FTA RESEARCH

FEDERAL TRANSIT ADMINISTRATION

Promoting Employment in Transit Construction Projects by Members of Minority and Low-Income Communities

JULY 2013

FTA Report No. 0080
Federal Transit Administration

PREPARED BY
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University of Southern California

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Metric Conversion Table

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liter	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: volumes greater than 1000 L shall be shown in m^3				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C

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13. ABSTRACT

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ABSTRACT

This project had a dual aim: understanding the extent to which local low-income and minorities participate in employment generated by transit projects and identifying practices to increase their participation. We developed four in-depth case studies of recent light rail projects: Santa Clara Valley Transportation Authority's Vasona Project, Dallas Area Rapid Transit's Green Line, St. Louis Metro's St. Clair Extension, and Los Angeles Metro's Gold Line Eastside Extension. We determined that in three out of the four cases, local minority and low-income workers obtained a fair proportion of construction jobs generated. We conclude that a complex interplay of a transit agency's size and construction activity, demographic profiles and trends within metropolitan areas, contracting methods and the relative integration of regional construction markets, and/or unions influences who gets the jobs in transit construction. We identified areas of concern and opportunity for best practices in minority and local hiring in transit projects: contracting mechanisms, outreach to ensure disadvantaged business enterprises (DBE) participation in transit projects, financial assistance for DBE firms, ensuring contractor compliance with DBE programs, and agency leadership. Under these categories, we identified 14 best management practices (BMPs) and prepared a manual for transit agencies. For each of the BMPs, we discuss the background for the practice, followed by the rationale for the practice and examples. We also document the research support for the practices.

EXECUTIVE SUMMARY

Introduction

The purpose of this project was to research, identify, and highlight strategies that promote employment in transit construction projects for members of minority and low-income communities. There are two basic questions addressed in this report: 1) To what extent do low-income and minority community members participate in the employment and other benefits of transit capital projects, and 2) How might their share be increased? We address these questions through four case studies of rail transit construction projects around the U.S., located in Dallas, Los Angeles and San Jose, and St. Louis. These cases were selected to represent different local labor market environments, extent of minority and low-income population, geographic region, and other criteria. Our case studies included assessments from field visits, data collection and analysis, and in-depth interviews of transit agencies, prime contractors and subcontractors, union representatives, training providers, and other community-based organizations. We conducted a comparative analysis of the cases to identify important factors that influence who obtains the jobs in transit projects. The study culminated with the identification of best management practices (BMPs) aimed at increasing opportunities for minorities and low-income persons in local communities and disadvantaged business enterprises.

This report is organized in 11 sections. Section 1 introduces the research project and its organization. This is followed by a literature review in Section 2 that examines labor demands associated with transit projects, the related contracting and hiring process, data related to the participation of low-income and minority workers on these projects, and factors that influence this participation. Section 3 identifies case study selection criteria, a shortlist of projects selected for further case study, and selected characteristics. Section 4 provides a brief introduction to the methods used and the organization of the case studies. Sections 5 through 8 provide a summary of the of the case studies conducted in San Jose, Dallas, St. Louis, and Los Angeles as part of FTA's New Starts Program. These case studies provide an in-depth analysis of the projects with a discussion of the contracting process, minority participation in transit construction, and promising practices identified in the cases. Section 9 compares the case studies and provides critical reflections on the major variables that effect the hiring of minority, low-income, and local workers in federally-supported transit construction. Section 10 presents a manual of tools—best management practices—to assist transit agencies in training and employing minority and low-income persons on transit projects in their communities. Finally, Section 11 provides a discussion of the survey of transit agencies on best practices and feedback from the agencies studied.

Rationale

Equity in the provision of public transit services is a major public policy objective. Rail transit investments are financed by federal, state, and local subsidies; therefore, the equity impacts of these investments are worthy of examination. Rail transit projects are justified, in part, by their direct and indirect employment impacts, and federal legislation calls for collaboration among governments and other interested parties "to help leverage scarce training and community resources (and) to help ensure local participation in the building of transportation projects."[1] As the federal agency that provides financial and technical assistance for local public transit systems, the Federal Transit Administration (FTA) shares responsibility for ensuring that the goal of achieving equity in transit investment is met. A major way in which FTA ensures minority and low-income participation in transit projects is through the Disadvantaged Business Enterprise (DBE) Program. This program, in effect since 1983, requires local recipients of federal transportation funds to award at least 10 percent of those funds to DBE firms [2]. According to the U.S. Department of Transportation,

> DBEs are for-profit small business concerns where socially and economically disadvantaged individuals own at least a 51% interest and also control management and daily business operations. African Americans, Hispanics, Native Americans, Asian-Pacific and Subcontinent Asian Americans, and women are presumed to be socially and economically disadvantaged. Other individuals can also qualify as socially and economically disadvantaged on a case-by-case basis.

The Contracting Process and the Role of DBEs and Unions

Section 2 situates the research in the broader context of labor markets and minority and low-income participation in transit projects. Transit capital projects are implemented by private contractors. The contracting of transit projects is a complex process often involving several prime contractors and dozens of subcontractors. We examined the phases of planning, design, and construction of light rail projects and the skill sets required for the occupations involved in these phases, as well as the typical budget allocations for different phases of a project. We concluded that for the purpose of determining the extent to which low-income and minority benefit from the jobs generated by light rail projects, the construction phase of light rail projects is the most important phase to analyze for two reasons: the construction phase typically amounts to the largest portion of the total light rail project budget, and a sizable portion of construction work

[1] Excerpted from Section 1920 (Transportation and Local Workforce Investment) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (Public Law 109-59, 119 Stat.1144).

involves work either without prior skill or a college education or can be learned on the job through apprenticeships. In states with unionized labor, labor unions add complexity to the task of determining the extent to which local minority and low-income members participate in transit projects. In such states, unions are major conduits for recruitment and training of minority, low-income, and local workers for transit construction jobs. This finding expanded our research into the role of unions in transit employment.

Regardless of the type of contract used in federally-funded transit projects, a major way in which transit agencies ensure the hiring of minority and low-income people in transit projects is through the participation goals of disadvantaged, minority, and women-owned business enterprises (D/M/WBEs) that agencies set in their contracts. Establishing goals and objectives for their DBE programs motivates contractors and agencies to use good faith efforts to meet and exceed those goals [14, 15]. During our research, it became clear that the setting of DBE goals is not only fundamental to hiring of disadvantaged minority small businesses and instrumental in the hiring of minority workers, but also a major way of gauging the employment of minority workers in transit projects. As a result, the major objectives of the research expanded to include the participation of DBE firms in transit projects in addition to the hiring of local low-income and minority workers.

Selecting Case Studies

In Section 3, to determine the extent to which minority and low-income populations benefit from the jobs generated by light rail projects, we sought to analyze a set of recent light rail projects from across the country. To select a diverse set of cases, we began with a recent set of New Starts projects funded by FTA. We then analyzed these cases in terms of their socio-demographic characteristics, e.g., race and ethnicity, income, poverty, labor force participation, construction employment, etc. We developed a set of indicators for the Metropolitan Statistical Areas (MSAs) of the projects-based on 2000 census data. This analysis resulted in the selection of 12 recent or ongoing projects. We further analyzed the 12 cases to arrive at a smaller set of cases that would be representative of the funded FTA light rail projects across the country, with geographical variation and differences in metropolitan socio-demographics and other variables. The indicators we developed helped us characterize important socio-demographic and economic variables in the urban context of the light rail projects. For example, we found that there were wide variations in the ethnic/racial composition of the construction labor market among the metropolitan areas of the projects. To illustrate, in 2000, in the St. Louis MSA, 93.3 percent of construction workers were Non-Hispanic White, in contrast to the more diverse ethnic/racial mix in the Los Angeles, Dallas, and San Jose MSAs. Such findings alerted us to potential entrenched problems in implementing programs designed to increase the employment of minorities in transit projects. This analysis and

consultation with the transit agencies led us to examine four projects: Santa Clara Valley Transportation Authority's (VTA's) Vasona Light Rail, DART's Green Line, St. Louis Metro's St. Clair Extension, and Los Angeles (LA) Metro's Gold Line Eastside Extension.

Case Study Methods and Organization

Section 4 reviews the methods and the organization of the case studies. Methods included field visits, data collection and analysis, and in-depth interviews of transit agencies, prime contractors and subcontractors, union representatives, training providers, and other community-based organizations. Each of the cases provides brief profiles of the agency, its urban context, and the light rail project. The cases then discuss the contracting method, the DBE goals set, the transit agency's outreach to DBEs and the community, DBE experience on projects, and their perception of the DBE program. Sections on minority and low-income employment experience follow, which include discussions of the role of unions, transit agency and contractor in ensuring opportunities. In states where labor is unionized, we focus on trade unions and their minority composition, recruitment practices, and opportunities for mobility. We also reflect on the extent to which minorities and low-income people obtained the jobs in the construction of the light rail project. This section relies primarily on interviews with union representatives, agency officials, contractors, subcontractors, and DBEs. We conclude the case study sections by identifying some promising practices in contracting or outreach to DBEs or local minority or low-income populations. Many of these are the basis for the best management practices (BMPs) identified in the manual presented in Section 10.

Santa Clara VTA's Vasona Light Rail Project

VTA is ranked as a medium-size transit agency among the 50 largest transit agencies in the U.S. It serves the high-income and diverse Silicon Valley region, which was expanding during the period of 1990–2000. The minorities predominant in the urban region were Asian and Hispanic, with a combined total of 47 percent for the MSA. Although the construction employment of the MSA and County was lower than the nation's, the City of San Jose's rate mirrored the country's at 7.3 percent. Significant, too, is that the minority construction labor force for the MSA was 47 percent in 2000.

The Vasona light rail project, with a cost of $313M, added 5.3 miles and 8 stations to its light rail system. It aimed at providing an alternative transportation mode to a major congested highway that could not be easily expanded. The Vasona project was divided into 20 construction contracts, and we analyzed

the contracting process for one of these, the Hamilton Avenue Crossing. In the areas of contracting and outreach to DBEs, the case study documents several promising VTA practices. According to agency and union officials, about 80 percent of the jobs in light rail projects are union jobs, and the trade unions have high percentages of Hispanic workers. The percentages vary, with the unions with fewer requirements in terms of education or skill reporting greater percentages of minorities in membership. We estimate that Hispanics, if not Asians, obtain a large proportion of light rail construction work, since they are well represented in the trade unions, especially in the Laborers Union.

In the Vasona case, we identified several promising practices, some more focused on DBE participation and others on directly increasing minority and low-income employment. A promising contracting practice is VTA's unbundling of the large Vasona light rail line construction contract into 20 prime contracts and identifying bid items for which the agency had determined that an adequate number of potential DBE firms could perform the work. This is promising management practice that is recommended by federal regulations and which is included in the Manual. VTA's outreach and services provided to small businesses and DBE was also noteworthy. VTA's Office of Small and Disadvantaged Businesses provides technical assistance to DBEs to enable them to navigate contracting in 13 regional transportation agencies and also provides DBE certification workshops. It operates various information and communication programs, such as e-mail blasts of subcontracting opportunities or a phone line for assistance in identifying DBE subcontractors for specific contracts.

The San Jose region unions also engaged in several promising outreach practices. The Trades Council's non-profit Santa Clara County Construction Careers Association (S4CA) provides a range of outreach activities to middle schools, high schools, and community colleges in the region. The Trades Council's sponsorship of community college and college programs for construction management is a management practice aimed at ensuring a career path for young people entering the construction trades. The bachelor's degree in Construction Management offered through San Jose City College and the National Labor College, in particular, provides college credit for apprenticeship training and would facilitate worker mobility from journeymen to management for both minority and non-minority workers.

DART's Green Line Project

DART is a medium-size transit agency serving the diverse and high growth Dallas–Fort Worth area. The MSA experienced a 29.4 percent growth rate during the 1990–2000 period, placing this growth in the top 20 of the 100 largest metropolitan areas in the country. This growth rate and economic development objectives for the region motivated the light rail projects that DART has undertaken since that period. The Green Line was the longest rail construction

project in the U.S. at the time and the largest project we examined. Its total cost was $1.8B and extended DART's rail system along 27.7 miles and 20 stations.

DART serves a diverse population, with African Americans making up 20 percent and Hispanics 37 percent of the county's population, with somewhat larger percentages in Dallas City. Construction employment in the region was more than 50 percent higher than the country's, reflecting the region's robust growth and development. Significant for the prospects of low-income and minority employment in transportation projects is that minorities employed in construction in 2000 was 44 percent.

Most construction work in Texas is non-union and, thus, contractors recruit their own workers. DART's innovative contract terms requiring outreach and results as well as the contractor's efforts resulted in very high local hiring, estimated at 95 percent by both DART and the prime contractors. It is reasonable to conclude that given the relatively integrated construction labor market in the Dallas region and the vigorous efforts on the part of DART and the prime contractors, close to half of the jobs on the project went to local minority workers

The agency's contracting process for the Green Line was an innovative Construction Manager/ General Contractor (CM/GC) at-risk and best-value contract with strong local outreach, hiring, and mentorship elements. This type of contract can go beyond the traditional D/M/WBE participation goals to allow the inclusion of value-added features, including encouraging the formation of joint ventures with D/M/WBE firms, specific outreach efforts, or mentor-protégé programs. Joint venture (JV) opportunities, in particular, enable small firms to grow and become medium-sized or gain valuable experience needed to compete for larger contracts. For example, one of the JV partners, Carcon, went from a company of 21 employees, mostly craftsmen, to 82 employees, many highly-paid project management staff. The mentor-protégé program incorporated in the Green Line contracts ensures that as D/M/WBE firms gain in responsibility and expand their size, the more experienced mentor provides guidance and resources and ensures high-quality performance.

DART's Memorandum of Understanding (MOU) with minority chambers of commerce in 2001 and renewable every five years was the likely seed of the Green Line contract innovations. Through this MOU, DART established an ongoing relationship with minority chambers of commerce where many minority and small business construction contractors are active. This relationship is likely to have been instrumental in obtaining public support to use a different kind of contracting for the Green Line from the more common Design-Bid-Build.

The community outreach initiative in the Archer Western Brunson Carcon JV contract included the use of local apprenticeship programs for hiring and recruiting workers as well as special outreach to local high schools. A similar

initiative in the Archer Western Herzog JV contract required recruitment from minority, women, and community organizations, internships for minority and women students in colleges and universities, and outreach to minority and women chambers of commerce and similar organizations.

St. Louis Metro's St. Clair Extension Project

ST. Louis Metro is a medium-size transit agency serving the bi-state metropolitan area of St. Louis, Missouri–Illinois. The region is a classically segregated region with a majority African American inner city and majority white suburban area. While the MSA as a whole experienced modest growth in the 1990s, the population of the cities shrank by over 12 percent in St. Louis and 22.8 percent in East St. Louis. The region's demographics are a study in contrast—an MSA with a lower minority population than the nation's and majority African American populations in St. Louis (50.6%) and East St. Louis (98%). The contrast was also evident for other socio-economic indicators, including median income, poverty rates, and unemployment. In terms of construction employment, while the MSA rate of employment in construction reflected the average for the country, lower rates held for St. Louis and construction employment in East St. Louis was 1/3 the nation's rate.

The St. Clair Extension Project extended the St. Louis Metro system 17.4 miles and added 9 stations at a total cost of $$243.9M. St. Louis Metro used a design-bid-build contract for the project, and a traditional Project Labor Agreement. The DBE goal for the project as a whole was 25 percent, which the contractor met, but the DBE goal was race-neutral, and the contractor was able to meet the goal with a large participation of women-owned and not minority DBEs. The region's labor force is unionized and whether minority local workers obtain jobs in transit construction depends on the extent of racial integration within the unions. All sectors interviewed recognized that union membership does not reflect the proportion of African Americans in the region, let alone St. Louis. As a result, in this project, we can estimate that local low-income minority workers did not get a fair share of the construction jobs generated by the project.

This case made clear the need to monitor the use of DBE firms by contractors to ensure that firms are not dropped once a contract is signed and to put pressure on contractors and unions to attain the minority and women goals set for the project. Through lessons learned, one promising practice emerged from this case. In addition, St. Louis Metro could benefit from alternative contracting methods to the traditional lowest bidder awarding of contracts by which the agency abides. A best value contract approach, for example, would enable the agency to take into account the prior performance of prime contractors and require vigorous outreach and hiring of minority and community residents. A promising practice identified in this case was the establishment of the non-profit

organization, ACCESS. Started by St. Clair Metro, it provides effective outreach, recruitment, and access to training, as well as advocacy for minority and women in the construction trades. It can serve as a model for other transit agencies and regions.

LA Metro's Gold Line Eastside Extension Project

LA Metro is already the third-largest transit agency in the country in a highly-diverse, still-growing urban region with proverbial traffic congestion. Metro is pursuing a huge rail transit expansion through the next 20 years, funded largely by voter-approved, own-source sales tax revenues. The Gold Line Eastside Extension project added 6 miles and 8 stations to Metro's light rail system at a total cost of $610M, extending service to downtown Los Angeles to traditionally low-income Latino communities. The Los Angeles region is diverse, with a majority Hispanic population in both the city and the county and sizable percentages of Asian Americans and African Americans. Hispanics are well-represented in the construction trades and in the unions, but African Americans, Asian Americans, and women are under-represented.

The contracting process included an innovative Metro Jobs Program through which the selected prime contractor agreed to Metro's policy that 30 percent of the work hours on the project would be from an area identified as the Eastside Project Community, an area in the county within a five-mile radius of the alignment. The program also requires the prime contractor to monitor and provide quarterly reports to Metro. The Metro Jobs Program of the Eastside Extension Project ensured that local hires in a predominantly minority region would benefit from employment opportunities in the light rail project. The 30 percent requirement for workers and worker hours in a heavily-unionized region opened up union apprenticeships to local applicants.

In general, the unions representing workers in the Los Angeles region already have a majority Hispanic membership, but African Americans and Asian Americans and women are under-represented in the unions. We estimate that the project exceeded its target of 30 percent local low-income and minority participation.

Metro's proactive outreach through the Transportation Business Advisory Council (TBAC) and Metro's Diversity and Economic Opportunity Department (DEOD) that mentors and/or assists D/M/WBE firms are promising practices to ensure continuing access and communication with DBEs and small businesses.

Comparative Analysis of the Cases

The four cases examined differed in multiple ways: agency size, metropolitan characteristics, size of project and contract, contracting method, DBE goals, and the extent of labor unionization, among important factors. The case studies provide accounts of complex projects led by agencies ranging from the third-largest in the country, LA Metro, to medium-size agencies that ranked towards the middle of the 50 largest transit agencies in the country. They range from more integrated labor markets or labor unions to relatively segregated labor unions and markets. They employed a range of contracting methods as well as distinctive ways of using contracting methods to increase DBE participation and to increase participation of local workers in transit.

The case studies suggest, however, that neither the size of the agency nor even the size of the project is as important in determining who gets the jobs as is the agency's recent and future transit system expansion. If an agency, such as LA Metro, is undergoing major expansion, we can expect a larger influence of its minority hiring practices on the greater construction labor market and/or on the demographic composition of unions. On the other hand, in the case of transit agencies, such as St. Louis Metro, whose transit fleets may be considerable but which are not experiencing ongoing light rail transit expansion as in the LA Metro case, their minority hiring practices are likely to have less influence on their construction labor markets or unions. In addition, the lack of sustained construction work in transit in a transit agency such as St. Louis Metro makes it difficult for minority workers, even after gaining entry into unions, to remain in the trade, since the overall demand for work is low and it is difficult for apprentices to complete apprenticeships and become journeyman. As reported by our interviewees in St. Louis, often, minority apprentices drop off the union lists discouraged by the lack of opportunities.

The relative integration of the construction labor market and of unions are also important determinants of who gets the jobs in transit construction. In this case, when comparing the MSA's minority populations to minorities in construction, the St. Louis MSA was the least integrated.

The cases indicate that different contracting methods can achieve similar results. Santa Clara's VTA used a traditional design-bid-build awarded to lowest bidder, but with its knowledge of D/M/WBE firms in the region and by breaking up the project into 20 prime contracts, it was able to provide many more opportunities for smaller firms and more DBE firms in the overall project. While DART, through a General Manager/General Contractor (GM/GC) at-risk contract with best-value features, was also able to increase DBE participation. Beyond this, it was able to increase outreach to increase minority and women workers on the project. In addition, DART, through its mentor-protégé program, helped to

improve the capacity and experience of its DBE protégé firms and to increase their size.

In unionized states, unions are the major gateways to jobs in transit construction. In non-unionized contexts, such as in DART's Green Line, all workers access transit jobs primarily through contractors' outreach and training. Thus, the extent to which minorities and women obtain the jobs depends on either the extent to which unions are integrated along racial, ethnic, and gender lines or the extent to which prime contractors and subcontractors recruit women and minority workers.

Local hire policies, such as the one LA Metro incorporated in its Gold Line Eastside Extension Project, can be used to ensure that contractors conduct vigorous local outreach to low-income and minority workers and that unions open up apprenticeships to these groups. Such local hire programs can be incorporated into Project Labor Agreements (PLAs). PLAs are primarily structured between a transit agency and groups of trade unions to establish a process for conflict resolution to avoid work stoppages or strikes. But such agreements can involve the local community in which a project takes place and spell out defined benefits for the community in terms of access to jobs. PLAs were prohibited in federally-funded projects from 2001–2009 by a presidential Executive Order, which was revoked in 2009. In 2012, Metro adopted a policy requiring PLAs in all rail projects and incorporating a Construction Careers Program in the policy. Such local hire policies embedded in PLAs directly engage both contractors and unions in the effort to increase the employment of local low-income and minority workers in transit construction.

In conclusion, a complex interplay of the size and activity of transit agencies, demographic profiles and trends within metropolitan areas, contracting methods, and the relative integration of regional construction labor markets or unions influences who gets the jobs in light rail construction.

Manual of Best Management Practices

Our case study research led us to identify several areas of concern and opportunity for identifying best practices in minority and local hiring in transit projects: contracting mechanisms, outreach to ensure DBE participation in transit projects, financial assistance for DBE firms, ensuring contractor compliance with DBE programs, and agency leadership. We organized the BMPs identified under these categories, as shown in Table ES-1. For each of the BMPs, we discuss the background for the practice, followed by the rationale for the practice and examples.

Table ES-1

Best Management Practices for Transit Agencies

BMP Areas	BMP #	BMPs
Contracting	1	When using design-bid-build contracts and selecting on basis of lowest bidder, break large construction contracts into smaller contracts.
	2	When labor force is unionized, transit agency can structure and use PLAs before bidding to ensure increased opportunities for minorities, low-income, and local outreach and apprenticeships.
	3	If transit agency uses a design-build or a CM/GC approach, include best-value approach to incorporate local hiring program or mentorship opportunities for DBE firms.
Assistance to DBEs to Participate in Contracts	4	Develop effective ongoing public outreach program to DBE firms and prime contractors to ensure that such firms have adequate notice and time to bid on sub-contracts.
	5	For large and medium-size projects or agencies, establish full-time DBE Coordinator to ensure ongoing outreach and support for such firms.
	6	Partner with third-party entities to facilitate DBE inclusion in contracts.
	7	Partner with contractor associations or non-profit organizations to increase mentorship opportunities for DBE firms.
Financial Support for DBE Firms	8	Partner with local banks to improve access to capital, e.g., through a loan mobilization program, for DBE firms participating in transit contracts.
	9	Ensure that DBE firms receive prompt payments; explore feasibility of advance payments for such firms.
	10	Develop bonding program for DBEs participating in transit projects.
Ensuring DBE Goal Compliance	11	Monitor data on local employment and DBE participation.
	12	Disseminate project results on local and minority hiring and DBE participation.
Agency Leadership	13	Penalize violation of DBE Program goals.
	14	Monitor agency leadership in promoting diversity and DBE participation.

Our case study research provided several examples of best practices in contracting, including VTA's Vasona project, which unbundled a large construction project into multiple smaller ones; LA Metro in its Gold Line Extension project incorporated a local hiring policy in its design-build contract; and DART's Green Line project, which included a best-value approach in its GM/GC contract with strong local hiring and DBE mentorship requirements. With respect to best practices in assisting DBEs to participate in transit contracts, our study found effective public outreach programs in all of our case studies, e.g., Santa Clara VTA had a full-time DBE coordinator. All the agencies we studied partnered with third-party agencies to expand their outreach efforts, e.g., DART partnered with minority chambers of commerce, LA Metro partnered with the Transportation Business Advisory Council it helped to establish. Although our study documents the expressed need of DBEs for financial support, we did not find examples of best practices in this area among our cases and, instead, drew

best practices from recent studies. DBE goal compliance was an issue brought up by many DBEs we interviewed in our case studies. LA Metro's local hiring agreement for the Gold Line Extension provided a best practice for documenting local and minority hiring. However, we did not find examples of public and accessible dissemination of such data or of penalizing DBE program violations. We included BMPs on these issues-based on recent studies discussed below. Our final BMP identifies agency leadership as crucial, in particular, for contracting mechanisms that expand opportunities for the local hiring of low-income and minority workers and nurturing DBE firms. Several of our case studies—DART, LA Metro, and Santa Clara—provide examples of agency leadership that resulted in innovative contracting and program features.

In addition, we supplemented our field observations with a literature review on best practices. Particularly relevant and timely, although focused on highway projects, were the findings of the 2008 and 2009 surveys supported by the Transportation Research Board (TRB) National Cooperative Highway Research Program (NCHRP) of selected state Department of Transportation DBE program managers across the states [169],), as well as an NCHRP Synthesis Report [170] that presented the results of a survey of 47 out of 50 states conducted of state DOT offices of Civil Rights or Equal Opportunity to identify the implementation of race-neutral measures used by DBE programs.

Dissemination and Feedback on the Manual

The manual of BMPs is available in PDF form on the website of the METRANS Transportation Center. The METRANS Transportation Center is a primary source for transportation research in Southern California and ensures that the manual will be widely disseminated. Further, an announcement of the availability of the manual was sent by e-mail to the 50 state DOT DBE liaisons with a request to provide feedback.

To obtain feedback on the manual, we developed an Internet survey for diversity and DBE liaison officers. The survey asks respondents whether their agencies have had experience with the practices identified in the manual and, if so, whether such practices where implemented successfully and to what they attribute the success or failure of the practices. In addition, we asked respondents to identify the top 3 of the 14 BMPs that they believed were most important to achieve the goal of increasing local minority and low-income employment and DBE participation in transit construction projects and whether there were any other practices not identified in the manual they believed were best practices. The responses to the survey are meant to establish the relative experience with the 14 practices among transportation agencies, the reasons respondents provide for the success or failure of the practices, and what respondents consider top practices.

We contacted the state DOT DBE Liaisons identified on the U.S. DOT website through e-mail, announcing the availability of the manual at the METRANS site and asking them to respond to the survey and provide feedback. We also notified by telephone and e-mail our case study agencies. At the time of this report's publication, we had obtained a small sample of responses to the survey, a total of seven—five from state DBE officials and 2 from our case study agencies. The responses were encouraging, with most respondents indicating experience with several of the BMPs, but most indicating lack of experience with more than half of the BMPs. This suggests that the BMPs identified are relevant but not yet common practice.

Since the sample of agencies that have responded is small, we will continue to notify agencies of the availability of the manual and the survey over the summer of 2013. Once we obtain a larger sample, we will analyze the results and prepare a paper summarizing them. We will make the results available as an addendum to the manual on the METRANS site in the fall of 2013.

SECTION 1

Introduction

Overview

The purpose of this project was to research, identify, and highlight strategies that promote employment in transit construction projects for members of minority and low-income communities. There are two basic questions addressed in this report: 1) To what extent do low-income and minority community members participate in the employment and other benefits of transit capital projects, and 2) How might their share be increased? We address these questions through four case studies of rail transit construction projects around the U.S.—Dallas, Los Angeles, San Jose, and St. Louis. These cases were selected to represent different local labor market environments, extent of minority and low-income population, geographic region, and other criteria. Our case studies included assessments from field visits, data collection and analysis, and in-depth interviews of transit agencies, prime contractors and subcontractors, union representatives, training providers, and other community-based organizations.

Social Justice and Federal Transit Investments

Equity in the provision of public transit services is a major public policy objective. Rail transit investments are financed by federal, state, and local subsidies; therefore, the equity impacts of these investments are worthy of examination. Rail transit projects are justified, in part, by their direct and indirect employment impacts, and federal legislation calls for collaboration among governments and other interested parties "to help leverage scarce training and community resources (and) to help ensure local participation in the building of transportation projects."[1] As the federal agency that provides financial and technical assistance for local public transit systems, the Federal Transit Administration (FTA) shares responsibility for ensuring that the goal of achieving equity in transit investment is met. A major way in which FTA ensures the minority and low-income participation in transit projects is through the Disadvantaged Business Enterprise (DBE) Program. This program, in effect since 1983, requires local recipients of federal transportation funds to award at least 10 percent of those funds to DBE firms [2]. According to the U.S. Department of Transportation (DOT)

> DBEs are for-profit small business concerns where socially and economically disadvantaged individuals own at least a 51% interest and also control management and daily business operations. African Americans, Hispanics, Native Americans, Asian-Pacific and Subcontinent

> Asian Americans, and women are presumed to be socially and economically disadvantaged. Other individuals can also qualify as socially and economically disadvantaged on a case-by-case basis. [3]

The relationship of transit investment to economic development and neighborhood revitalization is well-represented in the academic literature (for recent summaries, see [4, 5]. Studies have discussed the equity and environmental justice aspects of public transit investment and policy, such as fare policy [6, 7], rail transit investment [8], and transit access [9, 10]. Other studies have provided guidelines for promoting positive local land use and economic effects [11, 12]. In contrast, the employment impacts of transit construction projects on minorities and economically distressed communities are unclear. Given that $10.5B was spent in 2010 alone on the construction of transit facilities, guideways, stations and administrative buildings[2] [13], the employment impacts of transit construction have important public policy implications.

Given FTA's vision of thriving communities that grow around transportation investments as well as a commitment to equal opportunity employment, it is important to document both the extent to which low-income and minority individuals directly participate in transit projects in their communities and also the factors that may influence this participation. We examined the direct employment outcomes of rail transit projects to determine the extent to which minority and low-income workers are the beneficiaries of transit construction projects and the factors that influence employment on these projects. Based on the results, we identified ways that barriers to employment on transit construction projects may be reduced.

The Contracting Process and the Roles of DBEs and Unions

Private contractors implement transit capital projects. The contracting of transit projects is a complex process, often involving several prime contractors and dozens of subcontractors. In states with unionized labor, labor unions add complexity to the task of determining the extent to which local minority and low-income members participate in transit projects. Regardless of the type of contract used in federally-funded transit projects, a major way in which transit agencies ensure the hiring of minority and low-income people in transit projects is through the disadvantaged, minority, and women-owned business enterprises' (D/M/WBEs or DBEs) participation goals that agencies set in their contracts. Establishing goals and objectives for their DBE programs motivates contractors and agencies to use

[2] Together, these are categorized by APTA under "facilities" and account for the largest share (58.9%) of transit project capital expenses. Additional capital expenses include "rolling stock" ($5.2B or 29.2% in 2010) and "other vehicles, fare revenue and collection equipment, systems and other" ($2.1B or 11.9% in 2010.)

good faith efforts to meet and exceed those goals [14, 15]. During the conduct of our research, it became clear that the setting of DBE goals is not only fundamental to hiring of disadvantaged minority small businesses, and instrumental in the hiring of minority workers, but also a major way of gauging the employment of minority workers in transit projects. As a result, the major objectives of the research expanded to include the participation of DBE firms in transit projects in addition to the hiring of local low-income and minority workers. In states with unionized labor, unions are major conduits for recruitment and training of minority, low-income and local workers for transit construction jobs. This finding expanded our research into the role of unions in transit employment.

Project Design and Methodology

Table 1-1 identifies the initial objectives or tasks of the project, indicates changes to the tasks during the course of the research, and introduces the sections in this report that address the tasks.

Table 1-1 *Research Tasks, Sections Addressing Tasks, and Revisions*

Task	Proposed Tasks	Sections Addressing Tasks	Revisions
1	Identify transit construction projects that are scheduled to begin or are ongoing between 2006 and 2009 and identify subset of these projects (or portions of these projects) that are taking place in jurisdictions with disproportionately high numbers of minority and low-income residents.	Section 2	None
2	Identify education levels, prior work experience, skill sets, and employment and career expectations of minority and low-income populations living in jurisdictions.	Section 3	None
3	Identify types of employment opportunities that accompany projects during and after construction as well as education, skill sets, and experience required for these positions.	Sections 2-3, incorporated in case study sections	None
4	Identify subset of these employment opportunities that best match existing education and skill sets of the persons in jurisdiction and analyze opportunities and barriers for hiring community residents to fill these jobs.	Incorporated in case study sections	Revised focus on DBEs, local preference programs, labor union recruitment and training
5	Identify subset of employment opportunities that community residents could be trained to perform and analyze opportunities and barriers for training community residents to apply for these positions.	Incorporated in case study sections	Revised focus on DBEs, local preference programs, labor union recruitment and training
6	Identify specific instances where transit agencies and/or local government have employed local minority and low-income residents on transit projects in their communities and discuss lessons learned from these examples.	Incorporated in case study sections and Section 10, Manual of Best Practices	None
7	Develop and disseminate technical assistance tools to assist transit agencies and metropolitan planning organizations in training and employing minority and low-income persons on transit projects in their communities.	Section 10	None
8	Evaluate effectiveness of technical assistance tools in demonstration projects.	Section 11	Revised Internet survey, follow-up phone survey of case studies

Task 1, identifying transit construction projects taking place in jurisdictions with high levels of minority and low-income populations, and Task 2, identifying socio-economic characteristics of minority and low-income populations in transit project areas, were carried out early in the project, and the results of the analyses are presented in Section 3. Information on Task 3, identifying employment opportunities accompanying transit projects, and Task 6, identifying instances of transit agencies employment of local minority and low-income populations, are incorporated in the case study sections.

As the project team increased its understanding of the complex contracting and of labor union recruitment and training, we shifted the individual worker focus of Task 4, identifying subset of employment opportunities matching local minority and low-income residents skill sets, and Task 5, identifying the subset of opportunities that local minority and low-income residents could be trained to perform. Instead, our interest in local minority and low-income employment focused on labor recruitment and training, as well as DBE participation in the transit projects. Our discussion of these issues is incorporated in the case studies.

Task 7, the set of technical assistance tools, was developed from our case studies and supplemented by a literature review found in Section 10. The manual of tools incorporated in Section 10 is available on the METRANS Center website,[3] and an announcement of the manual's availability was sent to the major transit agencies in the country. Task 8 called for the implementation and evaluation of the effectiveness of best management practices in two transit agencies. Experience with the projects studied made clear that our original plan was unrealistic. Given the time limitation of our study, we could not obtain agreement from two transit agencies to implement a set of best management practices and to then study the results. Instead, we designed and conducted an Internet survey of transportation agencies' diversity officers to determine their experience with the tools identified in our manual, the conditions that determined their success or failure, and the measures that they believe would most increase minority and low-income employment in transit projects. The survey and preliminary results are discussed in Section 11.

Most of the research objectives are addressed through four case studies of rail transit construction projects around the U.S.—Santa Clara Valley Transit Authority's (VTA's) Vasona Light Rail Extension, Dallas Area Rapid Transit's (DART's) Green Line, St. Louis Metro's St. Claire Extension Project, and,

[3] The METRANS Transportation Center was established in 1998 as the first University Transportation Center in Southern California. Its primary objectives are to foster research, train the next generation of the transportation workforce, and disseminate information, best practices, and technology to the professional community. Its website is http://www.metrans.org/.

Los Angeles (LA) Metro's Gold Line Extension. The cases were selected to represent different local labor market environments, extent of minority and low-income population, geographic region, and other criteria. Our case studies included assessments from field visits, data collection and analysis, and in-depth interviews of transit agencies, prime contractors and sub-contractors, union representatives, training providers, and other community-based organizations. Initially, the project set out to develop five case studies. After a promising field visit, we had to drop one case study, the Long Island East Side Access case, since we received no further collaboration from the transit agency due to delays that shifted project completion until 2019. Section 9 provides a comparison of the cases and draws conclusions.

Report Organization

This report is organized in 11 sections. Section 2 is a literature review that examines labor demands associated with transit projects, the related contracting and hiring process, the representation of low-income and minority workers on these projects, and factors that influence this representation. Section 3 identifies case study selection criteria, a shortlist of projects selected for further case study, and market area characteristics. Section 4 provides a brief introduction to the methods used and the organization of the case studies. Sections 5–8 provide a summary of the of the case studies conducted in San Jose, Dallas, St. Louis, and Los Angeles as part of FTA's New Starts Program. These case studies provide an in-depth analysis of the projects with a discussion of the contracting process, minority participation in transit construction, and promising practices identified in the cases. Section 9 compares the case studies and provides critical reflections on the major variables that effect the hiring of minority, low-income and local workers in federally-supported transit construction. Section 10 presents a manual of tools—best management practices—to assist transit agencies in training and employing minority and low-income persons on transit projects in their communities. Finally, Section 11 provides a discussion of the survey of transit agencies on best practices and initial feedback from some of the agencies studied and from several state DOT DBE liaison offices.

SECTION 2

Equity in Transit Construction: Who Gets the Jobs?

Introduction

As indicated in Section 1, equity in the provision of public transit services is a major public policy objective. Rail transit investments are financed by federal, state, and local subsidies; therefore, the equity impacts of these investments is worthy of examination. While there is a substantial literature on the equity of rail transit services, much less is known regarding the employment benefits of these projects as they are planned, designed and constructed. In this section, we explore the labor demands associated with transit projects, the related contracting and hiring process, the representation of low-income and minority workers on these projects, and factors that influence this representation. Preliminary results suggest that 1) there are many jobs associated with transit projects, but the most likely jobs available to locally-based low-income and minority workers are associated with the construction phase and involve low or moderate skill; 2) transit projects draw from a regional, if not larger, labor pool, such that the competition for jobs extends well beyond the neighborhoods that immediately surround the projects; and 3) the contracting process is complex, hierarchical, and subject to several important institutional influences that may affect the hiring of low-income and minority workers.

This section is organized as follows. First, we provide a brief literature review on transit investments and employment. We then provide some background on the transit construction industry, including a description of the major elements and phases of a transit project along with a characterization of the labor involved. Next, we discuss the contracting process, especially to provide background on the representation of minorities and minority-owned firms in transit construction. Then, we discuss issues that pertain to minority and low-income employment and offer some preliminary observations on how these influence participation on transit construction projects. Finally, we draw preliminary conclusions relevant to the second phase of our research.

Transit Investment and Employment

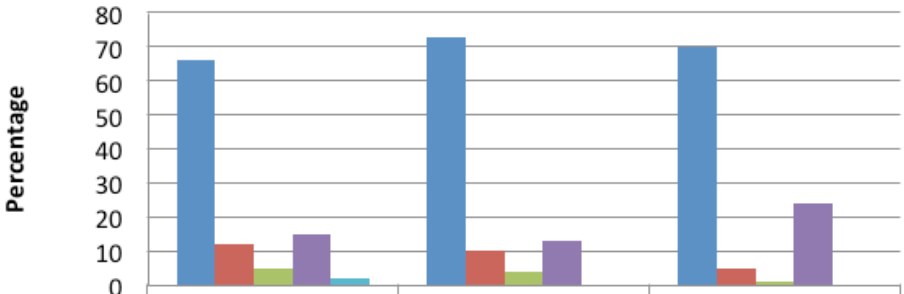
The U.S. has invested heavily in the revitalization and expansion of the nation's public transit systems. The American Public Transportation Association (APTA) reports that capital funding for transit systems from the federal government increased from $2.5B in 1988 to $7.3B in 2010. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) authorized $6.6B in federal funds through 2009 for the New Starts Program. These figures do not include funding from state, local, and other sources, which in 2010 accounted for 59 percent of the $17.8B total capital investment in public transportation [13]. These investments have been made on the promise of substantial societal benefits, including reduced congestion, energy consumption, and air pollution; reduced reliance on the private vehicle; and improved livability of cities. In addition, these investments are seen as particularly beneficial for minority and low-income households, who are more dependent upon public transit. Another aspect of benefits comes from the transit investment itself: who gets the planning and construction contracts associated with these large public infrastructure investments, and who gets the jobs?

The planning, design, and construction of a major rail facility requires many different types of workers and expertise. In terms of the average cost of such facilities, 2/3 to 3/4 of the funding is allocated to construction [16]. In addition, as we will discuss in a section that follows, the planning and design phase of transit projects involves a highly-skilled labor force who are typically engaged as professional consultants and, often, are not local. We, therefore, focus on the construction sector. Despite a long history of minorities working as laborers in the construction industry [17], the literature suggests that minorities and minority-owned firms are often unable to take full advantage of the employment opportunities offered by construction projects in their communities [18]. Swanstrom found that African Americans, in particular, were under-represented in construction jobs compared to Hispanic and White workers, and that Whites more often occupy positions of higher skill and pay [19].

National data are available to describe the construction workforce; however, we cannot isolate the portion of the sector that is involved in rail project construction. Overall, the construction sector accounts for 7.3 percent of those employed in all sectors in the U.S., accounting for 7.2 million employees and $2.4B in annual payroll [20]. Shares of U.S. population, the civilian labor force, and the construction workforce by race and ethnicity are depicted in Figure 2-1.

Figure 2-1

U.S. population, civilian labor force, and construction labor by race and ethnicity, 2007



	Population	Civilian Labor	Construction Labor
White	66	73	70
Black	12	10	5
Asian	5	4	1
Hispanic	15	13	24
Other	2		

"Other" refers to American Indians, Alaska Natives, and people and groups representing two or more races or ethnicities.

Sources: [21, Table 6; 22, Tables 1, 4]

While African Americans, Asians and Pacific Islanders, and Hispanics accounted for 10 percent, 4 percent, and 13 percent of the total workforce in the U.S. in 2007, these same racial and ethnic groups accounted for 5 percent, 1 percent, and 24 percent of those employed in construction [22], suggesting a disproportionately higher share of Whites and Hispanics in the construction industry than is represented by other groups. Further, only 2.4 percent, 1.4 percent, and 7.0 percent of the 2,781,624 firms identified by the 2007 Economic Census [23] were owned by African Americans, Asians and Pacific Islanders, and Hispanics, respectively. These shares of firm ownership are well below the representation of these groups in the population as a whole. It is unknown whether these patterns are reflected in the subsector for transit construction.

The construction industry's looming problem of an aging workforce may provide opportunities for low-income and minority workers on transit construction (and other) projects. The Bureau of Labor Statistics reported the average age of a construction worker was 47 years, and 240,000 workers would need to join the construction industry each year to keep pace with retirement and turnover in the future. Furthermore, Glover suggests that it is possible to increase minority employment and income more effectively in construction than is possible with most other minority-owned businesses [24]. As will be discussed in a later section, this may explain the ongoing focus on transportation agencies to promote the participation of low-income and minority workers and firms on construction projects.

The Transit Project Development Process

The potential for employment of low-income and minority members of the communities surrounding transit projects depends on several factors: 1) the number and type of jobs available, 2) the ability of low-income and minority workers to successfully compete for these jobs, and 3) the reliance of contractors on local labor markets. In this section, we explore the process involved in a "typical" transit project and the jobs variously associated with it. We also estimate the spatial distribution of workers vying for these jobs.

Results from this portion of our research are based on a literature review, some preliminary interviews with executives and managers of construction firms,[4] and analysis of various data available from the U.S. Census Bureau. They informed our case study analysis.

Elements and Phases of a Transit Construction Project

The first step in determining the number and type of jobs available is to understand the transit project process more generally. Constructing a transit project is a complicated endeavor, involving many resources and specialized skills to complete. The process involves many individuals and firms and spans many years.

To better understand the process, first we describe it in terms of major elements and phases. Elements describe discrete components of a project that may have different labor requirements to complete. Phases describe how these elements are more broadly grouped and distributed over time from project conception to completion. Phases, too, involve changes in labor requirements as the project proceeds.

In a description of the program schedule of a "typical light rail design/ construction project,"[5] Everly [25] lists from a transit agency's point of view the following "major elements" required to construct a rail line and associated facilities:

[4] Interviewees were selected by convenience to help guide our further research. Our sample was neither exhaustive nor randomly selected, and as such, it may be biased. Results, therefore, were preliminary and were not to be used as a basis for concrete recommendations to FTA or any transit agency on policy decisions.

[5] The Interstate MAX Light Rail Project was a $350M transit project in Portland, Oregon, that included 5.8 miles of track, associated structures, systems elements, the extension of an existing control facility, 10 stations, and 17 new vehicles. The project was completed under the authority of the Tri-County Metropolitan Transportation District of Oregon (TriMet).

- Draft and final environmental impact statements
- Project management plans/finance plans/contracting plans, etc.
- Design team procurement
- Preliminary and final engineering plans
- Right-of-way acquisition
- Intergovernmental agency agreements
- Federal, state, and local permits
- Owner-furnished materials
- Vehicle procurement
- Civil and systems construction team procurement
- Systems testing
- Simulated revenue
- Startup

These elements are listed largely in temporal order and can be broadly grouped into three broad phases: (1) planning and design, (2) construction, and (3) operation. Looking more closely at the work involved in these phases, we can further partition the labor market according to the number and type of workers involved in each. Figure 2-2 provides an overview of the elements of a transit project, grouped by phase. These phases and their elements are discussed further below.

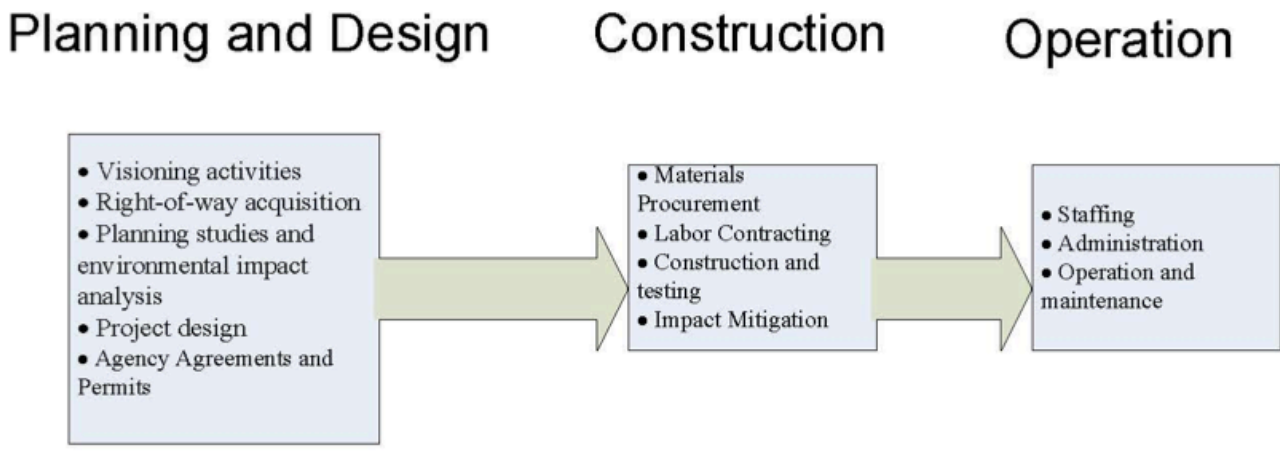


Figure 2-2 *Elements and phases of a transit project*

Planning and Design Phase

Planning and design work is largely conceptual involving local jurisdictions and stakeholder groups who often initiate the process. As part of a more comprehensive transportation planning process, local, state and federal agencies and their consultants generally engage in needs assessments and visioning activities, develop alternatives, preliminarily analyze them, select from among them, and vet preferred alternatives with relevant stakeholder groups. Costs, benefits, and impacts of the alternatives are often summarized in Major Investment Studies (MIS) when federal funding of the project is contemplated[6] and further analyzed in related environmental review documents. More specific design and engineering work follows once a preferred alternative is identified and necessary land is acquired. Various permits from regulatory agencies are also sought during this phase. The planning and design phase can be rather lengthy, often spanning many years. This phase also involves the greatest number of major elements—at least the first 7 of 13 elements named above.

Transit project planning is part of the regular transit planning process conducted by staff of local and regional planning agencies. This phase of the process also requires highly-skilled expertise in modeling, construction design and engineering, impact analysis, public participation, etc., most of which is obtained via outsourcing to professional consultants. These consultants need not be based in the area surrounding the project site; the required expertise is transferable and could involve contractors who reside hundreds or even thousands of miles from the project site itself. Thus, a given transit project seems unlikely to create substantial share of jobs to be filled locally during this phase. Given our research interest in "local participation in the building of transportation projects," we reason that employment associated with the planning phase should not be a central focus of our study. We do, however, recognize that enhancing participation of low-income and minority groups in this phase might be an important long-term goal of FTA and, therefore, the focus of other studies.

Construction Phase

The construction phase of the project involves putting plans into action. Construction teams are hired, materials are ordered and delivered, earth is moved, concrete is poured, structures are built, tracks and systems are installed and tested, and environmental impacts are mitigated, all according to specifications of the approved plan. According to Everly, construction itself occurs in various "contract segments, reaches, and areas" of the project [25]. A more detailed breakdown of construction elements are presented in Table 2-1.

[6] The MIS process was formally enabled as part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) as a means for improving transportation planning decisions and as an input to the National Environmental Policy Act (NEPA) process. MISs are also known as "subarea studies, corridor studies, and feasibility studies, to name a few" [26].

Table 2-1

Construction Elements of a Major Transit Project

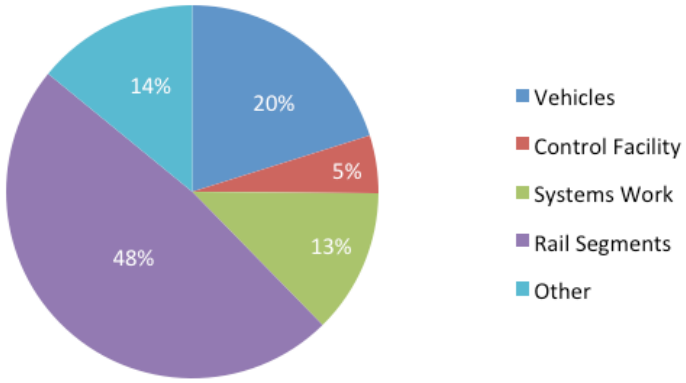
• Storm/sewer construction • Street and sidewalk work • Track construction • Overhead catenary and traction electrification (TES) construction • Signals/communications installation • Integrated testing • Simulated revenue • Station and artwork	• Bridge substructure • Superstructure • Pile driving • Girder setting • Deck forming • Plinth construction • Systems building construction • Substation equipment installed and energized • Wetland construction

Source: Everly [25]

In a review of the $350M Interstate MAX Light Rail Project, Everly reports that design and construction accounted for 80 percent of the program budget [25]. Major contracts and proportions of design and construction budget are shown in Figure 2-3.

Figure 2-3

Major design and construction contracts for the MAX Light Rail Project, by category and funding



Source: Everly [25]

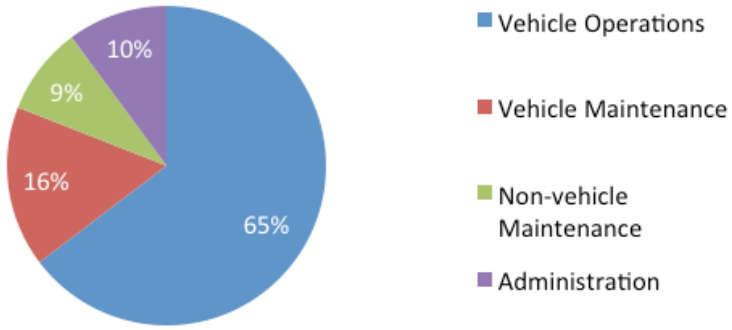
Nearly half of the design and construction contracts (estimated to be $137M) for the Interstate MAX Light Rail Project were for construction of the 5.8-mile rail segment itself. Another $50M of contracts were let for control and systems tasks. Assuming that a substantial share of these additional contracts also involved construction work, we estimate that more than half of funds expended were for construction work that occurred at the project site itself. We reason that the construction phase thus provides substantial work opportunity that could potentially be filled by local labor.

Operation Phase

Operation of a light rail system involves many varied jobs: drivers, mechanics, repair contractors, maintenance workers, administrators, parking attendants, and customer service workers. APTA reports that 382,827 people were employed in the operation of transit systems nationwide in 2010 [13]. The greatest share (64.6%) of these was engaged in vehicle operations, i.e., vehicle operators, conductors, ticket collectors, security agents, and activities in support of these. Another 25.2 percent of operations employees were involved in vehicle and non-vehicle maintenance, and 10 percent were involved in general administration, as shown in Figure 2-4.

Figure 2-4

Employees in operation of transit systems in U.S., by type of operation, 2010

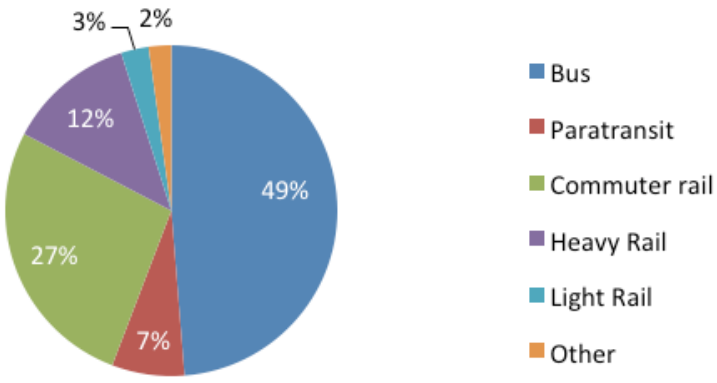


Source: APTA [13]

As shown in Figure 2-5, rail operations (commuter, heavy and light rail) in 2010 accounted for 42 percent of transit operating employees nationwide. Average compensation per operating employee in 2010 (salaries plus fringe benefits) was $62,500 [13].

Figure 2-5

Percentage of employees in transit, by transit type, 2010



Source: APTA [13]

Note, however, that the area serving operating employees likely extends well beyond the area around a given project. That is, if the project extends an existing system, then the area serving operation-related jobs is that of the entire system, not just the project. The number of operation-related jobs created by a transit project for a given community, then, is the proportional share of the jobs available to all communities served by the system, and this share for a given community is arguably small.[7] We reason that the potential for employment of locally-based, low-income and minority workers in this phase of a given project is comparatively low. Thus, despite the importance of operations-related employment overall, jobs associated with this phase of a transit project are not the focus of our research.

A Closer Look at Construction Jobs

The discussion above suggests that most promising employment opportunities for local low-income and minority workers appear to be those jobs required during the construction phase. In this section, we discuss in greater detail what these specific jobs may be. As a starting point, we consider how construction jobs are classified in the U.S. according to the North American Industry Classification System (NAICS).[8] Relevant jobs compiled under NAICS 23 (Construction) are shown in Table 2-2.

[7] For example, the San Francisco Municipal Transportation Agency (SFMTA) estimates that the Third Street Light Rail Project created more than 300 employment opportunities, including operations jobs, for "local residents" [27]. The project extended an existing system by 5.1 miles. The system serves an area that encompasses 410,400 employed workers [28]. SFMTA reports employing more than 4,500 people in 200 job classifications. The addition of 300 jobs by the Third Street Light Rail Project thus increased employment at SFMTA by approximately 7 percent and employment increased in San Francisco by less than 0.1 percent.

[8] NAICS is a conceptual framework that groups establishments into industries according to similarity in the process used to produce goods or services. Establishments are classified by industry-based on their primary activities. The number of digits in the code indicates increased specificity in this classification.

Table 2-2

Taxonomy of Construction Industry in U.S.

NAICS code and description
236. Construction of Buildings
2361. Residential Building Construction
2362. Non-residential Building Construction
23621. Industrial Construction
23622. Commercial Construction
237. Heavy and Civil Engineering Construction
2371. Utility System Construction
23711. Water and Sewer Line and Related Structures Construction
23712. Oil and Gas Pipeline and Related Structures Construction
23713. Power and Communication Line and Related Structures Construction
2372. Land Subdivision
2373. Highway, Street, and Bridge Construction
2379. Other Heavy and Civil Engineering Construction
238. Specialty Trade Contractors
2381. Foundation, Structure, and Building Exterior Contractors
23811. Poured Concrete Foundation and Structure Contractors
23812. Structural Steel and Precast Concrete Contractors
23813. Framing Contractors
23814. Masonry Contractors
23815. Glass and Glazing Contractors
23816. Roofing Contractors
23817. Siding Contractors
23819. Other Foundation, Structure, and Building Exterior Contractors
2382. Building Equipment Contractors
23821. Electrical Contractors
23822. Plumbing, Heating, and Air-Conditioning Contractors
23829. Other Building Equipment Contractors
2383. Building Finishing Contractors
23831. Drywall and Insulation Contractors
23832. Painting and Wall Covering Contractors
23833. Flooring Contractors
23834. Tile and Terrazzo Contractors
23835. Finish Carpentry Contractors
23839. Other Building Finishing Contractors
2389. Other Specialty Trade Contractors
23891. Site Preparation Contractors
23899. All Other Specialty Trade Contractors

Source: NAICS 23 [29]

By cross-referencing these codes with U.S. Census Bureau and Bureau of Labor and Statistics indices [29], we found that firms involved primarily in transit construction are limited to those in NAICS 2379 (Other Heavy and Civil Engineering Construction). This category includes a wide range of heavy construction work in addition to transit construction, such as dam, tunnel, recreation facility, marine structure, and shore protection work. Specialty trade contractors classified under NAICS 238 may also participate in transit construction projects.

Table 2-3 reports the most recent data on annual payroll and the number of employees at the four-digit NAICS code level for the U.S. We estimate the average salary of employees using these data.

Table 2-3
Annual Payrolls, Number of Employees, and Average Salary of Construction Workers in U.S., March 2006

NAICS Code and Description	Payroll($000)	Employees	Average Salary
236. Construction of Buildings	$82,560,204	$1,708,176	$48,332
2361. Residential Building Construction	42,481,300	966,198	43,967
2362. Non-residential Building Construction	40,078,904	741,978	54,016
237. Heavy and Civil Engineering Construction	52,681,055	989,383	53,246
2371. Utility System Construction	25,067,195	496,628	50,475
2372. Land Subdivision	4,098,221	77,406	52,944
2373. Highway, Street, and Bridge Construction	18,541,601	325,182	57,019
2379. Other Heavy and Civil Engineering	4,974,038	90,167	55,165
238. Specialty Trade Contractors	186,762,875	4,641240	40,240
2381. Foundation, Structure, and Exterior	41,956,494	1,167,986	35,922
2382. Building Equipment Contractors	86,667,068	1,940,281	44,667
2383. Building Finishing Contractors	34,454,303	975,335	35,326
2389. Other Specialty Trade Contractors	23,685,010	557,638	42,474
TOTAL NAICS 23	**$322,004,134**	**$7,338,799**	**$43,877**

Source: Census [30]

We note that NAICS 2379 accounts for only 1.2 percent of total construction employees in the U.S, and transit construction workers likely account for only a fraction of these. These data suggest that the labor market we are interested in may be very small. However, we also note that average salaries for NAICS 2379 are comparatively high—more than 25 percent higher on average than workers in the construction industry as a whole.[10] We may expect competition for these relatively few, relatively high-paying jobs to be challenging.[11] By comparison, NAICS 238 accounts for more than half (58%) of construction workers, but these workers receive substantially lower pay, on average. The labor market

[9] As a first approximation of wages that construction workers earn in these various categories, we divided annual payroll by the number of employees in the respective categories.

[10] It is important to note that this is only a rough indicator of salaries of workers in the construction industry, as averages are computed with salaries of all employees, from the entry-level laborer to the highest-level managers. We do not know from these data precisely how salaries vary among workers, but assuming that each category has a reasonable range of these workers (e.g., by skill and/or experience), this measure likely supports a fair, though approximate, comparison at the industry level.

[11] By comparison, $55,165 is well above the average annual salary in the U.S. and compares favorably to salaries earned in relatively high-paying business, healthcare, and science professions [22], professions that often require considerably more years of formal education and training.

for transit construction is likely complex and hierarchical and involves many contractors that compete within several construction submarkets, some of which may be more opportune for low-income and minority workers.

The Spatial Distribution of Construction Workers

Above, we have begun to identify the basic job categories and wages relevant to transit construction work. Another important consideration for our study, given an interest in "local participation in the building of transportation projects," is where the potential construction workers may be found. We reason that the labor pool relevant to a given transit project is defined by an area that describes a reasonable commute to the project site, i.e., the relevant "job shed." In this section, we consider commute times and distances traveled by construction workers in three of the largest metropolitan areas of the U.S.—New York, Los Angeles, and Dallas—where transit projects are currently under construction.[12] Estimating the number of construction workers within a given job shed thus provides another measure of the labor pool in which low-income and minority workers compete for jobs.

Table 2-4 summarizes the distribution of commute times for full-time construction workers for these three areas.[13] Note that the vast majority of workers travel to work by automobile. The median commute time is generally about 30 minutes, but many workers commute much longer. The 90th percentile ranges from 60–90 minutes, meaning that 10 percent of construction workers have a one-way commute of one hour or more. The median commute for all workers in the U.S. has remained at about 25 minutes since 2000, and in 2009, only 7.5 percent of all workers had a commute longer than 60 minutes [32]. Thus, construction workers in both metropolitan Los Angeles and New York have longer average commute trips by car than the national average, and the commute trips of construction workers in the Dallas region conform to the average commute trip.

[12] More specifically, we considered commute data for New York-Northern New Jersey-Long Island, NY-NJ-PA; Los Angeles-Long Beach-Santa Ana; Dallas-Fort Worth-Arlington. These three MSAs encompass three of the cases we selected for further study. Detailed discussion of selection procedures can be found in Section 3. Essentially, these areas have transit projects that were scheduled to begin or were ongoing between 2006 and 2009 and were funded through FTA's New Starts Program. These areas also stand out as having both the highest percentage of low-income and minority residents of all cases considered and employing some of the highest numbers of construction workers in the U.S. We expect these cases, therefore, to be most fruitful for purposes of our study.

[13] These estimates were computed using Public Use Microdata Sample (PUMS) data from Census 2000 [31]. We use PUMS data to create custom cross-tabulations for commute times specifically for construction workers in these metropolitan areas.

Table 2-4

Distribution of Commute Times (in Minutes) for Full-Time Construction Workers in Dallas, Los Angeles, and New York MSAs in 2000

CMSA	Number of Commuters by Mode		90th percentile	75th percentile	50th percentile	25th percentile	10th percentile
Dallas	671,079		60	40	25	15	10
Auto	653,472	97.4%	60	40	25	15	10
Transit	5,165	0.8%	90	60	45	30	15
Los Angeles	419,870		60	45	30	15	10
Auto	403,228	96.0%	60	45	30	15	10
Transit	7,518	1.8%	90	60	45	30	20
New York	533,605		60	45	30	15	10
Auto	468,376	87.8%	60	45	30	15	10
Transit	51,473	9.6%	90	60	50	30	25

Source: Census [31]

Unfortunately, data describing distances traveled by construction workers are not readily available. Thus, we estimate distance by considering commute times along with average speed. Assuming an average travel speed of 32 miles per hour,[14] a reasonable upper bound for a job shed radius that encloses 90 percent of potential construction workers around a given transit construction site becomes 32 miles (given that the vast majority who travel also travel by automobile.) We reason that construction workers at or beyond this limit are more likely to choose construction work elsewhere in the MSA, if available. We further reason that the most likely competitors will be well within the 32-mile limit; indeed, we expect that at least half of the potential competitors are likely to be found within 16 miles of the project site. Note that while fewer than 10 percent of workers may commute from distances beyond 32 miles, some workers nonetheless do. It is possible that many construction workers throughout the metropolitan areas, and even beyond, pursue work at any given project site. Section 3 further discusses job sheds for transit project construction labor. This information is relevant for establishing the relative opportunities or competition that local workers face to obtain transit construction jobs.

The Contracting Process

Transit projects are planned, constructed, and operated over many years, and each phase requires a different combination of tasks and expertise. A complex institutional structure of prime contractors and subcontractors has evolved to match workers to jobs. It is within this structure that labor demand is identified,

[14] U.S. DOT estimates average travel speed for commuting by automobile to be 32.3 miles per hour in 2001, slower for commuting by transit [33].

firms bid on available work, hiring processes are implemented, and, ultimately, the work is performed. In this section, we discuss, in particular, the competition for transit construction jobs. We conducted a series of brief interviews with executives of major construction firms to better understand the bidding process and the structure of contracts for transit construction projects. The discussion below is informed by those discussions.

Bidding Process

The typical practice in government procurement is to award contracts to the lowest responsive bid from a responsible firm. The firm with the lowest bid is that which proposes to do the required work at lowest cost. The responsive firm is that which proposes to do the work requested. A responsible firm is that which has the financial resources and technical capacity to perform the contract, has a satisfactory performance record, and is otherwise qualified to receive an award. Whereas, traditionally, the responsibility determination was made after the lowest responsive bid was identified, more recently, agencies maintain lists of prequalified firms that are eligible to compete for projects-based on their technical and cost proposals. Procurement following this practice is understood to ensure more timely performance of projects than the traditional approach.

Thus, the first step for a construction firm to bid on a transit construction project often is to become listed as a prequalified firm with the relevant transit agency. The list includes those firms the agency determines to be qualified to perform specific types of contracts and, thus, limits the field of potential bidders to those on this list. For small businesses, prequalification requires consultation with the appropriate Small Business Administration office on whether the small business is deemed responsible.

In principle, the team of prequalified firm(s) that demonstrates greatest technical capability and proposes to do the required work at lowest cost will win a given contract. According to our interviews, firms that have satisfactorily completed projects in the past have a significant advantage in winning a given contract as well. Favorable past performance contributes to a business's reputation. According to results of our interviews, reputation and word-of-mouth recognition can contribute greatly to a firm's success in winning construction contracts.

Winning contracts also depends heavily on whether a firm can secure the necessary contract bond. A contract bond is a financial guarantee that the contractor will perform according to the specifications of the contract. If the contractor fails in this regard, the insurance company is responsible to the insured for payment, up to the limit of the bond. The insurance company then has recourse against the contractor for reimbursement. The limit of the bond is usually an amount equal to the cost of the construction project. Only large construction firms will have sufficient financial position (including collateral) to

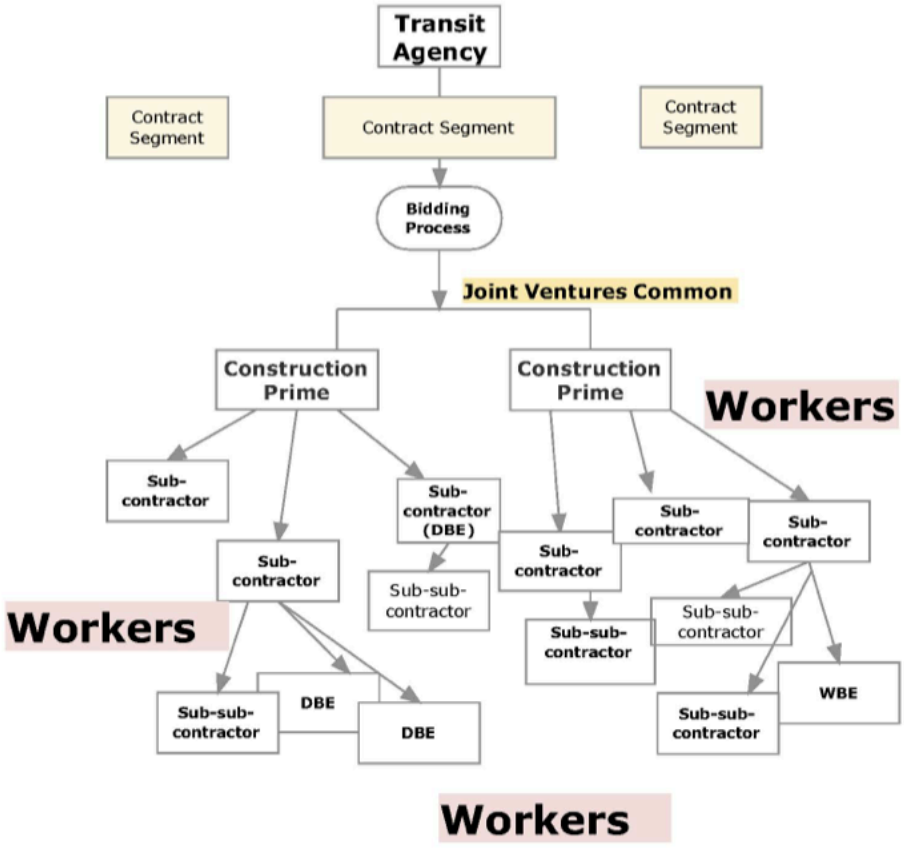
secure the bonding required for major transit construction projects. This last point contributes in part to a complex contracting structure discussed next.

Structure of Transit Construction Contracts

Figure 2-6 illustrates the hierarchical structure of contracting involved in the construction of transit projects. As described previously, a large project is often divided into various "contract segments, reaches, and areas" [25] that define a variety of specific tasks that need to be completed. It is unusual for one firm to have all the expertise to complete an entire contract segment cost-effectively; thus, completing the project often requires assembling a variety of construction contractors, each qualified to complete various tasks. Furthermore, as described above, relatively few construction businesses are able to secure the required bonding for a major transit construction contract. Thus, large civil engineering firms will typically engage the transit agency for work on a given contract segment, assuming overall responsibility and acting as prime contractor. In turn, that prime contractor will also engage one or more subcontractors who, in turn, will assemble additional workers, both skilled and unskilled, for the contracted task. In many cases, there are layers of subcontractors. For example, the subcontractor responsible for installing electrical systems may have its own specialized subs for signal connections or station power.

Figure 2-6

Overview of multi-level contracting structure for transit construction projects



It is important to note that a prime contractor for one project (or contract segment) may be a subcontractor on another. Furthermore, a subcontractor may be hired by one prime contractor on one project but by another prime contractor on another. Similarly, the workers themselves may be hired by one subcontractor (or prime contractor) on one project, and another subcontractor on another. There are essentially no formal rules on how a potential team should be formed, except that construction teams assemble as work opportunities present themselves according to previous experiences and the size and specific requirements of the job.

Despite this apparent fluidity among construction labor, certain businesses with established relationships with other firms and funding agencies may be predisposed to reassemble teams according to past successes rather than assemble teams with unproven newcomers. Agencies, too, may prefer to reengage contractors that have a proven record of success, rather than give contracts to new firms. In addition, the presence of labor unions, wage regulations, and other factors may affect the assembly of teams. The implications of these statements for the hiring of low-income and minority firms for transit construction work are the focus of the next section.

Types of Contracts

Various forms of contracting vehicles are used to deliver construction projects including design-bid-build, design-build, design-bid-build, contract manager/general contractor (CM/GC), and best-value contracting [34]. Transportation agencies had traditionally used the lowest-bid, design-bid-build contract, but more agencies have turned to design-build contracts, and agencies are increasingly using best-value processes to ensure quality construction and other agency goals. We discuss briefly the four different types of contracting methods prevalent in transit construction.

Design-Bid-Build

This is the traditional type of contract where the project owner enters into a contract with a design professional to design the project. The designer may employ other design consultants such as architects or engineers. Upon the completion of the design phase and subsequent approval by the project owner, several bids are solicited from contractors. The project owner then enters into a separate contract with the winning contractor to construct the infrastructure. In contrast to design-build, in design-bid-build contracts, generally, the design must be completed prior to letting out bids for construction. A design-bid-build method was used in the tunneling portion of the Metro Gold Line Eastside Extension in which Metro wanted to exercise full control over the contracting process due to safety concerns arising from seismic and methane gas issues due to tunneling.

Design-Build

In a design-build contract, designing and construction services are contracted by the project owner to a single entity known as the design-build contractor. The design-build approach provides single-point responsibility. The design-builder may employ designers or engineers or contractors (either on the design-builder's staff or from outside firms), but such professionals are directly responsible to the design-builder, not the owner. This type of contract minimizes risks to the project owner and reduces the delivery schedule by overlapping design and construction phases. In a design-build contract, construction can start prior to the completion of the final design. Early project scheduling can be done and the designer-builder can order long-lead items before the completion of design. The design-build contracts are more flexible and, typically, are completed sooner than the traditional design-bid-build projects. LA Metro employed the design-build contract in the Gold Line Eastside Extension and, according to our interview with LA Metro's Chief Capital Management Officer of Metro's Capital Program, design-build continues to be the most widely used method of contracting for existing and future LA Metro projects.

Contract Manager/General Contractor

The CM/GC is a modified design-build process in which the project owner holds the contract for the design consultant and the contractor. The project owner remains in charge of the process and is the main recipient of the cost savings. Speed of delivery, reduced risk, and flexibility are the major benefits of this approach. According to Utah DOT, compared to the traditional design-bid-build, the CM/GC approach results in time savings in four areas: the project can begin earlier, design takes less time, construction takes less time, and the overlap of design and construction reduces overall project time. Having the contractor involved early in the design process reduces risk and improves constructability. Effective construction sequencing and scheduling reduces utility risks as well. This method allows for innovation and flexibility, as the contractor is not bound to a hard bid price. The flexibility can result in a higher overall price, yet in Utah DOT's case there were half as many of the costly change orders with CM/GC compared to a more traditional approach of design-bid-build [35].

Best Value

The best-value method depends upon the project, the selection criteria used for the project, and decision factors that are used when a project is considered for implementation. The project owner considers and identifies potential benefits—such as flexibility, innovation, cost, time, quality, safety, and durability—that might be available by adopting this approach. If the project owner chooses to use best value, then the evaluation criteria upon which the bids would be assessed should align with the project goals. Relevant evaluation criteria are selected

for each of the appropriate goals. Typically, the project owner will evaluate the proposals by using weighted averages, which assign scores and weights to each evaluation criteria, which are then summed up into a total score. The winning contractor bid then provides the best-value solution to the project owner ensuring that the resulting score is in alignment with the project goals and requirements. Sometimes, the project owners consider using a two-step best-value process that draw a large pool of bidders and the submission of a large number of alternate technical proposals. First, the project owner screens and pre-qualifies contractors to develop a short-list. In the second step, the project owners evaluate and score short-listed contractors on their approach, cost, schedule, etc. to determine the best-value solution [36].

Influences on Minority Representation in Transit Construction

As discussed above, the construction sector accounts for a substantial portion of jobs in the U.S., yet competition for transit projects may be especially fierce and the contracting process may favor some firms over others. While data on the racial and ethnic breakdown of workers specific to transit construction projects are limited, evidence does indicate a disproportionately higher share of White and Hispanic workers in construction more generally, and Whites more often occupy positions of higher skill and pay. In this section, we discuss possible explanations for these outcomes, including the proximity of workers to jobs, prevailing wage issues, workers' access to training programs, and the influence of trade unions and other institutional factors on hiring practices. We also discuss the influence of affirmative action programs, especially DBE programs, on employment of minorities in construction. Our discussion is based upon results of our literature review and initial interviews with executives and managers of construction firms. Our discussion provides important background for the second phase of our research, which discusses in more depth how these influences may be reflected in selected transit construction projects.

Spatial Influences on Minority Employment

An extensive literature was developed from the "spatial mismatch hypothesis" [37], which suggests that lower rates of employment among inner city residents are in part explained by employment decentralization and limited car ownership of low-income households [38]. Limited access to jobs increases search costs and decreases the likelihood that job opportunities in suburban areas will be found via word of mouth networks available to inner-city residents [39, 40, 41]. To the extent the inner-city residents include the low-income, minority construction workers of interest in our research, we might expect spatial mismatch to present an important barrier to employment for these workers, especially for

construction jobs located in suburban areas. However, the transit construction projects we investigated are sited largely in inner-city areas, which, therefore, might be expected to reduce the effect of spatial mismatch, if construction labor were actually recruited from areas near the project site.

However, as demonstrated in a previous section, construction workers can be highly mobile. Thus, construction labor need not be recruited from the community immediately surrounding a transit project. Furthermore, construction subcontracts for transit projects tend to flow from large firms serving as prime contractors. Thus, construction teams might form from a large labor pool that encompasses workers residing far from a given site, even to distant reaches of a given metropolitan area, possibly beyond, to work on a given job.

Some research suggests that contractors may specifically choose not to recruit labor from the inner city neighborhoods where transit projects may be sited. Fernandez and Su [42], for example, report that employers have been found to screen applicants residing in less "desirable" public housing projects or neighborhoods, which are used as a measure of that applicant's work ethic and capabilities.

Thus, if spatial considerations are important to our understanding of employment in construction, these considerations are not intuitive. The chances of construction employment are not necessarily increased by virtue of proximity to a given transit project sited in a particular community. Moreover, the inner-city residence of locally-based construction workers may even decrease chances of employment further.

Prevailing Wage Issues

The Davis-Bacon Act, created in 1931 (and amended in 1935 and 1964), requires that all federal construction projects pay contracted construction workers a "prevailing wage" [43]. This requirement essentially serves as the construction industry's minimum wage law. The prevailing wage rate is the basic hourly rate paid on public works projects to a majority of workers engaged in a particular craft, classification, or type of work within a given labor market area. The prevailing wage for each state is set by the U.S. Department of Labor based on an assessment of wages for that particular area of the country. Construction industry wages can vary widely by location and skill required of each trade. Skilled construction trades such as plumbers and electricians are especially well paid for example, by comparison to unskilled laborers.[15]

[15] According to the U.S. Bureau of Labor Statistics, the national average salaries for plumbers and electricians in 2007 were $47,350 and $48,100. Average salaries for various types of construction "helpers" ranged from $23,320 to $28,480. There is considerable variation in wages within categories. For example, the 10th percentile annual salary for a painter's helper is $16,600, while the 90th percentile salary for an elevator installer/repairer is $94,220 [22].

The impact of the prevailing wage varies by state, as each state employs a different method for setting its prevailing wage rate.[16] A majority of states, including California and New York, have enacted their own prevailing wage laws commonly known as "Little Davis-Bacon Laws." The state-level construction prevailing wages for California and New York are generally higher than federal guidelines require. While prevailing wage rates and union wage rates are not the same, prevailing wage determinations often reflect union wages, which are generally much higher than non-union wages [44].

Proponents of prevailing wage regulations argue that it provides workers with a better standard of living and greater incentive for employers to hire better-trained and better-equipped workers (thereby reducing delays, injuries and cost escalation, and improving construction quality). Opponents argue that use of the prevailing wage drives up costs of public works projects. Critics also tie prevailing wage rates to discrimination against minority construction workers, since these rates reduce non-union worker competition with historically discriminatory trade unions [45]. This argument follows that the higher wages required by the Davis-Bacon Act disadvantage minority workers, who may be less experienced and less skilled. Employers who want to hire minority workers often cannot afford to do so if they perform tasks at a slower rate. Minority workers, then, who would otherwise be willing to work for lower wages cannot do so if they work in states with stringent Davis-Bacon laws.

One study argues that a repeal of the Davis-Bacon Act would "increase the relative construction employment of minorities and laborers" by reducing the effect introduced by wage floors set through the prevailing wage regulations and thereby provide an advantage to lower-skilled laborers [46]. This study also found that local Davis-Bacon wage rates at the state level tend to be higher when a greater percentage of tradesmen are union members.

Thus, the existence of state-level Davis-Bacon Laws and prevailing wage rates may influence low-income or minority employment in construction, especially if these workers are not members of trade unions or do not have relatively high levels of skill required for transit construction projects.

Access to Training

Construction workers often gain skills for specialized trade jobs through apprenticeship programs. As discussed above, skilled workers are paid substantially more than unskilled workers. Demand for apprenticeship programs continues to grow across the U.S. and programs reflect an increasingly diverse mix of enrollees overall. However, increasing the number of minority apprentices in specialized trades has been difficult to achieve in some areas.

[16] States make determinations on prevailing wage rates for each craft or classification for worker in a given area (by county, for example). In some states, information for determining wages is-based on surveys of contractors and public organizations.

According to data compiled by the Bureau of Apprenticeship Training at the U.S. Department of Labor for the period of 1989–1995, minority apprentices were under-represented in the higher skilled trades (such as electrical and mechanical work) in apprenticeship programs for construction [47]. More recently, a trades council representative from the northern California region reported that whereas minority workers are more prevalent in basic trade positions, White workers continue to dominate the mechanical trades (such as electrical and plumbing). On the other hand, our interviews with trades council representatives elsewhere, including Southern California, suggest that the number of Hispanics in union-sponsored apprenticeship programs for all skill areas has increased. In New York, the Building and Construction Trades Council operates three apprenticeship programs working with local vocational schools, members of the armed forces, and women. According to one council representative there, the program with vocational schools boasts an 86 percent retention rate, and enrollment reflects the racial/ethnic composition of New York.

Training programs appear to be an important entry point for low-income and minority workers in the construction industry, and a promising opportunity for increasing low-income and minority employment on transit construction projects. The shortage of skilled construction workers and the aging of the labor force may provide new opportunities to create a more diverse workforce, where apprenticeship programs can be used to bring low-income, minority and women workers into the field.

Trade Union and Other Institutional Influences

As suggested, most firms and workers who seek jobs on transit construction projects compete with many others, especially in secondary markets for specialized trade subcontracts. Those firms who get the jobs are those with financial resources and technical capacity to perform the work specified by the contract have a satisfactory performance record, and are otherwise qualified to receive an award. Workers affiliated with trade unions often dominate public sector contracts, especially transportation project contracts, primarily because the jobs require highly skilled workers, and unions offer workers with the experience necessary to handle these complex jobs, especially given additional wage requirements.[17] In this section, we assess the influences of trade unions and other institutions on the competitive field of prospective contractors.

We have discussed the advantages unions appear to have in terms of providing trained labor through coordinated apprenticeship programs, and the influence

[17] This may be the case in California and New York. In Texas, where there is no "Little Davis-Bacon Law," non-union contractors reportedly win most of the federal transportation construction projects. According to one Trade Council representative in Texas we interviewed, this is because wages are relatively low.

unions may have on setting wages. The project labor agreement (PLA) process provides another important example of how unions may influence transit construction employment. A PLA is an agreement that defines wages and work rules for a project and is approved by labor and the awarding public agency before the project begins. It eliminates the need to negotiate a separate labor agreement with each contractor and each building trade, and sets up a process of conflict resolution to deal with the any job disputes that may arise. A PLA coordinates differences among the numerous and distinct union and non-union contractors on a project site. A PLA guarantees unions will not strike at a job site, and in return, contractors agree to use the local hiring hall (the organization that provides new recruits under union guidance). Typically, PLAs help increase union involvement in a project [48]. PLAs can contain requirements that contractors meet DBE participation requirements. In addition, they can also be designed to require increased opportunities for minorities, low-income, and local outreach [49].

PLAs on federally-funded projects were prohibited by a Presidential Executive Order issued in 2001, although this Executive Order did not prohibit contractors from voluntarily entering into agreements with labor unions [50]. However, the 2001 executive order was repealed by Pres. Obama's 2009 Executive Order 13502 [51]. In 2011, FTA issued a guidance document on the use of PLAs in federally-funded projects, which clarifies that since such agreements are no longer prohibited, it is a transit agency's choice to enter into such agreements [52]. Three out of the four projects we studied were implemented during the period when PLAs were prohibited in federally-supported contracts.

Perceptions of union involvement on construction projects are varied. One study, for example, indicates that unionized construction workers are more productive than their non-unionized counterparts, due in part to apprenticeship programs and hiring halls that both develop the required skills and deliver workers to where they are in demand [53]. Union proponents argue that the better pay and more highly trained labor minimize injuries, work stoppages and costly project delays.

Unions have operated rigorous apprenticeship programs that develop highly trained craftsmen through organized programs, sometimes targeting specific disadvantaged populations (i.e., former military personnel). Because of the basic standards that must be met, however, union hiring halls sometimes boost performance by pre-screening more skilled or capable applicants for union membership. Bilginsoy [47] suggests unions also screen recruits for apprenticeship programs, according to their minority group status, ultimately limiting the ability of these groups to be hired on construction jobs that require skilled labor.

Union status aside, it is often difficult for minority-owned firms to obtain working capital required to enter and compete with other contractors, a problem that may be explained by discriminatory banking practices [54]. This translates into a lack of equipment and insurance bonding needed to demonstrate being a responsible firm during the bidding process.

Overall, then, a wide variety of institutional factors may challenge low-income and minority workers who seek employment on transit construction projects, including, union influences on recruiting apprentices, wage-setting, hiring practices, and banking practices. These influences present challenges to low-income and minority workers, above and beyond the challenges already presented by a highly competitive market for construction work.

Overcoming Employment Barriers in Construction: The DBE Program

For decades, the federal government has sought to address inequities in employment faced by socially and disadvantaged workers. In 1941, President Roosevelt's Executive Order 8802, for example, declared that it was to be U.S. policy to encourage full participation in national defense programs by all its citizens regardless of race, creed, color or national origin. A similar order by President Kennedy (Executive Order 11246) in 1961, in combination with the passage of the Civil Rights Act of 1964, formally obligated contractors doing more than $10,000 worth of business with the federal government to ensure equality of employment through affirmative action.[18] In 1969, the "Philadelphia Plan" overtly specified goals and timetables for minority participation in construction contracts. The plan was implemented to address inequities in hiring practices by local building trades unions, particularly among skilled trades (the plan has since been copied by other cities.) Since its establishment in 1953, the Small Business Administration has supported small business startups, and alongside affirmative action policies, has increasingly extended its support of women and minorities.

Since 1983, U.S. DOT has set aside at least 10 percent of funds authorized for highway and transit financial assistance programs for DBEs. DBE participation goals have been included in federal transportation laws, since that time, most recently by the Moving Ahead for Progress in the 21st Century (MAP-21), based on significant findings of continuing discrimination for minority and women-owned firms who are seeking to do business in federally-assisted programs across the United States [55, §1101 (b) (1) (A-E); 56]. The DBE program

[18] Affirmative action describes the preferential hiring of workers-based on consideration of certain factors—race, ethnicity, and sex—to favor those who are under-represented in the workforce with respect to these factors.

requires that recipients of federal financial assistance, that is, state and local transportation agencies, establish goals for the participation of disadvantaged businesses and certify the eligibility of DBEs to participate in U.S. DOT-supported contracts. The DBE program is implemented through U.S.DOT regulations in 49 Code of Federal Regulations (CFR) Part 26 [57].

Note also, that although DBEs typically hire larger proportions of minorities than non-DBEs, DBE workers need not be workers within the local community. For example, if DBEs are unionized, and since unions often draw workers from across counties or metropolitan regions and send workers to construction jobs based on who is available, even if DBEs are based within the local community of a construction project, their union workers may not be local. This is a major reason that some transit agencies are increasingly developing additional policies beyond the DBE program to ensure local participation of low-income, women and minorities in transit construction programs.

In addition, questions remain as to how legitimately and rigorously DBE programs are implemented, and the constitutionality of favoring disadvantaged firms over others for work on public projects has been challenged in court.

DBE Violations

The implementation of DBE programs has been fraught with problems. A six-year probe into DBE fraud by U.S. DOT resulted in 40 indictments, 29 convictions, and $10.7M in fines following the investigation of 42 cases in 17 states and territories [58]. DBE fraud accounted for 16.7 percent of open investigations by U.S. DOT in October 2001, and that number rose to 22.4 percent in 2005 [59]. The most common incidence of fraud was among prime contractors employing firms with questionable DBE status to act as subcontractors and the hiring of legitimate DBEs that do not actually perform any work. Blanchflower and Wainright [54] also report that minority-owned or otherwise disadvantaged firms may act as "fronts" for white males taking advantage of the affirmative action program benefits.

Constitutionality of DBE Programs

The constitutionality of U.S. DOT DBE programs was called into question in a 1995 Supreme Court case (*Adarand Constructors v. Pena* [93-1841], 515 U.S. 200 [1995]). The ruling stated that federal programs that benefit minority-owned business must demonstrate that discrimination exists and that those programs seek to benefit only those affected.[19] State and local transportation

[19] More specifically, the Adarand decision held that all racial classifications must be reviewed under a standard of "strict scrutiny." Strict scrutiny is a test to determine constitutionality of a law that creates classification of persons. The standard requires a "heavy burden of justification" to show that a compelling state interest is being achieved and by the least drastic and intrusive of means [60].

agencies conduct disparity studies to provide the required evidence of discrimination against DBEs. Yet, the Government Accountability Office found numerous weaknesses among the disparity studies assessed [61]. Further, the U.S. Commission on Civil Rights found, 10 years after the Adarand decision, that several federal agencies including U.S. DOT, largely fail to consider race-neutral alternatives to affirmative action approaches and that these agencies do not engage in adequate program evaluation, or provide adequate resources for contractors who may be victims of discrimination [62]. Note that federal regulations define two types of DBE programs: race-conscious programs that are focused on assisting only DBE programs and race-neutral programs that are used to assist all small businesses, with race-neutral programs including gender neutrality [57].

California's Proposition 209 passed in 1996, amending the state constitution to prohibit public institutions from considering race, sex, or ethnicity for procurement contracts. In 2006, the California Department of Transportation (Caltrans) adopted a policy of neutrality toward women- and minority-owned businesses. According to a northern California trades council representative, Proposition 209 decreased the ability of using DBEs, except for federal projects. Proposition 209 likely triggered the substantial decline in the number of registered DBEs in the state. Blanchflower and Wainwright [63] found that despite an increase in federal funding for construction, state DOT awards to DBEs declined by almost 30 percent in the period from 1998 to 2002.

In addition, as a result of the ruling of the 9th District Court in the 2005 Western Paving case (Western Paving Co. v. Washington State Dept. of Transportation, 407F. 3d 993 (9th Cir. 2005)), western states covered by the 9th District Court, including California, must limit their application of race and gender preferences, or race-conscious goals, in their awarding of contracts to those groups where discrimination is demonstrated through periodic studies of disparity. In response to this ruling, in 2007, Caltrans commissioned a study [64] that documented discrimination in transportation contracts in the case of several groups: Women, African Americans, Asian Pacific Americans, and Native Americans (these four groups are now known as *underutilized* disadvantaged business enterprises (UDBEs).[20] The groups that dropped out of the DBE classification were Hispanic-owned and Sub-continent Asian American male businesses. Based on its disparity study, Caltrans petitioned FHWA and U.S. DOT to implement a mixed, race-neutral. and race-conscious program and obtained approval. Under such a program, for example, for 2008–2009, Caltrans set a goal-based on the study findings of 13.5 percent of which 6.75 percent was for race-conscious UDBE participation and 6.75 percent was for race-neutral

[20] Transit agencies also conducted their own disparity study; for example, Santa Clara VTA commissioned a similar disparity study in 2007 [65].

DBE participation [66].[21] According to our interviews, this policy has been sharply criticized for being based on what some consider a questionable disparity study for having the potential to increase the cost of transit construction, and for being inconsistent with applicable law.

Even before the 9th Circuit Court ruling, U.S. DOT had amended its regulations, and all states since the early 2000s are required to meet the maximum feasible portion of their DBE participation goals using race-neutral means designed to remove barriers and enhance opportunities for all small businesses, not just DBEs [2]. We will discuss this shift in DBE policy in the case studies to follow.

Amidst the controversy and apparent decline of state and federal affirmative action programs in California and elsewhere, one transit project in Southern California is often cited for its "best practices" in encouraging employment of minorities and minority-owned firms. The Alameda Corridor project, a $2.4B, 20-mile railroad express line that links downtown Los Angeles to the port of Long Beach. The DBE program put in place by the Alameda Corridor Transportation Authority (ACTA) required that DBEs comprise at least 22 percent of the professional services and construction subcontractors. The ACTA and Los Angeles mayor's office, among others, jointly formed the Alameda Corridor Business Outreach Program (ACBOP). The project boasts, among many community benefits, providing construction-specific jobs for 1,281 local residents including 637 placed in union apprenticeships, and securing $285M for DBE construction firms. The project instituted several practices to engage DBEs in the line's construction, including alerting DBEs to contracting opportunities and assisting with DBE outreach [67].

Recent Changes in DBE Program

Several recent changes in FTA DBE program are important to note. Under new FTA rulings, transit agencies can set goals for DBE participation in FTA-funded contracts every three years instead of annually. This change recognizes the time and cost that states or regions incur to prepare disparity studies in support of their race-conscious DBE goals. An important change to the DBE program is that, since 2011, a prime contractor who has submitted the name of a DBE in its winning bid cannot dismiss the DBE without the written consent of the DBE firm or for "good cause"—this is interpreted as including situations where the DBE "has failed or refused to do the work detailed in its subcontract in accordance with normal industry standards." This change responds to a common complaint

[21] Important to note in this change in policy is that the UDBEs or race-conscious part of the new policy was to be tracked and enforced in the same way as the DBE policy was before the Court ruling. However, the race neutral goal, under which Hispanic male-owned and sub-continent male-owned small businesses fell, was not be tracked and enforced. For example, under a race neutral goal, if a prime chose not to use a Hispanic male-owned DBE included in the contract documents, there was no requirement to substitute that firm with another DBE [66].

from DBE firms that contractors often drop DBE firms they have included in their contract documents without repercussions. The change, however, would apply only in the case of race-conscious goals. Under a race-neutral goal, if a DBE included in the winning contract either consents to terminate its contract or has been dismissed for "good cause," there is no obligation on the part of the prime to substitute the DBE firm with another DBE firm [57].

These recent revision of its regulations adjusted for inflation the net worth threshold requirement for DBE owners from $750,000 to $1.32M.[22] This change responded to many complaints from DBE firms about the low ceiling for owner net worth that went unrevised since 1989 and will increase the pool of DBEs.

In addition, FTA is encouraging interstate certification of DBEs in the following way. As of the beginning of 2012, DBEs certified in their home state can present their certification application package to State B. Under the new ruling, State B would have 60 days to determine whether it has specific objections to the firm's eligibility and to communicate objections to the firm. The DBE firm would then have an opportunity to respond and present information and arguments to rebut the rejection [57]. The change will make it possible for DBE firms to compete for contracts in several states. It will especially benefit DBEs in bi-state metropolitan areas, such as the St. Louis Metropolitan area.

Conclusions

This section discusses our preliminary examination of the employment outcomes of transit construction projects to determine the extent to which low-income and minority workers participate in the projects being constructed in their communities and to identify factors that influence this participation. We discussed the labor demands associated with transit construction projects and concluded that the greatest opportunities for these workers likely involve subcontracts for construction work itself, as opposed to planning, design, or operation of the project. We further suggest that the most promising immediate opportunities for employment of these workers may be for work that requires lower to moderate skill and lesser contract bonding requirements. We also note that transit projects draw from a regional, if not larger, labor pool and that local workers must compete within this broader market for construction jobs. Construction contractors must negotiate a complex and hierarchical contracting process that encompasses many factors that likely present barriers to the hiring of low-income and minority workers. As preferential treatment for minority-owned businesses is increasingly criticized as discriminatory, government-led initiatives to boost minority contracting are being reduced. Community-based organization emerge as potentially important means for low-income and minority workers to gain the skills necessary to compete for construction jobs.

[22] In addition, to qualify as a DBE, firms must not exceed average gross receipts over the previous three years of $22.41M. 49 CFR, Part 26.65 (b) [57].

SECTION 3

Case Study Selection and Market Area Characteristics

Section 2 described the many issues that could affect employment outcomes on rail transit construction projects. A case study approach offers the best possibility for gaining an in-depth understanding of the particular circumstances of each project, and its outcomes. This section presents our case study selection process and describes each of the selected projects and their respective metropolitan areas.

Candidate Projects

Because we were interested in employment outcomes, we initially restricted the possible candidate projects to those that were ongoing between 2006 and 2009. We eliminated projects completed before 2006 because we would have had to rely exclusively on historical data and it would have been more difficult to interview people who were directly involved in the project. We, therefore, began with 25 candidate projects drawn from the FTA New Starts Program [68, 69]. Our analysis uses several datasets, including the 2005 American Community Survey [70], 2005 Population Estimates [71], 1997 and 2002 Economic Census [72, 73], and Census 2000 [20, 31], all of which are products of the U.S. Census Bureau.

Table 3-1 lists 25 candidate projects identified by FTA [68, 69]; their locations are shown in Figure 3-1. The largest concentration of projects (8 of 25) was in California, and the second largest concentration was on the mid-Atlantic coast (5 of 25). The remainder was scattered across mid to large metro areas in several states.

Table 3-1 *Transit Projects and Locations*

ID	Description	State	Metropolitan Area
1	Central Phoenix/East Valley LRT	AZ	Phoenix-Mesa-Scottsdale, AZ
2	Metro Gold Line East Side Extension	CA	Los Angeles-Long Beach-Santa Ana, CA
3	Southeast Corridor LRT	CO	Denver-Aurora, CO
4	Largo Metrorail Extension	DC	Washington-Arlington-Alexandria, DC-VA-MD
5	Ravenswood Line Extension	IL	Chicago-Naperville-Joliet, IL-IN-WI
6	Hudson-Bergen MOS-2	NJ	New York-Northern New Jersey-Long Island, NY-NJ-PA
7	Long Island East Side Access	NY	New York-Northern New Jersey-Long Island, NY-NJ-PA
8	North Shore LRT Connector	PA	Pittsburgh, PA
9	Northwest/Southeast LRT MOS	TX	Dallas-Fort Worth-Arlington, TX
10	Weber County to Salt Lake City Commuter Rail	UT	Salt Lake City, UT
11	Central Link Initial Segment	WA	Seattle-Tacoma-Bellevue, WA
12	South Boston Piers	MA	Boston-Cambridge-Quincy, MA-NH
13	River Rail Vintage Streetcar Circulator System	AR	Little Rock-North Little Rock, AR
14	Hiawatha Corridor Project	MN	Minneapolis-St. Paul-Bloomington, MN-WI
15	Nashville-Lebanon Project	TN	Nashville-Davidson–Murfreesboro, TN
16	Newark Rail Link	NJ	New York-Northern New Jersey-Long Island, NY-NJ-PA
17	Girard Avenue Light Rail Reconstruction	PA	Philadelphia-Camden-Wilmington, PA-NJ-DE
18	Mather Field to Sunrise Boulevard	CA	Sacramento-Arden-Arcade-Roseville, CA
19	Amtrak Station/Folsom Extension	CA	Sacramento-Arden-Arcade-Roseville, CA
20	Cross County Metro Extension	MO	St. Louis, MO-IL
21	Mission Valley East	CA	San Diego-Carlsbad-San Marcos, CA
22	3rd St Light Rail	CA	San Francisco-Oakland-Fremont, CA
23, 24	Tasman East/Capitol	CA	San Jose-Sunnyvale-Santa Clara, CA
25	Vasona	CA	San Jose-Sunnyvale-Santa Clara, CA

Figure 3-1

Recent light rail project locations within U.S.

Selection Criteria

Our study intended to analyze in detail the experiences of construction workers in a subset of five transit construction projects in the U.S. In this section, we describe our efforts to develop indicators to support case selection and the results of this selection.

In addition to the status of the project—that is, whether the projects were scheduled to begin or to be ongoing between 2006 and 2009—other major criteria for selecting projects were whether they were located in jurisdictions having disproportionately high numbers of minority and low-income[22] residents and whether the set of projects chosen had a reasonable geographic distribution across the U.S. Our screening analysis depended upon several datasets available from the U.S. Census Bureau, further described in Appendix A.

In addition, we sought projects that would best illustrate issues of accessibility to potential jobs and a range of demographic and socioeconomic characteristics of the population within a given project's job shed.[24] To that end, several indicators were developed for a variety of measures, and final case selection included analysis of these indicators. Specific indicators (of which there were 40) were broadly grouped according to the following 14 measures:

1. Growth trends
2. Racial/ethnic diversity
3. Income
4. Poverty levels
5. Transit dependency
6. Educational attainment
7. Foreign-born population—Latino/Hispanic immigration, more specifically
8. Linguistic isolation
9. Workforce
10. Employment
11. Population density
12. Commute times

[23] For purposes of this study, we define $35,000 as the upper limit for a low-income household. This value was approximately 80 percent of the median household income in the U.S. in the early 2000s.

[24] We define "job shed" as the area that encloses the residences of workers who travel to a given jobsite. As a first approximation, we considered the MSA in which the project is located. The MSA is, essentially, the job shed for all workers of an urban area.

13. Disadvantaged business enterprise (e.g., minority-owned businesses) participation
14. Project size

Each of these measures is indicated by at least one variable derived from the various data available. Estimates at metropolitan, county, and city levels of aggregation were used to compare candidate projects. As appropriate, estimates were normalized by population or land area to facilitate this comparison. Case selection occurred in two steps: reducing the list of candidates from 25 to 12 and then arriving at the final subset of five transit construction projects selected for further study.

Measures, indicators, and their descriptions are presented in Table 3-2. Because data were not available for all indicators at all spatial scales, the number of indicators we considered varied between 27 and 31.

Table 3-2 *Indicators Used for Project Selection and Characterization*

Measures	Indicator	Description
(a) Growth trends	A1.	Population growth rate (1990–2000)
	A2.	Population growth rate (2000–2005)
(b) Racial/ethnic diversity	B1.MINORITY	% of population not White
	B2.NONHW	% white alone, non-Hispanic
	B3.NONHBL	% Black alone, non-Hispanic
	B4.NONHAS	% Asian alone, non-Hispanic
	B5.HISPANIC	% Hispanic/Latino-a
	B6.	Diversity (std. dev. [B2, B3, B4, B5])
(c) Income	C1.HINCLT35	% of households with household income < $35,000*
	C2.RENTER	% of occupied housing units renter-occupied
	C3.RGT30PIN	% of renter households spending > 30% of income on rent**
(d) Poverty levels	D1.	% of population below federal poverty level
(e) Transit dependency	E1.PUBTRANS	% of workers 16 and older taking public transit to work
	E2. WALKTOWORK	% of workers 16 and older walking to work
	E3.NOVEHICL	% of occupied housing units with no vehicle available
(f) Educational attainment	F1.NOCOLL	% of population 25 and older not attended college
(g) Foreign-born pop.	G1.FORBORN	% of population foreign born
(h) Latino/a immigration	H1.LATORIG	% population born in Latin America
(i) Linguistic isolation	I1.LINGISOL	% population age 5 and older, English spoken less than "very well" at home
(j) Workforce/skill level	J1.CONSTRUC	% of civilian employed population 16 and over, "Construction"
	J2.TRANWARE	% of civilian employed population 16 and over, "Transportation and Warehousing"
	J3.PROSCITE	% of civilian employed population 16 and over, "Professional, Scientific and Technical"
	J4.ADMSUPWM	% of civilian employed population 16 and over, "Administrative Support and Waste Management"
	J5.HIGHERSK	% of workers 16 and over, average annual salary by SOC > $40,000
	J6.LOWERSK	% of workers 16 and over, average annual salary by SOC $30,000-$40,000
	J7.LOWESTSK	% of workers 16 and over, average annual salary by SOC <$30,000
(k) Employment	K1.UNEMPL	% of civilian labor force unemployed
(l) Population density	L1.	Land area in sq. mi. (2000)
	L2.	Total population (2005)
	L3.	Population per sq. mi. (L2/L1)
(m) Commute times	M1.	Mean travel time to work
	M2.TRAVLT25	% of civilian labor force, commute time < 25 mins
	M3.TRAV2544	% of civilian labor force, commute time 25-44 mins
	M4.TRAVGT45	% of civilian labor force, commute time > 45 mins
(n) DBEs	N1.	% of firms minority-owned
	N2.	% of firms women-owned
(o) Project and system size	O1.	Length (mi) of FTA-assisted New Starts and extensions under construction
	O2.	Length (mi) of FTA-assisted New Starts and extensions open
	O3.	1970–2004 New Start capital program obligations ($M)
	O4.	2008 existing new starts total full funding grant agreements ($M)

*$35,000 was approximately 80% of median U.S. household income in 2000, a common definition of low-income.
**A common rule of thumb is that no more than 30% of income should pay for housing.

A key aspect of this study was to determine the accessibility of potential workers to construction jobs. We, therefore, included a measure of travel times, from which we estimated relevant job sheds. Furthermore, our analysis sought insight into growth trends, racial/ethnic patterns, income, poverty, transit-dependency, educational attainment, Latino/Hispanic immigration, linguistic isolation, workforce characteristics and employment, population density, and ethnic diversity, all as they relate to transit construction. Indicators were developed to capture these characteristics within our selected project areas as well.

Most of the indicators employed in our analysis are continuous variables describing the proportion of a population within a given census tract having a given characteristic. The proportions were computed for the relevant universe of data (e.g., proportion of construction workers are-based upon those within the civilian labor force of working age.) For some indicators, cutoffs were applied based on the judgment of the study team. For these, we provide some additional explanation, summarized in Appendix B.

Tables C-1 and C-2 in Appendix C summarize indicator values for each of the metropolitan areas, counties, and cities served by each of the candidate transit construction projects.

Our initial screen consisted of comparing the MSAs, counties, and cities in which the projects were located according to the indicators identified in Table 3-2. To do so, we created comparative tables that indicate whether the MSA/county/city ranks in the lower, middle or upper tercile of variables focused, to a large extent, on minority status and low-income characteristics, e.g., percent unemployed, percent below the poverty line, etc., as well as the status of light rail projects in the area. In general, we selected projects in MSA/counties/cities that ranked in the top two terciles in most of the indicators. Tables C-1 and C-2 provide all the indicator values and their tercile rankings. This initial screen reduced the field of candidate projects from 25 to 12, and the results of the initial screen are presented in Table 3-3.

Table 3-3 *Summary of First-Cut Transit Construction Project Start, Opening, and Status*

Project Name	City	Start	Open	Status
Central Phoenix/East Valley LRT	Phoenix	2004 [b]	2008 [b]	Under construction [b]
Metro Gold Line East Side Ext.	Los Angeles	2004 [c]	2009 [c]	Under construction [c]
Southeast Corridor LRT	Denver	2001 [d]	2006 [d]	Open [d]
Ravenswood Line Extension	Chicago		2009 [e]	Under construction [e]
Long Island East Side Access	NY City	2002 [f]	2011 [f]	Under construction [f]
Northwest/Southeast LRT MOS	Dallas		2004, 09, 10 [g]	Under construction [g]
Central Link Initial Segment	Seattle	2003 [a]	2009 [h]	Under construction [h]
Newark Rail Link	Newark	1998 [i]	2006 [i]	Open [i]
Cross County Metro Extension	St. Louis	2003 [j]	2006 [j]	Open [j]
3rd St. Light Rail	San Francisco	2002 [a]	2007 [k]	Open [k]
Tasman East/Capitol Light Rail	San Jose		2007 [l]	Open [l]
Vasona Light Rail	San Jose		2005 [l]	Open [l]

Sources: a: [68] FTA 2004; b: [74] VM 2007; c: [75] Metro 2007; d: [76] RTD 2007; e: [77] CTA 2007; f: [78] MTA 2007; g: [79] DART 2007; h; [80] CPSRTA 2007; i: [81] NJT 2007; j: [82] Metro-SL 2007; k: [83] MUNI 2007; l: [84] VTA 2007

After conducting the initial screen, to select the five case studies, we took into account the clustering of light rail projects in California (8 projects) and the East Coast (5 projects) and selected two projects in California, one in the Los Angeles region, another in the San Jose region, and a New York City regional project to represent the East Coast. To obtain a greater geographical reach, we also selected the Dallas LRT project and the St. Louis project. For comparative purposes, in the selection of the five projects, we selected the Dallas case to ensure that at least one project was in a region or state where labor is not unionized for the most part. Another criterion that guided our selection was variation in the minority groups in the region, as well as variation in the size of the MSAs. The projects selected for detailed analysis in our study are listed and briefly described in Table 3-4.

Table 3-4 *Transit Construction Projects Selected for Further Study*

CMSA	Name	Description
Dallas-Ft. Worth, TX	Northwest/ Southeast LRT MOS	The project expands the existing system with a new line (the Green Line). The Green Line will be 27.7 miles long and have 20 stations, extending from Dallas to Carrolton in the northwest and to Pleasant Grove in the southeast. A short section (from West End to Victory) opened for special events in 2004. Daily service to seven stations is expected by 2009 and to the remaining by 2010 [79].
Los Angeles-Riverside-Orange County, CA	Metro Gold Line East Side Extension	The Gold Line East Project will serve communities of East Los Angeles. Groundbreaking occurred in 2004, and the extension is estimated to open in late 2009. It will be six miles long and connect to the existing Metro Gold Line at Union Station, and add eight new stations. [75].
New York-Northern New Jersey-Long Island, NY-NJ-CT-PA	Long Island East Side Access	The East Side Access Project will bring Long Island Rail Road (LIRR) commuters into Grand Central Terminal, creating a terminal on Manhattan's East Side to complement Penn Station on the West Side. It is a four-mile, two station extension under the East River using an existing rail tunnel. Construction began on the tunnels in both Manhattan and Queens in 2002. Completion is estimated for 2011. [78].
St. Louis, MO-IL	Cross County Metro Extension	The Cross County extension of the MetroLink system connects additional communities to the existing rail system. The project adds 8.2 miles to the previously existing 38 miles extending from Scott Air Force Base and Shiloh, Illinois to Lambert-St. Louis International Airport. The project included reconstruction of an existing station and addition of nine new stations. Construction began in 2003; service began in 2006 [82].
San Francisco-Oakland-San Jose, CA	Tasman East/ Capitol, Vasona	The Tasman East/Capitol Light Rail Project is an 8.2-mile extension of Valley Transit Authority (VTA) Light Rail transit into Milpitas and East San Jose. Eleven new stations connect to VTA Bus service, with future transfer to BART (VTA 2007). The Tasman Light Rail Project was initially planned as a 12.4-mile expansion of the existing line. However, funding constraints resulted in a phased construction beginning with the Tasman West 7.6 mile segment to downtown Mountain View (completed 1999). The first phase of the Tasman East Light Rail project was completed in 2001 (running1.9 miles from Baypointe Transfer Station to I-880 in Milpitas.)The second phase is a 3.0-mile extension that runs along Capitol Avenue to Hostetter Road. The Capitol Light Rail Project is a 3.3-mile extension of the Tasman Light Rail Line continuing along Capitol Avenue from just south of Hostetter Road to Alum Rock Avenue, north of Capitol Expressway. Tasman East/Capitol Light Rail is now open with "most, if not all [contracts] close to completion" [84]. --- The Vasona Light Rail project is a 5.3-mile extension of VTA Light Rail Transit from downtown San Jose to the Winchester Station, south of downtown Campbell. It includes eight new stations and two park and ride lots, and ultimately will connect to bus service and BART. The project opened in 2005. An additional 1.5 miles is planned as part of a future extension to the Vasona Junction at Route 85 and Winchester Boulevard [84].

Exploratory Analysis of Cases

To begin exploring the selected cases, we required a focal point for doing so. Since a main goal of the project was to determine the extent to which low-income and minority community members obtain jobs in transit projects, we began by considering the "job shed" of potential workers for a given project site, which is a measure of proximity to job sites. Next, we sought to characterize the number and type of potential workers within job sheds.

Transit Project Job Sheds

A job shed describes an area enclosing the residences for workers employed at a given jobsite. We are interested in defining job sheds around our transit construction project sites and further characterizing workers within these job sheds according to their race/ethnicity, income levels, and commute distances. Defining an actual job shed would require detailed employee data for workers employed at a given site. Doing so is not attempted in our study. Instead, we seek to estimate reasonable job sheds using data available from the U.S. Census Bureau. However, this approach requires various data processing techniques and several assumptions.

The U.S. Census Bureau gathers data on commute times on the long-form questionnaire-based on residence; thus, data support estimates of a commute shed[25] rather than job shed. Furthermore, commute time must be multiplied by travel speed to compute distance traveled. Travel speed depends on route, traffic conditions, etc. Finally, cross-tabs of commute time (or distance for that matter) by income, race/ethnicity, and occupation are not available at the relatively fine resolution we require for studying "local participation in the building of transit projects." Crosstabs can be created using coarser resolution data, however.

As a first step, we linked several characteristics—income, race/ethnicity, and occupation—to commute times for each of the metropolitan areas for our selected projects using Public Use Microdata Sample (PUMS) 2000 data [31], available from the U.S. Census Bureau. PUMS areas (PUMAs) were aggregated to Consolidated Metropolitan Statistical Areas (CMSAs) according to a conversion table provided by the Missouri Census Data Center.[26] We considered commute times for 10th, 25th, 50th (median), 75th, and 90th percentiles for full-time construction workers and also for transportation/warehousing workers within each of the metropolitan areas for our selected projects.

[25] Commute shed describes the area workers travel from a given residential area to various jobsites.

[26] Los Angeles-Riverside-Orange County (CA) contains 110 PUMAs; New York, Northern New Jersey, Long Island, (NY-NJ-CT-PA) contains 93 PUMAs; St. Louis, (MO-IL) contains 15 PUMAs; and San Francisco-Oakland-San Jose (CA) contains 56 PUMAs. Dallas-Fort Worth (TX) contains 38 PUMAs, but 3 of these extend beyond the CMSA.

Table 3-5 shows the sample of construction workers for the five CMSAs. Each column is a subset of the column to the left. Therefore, for the five regions, there were a total of 4.7 million workers in the construction industry in 2000. In the survey period, 3.6 million of them were employed. Of the 3.6 million employed workers, 3.5 traveled to work—in other words, did not work at home. Among them, however, only 2.5 were full-time workers, which are defined as workers who worked more than 45 weeks the previous year and worked more than 30 hours a week. The focus on full-time workers makes the comparison consistent between different socio-economic groups, especially income groups.

Table 3-5
Construction Workers for the Five CMSAs

	Total	Employed	Commute > 0	Full Time
Dallas-Fort Worth	1,239,898	957,669	914,947	671,079
Los Angeles	847,551	634,898	604,390	419,870
New York	1,012,505	770,768	735,066	533,605
San Jose	1,160,519	906,050	861,524	629,266
St. Louis	460,916	364,687	348,735	260,498
Total	4,721,389	3,634,072	3,464,662	2,514,318

As shown in Table 3-5, in 2000, there were approximately 671,000 full-time construction workers who commuted to work in the Dallas-Fort region, 420,000 in the Los Angeles region, 534,000 in the New York region, 629,000 in the San Jose region, and 260,000 in the St. Louis region.

Table 3-6 shows the commute patterns of full-time construction workers in the five case study areas. St. Louis has the shortest commute time compared to the other four CMSAs.

Table 3-6 *Distribution of Commute Time for Full-Time Construction Workers for the Five CMSAs*

	Commuter	90th percentile	75th percentile	50th percentile	25the percentile	10th percentile
Dallas-Fort Worth	671,079	60	40	25	15	10
Los Angeles	419,870	60	45	30	15	10
New York	533,605	60	45	30	15	10
San Jose	629,266	60	40	25	15	10
St. Louis	260,498	60	35	20	15	10
Total	2,514,318	60	45	30	15	10

Median commute time of construction workers is between 20–30 minutes. Nearly all (90%) reach their jobsites within 60 minutes, regardless of race/ethnicity or income levels. Assuming a range of average travel speeds (15–35 MPH) and commute times (20–90 minutes) for construction workers, we can estimate several possible job shed radii. Job shed estimates based on these commute times and travel speeds range from less than five miles to the limits

of the metropolitan area, with several gradations in between. Therefore, we considered potential job sheds defined by 5-mile, 10-mile, and 25-mile limits around the selected transit projects, as well as the limits of their corresponding metropolitan areas.[27] We considered also a job-shed radius of one mile in an effort to delimit the area where environmental and public safety-related costs of a transit project are more likely to occur.[28]

Potential job sheds around our selected projects were computed using various GIS spatial analysis tools. Construction workers and minorities were tabulated for different scale job sheds from 1- to 32-mile job sheds. Table 3-7 shows estimates of minority persons, construction workers, and minority construction workers in the Dallas, Los Angeles, and New York job sheds.

Table 3-7

Construction Workers and Minorities within 1-, 5-, 16-, and 32-Mile Job Sheds and MSAs for Dallas, Los Angeles, and New York

	Number of Persons within Job Shed Radius				
	1-mile	*5 mile*	*16 mile*	*32 mile*	*MSA*
Dallas					
Total population in 2000	161,059	863,819	2,827,667	4,417,575	5,219,811
Minority persons	125,213	507,401	1,433,045	1,812,181	2,124,980
Construction workers	24,755	93,623	245,983	302,779	436,461
Minority construction workers					126,577
Los Angeles					
Total population in 2000	200,507	1,521,554	6,086,934	12,318,116	16,362,793
Minority persons	191,582	1,404,747	4,783,390	7,845,684	10,002,236
Construction workers	12,314	86,408	324,880	672,513	1,015,250
Minority construction workers					166,259
New York					
Total population in 2000	410,537	3,148,545	10,058,524	12,988,012	21,055,190
Minority persons	152,690	1,926,423	6,420,143	7,312,616	9,144,184
Construction workers	10,280	125,218	446,663	633,627	1,114,515
Minority construction workers					154,659

Source: Census [31]

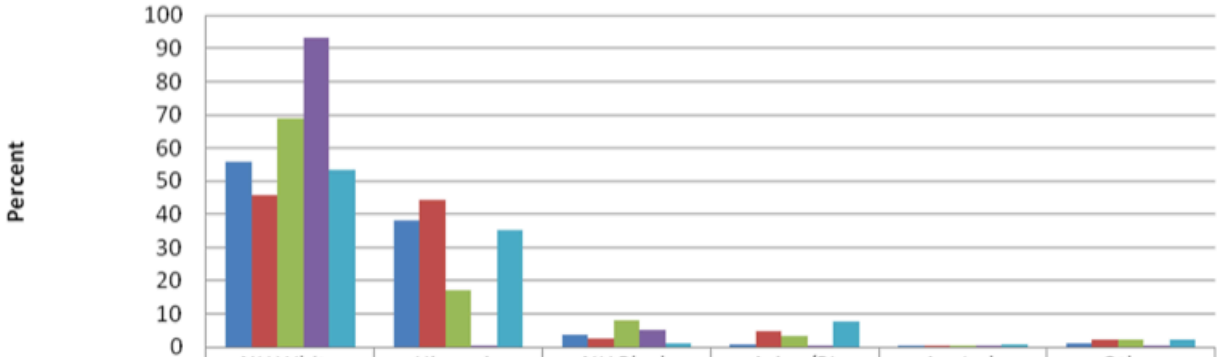
[27] Note that metropolitan areas are, by definition, job sheds. The census [23] describes these as areas having a "high degree of social and economic integration (as measured by commuting to work) with the urban core."

[28] Chakraborty [85] considers a one-mile buffer in an effort to enclose most of the adverse impacts associated with transportation projects (e.g., pollutants, noise, hazards.) The employment benefits, net of these costs, have important policy implications in these areas.

Characterization of Communities for Selected Cases

Our final selection of projects considered an analysis of indicators at the scales of city, county, and metropolitan area. Many of these indicators can support analysis at much finer resolution, namely census tracts.[29] As described above, a problem with data available at this scale (namely SF3 data from the U.S. Census Bureau) is that particular cross-tabulations of variables are not available. In particular, SF3 data cannot be used directly to estimate or map those census tracts having high proportions of construction workers that are also members of minority and low-income households. PUMS data, on the other hand, can be used to construct such cross-tabs. However, using PUMS data, we can only estimate counts of minority, low-income, construction worker households at the level of PUMA (areas comprising at least 100,000 people.)

We conducted this analysis for the distribution of race and ethnicity for the full-time construction workers in the five case study areas. Figure 3-2 shows the percentages of full-time construction workers in the five MSAs studied by race and ethnicity in 2000. Note that St. Louis had the least racial/ethnic diversity in the MSAs studied, with 93.3 percent Non-Hispanic White full-time construction workers, while in Los Angeles, Non-Hispanic Whites and Hispanics had almost equal representation in this employment sector.



	NH White	Hispanic	NH Black	Asian/PI	Am Ind.	Other
Dallas-Ft.Worth	55.7	38.1	3.8	0.9	0.5	1
Los Angeles	45.7	44.1	2.7	4.8	0.4	2.4
New York	69	17	8.1	3.3	0.2	2.3
St. Louis	93.3	0.1	5	0.3	0.2	0.2
San Jose	53.4	35.1	1.1	7.6	0.8	2.1

Source: Census PUMS [31]

Figure 3-2 *Distribution of race and ethnicity of full-time construction workers, 2000*

[29] Census tracts are statistical areas that are intended to serve as relatively stable geographic units for presentation of decennial census data. Census tracts generally have between 1,500 and 8,000 people, with an optimum size of 4,000 people. The spatial size of census tracts and block groups varies with density of settlement, covering much less ground in urban areas than in suburban or rural areas [86].

These results apply to entire metropolitan areas. To draw the inferences about minority and low-income construction workers at finer resolution, we can use census tract-level data but must make an assumption-based on Tobler's first law of geography, which states that, "Everything is related to everything else, but near things are more related than distant things" [87]. Put another way, objects tend to be more related the smaller the frame in which they are observed. When a set of features tends to relate spatially, or cluster, these features are said to be "spatially autocorrelated."[30] If we assume that households within census tracts, therefore, demonstrate relatively greater spatial autocorrelation, then we can assume also that tracts with high proportions of minority population or high proportions of construction workers also demonstrate relatively high degrees of spatial autocorrelation. Applying Tobler's first law, households within census tracts having high proportions of minority population and high proportions of construction workers are more likely to contain instances where minority population and construction workers are one and the same.

We computed and reported statistics for tract-level distributions of these indicators for the metropolitan areas of each of the selected projects. We further computed the intersection of upper quartile values for independent measures of minority and construction worker households. Based on this, we estimated the number of construction workers who are also members of minority communities within the MSAs selected for our study. Based on census tract analysis, Table 3-7 presents an estimate of the number of construction workers within the MSA of the study areas correcting for autocorrelation. This analysis reveals that the share of minority construction workers within the MSAs of the study areas is only a fraction of the estimates shown in Table 3-6 and is clustered in a small number of census tracts. The results for the St. Louis MSA are of particular concern compared to the other MSAs. While the total number of construction workers in the St. Louis MSA is smaller than in the other MSAs studied, compared to the other MSAs, minorities in construction in St. Louis constitute a small fraction of construction workers. When autocorrelation is taken into account, that number—146 minority construction workers or 0.02 % of the construction workers in the MSA—is miniscule.

[30] Spatial autocorrelation describes the degree to which a set of features tend to be clustered together (positive spatial autocorrelation) or evenly dispersed (negative spatial autocorrelation). The importance of, and conditions under which spatial autocorrelation can address data shortcomings is discussed in Gotway and Young [88].

Table 3-8

Estimate of Number of Minority Construction Workers in 2000 by MSA Taking into Account Autocorrelation

	CONSTRUC	CONSTRUC in CON 4q	CONSTRUC in MIN 4q	CONSTRUC in [(MIN 4q) AND (CON 4q)]
Dallas	200,416	131,364	37,752	35,154
Los Angeles	411,865	168,714	121,845	59,250
New York	504,520	174,155	80,932	15,566
St. Louis	78,396	35,342	2,481	146
San Jose	207,709	92,095	31,848	19,595

Given the job shed buffers described above and census tract-level indicators of interest, we estimated the population within these buffers according to these indicators. Specifically, block-level population counts were modeled as block centroids and assigned the corresponding characteristics compiled in SF3 for the corresponding block group. Population counts were summed according to where block centroids fell relative to the buffer areas.[31] Results are reported according to buffer and characteristic of interest. We further reported these counts according to the area and ZIP codes where the highest concentrations (upper quartile values) of minority, construction, and low-income households occurred within metropolitan areas for each of our selected projects. Table 3-9 provides percentage statistics of major indicators for the five projects selected by MSA.

[31] In an analysis of communities along the Mississippi Coast that were affected by Hurricane Katrina, McCarthy and Hanson [89] applied a similar approach. Importantly, the authors suggest that this method improves the accuracy of census-derived population estimates resulting from combining spatial data layers.

Table 3-9 *Summary Statistics for Indicators by MSA*

	Dallas		Los Angeles		New York		St. Louis		San Jose	
	n 1,050		*n 3,364*		*n 5,085*		*n 524*		*n=1,456*	
Indicator*	mean	s.d.**	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
NONHWH	57.6	28.4	40.3	28.9	54.2	34.8	72.2	32.9	51.2	25.4
MINORITY	42.4	28.4	59.7	28.9	45.8	34.8	27.8	32.9	48.8	25.4
NONHBL	15.1	21.3	7.1	12.9	18.0	26.8	23.3	33.3	7.6	13.3
NONHAS	3.6	4.6	10.2	12.6	6.7	9.7	1.3	2.0	17.9	16.5
HISPANIC	21.7	21.3	39	28.1	18.1	20.3	1.6	2.7	18.6	16.4
BELOWFPL	12.6	10.9	15.6	12.1	13.7	13.4	12.6	12.6	9.2	7.9
FORBORN	14.9	13.0	30.4	16.7	24.7	17.1	3.1	3.9	26.2	14.9
LATORIG	21.7	21.3	39.0	28.1	18.1	20.3	1.6	2.7	18.6	16.4
LINGISOL	0.2	0.5	0.7	1.9	1.8	3.0	0.4	0.8	0.6	0.8
NOCOLL	45.1	22.7	48.5	22.9	49.3	18.6	47.8	17.1	34.2	18.3
HINCLT35	37.7	19.3	39.3	19.3	36.7	19.5	42.2	19.3	26.9	14.9
RGT30PIN	32.2	10.5	41.8	11.3	38.1	12.2	32.0	12.2	37.9	10.5
RENTER	38.6	25.8	44.4	26.1	46.6	30.1	31.0	20.3	41.5	24.4
NOVEHICL	7.2	8.6	10.8	10.9	28.3	26.5	11.3	12.0	9.7	11.9
CONSTRUC	8.4	5.8	6.2	3.4	5.3	3.5	5.9	3.3	6.0	3.4
TRANWARE	5.6	3.2	4.2	2.6	5.7	3.9	5.1	2.4	4.1	2.8
PROSCITE	7.0	5.9	6.1	4.8	7.3	5.0	5.5	3.7	10.8	6.5
ADMSUPWM	4.3	2.6	4.6	2.7	3.6	2.4	3.7	2.0	4.1	2.4
UNEMPL	5.6	5.5	7.9	5.4	7.7	7.5	7.0	7.4	4.9	3.8
TRAVLT25	53.7	11.9	52.3	18.3			57.7	13.2	52.7	15.6
TRAV2544	28.1	7.3	26.8	7.6	24.4	7.7	27.8	8.4	25.8	7.2
TRAVGT45	16.2	8.0	18.9	7.8	30.3	14.3	13.4	7.5	20.8	8.4
PUBTRANS	2.4	4.2	5.5	7.8	28.1	23.6	4.3	6.9	9.8	10.3
WALKTOWK	2.8	3.3	4.6	6.3	6.9	8.5	2.8	3.6	6.0	8.3
LOWESTSk	42.0	13.7	45.5	15.9	42.3	15.0	46.1	13.7	37.2	14.5
LOWERSK	25.3	5.5	23.6	5.4	23.2	5.8	23.1	4.7	21.0	05.7
HIGHERSK	30.5	14.5	28.7	14.7	32.4	13.2	28.2	11.0	39.4	15.7

*See Table 3-2 for indicator definitions.
**s.d. = standard deviation

Table 3-10 summarizes population counts by selected measures within job shed buffer areas for the selected projects.

Table 3-10 *Population by Selected Measures within 1-, 5-, 10-, and 25-Mile Job Sheds*

Area/Indicator*	1 mile	5 mile	10 mile	25 mile	MSA
Dallas					
POP2000	161,059	863,819	1,940,174	3,881,987	5,219,811
MINORITY	125,213	507,401	1,039,644	1,682,838	2,124,980
HISPANIC	86,181	303,330	578,760	866,018	1,119,674
CONSTRUC	24,755	93,623	179,146	300,729	436,461
LOWERSK	46,732	228,151	491,112	953,212	1,324,807
LOWESTSK	82,747	368,503	831,264	1,560,332	2,171,224
UNEMPL	14,845	60,083	115,804	193,081	265,755
Los Angeles					
POP2000	200,507	1,521,554	3,827,562	9,599,420	16,362,793
MINORITY	191,582	1,404,747	3,208,507	6,740,073	10,002,236
HISPANIC	162,403	1,082,111	2,192,059	4,333,001	6,597,653
CONSTRUC	12,314	86,408	201,155	518,672	1,015,250
LOWERSK	51,738	341,394	851,229	2,154,627	3,878,482
LOWESTSK	120,766	910,092	2,098,281	4,664,398	7,576,664
UNEMPL	26,728	171,707	405,582	821,216	1,290,173
New York					
POP2000	410,537	3,148,545	7,174,475	12,644,308	21,055,190
MINORITY	152,690	1,926,423	4,816,368	7,269,339	9,144,184
HISPANIC	66,589	1,014,878	2,213,961	3,056,767	3,816,323
CONSTRUC	10,280	125,218	311,734	587,349	1,114,515
LOWERSK	76,722	630,390	1,562,888	2,844,634	4,880,140
LOWESTSK	120,355	1,364,762	3,377,160	5,684,856	8,811,134
UNEMPL	24,570	320,209	773,194	1,138,682	1,525,934
San Jose					
POP2000	107,175	541,067	1,280,681	2,662,238	7,031,628
MINORITY	86,705	431,713	809,441	1,432,321	3,479,920
HISPANIC	33,408	201,970	345,798	594,687	1,381,687
CONSTRUC	5,518	32,835	68,698	145,838	430,380
LOWERSK	20,405	107,183	246,927	520,708	1,499,269
LOWESTSK	48,058	259,811	502,798	960,344	2,666,174
UNEMPL	4,566	27,713	53,756	107,490	337,226
St. Louis					
POP2000	64,455	496,048	1,026,665	2,057,509	2,603,350
MINORITY	15,089	187,392	388,985	554,138	588,084
HISPANIC	1,390	8,072	16,862	33,294	39,514
CONSTRUC	1,872	20,218	46,177	109,653	159,965
LOWERSK	12,378	103,984	221,399	470,644	613,072
LOWESTSK	18,168	218,336	466,340	907,644	1,158,677
UNEMPL	5,716	39,103	79,493	129,716	151,365

*See Table 3-2 for indicator definitions.

Factor Analysis

We also conducted a factor analysis using the tract-level indicators previously developed. Factor analysis is a multivariate statistical technique that relates a multitude of variables to common dimensions-based on their mutual correlative relationships. While the result is often used to reduce large datasets to a minimal set of "factors," it is also used to better understand the underlying structural relationships within the dataset that are the basis of these factors. Applied to census data, factor analysis can be used to reasonably characterize communities according to indicators of interest. The "factor loadings" of these indicators provide insight into the underlying structural relationships among our indicators. In particular, results demonstrate which variables tend to group together for a given factor. Heikkila [90] interpreted factor loadings for variables with the same sign (+/-) as being shared characteristics of "Tieboutian clubs."[32] By mapping normalized "factor scores," Heikkila demonstrated that such clubs do indeed exist as discrete areas reinforced by the many municipal boundaries within Los Angeles County. A detailed discussion of factor analysis and Tiebout sorting is beyond the scope of our study,[33] but these, nonetheless, provide important means for characterizing and understanding our project areas given our data.

Appendix D provides key components of the factor analysis, including indicators of interest and the factor loadings for the first three factors, grouped by the sign of their eigenvectors. According to their eigenvalues, the first three factors describe between 58 and 65 percent of variation within the data for each of the metropolitan areas encompassing our selected projects. According to a standard rule of thumb, the other principle components are not important.[34]

Results of the factor analysis allowed us to see which of the many indicators tend to associate with one another in our project areas, and which do not. The results assisted us in providing a richer description of workers and their neighborhoods, and understanding how and where to focus our survey and outreach efforts.

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[32] Tieboutian clubs are the result of Tiebout sorting, named after work of Charles Tiebout [91]. The Tiebout Hypothesis predicts the tendency for people to distribute themselves according to their preferences for various local goods and services.

[33] See Griffith and Amrhein [92] for a discussion of factor analysis, and Heikkila [90] for discussion of an application of factor analysis using census data. Our approach largely follows that of Heikkila, who demonstrated Tiebout sorting in Los Angeles County using 1990 census data.

[34] Of the various rules compiled by Griffith and Amrhein [92](1996), the most easily applied is "Rule Of Thumb 6.2. Only eigenvalues accounting for at least 5% of the total variance are important."

Results of Factor Analysis for Selected Project Areas

The factor analysis suggested that many indicators of interest positively associate with CONSTRUC; our indicator of households with members that report being employed in construction work. We focused in particular on the association of MINORITY, HISPANIC, HINCLT35 (household income < $35,000), UNEMPL, LOWESTSK (average annual salary < $30,000), LOWERSK (average annual salary between $30,000–40,000) with CONSTRUC. Such associations, we suggest, are most relevant to our study. Identifying areas according to race/ethnicity and low-income status around our selected projects is an explicit requirement of our study. Furthermore, the indicators of lower skill levels and unemployment likely represent those who may be most likely to pursue job opportunities associated with transit construction.[35] Remaining indicators—NOCOLL (no college), LATBORN, LINGISOL (% of adults for which English not spoken "very well" at home), PUBTRANS, TRAVGT45 (commute time greater than 45 minutes), etc.—help to paint a rich description of the construction workers and their neighborhoods around the transit construction projects we have selected for study.

Reviewing loadings for Factor 1, MINORITY, HISPANIC, LATBORN, and HINCLT35 associate with CONSTRUC for Dallas, Los Angeles, and San Jose (but not for New York and St. Louis).[36] Several other indicators of interest—namely, lower skill levels and unemployment also associate with CONSTRUC in these areas. MINORITY and HINCLT35 do not associate at all with CONSTRUC for New York for any of the factors, but LOWERSK, LOWESTSK, HISPANIC, and LATBORN do for Factor 3; this same characterization applies to St. Louis, except that HINCLT35 also associates with CONSTRUC in this area.

Normalizing factor scores and mapping them by census tract, we identified neighborhoods where existing construction workers, further characterized by their minority or low-income status, were located. These are represented by highest values of Factor 1 for Dallas, Los Angeles, and San Jose, and high values of Factor 3 for New York and St. Louis (Hispanic only for these last two areas.)

According to Factors 1 and 3, members of communities having minority, low-income construction workers occur may also be linguistically isolated and travel for more than 45 minutes on public transit to reach their jobsites. The variables LINGISOL, TRAVGT45, and PUBTRANS associate positively with Factors 1 and 3 for all study areas. One interpretation is that these additional characteristics appear not to prevent these workers from work (but may create challenges for some); indeed, UNEMPL also associates with Factor 1 in Dallas, Los Angeles,

[35] Those employed in jobs requiring specialized skills in management, law, medicine, education, etc. (i.e., those indicated by HIGHERSK), we reason, are less likely to do so.

[36] More specifically, each of these indicators associates positively with Factor 1.

and San Jose. These same communities do not include workers employed in professional, scientific or technical occupations (PROSCITE does not associate with Factors 1 and 3 in any area), but these communities often have workers with jobs in transportation, warehousing, administrative support, and waste management (TRANWARE and ADMSUPWM associate positively with Factors 1 and 3, except ADMSUPWM in New York and TRANWARE in St. Louis.)

Given that members of minority groups other than Latino appear not to associate at all with construction work in New York or St. Louis, results of our factor analysis suggest that outreach and skills training for Non-Hispanic Black and Asian groups who may be interested in transit construction opportunities may present a greater challenge in these areas.

Conclusions from the Analysis

The analysis conducted identifies several challenging issues for increasing participation of local, low-income, and minority populations in transit employment. We highlight them as follows.

Estimates of minority construction workers within the project MSAs indicate that the labor pool even within one mile of the projects exceeds 10,000 workers (Table 3-7), exceeding the labor demand for the projects. This indicates that competition for transit projects would be very strong even within the areas closest to projects.

In some MSAs—for example, Dallas and Los Angeles—areas within one mile of the project site are predominantly populated by minority residents, and within the MSAs, there are likely hundreds of thousands of low-income and minority construction workers, given the high mobility of construction workers. However, in many of these MSAs, low-income minority construction workers would be competing in a labor pool of more than 70 percent White Non-Hispanic, which will mean that for local minority workers to obtain jobs will be highly competitive.

Since we selected case study areas characterized by high proportions of minority and low-income persons, higher unemployment rates, etc., we can infer that workers within the selected study areas are likely to be attracted to the job opportunities associated with transit construction. However, the analysis also suggests that in the New York City and St. Louis MSAs, Non-Hispanic Black and Asian groups interested in transit construction are likely to require great efforts to incorporate into the construction labor force. In particular, the estimate of St. Louis MSA (Table 3-7) minority construction workers (146 workers) is troubling.

The early analyses conducted to identify the case studies and characterize the study areas emphasized the role of job sheds to ascertain the accessibility of

local minority and low-income workers for engaging in transit construction employment. As the project advanced, our increasing understanding of the mediating role of unions (except in the Dallas case), which are gateways for low-income construction employment, subsequently lessened the importance of job sheds in our analysis.

Case Study Selection Update

With the identification of five case study areas and an understanding of their market characteristics, our next step involved contacting respective transit agencies for project-level data and information. The ensuing interaction with transit agencies resulted in changes to our final list of case studies.

We identified two Santa Clara VTA projects. VTA recommended that we pursue the Vasona Light Rail project instead of the Tasman East/Capitol Light Rail project. Information on the Vasona Light Rail project, according to VTA, was readily-available, which led us to choose this for further study. The Vasona project had also been included in the original 25 projects.

After conducting preliminary analysis of the St. Louis Metro's Cross Country Extension project, St. Louis Metro recommended in 2011 that we examine the St. Clair Extension as a case study instead of the Cross County Metro Extension project. According to St. Louis Metro, litigation on the Cross County Metro Extension between the agency and its minority contractors would prevent the agency from freely sharing information with us.[37] We followed St. Louis Metro's recommendation and analyzed the St. Clair Extension project instead. No separate job shed analysis was conducted for the St. Clair Extension project, but the projects share the same MSA.

After conducting a preliminary analysis, in 2011, we dropped the Long Island East Side Access project in New York City as a case study because we were not able to get MTA's cooperation. MTA responded to our repeated requests by finally stating that staff would not be able to assist us since they were significantly behind their construction schedule.[38]

[37] The April 2010 suit between a minority contractors group and the NAACP against St. Louis Metro on a segment of the St. Louis Metro Cross County Extension claimed that Metro "failed to live up to its end of an agreement to ensure more minority-owned firms were hired in the building of the Shrewsbury MetroLink line." See Leiser [93] for a St. Louis Post-Dispatch article on the suit.

[38] In 2007, the MTA estimated the project would cost $6.3B and be completed by 2013. By 2011, the project was seriously behind schedule, and in 2012, MTA announced that the project would cost $8.4B with a completion date moved back to 2019. See the NY Times article by Moynihan [94] for a 2012 update.

In the end, the following four projects were selected for in-depth case study and are presented in the next sections:

- Vasona Light Rail, VTA, San Jose
- Green Line Project, DART, Dallas
- St. Clair Extension, Metro, St. Louis
- Gold Line Eastside Extension, Metro, Los Angeles

SECTION 4

Introduction to Case Studies

The four case studies presented in Chapters 5–8 summarize field work that took place from 2008–2012 and reviews of relevant published literature and agency and related documents. The field work consisted of site visits, surveys, and interviews with transit agency officials, union representatives, contractors and subcontractors, and DBEs. In this section, we present the organization of the case studies that follow and explain the sequence of case studies. Section 9 provides a comparative assessment of the case study findings and identifies areas for future research.

Research Methods

In all case studies, we used a combination of literature reviews, interviews, and surveys.

Literature Reviews

Most of the case studies have not been the subject of peer-reviewed literature. Thus, the literature reviewed that informs the case studies is composed primarily of agency and project documents, in particular, the following:

- Environmental Impact Statements (EISs) provide us with valuable information on the justification for the project, the types of work that they project would likely generate, and community impacts.
- Contracts provide information on the type of contract, DBE goals, list of contractors, subcontractors, and DBEs, as well as contract requirements for contractors and subcontractors.
- Other agency documents include progress reports on the project to agency boards, financial statements on project expenditures, DBE services, etc.

Surveys

In 2009, to obtain information on contractor, subcontractor, and DBE characteristics and their attitudes towards the DBE program in Southern California as part of the research for LA Metro's Gold Line Extension, we developed a survey and contracted with a professional firm, Interviewing Service of America (ISA), to conduct telephone surveys of a large sample of contractors in the region. We designed the survey for transportation construction contractors who had participated in projects in the Southern California metropolitan areas within the past 10 years. A total of 246 firms that met this

criterion responded to the survey, with 177 identifying their firms as minority-owned and 69 as non-minority-owned. Of the minority firms, 157 (89%) were DBE firms, and 7 of the non-minority firms were women-owned. The survey intentionally oversampled minority and DBE firms and included structured and open-ended questions. Appendix E includes a description of the methodology employed in the survey and results of the survey. The surveys were conducted at the end of 2009–beginning of 2010. The relevant results of the survey are summarized in the LA Metro's Gold Line Extension case. We did not conduct similar surveys for the other cases.

Well-designed and administered surveys can be important to establish important characteristics and perceptions of a population but, after conducting the survey for Southern California contractors, the research team realized that the results of the survey provided limited insights. For the remaining cases, we relied on interviews with contractors, primarily DBE firms, that were conducted by research faculty either in person or by telephone. In this way, we conducted fewer interviews but were able to pose follow-up questions to gain a better understanding of the characteristics and issues that concern minority firms.

In addition, we developed and conducted a survey of workers in the Cement Masons Union in Los Angeles; Appendix F includes the survey and the survey results. The survey was a convenience sample that a union representative provided to union members in the fall of 2009. Unfortunately, none of the workers that completed the survey reported working on Metro's Gold Line Extension Project, and, of greater concern, most of the respondents reported they had not worked in transportation construction. In addition, 98 percent of the respondents indicated that they were of Hispanic/Latino origin, making the sample skewed, since the Hispanic membership of the Union, according to union officials, was 60 percent. Consequently, we decided that convenience sample surveys of union workers were too broad-brushed to be useful and, therefore, we did not conduct any other such surveys of workers.

Interviews

Since we wanted to develop case studies that provided in-depth understanding of the dynamics of the contracting and institutional context of local minority and low-income employment in transit projects, we increasingly turned to interviews as a major field study method. In our field work, we conducted interviews with agency officials, contractors, subcontractors, DBEs, and union representatives in the case study areas. Many of the interviews were in-person interviews during our field visits, and some were group interviews of several transit agency officials or contractors. We also held focus groups with union officials connected with VTA's Vasona project, LA Metro's Gold Line Extension, and St. Louis Metro's St. Clair project. For both the focus group interviews and individual interviews, we followed a structured protocol with the same or similar questions for

contractors and union officials. Appendix G includes the set of questions used for the interviews and a list of interviewees. In some cases, such as VTA's Vasona project, we conducted telephone interviews using the same protocol.

Organization of Case Studies

The case studies are organized as follows:

- *Agency profiles*—these include a brief description of the transit agency, including an overview of its light rail system, to situate the project within the larger transit system. The profiles are based on information published by the transit agencies and other sources.
- *Urban context*—a brief profile of the MSA, city, and county, as appropriate, is included in this section, based on the socio-economic analyses summarized in Section 3.
- *Light rail project overview*—this includes a description of the project, purpose, cost, length/stations, funding sources, and construction jobs anticipated. The data presented in this section are drawn from EISs for the projects, contract documents, and other information published by the agencies on the projects, as well as interviews with agency officials.
- *Contracting process*—this includes contract dates, prime contractor(s) selected, subcontractors, and DBEs. The source for much of this information is the contract documents. This section also describes the DBE process and the agency office in charge of DBE outreach, as well as the results of interviews with DBE subcontractors. Interviews with DBEs provide the characteristics of the firms, including size, percent of minority and women staff, and DBE views on the contracting process and DBE opportunities.
- *Minority and low-income participation in transit construction*—in states where labor is unionized, we focused on trade unions, their minority composition, and their recruitment practices and opportunities for mobility. We also reflected on the extent to which minorities and low-income persons obtained the jobs in the construction of the light rail project. This section relies primarily on interviews with union representatives, agency officials, contractors, subcontractors, and DBEs.
- *Conclusions and promising practices*—we conclude each case study section by identifying some promising practices in contracting or outreach to DBEs or local minority or low-income populations.

Note that the extent of treatment of some topics in the case studies varies. In particular, we may cover a subject matter more extensively in one case, which makes it unnecessary to cover the same or similar topic in the subsequent chapters. For example, in the Santa Clara VTA case, the first case discussed, we cover extensively the different unions and their recruitment practices and requirements for apprentices, as well as contracting bidding requirements. These

topics are not discussed as extensively in subsequent cases unless there are striking differences among the cases.

Sequence of Case Studies

We began our field work on the LA Metro Gold Line Extension project in 2009 with initial interviews, data collection, and a contractor survey briefly reviewed above . The LA Metro case, however, was a difficult first case. LA Metro is the third largest metropolitan transit agency in the U.S., surpassed only by New York City's Metropolitan Transportation Authority and Chicago Transit Authority, and we encountered delays in obtaining information on the project and access to agency officials and union leaders. As a result, we decided to set this case aside, proceed to conduct field work for the other cases, and return to the LA Metro case towards the end of our project. The first case study we completed, including field work, was VTA's Vasona Extension in 2010, followed by DART's Green Line, and St. Louis Metro's St. Clair Extension project in 2011. After several initial interviews with NYC MTA East Side Access representatives in 2010, and no cooperation in providing access to project documents, finally, in 2011, MTA officials explained they would not be able to collaborate with us given their construction delays. As a result, we dropped the MTA case. We returned to LA Metro's Gold Line in late 2011–2012, conducting follow-up interviews and agency document review. The sequence of case studies in the next sections follows the sequence in which we completed our case studies.

Comparative Assessment of Cases

Section 9 compares the four cases we investigated, focusing on factors that influence the extent to which local minority and low-income persons get the jobs in light rail construction projects, such as type of contract, minorities in the construction labor force, and outreach measures. It concludes by identifying needs for future research.

SECTION 5

Santa Clara County VTA's Vasona Light Rail Project

Agency Profile: Santa Clara County (VTA)

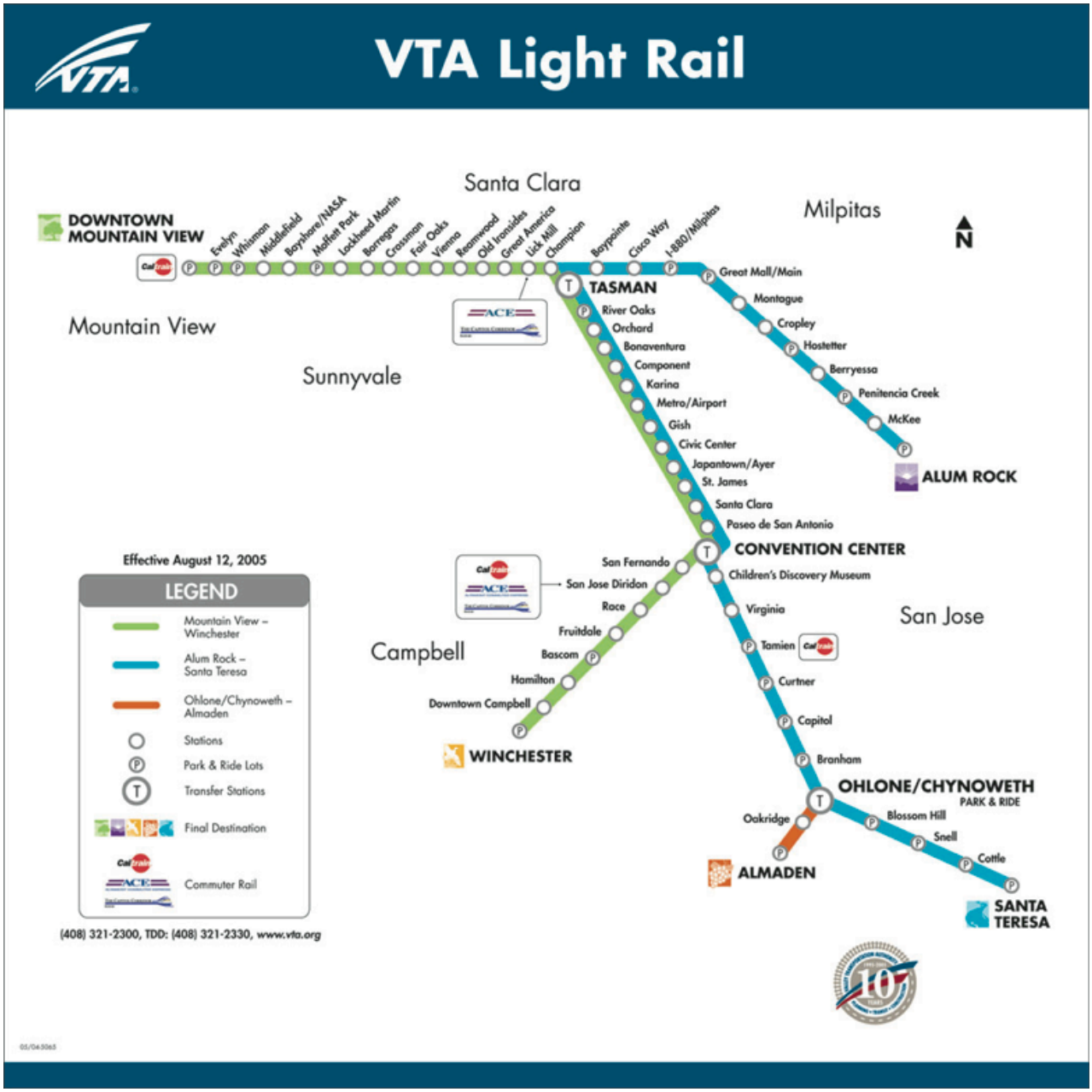
Established in 1995 as an independent special district, the Santa Clara Valley Transportation Authority (VTA) oversees bus and light rail operations, congestion management, specific highway improvement projects, and countywide transportation planning. VTA provides bus service to the 326-square-mile urbanized area in Santa Clara County and light rail service to the cities of San Jose, Santa Clara, Sunnyvale, Campbell and Mountain View along its 42.2-mile rail system. VTA's 2,100 employees provide bus and rail service to approximately 140,000 passengers each day [95].

VTA is run by a 12-member Board of Directors. During FY 2010, operating expenses were $262.8M and other expenses totaled $67.9M. Overall, expenses totaled $330.7M and operating revenues totaled nearly $347M. During this period, net income in VTA's Transit Fund was $16.3M [96].

VTA's predecessor, "County Transit", began providing the county's first publicly-operated bus service in 1973 when it purchased three local bus lines that were struggling financially. The system's initial fleet of 50 buses grew to 424 active buses by FY 2009 [97]. As of FY 2009, VTA operated 75 bus routes and served a total of 34,510,273 annual riders with an average weekday ridership of 111,820 [98].

When VTA began providing light rail service in 1987, the first line extended from Old Ironsides to Younger Street. The next extension was a nine-mile segment connecting Santa Clara to downtown San Jose, which was completed in June 1988. Today, VTA operates 99 light rail vehicles and 4 historic trolleys serving 62 stations along a 42.2-mile light rail system. In FY 2009, the light rail system's total ridership was 10,754,161, with about 34,305 on an average weekday [99]. In 2010, according to APTA, VTA was ranked 31 among the 50 top transit agencies in the country in unlinked passenger trips [13].

In this case study, we focused on the Vasona Light Rail Extension Project, from the Convention Center to Winchester, the southwest segment of the Green Line. Figure 5-1 is a map of VTA's light rail system.



Source: VTA

Figure 5-1 *Santa Clara VTA's Light Rail System*

Urban Context

VTA serves the metropolitan area of San Jose-Sunnyvale-Santa Clara, nested within the larger CMSA of San Francisco-Oakland-San Jose. The MSA experienced a 13.1 percent growth rate during the 1990–2000 period, placing this growth in a mid-range ranking among the 100 largest metropolitan areas in

the country [100]. The population growth during this period led to greater road congestion and motivated the light rail projects that VTA has undertaken since that period. Table 5-1 provides basic statistics for the MSA, Santa Clara County, and the city of San Jose in 2000 based on the analysis reported in Section 2 and Appendix C tables. As the table shows, the region's diverse population included 29.9 percent Asians and 25 percent Hispanics in the county, with a larger Hispanic population (31.5%) in the city of San Jose. In terms of low-income indicators, the area had a smaller percentage of population below the poverty line, which was 11.3 percent nationally. In 2000, 7.3 percent of the civilian population in the U.S. was employed in construction compared to the MSA's rate of 5.9 percent, although the city of San Jose's percentage of construction workers fits the national profile

Table 5-1 *Selected Characteristics of VTA Urban Region, 2000*

Characteristics	MSA	Santa Clara County	City of San Jose
Total Population	1,726,057	1,669,890	887,330
Growth rate (1990–2000)	13.1		14.4
Land Area (sq. mi.)		1,290	175
Density (pop/sq. mi.)		1,294	5,070
Race/Ethnicity			
% Minority (Non-White)	46.9	47.2	49.6
Non-Hispanic White		39.4	31.8
Non-Hispanic Black		2.4	3.1
Non-Hispanic Asian		29.9	30.3
Hispanic/Latino		25.0	31.5
Low-income Indicators			
% of households with income < $35K	22.4	22.4	23.6
% of occupied housing units renter-occupied	39.4	39.8	39.0
% of renter households spending > 30% of income on rent	49.9	45.2	49.4
% of population below federal poverty level	8.4	8.3	10.0
% of civilian labor force unemployed	6.8	6.7	7.3
Construction Employment			
% of civilian employed population in construction	5.9	5.9	7.3
% of MSA minorities in construction in 2000	46.6		

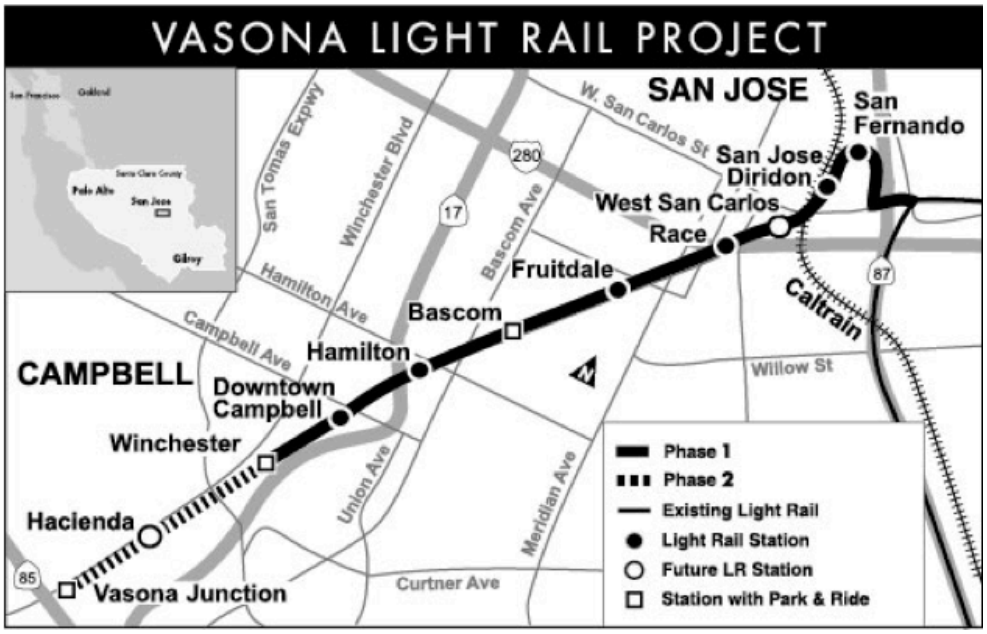
As a result of its diverse population, it was expected that minority workers would make up a sizable percentage of union members in the construction trades, and this was confirmed by the percentage of minorities in construction in the MSA (47%), the large proportion of which are likely Hispanic. As a result, we estimated that Hispanics likely obtained at least 30–40 percent of the jobs in the construction of the light rail project. VTA serves a higher-income population, with a median household income of $74,335 in the MSA compared to the median household income in the U.S. of $41,994 in 2000. This implies that there were

likely fewer lower-income workers employed in construction living in the MSA, but a relatively higher proportion of them living in San Jose.

Project Overview: Vasona Light Rail System

The Vasona Light Rail Extension Project is a 5.3-mile extension to the existing 36.9-mile Santa Clara VTA light rail system. Vasona Light Rail operates primarily on the existing Union Pacific Railroad (UPRR) right-of-way between the San Jose Diridon Station and Vasona Junction, with the segment between the San Fernando and San Jose Diridon stations operating within a tunnel alignment. Figure 5-2 is a map of the Vasona segment.

Figure 5-2
Vasona Corridor Light Rail Project



Source: Vasona Corridor Project FEISR [101]

The purpose of this project was to provide a quality and accessible public transportation system to the cities of San Jose, Campbell, and Los Gatos. Minimizing environmental effects on existing land uses to the extent practical, the project was meant to reduce automobile trips and energy consumption and thus improve air quality. The substantial growth and development in Santa Clara County had caused transportation system deficiencies in the Vasona Corridor. Basically, the low level of service, "F," at a number of locations along Highway 17/I-880, the primary transportation facility in the Vasona Corridor, results from the existing congestion and limited opportunities for widening the existing freeways. As a way of addressing this deficiency, to accommodate growth, and to provide future transit improvements, the Santa Clara County Transportation

Agency's plan, Transportation 2010 (i.e., T-2010) called for the construction of the Vasona Corridor [101].

The project included eight new stations: San Fernando, San Jose Diridon, Race, Fruitdale, Bascom, Hamilton, Downtown Campbell, and Winchester. In addition, the project constructed 102 parking spaces at the Bascom Station and 55 spaces at the Winchester Station. Forecasted daily ridership was between 8,000 and 9,000 riders, with trains running at 10-minute intervals during peak times. Travel time from Winchester Station to Downtown San Jose is approximately 16 minutes. This project includes a direct connection to Caltrain, Amtrak, and Altamont Commuter Express rail service as well as the service for access to the San Jose Arena. Figure 5-3 is a photo of Campbell Station.

Figure 5-3

Campbell Station on VTA's Vasona Line

Source: Santa Clara VTA

The total capital cost of the Phase I Vasona line was budgeted at $313.0M. The second phase, in the planning stage in 2011, would extend service to Vasona Junction and includes two new stations, one at Hacienda and one at Vasona Junction. A total of $59M has been allocated for Phase II. This study focused on Phase I. Table 1 provides a breakdown of the costs of Phase I by source of funding. Federal funding for Phase I represented about 20 percent of total project cost.

Table 5-2

Costs of Vasona Light Rail Project by Funding Source

Costs	Project Budget	Cost Estimate as of 09/30/07	Expenditure as of 09/30/07
Federal share $ & (%)*	$61.5M (19.6%)	$61.5M (19.6%)	$60.9M (99.1%)
Local share $ & (%)	$251.5M (80.4%)	$251.5M (80.4%)	$248.5M (98.8%)
Contingency	$6.7M (2%)	$5.6 M	$5.6M
Total costs	$313.0M	$313.0M	$309.5M (98.9%)

*Federal share includes $60.6M in FTA funding and $0.9M in FHWA funding.
Source: Gannet Fleming, Inc. [102, p. 2]

The Vasona Line began revenue service on October 1, 2005, three months ahead of schedule. It did not achieve the planned closeout date of December 31, 2006; final closeout was delayed by land transfers and closing out of consultant contracts until the spring of 2010.

Contracting Process

General Contract

The Santa Clara VTA was the responsible agency for the Vasona project, and other entities, such as the City of San Jose, City of Campbell, Caltrans, Santa Clara Valley Water District, Pacific Gas and Electric, and Pacific Bell, played supplementary roles in the project. The type of contract used was design-bid-build, which provides the construction contract to the lowest bidder. VTA packaged the Vasona project into 20 prime contracts with associated subcontracts. According to VTA officials, packaging light rail contracts into multiple prime contracts instead of using one prime contract, has been VTA's standard approach since the early 1980s. VTA officials explained that they package contracts to create more opportunities for local and DBE firms (Smith, Haywood, Robinson, unpublished data).

Hamilton Avenue Crossing Contract

Since the contracting process was similar for the 20 prime contracts, VTA recommended that we focus on one of the 20 prime contracts. In consultation with VTA, we selected the Hamilton Avenue Crossing. It was a typical contract in the Vasona Line project, all the relevant information was available, and most of the contract dollars were allocated for construction.

Specifics of this VTA contract include the following:

- Issue date for bid: March 28, 2003
- Date when bid opened: April 28, 2003 (2nd rebid)
- Starting date: June 26, 2003
- Contract completion date: Aug 26, 2004
- Duration of contract (number of calendar days): 428 days

Three types of conditions were required in the contract: general conditions, special conditions, and technical specifications. General condition requirements include responsibility for contract modification (Disputes and Claims), suspension of work and termination, and warranty provisions. These conditions generally cover scope of work, control of work, legal relations and responsibility, and other Caltrans standard specifications. Under general condition requirements, prime contractors need to be fully experienced and properly qualified firms to perform the work with a proper license, equipment, organization, and finance.

The prime contractor is fully responsible for the work of its subcontractors, and prime contracts do not establish any relationship between subcontractors and VTA. Prime contractors provide all necessary plans, specifications, schedules, and instructions to their suppliers and subcontractors for proper performance and also submit executed copies of all contracts regarding subcontracts to VTA within 60 calendar days from issuance of a notice of award. Special conditions involve performance/payment bond, certificate of insurance, special endorsement(s), material suppliers list, and DBE utilization reports. Technical specifications not only contain general requirements (for track installation only) for work sequence and constraints, but also provide the direction regarding site work and thermal/moisture protection. Special conditions, such as bonding and a certificate of insurance to be supplied within six working days following notice of contract approval, are often noted as obstacles for small businesses and, in particular, for DBEs to make the transition from subcontractor to prime [103].

The bid issued for this prime contract included a list of bid items, which VTA identified in its bid announcement. The bid schedule of quantities and prices, submitted by prime contractors in their bids, describe the bid items, the quantity for each item, the unit in which it is measured, the per-unit price, and the total price per bid item. Examples of the bid items included temporary fencing, relocation of storm drain pipes, roadway excavation, and structural concrete—bridge footing, sound wall, cobblestone paving, painted traffic stripe, remove chain link fence, etc.[39]

VTA has an Office of Small and Disadvantaged Businesses at which small or disadvantaged businesses can apply for DBE or SBE certification. The Office also provides assistance to prospective prime bidders to identify qualified DBE or SBE subcontractors. As indicated above, VTA, with its prior knowledge of DBEs, SBEs, and local firms in general and their specializations, can facilitate the use of DBEs by breaking down the contract into a set of bid items for which there will be enough DBE firms with the expertise to be subcontractors (Lee, unpublished data).

The prime contractor selected for the Hamilton Avenue Crossing project was Stacy and Witbeck, Inc./R.M. Harris Co., Inc., JV, a new joint venture. The prime contractor entered into a construction agreement for the furnishing of all materials, labor, and services and transportation necessary, convenient, and proper to the performance of "Route 17 underpass and Hamilton Avenue

[39] The temporary fence bid item in the Hamilton Crossing contract submitted by the winning prime, for example, was measured in meters—107 meters of temporary fence was indicated, the dollar price per meter was $16, and the total amount for the bid item was $1,712. Thus, prime contractors in their bids identify the subcontractor, the bid item, and the total price per bid item. This information is important because the bids are judged not only on the lowest overall cost, but also on meeting the percent of the total contract amount awarded to DBEs and SBEs [103].

overcrossing." As shown in Table 5-3, the prime included 13 subcontractors for 13 bid items. All subcontractors came from the greater San Francisco Bay Area, including San Jose, San Francisco, Hayward, and Richmond. Seven of the 13 subcontractors identified in the bid were women- or minority-owned firms.

Table 5-3 *Hamilton Crossing Subcontractor List by Bid Items*

Name of subcontractor	Location (CA)	Minority or Women Owned Firm	Bid item
R&W Concrete Construction, Inc.	San Francisco	M	Flatwork & platform
CASE Pacific	Hayward		Piles
CONFAB Corp	Lathrop		Precast girders
Harris/Salinas Rebar	Livermore		Rebar
Golden Bay Fence	Hayward	M	Fences
Lori and Company	Stockton	W	Hauling pre-cast girders
Sealtech	San Jose	W	Waterproofing
Corrpro Company, Inc.	San Leandro		Remove/moving
Lane Safety Co., Inc.	Benicia	W	Traffic control
Cirimele Electric	Richmond	W	Electronic
San Jose Transport	Gilroy	M	Trucking
CTM Construction Inc.	Rancho		Concrete barrier rail
Rileys Striping	Benicia		Striping

Source: VTA Vasona Contract [103]

The total cost in this project, one out of 20 that comprised the Vasona Light Rail Corridor, was $6,453,520. The amount allocated to general construction was $5,559,334, making up a large portion (86%) of the total cost. The percent of total costs allocated for process fee and rail construction were about 7.5 and 5.7 percent, respectively. The dollar amount allocated to sub-contractors of the total cost was $2,750,000 (42.6%), and the amount that the prime contractor allocated to DBEs was $766,686 (11.88%, exceeding VTA's contract goal of 11%) [103]. The contractor achieved the DBE goal (Robinson, unpublished data).

DBE Process for Hamilton Crossing Contract

VTA, following federal regulations, set out the contract bidding process with a DBE goal for the Vasona Light Rail Extension Project at 19 percent of total contract dollars [102]. Each of the 20 projects was assigned a different goal based on VTA's knowledge of the available pool of DBE firms to conduct the specific work required in each contract, some with a higher DBE goal and some with a lower goal, to total an overall project goal of 19 percent. As indicated above, in the Hamilton Crossing contract, the goal was 11 percent. The Hamilton Crossing contract was issued for bid March 28, 2003, and the bid opening date was April 28, 2003; thus, potential prime bidders had one month in which to identify all subcontractors, including DBE firms. VTA awards contracts to the lowest

responsible and responsive bidder as required by federal and California laws and VTA DBE policy [103].

After the agency puts out the bid announcement, prime bidders must identify bid items or further break down bid items to solicit DBE participation. VTA's Office of Small and Disadvantaged Businesses plays a crucial role in facilitating the inclusion of DBE firms in agency contracts, from providing listings of certified DBEs to a special phone line for assistance in identifying eligible firms. A section below provides a fuller account of the Office's outreach efforts.

One working day after the bid opening, the three lowest bidders must submit a list of certified DBE prime contractors, subcontractors, etc. If the lowest bidder did not achieve the DBE goal, documentation that the bidder undertook all necessary and reasonable steps to achieve DBE goal must be submitted.

According to VTA, to demonstrate good faith efforts to achieve DBE goals, prime bidders must provide written notice 10 days before bid opening to 11 certified DBE firms in each work category to be subcontracted. They also must follow up the written notice by phone or fax and must advise and assist DBE firms to obtain bonds, insurance, and lines of credit or contract these or waive them for DBE firms. VTA also advises prime bidders to advertise, at least 10 days before bid opening date, to solicit sub-bids from DBE firms for specified amount of work or materials or supplies. These ads must be placed in major media for construction and small business trades such as the *Daily Pacific Builder* or *Daily Construction Service* and California Small Business Alliance or California Business Exchange. Follow-up with DBE firms must also be documented (Lee, unpublished data).

In the case of the Hamilton Overpass contract, the winning prime—Stacy and Witbeck, Inc./R.M. Harris Co., Inc., JV—included 7 DBE firms for a subcontract amount of $766,686, or 11.88 percent of the total contract, thus achieving the DBE goal. The contract documents indicate that 48 firms provided quotes to the winning prime. Of the 48 firms, 17 were DBEs, of which 7 were selected. Of the 7 selected, the median number of years the firms had been in business was 12, and the median annual gross income of the firms was in the range of $3–5M. The DBE firms not selected had lower median gross annual incomes in the range of $1–3M and the same median number of years in business [103]. Table 5-4 is a list of the DBE subcontractors, the type of work performed, and the amounts of their contracts.

Table 5-4 *DBE Subcontractors by Bid Item and Dollar Amount*

DBE Subcontractor	Type of Work	Amount	%
Lori and Company	Trucking precast girders	$54,000	7.0
Sealtech Caulking & Waterproofing	Waterproofing	$109,499	14.3
San Jose Transport	General Trucking	$40,000	5.2
Lane Safety	Traffic Control	$70,324	9.2
Crimele Electric Works	Stray current monitoring system and grounding	$157,400	20.5
R & W Concrete Contractors	Station concrete foundation, cobblestone paving	$45,175	5.9
Golden Bay Fence and Ironworks	Wire mesh and chain link fences, tubular guard railing	$290,288	37.9
Total (DBE)		**$766,686**	**100**

Source: VTA Contract [103]

There are several types of work that the DBE firms in this project performed, as shown in Table 5-4. Fencing work had the largest dollar amount, at $290,288. Other major types of work with a large portion of dollar amount were electronics (20.5%) and waterproofing (14.3%). Minor subcontracts were awarded in traffic control (9.2%), trucking precast girders (7%), concrete (5.9%), and general trucking (5.2%).

Note that the short time frame under this type of contracting implies that potential prime contractors are likely to rely on DBE firms with whom they have previously worked or that are better-established and known. This, in turn, may imply that it is more difficult for new DBE firms to get selected as subcontractors. Both shortness of time between a bid issuance and opening bid and the difficulty of new DBE firms obtaining subcontracts have been identified by several studies as major barriers that DBE firms face in transportation contracting [104, 105].

VTA's Office of Small and Disadvantaged Businesses (OSDB)

This office provides a range of outreach and technical assistance services to SBEs and DBEs in the metropolitan area. They hold construction outreach events for bringing together DBEs, SBEs, and prime contractors. The Office has held several technical assistance workshops for DBEs and SBEs on behalf of a consortium of 13 transportation agencies in the region to familiarize enterprises with bidding practices and expectations of the various agencies and equip them better to become subcontractors. They also provide certification workshops, and certify SBEs and DBEs. OSDB conducts outreach to minority businesses in local minority associations, such as local Hispanic or Asian Chambers of Commerce. Since 2010, they are providing e-mail blasts to DBEs and SBEs informing them of contract opportunities. For potential prime contractors, OSDB provides a phone line for help in identifying eligible DBE firms. (Lee, unpublished data)

DBEs Experience with VTA Contracting

We conducted seven telephone interviews with VTA DBE construction contractors. The interviews provided information about the companies' characteristics, how the firms find out about transportation construction opportunities, whether they are satisfied with ways in which they find out about construction opportunities, whether their labor force was unionized, and about the difficulty of recruiting skilled minority workers in the area. Appendix 7 includes the questions asked in the interviews. Of the companies interviewed, the total employees ranged from 11 to 90, with a median of 35 workers. Companies interviewed estimated that they bid on hundreds of projects a year (two of the firms indicated they bid on 1,000+ projects) and obtain contracts in 10–38 percent of the bids. Only one firm indicated that it entered into joint ventures. Estimates of minority workers in the firms ranged from 50–98 percent, with a median of 80 percent minority workers. Six out of the seven companies employed union labor.

Concerning the issue of how the companies learn about bid opportunities, all DBEs indicated that they rely on prime contractor calls as well as a news bulletin or exchange service, in particular, the Builders Exchange of Santa Clara County, a non-profit association that operates a construction library and provides online services, and two news bulletins, *Daily Pacific Builder News* and *Northern California Daily Construction Service*. One DBE firm indicated that it also obtained information from the VTA website. The subcontractors are generally satisfied with the ways they learn about contracting opportunities. Two DBEs indicated, however, that obtaining plans needed to prepare a bid are sometimes difficult to obtain, although the Builders Exchange of Santa Clara County provides access to plans in its Library Room. One DBE indicated that some websites are difficult to use, e.g., Caltrans.

On whether the DBE designation helps in obtaining contracts, the responses from the DBEs interviewed were mixed between "definitely no" and "somewhat helpful." Those that indicated that DBEs were not helpful cited that DBEs had no advantage at the time, since the Underutilized Disadvantaged Business Enterprise (UDBE) designation was the more important designation that could make firms more competitive in the state.

As discussed in Section 2, California, to comply with the strict scrutiny requirement of the Western Paving 9th Circuit court decision of 2005, from 2006–2008 developed strictly race-neutral goals, which, in effect, supported all small businesses regardless of race or ethnicity. In 2007, Caltrans and VTA commissioned disparity studies to document those racial and ethnic groups that can be documented to be UDBEs [104,105]. As a result of the Caltrans study, in 2008, California obtained a waiver from U.S. DOT to employ a mixed, race-neutral, and race-conscious policy, setting race-conscious goals only for

UDBEs. As mentioned in Section 2, Hispanic and Sub-continent Asian American DBEs were not classified as UDBEs [106].[40] This approach enabled the State and regional transit agencies such as VTA to develop mixed, race-neutral, and race-conscious DBE goals. To meet race-conscious goals, only UDBE were considered. Evident from our interviews, this change in the DBE program caused much confusion and dissatisfaction among many Hispanic DBEs.

One of the DBE firms we interviewed stated that it was excluded from UDBE designation, and another stated that it was seeking UDBE certification. Two DBE contractors pointed out problems with the DBE process, claiming that some develop a general contractors list but do not use DBEs and that since subcontractors do not work directly with VTA, the prime contractor decides whether to use a listed DBE or not, and that the agency never checks nor imposes a penalty. But several DBEs pointed out that these designations were helpful, and one company noted that it would not be in business without the DBE program. Note that the Vasona light rail project was essentially completed by 2006 before the State-designated UDBEs, and thus, the perceptions of DBE firms interviewed in 2010 most likely reflect the changes that took place in DBE policies after the completion of the project, and between 2006–2010.

Minority Participation in Transportation Construction in the Santa Clara Region

The Role of Unions

In the San Jose metro area and the greater Bay Area, transportation construction labor is heavily unionized, and the several construction unions are organized under a Trades Council, the Santa Clara and San Benito Counties Building and Construction Trades Council. The Trades Council for the area, as well as VTA officials, estimated that about 80 percent of the jobs in the area are performed by unionized labor. Thus, in the VTA case, unions are responsible for the majority of recruitment and training of construction workers in transit projects. For this sector of construction, several unions are relevant and active in the area:

- Electrical Workers Union, International Brotherhood of Electrical Workers (IBEW) Local Union 332

[40] By spring of 2011, however, Caltrans showed evidence of underutilization of Hispanic and Sub-continent Asian American male-owned firms, and in 2012 U.S. DOT rescinded the waiver and ordered the State to include all race, ethnic, and women DBEs in race-conscious programs [107]. In addition, on April 16, 2013, the 9th District Court upheld Caltrans' race-conscious programs in *Associated General Contractors of America, San Diego Chapter, Inc. v California Dept. of Transportation* (No. 11-16228) [108].

- Laborers Union, Laborers' International Union of North America, AFL-CIO, Local 270.
- Carpenters Union, Local 405
- Iron Workers Union, Bridge, Structural, Ornamental & Reinforcing Iron Workers, Local Union 377

These are craft unions, in which workers learn specialized skills in their craft through years of apprenticeships.

Apprenticeships and Training in Construction

Apprenticeships are the main way in which workers enter unions and obtain training in construction in the greater Bay Area. According to the Trades Council, 94 percent of training in construction is union training (Struthers, unpublished data). Recruitment of apprentices and the requirements for becoming an apprentice in a union, as well as the training offered through apprenticeships, are of major importance for understanding the opportunities and barriers that minority and disadvantaged workers face in transit construction employment.

Construction work through a union does not depend on seniority. Instead, on a daily basis, union members notify the union that they are available for work. The union sets up a waiting list of members available for work on the basis of first come, first on waiting list. As contractors call in with their needs, workers are sent to jobs based on their position on the list. Although employers can request a worker, the union typically sends whoever is next on the union list of people waiting for jobs. Union employers, whether prime contractors or subcontractors, pay prevailing wage, but apprentices get reduced wages. Contracts between employers and unions include agreements about training, but, typically, at least 20 percent of all workers on a job will be apprentices. It is a joint decision between the contractor and the union how many apprentices will be on a given job. During their first six months, apprentices earn 40–45 percent of the prevailing wage. There are 10 gradations of wages, depending on time spent as apprentice; after 4–5 years, as apprentices become journeymen, they receive 100 percent of the prevailing wage. According to the Trades Council, the challenge the construction unions face is that 50–70 percent of union members are apprentices (Struthers unpublished data).

Requirements for Apprenticeships and Opportunities for Mobility

Unions have different requirements for apprentices. The electrical union requires high school graduation, two semesters of algebra with a grade of C or better, and a driver's license. The apprenticeship lasts five years, and at the successful end the worker becomes a journeyman. After journeymen, workers can become foremen, then general foremen. In the electrical union, after a general foreman,

a worker can become a contractor or an estimator. If, at that point, a worker gets an advanced degree, he/she can become a construction manager. The electrical union official interviewed estimated that there are about 180 electrical contractors in area and that 110 are local, and indicated that all local contractors advanced through apprenticeships (Ventura, unpublished data). A major reason that mobility in electrical construction work is good is that the capital requirement to become a contractor in this field is not substantial. According to an electrical union official, more important than capital to become an electrical contractor is having a solid customer base, which can be obtained over time during work as a union member.

The laborers union, on the other hand, does not require a high school diploma for apprentices. A laborers union official indicated that there is some mobility among union members, with some becoming foremen and others starting their own company (Homer, unpublished data).

The carpenters union requires a high school diploma for apprenticeship. Once an apprenticeship is completed, they become journeymen, and some can become foremen. A carpenters union official explained that many carpenters also work on their own, in addition to union work. To advance further and become managers, workers need to learn CAD and LEED (Baldini, unpublished data).

The ironworkers union requires a high school diploma or GED. It is a four-year apprenticeship to journeyman, and the attrition rate is 60 percent The union also offers a foreman's class. Work habits are very important for this kind of work, since the equipment is expensive and the potential for major injury is great. To screen for work habits, e.g., lateness, completion of assignments, etc., the union conducts "gladiator programs," one-week programs for young people interested in becoming apprentices. If they complete the program, they can enter apprenticeships (Meakin, unpublished data).

The Trades Council executive director indicated that over the last 50 years there has been a continued evolution of standards—for example, apprentices are scored and put on the union list on basis of their performance as apprentices. He also pointed out that different locals have programs to help members become contractors, e.g., in San Diego and in Los Angeles, but he estimated that of 100 trained members, only 3–4 become contractors (Struthers, unpublished data).

Recruitment of Workers

Since most construction work is unionized in the San Jose area, the recruitment of workers in transit construction is done primarily through union recruitment of apprentices. Unions recruit apprentices through various means, as individual unions, and through union associations. The Trades Council has a non-profit, the

Santa Clara County Construction Careers Association (S4CA), that conducts marketing and outreach to high school and community colleges [109].

S4CA, along with San Jose City College and the National Labor College, was instrumental in the development of the California Construction College that provides a way for people in construction trades to earn a bachelor's degree in construction management [110]. This pilot program, which could eventually be duplicated in California and throughout the U.S., enables people in construction to obtain college credit for apprenticeship training and life experience for up to half of the credits required for the degree. This program could help unions to compete better for high school students. The unions interviewed stressed that it was difficult to recruit young people into the building trades, especially in the San Jose area, since high school students are steered into college and community college. S4CA also offers AA/AS degrees in construction management, conducts outreach to high school and middle school students, and provides tours of training centers.

Individual unions also conduct their own outreach. For example, the electrical union indicated that it advertises in trade and business journals and attends community events to recruit apprentices. The laborers union has held orientations in family wellness courts and in prisons and correctional facilities, including Folsom Prison. The carpenters union partners with Catholic Charities and other organizations to provide outreach. The unions also have participated in the Helmets to Hardhats program, which connects veterans with construction opportunities.

Two of the seven DBE subcontractors interviewed did not use union labor, indicating that they recruited their employees primarily through word of mouth.

Minority Participation in Construction

According to the Trades Council, minorities make up 51 percent of the membership in the area, mostly Hispanics, with about 7–8 percent women. There is wide variation in minority membership among the different unions, with the estimate for the electrical union at 25 percent and a high of 75 percent for the laborers union. The estimate of minority workers in the carpenters union is 55 percent and 60 percent for ironworkers. The composition of minority groups also varies. In the electrical union, for example, Black males make up 1.9 percent of the total membership, Black females 0.18 percent, and Asian Americans, 4.3 percent, with Hispanics making up almost 20 percent of the union membership.

The relation of DBE firms to minority employment in transit construction is also worth noting. DBE firms are likely to employ minority workers to a greater extent than non-DBE firms, but they are typically small companies, with few employees. The DBE firms interviewed, for example, noted that large

percentages of their employees were minority, but the median number of workers was 35 for the firms interviewed.

Challenges Identified

The DBE contractors interviewed indicated that they had no trouble finding qualified minority workers. Two factors likely explain the lack of challenge in this area: the recession and its resulting oversupply of construction workers and the fact that unions supplied and trained the workforce for five of the seven DBE subcontractors interviewed.

Union officials identified several challenges they faced: I-9 employment eligibility certification, local hire policies, college as the one goal, lack of affordable housing in the region, and problems with worker drug abuse and working habits.

On the I-9 employment eligibility certification, the unions noted that although they are not required to check for worker eligibility now, they feared that it would be required in the future. Union policy is that they are not police and would like to let this policy continue to be applied by employers.

Union representatives brought up the issue of local contractors vs. local workers. The union officials we interviewed approved of PLAs but were concerned about preferential treatment of local contractors, as occurs in Oakland, California. Under a VTA PLA, for example, all workers would be paid prevailing wages, and therefore, there would be no incentive to hire non-local labor or non-union labor. But, without a PLA, if a City has a preferential policy for local enterprises, in the case of local enterprises that are non-union, there would be an incentive to hire non-local, since they would not be able to hire union labor. On the basis of this, unions prefer PLAs, but not preferential treatment of local contractors.

"College as the one career goal" was identified by the union officials as a real barrier to recruit more widely among the population, even though the pay scales for journeymen in many of the trades are comparable to the average wages of college graduates. In particular, union officials pointed out that, in an area like Silicon Valley, construction has difficulty competing for young people's attention as a viable career option.

Union officials identified the lack of affordable housing in the San Jose area as a challenge. Housing is very expensive in the area, and union members need to go out 30–50 miles to find affordable housing.

Also noted as challenges to recruitment were the lack of good work habits on the part of recruits and the problem of drug abuse. To deal with this, the ironworkers union, for example, conducts "gladiator programs," one-week

orientation boot camps that test potential apprentices' work habits, e.g., attendance or following instructions.

Who Obtained the Jobs in VTA's Vasona Line?

Since the study team had no access to union or contractor employee information, the answer to the question is speculative. However, we can make informed estimates based on the information we obtained through interviews and agency documents. More than 80 percent of the construction jobs on the Vasona light rail project were union jobs, according to both the VTA and union officials interviewed. As a result, because the local unions are relatively integrated in an MSA that has a large minority population, split between Hispanic and Asian minorities, a significant proportion of the construction jobs in the project likely went to the minority group in this region with lower educational attainment, Hispanics.[41] This was confirmed by union representatives who reported that about half of their membership was minority, mainly Hispanics. DBE participation in the project, since DBEs are less likely to be union subcontractors than non-DBEs,[42] also likely contributed to minority hiring, since DBE firms interviewed in the area reported a somewhat larger percentage of their workforce as minority than the general population in the region.

Conclusions and Promising Practices

VTA is a medium-size transit agency serving the high-income and diverse Silicon Valley region, which was expanding during the period of 1990–2000. The Vasona light rail project, at a cost of $313M, added 5.3 miles and 8 stations to its light rail system. It aimed at providing an alternative transportation mode to a major congested highway that could not be easily expanded. The Vasona project was divided into 20 construction contracts, and we analyzed the contracting process for one of these, the Hamilton Avenue Crossing. In the areas of contracting and outreach to DBEs, the case study documents several promising VTA practices, some of which are highlighted below.

The predominant minorities in the urban region were Asian and Hispanic with a combined total of 47 percent for the MSA. Although the MSA's and County's construction employment was lower than the nation's, San Jose's rate mirrored the country's at 7.3 percent. Significant, too is that the minority construction labor force for the MSA was 47 percent in 2000.

[41] According to the 2000 Census, in Santa Clara County, 51% of Asian Americans had a bachelor's or professional degree, compared to 47% of Whites; only 11% of Hispanics had bachelor's or graduate degrees [111].

[42] According to the results of our survey of contractors in Southern California, discussed in Section 8.

About 80 percent of the jobs in light rail projects are union jobs, and the trade unions have high percentages of Hispanic workers. The percentages vary, with the unions with fewer requirements in terms of education or skill reporting greater percentages of minorities in membership.

We estimate that Hispanics and perhaps Asians obtained a large proportion of light rail construction work since they are well-represented in the trade unions, especially in the laborers union.

In the following, we identify several promising practices in the VTA study, some of which focus on increasing DBE participation and others on minority worker participation.

DBE-Focused

VTA's unbundling of large contracts, such as the Vasona light rail line, into 20 prime contracts and identifying bid items for which the agency had identified an adequate number of potential DBE firms that could perform the work is a promising management practice that is cited as method that could assist minority- and woman-owned businesses to overcome barriers to contracting according to Federal Rule 49 CFR Part 26.51 (b).

Other promising VTA practices also cited by 49 CFR Part 26.51 (b) are the technical assistance and information and communication programs to DBEs that VTA's Office of Small and Disadvantaged Businesses operates. As indicated on the section on OSDB, this VTA Office provides technical assistance to DBEs to enable them to navigate contracting in 13 regional transportation agencies and also provides DBE certification workshops. OSDB also operates various information and communication programs, such as e-mail blasts of subcontracting opportunities or a phone line for assistance in identifying DBE subcontractors for specific contracts.

Worker-Focused

A promising practice in outreach to potential workers is the Trades Council's non-profit, S4CA. As indicated above, S4CA provides a range of outreach activities to middle schools, high schools, and community colleges in the region.

On the Vasona project, VTA initiated a project with San Jose City College to train and certify local diesel mechanics. VTA subsidized the trainees and, at the end of the training, guaranteed them a job at the transit agency. Although this is a practice aimed at increasing local employment, it could also increase minority participation in the transportation sector.

The Trades Council sponsorship of community college and college programs for construction management is a management practice aimed at ensuring a career

path for young people entering the construction trades. The bachelor's degree in construction management offered through San Jose City College and the National Labor College, in particular, provides college credit for apprenticeship training and would facilitate worker mobility from journeymen to management for both minority and non-minority workers.

SECTION 6

DART's Green Line Project

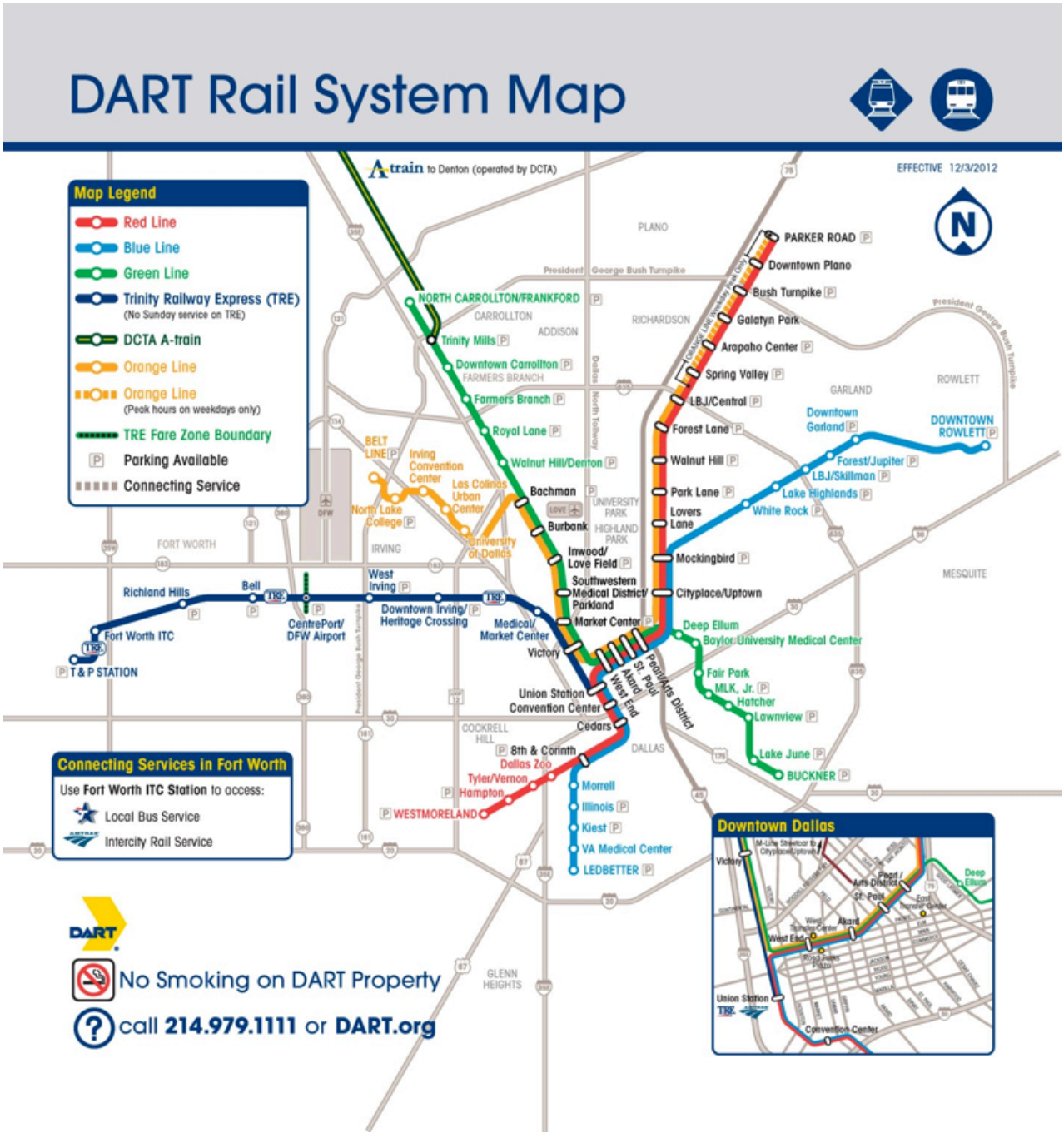
Agency Profile: Dallas Area Rapid Transit (DART)

DART's mission is "to build, establish and operate a safe, efficient and effective transportation system that, within the DART Service Area, provides mobility, improves the quality of life, and stimulates economic development" [112]. The agency was established in 1983 and began operating as the primary public transportation authority for the Dallas region in 1984. Its services include bus lines, the light rail system, HOV lanes, and paratransit, and it partners with "The T," Fort Worth's Transportation Authority, to serve regional rail commuters with the Trinity Railway Express. DART provides service to the cities of Addison, Carrollton, Cockrell Hill, Dallas, Farmers Branch, Garland, Glenn Heights, Highland Park, Irving, Plano, Richardson, Rowlett, and University Park. In 1987, DART began developing a 20-year Transit System Plan. The latest 2030 DART Transit System Plan includes 110 miles of light rail transit, 60 miles of express or commuter rail, 116 miles of managed HOV lanes, 97 miles of enhanced and rapid bus corridors, and mobility programs (including intelligent transportation systems, transportation system management, passenger facilities, travel demand management, bicycle/pedestrian integration, safety and security, and system accessibility) [113].

DART activities are supported by a 1 percent sales and use tax within the member jurisdictions; fare collections; federal, state, and local financial assistance; and other receipts such as advertising and rental income. As of the latest audit in September 2010, its total net assets were $2.45B. DART's capital assets increased from $3,183,950,000 at the beginning of October 2008 to $3,934,142,000 at the end of September 2009 [114].

DART's first light train transit systems, the Red and Blue Lines, opened in June 1996, totaling 11.2 miles (the first of the 20-mile plan). It opened on time and within budget. In 2000, DART completed the Northwest Corridor Major Investment Study by selecting the rail routes for light rail service to Carrollton, Farmers Branch, Irving, and eventually Dallas/Fort Worth (DFW) International Airport, which would increase the total rail system to 93 miles. In 2006, FTA approved a $700M full-funding grant agreement (FFGA) to kick-start a $2.5B expansion. The expansion included the Green Line completed in December 2010 (28 miles, 20 stations, $1.8B, from Buckner Pleasant Grove to Farmers Branch

and Carrollton), the Orange Line under construction (connecting with the Green Line at Bachman Station and opening in 2011, 2012, and 2013, ultimately reaching DFW Airport) and the Blue Line expansion (connecting the downtowns of Garland and Rowlett). Figure 6-1 shows the current system and future improvements up to 2013 [113].



Source: DART

Figure 6-1 *Map of DART's Light Rail System*

DART receives high approval rating from its passengers; in DART's 2012 Customer Survey, approximately 80 percent of respondents were satisfied with its service. It has won numerous awards, most notably "Transit Agency of the Year" by APTA (1997) and "Best Metro Americas" (2009). In September 2011, DART's President/Executive Director was elected Chair of APTA by association members. DART continues to have significant economic impact with its recently completed and under construction transit projects, which are expected to catalyze future transit-oriented developments in the region. DART has also been recognized by the minority community in the region. In 2000, it received the Garland's Community Appreciation Award, an award sponsored by the NCAAP, and in 2003, it was recognized with the "Sharing Success Award" by publishers of four minority business newspapers. It was also recognized as the "Best of the Decade in Supplier Diversity Procurement in the Public and Nonprofit Sector," paying more than $30M to D/M/WBE in FY02, more than 25 percent of its vendor activity. In 2006 and 2007, it was honored with the "Unidos Award" for its contribution to the growth of Hispanic businesses by the Great Dallas Hispanic Chamber of Commerce [113].

Urban Context

DART serves the metropolitan area of Dallas-Fort Worth. The MSA experienced a 29.4 percent growth rate during the 1990–2000 period, placing it in the top 20 of the 100 largest metropolitan areas in the country [100]. This growth rate and economic development objectives for the region motivated the light rail projects that DART has undertaken since that period. Table 6-1 provides basic statistics for the MSA, Dallas County and the city of Dallas in 2000 based on the analysis reported in Section 2 and on Appendix C tables. As the table shows, the region's diverse population included 20.1 percent Blacks and 36.8 percent Hispanics in the county, with larger Hispanic and Black populations (42.2% and 23.6%, respectively) in Dallas City. In terms of low-income indicators, the area had a higher percentage of population below the poverty line, especially in the city of Dallas, where the poverty rate was almost double the national rate of 11.3 percent. In 2000, the MSA had a higher proportion of people employed in construction than the national average (7.3%), and both the county and city of Dallas had considerably higher rates, above 11 percent.

Table 6-1 *Selected Characteristics in Dallas Urban Region, 2000*

Characteristics	MSA	Dallas County	City of Dallas
Total Population	5,727,391	2,267,080	1,188,580
Growth rate (1990–2000)	29.4		
Land Area (sq. mi.)		879	343
Density		2,579	3,338
Race/Ethnicity			
% minority (Non-White)	43.8	39.7	43.1
Non-Hispanic White		37.1	28.5
Non-Hispanic Black		20.1	23.6
Non-Hispanic Asian		4.4	2.7
Hispanic/Latino		36.8	42.1
Low-Income Indicators			
% of households income < $35K	34.8	40.7	48.1
% of occupied housing renter-occupied	37.5	44.1	54.1
% of renter households spending > 30% income on rent	50.5	47.7	48.1
% of population below federal poverty level	13.1	16.9	22.1
% of civilian labor force unemployed	7.1	8.3	8.6
Construction Employment			
% of civilian employed population in construction	8.9	11.2	11.6
% minorities in construction	44.3		

As a result of its diverse population, it is expected that minority workers would make up a large percentage of construction workers and obtain a large percentage of the jobs in the construction of light rail projects. DART serves a mixed-income population, with a median household income of $48,364 in the MSA compared to the U.S. median of $41,994 in 2000, while the city of Dallas had a lower median income than the national average of $37,628. Since the region had a higher proportion of people employed in construction than the national average, especially in the city of Dallas with its greater proportion of lower-income workers, we can infer that a greater proportion of minority and low-income workers would be attracted to or employed in transit construction projects. As it is, minority construction employment in the MSA slightly exceeds the proportion of minorities in the MSA.

Project Overview: Green Line Extension

The Northwest/Southeast Corridor, which the Green Line services, has been considered as a major employment destination for the Dallas region. The increase of availability of transportation resources was a key factor that encouraged land use and economic activities within the corridor. In 1997,

DART initiated a Needs Assessment for the Northwest Corridor, and a Major Investment Study (MIS) was conducted to identify and assess the investment strategy that extends the existing Guadalupe Corridor LRT with 12 miles of new double-track and 19 new transit stations.

The FEIS/EIR for the Green Line identified four primary project purposes for the Northwest Corridor LRT Line to Farmers Branch and Carrollton project. First, the proposed extension of the LRT system was to expand opportunities for current and prospective transit riders by increasing regional connectivity and transit effectiveness. Next, it was to provide a practical strategy to reduce traffic congestion during the peak period by improving the transit system and changing travel patterns centered on single-occupancy vehicle. Regional travel demand between employment centers (i.e., downtown Dallas) and residential areas in both north and south would be met by increasing people-carrying capacity in the corridor. Last, the increased accessibility was to strengthen economic conditions at existing activity centers and provide an opportunity for development of further economic activity at other locations in the corridor [116, 117].

The Green Line extension was the longest rail construction project in the United States [113]. It is 27.7 miles long and has 20 stations, extending from Dallas to Carrolton in the northwest and to Pleasant Grove in the southeast. The southeast segment extends 10.2 miles northward from Buckner Boulevard to the eastern termini of the existing downtown Dallas transit way mall. The northwest alignment begins at the western end of the mall and continues 10.7 miles northward parallel to I-35 to the city of Farmers Branch.

The entry of Northwest/Southeast LRT Minimum Operable Segment (MOS) was approved by FTA in July 2001. Through the NEPA process, Records of Decision (ROD) on the Northwest/Southeast alignments were made in December 2003. As a project agency, DART conducted the analysis on the costs and benefits of the LRT construction including an additional station and environmental work. A short section (from West End to Victory) opened for special events in 2004. In 2006, FTA and DART signed the grant agreement for $700M, almost half of the capital costs of a large section of the Green Line from Farmers Branch to Buckner. The first section of the Green Line was scheduled to open (and opened) in 2009 and the remainder by 2010. Total budget for the Green Line is $1.8B, which consists of local funding dedicated sales tax and federal funding [113].

Figure 6-2

Map of DART Green Line Project

Source: DART

The Green Line was built in multiple phases. Four stations in downtown (i.e., Pearl, St. Paul, Akard, and West End) began operations in 2007. The 2.7-mile stretch from Pearl Station to MLK Station opened in September 2009. Other sections between MLK Station and Buckner Station (7.4 miles) and between Victory Station to North Carrollton/Frankford Station (16.4 miles) opened in December 2010. Figure 6-3 is a photo of the Carrollton Station. The line is expected to average 46,000 weekday passengers by 2025 [118].

Figure 6-3

Green Line Downtown Carrollton Station

Source: DART

Construction Employment Anticipated by the FEIR/EIS

The FEIS/EIR for the project identified the major types of construction work required by the Green Line, including track relocation; clearing and grubbing; grading, drainage, paving; earthwork; water and sewer utility work; minor structures and retaining walls; bridge demolition; bridge new construction; minor structures and retaining walls; pavement markings; substation site and catenary pole foundations; signal case and signal house site work, signal foundations; installation of traffic regulatory signs and traffic signal foundation; LRT and station signage; landscaping and irrigation installation; LRT track construction; traction electrification system; signal system; utilities, etc. [116,117].

Fiscal Impact Analysis

The University of North Texas (UNT) Center for Economic Development and Research, led by Profs. Clower and Weinstein, conducted an economic and fiscal impact analysis of DART's current and future rail projects [119]. The study concluded that the Green Line project would support about $1.5B in regional economic activity and generate employment for approximately 11,921 people, based on its capital expenditure of $868M over a five-year period. They estimated that the project would have an impact on labor of approximately $564,611,000. Their study projected that property income from rents, royalties, dividends, and corporate profits would increase by $160,504,000. They also projected that state and local taxing jurisdictions would increase their revenues by more than $37,136,000. The economic and fiscal impact the study projected would ensue from the build out of the Green Line is summarized in Table 6-2.

Table 6-2

Economic and Fiscal Impacts from Buildout of Green Line Project

Description	Impact
Total expenditures	$868,000,000
Economic activity	$1,507,829,000
Labor income	$564,611,000
Employment[1]	11,921
Other property income[2]	$160,504,000
Indirect business taxes[3]	$37,136,000

[1] Person-years of employment. Actual employment levels to vary from year to year.
[2] Includes royalties, rents, dividends, and corporate profits.
[3] Includes state and local sales and use taxes, property taxes, license and permit fees.
Source: Clower and Weinstein [119]

Contracting Process for the Green Line

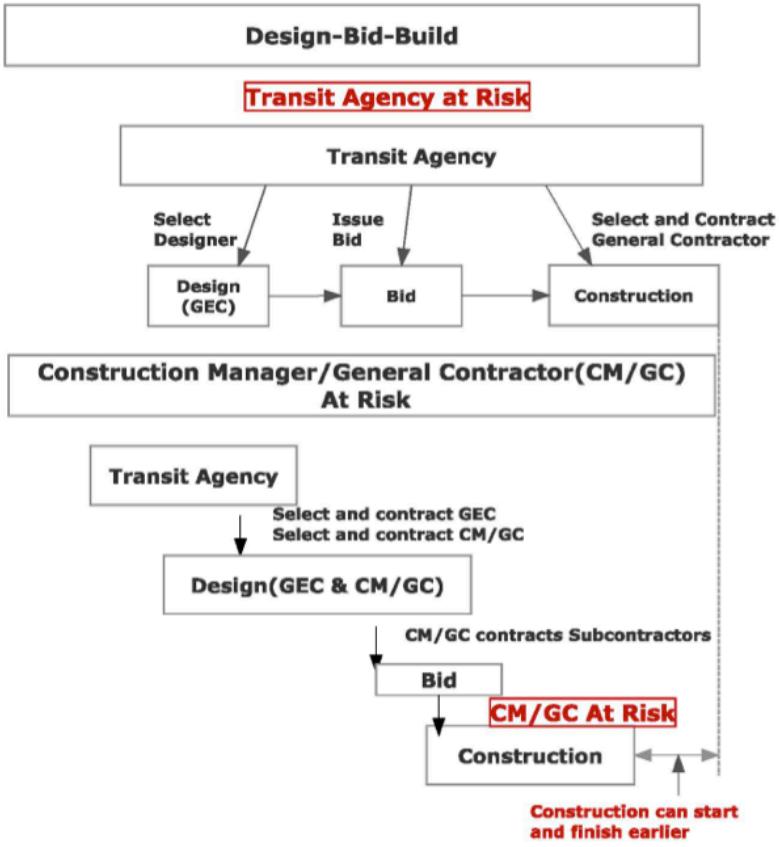
General Manager/Construction Manager at Risk Type of Contract

For the Red and Blue Lines, DART used a design-bid-build contract in which the construction contract is awarded through a bid process to the lowest bidder. Under a design-bid-build contract, the design has to be completed before putting out the bid for the construction General Contractor. The design itself is conducted by a General Engineering Consultant (GEC). Once the design phase is completed, the owner puts out a bid for construction. Under this type of contract, the owner is placed at risk from the contractor for any design errors.

For the Green Line, DART management, after a long process of community consultation and feedback, advised the DART Board to adopt a CM/GC at Risk type of contract (Gollhofer, Thomas, Mason, unpublished data). Under this type of contract, the bid for the CM/GC occurs close to the time when the GEC for the design phase is selected, and the CM/GC overlaps and coordinates with the GEC to develop further the construction plan. Figure 6-3 is a diagram comparing the two contract models.

Figure 6-4

Comparing design-bid-build vs. CM/CG at-risk contracting approaches



Source: Modified from DART [120]

In the case of the Green Line, CM/GC contractors bid on the entire construction contract, but the initial award to the CM/GC selected covered the design/pre-construction phase only. Before the end of the design period, the CM/GC assembled a subcontractor team and revised its original bid, and the owner (DART in this case), based on whether the bid was reasonable or not, can rebid the construction contract. In the case of the Green Line, the CM/GC final construction bid was lower than the original bid that was submitted at the pre-construction phase, and the construction contract was awarded to the CM/GC firm. Since the CM/GC worked with the GEC to develop the design, the CM/GC assumes the risk for construction. In addition to the risk shifting from the owner to the CM/GC for this type of contract, the CM/GC model can reduce project schedule. Construction can start and finish earlier since there is no need to wait for 100 percent of design. This type of contract also allows for a more targeted selection of subcontractors as the design progresses. The CM/GC model has advantages in several areas, including improvements in the design phase, cost benefits, and construction benefits. In the design phase, the CM/GC model provides construction consultation during the design phase assisting in evaluating technical complexities, constructability, sequencing and scheduling of work, etc.

In terms of cost benefits, the risk shifts from the owner to the CM/GC, since this type of contract provides the owner with a Guaranteed Maximum Price (GMP) to fix the cost as well as a guaranteed scheduled delivery date. In addition, construction work is competitively bid through subcontractors, based on lowest bid, and procurement time and effort are reduced. The CM/GC aims to provide a single best-qualified point of responsibility for construction and to reduce changes during construction, since potential changes are addressed during the pre-construction services phase. The CM/GC can also provide greater flexibility and creativity in providing economic opportunities for D/M/WBEs. Participating in the design phase increases the ability to provide more focused outreach to such firms to increase participation. In this case, it allowed DART's Department of Economic Opportunity (DEO) to provide oversight of the CM/GC and maintain commitment to the entire DEO mission (Gollhofer, Beltran, Hammond, Mason, Shelton, unpublished data).

For the Green Line, DART pursued two corridor CM/GC at Risk contracts—one for the Northwest Corridor and the other for the Southeast Corridor [121,122]. DART adopted a competitive best-value approach to evaluate the bidders for the CM/GC contract for the Green Line. In effect, this approach considered the technical capabilities and performance history of the bidders significantly more important than price. Technical capabilities were judged in terms of project approach (30%), project personnel (20%), team composition/subcontracting opportunities (20%), firm/team experience (20%), and proposal risk assessment (10%). Performance history was evaluated through a survey questionnaire sent to previous clients of the firms bidding that included questions

on diversity, quality, timeliness, cost control, business relations, customer satisfaction, and management. Price was the last criterion; this was judged on the basis of completeness, reasonableness, and realism [120, 121, 122].

DART's D/M/WBE Policies

According to the 2010 census, the population of the city of Dallas is 42.4 percent Hispanic and 25 percent Black, and the population of the Dallas-Fort Worth-Arlington metropolitan area is 27.5 percent Hispanic, 15.4 percent Black, and 5.9 percent Asian, increasing its diversity since 2000 [123]. DART's procurement policy has a strong emphasis on reaching out to disadvantaged, minority, and women business enterprises. This policy includes outreach, education, and partnerships with D/M/WBE firms in the Dallas Area. DART Employment Opportunity (EO) staff members attend numerous trade fairs and community events as forms of outreach. To assist with D/M/WBE networking, DART provides a list of potential prime contractors, notices of bid/proposal conferences (frequented by prime contractors) to D/M/WBEs, and listings of certified D/M/WBEs interested in subcontracting to potential prime contractors. In 2002, the agency signed several MOUs with minority Chamber of Commerce groups to continue its outreach throughout the decade. The MOUs represent a promising practice that will be further discussed in a section below.

In addition, the EO Division ensures that D/M/WBEs have equitable opportunities to compete for DART procurements by setting D/M/WBEs contracting goals and helping make D/M/WBEs aware of contracting opportunities. The division sets contract goals based on the availability of D/M/WBEs listed in DART's Vendor list that can perform the types of work identified on the statement of work.

DART distinguishes between MWBEs and DBEs. MWBEs are defined as small for-profit businesses certified by regional agencies with at least 51 percent minority or women ownership and management. DBEs are defined as MWBEs with the additional FTA ceilings for owner's net worth and average gross receipts. There is no reference to net worth or gross receipts in DART's definition of MWBEs. This is important, since without the FTA requirement that DBEs not exceed $22.41 in annual gross receipts, MWBEs in the North Texas region can still get consideration as minority- or women-owned SBEs. SBE gross receipts ceilings depend on the type of business, but for businesses categorized under NAICS 237990, Other Heavy and Civil Engineering Construction, the category under which much light rail construction falls, the ceiling is 50 precent higher, currently set at $33.5M.[43] This means that for minority-owned firms, as they grow beyond the annual gross receipts ceiling of DBE designation, they can still get consideration as minority- or women-owned firms until they reach the SBE ceiling.

[43] See 13 CFR 121.201, Small Business Size. See also North Central Texas Regional Certification Agency requirements for MBEs, WBEs, and DBEs [124].

Green Line RFPs

As the primary transit agency for the Green Line project, DART issued two RFPs. The first, No. 1007571 (issued 4/22/03), was awarded to Archer Western joint venture with Brunson and Carcon to construct the NW1A, NW1B, SE1, and SE2 lines on June 30, 2004 [121]. Archer Western's parent company, The Walsh Group, is based in Chicago. Archer Western had previously been awarded contracts to build light rail projects for MARTA, BART, CDOT, and many others. It was 20th overall in the *Engineering News Record* Top Contractor's survey and the 7th largest contractor in the Transportation sector. Archer Western developed a mentoring relationship with Texas-based companies Brunson Builders, an MBE and DBE firm, and CARCON, a DBE firm. Brunson and CARCON are both Dallas/Fort Worth area companies that previously had contracts with DART. A total of 56 MWDBE subcontractors was included in total for the project. The Archer Western/Brunson/Carcon (AWBC) team aimed to have 25 percent M/WBE participation and 5 percent DBE participation. The total pre-construction services contract was $5,618,850 and the Construction Services Contract was $364,373,057, for a total of $369,991,917 [121].

Archer Western's bid proposal included an innovative mentor-protégé agreement, whereby Archer Western would mentor Brunson Builders in the construction processes and Carcon in the engineering review process including the pre-planning, scheduling, coordinating, and construction phases. The bid proposal also included a Community Employment Initiative, which consisted of a "community" map that outlined the designated areas within the city of Dallas where hiring and recruitment would take place through local apprenticeship programs. The Initiative included internship opportunities for disadvantaged high school and college students during summer and winter breaks extended to target schools such as Barbara M. Manns High School, B.T. Washington for the Performing/Visual Arts (High School), Lincoln High School, James Madison High School, and Middle College High School [121].

Additionally, Archer Western offered to provide training courses through the Construction Education Foundation in English as Second Language (ESL), and programs such as Field Engineering/Carpentry. It also indicated it would partner with local organizations and vendors such as Associated Buildings and Contractors, United Rentals, Hilti, Texas Utility, Holt Caterpillar, and AWBC employees for training on safety, proper use of equipment, and management techniques and tools (Heavin, Brunson, Acosta, unpublished data) [121].

The second RFP, No. 1009666 (issued 10/17/2005), was awarded to Archer Western joint venture with Herzog on April 20, 2006, to construct the NW2, NW3, and NW4 lines [122]. The RFP required the general contractor to develop on-the-job training opportunities and/or participate in training programs for the area that included minorities and women, including upgrading programs

and apprenticeship and trainee programs relevant to the General Contractor's employment needs. They had to recruit both verbally and in writing directly from minority, female and community organizations, from schools with minority and female students, and from minority and female recruitment and training organizations serving the General Contractor's recruitment area and employment needs. They also had to send a written notification to organizations describing job openings, screening procedures, and tests to be used in the selection process. Furthermore, they had to conduct an annual inventory and evaluation of all minority and female personnel for promotional opportunities. Should a D/M/WBE firm leave, it had to be substituted by another D/M/WBE subcontractor (Crabb, Piwonka, unpublished data). In its winning proposal, Archer Western developed a mentor-protégé relationship with Herzog, an M/WBE, and DBE firm Gar-Tex Construction. The construction team, also known as Archer Western Herzog (AWH), aimed to have 32 percent M/WBE and 7 percent DBE participation. There were 34 MWDBE subcontractors total for the project. The total pre-construction budget was $2,460,802, and construction services was $424,755,693, for a total of $ 427,216,495.[122]

The mentor-protégé program between AWH and Gar-Tex Construction included estimating procedures, writing of subcontracts and purchase orders, writing and tracking of submittals and requests for information (RFIs), reading and updating cost reports, budgeting and billing, pre-planning work, scheduling, coordinating subcontractors and supplier, and working with the owner's engineers and architects. Internships to promote professional and technical development with local colleges included Texas A&M University, University of Texas Tyler Junior College, Texas State University, the University of Texas, Austin Community College, and Texas Tech University. Construction Education Foundation partners included OSHA, Crane Institute of America, Engineering Safety Consultants, City of Dallas Storm Water Management Construction Workshop, Texas Utility, American Red Cross, Texas A&M Engineering Extension, American Concrete Institute, Southern Star Concrete, and AREMA. Similar to the joint venture with Brunson and Carcon, AWH partnered with local organizations including Black Contractors Association, Dallas Black Chamber of Commerce, Conference of Minority Transportation Officials, Hispanic Contractors Association, Greater Dallas Hispanic Chamber of Commerce, Asian Chamber of Commerce, Dallas/Fort Worth Minority Business Council, Woman's Business Council, Woman's Transportation Seminar, and Dallas Urban League. Hiring strategies included soliciting opportunities through minority chambers of commerce, minority newspapers, high-volume newspapers within the DART service area, phone and fax communication, and minority business associations (Crabb, Piwonka, unpublished data) [122].

Outcomes

According to DART, more than 2,200 workers were involved in the construction of the Green Line, and approximately 95 percent of the crews were local residents [125]. Furthermore, the mentoring of new hires by senior construction workers on proper safety training for the first month on the job resulted in a much safer work environment such that workers' compensation and liability insurance expenses were reduced from previous projects to significantly below the national average within the construction industry. Approximately 250 safety training classes were conducted, including more than 120 in Spanish (Hebisen, Chavez, unpublished data). The Green Line Project, along with the current construction of the Orange Line and Blue Line Extension, are expected to have an $8B impact as they catalyze future transit-oriented developments [126].

The mentor-protégé relationship that Archer Western provided to its joint venture partners helped the partners grow in experience and numbers. For example, Brunson's staff grew five-fold (Brunson and Acosta, unpublished data). Brunson Builders was responsible for the construction of a four-station segment of the Green Line, which provided invaluable experience to the company for bidding on future light rail projects across the nation. In September 2012, the design-build contract for the Dallas Streetcar Project was awarded to the joint venture of Stacy and Witbeck and Carcon Industries [127].

Green Line D/M/WBE Characteristics and Experience with DART and DBE Program

We interviewed nine D/M/WBEs subcontractors that participated in the Green Line. In terms of employees, the firms ranged in size from 20–450, with a mean of 140 employees and a median of 84. The median percentage minority or women employment in the firms was 85 percent. When asked how they learn about contracting opportunities, the subcontractors said owners, general contractors, mailing lists, and plan services. On the whole, they expressed satisfaction with the ways they learn about opportunities, but a couple noted that additional time would be helpful to prepare a bid. Another firm noted that it would like to see DART send the list of RFP opportunities to all subcontractors instead of just prime contractors. The median number of bids that the subcontractor firms submitted in the past year was 88, and their median success rate was 12 percent. Half the firms had participated in joint ventures. Most responded that DBE designation helped them obtain contracts. One firm clarified that it was an MBE, not a DBE, and pointed out that the DBE designation in federal regulations has hurt the firm's ability to get contracts, "since all preferences are still skewed towards DBEs." Two firms pointed out that although DBE designation is helpful, competitive prices are essential to winning a bid.

Minority Participation in Transit Construction

Role of Unions

In the Dallas region, most construction work is not unionized, and most contractors and subcontractors are not unionized. The major exceptions are the electrical contractors and the steel contractors that belong to the International Brotherhood of Electrical Workers (IBEW) or the United Steel Workers of America. These contractors rely on the unions to recruit apprentices and to train them (McAfee, unpublished data).

Apprenticeships and Training

The non-union contractors and subcontractors interviewed indicated that they do not hire or train apprentices. The training they provide is primarily in safety. However, several firms interviewed indicated that they provide craft training such as welding certification and contractor license training. In addition, one prime contractor and one subcontractor indicated that they pay for construction accounting and certification classes for some of their workers. Instead of in-house training, many of the firms rely on the Construction Education Foundation (CEF) of North Texas, a non-profit organization that provides courses and programs in the construction crafts, including construction management. CEF trains workers from entry level to the supervisory level. It develops courses for major contractors in skills needed for specific projects, and, in general, major contractors often send workers to CEF to obtain the training necessary to move into supervisory positions (Heavin, Crabb, unpublished data). The program courses are accredited by the American Council for Construction Education, the accrediting agency for two- and four-year schools that offer construction programs in the United States [128]. The Green Line contract with Archer Western/Brunson/Carcon included employing CEF to develop complete programs such as Field Engineering or Carpentry (Noble, unpublished data).

In addition, City Square, a non-profit community organization in Dallas, runs a distinctive 12-week program, Build4Success, in commercial construction and environmental remediation for low-income, low-educational-achievement populations (60–80% ex-offenders, primarily felons, some misdemeanors) (Bills, unpublished data). This program provides fundamentals of electrical, plumbing, welding, blueprint reading, and basic carpentry, as well as "workplace" life/soft skills such as positive communication in the workplace and showing up on time. The program places about 80 percent of its participants with general contractors, including Archer Western. The program continues to mentor participants for 6–9 months after completion to reinforce workplace skills [129].

Skilled Minority Workers

When asked whether they had problems finding skilled construction workers, most contractors interviewed indicated that they had no difficulty recruiting skilled minority workers. But several pointed out that the reason for this was the current state of the economy. As one of the subcontractors put it, it is "an employer's market." The same contractor pointed out that in 2007, when they were hiring for the Green Line, it was very difficult to find skilled workers. Yet another subcontractor pointed out that on the Green Line project, it was competing for skilled workers with the prime contractor, who could provide higher salaries. Another contractor stated that in the Dallas region the difficulty depends on the particular trade and that the region had plenty of semi-skilled craftsmen, but was weak on skilled workers.

Opportunities for Mobility

The Green Line contract with Archer Western Herzog included a distinctive provision requiring the firms to conduct an annual inventory and evaluation of all minority and female personnel for promotional opportunities. All contractors interviewed stated that they provided opportunities for mobility within the firm. Several indicated that they reviewed their workers on an annual basis for promotional opportunities.

Who Obtained the Jobs in DART's Green Line?

Non-union contractors recruit their own workers. They use a variety of methods to achieve this. The most common means cited by the contractors interviewed include word of mouth and advertising in local minority publications. Contractors also noted that they contact past employees, post jobs on trade association e-boards, use referrals, and post jobs on the Texas Workforce Commission job search site.

In the case of the Green Line, both DART and the prime contractors did an extraordinary job of ensuring that local minorities and women had access to construction jobs in the project. The first contract, the joint venture between Archer Western, Brunson, and Carcon, required the contractor to develop on-the-job training opportunities for minorities and women, as well as to notify minority and women recruitment and training organizations in writing and verbally about opportunities. In addition, the contractor partnered with minority and women organizations such as chambers of commerce to notify and recruit workers.

DART reports that local employment within the city and county on the Green Line was approximately 95 percent. This is supported by the interviews. All contractors and subcontractors interviewed indicated that most of their workers were local hires. Archer Western also estimated that 95 percent of the workers

on the Green Line were local. We can infer from this that a large proportion of the construction workforce on the Green Line was minority, since both Dallas City and County have large minority populations, and there is a large percentage (44%) of minorities in construction in the MSA as a whole. It is reasonable to conclude that given the relatively integrated construction labor market in the Dallas region and the vigorous efforts on the part of DART and the prime contractors, close to half of the construction jobs on the project went to local minority workers.

Conclusions and Promising Practices

DART is a medium-size transit agency serving a diverse and high growth Dallas-Fort Worth MSA. DART's Green Line was the largest project we studied, at a cost of $1.8B, adding 27.7 miles and 20 new stations to DART's light rail system. DART serves a diverse population, with African Americans making up 20 percent and Hispanics 37 percent of the county's population in 2000, with somewhat larger percentages in Dallas City. Construction employment in the region was more than 50 percent higher than the country's, reflecting the region's robust growth and development. Significant for the prospects of low-income and minority employment in transportation projects is that the percent of minorities employed in construction at the time was 44 percent. Most construction work in Texas is non-union, and thus, contractors recruit their own workers. The innovative contract terms requiring outreach and results as well as the contractor's efforts resulted in very high local hiring, estimated at 95 percent by both DART and the prime contractors. It is reasonable to conclude that given the relatively integrated construction labor market in the Dallas region and the vigorous efforts on the part of DART and the prime contractors, close to half of the jobs on the project went to local minority workers.

The agency's contracting process for the Green Line was an innovative CM/GC at-risk and best-value contract, with strong local outreach, hiring, and mentorship elements. We highlight this and other promising practices below.

DBE-Focused

CM/GC At-Risk Contracts

This type of contract can go beyond the traditional D/M/WBE participation goals to allow the inclusion of value-added features, including encouraging the formation of joint ventures with D/M/WBE firms, specific outreach efforts, or mentor-protégé programs. Joint venture opportunities, in particular, enable small firms to grow and become medium-size or gain valuable experience needed to compete for larger contracts. Carcon, for example, went from a company

of 21 employees, mostly craftsmen, to 82 employees, many highly-paid project management staff. [130]

Mentor-Protégé Program

The mentor-protégé program incorporated in the Green Line contracts ensures that as D/M/WBE firms gain in responsibility and expand their size, the more experienced mentor provides guidance and resources and ensures high quality performance.

MOU with Minority Chambers of Commerce

DART's MOU with minority chambers of commerce in 2001 and renewable every five years was the likely seed of the Green Line contract innovations. Through this MOU, DART established ongoing relationships with minority chambers of commerce in which many minority and small business construction contractors are active. This relationship is likely to have been instrumental in obtaining public support to use a different kind of contracting for the Green Line from the more common design-bid-build.

Worker-Focused

Community Outreach Initiative

This initiative in the Archer Western Brunson Carcon contract included the use of local apprenticeship programs for hiring and recruiting workers, as well as special outreach to local high schools. A similar initiative in the Archer Western Herzog contract required recruitment from minority, women, and community organizations, internships for minority and women students in colleges and universities, and outreach to minority and women chambers of commerce and similar organizations.

Mentoring of New Hires by Senior Workers

The mentoring of new hires by senior construction workers that reduced accidents on the job is also a noteworthy program.

Build4Success Program

This program run by a non-profit provides training to and placement of ex-offenders and other difficult-to-employ populations. The placement of participants with the prime contractor on the Green Line, Archer Western, shows the synergistic effect of effective community outreach in transit projects.

SECTION 7

St. Louis Metro's St. Clair County MetroLink Extension Project

Agency Profile: St. Louis Bi-State (Metro) Redevelopment Agency

Metro (formerly known as the Bi-State Development Agency) was established in 1949 with numerous responsibilities ranging from overseeing transportation facilities (i.e., bridges, tunnels, airports and terminal facilities) to establishing policies regarding sewage and drainage facilities. It was established as a bi-state agency by the Illinois and Missouri state legislatures with more than 200 municipalities included. Metro has no taxing power but does have bonding authority (St. Louis Metro management interview 5/24/2011, unpublished data). Metro began providing public-transit service in 1963 when it initially purchased and consolidated 15 privately-owned bus and streetcar lines [131]. Today, Metro's primary responsibility is to operate three modes of transit service: MetroBus, MetroLink light rail, and Metro Call-A-Ride demand-response service. During fiscal year 2010, Metro provided transit services to 47.2M customers in a 579-square-mile service area that includes the city of St. Louis and St. Louis County in Missouri and St. Claire, Madison, and Monroe counties in Illinois [131].

Metro is run by a 10-member Board of Directors, with 5 members from Missouri and 5 from Illinois. During FY 2010, the District's total operating expenses were $293.0M, and operating revenues were $62.9M. During this period, the district operated at a loss of $230.1M.[44] In March 2009, the Agency was forced to reduce its services. The State of Missouri provided a one-time emergency appropriation to the agency, which allowed operations to continue. Shortly thereafter, Metro began a public engagement effort with the East-West Gateway Council of Governments to develop Moving Transit Forward, a 30-year regional transit plan for the St. Louis region. St. Louis County passed a tax initiative in April 2010 that provided Metro Transit with a new funding source that allowed the agency to restore transit service to the previous level before the 2009 cuts and to begin to implement the Moving Transit Forward long-range plan [132].

[44] This amount includes the operating finances of the General Agency, Gateway Arch Tram System, Gateway Arch Parking Facility, Gateway Arch Riverfront Attractions, St. Louis Downtown Airport, and Transit System [131].

Construction of the MetroLink light rail system began in the late 1980s. The first phase of a 37.9-mile extension connecting Lambert International Airport and Shiloh, Illinois, was completed in July 1993. After the Cross County extension was completed in August 2006, connecting the system to Shrewsbury, Missouri, the MetroLink system included 46 miles of light rail track, 37 stations, and 50 light rail vehicles. In FY 2010, 17.7M passenger trips were taken, and 29.0 percent of operating expenses were recovered from the fare box. Metrolink includes 87 rail cars—2 per train—and runs 55 MPH with no commuter rail. A trip costs $2.25 with no zones, and a student monthly pass averages $1.50 to $1.60 per ride. Transfers cost $0.25, and buses cost $2.00. The system is mostly used for event transit; it connects major event centers such as baseball stadiums, museums, concert, convention, and fireworks, but is not a major means for commuter transit (Jackson, unpublished data).

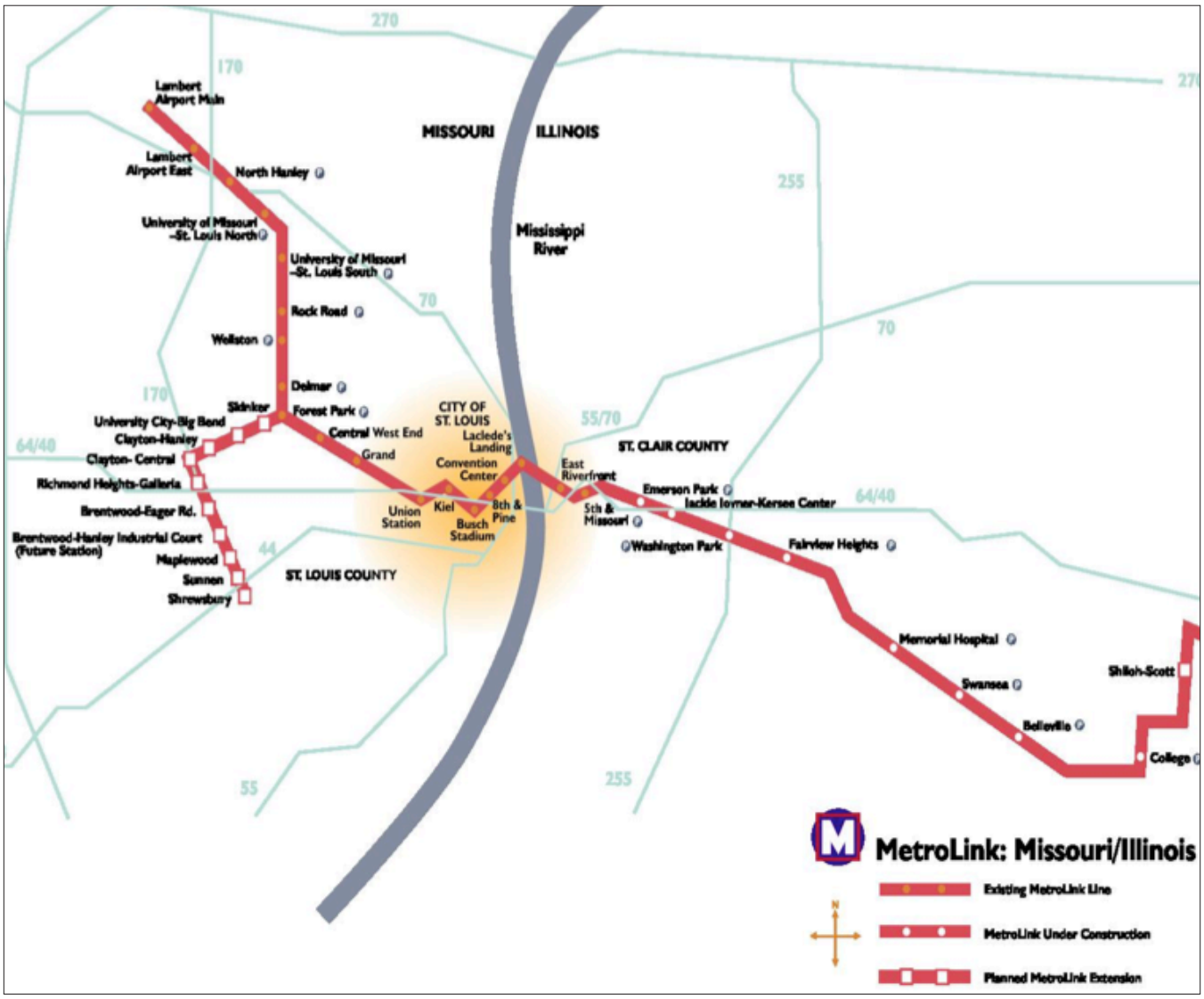
Figure 7-1 is a map of St. Louis Metro's rail system. The map is circa 2000, before the completion of the St. Clair Extension, which is labeled as "Under Construction," and the Cross-County Extension, which is labeled as "Planned."[45]

In addition to its fixed-route transit services, Metro also provides Call-A-Ride service for residents who have limited access to MetroBus or MetroLink or for customers with disabilities who are unable to use fixed-route service. Metro began providing demand-response service in 1988, and today, the Call-A-Ride fleet comprises 93 vehicles. In FY 2010, demand-response counted 545 passenger trips and recovered 4.2 percent of operating expenses from fare box revenues.

The MetroLink Cross County Extension was completed in August 2006 and cost a total of $676M. The Cross County Extension project extended the system 8.2 miles "west and south from the existing Forest Park Station running west through Clayton and south or southeast along Interstate 170 to Lansdowne Avenue in Shrewsbury, Missouri" [133, p. 5].

[45] The current maps of the light rail system were not available in a reproducible form.

Figure 7-1 *Map of St. Louis Light Rail System*



Source: St. Louis Metro

Urban Context

St. Louis Metro serves the bi-state metropolitan area of St. Louis, Missouri–Illinois. The MSA experienced a 4.6 percent growth rate during the 1990–2000 period, placing this growth among the lowest 20 of the 100 largest metropolitan areas in the country. During this period, the city of St. Louis itself experienced a drop in population of 12.2 percent. Table 7-1 provides basic statistics for the MSA, St. Louis County, and the city of St. Louis in 2000, based on the analysis reported in Section 2 and Appendix C tables.

Table 7-1 *Selected Characteristics in St. Louis Urban Region, 2000*

Characteristics	MSA	St. Louis County	City of St. Louis	East St. Louis*
Total Population	2,725,336	985,393	333,730	31,542
Growth rate (1990–2000)*	4.6			-22.8
Land Area (sq. mi.)		507	62	
Density		1,944	5,383	
Race/Ethnicity				
% Minority (Non-White)	21.8	26.3	55.7	
Non-Hispanic White		72.7	43.0	
Non-Hispanic Black		21.3	50.6	97.7%
Non-Hispanic Asian		3.0	2.1	
Hispanic/Latino		1.7	2.1	
Low-Income Indicators				
% of households with income < $35K	36.1	31.3	56.4	
% of occupied housing units renter-occupied	26.9	24.7	50.7	
% of renter households spending > 30% income on rent	50.3	45.2	51.3	
% of population below federal poverty level	10.9	8.2	25.4	35.1
% of civilian labor force unemployed	6.9	6.0	11.8	
Construction Employment				
% of civilian employed population in construction	7.5	5.5	5.7	2.4
% of minority employment in construction in MSA	6.7			

* U.S. Census [134]

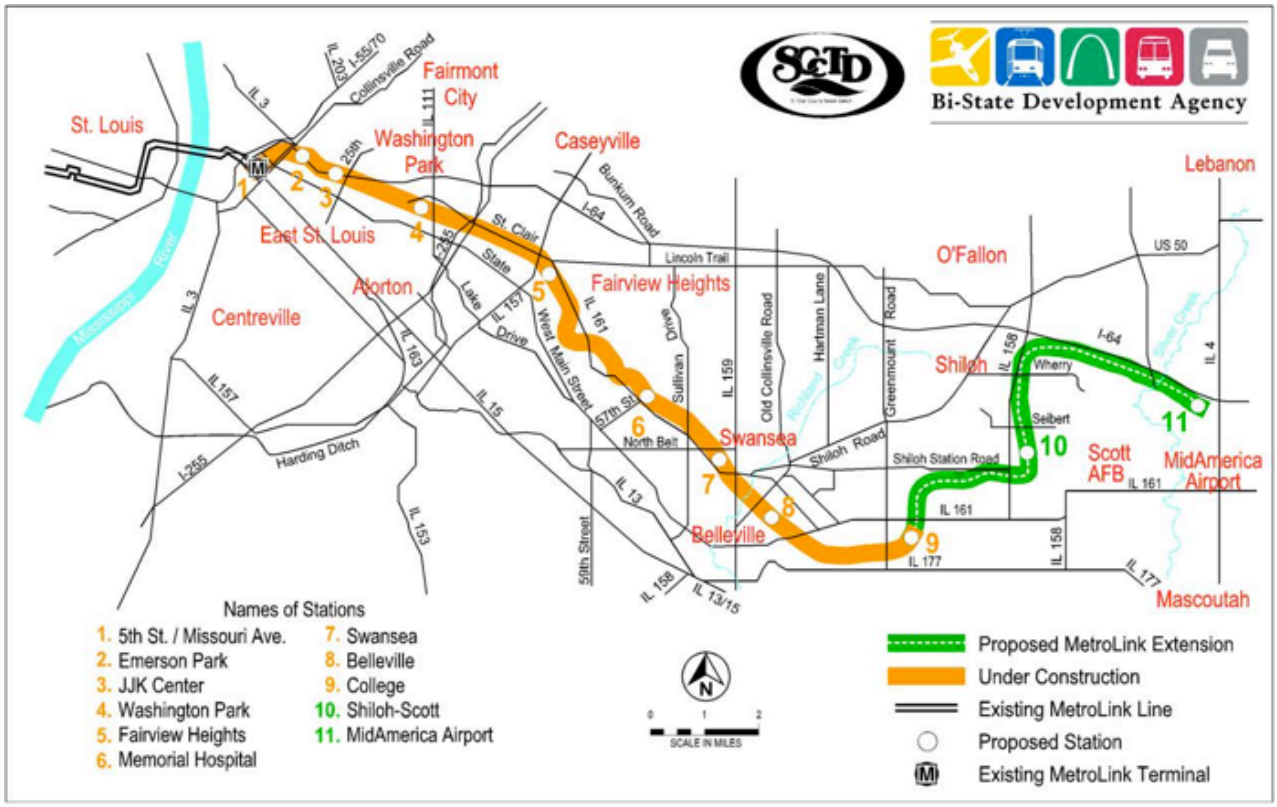
As the table shows, the region's demographics are a study in contrast—an MSA with a lower minority population than the nation's and a majority Black population in the city of St. Louis (50.6 %), with relatively small Asian and Hispanic populations (under 5%) for both the county and city. The median income for the St. Louis MSA in 2000 was $44, 437, higher than the country's median income ($41,994), while the city's median income was much lower ($30,141). In terms of low-income indicators, again, the MSA's and the county's poverty rates are lower than the nation's 11.3 percent, whereas the poverty rate in the city (25.4%) was more than double the nation's. Also, the unemployment rate for the city was almost double that of the nation. Both the county and the

city had lower rates of people employed in construction than the country, while the construction employment rate in the MSA reflected the average for the country. Segregation is even more stark in the case of East St. Louis, adjacent to St. Louis on the Illinois side of the MSA. Several of the St. Clair Extension stations are within East St. Louis. In 2000, East St. Louis was 98 percent African American, having experienced a 22.8 percent drop in population between 1990–2000, with a poverty rate of 35 percent and a median household income about half of the nation's. Its construction employment rate was 2.4 percent.

As a result of this classic racial divide between inner city and suburban areas in the St. Louis MSA, and since the region's labor force is unionized, minority local workers obtaining jobs in transit construction depends on the extent of racial integration within the unions. It is also clear that a greater percentage of low-income live in the city of St. Louis than in the larger metropolitan area, and, thus, the extent to which local low-income workers obtain the jobs in transit construction also depends on the extent of union recruitment and membership within the city. We can also infer that since there are lower percentages of people employed in construction in the county and in the cities of St. Louis and East St. Louis, in contrast to the MSA, union membership in the construction trades is lower in both cities.

Project Overview: St. Clair County MetroLink Extension

Construction of the St. Clair County MetroLink extension began in 1998, and the line opened in 2001. It has a 17.4-mile alignment, running from Fifth and Missouri in East St. Louis to Belleville Area College (BAC), with eight new stations and seven park-and-ride lots. The line opened in May 2001 [135]. Figure 7-2 is a map of the St. Clair County Extension, which is depicted in yellow as "Under Construction."



Source: St. Louis Metro

Figure 7-2 *St. Clair County MetroLink Extension map*

FTA funded 72 percent of the St. Clair extension; the cost (represented above as MetroLink Phase Two A) was approximately $243.9M. The remaining 5.3-mile stretch of the MetroLink line that extended from Shiloh to Mid-America Airport (represented in Figure 7-2 as Proposed MetroLink Extension in green), was locally funded by the St. Clair County Transit District (established under the Illinois Mass Transit District Act) with funding from a ½-cent sales tax passed in November 1993. The cost of this portion of the extension was approximately $95.2M. Overall, the total budget cost for the project was $339.2M [135]. Figure 7-3 is a photo of the St. Clair Extension's Belleville Station.

Figure 7-3

St. Louis Metro St. Clair Extension's Belleville Station

Source: St. Louis Metro

The St. Clair Line runs in two states (Illinois and Missouri) and through several counties. It was built on abandoned rights-of-way and cornfields, mostly in industrialized areas. The demographics of the line are different: East St. Louis is a shrinking de-industrialized area with a 98 percent African American population, while Belleville is suburban and has mostly a white middle-class population [134].

The Contracting Process

Prior to the bidding process on the contract, Metro entered into a PLA with the trade unions, and the project was completed in 2001, before Pres. Bush's 2001 Executive Order prohibiting PLAs in federally-supported projects. The PLA was a traditional PLA geared to establish a process for dealing with contractor-union conflicts to avoid work stoppages or strikes [137]. The St. Clair Project had a Project Management Team that was in charge of three line sections. The DBE Program goal was 25 percent, set by FTA rather than by the State. The goal was project-specific and race-neutral. In the design-bid-build contract, several contracts were issued. Contract 1 was for remediation for the maintenance facility site and wetlands remediation. The Facilities 1 and 2 contracts were awarded to a joint venture between Keeley & Sons (structures) and Keller Construction (earthwork). Facility 3 was awarded to another joint venture between KBIU (Kilian/Backsmeyer) and Illini Excavators. According to Metro, the contractors maximized use of local contractors (Jackson, Hutchinson, Wright, unpublished data). Altogether, there were 14 construction contractors, including prime contractors who had different DBE goals that collectively would amount to 25 percent overall contract goal (Table 7-2).

Table 7-2 *St. Clair Extension Contractors, Original Contract, and Contract Amounts at Closing, October 2001*

Contractor	Project	Original Contract	Current Contract
Siemens Transportation	LRV Procurement	$37,516,337	$60,401,737
Spirtas Wrecking	Demo & HazMat Mitigation	1,124280	1,762,913
Kelley & Son/Keller Const.	Line Sect 1	27,311,499	28,798,856
Kelley & Son/Keller Const.	Line Sect 2	27,311,499	29,987,136
Killian/Baxmeyer/Illini Excav	Line Sect 3	29,552,690	33,704,495
Hank's General Const.	Station Finishes	8,865,665	9,746,852
Baker Heavey & Highway	Trackwork	24,407,701	24,407,964
Hank's General Const.	Illinois Maintenance Facility	11,451,543	12,454,585
Kozney Wagner	Material Storage Building	572,866	737,604
Hamon Industrial	Signals	13,608,840	14,291,668
Sesco Inc.	Communication	6,889,089	9,160,344
Scheidt & Bachman USA	Fare Collection Equipment	1,944,003	1,944,003
C Grantham Company	Wetland Mitigation	1,287,871	1,322,541
Total to Date		$207,110,960	$245,184,441

Source: Bi-State Development Agency [136]

For example, the Killian/Baxmeyer/Illini Excavators contract for Line Section 3 amounted to $29.6M and, over the course of the contract, increased to $33.7M. It originally had a set DWBE contract goal of 25 percent and, at the end of the contract period, the firm indicated that it had employed 19 DBE or WBE subcontractors, 4 of which had been added after the initial contract, for a total amount of $8.6M, which attained a 25.5 percent DWBE participation goal. However, 64.7 percent of the DBE total contract amount was paid to WBEs rather than other disadvantaged minority DBEs [136].

DBE Process for the Contract

FTA set the DBE race-neutral goal for the contract at 25 percent of the total base bid price. It achieved these goals [136]. According to Metro, the prime contractor was required to report monthly, and the PLA included a comprehensive pre-hire collective bargaining agreement. Also Metro indicated that basic terms and conditions for labor were established in advance for everyone involved in the project, including public sector employees, contractors and subcontractors, and the labor force (Jackson, unpublished data).

To enhance their chances of winning the contract, contractors try to go beyond the agency's DBE goals in the process of prime contractor-subcontractor team formation. Prime contractors typically have pre-established relationships with DBE firms. This was a point noted several times by St. Louis Metro officials and contractors.

Metro currently has a new method for tracking who is paid to ensure that contractors use the DBE firms they indicate on a bid. Metro officials noted that during the St. Clair construction, the system for tracking DBE firms was not as sophisticated, although they still met the goals. FTA has annual goals for DBE and MWBE but Metro establishes its own goals such as its forthcoming three-year goal of 12, 15, and 18 percent for combined race-neutral and race-conscious efforts (Hutchinson, Wright, unpublished data).

A Metro official indicated that there is not a large pool of available DBE contractors, and, as a result, race-neutral and race-conscious approaches were not distinguished in the St. Clair contract (Jackson, unpublished data). According to Metro diversity procurement specialists, a better reporting mechanism for DBE participation might improve the system (Hutchinson, Wright, unpublished data).

For outreach, Metro hosts 2- to 3-hour sessions on how to obtain DBE certification, with 8–10 certifications per month.

DBE Experience with Metro Contracting

One small DBE firm noted that competition is tough for both majority/minority bids (Doe, unpublished data). The owner indicated that it usually provides quotes for 1,500–2,000 per year, and for general development projects, the success rate is about 30 percent. For transportation/highways contracts, the success rate, however, is lower. This DBE owner noted that DBE status has helped in getting contracts, but that DBE status is also a hindrance because prime contractors contract DBEs only to meet the DBE goals, since prime contractors tend to award subcontracts to their "buddies." Further, the DBE owner pointed out that St. Louis is a segregated city and a cliquish town for all industries and that a "good old boys network" still characterizes how subcontracts are awarded. The presence of a "good old boys network" was also mentioned by Metro officials.

The Procurement Office at Metro provides informational sessions to small businesses on how to obtain DBE or MBE/WBE certification and how to follow federal regulations in project management, pre-bid, etc. However, according to an official interviewed, the process is not successful, as the minority subcontractor has "as much chance as next guy to get a contract" (Hutchinson, unpublished data).

Minority Participation in Transit Construction in the St. Louis Region

The Role of Unions

The construction labor force in the St. Louis MSA is strongly unionized, and transit construction projects rely on union labor. Illinois unions (Locals) are different than Missouri's, since State labor laws are different, and projects from each state can employ only union workers from the respective state. Projects can split employment 50/50 between the states' unions, but workers can also come from outside either state. Generally, union workers cannot transfer to another Local even in the same state, and so, often, their job opportunities are constrained by the Local Union Shop's relations to prime contractors and their subcontractors. In the case of PLAs, only certain unions can participate. The St Clair County Extension's PLA was 100 percent union; however, not all projects require union contractors. Typically, unions are required to be involved as the scope of work, size, and complexity of a project increase. Metro does not interface with unions; it leaves union hiring up to prime contractors and/or subcontractors. Metro does not conduct outreach to the construction trades (Jackson, Hutchinson, unpublished data).

One DBE firm indicated that unions are not receptive to some minorities. The owner pointed out that, currently, unions lack work opportunities to provide their members, citing that in 2011, approximately 900 electricians were out of work. He also indicated that subcontractors do not have access to minority/women workers. The DBE owner was not sure that increasing the minority participation requirement would help because "it could further polarize society" (Doe, unpublished data).

In addition, contractors in the region have pre-established relations with a core group of workers who are not permanent, but whom they carry through the winter months and only supplement their workforce with local union members when needed. Two prime contractors in the St. Clair project who were interviewed reported that their workforce is 8–9 percent minority and women (Nichols, Lindenberg, unpublished data). This implies that even if local unions were well-integrated, contractors use less union labor in a project than in regions where contractors do not retain a core group of workers. Thus, the influence of unions on local or minority employment may not be as great as the rate of unionization implies. It also confirms the description of the region's construction contractors as being a "good old boys" network.

Apprenticeships and Training in Construction

The President of Laborers' Local 42, who was familiar with the MetroLink projects, noted that one key barrier is not having enough construction projects that would provide current apprentices the necessary training to complete their 4,000 hours to become a journey-level construction worker. He pointed out that the largest construction project before the MetroLink Extension was the Hunt Stadium, which had occurred three years before the extension project, emphasizing the scarcity of large-scale construction projects in the area (McLaughlin, unpublished data). The President/Business Agent of Ironworkers Local 396 also explained that finding employment is the largest obstacle and not the apprenticeship program itself: "The market is depressed and it's hard to get rail projects going when nobody wants to pay for it." As a result, experienced construction workers have left the region to work on projects outside the area (Brennell, unpublished data).This also makes it difficult for mentorship relationships to take place between journey-level construction workers and apprentices. Typically, when Locals announce that they will accept applications for apprenticeships, 500 people apply, and only 55–70 people are accepted for class (Hampton, unpublished data). In addition, since the jobs are scarce, the minorities or women who do make it into a union apprenticeship program are often discouraged and drop out of the union list altogether.

Requirements for Apprenticeships

The apprenticeship program for laborers teaches construction in building highways, bridges, sewer systems, water mains, light rail systems, airports, stadiums, treatment plants, and all kinds of buildings, factories, stores, and plants. Each apprentice must have at least a 12th grade education and be 18 years old, and possess good math, human relations, and communication/reading skills [138]. Each apprentice must complete 288–368 hours (equivalent to 11–15 weeks) of off-the-job related skill training at the Laborers-AGC Training Center, which is a campus style facility that provides its own dormitory housing, laundry facility, classrooms, outdoor "hands-on" areas, student lounge, recreation room, dining hall, and a lake for after-hours recreation (McLaughlin, unpublished data). The facility, however, is in a rural area (Silus, Missouri), remote from the city of St. Louis. This appears to discourage minorities who lack transportation to the site (Hampton, unpublished data). To move up to the journeyman level, an apprentice must complete 4,000 hours of on-the-job training of a qualified and competent journey level laborer (about 30 months) (McLaughlin, unpublished data).

Access to Jobs

The Association for Construction Careers Education and Support Service (ACCESS) is an organization that serves as a clearinghouse for information on the construction trades and provides resources and services for increasing minority employment in construction in the St. Louis region. It recruits minority

workers and serves as a funnel into construction trade apprenticeships. In 2011, it had 30 board members drawing from the Associate General Contractors of America (AGC) and construction consumers, including city, county, and Metro [139]. Its goal is to foster collaboration of all programs in the St. Louis area and Illinois designed to address diversity issues. ACCESS outreach programs are conducted at career fairs, schools, community colleges (to provide training and funnel employment), and churches. The organization focuses on the city of St. Louis and helps workers prepare for comprehension tests for the trades set by unions as well as teaching life skills and providing mentorship. ACCESS was started and is supported by Metro. Its formation was motivated by the shortage of skilled workers during the Cross County extension project, which was completed in 2006.

The director of ACCESS (Hampton, unpublished data) and Metro officials identified the many challenges that minority and women workers face in obtaining access to construction jobs in the St. Louis region:

- Lack of jobs to sustain the workforce—the metropolitan region has lost major employers in the past few decades. The rate of unemployment for construction apprentices and journeymen is still 25–30 percent. Unions are graduating only 50 percent of apprentices, but graduation rates are going upwards compared to past years. Getting jobs is important for apprentices but difficult in the current economic climate. Metro has an irregular number of large projects compared to the Missouri Department of Transportation, where capital projects amount to about $1B per year. Local union officials also agreed this was a key impediment for minorities to enter the construction trades.
- Lack of participation of African Americans in local construction unions—the composition of union membership in the construction trades is not reflective of the percentage of African Americans in the city of St. Louis or even the region. This is a legacy of segregation and the lack of ongoing large-scale construction projects.
- Small number of D/M/WBE firms—this may be due to the infrequency of FTA projects that require DBE targets. It may be also due to the DBE ceilings on net worth and gross income that discourage DBE certification.
- Lack of monitoring of the use of DBE firms by prime contractors—once a contract is obtained, lack of monitoring and the small number of DBE firms are likely to lead prime contractors to drop some DBE firms without having to replace them by other DBE firms.
- Lack of tracking of contractors' employment of minorities/women—contractors rely on unions for workers, and with a scarcity of minorities/women in construction unions, it is easy for contractors to claim that they could not obtain minorities from the unions to fulfill equal employment/affirmative action targets.

- Knowledge of upcoming projects seen as an insider process—in a context where prime contractors select subcontractors on the basis of a "good old boys network," it is important to conduct vigorous outreach, and monitoring of the process.
- Lowest bid contracts—Metro procurement officers question the efficacy of the "Capacity Requirement" clause in contracting because this stipulates that the agency is bound to award contracts to the lowest bidder. This clause restricts the ability of Metro to require more vigorous outreach to minorities in contracts or to evaluate contractor's previous performance on meeting minority participation goals.

Who Obtained the Jobs in St. Clair Project?

Unions control access to jobs in transit construction in the St. Louis region, and the union membership in 2000 was overwhelmingly White. Metro, contractors interviewed, the non-profit outreach firm ACCESS, and union officials recognize the problem of not only attracting but retaining minority workers in conditions where work opportunities are spotty. In this case, a segregated metropolitan area is compounded by an even more segregated construction labor force and associated trade unions, making clear that even if Metro met its contractual DBE and employment goals, a fair share of the jobs in the St. Clair project did not go to minorities.

Conclusions and Promising Practices

St. Louis Metro is a medium-size transit agency serving the bi-state metropolitan area of St. Louis, Missouri-Illinois. The region is a classically segregated region with a majority African American inner city and majority White suburban area. While the MSA as a whole experienced modest growth in the 1990s, the population of the cities shrank by over 12 percent in St. Louis and 23 percent in East St. Louis. The region's demographics are a study in contrast—an MSA with a lower minority population than the nation's, and a majority Black population in the city of St. Louis (50.6%) and 98 percent in East St. Louis. The contrast was also evident for other socio-economic indicators, including median income, poverty rates, and unemployment. In terms of construction employment, while the MSA rate of employment in construction reflected the average for the country, lower rates held for the city of St. Louis, and construction employment in East St. Louis was 1/3 of the nation's rate.

The St. Clair Extension Project extended the St. Louis Metro system 17.4 miles and added 8 stations at a total cost of $$243.9M. St. Louis Metro used a design-bid-build contract for the project, and a traditional PLA. The DBE goal for the project as a whole was 25 percent, which the contractor met, but the DBE goal was race-neutral, and the contractor was able to meet the goal with a large

participation of women-owned, not minority, DBEs. The region's labor force is unionized, and minority local workers obtaining jobs in transit construction depends on the extent of racial integration within the unions. All sectors interviewed recognized that union membership does not reflect the proportion of African Americans in the region, let alone the city of St. Louis. As a result, in this project, we can estimate that local low-income minority workers did not get a fair share of the construction jobs generated by the project. Several lessons learned and one promising practice emerged from this case.

DBE-Focused

Monitoring the use of DBE firms by prime contractors would help to ensure that DBEs are not dropped once a contract is signed.

Worker-Focused

Lowest Bid Contracts

Alternative contracting methods to lowest-bid contracting, such as a best-value approach, can provide Metro with the ability to require more vigorous outreach to minorities and to evaluate a contractor's previous performance on meeting minority participation goals.

Monitoring Contractors' Employment of Minorities/Women

Such monitoring could pressure both contractors and unions to attain the minority and women goals set for the project.

ACCESS

This non-profit, started by St. Clair Metro, provides effective outreach, recruitment, and access to training, as well as advocacy for minority and women in the construction trades. It can serve as a model for other transit agencies and regions.

SECTION 8

Los Angeles County Metropolitan Transportation Authority (Metro)'s Gold Line Eastside Extension

Agency Profile: Los Angeles County Metropolitan Transportation Authority (Metro)

The Los Angeles County Metropolitan Transportation Authority (Metro) is the third largest transit agency in the country by unlinked passenger trips (463.2M in 2010) and the second largest bus agency [13]. It was established in 1993 as a result of a merger of the Southern California Rapid Transit District (the bus transit agency) and the Los Angeles County Transportation Commission (a commission that controlled rail transit funding).[46] Metro is the primary transit provider for the city and the county of Los Angeles. Its rail operations include subway, light rail, local buses, and bus rapid transit (BRT) lines.[47] It designed, built, and operates 86.8 miles of urban rail service, serves a 1,433-square-mile area, and has more than 9,000 employees. Table 8-1 identifies Metro's rail lines, their type, when service began, and origin and destinations.

Table 8-1

LA Metro Rail Lines, by Type, Date Opened, and Origin/ Destination

Metro Rail Lines	Type	Opened	Origin/Destination
Red Line	Subway	1993	Downtown LA/North Hollywood
Purple Line	Subway	1993	Downtown/Mid-Wilshire District
Blue Line	Light rail	1990	Downtown LA/Downtown Long Beach
Green Line	Light rail	1995	Redondo Beach/Norwalk (indirect access to LAX via shuttle bus
Gold Line	Light rail	2003	Downtown LA/Pasadena
Gold Line East Side Ext.	Light rail	2009	Downtown/East Los Angeles
Expo Line	Light rail	2012	Downtown/Culver City
Metro Orange Line	BRT	2005	North Hollywood/Chatsworth
Metro Silver Line	BRT	2005	El Monte/Harbor Gateway District of Los Angeles

Source: LA Metro [140]

[46] The Commission controlled the funding from Proposition A, the 1980 voter initiative that generated funds from a 0.5% increase in sales tax in the county that was targeted for rail transit construction.

[47] The Metro Liner consists of two BRT lines that operate on dedicated or shared busways with dedicated stations and priority at intersections.

Figure 8-1 is a map of Metro Rail lines, including BRT lines.

Source: LA Metro

Figure 8-1 *LA Metro Rail map*

Metro is governed by a13-member Board of Directors composed of the 5 Los Angeles County Supervisors, the Mayor of Los Angeles, 3 Los Angeles mayoral appointees, 4 City Council members from cities other than Los Angeles, and a non-voting member appointed by the Governor (typically the Caltrans Director).

The transit agency that merged into Metro was a bus transit agency. The rail system was made possible by several County sales taxes approved by county voters. The first sales tax funding, 0.5 percent imposed on most retail sales in the county, was approved by voters through Proposition A in 1980. The other agency that merged into Metro was the commission that controlled the funds generated by Proposition A. Most of Proposition A's revenues were earmarked for rail transit. Proposition C sales tax, approved by voters in 1990, added another 0.5 percent to the County sales tax for transportation improvements. Measure R, passed by county voters in 2008, authorized an additional 0.5 percent sales tax [141]. Although Metro does not receive all the proceeds of the total 1.5 percent sales taxes authorized by these three county measures (certain portions are returned to the County or cities in the county for transportation purposes), as Table 8-2 makes clear, more than 40 percent of Metro's current budget is funded by sales tax revenues, most of it going into rail capital projects.

Table 8-2
LA Metro FY 2012 Budget

Description	FY 2012 Budget (millions)	Percent
Sales tax revenues (Props A and C, Measure R)	$1,815	43.7%
Bond proceeds	394	9.5%
Federal funds	520	12.5%
State funds	900	21.68%
Operating revenues	332	8.0%
Other local sources	121	9.5%
Prior year fund balance	70	1.7%
Total Sources of Funds	**$4,152**	
Operating expense budget	1,247	30.0%
Capital and non-operating budget	2,560	61.7%
Debt service	345	8.3%
Total Uses of Funds	**$4,152**	

Source: Metro [142]

Initially, the rail program was very controversial, prompting a revolt of bus riders who organized into a community-based organization, the Bus Riders Union. In 1994, the Bus Riders Union sued Metro, charging it with discrimination against bus riders and arguing that by expanding rail transit to the suburbs instead of improving bus transit, Metro was discriminating against the lower-income, minority, inner-city population of bus riders and favoring higher-income White suburbanites. The case was settled with a consent decree in 1996, providing for improvements to the quality of bus service and allowing the rail system expansion to continue [143].

Metro's 2009 Long Range Transportation Plan (LRTP) identifies dozens of capital projects to be funded by sales tax and other revenues by 2040. The 2009 plan will expand Metro Rail to cover 185 miles and up to 150 stations. The plan also includes a number of other unfunded rail projects, such as the Gold Line Foothill LRT Extension and the eastside Subway Extension [144]. Metro has also devised an initiative, the LA Metro 30/10 Initiative, to accelerate the funding of 12 key Metro expansion projects scheduled over the next 30 years to complete them by 2019. The concept underlying the initiative is to use the funding for projects from Measure R's 0.5 percent of the sales tax as collateral for long-term bonds (Transit Improvement Bonds) and a federal loan, in order to accelerate the projects' construction. LA Metro estimates that 160,000 new jobs would be created in construction, permanent operations, and maintenance by 2020 as a result of the accelerated infrastructure investment anticipated by the initiative. [145].

Metro, as the third largest transit agency in the country, with ongoing expansion of its rail system, has a sizable capital budget. In its FY 2013, the agency's capital budget represents 36 percent or $1.66B of the total budget. The agency generated more than $2B from its own source sales tax revenues, much of it earmarked for capital projects [146]. Beginning in the early 1990s, since Metro contracts out all of its capital projects, it has been one of the regions' major sources of engineering and construction contracts. Metro's plans to continue and accelerate its rail system expansion will maintain the agency's role as a major source of construction employment in the region through at least the end of this decade, if not beyond.

Urban Context

LA Metro serves Los Angeles County and is situated in the Los Angeles-Long Beach-Santa Ana MSA, nested within the larger CMSA of Los Angeles-Riverside-Orange County. The city of Los Angeles itself is ranked as the 2nd largest city in the U.S. The MSA experienced a 9.7 percent growth rate during the 1990–2000 period, placing this growth rate in the lower third of the 100 largest metropolitan areas in the country [100]. This dense urban area experiences proverbial traffic congestion, which has motivated improvements to transit in general and the funding and construction of the extensive system of light and heavy rail outlined above. Table 8-3 provides basic statistics for the MSA, Los Angeles County, and the city of Los Angeles in 2000 based on the analysis reported in Section 2 and Appendix C tables.

Table 8-3
Selected Socio-Demographic and Other Characteristics in Los Angeles Urban Region, 2000

Characteristics	MSA	County	City
Total Population	12,703,423	9,758,886	3,731,437
Growth rate (1990–2000)	9.7		6
Land Area (sq. mi)		4060	469
Density		2404	7956
Race/Ethnicity			
% Minority (Non-White)	46.4	49.1	50.9
Non-Hispanic White		29.0	28.5
Non-Hispanic Black		8.6	9.5
Non-Hispanic Asian		12.9	10.9
Hispanic/Latino		47.3	48.9
Low-income Indicators			
% of households with income <$35K	34.3	37.4	42.3
% of occupied housing units renter-occupied	47.9	50.9	60.1
% of renter households spending > 30% income on rent	57.6	53.1	54.8
% of population below federal poverty level	14.5	16.3	20.1
% of civilian labor force unemployed	6.9	7.4	8.3
Construction Employment			
% of civilian employed population in construction	7.2	7.0	7.8
% of minority employment in construction	54.3		

As the table shows, the region's highly diverse population includes 47.3 percent Hispanics in the county, with a slightly larger Hispanic population in the city; about 29 percent White population in the city and the county; and 12.9 percent Asian and 8.6 percent Black populations. In terms of low-income indicators, both the county and city had higher poverty rates than the country as a whole, with much higher rates in the city. Unemployment rates in both county and city were higher than the national average (11.3%), especially in the city. In 2000, rates of employment in the construction industry in the city were slightly higher than the country and the county. In his study of racial/ethnic composition of the construction trades in 18 metropolitan areas, Swanstrom [19] indicates that in Los Angeles, Hispanics are represented in the construction trades "at a rate more than 25 percent than their participation in the overall workforce. Over two-thirds of construction workers in Los Angeles are Hispanics." Non-Hispanic Blacks, the same study states, were underrepresented by 6 percent in the construction trades in Los Angeles.

As a result of its diverse population, we can expect that minority workers, especially Hispanics, would make up a large percentage of union members in the construction trades and obtain a large percentage of the jobs in the construction of light rail projects. The city has a greater share of lower-income population than the county and the MSA and, thus, if unions recruit within the city, more lower income workers could be employed in transit construction. Construction

employment rates were slightly higher in the city than the nationwide average, and the percentage of minority employment in construction was 54.3 percent in the metropolitan area, suggesting that union membership in the construction trades reflects that percentage, especially for Hispanics.

Another important aspect of the Los Angeles region is its history of community activism on transportation projects. We already indicated the unprecedented legal suit that the Bus Riders Union brought against Metro in 1994. Another important case was the Alameda Corridor case briefly outlined in Section 2. In the late 1990s, the Alameda Corridor case directly involved the Cities of Los Angeles and Long Beach, their port authorities, and the new institution they created, the Alameda Corridor Transportation Authority (ACTA) in community conflicts over the largest freight rail construction project in the country. Although the project did not involve Metro, the community activism in this case set a precedent for successful local workforce hiring programs in community benefits agreements between local communities affected by rail construction and transportation agencies [147].

Project Overview

The Gold Line East Side Extension Project is a 6-mile line, 8-station dual track light rail project running mostly at-grade from Union Station in Downtown Los Angeles to East Los Angeles. It connects directly to the Metro Gold Line from Pasadena at Union Station and serves ethnically-diverse communities along its route, including the Little Tokyo–Arts District, Boyle Heights, and East Los Angeles. It incorporates six at-grade stations and two underground and includes twin 1.7-mile tunnels underneath Boyle Heights. Figure 8-2 is a map of the project area. The extension has an estimated one-way trip time of 20 minutes from Union Station to Atlantic Station.

Source: Metro [148]

Figure 8-2 *LA Metro Gold Line Eastside Extension Project Map*

In 1998, Metro undertook an Alternatives Analysis to evaluate feasible alternatives for the Eastside and Mid-City corridors. FTA approved the project into preliminary engineering in August 2000, with Section 5309 New Starts funding share of $490.70M. In May, 2001 the Metro Board approved the locally preferred alignment for the Metro Gold Line Eastside Extension. Metro completed the NEPA process and received a Record of Decision in June 2002 [149]. FTA approved the project's entry into final design in October 2002. FTA and Metro entered into a Full Funding Grants Agreement for the New Starts funding in June 2004, with revenue operations scheduled for December 2009 [150].

Construction started in July 2004, and the project was completed within budget and on schedule with a perfect safety record. The project won two awards in 2010: it was named the top transportation project in Southern California by *California Construction Magazine* and won the 2010 Outstanding Government Civil Engineering Project Award from the American Society of Civil Engineers (ASCE)

[151]. Figure 8-3 is a photo of the Gold Line Eastside Extension train approaching the East LA Civic Center station at its official dedication in November 2009.

Figure 8-3

LA Metro Gold Line Train at official dedication of East LA Civic Center Station, November 14, 2009

Source: LA Metro

As of 2012, the sources of funds for the project included federal (57.6%); state (24.7%), and local (17.9%). As indicated, FTA's Section 5309 New Starts funding share was $490.70M [148].

Need for the Project

The need for public transit in the Eastside of Los Angeles was recognized since the early 1990s. Eastside Los Angeles, comprising the communities of Boyle Heights and East Los Angeles, was characterized by a growing population (212,000) in 1990 and projected to increase to 275,000 by 2020. With a predominantly Latino ethnic origin population (97% minority vs. 59% minority in the county as a whole), a high percentage of low-income households (26% low-income vs. 12% for the county as a whole), the area had high rates of transit use and dependence. In these communities, 30 percent had no access to automobiles, in contrast to 11 percent with no auto access in the county; about 20 percent of workers used the bus system in their journey to work compared with 6.5 percent of county workers in 1990. Rates of carpooling and walking were also higher in the Eastside corridor. In addition, all the major freeways serving the area were operating above design capacity during peak and off-peak hours, and no new improvements to freeways were planned [152].

At first, Metro's plans were to expand the Red subway line into the corridor, but a 1998 County Initiative was passed that prohibited funding from Propositions A and C sales tax revenues for heavy rail (but not for light rail). Plans for the Red Line Extension into the Eastside were withdrawn. Metro commissioned studies for alternatives, especially alternative light rail and BRT. Finally, in May 2001, the Metro Board at the completion of the environmental review process selected the final Eastside Extension alignment with six light rail stations and a tunnel section under Boyle Heights with two subway stations. The 1998 Initiative and its denial of funding for heavy rail throws light on the evolution of the project, as well as on the final budget breakdown for the project—in particular, on the high percentage of funding from the federal government and the relatively low local sales tax contribution.

Overall, the Eastside was growing in population and economic activities, and there was a consensus that transport investment in this part of the city would attract other types of investment as well as address the mobility problem that Eastside minority, low-income communities faced. As a result, as stated in the FSEIS [152], the primary objective of the project was to improve access and mobility of residents to employment opportunities in Downtown Los Angeles and other locations along the transit corridor.

Estimates of Employment Generated by the Project

According to the final environmental impact study for the project, the Eastside Extension was estimated to generate approximately 47,000 new short-term direct and indirect construction-related jobs, and more than 1,000 permanent jobs within the first 14 years of operation to maintain and operate the LRT line and additional bus service [152]. In addition, Metro committed to formulate a local hiring policy for the project that would include resources for job development and training, as well programs to encourage small and disadvantaged business enterprises to participate in the construction and operation of new transportation projects.

The environmental impact study indicated the types of employment that the project would generate. Design and planning work included redesign of sidewalks, station-specific master plans, pedestrian linkages, etc. During the construction process, construction jobs would include construction of park-and-ride facilities, noise barriers, street widening, pedestrian paths, barriers, railbeds, stations, etc. [152].

The Contracting Process

Two departments at Metro manage major capital projects. Metro's Countywide and Regional Planning Division develops plans and manages projects up to the adoption of the locally preferred alignment and the completion of

the environmental certification for the project. The Construction Capital Management Division then takes over. On the Gold Line Eastside Extension project, Metro hired a general engineering consultant to develop concept, preliminary, and final design and to prepare the solicitation documents for the construction phase. In 2002, Metro awarded the consultant contract to Eastside LRT Partners, a joint venture of Parsons, Brinckerhoff, Quade & Douglas; Jenkins, Gales and Martinez; and Barrio Planners, Inc. [153].

Metro officials originally planned two separate contracts for the Gold Line Extension, one for the tunnels and station excavations, using the traditional design bid-build delivery system and a design-build contract for stations, track work, and systems. Metro had first used a design-build contract on the Pasadena Gold Line very successfully. However, because of the presence of the tunnel portion of the project with complicating factors of seismic risk and methane issues, the agency wanted to have more control of the process and decided to contract the tunneling portion of the project as a design-bid-build contract. Metro subsequently established a Tunnel Advisory Committee with national and international experts to ensure tunnel safety (Thorpe, unpublished data). The invitation for bids was issued on November 26, 2002. Bids were received on February 26, 2003, but all bids were rejected as non-responsive to the DBE goal. Staff determined that issuing the two scopes of work in one solicitation under Contract No. C0803 could mitigate delays for the project schedule. IFB C0803 provided the opportunity for bidders to compete for the three separate contract opportunities: the tunneling and station excavation as a design-bid-build and the station, track work and systems as a design-build or both [154].

The recommended contractor was determined by means of a two-step sealed bid. In the first step, bidders submitted Technical and Qualifications Submittals (TQS), which were evaluated for technical acceptability. In the second step, those bidders determined to be technically acceptable were invited to submit sealed-price bids. The IFB stipulated that the contract be awarded to the technically-acceptable, lowest-priced responsive and responsible bidder.

All bids exceeded the Metro construction project budget by more than 10 percent. One of Metro's rights listed in the IFB was "Request from the low Bidder(s) Best and Final Offers (BAFOs), which may be negotiated, as an alternative to cancellation of an IFB, in the event the bid(s) exceed the Metro Project Construction Budget by 10% or more." On February 9, 2004, Metro requested a BAFO from the apparent low bidder, Eastside LRT Constructors. On February 23, 2004, Metro received a BAFO (Bid) in the amount of $609,964,000, which included the base contract work in the amount of $586,750,120, the Provisional Sums amount of $13,698,880, to cover specified additional work that may be necessary during the performance of the work, and other miscellaneous costs. Staff recommended, and the CEO awarded Contract No.

C0803 to Eastside LRT Constructors in June 2004. Eastside LRT Constructors was a joint venture comprised of Washington Group International, Obayashi Corporation, and Shimmick Construction Company. All three firms had many years of experience in both design-build construction projects and various types of heavy construction work. All three also had prior contracts with Metro with satisfactory past performance. Washington Group was involved in the design-build Pasadena Gold Line project. Both Obayashi and Shimmick were previously involved in the construction of the Metro Red Line and, at the time, were joint-ventured on the design-build of the Metro Orange Line [154].

ELRT Constructors subcontracted the tunnels and underground station excavations to Traylor Brothers and Frontier Kemer Joint Venture. Eighty-eight subcontractors worked on various job functions for the project. Out of the total number, 18.2 percent were designated DBEs and 7.9 percent were considered small businesses.

Metro used a low bid to select the contractor in the Gold Line Eastside Extension; since then, however, for the more recent Expo Line, the agency has adopted a "best-value approach." For the Expo Line, Metro accepted bids, and two firms were short-listed to prepare preliminary engineering drawings. Subsequently, a best-value approach was used to select the final firm using a scoring system in which the construction cost could amount to 80 percent of the score and qualifications could account for 20 percent. Qualifications could include the contractor's record, staff qualifications, contracting plan, community outreach, SBE program, and other factors (Thorpe, unpublished data).

Metro's D/M/WBE Policies

As indicated, Metro's commitment to DBE participation on the project led to a rebidding of the project. The firm that was awarded the contract, ELRT Constructors, committed to a goal of 17 percent ($51.5M) of total construction amount of $318.6M for DBE participation, a goal of 20 percent ($4.2M) of total design funds of $21.2M; and a goal of 13 percent ($27.9M) of the total tunnel amount of $212.6M. ELRT Constructors exceeded its DBE goals [155].

As an example, the tunneling portion of the contract, with a DBE participation commitment of 13 percent, was completed by mid-2008. The final DBE participation was reported as 15.50 percent, exceeding the goal. Of the 14 original subcontractors/suppliers, although listed as having performed (except for one, who was substituted), 8 had much lower attainment rates than originally committed. Five of the original 14 DBEs had substantial increases in budget from the original commitment. With respect to the DBE firms that were contracted for much less than originally committed, the prime contractor, according to the agency, demonstrated good faith efforts by using nine additional DBE firms that were not listed on the original team [155] (Table 8-4.) This type of discrepancy

between commitments to DBE firms at the beginning of the contract and changes in contracting during the process likely generate bad feelings among the DBE community, putting into question standards for "good faith efforts."

Table 8-4 *Tunnel DBE Subcontractors on Gold Line Eastside Extension Project, DBE Contract Commitment, Attainment, and Participation*

Subcontractor's Name	Commitment	Current Attainment[1]	Current Participation[2]	Current Status
Abratique and Associates	0.14%	3.91%	4.14%	Performed
Ace Fence Company	0.48%	3.07%	3.25%	Performed
Anthony Marmolejo Construction	2.97%	0.04%	0.05%	Performed
CGO Construction	0.28%	0.00%	0.00%	Performed
G & C Equipment	2.26%	0.07%	0.08%	Performed
Ghazi Precast	0.86%	0.28%	0.30%	Performed
Island Environmental Services	1.07%	0.29%	0.21%	Performed
Medlin & Associates	0.38%	0.57%	0.60%	Substituted
RMD Rebar	1.38%	0.06%	0.06%	Performed
RT Construction	2.45%	1.08%	1.14%	Performed
Seville Group	0.47%	0.15%	0.16%	Performed
Sudhakar Company	0.06%	0.95%	1.01%	Performed
Sullivan Concrete Textures	0.11%	0.82%	0.87%	Performed
W.C. Goolsby, Inc.	0.20%	1.51%	1.59%	Performed
MBI Media, Inc.	N/A	0.03%	0.04%	Performed
Antich Consulting	N/A	0.11%	0.12%	Performed
Mariman Security	N/A	0.32%	0.34%	Performed
VSA and Associates	N/A	0.15%	0.16%	Performed
Morgner Tech. Management	N/A	0.04%	0.04%	Performed
Ultrasystems Environmental	N/A	0.02%	0.02%	Performed
G&C Equipment-Procurement Svcs.	N/A	0.10%	0.11%	Performed
Manuel Tejada Trucking	N/A	0.42%	0.44%	Performed
EW Corporation	N/A	0.75%	0.79%	Performed
TOTAL	13.11%	14.56%	15.50%	Performed

[1]From close-out memo dated 6/19/2008; Current Attainment = Total Actual Amount Paid-to-Date to DBE Subs ÷ Total Current Contract Amount

[2]Current Participation = Total Actual Amount Paid-to-Date to DBE Subs ÷ Total Actual Amount Paid-to-Date to Prime

Source: Metro [155]

It is important to highlight here that although DBEs typically hire larger proportions of minorities than non-DBEs, DBE workers need not be workers within the local community. For example, if DBEs are unionized, and since unions often draw workers from across counties or metropolitan regions and send workers to construction jobs-based on who is available on their lists, even if DBEs are-based within the local community of a construction project, their

union workers may not be local. This is a major reason that transit agencies develop additional policies beyond the DBE program to ensure local participation of low-income persons, women, and minorities in transit construction programs.

Metro's DEOD and the Transportation Business Council (TBAC)

Metro's Diversity and Economic Opportunity Department (DEOD) is responsible for ensuring non-discrimination in Metro contracting and employment practices. Within DEOD, the Contract Compliance Unit is responsible for ensuring that a fair share of all contracted work with subcontracting opportunities is achieved with appropriate S/D/M/WBEs. It establishes goals on applicable projects awarded by the Metro, reviews bids/proposals and responses, recommends awards, and monitors projects for appropriate S/D/M/WBE participation. The Contract Compliance Unit works closely with the Procurement Department on all relevant contracts, works to maximize opportunities, and ensure fair and equitable treatment to S/D/M/WBEs who participate in the performance of Metro contracts [156].

Metro helped establish a Transportation Business Advisory Council (TBAC) to serve as Metro's small business advocate. Metro information is disseminated at monthly TBAC meeting, informing small businesses about upcoming contracts and small business legislative updates and about topics on small business economic development. The Council encourages small business owners and interested parties to attend TBAC meetings. These meetings provide small businesses, including DBEs, MBEs, and WBEs, with a forum to discuss topics and issues of concern to business owners. TBAC advocates for small business owners to have increased access to Metro's procurement process. TBAC meetings feature a monthly speaker series, Metro current and future contract opportunities, legislation updates, and current trends in transportation. TBAC works with Metro's DEOD to ensure small business access to Metro contracting opportunities [157].

DBE Characteristics and Perceptions

As indicated in Section 4, we conducted a telephone survey of contractors in Southern California to obtain information on minority contractors, especially DBEs, regarding characteristics of their business, how they found out about transit contract opportunities, the role that the DBE designation plays in obtaining contracts, and union affiliation, among others. The survey included 246 firms, 177 of which were minority firms. A total of 89 percent (158) of the minority firms were DBEs. Here we summarize the characteristics of the firms and their perception of the value of DBE status. See Appendix E for survey methodology and for survey results.

Characteristics of Contractors

- Small firms with high minority employment—the majority of all firms surveyed employed fewer than 25 people. However, a greater percentage of minority firms, more than 80 percent vs. 65 percent for non-minority firms, indicated workforce size of less than 25 people. Both minority and non-minority firms reported high percentages of minority employment, with minority firms reporting higher percentages (65%) vs. non-minority firms (about 50%).
- Outreach methods—to find out about contract opportunities, minority firms relied primarily on prime contractors (which they identified as the most important method), personal contacts, and the Internet. Both minority and non-minority contractors indicated that they were satisfied with the ways in which they hear about contract opportunities, with a higher proportion of non-minority contractors expressing satisfaction.
- Union affiliation—lower proportions of minority contractors compared to non-minority contractors reported that their workers were mostly union affiliated, 54 percent of non-minority vs. 15 percent of minority firms.
- Training of workers—the survey asked, if the firm was not affiliated with a union, whether it provided training to its workers. Less than ¼ of the respondents said yes, with slightly more of the non-minority firm responding that they offered some training.
- Recruitment of workers—more than 60 percent of non-minority firms identified unions as their first means of recruiting workers, followed by direct contacting of workers and word of mouth. For minority firms, word of mouth was their first method (58%) for recruiting workers, followed by direct contact with workers.
- Perspectives on DBE influence—DBE firms were asked whether DBE designation had increased their success in obtaining transportation construction contracts. The respondents' views were split among those that believed that DBE status had improved their success (38%), those that believed it had no influence (44%), or those who believed it had worsened their chances (6%). Of those respondents that noted reasons for their dissatisfaction with DBE designation, the major reason noted were structural problems with the DBE program.
- Perspectives on hiring skilled workers—more than 50 percent of both minority and non-minority firms responded that it was relatively easy to hire skilled minority workers, but a higher proportion (68%) of non-minority firms responded it was relatively easy to hire such workers. The major reasons that non-minority contractors felt it was easy to hire minority workers were that representation of minority workers in unions was high and that minority workers are a significant part of the Southern California workforce. For minority contractors, the two major reasons were that minority workers are a significant part of the region's workforce and because outreach to minority communities is easy.

Worth noting is that both minority and non-minority owned companies surveyed reported a large percentage of their work force as minority. As the survey respondents recognized, this reflects largely the high proportion of minorities in the Los Angeles region and that their representation in unions is relatively high. Another important finding from the survey is the low rate of union affiliation reported by minority contractors compared to non-minority contractors. Most likely, a major reason is the smaller size of minority firms, especially DBEs.

On DBEs' split perception of the value of the DBE program, much of the lukewarm or negative perception was likely due to the changes that California transit agencies underwent from 2006–2012 in response to 9th Circuit Court's *Western Paving* decision. These changes lessened the value of DBE designation, especially for Hispanic male-owned DBE firms. This is supported by the major reason—structural problems—cited by respondents for their dissatisfaction with the program.

To gain a better understanding of the split perception of the value of DBE designation among survey respondents, in 2012, we conducted follow-up interviews with several DBEs that had worked on the Gold Line Eastside Extension project and other Metro projects (Lindsay, Eldridge, Gardner, Ng, Henry, unpublished data). The firms interviewed agreed that DBE/WBE/UDBE/SBE designations had helped them obtain contracts and that without them they could be easily squeezed out of the market, since, as one interviewee put it, "construction is a majority White industry." They pointed out the fierce competition among minority firms to obtain subcontracts. The firms had positive reviews of Metro's outreach efforts but claimed that there was room for improvement. In particular, they brought up the need for strengthening Metro's good faith effort requirements, e.g., that large contractors should not be able to shirk their responsibility for achieving DBE and related goals and, if they do, Metro should sanction them and remove them from the contractor eligibility list. As noted in the discussion of the project contract details, during the contract period, there can be significant changes between the original DBE firms, the contract amounts committed to them, and the final outcomes. Since the process is not transparent, such changes become an issue of concern for the DBE community.

Metro Jobs Program

Metro's findings of fact concerning the Eastside Extension Project's Final Environmental Impact report identified economic and land displacement and relocation impacts of the project [149, 152]. On the benefit side, the project was expected to generate 1,078 direct and indirect jobs over the first 14 years and 46,000 direct and indirect jobs during construction. On the negative side, the project was estimated to displace 20 businesses and 124 employees. As a result, Metro became responsible for mitigating the adverse economic impacts of the

project by developing, funding, and implementing a local employment policy for construction-related and long-term job opportunities. This local employment policy, or, as the program became known, the Metro Jobs Program, was required to include resources for job development, hiring, training, and outreach. The Metro Jobs program is overseen by Metro's DEOD, and in particular by a Metro Jobs Compliance Officer. Under this program, Eastside Constructors, the prime contractor, was required to develop an Eastside Project-specific Metro Jobs Program to increase the work opportunities for local communities' residents in the Eastside Extension Project [158]. On this project, Metro was not allowed to enter into a PLA with labor unions due to Pres. Bush's Executive Order of 2001 that prohibited agencies receiving federal funds from entering into PLAs. However, as Metro realized, the Executive Order did not prohibit contractors from voluntarily entering into agreements with labor unions. This latter was the path that Metro pursued in the Gold Line Eastside Extension project by requiring that the prime contractor identify and consider for employment eligible trade workers living in the Eastside Project Community (EPC). The EPC, in effect, was a set of targeted communities to benefit from construction-related jobs generated by the project. It included zip codes within a five-mile radius of the project, beginning with those communities closest to the project site and then extending the local hire area to ZIP codes within the county with high unemployment rates [159, 160].

With respect to these communities or target areas, Metro set a goal that 30 percent or more of all work hours billed to the project should be from workers residing within the EPC overlay. Although short of achieving the 30 percent goal, the policy resulted in 27 percent of the work hours were performed by local residents [161]. In addition, the contractor was responsible for steering all other EPC residents interested in work opportunities in the Eastside Light Rail project into pre-apprenticeship programs. Metro also required that Eastside Constructors hire an Eastside Metro Jobs Program Officer (MJO) to disseminate policy, conduct manpower analyses of all trade and crafts and non-trade workers needed, develop outreach and recruitment programs, provide job training referrals, and keep records (for example, of trade workers, names, addresses, number of hours, or referrals to pre-apprentice training). The MJO for the project tracked this information and submitted it to Metro's DEOD on a quarterly basis (for example, a summary report on trade employees from September 2008 to June 2009 varied from 29% to 25.2% [162]).

In January 2012, Metro's Board adopted a PLA approach for all its future projects. Metro negotiated with the Los Angeles/Orange County Building Construction Trades Council to ensure the timely completion of future transit projects. Incorporated in the PLA is a Construction Careers Policy, which is, in effect, a modification of the Metro Jobs program developed for the Gold Line Eastside Extension Project. It requires all contractors working on Metro

construction projects covered by the PLA to comply with targeted hiring requirements [161, 163, 164].

Minority and Low-Income Participation in Transit Construction

Metro estimated that trade union members would likely perform about 75 percent of the work on the Eastside Extension Project [159]. To develop its local hire requirement, Metro first determined the trades required by the Eastside Extension Project and then the number of trade workers who lived in the Eastside Extension Project Community (EPC), which amounted to a total of 5,260 union members distributed among 14 unions. For example, 600 trade members in the Carpenters Union, 166 members of the Cement Masons Union (Local 600) and 1,119 members of Laborers Union (Local 300) lived in the EPC. This information, combined with estimates of the typical distribution of construction work hours in similar rail projects, provided Metro with the basis for arriving at the 30 percent target for workers and work hours to be performed by EPC residents in the Eastside Extension Project. It was then up to the prime contractor and its subcontractors to engage the unions to provide local union members to meet the 30 percent targets.

The Role of Unions

As Metro estimated, and union officials confirmed, 75 percent or more of the jobs on transit projects in the Los Angeles region are union jobs.

Race and Ethnicity of Union Members

According to the Los Angeles/Orange County Building and Construction Trades Council, in 2008, across all trade unions, 55 percent of the membership was Hispanic, 7 percent was African American, 1 percent was Asian American, and 2 percent as women (Slawson, unpublished data). The ethnic/racial composition varied across the trades. According to the Cement Masons Union, for example, 60 percent of its membership was Hispanic and 2 percent was African American, while the Carpenters Union estimated that 30 percent of its membership was minority (De Brito, Gordon, Rubio, unpublished data).

Union Recruitment and Training

The unions reported several means of recruitment, including attending career fairs; advertising; reaching out to high schools, community-based organizations, and military bases; targeted mailings; the Helmets to Hardhats Program; and word of mouth. Different unions reported innovative programs; for example, the Cement Masons representative indicated that WINTER (Women in Non-

Traditional Employment Roles), a Los Angeles organization that teaches female job seekers about opportunities in the trade unions, has been a useful recruiting partner for them [165]. The Cement Masons Union has also been approved by the Veterans Administration for their apprentices to enjoy the same GI Bill benefits they would receive for attending college. Both Laborers and Cement Mason Unions indicated that they recruit from military bases and attend military recruiting events and that churches have been very good partners in reaching out to African American recruits.

Union representatives indicated that they had most difficulty recruiting Asians and women. As with the labor unions involved in transit construction in the San Jose region, union officials interviewed in Los Angeles also noted the problem they face competing with colleges for young recruits.

The three unions interviewed have low educational requirements for recruits. Even the Carpenters Union, which is a skilled trade, has no educational requirements but offers a demanding training program, with a 50 percent attrition rate. The Cement Masons official noted that many of its recruits entered with minimal English skills but that they provide bi-lingual instruction and "buddy systems" while on the job to ensure security. The Laborers Union, which typically has the fewest requirements, does require minimal English skills and provides English classes that recruits must pass in order to become apprentices (De Brito, Gordon, Rubio, unpublished data). Opportunities for career mobility are similar to those of unions in the San Jose region (see Section 5).

Given the few requirements for entry, unions have high attrition rates, which open up opportunities for new members, but may prove frustrating for recruits that fail the process.

Unions and Local Hiring Requirements

Local hiring requirements may conflict with union rules about seniority or place on the union list. We asked representatives of the trade unions how they handled local hiring requirements, such as the ZIP code requirements in the Gold Line Extension project. All the local union officials responded that, when they have no members in the local hiring ZIP codes, they recruit for and train members from the ZIP code.

Job Sheds in Los Angeles Region

Union representatives in the Los Angeles region stressed that their members often had long commutes. They estimated that a 30- to 60-minute commute is the norm for their members, and that given the weak economy, it was not uncommon for some members to commute from San Diego to Los Angeles. This fact emphasizes the potential conflict between local hiring rules and union traditions. Union workers go where the jobs are found, and in a weak economy,

they may need to travel much farther than usual. Local hiring programs require unions to recruit new members when they have no current members residing in the locale required, thus bypassing their traditional system of assigning jobs-based on daily sign ups.

Who Obtained the Jobs in Metro's Gold Line Eastside Extension Project?

The Los Angeles region is diverse, with a majority Hispanic population in both the city and the county and sizable percentages of Asian Americans and African Americans. Hispanics are well represented in the construction trades and in the unions, but African Americans, Asian Americans, and women are under-represented. Three-quarters of the jobs on the Gold Line East Side Extension project were union jobs and more than a third of these union jobs fell within the work of the Laborers Union. Typically, The Laborers Union is the trade union with the fewest requirements for apprentices.

The unions in Los Angeles, especially the Laborers Union, already have high percentages of Hispanic members. From the already high representation of minority workers in the Los Angeles trade unions and the active recruitment of apprentices from low-income minority communities surrounding the project area, it is likely that local low-income and/or minority workers on the project exceeded the 30 percent target set for the contractor. It is also likely that the targets were met primarily through Hispanic participation in construction jobs and that African Americans and Asian Americans were under-represented in overall minority participation.

Conclusions and Promising Practices

Metro is already the third largest transit agency in the country in a highly-diverse, still-growing urban region with proverbial traffic congestion. Metro is pursuing a huge rail transit expansion through the next 20 years, funded largely by voter-approved, own-source sales tax revenues. The Gold Line East Side Extension project added six miles and eight stations to Metro's light rail system, extending service to downtown Los Angeles to traditionally low-income Latino communities. The contracting process included an innovative Metro Jobs Program through which the prime contractor selected agreed to Metro's policy that 30 percent of the work hours on the project would be from an area selected as the Eastside Project Community. The program also requires the prime contractor to monitor and provide quarterly reports to Metro. In general, the unions representing workers in the Los Angeles region already have a majority Hispanic membership, but African Americans, Asian Americans, and women are under-represented in the unions. We estimate that the project exceeded its target of 30 percent local low-income and minority participation.

The Metro Jobs program initiated for the Gold Line Eastside Extension project, continued on the Exposition Line, now Metro's official policy embedded in its adoption of PLAs for all new Metro projects [161] undoubtedly has been influenced by the success of ACTA's program and the lessons learned from the bus riders' rebellion. It is a smart and sensitive response to the high unemployment in the low-income and minority communities that the Gold Line Extension project serves.

In the following, we identify several promising practices in the Metro study, including the local jobs requirement.

DBE-Focused

Metro's proactive outreach through the TBAC and Metro's DEOD that mentors and/or assists D/M/WBE firms are promising practices to ensure continuing access and communication with DBEs and small businesses.

Worker-Focused

The Metro Jobs Program of the Eastside Extension Project ensured that local hires in a predominantly minority region would benefit from employment opportunities in the light rail project. The 30 percent requirement for workers and worker hours in a heavily-unionized region opened up union apprenticeships to local applicants.

The local Cement Masons Union partnering with WINTER, the local non-profit that promotes women in non-traditional employment, is a promising effort to increase women participation in trade unions.

SECTION 9

Conclusions from the Case Studies

Introduction

In the course of conducting this study, we learned that we could not directly determine who gets the jobs in light rail transit construction because contractors do not submit specific enough information on their employees to the transit agency to enable researchers to identify and survey them. As discussed, the contracting process in large transit projects involves layers of contracting from sets of prime contractors to layers of subcontractors, as well as the mediation of labor unions. On contracts, transit agencies communicate directly primarily with the prime contractors. Prime contractors self-report information related to fulfilling their M/W/U/DBE goals and their U.S. Dept. of labor minority requirements. These data are important to determine whether contractors are meeting their minority goals but do not provide specific information on workers to conduct follow-up research. Subcontractors and M/W/U/DBE are identified in contract documents, and they can be surveyed and interviewed. However, the episodic nature of construction work and the mediation of unions make it practically impossible to identify the set of workers or to characterize the workforce on a specific project.

As a result, research on who gets the jobs in light rail projects funded in part through FTA has to rely primarily on the accounts of contractors, subcontractors, and the M/W/U/DBEs involved in the contracts and on union representatives in unionized states to draw more specific conclusions.

In our case studies, we pursued a two-pronged approach that, in addition to obtaining information on the transit project from the transit agency and on the general characteristics of the construction labor market, led us to interview prime contractors, subcontractors, and M/W/U/DBE firms and union representatives to provide indirect information on the characteristics of who gets the jobs.

In this chapter, we briefly summarize, compare, and discuss the characteristics of the four projects we studied that are relevant to an understanding of who gets the jobs. Table 9.1 identifies these characteristics by project. The four cases examined in this project differed in multiple ways: agency size, metropolitan characteristics, size of project and of contract, contracting method, DBE goals, and the extent of labor unionization, among important factors.

Table 9-1 *Features of the Four Case Studies*

Project Features	Santa Clara VTA's Vasona Project	St. Louis Metro's St. Clair County MetroLink Extension	DART Green Line	LA Metro Gold Line Eastside Extension
National ranking of agency by unlinked passenger trips and number of unlinked passenger trips per year[1]	#31 42.9M trips	#35 40.6M trips	#27 60M trips	#3 463M trips
Cost and duration	$313M Start date June 2003; began revenue service October 2005	$243.9M Start date 1998; began revenue service May 2001	$1.8B Start date 2004; first section opened 2009; final segment opened 2010	$610M Start date July 2004; began revenue service December 2009
Length, stations	5.3-mi extension, 8 new stations	17.4 mi, 8 new stations, 7 park-and-ride lots	27.7 mi long, 20 new stations	6 mi, 8 stations (6 above-ground, 2 below), twin 1.7-mi tunnels
Contract Type	Design-bid-build lowest bidder; broke up contract into 20 prime contracts	Design-bid-build lowest bidder; PLA	CM/GC at-risk and best-value contracts	Design-bid build for tunnels and site excavation; design-build for stations, track work and systems; innovative metro jobs program
MSA minority population in 2000[2]	55.8%	22.6%	43.8%	68.9%
MSA minorities in construction 2000[3]	46.6%	6.7%	44.3%	54.3%
Index of relative integration of construction labor market[4]	0.83	0.3	1.0	0.79
Extent of unionized labor	Unionized	Unionized	Not unionized except for electrical and steel contractors	Unionized
DBE participation goals	Goal of 11% for Hamilton Crossing Vasona contract; goal achieved	DBE goal of 25%; achieved goal	25% M/WBE participation, 5% DBE participation; goals exceeded	13% for tunnel contract; 17% for other construction contract; goals exceeded
Outreach to minority workers	Union outreach and Santa Clara Trade Council's sponsored non-profit, Santa Clara County construction careers association (S4CA)	Union outreach and Metro's sponsored access	Green Line contract condition	Union outreach and Gold Line contract condition; also outreach to DBEs through Metro's TBAC
Training for minority workers	Through union apprenticeships—craft-based	Through union apprenticeships—craft-based	Contractors provide safety training and send workers to North Texas CEF for craft training	Through union apprenticeships—craft-based
Mobility opportunities	Through union apprenticeships and supervisor training	Through union apprenticeships and supervisor training	Through contractors—DART contract required annual review of workers for promotion opportunities	Through union apprenticeships and supervisor training

[1] APTA [13, reporting for 2010, Table 3]
[2] U.S. Census, 2000 [134]
[3] See Figure 3-4 for source
[4] This is a rough index based on 2000 MSA figures and PUMs analysis. The ratio is Minority Population in Construction in MSA/Minority Population in MSA; as ratio gets closer to one, the more integrated the construction labor market; the closer to zero, the more segregated the construction labor market.

The case studies provide accounts of complex projects led by agencies ranging from the third largest in the country, LA Metro, to medium-size agencies ranked towards the middle of the 50 largest transit agencies in the country. They range from more integrated labor markets or labor unions, to relatively segregated labor unions and markets. They employed a range of contracting methods, as well as distinctive ways of using contracting methods to increase DBE participation and to increase participation of local workers in transit.

Comparing the Cases

The largest agency we examined is LA Metro, the third largest transit agency in the country-based on number of unlinked passenger trips per year. The largest project we studied in terms of cost was DART's Green Line, which was triple the cost of the next largest project, LA Metro's Gold Line Eastside Extension project. The other two projects were of similar size and belonged to Santa Clara's VTA and the Bi-State Development Agency in St. Louis. St. Louis Metro has a peculiar characteristic, in that it is a bi-state agency, which complicates its labor market for construction. The case studies suggest, however, that neither the size of the agency nor the size of the project is as important in determining who gets the jobs as the agency's recent and future transit system expansion. If an agency such as LA Metro is undergoing major expansion, we can expect a larger influence of its minority hiring practices on the greater construction labor market, and/or on the demographic composition of unions. On the other hand, in the case of transit agencies such as St. Louis Metro, whose transit fleets may be considerable but which are not experiencing ongoing light rail transit expansion as in the LA Metro case, their minority hiring practices are likely to have less influence on their construction labor markets or unions. In addition, the lack of sustained construction work in transit in a transit agency such as St. Louis Metro makes it difficult for minority workers, even after gaining entry into unions, to remain in the trade, since the overall demand for work is low and it is difficult for apprentices to complete apprenticeships and become journeyman. As reported by our interviewees in St. Louis, often minority apprentices drop off the union lists discouraged by the lack of opportunities.

The size of a project, such as DART's Green Line or LA Metro's ongoing expansion of its light rail system, heightens the agency's profile within a metropolitan area. In regions with large and growing minority populations, such as the LA Metropolitan area or the Dallas metropolitan area, there is pressure on transit agencies to emphasize the employment benefits of such projects, especially during the construction phase. In these cases, agencies are likely influenced to incorporate more vigorous local outreach, including outreach to minority and women organizations. In both these cases, the transit agencies used distinctive contracting methods to reach out to minority communities and to

ensure that contractors and subcontractors hired greater proportions of local, minority, and women workers.

In Table 9-1, we included a rough index of the relative integration of the construction labor market—the proportion of minorities in construction within an MSA over the proportion of minority population within an MSA in 2000. In this case, as the proportion gets closer to 1, the more integrated the labor market; the closer to 0, the more segregated the construction market. Note that the minorities in construction MSA figures are based on our PUMS analysis of 2000 statistics and do not exactly match the labor market characteristics of the project construction period. Note also that the index aggregates minorities and does not capture the different extent of labor market integration/segregation by minority group. For example, it is clear from our study that although minority representation in the San Jose region construction trades is close to the minority share of the region's population, African Americans are under-represented in the construction trades. In addition, the choice of MSA as the unit of analysis underplays the extent of segregation within the core of the transit systems, since cities and counties where the transit systems are centered typically have higher proportions of minorities. For example, St. Louis County's minority population in 2000 amounted to 26.3 percent and St. Louis City's minority population amounted to 55.7 percent. The index shows the Dallas MSA to be the most highly integrated labor market, and the St. Louis MSA to be the least integrated, again with the above caveats.

The cases indicate that different contracting methods can achieve similar results. Santa Clara's VTA used a traditional design-bid-build awarded to lowest bidder, but with its knowledge of M/W/U/DBE firms in the region, and by breaking up the project into 20 prime contracts, it was able to provide many more opportunities for smaller firms, and more DBE firms in the overall project. Note that such a policy can increase DBE participation, and thereby minority employment, since M/W/DBE firms tend to employ more minorities and women as confirmed by our interviews. However, since DBE firms are typically small, this type of contract spreads contracting opportunities among many small firms, which typically have small numbers of workers. This policy ensures that DBE firms survive, and perhaps allows for some new DBE entrants, but it does not necessarily change the status quo in terms of minority employment in the construction labor market. However, since construction labor in the Santa Clara MSA is heavily unionized, and many of the Santa Clara Trades, according to our interviews with union representatives, are highly integrated, minority workers are likely obtaining an increasingly larger proportion of transit construction jobs.

DART, through a GM/CG at risk contract with best value features, was also able to increase DBE participation, but more distinctively, and was able to increase outreach to increase minority and women workers on the project. In

addition, DART, through its mentor-protégé program, helped to improve the capacity and experience of its DBE protégé firms and to increase their size. This distinctive feature of the Green Line contract, we suggest, is a significant next step in the development of public policy to increase minority participation in transit projects, especially in regions such as Dallas with low levels of unionized labor and a high level of integration in its construction labor market. This type of mentorship of minority firms is likely to enable mentored firms in the future to enter into joint ventures with other firms as prime contractors or to become larger subcontractors. For example, in the Green Line case, under the mentorship of Archer Western, Brunson Builders, an MBE and DBE firm, grew its staff five-fold, and, as important, the prime contractor provided mentoring and decreasing supervision to Brunson Builders to enable Brunson to successfully construct 4 of the 20 new stations in the line. With this substantial experience in light rail station construction (representing half of the total stations constructed in each of the other three cases we studied), this DBE subcontractor is now competitive to enter into joint ventures as a prime contractor or to become a major subcontractor in the Dallas region or around the country. As they grow, such mentored firms are likely to increase minority employment. As the number of larger minority firms that can act as prime contractors or large subcontractors increases, the more pressure, recruitment, or influence these firms are likely to exert on the labor market to increase the number of minority and women workers in the construction trades.

In unionized states or regions, with relatively integrated labor markets, growing minority firms may not be as high a priority, since union memberships may be more representative of the demographic makeup of the regions and, thus, the workforce hired on transit projects is likely to be diverse. However, it may be useful to use strategies such as DART's mentor-protégé program in trades where union membership lags behind the demographic make-up of the population, as, for example, in the Santa Clara region's electrical union that reported a minority participation rate of 25 percent. Mentorship of several small electrical DBE firms to increase their capacity and size could enable these firms to pressure or influence the trade union to increase its recruiting efforts to attract more women and minorities. The mentor-protégé program used by the DART contract may also be a promising approach in relatively segregated labor markets or unions such as St. Louis Metro since several larger minority firms could provide continuing and significant pressure on unions to recruit and retain minority workers. In the St. Louis area, as we learned from the executive director of ACCESS, Washington University, one of the largest employers in the city with ongoing construction projects, is exerting such an influence on the construction labor market by setting and enforcing minority goals in their capital projects. Larger minority-owned construction firms could exert a similar influence in relatively segregated labor markets.

In unionized states, unions are the major gateways to jobs in transit construction. In non-unionized contexts, such as in DART's Green Line, all workers access transit jobs primarily through contractors' outreach and training. Thus, the extent to which minorities and women obtain jobs depends on either the extent to which unions are integrated along racial, ethnic, and gender lines or on the extent to which prime contractors and subcontractors recruit women and minority workers. Prime contractors and subcontractors are motivated to employ women and some ethnic minorities by FTA and agency diversity goals. They accomplish these goals by subcontracting to DBE/MBE/WBE/UDBE firms and, more generally, by ensuring that contractors include enough minority workers to meet project targets. In turn, such DBE firms or subcontractors in unionized states also rely on union labor[48] and, thus, they also depend on the integration of labor unions. In non-unionized states, DBE firms must recruit their own workers, but here again, it is likely that such firms will hire a greater proportion of minorities than non-DBE firms, depending on the relative integration of the construction labor market in the area. In unionized states with relatively segregated labor unions, the number of DBEs and their size are likely to remain small, since DBEs cannot rely on unions to supply minority workers as projects come up, and contractors and subcontractors will likely have trouble meeting minority goals.

PLAs are primarily structured between a transit agency and groups of trade unions to establish a process for conflict resolution to avoid work stoppages or strikes. Such agreements often involve the local community in which a project takes place and spell out defined benefits for the community in terms of access to jobs, for example. The celebrated ACTA PLA incorporated a community jobs benefits program. PLAs were prohibited from 2001–2009 by a presidential Executive Order revoked in 2009. Most of the projects we studied were developed during the period when PLAs were prohibited, except St. Louis Metro's St. Clair project, which was completed in 2001. In the St. Clair project, the agency entered into a PLA with the trade unions in the region, but its PLA was a traditional PLA with no provision for community benefits. In the case of the Gold Line Eastside Extension, since the injunction against the use of PLAs was in effect, LA Metro developed a local hiring jobs policy that it required the contractor to implement. Subsequently, in 2012, Metro adopted a policy requiring PLAs in all rail projects and incorporating a Construction Careers Program in this policy [161, 163, 164]. LA Metro's policy goes a long way to ensure that local communities, especially disadvantaged, minority communities, benefit from transit construction projects. In particular, by requiring that unions provide union members that reside in the designated community, the policy offers the promise of opening up apprenticeship opportunities for local minority workers in relatively segregated unions. In metropolitan areas where transit construction projects are projected

[48] Although to a lesser extent than non-minority firms, as we learned in our study, most likely due to the smaller size of their enterprises.

to continue for one or two decades, as in the case of LA Metro, such a policy could change the ethnic/racial composition of trade unions.

It is not so clear what useful remedies are available for transit agencies in segregated labor markets and trade unions, such as those that prevail in St. Louis, since economic growth in the region is weak (or shrinking) and transportation projects are sporadic. However, the mentoring of DBE firms and the growth of several of these firms beyond SBE status may make some gradual changes in the constitution of the labor market and trade unions in such regions.

Outreach

Outreach and recruitment are crucial in determining who gets the jobs. In states where labor is unionized, unions conduct outreach to minorities and women to varying degrees. When construction projects are scarce and the union has many more apprentices and journeymen than work to occupy them, unions are likely to conduct less outreach, and many unions accept apprentices only when they have a greater demand for workers than they can fulfill with the available union members. Typical outreach includes booths at job fairs and outreach to community groups, churches, veterans groups, etc. A distinctive program is the outreach non-profit S4CA that Santa Clara's Trades Council sponsors, conducting ongoing outreach to middle school, high school, college, and community groups on opportunities for construction jobs. More focused on minority recruitment is ACCESS, the outreach non-profit sponsored by St. Louis Metro, which was motivated by the lack of skilled minority workers for its Metro light rail projects. In the case of DART's Green Line, without unions to perform the outreach function, DART took on this function directly through its outreach to Minority Chambers of Commerce and by setting out outreach requirements in the prime contract. LA Metro's Gold Line Eastside Extension project specified outreach by its prime contractor within a local labor shed and required documentation of such outreach by the prime contractor and follow up by unions. Both St. Louis Metro's initiative in founding ACCESS and Los Angeles's Metro's distinctive contract requirements for documented outreach point to the agencies' perceived need to go beyond union outreach to ensure a construction workforce more representative of their service area.

Training

Training for minority workers in construction in unionized states is primarily conducted through craft apprenticeships that include instruction and on-the job training. In the case of non-unionized work settings, as in DART's Green Line project, workers attain skill on the job, and instruction in many skill areas is provided by the non-profit CEF [128]. Contractors typically send workers to be trained in specific courses, depending on the work required by the contract. Workers do not necessarily obtain mastery in a crafts trade as unions provide,

but in the course of their work history may gain basic skills in many crafts. Opportunities for promotion within a trade are important for established workers, but also for young people as they consider entering a trade. Unions offer a well-defined opportunity to advance to a recognized skill level—journeymen, with an increasing pay scale during apprenticeships. Supervisor and manager status is also available in most trades. Without the well-defined career ladder characteristic of unions, non-union settings, as in the case of the Dallas Metropolitan area, make mobility less certain, and, in the construction labor market where work is often seasonal and episodic, mobility may be constrained. DART's innovative clause in the Green Line contract addressed this issue directly by requiring yearly performance evaluation of workers for the purpose of considering them for promotion. From our case studies, however, neither training nor mobility opportunities seem to be significant factors affecting who gets the jobs in the construction of light rail transit projects.

Conclusion

In conclusion, a complex interplay of size and activity of transit agency, demographic profiles and trends within metropolitan areas, contracting methods, and the relative integration of regional construction labor markets or unions, influences who gets the jobs in light rail construction. Our study suggests several hypotheses that can be tested in future studies:

- In general, the extent to which minorities get the jobs in light rail transit construction, beyond the meeting of DBE and EEA goals, depends on the extent of relative integration in regional construction labor markets and of unions.
- Different contracting methods can be used effectively to increase the opportunities for minority participation. The traditional design-bid-build lowest bidder contracting method can be used to increase DBE participation and thereby minority employment by unbundling large contracts into multiple small ones. Best value contracting can go beyond increasing DBE participation and introduce measures to directly and indirectly increase minority employment.
- In unionized regions, transit agency local hiring policies, by themselves or through PLAs, can open up apprenticeship opportunities for local minority and disadvantaged residents in trade unions.
- Successful outreach to minorities and increases in minority employment can be improved through contract requirements and through non-profits dedicated to ongoing outreach efforts.
- Increasing minority employment in light rail transit projects in relatively segregated labor markets or unions likely requires efforts beyond DBE goals and EE/AA requirements, including active engagement from transit agencies through measures such as best-value contracting to directly increase local employment of minority and disadvantaged populations.

SECTION
10

Manual of Best Management Practices for Transit Agencies for Increasing Participation of DBEs and Local Minority Low-Income Employment in Transit Construction

This section presents the manual of best management practices (BMPs) that we developed from our research on local low-income and minority and DBE participation in light rail construction projects supported by FTA. The manual is meant to be a self-contained document for wider dissemination, and, as such, it provides background on the overall research project and summarizes information contained in Sections 1 through 9. In particular, it refers to promising practices identified in the cases we analyzed. The manual is now available on the website of the METRANS Transportation Center at the University of Southern California [166]. In this section, we reproduce its contents, minus its executive summary and other front matter.

Introduction to the Manual

The purpose of this manual is to identify, discuss, and provide examples of BMPs for transit agencies that can lead to increased participation by DBEs, as well as the hiring of minority and low-income persons on large transit infrastructure construction projects. A DBE is defined as a small, for-profit business concern that is at least 51 percent owned and controlled by one or more socially- and economically-disadvantaged individuals. In 1983, to respond to discrimination against disadvantaged and minority workers and firms in transportation construction trades, Congress enacted the first DBE provision establishing a national goal of 10 percent of the funds authorized for transportation projects by the Federal Highway Administration (FHWA), FTA, and the Federal Aviation Administration (FAA) to be spent with DBEs. This requires that recipients of federal financial assistance—that is, state and local transportation agencies—establish goals for the participation of disadvantaged businesses and certify the eligibility of DBEs to participate in U.S. DOT-supported contracts. Congress

established and has reauthorized this program since 1983, most recently in the Moving Ahead for Progress in the 21st Century (MAP-21, H.R. 4348), based on significant findings of continuing discrimination for minority- and women-owned firms who are seeking to do business in federally-assisted programs across the United States (MAP-21, §1101 (b) (1) (A-E)) [55,56]. Indirectly, the DBE program is a major way to ensure the hiring of minority workers in transit projects, since DBE firms, according to our study results, tend to hire greater proportions of minority workers. Since about 85 percent of federal assistance for transportation projects is for construction, the DBEs benefiting from the program are, to a large extent, construction firms rather than planning and design firms. Since both the educational requirements and the average wages of construction workers, especially construction laborers, are lower than workers employed in the planning and design phase of transit projects, the participation of DBE firms is, thus, also likely to increase the participation of lower-income workers in transportation projects.

However, the hiring of minority, low-income, and local workers on transit projects can be accomplished in ways other than through the DBE program, and this manual identifies several such practices. But, due to the barriers presented by the complex transit contracting process, including the multiple and nested set of subcontractors in transit projects as well as labor recruitment practices and union controls, the DBE program remains a major way in which transit agencies increase participation of minority and disadvantaged workers in federally-assisted projects. Consequently, many of the practices identified in this manual focus on DBEs.

During the period of this project, the DBE program was authorized by Section 1101(b) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), Public Law 109-59. But, as indicated, the new transportation authorization bill, MAP-21, continues programs to support DBEs (MAP-21, §1101(b)).The DBE program is implemented through U.S.DOT regulations in 49 CFR Part 26 [57]. The regulations define two types of DBE programs:

- A race-conscious measure or program is one that is focused specifically on assisting only DBEs, including women-owned DBEs.
- A race-neutral measure or program is one that is, or can be, used to assist all small businesses. For the purposes of this part, race-neutral includes gender-neutrality.

As a result of the ruling of the 9th District Court in *Western Paving vs. Washington State Department of Transportation* in 2005, the nine western states covered by the 9th District Court, including California, must limit their application of race and gender preferences, or race-conscious goals, in the awarding of contracts to those groups where discrimination is demonstrated through periodic studies

of disparity [167]. Even before this court decision, U.S. DOT had amended its regulations to ensure the constitutionality of the DBE program by requiring transportation agencies to meet the maximum feasible portion of their DBE participation goals using race-neutral means designed to remove barriers and enhance opportunities for all small businesses, not just DBEs [168].

Complying with federal DBE requirements in transit projects requires transit agencies to engage in the following activities: set DBE goals; create and develop a bidder's list; ensure that firms included in contracts have DBE certification; monitor DBE contract compliance; have personnel assigned to develop DBE policy and act as a DBE liaison; provide DBE reporting to FTA; and have a prompt payment mechanism (subcontractors to be paid within 30 days after prime contractor has been paid). The regulation also encourages agencies to establish business development programs for DBEs and/or mentor-protégé programs. Unless indicated as optional, these are typical functions related to DBE compliance, and this manual does not include BMPs on each of these functions unless our research or other recent research identified these functions as problematic.

The funding for this research on best practices came from FTA's Office of Civil Rights. The practices presented in this manual are based on research conducted in the project, "Promoting Employment in Transit Construction Projects by Members of Minority and Low-income Communities," funded by FTA during 2007–2013. The BMPs identified are drawn from interviews with transit agencies, prime contractors, subcontractors, union representatives, and skills training service providers in four light rail projects funded by FTA: Santa Clara Valley Transit Authority's Vasona Light Rail Extension, Dallas Area Rapid Transit's Green Line, St. Louis Metro's St. Claire Extension Project, and LA Metro's Gold Line Extension.

Our case study research led us to identify several areas of concern and opportunity for identifying best practices in minority and local hiring in transit projects: contracting mechanisms, outreach to ensure DBE participation in transit projects, financial assistance for DBE firms, ensuring contractor compliance with DBE programs, and agency leadership. We have organized the BMPs we have identified under these categories. Our case study research provided several examples of best practices in contracting, including VTA's Vasona project, which unbundled a large construction project into multiple smaller ones; LA Metro's Gold Line Extension project, which incorporated a local hiring policy in its design-build contract; and DART's Green Line project, which included a best-value approach in its GM/GC contract with strong local hiring and DBE mentorship requirements. With respect to best practices in assisting DBEs to participate in transit contracts, our study found effective public outreach programs in all of our case studies, e.g., Santa Clara VTA had a full-

time DBE coordinator. All the agencies we studied partnered with third-party agencies to expand their outreach efforts, e.g., DART partnering with minority chambers of commerce or LA Metro partnering with the Transportation Business Advisory Council it helped to establish.

Although our study documents the expressed need of DBEs for financial support, we did not find examples of best practices in this area among our cases and drew best practices from recent studies. DBE goal compliance was an issue brought up by many DBEs we interviewed in our case studies. LA Metro's local hiring agreement for the Gold Line Extension provided a best practice for documenting local and minority hiring. However, we did not find examples of public and accessible dissemination of such data or of penalizing DBE program violations. We included BMPs on these issues-based on recent studies discussed below. Our final BMP identifies agency leadership as crucial, in particular, for contracting mechanisms that expand opportunities for the local hiring of low-income and minority workers and nurturing DBE firms. Several of our case studies—DART, LA Metro, and Santa Clara—provide examples of agency leadership that resulted in innovative contracting and program features.

In addition, we supplemented our field observations with a literature review on best practices. Particularly relevant and timely, although focused on highway projects, were the findings of the 2008 and 2009 surveys supported by TRB's NCHRP of selected state DOT DBE program managers across the states [169], as well as the NCHRP Synthesis Report [170] that presented the results of a survey of 47 of 50 states conducted of state DOT offices of Civil Rights or Equal Opportunity to identify the implementation of race-neutral measures used by DBE programs.

The TRB study led by Orndoff et al. [169] asked state DOT DBE administrators to identify the three most important issues or problems that their agencies faced. The study conducted the same survey in 2008 and 2009 and focused on changes in responses between the two samples. Overall, the responses to both surveys provide a good indication of the importance of various implementation issues from the perspective of DBE administrators. The respondents to the 2008 survey identified DBE issues, which include financial issues, diversity in DBE firms, and DBE capacity, as the primary area of concern. This was followed by issues grouped under DBE program administration, including staffing capacity and funding for DBE-supportive services, as well as the actual funds going to minority firms. The third major topic of concern dealt with issues related to U.S. DOT or FHWA, which included lack of enforcement goals. Both DBE issues and DBE program administration issues were again identified as top issues of concern in the 2009 survey responses. In the 2009 survey results, however, negative issues with prime contractors and the underutilization of DBE firms by prime contractors emerged as one of the top areas of concern [169].

In the NCHRP Synthesis Report on race-neutral DBE practices, led by Casey et al. [170], respondents were presented with a list of 22 race-neutral measures and asked to rate these measures as effective or non-effective on a five-point scale [170]. Many of the 22 measures related to typical functions of state DOT Civil Rights or DBE offices, such as branding, marketing, and publicizing the state's DBE program, assisting firms in using technology, or providing firms with technical assistance. Of particular importance to the identification of our BMPs are those strategies that received an effective or higher rating by more than 30 percent of the respondents. These included facilitating meetings, networking between DBEs and prime contractors, participating in loan mobilization programs, facilitating mentor-protégé programs, partnering with local jurisdictions for outreach and training, and unbundling contracts (breaking up large contracts) [170]. In addition, the NCHRP study identified the most significant challenges reported by State DOT Civil Rights officers related to state DBE programs. The most important challenges identified by 50 percent or more of the respondents included lack of DBE firms that work as prime contractors, prime contractors not willing to work with new DBEs, DBE cash flow issues, DBE inability to obtain bonding, and external factors such as the economy [170]. The concluding section links the findings of these studies to the BMPs identified.

This manual identifies and discusses 14 BMPs organized under the categories of contracting, outreach to DBEs, financial assistance for DBEs, compliance with DBE programs, and agency leadership. For each of the BMPs, we discuss the background for the practice, followed by the rationale for the practice and examples. The BMPs are organized under the general categories of contracting, assisting DBEs to participate in contracts, providing financial support for D/M/WBE firms, ensuring goal compliance, and leadership.

The Conclusions section of this manual provides a table summarizing the recent research supporting each of the BMPs, as well as their support or use in the case studies analyzed in the project.

Contracting

Background

Types of Contracts

Various forms of contracting vehicles are used to deliver construction projects, including design-bid-build, design-build, CM/GC, and best-value contracting. Transportation agencies had traditionally used the lowest-bid design-bid-build contract, but more agencies have turned to design-build contracts, and agencies are increasingly using best-value processes to ensure quality construction and other agency goals. We discuss briefly the four different types of contracting methods prevalent in transit construction.

Design-Bid-Build

This is a traditional type of contract where the project owner enters into a contract with a design professional to design the project. The designer may employ other design consultants such as architects or engineers. Upon the completion of the design phase, and subsequent approval by the project owner, several bids are solicited from contractors. The project owner then enters into a separate contract with the contractor to construct the infrastructure. In contrast to design-build, in design-bid-build contracts, the design generally must be completed prior to letting out bids for construction. A design-bid-build method was used in the tunneling portion of the Metro Gold Line Eastside Extension where Metro wanted to exercise full control over the contracting process especially due to safety concerns arising from seismic and methane gas issues due to tunneling.

Design-Build

In a design-build contract, designing and construction services are contracted by the project owner to a single entity known as the design-build contractor. The design-build approach provides single-point responsibility. The design-builder may employ designers or engineers or contractors (either on the design-builder's staff or from outside firms), but such professionals are directly responsible to the design-builder, not the owner. This type of contract minimizes risks to the project owner and reduces the delivery schedule by overlapping design and construction phases. In a design-build contract, construction can start prior to the completion of the final design. Early project scheduling can be done and the designer-builder can order long-lead items before the completion of design. The design-build contracts are more flexible and typically get completed sooner than the traditional design-bid-build projects. The LA Metro employed the design-build contract in the Gold Line Eastside Extension and according to our interview with LA Metro's Chief Capital Management Officer of Metro's Capital Program, design-build continues to be the most widely used method of contracting for existing and future LA Metro projects.

Contract Manager/General Contractor

The Contract Manager/General Contractor (CM/GC) is a modified design-build process where the project owner holds the contract for the design consultant and the contractor. The project owner remains in charge of the process and is the main recipient of the cost savings. Speed of delivery, reduced risk, and flexibility are the major benefits of this approach. According to Utah DOT, compared to the traditional design-bid-build, the CM/GC approach results in time savings in four areas: the project is able to begin earlier, design takes less time, construction takes less time, and the overlap of design and construction reduces overall project time. Having the contractor involved early in the design process reduces risk and improves constructability. Effective construction sequencing and scheduling reduces utility risks as well. This method allows for

innovation and flexibility as the contractor is not bound to a hard bid price. The flexibility can result in a higher overall price, yet in Utah DOT's case there were half as many of the costly change orders with CM/GC compared to a more traditional approach of design-bid-build [171]. A variation of the CM/GC, the CM/GC at-risk method, was used in Dallas, in which the construction contractor guaranteed a maximum fixed price and accepted risk if it exceeded the price. As with CM/GC, there were extensive pre-construction activities in the beginning of the project to eliminate any unresolved issues, improve constructability, and reduce change orders that could push the project off schedule and over budget. DART claimed to have saved significant amounts of time and dollars in addition to mitigating risks by adopting the CM/GC approach on the Green Line. Moreover, the CM/GC process exceeded minority-contracting goals and encouraged partnerships and mentor-protégé relationships with small businesses, as discussed in Section 6.

Best-Value

The best-value method depends upon the project, the selection criteria used for the project, and decision factors that are used when a project is considered for implementation. The project owner considers and identifies potential benefits, such as flexibility, innovation, cost, time, quality, safety, and durability, that might be available by adopting this approach. If the project owner chooses to use best-value, then the evaluation criteria upon which the bids would be assessed should align with the project goals. Relevant evaluation criteria are selected for each of the appropriate goals. Typically, the project owner will evaluate the proposals by using weighted averages that assign scores and weights to each evaluation criteria and summing to a total score. The winning contractor bid then provides the best-value solution to the project owner, ensuring that the resulting score is in alignment with the project goals and requirements. Sometimes, the project owners consider using a two-step best-value process that draw a large pool of bidders and the submission of a large number of alternate technical proposals. First, the project owner screens and pre-qualifies contractors to develop a short-list. In the second step, the project owners evaluate and score short-listed contractors on their approach, cost, schedule, etc., to determine the best-value solution [172, 173].

LA Metro used a two-step best-value approach on the newly-opened Exposition Line. On this line, Metro accepted bids, and two firms were short-listed to prepare preliminary engineering drawings. Subsequently, a best-value approach was adopted to select the final firm using 80 percent of the score for construction cost and 20 percent for qualifications. The qualifications included contractor's previous record, staff experience, contracting plan, community outreach, SBE program participation, etc.

DART also used a best-value approach on its Green Line project, requiring that the General Contractor develop on-the-job training opportunities for the local area that included minorities and women.

Best Management Practices in Contracting

1. **When using design-bid-build contracts and selecting on the basis of lowest bidder, break large construction contracts into smaller contracts.**

One of the barriers facing minority subcontractors is the size of the project. Small DBE firms often lack a sufficient track record and typically do not have financial capacity to compete effectively with large construction firms or consortia [174, 175]. Transit agencies can increase D/M/WBE firm access to public contracts by breaking up what would usually be large public contracts into multiple, smaller opportunities. According to an NCHRP study, about half of the state DOT programs had used this strategy, and the majority who used it found it effective [170].

The breaking of large contracts into multiple smaller contracts allows and encourages DBEs to bid as a prime contractor or quote on subcontracts. Bundling of contracts (the use of a single large prime contractor) is attractive to agencies because it lowers administrative costs, reduces delays and miscommunication between the agency and the contractor, and improves contractor accountability. However, bundling prevents small business from competing and winning federal contracts. It reduces competition in terms of frequency and the number of opportunities available.

Recent FTA federal regulations recognize the value of unbundling. CFR 26.39, the section on fostering small business participation, enjoins DBE programs "to take all reasonable steps to eliminate obstacles to their [small business] participation, including unnecessary and unjust bundling of contract requirements...." [57]

The Florida DOT, starting in 2006, used a strategy of breaking up large FHWA projects into smaller pieces (under $500,000 each) specifically for small businesses. This enabled it to award more than 34 percent of contracts to DBEs [170].

The Santa Clara Valley VTA adopted a strategy of unbundling contracts ensuring more competition and opportunities for DBEs. The VTA packaged the Vasona Line into 20 prime contracts with associated subcontracts. According to VTA officials, packaging light rail contracts into multiple prime contracts, instead of using one prime contractor, has been VTA's standard approach from the early 1980s (VTA Focus Group, 3/31/2010 unpublished). Unbundling the contract was instrumental in the hiring of a diverse group of prime contractors and subcontractors, leading to increasing the employment of minority and low-

income workers. Although VTA has pursued unbundling contracts on smaller (less than $250M) projects, VTA is pursuing a design-build contract on the $2.1B BART Silicon Valley Berryessa Extension Project, where unbundling contracts is unlikely due to the scale and size of the project.

2. When the labor force is unionized, the transit agency can structure and use PLAs before bidding to ensure increased opportunities for minorities, low-income persons, and local outreach and apprenticeships.

A PLA is a project-specific agreement between the responsible agency and the contractor and labor unions that work on the project. It defines the work rules, wage rates, and benefits for the project before the project begins. PLAs can contain requirements that contractors meet DBE participation requirements. In addition, they can also be designed to require increased opportunities for minorities and low-income workers, and for local outreach.

PLA's on federally-funded projects were prohibited by a presidential Executive Order issued in 2001 [50], but this order was repealed by Pres. Obama's 2009 Executive Order 13502 [51]. In 2011, FTA issued a guidance document on the use of PLAs in federally-funded projects, which clarifies that since such agreements are no longer prohibited, it is a transit agency's choice to enter into such agreements [52].

LA Metro was the first transit agency in the nation to adopt a policy of PLAs for all projects with a cost of $2.5M or more for the life of the project. Conditional on FTA approval, Metro has set a target of 40 percent of project hours for FTA-funded projects to be performed by workers living in extremely disadvantaged areas anywhere in the country and 10percent of the total work hours by disadvantaged workers. For non-FTA funded projects, 40 percent of the hours must be performed by locally-targeted workers, with priority given to community area residents, and 10 percent by disadvantaged workers living in the county. The PLA and Metro's Construction Careers Policy (CCP) were approved by Metro's Board of Directors on January 26, 2012, and negotiated with the Los Angeles/Orange County Building Construction Trades Council to help facilitate the timely completion of transit projects in LA County [161, 164]. The first light rail project in Los Angeles to be covered by the general PLA policy is the Crenshaw/LAX Transit Corridor [176]. Metro's Exposition Line Extension to Santa Monica, with no federal funding, also includes a PLA with a strong local hiring program [177].

3. If the transit agency uses a design-build or a CM/GC approach, include a best-value approach to incorporate a local hiring program or mentorship opportunities for DBE firms.

A transit agency that uses a best-value approach can award a contract based on the track record of prime contractors with DBEs and can incorporate local outreach and training program in its contract requirements. The 2005 report "Winning Construction Jobs for Local Residents" emphasizes the importance of advocating for local construction jobs early in the development process [178]. After identifying an appropriate project to target, transit agencies can require that prime contractors demonstrate equal-opportunity track records of paying prevailing or union-scale wages, following workplace laws such as overtime requirements, safety regulations, non-discrimination in hiring, commitment to hiring local residents, and imparting new skills to workers through high-quality apprenticeship training. In addition to signing these contractors, transit agencies can secure commitments from contractors to conduct local outreach and training.

LA Metro adopted a local hiring policy, the Metro Jobs Program, to provide job placement and skills training services to interested residents of the Eastside Project Community (EPC) on the Gold Line Eastside Extension. The mission of the program was to "provide residents of communities adjacent to MTA rail construction projects access to project-related job training and employment opportunities" [158]. Metro established a goal of 30 percent of work hours on the non-tunnel aspects of the construction project to be performed by residents of the Eastside Project Community. Additionally, the designer-builder, Eastside LRT Constructors, was to identify and channel all other interested EPC residents and non-EPC residents into pre-apprenticeship programs for training in construction trades/crafts. Metro established that good faith efforts be employed by the designer-builder and its subcontractors to recruit EPC residents who had completed the pre-apprenticeship training and were properly enrolled in a recognized apprenticeship program.

Metro, as an agency, was not unique in this respect. Other agencies had included local hiring as an expressed goal in significant infrastructure projects in the Los Angeles metropolitan area, including East Central Interceptor Sewer (City of LA), 40 percent local hire goal; LAC+USC Medical Center Replacement (Los Angeles County), local hire program with no specified goal set; and Prop. A Facilities (Los Angeles Community College District), 30 percent local hire goal [179].

Assisting DBEs with Participating in Contracts

Regardless of the type of contract used in federally-funded transit projects, traditionally, the major way in which transit agencies ensure minority and low-income workers in transit projects is through the D/M/WBE participation goals that agencies set in their contracts. Establishing goals and objectives for their DBE programs motivates contractors and agencies to use good faith efforts to meet and exceed those goals [180, 181]. In our interviews with agency staff,

contractors, and union representatives, it became clear that the setting of DBE goals is (a) fundamental to hiring of disadvantaged minority small businesses and (b) instrumental in the hiring of minority workers. According to the U.S. DOT:

> DBEs are for-profit small business concerns where socially and economically disadvantaged individuals own at least a 51% interest and also control management and daily business operations. African Americans, Hispanics, Native Americans, Asian-Pacific and Subcontinent Asian Americans, and women are presumed to be socially and economically disadvantaged. Other individuals can also qualify as socially and economically disadvantaged on a case-by-case basis. To participate in the DBE program, a small business owned and controlled by socially and economically disadvantaged individuals must receive DBE certification from the relevant state– generally through the state Uniform Certification Program (UCP). To be regarded as economically disadvantaged, an individual must have a personal net worth that does not exceed $1.32 million. To be seen as a small business, a firm must meet SBA size criteria and have average annual gross receipts not to exceed $22.41 million. [3]

In all of the case study areas—Dallas, Los Angeles, San Jose, and St. Louis—the agencies met their respective project contracting DBE goals. In fact, DART and LA Metro exceeded the target DBE goals on their respective projects. We were able to draw the following conclusions from our interviews:

- DBE contractors unequivocally vouched for the DBE program as a means to increase minority participation in transit construction projects. The construction industry is dominated by large, full-service firms with disproportionately few minorities in the ownership structure and as employees. The DBE program provides a clear-cut avenue for the disadvantaged firms to engage in the construction process, quite unlikely in a business as usual setting.
- DBE contractors, more often than not, hire minority workers. To a large extent hiring in construction is based on word of mouth and networking with family, friends, and acquaintances.
- Given the size limitation of DBE firms, they are likely to draw from local labor. However, workers in DBE firms need not live within the designated local project area, since DBE firms, similar to all other firms likely draw labor from the larger regional/metropolitan area. Our research found that construction workers, in general, are highly mobile and may travel very long distances for short-term jobs. Since even DBE firms draw labor from the larger regional/metropolitan area, especially in states where labor is unionized, this may be a major reason for the increasing use of local labor provisions in transit projects.

The best practices identified and discussed below address issues related to the outreach that transit agencies should conduct to DBE firms to ensure their participation in specific projects, staffing to ensure ongoing outreach, and other steps that transit agencies in partnership with outside agencies can take to provide training and mentorship.

4. Develop an effective, ongoing public outreach program to DBE firms and prime contractors to ensure that DBE firms have adequate notice and time to bid on subcontracts.

Public outreach is necessary to effectively hire DBE firms and local residents in minority and low-income communities. Recruitment methods include placing ads or notices of construction projects in local newspapers (particularly in ethnic newspapers), trade publications, specialty magazines, and e-mails [181]. Recruitment can also be done through career fairs at local high schools, community colleges, and universities. Other strategies include keeping a directory of DBE firms and connecting prime contractors and DBE firms through conferences, trade shows, and panels [170]. Outreach to prime contractors is also important, since prime contractors decide which DBEs are included in a contract.

In all of the case study areas, we found transit agencies conducting extensive public outreach to announce contracting opportunities. Prime contractors and subcontractors, including DBEs and non-DBEs, expressed their satisfaction in receiving notices of opportunity, outreach events, and pre-bid meetings on a timely basis. Transit agencies studied heavily use the Internet through Web postings, e-mails, and e-blasts to inform their constituency of new opportunities. However, interviews of DBE firms indicated that notice and time to bid on sub-contracts was often inadequate.

5. For large and medium-size projects or agencies, establish a full-time DBE Coordinator to ensure ongoing outreach and support for such firms.

Having a full-time D/M/WBE coordinator can help in successfully meeting the transit agency's DBE goals [180]. The coordinator can assist minority firms with the bidding process, such as holding mock workshops on the bidding process or assisting firms with plan reading, bidding, and estimating; job costing; and writing/designing statements of qualifications. This coordinator can also assist firms with one-on-one business reviews and/or technical assistance or assist firms in using technology such as electronic bidding, website development, and conducting business over the Internet.

Although all of the agencies we interviewed had departments and staff addressing the issues outlined above, the Santa Clara VTA had a full-time designated DBE coordinator who conducted outreach with the DBE subcontractors and

provided them technical assistance on certification, pre-bids, mentor-protégé relationships, compliance, and enforcement issues.

6. Partner with third-party entities to facilitate DBE inclusion in contracts.

A significant component of choosing partners for transportation projects is based on relationships in previous working relationships. Prime contractors may not be willing to work with new minority firms because they are uncertain about the firms' skills and experience [169]. Often, contracts are awarded to already-successful and experienced minority firms because they are more likely to generate economic development and generate jobs [182]. As a result, less mature DBE firms with fewer connections to veteran firms are at a disadvantage when bidding for projects [170].

Programs that facilitate connections between DBE firms and prime contractors accepting bids is an important element in a successful plan to improve the position of minority firms so that they can more successfully compete for contracts against more established firms. Treuhaft et al. [176] suggest that establishing an intermediary group to identify minority firms that are serious about bidding for larger projects may be an effective way to connect those specific firms with the contractors collecting bids. Assisting minority firms with bidding, bonding, and business development can be done through a partnership with a local government small business development program, a local non-profit, banks/insurance/private institutions, and other agencies/entities that promote minority participation [170, 183].

One example is St. Louis's ACCESS, a non-profit group that provides resources and advocacy to promote minority hiring including a workforce assimilation program. The ACCESS Center analyzes construction industry supply and demand data to identify gaps and shape policies that will increase construction workforce and contractor diversity. ACCESS works with organizations such as trade councils, contractors, educators and trainers, local governments, and the County [139].

7. Partner with contractor associations or non-profit organizations to increase mentorship opportunities for DBE firms.

Creating mentorship opportunities between minority firms and veteran firms is an important way to expand the professional networks of minority firms, provide an entry point for small firms to do business, and develop business relationships that cultivate new opportunities for both large and small firms. Programs that facilitate mentor-protégé relationships help minority firms access basic support and technical assistance from private firms in the industry [170, 175, 183]. Relationships with well-established firms in their field help minority firms during the process of partnering for projects and bidding for jobs. According to an

NCHRP study, 43 percent of states had used this strategy and, of those states, 60 percent found it to be effective [170]. A more formal way of implementing this is through a joint venture, whereby the mentor and protégé are committed to work together for two years [184].

As an example, the Ohio Contractors Association and Ohio DOT created a mentor-protégé program, where roles are as follows:

- Mentor role:
  - Sign an agreement with the protégé,
  - Meet regularly to discuss protégé's strengths, weaknesses, and opportunities
  - Recommend training options
  - Monitor and report on protégé progress
- Protégé role:
  - Be available for meetings with mentor
  - Openly share relevant business information with mentor
  - Follow through with actions identified in the development action plan
  - Report on program progress and satisfaction.
- Support role:
  - Monitor mentor-protégé relationship
  - Coordinate DBE support services
  - Receive and coordinate progress reports
  - Program publicly [185]

In California, Calmentor is a program created from a partnership between Caltrans and the private consulting industry to promote and increase the participation of small businesses on Caltrans professional architectural and engineering (A&E) contracts. The mission of the program is to increase the pool of small business participating in transportation projects by providing them opportunities to network and partner with larger, established firms. Calmentor supports the participation of certified DBE, Small Business Enterprise (SBE), and Disabled Veterans Business Enterprises (DVBE) firms participating voluntarily through acceptance and screening of completed applications from mentors and protégés. The strategies for successful pairing include the mentor not taking on more than two protégés, MOUs with clear and achievable objectives, participants championing the program within their respective company, and a mentor-protégé relationship duration of a year [186].

In Dallas, the mentor-protégé program incorporated in the Green Line's best-value contract ensured that as DBE firms gained in responsibility and expanded their size, the more experienced mentor, Archer Western, provided

guidance and resources and ensured high-quality performance. Joint venture opportunities, in particular, enabled small firms to grow and become medium-size and gain valuable experience needed to compete for larger contracts. Carcon, joint-venture partner, on the DART Green Line project, for example, went from a company of 21 employees, mostly craftsmen, to 82 employees including many highly-paid project management staff. In addition, DART's MOU with minority chambers of commerce in 2001 and renewable every five years was the likely seed of the Green Line contract innovations. Through this MOU, DART established an ongoing relationship with minority chambers of commerce in which many minority and small business construction contractors are active. This relationship is likely to have been instrumental in obtaining public support to use a different kind of contracting for the Green Line from the more common design-bid-build.

Financial Support for DBE Firms

Lack of access to capital finance is the largest obstacle for D/M/WBE firms [170, 182, 187]. There are several best practices that can address financing problems of DBE firms in the construction industry. The first BMP, breaking down large contracts into smaller ones, reduces the amount of funding to be raised by such firms. In addition, improving access to capital, advance and prompt payment arrangements, and access to bonding are steps that transit agencies can take to support DBE participation in transit projects.

8. Partner with local banks to improve access to capital, such as through a loan mobilization program, for DBE firms participating in transit contracts.

Lack of access to capital for business development and training and lack of the right equipment for large construction project act as barriers for many DBE firms [188, 189]. One way to help smaller DBE firms access capital is a loan mobilization program, whereby the transit agency provides direct loans through a trust fund or partners with a bank to assume default risk or pay for default insurance for DBE firms. Two types of loans can be awarded: those for equipment purchases and those for contract financing. Equipment loans can be used to purchase construction equipment such as heavy trucks. Contract financing helps firms pay for insurance, supplies, and other expenses associated with the construction project. The loan amount can be based on the size of the contract, such as $25,000 for contracts under $250,000 or $50,000 for contracts in excess of $250,000 [188].

The Rhode Island Department of Transportation (RIDOT) began implementing such a program in 2003, setting aside $4M initially for the program, which provides low interest 2–3 percent loans. RIDOT first handled the loan program in-house, but the trust fund is now administered through a third party [170, 190]. As a result, Rhode Island has been able to recruit underutilized DBE firms. The

state has also assisted DBE firms in purchasing equipment in new types of work. According to the TRB survey, just 28 percent of states surveyed use this strategy. However, of those states that had used it, approximately 62 percent found it to be very or extremely effective.

9. Ensure that DBE firms receive prompt payments and explore the feasibility of advance payments for such firms.

Lack of capital up front prohibits many minority firms from being able to bid or perform on public contracts. FTA's DBE program already requires that prime contractors pay their subcontractors for satisfactory performance no later than 30 days from receipt of the prime contractors being paid. One way to increase access to public contracts is to offer advance payments to subcontractors [174, 175]. Another is to penalize prime contractors that make tardy payments to subcontractors [169, 174]. According to a TRB report [184], penalties for prime contractors failing to comply with prompt payments may include:

- Withholding future prime contractor payments
- Interest of 1.5–2 percent per month on the amount owed or fixed-fee charges (liquidated damages) of $50 per day or some other amount
- Suspension of bidding privileges
- In repeat or chronic cases the contractor may be suspended from bidding or revocation of prequalification

10. Develop a bonding program for DBEs participating in transit projects.

DBE inability to obtain bonding is a major challenge. Obtaining bonding may be difficult due to poor cash flow or balance sheets. Also, new DBEs may face higher premiums on bonding than more established firms [170]. Creating a bonding program that allows small and disadvantaged businesses to apply for reimbursement for bonding premiums and fees incurred when competing for or performing on transportation infrastructure projects can be useful. The following are a few ways to overcome this barrier:

- Have a bond guarantee program in which the transportation department would guarantee 80 or 90 percent of the firm's bond to a bonding agency [170].
- Reimburse DBE firms for bonding fees [170]. Although some prime contractors traditionally carry subcontractors under their own bond, this practice is slowly diminishing.
- Eliminate the up-front cost retainage [170, 184].
- Relax bonding requirements for government work by allowing some firms to work unbonded [183].

- Encourage insurance companies to help D/M/WBE firms with bonding by establishing special bonding agents to work with minority contractors, streamlining the bonding procedure, and reducing bonding requirements for minorities [183].

Ensuring DBE Goal Compliance

Once contracts have been finalized, and projects are underway, transit agencies need to ensure that the DBE goals in the contracts are being met. "Winning Construction Jobs for Local Residents" [178] emphasizes the importance of including provisions that will monitor and enforce training and hiring goals and follow up regularly to ensure that the contractors are accountable for meeting the agreed upon hiring goal. This gives contractors and agencies overseeing the project opportunities to adjust practices, if goals are not met early on.

11. Monitor the data on local employment and DBE participation.

The monitoring board or staff should have access to detailed project information. For example, when tracking local participation in transit projects:

Parties should be held accountable for reporting data such as (1) the number of residents who applied for, enrolled in, and graduated from pre-apprenticeship program, (2) the number of residents and non-residents hired as apprentices on the project, (3) the number of residents who go on to complete various stages of apprenticeship training [179].

Regardless of whether or not a monitoring board is created, the contractor should still be expected to provide timely and accurate data on job creation, training, and local hiring. These data are critical to create transparency so that all public and private organizations affiliated with the project and the public may know whether or not hiring goals are met. Both DART's Green Line project and LA Metro's Gold Line Extension project set out clear guidelines for tracking training and employment of disadvantaged and community residents.

Equally important is the monitoring of DBE participation; 49 CFR 26.37 already requires that transit agencies establish a monitoring and enforcement mechanism to ensure that the "work committed to DBEs at contract award or subsequently is actually performed" [57].

12. Disseminate project results on local and minority hiring and DBE participation.

Once transit projects are completed, the transit agency should disseminate DBE achievement results for feedback and evaluation of the DBE program [180, 181]. Making such data publicly accessible can contribute to research on the effectiveness of policies to increase minority and low-income participation in transit projects. Disseminating results also can provide increased incentive for

the agency and other interested parties to develop more effective programs. Transit agencies provide much information on their websites, but accessing the information on an agency's website is often difficult. To make local low-income and minority hiring and DBE results truly accessible, the information needs to be provided as a major clickable heading in the Diversity or DBE office subpage of the agency's webpage. The information should also be directly provided to minority chambers of commerce, local nonprofits, and local and regional government agencies.

13. Penalize violation of DBE/MBE/WBE programs.

In many interviews with DBE firms we conducted, owners of firms pointed out instances where DBE firms were included in contract documents as subcontractors to meet DBE goals but were subsequently dropped with no repercussions to the contractor. Federal regulations (49 CFR 26.53) are quite clear about good faith efforts required on the part of prime contractors to remove or change DBE firms after the award of the contract [57], but monitoring and enforcement of these regulations vary across agencies. Violations of DBE laws and regulations such as fraudulent certification or failing to comply with the DBE utilization plan set forth in the contractor's bid could result in some firms being barred from bidding on or participating in any future contracts for a period of 30 days to one or more years [191]. Some firms may face suspension or termination of contract and/or a penalty amount for violating state rules. Several recent prosecutions of fraud in meeting DBE goals in federally-funded contracts indicate that this is still a problem, and that transit agencies should have monitoring in place to avoid such fraud, as well as establish rules to deal with violations. Without such monitoring and enforcement in place, such violations can go on for years. For example, in 2011 in New York City, Skanska USA Civil Northeast, Inc., a subsidiary of one of the country's top 10 construction companies and a prime contractor for the Metropolitan Transit Agency, agreed to pay $19.6M, in a fraud case that involved the use of a subcontractor as a front to evade DBE requirements for over 10 years [192].

Agency Leadership

Most of the practices identified require the support of the top management in transit agencies, including their Board of Directors and executive management, especially, those BMPs that call for agencies to select contracting models new to the agency or local labor agreements. Without such support, most of the BMPs identified in this manual could not be implemented [169].

14. Monitor agency leadership in promoting diversity and DBE participation.

Since most of the BMPs identified in this manual require the support of top transit agency management, FTA should monitor agency leadership in DBE

participation in transit contracts and minority employment. Such monitoring could be based on the extent to which transit agencies implement the BMPs identified in this manual, especially the ones that could not be implemented without strong agency leadership support, such as BMPs 1–3, which involve contracting options to increase minority and low-income employment and DBE participation in contracts, BMPs 8-10, which include financial support of DBE firms, and BMPs 11–13, measures that ensure DBE compliance. The implementation of BMPs 4–7 would also benefit from agency leadership, but these practices are more within the scope of work of transit agency DBE functions.

In the Green Line project in Dallas, for example, DART exhibited strong leadership in promoting diversity and in the hiring of minority contractors. Support from top management and the Board of Directors for a new contracting mechanism, a CM/GC best-value contract, which included a strong mentorship program as well as a local hiring plan, was critical in DART's well exceeding its established DBE goals. With strong support of management, an institutional culture of pride and inclusion permeated from the highest levels to the rank and file. VTA's leadership was also essential in the breaking up of the Vasona line transit contract into smaller contracts to improve small business and DBE participation.

Conclusion

The BMPs presented in this manual are based on our field studies of four major light transit projects funded by FTA, data on other transit projects throughout the U.S., and our review of the literature. Recent TRB [169] and NCHRP [170] surveys of state DOTs DBE and Civil Rights officers on the challenges posed by the DBE program and successful measures to address these challenges also support the BMPs identified. The following summary table identifies the BMPs and indicates how each BMP is supported by the most recent research on the topic. In particular, we indicate the project case studies that support the BMP as an issue of concern and/or provide examples of best practices. We also note the problems identified by the TRB surveys on the barriers faced by state DBE programs as well as the most effective implementation measures reported the NCHRP Synthesis report in its survey of civil rights state transportation officers.

Table 10-2 *Best Management Practices for Transit Agencies and Research Findings*

Best Management Practice Areas	BMP #	BMPs	Support for BMP from Project Case Studies	Support for BMP in Recent Studies
Contracting	1	When using design-bid-build contracts and selecting on the basis of lowest bidder, break large construction contracts into smaller ones.	VTA's Vasona Project broke up a large light rail construction project into 20+ prime contracts to increase the opportunities for DBE firms.	NCHRP report [170] identified the unbundling of large contracts as a most effective strategy rated by respondents who had experience with it. Also, FTA discourages bundling [57]. TRB surveys [169] identified problems associated with prime contractors and underutilization of DBEs as major issues.
	2	When the labor force is unionized, the transit agency can structure and use PLAs before bidding to ensure increased opportunities for minorities, low-income and local outreach and apprenticeships.	LA Metro will be using a PLA in the Crenshaw/ LAX Transit Corridor line to ensure the hiring of disadvantaged workers as well as workers from disadvantaged areas in construction contracts.	
	4	If the transit agency uses a design-build or a CM/ GC approach, include a best-value approach to incorporate a local hiring program or mentorship opportunities for DBE firms.	DART in its Green Line light rail contract used a CM/GC best value approach that incorporated a mentor-protégé program to expand the capacity of DBE firms and provide experience with large contracts. It also included an extensive local hiring outreach program.	

Best Management Practice Areas	BMP #	BMPs	Support for BMP from Project Case Studies	Support for BMP in Recent Studies
Assisting DBEs to Participate in Contracts	4	Develop an effective, ongoing public outreach program to DBE firms and prime contractors to ensure that such firms have adequate notice and time to bid on subcontracts.	All the case studies had various methods for outreach to DBE firms. However, DBEs interviewed noted the need for more time to bid on subcontracts.	A TRB survey indicates DBE program administration is a major issue of concern to survey respondents, especially the lack of DBE firms available for projects [169].
	5	For large and medium-size projects or agencies, establish a full-time DBE Coordinator to ensure ongoing outreach and support for such firms.	VTA has a full-time DBE manager in charge of public outreach and assistance for DBE and SBE firms. LA Metro has a Diversity and Economic Opportunity Department, and the Gold Line Extension Project also included a Metro Jobs Compliance Officer.	TRB survey notes that staffing capacity and expertise required at transportation agency was the 2nd most frequent issue of concern for respondents [169].
	7	Partner with third-party entities to facilitate DBEs inclusion in contracts.	St. Louis Metro helped establish ACCESS, a non-profit that provides outreach and assistance to DBE firms.	TRB notes the importance of increasing communication between prime contractors and DBEs through meetings, etc., as well as partnering with third-party entities such as Small Business Development Centers [169]. NCHRP survey indicates that prime contractors not willing to work with DBE firms (or new DBE firms) is a major challenge [170].
	7	Partner with contractor associations or non-profits to increase mentorship opportunities for DBE firms.	In DART's Green Line Project, DART worked closely over years with minority chambers of commerce and other community agencies to increase DBE participation and local hiring.	Increasing mentorship opportunities between prime contractors and DBE firms is a major administrative support strategy identified by the NCHRP report [170].
Financial Support for DBE Firms	8	Partner with local banks to improve access to capital, e.g., through a loan mobilization program for DBE firms participating in transit contracts.		Financial support issues noted as among the top three issues identified by NCHRP report [170]. Partnering with banks to provide loans to DBEs, although only 28% of the states used this strategy, was rated as highly effective in the NCHRP survey [170].
	9	Ensure that DBE firms receive prompt payments, and explore the feasibility of advance payments for such firms.	Noted as an impediment in interviews with DBE subcontractors.	Access to cash-flow loans and capital was among the top issues identified in TRB surveys [169].
	10	Develop a bonding program for DBEs participating in transit projects.	For Santa Clara VTA's Vasona project, prime contractors were expected to assist DBEs in obtaining bonding.	Another strategy supported by NCHRP report [170].

Best Management Practice Areas	BMP #	BMPs	Support for BMP from Project Case Studies	Support for BMP in Recent Studies
Ensuring DBE Goal Compliance	11	Monitor data on local employment and DBE participation.	In LA Metro's Gold Line Extension Project, the Metro Jobs Compliance Officer monitored data on local employment.	Monitoring data on local employment and DBE participation during project implementation enables the agency to apply pressure on the prime to ensure agency goals. Also responds to a recent GAO report [193] calling for data reporting to U.S. DOT that provides annual spending on DBE contracts.
	12	Disseminate project results on local and minority hiring and DBE participation.	DBE interviews brought up several cases in which contractors failed to use DBEs listed in contracts with no repercussions. Without access to DBE information, such cases cannot be confirmed.	
	13	Penalize violation of DBE Program Goals.		Lack of program enforcement by state and federal agencies was cited as an important issue by TRB survey respondents [169].
Agency Leadership	14	Monitor agency leadership in promoting diversity and DBE participation.	Agency leadership was crucial in adoption of innovative contracting in the DART, Santa Clara VTA and LA Metro cases.	As TRB study noted, the "success of any program is a direct result of the commitment of administration" [169, p. 147].

SECTION 11

Dissemination and Responses to the Manual

To disseminate the manual of best management practices contained in Section 10, we placed an announcement and link to the manual on the METRANS Transportation Center webpage.[49] The METRANS Transportation Center was established in 1998 through the Transportation Equity Act for the 21st Century (TEA-21) as the first University Transportation Center in Southern California. It is a joint partnership of the University of Southern California (USC) and California State University Long Beach (CSULB). The objectives of METRANS are to foster independent, high-quality research to solve the nation's transportation problems, train the next generation transportation workforce, and disseminate information, best practices, and technology to the professional community. As such, it serves as a primary source for transportation research in Southern California and ensures that the manual is widely disseminated [166]. The announcement of the release of the manual was the top news item on the METRANS webpage from June 18–July 8, 2013, with a link to a PDF of the manual. Further, an announcement of the availability of the manual was sent by e-mail to the 50 State DOT DBE Liaison Officers with a request to provide feedback [194].

Obtaining Feedback

To obtain feedback on the manual, we developed an Internet survey for diversity and DBE Liaison Officers (see Appendix H for a copy of the survey). In particular, we were interested in whether responding agencies have had experience with the practices identified in the manual; if so, whether such practices where implemented successfully; and to what they attribute the success or failure of the practices. In addition, we asked respondents to identify the top 3 of the 14 practices they believed were most important to achieve the goal of increasing local minority and low-income employment and DBE participation in transit construction projects and whether there were any other practices not identified in the manual they believed were best practices. The responses to the survey were meant to establish the relative experience with the 14 practices among transportation agencies, the reasons respondents provide for the success or failure of the practices, and what respondents consider top practices.

[49] The link to the manual is located at http://www.metrans.org/announce/item.php?id=257. The announcement appeared on the top of page of METRANS front page from June 17–July 15, 2013.

The survey was developed through SurveyMonkey. The survey uses a "yes or no" format to determine whether the responding agencies have or have not had experience with each of the 14 practices. If respondents answered "yes," they were asked a follow-up question on implementation of the practice and reasons for its success or failure in the agency. The question on any additional practices was open-ended.

The survey was available for agencies to respond from June 17–July 12, 2013. We contacted the State DOT DBE Liaisons identified in the U.S. DOT website [194] three times through e-mail, announcing the availability of the manual at the METRANS site and asking them to respond to the survey and provide feedback on the manual. Appendix H includes a copy of the e-mail announcement. We contacted our case study agencies several times by e-mail and by telephone to obtain feed-back on the manual.

Feedback from Case Study Agencies

Case study agencies were contacted directly by telephone and e-mail in June and early July 2013 to obtain feedback on the manual. We provided the agencies with links to the survey. We obtained one completed survey from one of our case studies and feedback on several of the questions from another agency. Two of our case study agencies did not respond in time to include in this report. One of the agencies responded that its small business/DBE manager had left the agency and they could not find the proper person to respond. The other agency failed to respond in time.

St. Louis Metro provided important feedback on the best practices. First, the Metro official pointed out that, in addition to outreach to DBE firms (BMP 4), it was equally important to provide outreach to prime contractors, especially to achieve the race-neutral portion of the agency's overall goal. The respondent also pointed out that BMP 11 (monitor data on local employment and DBE participation) did not discuss the monitoring of DBE subcontractor participation but only referenced local employment. For BMP 12 (disseminate project results on local and minority hiring and DBE participation), the official pointed out that the BMP does not discuss to whom this information should be disseminated. Finally, BMP 13 (penalize the violation of D/M/WBE programs), the official points out that federal regulations (49 CFR 26.53) are quite clear in defining the good faith efforts that contractors should prove when they remove or replace DBEs. Instead, the emphasis of the BMP should be on monitoring and enforcement to achieve the aim of greater compliance with DBE rules.

As a result of the St. Louis Metro feedback, we amended the BMPs to reflect these insights in the following way. BMP 4 now includes outreach to prime contractors as well as DBE firms. BMP 11 includes a brief discussion of monitoring data on DBE participation. BMP 12 now discusses ways to

disseminate project results to relevant parties. BMP 13 text was changed to recognize existing regulations on good faith efforts and emphasize monitoring and enforcement. These changes are now reflected in the text of the manual in Section 10.

Results from the Survey

As of July 12, 2013, we received six responses to the online survey, five responses from state DBE officers, and one response from a case study transit agency, DART. Appendix H provides a summary of the responses and comments.

Among the six agencies responding, most had experience with BMP 9 (prompt payments) and BMP 4 (effective outreach programs). Federal regulation 49 CFR 26.29 requires transit agencies to set up a policy requiring prime contractors to pay their subcontractors for satisfactory performance within 30 days of the prime receiving payment. But even within our small sample, the policy of "prompt payment" varied. NHDOT requires payments to subcontractors within 21 days and monitors such payments. DART requires payment within 10 days of prime contractors receiving payments and monitors by contacting DBE subcontractors. Other agencies indicated their compliance with federal regulations. Four agencies noted their experience with effective outreach programs and, as discussed below, this BMP is also one of the BMPs that half of our sample identified among the top three most important practices. Half of the agencies responding noted experience with BMP 1 (unbundling), BMP 3 (best-value contracting), and BMP 13 (penalizing violations). Only one of the six agencies responding had experience with BMP 6 (partnering with third-party agencies to facilitate DBEs inclusion in contracts), BMP 8 (partnering with local banks to improve access to capital), and BMP 12 (disseminating project results on local hiring and DBE participation). None of the agencies in the sample had experience with BMP 2 (use of PLAs to incorporate local hire programs) or BMP 14 (monitoring agency leadership on the issue). PLAs have just recently been permitted again in federal contracts, and the lack of experience with this BMP is understandable (see Section 9). The lack of experience with BMP 14 is also understandable, since it is a proposed novel practice. In an increasingly diverse nation, however, it makes sense to evaluate leadership in terms of a leader's performance on diversity issues/policies.

The six respondents also indicated which of these 14 BMPs would contribute most to increase minority and low-income employment and DBE participation in their agency. They were prompted to choose the three BMPs they consider would have the most impact. As with the entire survey results, since the sample is small, these responses are, at most, suggestive. As it is, half of the respondents (three agencies) identified two BMPs—BMP 4 (developing an effective outreach program) and BMP 13 (penalizing violation of DBE goals)—among their top three measures. Among other BMPs noted as top practices by two agencies

are BMP 5 (establishing a full-time DBE manager), BMP 7 (partnering with contractor associations or non-profits for outreach), BMP 9 (prompt payments), BMP 10 (developing a bonding program), and BMP 11 (monitoring data on local employment and DBE participation). Several BMPs were not among the top choices for any of the agency officials. They include BMP 2 (use of PLAs for local hires), BMP 6 (partnering with third-party entities to facilitate DBE participation), BMP 8 (partnering with local banks to improve access to capital), and BMP 12 (disseminating project results).

The respondents were also asked to identify other best management practices not identified in the manual. Two agency officials responded to this question. One response identified "open communication with all prospective bidders on medium and large FTA projects to ensure DBE participation." The other response stated that the manual "covers all important practices that helps this program to continue grow with compliance & contractual."

Because of the small sample, the results are, at best, suggestive. However, the choice of BMP 13 (penalizing violations) among the top three measures by three of the six agencies does suggest the importance that state DOT's place on the need for enforcement of DBE goals. This result should, of course, be supported by further research and a larger sample.

Another objective of the survey was to find out from the agencies about the conditions that led to the success or failure of the BMPs in their agencies. But the respondents' comments on the BMPs with which their agencies had experience did not address those conditions. Instead, respondents' comments typically described the agency's policies. For example, for the BMP on prompt payments, one respondent commented that his agency "includes prompt payment guidelines on all projects and requires payment to subcontractors within 21 days after receiving payment for work performed/materials supplied. Monthly prompt payment monitoring ensures firms are paid on a timely basis. No consideration has been given to advance payments." For the BMP calling for partnering with contractor associations to increase mentorship opportunities for DBEs, a response comment was "Yes, we have regular quarterly industry meetings." The responses make clear that identifying conditions that lead to the success or failure of a policy in an agency calls for more in-depth individual interviews or focus groups at which follow-up questions can be posed.

Overall, if our sample of respondents is a representative sample, their responses are encouraging. None of the respondents had experience with all of the BMPs; in fact, one respondent reported no experience in his agency with any of the BMPs. Three respondents indicated experience with less than half of the BMPs, and two indicated experience with 8 of the 14. This suggests that the BMPs we have identified are relevant, but not yet common practice.

Next Steps

Since the sample of agencies that have responded so far is small, we will continue to notify agencies of the availability of the manual and the survey over the summer of 2013. Once we obtain a larger sample, we will analyze the results and prepare a paper summarizing them. We will make the results available as an addendum to the manual on the METRANS site in the fall of 2013.

APPENDIX

A

Description of Data Sources Used

2005 American Community Survey

The American Community Survey (ACS) is conducted by the U.S. Census Bureau. The survey characterizes small areas (block groups and census tracts[1]) during the period between the decennial censuses (e.g., 2000, 2010). The ACS data products include estimates for most areas with a population of 65,000 or more people. Importantly, the data is sample-based (1 in 100 households are surveyed). At the time we selected our subset of projects, the 2005 update of the ACS was the latest available. Thus, in a tradeoff for being more current than the 2000 census, the 2005 ACS is less precise.[2] Nonetheless, we used these data to reveal general demographic, social, and economic characteristics of people, households, and housing units for the various candidate project areas.

2005 Population Estimates

Each year, the U.S. Census Bureau Population Estimates Program publishes estimates of total resident population and demographic components of change (births, deaths, and migration). We used 2005 estimates to gather additional insight into growth trends since 2000 for the various project areas under consideration.

1997 and 2002 Economic Censuses

The Economic Census profiles the U.S. economy every five years. Data are compiled at national, state, county, and city levels of aggregation. We considered city and county-level data describing minority-owned business enterprises for the candidate project areas.

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[1] According to the U.S. Census Bureau, a block group is a statistical subdivision of a county that contains between 600 and 3,000 people with an optimum size of 1,500 people. Census tracts are slightly larger statistical areas that are intended to serve as relatively stable geographic units for presentation of decennial census data. Census tracts generally have between 1,500 and 8,000 people, with an optimum size of 4,000 people. The spatial size of census tracts and block groups varies with density of settlement, covering much less ground in urban areas than in suburban or rural areas (Census Bureau 2007).

[2] See also MacDonald (2006) for discussion of this issue.

Census 2000

The 2000 census was the last complete count of the U.S. population, a count that is conducted once every 10 years. Census 2000 characterizes in detail the various demographic, social, and economic characteristics of people, households, and housing units in the U.S. and its territories. Census 2000 data are the most precise available. For some measures, characteristics of people are available for 100-percent samples at the level of census blocks.[3] We used two datasets derived from Census 2000 to select and characterize project areas:

- Summary File 3 (SF3) consists of 813 detailed tables of Census 2000 social, economic, and housing characteristics of a sample of about 1 in 6 households that received the Census 2000 long-form questionnaire. Many of the specific characteristics are not tabulated in the 100-percent data compiled in Summary File 1 (SF1). Nonetheless, the spatial resolution of SF3 data is relatively fine (block group or census tract) and margin of error is relatively low.
- Public Use Microdata Sample (PUMS) files are extracts from the full census database, but taken in a manner that avoids disclosure of information about households or individuals. These extracts cover all of the same characteristics contained in the larger database, but are sampled either at 1 in 100 households ("1% sample") or 1 in 20 households ("5% sample") for a given area. Furthermore, samples are taken from areas with a minimum of 100,000 people called Public Use Microdata Areas (PUMAs.) Because PUMS data are sampled from the larger set, estimates-based upon them are subject to relatively higher margins of error. Their spatial precision is also much lower than that of SF3 or SF1 data, which are compiled at census tract, block group, and block levels. The main advantage of using PUMS data is the ability to create customized cross-tabulations of variables not compiled by other Census Bureau data products. We use "5% sample" PUMS data from Census 2000 to gather insight into income levels, race/ethnicity and commute times for various types of workers in each of the metropolitan areas for our selected projects.

[3] A block is the smallest geographic unit for which the U.S. Census Bureau tabulates 100% data. In urban areas, blocks typically correspond to individual city blocks. While a city block of apartment complexes in dense urban areas might comprise several hundred people, the average block in the U.S. has about 25 people.

2005 CenStats

The CenStats database compiles data on the total number of establishments, mid-March employment, first quarter and annual payroll, and number of establishments for Core Based Statistical Areas (CBSAs)[4] in the United States. These data are further organized by North American Industry Classification System (NAICS) codes.[5]

The NAICS categories for which we can describe labor involved in transit projects include those in four broad categories: Construction (NAICS 23), Transportation and Warehousing (NAICS 48), Professional, Scientific, and Technical Services (NAICS 54), and Administrative and Support and Waste Management and Remediation Services (56). NAICS codes can be up to six digits, with each additional digit providing a more detailed breakout of jobs within a given industry. The NAICS four-digit level of detail for metropolitan areas was deemed appropriate for our purposes.

2006 BLS

The Bureau of Labor and Statistics provides annual salary and wage data by Standard Occupation Code (SOC). SOC categories are defined by the U.S. Census Bureau, and their occurrences are further tracked by Census 2000. We used BLS data, aggregated to national scale, to develop a proxy indicator for training and skill level associated with various occupations.

[4] A CBSA is a "collective term for both metropolitan and micropolitan areas. A metropolitan area contains a core urban area of 50,000 or more population, and a micropolitan area contains an urban core of at least 10,000 (but less than 50,000) population. Each metropolitan or micropolitan area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core" (Census 2007).

[5] The NAICS system is conceptual framework that groups establishments into industries according to similarity in the process used to produce goods or services. Establishments are classified to one industry-based on their primary activities. Increasing detail is indicated by the number of digits in the code.

APPENDIX

B

Further Explanation of Some Indicators Used

Most of the indicators employed in our analysis are continuous variables describing the proportion of a population within a given census tract having a given characteristic. The proportions are computed for the relevant universe of data (e.g., proportion of construction workers are based upon those within the civilian labor force of working age). For some indicators, cutoffs were applied based on the judgment of the study team. For these, we provide some additional explanation:

- *HINCLT35*: This indicator seeks to characterize areas with high proportion of "low-income" households. HUD commonly defines "low-income" as household income that does not exceed 80 percent of the area median income. According to the U.S. Census Bureau, the median household income in the U.S. in 2000 was $41,994 (median household incomes for Dallas, Los Angeles, New York, St. Louis and San Francisco metropolitan areas were $47,418, $45,903, $50,795, $44,437, and $71,333, respectively.) Given this variability across our study areas, our interest in indicating areas of highest proportion of low-income households, and the limitations of Census data, we selected $35,000 as the low-income cutoff for our study.
- *RGT30PIN*: This indicator describes the percent of renter households that spend more than 30 percent of household income on rent. HUD's benchmark for affordable housing is defined as that in which housing costs do not exceed 30 percent of household income, beyond which households, particularly low-income households, are understood to be overburdened by housing costs.
- *HIGHERSK*: This indicator seeks to describe areas of workers with presumably high levels of professional training and skill, judging from their average annual salaries and occupations. The U.S. Bureau of Labor Statistics provides data describing average annual salaries for 2006 nationwide by two-digit "Standard Occupational Code." Ordering these occupations by salary, we arrived at three groups we labeled HIGHERSK, LOWERSK, and LOWESTSK. HIGHERSK includes occupations with average annual salaries greater than $40,000: Management (11), Legal Occupation (23), Computer and Mathematical (15), Architecture and Engineering (17), Healthcare Practitioners and Technicians (31), Business and Financial Operations Specialists (13), Life, Physical, and Social Science (19), Arts, Design, Entertainment, Sports, and Media (27), Education, Training, and Library (25).
- *LOWERSK*: This indicator seeks to identify areas with high proportions of workers having lower levels of training and skill, judging from their average

annual salaries and occupations. Members of this group have average annual salaries between $30–40,000: Construction and Excavation (47), Installation, Maintenance, and Repair (49), Community and Social Service (21), Protective Service (33), Sales and Related (41).

- *LOWESTSK*: This indicator seeks to identify areas of workers having lower levels of training and skill, judging from their average annual salaries and occupations. Members of this group have average annual salaries less than $30,000: Production (51), Office and Administrative Support (43), Transportation and Material Moving (53), Healthcare Support (31), Personal Care and Service (39), Building and Grounds Cleaning and Management (37), Farming, Fishing, and Forestry (45), Food Preparation and Serving-Related (35).
- *TRAVLT25*: This indicator seeks to identify areas where residents travel to work for less than 25 minutes. For areas selected for our study, median commute time by automobile was 20–30 minutes, and median commute time by transit is 30–50 minutes. Thus, this indicator identifies areas where commute to work is less than the median.
- *TRAV2544*: This indicator seeks to identify areas where commute time is above median, but well within a "reasonable" commute time.
- *TRAVGT45*: This indicator seeks to identify a lower threshold for "less reasonable" commute times. Indeed, less than 10 percent of the households in our study areas commuted by car for more than 60 minutes, or 90 minutes by public transit.

APPENDIX

C

Indicator Values at MSA Level

Table C-1 *Summary of Projects by Screening Indicator at MSA Level*

ID	1	2	3	4	5	6	7	8	9	10	11	12
Indicator	Phoenix Mesa Scottsdale, AZ	Los Angeles Long Beach Santa Ana, CA	Denver Aurora, CO	Washington Arlington Alexandria, DC VA MD WV	Chicago Naperville Joliet, IL IN WI	New York Northern New Jersey Long Island, NY NJ PA	New York Northern New Jersey Long Island, NY NJ PA	Pittsburgh, PA	Dallas Fort Worth Arlington, TX	Salt Lake City, UT	Seattle Tacoma Bellevue, WA	Boston Cambridge Quincy, MA NH
A1												
A2												
B1	21.9%	46.4%	19.5%	42.2%	34.7%	39.9%	39.9%	10.8%	30.6%	13.9%	24.0%	18.2%
C1	35.2%	34.3%	30.9%	20.2%	31.9%	32.7%	32.7%	42.4%	34.8%	33.1%	30.2%	28.6%
C2	31.9%	47.9%	32.2%	33.3%	31.6%	46.7%	46.7%	27.5%	37.5%	30.9%	37.4%	36.2%
C3	51.7%	57.6%	51.9%	49.2%	54.0%	53.8%	53.8%	51.6%	50.5%	47.1%	49.4%	53.3%
D1	12.7%	14.5%	9.9%	7.0%	11.8%	12.6%	12.6%	11.4%	13.1%	9.4%	9.6%	9.5%
E1	2.1%	5.5%	3.8%	13.0%	10.5%	28.9%	28.9%	5.3%	1.5%	3.5%	6.8%	10.3%
E2	1.6%	2.3%	2.3%	2.6%	2.5%	5.5%	5.5%	2.9%	1.2%	1.5%	2.6%	4.2%
E3	6.4%	8.5%	6.2%	10.1%	11.6%	30.7%	30.7%	11.0%	5.1%	5.4%	7.8%	12.3%
F1	59.6%	55.2%	65.5%	69.0%	59.1%	56.3%	56.3%	52.0%	58.3%	63.2%	67.8%	63.5%
G1	17.2%	35.6%	13.7%	21.7%	18.6%	30.7%	30.7%	3.3%	18.8%	11.8%	17.2%	17.7%
H1	11.7%	20.4%	7.3%	7.8%	8.5%	13.9%	13.9%	0.2%	12.3%	6.3%	2.9%	6.2%
I1	12.7%	26.5%	9.4%	10.6%	12.8%	16.4%	16.4%	1.4%	14.2%	7.9%	8.8%	9.2%
J1	10.7%	7.2%	8.9%	7.3%	6.6%	6.0%	6.0%	6.4%	8.9%	7.7%	7.1%	6.5%
K1	5.5%	6.9%	6.2%	5.0%	8.0%	6.8%	6.8%	6.6%	7.1%	5.3%	6.6%	5.9%
L1												
L2	3,805,123	12,703,423	2,327,901	5,119,490	9,272,117	18,351,099	18,351,099	2,314,937	5,727,391	1,017,572	3,133,715	4,270,631
L3												
M1	26.5	28.4	25.7	33.4	31.0	34.2	34.2	24.6	26.5	21.9	27.1	28.6
N1												
N2												

Table C-1 *Summary of Projects by Screening Indicator at MSA Level (cont'd.)*

ID	13	14	15	16	17	18	19	20	21	22	23	24	25
Indicator	Little Rock North Little Rock, AR	Minneapolis St. Paul Bloomington, MN WI	Nashville Davidson Murfreesboro, TN	New York Northern New Jersey Long Island, NY- NJ PA	Philadelphia Camden Wilmington, PA NJ DE MD	Sacramento Arden Arcade Roseville, CA	Sacramento Arden Arcade Roseville, CA	St. Louis, MO IL	San Diego Carlsbad San Marcos, CA	San Francisco Oakland Fremont, CA	San Jose-Sunnyvale-Santa Clara, CA	San Jose-Sunnyvale-Santa Clara, CA	San Jose-Sunnyvale-Santa Clara, CA
A1													
A2													
B1	26.3%	15.9%	20.2%	39.9%	29.1%	32.8%	32.8%	21.8%	31.8%	44.7%	46.9%	46.9%	46.9%
C1	41.7%	26.9%	38.8%	32.7%	33.3%	31.0%	31.0%	36.1%	30.2%	26.6%	22.4%	22.4%	22.4%
C2	33.4%	25.6%	32.5%	46.7%	29.9%	36.9%	36.9%	26.9%	41.8%	42.2%	39.4%	39.4%	39.4%
C3	49.4%	51.5%	50.7%	53.8%	54.3%	56.0%	56.0%	50.3%	59.5%	52.3%	49.9%	49.9%	49.9%
D1	13.1%	8.3%	11.8%	12.6%	11.7%	12.0%	12.0%	10.9%	11.0%	9.9%	8.4%	8.4%	8.4%
E1	0.6%	3.8%	0.7%	28.9%	8.5%	2.1%	2.1%	2.2%	2.9%	13.3%	3.0%	3.0%	3.0%
E2	1.4%	2.0%	1.3%	5.5%	3.3%	2.0%	2.0%	1.2%	1.9%	3.8%	2.2%	2.2%	2.2%
E3	6.3%	6.6%	5.0%	30.7%	14.0%	6.0%	6.0%	7.0%	5.9%	12.0%	4.7%	4.7%	4.7%
F1	56.4%	68.0%	53.5%	56.3%	54.7%	64.4%	64.4%	58.1%	64.8%	68.9%	68.7%	68.7%	68.7%
G1	4.2%	9.2%	7.0%	30.7%	10.4%	18.8%	18.8%	4.5%	25.2%	30.7%	36.8%	36.8%	36.8%
H1		2.3%	2.8%	13.9%	2.3%	5.8%	5.8%	0.8%	12.5%	9.3%	10.2%	10.2%	10.2%
I1	2.1%	5.2%	3.9%	16.4%	5.5%	11.6%	11.6%	2.2%	16.1%	18.2%	21.5%	21.5%	21.5%
J1	6.0%	6.1%	8.2%	6.0%	6.1%	8.9%	8.9%	7.5%	7.7%	6.6%	5.9%	5.9%	5.9%
K1	5.8%	5.5%	5.7%	6.8%	6.9%	6.7%	6.7%	6.9%	5.5%	7.1%	6.8%	6.8%	6.8%
L1													
L2	623,851	3,076,239	1,384,347	18,351,099	5,644,383	2,004,476	2,004,476	2,725,336	2,824,259	4,071,751	1,726,057	1,726,057	1,726,057
L3													
M1	22.3	24.1	25.4	34.2	27.9	25.2	25.2	24.6	25.2	28.3	23.8	23.8	23.8
N1													
N2													

APPENDIX

D

Factor Analysis Tables

Table D-1 *Summary Statistics for Indicators by MSA*

	Dallas		Los Angeles		New York		St. Louis		San Jose	
	n=1,050		*n 3,364*		*n=5,085*		*n 524*		*n 1,456*	
Indicator	**mean**	**s.d.***	**mean**	**s.d.**	**mean**	**s.d.**	**mean**	**s.d.**	**mean**	**s.d.**
NONHWH	57.6	28.4	40.3	28.9	54.2	34.8	72.2	32.9	51.2	25.4
MINORITY	42.4	28.4	59.7	28.9	45.8	34.8	27.8	32.9	48.8	25.4
NONHBL	15.1	21.3	7.1	12.9	18.0	26.8	23.3	33.3	7.6	13.3
NONHAS	3.6	4.6	10.2	12.6	6.7	9.7	1.3	2.0	17.9	16.5
HISPANIC	21.7	21.3	39	28.1	18.1	20.3	1.6	2.7	18.6	16.4
BELOWFPL	12.6	10.9	15.6	12.1	13.7	13.4	12.6	12.6	9.2	7.9
FORBORN	14.9	13.0	30.4	16.7	24.7	17.1	3.1	3.9	26.2	14.9
LATORIG	21.7	21.3	39.0	28.1	18.1	20.3	1.6	2.7	18.6	16.4
LINGISOL	0.2	0.5	0.7	1.9	1.8	3.0	0.4	0.8	0.6	0.8
NOCOLL	45.1	22.7	48.5	22.9	49.3	18.6	47.8	17.1	34.2	18.3
HINCLT35	37.7	19.3	39.3	19.3	36.7	19.5	42.2	19.3	26.9	14.9
RGT30PIN	32.2	10.5	41.8	11.3	38.1	12.2	32.0	12.2	37.9	10.5
RENTER	38.6	25.8	44.4	26.1	46.6	30.1	31.0	20.3	41.5	24.4
NOVEHICL	7.2	8.6	10.8	10.9	28.3	26.5	11.3	12.0	9.7	11.9
CONSTRUC	8.4	5.8	6.2	3.4	5.3	3.5	5.9	3.3	6.0	3.4
TRANWARE	5.6	3.2	4.2	2.6	5.7	3.9	5.1	2.4	4.1	2.8
PROSCITE	7.0	5.9	6.1	4.8	7.3	5.0	5.5	3.7	10.8	6.5
ADMSUPWM	4.3	2.6	4.6	2.7	3.6	2.4	3.7	2.0	4.1	2.4
UNEMPL	5.6	5.5	7.9	5.4	7.7	7.5	7.0	7.4	4.9	3.8
TRAVLT25	53.7	11.9	52.3	18.3			57.7	13.2	52.7	15.6
TRAV2544	28.1	7.3	26.8	7.6	24.4	7.7	27.8	8.4	25.8	7.2
TRAVGT45	16.2	8.0	18.9	7.8	30.3	14.3	13.4	7.5	20.8	8.4
PUBTRANS	2.4	4.2	5.5	7.8	28.1	23.6	4.3	6.9	9.8	10.3
WALKTOWK	2.8	3.3	4.6	6.3	6.9	8.5	2.8	3.6	6.0	8.3
LOWESTSk	42.0	13.7	45.5	15.9	42.3	15.0	46.1	13.7	37.2	14.5
LOWERSK	25.3	5.5	23.6	5.4	23.2	5.8	23.1	4.7	21.0	05.7
HIGHERSK	30.5	14.5	28.7	14.7	32.4	13.2	28.2	11.0	39.4	15.7

*s.d. = standard deviation

Table D-2 *Factor Loadings for Factor 1 by MSA**

	Dallas (39.7%)		Los Angeles (41.5%)		New York (38.0%)		St. Louis (38.8%)		San Jose (34.7%)	
(+)	NOCOLL	0.893	NOCOLL	0.928	NONHWH	0.891	BELOWFPL	0.923	NOCOLL	0.920
	HINCLT35	0.883	LOWESTSK	0.910	HIGHERSK	0.668	HINCLT35	0.914	LOWESTSK	0.910
	MINORITY	0.874	MINORITY	0.885	PROSCITE	0.584	NOVEHICL	0.906	MINORITY	0.821
	BELOWFPL	0.857	HISPANIC	0.878	CONSTRUC	0.055	MINORITY	0.895	HISPANIC	0.748
	LOWESTSK	0.841	LATBORN	0.878	LOWERSK	0.033	NONHBL	0.893	LATBORN	0.748
	LATBORN	0.745	BELOWFPL	0.856			PUBTRANS	0.861	HINCLT35	0.715
	HISPANIC	0.745	HINCLT35	0.855			LOWESTSK	0.788	BELOWFPL	0.698
	NOVEHICL	0.715	NOVEHICL	0.752			UNEMPL	0.769	UNEMPL	0.682
	CONSTRUC	0.688	FORBORN	0.705			NOCOLL	0.705	ADMSUPWM	0.653
	UNEMPL	0.622	PUBTRANS	0.697			RENTER	0.704	NONHBL	0.515
	ADMSUPWM	0.620	RENTER	0.651	MINORITY	-0.891	ADMSUPWM	0.650	FORBORN	0.490
	FORBORN	0.603	UNEMPL	0.646	HINCLT35	-0.884	RGT30PIN	0.592	TRANWARE	0.483
	PUBTRANS	0.599	ADMSUPWM	0.563	BELOWFPL	-0.833	TRANWARE	0.476	NOVEHICL	0.468
	RENTER	0.493	RGT30PIN	0.408	RENTER	-0.816	WALKTOWK	0.368	RENTER	0.450
	NONHBL	0.482	WALKTOWK	0.308	LOWESTSK	-0.813	TRAVGT45	0.136	CONSTRUC	0.449
	LOWERSK	0.470	CONSTRUC	0.296	NOCOLL	-0.797	LINGISOL	0.027	LOWERSK	0.364
	WALKTOWK	0.383	TRANWARE	0.264	NOVEHICL	-0.782	HISPANIC	0.003	RGT30PIN	0.360
	RGT30PIN	0.374	NONHBL	0.262	HISPANIC	-0.744	LATBORN	0.003	PUBTRANS	0.270
	TRAV2544	0.091	TRAV2544	0.249	LATBORN	-0.744			WALKTOWK	0.146
	TRAVGT45	0.057	LOWERSK	0.062	UNEMPL	-0.666			TRAVGT45	0.081
	TRANWARE	0.044			PUBTRANS	-0.661			NONHAS	0.081
					FORBORN	-0.555			TRAV2544	0.073
					NONHBL	-0.537			LINGISOL	0.026
(-)	NONHWH	-0.874	NONHWH	-0.885	TRANWARE	-0.427	NONHWH	-0.895	HIGHERSK	-0.855
	HIGHERSK	-0.859	HIGHERSK	-0.869	ADMSUPWM	-0.424	PROSCITE	-0.600	NONHWH	-0.821
	PROSCITE	-0.628	PROSCITE	-0.699	RGT30PIN	-0.418	HIGHERSK	-0.560	PROSCITE	-0.722
	NONHAS	-0.241	NONHAS	-0.142	TRAVGT45	-0.362	LOWERSK	-0.431		
	LINGISOL	-0.014	TRAVGT45	-0.053	WALKTOWK	-0.357	CONSTRUC	-0.345		
			LINGISOL	-0.037	LINGISOL	-0.187	NONHAS	-0.217		
					TRAV2544	-0.172	TRAV2544	-0.171		
					NONHAS	-0.051	FORBORN	-0.155		

* % of total variation shown in parentheses

Table D-3 *Factor Loadings for Factor 2 by MSA**

	Dallas (11.8%)		Los Angeles (10.1%)		New York (11.9%)		St. Louis (16.7%)		San Jose (15.5%)	
(+)	LOWERSK	0.653	LOWERSK	0.649	PROSCITE	0.628	NONHAS	0.714	NOVEHICL	0.653
	CONSTRUC	0.572	CONSTRUC	0.610	HIGHERSK	0.620	FORBORN	0.699	PUBTRANS	0.645
	LATBORN	0.421	TRANWARE	0.356	PUBTRANS	0.548	HIGHERSK	0.654	WALKTOW	0.605
	HISPANIC	0.421	TRAVGT45	0.321	NOVEHICL	0.467	PROSCITE	0.610	RENTER	0.580
	TRAVGT45	0.289	NOCOLL	0.205	WALKTOWK	0.449	RENTER	0.427	NONHAS	0.529
	NOCOLL	0.284	LOWESTSK	0.150	NONHAS	0.400	LINGISOL	0.391	PROSCITE	0.455
	FORBORN	0.228	HISPANIC	0.136	RENTER	0.343	WALKTOW	0.364	FORBORN	0.432
	NONHWH	0.180	LATBORN	0.136	TRAV2544	0.319	RGT30PIN	0.233	HIGHERSK	0.381
	LOWESTSK	0.108	ADMSUPWM	0.077	FORBORN	0.305	NOVEHICL	0.216	BELOWFPL	0.354
	TRAV2544	0.106	NONHBL	0.067	TRAVGT45	0.134	HISPANIC	0.210	LINGISOL	0.336
			NONHWH	0.059	LINGISOL	0.102	LATBORN	0.210	HINCLT35	0.315
			UNEMPL	0.019	BELOWFPL	0.087	MINORITY	0.165	TRAV2544	0.264
					MINORITY	0.060	PUBTRANS	0.159	MINORITY	0.237
					HINCLT35	0.006	BELOWFPL	0.141	NONHBL	0.130
					HISPANIC	0.002	NONHBL	0.094	UNEMPL	0.075
					LATBORN	0.002	UNEMPL	0.049	RGT30PIN	0.005
							HINCLT35	0.041		
(-)	NONHBL	-0.605	NONHAS	-0.485	LOWERSK	-0.565	CONSTRU	-0.679	CONSTRUC	-0.644
	NOVEHICL	-0.468	RENTER	-0.457	CONSTRUC	-0.543	TRAVGT45	-0.629	LOWERSK	-0.627
	PUBTRANS	-0.457	FORBORN	-0.456	NOCOLL	-0.448	LOWERSK	-0.528	HISPANIC	-0.272
	RENTER	-0.386	PROSCITE	-0.427	LOWESTSK	-0.360	NOCOLL	-0.522	LATBORN	-0.272
	UNEMPL	-0.371	LINGISOL	-0.375	TRANWARE	-0.255	LOWESTS	-0.425	TRAVGT45	-0.251
	HIGHERSK	-0.314	HIGHERSK	-0.349	ADMSUPWM	-0.244	TRANWAR	-0.346	NONHWH	-0.237
	BELOWFPL	-0.305	PUBTRANS	-0.331	NONHBL	-0.077	TRAV2544	-0.237	NOCOLL	-0.200
	RGT30PIN	-0.302	NOVEHICL	-0.328	NONHWH	-0.060	NONHWH	-0.165	LOWESTSK	-0.161
	PROSCITE	-0.293	TRAV2544	-0.242	RGT30PIN	-0.052	ADMSUPW	-0.085	ADMSUPWM	-0.157
	NONHAS	-0.231	WALKTOWK	-0.222	UNEMPL	-0.013			TRANWARE	-0.126
	LINGISOL	-0.211	BELOWFPL	-0.160						
	ADMSUPWM	-0.194	HINCLT35	-0.133						
	WALKTOWK	-0.184	RGT30PIN	-0.099						
	MINORITY	-0.180	MINORITY	-0.059						
	HINCLT35	-0.163								
	TRANWARE	-0.025								

* % of total variation shown in parentheses

Table D-4 *Factor Loadings for Factor 3 by MSA**

	Dallas (11.0%)		Los Angeles (6.9%)		New York (7.6%)		St. Louis (9.7%)		San Jose (11.2%)	
(+)	FORBORN	0.677	WALKTOWK	0.494	LINGISOL	0.626	HISPANIC	0.840	NONHAS	0.683
	RENTER	0.483	NONHWH	0.376	FORBORN	0.560	LATBORN	0.840	FORBORN	0.655
	NONHAS	0.483	RENTER	0.308	NONHAS	0.542	FORBORN	0.551	TRAV2544	0.544
	LINGISOL	0.439	NOVEHICL	0.305	CONSTRUC	0.477	LINGISOL	0.375	MINORITY	0.423
	PROSCITE	0.418	LOWERSK	0.296	LOWERSK	0.243	NOCOLL	0.313	LATBORN	0.201
	LATBORN	0.410	HINCLT35	0.290	NONHWH	0.214	CONSTRUC	0.276	HISPANIC	0.201
	HISPANIC	0.410	CONSTRUC	0.286	HISPANIC	0.133	LOWERSK	0.226	LINGISOL	0.173
	WALKTOWK	0.377	BELOWFPL	0.281	LATBORN	0.133	LOWESTSK	0.213	TRANWARE	0.128
	HIGHERSK	0.247	UNEMPL	0.228	TRAVGT45	0.117	NONHWH	0.165	NOCOLL	0.095
	ADMSUPWM	0.085	LINGISOL	0.216	RGT30PIN	0.105	HINCLT35	0.160	LOWESTSK	0.095
	CONSTRUC	0.082	PUBTRANS	0.142	NOCOLL	0.102	WALKTOWK	0.109	HIGHERSK	0.013
	MINORITY	0.055	RGT30PIN	0.095	TRAV2544	0.081	NONHAS	0.107		
	RGT30PIN	0.019	ADMSUPWM	0.085	WALKTOWK	0.073	RENTER	0.101		
			PROSCITE	0.054	LOWESTSK	0.066	ADMSUPWM	0.094		
			HIGHERSK	0.043	RENTER	0.061	TRAVGT45	0.081		
					PUBTRANS	0.042	BELOWFPL	0.008		
					TRANWARE	0.000				
(-)	TRAVGT45	-0.608	NONHAS	-0.431	NONHBL	-0.597	HIGHERSK	-0.314	HINCLT35	-0.478
	TRANWARE	-0.484	TRAV2544	-0.404	UNEMPL	-0.308	NONHBL	-0.245	WALKTOWK	-0.441
	NONHBL	-0.444	MINORITY	-0.376	MINORITY	-0.214	PROSCITE	-0.207	NONHWH	-0.423
	LOWESTSK	-0.285	TRANWARE	-0.372	HIGHERSK	-0.156	MINORITY	-0.165	BELOWFPL	-0.413
	UNEMPL	-0.210	FORBORN	-0.226	BELOWFPL	-0.145	RGT30PIN	-0.139	NOVEHICL	-0.355
	NOCOLL	-0.199	HISPANIC	-0.155	ADMSUPWM	-0.078	TRAV2544	-0.128	RENTER	-0.346
	TRAV2544	-0.186	LATBORN	-0.155	PROSCITE	-0.036	PUBTRANS	-0.121	UNEMPL	-0.296
	PUBTRANS	-0.109	LOWESTSK	-0.128	NOVEHICL	-0.022	UNEMPL	-0.059	NONHBL	-0.279
	NOVEHICL	-0.062	NONHBL	-0.110	HINCLT35	-0.007	TRANWARE	-0.013	LOWERSK	-0.268
	NONHWH	-0.055	NOCOLL	-0.049			NOVEHICL	-0.009	RGT30PIN	-0.199
	HINCLT35	-0.039	TRAVGT45	-0.034					PUBTRANS	-0.189
	BELOWFPL	-0.031							CONSTRUC	-0.170
	LOWERSK	-0.023							TRAVGT45	-0.149
									PROSCITE	-0.076
									ADMSUPWM	-0.038

* % of total variation shown in parentheses

APPENDIX

E

Contractor Survey, Methodology, and Results

This document describes the methodology used for the contractor/subcontractor survey for this project. The purpose of the survey was to assess the impact on minority and low-income employment in local urban transportation construction projects.

Methodology

Description of Survey

The survey was designed to gather business information from contractors/subcontractors involved in transportation construction projects throughout the Southern California metropolitan areas. A pilot study was conducted initially for further modification of the survey. The survey was tailored to include certain industry-specific questions, if applicable. For example, given the lack of union-affiliation among certain specialty trades in the transportation construction industry (i.e., design and architecture, planning, etc.), questions regarding unions were exclusively addressed to construction companies. Specific survey questions were also formulated for companies designated as DBEs. Additionally, postcards were sent to the selected companies prior to conducting the study to inform them of the upcoming survey and thank them in advance for their willingness to participate in the study. All of the respondents selected for the study were proprietors or individuals in management positions and were contacted via telephone. The major sections of the survey are outlined as follows:

- **Introduction**. The start of the survey included a brief introduction specifying the sponsors of the study, and describing the purpose of the study, including the estimated length of the survey (15–18 minutes).
- **Eligibility Determination and Referrals**. The eligibility requirements for the study included companies involved in recent transportation construction projects. Respondents were asked, "Has your company worked on a transportation construction project in the last 10 years?" Respondents answering "yes" proceeded with the survey, and respondents answering "no" were thanked for their time and the interview was terminated. Respondents eligible for the study were also asked for possible referrals to other companies involved in transportation construction projects within the past ten years.
- **Description of Transportation Construction Projects/Work**. Respondents were asked about their company's specialty in the

transportation construction field, their most recent project and total budget and workers employed for the project, and the approximate percentage of traditionally underrepresented groups (i.e., African American, Asian American, Latino, Women, etc.) on their projects.

- **Information Regarding Company Profile**. Detailed information on the company profile included questions regarding the company status: prime or subcontractor, minority or woman-owned, designated DBE (and length of DBE status, perception of DBE influence), methods of exposure to transportation construction contract opportunities (and perception of opportunities available), bidding frequency and success, and joint venture participation (if not applicable, reasons for not participating).
- **Information Regarding Workforce Profile**. Construction companies were asked about their union affiliation. All respondents were asked about their company's training and recruitment methods, and the average distance traveled for their employees on a given job site.
- **Perception of Transportation Construction Industry**. The respondents were asked about their general opinions on the transportation construction industry, including their thoughts on the hiring of skilled minority workers in Southern California (choices were "easy," "difficult," and "depends" and their reasons for their selected choice); and the most effective organizations and individuals they believe in promoting the recruitment and hiring of minority workers in transportation construction projects.
- **Characteristics of Survey Respondents**. The survey concluded with respondents being asked for their identified ethnic group, and their length of time working in the transportation construction industry.

Identification of Samples and Sample Size

The study included a purposive sample from two main sources: case study of the Metro Gold Line Eastside Extension in Los Angeles, and Caltrans for a list of DBEs and general subcontractors in Southern California. The total number of the entire sample size was 761.The following details17the sample lists identified for the study:

List #1: Metro Gold Line Eastside Extension Case Study

The Metro Gold Line Eastside Extension was selected as the case study for Los Angeles. The Eastside Extension is considered the largest construction project carried out by LACMTA since the 1990s construction of the Metro Red Line.[1] It consists of a six-mile light rail extension of the existing Metro Gold Line. The project created eight new stations (two stations underground) beginning at Union Station in downtown Los Angeles eastward through Little Tokyo Arts District, Boyle Heights and East Los Angeles, and ending at Atlantic station in the City of Monterey Park.[2] Eastside LRT Constructors, a joint venture between Washington Group, Obayashi Inc., and Shimmick Construction Co., completed the project in November 2009.

Affiliates at LACMTA provided the list of subcontractors involved in the Eastside Extension project. A total of 88 subcontractors worked on various job functions for the project. Out of the total number, 18.2 percent were designated DBEs and 7.9 percent were considered small businesses, as shown in Table E-1.

Table E-1

Metro Gold Line Eastside Extension Subcontractors

Firm Type	Total Number	Total Percentage
DBE	16	18.2%
Small Business	7	7.9%
Remaining Subcontractors (non-DBE; non-small business)	65	73.9%
Total	88	100%

List #2 and #3: Caltrans DBE's and Caltrans General Contractors

Companies involved in Caltrans projects and contracts were determined the best option to target samples of transportation construction companies. Information on Caltrans-affiliated companies, including a directory of designated DBEs, was made public and accessible on the Caltrans website. List #2 was a total of 492 DBEs within the Southern California region (Districts 7, 8, 11, 12), narrowed down to include NAICS codes presumably to be most likely involved in transportation construction-related work, as shown in Table E-2. List #3 was a total of 181 general subcontractors and contractors in Southern California that had reported bids on or were awarded, Caltrans contracts from July–August 2009. (Note: NAICS codes were not recorded within the Caltrans contract documents.)

Table E-2

Caltrans Lists: DBEs and General Contractors

NAICS Code	NAICS Description	# of Caltrans DBE's	# of Caltrans General Contractors
23711	Water and Sewer Line and Related Structures Construction	13	
23712	Oil and Gas Pipeline	1	
23713	Power/Communication Line and Related Structures Construction	4	
23731	Highway, Street, and Bridge Construction	22	
23799	Other Heavy and Civil Engineering Construction	9	
23811	Poured Concrete Foundation and Structure Contractors	7	
23812	Structural Steel and Precast Concrete Contractors	7	
23814	Masonry Contractors	7	
23815	Glass and Glazing Contractors	3	
23816	Roofing Contractors	6	
23819	Other Foundation, Structure, and Building Exterior Contractors	3	
23821	Electrical Contractors	43	
23822	Plumbing, Heating and Air-Conditioning Contractors	22	
23829	Other Building Equipment Contractors	1	
23831	Drywall and Insulation Contractors	6	
23832	Painting and Wall Covering Contractors	9	
23833	Flooring Contractors	4	
23834	Tile and Terrazzo Contractors	2	
23835	Finish Carpentry Contractors	2	
23839	Other Building Finishing Contractors	1	
238910	Site Preparation Contractors	14	
238990	All Other Specialty Trade Contractors	39	
541310	Architectural Services	31	
541320	Landscape Architectural Services	12	
541330	Engineering Services	71	
541370	Surveying and Mapping Services	9	
541611	Administrative/General Management Consulting Services	37	
541612	Human Resources & Executive Search Consulting Services	3	
541613	Marketing Consulting Services	13	
541614	Process, Physical Distribution, and Logistics Consulting Service	3	
541618	Other Management Consulting Services	36	
541620	Environmental Consulting Services	24	
561730	Landscaping Services	13	
562910	Remediation Services	5	
611430	Professional and Management Development Training	4	
	TOTAL	**492**	**181**

Conducting the Surveys

Conduct of the surveys was contracted out to Interviewing Service of America (ISA). The surveys were conducted throughout a four-week period, from December 2009–January 2010. A total of 4,210 phone calls were made, resulting with a completed sample size of 246 (177 minority-owned businesses, 69 non-minority owned businesses).

Survey Results

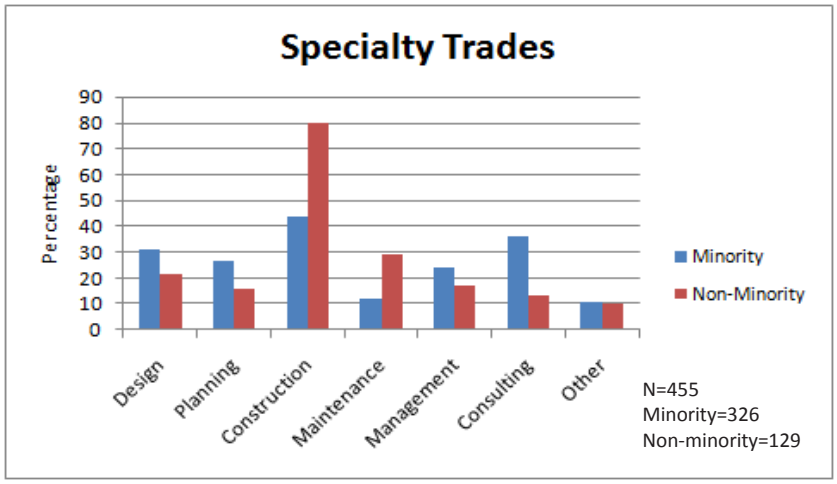
Anticipated results from the survey were the following:

- Mixed feelings among DBEs regarding their DBE status
- Dissatisfaction toward contract opportunities among DBE's and minority-owned businesses
- Joint ventures associated with higher bidding success rates

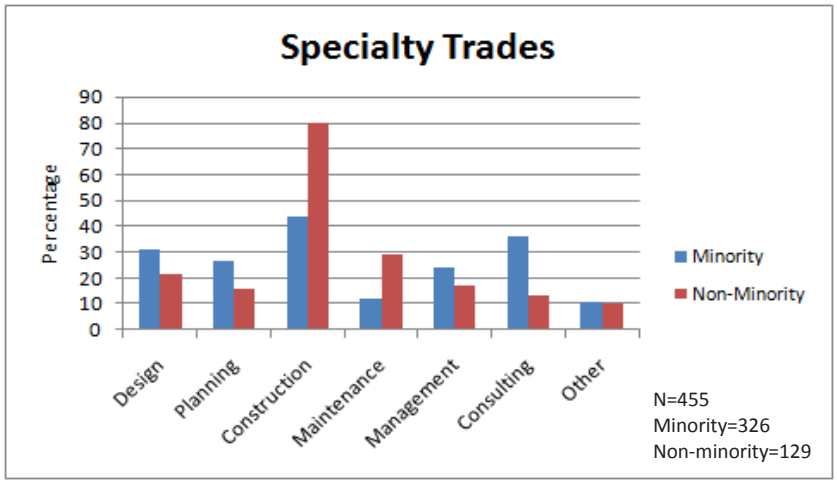
Telephone Survey of DBE and Non-DBE Contractors: Southern California

Total sample size: 246 (177 minority, 69 non-minority)
Respondents declining to do survey: 11
Respondents not qualifying for survey: 131 companies significantly higher in construction trades

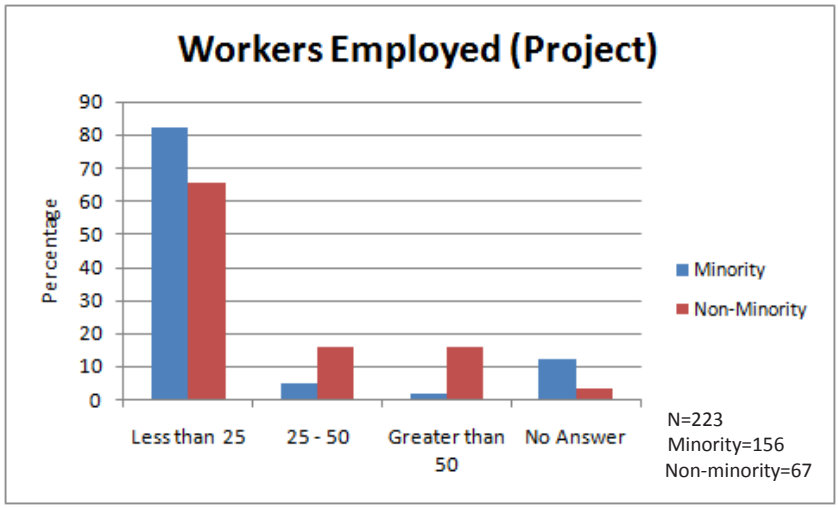
Q2: How would you describe your company's specialty in the transportation construction field? Non-minority. Minority companies higher in design, planning, management and consulting trades (largest in consulting).



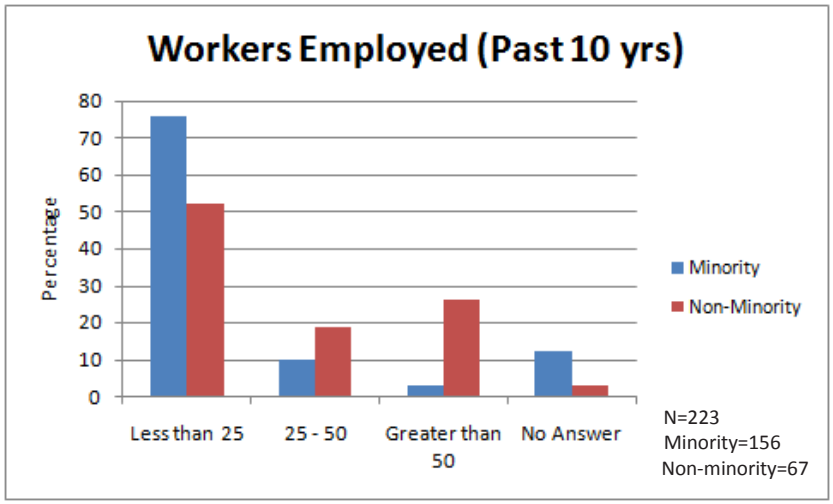
Q4: What was/is your total budget for the project? Large discrepancy between project budgets for minority v. non-minority. Minority companies had the smallest amount (Under $100k) for their most recent project budget. Non-minority companies had higher budgets (over $1 mil) for their most recent project.



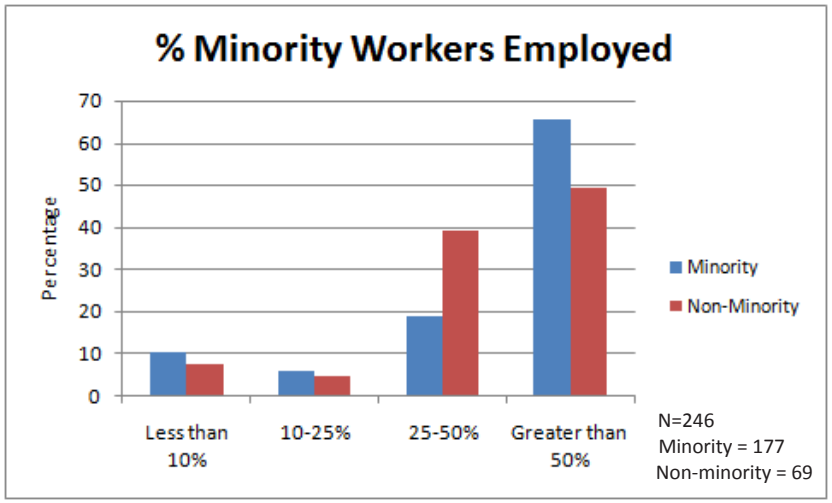
Q5: How many workers did you employ for the project? Both minority and non-minority companies employed more employees in the "less than 25" category for their most recent project, but minority was 16.7 percent higher than non-minority (81.9% v. 65.2%). Generally, non-minority had employed more employees than minority companies.



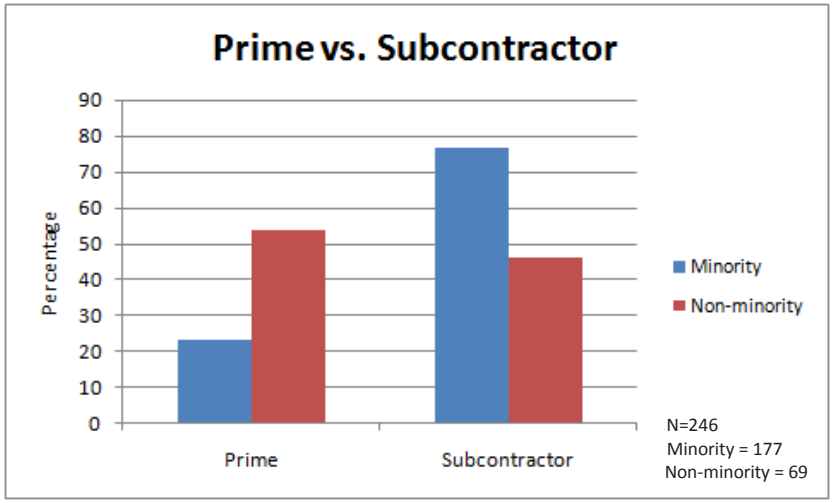
Q6: Over the past 10 years, about how many employees has your company employed annually in transportation construction work? Over the past 10 years, non-minority companies employed less than 25 employees than non-minority companies. Again, non-minority companies generally employ more employees.



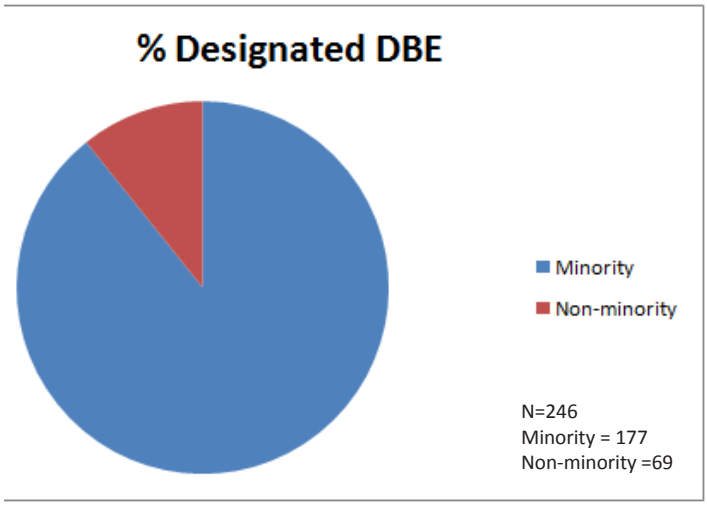
Q7: What percentage of these employees in your company can be classified as traditionally under-represented groups? By traditionally under-represented groups, we mean African American, Asian American, Latino, women, etc. Both minority and non-minority companies have a majority of minority workforce, with minority companies having the highest amount (65.5% vs. 49.3%).



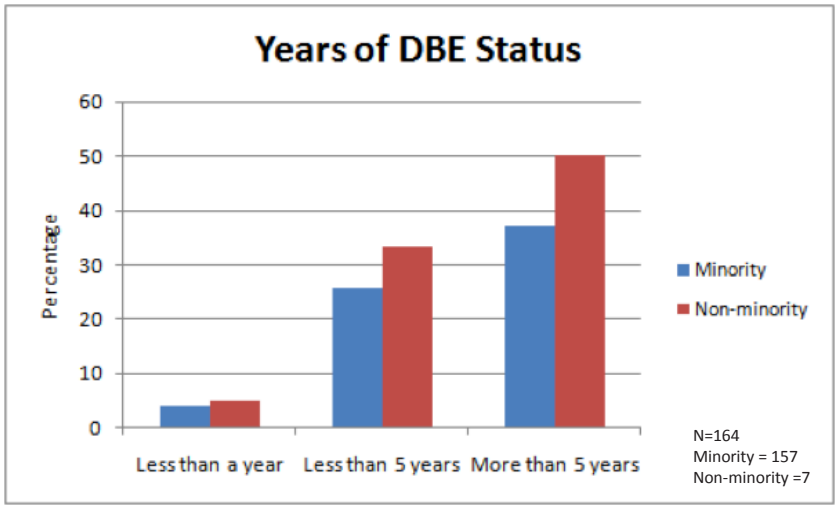
Q8: Is your company generally a prime or subcontractor company in the transportation construction industry? More non-minority companies were prime contractors in the transportation construction industry. Conversely, more minority companies were subcontractors.



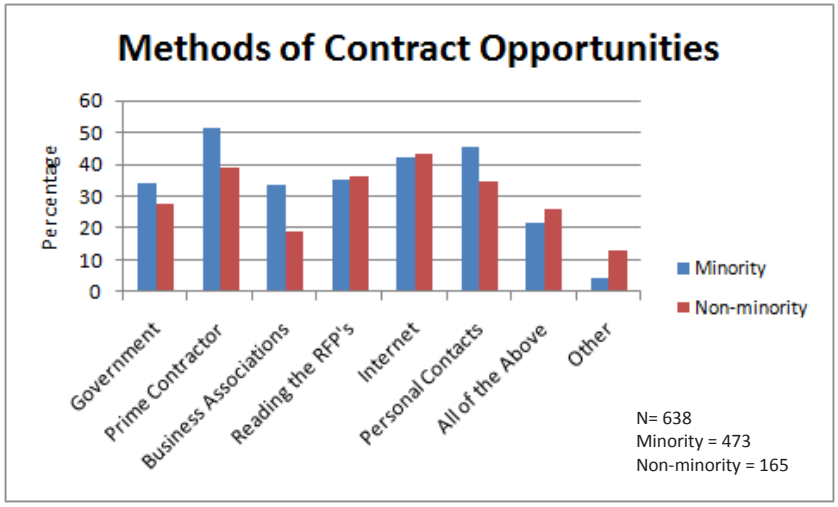
Q10: Is your company designated as a Disadvantaged Business Enterprise (DBE)? [IF YES, ask follow up question Q10a] A total of 88.7% of minority-owned companies were designated DBEs. 10.7 percent of non-minority owned companies were designated DBEs.



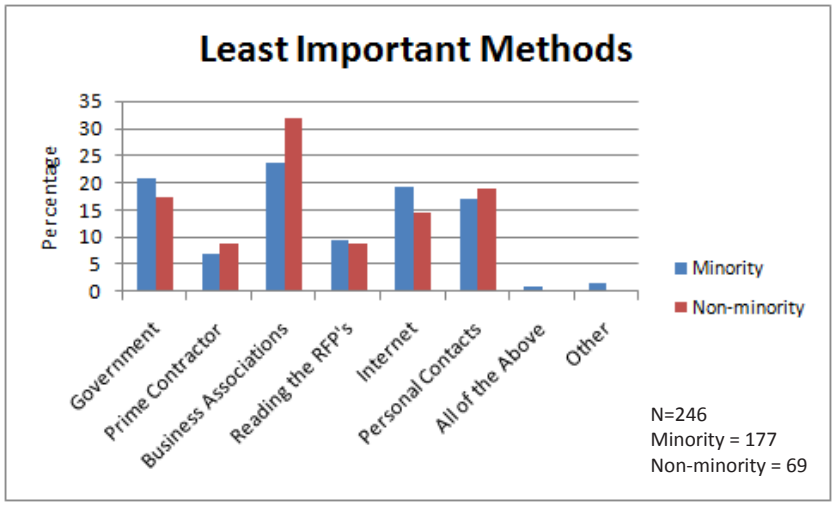
Q10a: IF DBE, when did your firm register as a DBE? The majority of both minority and non-minority registered as DBEs more than five years ago. Very few registered less than a year ago.

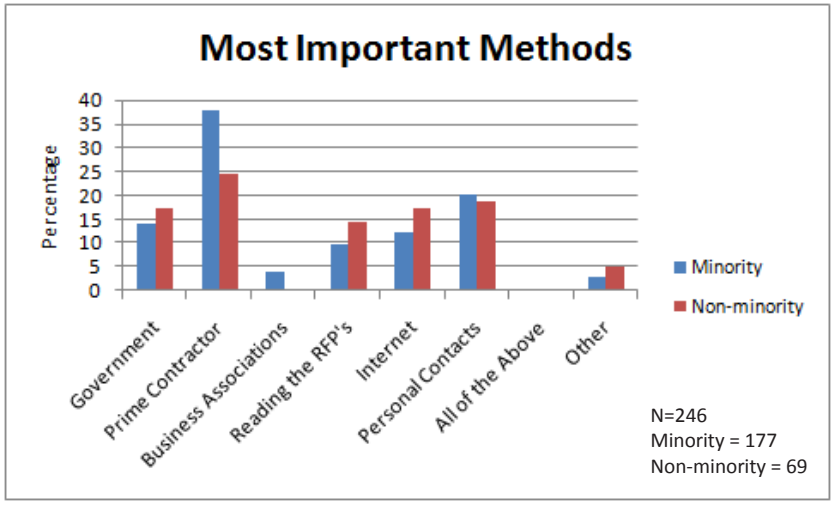


Q11: How do you hear about transportation construction contract opportunities? Minority companies hear mostly about contract opportunities through prime contractors. Overall, both minority and non-minority companies use a variety of methods to hear about contract opportunities.

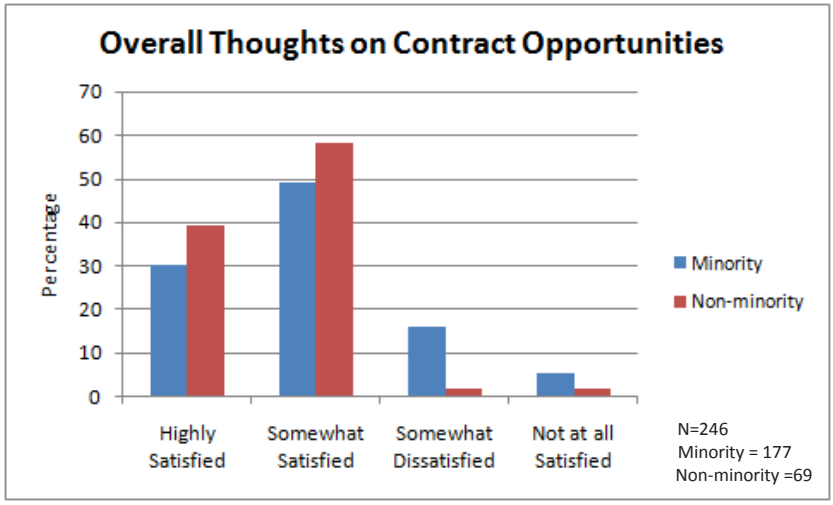


Q12: From the choices above, which of these are the least important and most important when it comes to hearing about transportation construction contracting opportunities? Let me repeat the choices. Generally, both minority and non-minority companies felt business associations was the least important method of hearing about contract opportunities. Prime contractors were generally viewed as the most important method of hearing about contract opportunities.

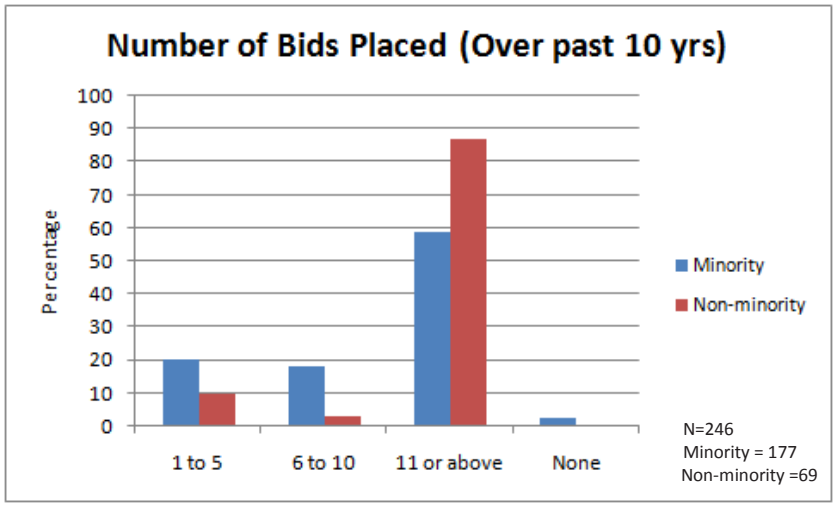




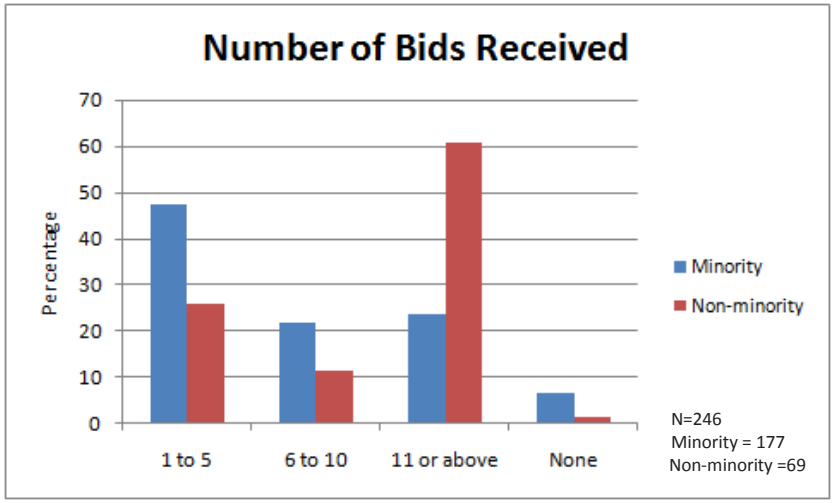
Q13: Are you satisfied with the way you are made aware of contracting opportunities in transportation construction projects? Generally, both minority and non-minority are satisfied with how they are made aware of contract opportunities (more in the somewhat satisfied category). There was more dissatisfaction among minority companies.



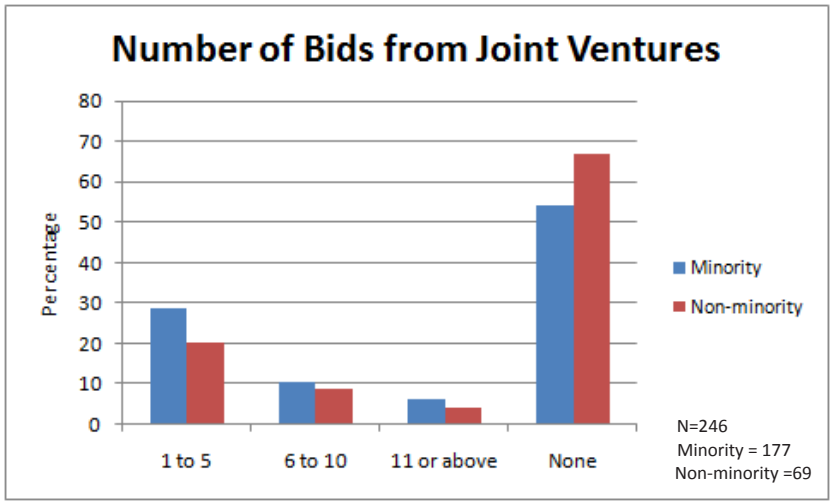
Q14: How many transportation construction contracts have you bid on in the last 10 years? Both minority and non-minority had bid on 11 or more transportation construction contracts over the past 10 years, but non-minority companies had almost 30% more bids than minority companies. Overall, minorities place less bids than non-minority companies.



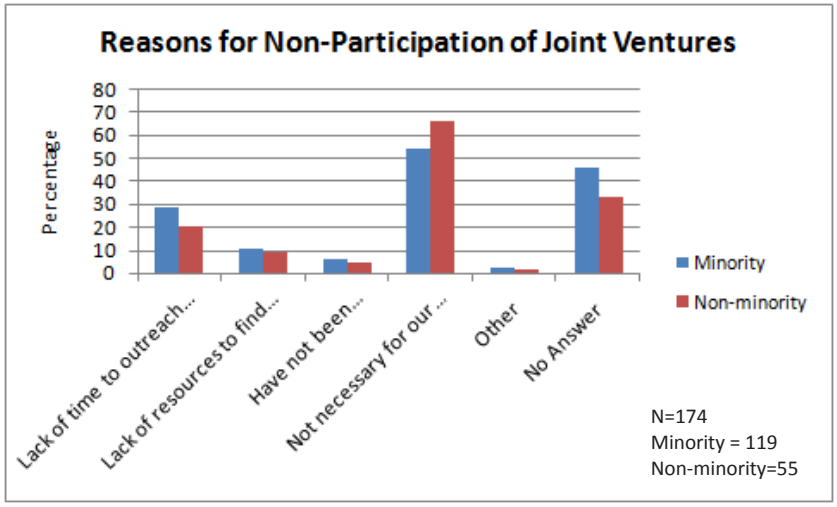
Q15: How many of those contracts did you actually receive? Overall, non-minority received more of the contracts they bid on than minority companies. The more you bid, the more likely you can win contract.



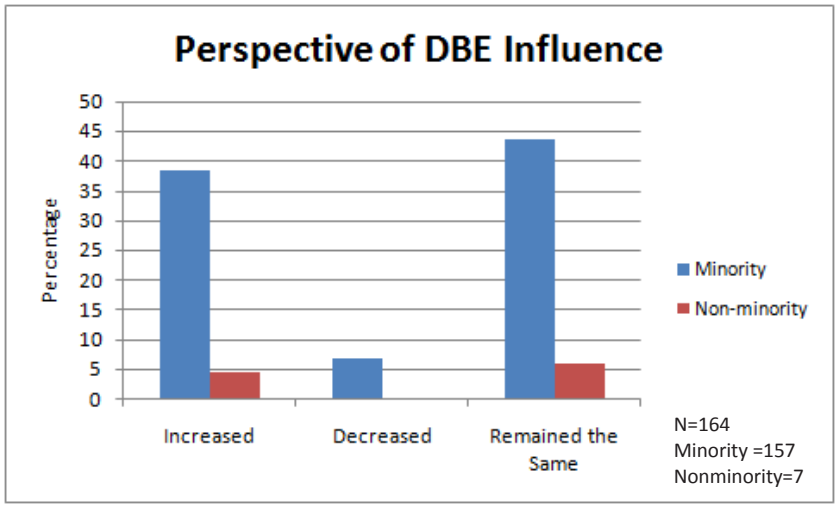
Q16: Of the bids you submitted in the last 10 years, about how many of them were joint ventures with other companies? [IF NONE, proceed with 16a] A large majority did not participate in joint ventures (54.2% minority, and 66.7% non-minority). Minority companies are only slightly more likely to participate in joint ventures.



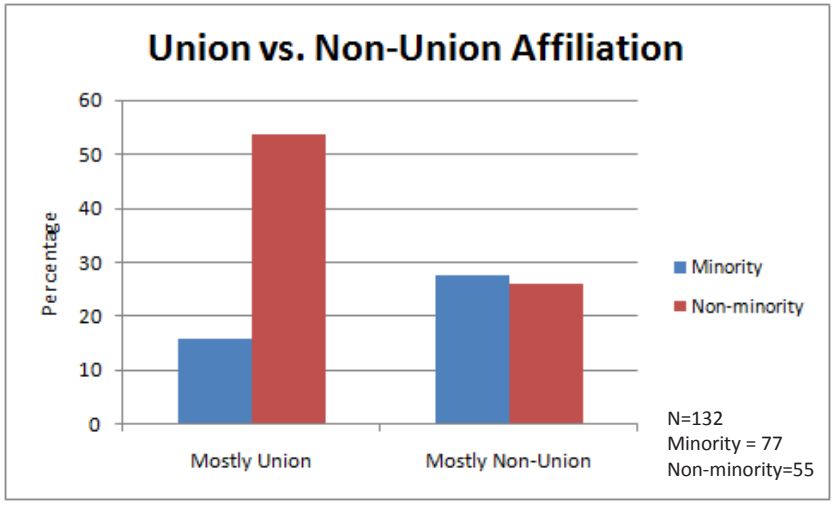
Q16a: IF NONE: We have been told by other construction industries that they do not participate in joint ventures for a variety of reasons. Which of the following apply to your company? Circle any that apply. A majority stated participating in joint ventures was not necessary for their company at the moment (54.2% minority, 66.7% non-minority). Another large majority chose not to answer.



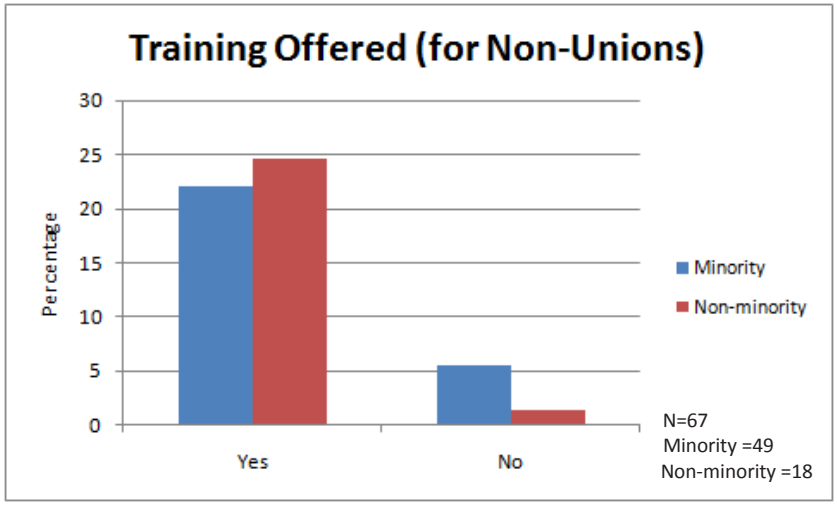
Q17: DBE's ONLY (from Q10): Do you believe that your status as a DBE influenced your success in receiving transportation construction contracts? Among minority companies views on DBE influence was split between believing DBE status increased their success in receiving transportation construction contracts and DBE status having no impact on their success in receiving contracts. Additionally, non-minority companies were also split between increased influence and remaining the same. Both minority and non-minority had slightly higher numbers in believing their DBE influence remained the same.



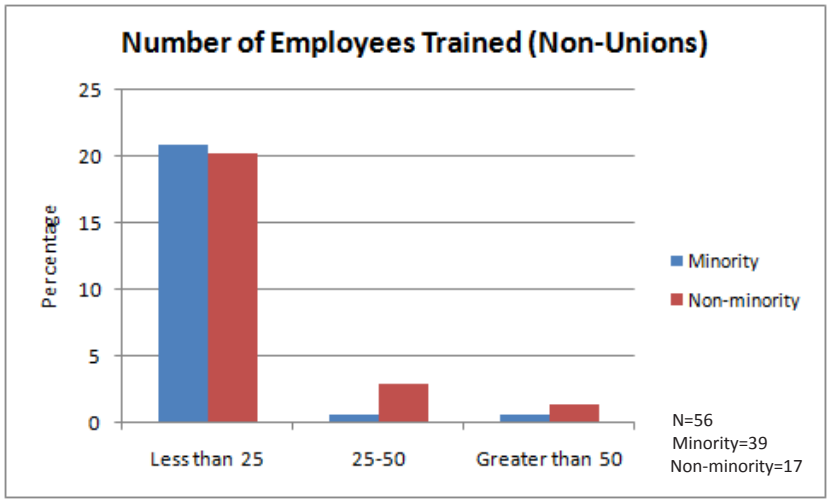
Q18-18b FOR CONSTRUCTION ONLY (from Q2): Are your transportation construction employees mostly union-affiliated, or without union affiliation? Non-minority companies have significantly higher union-affiliations than minority companies (53.6% v. 27.7%).



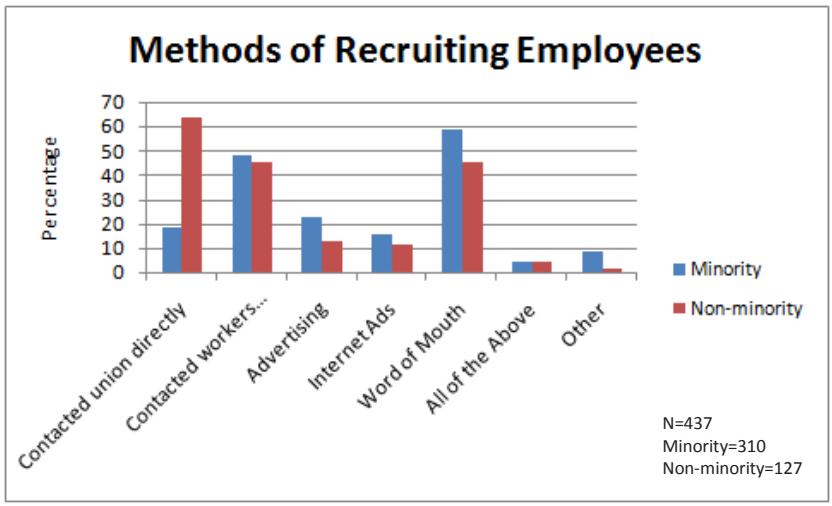
Q18a: IF NON-UNION: Does your company provide training for your non-union transportation construction employees? For those non-union companies, the majority offered training for their employees, but minority companies were slightly less likely to offer training.



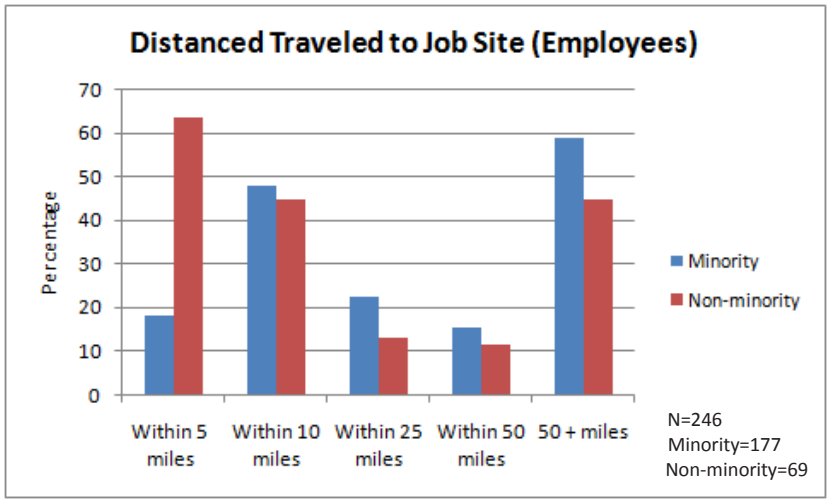
Q18b: IF YES: How many employees does your company train for transportation construction projects? Less than 25 employees have been trained by minority and non-minority companies (non-unions), but non-minority companies trained slightly more employees.



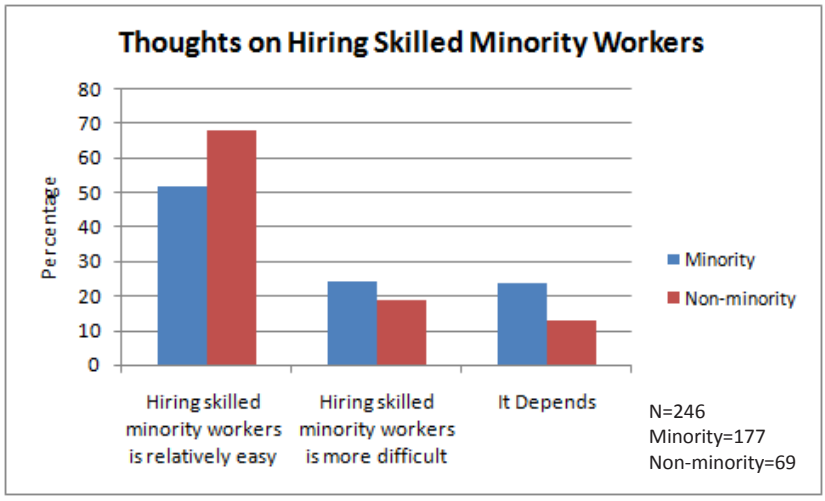
Q19: How do you recruit transportation construction employees at your company? Since more non-minority companies appear to be unionized, they recruited employees mostly through contacting the union directly. Minority companies appeared to rely on word of mouth and contacting workers directly from previous work on other projects.



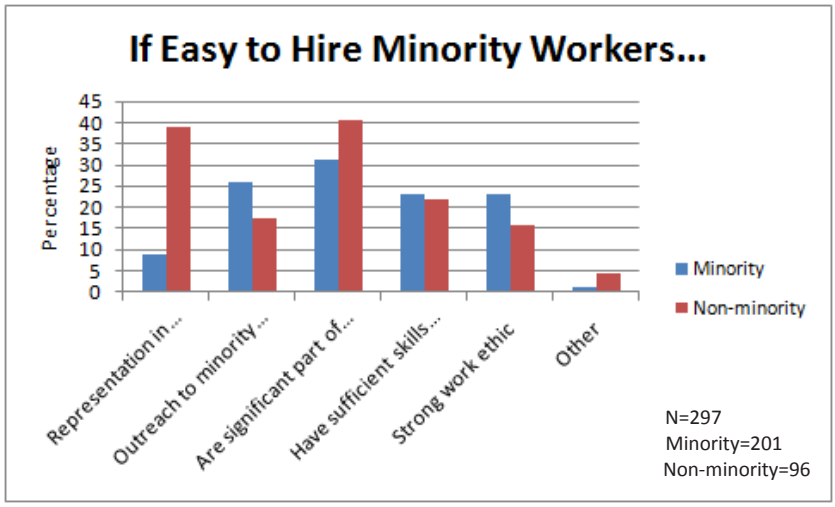
Q20: How far do your transportation construction employees typically travel to reach a given job site? Contrary to popular belief, the majority of minority companies state their employees traveled 50 or more miles to a job site. Non-minority companies have more employees traveling within 5 miles to a job site.



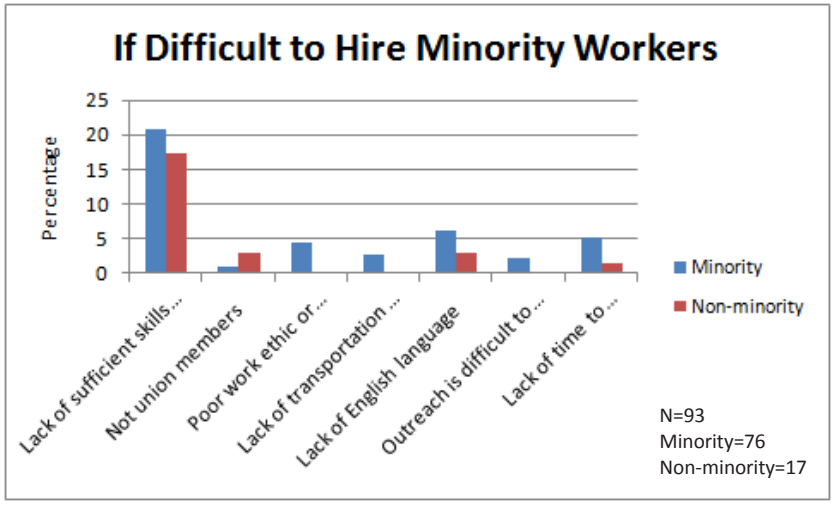
Q21: Some in the construction industry tell us that it is relatively easy to hire skilled minority workers in Southern California; others tell us that it is difficult. What is your opinion? A large consensus was that it is relatively easy to hire skilled minority workers in Southern California. Minority companies thought it was slightly more difficult to hire skilled minority workers and also that it depends.



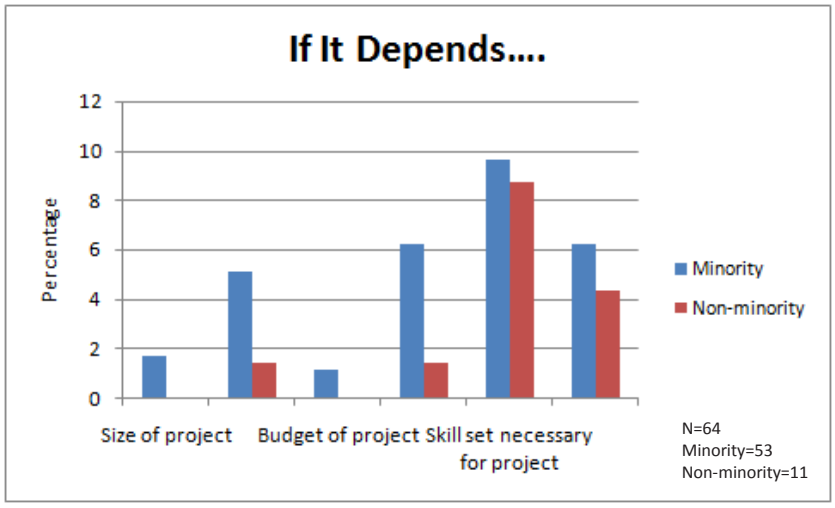
Q21a: IF RELATIVELY EASY: Why is it easy to hire minority workers? Circle any that are mentioned. Non-minority companies believed it was easier to hire minority workers because representation in unions is high and they are a significant part of the Southern California workforce. Minority companies felt it was easy because outreach to minority communities is easy and they are a significant part of workforce and have sufficient skills and work ethic.



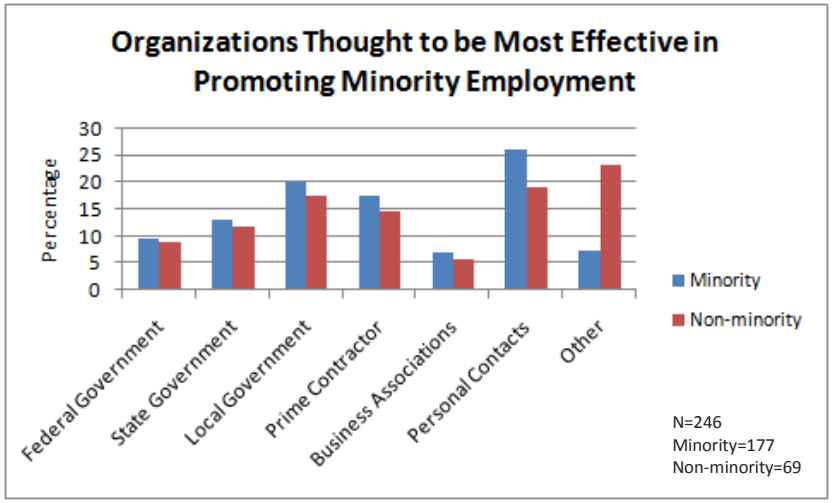
Q21b: IF MORE DIFFICULT: Why is it difficult to hire minority workers? Circle any that are mentioned. The largest consensus was among those believing difficult to hire minority workers is a result of minority workers lacking sufficient skills and training.



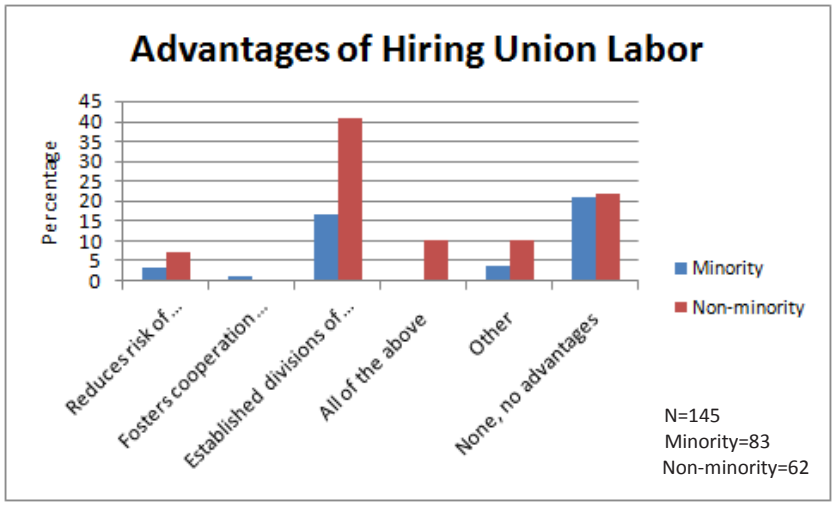
Q21c: IF IT DEPENDS: What does it depend on? Circle any that are mentioned. Skill sets necessary for project are factors when hiring (both minority and non-minority), as well as the location and type of project (minority).



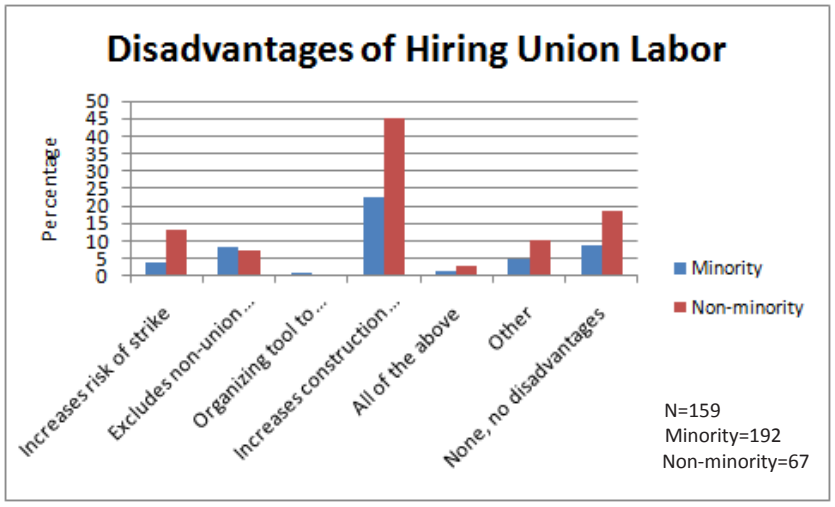
Q22: In your opinion, which organization is the most effective in the promotion of the recruitment and hiring of minority and/or low-income workers for transportation construction projects?



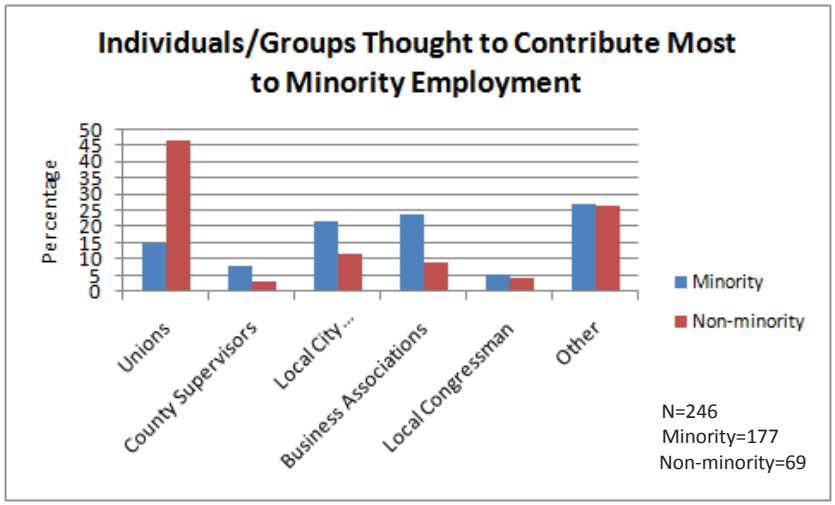
Q23-24 FOR CONSTRUCTION ONLY: We hear positive and negatives about union labor. In your opinion, what are the advantages of hiring union labor? Among non-minority unionized companies, the biggest advantage of hiring union labor is believed to be that established divisions of labor provide benefits, such as apprenticeship programs and higher skill levels, labor discipline, and network referral systems. Minority companies saw fewer advantages to hiring union labor than non-minority companies.



Q24: What are the disadvantages of hiring union labor? Non-minorities saw fewer disadvantages of hiring union labor than minority companies; however, the largest disadvantage non-minorities reported was increase in construction costs.

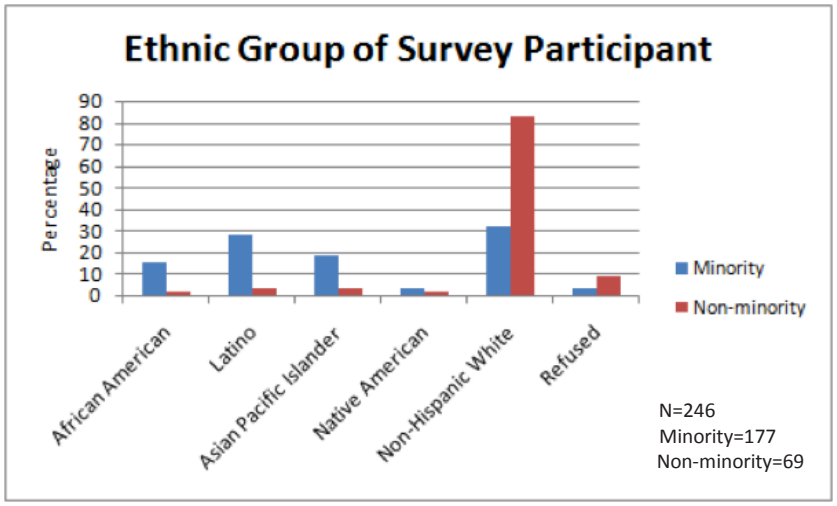


Q25: Of the following groups or individuals, who do you believe has done the most to promote employment of minorities on transportation construction projects here in Southern California?
Non-minority companies feel unions have done the most to promote minority employment in transportation construction.



Characteristics of Survey Respondents

1. What ethnic group do you consider yourself to belong to? The largest minority group was Latino and Non-Hispanic White.



APPENDIX

F

Survey and Results of Cement Masons Union Members

Cement Masons Union Survey

Dear Madam/Sir:

The School of Policy, Planning, and Development at the University of Southern California, in collaboration with three of its affiliated research centers—the METRANS Transportation Center, the Tomás Rivera Policy Institute (TRPI), and the Center for Economic Development (CED)—is conducting research on strategies to promote employment associated with major transit construction projects for members of minority and low-income communities. As part of this research, we are conducting a survey in Southern California to understand workforce characteristics including education levels, prior work experience, skill sets, and employment and career expectations. We seek your help in furthering this research. Your responses to the attached survey will be kept confidential.

Please send the completed survey to the following address:

Deepak Bahl, Program Director
USC Center for Economic Development
VKC 385
University of Southern California
Los Angeles, CA 90089-0626

If you have any questions, please feel free to call Deepak Bahl at (213) 740-9491. Thank you for taking the time in completing the survey.

1. Survey Questionnaire

1. In 2008, how much time did you spend for work in each of the following categories? Amounts should sum to 100%.

- _____% Transportation construction
- _____% Construction
- _____% Non-construction
- _____% I did not work

2. Did you work on the Metro Gold Line Eastside Extension in Los Angeles?

- Yes
- No

3. In 2008, how many months did you work on the Metro Gold Line Eastside Extension in Los Angeles?

4. How did you hear about the union that you are currently a member of or applying to be a member? Please check all that apply.

- Pre-apprenticeship training seminar (e.g. LAUSD's "We Build", Century Community Training Program, Helmets to Hardhats)
- Job-fair in the community/high school/community college
- Friend
- Relative
- Other worker
- Radio/television
- Local newspapers

5. How long have you been a member of this union?

- 0 to 1 year
- 2 to 5 years
- 6 to 10 years
- 11 years or more

6. How would you classify your construction trade occupation?

- Master
- Journeyman
- Apprentice craft worker
- Construction manager
- Construction laborer

7. What is your career goal? Please check all that apply.

- Become an apprentice craft worker
- Become a journeyman
- Become a supervisor
- Become a construction manager
- Become a teacher at the union training facility
- Start my own business as a contractor

8. Please rate benefits the union offered to attract you.

	Very important	Important	Less important	Not important at all
Healthcare benefits				
Vacation benefits				
Higher pay				
Job security				
Pension benefits				

9. Please rate each of the following work related issues according to difficulty.

	Very difficult	Difficult	Less difficult	Not difficult at all
Commuting to job sites				
Finding new jobs				
Getting answers to work related questions				
Maintaining continuous employment				
Working under hazardous conditions				
Physical demands of work				

10. Which of the following do you consider a barrier to your training/education?

	Significant barrier	A barrier	Less of a barrier	Not a barrier at all
High cost (e.g. course fees, books)				
Inconvenient class schedules				
Lack of bilingual materials				
Few training centers				
Transportation to training site				

11. Please rate each of the following issues according to how important they are for employment in construction.

	Very important	Important	Less important	Not important at all
Steady work				
Good pay				
Job benefits (e.g. health care)				
Being able to work outdoors				

12. What do you consider to be a barrier to your future employment in construction?

	Significant barrier	A barrier	Less of a barrier	Not a barrier at all
Low education level				
Low skill level				
English language ability				
Contracting process				
Legal issues				

13. How often were you able to find construction work within 80 miles of where you lived in 2008? Please check only one response.

- Less than 25% of the time
- 26% to 50%
- 51% to 75%
- 76% to 100%

14. How easy is it for people in your neighborhood to get a construction job?

- Easy
- Difficult

15. How about for you, was it relatively easy or difficult?

- Easy
- Difficult

16. My age is:

- Less than 30 years old
- Between 31 to 40 years old
- Between 41 to 50 years old
- More than 50 years old

17. My race/ethnicity is:

- White
- African-American
- Asian
- Hispanic/Latino
- Other

18. What is your level of education?

- Less than high school
- High school graduate
- GED certificate
- Some college
- Bachelor's degree or higher

19. Were you born outside the U.S.?

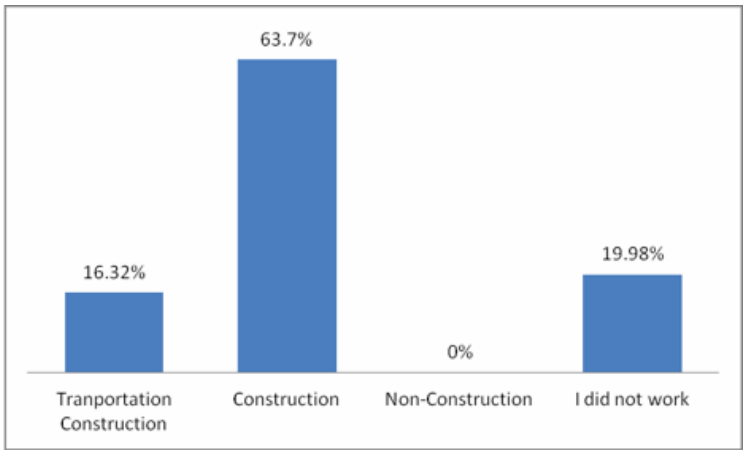
- Yes
- No

20. What is your zip code?

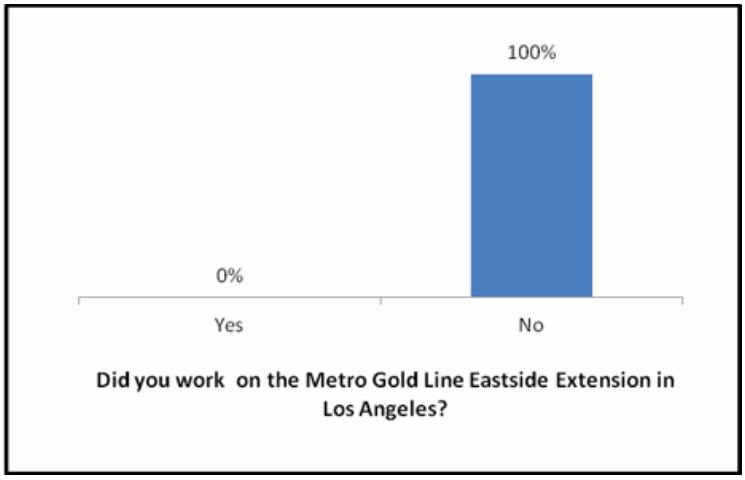
Cement Masons Survey Results

Our survey of the Cement Masons union yielded 96 usable surveys. A total of 19 survey questions were asked, with some questions containing multiple parts. The breakdown of the survey by question follows.

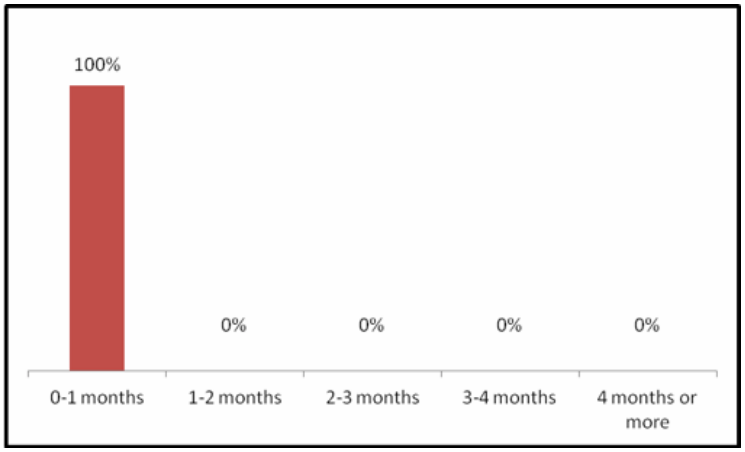
1. In 2008, how much time did you spend for work in each of the following categories? A large majority (64%) of the respondents answered that they worked in construction and not transportation construction. This result can be interpreted in two ways: 1) the respondents' perception of "transportation construction" is accurate and these surveys may not accurately reflect our target population, and 2) the respondents did not accurately distinguish between transportation construction and other forms of construction, thereby making the results inaccurate.



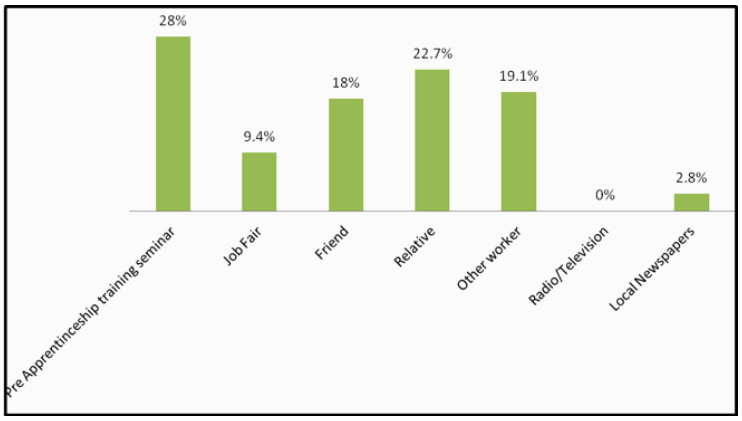
2. Did you work on the Metro Gold Line Eastside Extension in Los Angeles? All (100%) respondents said that they did not work on the Metro Gold Line Eastside Extension. This result would make the surveys inadmissible for our study, but it can be argued that while the foremen and upper management in the unions knew specifically about the Gold Line Eastside Extension, the majority of the union workers might not have known the name of the specific project at which they were working.



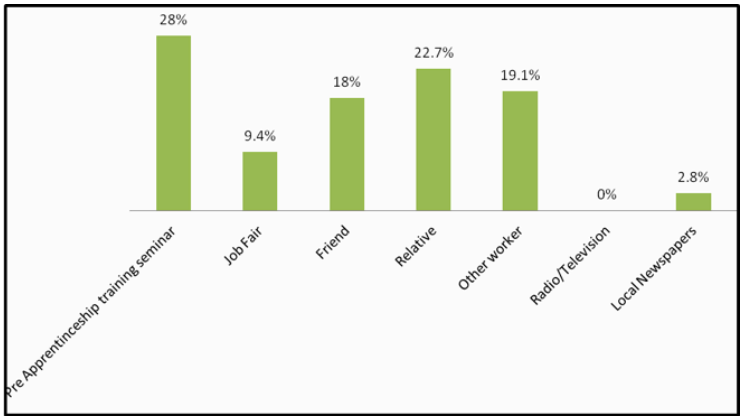
3. In 2008, how many months did you work on the Metro Gold Line Eastside Extension in Los Angeles? All (100%) respondents answered "0–1 months" of work on the Metro Gold Line Eastside Extension.



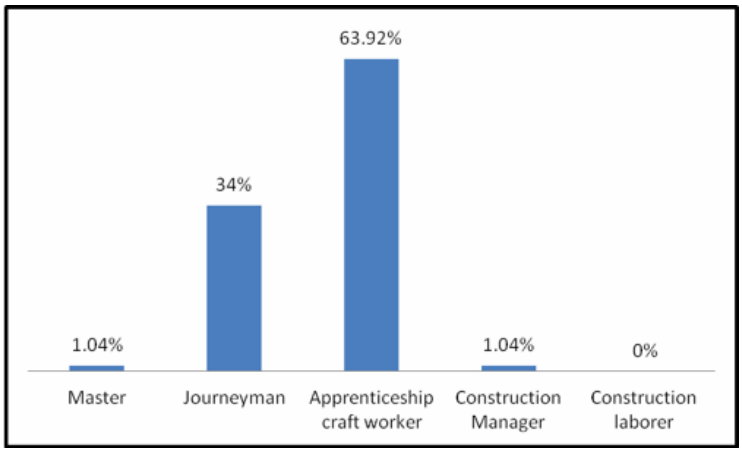
4. How did you hear about the union that you are currently a member of or applying to be a member? Please check all that apply. This question outlines how respondents heard about the Cement Masons. More than one-quarter (28%) of union workers identified pre-apprenticeship training seminars as the major tool for outreach. Personal and social networks such as friends, relatives, and other workers accounted for nearly 60 percent of the recruitment. Job fairs accounted for 9.4 percent and local newspapers nearly 3 percent.



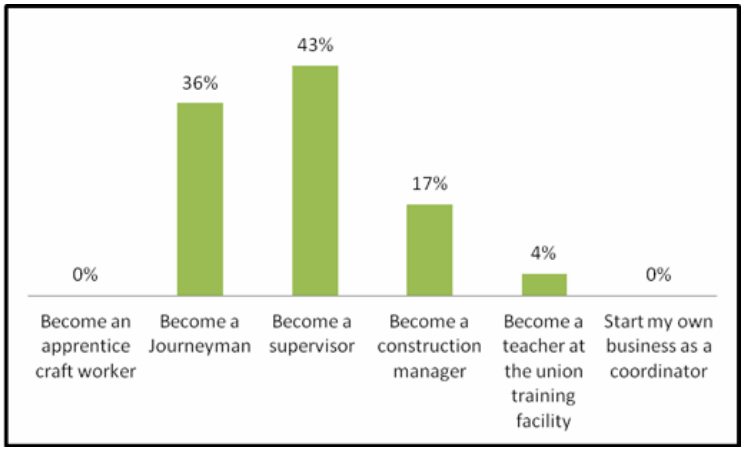
5. How long have you been a member of this union? A majority (86%) of the respondents have been a member of the Cement Masons for less than five years. About 39% of the respondents have been a member for less than one year. The rest (14%) of survey respondents have been members from 6–10 years.



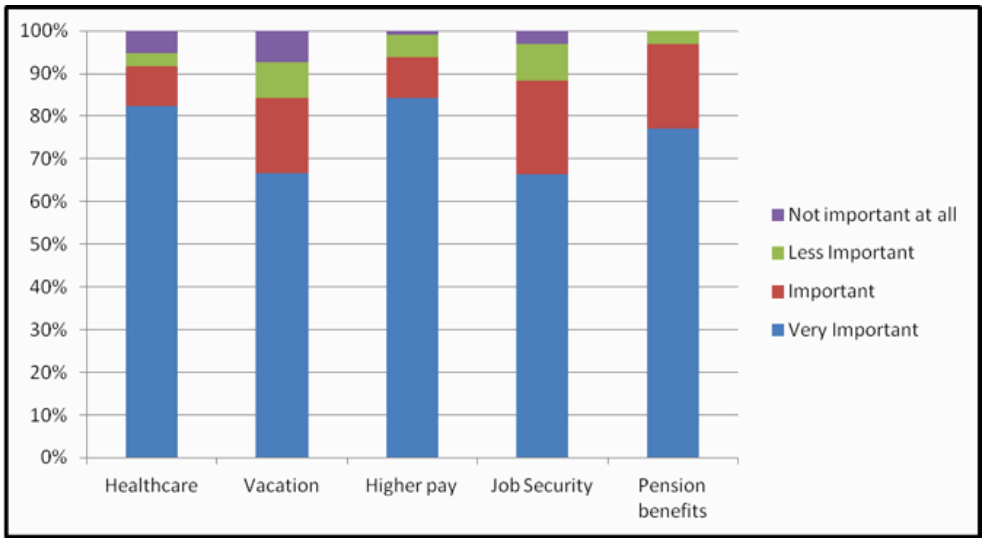
6. How would you classify your construction trade occupation? The majority of survey respondents, nearly 64 percent, were apprenticeship craft workers. About one-third of the respondents classified themselves as journeymen. Only one percent of the respondents classified their occupation as construction manager or master.



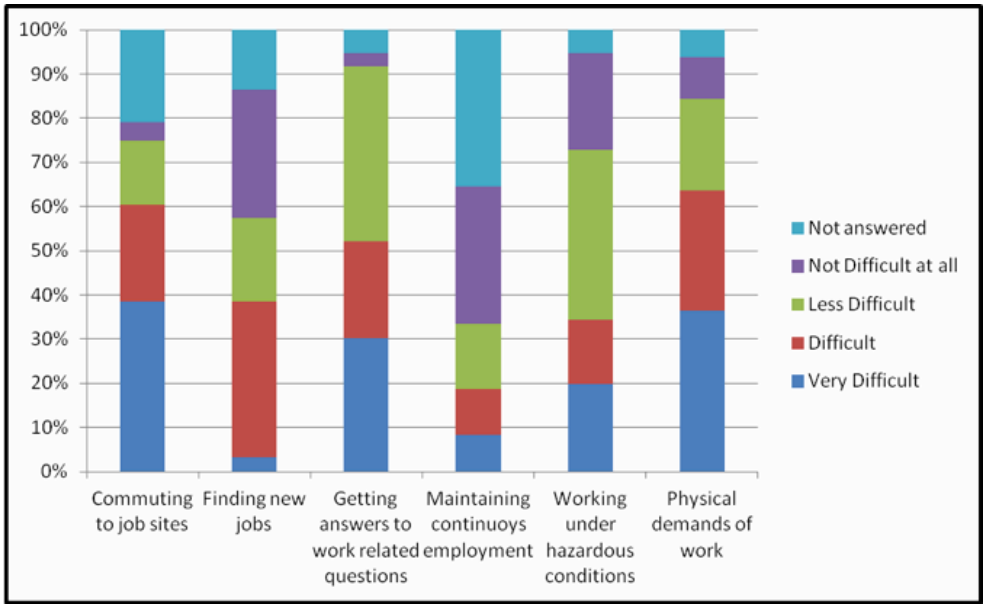
7. What is your career goal? Please check all that apply. This career goal question highlighted the respondents' aspirations to move up from their current position in the union workforce. The respondents who were apprentices wanted to either become a journeyman or work in upper management. Similarly, journeymen either wanted to carry on as journeymen or become construction managers. Nearly 43 percent of the respondents wanted to become a supervisor, 36 percent a journeyman, 17 percent a construction manager, and 4 percent a teacher at the union training facility.



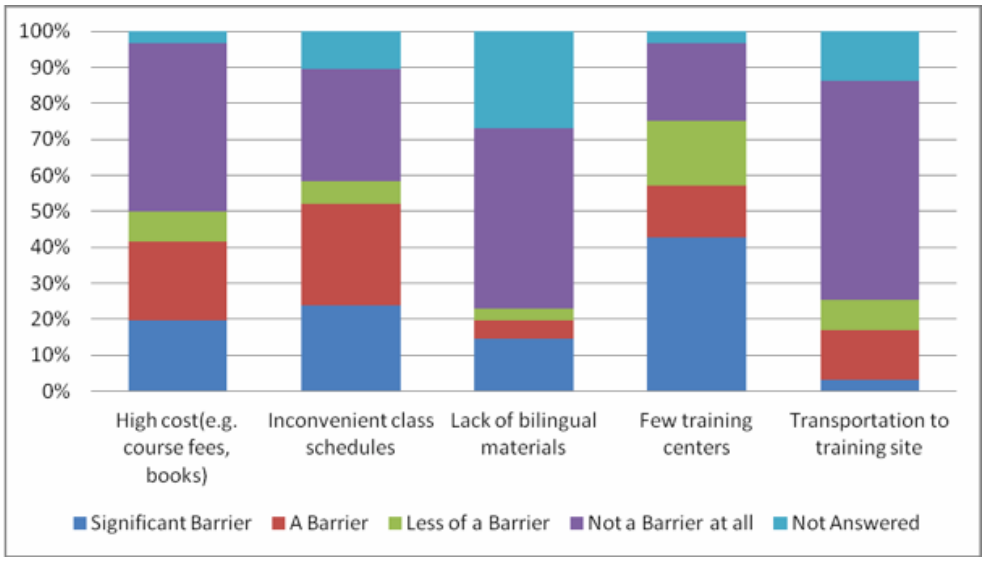
8. Please rate benefits the union offered to attract you. More than 80 percent of survey respondents rated healthcare as the most important aspect of their benefits the union offered to attract them. Monetary compensation in the form of higher pay and pension benefits were also rated as important aspects. Vacation pay was rated the least important benefit offered among the categories surveyed.



9. Please rate each of the following work-related issues according to difficulty. This question addressed work-related issues faced by respondents according to difficulty. Nearly 40 percent of respondents identified commuting to job sites as a major issue. This is backed up by our background research and interviews, which show that construction workers typically travel between 50 and 100 miles to worksites. Respondents rated physical demands of construction as a major issue, as more than one-third of them rated it as very difficult. About 20 percent of respondents felt that they worked under hazardous conditions, but maintained that it was not a major work-related issue.

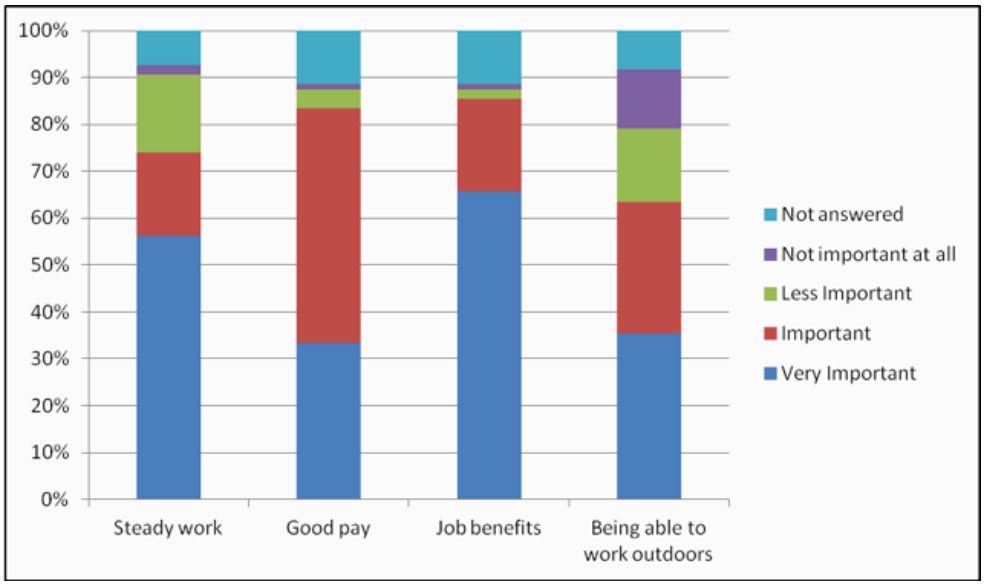


10. Which of the following do you consider a barrier to your training/ education? The respondents identified barriers to training and education that might be impediments to a better professional career. The majority of respondents pointed out the low number of training centers as one of the main barriers to training. This result agrees with our initial research, as training centers are one of the few places where trade skills are available for a lower cost (compared to a technical college or trade school). About one-fifth of the respondents felt that the class schedules offered to them were inconvenient, and a similar 20 percent of respondents identified the high cost of education as a barrier. It is interesting to note that the same respondents who considered commuting to work sites as a major barrier in the previous question considered transportation to a training site a non-factor for their training/education.

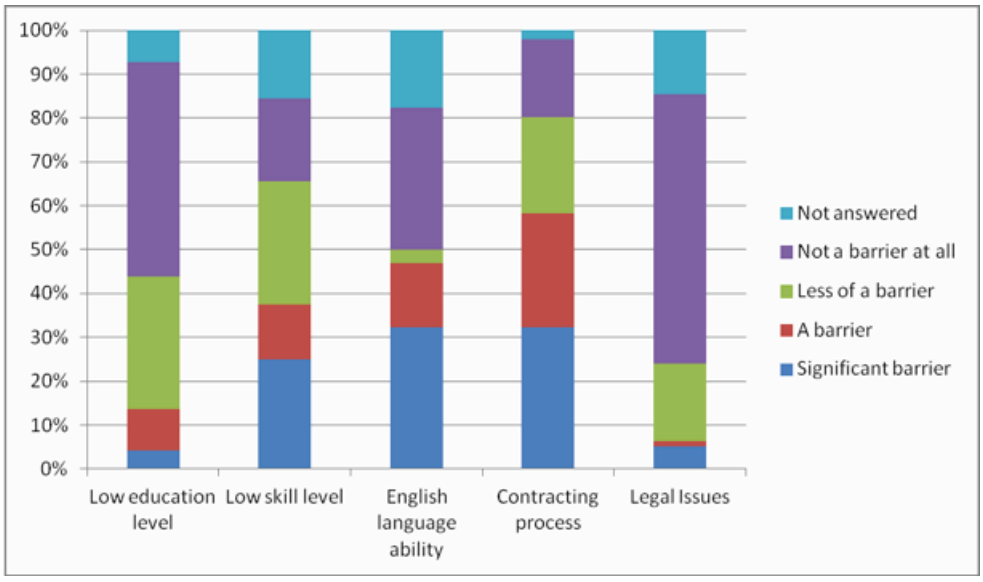


11. Please rate each of the following issues according to how important they are for employment in construction.

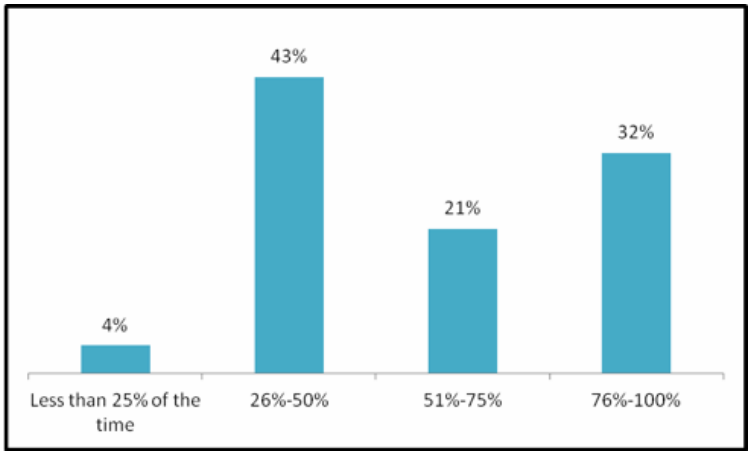
The benefits of construction work surveyed in this question reaffirmed our conclusions in previous questions on job benefits. As expected, job benefits were rated as very important, followed by steady work, which makes sense since continuous employment is seen as the mechanism to maintain job benefits. While an overwhelming majority found good pay to be an important issue, only one-third rated it as very important, instead choosing job benefits as very important.



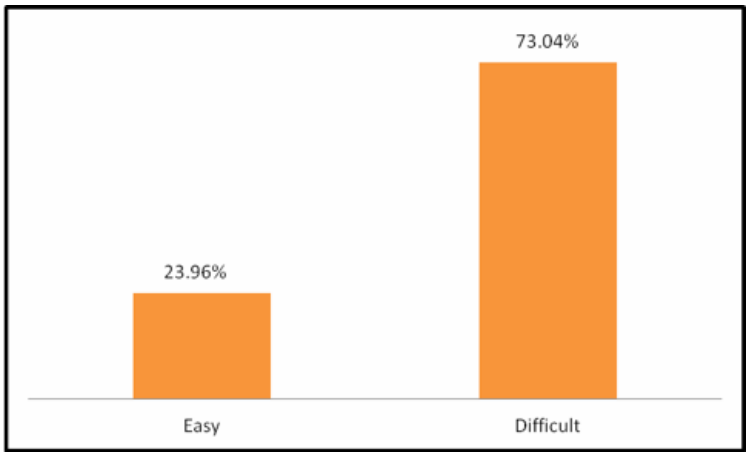
12. What do you consider to be a barrier to your future employment in construction? The contracting process, English language ability, and low skill levels were considered to be major barriers to future employment. The contracting process seemed to be the most significant barrier, as more than half of the respondents marked it as a barrier. It is interesting to point out that English language ability was considered by many as a barrier, as the same respondents had earlier indicated that lack of bilingual material in their training was not a barrier at all.



13. How often were you able to find construction work within 80 miles of where you lived in 2008? Please check only one response. About half of the respondents found jobs within 80 miles of their residence. Nearly half of the respondents indicated that they had to travel further than 80 miles from their residence to the job site. The temporal nature of construction jobs in addition to a large Southern California market (five-county Los Angeles, Orange, Riverside, San Bernardino, and Ventura) makes for a highly mobile construction workforce.

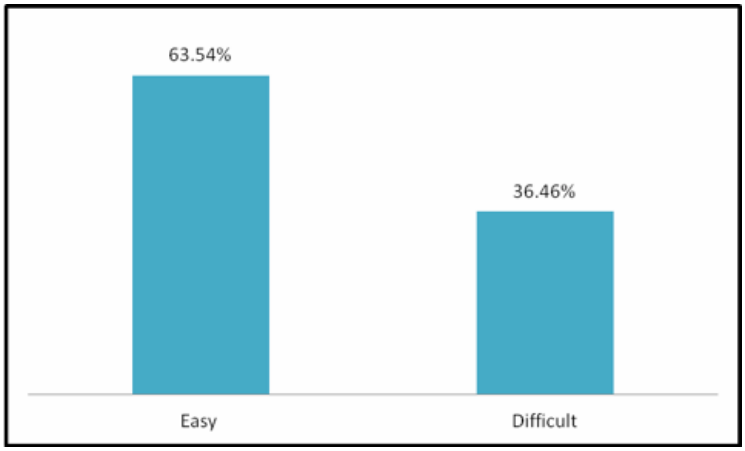


14. How easy is it for people in your neighborhood to get a construction job?

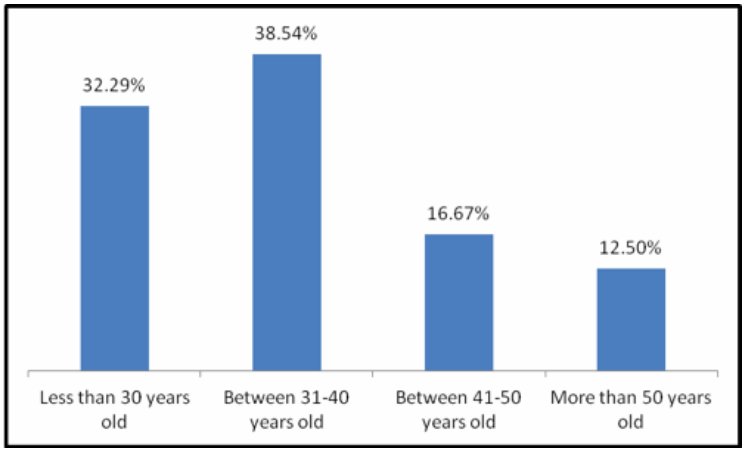


15. How about for you—was it relatively easy or difficult? Questions 14 and 15 should be analyzed together as they are continuations of the same thought process. Most respondents said that finding work was difficult for their neighbors but easy for them. This should be analyzed from both an economic point of view as well as a psychological one. Respondents realize that times are

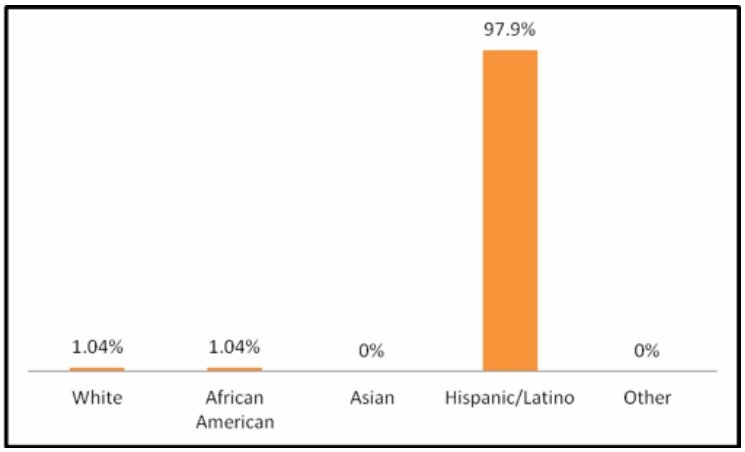
hard and that people are having trouble finding jobs, creating the perception that their neighbors found it difficult to find suitable employment. The measure of the difficulty to find suitable employment is very subjective, and very few would admit that it was hard for them as well. The only metric used to judge the difficulty of a job search here is a personal opinion.



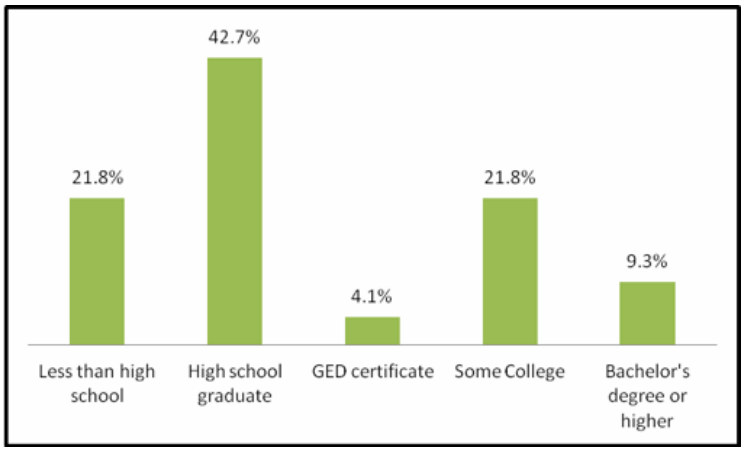
16. My age is: About 71 percent of the sample population identified themselves as being under the age of 40, with nearly 39 percent ages 31–40. Among the respondents, nearly 17 percent reported being age 41–50 and 13 percent more than 50.



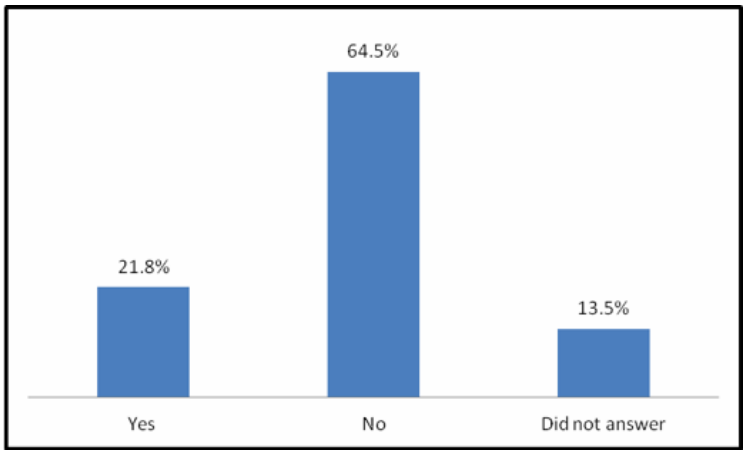
17. My race/ethnicity is: All of the respondents identified themselves as of Hispanic/Latino origin.



18. What is your level of education? The majority of the respondents are at least high school graduates (~70%). While one-fifth of the respondents did not finish high school, nearly 9 percent had a bachelor's degree or higher education.



19. Were you born outside the U.S.? About two-thirds of the union members were born outside the U.S. They could be foreign nationals, either holding a working visa or maintaining a permanent residency status. They could also be citizens of the United States having gone through the naturalization process.



APPENDIX

G

Interview Questions for Agency Officials, Contractors, and Union Officials, and List of Interviewees

Interview Questions for Agency Officials

1. Describe the RFP and contracting process for construction of the project.
   a. Who was the prime contractor and who were the subcontractors?
   b. What was the process of selecting the prime contractor and the subcontractors?
   c. What is the breakdown of funding by prime and subcontractors?
2. What type of contract was this? (fixed-price contract, design-build, etc.) What advantages does it offer over other types? Any disadvantages?
3. What was the transit agency's DBE goal and participation rate?
   a. Are these race-conscious or race-neutral goals?
   b. What is the distinction between minority and DBE contractors?
   c. What is the dollar volume of contracts awarded to DBEs? What is the DBE percentage share of the total construction budget?
4. Does the transit agency conduct proactive outreach to D/M/WBEs and to the construction labor force?
   a. Does the transit agency mentor and/or assist D/M/WBE firms in the contracting process?
5. To what extent are the workers unionized? For non-unionized workers, who provides them the training in trade skills?
   a. What role do community colleges or trade schools play in preparing the construction labor force?
   b. Does the transit agency interface with these training providers?
6. Do you have any programs or policies to hire local firms or local workers?
7. What are some of the exemplary lessons learned from this project with respect to contracting, hiring, and training that could be classified as best practices and replicated in other communities?

Interview Questions for Contractors (including D/M/WBEs)

1. What is the company's specialty?
2. About how large is your company (number of workers)?
   a. Percent of minority workers and women?
3. How do you find out about transport construction contract opportunities? What are the most important methods?
   a. Are you satisfied with the ways you hear about contracting opportunities?
4. Number of bids your company submitted last year? Number of contracts received in the past year.
   a. Did you participate in any joint ventures?
5. Does DBE or M/WBE designation help in getting contracts?
6. Is labor force unionized or not? If so, what union?
7. For non-unionized companies, do you provide training? What kind and how many did you train this past year?
8. How do you recruit employees—through unions, advertising, word of mouth, etc.?
9. Do you have apprentices? If so, what is the length of time workers work as apprentices, what is the wage differential? What opportunities do they have for advancing in your company? We're interested in finding out about the opportunities that minority workers have for advancing in your company.
10. About how far do employees typically travel to the job site? We are interested in whether you have a policy to hire local workers or whether in fact the people who work for your company are primarily local.
11. Is it difficult to recruit skilled minority workers in this area?

Interview Questions for Union Representatives

1. What is the union's specialty?
   a. What are some of the key benefits that you offer the workers?
2. About how large is your union (number of workers)?
   a. Percent of minority workers and women?
   b. What are some of the recent trends in recruiting and retention?
3. How do you find out about transport construction contract opportunities? What are the most important methods?
   a. Are you satisfied with the ways you hear about contracting opportunities?

4. At what point does the prime contractor or subcontractor engage the union?
5. How do you recruit workers?
6. Do you provide training? What kind and how many did you train this past year?
7. What is the typical education level of the workers joining the union? What are their career aspirations?
8. We are interested in learning more about the career ladder for workers joining the union. What are the typical steps, training requirements, wage differentials, and what opportunities do they have for advancing in the union?
9. About how far do workers typically travel to the job site?
10. We are interested in whether you have a policy to hire local workers or whether, in fact, the people who work for your union are primarily local. Do you have project labor agreement or community workforce agreements on certain projects?
11. Is it difficult to recruit skilled minority workers in this area?

Lists of Interviewees by Project

Table G-1 *VTA's Vasona Line Interviewees*

Name	Affiliation	Date
Tom Smith	VTA, Contracts Manager for the Vasona project	3/31/2010
Scott Haywood	VTA, Information Officer	3/31/2010
Hayden Lee	VTA, Director of DBE/SBE Office	3/31/2010
Mark Robinson	VTA, Chief Construction Officer, project manager for Vasona Project	3/31/2010
Gail Collins	Senior Planner, oversaw community outreach for project	3/31/2010
Neil Struthers	CEO, Santa Clara/San Benito Counties Building & Construction Trades Council	2008, 5/12/2010
Jim Homer	Local 270, Laborers Int'l Union of N. America, AFL-CIO	5/12/2010
Dennis Meakin	Local Union 377, iron workers	5/12/2010
Robert Baldini	Carpenters Union, Local 405	5/12/2010
Sal Ventura	IBEW, Electrical Workers Local Union 332	
Darryl, ABSL Construction	Office Manager, ABSL Construction, DBE firm, worked on Vasona Line	6/14/2010
Homer Olson	Owner, RMT Landscape, formerly DBE	6/15/2010
Ada Tang	Office Manager, Kwan Wo Ironworks, S.F. WBE	6/16/2010
Jim Vergara	President, San Jose Transport, DBE	6/18/2010
Brian Smith	Office Manager, R & W Concrete Contractors, DBE	6/18/2010
Debbie Garcia	President, Oliveira Fence, WBE	6/28/2010
Carlos Gamero	Satellite Painting, MBE	6/28/2010

Table G-2 *DART's Green Line Interviewees*

Name	Affiliation	Date
Diane Gollhofer	DART, Asst. VP, Construction Management	2/14/2011 2/15/2011
Gabriel Beltran	DART, Equal Opportunity Specialist	2/14/2011 2/15/2011
Edward E. Hammond	DART	2/14/2011
Jorge Espinoza	DART	2/14/2011
Debra Hebisen	DART/QA/Safety	2/14/2011
Oscar Chavez	DART/Safety	2/14/2011
Melinda Mason	DART, Construction Management	2/14/2011
Kay Shelton	DART	2/15/2011
Gary Thomas	DART President/Executive Director	2/15/2011
Kenny Crabb	Archer Western (prime), project manager, Green Line, CMGC 3	2/14/2011 2/15/2011
Al Brunson	Brunson Technical, President and CEO DBE, CMGC1	2/14/2011
Bill Heavin	Archer Western, project manager, Green Line, CMGC 1	2/14/2011
Derek Piwonka	Herzog Contracting Corp., area managerCMGC3	2/14/2011
Arcilia Acosta	Carcon Industries, President and CEO, WBE, CMGC 1	2/15/2011
Larry Hart	L & E Hart, owner, subcontractor	2/14/2011
Madison Smartt	Dowager Construction, sub, owner/manager WBE	2/14/2011
Walter Antonyshyn	L.K. Comstock, subcontractor, project manager	2/14/2011
Chris Inglis	Mass Electric, project manager	2/15/2011
Matt Swanson	Mass Electric, project manager	2/15/2011
Jorge Espinoza	AWH, contractor	2/14/2011
Karsten Frentrup	EBEW	2/15/2011
A.C. McAfee	EBEW	2/15/2011
Tony Meza	Global Learning Solutions	2/15/2011
Nancy Jarmon	Willis	
Andrea Bills	CitySquare	2/15/2011
Jonna Noble	CEF	2/15/2011
Angela Dominguez	Renaissance Contractors	2/15/2011
Luis Espinola	Owner, Azteca-Omega Group MBE	2/15/2011
Mike Cunningham	Exec. Secy.-Treas., TX Building and Construction Trade Council	2008

Table G-3 *St. Louis Metro's St. Clair Extension Interviewees*

Name	Affiliation	Date
Larry Jackson	St. Louis Metro, VP, Procurement, Inventory Management and Supplier Diversity	5/24/2011
Gerard Hutchison	St. Louis Metro, Diversity Input	5/24/2011
Diane Wright	St. Louis Metro, Procurement and Contract Management	5/24/2011
John Nichols	Cosney-Wagner, contractor	5/25/11
Ron Lindenberg	Illinois Excavators, contractor	5/25/11
Terry Hampton	Access Director	5/25/11
	ACCESS, Outreach Specialist	5/25/11
	DBE supplier	5/25/11
Tim Green	Missouri State Building Trade Council	2008
Todd Swanson	St. Louis Building and Trade Council	2008
Richard McLaughlin	President, Laborers Local 42	05/24/2011
William "Billy" Brennell	President/Business Agent, Ironworkers Local 396	05/24/11

Table G-4 *LA Metro's Gold Line Eastside Extension Interviewees*

Name	Affiliation	Date
Steve Shelton	Eastside LRT Constructors, contractor	12/16/08
Martin Reina	ELRTC, contractor	12/16/2008
Mike Roddy	Eastside LRT Constructors, contractor	12/16/2008
Carl Sandstedt	Eastside LRT Constructors, Project Mgr.	2009
Joe O'Donnell	Metro	12/16/08
Rick Thorpe	Metro, Chief Capital Management Officer	4/26/2012
Linda Wright	Metro, Deputy Exec. Officer, Diversity	2009
Eric Carlson	Metro, Project Manager	2009
Pat McGinn	Senior Bus. Rep, Southwest Carpenters Union	2008
Mike Rubio	Laborer's Union, Senior Coordinator, Apprenticeship Programs	4/13/ 2012
William Luddy	Exec. Dir., Carpenters Contractors Cooperation Committee, Carpenters Union	2008
Richard Slawson	Exec. Secretary-Treasurer, Los Angeles/Orange Counties Building and Construction Trades Council	2008
Fitzgerald Jacobs	Cement Masons, Local 600	2008
Betsy Lindsay	President, UltraSystem, subcontractor	4/23/2012
Earl Eldridge	VP Underground, ARB Inc., subcontractor	4/17/2012
Emile Gardner	GC Tech Inc., subcontractor	4/20/2012
Peter NG	Ace Fencing Co., contractor	4/20/2012
Edward De Brito	Apprenticeships Mgr., Cement Masons Union	3/30/2012
Scott Gordon	Dir. of Apprenticeships, Carpenters Union	3/30/12
Roger Henry	Vice President of Operations, Yang Mgt, DBE	4/17/12

APPENDIX

H

Announcement of Manual Availability and Survey of Best Management Practices

E-mail Announcement

Subject: Feedback needed on new "Manual of Best Practices to Increase Minority and Low-Income Employment in Light Rail Projects for Transit Agencies"

Sent: June 24, 2013

Dear State DOT DBE Liaison Officer:

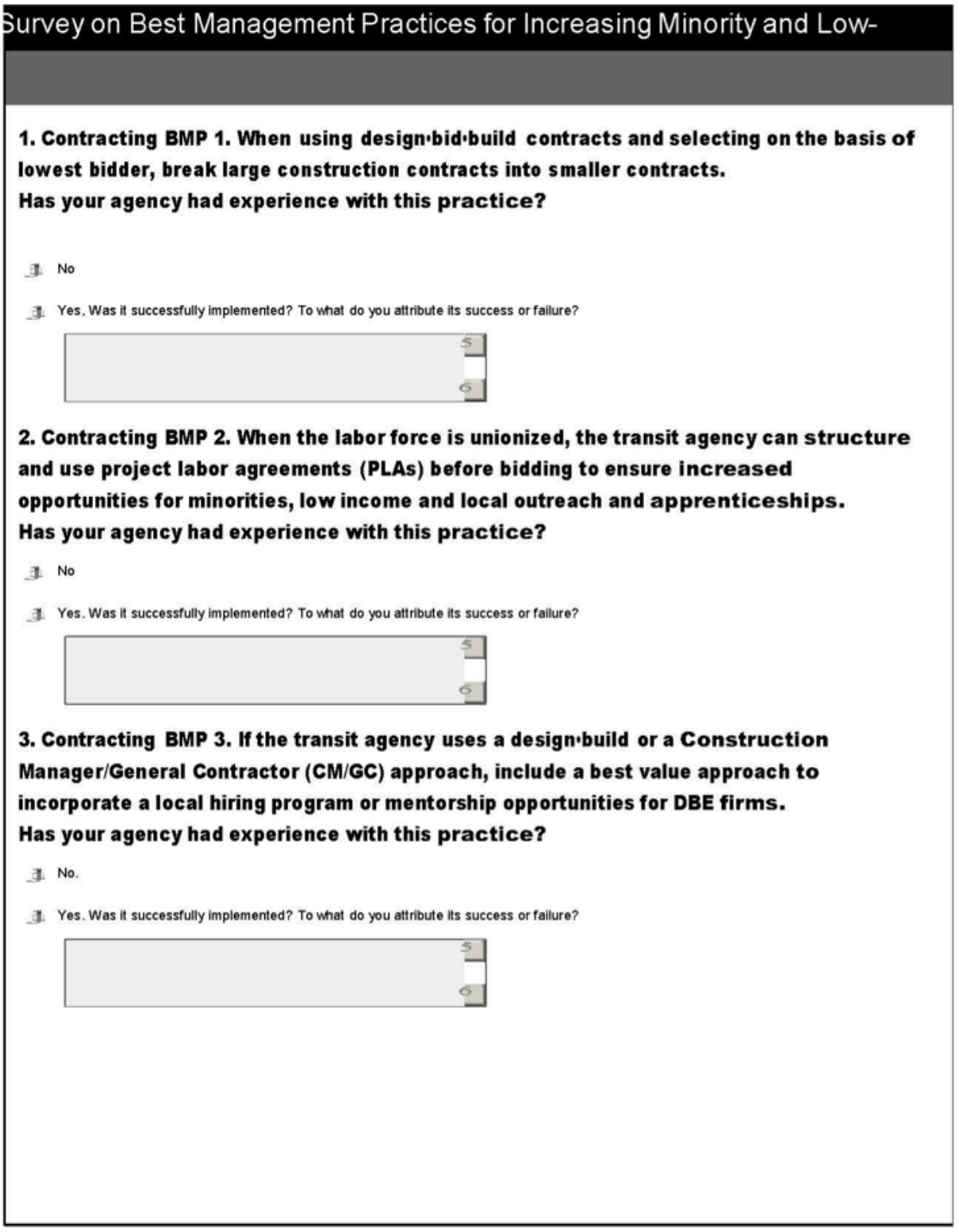
A research team, led by Prof. G. Giuliano at the Price School of Public Policy at the University of Southern California, has been conducting a study of minority and low-income employment in light rail projects supported by the Federal Transit Administration. We analyzed four case studies across the country: LA Metro's Gold Line Eastside Extension, DART's Green Line, St. Louis Metro's St. Clair Extension, and Santa Clara VTA's Vasona Line projects. We are at the end of our study and have prepared a manual of best management practices for transit agencies-based on our research, which we will be submitting to FTA. The manual can be found at the METRANS Transportation Center at http://www.metrans.org/announce/item.php?id=257.

Could we count on your help to review the manual and give us some feed-back on it?

We prepared a brief survey found on the web page above to find out whether your agency has had experience with the BMPs or other promising practices.

Thanks so much for your help.

SurveyMonkey Survey on Best Management Practices for Increasing Minority and LowIncome Employment in Transit Construction



Survey on Best Management Practices for Increasing Minority and Low-

1. Contracting BMP 1. When using design-bid-build contracts and selecting on the basis of lowest bidder, break large construction contracts into smaller contracts.
Has your agency had experience with this practice?

- No
- Yes, Was it successfully implemented? To what do you attribute its success or failure?

2. Contracting BMP 2. When the labor force is unionized, the transit agency can structure and use project labor agreements (PLAs) before bidding to ensure increased opportunities for minorities, low income and local outreach and apprenticeships.
Has your agency had experience with this practice?

- No
- Yes. Was it successfully implemented? To what do you attribute its success or failure?

3. Contracting BMP 3. If the transit agency uses a design-build or a Construction Manager/General Contractor (CM/GC) approach, include a best value approach to incorporate a local hiring program or mentorship opportunities for DBE firms.
Has your agency had experience with this practice?

- No.
- Yes. Was it successfully implemented? To what do you attribute its success or failure?

Survey on Best Management Practices for Increasing Minority and Low-

4. Outreach BMP 4. Develop an effective ongoing public outreach program to DBE firms to ensure that such firms have adequate notice and time to bid on sub•contracts.
Has your agency had experience with this practice?

- No.
- Yes. Was it successfully implemented? To what do you attribute its success or failure?

5. Outreach BMP 5. For large and medium•sized projects or agencies, establish a full•time DBE Coordinator to ensure ongoing outreach and support for such firms.
Has your agency had experience with this practice?

- No
- Yes. Was it successfully implemented? To what do you attribute its success or failure?

6. Outreach BMP 6.Partner with Third•Party Entities to Facilitate DBEs Inclusion in contracts
Has your agency had experience with this practice?

- No
- Yes. Was it successfully implemented? To what do you attribute its success or failure?

7. Outreach BMP 7. Partner with contractor associations or non•profits to increase mentorship opportunities for DBE firms.
Has your agency had experience with this practice?

- No.
- Yes. Was it successfully implemented? To what do you attribute its success or failure?

Survey on Best Management Practices for Increasing Minority and Low-

8. Financing BMP 8. Partner with local banks to improve access to capital, e.g., through a loan mobilization program, for DBE firms participating in transit contracts.
Has your agency had experience with this practice?

- No.
- Yes. Was it successfully implemented? To what do you attribute its success or failure?

9. Financing BMP 9. Ensure that DBE firms receive prompt payments, and explore the feasibility of advance payments for such firms.
Has your agency had experience with this practice?

- No.
- Yes. Was it successfully implemented? To what do you attribute its success or failure?

10. Financing BMP 10. Develop a bonding program for DBEs participating in transit projects.
Has your agency had experience with this practice?

- No.
- Yes. Was it successfully implemented? To what do you attribute its success or failure?

11. Compliance BMP 11. Monitor the data on local employment and DBE participation.
Has your agency had experience with this practice?

- No.
- Yes. Was it successfully implemented? To what do you attribute its success of failure?

Survey on Best Management Practices for Increasing Minority and Low-

12. Compliance BMP 12. Disseminate project results on local and minority hiring and DBE participation.

Has your agency had experience with this practice?

- No.
- Yes. Was it successfully implemented? To what do you attribute its success or failure?

13. Compliance BMP 13. Penalize Violation of DBE Program Goals

Has your agency had experience with this practice?

- No.
- Yes. Was it successfully implemented? To what do you attribute its success or failure?

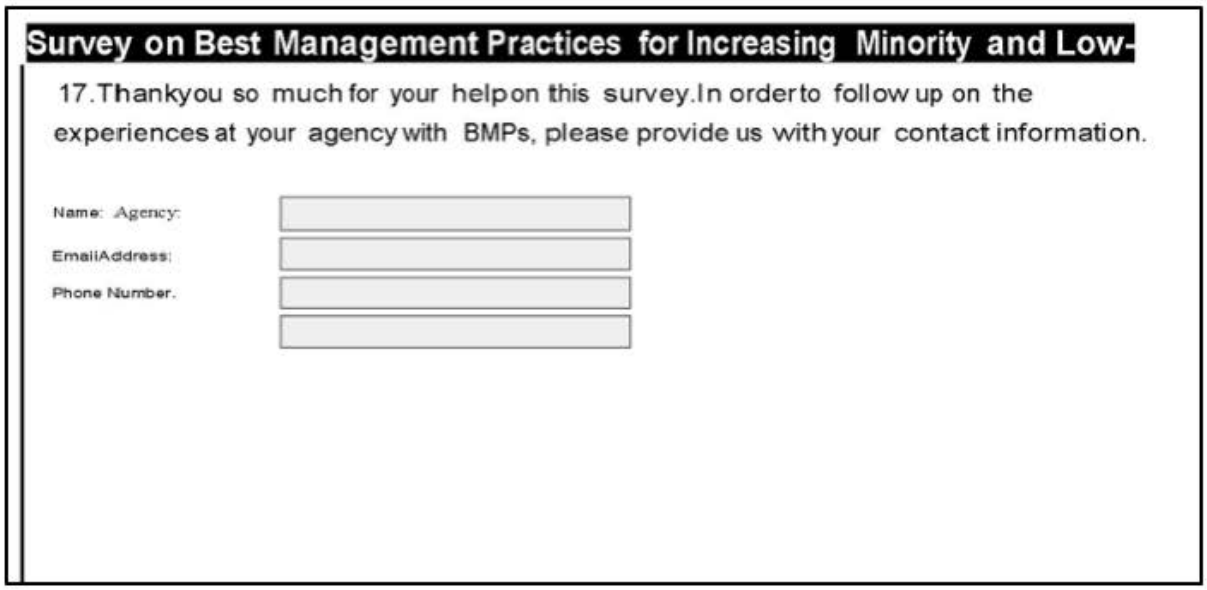
14. Compliance BMP 14. Monitor Agency Leadership in Promoting Diversity and DBE Participation

Has your agency had experience with this practice?

- No.
- Yes. Was it successfully implemented? To what do you attribute its success or failure?

15. From your perspective and experience, which three of these 14 BMPs above would contribute most to increase minority and low-income employment and DBE participation in your agency? Please choose the 3 BMPs you consider would have the most impact.

16. Are there other best management practices that this manual does not identify? If so, please describe briefly.



Survey on Best Management Practices for Increasing Minority and Low-

17. Thank you so much for your help on this survey. In order to follow up on the experiences at your agency with BMPs, please provide us with your contact information.

Name: Agency:

Email Address:

Phone Number.

Summary Results from Survey of Agencies on Best Management Practices*

BMP #	Best Management Practices	Experience with BMP?	Comments
BMP 1	When using design-bid-build contracts and selecting on basis of lowest bidder, break large construction contracts into smaller ones.	3 yes, 3 no	One agency commented that it was currently working on one of its biggest contracts to break it up. Another commented that they do unbundle.
BMP 2	When labor force is unionized, transit agency can structure and use project labor agreements (PLAs) before bidding to ensure increased opportunities for minorities, low-income, and local outreach and apprenticeships.	All no	
BMP 3	If transit agency uses a design-build or a CM/GC approach, include best-value approach to incorporate local hiring program or mentorship opportunities for DBE firms.	3 yes	One agency responded that it sent it for a quote, another that it "may assign an on-the-job training requirement to the project if the scope of work and size of the project warrants it." NHDOT routinely uses this practice for FHWA transportation-related projects; however, it has not had an FTA project meet these requirements to date. DART official noted that agency "has always stressed and placed a high importance on utilization of not only DBE firms but also local DBE firms. Offerors that include this as well as mentor-protege programs with their proposal are usually scored higher during the evaluation process."
BMP 4	Develop effective ongoing public outreach program to DBE firms to ensure that such firms have adequate notice and time to bid on sub-contracts.	4 yes, 2 no	Comments from agencies with experience: 1) Not many DBE participate; 2) Yes, we make some open meeting and presentations, so they can know us and we let the company the opportunity to tell us what services they offer, materials, etc.; 3) For FTA projects with a specific DBE goal, NHDOT notifies all contractors that request a bid packet of the projects DBE goal requirements and offers assistance if necessary, identifying DBE firms available for project work. Also notifies all DBE's in the database of project bidding opportunities via e-mail to educate prospective prime contractors of DBE requirements so they can incorporate DBEs in their subcontracting activities and to notify DBEs of potential bid opportunities so they can be proactive and contact bidders; 4) DART's Diversity Department is responsible for outreach and D/M/WBE contract goal setting/ compliance and has historically had very aggressive goals that are either met or exceeded by the contractors.
BMP 5	For large and medium-size projects or agencies, establish full-time DBE Coordinator to ensure ongoing outreach and support.	2 yes, 4 no	Comments from agencies with experience: 1) DBE coordinator position is required by FHWA and evaluates FTA projects for opportunities for DBEs as part of routine job functions; 2) For these type of projects, DART has staff to monitor the project for compliance from cradle to grave. It has also been the practice for its prime contractors to include a DBE subcontractor as part of the project, to monitor their activity as well.

BMP #	Best Management Practices	Experience with BMP?	Comments
BMP 6	Partner with third-party entities to facilitate DBEs inclusion in contracts.	1 yes, 5 no	Comment from agency with experience: We are in communication with a non-DBE company that used a DBE company help us to meet our goal.
BMP 7	Partner with contractor associations or non-profits to increase mentorship opportunities for DBE firms.	2 yes, 4 no	Comments: 1) Yes, have regular quarterly industry meetings; 2) Our Outreach division is consistently in open communication with area chambers and contractors associations to notify members of upcoming opportunities. We also are frequent speakers at banquets and luncheons.
BMP 8	Partner with local banks to improve access to capital, e.g., through a loan mobilization program for DBE firms participating in transit contracts.	1 yes, 5 no	Comment: We have an active list of identified DBE banks and financial institutions.
BMP 9	Ensure that DBE firms receive prompt payments and explore feasibility of advance payments for such firms.	5 yes, 1 no	Comments: 1) All DBE companies received their payments in accordance with the company payment terms; 2) NHDOT includes prompt payment guidelines on all projects and requires payment to subcontractors within 21 days after receiving payment for work performed/materials supplied. Monthly prompt payment monitoring ensures firms are paid on a timely basis. No consideration has been given to advance payments; 3) We have built into our contracts a prompt payment provision that states the contractor must pay their DBE subs within 10 days from receiving payment from DART. Staff monitors this by reviewing invoices and directly contacting the DBE subs to ensure that prompt payment was adhered to; 4) We currently monitor prompt payment on all federal projects to ensure compliance with the regulations.
BMP 10	Develop bonding program for DBEs participating in transit projects.	2 yes, 4 no	Comments: 1) In process; 2) We reinforce this program.
BMP 11	Monitor data on local employment and DBE participation.	2 yes, 4 no	Comments: 1) We are constantly verifying the list and reports that tell us if they are getting participation; 2) We currently track DBE participation to ensure contractors stay on track to meet project goals.
BMP 12	Disseminate project results on local and minority hiring and DBE participation.	1 yes, 5 no	Comment: We send e-mails, letters, and other alternatives so companies not in DBE program can be part of it. We broadcast the message to the public in different forms.
BMP 13	Penalize violation of DBE Program goals.	3 yes, 3 no	Comments: 1) Have done some penalizing of DBEs and prime contractors. Should have stronger enforcement. 2) Fortunately, we have not had a contractor fail to meet the DBE goals on such large project; the trend we have seen at DART is the contractor usually exceeding DBE goals. We have language in our contracts that states clearly the consequences for not meeting the DBE program goals; 3) Rare, most contractors comply once made aware of non-compliance and the fact that we are monitoring closely.
BMP 14	Monitor agency leadership in promoting diversity and DBE participation	6 no	

*6 agencies responded

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INTERVIEWS

See Appendix G for interview protocol, affiliation, and dates.

1. Tom Smith, Scott Haywood, Mark Robinson, VTA, unpublished data.
2. Hayden Lee, VTA, unpublished data
3. Neil Struthers, Santa Clara and San Benito Counties Trades Council, unpublished data.
4. Sal Ventura, IBEW, unpublished data.
5. Jim Homer, Laborers Union, unpublished data.
6. Robert Baldini, Carpenters Union, unpublished data.
7. Dennis Meakin, Iron Workers Union, unpublished data.
8. Diane Gollhofer, Gabriel Beltran, Edward Hammond, Melinda Mason, Kay Shelton, Gary Thomas, DART, unpublished data.
9. Bill Heavin, Al Brunson, Arcilia Acosta, AW/B/A, unpublished data.
10. Kenny Crabb, Derek Piwonka, AWH, unpublished data.
11. Debra Hebisen, Oscar Chavez, DART Safety, unpublished data.
12. A.C. McAfee, IBEW, unpublished data.
13. Jonna Noble, Construction Education Foundation, unpublished data.
14. Andrea Bills, CitySquare, unpublished data.
15. Larry Jackson, St. Louis Metro, unpublished data.
16. Larry Jackson, Gerard Hutchinson, Diane Wright, St. Louis Metro, unpublished data.
17. John Doe, DBE supplier, unpublished data.
18. Richard McLaughlin, Laborers Union, William Brennel, Ironworkers union, unpublished data.
19. John Nichols and Ron Lindenberg, contractors, unpublished data.
20. Terry Hampton, ACCESS, unpublished data.
21. Rick Thorpe, L.A. Metro, unpublished data.
22. Betsy Lindsay, Earl Eldridge, Emile Gardner, Peter Ng, Roger Henry, contractors, unpublished data.
23. Richard Slawson, Trades Council, unpublished data.
24. Edward De Brito, Scott Gordon, Mike Rubio, L.A. Union officials, unpublished data.

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