DHARAM
CONSULTING

CONSTRUCTION COST NOTE
HOUSTON

February 2019

This note provides an overview of the Houston construction market, assessing the recent trends in building costs and providing Dharam Consulting's view on the outlook for prices.

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DHARAM CONSULTING VIEW

The construction pricing trend of moderate year-on-year increases is expected to be sustained in 2019 (3.5%) and 2020 (2.5%). Our bid submission price forecast is based on the following assumptions:

- Project pipeline increased significantly in 2018, but a number of high-profile developments were completed last year freeing up capacity.
- A number of large projects are in planning and could if they were to commence near-term put significant pressure on capacity on the market.
- Investor confidence is strong, but a change in sentiment and slower construction growth at the national level could impact the regional market.
- Higher construction cost and rise in interest rates could lead to some projects being reviewed.
- Labor cost inflation is not abnormally high currently. Labor constraints appear to be impacting construction timelines, as (sub-) contractors appear to be struggling to find the appropriate resources.
- Material price rises are levelling out.

CONSTRUCTION COST DRIVERS

Market Activity

Economic activity and construction rebound in 2018. Houston's economy struggled from 2015 to 2017, a period of no to little growth for the city, with its problems centered on the fall in oil prices and the loss of many local oil-related jobs. Partially offsetting the oil price related slump in activity were a strong U.S. economy, a petrochemical construction boom on the back of low gas prices, and Hurricane Harvey related reconstruction activity.

In 2018, the Houston economy rebounded, spurred by strong activity in the wider U.S. and a local increase in construction activity, as post-hurricane reconstruction gathered momentum.

Looking ahead, the local economy will remain critically dependent on the outlook for oil prices and wider U.S. growth.

Hurricane Harvey, that hit the Houston area in summer 2017, caused $125 billion in damage, devastating numerous building structures and infrastructure. In response to the natural disaster, Harris County's voters approved a $2.5 billion flood infrastructure bond designed to protect the region in future storms. The bond allows the Harris County Flood Control District to undertake more than 230 projects over the next decade.

It is also key to accessing more than $2 billion in matching federal funds. Texas and the U.S. Army Corps of Engineers are in the process of developing a $23-32 billion plan for a "coastal spine" system of flood protection and draining infrastructure to protect the Gulf Coast.

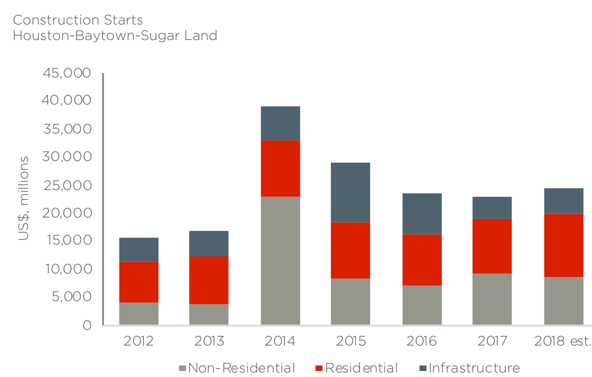
In addition to infrastructure, energy and industrial-related construction, the local market has seen a strong increase in education + research, arts and in particular healthcare-related projects, ranging from modernizations, expansion and new build programs.

Construction starts in Houston totaled $28.0 billion in 2018 ($24.3 billion), the highest value among major U.S. cities last year. Dallas saw the second highest value of construction starts in 2018, totaling $26.1 billion ($29.2 billion in 2017).

Whilst construction activity currently underway is focused on the industrial, chemical and energy industries, other sectors are also seeing an increase in demand. The buildings sector in the area is particularly driven by the education and healthcare sectors, with universities and hospitals major driving forces of building activity. Construction activity in the urban area pushed by demand for residential space, tax abatements on new construction, with the city lately also seeing an increase in new commercial work being undertaken.

A number of significant projects were completed in 2018, including the $697 million Paula and Joseph C. "Rusty" Walter III Tower, the $506 million Texas Children's new patient tower and the $300 million Post Oak mixed-use development. The by far largest project in the area, CP Chemical's $6 billion USGC Ethylene facility, also commenced production.

FIG. 1: HOUSTON CONSTRUCTION STARTS



Source: ENR, Dodge Data

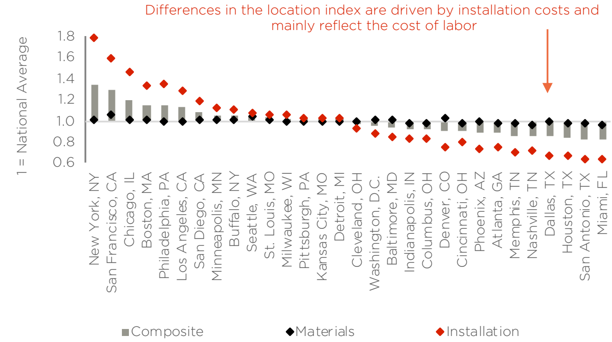
Local Building Costs

Construction input costs in Houston are significantly lower than the national average according to the ENR. The composite index, which includes material and installations (mainly common labor) is 15% lower in Houston. than the national average (Fig. 2). The index for labor (installation) was nearly a third lower than the national average in 2018, despite reports that local labor costs have been rising faster than elsewhere due to strong demand.

The ENR building cost index, which includes materials and skilled labor, recorded a 3.3% increase in 2018 on average nationally. **Building input costs are estimated to have increased by 2.3% in Houston/ Dallas.**

FIG. 2: COMPARATIVE BUILDING COSTS

Construction Cost Index



Source: ENR

Labor Costs

Construction employment growth in Houston accelerated in 2018, as major projects proceeded and commenced (fig. 3). The Houston metropolitan area added 19,400 construction jobs between December 2017 and December 2018, by far outstripping average construction job growth in the U.S.

Despite documented labor shortages across many U.S. markets, average wage rates have not increased significantly on average, though price adjustments are not uniform with specific trade that are high in demand commanding more significant hourly wage increases in particular in some high-growth urban markets.

According to ENR data, labor costs, both skilled and common labor, have not changed significantly in Houston in 2018.

Current open-shop wage rates for the South-Central region are shown in fig. 4. Average labor costs are lower than the national average. This does not mean however, that labor costs are necessarily lower for all trades and on all schemes, and those requiring specific skilled labor and / or very experienced sub-/ contractors, may well face higher than average local labor costs.

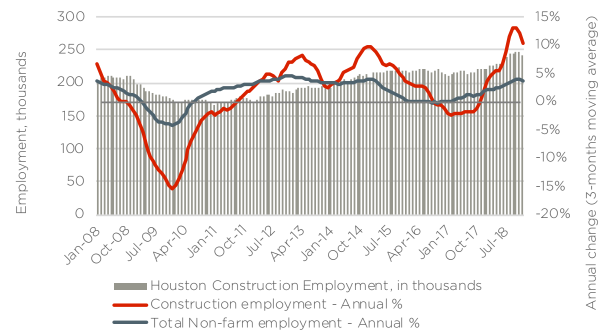
Current prevailing wages in Houston are shown in figure 5. Prevailing wage rates between 2017 and 2019, as reported by the City of Houston have stagnated or increased only slightly.

However, local contractors and sub-contractors report that labor costs increased between 3-5% in 2018 on the back of capacity constraints due to reconstruction efforts. This is particular the case for specific trades within the housebuilding sector, such as drywall finishers, electricians and painters.

Some developers report that a shortage of labor has contributed to the delays in construction in 2018.

FIG. 3: HOUSTON CONSTRUCTION EMPLOYMENT

Houston-The Woodlands-Sugar Land



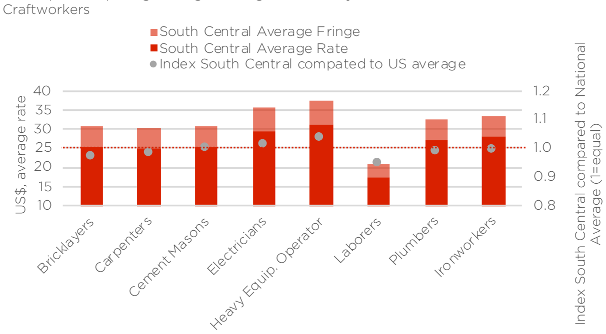
Source: BLS

+19,400

Construction Jobs
Dec-17 to Dec-18

FIG. 4: REGIONAL AVERAGE OPEN-SHOP WAGES

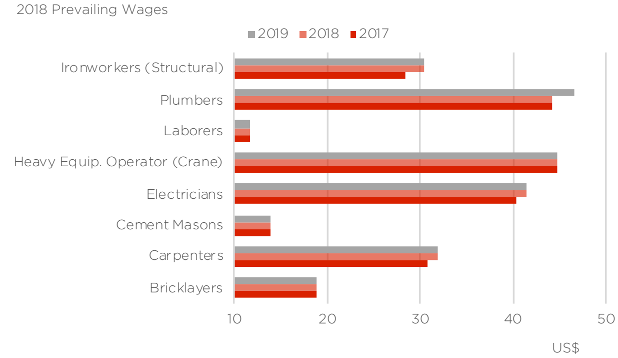
2018 Open-Shop Wage+Fringe Package for Journey-Level Craftworkers



Source: ENR
South Central REgion: Ark., LA., N.M., Okla, Tex.

FIG. 5: HOUSTON PREVAILING WAGES

2018 Prevailing Wages



Source; City of Houston

The import tariffs levied by the U.S. on a number of countries and the reciprocal actions by those affected countries aggravated the fluctuation in commodity prices which were already fluctuating amid growing trade tensions, increased sanctions, and growth concerns. Volatile market conditions are widely expected to continue amid uncertainty over a further escalation of trade-restrictive measures and associated spillovers on economic growth, confidence, financial and commodity markets.

On average, material prices nationally increased by 4% in 2018. Material prices in Houston are seen as corresponding largely to national price trends.

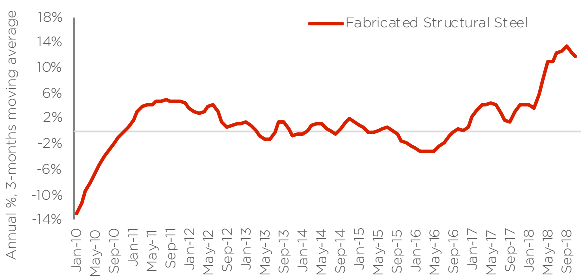
Material prices are expected to increase moderately on average in 2019, as the impact of tariffs wears off and the market cools. IHS forecasts a 3.5% increase on average. Lumber softwood prices are forecast to decrease by 10% this year, after the sharp increases in 2018. Similarly, rebar prices are expected to edge back slightly. Forecasts expect asphalt paving and cement prices to see the highest cost increases this year (+4%) and next (2-3%).

Selected materials are shown in Figure 6.

FIG. 6: PRICE CHANGES OF SELECTED MATERIALS

Fabricated structural metal

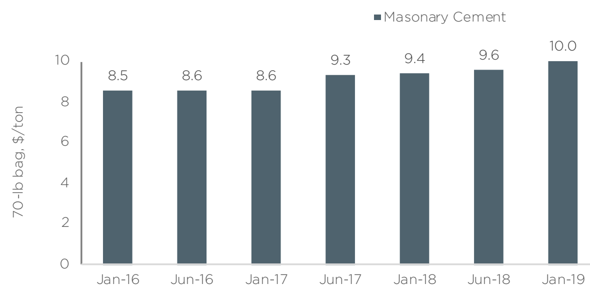
Average 2018 vs 2017 (1 year) ▲10.2%



Source; ENR, BLS

Masonry Cement

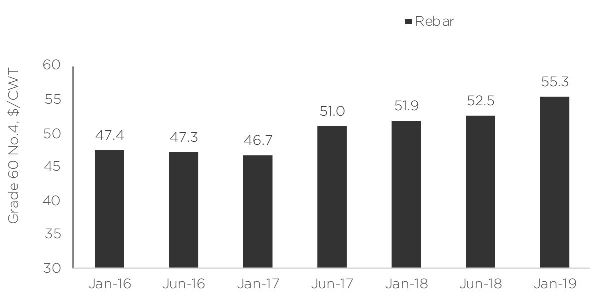
Jan-19 vs Jan -18 (1 year) ▲6.1%



Source; ENR,

Rebar

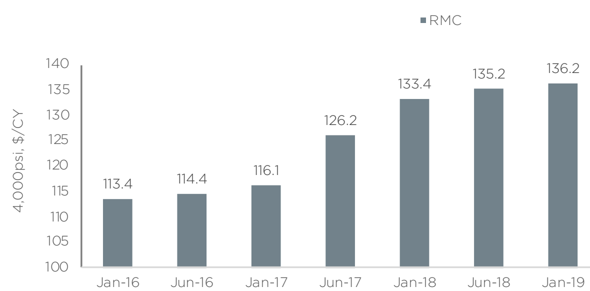
Jan-19 vs Jan -18 (1 year) ▲6.6%



Source; ENR,

RMC

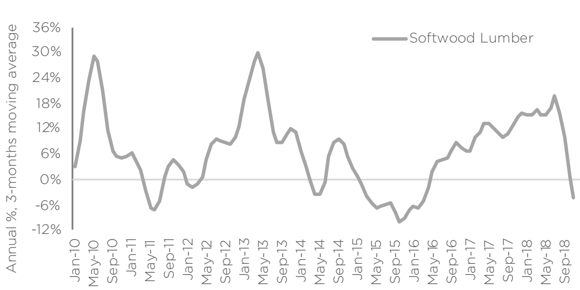
Jan-19 vs Jan -18 (1 year) ▲2.1%



Source; ENR,

Softwood Lumber

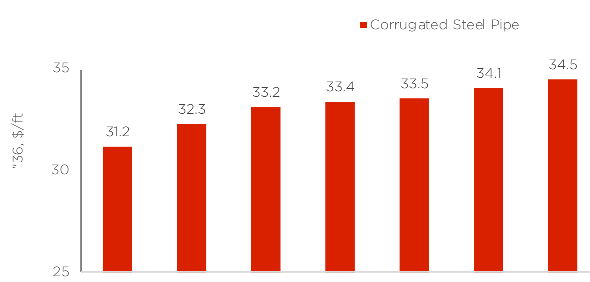
Average 2018 vs 2017 (1 year) ▲8.3%



Source; ENR, BLS

Corrugated Steel Pipe

Jan-19 vs Jan -18 (1 year) ▲2.9%



Source; ENR,

CURRENT CONSTRUCTION PIPELINE

Our major projects pipeline contains 41 active projects with an estimated project value of more than $11 billion. The projects list focusses on residential and non-residential buildings, as well as transportation infrastructure, and excludes chemical, heavy industrial and energy related projects.

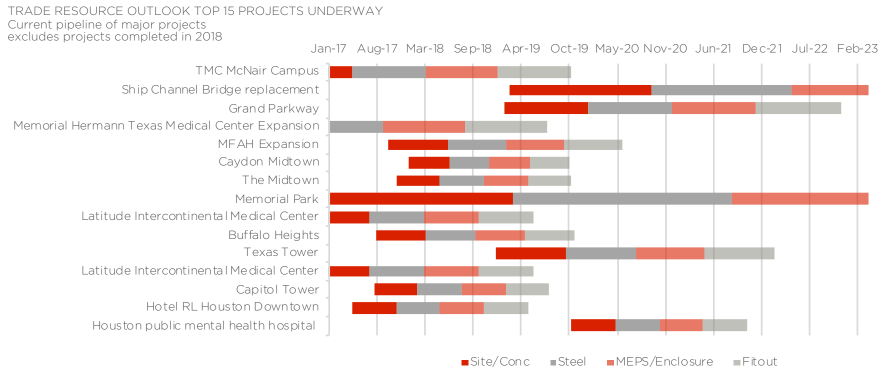
The largest projects currently underway are the $1.1 billion TMC McNair Campus, the $961 million Ship Channel Replacement, the $894 million Grand Parkway and the $650 million Memorial Hermann Texas Medical Center Expansion.

20 large projects, together totaling more than $8 billion were completed in 2018. This includes the $6 billion CP Chemical USGC Ethylene facility.

Our analysis of the flow of trade resources within the current pipeline for the top 15 projects by value is summarized in figure 7. The analysis includes only active projects and excludes any projects completed in 2018.

Based on the current projects in the pipeline, estimated construction times, and the assumption that most projects proceed as planned, we expect steady workload levels in 2019 and 2020. There are some large projects overlapping, but the volume of work is not exceeding levels that the local market has experience with. Should the two +$1 billion projects - TMC3 Biomed and MLIT at George Bush Intercontinental Airport commence near term, and planned infrastructure projects by the state of Texas and the Army Corps of Engineers come to fruition later this year, this could add pressure on the market and lead to more critical shortages in the (skilled) labor pool

FIG. 7: PRICE CHANGES OF SELECTED MATERIALS



Source: BLDUP, Houston Chronicle, Biznews, Dharam Consulting

TABLE 1: TRADE RESOURCES PEAK DEMAND OF TOP 15 PROJECTS

Trade Resource	Top 15
Peak Site Concrete	Q2 2018
Peak Steel	Q4 2018
Peak MEPS/Enclosure	Q3 2019
Peak FITOUT	Q2 2020

BID SUBMISSION PRICES

In 2017 Hurricane Harvey impacted on the local and regional construction industry, disrupting supply chains and the procurement of certain materials. Major supply routes, for example the port of Houston and other transport infrastructure, were partially destructed and it took some time to recover capacity. Rebuilding efforts began in earnest in 2018, increasing demand for contracting resources, labor and materials.

Year-on-year bid submission price increases have been relatively modest in Houston between 2015 and 2017, in parts due to slower construction activity following the oil price induced slowdown in the local economy. Increased demand and a high level of project starts pushed up construction prices in 2018 by an estimated 3.5%. Sub-contractor capacity constraints in several trades increased labor costs, while the import tariffs on steel and aluminum impacted the cost of trades such as structural steel and rebar, MEP, or drywall framing.

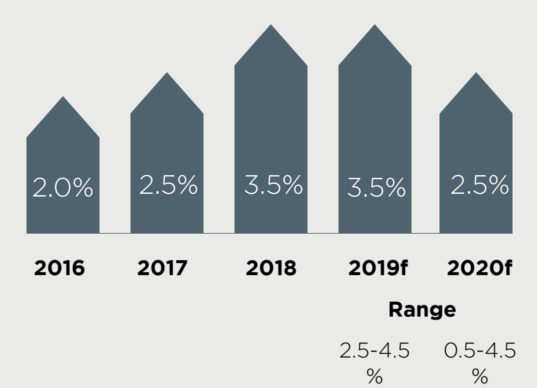
Bid submission prices are expected to continue to rise this year and next at an overall moderate rate. Whilst there is a reported shortage of (skilled) labor in the market, the increase in wage costs in recent years has been restraint and we see this trend continuing in the near term. Labor capacity constraints are likely to impact construction durations rather than costs. Given the strong increase in materials costs in 2018, we expect cost escalation to moderate significantly this year, as the impact from tariffs wears off.

Our bid submission price forecast is based on the following assumptions:

- Project pipeline increased significantly in 2018, but a number of high-profile developments were completed last year freeing up capacity.
- A number of large projects are in planning and could, if they were to commence near-term, add pressure on capacity in the market.
- Investor confidence is strong, but a change in sentiment and slower construction growth at the national level could impact the regional market.
- Elevated construction cost and rise in interest rates could lead to some projects being reviewed.
- The shortage of skilled workers will maintain pressure on the local market, but the pace of labor cost inflation is not abnormally high currently. Labor constraints appear to be impacting construction timelines, as (sub-) contractors appear to be struggling to find the appropriate resources.
- Material price rises are levelling out.

Bar any major upside or downside shocks to the market, the pricing trend of moderate year-on-year increase is expected to be sustained in 2019 (3.5%) and 2020 (2.5%). Our forecast is shown in figure 9.

FIG. 8: HOUSTON BID SUBMISSION PRICES



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