2020 UPDATE

LOS ANGELES CONSTRUCTION MARKET ANALYSIS

March 2020

Prepared by

Metro

KKCS/TRIUNITY JV


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Executive Summary

Delivering Metro Projects for the Next 10 Years

With many major capital projects in construction, and more in the next few years, Metro is on track to achieve ambitious goals. In addition to routinely reviewing project status, Metro uses the Construction Market Analysis as a tool to gauge progress, assess current and future market conditions, and adjust strategies for attaining its 10-year goals.

The economy has been growing at all levels, and robust national and regional capital programs compete for limited resources putting a strain on the construction industry. In response, innovative approaches to construction delivery coupled with ongoing implementation of best management practices present opportunities for Metro to remain competitive in this challenging market. This report focuses on how these conditions will impact delivery of Metro's projects and influence contractor bids.

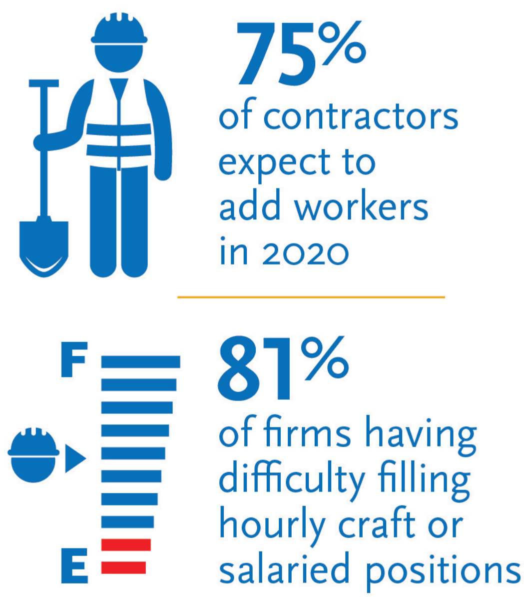
Market analysis findings have been incorporated into a strategic assessment of Metro's strengths, weaknesses, opportunities, and threats (SWOT) with associated recommendations. These findings and recommendations accent Metro's ability to plan around market challenges:

- Volatile commodity pricing
- High demand for resources, along with increased competitive bidding from more contractors
- Completing projects within schedule and budget baselines.

Key Indicator:
Los Angeles tied Seattle for the most construction cranes in the US in 2019.

Economic Conditions

Overall, the US economy in 2019 maintained steady momentum, while both California and Los Angeles growth outpaced the rest of the country. Major economic events that impacted the construction industry included the US trade treaty with Canada and Mexico, on-going trade negotiations with China, California's $1.8 billion subsidies and expanded tax credits to address the housing shortage, and recovery efforts from natural disasters across California. While normal economic cycles assume a "correction" or recession will eventually transpire, the economy in the short term is poised to continue positive employment and growth trends.



State of the Construction Industry

Transportation construction expenditures increased by 8% in 2019 for a total of $73.1 billion nationwide. This level of expenditure is forecast to grow approximately 5% in 2020 largely because of increased funding from all levels of government.

Unemployment in the construction industry is exceptionally low at 3.6%, and the number of construction job openings are at the highest levels since 2000. An Associated General Contractors of America survey found that 75% of contractors expect to add workers in 2020 and 81% of firms indicated difficulty filling positions.

A "perfect storm" of conditions is occurring in the Los Angeles region's construction industry:

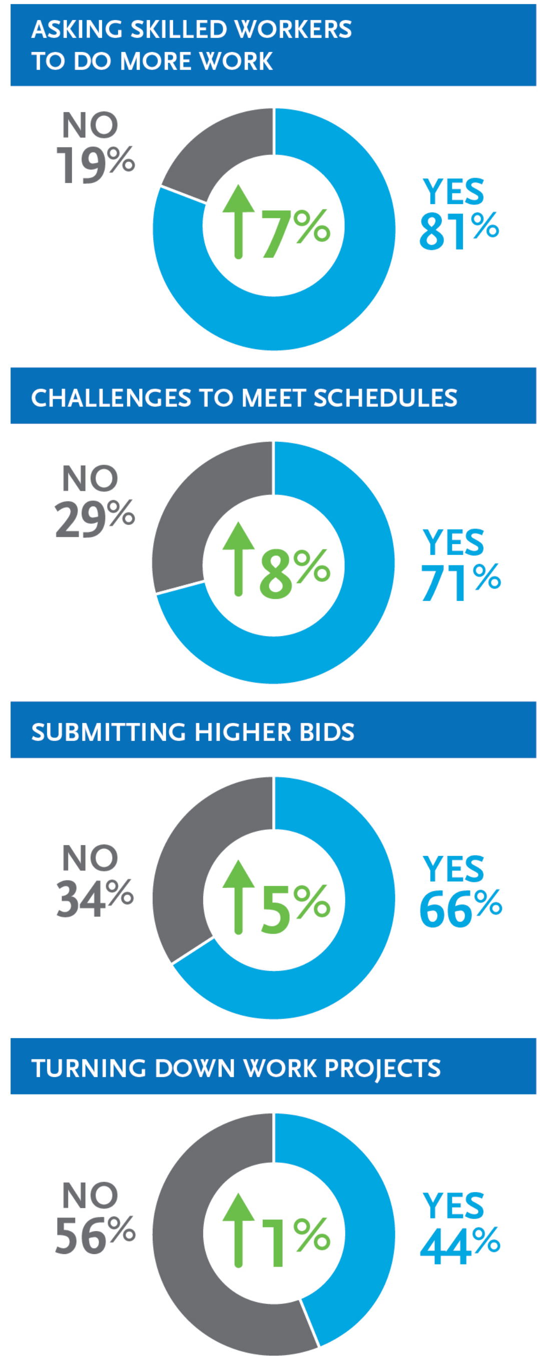
- Shortage of skilled construction labor
- Low unemployment
- Large amount of ongoing and planned work

Market corrections have normalized the cost of commodities and materials after a spike a year ago during potential trade tariff tensions. However, cost escalations appear likely to continue for several more years.

The COVID-19 coronavirus is creating a global economic impact that may hurt supply chains for the construction industry. However, is too early to tell the significance and duration of what economic impact may result from the coronavirus.

Contractor Response to Skilled Labor Shortage

Average annual change since 2018



Emerging Trends Challenge "Business as Usual"

Although increasing demands on the construction industry are causing a labor shortage and higher prices, they are also changing how owners and contractors approach the marketplace. These emerging trends challenge "business as usual."

- Megaprojects are growing not only in number, but in scale and complexity. The average size of a megaproject is expected to increase 37% from $2.1 billion to $2.9 billion between 2019 and 2023, making projects that have historically been difficult to control cost and schedule even more challenging.
- Contractors are more selective when bidding work, gravitating toward "owners of choice" while steering away from fixed-price contracts and their associated risks.
- Contractors are weighing the risks and rewards of the P3 market; some are moving away, while others are embracing the innovative alternative delivery method.
- Alternative delivery methodologies such as Construction Manager/General Contractor and Progressive Design Build, are gaining traction to attract bidders to a more "risk friendly" contracting environment.

Metro's Response to Shifting Construction Market Conditions

Three intended outcomes have shaped Metro's strategy for adapting to evolving market conditions: (1) increase the labor pool, (2) be the owner of choice, and (3) create a stronger, more resilient organization. They resulted in a broad array of actions.

Increase the Labor Pool

Metro recognizes the need to build and train a diverse, inspired, and high-performing workforce. It has made significant strides toward developing a larger labor pool and embarked on bold strategies to develop the next workforce generation.

The percentage of women in construction has not changed for years, despite several initiatives to address this issue. Metro is paving the way for women to enter the construction workforce through several initiatives:

- WIN-LA
- SEED Transportation School
- E3 Youth Initiative
- Female Construction Scorecard
- Women Build Metro LA

Be the Owner of Choice

Metro remains focused on adapting to changing market conditions to attract more bidders to drive innovation and to support competition in the private sector.

- Reducing risk associated with firm-fixed-price contracting in favor of alternative deliveries, where appropriate
- Conducting contractor outreach to attract more bidders, such as industry forums and market soundings
- Scaling projects to increase competition and create more bidding opportunities for smaller contractors.

Megaprojects: Increasing in Number, Size, and Complexity

473 MEGAPROJECTS PLANNED IN U.S. FOR NEXT 4 YEARS (TO 2023)

40% OF NATIONAL TOTAL FOR PLANNED MEGAPROJECTS ARE IN CALIFORNIA, TEXAS, AND NEW YORK

37% INCREASED AVERAGE SIZE EXPECTED FROM $2.1 B TO $2.9 B

90% OF MEGAPROJECTS IN THE US EXPERIENCE SCHEDULE DELAYS AND COST OVERRUNS

12 METRO MEGAPROJECTS (> $1B) TOTALING $35B ARE UNDER CONSTRUCTION OR PLANNED IN NEXT 10 YEARS

Create a Stronger, More Resilient Organization

Metro is implementing the largest transportation expansion program in the country during a time of booming construction activity in Southern California. Consequently, Metro has started to implement critical steps to plan and build projects more cost effectively and with less risk using these actions:

- Applying recent lessons learned to overcome the cost and schedule challenges historically associated with megaprojects
- Greater collaboration among Metro departments to better manage scope and costs
- Risk management and contingency planning that accounts for current and trending macroeconomic conditions

External Factors Influencing Metro

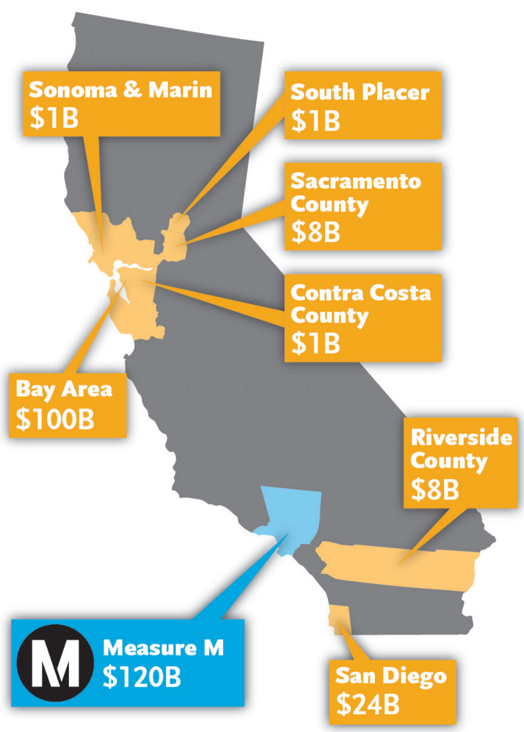
While Metro continues to respond to shifting market conditions, external factors largely beyond Metro's control remain. However, strategies can and are being developed to optimize beneficial external factors and minimize detrimental external factors.

Beneficial External Factors

- An economic downturn may ease the construction market demand, creating greater availability in the workforce and more competition on Metro procurements.
- The fate of the next federal surface transportation bill creates uncertainty because federally funded projects may be delayed, and contractors would look to Metro for locally funded work.
- The changing regulatory setting that is focusing on fewer government-initiated obstacles may shave years off project delivery.

Detrimental External Factors

- The labor need is so significant that it is essential to bring in qualified workers outside Southern California. But the high cost of living poses a major hurdle for contractors trying to hire qualified workers from outside the region.
- Lengthy third-party jurisdictional and utility processes and approvals are contributing to additional cost and schedule pressures.
- With multiple billion-dollar-plus capital programs in the region, Metro is competes with other local agency programs for the same limited resources. This may be compounded as ballot measures rivaling Measure M and could divert resources from Metro are considered.



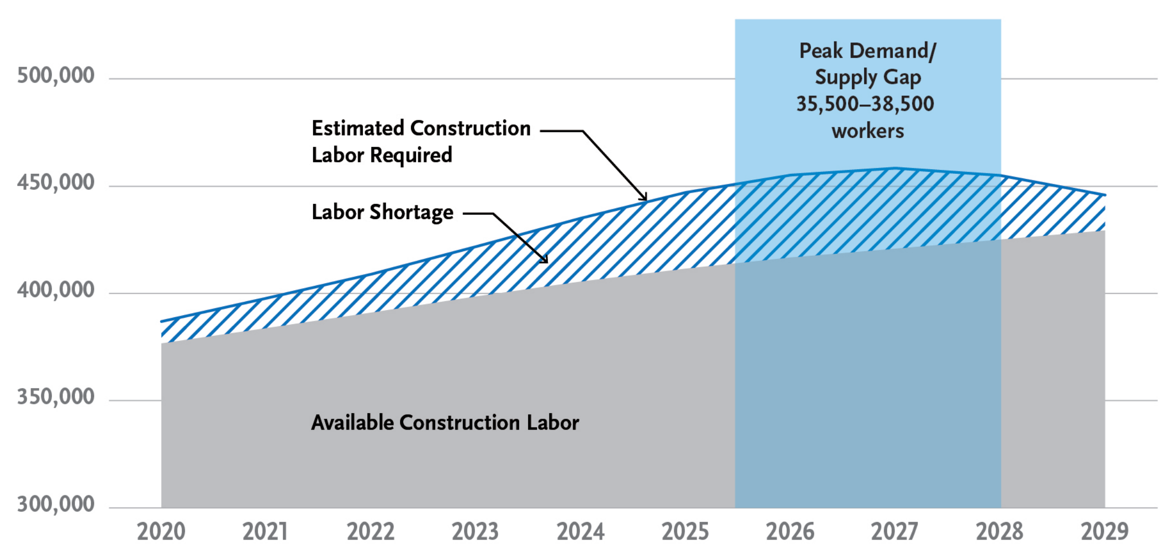
Future Construction Labor Needs and Availability

To forecast the future construction jobs needed in the Los Angeles region, construction expenditures were projected for Metro, local public work agencies, and private development. These projections included some significant findings:

- Over the next 10 years, Metro construction expenditure will average nearly $2.9 billion per year with expenditures peaking in 2025 to 2027.
- Local public work agencies are anticipated to spend $9.5 billion per year on construction driven by major programs such as Measure W, Metrolink's SCORE Program, and Los Angeles World Airports.
- The construction industry is anticipated to sustain substantial growth and need for construction labor during preparation for the 2028 Olympic Games in Los Angeles related to significant investments in infrastructure and private development.

Using the construction expenditure budgets and data from Dodge, the Bureau of Labor Statistics, and Los Angeles Economic Development Corporation, an economic model forecasted the number of construction jobs. Model results indicate a significant and prolonged construction labor shortage if all planned and unplanned (and currently unknown) construction projects were to occur simultaneously. The labor shortage gap between the estimated construction labor needed and available labor is increasing. The peak of the labor shortage is anticipated between 2026 and 2028, resulting in a shortage of approximately 35,500 to 38,500 people to fill construction jobs.

ESTIMATED CONSTRUCTION LABOR PROJECTIONS BETWEEN 2020-2029



SWOT Assessment and Recommendations

SWOT assessments help identify how an organization can enhance areas of strength, boost areas of weakness, leverage potential opportunities, and minimize threats. This report assessed national and regional economic conditions, the state of the construction industry, emerging trends in the market, Metro's previous actions, and external factors. Assessment results provide a basis for Metro to prepare its strategy for the next decade of construction demand, which will likely exceed supply and will increase costs for labor and materials.

The predecessor study to this Construction Market Analysis was prepared in early 2018. The 2018 report provided recommendations that have been implemented by Metro or are being developed.

Building on the strengths identified in the SWOT assessment, implementation of the previous report's recommendations, and Metro's recent initiatives and policies, this current study provides additional recommendations designed to increase the number of bidders, increase the availability of craft and management resources, and continue building Metro as an "owner of choice." Detailed descriptions of the recommendations are provided in Chapter 6 of the report.

RECOMMENDATIONS AND BENEFITS SUPPORTING METRO OUTCOMES

Actions and Outcomes	Benefits					
Recommended Actions Supporting Outcomes	**Address Labor Shortage**	**Reduce Cost**	**Minimize Risk**	**Attract Bidders**	**Manage Schedule**	**Response**
Increase the Labor Pool						
1. Innovate worker housing	✔			✔	✔	T
2. Leverage technology	✔	✔			✔	T
Be the Owner of Choice						
3. Incentivize diversity	✔			✔		S
4. Reduce bidder burden		✔		✔	✔	W
5. Incorporate modular design	✔	✔		✔	✔	O
Create a Stronger and More Resilient Organization						
6. Phased implementation		✔	✔	✔	✔	W
7. Shared cost	✔	✔	✔		✔	O
8. Recruit talent	✔	✔	✔		✔	W

01

Delivering Projects for the Next 10 Years

Measures R and M capital programs delivery is well underway. Staying on track to achieve ambitious goals by 2030, the Los Angeles County Metropolitan Transportation Authority (Metro) gauges progress by routinely reviewing project status, assessing current and forecasting future construction market conditions, and adjusting strategies for attaining its 10-year goals.

Serving as a barometer for today's and tomorrow's construction market, this updated Los Angeles Construction Market Analysis is an important tool for gauging near- and long-term conditions in the Los Angeles region that may affect Metro's ability to sustain progress toward improving transportation infrastructure in Los Angeles County.

Market conditions and resource availability are dynamic year to year, but industry followers provide key data indicators and trends to inform Metro's delivery approach:

- What has changed since the previous market analysis in 2018?
- Do construction market conditions continue to tighten? Will resources be available to support Metro's capital program?
- Is Metro positioned for success, or should it refine delivery strategies to be the owner of choice in the region?

Building on the 2018 Los Angeles Construction Market Analysis, this 2020 report reviews key indicators to keep Metro on track:

- Performs a market analysis showing the current and projected construction activity in the Los Angeles region
- Analyzes the qualified contractor and skilled labor availability in the region, including employment trends in the construction industry
- Provides recommendations for how Metro can be the owner of choice to attract construction contractors in the region when compared with other successful transit agencies

What is Driving Metro's Construction Needs?

In November 2016, Los Angeles County voters approved Measure M, a half-cent sales tax to improve transportation infrastructure in Los Angeles County. Measure M is expected to generate $120 billion in revenue over 40 years and create a continuous source of funding for transportation in Los Angeles County. This influx of funding will be allocated to a comprehensive capital program portfolio that ranges from "state of good repair" improvements, such as the recently renovated Blue Line, to large-scale megaprojects like the Sepulveda Transit Corridor.

The overall Measure M budget for the first 40 years focuses on the capital project delivery of major transit and highway projects, which includes $41.8 billion in transit construction, $20.3 billion in highway construction, and $2.4 billion in state of good repair refurbishments and improvements. According to the Los Angeles Economic Development Corporation's the 2016 economic forecast, Measure M will add 465,900 new jobs and stimulate $79.3 billion in economic output in the region.

Current economic conditions at the national and global level have also changed since the 2018 Los Angeles Construction Market Analysis:

- The national economy continues to grow, but at a slower pace, with consumer and business confidence generally high and with low unemployment.
- Trade policies including new tariffs, along with low unemployment and a robust economy, may fuel higher inflation.

Measure M allocation of $120 billion in revenue

$41.8 B NEW TRANSIT CONSTRUCTION INCLUDING 100 MILES FOR METRO RAIL AND 65 MILES OF BRT

$20.3 B HIGHWAY IMPROVEMENTS, CARPOOL LANES AND GOODS MOVEMENTS

$20.3 B LOCAL CITY TRANSPORTATION IMPROVEMENTS

$2.4 B STATE OF GOOD REPAIR PROGRAM

$2.4 B ACTIVE TRANSPORTATION PROJECTS

METROLINK®

$1.2 B METROLINK PROJECTS

The impact of these concerns may result in consequences to the construction industry due to increases to material costs, labor shortages, and demand for construction.

Identifying Critical Strategies to Achieve Measure M Goals

Metro must analyze the challenges of delivering Measure M in the current economic climate to better understand the impacts of a growing economy at all levels, shifting approaches to construction delivery, and competing capital programs and projects. This report illuminates current and projected future construction market conditions that will impact contractor delivery on Metro's current projects, and influence contractor bids on Metro's upcoming projects.

This construction market analysis update for 2020 has the following primary objectives:

- Provide economic analysis at all levels related to the construction market industry
- Evaluate employment trends and skilled labor availability
- Identify the current and projected construction activity in the Los Angeles region for the period from 2020 to 2030
- Identify factors impacting current Metro projects and influencing future bids on upcoming Metro projects

Analyses aimed at these objectives will reveal current and future indicators of construction market conditions. These updated results will help guide Metro's approach to construction contracting, enhance Metro's ability to compete for resources, and increase competitive bidding from more contractors.

The Metro Vision 2028 Strategic Plan serves as the foundation that aligns all Metro's plans, programs, and services to achieve a common vision. This construction market analysis supports Goal 5 (Provide responsive, accountable, and trustworthy governance within the Metro organization) by aligning this market analysis report's recommended actions under Metro Vision 2028 Strategic Plan Goal 5.

Market Intelligence Sources Supporting this Assessment

Metro asked the KKCS/Triunity JV (KTJV) team to perform an extensive literature review and research statistical data and public records to develop a picture of the current and future construction market, employment, and availability of construction labor and trade resources.

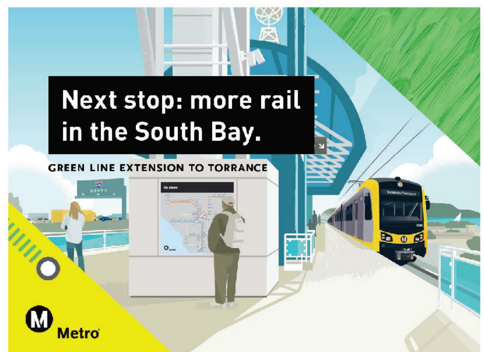
The assessment compared Metro's capital program with other local agency programs to identify similarities or differences in several areas, such as amount of work, SBE/DBE participation, bid estimates versus engineers estimate, and number of bidders.

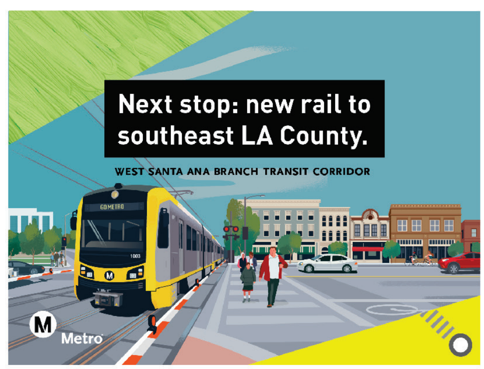
Measure M's portfolio of projects helped win the award of the 2028 Summer Olympic and Paralympic Games to Los Angeles because of its goals to improve mobility options and enhance transportation infrastructure in Los Angeles County. Now, Measure M and the 2028 Olympic Games position Metro to not only prepare for hosting a global event, but to accelerate delivery of public benefits to Angelenos even earlier than originally envisioned, especially for its four pillar projects.

The Journey Ahead: Market Drivers Threaten Major Capital Programs

When Measure M passed, Los Angeles was in a building boom, and construction continues to be robust across all sectors in Los Angeles. Now, more than 52 building projects are under construction and another 120 are planned in downtown Los Angeles[i], along with several multi-billion-dollar sports and cultural facilities, and extensive improvements at Los Angeles International Airport (LAX). Delivery is also shifting toward more alternative delivery, such as public-private partnerships (P3), as a method to accelerate projects.

Metro Is Focused on Accelerating Funding and Delivering Four Pillar Projects





These industry and public resources provided the most current, relevant data available for this construction market analysis:

- Federal economic indicators, including US Bureau of Economic Analysis, US Bureau of Labor Statistics, Census Bureau, and the US Department of Commerce
- American Road and Transportation Builders Association (ARTBA)
- Associated Builders and Contractors (ABC)
- Associated General Contractors of America (AGC), including an interview with AGC's Chief Economist, Ken Simonson
- Engineering News-Record (ENR)
- Business and trade journals
- Dodge Data and Analytics (Dodge)
- Los Angeles Economy Development Corporation (LAEDC)
- University of California, Los Angeles (UCLA) Anderson School of Management
- US Chamber of Commerce
- Agency websites and bid data

The economic market forecast is based on federal, state, and local data and market intelligence that was gathered and used in the economic modeling and development of the forecast.

Considerations Framing this Assessment

The current extremely dynamic market will require Metro to closely monitor trends and adjust strategies to achieve not only its 2028 goals for its four pillars projects, but also its fundamental levels of service in the communities it serves. The earlier 2018 Los Angeles Construction Market Analysis closely examined and modeled current economic conditions for the first time. This 2020 update will help Metro stay informed and proactively adjust strategies in a dynamic market where economic projections are more short-lived than ever. The following discussion steps through these topics:

- Delivering projects for the next 10 years
- Construction market conditions today and tomorrow
- Metro's response to shifting market conditions
- External factors influencing Metro
- Future construction market projection
- Strengths, weaknesses, opportunities, and threats (SWOT) assessment with recommendations

02

Construction Market Conditions Today and Tomorrow

The economy is cooling from the historic pace of 2019, which marked the longest economic expansion in US history. California surpassed national performance and is forecast to continue outpacing the rest of the country. Los Angeles' income growth, however, is expected to lag California's in 2020.

Economic Conditions Cooling from Historic Pace

Overall, the US economy in 2019 maintained steady momentum, but it was outpaced by California's and Los Angeles' growth. Although a recession will eventually hit as a part of the normal economic cycle the short-term economy is poised to continue positive trends in unemployment and growth.

National

In 2019, the US economy broke several records: longest economic expansion in US history, lowest unemployment rate since 1969, and longest stretch of monthly job gains. This contributed to the 2.3% growth rate of the US Gross Domestic Product (GDP) in 2019.

This sustained growth rate provides for balanced jobs growth while preventing inflation and volatility. The stock market was strong in 2019, including recovery from market corrections in 2018. Another positive signal was the strong pace at which consumer spending rose throughout 2019, supported by solid job growth and wage increases. The passage of the United States-Mexico-Canada Agreement (USMCA) also served to reduce market uncertainty and increase optimism.

After a series of interest rate hikes, the Federal Reserve cut interest rates to support continued economic expansion. Historically, however, such action is taken only when evidence of pending economic hardship is seen.

As a new decade begins, the US economy is likely to experience continued growth but at a slower pace, and likely to avoid a recession in 2020. The Federal Reserve is projecting the GDP to hover at or below 2% between 2020 and 2022[ii]. The unemployment rate is projected to remain below 4%, according to the Federal Reserve, and inflation is likely to rise in 2020 and beyond. (Note that some industry experts believe the low unemployment rate may be misleading because many workers are part-time in low-paying industries and would prefer full-time work in higher-paying jobs.)

However, uncertainty at the global stage will continue to be the economy's biggest risk:

- Trade tensions with China resulting in tariff increases
- A slowing Chinese economy that may cause a sluggish global economy
- Uncertainty until the 2020 election cycle ends
- Federal monetary policy with unpredictable interest rate changes.
- The corona virus' affect on manufacture and imports of construction-related goods and materials
- Slowing population growth generally reducing the labor pool in the long term

This uncertainty and recent events may result in lower growth, tighter financial conditions, lower asset prices, and weakened labor markets.

California

As the fifth-largest economy in the world, California's GDP is expected to grow roughly in line with the national average. According to the University of California, Los Angeles (UCLA) Anderson Forecast, California will continue to outpace the rest of the country in job growth, and real personal income. However, California's unemployment rate will likely remain higher, and home building production will likely be lower than what the rest of the country experiences.

Key Economic Indicators and Drivers since 2018

National

KEY INDICATORS

- GDP ↑ $21.7 T
- CPI ↑ 256
- UNEMPLOYMENT ↓ 3.7%
- INFLATION ↓ 1.8%

KEY DRIVERS

- 2019 US population growth was slowest in 100 years
- Federal Reserve cut interest rates and a trade treaty between US, Canada, and Mexico was approved

California

KEY INDICATORS

- GDP ↑ $3.1 T
- CPI ↑ 281
- UNEMPLOYMENT ↓ 4.1%
- INFLATION ↓ 3.0%

KEY DRIVERS

- $1.8 billion state investment to address the housing crisis
- 3 CA metro areas in top 10 of most construction jobs added in 2019

Los Angeles

KEY INDICATORS

- GDP ↑ $0.8 T
- CPI ↑ 274
- UNEMPLOYMENT ↓ 4.5%
- INFLATION ↓ 3.1%

KEY DRIVERS

- Highest ratio of housing prices to household income in the country
- Currently tied with Seattle for most cranes in the nation

Indicators shown are the actual values as of February 2020.
Arrows represent the direction of change in the indicator from 2018.

The State of California (State) approved its largest budget in history with increased spending on schools, homelessness, and health care, while still adding billions to the State's reserves funds. The State budget allocated $1.8 billion for subsidies and expanded tax credits to spur new housing production, along with incentives for cities to approve new home construction[iii]. After the defeat of Proposition 6 in November 2018 (intended to reverse the SB-1 legislature-approved gas tax for infrastructure spending), SB-1 has gone into full effect. The 12-cent-per-gallon SB-1 gas tax has increased Caltrans' budget to $14.6 billion, up from $9.5 billion 3 years ago, and will support a $52.0 billion program to repair and maintain the state's highways and bridges as well as invest in public transportation.

Risks to California's economy include the high cost of housing and the ability to attract and keep skilled workers, and slowing population growth. The increased frequency of natural disasters throughout the state will further constrain the construction market as destroyed structures and infrastructure are rebuilt.

California has both the highest number and largest value of projects in the country. With over 1,300 construction projects, California accounts for nearly 15% of all the construction spending in the country[iv] [v]. Major projects being undertaken in the state include LAX's Landside Access Modernization Program (LAMP), California High-Speed Rail, and the Virgin Trains' Xpress West from Los Angeles to Las Vegas.

Los Angeles

Real income gains are emblematic of the trends taking place across the state, however income growth in Los Angeles is expected to lag behind the state in 2020 due to Los Angeles' relatively higher unemployment rate and greater degree of labor market slack. Robust employment increases in service sectors such as health care and business will create an additional 60,000 jobs per year, continuing the long-term decrease in unemployment rate and Los Angeles County's projected unemployment rate of 4.3% in 2020.

Despite the county's projected GDP growth, which roughly paces the statewide economy and national growth, housing shortages pose a threat to continued growth. Approximately 21,000 new unit permits are forecasted in 2020 in Los Angeles County, an upward trend that must continue if home prices are to decline to more attainable levels. Consequently, housing construction will continue to rise to make up the affordable housing gap that has widened over years of suppressed development.

Los Angeles County has also seen a major shift. A wave of technology companies has taken root along the coast, spanning from Santa Monica to Los Angeles International Airport (LAX), creating "Silicon Beach." Now considered the technology capital of Southern California, Silicon Beach is bringing employment opportunities and an influx of new residents. As this new tech hub expands and attracts more entrepreneurs and investors to the region, housing prices will continue rising along the coast and push residents farther inland toward more affordable housing, but longer commute times.

The Construction Industry is Booming

Voters are passing transportation funding measures across the nation resulting in 5% projected growth in 2020, optimistic contractors, and labor shortages.

Construction Spending Continues Rising

With annual national spending of approximately $1.3 trillion last year, the construction industry is a major contributor to the US economy. It accounts for 4.1% of the national GDP and employs 5.3% of the country's total workforce.

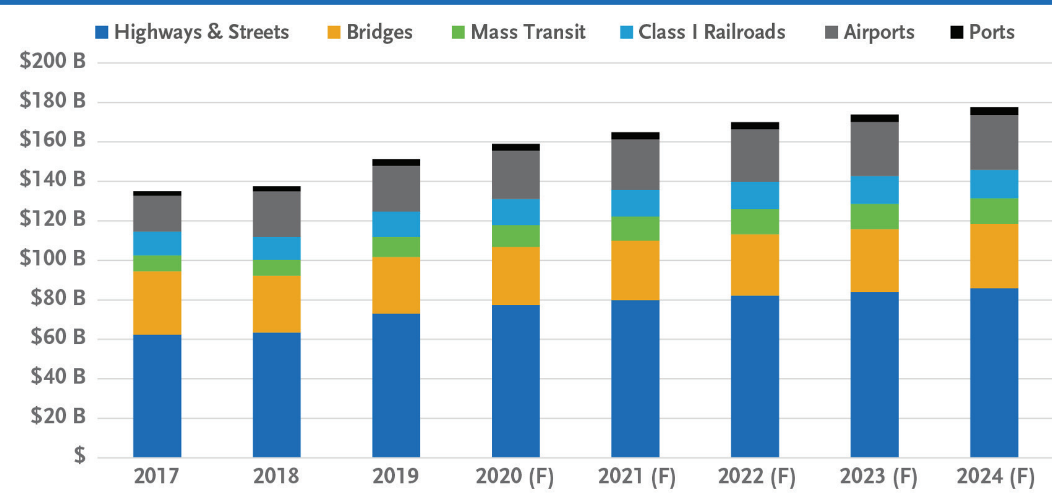
Transportation construction expenditures increased 8.0% in 2019, with significant gains in highway, street, and pavement work, which grew by $9.6 billion for a total of $73.1 billion nationwide. Several rail transit megaprojects also broke ground.

Four more states raised gas taxes in 2019 to support transportation investment, bringing the total number such states to 31. Nearly 90% of the 305 state or local transportation measures on the ballot in November 2019 were approved, resulting in additional $9.6 billion in potential construction spending on projects in the next few years.

According to the American Road and Transportation Builders Association (ARTBA) 2020 Market Forecast, the US transportation infrastructure market is expected to grow 5% in 2020 with increased funding from all levels of government. This accounts for public investment in highways, bridges, public transit, rail, ports and waterways, and airport runways and terminals, as well as related transportation infrastructure for residential and commercial development.

Potential delays in the reauthorization of the Fixing America's Surface Transportation (FAST) Act and Congress ability to find additional revenues to support the Highway Trust Fund both pose a risk to the transportation construction market. If states delay projects over concerns about whether the next federal surface transportation bill is completed in a timely manner, this could temper 2020 market growth.

TRANSPORTATION CONSTRUCTION SPENDING PER YEAR



Note: (F) ARTBA's forecast of construction spending for future years.

Exceptionally Low Unemployment in the Construction Industry

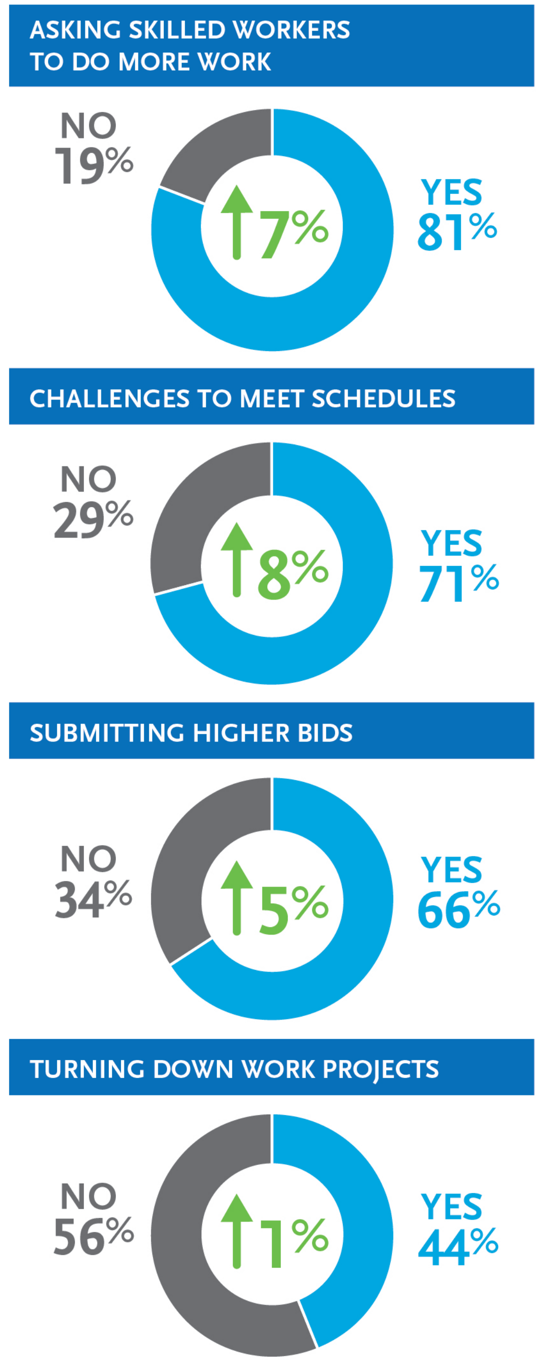
Despite some concerns of the overall economy slowing, most construction firms expect demand for their services to expand in 2020. Contractors plan to add staff to ensure a sufficient workforce to keep pace with growing demand[vi]. On a year-over-year basis, construction employment has expanded 3.1% nationally in 2019, and California alone is projected to add 29,400 construction jobs in 2020.

Although construction job openings in recent months have been at the highest level since 2000, the number of unemployed skilled workers available to fill these openings has fallen. The national annual unemployment rate has fallen to a low of 3.7%, and the construction annual unemployment rate has also fallen, down to 4.5% in 2019. Although good for individuals, the low unemployment rate has created labor shortages in industries, especially construction. Associated General Contractors released a survey that found 75% of contractors expect to add workers in 2020, but 81% of firms indicated difficulty filling hourly craft or salaried positions and do not foresee improvement in the near future [vii].

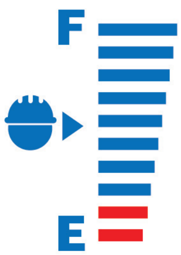
The construction industry continues to increase employment, including a 3.4% increase in California on a year-over-year basis as of November 2019 [viii]. However, labor shortages threaten to undermine the growth of the construction industry. Staffing challenges as a result of labor shortages are increasing construction costs and delaying project schedules—projects take longer and bids also become more expensive. Workforce shortages that make construction projects more costly and slower to build increase the risk of undermining broader economic growth by making development projects—including infrastructure—more expensive and time-consuming.

Contractor Response to Skilled Labor Shortage

Average annual change since 2018



75%
of contractors expect to add workers in 2020



81%
of firms having difficulty filling hourly craft or salaried positions

The Los Angeles construction market is experiencing "perfect storm" conditions driven by a skilled-labor shortage, low unemployment, and large amount of ongoing and planned work in the region. Construction employment in Los Angeles County has increased significantly by over 7% the past year, resulting in 10,700 jobs. The construction industry's recent growth in Los Angeles has been driven up primarily by transportation infrastructure and by private-sector redevelopment investment in response to increased demand for housing and office space. More information regarding the number of construction jobs needed over the next 10 years in Los Angeles is presented in Chapter 5.

> *The Los Angeles construction market is experiencing "perfect storm" conditions driven by a skilled-labor shortage, low unemployment, and large amount of ongoing and planned work.*

Normalization of Construction Materials/Costs

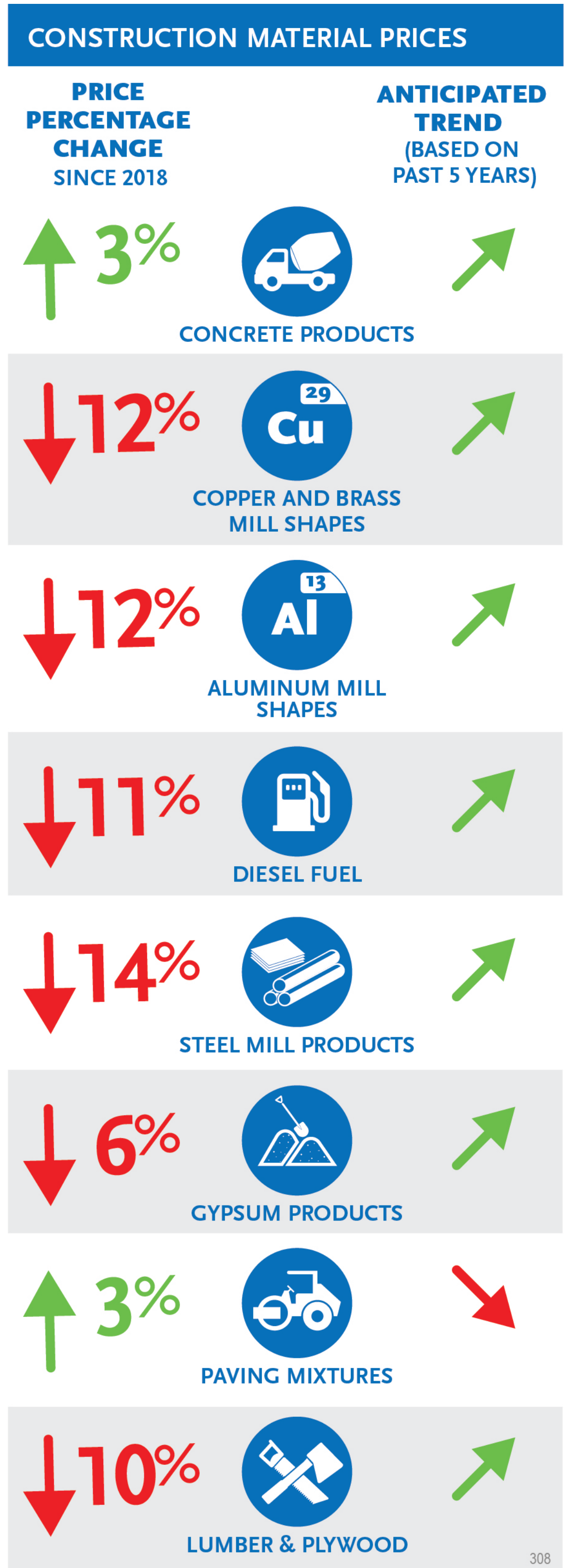
Each month, the US Department of Bureau of Labor Statistics (BLS) surveys the prices that goods producers charge for items used in construction. The Producer Price Index (PPI) is a measure of the average change over time in the prices paid by contractors for construction materials. These prices are expressed as index numbers rather than dollars, and how much these numbers change over time is significant.

One of the contributing factors putting pressure on construction costs includes materials costs, which are rising at the fastest rates in several years driven in part by recent tariffs on construction materials including lumber, steel, and aluminum. As of the beginning of 2019, material prices have cooled off according to ENR and BLS statistics[ix]. This is in part due to a market correction resulting from lower than expected construction starts in the US housing market and tariffs that are now lifted. However, the US could potentially see new tariffs introduced or removed anytime, making the cost of construction materials volatile and uncertain. The unpredictability and continually changing trade negotiations and agreements over the past year has resulted in suppliers decreasing the window of time that quotes remain valid.

AGC reviewed specific construction items and how prices have normalized within a few months following the trade agreement between the US, Canada, and Mexico. Material costs are also expected to continue to escalate, but at a slower pace than labor costs.

Per the BLS October 2019 News Release, the PPI final demand index rose 1.1% for the 12 months ending in October, the lowest rate of increase since advancing to 1.1% in October 2016 [x]. The 20-city average also showed a fall-off with prices decreasing 3.1% for the year. Steel prices—which soared as the tariffs were introduced—have since fallen below where they were at the outset of the trade war, dropping by more than 40% since last summer. As of October 2019, after months of price slides, domestic steel suppliers have already began increasing steel pricing.

Despite the recent decline and short-term continuation of decreasing producer price indices for key construction materials, based on recent market and policy trends, cost escalations appear likely to remain in place for several more years. These increases will result in increased costs for Metro projects.



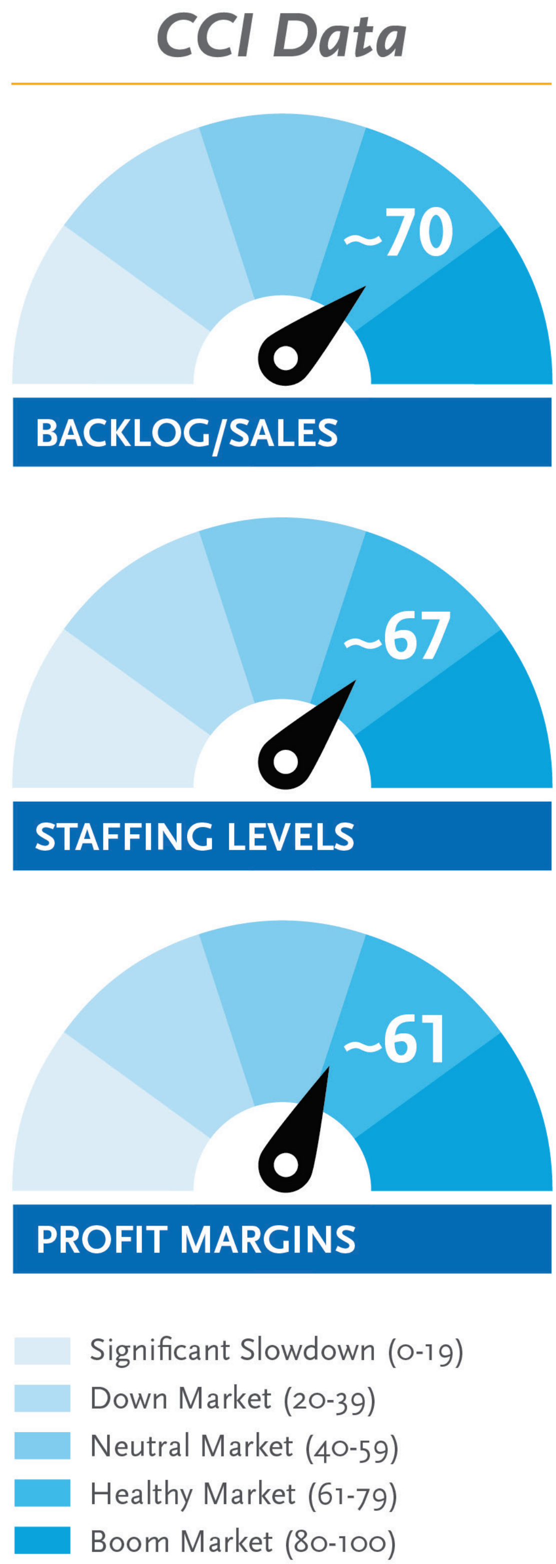
Contractor Confidence Index Remains Optimistic

The Construction Confidence Index (CCI) measures general contractors', subcontractors' and design firms' sentiment about the current market and where it will be in 3 to 6 months and over a 12- to 18-month period. The CCI is a forward-looking national indicator that reflects the industry's perceptions and expectations of the business environment through indicators such as sales, profits, and staffing. Index readings above 50 indicate growth optimism, and below indicate growth pessimism.

Contractors became slightly less confident since January 2019 regarding their staffing levels because of greater challenges recruiting and retaining talent, dropping from 68.2 to 63.6 points. Given the large and growing skills shortages and rising compensation costs, contractors are finding it increasingly difficult to hire skilled workers who can complete jobs within the estimated labor costs.

Most contractors still have high confidence in the market's ability to provide new business opportunities and believe they will see revenue growth despite a point drop of 4.6 to 63.8. Profit margins dropped less than 2 points in 2019, finishing at 58.5 in December, strongly suggesting that demand for construction services remains elevated.

All 2019 indicators showed an overall decrease in index number, yet all remain above 50 points, suggesting a growing market. Moving into 2020, Associated Builders and Contractors (ABC) chief economist Anirban Basu believes "Contractors [will] continue to position themselves for a growing and more profitable marketplace with expectations of rising sales, wider profit margins and larger teams of workers." However, abundant risks remain including material price fluctuations and the struggle to meet shorter project schedules with limited resources.



Emerging Trends Challenge "Business as Usual"

Increasing demand for construction combined with industry challenges such as labor shortages affecting productivity have shifted needs and emerging trends in the market. Current trend drivers include increases in megaprojects, contractors bidding more selectively, perceived risks of P3 delivery, and growing interest in alternative delivery methods.

Megaprojects

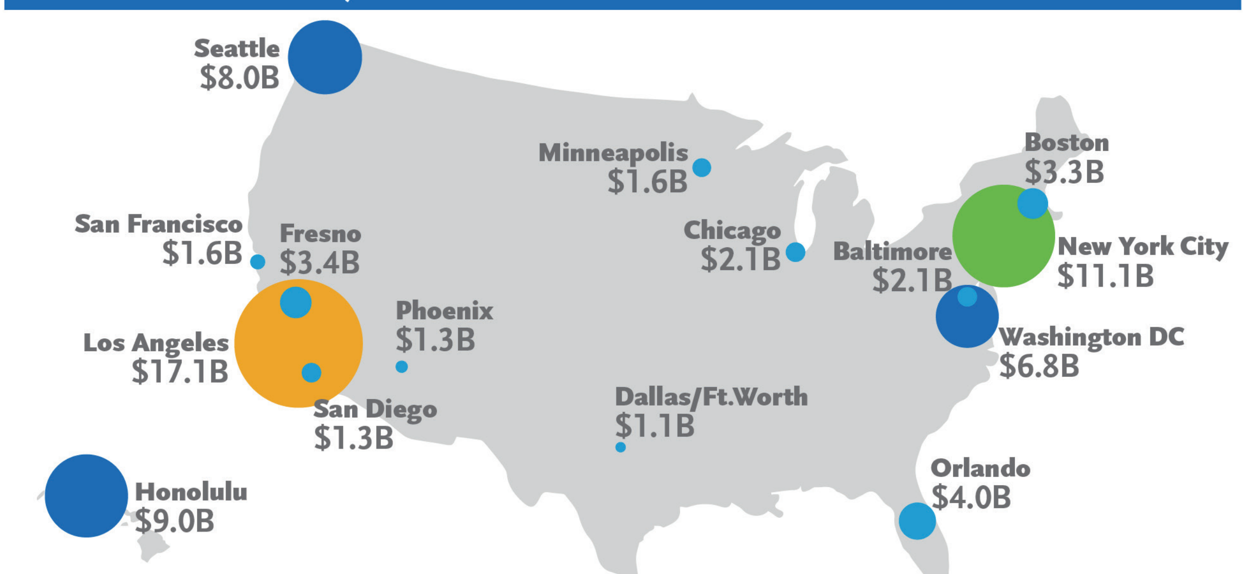
Massive and transformational undertakings costing over a billion dollars, megaprojects also involve more stakeholders. This scale of effort comes with more unforeseen challenges, construction duration up to a decade, and historically overrun cost and schedule objectives.

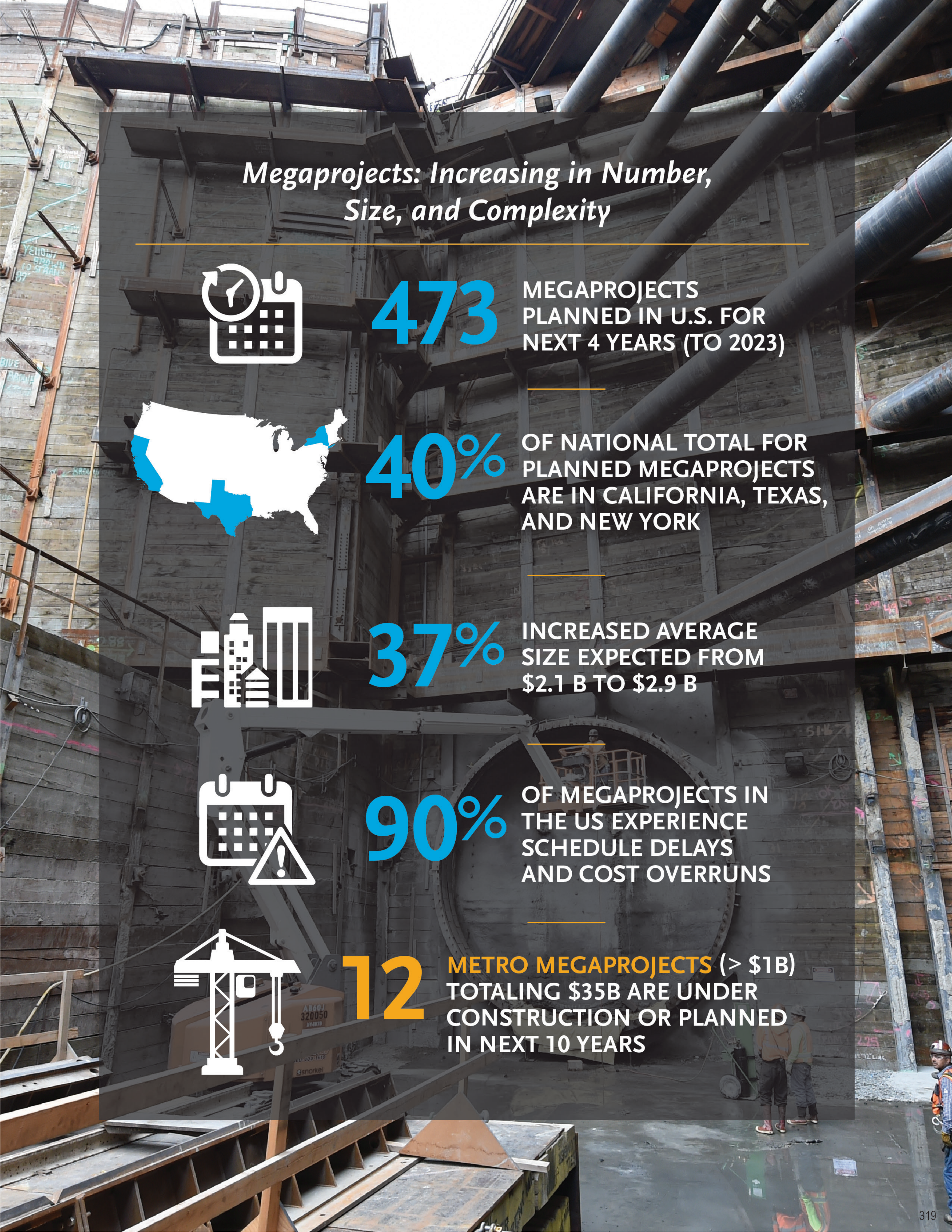
The demand to rebuild infrastructure is high, and megaprojects are growing larger and increasing in number and complexity. Between 2013 and 2018 alone, the annual value of US megaprojects increased from 3% to approximately 33% of all US construction project starts[xi]. Today, 473 megaprojects are planned in the US between 2019 and 2023, and the average size is expected to increase 37% from $2.1 billion to $2.9 billion. The US is projected to exceed $2.5 trillion in total construction allocated for megaprojects in the next decade, and—notably—these projects are densely located:

- California, Texas, and New York represent 40% of the national total for planned megaprojects.
- Over the next 3 to 5 years, 50% of megaproject construction will occur in only 20 metropolitan markets.

Owners and contractors are struggling to develop accurate bid estimates and manage the administrative burden inherent in the scale and complexities of megaprojects.. Megaproject performance analysis indicates that merely one out of ten megaprojects in all US market sectors are delivered on time and on budget. This trend is not likely to improve, because the pool of contractors and resources will be further constrained as the number of megaprojects in the market increases.

RAIL TRANSIT MEGAPROJECTS UNDER CONSTRUCTION BY METROPOLITAN AREA





Megaprojects: Increasing in Number, Size, and Complexity

473 MEGAPROJECTS PLANNED IN U.S. FOR NEXT 4 YEARS (TO 2023)

40% OF NATIONAL TOTAL FOR PLANNED MEGAPROJECTS ARE IN CALIFORNIA, TEXAS, AND NEW YORK

37% INCREASED AVERAGE SIZE EXPECTED FROM $2.1 B TO $2.9 B

90% OF MEGAPROJECTS IN THE US EXPERIENCE SCHEDULE DELAYS AND COST OVERRUNS

12 METRO MEGAPROJECTS (> $1B) TOTALING $35B ARE UNDER CONSTRUCTION OR PLANNED IN NEXT 10 YEARS

Contractor Bid Decisions

With a strong backlog growth and optimism in future demand for construction, contractors are being more selective when bidding work. As a result of the tremendous demand and less contractor capacity, there will be diminished competition on bids and margins will be driven up that will likely increase construction costs for owners.

One of the biggest considerations for contractors in making decisions to bid are fixed-price agreements that lock in a price early on. As things change on fixed-price jobs, so does costs, increasing the chances for disputes between contractor and owner about who is responsible to pay for these changes.

Another factor influencing contractor willingness to bid is contract terms and conditions. Contractors are seeking more “friendly” terms and conditions related to liquidated damages, significant upfront payment on mobilizations, and clauses that mandate ongoing issue resolution.

> ***Five*** *of the Engineering News Record’s top 25 ranked contractors are backing away from, or are more risk averse to, P3 delivery.*

Weighing the Risks of the P3 Market

The rapid deterioration of infrastructure in every state, investment shortfalls for building and rebuilding vital public systems, and overcapacity of systems are forces driving the expansion of the public-private partnership (P3) market in the US. The US Department of Transportation defines P3s as “contractual agreements formed between a public agency and a private sector entity that allow for greater private sector participation in the delivery and financing of transportation projects.”

At the heart of the P3 model is the principle that risks associated with the delivery of infrastructure should be allocated to the contractual party best able to manage them—both the public and private sector have echoed that efficient allocation of risks between partners is needed to have a successful project. Problems arise when risks are not identified or properly allocated prior to beginning work, and neither the owner nor contractor can agree on who will pay for the additionally incurred costs.

This was the case for five of ENR’s top 25 ranked 2019 contractors who recently became considerably more selective when choosing which P3 projects to participate in, or discontinued participation in P3 projects in the US altogether[xii]. Each contractor reported large financial losses as a result of recent projects, heavily influencing their decision to limit involvement in P3 projects in the US. And as risks facing large public projects increase due to the growing pressures over labor and materials prices, contractors are being even more cautious about this alternative delivery.

While several of the country's largest contractors are moving away from P3 projects, others see them as a worthwhile solution to financing, designing and building large-scale government projects. Under the right circumstances and with the right partners, P3s can have extraordinary results compared to other methods. The Design-Build Institute of America (DBIA) recently produced a position paper on the delivery method, saying it "supports P3s as a potentially effective and efficient method to help address our nation's infrastructure financing and delivery challenges," noting that the key to a successful P3 is collaboration between parties in all phases of project delivery[xiii]. Even as the P3 model becomes an important part of the country's infrastructure landscape as state and local governments try to drum up new funding sources and minimize their risk of cost overruns and schedule delays, the US currently lags behind other nations. Canada, widely acknowledged to be the key source of international best practice for P3, has initiated dedicated procurement offices and standardized P3 contracting as risk reduction measures. In contrast, US contract terms vary from project to project—adding uncertainty and decreasing attractiveness to potential bidders.

Alternative Delivery Methods Are Gaining Traction

The industry is looking to alternative delivery methods, instead of traditional design-bid-build (DBB) and design-build (DB), to address capital programs and projects that are trending larger in size and with greater complexity. These alternative delivery methods are intended to better address (1) quality, time, and cost requirements, (2) risk sharing between stakeholders and project delivery parnters, and (3) increasingly constrained market resources including attracting proposers from a limited bidding pool. Primary among these alternative delivery methods is Construction Manager/General Contractor (CM/GC) and Progressive Design Build (PDB).

Construction Manager/General Contractor

CM/GC is in some sense like a hybrid of DBB and DB, because the owner separately procures a designer and a contractor (like with DBB), but brings the contractor (the CM/GC) onboard during the pre-construction phase to collaborate with the owner and designer during design development. This collaboration is intended to assist with constructability reviews and value engineering of the final design (like with DB). Under CM/GC a Guaranteed Maximum Price (GMP) is negotiated with the owner for delivery of the construction project (in whole or in phases).

Progressive Design Build

PDB is like a hybrid of DB and CM/GC, whereby delivery involves a single procurement of the resources necessary to complete final design and construction (like DB), but a firm fixed price is collaboratively developed between the owner and the DB contractor during the Preconstruction Phase of the project (similar to CM/GC). The primary difference with "traditional" design-build is the award is qualification based, not price based. Essentially, the owner defers obtaining price and schedule commitments until after the design has been sufficiently defined to support improved baseline establishment.

COMPARISON OF ALTERNATIVE DELIVERY METHODS

Alternative Delivery Method:	Construction Manager/ General Contractor	Progressive Design-Build
Key Features		
Negotiate GMP for delivery of the construction project (in whole or in phases)	✔	
Create "off-ramp" milestones during pre-construction	✔	
Utilize qualification-based selection		✔
Defer price and schedule commitments until after the design has been sufficiently defined		✔
Shared Benefits Addressing Market Conditions		
Doesn't lock the bidder into a firm fixed price at the time of the bid, reducing contractor risk	✔	✔
Reduced time of delivery by overlapping early critical path construction items	✔	✔
Early input from the contractor via constructability reviews and value engineering	✔	✔
Additional Benefits		
Provides for greater cost certainty through GMPs	✔	
Lower proposal preparation costs to attract more bidders		✔
Low bid is not the deciding factor in selection		✔

03

Metro’s Response to Shifting Construction Market Conditions

Three intended outcomes shape Metro’s strategy for adapting to evolving market conditions: increase the labor pool, be the owner of choice, and create a stronger and more resilient organization.

Increase the Labor Pool

Metro recognizes the need to build and train a diverse, inspired, and high-performing workforce as outlined in Metro Vision 2028 Strategic Plan Goal 5.7. Over the past few years, Metro has made significant strides to developing a diverse labor pool and embarked on bold strategies to develop the next workforce generation.

WIN-LA Workforce Program Is Developing Needed Resources

As of today, 50% of Metro's workforce will be eligible for retirement by 2024, and a qualified workforce is needed to continue building and maintaining Los Angeles County's transportation infrastructure.[xiv] The boom in local infrastructure development, coupled with the agency's aging workforce, creates an urgent need for a new generation of qualified, trained, and prepared talent that reflects the region's demographics.

> *"Contractors are paying more to locate and train labor, and paying for more overtime hours. However, the quality and productivity of workers has declined as a result of a poor pipeline of craft personnel who are well trained and skilled."*
>
> *Ken Simonson, AGC*

Metro's workforce development program, Workforce Initiative Now Los Angeles (WIN-LA), is helping address this challenge increasing opportunities and creating career pathways in the transportation industry– including construction.

WIN-LA focuses on Los Angeles County communities and inividuals who may be underrepresented in the workforce:

- Economically challenged communities
- Emancipated foster youth
- People who are veterans, homeless, previously involved in the criminal justice system
- People who or lacking a high school diploma or GED

WIN-LA is delivered through established regional partnerships between Metro, the Los Angeles Regional Community College Consortium, the Transportation Workforce Institute, and community-based organizations.

Beyond providing needed resources for training and placement of hard-to-fill positions within the transportation industry, WIN-LA collaborates with program partners to support areas such as life skills development, skill set enhancement, and educational attainment services. By providing the resources needed for training and placement of these positions, WIN-LA was able to deem 89% of program participants as job-ready after completing training, and succeeded assissting 85% of participants from priority communities gain employment.

Strengthening Metro and Reducing Risk

Metro is implementing the largest transportation expansion program in the country and is experiencing the impacts of booming construction activity in Southern California.

In response, Metro is implementing critical steps to plan, build, and deliver critical mobility projects in Los Angeles County made possible by Measures R and M.

WIN-LA Workforce Development Program

50% OF METRO FORCE ELIGIBLE FOR RETIREMENT IN 2024

89% OF PARTICPANTS IN WRP WERE DEEMED JOB-READY

85% FROM PRIORITY COMMUNITIES GAINED EMPLOYMENT

Contractor Outreach

300+ ATTENDEES AT INDUSTRY FORUMS FOR SEPULVEDA TRANSIT CORRIDOR AND LINKUS

24+ MONTHLY OUTREACH EVENTS BETWEEN METRO AND CONSTRUCTION INDUSTRY ASSOCIATIONS

SEED Transportation School/ E3 Youth Initiative Will Build the Next Workforce Generation

Metro and Los Angeles County has announced the kickoff of its Transportation School. This free boarding school offers vocational and college-preparatory curriculum tailored to train approximately 400 high school students annually in the transportation industry. It aims to attract students from across the county who have been homeless, in foster care, or involved in the criminal justice system (and through the WIN-LA Program)

Early plans for curriculum envision seven career tracks that include logistics, civics and public policy, engineering and mechanics, along with classes that meet State curriculum requirements. After graduation, students could obtain work with Metro or other local contractors, or go to college to study engineering, architecture, or urban planning.

The school aligns with Metro's Expose, Educate, and Employ (E3) Youth Initiative. E3's mission is to "prepare Los Angeles County youth for career and college pathways in the global transportation infrastructure industry by teaching them transferrable industry skills." The initiative's goals include exposure to careers in the global transportation industry, education and training in transferrable transportation industry skills, and expansion of Metro's highly skilled and diverse workforce.

As Metro's soon-to-retire employees begin transition out of the work force in the next few years while the boom in local development continues, existing staff will move up to fill these positions, leaving thousands of positions to fill. Metro hopes graduates could address this critical projected need for qualified workers.

Helping Women Enter the Construction Market

The construction industry is a male-dominated industry that consists of roles traditionally filled by men. A perception that women are physically incapable of doing the work has been a barrier to entry, which has been reinforced by an unwelcoming industry and environment that lacks encouragement and support.

According to the BLS the construction industry is composed of only 9% women, which includes those in executive, administrative, and office roles. This number has remained approximately 9% since 1996. However, looking specifically at women workers on active job sites and in trades, women make up only 3.4% of the workforce.

If more women join the construction industry, more labor will be available to deliver projects now and in the future.

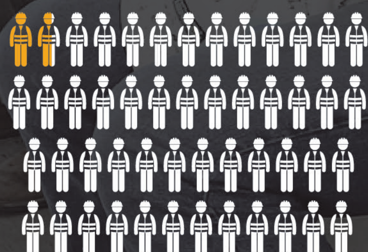
The inclusion of female workers to meet demand for future infrastructure projects is vital. The older construction workforce is growing faster than new, younger workers entering the market. Realizing the potential for women to find new opportunities while helping to address labor shortages, the industry has launched several initiatives supporting this movement.[15]

In 2016, Metro began challenging the status quo by implementing programs to support women entering the industry. Metro has passionately committed to increasing the number of qualified women candidates for apprenticeship and placement with all trades that work on Metro construction projects, and setting ambitious, measurable goals. These efforts to encourage and support women include Women Build Metro LA (WBMLA), and the Female Participation Scorecard.

Women in the Workforce

The number of women in construction has not changed for years despite several initiatives to address this issue. Metro is paving the way for women to enter the construction workforce through several initiatives.

- WIN-LA
- SEED Transportation School
- E3 Youth Initiative
- Female Construction Scorecar
- Women Build Metro LA



3.4%

WOMEN ON ACTIVE JOB SITES AND IN TRADES NATIONALLY

3.6%

METRO'S CURRENT AVERAGE FEMALE PARTICIPATION ON CONSTRUCTION PROJECTS AS OF SEPTEMBER 2019

6.9%

FEMALE UTILIZATION GOAL SET BY METRO BOARD EXECUTIVE ORDER 11246

Women Build Metro LA

In response to the lack of women in the construction workforce, WBMLA was established to recruit, educate, and support women’s introduction to all aspects of the transportation industry, with an emphasis on the construction trades. This program supports Metro’s Project Labor Agreement and Construction Careers Policy, which encourage construction employment and training opportunities to those who reside in economically disadvantaged areas on Metro construction projects. WBMLA is composed of women and men in construction related industries, community advocates, stakeholders, and decision makers from the private and public sectors who strive to improve access to career opportunities and serve as a catalyst for improving socio-economic status for minorities and women. By empowering women to pursue careers in the construction industry, WBMLA creates a more equitable and inclusive work environment.

Female Construction Scorecard

Construction workers on Metro projects are contractor employees. The current average female participation on Metro construction projects is 3.6% as of September 2019, compared to a Metro Board of Director goal of 6.9%. However, Metro aims to exceed the female utilization goal and has established a score card system to highlight prime contractors’ attainment of this goal. From 2015 to 2019, with the establishment of WBMLA and the score card, female participation in Metro projects increased to from 2.9% to 3.8%, and from 1.0% to 2.3%, respectively. Metro continues to emphasize to contractors who work with Metro that increasing female utilization is a Board priority.

WMBLA and the female participation score card helped increase female participation in Metro projects from 2.9% to 3.6% and participation in greater Los Angeles area projects from 1.0% to 2.3% from 2015 to 2018.

Be the Owner of Choice

Metro has many successful relationships with the construction contracting community, but now more than ever, contractors have many options and must make savvy business decisions when determining which owners and projects to bid. Metro continues evolving and adapting more nimbly to changing market conditions to attract the highly qualified bidders, drive innovation, and support competition as outlined in Metro Vision 2028 Strategic Plan Goal 5.5: Metro will expand opportunities for business and external organizations to work with us.

Reducing Risk on Firm-Fixed-Price Contracts Through Alternative Delivery

Several large contractors have had major losses with firm-fixed price delivery because complex projects are difficult to accurately bid while accounting for uncertainties. Contractors have expressed that current contracts have skewed risk too far toward favoring owners, resulting in limited bidding pools and withdrawn bids.

Understanding this trend in the market and the complexity associated with projects, Metro has begun evaluating more equitable alternative delivery methods.

Allowing more equitable sharing of project risk and engaging in earlier collaboration to help refine scope and price will increase contractors' ability to assess and account for risk before submitting a firm-fixed price.

Delivery methods such as pre-development agreement (PDA), construction management/general contractor (CM/GC), and progressive design-build (PDB) when soundly contracted and administered allow for contractor insight on critical design decisions helps to reduce risks, facilitate improved management of costs, and accelerate delivery.

These alternative delivery methods provide equitable sharing of project risk. Attracting a larger pool of bidders becomes possible as risk is reduced and appropriate reward is available to the contractor.

As with any delivery strategy, benefits must be balanced by pitfalls. For alternative delivery strategies, the primary pitfall is implementation of a delivery method that is new to an owner and untested. Metro's implementation of a more formalized project delivery selection procedure is intended to weigh advantages and disadvantages of numerous contracting types, traditional and alternative, based on the project goals and attributes.

Attract More Bidders through Contractor Outreach

Metro has actively engaged contractors early and often regarding upcoming projects through several means:

- Sharing appropriate information (project scope, timing, procurement and financial approach, technical components)
- Holding one-on-one meetings with contractors during the pre-solicitation stage
- Hosting 300+ person industry forums and market sounding events

Advantages of early contract outreach include obtaining high-level feedback from the private sector prior to project procurement regarding project design, delivery mechanism, public funding commitments, and feasibility; and determining if there is sufficient interest to proceed with the procurement or the need to modify the procurement approach.

Scale Projects to Increase Competition

As Metro implements a large portfolio of small-, medium-, and large-scale projects, there will likely be fewer and higher-cost bids from contractors as a result of contractor capacity and labor availability challenges in the market. For megaprojects, there are select few contractors that are willing to take on the high risk associated with these projects. Metro may want to evaluate contracting options that logically phase projects for initial operating segments (IOS) and structure contracts to allow the contractor to build a manageable IOS and have the option to build the subsequent IOS based on performance.

> *"Attracting a larger pool of bidders becomes possible as risk is reduced and appropriate reward is available to the contractor."*
>
> *Ken Simonson, AGC*

Multiple Metro projects will compete with each other for the same pool of resources. Metro may need to consider contractor-friendly terms and conditions to incentivize additional bidders on small- and medium-size projects. Although doing so creates greater administrative burden, scoping projects into smaller packages will create more bidding opportunities for smaller contractor firms that would otherwise be unable to provide necessary bonding or form teams for larger procurement packages.

Create a Stronger and More Resilient Organization

As Metro implements the largest transportation expansion program in the country, it has experienced the impacts of the booming construction activity in Southern California and macroeconomic market conditions. Subsequently, Metro has started to implement critical steps to plan and build projects more cost effectively, with less risk to accelerate. Aligning with Metro Vision 2028 Strategic Plan Goal 5.5: Metro will expand opportunities for business and external organizations to work with us, these critical steps to position Metro for the shifting construction market conditions are outlined below.

Metro's Program Management Department has instituted internal training, mentoring and provided large amounts of hands-on experience and responsibility to personnel working on megaprojects. Megaprojects are tremendous opportunities for young and new personnel to learn, accept challenging assignments and move up the ladder.

Lessons Learned to Overcome the Megaproject Challenges

Managing the delivery of megaprojects is difficult, resulting in increased claims and change orders, delays, and owner/contractor disputes ending in litigation. The size and complexity of megaprojects amplifies cost increases and schedule delays resulting from these issues. In the past, most megaprojects have been delivered through low-bid design-bid-build or design-build. Depending on the type and complexities of the projects, these delivery methods can be appropriate, but have a greater risk of cost overruns due to low bid selection that does not account for the risk uncertainties and complexities of megaprojects.

As outlined in Metro Vision 2028 Strategic Plan Goal 5.2 (Metro will exercise good public policy judgment and sound fiscal stewardship), Metro is using best practices for sound fiscal stewardship by better defining and controlling the costs of infrastructure projects. Reviewing Metro's current and past megaprojects reveals several successes on current and past projects, such as the Purple Line Extensions. Many of the lessons learned from Regional Connector and Crenshaw/LAX are being incorporated into current and planned Metro projects to increase market-readiness, improve execution, and manage costs. Some of the lessons learned can be applied on several levels:

- Provide clear project team governance and administrative support
- Conduct quality assessments for deeper understanding of project issues and opportunities
- Perform additional early due diligence for major identified risk areas, as well as cost, schedule, and value factors
- Provide internal clarity around major commercial terms and project specifications

- Create dispute resolution procedures both parties can rely on
- Design to appropriate levels based on risk assessments

Furthermore, planned megaprojects in the Metro portfolio are also being evaluated for the most appropriate and cost-effective delivery methods, as seen with West Santa Ana Branch Transit Corridor, Sepulveda Pass Transit Corridor, and Link Union Station. Project considerations including constraints and opportunities, value for money, empirical metrics, and risk transfer are being evaluated to identify the most appropriate project delivery method. Through this process, the historical challenges of costs and risks associated with megaprojects will be better defined and managed to ultimately improve the delivery execution.

Greater Collaboration Among Departments to Better Manage Scope and Costs

As projects transition from the Metro Countywide Planning Department to Program Management, so does management responsibility. To leverage expertise and resources, there has been more strategic and greater collaboration between respective Metro departments during the early stages of project development. The enhanced collaboration between Countywide Planning, Program Management, Construction Management, Real Estate, and Operations and Maintenance will help reduce risks and accelerate projects through knowledge transfer by multidiscipline subject matter experts, innovation to solve technical challenges, implementing best practices, and aligning Metro plans, policies, and initiatives. Irrespective of which Department a project lies with, closer collaboration with each Department will enhance the scope, public benefit, and more accurately ensure schedule and costs are accounted for from the inception of the project.

Improved Risk Management Program Accounts for Uncertain Market Conditions

Metro developed a Risk Management Program Plan to formalize and document risk management protocols and practices, and commence risk assessments at the earliest practicable time in the project life. The Risk Management Plan is a robust tool to guide projects in identifying and managing project risks and opportunities. The plan includes guidance on risk management, top-down and bottom-up risk analysis, and risk and contingency management. The focus is to avoid and/or mitigate risks (and optimize opportunities) so avoidable cost increases do not compound already higher construction costs.

A key component of the risk management process is an assessment of Market Conditions. A continually tightening marketplace, lack of bid competition, inflation/escalation pressures, and the resulting likelihood of higher bids are considered in the risk modeling and establishment of contingency amounts reflective of this risk.

04

External Factors Influencing Metro

Several emerging trends in the construction industry are affecting Metro's ability to deliver Measures R and M. Although many trends are outside of its control, Metro can develop strategies to position itself for positive external factors and minimize potentially negative external factors.

To position itself for success in this market, Metro is taking proactive, necessary steps for factors it can control. However, significant external factors—beneficial and detrimental—are largely beyond Metro's control.

Beneficial External Factors

Economic Downturn May Ease Construction Market Demand

The most recent recession began more than 10 years ago, which increases the probability of an economic downturn sometime soon. In the event of a downturn, private investment and development would slow, causing a ripple effect throughout the economy. As private construction projects pause, the available labor market would be greater for Metro projects.

Although a recession would produce less sales tax revenue to fund Metro's construction projects, it would create opportunity for Metro to tap a deeper pool of available workers. Likewise, contractor competition would increase as bidders seek project owners with resilient and continuous streams of revenue for construction.

Fate of Federal Surface Transportation Bill Creates Uncertainty

Potential delays in the reauthorization of the FAST Act, set to expire in September 2020, and Congress' ability to identify new revenue sources to support the Highway Trust Fund is a major concern. Many state transportation agencies rely on the Highway Trust Fund to provide 50% or more of their highway and bridge capital investments. Although several attempts to pass a major infrastructure bill in Washington have occurred, none built enough momentum to get out of Congress.

Concerns regarding timely approval of a new federal surface transportation bill may cause some state and local agencies to delay construction projects as a consequence of sparse federal funding. This could temper the transportation construction market in 2020 and potentially 2021. This scenario may be beneficial to Metro because Measure R and M are locally funded revenue streams. Contractors would be drawn to bid with agencies like Metro, which could result in greater competition and lower bids on Metro projects.

> *"With the unlikelihood of a new infrastructure bill from Washington, the number of new projects will taper off in the next few years, which will be beneficial for Metro."*
>
> *Ken Simonson, AGC*

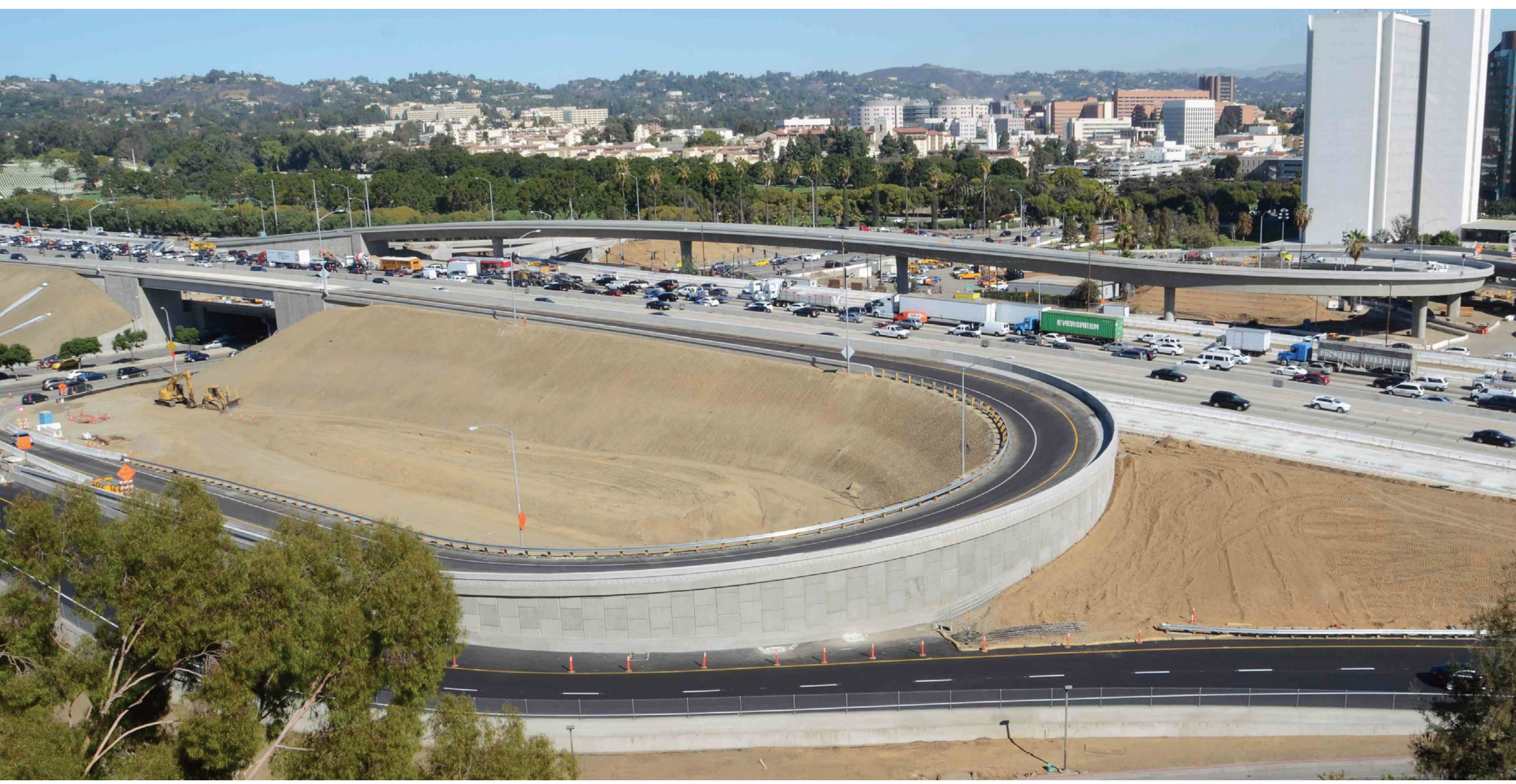
Changing Priorities in the Regulatory Setting

The regulatory process of approving infrastructure projects is complex, lengthy, and burdensome. It can take longer to obtain environmental clearance and permits than it takes to construct the project.

Once in construction, projects must comply with strict regulations from many federal permits that typically slow construction and add unnecessary expense to projects.

To address this issue, the Council on Environmental Quality (CEQ) is proposing to comprehensively update and substantially revise National Environmental Policy Act (NEPA) procedures to make the environmental review process more efficient. Key provisions include limiting time for completing environmental impact statements to 2 years, and 1 year for environmental assessments, which would give project owners greater authority in preparing their own environmental impact statements.

Metro major transit and highway projects typically receive federal funding and are then required to go through the NEPA process. This potential streamlining of NEPA will help Metro projects with federal funding get out to the market sooner therefore reducing costs and accelerating delivery.



Detrimental External Factors

Many external factors deseve attention now, and as they continue evolving, as part of Metro's strategy to achieve it three intend outcomes in construction: high cost of living constraints, third-party collaboration influences, agency competion for resources, and ballot measure trends in California and beyond.

High Cost of Living Deters Qualified Workers

According to Zillow estimates, the $2,950 median rent for the Los Angeles area is nearly double the national median rent of $1,590[xvi]. Los Angeles is also considered one of the least affordable metropolitan areas in the country based on the ratio of house prices to household income[xvii]. This issue hits blue collar workers the hardest, because the price of housing more than eliminates the advantage of higher wages in the Los Angeles area.

The need for labor is so significant that it will be essential to bring in qualified workers from outside Southern California. But the high cost of living poses a major hurdle for contractors trying to hire qualified workers from outside the region to work in Los Angeles. For specialized work, contractors are having to provide special hiring packages, higher salaries, and subsidies for transportation and relocation costs. These costs are reflected in contractor bids and drive up the costs to build projects.

Third-Party Collaboration

Misalignment with local jurisdictions and utility agencies is an issue that continuously causes project delays. Close coordination with all interfacing governmental entities and utility owners is important for maintaining project schedule and budget. Some of the common issues impacting project delivery include the length of submittal review times, changes in assigned reviewers, scope creep, inconsistent review comments, multiple rounds of review, and lack of authority for approval. Enhancing collaboration and expediting third-party jurisdictional and utility processes could help offset the cost and schedule pressures facing Metro in these market conditions. Metro is addressing this issue by evaluating how it can develop simpler master cooperative agreements (MCAs) that are more user-friendly, particularly for jurisdictions new to doing business with Metro.

Accounting for COVID-19

COVID-19 is creating a global economic impact that may soon affect the construction industry. Metro and contractors should brace themselves for potential supply-chain interruptions, labor disruption, increased costs for materials, logistic breakdown, and legal disputes. As a precaution, Metro should start conducting supply chain audits and identify vulnerabilities. The construction industry should prepare for short-term impacts, but the significance and duration of COVID-19 impact in the long term is uncertain.

Local Agencies Already Competing for the Same, Limited Resources

Southern California is arguably the infrastructure capital of the world with multiple billion-dollar-plus capital programs across various markets such as transportation, ports, aviation, water, and utilities. Major regional competition in construction market may divert potential resources away from Metro:

- California Department of Transportation (Caltrans) SB 1 highway repair and improvement projects
- Los Angeles Department of Water and Power (LADWP) $1 billion program to transition to 100% renewable energy
- Los Angeles World Airports (LAWA)'s $14 billion LAMP and $2 billion Airfield & Terminal Modernization Project (ATMP)
- Orange County Transportation Authority (OCTA) freeway widening and improvement project totaling $3 billion
- Port of Long Beach with construction of Middle Harbor, Pier B Railyard, and Gerald Desmond Bridge.
- Southern California Regional Rail Authority (Metrolink)'s $10 billion Southern California Optimized Rail Expansion (SCORE) Program
- Virgin Trains' $3.5 billion XpressWest high-speed rail line project connecting Southern California to Las Vegas

Consequentially, Metro's local peer agencies are all competing for the same limited resources to deliver their projects. In addition, contractors have multiple project owners to choose from and will prefer owners with favorable contracts.

Ballot Measures Rivaling Measure M Could Steal Construction Resources from Metro

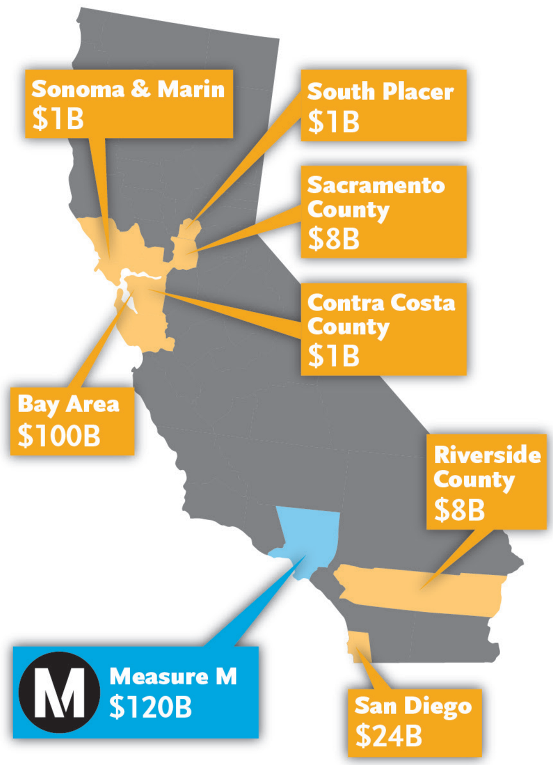
After witnessing the successful passage of two major transportation ballot measures, other jurisdictions are following Metro's approach by going to the ballot to fund transportation improvements.

Across the nation, nearly 90% of the 305 state or local transportation measures on the ballot in November 2019 were approved, resulting in additional $9.6 billion in potential construction spending on projects in the next few years. In addition, recent legislation in California is making it easier for agencies to place funding measures for special districts or on a sub-regional basis. Therefore, several transportation ballot measures and funding strategies outside of Los Angeles County that rival Measure M could pass in 2020. Passage of these ballot measures and programs, especially in California, would significantly increase construction demand, further constraining the short supply of construction labor to support Metro's capital program under Measures R and M.

- **Bay Area** – A nine-county initiative in the San Francisco Bay Area, called the "Faster Bay Area Transportation Tax" will be on the November 2020 ballot. This ballot initiative is projected to generate approximately $100 billion over 40 years for transportation projects. Projects would likely include transit and rail projects, and highway and bridge improvements. Polling for this ballot measure is hovering around 70% in general support.

- **Riverside County** – In December 2019, Riverside County Transportation Commission (RCTC) approved the placement of a half-cent sales tax increase on the November 2020 ballot to generate $8 billion in transportation infrastructure. The half-cent sales taxes would have no sunset and could generate several billion dollars over the first 30 years. Potential projects would mostly be highway and regional rail improvements.
- **San Diego** – San Diego Metropolitan Transit System is moving forward with a half-cent sales tax measure on the November 2020 ballot to fund nearly $24 billion over 50 years for transportation projects.
- Other California counties plan to go to the ballot box with transportation funding measures in March and November 2020.

Ballot measures at the local, state, and regional levels rivaling Measure M could threaten Metro's construction resources.



05

Future Construction Market Projection

Economic modeling was used to identify the number of construction jobs that will be generated from construction activity between 2020 and 2030. The modeling results shows a significant labor shortage between the estimated construction labor required and available construction labor force.

Metro's Construction Expenditure Forecast

To forecast Metro's annual construction expenditure for its projects, a model was developed to analyze available project data such as construction costs, anticipated construction start dates, and construction duration. The data was entered in an S-curve model to capture the cumulative progress of a project as construction activity typically begins slowly, ramps up in the middle, and then slows toward completion.

Over the next 10 years, Metro construction expenditures will likely average nearly $2.9 billion per year with expenditures peaking in 2025. The figure below provides details of Metro's forecasted capital expenditures by year and project type. This forecast does not capture all Metro projects, such as the I-710 South Corridor, due to uncertainty in how the project will be built, and Crenshaw Northern Extension, which is estimated to start construction outside the forecast period.

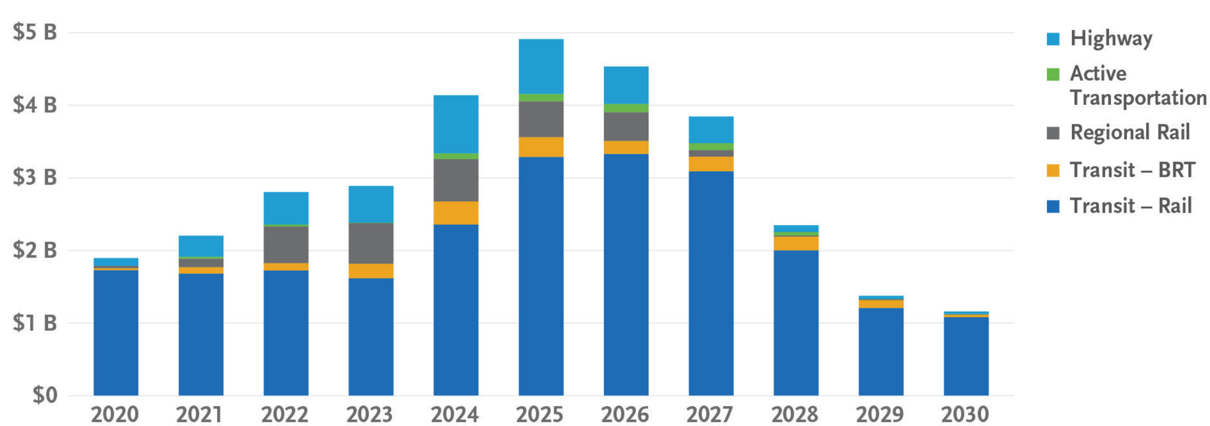
Local Agency Construction Budget Forecast

Local agency construction budgets from 2020 to 2030 with major capital programs were forecasted similarly and are summarized below.

These local agencies were categorized by sector:

- Transportation: Caltrans, OCTA, RCTC, SANDAG, SBCTA, SCRRA, Virgin Trains
- Airports: LAWA, BUR, LGB, ONT
- Water: MWD and LADWP
- Ports: Los Angeles and Long Beach
- Schools: LACCD and LAUSD
- Municipalities: City of Los Angeles, Los Angeles County, Orange County, San Bernardino County, Riverside County

METRO ANNUAL EXPENDITURE BY CONSTRUCTION PROJECT TYPE



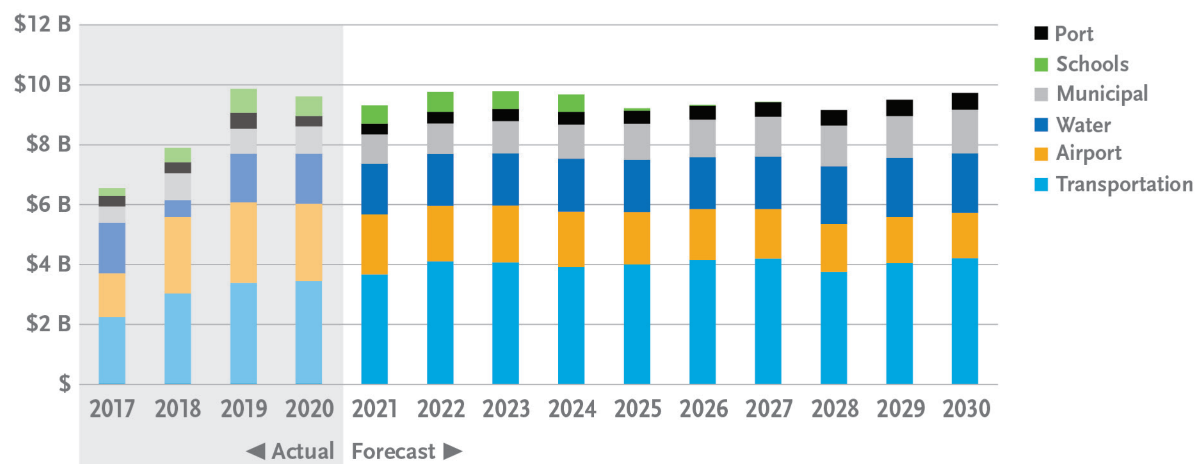
Most agencies reviewed included annual budgets out to Fiscal Year 2021 only. To estimate the budgets for years 2020 to 2030, linear trends were projected based on historical data.

Since the 2018 report, local agency budgets are anticipated to increase by $1.9 billion annually to an annual average of $9.5 billion over the next decade. This increase is driven by SB-1 going into full effect after repeal efforts failed in November 2018, the passage of Los Angeles County's Measure W, LAWA's $2 billion Airfield & Terminal Modernization Program (ATMP), LADWP renewable energy and recycled water program, Metrolink's SCORE program, and Virgin Train's XpressWest project.

The total construction amount of capital improvement projects in the region which would directly compete with Metro's capital program over the next decade is projected to be $104.5 billion. In contrast, Metro's total construction amount over the next decade is projected to be $35 billion, or 33.5% of all projected construction spending in the region between 2020 and 2030.

This data will be affected by ongoing events such as local ballot measures and awards of State and federal funding to local agencies. If approved, many transportation improvements planned in future decades will be accelerated. Expenditure plans for the pending local ballot measures were not included in this report's analysis.

LOCAL AGENCY FORECAST OF ANNUAL CONSTRUCTION SPENDING BY SECTOR



Dodge Data for Other Non-Residential and Residential Construction

Private development is a major source of construction demand in Los Angeles with major cultural and entertainment projects in construction, including the NFL Stadium and the George Lucas Star Wars Museum. Downtown Los Angeles, Hollywood, and Silicon Beach are seeing sigincaint growth in private development. Private development demand now employs the majoirty of construction labor. Construction expenditure data for private development is typically not public information, but is trade specific; therefore, to obtain past expenditures and projected projects, Dodge Data & Analystics was contacted and the private development construction expenditure data were purchased for the region (Los Angeles County, Orange County, San Bernardino County, and Riverside County). The Dodge data was then adjusted to account for possible double-counting in the nonbuilding and nonresidential project expenditures as well as Metro and local agencies construction expenditures.

Key Indicator:
Los Angeles tied Seattle for the most construction cranes in the US in 2019.

How the Number of Construction Jobs Required Was Modeled

Data gathered from the Bureau of Labor Statistics (BLS), LAEDC, local agency budgets, Dodge data, and Metro were used to model the job creation impact to the region (Los Angeles County, Orange County, San Bernardino County, and Riverside County) for the period of 2020 to 2030. Economic modeling was performed with the IMPLAN model to determine job creation by using construction budgets for Metro and local agencies and using Dodge data for private development as input. These employment values were compared to the current BLS number of construction employment for the current year and projected out to 2030 based on various growth factors including LAEDC's latest growth rate for the construction industry in the region.

The available construction labor was based on the current BLS employment and projected by California Employment Development Department (EDD) growth of 2% for the construction industry. This growth rate was adjusted slightly in the latter half of the decade to account for slowing population growth in California.

Limitations of the analysis should be considered when evaluating the data as the model does not account for employment resulting from other public or private construction expenditures. For example, the planned local agency public expenditures do not include any planned construction for the statewide expenditures on public construction projects such as the California High Speed Rail project and the University of California capital projects. Additionally, projected private construction expenditures data from Dodge excludes minor additions or alterations to existing buildings.

The Forecast Reveals a Prolonged Construction Labor Shortage

Although specualtive, this 10-year economic analysis is provides a view into the construction employment conditions that are anticipated from 2020 to 2029. It provides a basis to further develop trends that will impact the implementation and completion of Metro's projects. The results of this employment conditions modeling show that demand for construction jobs exceeds the available resources to fill these jobs.

The results from the economic modeling forecast for the annual estimated number of constructions jobs is provided in a table. The construction industry is expected to sustain substantial growth and need for construction labor in preapration for the 2028 Olympic Games in Los Angeles along with significant investment in infrastructure and private development. After the Olympics, the construction industry will likely experience a slight decline as a localized market correction that reflects completion of Olympic-related constructionactivity.

ECONOMIC MODEL FORECASTING RESULTS FOR ANNUAL ESTIMATED NUMBER OF CONSTRUCTIONS JOBS

Year	Available Construction Labor	Estimated Construction Labor Required	Estimated Metro Construction Labor Required	Labor Shortage
2020	369,600	376,100	10,100	6,500
2021	376,600	386,900	11,500	10,300
2022	383,800	397,700	14,600	13,900
2023	391,100	409,000	15,100	17,900
2024	398,500	421,800	21,700	23,300
2025	405,500	435,100	25,800	29,600
2026	411,600	447,100	23,800	35,500
2027	416,700	455,200	20,200	38,500
2028	420,900	458,400	12,200	37,500
2029	425,000	454,900	7,100	29,900

The current labor shortage is felt as contractors have difficulty filling positions on current projects. The next 5 years will likely bring a labor shortage gap between 10,000 and 30,000 people. The peak of the labor shortage is anticipated between 2025 and 2028, resulting in a shortage of approximately 35,500 to 38,500 people to fill construction jobs.

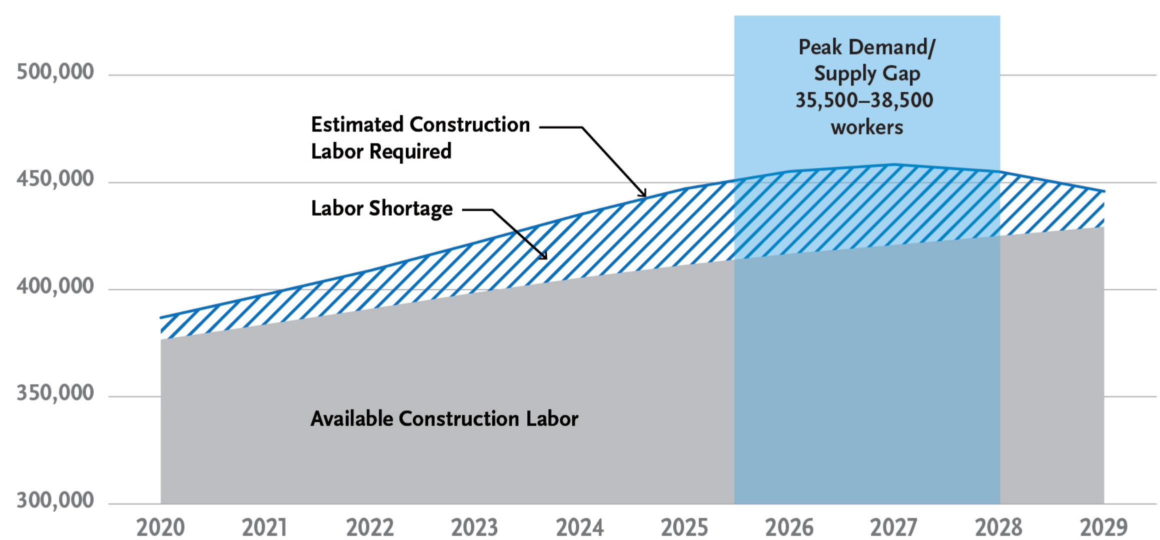
Metro will need to take significant further actions to close this labor gap. It represents the peak levels of construction expenditures as the region prepares to host the Olympics. The labor shortage will result in construction projects being delayed and costing more than originally anticipated. Following the conclusion of the Olympics, the labor shortage will subside as available labor reaches estimated demand.

This projected construction labor shortage as well as the estimated duration of the shortage is variable and will be affected by market conditions:

- Economic volatility
- Unforeseen events (such as national policy decisions)
- Natural and environmental disasters
- Population growth

Therefore, these conditions must be routinely monitored to detect either positive or negative impacts to the projected labor shortage. Annual updates to the findings in this study are prudent.

ESTIMATED CONSTRUCTION LABOR PROJECTIONS BETWEEN 2020-2029



06

SWOT and Recommendations

The next 10 years will see more construction work than workers and firms available at a reasonable cost. Metro's recent initiatives in management practices and innovative development of local talent are solid examples of adaptation to this challenging market. Staying competitive will require Metro to remain vigilant and diligent in assessing its strengths, weaknesses, opportunities, and threats (SWOT) facing project delivery.

Over the next 10 years, the Los Angeles market will see more construction work than it will have workers and firms available to execute the work and at a reasonable cost. Metro's Measure M and Measure R programs will be affected by this lack of resources. Metro's recent initiatives to implement best management practices and to initiate innovative approaches to developing local talent and resources are steps in the right direction to attract bidders and to expand available industry resources in a tightening and competitive marketplace.

As market demand increases, contractors will become increasingly selective about which projects to pursue. Decisions will depend on who is the project owner and the amount of risk that owner places on the contractor. Contract language that contractors perceive to be difficult, punitive, subject to interpretation, or inconsistent with other processes or procedures will be viewed as a source of conflict, uncertainty, and inefficiency, are more likely to be unattractive to potential bidders.

Assessment of Metro's Strengths, Weaknesses, Opportunities, and Threats (SWOT)

A SWOT assessment is a useful tool for an organization to identify how it can enhance areas of strength, boost areas of weakness, minimize threats, and leverage potential opportunities. Metro developed a SWOT assessment relative to the construction market by examining national and regional economic conditions, the state of the construction industry, emerging trends in the market, Metro's previous actions, and external factors. Assessment results provide a basis for developing recommendations to prepare Metro's strategy for the next decade of construction demand. The results also help align recommendations with its Vision 2028 Strategic plan's three desired outcomes (increase the labor pool, be the owner of choice, and create a stronger and more resilient organization) to navigate the next decade of construction demand.

Strengths:
Metro has taken bold actions to address labor availability, material cost challenges, and become the owner of choice.

Weaknesses:
Factors driving up project cost and testing Metro's ability to deliver projects on schedule without sufficient resources.

Opportunities:
Should certain external factors occur, Metro has opportunities to leverage to their benefit.

Threats:
External factors beyond Metro's control threaten to increase inflationary pressures and reduce available labor resources.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Strengths:

Metro has taken bold actions to address labor availability, material cost challenges, and become the owner of choice.

- Project-by-project evaluation for alternative project delivery (P3, PDA, PDB, CM/GC) based on project goals and the need to better control cost and schedule.
- Countywide Planning and Program Management resources are collaborating earlier in the project lifecycle.
- Risk assessments are being conducted earlier and more regularly in the project lifecycle to identify project uncertainties and risk events affecting project budget and/or schedule, and mitigation efforts to reduce the probability of their occurrence.
- Outreach to contractors through one-on-one meetings, industry forums, and market sounding to obtain high-level feedback on project design, delivery mechanism, public funding commitments, and feasibility.
- Significant investments in workforce development initiatives such WIN-LA, SEED Transportation School, Female Participation Scorecard, Metro Youth Career Experience Program (MYCE), E3 Youth Initiative, Women Build LA, and the Women & Girls Governing Council.
- Increased internal training effort along with the experience gained by staff in managing megaprojects.
- Metro has initiated a review of third-party jurisdictional best practices with a goal of expediting the submittal review process.

Weaknesses:

Factors driving up project cost and testing Metro's ability to deliver projects on schedule without sufficient resources.

- Industry feedback on Metro procurements indicates that the process is still administratively burdensome and costly to bid.
- Along with the rest of the industry, Metro and its contractors are struggling with attracting qualified staff and talent.
- Multiple long-term megaprojects in the Measure M portfolio are complex and historically difficult to determine the life of project budgets.
- The sheer size and number of Metro projects is so great that the number of bidders per procurement will likely decline as contractors are forced to make difficult business decisions in this market.

Opportunities:

Should certain external factors occur, Metro has opportunities to leverage to their benefit.

- Identify potential project synergies between Metro and local jurisdictions for shared costs opportunities and win-win solutions to streamline local jurisdictional approval for Metro projects.
- Identify project delivery methods that are tailored to the project size, complexity, and attractiveness to potential bidders, including use of PDB and CM/GC.
- If interest rates rise, demand will decrease for income-producing and housing projects, possibly taking some pressure off of the labor shortage and materials costs.
- Advocate for regulatory reform to streamline environmental clearance and construction of transit infrastructure that can help reduce climate change.
- In the event of future recession, the Los Angeles market and Metro will likely be resilient to potential impacts and likely see more benefits, such as an increase in the number of bidders, more availability of talent and labor resources, and a decrease in bid prices.

Threats:

External factors beyond Metro's control threaten to increase inflationary pressures and reduce available labor resources.

- Occurrences of natural disasters and extreme weather events are increasing, resulting in billions of dollars in reconstruction efforts.
- An increasingly booming construction industry decreases the labor pool and increases wages.
- Impacts to materials costs if trade policies/tariff increases continue or remain uncertain.
- Jurisdictions outside of Los Angeles are initiating sales tax increases rivaling Measure M, which could further divert construction resources away from Metro.
- Contractors exiting the P3 market and being more cautious on bidding fixed-price projects.

Recommendations

In 2018, after Measure M passed, Metro commissioned a construction market analysis to evaluate conditions in Los Angeles County and Southern California. The 2018 report provided recommendations that have been implemented by Metro or are being developed. The findings in this 2020 market analysis, including the SWOT assessment, advance several more recommendations. The status of the 2018 recommendations, as well as the new recommendations resulting from this 2020 update, are discussed below.

2018 Recommendations Review

Previous recommendations from the 2018 Market Analysis are summarized to provide more complete strategic context. These earlier recommendations identified actions intended to enhance Metro's ability to deliver projects, expand the resource pool, and make Metro an "owner of choice." The following recommendations from the 2018 Construction Market Analysis have been implemented or are being developed:

- Develop a joint committee to develop skillsets relevant to the construction market.
- Identify appropriate projects that could use design-bid-build to increase bidding competition by smaller and certified firms to increase DBE/SBE participation.
- Evaluate contract language that might result in a less-attractive bidding climate to proposers and at higher cost.
- Conduct one-on-one meetings with proposers before or during the request for proposal (RFP) process to evaluate where they may include risk transfer to contractors.
- Increase the dollar ceiling for project-level change authority to reduce the time required to resolve change orders by delegating more authority at the project manager level.
- Develop estimates that are consistent with the current market trends.
- Develop contract language to allow for addressing project cost increases so risk to both Metro and contractors can be limited.
- Institute active engagement with the contracting community to jointly identify balanced risk sharing in contracts.
- Conduct regular interviews with the contractors to identify lessons learned.

2020 Recommendations

The results of the 2020 Los Angeles Construction Market Analysis point to an industry that will be challenged to fulfill nationwide public and private needs, especially within the transit and highway sectors. Public agencies, like LAWA and Caltrans, are investing in their infrastructure and will be competing for construction resources. The private sector is also competing for resources to construct new cultural and sports facilities in Los Angeles and rebuild more than 5,000 residential properties affected from recent wildfires throughout California.

Building on the strengths identified in the SWOT assessment, Metro's recent initiatives and policies, and implementation of the previous 2018 report recommendations, this 2020 study provides additional and refined recommendations aimed at supporting Metro's intended outcomes:

- Increase the labor pool
- Be the owner of choice
- Create a stronger and more resilient organization

Recommended actions are designed to increase the number of contractors and depth of craft and management resources available to build Metro projects. They focus on positioning Metro as the owner of choice for potential bidders, who are becoming increasingly cautious about which owners to invest in.

Based on the current market conditions and analysis presented in this report, recommendations are identified under each intended outcome they support.

Increase the Labor Pool

1. **Innovate worker housing.** Develop innovative ways to create housing for construction workers. For example, constructing dormitory-style housing that could serve the dual purpose of housing unemployed persons who are capable of job retraining into the construction field. Another approach could develop transit-oriented community sites to temporarlily house construction workers during project construction, and then be sold on the open market after the transit project is complete.
2. **Leverage technology.** Establish an initiative to attract and engage new generations of potential workers while challenging outdated perceptions of the construction industry. Explore partnerships and concepts aimed at showcasing the industry's adoption of technology, along with opportunities to engage in tech innovation through training and career development that can benefit project productivity, schedules, and labor pool challenges.

Be the Owner of Choice

3. **Incentivize diversity.** Consider a different strategy by incentivizing contractors for meeting certain diversity thresholds in the form of bonuses.
4. **Reduce bidder burden.** Save contractors time and cost when proposing on Metro projects by (1) reducing and simplifying the number of contracting templates (require standard bid forms be prepared outside the proposal process to be completed once, placed on file at Metro, and remain effective until their information changes), (2) allowing for electronic submission of forms, certificates, and licenses, and (3) considering a three-firm limit on the number of bidders short-listed to avoid burdening contractors with the high cost of developing detailed cost estimates.
5. **Incorporate modular design.** Encourage modular construction design and approaches to simplify on-site contruction, relieve local labor pool constraints, and streamline schedules. Taking the work to the workforce by fabricating project componenets at offsite locations with fewer constraints could benefit contractors and Metro in several ways: reducing local labor pool demand, saving cost, shortening schedule, and more comptetitive bids.

Create a Stronger and More Resilient Organization

6. **Phase implementation.** Assess the potential for initial operating segments of transit corridor with lower risk and complexity to maximize benefits for the money and getting the project out to market sooner.
7. **Share Cost.** Identify potential project synergies for shared costs opportunities through third-party collaboration on projects.

8. **Recruit Talent.** Maintain an aggressive posture competing with other agencies for limited available resourcestalent, including onboarding project management staff when qualified candidates are identified and available, even if prior to actual need arising.

Implementing these recommendations will help Metro expand available resources to serve its program by initiating an expedited and more bidder-friendly RFP process, attracting contractors outside of the region to participate in Metro procurements, building the craft labor base in the region, and structuring procurement packages to attract a greater range of responding firms.

RECOMMENDATIONS AND BENEFITS SUPPORTING METRO OUTCOMES

Actions and Outcomes	Benefits					
Recommended Actions Supporting Outcomes	Address Labor Shortage	Reduce Cost	Minimize Risk	Attract Bidders	Manage Schedule	Response
Increase the Labor Pool						
1. Innovate worker housing	✔			✔	✔	T
2. Leverage technology	✔	✔			✔	T
Be the Owner of Choice						
3. Incentivize diversity	✔			✔		S
4. Reduce bidder burden		✔		✔	✔	W
5. Incorporate modular design	✔	✔		✔	✔	O
Create a Stronger and More Resilient Organization						
6. Phased implementation		✔	✔	✔	✔	W
7. Shared cost	✔	✔	✔		✔	O
8. Recruit talent	✔	✔	✔		✔	W

Acronyms and Abbreviations

ABC	Associated Builders and Contractors
AGC	Associated General Contractors of America
BLS	Bureau of Labor Statistics
CCI	Construction Confidence Index
CEQ	Council on Environmental Quality
DBIA	Design-Build Institute of America
ENR	Engineering News-Record
FAST	Fixing America's Surface Transportation
GDP	Gross Domestic Product
IOS	initial operating segments
LAMP	Landside Access Modernization Program
LAX	Los Angeles International Airport
METRO	Los Angeles County Metropolitan Transportation Authority
NEPA	National Environmental Policy Act
P3	public-private partnership
PDA	pre-development agreement
PDB	Progressive Design-Build
PPI	Producer Price Index
RFP	request for proposal
SCORE	Southern California Optimized Rail Expansion
SWOT	strengths, weaknesses, opportunities, and threats
UCLA	University of California, Los Angeles
USDOT	US Department of Transportation
WBMLA	Women Build Metro LA

Notes

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#	Page	Source	Project
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5	1	Metro - Steve Hymon	Westside Purple Line Extension Section 1
6	3	Metro	Patsaouras Plaza
7	5	Metro	Sepulveda Transit Corridor, Green Line Extension, West Santa Ana Branch Transit corridor, Eastside Transit Corridor Phase 2
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22	Back Cover	Metro	Regional Connector Transit Project


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