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November 12, 2018

Mr. Habib F. Balian
Chief Executive Officer
Foothill Gold Line Construction Authority
406 East Huntington Drive, Suite 202
Monrovia, CA 91016

Dear Mr. Balian:

This letter and attached white paper are in response to a request for an analysis of the factors that are likely to affect costs for construction of the Foothill Gold Line light rail line extension. I am the chief economist for the Associated General Contractors of America (AGC), a national trade association whose more than 27,000 member companies perform every type of construction other than single-family homebuilding. As chief economist—my position for the past 17 years—I track many types of data relating to construction costs and speak daily to contractors, public and private project owners, suppliers and other stakeholders.

As you know, the latest segment of the Foothill Gold Line was completed in September 2015, ahead of time and under budget. This segment was built when there was excess capacity in the construction industry; nearly flat or even falling prices for many items used in construction; higher unemployment than at present; and minimal increases in wages and salaries.

Since then, however, the construction market has changed dramatically in several respects that make higher costs much more likely when future segments are built. Construction activity has increased, notably for transit and rail construction—a relatively small and specialized subsector with a limited number of current competitors and significant hurdles for new entrants. The labor market has tightened, with unemployment rates at historic lows and the overwhelming share of contractors reporting difficulty finding qualified workers. Wages and salaries are rising at an accelerating pace. Prices for many materials and services used in construction are increasing at the fastest rate in several years.

These cost pressures on contractors are likely to continue. Labor supply will be constrained by rising retirements and flat or declining numbers of new labor market entrants, exacerbated by immigration policies that make it difficult to attract and retain foreign-born workers. Materials costs are likely to go higher, driven in part by recent tariffs—and scheduled tariff increases—affecting key inputs.

The price index that tracks contractors' bid prices suggests that they are beginning to charge more but have not raised prices enough to keep up with rising input costs. Thus, it is likely that there will be some combination of further escalation in bid prices and/or fewer bidders for projects as long as labor and materials costs are rising at current rates or higher. Based on recent demographic, market and policy trends, these cost escalations appear likely to remain in place for several more years.

Feel free to share this letter and attachment, and to contact me at simonsonk@agc.org or 703-837-5313 if you have any questions.

Sincerely,

Kenneth D. Simonson

Kenneth D. Simonson
Chief Economist
Associated General Contractors of America

Construction Cost Trends and Outlook Affecting the Foothill Gold Line Light Rail Extension

Summary

This paper discusses factors likely to affect costs for construction of the extension of the Foothill Gold Line light rail line. Planning, design and construction is overseen by the Foothill Gold Line Construction Authority, an independent transportation planning and construction agency created in 1998 by the California state legislature. The Authority completed the latest segment by September 2015 and opened it in March 2016, ahead of time and under budget. Currently, the Authority is soliciting design-build bids for a 12.3-mile, six station light rail project. The line ultimately will extend to Montclair, along the Foothills of the San Gabriel Valley.

The latest segment of the Foothill Gold Line was built when there was excess capacity in the construction industry; nearly flat or even falling prices for many items used in construction; higher unemployment than at present; and minimal increases in wages and salaries. These conditions allowed construction to occur ahead of schedule and under budget.

Since then, however, the construction market has changed dramatically in several respects that make higher costs much more likely when future segments are built. Construction spending has increased, notably in transit and rail construction—a relatively small and specialized subsector with a limited number of current competitors and significant hurdles for new entrants. The labor market has tightened, with unemployment rates at historic lows and the overwhelming share of contractors reporting difficulty finding qualified workers. Wages and salaries are rising at an accelerating rate. Prices for many materials and services used in construction are rising at the fastest rate in several years.

These cost pressures on contractors are likely to continue. Labor supply will be constrained by rising retirements and flat or falling numbers of new labor market entrants, exacerbated by immigration policies that make it difficult to attract and retain foreign-born workers. Materials costs are likely to go higher, driven in part by recent tariffs—and scheduled tariff increases—affecting key inputs.

Future bid prices—the relevant consideration for the Authority—are likely to reflect past recent bid prices as well as contractors' expectations about future labor and materials costs. The nearest proxy for light rail construction bid prices is a Bureau of Labor Statistics price index that tracks the price contractors say they would charge to put up new nonresidential buildings. Recent acceleration in this index suggests that contractors are beginning to charge more but have not yet raised prices enough to keep up with rising input costs. Contractors that cannot cover these costs are likely to avoid bidding Thus, it is likely that there will be some combination of further escalation in bid prices and/or fewer bidders for projects as long as labor and materials costs are rising at current rates or higher. Based on recent demographic, market and policy trends, these cost escalations appear likely to remain in place for several more years.

Construction Cost Trends and Outlook Affecting the Foothill Gold Line Light Rail Extension

Introduction

This paper is written in response to a request for an analysis of the factors that are likely to affect costs for construction of the extension of the Foothill Gold Line light rail line. Planning, design and construction are overseen by the Foothill Gold Line Construction Authority, an independent transportation planning and construction agency created in 1998 by the California state legislature. The agency completed the latest segment by September 2015 and opened it in March 2016, ahead of time and under budget. Currently, the agency is soliciting design-build bids for a 12.3-mile, six station light rail project. The line ultimately will extend to Montclair, along the Foothills of the San Gabriel Valley.

The price of construction services, like most other privately supplied goods and services, reflects supply and demand. In the case of the Foothill Gold Line project, the relevant factors include:

- the amount of construction activity overall and in the specialized market for light rail and similar projects;
- the supply and cost of labor with the requisite skills; and
- the cost of purchased materials and services.

This report discusses the data sources relevant to each of these factors and what they show about how the cost of construction has changed from 2016 to the present. The report concludes with general predictions about costs for the project, given that the Authority is seeking design-build bids now for a project with an expected eight-year design-build timeline.

Construction activity

One critical element affecting the cost of a project is the number of bidders—in this case, construction firms with the expertise to build rail projects in existing urban right-of-way. The number of such firms is quite limited, and their willingness to bid on the Foothill Gold Line extension may be affected by the volume of work available nationwide.

Each month, the U.S. Census Bureau reports (at www.census.gov/constructionspending) on "value put in place," or spending on construction under way across the United States. The Bureau reports construction spending separately for state and local projects and privately owned projects, with varying degrees of detail.

For the Foothill Gold Line project, the most relevant measure of comparable construction activity comes from two series: state and local mass transit construction and private railroad transportation. Private railroad transportation construction involves some of the same types of crews, equipment and companies as mass transit construction. Both types of construction entail building (or relocating) utilities, grade crossings, yards and repair facilities, and communications and power structures.

Spending on both categories declined nationally in 2016 and increased in 2017 and year-to-date in 2018. The annual total for state and local mass transit construction spending in 2016, $7.1 billion, was 6% less than in 2015. Mass transit construction spending in 2017 totaled $7.4 billion, 5% higher than in 2016. The total for the first nine months of 2018 combined rose by a further 6% compared to January-September 2017.

Spending on private railroad transportation shows a similar pattern. The 2016 total, $9.9 billion, was 15% less than in 2015. Spending in 2017 increased 2%, to $10.1 billion. The data for private land transportation in the first nine months of 2018 showed a further 1% increase over January-September 2017. (Railroad construction is not shown separately in the monthly release, but the more detailed annual report shows that around 90% of the private land transportation total is rail, rather than trucking, motor coach, taxi, etc.).

The combined total for state and local mass transit construction and private railroad construction shows a 9% decline in spending in 2016, followed by nearly two years of increases. Thus, it is likely that some construction firms exited this segment of the industry following the steep downturn of 2016, while remaining firms are now much busier—to the point that some may not have the capacity to take on a project as large as the Foothill Gold Line extension.

Construction employment and labor costs

Bid prices are likely to reflect bidders' expectations regarding the availability and cost of qualified labor, as well as materials and services they must purchase. Indications about future labor supply and cost may be inferred from data on employment and wage trends, along with surveys of contractors' expectations.

The Bureau of Labor Statistics (BLS) reports on construction employment—nationally on the first Friday each month (at www.bls.gov/ces) and at the state and metro level about two weeks later (at www.bls.gov/sae). The relevant subsector of construction employment for the Foothill Gold Line extension is called heavy and civil engineering construction.

Heavy and civil engineering construction employment in California increased by 3.6% from 2014 to 2015 but only 1.9% from 2015 to 2016. Employment in the subsector declined on a year-over-year basis in the state in December 2016 through February 2017. Employment growth has resumed since then; employment increased 3.5% for 2017 as a whole and has averaged a 4% increase through the first nine months of 2018 compared with the same months in 2017. These statewide patterns are broadly consistent with the national figures on construction spending for transit and rail, thus supporting the notion that contractors are busier now and may less willing to hold down bid prices to win new contracts than in 2016.

BLS also reports on average hourly earnings for all employees in construction firms nationally and statewide. (The sample size for this calculation is too small to allow BLS to report industry figures by metro area or for heavy and civil engineering construction at the state level.)

Average hourly earnings for all construction industry employees in California actually declined 0.3% from 2014 to 2015 and increased 3.2% from 2015 to 2016. In 2017, the increase was 5.2%. Thus, contractors experienced much higher wage and salary costs per worker in 2017 than in the previous two years.

The pay increases are most likely in response to a shrinking supply of available workers, particularly hourly craft workers. The Associated General Contractors (AGC) of America, the only national construction trade association that represents all types of construction other than single-family homebuilding, conducts a survey of its members each summer regarding workforce issues. In the survey that AGC released in late August 2018 (www.agc.org/WorkforceSurvey), 80% of the 2,552 respondents reported their firms were having trouble filling hourly craft positions. For all but one of the 20 craft positions included in the survey, a majority of the firms that employ those crafts reported the positions were harder to fill than the year before. As a result, 62% of respondents said their firms were raising

base pay to attract and retain hourly workers, and 47% said they were raising their bid or contract prices to cover the higher costs related to hiring difficulties. In addition to higher pay, those costs include more money spent on outreach and recruitment, training of new employees, and overtime when there are not enough workers.

Two recent BLS releases show why contractors say it is so hard to find qualified employees. BLS reported as part of its October employment release on November 2 that the number of unemployed jobseekers whose previous job was in construction was the lowest October total since the agency began calculating that figure in 2000. BLS reported on November 7 (at www.bls.gov/jlt) that the number of job openings in construction at the end of September was the highest for September in the 18-year history of the agency's Job Openings and Labor Turnover Survey (JOLTS). (Unemployment and job openings are available only at the national level.)

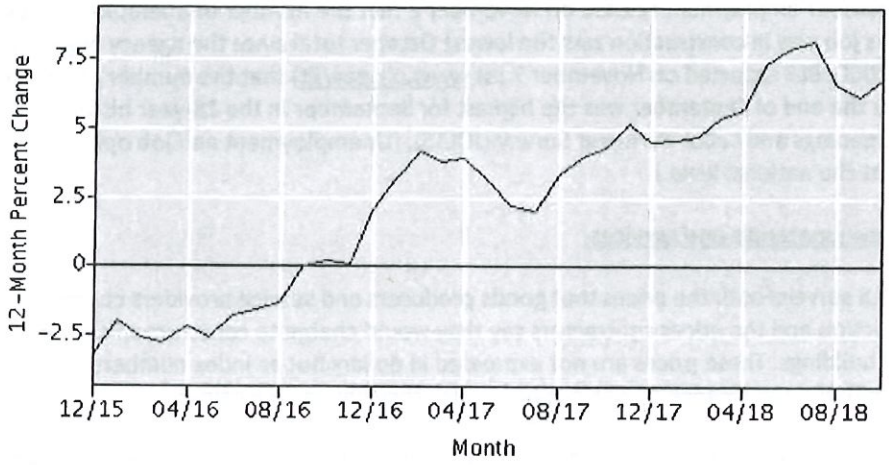
Cost of purchased materials and services

Each month, BLS surveys both the prices that goods producers and service providers charge for items used in construction and the prices contractors say they would charge to construct a fixed set of nonresidential buildings. These prices are not expressed in dollars but as index numbers (posted at www.bls.gov/ppi), the significance of which is how much they change over time.

For the Foothill Gold Line projects, the producer price index (PPI) that best tracks the cost of what contractors purchase is the PPI for "other" new nonresidential construction. "Other" covers the inputs to highways and streets, power and communications structures, educational and vocational structures, and other miscellaneous nonresidential construction; it excludes commercial, healthcare and industrial structures. The index measures the change in the cost of all materials that go into projects, services purchased by contractors, and the items they consume such as diesel fuel.

This index declined 3.2% from December 2014 to December 2015 and continued to decrease on a year-over-year basis until August 2016. For the next three months, it was roughly flat compared to year-earlier levels. But it has steadily accelerated since November 2016. In the 12 months ending in October 2018, the index climbed 6.8%, BLS reported on November 9. Thus, estimates of construction costs that were prepared in 2016 may have reflected rates of change far below recent experience. (See the graph below, copied from www.bls.gov/ppi on November 10, 2018.)

12-month percent change in PPI for net inputs to other nonresidential construction, excluding capital investment, labor, and imports, not seasonally adjusted



A variety of input costs contributed to the acceleration in this PPI. Two of the fastest-rising PPIs for materials are the PPI for steel mill products, which jumped 18.2% from October 2017 to October 2018, and the PPI for aluminum mill shapes, which climbed 8.2%. Both of these categories of products are subject to tariffs imposed in 2018. Even if the steel and aluminum products that are purchased for Foothill Gold Line projects are produced in the United States, their prices are likely to rise as suppliers match the price increases that result from tariffs on competing products.

Bid prices

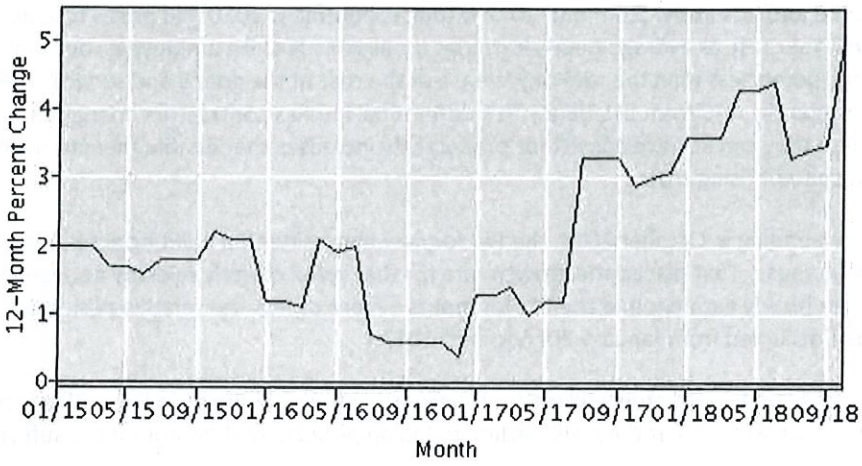
Because the Foothill Gold Line extension contract will be awarded as a design-build project, bidders—not the Authority—will have to absorb any changes in the costs of labor and purchased materials and services. Therefore, in addition to examining trends in input costs, evidence regarding recent changes in bid prices should be useful in predicting future bid prices.

Although there is no price index that matches the type of projects involved in the Foothill Gold Line extension, the Bureau of Labor Statistics posts a producer price index that tracks the price that contractors say they would charge to put up new nonresidential buildings—a close proxy for the pricing likely for the Foothill Gold Line work. This index measures the amount a fixed group of contractors say they would charge to erect the same set of buildings as in previous periods. While the index measures nonresidential building construction and not "other" nonresidential structures, the change in input and labor costs for the two categories of structures has been similar, and it is likely the changes in the output indexes (bid prices) would have similar tracks, as well.

This index increased at a fairly steady year-over-year rate of close to 2% throughout 2015, then slowed to an increase of 0.7% or less in the second half of 2016. The index began accelerating in mid-2017,

rising to a 5.0% increase in the 12 months through October 2018. That was the largest year-over-year gain in that index since it was created in June 2009. (See the graph below, copied from www.bls.gov/ppi on November 10, 2018.)

12-month percent change in PPI for nonresidential building construction, not seasonally adjusted



The outlook

Several factors make it likely that construction costs—and bid prices—will not revert to the decreases or minimal increases recorded in 2015 and 2016. If anything, prices may soon rise even more rapidly.

First, the overall level of construction activity appears likely to remain near present levels and perhaps increase. Total construction spending has been rising at roughly a 5% year-over-year rate (not adjusted for inflation) throughout 2018, according to Census figures. Over three-fourths of the participants in the AGC workforce survey reported that their firms intend to increase their headcount in the coming year. That is a strong indication they expect to have more work to perform, as is the record level of job openings reported in the JOLTS data.

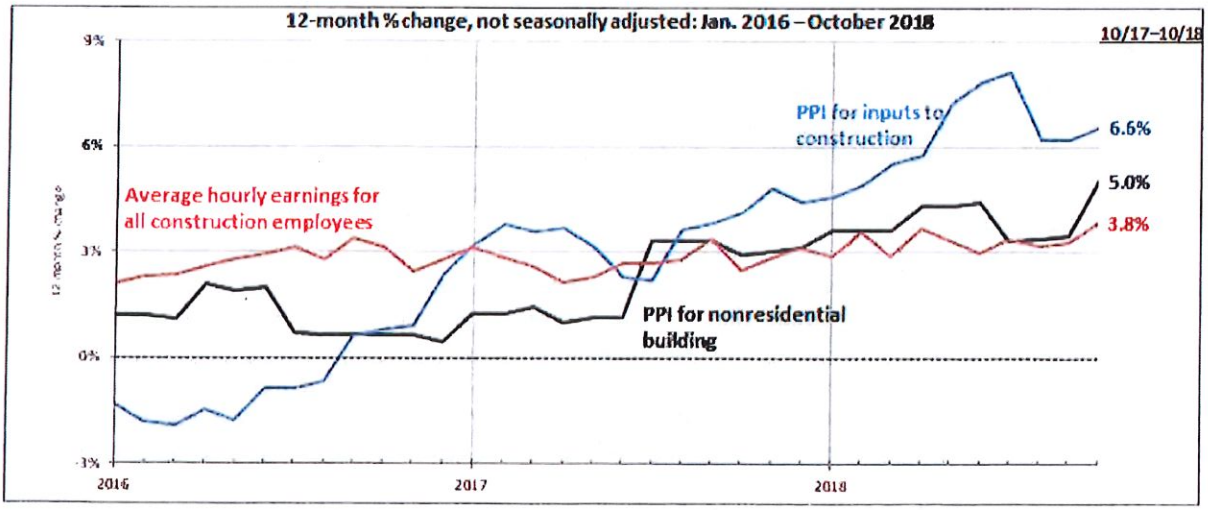
Second, labor costs seem likely to rise at least as fast as the current rate of increase, given the current tight labor supply and the prospect that supply will increase even more slowly in the future. For the entire economy, the growth rate of the workforce has dropped to roughly 0.5% per year, from a long-time average of 1%, and appears to be headed still lower, as the number of retirees increases while the number of 18-24 year-olds entering the job market levels off or shrinks. The overall unemployment rate is at a 49-year low, suggesting that contractors will have to increase compensation at a steeper rate to attract first-time jobseekers, workers who have left the labor force, and employees from other industries. Construction faces an added challenge in that the industry has historically relied on foreign-born workers to a greater extent than have employers overall. Now, fewer of those workers are coming to the United States, and some who are here have been leaving the country or dropping out of the labor force to avoid detention or deportation.

Third, materials costs may increase even more in 2019 than they have so far in 2018. Some tariffs have taken effect only recently, and the impact on domestic prices may not have been fully felt, especially by contractors that are receiving goods under contracts signed before the tariffs were announced. By 2019, many more products will be exposed to the full impact of those tariffs. In addition, the Trump administration has imposed tariffs of 10% on $200 billion of Chinese imports, many of which are used in construction; the tariff rate on those items is scheduled to increase to 25% on January 1, 2019.

While it is not inevitable that contractors will pass along higher labor and materials costs in their bids, such an outcome appears likely. From mid-2017 through September 2018, bid prices rose at about the same year-over-year rate as average hourly earnings for all construction employees, but that rate is 1-to-4 percentage points less than the rate of increase of the cost of the goods and services they buy. (See graph below, drawn by AGC from BLS data.) This differential implies contractors' margins are being squeezed, unless they can achieve consistent productivity increases that enable them to maintain profitability in spite of rising costs.

In the 12 months ending in October 2018, the PPI for new nonresidential building accelerated to a 5.0% annual rate of increase. That placed the growth rate for that index roughly midway between the growth rates for average hourly earnings and the PPI for inputs—more or less the relative position the new-building PPI had occupied from January 2016 to mid-2017.

This suggests either that contractors will return to increasing their bid prices in line with the rise in materials and labor costs, or that they will decline to bid on projects that do not offer a sufficient profit potential.



Conclusion

The latest segment of the Foothill Gold Line was built when there was excess capacity in the construction industry; nearly flat or even falling prices for many goods and services used in construction; higher unemployment than at present; and minimal increases in wages and salaries. These conditions allowed construction to occur ahead of schedule and under budget.

Since 2016 the market has changed substantially in several respects that make higher costs much more likely when future segments are built. Recent increases in construction spending, notably in transit and rail construction—a relatively small and specialized subsector with a limited number of current competitors and significant hurdles for new entrants—suggest there may be few bidders for some types of projects. The labor market has tightened, with unemployment rates at historic lows and the overwhelming share of contractors reporting difficulty finding qualified workers. Wages and salaries are rising at an accelerating rate. Prices for many materials and services used in construction are rising at the fastest rate in several years.

These cost pressures on contractors are likely to continue. Labor supply will be constrained by rising retirements and flat or falling numbers of new labor market entrants, exacerbated by immigration policies that make it difficult to attract and retain foreign-born workers. Materials costs are likely to go higher, driven in part by recent tariffs—and scheduled tariff increases—affecting key inputs.

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Kenneth D. Simonson
Chief Economist
Associated General Contractors of America
November 12, 2018

Mr. Simonson has been the chief economist of the Associated General Contractors of America (AGC) since 2001. He has been invited to make presentations on construction costs and workforce by transit authorities in Denver and Los Angeles as well as federal, state and local agencies throughout the United States. His weekly summary of economic news relevant to construction, *Data DIGest*, goes to 45,000 contractors, public and private owners, and other stakeholders. Ken is a member of the Census Scientific Advisory Council and the Bureau of Labor Statistics' former Data Users Advisory Council. He is a Fellow and past president of the National Association for Business Economics, the professional society for people who use economics in the workplace. He has more than 40 years of experience analyzing, advocating and communicating about economic and tax issues. Ken has a BA in economics from the University of Chicago and an MA in economics from Northwestern University.

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