Long Beach Streets Review
Phase II

July 2008

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Executive Summary

This report was commissioned by the Office of the City Auditor of Long Beach and was prepared by Public Financial Management (PFM). The report represents Phase II of the Long Beach Streets Review ("the Review"). In Phase I of the Review, PFM conducted an assessment of the Long Beach Streets Capital Improvement Program (CIP) that identified how the City could make more effective and full use of Streets CIP funding sources; improve budget practices; reduce project backlogs; improve project tracking; and address staffing levels.

The Phase II Review builds on Phase I and focuses on other issues regarding the delivery of streets capital improvements. The Phase II Review is organized into five main sections:

- An assessment of the current condition of Long Beach's streets, and an analysis of how various levels of investment in Long Beach's streets infrastructure may affect the condition of the City's streets over time.

- A comparison of Long Beach's street conditions and streets maintenance practices in relation to other California cities.

- A review of DPW's contracting practices and general approach to contract management.

- A comparison of DPW costs relative to those of other California cities.

- An examination of DPW's streets infrastructure performance measure practices.

The following are PFM's key findings and recommendations for Phase II. These recommendations are followed by the recommendations for Phase I for reference.

- **Invest early in preventive street maintenance in order to realize the greatest potential cost savings.** Extensive research has demonstrated that it is more economical in the long run to invest early in maintaining streets that are still in good condition than it is to defer maintenance until streets have deteriorated and more expensive repairs are needed. According to a March 2008 The Road Information Program (TRIP) report, <u>a preventive approach to street maintenance can reduce the life cycle costs of a pavement surface by approximately one-third over a 25-year</u>

period.[1] Specifically in the case of Long Beach, the cost of deferring street maintenance at critical junctures in a street's life cycle can mean the difference between applying a slurry seal treatment at a cost of $0.30 per square foot for a street still in good condition and applying an overlay treatment at a cost of $2.34 per square foot for a street in deteriorating condition – an expense almost 7 times as great.

- **Improve oversight mechanisms for contractor work.** Given current DPW staffing levels, any proposed increase in engineering and/or maintenance project volume would require DPW to delegate more management responsibility to its contractors. In order to ensure proper contractor oversight under this arrangement, DPW should increase its use of project tracking reports and electronic communication technology, such as a comprehensive project website. Such a website would include all deliverables and important notifications, as well as a publicly accessible portion to keep citizens aware of traffic delays and construction progress. DPW can further increase contractor oversight through the use of quantitative performance measures, many of which are outlined in this report.

- **Implement a comprehensive kick-off meeting prior to the beginning of every project.** This kickoff meeting should establish clear objectives, expectations, and lines of accountability for all involved parties in order to improve communication and coordination. Problems and solutions should be documented as they occur and posted on an open forum for the group to review. Following the completion of a project, a project coordinator should use the project tracking system and log to prepare reports that will aid future project managers and build institutional knowledge.

- **Extend the use of performance measurements.** While DPW currently publishes a list of several qualitative and quantitative metrics which it uses to measure performance, PFM recommends that this list be expanded in order to enable DPW to more efficiently allocate scarce resources; aid DPW in the development and justification of budget proposals; and hold DPW more accountable to the general public for its stewardship of Long Beach's streets. Specifically, DPW should track more detailed information on an annual basis regarding the average pavement condition of its streets infrastructure by street type and geographic area, as well as the total number of lane miles that are slurry sealed, repaved, and reconstructed. In addition, DPW should make greater use of efficiency metrics to gauge the cost effectiveness of key performance outputs. For ease of analysis, DPW should reclassify its expenditure costs in order to better reflect the relationship between street repair costs and street types.

[1] The Road Information Program (TRIP) Report (March 2008), "Keep Both Hands on the Wheel: Metro Areas with the Roughest Rides and Strategies to Make our Roads Smoother," 19. http://www.tripnet.org/UrbanRoadsReportMarch2008.pdf.

- **Increase communication and cooperation with peer cities.** Engineers in other cities provided helpful quantitative and anecdotal information for this report, and a number of the cities already participate in a periodic survey of public works issues. However, in a number of cases, information was not consistently available and/or presented uniformly. Measuring performance and adopting common metrics would allow these mid-sized cities to more easily share new technologies, management approaches, and assessments of contractors. This also applies to unit cost comparisons and bidding experience. This might be facilitated through the local chapter of the Association for Public Works.

PFM's Phase I findings and recommendations are summarized below:

- **Make full and complete use of all available transportation funds.** Given the overall need for improving the City's streets infrastructure and the limited resources to fund improvements, it is critical that the City identify all available transportation funds. In particular, the City should examine available fund balances in the Transportation Fund, SR 182. While minimum balance levels are expected for capital funds, the balance in this fund is high by most measures.

- **Improve quality control and make adjustments to data elements of DPW's project tracking system.** The system has valuable information not otherwise captured. It should be used for more purposes within DPW, and can also be used to provide quarterly progress reports to other constituencies in the City.

- **Implement a multi-year capital plan.** The City can much more effectively communicate the importance of its capital needs to City Council, executive management, and the public with such a plan. While a streets condition inventory and estimate of total needs are useful planning tools, the City needs to present a realistic plan for at least five years in order to secure the greatest possible investment in its streets infrastructure.

- **Realign DPW position titles to most appropriately match the delivery system for capital projects.** If the City does depend more on contracted services, it should consider replacing vacant Engineering Technicians and Associates with Capital Service Coordinators. This may allow a greater expansion of streets projects by leveraging contractors.

- **Review DPW salary levels and shorten the hiring process in order to remain competitive with the current labor market.**

- **Consider using more contractors.** While the City may have a preference for managing capital projects with a certain mix of staff and contractors, it needs to reconsider this premise if, for whatever reason, it is unable to attract, retain and replace in a timely manner, employees needed to manage its capital program.

The Phase I report was presented to management in September 2007. Subsequent to its completion, DPW submitted a proposal to City Council for making a substantial investment in street maintenance in order to raise the overall condition level of its streets infrastructure. It is hoped that the findings and recommendations presented in both phases of the report will assist the City in allocating its resources in the most cost-effective manner.

PFM would like to thank the engineers in Long Beach's DPW, peer cities' engineering departments, and members of the human resources department for providing the bulk of the data for this report and for offering many important additional insights regarding their work. We would also like to give special thanks to Long Beach's City Engineer Mark Christoffels for his prompt and detailed replies to our many inquiries.

The Cost of Rehabilitating Long Beach's Streets

The following section provides an overview of the challenges that Long Beach faces with regard to improving the quality of its streets infrastructure. The section is divided into five main parts. The first part assesses the current condition of Long Beach's streets. The second part compares the average condition of Long Beach's streets to comparable California cities. The third part examines the escalating costs of construction. The fourth part provides an economic rationale for investing early in street maintenance. The fifth and final part explores how various levels of investment in Long Beach's streets infrastructure may affect the condition of the City's streets over time.

The Current Condition of Long Beach's Streets

Over the past decade, the condition of Long Beach's streets has steadily declined. Among the factors that have contributed to the City's deteriorating street quality include the increasing age of the City's street inventory, high traffic volume, escalating construction costs, and limited capital investment in street maintenance.

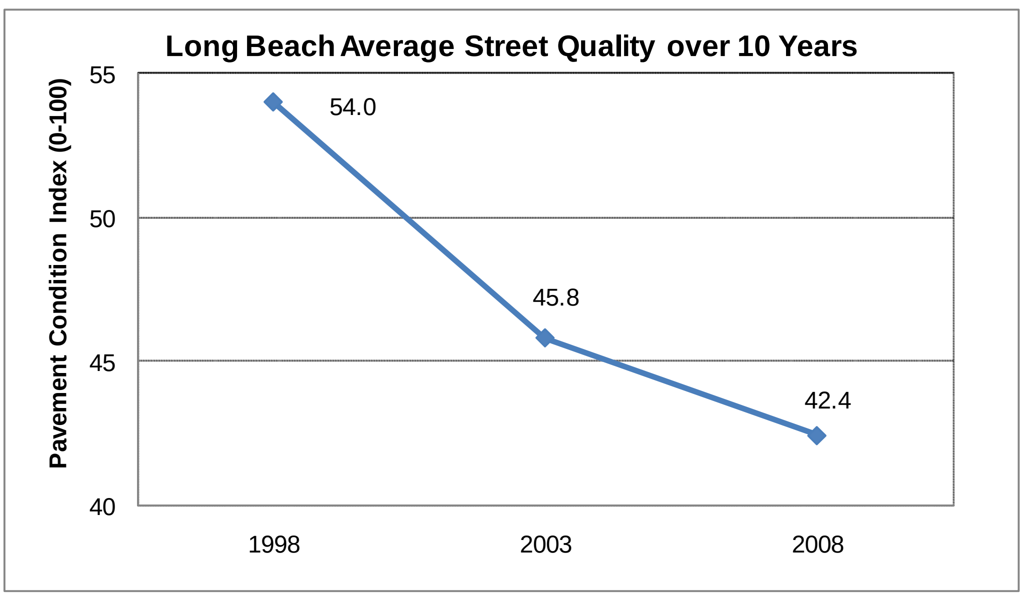
The City is currently responsible for maintaining 259 miles of arterial streets, 556 miles of local streets, 1,160 miles of sidewalks, and 1,500 miles of curbs.[2] In order to appraise the quality of its streets, DPW currently employs a sophisticated pavement management system called "MicroPaver," or simply "Paver" for short. The Paver system, which was originally developed by the American Public Works Association (APWA), is used to assess the most urgent maintenance needs and is periodically updated with data from field visits. Paver utilizes a database of Long Beach's streets to assess street conditions based on a set of objective criteria in order to award a condition score from 0 to 100. For a given numerical score range, DPW provides a qualitative condition description as well as a street improvement recommendation.

[2] City of Long Beach (August 2007), *A City in Need of Capital Investment,* v. http://www.ci.long-beach.ca.us/civica/filebank/blobdload.asp?BlobID=16263.

Table 1: DPW Pavement Condition Index Scale

Score Range	Classification	Description	Recommended Street Improvement
0-9	Failed	Pavement is in need of total reconstruction	Reconstruction
10-24	Very Poor	Severe deterioration has occurred requiring complete asphalt replacement and some base repairs	Reconstruction
25-39	Poor	Pavement is starting to fail in select areas.	Major overlay of new asphalt
40-54	Fair	Pavement has areas of cracking and some potholes	Minor overlay of asphalt
55-69	Good	Pavement surface is aging; however it is still in sound structural condition	Crack sealing and a seal coat
70-100	Very Good	Pavement is in sound condition	Do nothing / May require a seal coat in order to maintain appearance and extend useful life

As of 2008, the average street condition score in Long Beach is 42, which corresponds to a PCI rating of "Fair." As the following chart indicates, the City's average street condition score has declined by more than 7 percent over the past 5 years, and 22 percent over the past 10 years.



In September 2007, DPW presented a conceptual plan to City Council for improving its transportation infrastructure. According to the plan, it was estimated that **$230 million will be required to achieve an overall rating of "Good" (PCI Index 55-69) for all City streets, and to fix all damaged sidewalks (including curbs) within a ten-year timeframe.**[3] The funding breakdown is presented in Table 2:

Table 2: **Ten-Year Cost of Improving Long Beach's Transportation Infrastructure**

Category	Cost
Arterial Streets	$80,000,000
Local Streets	$100,000,000
Sidewalks	$50,000,000
Total	**$230,000,000**

The challenges that the City of Long Beach is facing with regard to its transportation infrastructure are not unique. Throughout the country, major urban streets and highways are showing significant signs of deterioration. According to one recent study, nearly one-quarter of the nation's major urban interstates, freeways, and other principal arterial routes are rated in substandard or poor condition.[4]

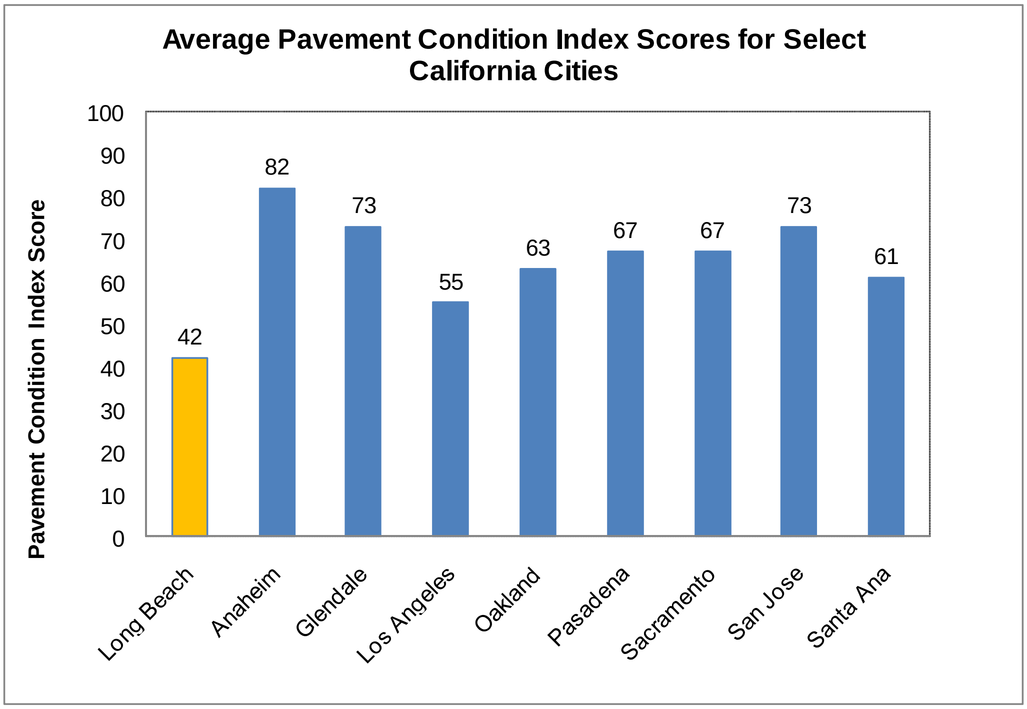
As witnessed by the recent collapse of the I-35W Bridge in Minneapolis, the urgency of addressing structural deficiencies in the nation's transportation infrastructure is immediate. Not only do such deficiencies pose myriad safety and environmental consequences to American motorists, but they are also prohibitively costly to repair. A 2005 report card published by the American Society of Civil Engineers (ASCE) estimates that poor road conditions cost American motorists $54 billion per year in repairs and operating costs, equivalent to $275 per motorist.[5]

A Comparison of Long Beach's Street Conditions to Other California Cities

While Long Beach is not the only city to have experienced declining street conditions, the average quality of its streets does not compare favorably in relation to other California cities. As the following chart illustrates, Long Beach's average pavement condition score of 42 was found to be lower than all nine (9) mid- to large-sized cities surveyed by PFM. These cities were identified in coordination with the City of Long Beach and selected for the similarities they share with Long Beach with respect to one or more of the following demographic

[3] City of Long Beach (August 2007), *A City in Need of Capital Investment,* 5, 43. http://www.ci.long-beach.ca.us/civica/filebank/blobdload.asp?BlobID=16263.
[4] TRIP Report (March 2008), "Keep Both Hands on the Wheel," 1.
[5] ASCE (2005). *Report Card for America's Infrastructure,* 38. http://www.asce.org/files/pdf/reportcard/2005_Report_Card-Full_Report.pdf.

characteristics: population size, population density, location, and per capita income. All data are from the most recent available streets survey performed by each city.



It is important to note, however, that a lack of a uniform scale and set of criteria for measuring street conditions across jurisdictions make it difficult to draw precise comparisons from the data. In addition, some cities reported individual condition scores for each type of road in its system (i.e., highways, secondary highways, and local streets). A simple average of these scores is presented above. All scores presented in the chart above were converted to a 100-point scale if necessary. For example, Pasadena had a score of 46.6/70 = 67, while Sacramento had a score of 7.37/10, with a minimum score of 2 (73.7-20)/.8= 67. However, a discussion with DPW suggests that this methodological approach is reasonable for drawing comparisons among these jurisdictions, given the available data.

The Escalating Cost of Street Maintenance

Over the past several years, a sharp increase in construction prices has severely limited the ability of public works and transportation agencies to address their infrastructure needs. Much of this increase is due to the rising prices of asphalt, of which oil is a prime ingredient.

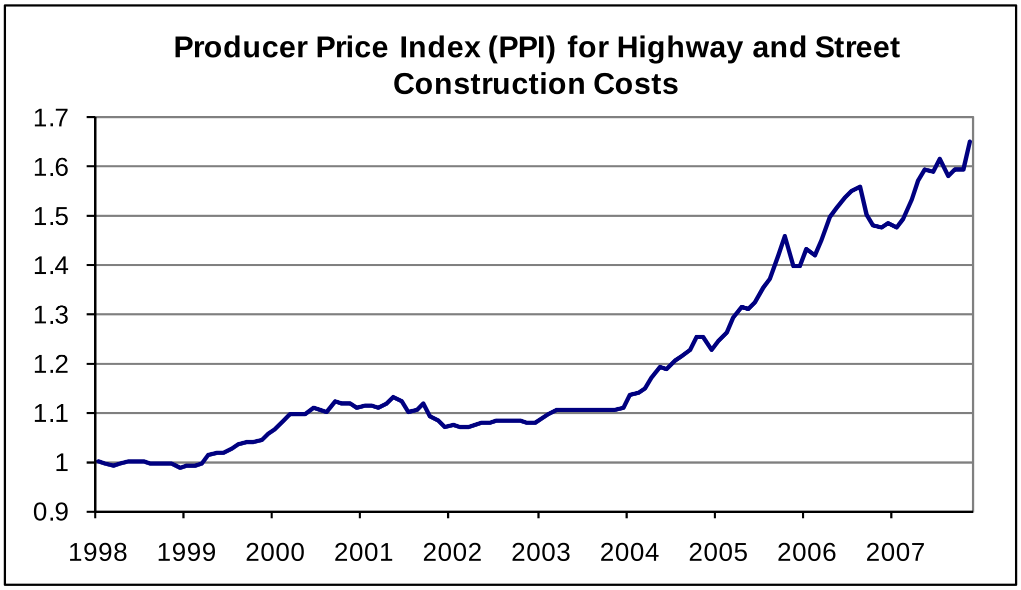
The Bureau of Labor Statistics measures construction cost trends as part of the Producer Price Index (PPI) it releases each month. In contrast to the Consumer Price Index (CPI), which measures the average change over time in the prices paid by consumers for a market basket of consumer goods and services, the PPI measures the average change over time in the selling prices received by domestic producers for their output. Accordingly, the PPI is a more appropriate index by which to benchmark DPW street expenditures.

Table 3 compares annual PPI growth on both a yearly and cumulative compounded basis. From 1999-2002, construction prices increased at a modest average annual rate of 2.1 percent and at a cumulative compounded rate of 8.3 percent. However, from 2002 to 2007, construction prices increased at an average annual rate of 7.9 percent and at a cumulative compounded rate of 46.1 percent. This accelerated rate of increase has limited DPW's ability to rehabilitate its streets at non-adjusted funding levels.

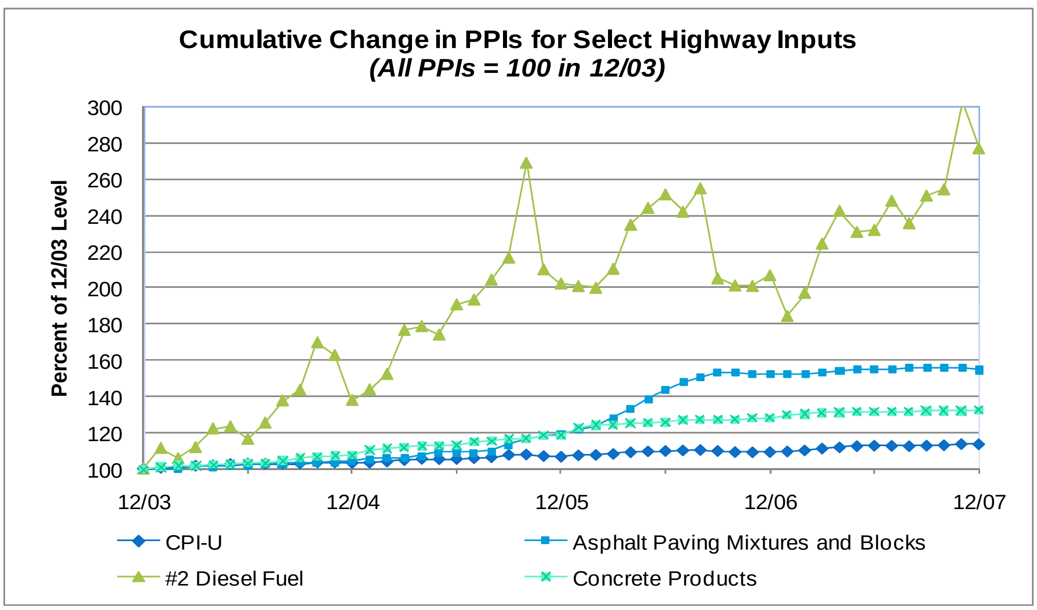
Table 3: Annual PPI Growth – Highway & Construction

Year	% Change by Year	1999 - 2002 Cumulative Compounded % Change	2002-2007 Cumulative Compounded % Change
1999	2.5%	2.5%	
2000	7.8%	10.5%	
2001	0.4%	10.9%	
2002	-2.4%	8.3%	
2003	2.2%		2.2%
2004	8.5%		10.8%
2005	12.6%		24.8%
2006	10.8%		38.2%
2007	5.7%		46.1%

The chart below provides a graphical illustration of the accelerated rate of increase in the PPI for highway and street construction costs over the past five years[6]:



The following chart shows the cumulative change in the Producer Price Index for select highway inputs. Relative to the Consumer Price Index for All Urban Consumers (CPI-U), all highway inputs included in the chart have experienced significant price increases. The price of #2 diesel fuel has experienced the most dramatic increase, rising by almost 200 percent since 2003.



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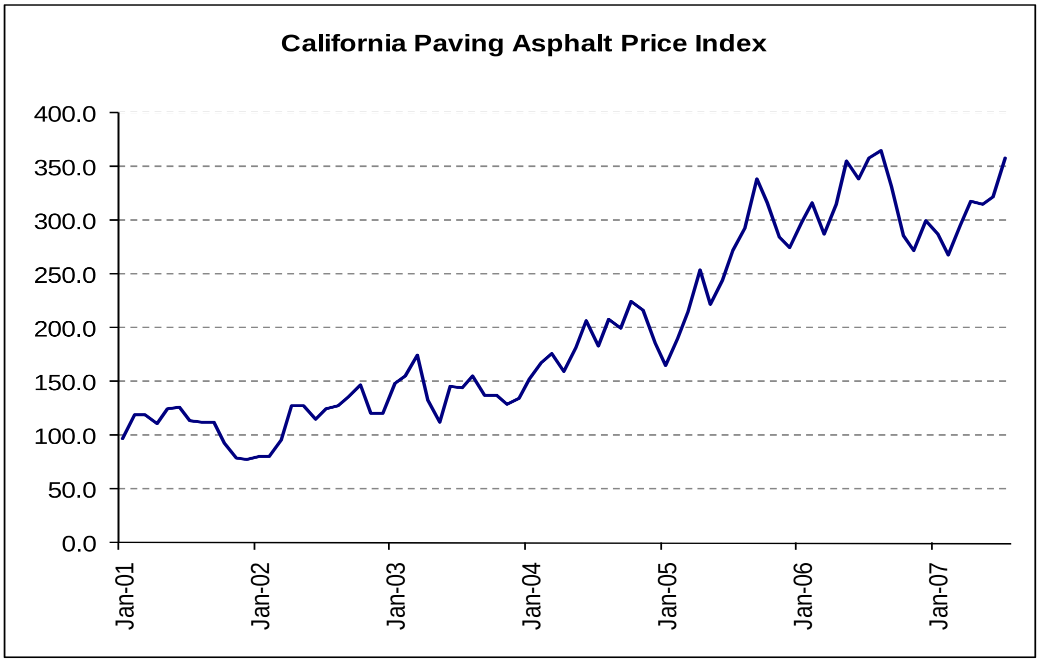
6 Bureau of Labor Statistics, *Producer Price Index Homepage*, accessed on January, 23rd, 2008. Found at: http://www.bls.gov/ppi/#publications. The y-axis of the graph represents the multiplicative change in highway and street construction costs using 1998 as a base year.

The price of asphalt is another key driver behind rising highway and construction costs. The chart below shows that asphalt prices in the California market have increased by approximately 250 percent since January 2001 (indexed to 2001 price levels).



While it is not possible to forecast future PPI trends with certainty, there is ample evidence to suggest that construction prices could continue to rise. First, global demand for construction inputs, especially from developing countries such as China and India, and other East Asian and Middle Eastern nations, is growing. Second, the price of construction materials is highly correlated with transportation and fuel prices, which are both expected to increase in the short-term.[7] As the following section explains, given these economic conditions, any transportation or public works agency would be wise to adopt a proactive approach to preventive street maintenance.

[7] The Association of General Contractors (AGC), *Construction Inflation Alert* (March 2008), 11. http://www.agc.org/galleries/econ/AGC_CIA08_webFinal.pdf.

The Importance of Investing in Preventive Street Maintenance

It is important to recognize that while deferring street maintenance in the short run may result in a temporary decrease in expenditures, the long run costs of adopting such an approach will almost always exceed the short run savings.

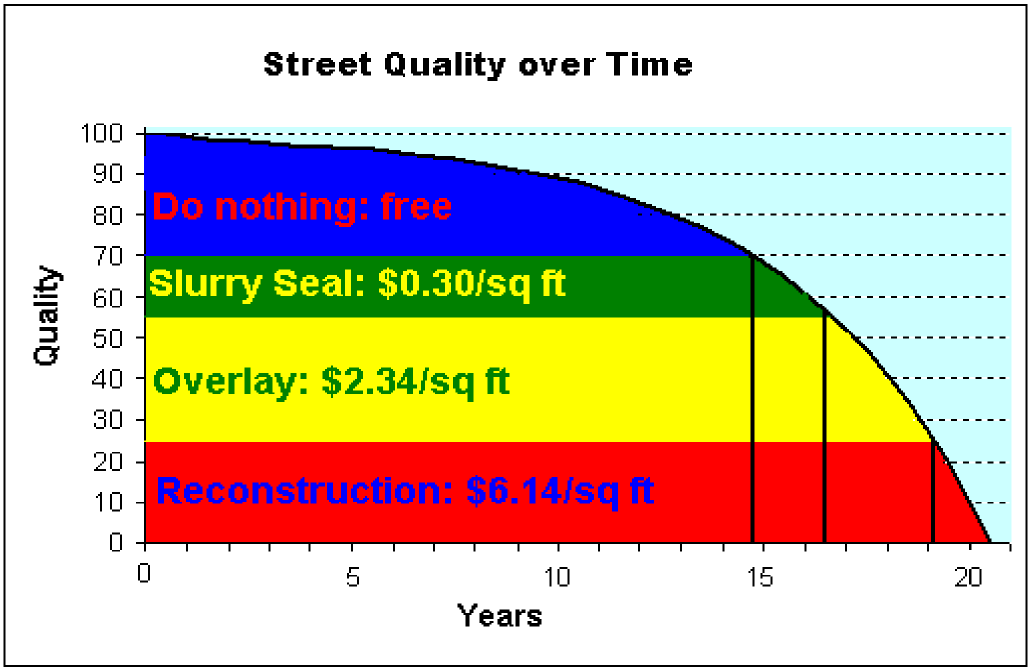
Two key drivers help to explain why deferring street maintenance typically results in significant increases in long run total costs. The first concerns the rate at which street quality declines over time. Controlling for climate and traffic volume, streets tend to deteriorate only 40 percent in quality in the first 75 percent of their useful life, but then experience another 40 percent drop in quality in the next 12 percent of their useful life.[8]

The second concerns the pronounced cost differential between repairing a street in poor condition and repairing a street in good condition. It has been estimated that deferred street repair can cost up to five times as much as early street repair.[9] As the preceding section explains, due to rising construction prices, this gap could potentially widen further.

Accordingly, **a short-term targeted investment in maintaining streets that are still in good condition will yield significant cost savings over their useful life.**

DPW engineers estimate that an average street in Long Beach will last approximately 20 years. Using current DPW data, the following chart depicts an average Long Beach street's expected life cycle, along with associated maintenance costs at various pavement condition levels. The chart reinforces the general notion that a preventive approach to street maintenance is preferable to a "worst-first" approach, given that the marginal cost of rehabilitating a street accelerates as the quality of a street deteriorates. In addition, the chart indicates specific points along the curve where a targeted investment in street maintenance can realize significant savings. For example, the chart shows that the last opportunity in an average street's life cycle to apply a slurry seal treatment at a cost of $0.30 per square foot is approximately 16.5 years, after which time the cost of maintenance increases 680 percent to $2.34 per square foot for an overlay treatment.

[8] Metropolitan Transportation Commission (March 2000). *The Pothole Report: An Update on Bay Area Pavement Conditions,* 11. http://www.mtc.ca.gov/library/pothole/pothole.pdf.
[9] Ibid.



The Effect of Different Funding Scenarios on Long Beach's Average Street Condition

The preceding discussion has shown why the return on investment in street maintenance is sensitive not only to size but also to timing. In order to illustrate how Long Beach's average street quality might be affected by both of these investment considerations, PFM worked with DPW's pavement management engineer to run several different funding scenarios through Paver to see what their effects would be on the average condition of Long Beach's streets over a 15-year period. Given the uncertainty of future PPI levels, we ran each scenario assuming 4, 6, and 8 percent annual inflation. These inflation assumptions are generally in line with recent economic forecasts.[10]

It should be noted that the following simulations assume a fully optimized use of street rehabilitation resources. In other words, resources are allocated based on their relative rate of return on investment on a citywide basis, without regard to other potential policy considerations. If a different approach were taken to prioritize how resources are allocated, then the street quality curves presented below would have a different shape. It is important for the City to weigh these potential trade-offs between equity and efficiency in the course of developing its overall street maintenance investment strategy.

[10] The Association of General Contractors (AGC), *Construction Inflation Alert* (March 2008), 14. http://www.agc.org/galleries/econ/AGC_CIA08_webFinal.pdf.

All of the following simulations are based upon data that the City submitted to City Council in September 2007 detailing its ten-year plan for improving its infrastructure needs.[11] The plan represents the expected status quo investment in streets and sidewalks maintenance through 2016.* As Table 4 indicates, funding sources include the City's General Fund, Community Development Block Grants (CDBGs), gas tax revenues, Redevelopment Agency (RDA) funding, as well as funding from various Propositions.

Table 4: Long Beach Streets & Sidewalks Revenue Sources: Base Pro Forma for Ten-Year Plan

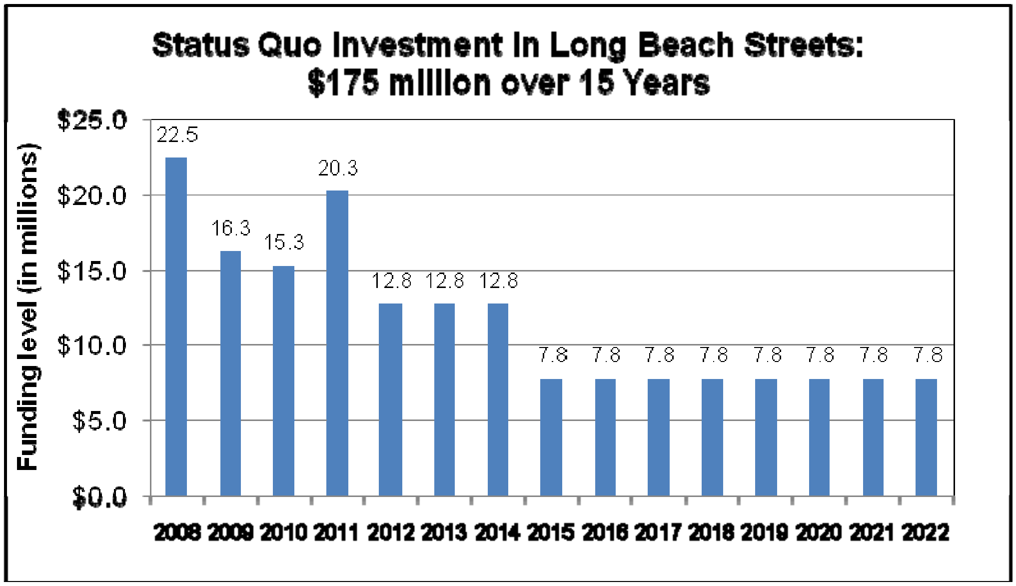
Fiscal Year	General Fund	CDBG	Gas Tax	Prop C	Prop 42	Prop 1B	RDA	Total Status Quo Investment
2007	$ 6,100,000	$500,000	$1,341,028	$3,500,000	$3,600,000		$4,600,403	$ 19,641,431
2008	$ 4,400,000	$600,000	$1,242,000	$3,500,000	$400,000	$7,900,000	$4,500,000	$ 22,542,000
2009	$ 2,500,000	$500,000	$1,300,000	$3,500,000	$5,000,000		$3,475,000	$ 16,275,000
2010	$ 2,500,000	$500,000	$1,300,000	$3,500,000	$5,000,000		$2,500,000	$ 15,300,000
2011	$ 2,500,000	$500,000	$1,300,000	$3,500,000	$5,000,000	$7,500,000		$ 20,300,000
2012	$ 2,500,000	$500,000	$1,300,000	$3,500,000	$5,000,000			$ 12,800,000
2013	$ 2,500,000	$500,000	$1,300,000	$3,500,000	$5,000,000			$ 12,800,000
2014	$ 2,500,000	$500,000	$1,300,000	$3,500,000	$5,000,000			$ 12,800,000
2015	$ 2,500,000	$500,000	$1,300,000	$3,500,000				$ 7,800,000
2016	$ 2,500,000	$500,000	$1,300,000	$3,500,000				$ 7,800,000
Totals	$ 30,500,000	$ 5,100,000	$ 12,983,028	$ 35,000,000	$ 34,000,000	$ 15,400,000	$ 15,075,403	$ 148,058,431

The first simulation is presented as a baseline case for illustrative purposes. It assumes that projected funding levels for FY08 – FY16 will not deviate from the funding estimates provided in the ten-year plan. Further, it assumes that FY17-FY22 funding levels will remain constant at FY16 levels ($7.8 million).

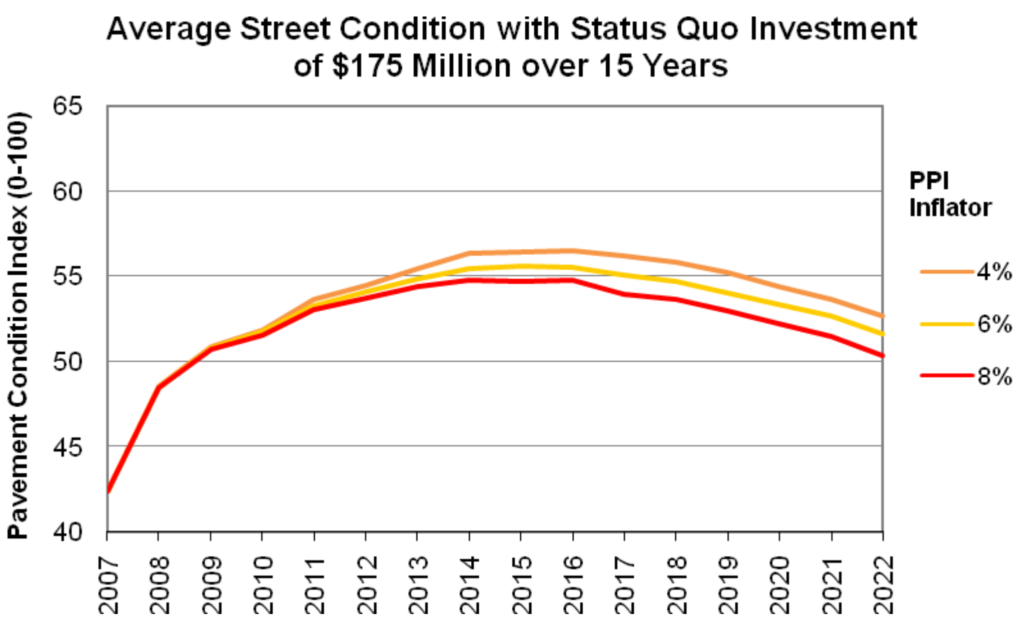
Under the scenario below, the quality of Long Beach's streets is expected to improve until 2016, but not meet the City's stated goal of an average street PCI score of 60. Beginning in 2017, the City's street quality is expected to decline without any additional injection of funding.

[11] City of Long Beach Report (2007), *City Infrastructure: Moving Toward our Preferred Future.* http://clblegistar.longbeach.gov/attachments/17549936-67a1-477f-a1bf-dd686238c46e.pdf,

* **NOTE:** DPW has since revised its ten-year plan to reflect various changes in projected funding streams. The revised plan, which now extends through 2018, estimates that roughly the same amount of total funds will be available from 2007-2016 as before, but that the funds will come from a substantially different mix of funding sources. DPW has opined, however, that these projected changes to funding stream levels and sources should not materially affect the street condition simulations presented in this report.



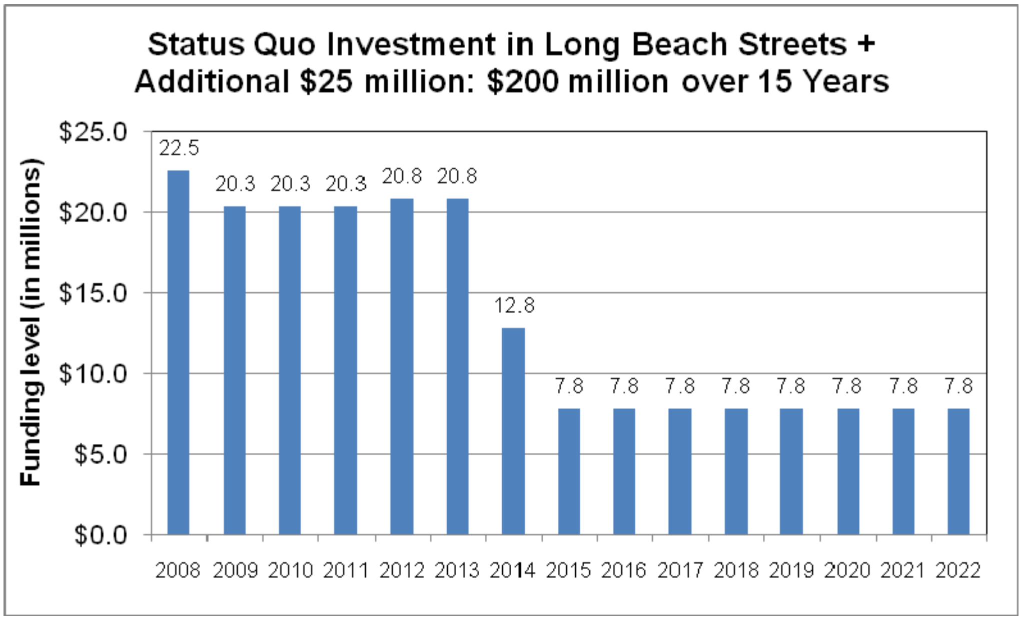
Simulation No. 1



The second simulation considers a hypothetical case in which $25 million in additional funding is secured over a period of five years beginning in FY09. The additional $25 million is slightly less than the $26 million DPW estimated could be raised (without seeking voter approval) by pledging $2.0 million annually to the Joint Powers Authority (CSCDA). The CSCDA has formed a revenue pool comprised of 450 counties, cities and special districts to bond against all or a portion of Gas Tax revenues.[12]

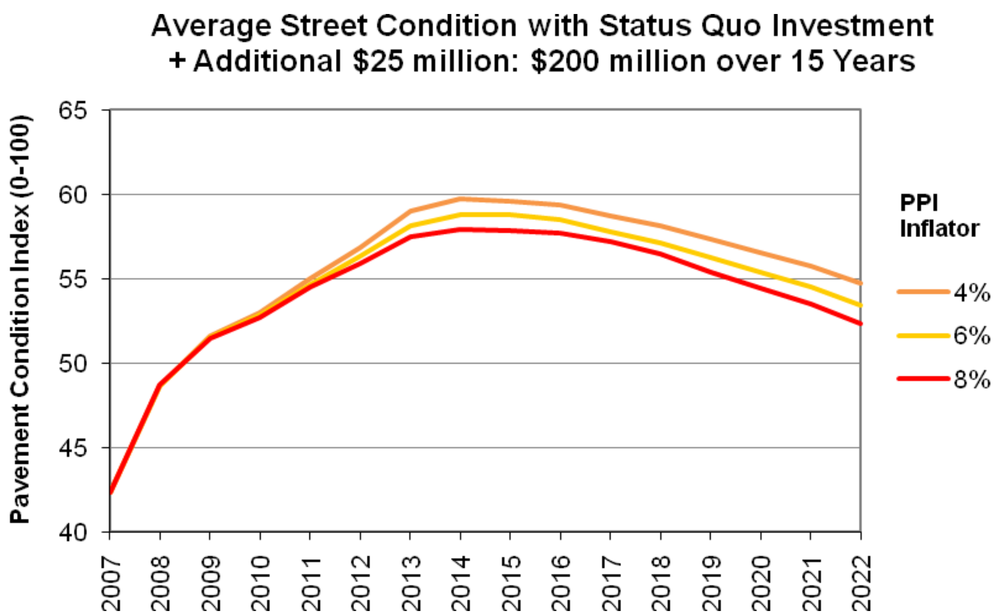
[12] City of Long Beach, *City Infrastructure: Moving Toward our Preferred Future,* Slide 74. http://clblegistar.longbeach.gov/attachments/17549936-67a1-477f-a1bf-dd686238c46e.pdf.

Under this scenario, the funds are distributed to even out funding levels from FY09 – FY13. Ideally, any additional funds that the City could secure would be spent immediately in order to realize the greatest possible savings. However, as discussed in the following section of this report, DPW engineers have stated that they cannot manage more than $20 million in street projects per year with a fully budgeted staff at current authorized staffing levels. Assuming this constraint is binding, the proposed funding allocation is considered to be optimal.

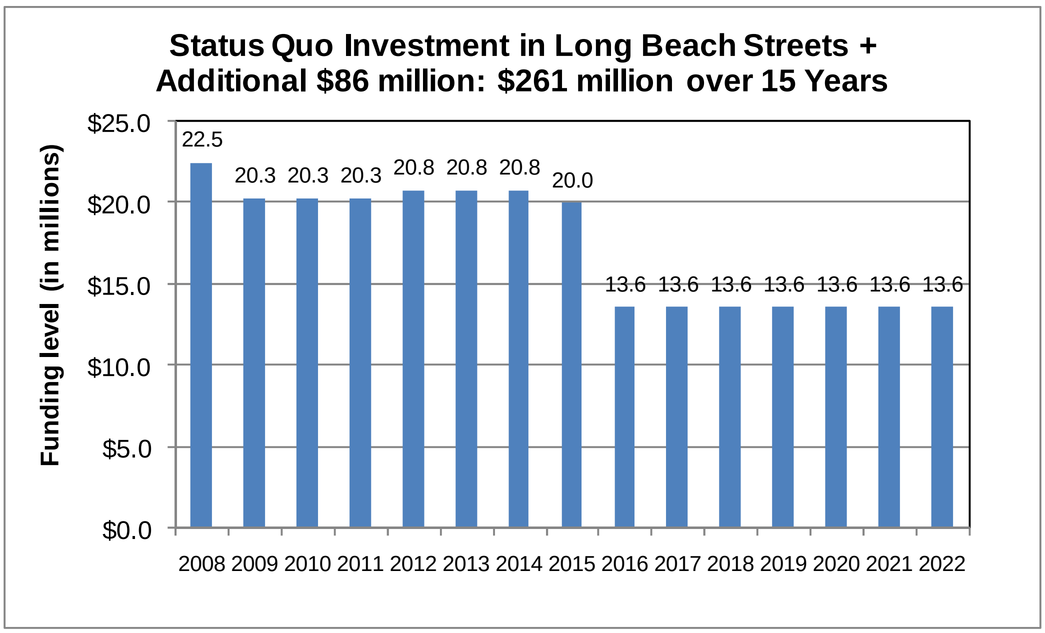


Given this funding scenario, Long Beach's average street condition score will reach its zenith in 2014 with a PCI rating of 59.6 assuming a PPI inflation rate of 4 percent, a 58.8 rating assuming a PPI inflation rate of 6 percent, and a 57.9 rating assuming a PPI inflation rate of 8 percent. However, while the $25 million (14.3 percent) hypothetical funding increase brings the City's average street condition score close to its target goal by 2014, it is not sufficient to maintain these condition levels thereafter.

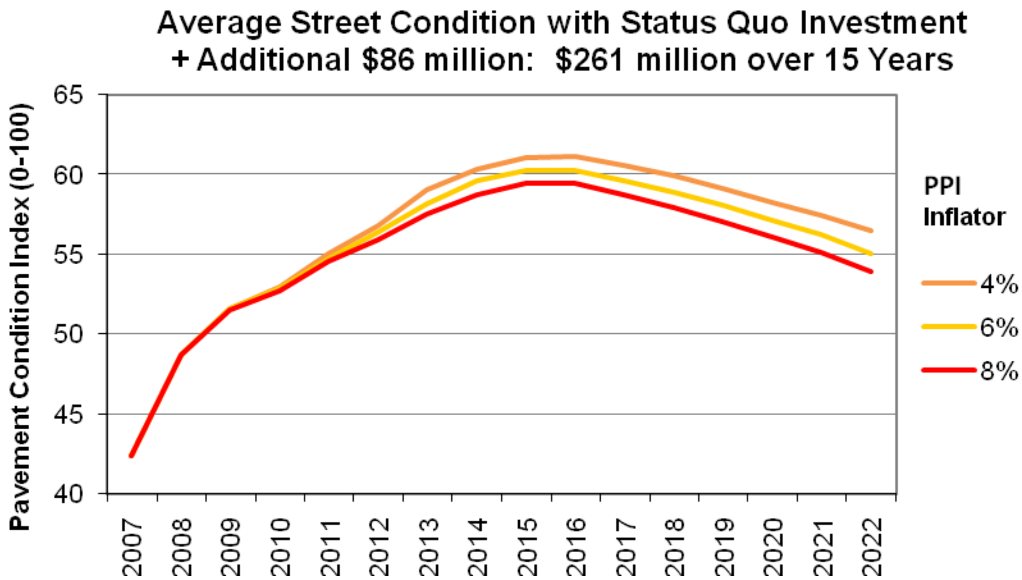
Simulation No. 2



The third simulation considers a hypothetical case in which approximately $86 million in additional funding is secured over a period of 14 years beginning in FY09. Limited by the same funding constraints as presented in the second simulation, the funds are distributed to even out funding levels at approximately $20 million from FY09 – FY15, with the remaining funds apportioned evenly through FY22.

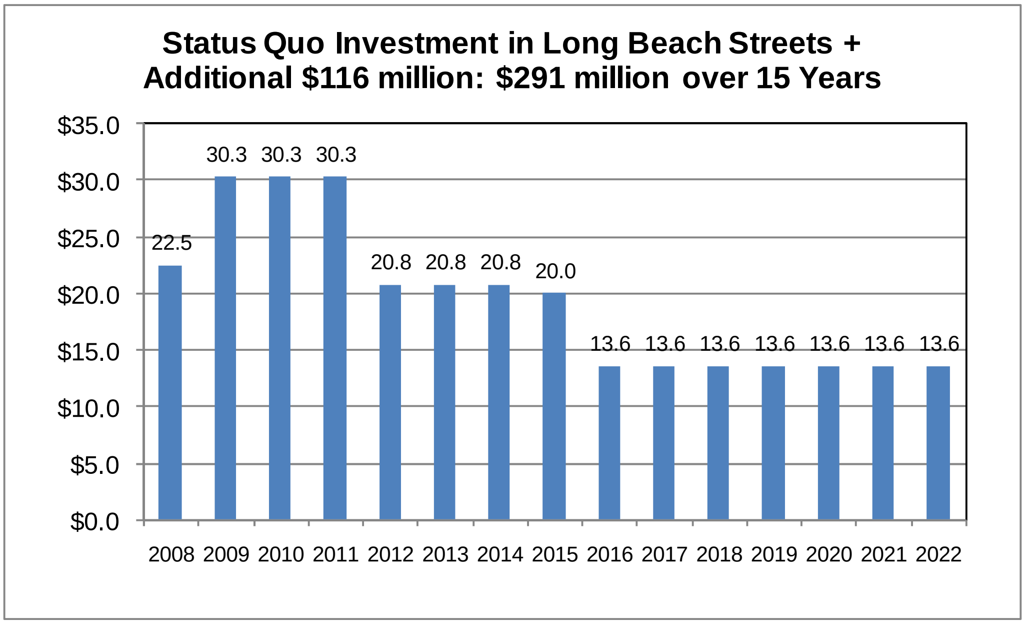


Simulation No. 3



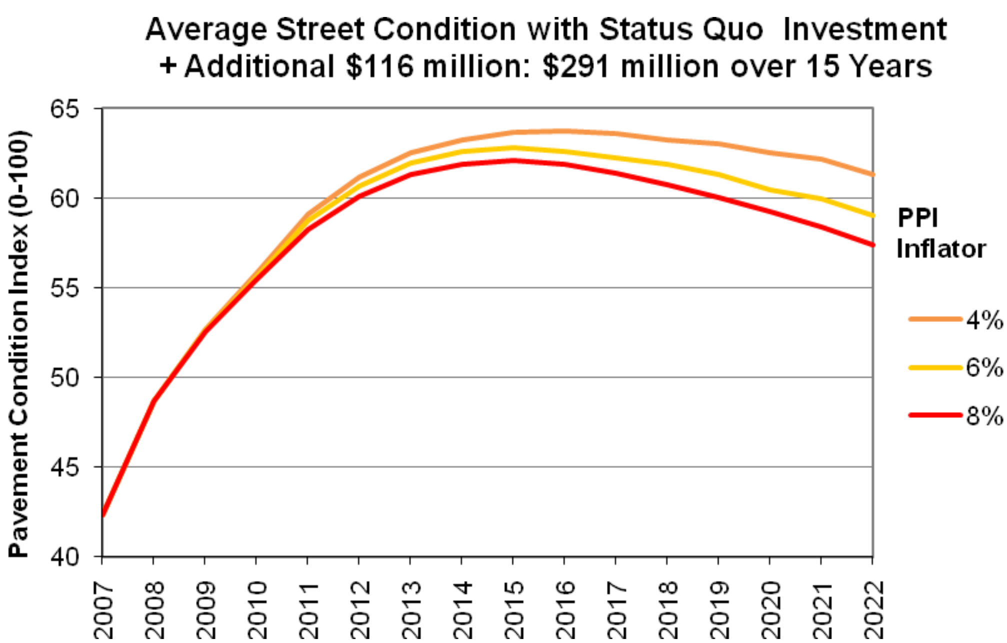
Under the above scenario, the average condition score of Long Beach's streets is projected to exceed the 60 point threshold from 2014-17 assuming a 4 percent PPI inflation rate, and from 2015-16 assuming a 6 percent PPI inflation rate. However, without additional funding, the average condition score of Long Beach's streets is projected to fall under 60 thereafter. Assuming a PPI inflation rate of 8 percent, the average condition score of Long Beach's streets is projected to approach but ultimately fail to reach the City's target goal of 60 for the entire 15-year period.

The final simulation disregards the capacity and bonding constraints discussed earlier for illustrative purposes. It considers a hypothetical case in which the City secures an additional $116 million of funding. Adopting an early investment strategy, FY09, FY10, and FY11 funding levels are set at approximately $30 million. This figure represents the maximum amount of construction that DPW estimates is possible without causing significant traffic congestion. The funding allocation for FY12-FY22 is identical to the previous example.



Under this funding scenario, the average condition score of Long Beach's streets is projected to exceed the 60 point threshold assuming 4 percent, 6 percent, and 8 percent PPI inflation by 2012. At a 4 percent PPI inflation rate, the average condition of the City's streets is projected to remain above a score of 60 through 2022. At a 6 percent inflation rate, the average condition score of the City's streets is expected to fall below the 60 point threshold by 2021; at an 8 percent inflation rate, this is expected to occur by 2020.

Simulation No. 4



Conclusion

The four funding simulations presented above demonstrate the urgency with which the City of Long Beach must address its transportation infrastructure funding shortfall. Without a significant, upfront injection of additional funds, the average condition of the City's streets will remain in unacceptable condition.

Governments can generally fund capital projects such as street improvements with either cash, on a pay-as-you-go basis, or by borrowing funds. Most governments will use a combination of both approaches. Borrowing is typically accomplished by the issuance of tax exempt bonds. Bonding is an approach that often makes sense for programs such as street improvements. First, it spreads the cost of the improvements over time, and to future generations who will share in the benefits of the improvements. Second, it allows governments to construct large projects or programs without a large immediate increase in revenues.

A Comparison of Streets Capital Program Management Practices in Other California Cities

In order to establish a context within which the investments and practices of the Long Beach DPW could be evaluated, PFM surveyed nine (9) California cities. These cities were identified in coordination with the City of Long Beach and selected for the similarities they share with respect to one or more of the following demographic characteristics: population size, population density, location, and per capita income.

Table 5 summarizes basic demographic and economic information for the City of Long Beach and the nine (9) comparable jurisdictions chosen to participate in the survey. As seen in the table, Long Beach is uniquely situated as a city with both one of the largest populations as well as one of the greatest population densities. The City is ranked below the median for per capita income and ranked as the second lowest for median family income.

Table 5: 2006 Demographic and Economic Data for Comparable California Cities

Regional Cities	Population (2006)	Area in Square Miles	Population Density	Median Family Income (2006)	Per Capita Income (2006)	Median Home Value (2006)	Mean Travel Time to Work
Long Beach	**466,718**	**50.4**	**9,260**	**$49,569**	**$22,908**	**$575,100**	**28.7**
Rank	**3 of 10**	**5 of 10**	**2 of 10**	**8 of 10**	**6 of 10**	**6 of 10**	**8 of 10**
Anaheim	344,141	48.9	7,038	$60,730	$22,320	$610,800	28.1
Fresno	477,468	104.4	4,573	$43,946	$18,697	$288,800	21.7
Glendale	192,340	30.6	6,286	$53,721	$27,946	$685,900	27.3
Oakland	377,256	56.1	6,725	$51,727	$26,473	$590,800	29.9
Pasadena	144,264	23.1	6,245	$70,502	$34,953	$677,900	25.9
Pomona	153,032	22.8	6,712	$46,544	$14,881	$416,000	31.9
Sacramento	438,246	97.2	4,509	$52,341	$23,886	$364,900	23.4
San Jose	916,220	174.9	5,239	$83,089	$30,794	$683,400	27.6
Santa Ana	351,894	27.1	12,985	$52,480	$15,799	$567,200	27.1
Average	**386,158**	**63.6**	**6,957**	**$56,465**	**$23,866**	**546,080**	**27.2**

Source: U.S. Census Bureau 2006 American Community Survey; City Area sourced from City-Data.com

PFM administered two versions of an infrastructure and standard practices survey. The first, the long survey, was sent to the entire group to collect extensive data on:

- Performance outputs,
- Outsourcing practices,
- Pavement management systems,
- Project specifications,
- Financial situations, and
- Operational and management issues.

A shorter second version of the survey, created to ease the administrative burden associated with completing the more time intensive long survey, targeted those jurisdictions unable to participate during the first round of outreach. These two surveys, in conjunction with web-based research and phone conversations with some of the cities' engineers, provided the data presented in this section of the report.

While every effort was made not only to collect data, but to collect it in a standard format, direct comparisons cannot always be made due to differences in the ways cities allocate costs and measure outputs. It should also be noted that Fresno and Pomona provided only descriptive information and Glendale only limited data.

Standard Practices

Survey responses from the participating jurisdictions and phone interviews with several city engineers yielded the following list of standard practices used in street maintenance and management among the comparable jurisdictions:

- Pavement Management System (PMS): A pavement management system is a software tool used to assist in information management and decision support. Though there are many different systems available on the market and in use by the comparable jurisdictions, most provide the same general level of functionality. Centralizing data collection, executing complex calculations and generating user-friendly reports, a PMS enables public works personnel to make cost-effective decisions in the maintenance and rehabilitation of city streets. With the ability to rank street conditions in a systematic way, cities are better able to prioritize maintenance activities.

  All responding jurisdictions reported that they use or plan to use a PMS of some kind. The most commonly used systems include MicroPaver (Long Beach and Santa Ana) and MTC Streetsaver (Oakland and San Jose). Table 6 lists the pavement management systems used in each of the comparable jurisdictions.

Table 6: Pavement Management Systems in Use in Select California Cities

City	Pavement Management System
Long Beach	**MicroPaver**
Anaheim	Pave Pro
Fresno	Transmaps
Glendale	N.R.
Oakland	MTC Streetsaver
Pasadena	In-house Design
Pomona	PMS implementation under discussion
Sacramento	Pavement Quality Index
San Jose	MTC Streetsaver
Santa Ana	MicroPaver

Note: "N.R." indicates that no response was received.

- Specification Book: All public works departments surveyed use standard specification books for public works construction. The specification books provide uniform standards for materials and methods of construction that are easily adopted by engineers, contractors and public works officials. In municipalities throughout the West Coast, the "Greenbook" is the official specifications document for street maintenance and construction. By standardizing construction specifications across jurisdictions, private contractors no longer have to contend with the frustrations of knowing each jurisdiction's individualized set of standards. As a result, "Greenbook" users typically enjoy greater participation by private contractors in competitive bidding processes, which tends to lower construction costs for their jurisdiction.

  As Table 7 shows, Long Beach currently reports using the "Greenbook," as do all but one of the responding jurisdictions.

Table 7: Specifications Books in Use in Select California Cities

City	Specification Book
Long Beach	**Greenbook**
Anaheim	Greenbook
Fresno	N.R.
Glendale	N.R.
Oakland	Greenbook
Pasadena	Greenbook
Pomona	N.R.
Sacramento	N.R.
San Jose	Caltrans Standard
Santa Ana	Greenbook

Note: "N.R." indicates that no response was received.

- Outsourcing Street Maintenance: Of those jurisdictions providing information on their outsourcing practices, all but one, including Long Beach, report contracting out 100 percent of slurry sealing, repaving and reconstruction. Anaheim also outsources 100 percent of highway maintenance and construction, but submits 30 percent of residential repaving to a competitive bid process. Nonetheless, outsourcing remains a standard practice among the responding jurisdictions for the above named types of street maintenance. Pothole repair, however, is generally split between public and private contractors, with a slight majority choosing to complete 100 percent of these projects in-house. Long Beach maintains a four-truck pothole repair crew.

- Surveying Street Conditions: Of those jurisdictions providing information on their street surveying practices, all, including Long Beach, report that the conditions of major and secondary highways are evaluated on a 2-year cycle. Pasadena and Santa Ana survey residential streets on a 2-3-year cycle, while Anaheim, Oakland and San Jose perform their survey every 4-5 years.

  While it is standard practice for cities in the survey group to evaluate major and secondary highways every two years, there is greater variation among cities with regard to the frequency with which residential roads are evaluated.

- Performance Measurement: A well-implemented performance measurement program enables municipalities to evaluate their effectiveness over time as well as to set future performance goals. The City of Long Beach and several of the survey respondents administer some variation of a performance measurement program within their jurisdiction.

  The program in place in Long Beach almost exclusively measures predefined outputs, such as the number of lane miles repaved annually. Cities such as Anaheim and Santa Ana, however, measure performance on a variety of levels. These cities administer much more expansive programs that track factors such as efficiency and customer satisfaction across a variety of data points. The Santa Ana program also has an annual goal-setting component.

  Benefits associated with a well-implemented performance measurement system include:

  - Improved knowledge of the efficiency/effectiveness of programs
  - Increased ability to make sound decisions in resource allocation
  - Increased accountability

Alternative Road Maintenance Practices

In addition to providing information on the above practices, several jurisdictions reported implementing alternative roads maintenance practices that have not been described elsewhere. These include the following:

- "Pave-Off" Competition: In 2005, the City of Fresno implemented a one-year "Pave-Off" competition between public and private contractors as part of the City's "No Neighborhood Left Behind" (NNLB) program. This competition challenged one City work crew and two privately bid crews to add new gutters, curbs, sidewalks, and streetlights to 14 inner city neighborhoods.

The "Pave-Off" competition evaluated the strengths and weaknesses of municipal and private industry crews in an attempt to learn how best to maximize the City's investments. The final report suggested that subsequent work be assigned based on the following recommendations:

  - Municipal crews should perform work that does not need plan or design reviews.
  - Complex major infrastructure work should be competitively bid to private contractors.
  - The City should consider pre-qualifying contractors to compete for future contracts.
  - The design and bid process should be continuous so work is ongoing and the time of year when field work can be done is optimized.
  - The City should utilize its already engaged private contractors through requirement contracts for as-needed services like slurry seals.

- Rubberized Emulsion Aggregate Slurry (REAS): As an alternative to the traditional overlay, the City of Sacramento utilizes rubberized emulsion aggregate slurry on its streets and highways. This product is a mixture of asphalt emulsion and crumb rubber produced from discarded car and truck tires. Although the upfront cost of rubberized slurry is 10-20 percent higher than traditional overlay, the advantages associated with this product often produce added cost-savings and benefits. According to the South California Rubberized Asphalt Technology Center, cost savings estimates are $22,852 per mile for a simple asphalt overlay and savings for $170,776 per mile for roadway reconstruction.[13] Additional advantages include:

[13] California Integrated Waste Management Board. "Innovations" Case Studies: Supporting Tire Recycling Through Local Public Works Projects." http://www.ciwmb.ca.gov/LGLibrary/Innovations/Tires/PublicWorks.htm.

- An approximate 50 percent increase in longevity
- Longer lasting color contrast for striping and pavement markings
- High skid resistance
- The use of more than 78 waste tires per lane mile

Recognized cost-savings as well as the environmental benefits associated with this product contribute to the increasing popularity of rubberized slurry among many California municipalities. Standard specifications and testing procedures for rubberized emulsion aggregate slurry are available in the "Greenbook."

The Costs and Benefits of Contracting Street Maintenance Work

The following section considers DPW's contracting practices and general approach to contract management in the broader context of its current staffing and capital project needs. As noted in Phase I of the Review, determining the appropriate mix of in-house versus contracted work is likely to be an ongoing issue for DPW. While the City may have a preference for managing capital projects with a certain mix of staff and contractors, it will need to reconsider this premise if it is unable to attract, retain, and replace in a timely manner employees needed to manage its capital program.

The section is divided into three main parts. The first part examines DPW's current staffing trends. The second part examines the costs of contracting out streets maintenance work as opposed to utilizing in-house personnel. The third part reviews DPW's current contracting practices and suggests ways to improve how DPW communicates with and manages its contractors.

Current DPW Staffing Trends

DPW currently has a number of staff vacancies which it has been unable to fill. Table 8 shows staffing data from a January 2008 Position Control Report. Each position listed performs some level of street-related activity; however, such activity does not necessarily consume all of an employee's time. Among the reasons cited for DPW's inability to fill these positions include a relative labor shortage of qualified civil engineers, cumbersome civil service requirements, and below-average salaries for key positions.

Table 8: January 2008 DPW Position Control Report

Long Beach Title	Total Budgeted DPW Positions	Vacancies	Vacancy Rate
Administrative Analyst I	1	1	100%
Administrative Analyst II	6	3	50%
Administrative Analyst III	10	1	10%
Capital Project Coordinator I-III	8	2	25%
Civil Engineer	11	2	18%
Civil Engineer Associate	6	2	33%
Construction Inspector I	3	0	0%
Construction Inspector II	1	0	0%
Engineering Aide I-III	4	0	0%
Engineering Technician I	2	2	100%
Engineering Technician II	8	2	25%
Senior Civil Engineer	5	3	60%
Senior Civil Engineer Technician I-II	5	1	20%
Senior Survey Technician	2	0	0%
Survey Technician	1	1	100%
Surveyor	2	0	0%
Total	**75**	**20**	**27%**

Table 9 compares midpoint salaries[14] for select positions in Long Beach with the average midpoint salaries for similar job titles within the comparable group of cities that PFM surveyed. While no match is perfect, the responsibilities, education, and certification requirements are similar and should provide a reasonable basis for assessing Long Beach's competitiveness in the overall California labor market.

Long Beach's midpoint salaries are generally below the comparable cities' average midpoint salary levels. This is especially true for the Administrative Analyst II-III, Capital Projects Coordinator I-III[15], Civil Engineer, and Senior Engineer positions. In a competitive market for professional employees, the City's inability to pay market wages is likely to hamper its ability to attract and retain qualified workers.

However, the relative disparity between Long Beach's salary levels and those of the comparable group does not appear to correlate with vacancy rates in all cases. For example, vacancy rates for Administrative Analyst III and Civil Engineer positions appear to be relatively low in spite of below-market wages. Conversely, the Engineering Technician I position appears to be compensated at competitive wage levels but remains unfilled.

As discussed in Phase I of the Review, the length and complexity of the process for filling positions may be a deterrent to potential job applicants, many of whom are also courted by private sector engineering firms. According to senior DPW officials, it usually takes six months for an applicant to become a full employee. In addition, some DPW positions may be left unfilled for budgetary reasons.

Salary ranges for positions whose functions are most closely tied to street-related activities are provided in the appendix of this report. These positions include: Construction Inspector I-II, Survey Technician, Senior Survey Technician, and Surveyor positions.

[14] Midpoint salaries are derived from the simple average of minimum and maximum salaries for each position.

[15] This particular title was hard to match and comparable titles seemed to generally have more responsibility.

Table 9: Comparison of Midpoint Salaries for Select DPW Positions to Similar Positions in Comparable California Cities

Long Beach Title	Long Beach Midpoint Salary	Comparable Average Midpoint Salary	Difference	% Diff.	Long Beach Vacancy Rate
Administrative Analyst I	$56,706	$60,214	($3,508)	-6%	100%
Administrative Analyst II	$61,170	$69,496	($8,326)	-12%	50%
Administrative Analyst III	$66,036	$79,690	($13,654)	-17%	10%
Capital Project Coordinator I-III	$72,978	$88,782	($15,804)	-18%	25%
Civil Engineer	$70,506	$88,310	($17,804)	-20%	18%
Civil Engineer Associate	$69,894	$75,003	($5,109)	-7%	33%
Construction Inspector I	$56,148	$58,777	($2,629)	-4%	0%
Construction Inspector II	$62,058	$58,777	$3,281	6%	0%
Engineering Aide I-III	$37,230	$41,707	($4,477)	-11%	0%
Engineering Technician I	$48,084	$48,428	($344)	-1%	100%
Engineering Technician II	$53,112	$57,735	($4,623)	-8%	25%
Senior Civil Engineer	$92,208	$108,532	($16,324)	-15%	60%
Senior Civil Engineer Technician I-II	$64,698	$67,622	($2,924)	-4%	20%
Senior Survey Technician	$58,476	$61,902	($3,426)	-6%	0%
Survey Technician	$58,476	$61,902	($3,426)	-6%	100%
Surveyor	$66,360	$68,726	($2,366)	-3%	0%

The Costs and Benefits of Outsourcing Streets Maintenance Projects

Given DPW's current staffing needs, PFM recommended in Phase I of this Review that the City consider the use of more contractors. In order to determine whether such an approach would be cost-effective, PFM compared the City's in-house personnel costs to outside engineering service rates for existing contracts. A limitation of this analysis is that governments and private sector firms do not always report and/or break out their costs in a similar manner. The government, for example, is more likely to use cost data to charge to the appropriate source and may not be as concerned with determining how the figures would convert to a fully-loaded hourly basis. Conversely, private firms may factor in non-billable time when quoting hourly rates.

To compare Long Beach's in-house personnel costs to contractor costs, additional expenses must be taken into account such as:

- Life Insurance
- Health Insurance
- Pension
- Amortization of OPEB
- FICA
- Medicare
- Paid leave
- Office space
- Supplies
- Non-productive work time
- Special events
- Mileage for travel
- Phone
- General administration
- Supervisory oversight

Including these costs gives a better approximation of the "true" in-house cost of providing various professional services, as shown in Table 10:

Table 10: Hourly Effective Pay Rate for Select DPW Positions

Long Beach Title	Long Beach Hourly Midpoint	Personnel Cost Loading Factor	Midpoint Salary with Loading	Midpoint Vacation Hours	Max Sick Hours	Paid Holiday Hours	Clocked Hours per Year	Measurable Hourly Effective Pay Rate	Hourly Effective Pay Rate + 10%	Hourly Effective Pay Rate + 20%
Administrative Analyst I	$27.26	45%	$39.63	134	96	96	1754	**$46.99**	**$51.69**	**$56.39**
Administrative Analyst II	$29.41	46%	$43.03	134	96	96	1754	**$51.02**	**$56.12**	**$61.22**
Administrative Analyst III	$31.75	44%	$45.65	134	96	96	1754	**$54.12**	**$59.53**	**$64.95**
Capital Project Coordinator I-III	$35.09	44%	$50.44	134	96	96	1754	**$59.81**	**$65.79**	**$71.77**
Civil Engineer	$33.90	41%	$47.86	134	96	96	1754	**$56.74**	**$62.42**	**$68.09**
Civil Engineer Associate	$33.60	43%	$48.03	134	96	96	1754	**$56.94**	**$62.64**	**$68.33**
Construction Inspector I	$26.99	47%	$39.61	134	96	96	1754	**$46.97**	**$51.66**	**$56.36**
Construction Inspector II	$29.84	45%	$43.29	134	96	96	1754	**$51.33**	**$56.46**	**$61.60**
Engineering Aide I-III	$17.90	52%	$27.20	134	96	96	1754	**$32.25**	**$35.47**	**$38.70**
Engineering Technician I	$23.12	52%	$35.09	134	96	96	1754	**$41.61**	**$45.77**	**$49.93**
Engineering Technician II	$25.53	49%	$37.92	134	96	96	1754	**$44.96**	**$49.46**	**$53.96**
Senior Civil Engineer	$44.33	39%	$61.44	134	96	96	1754	**$72.84**	**$80.13**	**$87.41**
Senior Civil Engineer Technician I-II	$31.10	44%	$44.80	134	96	96	1754	**$53.12**	**$58.43**	**$63.75**
Senior Survey Technician	$28.11	46%	$41.09	134	96	96	1754	**$48.72**	**$53.59**	**$58.46**
Survey Technician	$25.47	45%	$36.89	134	96	96	1754	**$43.74**	**$48.11**	**$52.49**
Surveyor	$31.90	45%	$46.22	134	96	96	1754	**$54.80**	**$60.28**	**$65.76**
Average	**$29.71**	**45%**	**$43.01**	**134**	**96**	**96**	**1754**	**$51.00**	**$56.10**	**$61.20**

The City's current charging system only measures some of these indirect costs, as represented by the "Personnel Cost Loading Factor" assigned to each position. PFM derived the "hourly effective pay rate" for each position in the following manner:

1. Determine the midpoint salary for each position in DPW.

2. Add loading factors for pension, health & life insurance, FICA, Medicare, and OPEB expenses to determine hourly "Midpoint Salary with Loading."

3. Determine total paid leave hours by summing "Midpoint Paid Vacation Hours," "Maximum Sick Time Hours," and "Total Paid Holiday Hours."

4. Subtract total paid leave hours from 2080 (total annual hours assuming 40 hour work week) to determine "Clocked Hours per Year."

5. Divide total annual personnel cost (hourly midpoint salary with loading multiplied by 2080) by "Clocked Hours per Year" to determine "Measurable Hourly Effective Pay Rate."

By taking into account these overhead adjustments, the Measurable Hourly Effective Rate is on average 72.3 percent higher than Long Beach's Hourly Midpoint. The non-measurable factors have been approximated by adding a ten and twenty percent adjustment factor, as shown in the last two columns. These rates are 89.6 and 106.8 percent higher than Long Beach's Hourly Midpoint.

Unavoidably, there is some degree of error associated with such an analysis and actual costs may be higher or lower than the "Hourly Effective Pay Rate" plus the ten or twenty percent adjustment factor. In spite of these limitations, the above analysis comes closer to estimating the "true" total cost of providing professional services.

As a result, these adjusted wage rates are more closely aligned to those charged by contractors, as can be seen in the following fee structure from one of Long Beach's current contracts.

Table 11: Example of Long Beach Contractor Fee Structure

Admin/Tech/ Professional Level	Title	Hourly Rate
6-8	General Admin	$55-$65
10-15	Draftsperson	$55-$80
16-7	Senior Technician	$85-$90
8-11	Staff Engineer	$85-$100
11-16	Project Engineer	$100-$136
17-18	Supervising Engineer	$140-$150
19-20	Principal Engineer	$160-$165

While hourly rates of contracted staff may remain higher than estimated government personnel costs, it is also important to consider other factors and benefits of outsourcing. For example, contracted engineers may offer skills that are only needed intermittently, thereby allowing contract arrangements to increase and decreasing staffing levels as workloads permit. Therefore, a capital plan that includes a large investment in the near term is greatly benefitted by heavily leveraging contractors to manage temporary short term increases in workload. Successfully utilizing contractors, however, will likely require greater attention to project management and performance metrics by City staff.

Capacity Considerations

Long Beach is already a heavily outsourced city relative to other large cities in California.[16] As such, contracting out projects requires DPW to exercise a high level of oversight of the City's engineers, inspectors, and capital service coordinators in order to ensure quality workmanship and deliverables. One concern of DPW staff is that a significant expansion of the use of contractors will require additional staff. However, the City Engineer estimates that with a fully budgeted staff, the department can manage approximately $20 million in street projects per year. Table 12 depicts current known projected revenues compared to the City's assumed capacity with a conservative PPI adjustment of five percent.

Table 12: DPW Street Maintenance Capacity Levels

Fiscal Year	Projected Status Quo Investment	Level of Capacity	PPI Adjusted investment Compounded @5%	Level of Capacity
2008	22.5	-2.5	22.5	-2.5
2009	16.3	3.7	15.5	4.5
2010	15.3	4.7	13.9	6.1
2011	20.3	-0.3	17.5	2.5
2012	12.8	7.2	10.5	9.5
2013	12.8	7.2	10.0	10.0
2014	12.8	7.2	9.6	10.4
2015	7.8	12.2	5.5	14.5
2016	7.8	12.2	5.3	14.7

As shown in the above table, the Department is under its estimated capacity in all years except 2008 and 2011. When discounted by a conservative five percent PPI, the Department's underutilized capacity is even greater. As such, there is still room to add additional street projects if additional funding is allocated.

The City Engineer has provided the following estimations of staff time to deliver an additional $10 million in street projects (staff time varies depending on the nature of the project):

[16] See page 32 of Long Beach Streets Review [phase I] by PFM and 2005 California Benchmarking Survey.

Table 13: DPW Personnel Costs for Additional $10M in Street Projects

FTEs	Simple overlay projects	More complicated projects	Min Annual Cost	Max Annual Cost
Analyst	0.25	0.75	$21,828	$65,483
Construction Inspectors	2	3	$165,751	$248,627
Engineering Technicians	1	2	$67,799	$135,599
Engineers	2	3.5	$250,801	$438,901
Surveyors	1	2	$86,911	$173,822
Total:	**6.25**	**11.25**	**$593,090**	**$1,062,431**

Apart from staffing constraints, the City Engineer estimates that the City can only bear a $30 million dollar volume of construction activity each year due to traffic congestion issues. However, bearable traffic congestion is difficult to gauge in dollar terms because of the many factors that influence it.

Some entities argue that a large increase in workload should be outsourced, and use general engineering contractors (GECs) to handle many of the management responsibilities that might otherwise be performed by staff. This is similar to the approach used by the RDA in the 2003 North Long Beach project.

The decision to staff up versus increase usage of contractors should ultimately be determined by the volume of work estimated in the capital plan. The approach to managing any large increase in workload will be predicated on the ability to attract and retain staff and the overall level and duration of the effort required. The most important issue will be to select an approach that is realistic and that will allow the city to accomplish its goals for capital projects. Cities can take a number of different approaches to solving this dilemma, and they can all be successful.

In accordance with Proposition L, if DPW does decide to outsource work that is currently performed in-house, it must demonstrate to City Council that the use of contractors would be more efficient and cost-effective. As discussed below, given that DPW already uses a large number of contractors, there appears to be ample precedent for such action, but DPW may wish to consult with the City Attorney's office before adopting such a plan to address any possible legal concerns.

DPW's Current Contracting Practices

Presently, Long Beach contracts out approximately 50 percent of design work for streets maintenance projects, though engineering staff must review plans for all projects. Labor on street rehabilitation projects is completely outsourced, with the exception of a four-truck pothole repair crew, which repaired nearly 25,000 potholes in the past year. Outsourcing construction projects for a city of Long Beach’s size is generally viewed as a more flexible and cost-effective strategy, given the considerable cost of equipment maintenance, as well as in-house personnel expenses.

The City contracts less complex design and construction projects through “on-call” arrangements. Potential contractors are selected through Requests for Qualifications (RFQs) every two to three years and granted multi-year contracts. RFQs are not evaluated solely on the basis of bid amounts, but also on factors such as the firm’s experience, reputation for quality workmanship, and experience on City projects. On-call arrangements are the norm for projects budgeted below $500,000, with most falling in the $60,000-$150,000 range. On-call arrangements are common both among public works agencies across the country and among the comparable group of California cities that PFM interviewed. In general, PFM believes that this type of arrangement expedites the street delivery process, cuts down on administrative overhead and generally provides an effective means of quickly contracting for smaller projects.

For larger, more complex projects, contractors take on more of the project and program management responsibility. This occurs much more frequently with projects for Long Beach’s Redevelopment Agency (RDA) and other Municipal Redevelopment Agencies. For example, the RDA contracted most management responsibility to a contractor for a major $16 million street project in north Long Beach, as the RDA lacked sufficient capacity to manage such work in house. The primary contractor managed three other main subcontractors to deliver the project. The contract stipulated that the primary contractor create a “Key Contact Database,” “Responsibility Matrix,” and “Work Area Exhibit” to ensure effective communications and accountability. This effort was facilitated by a sophisticated website that provided the following:

1. A homepage listing goals and objectives of the program to keep team members organized and on target;

2. Geographic Information System (GIS) that provided real-time data to select team members through an interactive street map;

3. Search capability for project and contact information;

4. A PDF copy of each deliverable from the contractor;

5. Copies of major and specific project schedules;

6. A “Problem Action Form” database with documentation of resolution to allow team members to avoid repeating errors and learn from one another; and

7. A section of the website devoted to keeping the public abreast of project accomplishments, street closures, safety information, FAQs, and detours.

Generally speaking, the City of Long Beach appears to have a good working relationship with its contractors and professional engineering firms. The contracted engineers whom PFM interviewed characterized members of the Department of Public Works as upfront, professional, and competent. They stated that on-call arrangements have kept them busy at a steady pace, and they have not felt under- or over-worked. As it is not uncommon in the street design industry for contractors not to bid on work from certain clients that they deem to be difficult to work for, especially if they are operating at capacity, the fact that the City has enjoyed a longstanding relationship with many of its contractors indicates that contractors tend to view the City favorably.

However, the contract engineers interviewed by PFM did offer some constructive criticism to improve the City's relationship with its contractors. A common complaint among the group is that DPW has occasionally solicited a firm to do some planning and design work for project proposals, only to drop the project soon thereafter. DPW confirmed these occurrences, acknowledging that contractors may be asked to draft such proposals even though DPW knows that it likely will have insufficient revenue to complete them. This exercise is burdensome for the contracted engineering firms, as they may devote significant staff time and coordination with sub contractors to complete such proposals, which are ultimately uncompensated. While such work is typically regarded as a "marketing expense," too many such projects may make firms less willing to devote time and energy to projects that they are unsure will move forward.

Accordingly **PFM recommends that DPW limit, to the extent possible, pursuing such projects; limit the scope of the uncompensated work on projects that are unfunded; or, if the city requires a significant amount of such services, enter into a contract with a firm to perform the work.**

A second complaint concerns project delays. According to the contractors whom PFM interviewed, these delays occur primarily in the engineering review phase of a project. The reported frequency of project delays varied among interview subjects: one contractor cited numerous examples, while another described delays as "occurring in waves." As noted in Phase I of this Review, DPW internal data corroborated these findings.

With regard to the specific concerns raised by the City's contracted engineers, **PFM recommends that a process review be undertaken to eliminate potential redundancies in the review process.** For example, one contracted engineer suggested that many of the copies of plans that contractors are required to submit are not seriously reviewed and slow down the review process. He also suggested that plans be submitted electronically when possible.

In response to more general concerns regarding project delays, PFM recommended in Phase I of this Review that the current project tracking system that DPW uses be substantially modified, if not outright replaced. PFM's recommendations for improving DPW's project tracking system include the following:

1. **Record phase start date.** This will allow for a much more precise analysis and allow management to get a better sense of phase overlays.

2. **Record suspension dates and causes for suspension in a uniform fashion.** Such data permits management to diagnose causes for bottlenecks and comprehensively address the issue. There may be appropriate and necessary reasons for suspension of a project phase, but as the system currently stands, there is no easy way of determining a suspension from just a delay.

3. **Enforce consistent recording of information on the part of project managers.** DPW's project tracking system can be an important tool, but only if data are consistently and accurately entered into the system.

4. **Produce regular exception reports.** An exception report identifies inconsistencies in the reporting of dates between the three data fields (Project Managers, Contract Administrators, and Construction analysts). This is a useful way of promoting accountability.

5. **Accurately document planned phase dates.** Experience from previous projects should provide for more accurate planning over time, improving the capital budgeting process.

6. **Record estimated schedules at the beginning of a year when funds are made available.** Currently, according to DPW, not all projects that may be funded are included in the project management system when funds are available. While there may be plans for projects, there are also "unprogrammed" funds available. PFM understands that this may be due, in part, to concerns about when DPW will be able to get to those projects, due to staffing issues and workload. While PFM recognizes that these are legitimate issues, if project schedules are developed only when DPW is ready to take on projects, the system cannot measure the delays in starting projects. For example, the system may show that all projects in the system are on schedule, but fail to capture the fact that there are funds that are still unprogrammed at the end of a year. The system should be used to capture both issues.

7. **Utilize "estimated total cost" to estimate future programmed needs.** The system includes a "total project cost estimate" that may not match the amount of the project budgeted expenditures in the accounting system.

The difference is likely due to projects that have been funded only through the design phase or other early development activities. Assuming the "estimated project cost" is maintained accurately, the difference, on a project-by-project basis, is one means of showing future project needs, which may not be encumbered or otherwise reflected in the budget.

8. **Use the system as a management tool.** The information from DPW's project tracking system can be a valuable management tool, as well as a means of tracking progress on individual projects. After addressing data issues, DPW can use the information to review how long components of projects take to look for ways to streamline processes, and as a means of communicating with management regarding issues related to completing projects.

9. **Present quarterly reports to the City Manager, Mayor, and Council on progress in Capital Improvement Program.** Progress is not just about dollars. The information in these reports should compare actual completions to planned completions, reasons for phase delay, actual expenditures as a percent of estimated total cost, and any qualitative factors that are important.

A final issue expressed by the engineers concerns the timely payment of invoices. Each of the engineering firms noted significant payment delays, which commonly run between 90 to 120 days and exceed that of other cities with whom they work. Delays in processing payments can come from a number of sources, including delays in review of materials and incomplete information provided to finance for processing. Subsequent discussions with DPW indicate that they have made some organizational changes which they hope will address the bottlenecks.

Capital Project Contracting Costs

One of the issues which PFM was requested to address in this report is how DPW's costs compare to those of other California cities. Other sections in this report, as well as in Phase I, have addressed DPW's costs in the context of process and management issues. This section of the report examines DPW's capital project contracting costs in relation to other California cities.

The section is divided into two main parts. The first part compares DPW's unit costs for common street and sidewalk bid items in relation to other California cities. The second part compares DPW's project delivery costs as a percentage of total construction costs for completed capital projects in relation to other California cities.

On balance, the contract data reviewed by PFM suggest that relative to its peers, DPW receives a comparable number of bids for street and sidewalk projects. For common street and sidewalk bid items, DPW's unit costs appear to be reasonably competitive in relation to the comparison group. However, significant variation in the data, especially with regard to overall contract size and date of contract award, must be taken into account when drawing unit cost comparisons among municipalities, given the substantial price volatility of construction material costs over a relatively short period of time, and the typically inverse relationship between economies of scale and price.

The capital project data reviewed by PFM suggest that DPW's project delivery costs – defined as the sum of all agency and consultant costs associated with project planning, design, bid, award, construction management, and closeout activities[17] – represent a slightly smaller percentage of its total construction costs than all but one of the six other California cities surveyed in the 2007 California Multi-Agency Capital Improvement Project Benchmarking Study. However, as with the street and sidewalk contract data reviewed by PFM, it should be noted that the capital project data submitted by each city to the Study differ substantially with respect to project size, project type distribution, and project delivery date.

It is important for DPW to actively monitor its contract performance relative to its peers in order to ensure that the bids it receives fall within the range of bid experiences and prices for similar contracts in other California cities. While the bid prices that Long Beach receives can be influenced by a number of endogenous and exogenous factors, this practice can alert DPW to particular price discrepancies for individual bid items, and encourage general information sharing and cooperation among municipal Public Works Departments.

[17] *California Multi-Agency CIP Benchmarking Study, Annual Report – Update 2007,* 1. http://eng.lacity.org/techdocs/cabm/

Street and Sidewalk Contract Survey Methodology

One of the challenges in comparing costs for capital projects is to ensure that the costs being compared correspond with reasonably similar items. There can be a wide range of types of streets projects, and, as discussed earlier in this report, the costs can vary substantially depending on the type of improvements that are being made. The cost of a reconstruction project, for example, can be multiple times higher than a simple overlay project. Differences can also exist between what would appear to be relatively simple and similar projects. For example, we noted pricing of between 10 to 34 different bid components for cities' annual sidewalk repair contracts. Additionally, costs are impacted by timing of projects, project size, overall economic activity in the area, and costs of raw materials.

Since the size and scope of municipal street and sidewalk contracts do differ considerably depending on local transportation infrastructure needs, a comparison of aggregate contract levels has limited analytical value. In view of this, it is more helpful, for comparative purposes, to compare common contract bid items on a per unit cost basis. While such an approach does not eliminate the potential for bias in the data, it does establish a reasonable set of parameters by which to evaluate the relative competitiveness of DPW's street and sidewalk contract prices.

In order to compare street and sidewalk contract prices on a per unit cost basis, PFM requested bid tabulation sheets for street and sidewalk contracts that had recently been awarded by nine (9) comparable California municipalities. PFM received and reviewed bid tabulation sheets from seven of the nine municipalities surveyed. Of the remaining two municipalities, the City of Anaheim provided a copy of its current master agreement purchase order that it uses for concrete sidewalk replacement projects, and the City of Sacramento provided a copy of its most recent sidewalk contractor ranking chart that it uses to price sidewalk bid items.

Table 14 provides summary information for all contracts under review. The contracts are grouped by municipality and ordered by bid date. For each contract, information regarding the total number of bids and total bid amount (low, high, and average) is provided. The last column in the table – "spread to average" – represents the percentage differential between the average total bid amount and the lowest total bid amount, as expressed by the following equation:

[Average total bid amount – low total bid amount] / [low bid amount]

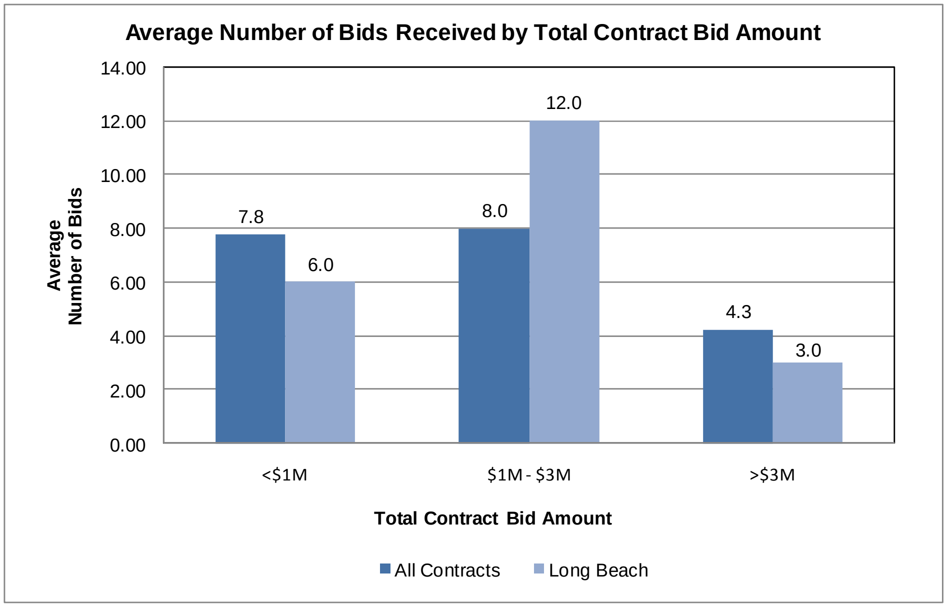
Table 14: Street & Sidewalk Contract Summary Information

City	Project Name	Bid Date	No. Bids	Low Bid	High Bid	Avg. Bid	Spread to Average
Long Beach							
	Walnut Avenue Improvement	3/9/2007	12	$1,276,234	$1,762,235	$1,394,532	9.27%
	Annual Contract for Sidewalk Repairs, Curb Ramps, etc.	10/3/2007	3	$6,736,025	$7,987,675	$7,257,743	7.75%
	Annual Contract for Local Street Improvements	12/5/2007	6	$588,686	$1,234,371	$787,108	33.71%
Fresno							
	Traffic Signal Modification - McKinley and West	9/13/2007	2	$300,745	$319,567	$310,156	3.13%
	Ashland Avenue Widening	2/14/2008	18	$449,973	$846,449	$595,975	32.45%
	Whitesbridge Road Overlay	2/14/2008	10	$659,894	$824,559	$748,747	13.46%
	Whitesbridge Road Reconstruction	3/6/2008	8	$754,632	$975,247	$880,974	16.74%
Glendale							
	ADA Curb Ramp Installation & Sidewalk Repair Program	9/5/2007	2	$703,000	$736,053	$719,526	2.35%
	Glenoaks Boulevard Rehabilitation	4/9/2008	9	$2,970,251	$3,537,479	$3,247,984	9.35%
	Los Feliz	4/23/2008	7	$1,223,911	$1,627,939	$1,316,713	7.58%
Lakewood							
	Prop 1B and CBDG Residential Street Rehabilitation	4/8/2008	8	$1,183,407	$1,434,545	$1,342,156	13.41%
Oakland							
	Citywide Street Resurfacing & Slurry Sealing for FY 2006-2007	9/17/2007	4	$4,351,881	$4,803,452	$4,474,943	2.83%
	Citywide Sidewalk Repair for FY 2007-2008 Contract A	9/24/2007	4	$717,940	$946,225	$829,835	15.59%
Pasadena							
	Preventive Maintenance of Streets	8/8/2007	8	$1,028,220	$1,451,323	$1,216,981	18.36%
	Miscellaneous Concrete Repair and Curb Ramps	12/19/2007	14	$239,250	$420,000	$359,829	50.40%
Santa Ana							
	Main Street Rehabilitation	8/30/2007	9	$1,989,989	$2,725,062	$2,385,835	19.89%
	First Street Rehabilitation	9/18/2007	6	$5,215,174	$5,975,384	$5,628,214	7.92%
	Fourth Street Downtown Streetscape Phase II	1/10/2008	7	$1,994,244	$2,749,525	$2,329,944	16.83%
San Jose							
	Remove and Replace Concrete Pavement Project	3/27/2008	9	$1,445,800	$2,082,890	$1,736,297	20.09%
	Slurry Seal	2008	3	$2,519,001	$3,034,883	$2,697,536	7.09%
	Street Resurfacing Backlog Reduction Project	2008	8	$7,774,886	$8,720,448	$8,255,867	6.19%
	Citywide Sidewalk Accessibility Curb Ramp 2008	2008	6	$399,392	$493,053	$440,721	10.35%
	AVERAGE		7.57				14.8%

The data show that there is considerable variation with regard to the size and scope of each contract, the date of each contract award, and the spread between the average and low bid. Of the 22 contracts reviewed, an equal number of contracts (9) were awarded for street and sidewalk projects totaling less than $1 million as were awarded for projects totaling between $1-3 million, with the remaining 4 projects exceeding $3 million. Similarly, an equal number of contracts (11) reviewed were awarded in 2007 as were awarded in 2008. The average spread per contract between the low and average bid was 14.8%, with significance variance between the high (50.4 percent) and low (2.4 percent) bounds.

While the relatively small sample size (n=22, Long Beach contracts = 3) and widespread variance in project scope make it difficult to draw definitive conclusions from the data, the information suggests that Long Beach receives roughly the same number of bids per street and sidewalk contract as other California cities. The 3 contracts submitted by Long Beach received an average of 7 bids, compared to an average of 7.6 bids for all contracts under review.

The chart below compares the average number of bids received by Long Beach and all municipalities for contracts of varying total dollar amounts. In general, a higher average number of bids were submitted for projects totaling less than $1 million and between $1-3 million than for projects exceeding $3 million. There is some variance between the number of bids received by Long Beach and the local average for each contract size category, but given the small sample size (Long Beach submitted one contract per category), it is not a statistically significant difference.



It is also important to recognize the many factors that may impact the number of bids. Bids can be influenced by overall supply and demand. If there are more projects than can be managed by the contractors in the area, cities (and others using the same firms) may see fewer bids and/or higher bid prices. As contracting activity retrenches, firms may be more aggressive in bidding on projects, and cities may also see more bids. These supply and demand relationships can change in a relatively short timeframe if the economy, and overall contracting activity, slow down. Further, the spreads in pricing of bids across the universe of contracts shows, in part, the benefit of multiple bids for such contracts.

Unit Cost Comparison of Select Street and Sidewalk Contract Bid Items

As discussed earlier, one approach to comparing costs among municipalities for street improvement activities is to compare unit costs for similar items. This method is also consistent with common bidding approaches for such projects; while contracts may be awarded based on a total cost comparison, that amount is derived from a number of quantities and prices. The following tables were developed to compare the unit costs of a select number of street and sidewalk contract bid items among all surveyed California municipalities. As a general rule, PFM has chosen to compare street and sidewalk contract bid components that: (1) were included in street and sidewalk contract bid specifications by a large number of municipalities; and/or (2) represented a significant percentage of the total contract dollar value.

For each contract item, information regarding the project name, bid date, number of bids, bid quantity, and unit cost amount (low, high, and average) is provided. In order to mitigate potential outliers in the data, the low and high bids have been eliminated from the computation of the average unit cost per contract bid item, except in cases where two or fewer bids were received.

As discussed in earlier sections of this report, the prices of many contract bid items (e.g. asphalt) are sensitive to fluctuations in the price of raw materials (e.g. oil) over time, variable delivery costs, and exogenous economic factors. Anecdotally, one municipal contract engineer has noted that in the aftermath of the collapse of the housing bubble, average contract prices have fallen by approximately 33 percent compared to the same time last year. In addition, a number of contractors surveyed offer discounted prices for higher bid quantities. One Long Beach contractor, for example, quoted a price of $400/cubic yard for concrete removal of 0.5 – 1.5 cubic yards, $140/cubic yard for concrete removal of 1.6-3.0 cubic yards, and $70/cubic yard for concrete removal of 50.1 cubic yards or more.

Furthermore, because contractors are ultimately concerned with winning the overall contract bid, they may set unit prices for selected bid items well below their market value. In view of these considerations, PFM has chosen not to compute a cumulative average of the unit cost per contract bid item for all individual contracts, as it does not appear to be a reliable barometer of regional market competiveness.

Notwithstanding the above caveats, the tables below and on the following pages suggest that on average, Long Beach's unit costs for a representative sample of bid items fall within a range to be considered competitive with the going market rate. For example, the lowest unit price that Long Beach received for asphalt concrete pavement ($73.50/ton) is identical to the lowest unit price received by San Jose, and 50 cents less than the lowest unit price received by Glendale ($74.00/ton). In addition, the average bid prices that Long Beach received for asphalt concrete pavement ($98.64/ton for the Walnut Avenue Improvement contract, and $87.13/ton for the Local Street Improvements contract) fall well within the low average ($67.06/ton) and high average ($128.60/ton) bounds for the comparison group. Similarly, the lowest unit price that Long Beach received for Portland Cement Concrete sidewalk repair ($3.65/square foot for the Walnut Avenue Improvement project) is 17 cents above the price set by Anaheim's master contract (3.48/square foot), 5 cents above the lowest unit price received by Santa Ana ($3.60/square foot for the First Street Rehabilitation project), and 6 cents below the lowest unit price received by Fresno ($3.71/square foot for the Whitesbridge Road Reconstruction project).

While much of this variation can be attributable to endogenous (e.g. quantity) variables, the evidence again suggests that Long Beach's unit contract prices are competitive with market rates. An additional factor is timing; while these are the most recent contracts for which information is available they do take place over a period of a year, which has seen changes in the overall economy as well as materials costs.

Table 15: Asphalt Concrete Pavement Unit Cost Comparison

City	Project Name	Bid Date	No. Bids	Unit	Quantity	Low	High	Avg.
Long Beach	Walnut Avenue Improvement	3/9/2007	12	TON	650	$78.00	$125.00	$98.64
Long Beach	Local Street Improvements	12/5/2007	6	TON	1,300	$73.50	$175.00	$87.13
Fresno	Ashland Avenue Widening[1]	2/14/2008	18	TON	1,093	$79.00	$129.00	$90.56
Glendale	ADA Curb Ramp Installation	9/5/2007	2	TON	150	$145.00	$185.00	$165.00
Glendale	Glenoaks Boulevard Rehab.	4/9/2008	9	TON	5,225	$76.00	$94.35	$82.07
Glendale	Los Feliz[2]	4/23/2008	7	TON	720	$74.00	$95.00	$80.40
Oakland	Citywide Street Resurfacing[3]	9/17/2007	4	TON	8,396	$99.45	$114.66	$112.00
Pasadena	Preventative Street Maintenance[4]	8/8/2007	8	TON	400	$90.00	$300.00	$128.60
Santa Ana	Main Street Rehabilitation	8/30/2007	9	TON	13,190	$63.00	$88.00	$72.23
Santa Ana	First Street Rehabilitation	9/18/2007	6	TON	36,500	$64.00	$75.16	$67.06
Santa Ana	Fourth Street Downtown Streetscape	1/10/2008	8	TON	4,252	$66.00	$130.00	$89.75
San Jose	Street Resurfacing Backlog[5]	2008	8	TON	43,300	$73.50	$87.00	$78.19

[1] Type B Overlay
[2] Base Failure
[3] Base Repair
[4] Base Course
[5] Type A Overlay

Table 16: Asphalt Rubber Hot Mix Unit Cost Comparison

City	Project Name	Bid Date	No. Bids	Unit	Quantity	Low	High	Avg.
Long Beach	Walnut Avenue Improvement	3/9/2007	12	TON	3,000	$73.00	$107.00	$87.95
Long Beach	Local Street Improvements	12/5/2007	6	TON	2,500	$90.00	$210.00	$108.60
Glendale	Los Feliz	4/23/2008	7	TON	1,824	$90.00	$114.00	$100.40
Glendale	Glenoaks Boulevard Rehab.	4/9/2008	9	TON	6,295	$87.00	$117.00	$101.46
Lakewood	Prop 1B Residential Street Rehab.	4/8/2008	8	TON	10,000	$81.00	$94.53	$88.91
Pasadena	Preventative Street Maintenance	8/8/2007	8	TON	2,200	$85.00	$130.00	$94.10

Table 17: Cold Milling Asphalt Concrete Pavement Unit Cost Comparison

City	Project Name	Bid Date	No. Bids	Unit	Quantity	Low	High	Avg.
Long Beach	Walnut Avenue Improvement	3/9/2007	12	SY	10,000	$1.70	$6.19	$2.56
Fresno	Whitesbridge Road Overlay	2/14/2008	10	SY	17,350	$1.37	$6.30	$2.11
Fresno	Whitesbridge Road Reconstruction	3/6/2008	8	SY	294	$2.00	$30.00	$9.04
Lakewood	Prop 1B Residential Street Rehab.	4/8/2008	8	SY	600,000	$0.86	$1.44	$1.34
Pasadena	Preventative Street Maintenance	8/8/2007	8	SY	225,000	$1.80	$4.50	$2.19
Santa Ana	Main Street Rehabilitation	8/30/2007	9	SY	38,238	$1.35	$4.50	$2.88
Santa Ana	First Street Rehabilitation	9/18/2007	6	SY	95,800	$0.90	$2.16	$1.61
Santa Ana	Fourth Street Downtown Streetscape	1/10/2008	8	SY	3,234	$2.70	$7.20	$4.08

Table 18: Portland Cement Concrete Sidewalk Repair – 4" Thickness Unit Cost Comparison

City	Project Name	Bid Date	No. Bids	Unit	Quantity	Low	High	Avg.
Long Beach	Walnut Avenue Improvement	3/9/2007	12	SF	1,500	$3.65	$7.20	$5.05
Long Beach	Annual Contract for Sidewalk Rep.	10/3/2007	3	SF	2,000	$6.04	$7.00	$7.00
Anaheim	Master Agreement PO - Sidewalk	2008	N/A	SF	50-5,000	$3.48	$3.48	$3.48
Anaheim	Master Agreement PO - Sidewalk	2008	N/A	SF	5,000+	$4.48	$4.48	$4.48
Fresno	Whitesbridge Road Reconstruction	3/6/2008	8	SF	11,080	$3.71	$5.00	$4.27
Lakewood	Prop 1B Residential Street Rehab.	4/8/2008	8	SF	9,500	$4.00	$8.00	$5.82
Oakland	Citywide Street Resurfacing[1]	9/17/2007	4	SF	9,831	$10.00	$12.10	$11.00
Oakland	Citywide Sidewalk Repair[2]	9/24/2007	4	SF	42,000	$8.50	$10.50	$10.15
Pasadena	Misc. Concrete Repair	12/19/2007	14	SF	20,000	$7.00	$13.80	$9.72
Sacramento	Sidewalk Contractor Ranking	2008	8	SF	N/A	$7.00	$9.00	$7.61
San Jose	Citywide Sidewalk Accessibility	2008	6	SF	1,265	$7.50	$10.00	$8.15
Santa Ana	Main Street Rehabilitation	8/30/2007	9	SF	1,556	$3.75	$12.00	$6.27
Santa Ana	First Street Rehabilitation	9/18/2007	6	SF	12,500	$3.60	$7.45	$5.89

[1] 3.5" sidewalk thickness
[2] 3.5" sidewalk thickness

Table 19: Adjust Manhole Frame and Cover Unit Cost Comparison

City	Project Name	Bid Date	No. Bids	Unit	Quantity	Low	High	Avg.
Long Beach	Walnut Avenue Improvement	3/9/2007	12	EA	22	$225.00	$465.00	$321.50
Long Beach	Local Street Improvements	12/5/2007	6	EA	15	$300.00	$600.00	$390.00
Long Beach	Annual Contract for Sidewalk Rep.	10/3/2007	3	EA	20	$200.00	$350.00	$335.00
Glendale	Los Feliz	4/23/2008	7	EA	17	$350.00	$800.00	$480.00
Lakewood	Prop 1B Residential Street Rehab.	4/8/2008	8	EA	105	$225.00	$400.00	$276.00
Pasadena	Preventative Street Maintenance	8/8/2007	8	EA	90	$275.00	$500.00	$296.85
San Jose	R&R Asphalt Concrete Project	3/27/2008	9	EA	70	$50.00	$465.00	$339.43
San Jose	Street Resurfacing Backlog	2008	8	EA	510	$300.00	$410.00	$369.67
Santa Ana	First Street Rehabilitation	9/18/2007	6	EA	66	$325.00	$550.00	$448.75
Santa Ana	Fourth Street Downtown Streetscape	1/10/2008	8	EA	10	$400.00	$1,000.00	$612.50

While there are a number of factors that will determine the number of bids, as well as the competitiveness of pricing for those bids, **it is important for DPW to monitor its performance relative to its peers.** This will not change economic conditions, materials costs, and other factors outside a city's control, and it will not change the timing or size of projects that may be dictated by the availability of funding constraints. However, within those parameters, cities will usually benefit from more interest in their projects. DPW should compare the prices it receives for bid items with other California cities to make sure that it at least keeps within the range of bid experience and pricing of similar contracts and if not, to determine why.

Comparison of Long Beach's Capital Project Delivery Costs in Relation to Other California Cities

In addition to assessing DPW's street and sidewalk contracting costs, PFM was asked to compare DPW's capital project delivery (PD) costs as a percentage of its total construction costs (TCC) in relation to other California cities. To fulfill this charge, PFM reviewed performance benchmarking data compiled by the 2007 California Multi-Agency Capital Improvement Project (CIP) Benchmarking Study. Published annually since 2002, the study is a collaborative, multi-agency initiative designed to share best management practices and implementation experiences in capital project delivery. Currently, participating cities include the cities of Long Beach, Los Angeles, Oakland, Sacramento, San Diego, San Jose, and the City and County of San Francisco.

The 2007 study contains data submitted by participating agencies for 698 CIPs of various types, including municipal facilities, parks, pipes, and streets. All projects under review were completed on or after January 1, 2002, and have a TCC exceeding $100,000. According to the study's performance benchmarking criteria, TCC is defined as the sum of the awarded construction contract, net change orders, utility relocation, and construction by agency forces. TCC does not include land acquisition, environmental monitoring and mitigation, design, or construction management costs.[18]

Table 20 summarizes the distribution of capital projects by project type for each participating city agency.

Table 20: Capital Improvement Project Distribution by Agency

Project Type	Long Beach	Los Angeles	Oakland	Sacramento	San Diego	San Francisco	San Jose	Total
Municipal Facilities	**8**	**55**	**8**	**10**	**6**	**13**	**27**	**127**
Libraries	0	33	0	0	2	1	6	42
Police/Fire Station	3	8	1	2	4	6	3	27
Comm. Rec. Center / Child Care / Gym	5	14	7	8	0	6	18	58
Streets	**14**	**11**	**39**	**40**	**37**	**24**	**48**	**213**
Widening/New/Grade Separation	1	1	1	3	8	2	10	26
Bridges	0	7	0	0	4	1	1	13
Reconstruction	9	3	14	5	5	6	8	50
Bike/Pedestrian/ Streetscape	2	0	13	17	7	7	9	55
Signals	2	0	11	15	13	8	20	69
Pipe System	**2**	**83**	**25**	**32**	**54**	**32**	**28**	**256**
Gravity System	2	82	25	25	35	25	24	218
Pressure System	0	0	0	3	17	3	2	25
Pump Stations	0	1	0	4	2	4	2	13
Parks	**4**	**4**	**12**	**1**	**3**	**15**	**63**	**102**
Playgrounds	3	2	10	0	0	13	52	80
Sportfields	2	2	1	1	1	0	4	11
Restrooms	1	0	1	0	2	2	7	13
Total	**28**	**153**	**84**	**83**	**100**	**84**	**166**	**698**

Source: 2007 California Multi-Agency CIP Benchmarking Study

[18] 2007 *California Multi-Agency CIP Benchmarking Study,19.*

As shown on the preceding page, the City of Long Beach accounts for only 4 percent of total CIP projects under review. Exactly half of the CIP projects that the City submitted are streets-related, compared to an average of 31 percent for all participating city agencies.

Table 21 compares aggregate project delivery (PD) costs as a percentage of TCC for all CIP projects submitted by participating city agencies. For the purpose of this analysis, PD costs are defined as the sum of all agency and consultant costs associated with project planning, design, bid, award, construction management, and closeout activities. In addition to providing a total PD cost figure, the table breaks out PD costs into design and construction management cost categories. Further, the table provides data on the relative percentage of costs across all categories incurred by in-house personnel versus outside consultants for each participating city agency.

To promote data sharing and collaboration among municipalities, the study does not identify the participating municipal city agencies by name. However, for the purpose of this review, the City of Long Beach is identified.

Table 21: Capital Improvement Project Delivery Performance and Consultant Usage by Agency

	DESIGN					CONSTRUCTION MANAGEMENT					PROJECT DELIVERY					TCC	
	In-House		Consultants			In-House		Consultants			In-House		Consultants				
Agency	($M)	% of Design[1]	($M)	% of Design	Total % of TCC[2,3]	($M)	% of CM	($M)	% of CM	Total % of TCC	($M)	% of PD	($M)	% of PD	Total % of TCC	Avg.	Median
Long Beach	$3.4	28%	$8.8	72%	20%	$5.8	69%	$2.6	31%	15%	$9.2	45%	$11.4	55%	34%	$2.0	$0.5
Agency A	$14.5	74%	$5.2	26%	22%	$14.3	97%	$0.4	3%	15%	$28.8	84%	$5.6	16%	37%	$1.2	$0.7
Agency B	$5.7	61%	$3.6	39%	17%	$4.9	67%	$2.4	33%	11%	$10.6	64%	$6.0	36%	28%	$0.8	$0.3
Agency C	$23.9	85%	$4.2	15%	19%	$20.9	96%	$0.9	4%	17%	$44.8	90%	$5.0	10%	36%	$1.7	$0.7
Agency D	$37.1	59%	$25.8	41%	21%	$56.6	93%	$4.5	7%	20%	$93.7	76%	$30.3	24%	41%	$2.5	$1.4
Agency F	$23.8	60%	$15.6	40%	22%	$22.2	90%	$2.4	10%	20%	$46.1	72%	$18.0	28%	41%	$1.1	$0.4
Agency G	$9.2	65%	$5.0	35%	21%	$7.6	100%	$0.0	0%	14%	$16.8	77%	$5.0	23%	36%	$0.8	$0.5
OVERALL	**$117.6**	**63%**	**$68.2**	**37%**	**21%**	**$132.3**	**91%**	**$13.2**	**9%**	**17%**	**$249.9**	**75%**	**$81.3**	**25%**	**38%**	**$1.5**	**$0.6**

Notes
[1] In-House and Consultant costs are expressed as percentage of total agency Design, CM (Construction Management), and PD (Project Delivery) costs.
[2] Total Construction Cost (TCC) is the sum of construction contract award, change orders, utility relocation cost, and city forces construction cost.
[3] Design, CM, and PD costs are expressed as a percentage of TCC and are unweighted, arithmetic averages of proejcts by agency.
Source: 2007 California Multi-Agency CIP Benchmarking Study, 28.

The data presented above show that DPW's average PD costs comprise a smaller percentage of its TCC (34 percent) than both the overall average for all CIP projects (38 percent) and the average of all but one of the six other California municipal agencies surveyed. In addition, the data indicate that DPW contracts the highest percentage of its project design costs (61 percent) and the second-highest percentage of its construction management costs (31 percent) to outside consultants.

Regression analyses performed by the California Multi-Agency CIP Benchmarking Study indicate that in general, PD costs (as a percentage of TCC) are inversely correlated with total project size.[19] However, the study also notes that differences in PD costs (as a percentage of TCC) among projects are more closely related to the total number of projects submitted by project type than to the average or median TCC for all projects.[20] While the study does not compare PD costs by project type for each participating agency, it does provide this information on an aggregate basis:

Table 22: Project Delivery Costs by Project Type (As % of Total Construction Cost)

Type	Design	Construction Management	Project Delivery (Total)	Median Total Construction Cost ($M)	Number of Projects
Municipal Facilities	21%	15%	36%	$2.90	127
Parks	20%	18%	38%	$0.40	102
Pipes	18%	17%	35%	$0.70	256
Streets	24%	17%	41%	$0.40	213
Average	21%	17%	38%	$0.60	698

Source: 2007 California Multi-Agency CIP Benchmarking Study, 27.

While the data compiled by the California Multi-Agency CIP Benchmarking Study certainly suggest that DPW's PD costs as a percentage of TCC fall generally in line with those of other California city agencies, considerable variation in the data with regard to project size, project type, and contract date renders it difficult to draw more nuanced conclusions. As with the street and sidewalk contracting data discussed above, the CIP data compiled by this study should be regularly reviewed by DPW to discern potential CIP contracting trends but should not be the sole driver of CIP contracting policy decisions.

[19] 2007 *California Multi-Agency CIP Benchmarking Study,29.*
[20] Ibid.

Tracking and Managing Performance

Long Beach currently includes several streets-related performance metrics in its annual budget[21]:

1. Percentage of residential streets in "good" condition.
2. Percentage of arterial streets in "good" condition.
3. Weighted average of design costs as a percentage of total project cost.

In addition, the City compiles these and other metrics in a document entitled "Report to the Community: Focus on Results."[22] Last published electronically in 2006, the report's metrics include percentage of residential streets in "good" or "better" condition; percentage of damaged sidewalks repaired since 2000; and percentage of potholes identified for repair that were repaired."

Long Beach's pavement condition scores and repair records are useful metrics because they provide an indication of the public's return on its investment in the City's streets infrastructure. The design cost metric is informative, but it can potentially be misinterpreted if the cost escalation of the construction phase of streets projects is not also taken into consideration.

While the above metrics provide some means of measuring DPW's performance, **PFM recommends that DPW broaden its use of performance metrics as a management and strategic planning tool.** The following are examples of performance metrics that DPW should consider compiling on a monthly and/or annual basis:

- **Average pavement rating score.** This score should also be disaggregated into separate scores for arterial and residential streets.

- **Percentage of streets at or below "poor" condition.** If possible, DPW should also separate this data by geographic region in order to identify underserved areas.

- **Total number of lane miles slurry sealed, repaved, and reconstructed.** It is important to provide separate data for each type of treatment, as each treatment has a very different cost structure. In addition, DPW should disaggregate these output measures by street type (e.g. arterial, residential), as different street types have different funding sources.

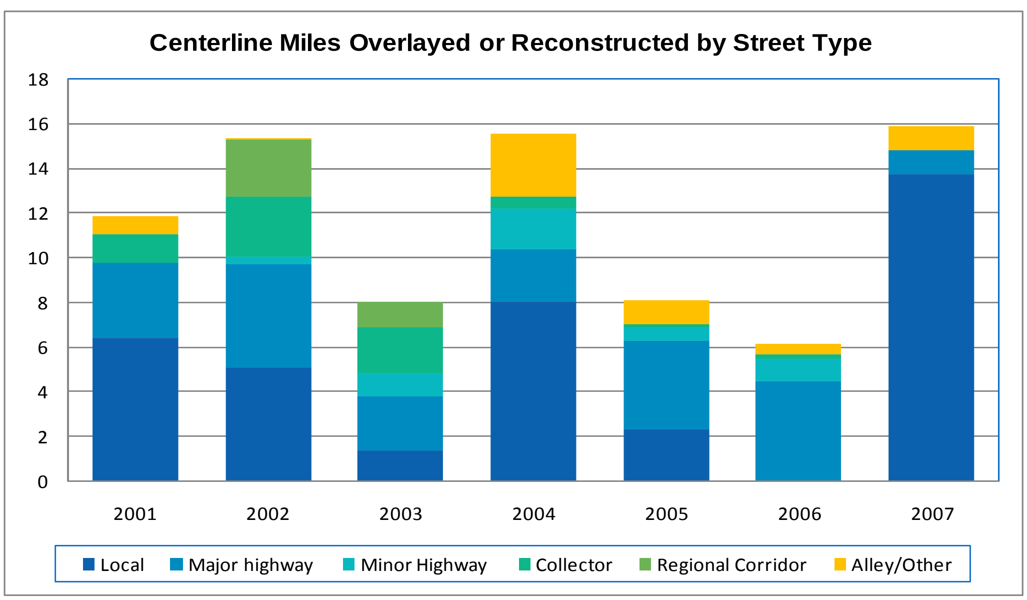
[21] City of Long Beach, *FY 2008 Budget*, Public Works section, pg. 38. http://www.ci.long-beach.ca.us/civica/filebank/blobdload.asp?BlobID=15860
[22] City of Long Beach (2006), "Report to the Community: Focus on Results." http://www.longbeach.gov/civica/filebank/blobdload.asp?BlobID=14266.

In general, DPW should attempt, whenever possible, to provide output data in a uniform manner. Units of measurement should be comparable to each other, such as lane miles and square feet of pavement. DPW's current performance measurement system tracks only linear feet and centerline miles. As one can imagine, the cost and time required to repave one centerline mile of a 4-lane arterial is much greater than the cost and time required to slurry seal a centerline mile of a one-way residential street. Moreover, it is nearly impossible to accurately extrapolate square feet from centerline mile figures, given the variability of width both between and within the various street types.

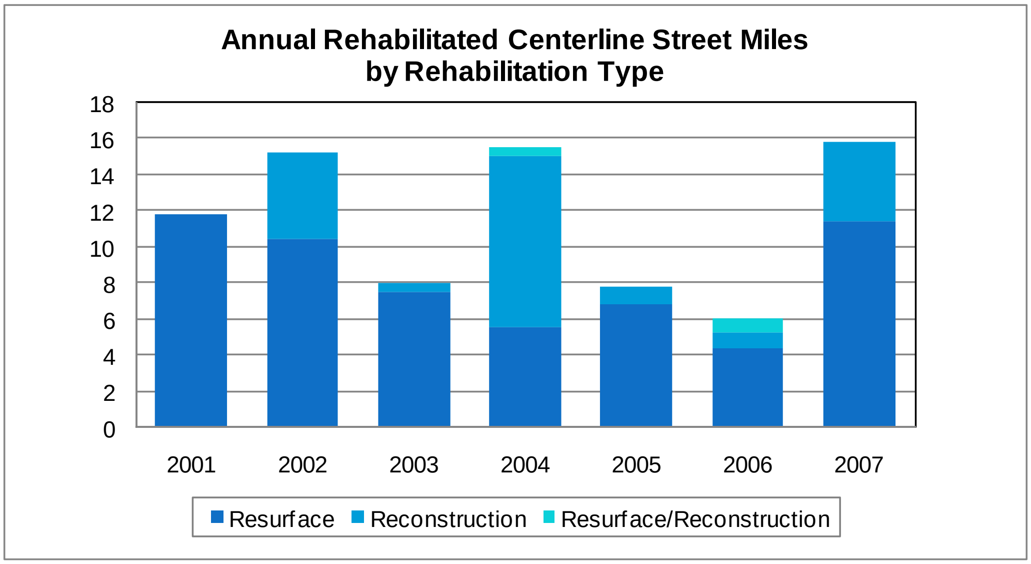
PFM recommends that the Department begin to track square feet while continuing to track existing metrics for comparability purposes. It is also important to demarcate data by fiscal year, so that it can easily be compared to financial data.

A sophisticated performance management system should also include an efficiency metric in order to gauge the cost effectiveness of outputs. The clearest example of this would be: "expenditure per lane mile," for each type of street repair (e.g. slurry seal, overlay, reconstruction). Expenditures should also be adjusted by the PPI for Highway and Street Construction to factor out the effects of inflation.

While DPW does not currently produce ideal financial output metrics, surrogate data can be used to measure certain outputs. The following is a stacked bar chart of paving output by street type from FY 01 – FY 07. It is useful to break the data out in this fashion, as it is more costly to rehabilitate major highways than local streets.

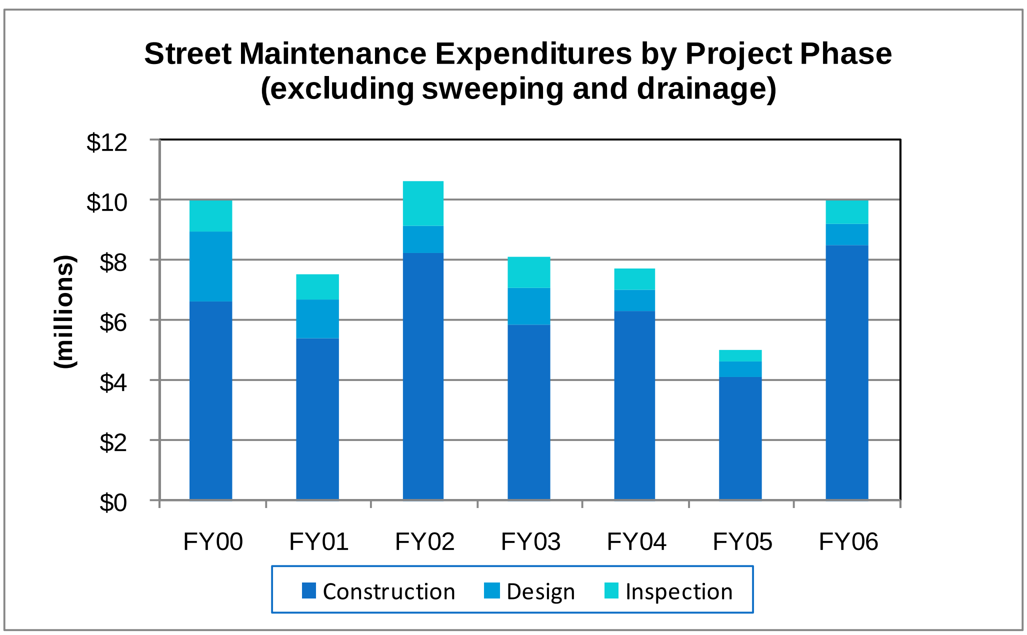


This next chart uses the same data set, but analyzes street repairs by rehabilitation type, instead of street type. As discussed in earlier sections of this report, resurfacing is significantly less costly than reconstruction. The chart does not include data on slurry seal treatment, which, because it is relatively inexpensive, tends to overshadow data on other types of treatment.

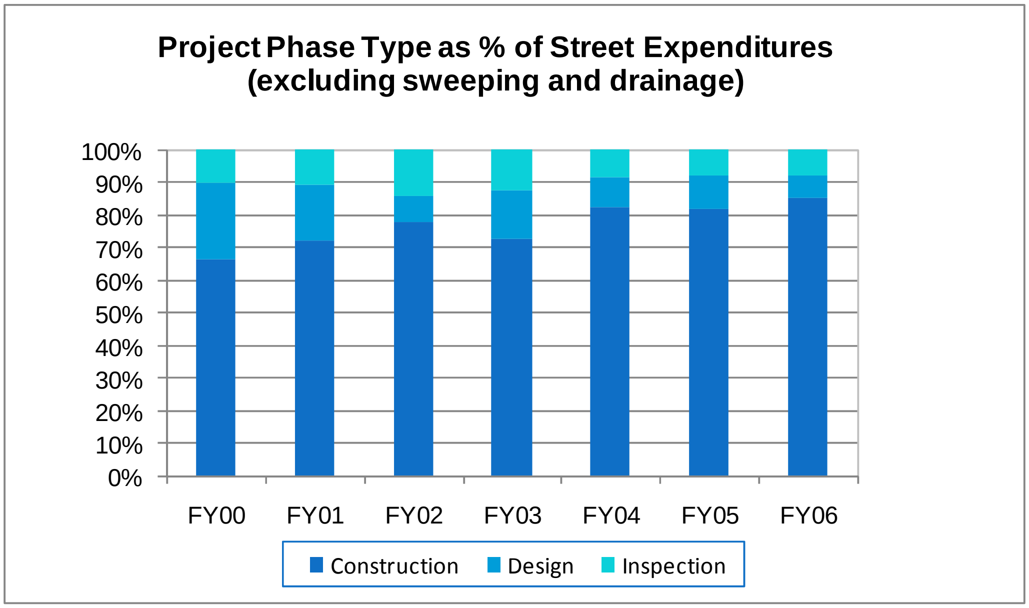


The City's financial system FAMIS also provides certain financial data with which to analyze streets expenditures. The three charts below provide data on street maintenance expenditures by project phase, both in terms of nominal (i.e. non-inflation adjusted) dollars and percentage of total expenditures.

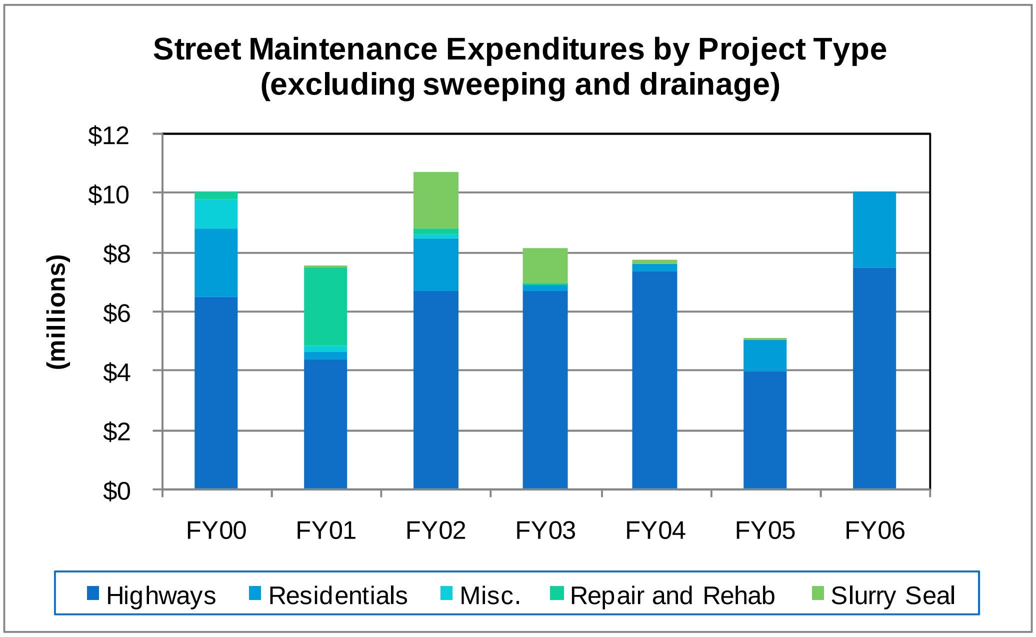
The first chart compares expenditures by project phase:



The second chart presents the same data, but in terms of the percentage of total spending each year that is dedicated for a specific project phase. This representation of the data can more easily identify trends in phase expenditures over time.



The third chart illustrates street maintenance expenditures by project type:



As mentioned earlier, these categories do not appear to be mutually exclusive. For example, almost every street project involves some form of "repair and rehab." **PFM therefore recommends that these types of expenditures be reclassified and/or coded according to a uniform schema for performance**

outputs in order to formulate efficiency metrics. The first object coding should capture the type of street: collector, local, major arterial, minor arterial, regional corridor, and null value (alleyways, etc). The sub-object would then capture the type of rehabilitation: slurry seal, repaving, and reconstruction.

Conclusions

Long Beach, like many other cities with acute transportation infrastructure needs, faces a number of difficult choices. On the one hand, addressing the City's deteriorating transportation infrastructure will require a significant capital investment at a time of increasing economic uncertainty for municipal governments. On the other hand, deferring transportation infrastructure improvements will result in a further decline in the condition of the City's transportation assets, coupled with a likely increase in citizen complaints. The City, for its part, has been considering a substantial increase in funding for streets improvements. Whatever the City ultimately decides with regard to funding levels, it is important for it to move quickly to implement its program in order to avoid or limit the increasing costs of maintenance and street construction inflation.

Long Beach's investment in transportation infrastructure improvements will likely confer additional benefits upon the City by increasing business investment, improving safety and comfort, providing quality local jobs, and generally adding to the appeal of the City. For these reasons, several cities close to Long Beach have issued infrastructure bonds, and we understand that more cities are contemplating doing so as well. This popular interest in infrastructure investment suggests that Long Beach and other cities will be competing for a limited number of engineering and construction contractors in the region.

Governments with large capital programs face the issue of whether to staff up or to use contractors in order to accomplish the work. This is largely a policy issue that was discussed at length in the Phase I Review. A related issue, however, is cost. While hourly rates of contractors appear to be more expensive than the cost of an average employee, the ability to match contractor resources with periods of increased work volume and demand for specialized expertise may outweigh this additional expense. It is also likely that the cost differential will be even closer once additional adjustments are made to the in-house versus contractor mix.

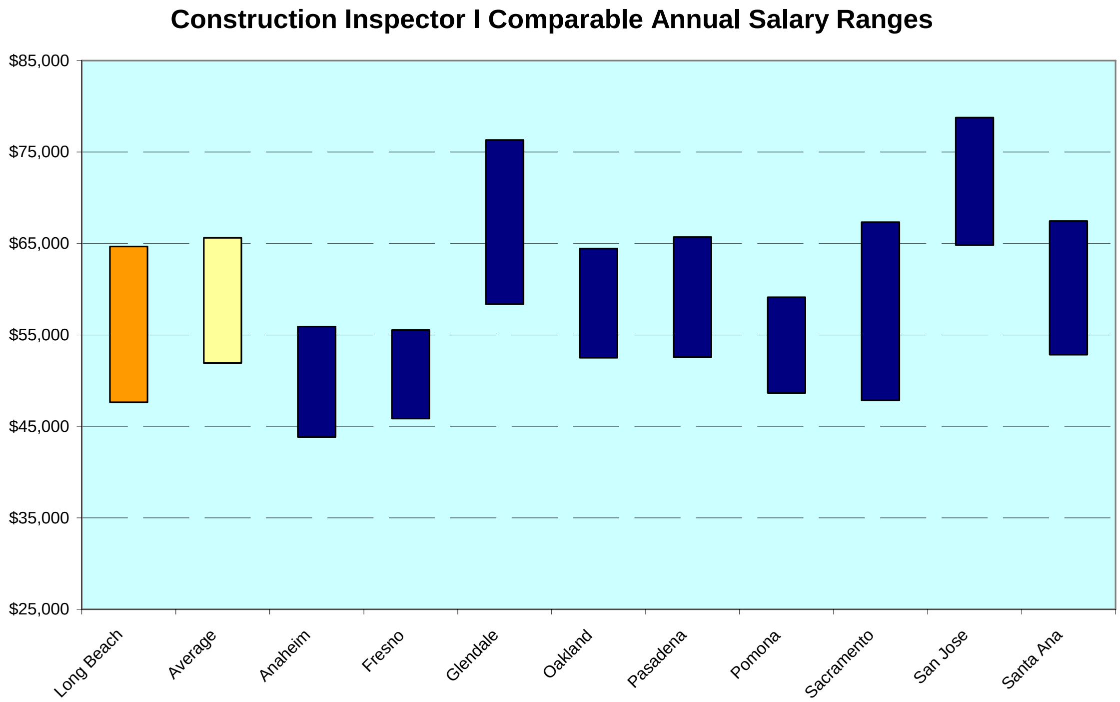
With regard to project management, PFM has recommended improving the accountability of DPW's streets improvement projects through a more advanced performance management system. In addition to improving DPW's internal management controls and demonstrating its progress to the citizens of Long Beach, it can also be used to evaluate the quality and efficiency of its contractors and to improve the procurement process. To move this forward, the City will need a solid Capital Improvement Plan, using an effective balance of in-house staff and contractors. This will be driven in part by the ability to find and retain experienced staff, and to replace critical vacancies promptly. Given the potential for future increases in construction costs, DPW should not be averse to finding practical ways to more effectively leverage contracted professionals to help manage projects.

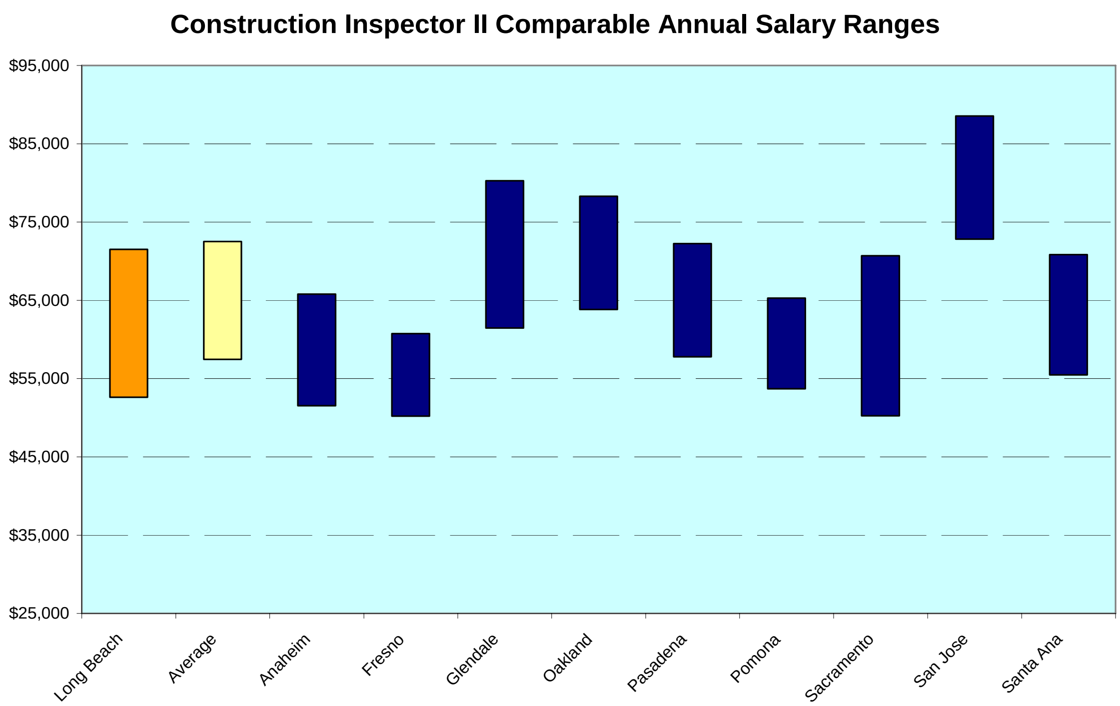
Finally, a larger capital program will likely result in more complex projects, with responsibility not limited to engineering staff. In order to be successful in accomplishing these projects in a timely manner, there needs to be a well coordinated effort among all involved parties, including attorneys, contractors, financial management professionals, utility relocation experts, traffic and transportation engineers, and others. A kickoff meeting to align goals will be imperative to prevent bottlenecks in the program, which generate unnecessary expense and traffic congestion. This kickoff meeting should present clear objectives, expectations, and lines of accountability. Finally, as projects go forward, issues should be tracked and documented in order to improve operational processes in the future. Emphasis on moving projects forward quickly should be a paramount concern for the Department.

Appendix I: Additional Salary Scales

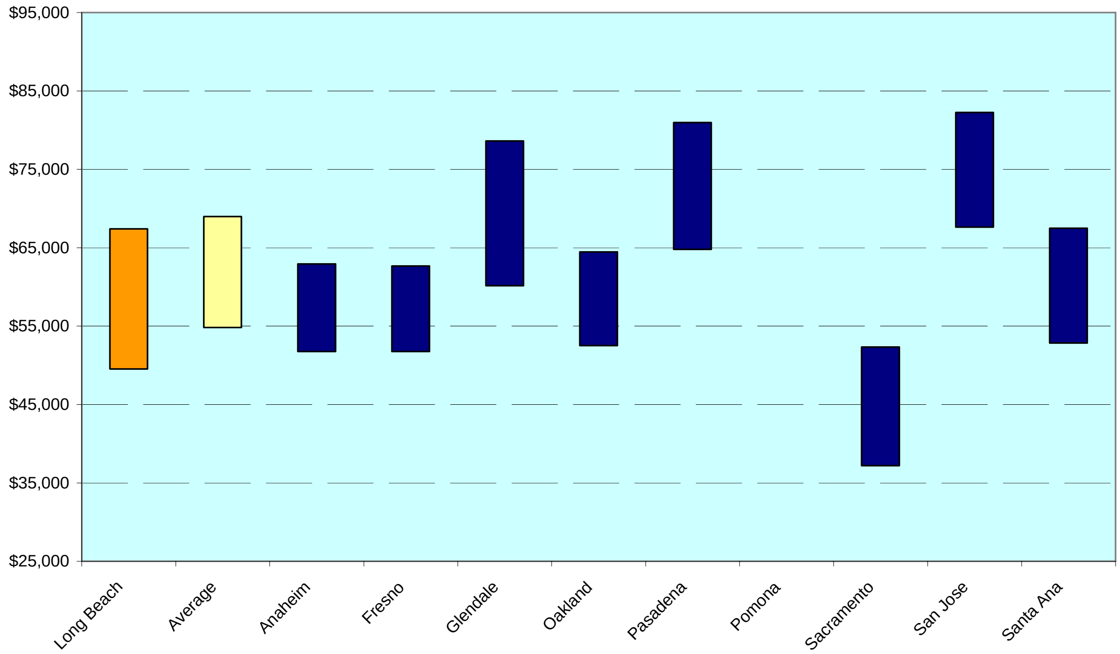
List of comparable title matches:

Long Beach	Anaheim	Fresno	Glendale	Oakland	Pasadena	Pomona	Sacramento	San Jose	Santa Ana
Admin Analyst II	Administrative Services Coodinator	Management Analyst II	Senior Administrative Analyst	Administrative Analyst II	Management Analyst III	Senior Management Analyst	Administrative Officer	Analyst II (C)	Senior Management Analyst (UC)
Administrative Analyst I	NA	Management Analyst I	Administrative Analyst	Administrative Analyst I	Management Analyst II	Management Analyst	Administrative Analyst	Analyst I (C)	Management Analyst (UC)
Administrative Analyst III	Administrative Analyst	Management Analyst III	NA	Management Assistant	Management Analyst IV	NA	NA	Senior Analyst	Principal Management Analyst (AM)
Capital Project Coordinator I-III	Engineering Contracts Specialist	Engineering Inspector I-II	Project Manager	Capital Improvement Project Coordinator	Capital Projects Manager	Public Works Superintendent	Engineering Manager	Capital Projects Program Coodinator	Projects Manager
Civil Engineer	Senior Civil Engineer	Professional Engineer	Civil Engineer I-II	Civil Engineer	Engineer	Senior Civil Engineer	Senior Engineer	Engineer II	Senior Civil Engineer
Civil Engineer Associate	Senior Engineering Aide	Engineer II	Civil Engineer Associate	Assistant Engineer II	Associate Engineer (Civil)	Engineering Associate	Associate Civil Engineer	Associate Engineer	Assistant Engineer II
Construction Inspector I	Construction Inspector I	Engineering Inspector I	Construction Inspector	Construction Inspector	Construction Inspector I	Public Works Inspector	Construction Inspector II	Associate Construction Inspector	Construction Inspector I
Construction Inspector II	Construction Inspector II	Engineering Inspector II	Senior Construction Inspector	Senior Construction Inspector	Construction Inspector II	Public Works Operations Crew Chief	Construction Inspector III	Senior Construction Inspector	Construction Inspector II
Engineering Aide I-III	Engineering Aide	Engineering Aid I/II	Engineering Aide	NA	Engineering Aide	Engineering Aide	Engineering Aide I/II	Engineering Aide	NA
Engineering Tech I	NA	Engineering Tech I	Engineering Technician	Engineering Tech I	Engineering Aide Assistant	Engineering Technician	Engineering Tech I	Engineering Technician I	Engineering Drafting Technician I
Engineering Tech II	NA	Engineering Technician II	Senior Engineering Technician	Engineering Tech II (Office)	NA	NA	Engineering Technician II/III	Engineering Technician II	Engineering Drafting Technician II
Senior Civil Engineer	Principal Civil Engineer	Supervising Professional Engineer	Senior Civil Engineer	Civil Supervising Engineer	Principal Engineer	Assistant City Engineer	Engineering Manager	Senior Engineer	Principal Civil Engineer
Senior Civil Engineer Technician I-II	Principal Engineering Aide	Supervising Engineering Technician	Senior Engineering Technician	Senior Traffic Engineering Technician	NA	NA	Senior Engineering Technician	Senior Engineering Technician	Traffic Technician
Senior Survey Technician	Survey Technician II	Survey Party Chief	Senior Survey Technician	Senior Surveying Technician	Assistant Engineer	NA	Survey Technician II	Survey Field Supervisor	Survey Party Technician II
Survey Technician	Survey Technician I	Survey Party Technician	Survey Technician	NA	Engineering Aide	Engineering Technician	Survey Technician I	Instrument Person	Survey Party Technician I

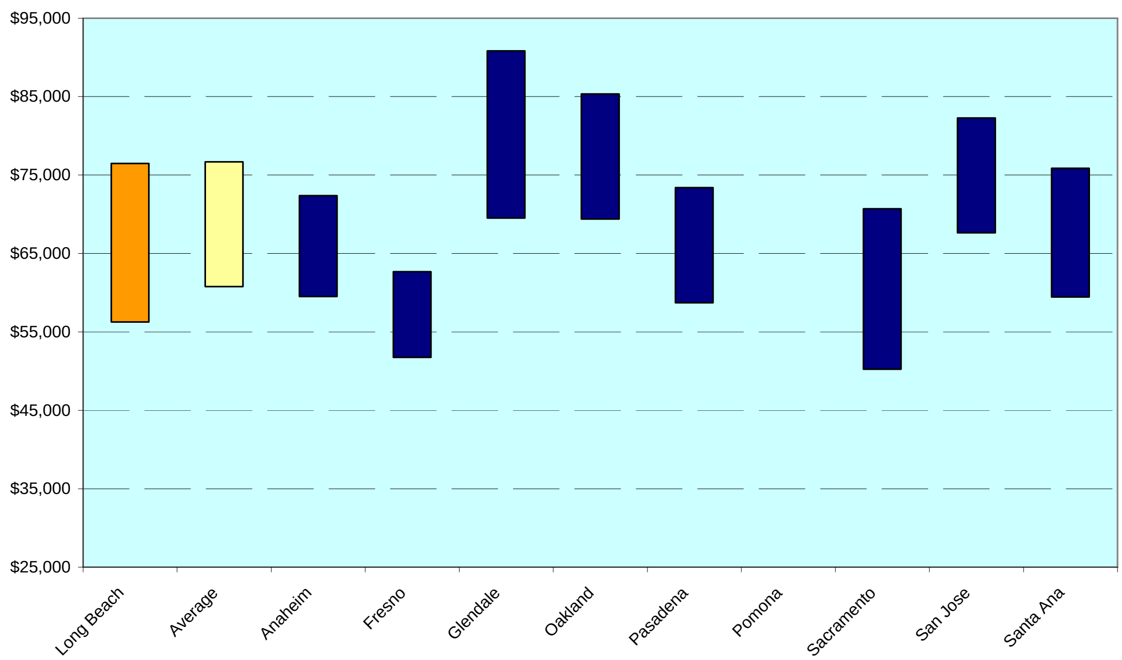

Construction Inspector I Comparable Annual Salary Ranges
$85,000
$75,000
$65,000
$55,000
$45,000
$35,000
$25,000
Long Beach
Average
Anaheim
Fresno
Glendale
Oakland
Pasadena
Pomona
Sacramento
San Jose
Santa Ana


Construction Inspector II Comparable Annual Salary Ranges
$95,000
$85,000
$75,000
$65,000
$55,000
$45,000
$35,000
$25,000
Long Beach
Average
Anaheim
Fresno
Glendale
Oakland
Pasadena
Pomona
Sacramento
San Jose
Santa Ana

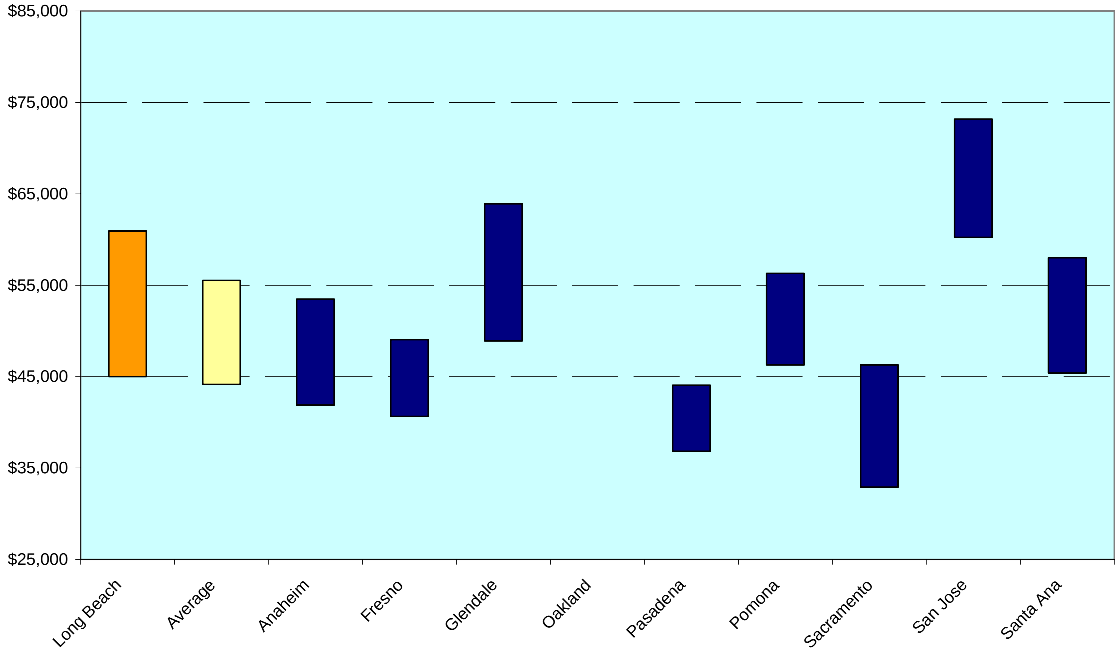
Senior Survey Technician Comparable Annual Salary Ranges



Surveyor Comparable Annual Salary Ranges



Survey Technician Comparable Annual Salary Ranges



Appendix II: Summaries of Comparable Cities' Survey Responses

The following summarizes the survey responses and phone conversations completed by each jurisdiction. Due to widely varied participation levels, some of the comparable cities have significantly more detailed information available than others.

Anaheim:

Anaheim: Survey Data Summary (FY 2007)				
	Units	Highways	Local Streets	% Outsourced
Responsible for:	Centerline miles	155.5	425.0	100%
Slurry Sealed:	Square feet	0.0	3,348,000	30%
Overlayed/Reconstructed:	Centerline miles/Sq ft	6.8	895,500	100%
Potholes repaired	Potholes	1,029		100%

Anaheim uses a Pavement Management System (PMS) called "Pave Pro," which rates street conditions on a scale of 0 to 100. Pave Pro generates and recommends different plans for street rehabilitation based on different scenarios projected over the next five years. Anaheim's highways are surveyed once every two years while local streets are surveyed every four years. The average reported scores were 81 for highways and 83 for local streets.

The City is presently considering issuing bonds as a means of providing additional funding for its routine rehabilitation program. If approved, these bonds will fund the street improvements planned for urban renewal zone referred to as the "Platinum Triangle" area.

According to the FY08 adopted budget, Anaheim expects to receive a total of $17.5 million in intergovernmental revenue to its Gas Tax and Roads fund. $2.6 million of this comes from the Gas Tax, $4.5 million from basic Measure M, $5.8 million from competitive Measure M grants, and the remainder from various grants, bonds, and fees.

Anaheim's Public Works Department holds a monthly Utility Coordination Meeting, where various departments and outside agencies attend to review the status of all ongoing projects.

Fresno:

Fresno is currently implementing a pavement management system called "Transmaps," which will rate street conditions on a scale of 0 to 100. Since this will be the City's first pavement management system, current and historic data is presently unavailable. Anecdotally, the head of the streets maintenance division reported a noteworthy decline in street quality over the past five to ten years. He likewise assessed current street conditions at moderate to poor on average.

In 2005, Fresno issued $46 million in bonds for street improvements under the City's "No Neighborhood Left Behind" program. Most of these funds were used to improve the quality of streets in neglected areas, with an overarching goal of revitalizing some of the City's lower income areas.

In conjunction with this effort, the City held a "Pave Off" that placed City work crews and local contractors in a competition to add new gutters, curbs, sidewalks, and streetlights to fourteen inner city neighborhoods.[23]

Glendale:

Glendale: Survey Data Summary (FY 2007)					
	Units	**Arterials**	**Collector Streets**	**Local Streets**	**% Outsourced**
Responsible for:	Lane miles	218	154	417	100%
Slurry Sealed:	Lane miles	0	0	24.6	100%
Overlayed:	Lane miles	0	5.15	0	100%
Reconstructed:	Lane miles	0	2.85	0	100%

Glendale's pavement management system estimates a current average score of 73 out of 100, down from 76 in 1999. Due to an incomplete survey response, no additional information is presently available.

Oakland:

Oakland: Survey Data Summary (FY 2007)						
	Units	**Arterials**	**Collector Streets**	**Local Streets**	**% Outsourced**	**Cost**
Responsible for:	Lane miles	697	347	1,244	100%	X
Slurry Sealed:	Lane miles	0	2.40	0.31	100%	$1,299,382
Overlayed:	Lane miles	0.67	2.22	6.03	100%	$1,906,431
Reconstructed:	Lane miles	0	0	0.49	100%	$1,389,413
Potholes Repaired:	Potholes	12,754 repaired, 10,000 remain			0%	$5,229,525
Cost:	Dollars	$8,085,615	$5,304,924	$8,364,686	X	X

Oakland uses the Bay Area Metropolitan Transportation Commission (MTC) "Streetsaver" program to monitor its pavement conditions. Oakland's most recent

[23] City of Fresno, Official Website, *No Neighborhood Left Behind Begins Reshaping Fresno Neighborhoods*, June 1st, 2005.
http://www.fresno.gov/News/PressReleases/2005/NoNeighborhoodLeftBehindBeginsReshapingFresnoNeighborhoods.htm

street condition ratings were 69 for arterials, 62 for collector streets, and 60 for local streets. Beginning in 2008, Oakland will implement MTC's recommended distress survey cycle. This cycle recommends that highways be surveyed every 2 years, and local streets every 5 years. The City was not comfortable comparing its ratings to previous scores, given variability in prior surveying techniques. However, they estimate that it will cost the City $30 million to maintain the current pavement condition of its street infrastructure over the next 5 years.

Oakland currently uses the Greenbook, but plans to transition to using both the Greenbook and Caltrans specifications.

Pasadena:

Pasadena: Survey Data Summary (FY 2007)						
	Units	Arterials	Secondary Highways	Local Streets	% Outsourced	Cost
Responsible for:	Centerline Miles	51	39	171	100%	X
Slurry Sealed:	Centerline Miles	0	0	13	100%	$300,000
Overlayed:	Centerline Miles	0.0	0.3	3.0	100%	$800,000
Reconstructed:	Centerline Miles	0.0	2.0	0.2	100%	$1,000,000
Potholes Repaired:	Potholes	- - - - - - - - - 300 - - - - - - - - -			0%	$75,000

Pasadena uses a pavement management system that was designed in-house. Ranked on a scale of 1 to 70, street conditions are rated 46.6 on average. Street conditions are surveyed every 2 to 3 years. It should be noted that unlike many of the other pavement management systems, Pasadena's PMS does not have the capacity to estimate maintenance costs.

Pasadena's FY 08 budget indicates $2.7 million in Gas Tax revenues, with $1.4 million devoted to capital expenditures, $105,000 for operating expenditures, and $623,000 transferred elsewhere.

Pomona:

Pomona currently utilizes a pavement management system that estimates only the type and cost of repairs. The City does, however, have plans to implement a new system equipped with a pavement condition index.

Professional service agreements for both project design and construction contracts are typically outsourced. Contractors may be used for program and project management, but these managerial duties are typically handled by in-house staff. Approximately 75 percent of street maintenance expenditures go to contractors.

According to its FY 08 budget, the City of Pomona estimates that it will receive $2.9 million in Gas Tax revenue and plans to transfer 99 percent of it into the general fund as an operating appropriation.

Sacramento:

While Sacramento did not complete the survey, they provided information through telephone conversations and a 2006 pavement quality report.

Sacramento: Data Summary (2006)						
	Units	Arterials	Collector Streets	Local Streets	Residential Streets	Industrial Streets
Responsible for:	Lane Miles	588	398	171	1,669	121
Quality of Street:	2 - 10 Points	7.3	7.6	7.5	7.6	6.9
Asphalt Seal (07):	Sq Yards	- - - - - - - - - 1,400,000 - - - - - - - - -				
Overlay (07):	Sq Yards	- - - - - - - - - - 300,000 - - - - - - - - - -				

According to this report:

"The City of Sacramento added about 500,000 square yards of pavement in the 2006 calendar year. This brought the total to over 26.5 million square yards of paved roadway. $12 million was spent resurfacing the existing roadways this past year. However, an additional 7.8 million square yards of pavement was recommended for approximately $71 million worth of resurfacing that was not done due to funding levels. This short fall [sic] contributes to reduced pavement quality levels."

The Sacramento Dept. of Transportation's (DoT) Pavement Quality Index (PQI) ranges from 2.0 to 10.0. The PQI comprises three distinct indices: surface distress, ride comfort, and structural adequacy. 10.0 is a new street, while 4.0 is a street that should be reconstructed. The Department has set a goal of 7.5 for city streets, and currently has an average of 7.37. The citywide PQI score has fallen from 8.4 in 2003.

The Sacramento DoT cites lack of adequate funding as a significant issue. To counteract this, it utilizes a half-inch rubberized slurry or cape, which is made primarily out of recycled tires. While this costs more than the traditional overlay upfront, there are significant long run cost savings associated with the use of this product. Their engineers report that it is particularly advantageous in Southern California as it exhibits a "self-healing" property in warmer climates.

San Jose:

San Jose: Survey Data Summary (FY 2007)	Units	Arterials	Secondary Highways	Local Streets	% Outsourced	Cost
Responsible for:	Lane Miles	1,047	292	2,711	100%	X
Slurry Sealed:	Lane Miles	41.60	15.86	176.98	100%	$25,000,000
Overlayed:	Lane Miles	72.1	0.0	67.4	100%	$26,000,000
Reconstructed:	Lane Miles	0.0	0.0	0.0	0%	$0
Potholes Repaired:	Potholes	- - - - - - - - - 590 - - - - - - - - -			0%	$7,500,000

San Jose uses the MTC Streetsaver Pavement Management System, which ranks street conditions on a scale of 0 to 100. Current reports evaluate major highways at 76, secondary highways at 79 and local streets at 64. The City surveys highway conditions on a 2-year cycle, while local streets are surveyed on a 4-year cycle.

The Streetsaver system estimates the costs of maintenance using the unit cost entered into the system. Estimated costs for maintenance projects, generated by this software, have generally been accurate.

Engineers in San Jose's DPW also cite significant funding issues. They estimate that a one-time investment of $268 million would bring streets to good condition and $34 million each year would be needed to maintain them at this level. Their best case scenario estimates annual revenue of only $24 million per year for the next 9 years. The City has considered raising revenues through other means, such as an additional tax.

City contacts also emphasized the importance of having a pre-construction meeting to align staff priorities with those of the contractors. If necessary, there may also be an internal coordination meeting prior to meeting with the contractors.

Santa Ana:

Santa Ana: Survey Data Summary (FY 2007)	Units	Arterials	Secondary Highways	Local Streets	% Outsourced	Cost
Responsible for:	Lane Miles	NA	440	630	100%	X
Slurry Sealed:	Lane Miles	NA	0	70	100%	$1,500,000
Overlayed:	Lane Miles	NA	30	0	95%	NA
Reconstructed:	Lane Miles	NA	15	0	100%	NA
Potholes Repaired:	Potholes	contracted on demand			100%	NA
Cost:	Dollars	X	$30,000,000	$2,000,000	X	X

Santa Ana uses the MicroPaver system, which operates on a PCI scale of 0 to 100. The City's secondary highways score at 83, while local streets score a much lower 45. Santa Ana surveys street conditions every two years for all streets.

Generally, the Department reports that their highways have improved over the past few years, while the local streets have deteriorated.

According to its FY08 Budget, Santa Ana is expected to receive $6.5 million in Gas Tax revenue and $3.3 million from the Prop 1B infrastructure bond.

Santa Ana's engineers informed us of an upcoming bond issue for street improvements. This bond issue is expected to be for $60 million and will be used primarily for local streets, as fewer funding streams exist for local streets as compared to highways. Most of these funds will be spent over the next 3 years.
The strategy for expending these funds will be to maximize cost effectiveness by focusing on those streets in good to fair condition.