

**Orange County Business Council  
Orange County Transportation Infrastructure Construction Cost Index  
Fall 2019**

**Orange County Business Council Research Team**

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**Background and Purpose**

As a supplementary examination to the Next 10: Market Conditions Forecast and Risk Analysis study delivered by Orange County Business Council (OCBC) in September 2017, the Orange County Transportation Authority (OCTA) Board of Directors (Board) requested further study and exploration of potential cost fluctuations beyond existing cost analysis from the California Department of Transportation's (Caltrans) Construction Cost Index (CCI) and internal OCTA analysis. Recent increases in construction costs combined with concerns over sales tax revenue growth trends have necessitated forward looking projections to determine the ability for OCTA to adequately fund a number of transportation and infrastructure projects aimed at alleviating traffic congestion and increasing the quality of life for Orange County residents.

In order to do so, the OCBC team has analyzed annual trends in material costs, labor costs and general economic conditions to determine a range of potential cost increases with a time horizon out until 2022 by collecting and tracking relevant market data and indicators and performing data analytics on these datasets. In doing so, and providing these findings to OCTA's Board, more accurate budgets can be determined reducing the potential risk of cost pressure and project delivery slowdowns due to financial constraints. The result of this analysis has been the creation of an Infrastructure CCI which provides a range of potential cost fluctuations for 2020, 2021, and 2022.

**Findings and Discussion**

OCBC has updated the Orange County Transportation Infrastructure CCI score, forecast to 2020, 2021, and 2022. The index value is "3" in each year.

Year	Index	Cost Increase Range (annual)
2020	3	2% - 6%
2021	3	2% - 6%
2022	3	2% - 6%

The cost pressure model shows cooling compared with the previous forecast from March 2019. Cost pressures have, on net, slowed in the most recently available data.

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Existing cost pressures are at cross-purposes, netting out to the mid-range index value of “3.” The cost pressure model has four primary inputs: California building permit activity, California unemployment rate, materials costs for transportation projects as tracked by Caltrans, and wages in Orange County’s construction workforce. Building permitting has slowed considerably in the state, and the unemployment rate, while still low, has leveled off. Materials costs are showing mixed signals, and Orange County construction wages continue to rise. The fundamentals are at cross-purposes. The slowdown in building permits is often associated with low infrastructure cost pressure, while rising wages are associated with rising cost pressure. At the current time, these factors are netting out to moderate annual cost increases forecast in the 2-6% range each year through 2022. We advise that OCTA continue to monitor conditions, as factors that influence unemployment rates, including the macro-economy, could tip the balance in either direction going forward. At this point we do not see sustained high cost pressures in the forecast.

**Recent Data Trends**

The cross-cutting economic trends can be seen in recent trends in key factors associated with infrastructure costs. Table 1 shows the values for 2016 through 2018 and the 2019 values based on projections from quarterly data. Building permitting in California is clearly slowing, the unemployment rate is dropping but at a less rapid pace, and construction labor costs (wages) in the county are rising. Building materials costs are multi-faceted and not shown, but on net building materials costs are rising at rates similar to but slightly less than in the 2016 to 2018 time-period.

**Table 1: Infrastructure Cost Correlates, Annual Percentage Changes, 2016-2019**

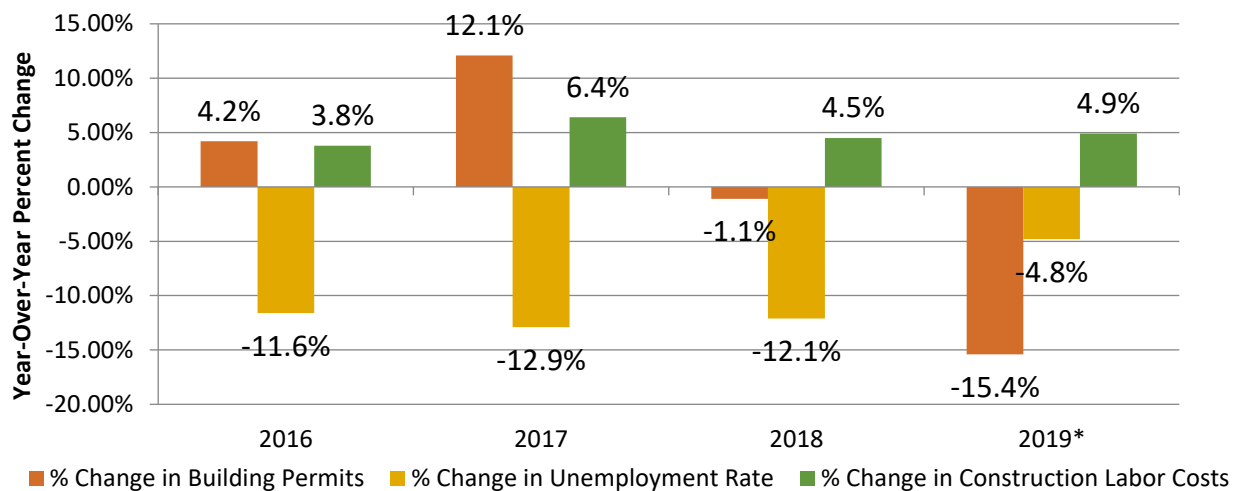
Year	California Building Permits	% change year-on-year	California Unemployment Rate	% change year-on-year	Orange County Construction Labor Costs (average. annual wage)	% change year-on-year
2016	102,350	4.2%	5.5%	-11.6%	\$67,179	3.8%
2017	114,780	12.1%	4.8%	-12.9%	\$71,474	6.4%
2018	113,502	-1.1%	4.2%	-12.1%	\$74,669	4.5%
2019*	96,067	-15.4%	4.0%	-4.8%	\$78,313	4.9%

\* 2019 values projected from year-on-year changes in quarterly data, 2018 to 2019.

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Building permitting activity has slowed notably in the most recent California data. While the statewide unemployment rate remains near record lows, the pace of decrease has started to decline, suggesting potential economic uncertainty in the future. Finally, percentage changes in Orange County construction labor costs remain steady at 4.9% in 2019, slightly above the increase seen in 2018, likely a result of low overall unemployment and the undersupply of Orange County construction workers. Meanwhile, the Caltrans CCI while anticipated to increase, is slowing after increasing by an annual average of nearly 13% between 2013 and 2018.

**Figure 1: Year-over-Year Percent Change in California Building Permits, California Unemployment Rate, and Orange County Construction Labor Costs, 2016-2019**



\* 2019 values projected from year-on-year changes in quarterly data, 2018 to 2019.

### Forecasting Method

OCBC used a series of regression analyses, and forward-looking projections to create the Infrastructure CCI. This index provides a ranking from 0-5, with each rank corresponding to range of percent changes in overall construction costs. Table 2 below highlights each Index ranking and the proposed range of cost fluctuations which have been provided on a low, midpoint, and high scale.

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**Table 2: OCBC Orange County Transportation Infrastructure CCI Score Ranking - Implied Range of Construction Cost Change**

Index Score	Low	Midpoint	High
0	-17%	-9.5%	-2%
1	-2%	-0.5%	1%
2	1%	1.5%	2%
3	2%	4%	6%
4	6%	8.5%	11%
5	11%	25.5%	40%

These ranges are built to be forecasting tools, with scores indicating public construction forecast cost increase. Values of 2 and 3 indicate somewhat normal inflationary environments. A value of 4 is a high inflation environment. A value of 1 is a low inflation/deflationary environment. Values of 0 and 5 correspond to the most extreme conditions observed in Orange County over the past two decades, and hence the ranges for those values are wide due to the unusual nature of the highly deflationary environment that occurred immediately prior to and during the Great Recession and the high cost inflation environment that occurred in the building boom years of the early 2000s.

### **Methodology**

To determine the Transportation Infrastructure CCI, the OCBC team started by aggregating several datasets, measures, and indicators on an annual basis as far back as 1972. Among others, these measures included the Caltrans CCI, state-level building permits and unemployment rates, material costs, and construction labor costs.

The OCBC team examined how the various measures and indicators of construction costs varied with changes in (1) building permitting activity, (2) unemployment rates, (3) materials costs, (4) labor costs, and recent past trends in construction inflation. Using statistical analyses, the research team has built a forecasting model that projects forward cost increases.

### **Appendix: Changes in Infrastructure Materials Costs 2016-2019 (all values are percent year-on-year changes)**

Year	Aggregate	PCC Pavement	PCC Structure	Steel Structure	Steel Bar
2016	9.4%	8.5%	7.6%	26.3%	35%
2017	24.2%	107.8%	26.9%	-51.0%	-21%
2018	18.9%	26.9%	17.2%	-58.8%	9.4%
2019 *	5.6%	-17.03%	13.4%	-34.9%	16.2%

Portland Concrete Cement

\* 2019 values projected from year-on-year changes in quarterly data, 2018 to 2019.