Fiscal Year 21/22
QUARTER 2
REPORT

Strategic Resource Evaluation Study Highway Construction Materials

Contract BEC18

January 2022

The Balmoral Group

165 Lincoln Avenue
Winter Park, FL 32789

January 2022: Florida's Highway Construction Materials

Florida's Highway Construction Materials Sector saw producer bid prices increase through the end of 2021 by 19% on average in an attempt to widen margins and overcome input costs burdens sustained throughout the year. Supply chain disruptions caused by winter storms and summer hurricanes seem to be easing in early 2022, but structural issues like labor and transportation remain bottlenecks for nearly every industry. With demand shifting from residential construction to infrastructure, resiliency, and other non-residential building projects in 2022, demand is expected to remain high. However, potential geopolitical conflict in the background (Russia/Ukraine, UAE/Yemen, and South China Sea issues) brings back memories of past conflicts that dramatically disrupted material costs and availability, especially for steel products.

Asphalt prices have increased rapidly over the last few months due to higher crude oil and fuel prices, affecting both production and transportation of HMA. Domestic supplies of binder are under pressure as a result of higher production costs as well as increased competition from other sectors for petroleum products. While FDOT's HMA prices improved compared to the previous quarter, prices are still running over $120 per ton in 2022.

Concrete pricing has eased since 2021, which posted prices over $900 per cubic yard on average. However, producers continue to experience supply chain bottlenecks that are limiting their ability to increase capacity amid surging demand. Improvements in fly ash supply may arrive from Eco Material Technologies, which intends to take over Boral's North American fly ash business in 2022. Reinforcing steel costs are still a concern, but steel fabricators do not expect huge price increases for rebar products within the next few months.

Steel availability may improve in 2022 as a trade deal with the European Union could see additional steel and aluminum imports arriving stateside. This change may be fortuitous timing as a 25% surcharge is expected on aluminum products this month. Steel makers surveyed this month expect small price increases to continue for some product, including galvanizing steel. Bid prices may increase as fabricators seek to offset losses from 2021. Production is expected to ramp up during the next quarter in order to meet demand.

Aggregate supply for construction is stable and prices have moderated in 2022 after significant increases in 2020 and 2021. The issue for this market continues being around supply chain disruptions and costs for transportation, logistics, parts/equipment and skilled labor needs. Increased demand from different sectors could increase costs for FDOT.

Earthwork prices have also eased in 2022, but are still significantly above 2019 prices. Costs have surged due to high demand for drivers, rising diesel prices, lack of equipment operators, and rising equipment costs. These issues are not expected to be solved in the near term, so earthworks costs may remain elevated throughout 2022.

Disclaimer

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the State of Florida Department of Transportation

Prepared in cooperation with the State of Florida Department of Transportation.

Prepared by

Prepared for

The Balmoral Group
Web - www.balmoralgroup.us

Florida Department of Transportation

Head Office
165 Lincoln Avenue
Winter Park
Florida, 32789, USA
Phone 1 407 629 2185

Tallahassee Office
113 S Monroe Street
Tallahassee
Florida, 32301, USA
Phone 1 850 201 7165

Sydney Office
Suite 1, Level 2
210 George St
Sydney, 2000, Australia
Phone +61 2 9247 9670

Report Authors – Valerie Seidel, Alicia Barker, David Osorio, Elizabeth Mandell

Contact
Valerie Seidel
President
407 629 2185
vseidel@balmoralgroup.us

Suggested citation:

The Balmoral Group, 2022. Strategic Resource Evaluation Study: Highway Construction Materials, Second Quarterly Report. The Balmoral Group, Winter Park, FL.

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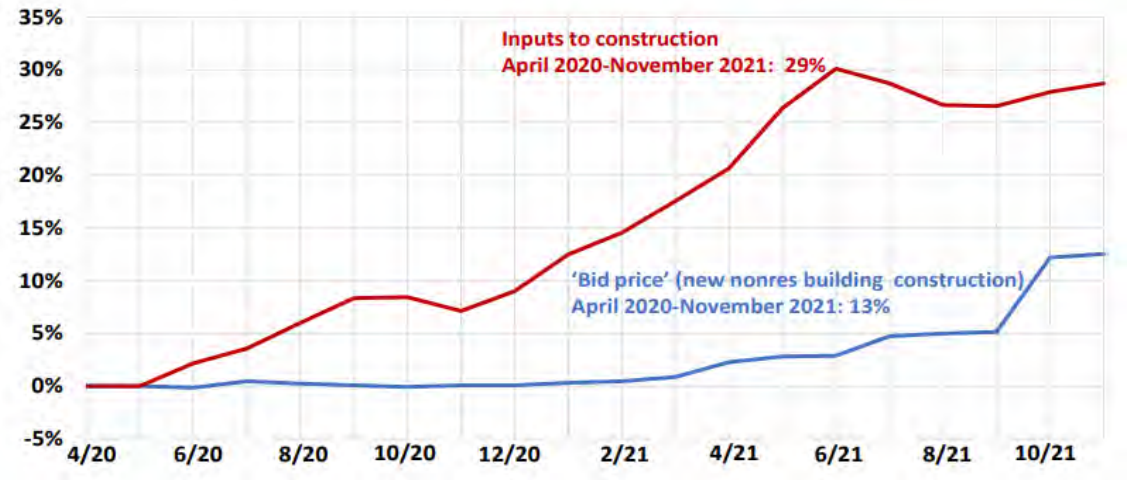
General Outlook for Highway Construction Materials

Input Costs vs. Bid Prices

The Associated General Contractors (AGC) reported in December that materials and services used in U.S. construction rose 29% through November 2021 compared to April 2020, while bid prices rose by 13% in comparison (**Figure 1**).

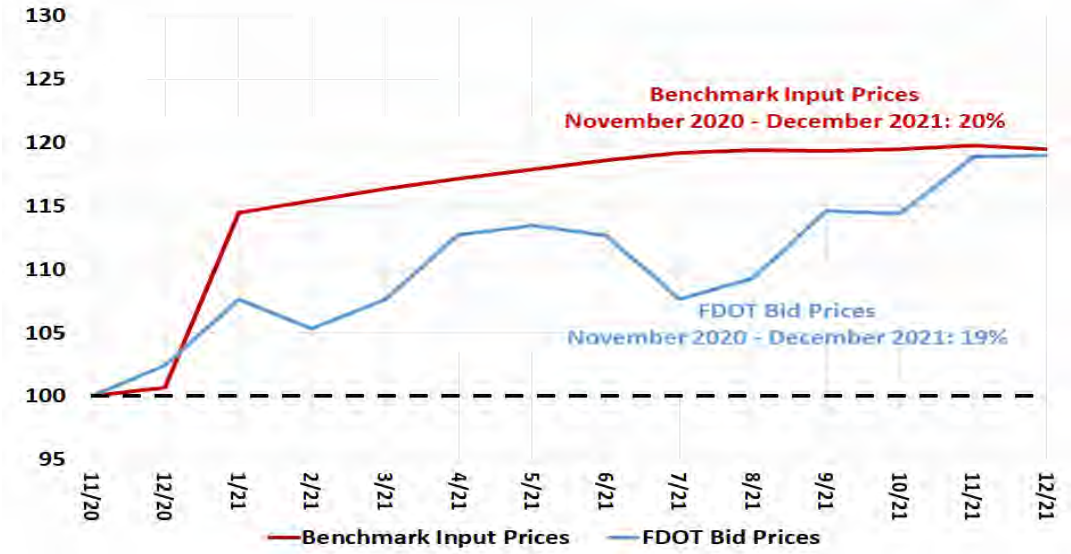
Figure 1. Change in U.S. Construction Input Costs and Bid Prices



Source: AGC.

In Florida, regional industry prices jumped in January of 2021 by about 15% compared to November 2020 levels (**Figure 2**). Since then, benchmark construction prices have risen another 5%, hovering at about 20% over November 2020. Average FDOT bid prices across all materials have ramped up in a similar fashion, increasing 19% compared to the benchmark month in December 2021. The mismatch between input costs and bid prices has almost completely narrowed, indicating that suppliers are increasingly passing on costs to FDOT. Monthly cost composition by material is provided in the **Appendix**.

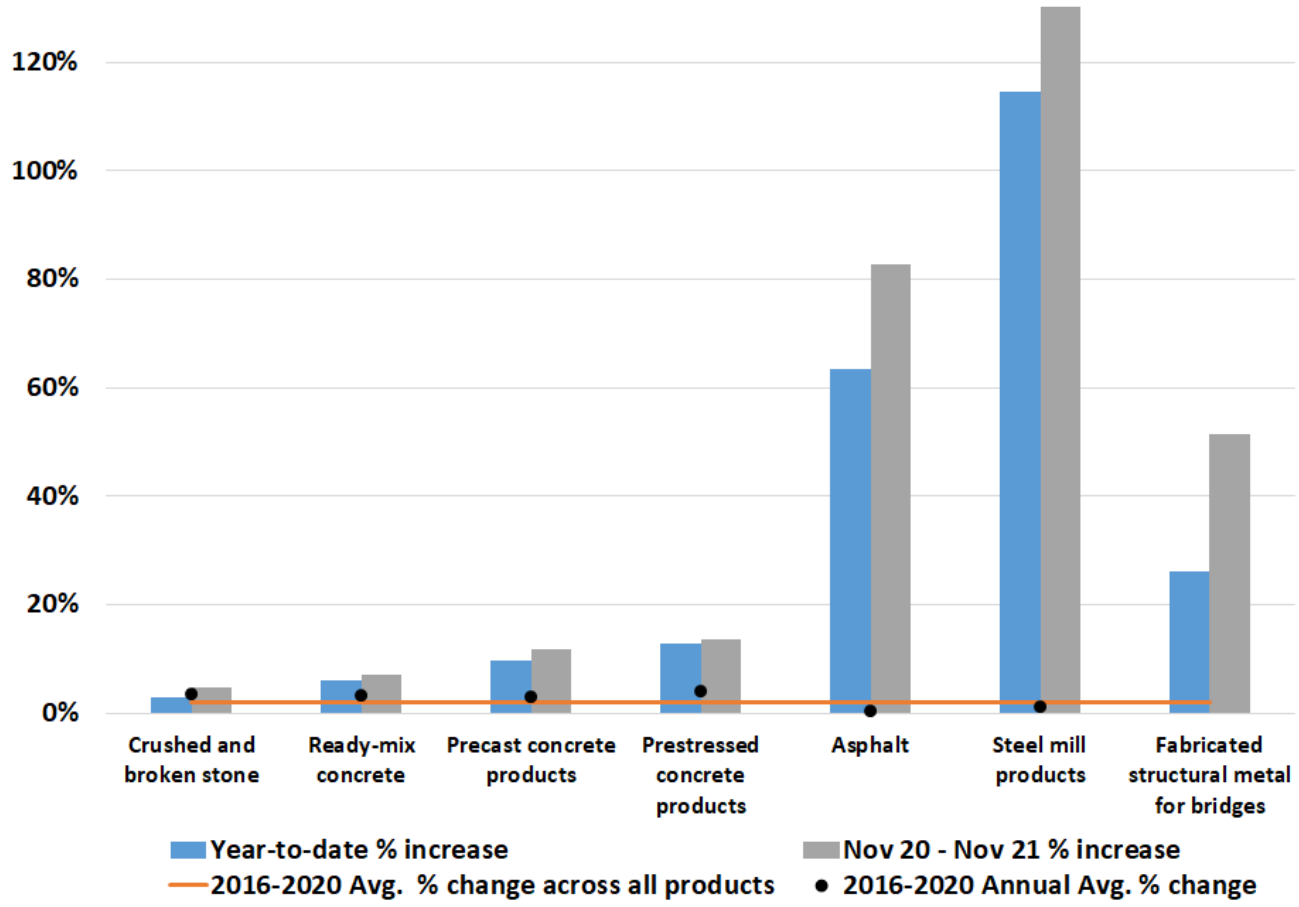
Figure 2. Florida Benchmark Input Costs vs FDOT Bid Prices



Source: Argus, ENR, FDOT, TBG Work Product.

The U.S. Bureau of Labor Statistics (BLS) releases monthly updates of the Producer Price Index (PPI) by commodity type. Nationally, the cost of steel mill products has increased by a staggering 141.6% in November 2021 compared to the same month in 2020. Iron and steel scrap prices are also high, having increased by about 78.1% since November 2020 and U.S. asphalt prices are spiking at 82.9% year-over-year. In contrast, price increases for concrete products are ranging between 4% to 14% and aggregate prices are up only about 5%. **Figure 3** illustrates select PPI in the U.S. for relevant commodity types, and the 5-year average for context.

Figure 3. U.S. Producer Price Index Percent Change by Commodity



Source: BLS (Producer Price Index, not seasonally adjusted); TBG Work Product

Funding

In November 2021, President Biden signed the $1 trillion Infrastructure Investment and Jobs Act into law. The bill provides an additional $550 billion of new spending over five years, $110 billion of which would go for roads, bridges and major projects plus the reauthorization of surface transportation programs. The bill also includes funds to establish a national per-mile user fee pilot program. Much of the funding for the bill is contingent on the larger reconciliation bill, termed the Build Back Better Act, that has yet to pass the Senate as of this writing.

The Federal Highway Administration has released state-level apportionment figures[1] for the Infrastructure Investment and Jobs Act, which will begin funding disbursement in 2022. The $52.5 billion package is about 22% higher than the 2021 level of $43.2 billion. Texas will receive the largest share among the states, with $5.17 billion, California is second with $4.86 billion, and Florida is third with $2.51 billion. The Army Corps released how it would spend the $17.1 billion from the infrastructure act. The budget includes $5 billion towards resilience projects and $3.9 billion toward improvements at ports and inland waterways. There are 4 Florida projects in their FY22 construction work plan: $1 billion for construction of the South Florida Ecosystem Restoration program, two re-nourishment projects in Pinellas county ($17 million) and a $5 million comprehensive Water Supply Infrastructure Modernization Project. In addition, their operation and maintenance work plan includes $102 million across 13 projects in Florida.

Additionally, in the January 2022 Revenue Estimating Conference, the Office of Economic & Demographic Research rose August's 2021 general revenue tax collections by $3.3 billion for the current fiscal year and by $704 million for FY 2022-23. Most of the increases are due to sales taxes followed by documentary stamp tax, primarily from housing sales. The Army Corps projects and housing activity provide competition for resources FDOT relies on.

Regulation

In recent weeks, there have been some regulatory changes that can affect the transportation construction industry:

- In November 2021, the Occupational Safety and Health Administration (OSHA) issued a COVID-19 vaccine mandate for large employers with 100 or more employees, but it was overturned in January 2022 by the U.S. Supreme Court. However, the court did uphold the health care worker vaccine mandate for all staff employed by institutions that operate under federal Medicare and Medicaid guidelines.
- In November 2021, Governor DeSantis signed a bill (HB 5-B) that begins the process to establish a Florida Occupational Safety and Health Plan. The initial part of the process is to develop a state plan that meet federal requirements. This is not expected to change standards any time soon.
- In November 2021, the EPA and Department of the Army signed their recent proposed rule to interpret 'waters of the United States' as it was defined prior to the 2015 Clean Water Act. The ruling was published in the Federal Register on December 7, 2021.
- In December 2021, President Biden issued an executive order "Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability." The order includes a Buy Clean provision that aims to "expand consideration of embodied emissions and pollutants of construction materials in Federal procurement and federally funded projects." While it is still unknown which materials will be included, the executive order lists steel and concrete as examples.

There are several initiatives at the start of the 2022 legislative session in Florida that can also affect the industry. These are at the early stages so it's unclear how likely are these to pass:

- In November 2021, Governor DeSantis announced a gas tax relief proposal that would temporarily suspend the state's gas tax. The proposal is expected to be discussed during the current legislative session and potentially be enacted after the FY 2022-23 budget comes into effect on July 1, 2022.

[1] Table 1, FHWA Notice N 4510.858 - Apportionment of Federal-Aid Highway Program Funds For Fiscal Year (FY) 2022 | Federal Highway Administration (dot.gov)

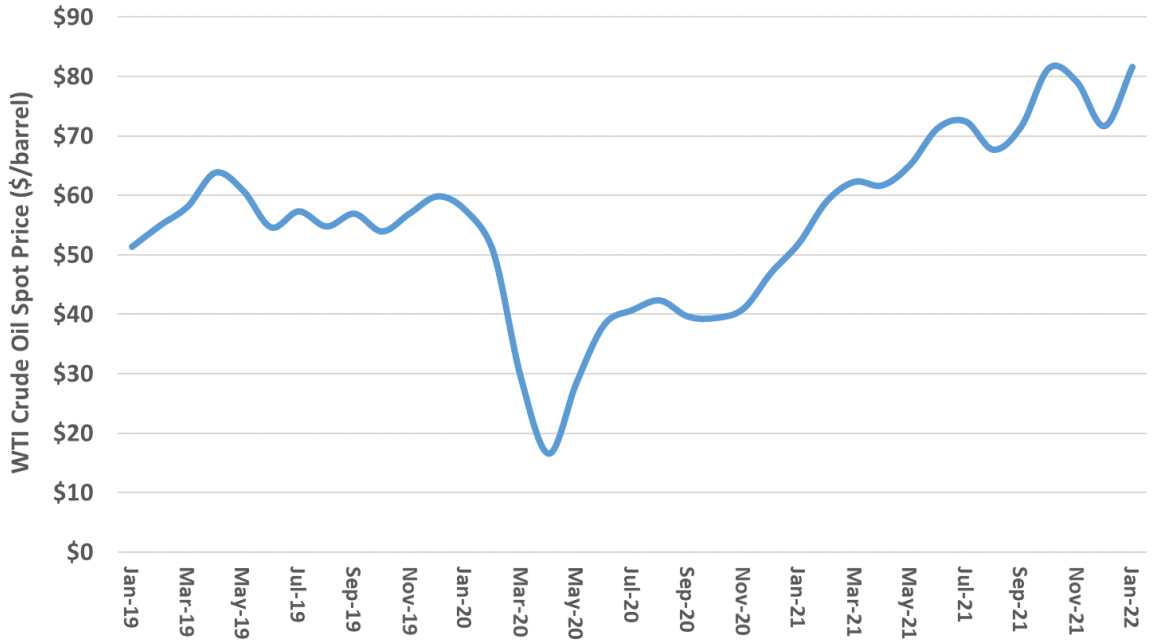
- Construction Materials Mining – Bill introduced to limit ground vibrations and use of explosives for construction materials mining activities that are within 1 mile of residential areas
- Bill that would require government entities to require use of United States produced iron and steel for public works projects. This requirement would be exempt if there is not enough supply of the product or if the total costs increase by more than 20%
- Inclusion of construction equipment owned by heavy equipment rental dealers under the term inventories for ad valorem taxes.

Energy Prices

According to the International Monetary Fund (IMF), global oil demand declined from 100 million barrels per day in Q4 of 2019 to 83 million barrels per day in Q2 of 2020. While global demand rebounded to 94 million barrels per day by mid-2021, demand is not expected to recover to pre-pandemic levels until the end of 2022. Continued global economic disruption is expected due to slow vaccination rollouts and possible travel restrictions related to the spread of COVID-19.

Monthly crude oil spot prices have averaged $82 per barrel in January 2022, a 59% increase from the same month in 2019 (**Figure 4**). Following declines in crude oil price futures in November and December, when the Omicron variant was designated as a variant of concern by the World Health Organization (WHO), prices have gone back up by 14% so far in 2022.

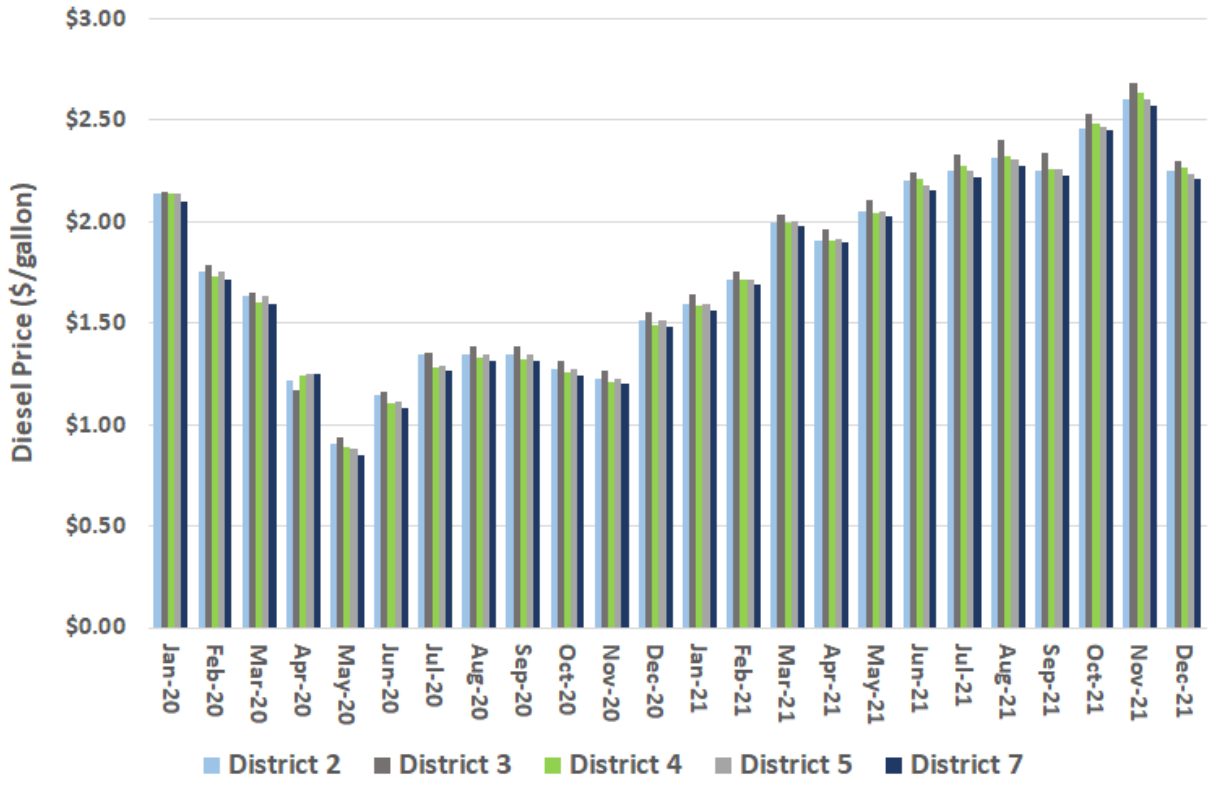
Figure 4. Monthly Crude Oil Price, Jan. 2019 to Jan. 2022



Source: EIA Average Monthly Spot Prices.

Diesel price quotes from suppliers at terminals around the state declined in December, following lower crude oil prices, ending the year slightly higher than January 2020 levels (**Figure 5**). Statewide, diesel prices now average $2.27 per gallon.

Figure 5. Average Diesel Price by District, Jan. 2020 to Dec. 2021



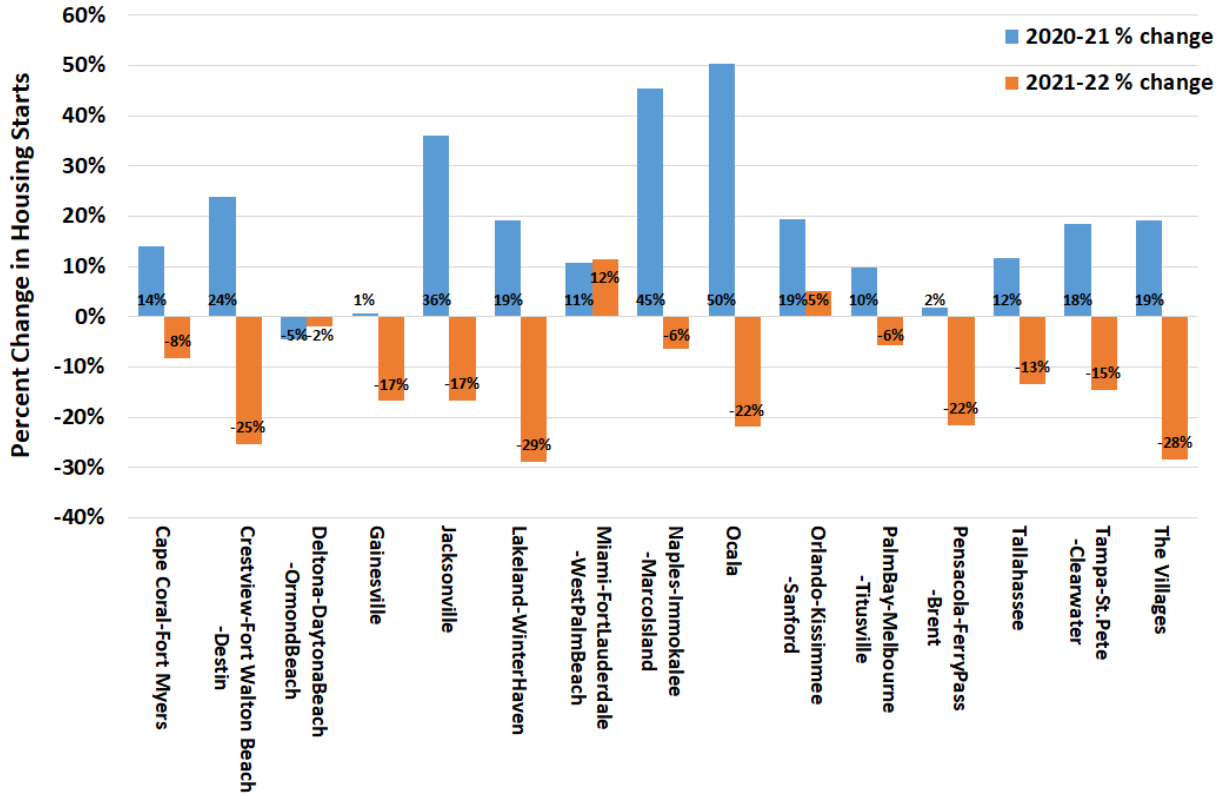
Source: FDOT, TBG Work Product (D1 and D6 terminals did not report data).

Background Data

Housing Starts

Figure 6 shows the estimated change in housing starts by metro area between 2020 and 2021 and the forecasted changed between 2021 and 2022. According to the UCF Institute for Economic Forecasting (IEF), in 2021 total housing starts in Florida were approximately 190,000, an increase of 21% compared to 2020. The December 2021 IEF update anticipates that most Florida metro areas will see declines in residential housing starts in 2022 after substantial growth in 2021. The overall decline in housing starts is expected to be about 11% in 2022. Since housing construction competes for many of the same resources as highway construction, a decline in housing demand may free up resources used in FDOT projects. However, nonresidential building is expected to recover in 2022, which may offset declines in residential construction.

Figure 6. Annual Change in Housing Starts



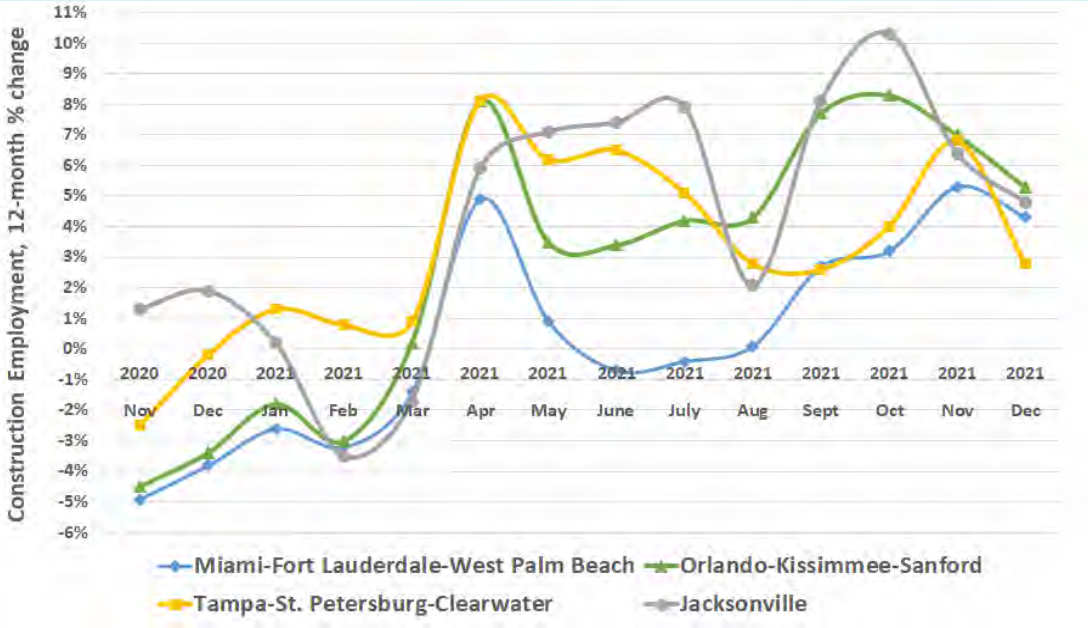
Source: UCF Institute for Economic Forecasting, Florida & Metro Forecast Quarter 2 Forecast.

Construction Employment

The U.S. added 199,000 jobs in December 2021, with Florida making up a significant portion of those gains (29,000). Statewide construction employment increased 3.6% in December, year-over-year, and 1.1% higher compared to pre-pandemic levels in December 2019. Construction employment in the selected metro areas has seen sustained recovery over the last year (**Figure 7**). Jacksonville saw a 4.8% improvement in December, following a 6.4% increase in November. Similarly, the Orlando metro area hit 5.3% growth in construction employment. Construction employment in the Tampa and Miami metro areas jumped as well, by 2.8% and 4.3%, respectively.

According to the IEF Fall 2021 Florida & Metro Forecast, overall construction employment in Florida was expected to average a growth rate of 1.1% in 2021. IEF has revised their 2022 forecast down to -1.1%, followed by another -1.0% decrease in 2023. However, despite a predicted slowdown in residential construction, federal funding for transportation and infrastructure projects is expected to boost demand in 2022 and beyond.

Figure 7. Changes in Construction Employment in Major Florida Markets, Nov. 2020 – Dec. 2021



Source: Bureau of Labor Statistics.

Inflation

U.S. consumer prices have increased by the largest year-over-year percentage since 1981, rising 7% from December 2020 to December 2021. By type of product, the largest increases were seen in gasoline (49.6%), used cars and trucks (37.3%), energy (29.3%), and utility gas service (24.1%). In response, the Federal Reserve is now anticipating up to three rate increases in 2022, with the first expected to occur in the first quarter of 2022. In December 2021, the Federal Reserve Board and the Federal Open Market Committee released an updated summary of economic projections, including forecasts for GDP growth, unemployment, and inflation in the next few years and in the long run (**Table 1**).

Table 1. December and September 2021 Economic Projections

Variable	Median					Range				
	2021	2022	2023	2024	Long Run	2021	2022	2023	2024	Long Run
Change in real GDP	5.5	4.0	2.2	2.0	1.8	5.3 - 5.8	3.2 - 4.6	1.8 - 2.8	1.7 - 2.3	1.6 - 2.2
September Projection	*5.9*	*3.8*	*2.5*	*2.0*	*1.8*	*5.5 - 6.3*	*3.1 - 4.9*	*1.8 - 3.0*	*1.8 - 2.3*	*1.6 - 2.2*
Unemployment Rate	4.3	3.5	3.5	3.5	4.0	4.0 - 4.4	3.0 - 4.0	2.8 - 4.0	3.1 - 4.0	3.5 - 4.3
September Projection	*4.8*	*3.8*	*3.5*	*3.5*	*4.0*	*4.5 - 5.1*	*3.0 - 4.0*	*2.8 - 4.0*	*3.0 - 4.0*	*3.5 - 4.5*
PCE Inflation[2]	5.3	2.6	2.3	2.1	2.0	5.3 - 5.5	2.0 - 3.2	2.0 - 2.5	2.0 - 2.2	2.0
September Projection	*4.2*	*2.2*	*2.2*	*2.1*	*2.0*	*3.4 - 4.4*	*1.7 - 3.0*	*1.9 - 2.4*	*2.0 - 2.3*	*2.0*
Core PCE inflation*	4.4	2.7	2.3	2.1		4.4 - 4.5	2.4 - 3.2	2.0 - 2.5	2.0 - 2.3	
September Projection	*3.7*	*2.3*	*2.2*	*2.1*		*3.5 - 4.2*	*1.9 - 2.8*	*2.0 - 2.3*	*2.0 - 2.4*	
Projected appropriate policy path										
Federal funds rate	0.1	0.9	1.6	2.1	2.5	0.1	0.4 - 1.1	1.1 - 2.1	1.9 - 3.1	2.0 - 3.0
September Projection	*0.1*	*0.3*	*1.0*	*1.8*	*2.5*	*0.1*	*0.1 - 0.6*	*0.1 - 1.6*	*0.6 - 2.6*	*2.0 - 3.0*

Source: Economic Projections were provided by Federal Reserve Board members and Federal Reserve Bank Presidents; federalreserve.gov.

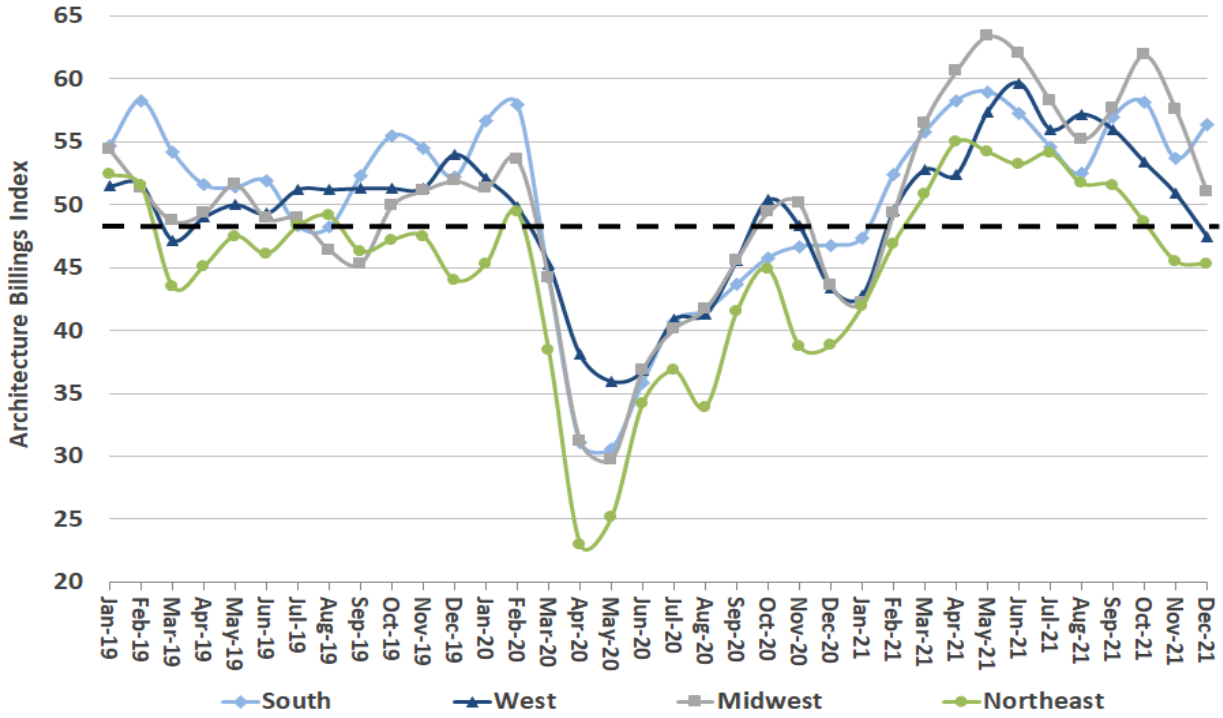
[2] PCE inflation and core PCE inflation are the percentage rates of change in, respectively, the price index for personal consumption expenditures (PCE) and the price index for PCE excluding food and energy.

According to these projections, the Federal Reserve still expects inflation to decrease over the next three years, however, their December projections increased from what they reported in September. Still, the Federal Reserve expects inflation to even out at 2% by 2024. This decrease in inflation is expected to come alongside an even lower unemployment rate and a lower (but still increasing) change in real GDP.

Production Capacity

The Architecture Billings Index (ABI)[3] is a lagging indicator (between 9 to 12 months) for nonresidential construction activity. Nationally, the ABI score was 52.0 in December, indicating that a majority of architecture firms were still seeing billings growth at their firms in late 2021. However, the south region is the only region where the index did not drop at the end of the year; the index has dropped in all other regions through December (**Figure 8**). Continued cost increases and supply chain disruptions may be limiting economic recovery.

Figure 8. ABI Billings Index, Jan. 2019 – Dec. 2021



Source: American Institute of Architects, Architecture Billings Index.

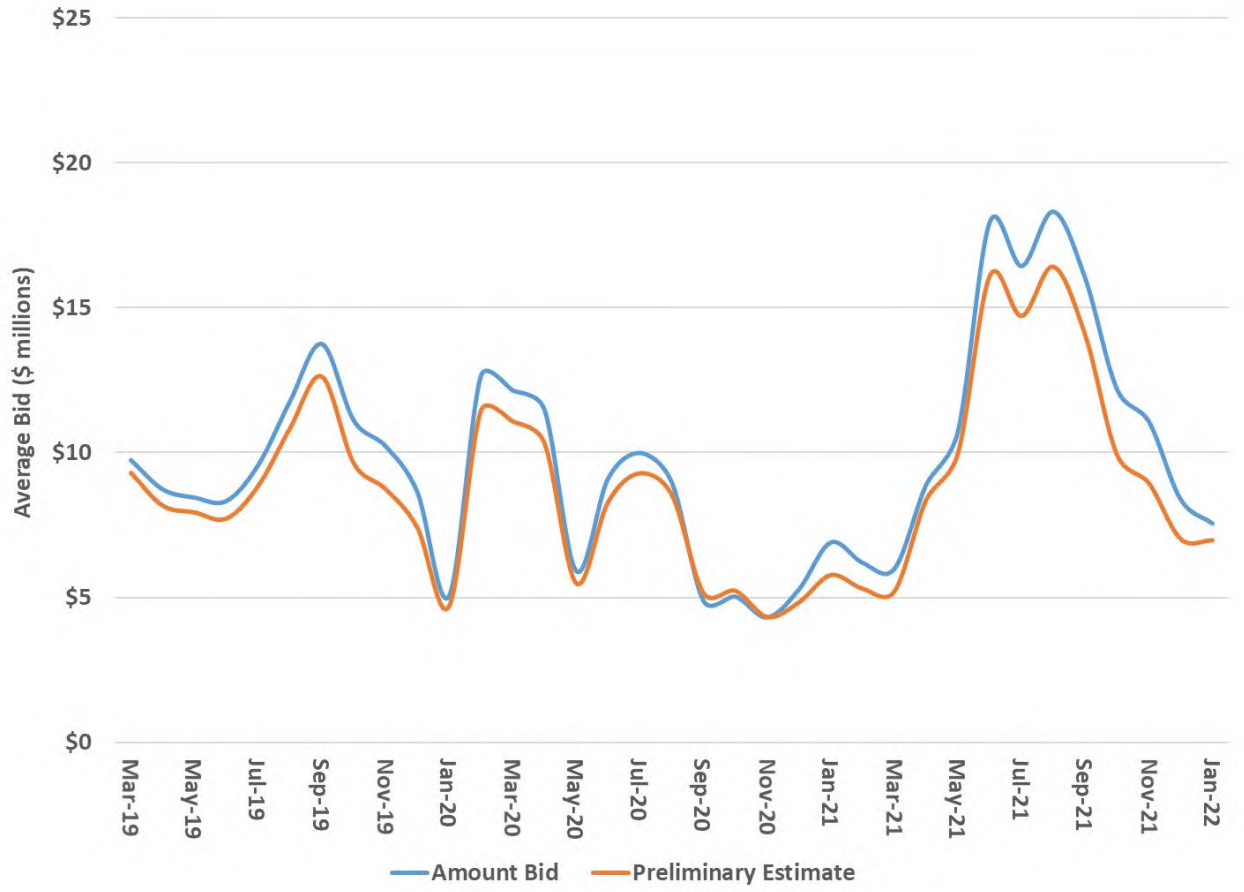
Bid Data

In economic terms, the expected value is the average of all bids. In this analysis, the average of all bids, or the mean, is compared to the official preliminary estimate. In the fourth quarter, the average deviation of bids from the mean bid was 10% (similar to previous quarters), where District 7 had the largest deviations (18%). Using a 3-month rolling average, the gap between the mean against the official preliminary estimate rose in the third and fourth quarters, being at least 12% higher than the official preliminary estimate since June 2021 and reaching a high point in October (23%) and November (24%).

[3] ABI Billings are considered a leading indicator, meaning that construction activity 6-12 months from now generally follows the current ABI billings activity. A score below 50 indicates declining firm billings.

(**Figure 9**). However, high value contracts appeared to be increasing the gap as excluding contracts $100 million or more from the analysis for the third quarter show that the average of all bids were also 9% higher instead of 12%.

Figure 9. Average Bid vs. Preliminary Estimate. 3-month Rolling Average



Source: FDOT; TBG Work Product.

Asphalt

Summary

- Higher crude oil prices and production costs as well as an inability to import additional supply continue to affect binder prices. These issues are not expected to ease in the short-term.
- Several factors may be affecting asphalt supply, such as refinery closures in the Gulf coast, increased competition from other sectors for oil products, and the increased value of asphalt as a feedstock. All of these factors negatively impact availability.
- Polymer prices continue showing significant increases, contributing to asphalt costs increases.

FDOT Impacts

- Updated bid data shows that FDOT HMA prices are 5.9% higher in the first six months of fiscal year 2022. This is an improvement over the previous quarter, but asphalt prices are still running over $120 per ton in 2022 amid crude oil price fluctuations and other input cost burdens.
- Supply is sufficient to meet demand. Recent refining events in the Gulf Coast as well as a potential change in export policy in Mexico could lead to tighter supply.

Refining Activity

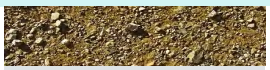
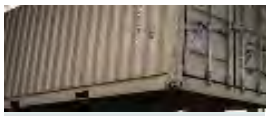
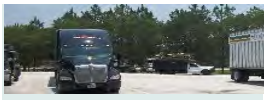
Refining activity has yet to fully recover from Hurricane Ida as utilization was below 90% at the start of 2022. Additionally, Phillips 66 announced the conversion of its 250,000-bpd refinery in Belle Chasse, LA to a terminal due to damages caused by the hurricane. While this refinery didn't produce asphalt, Oil & Gas Journal refinery capacity records show that the only other refinery owned by the company with asphalt production across the Gulf Coast is in Lake Charles, LA (5,000 bpd). This could affect the amount of asphalt produced as production is adjusted.

Production costs have increased with higher crude oil prices. Argus reported that there are some factors that could affect asphalt supply in the first half of 2022. One is that price differentials between heavy and light crude have increased and could incentivize producers to produce more heavy crude oil products like asphalt. However, the value of asphalt as feedstock has also increased, which could limit supply. High energy prices, especially natural gas, are expected to increase demand for oil products that can be used as an alternative. For instance, Argus estimated that 700,000 bpd of additional oil demand will be generated between October to March from different sectors switching to oil to avoid higher energy costs from other sources.

Supply Chain Variables for Asphalt Pavement Materials

Table 2 provides the current status of selected variables of interest that affect the asphalt supply chain.

Table 2. Supply Chain Summary: Asphalt Materials

 Aggregate	Sources for HMA are dominated by Georgia granite shipments and rock from South Florida Lake Belt mining area. There are no reports of issues with aggregate availability. Several HMA suppliers are vertically integrated to better manage their aggregate supply. No changes during this quarter.	=
 Refinery Capacity	Refinery utilization in the Gulf Coast has not fully recovered from Hurricane Ida impacts as utilization is still below 90% during the first weeks of 2022. A 250,000-bpd refinery will be converted to a terminal due to the magnitude of damages from the hurricane. While it didn't produce asphalt, its closure could affect asphalt production from other facilities. Production costs continue to be affected by higher crude oil prices. The crude oil market is expected to be volatile as energy prices have increased demand for oil products as well as COVID-19 variants affecting demand. Sanctions to Iran and Venezuela are still in place. No progress in talks with Iran.	↑
 Asphalt Binder	Unmodified (PG 67 & lower) asphalt binder prices increased 27% in 2021 and have increased 28% year-over-year. Crude oil prices have increased as supply is tight and production costs have followed. Argus reports that Gulf Coast supply of asphalt could be affected by different factors: High price differentials between heavy and light crude could incentivize producers to produce more heavy crude products like asphalt, but the value of asphalt as feedstock has also increased, which could limit supply.	↑
 Polymers	With very few suppliers, polymers are a source of vulnerability. Demand continues to be high and production costs has increased with recent increases in crude oil. Due to the increasing demand for petrochemical products, Chevron Phillips Chemical has announced in December that they will be constructing a new C3 splitter unit in Baytown, Texas. Additionally, earning releases continue showing significant price increases across different chemicals segments, with some prices rising by more than 100% year-over-year. Some suppliers have announced price increases of up to 40% for deliveries to compensate for higher trucking costs.	↑
 Imports	Cost of imports have risen and with U.S. sanctions against other countries still in place, there are limited import options. Data from the U.S. International Trade Commission shows limited amounts of bitumen imported into Florida in 2021. The largest cargos were sourced from Canada to Tampa. Canada has been a significant source of imports in 2021 for many ports throughout the east coast. In general, prices are expected to increase as bitumen used in Florida markets is primarily sourced from overseas.	↑
 Shipping	While reports have not indicated significant increases in shipping costs due to the implementation of the IMO 2020 rule, low-sulfur fuel oil as well as heavy-sulfur fuel oil had significant increases in 2021. Both increased around 50% in 2021, which has constrained imports from Europe and the Mediterranean.	↑
 Rail	More shippers have used rail rather than trucking to stockpile inventories due to a tight trucking market. CSX Q3 report shows that of asphalt products in the first nine months of 2021 rose 6% vs. 2020 (revenues rose 11%) and 13% vs. 2019 (revenues rose 16%). Fuel costs increased 77% year-over-year. On-time arrivals have followed the trend from previous reports, 66% through the first nine months of 2021 (down from 80% in 2020).	↑
 Trucking	Asphalt suppliers may continue to face driver shortages as demand for drivers from various industries continue to be high. For the first time since the pandemic started, the U.S. gained more trucking jobs in December 2021 than same month in 2019 according to the BLS. In December, the Biden administration unveiled a "Trucking Action Plan", which includes funding to expedite issuance of CDLs, promoting trucking apprenticeships and outreach efforts to veterans, among other initiatives. Higher diesel prices continue contributing to cost increases.	↑
 Pavement Markings	Due to weather-related closures in Texas and Louisiana during February 2021 and plant closures in Mississippi and other states from Hurricane Ida in the second half of 2021, a nationwide shortage of paint, resin, and glass has persisted over the last twelve months and led to higher prices and tighter supply. Producers worked through existing inventories in 2021, but restocking is expected to improve in 2022.	=
 Labor	Skilled labor is an ongoing concern for asphalt plant operators. Statewide construction employment increased 4.9% year-over-year in November and is above 2019 levels. Metro areas showed growth through the end of the year after some were stagnant during the summer. In AGC's construction outlook even though the majority of respondents expect worker shortages to continue, 74% expect to hire new workers.	↑
 Competition	According to FDOT's approved producer list there were two new plants under review in 2021. One in Lake Wales and another in Delray Beach. Additional plants would increase competition for FDOTs projects and could lower costs.	↓

↑	Exerting negative influence on FDOT's costs; monitor
=	Currently stable; not influencing FDOT's costs
↓	Exerting positive influence on FDOT's costs

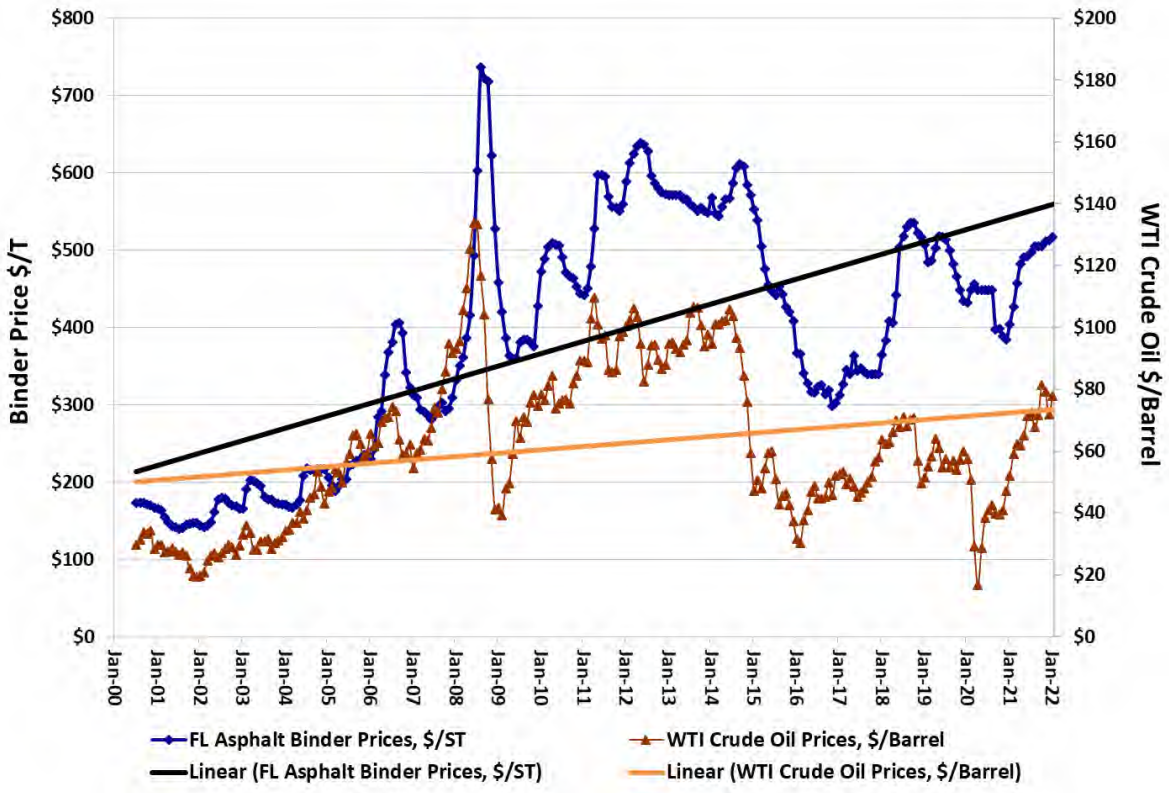
Asphalt Binder

Rising production from OPEC+ countries are expected to drive down crude oil prices in 2022. In addition, crude oil price futures fell 12% over Thanksgiving weekend, the largest drop since March 2020. The U.S. Energy Information Administration (EIA) partially attributes the fall in expected prices to the WHO's designation of the SARS-CoV-2 Omicron variant as a variant of concern. The Thanksgiving price declines likely reflect market expectations of lower global petroleum consumption in the beginning of 2022 as a result of the ongoing pandemic. Supply could also be affected with Pemex' plans to reduce exports by 57% in 2022 and by 100% starting in 2023. While U.S. crude imports from Mexico have been around 7-10% in past years, it is estimated that 37% of heavy crude processed in the Gulf coast is from Mexico.

Until the Great Recession, asphalt binder prices were closely correlated with crude oil prices. **Figure 10** shows the relationship between crude oil and Florida asphalt binder prices dating to 2000. Although crude prices came down in December 2021, binder prices lag changes in fuel costs and remain elevated.

Increases in rack binder prices[4] vary around the state. Comparing December 2021 to the same month in 2019, rack prices are up 13% in Jacksonville, 15% in Miami, 4% in Panama City, and 27% in Tampa. Through January 2022, statewide PG-67 prices have increased 28% to $517 per ton, year-over-year. Compared to December 2019, PG-67 costs are 19% higher. Similarly, PG-76 binder prices increased 23% year-over-year to $634 per ton.

Figure 10. Crude Oil and Asphalt Binder (PG-67) Price Comparison

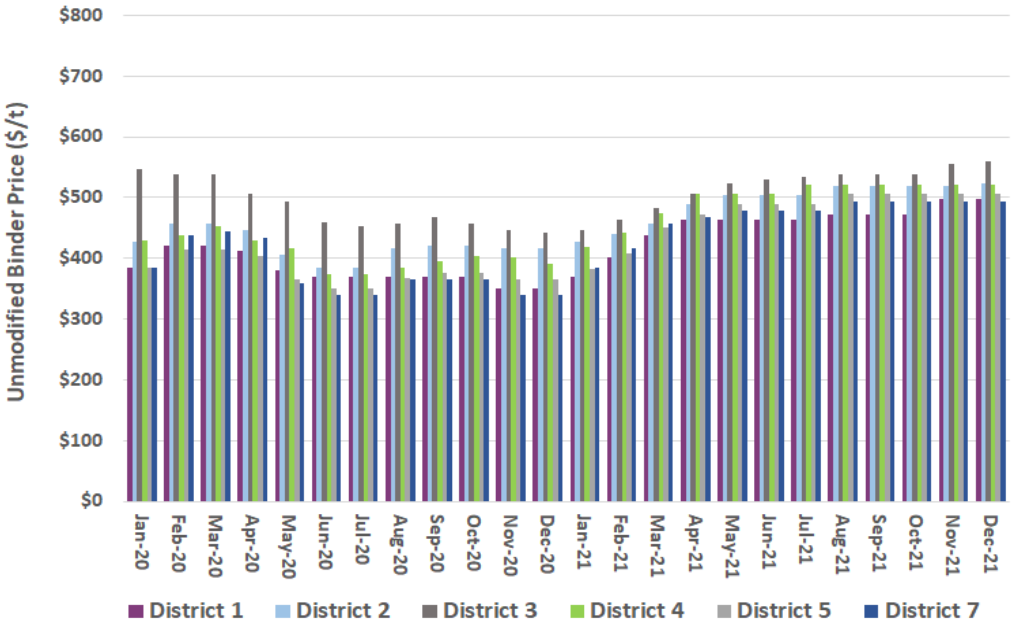


Source: EIA, FDOT.

[4] Argus' asphalt rack prices reflect trades of different grades of asphalt within a defined region, which include where the seller commits to deliver to the buyer's truck, typically at a truck-loading rack.

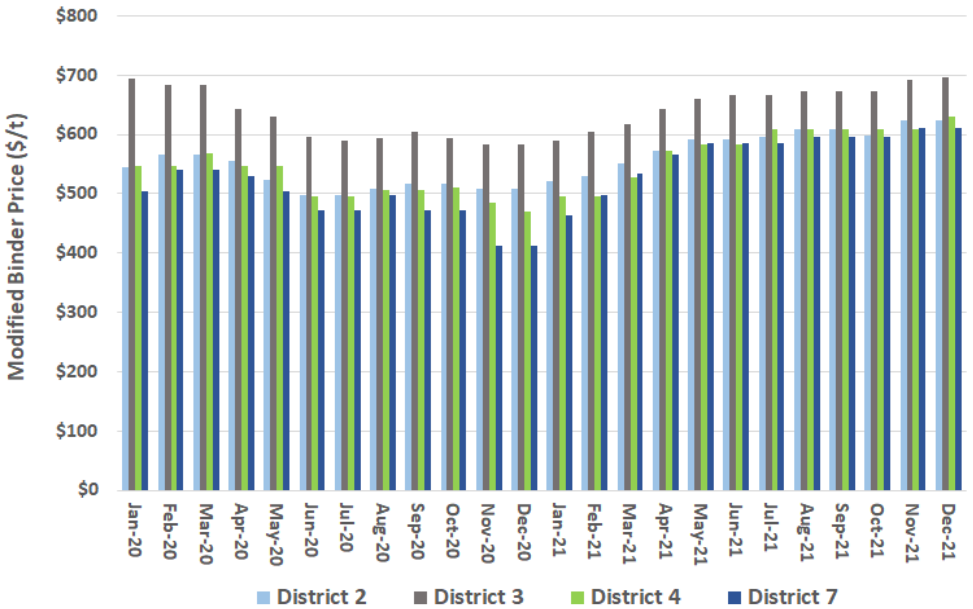
Where available, the average prices for unmodified (**Figure 11**) and modified (**Figure 12**) binder were calculated from monthly terminal price quotes at the district level. Unmodified binder is the average of PG 52-28 and PG 58-22 prices, while modified binder is a quote for the price of PG 76-22 (PMA) in the dataset. Unmodified binder prices are up between 25% to 45% in all FDOT districts through the end of 2021 (compared to December 2020). Modified binder prices are also up between 19% to 49% in December 2021, year-over-year. Price increases have slowed in December as fuel costs decline.

Figure 11. Unmodified Binder Price by District, Jan. 2020 to Dec. 2021



Source: FDOT, TBG Work Product (D6 terminals did not report data).

Figure 12. Modified Binder Price by District, Jan. 2020 to Dec. 2021



Source: FDOT, TBG Work Product (D1, D5, and D6 terminals did not report data).

Current Pricing

FDOT's HMA costs reflect a unique combination of asphalt binder costs, FDOT-specific requirements regarding manufacturing and installation, and non-FDOT competition for contractors and materials. Asphalt prices stagnated in 2020 due to the pandemic, but have since have increased by 3.6% in fiscal year 2021 and 5.9% in fiscal year 2022 through November (**Table 3**). HMA price increases through 2019 now appear to be permanent, with pandemic-related supply constraints and surging demand exacerbating the issue. Uncertainty in the market continues in 2022, with input costs like crude oil being hard to pin down due to rapid shifts in demand.

Table 3. HMA Price, 2018 - 2022

Fiscal Year	2018	2019	2020	2021	2022*
Price HMA, $/t	$104.01	$109.63	$109.83	$113.81	$120.50
Percent Change, y-o-y	2.2%	5.4%	0.2%	3.6%	5.9%

Source: TBG calculated from data provided by FDOT Estimates Office.
*Estimates through December.

Forecast

HMA prices are projected in **Table 4** for the five-year construction work program. Regression modeling was performed using pay item data, supply chain variables and other macroeconomic indicators to identify models that best predicted FDOT's materials costs and quantities.

The outlook for Florida gross state product (GSP), an important factor in FDOT HMA costs, remains optimistic for 2022 according to both the Office of Economic and Demographic Research and the Institute for Economic Forecasting. Updated forecasts for the second quarter estimate Florida GSP growth at about 5% in 2022 and between 2.0% to 4.5% over the rest of the five-year work program period, with lower growth in later years. On the other hand, a slowdown in Florida housing starts is projected for 2022 after double-digit increases in 2021. A contraction in the housing market could boost supply availability for other industries and potentially lower material costs.

With updated input variable forecasts, the best estimate of asphalt pricing shows a 6% change in costs between 2021 and the first six months of 2022 (compared to 13% in the previous quarter), ending at about $145 per ton by 2026. The trajectory of the price projection is about 4% lower than the previous report. This improvement indicates that supply chain disruptions and uncertainty in the asphalt industry have eased slightly since 2021. However, prices remain 10% higher than in 2019 as of this writing. The upper bound is calculated to hit $161 per ton by 2026 because of revisions in GSP, housing, crude oil projections, and construction employment growth. The lower bound reflects continued negative pandemic effects on the macro economy and potential recession (**Figure 13**).

Table 4. HMA Price Forecast Results, 2022 - 2026

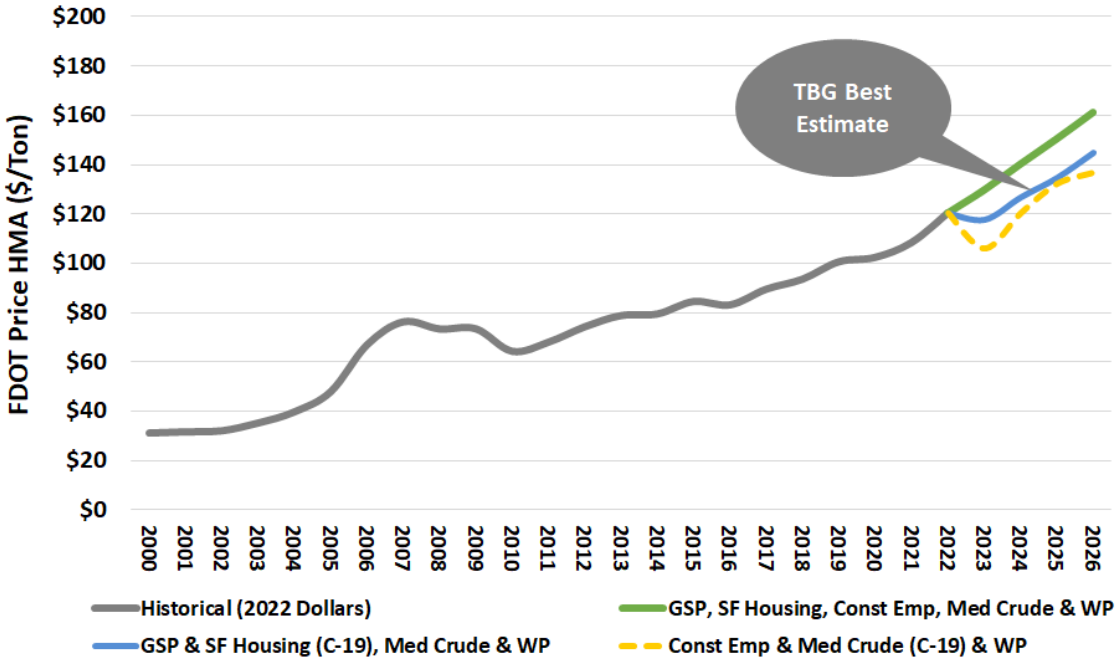
Fiscal Year	2022	2023	2024	2025	2026
Price HMA, $/Tons	$120.50	$117.82	$126.82	$134.66	$144.72
Annual Percent Change	5.9%	-2.2%	7.6%	6.2%	7.5%

Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

Figure 14 provides a forecast of total Florida HMA consumption over the work program given current data. The best estimate is based on current economic outlooks, which show declines in single family housing starts, improvements in overall non-farm and construction employment, and medium crude pricing. In addition to numerous resurfacing projects, infrastructure and resiliency spending are expected drive demand over the next few years with the injection of additional federal dollars, offsetting

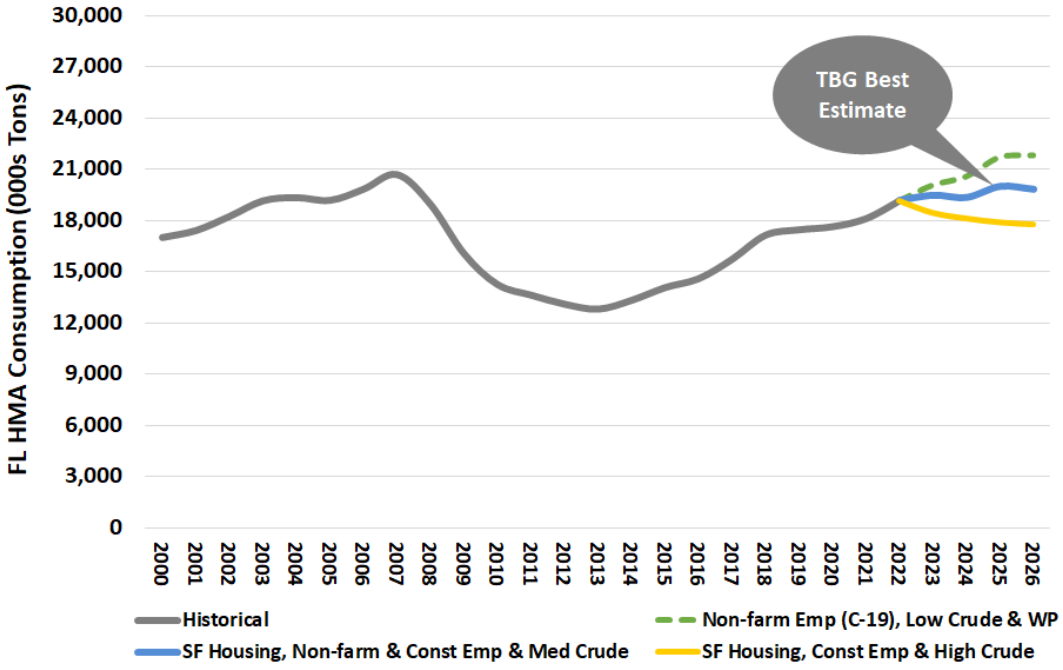
slowdowns in the housing sector. If crude oil markets become unstable and prices skyrocket, the trajectory would likely shift downward, following the lower bound.

Figure 13. HMA Price, 2022 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources. Historical pricing reflects actual bids and not adjusted for time. (Variable descriptions available in the **Appendix**.)

Figure 14. HMA Consumption, 2022 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.
(Variable descriptions available in the **Appendix**.)

Concrete

Summary

- Cement shortages seen in 2021 seem to be resolved for the time being, but prices are still high. Cement consumption is expected to grow in 2022 and beyond due to increased funding for concrete heavy infrastructure and resiliency projects, and ongoing private sector demand.
- Driver shortages remain an issue, along with recruiting other skilled labor. Concrete suppliers are less concerned with production than being able to deliver products to jobsites in a timely and cost-effective manner.

FDOT Impacts

- FDOT concrete prices have come down from the record highs of 2021 to pre-pandemic levels. Through the first six months of fiscal year 2022, the weighted average price of concrete is $733.15 per cubic yard.
- Concrete producers are reporting that sustained increases in reinforcing steel costs have reduced their margins in 2021 and are partially responsible for bid increases.
- Recent changes in the fly ash market may make the material more available and less costly in the future. However, this is a long-term situation, and concrete suppliers are still reporting spot shortages of fly ash, leading to higher costs and longer lead times.

General Trends

Publicly traded companies have indicated that issues related to supply chains, energy and freight costs, and inflation are impacting them and their customers in their most recent financial reports. They report limited availability of trucking and rail services, as well as congested shipping, which are all increasing their freight costs. These higher costs, limited availability of transport and backlogs in supply chains are contributing to price increases in cement and are limiting producers' ability to increase capacity. While prices continue to increase, producers report that the increases aren't enough to cover the rise in costs of energy and freight.

Producers are also acknowledging that the Infrastructure Investment and Jobs Act will increase already high demand for their materials. Companies are preparing through investments like CEMEX and Titan America's upgrades to their ports and terminals and other investments in Florida ports.

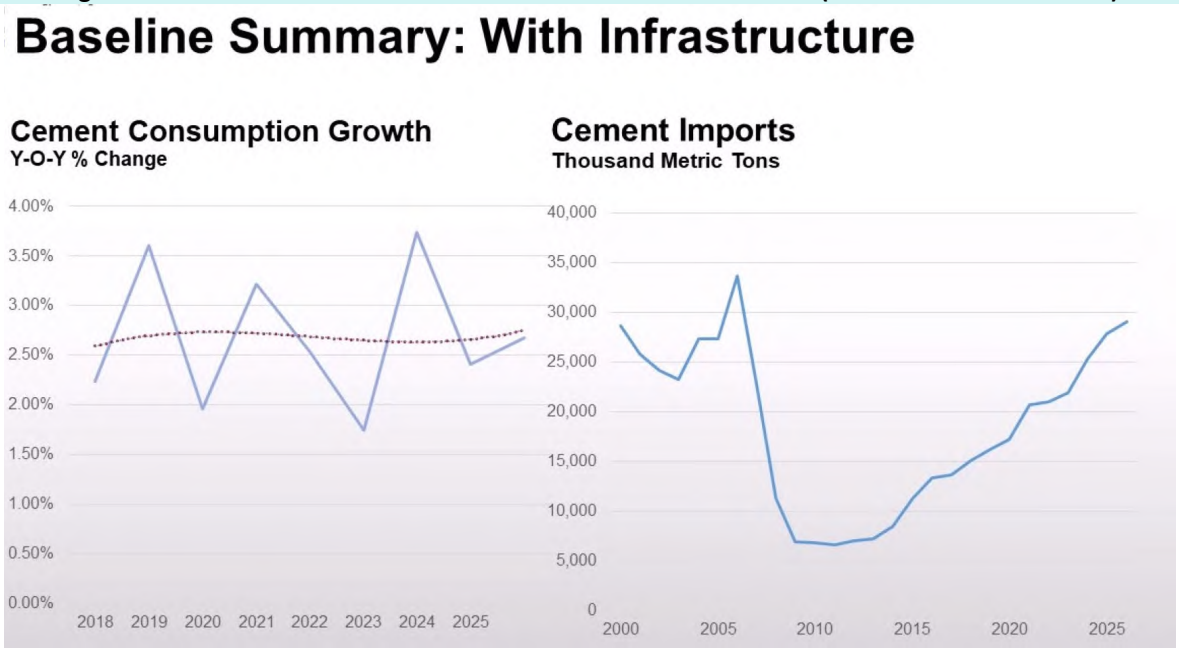
Cement Prices and Consumption

Over the past quarter, the Portland Cement Association's expectation for a more structural rather than transitory form of inflation proved to be correct and the Federal Reserve will, in fact, intervene. As a reminder, PCA's fall forecast accounted for this higher expectation for inflation, however, the Federal Reserve will most likely intervene much sooner than PCA expected. PCA predicted that they would increase rates at the end of 2022, rather than multiple rate increases in 2022. Sensitivity to these rates may still be small since rate increases will start from a rate of 0. As more increases are put in place, sensitivity could increase since the rates will be higher.

In addition, PCA reported that spikes in the pandemic and winter storms could impact what the recovery looks like. Over the last quarter the omicron variant has spread rapidly and may have impacted the cement/concrete industry's already constrained labor force. Worldwide demand for cement is also a concern as many countries recover from the pandemic at the same time.

Figure 15 shows a baseline cement consumption forecast with the passage of an infrastructure bill. Since the last quarter, the Infrastructure Investment and Jobs Act was passed. Many publicly traded cement and concrete companies are expecting this to keep demand for their products strong. While many of PCA's assumptions have held true over the last quarter, the spike in the pandemic, increased action from the Federal Reserve and other impacts from the past quarter may not have been fully accounted for in the fall forecast and this forecast may be more optimistic than what actually occurs.

Figure 15. Portland Cement Association's October 2021 Fall Forecast (with an infrastructure bill)

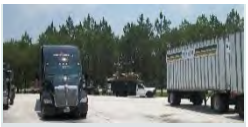


Source: Portland Cement Association.

Supply Chain Variables for Concrete Materials

Table 5 provides an overview of supply chain variables and a summary of their current status; items with current issues are further detailed in the subsequent text.

Table 5. Structural Concrete Supply Chain Variables & Current Status

 Cement	Cement prices continue to increase due to high energy and freight costs, but this still doesn't offset the increases producers are feeling. Demand remains high and is expected to increase. Producers are operating at high utilization levels and the ability to increase capacity is limited.	↑
 Aggregate	Aggregate prices are expected to increase due to supply chain issues such as driver shortages and increasing fuel costs and producers are reporting increment price increases to cover inflation. Logistics issues are expected to continue.	↑
 Fly Ash	Shipping is congested, impacting the costs of imports of fly ash and slag. In addition to port upgrades announced by CEMEX at two cement terminals in Florida and upgrades at Port Manatee that were announced in 2021, Titan America has announced that they are investing $35 million into their Port Tampa Bay Terminal. The investment will include the construction of a 70,000-ton dome to expand capacity of its low carbon cements and cementitious products, which will be completed in early 2023.	↑
 Rail	Depending on location in the state, rail is the primary transportation for aggregates. Publicly traded companies report that rail is an issue and CSX reports that on-time arrivals are down 13% compared to the same quarter last year.	↑
 Truck	Publicly traded companies continue to report that trucking availability is limited and transport costs are rising. Producers continue to report a lack of mixer drivers and other CDL drivers to meet demand.	↑
 Labor	Publicly traded companies continue to report increasing costs for labor.	↑
 Competition	Cement producers are still operating at high utilization levels. At the concrete level, the number of plants increased substantially, and competition will continue to constrain prices from fully passing on increased input costs. Published reports indicate competition within the U.S. and also externally from foreign imports from Canada will remain high.	=

↑	Exerting negative influence on FDOT's costs; monitor.
=	Currently stable; not influencing FDOT's costs
↓	Exerting positive influence on FDOT's costs.

Fly Ash

Cementitious materials companies continue to invest in Florida ports. Titan America has announced that they are investing $35 million into their terminal at Port Tampa Bay. This investment includes the construction of a 70,000-ton dome to expand the capacity for its low carbon cements and cementitious products, which will be completed in early 2023. This will allow for increased capacity for imports of things like fly ash and other cementitious materials.

In addition, there have been some news articles about the need for increased regulation around coal ash ponds closed before 2015, which under law aren't required to be monitored for safety risks. This could lead to increased monitoring of these ponds and potentially add pressure for them to be cleaned up and used as sources of fly ash. It was also recently announced that Eco Material Technologies will buy Australia's Boral Ltd.'s North American fly ash business in 2022. Boral owns intellectual property for converting sub-par coal combustion products to ASTM C618 fly ash.

Current Pricing

According to FDOT lettings data, concrete prices reached record levels in fiscal year 2021, but have since declined by 21% through the first half of 2022 (**Table 6**). Although prices are back to pre-pandemic ranges at the moment, increased demand for concrete in 2022 and beyond may push up prices later in the year. Steep increases in steel prices have persisted in 2022 and are affecting other material markets, including reinforcing steel used in concrete products. Cement production shortages that drove up costs in 2021 seem to have improved, but transportation and distribution issues are keeping cement prices high.

Table 6. Concrete Price, 2017 - 2022

Fiscal Year	2017	2018	2019	2020	2021	2022*
Price Concrete, $/CY	$608.14	$708.11	$746.88	$722.69	$926.47	$733.15
Annual Percent Change	-8%	16%	5%	-3%	28%	-21%

Source: TBG calculated from data provided by FDOT Estimates Office. *Estimates through December.

Forecast

Regression modeling was performed using pay item data, supply chain variables, and other macroeconomic indicators to identify models that best predicted FDOT's materials costs and quantities. Factors that drove up the price of concrete in 2021, such as input costs and supply chain disruptions, have improved, lowering the previous quarter's bleak forecast from over $1,000 per cubic yard for much for the five-year work program to between $733 to $840 per cubic yard by 2026. **Table 7** provides the updated forecast average price for concrete.

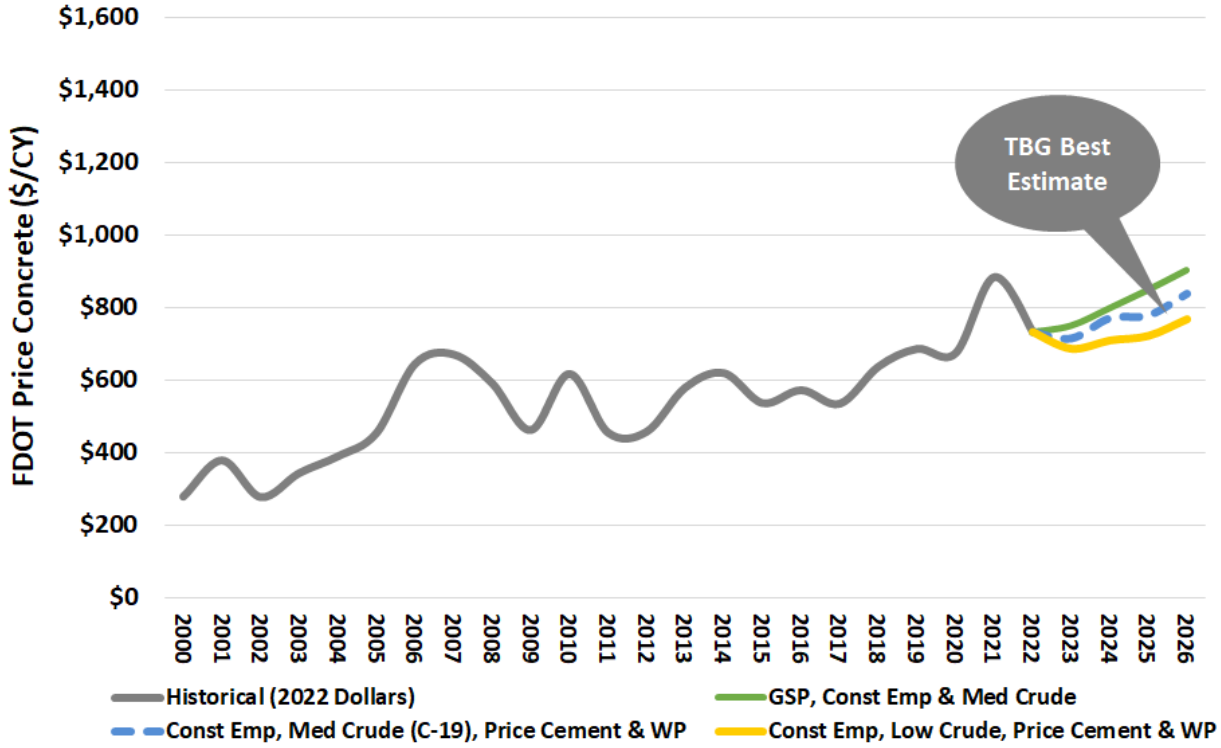
The best estimate currently considers a scenario with increased construction employment medium crude even under continued pandemic circumstances, the price of cement, and work program funding. The lower bound scenario indicates reduced demand over the five-year work program. The trajectory of the price projection could be shifted toward the upper bound if the most optimistic GSP forecasts are met by 2026, indicating a booming economy and high construction activity (**Figure 16**).

Table 7. Concrete Price Forecast Results, 2022 - 2026

Fiscal Year	2022	2023	2024	2025	2026
Price Concrete, $/CY	$733.15	$715.26	$771.80	$779.33	$839.56
Annual Percent Change	-21%	-2%	8%	1%	8%

Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

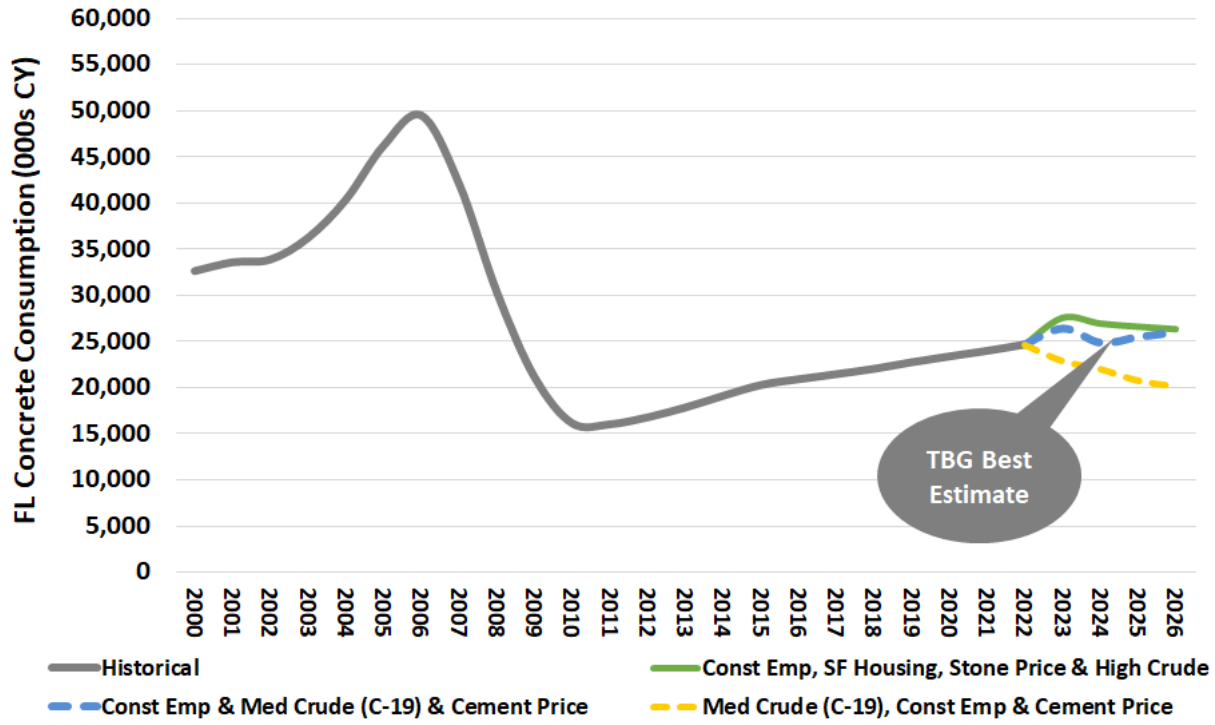
Figure 16. Concrete Price, 2022 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources. Historical pricing reflects actual bids and not adjusted for time. (Variable descriptions available in the **Appendix**.)

Figure 17 shows the output of several quantity models forecasting statewide consumption of concrete. The scenario identified as the best estimate shows a bump in concrete consumption due to pent-up demand. The projection includes rising but still pandemic constrained construction employment and crude oil pricing, as well as stabilizing cement prices. Increased resiliency and federal infrastructure funding over the next couple years is expected to sustain concrete consumption, barring another major event.

Figure 17. Concrete Consumption, 2022 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.
(Variable descriptions available in the **Appendix**.)

Steel

Summary

- Supply for steel is tight and demand is high, but producers indicate more capacity may come online and stabilize prices as inventories resupply.
- Labor impacts from COVID-19 continue to be an issue.
- Steel production and demand in China has declined due to a weakening economy and pollution restrictions.
- Global iron ore prices are expected to remain low amid weakened Chinese demand and oversupply.
- Aluminum and stainless steel prices are expected to continue to increase.

FDOT Impacts

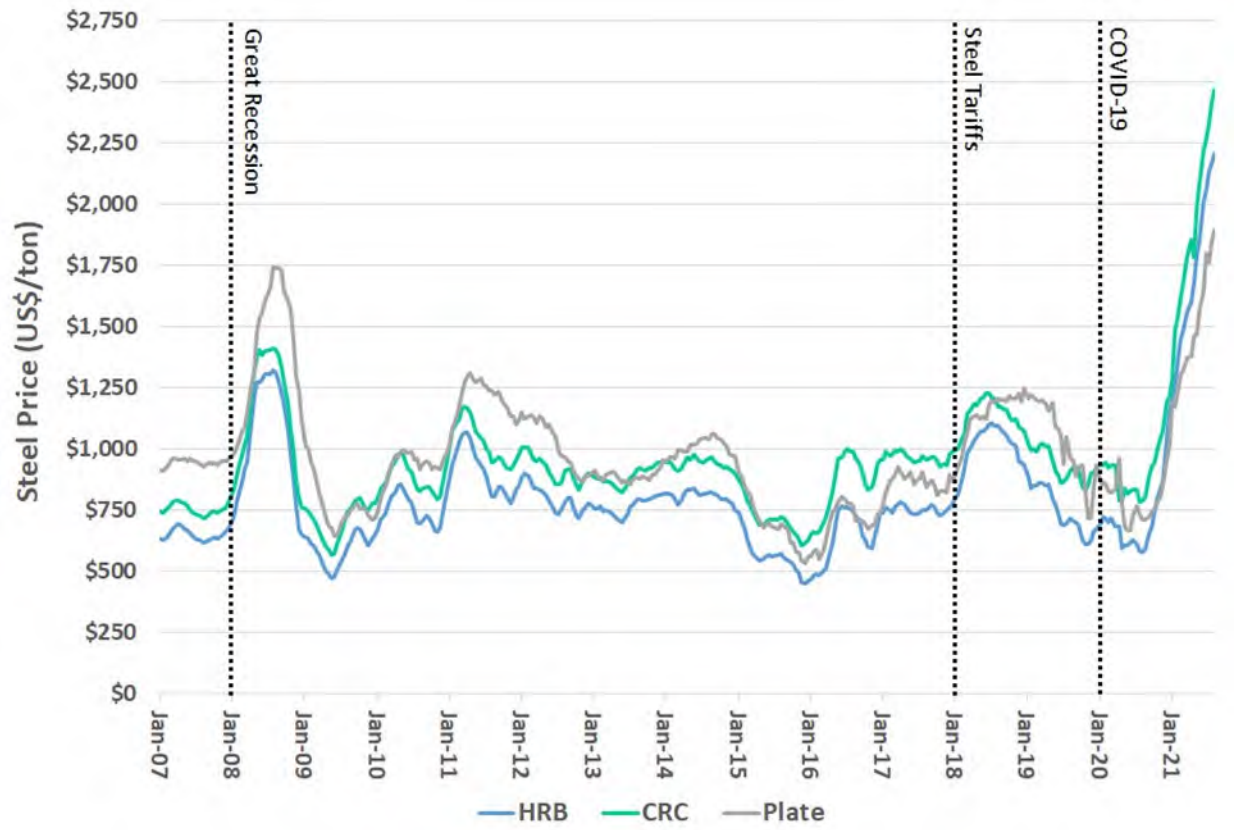
- Fabricators report price increases leveled off at the end of 2021, and even came down slightly for some suppliers, but the huge cost hikes seen last year are likely baked in for the time being.
- Lead times remain long as mills work to restock inventories, which may extend project development and increase costs.
- Supply may currently be tight, but constraints are expected to ease in 2022.

General Trends

Steel prices continued to rise over the last quarter (**Figure 18**). However, there are indications that things might be shifting globally, and potentially in the U.S. for some materials. Additional capacity is expected to come online in the U.S.. this year and next, which could help relieve prices. ArcelorMittal and Nippon Steel may complete a 1.5 million tons/year project in 2023 and US. Steel and Nucor both have announced plans for new electric arc furnace mills, which Nucor has announced will target the U.S. Midwest and Northeast markets and add 3 million tons/year in capacity. U.S. Steel is expected to add 3 million tons/year in capacity, but may end up in Arkansas and Alabama where they already have operations. The Nucor and U.S. Steel plants are expected to come online in 2024. Additional capacity is also expected to come online in Mexico near the end of 2022 from Ternium and ArcelorMittal. These electric arc furnaces are expected to increase demand for scrap steel, potentially driving up prices for the material.

The increase in steel capacity may potentially drive down steel prices and some Florida producers have indicated that they might be seeing a stabilization in steel price in early January. They report that some mills are coming online in early 2022 and inventories will resupply, with some service centers thinking this will stabilize steel prices and may even bring them down some. However, this will not apply to stainless steel or aluminum, which producers believe will continue to increase. Labor, galvanizing, and scrap steel costs and prices continue to increase or remain high. Prices in the European market remain about 50% lower than the highs seen in the U.S. since the end of 2020. Worldwide, steel export prices are nearly half of U.S. prices.

Figure 18. U.S. Steel Pricing, Jan. 2007 – Dec. 2021



Source: AISI Weekly Raw Steel Production.

The December 2021 survey revealed continued price increases in bids, but showed signs that prices may decline over the next quarter as production ramps up for structure steel (**Table 8**). Producers expect slight declines in price for steel plate, but other materials may continue to increase. Rebar prices may not decline as predicted for structural steel. Anecdotally, producers report aluminum and stainless steel prices continue to increase significantly and specialty material is so expensive or unavailable that it is requires design changes. Backlogs are prevalent.

Table 8. January Steel Producer Survey Results

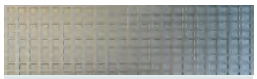
Material	Structural Steel	Steel Pipe	Rebar	Square Tubing	Steel Railing	Galvanizing
Price Change, December 2021	1%	17%	3%	3%	3%	4%
Expected Price Change, January 2021	-1%	3%	3%	0%	0%	3%
Expected Price Change Next Quarter (End of March)	-4%	3%	3%	0%	0%	4%
Bid Price Change, December 2021	10%	3%	3%	0%	0%	8%
Production Change, December 2021	4%	3%	3%	3%	3%	6%
Expected Production Change, January 2021	24%	3%	3%	3%	8%	10%
Expected Production Change Next Quarter (End of March)	26%	3%	3%	3%	8%	10%

Source: TBG Work Product

Supply Chain Variables for Steel Materials

Table 9 provides an overview of supply chain variables and a summary of their current status.

Table 9. Supply Chain Variables for Structural Steel

 Raw Materials	Raw materials prices are a mixed bag for 2022. Aluminum and stainless steel prices are expected to continue to increase, while weakened demand from China and oversupply is expected to decrease iron ore prices and prevent them from rebounding to 2021 highs.	↑
 Scrap Steel	Scrap steel prices are expected to remain high as electric-arc furnace capacity increases in the US, which will increase demand for scrap. Global demand for scrap is high as well. However, scrap prices tend to follow steel prices, and as more capacity comes online, prices may decline. Prime scrap is expected to remain tight through 2022 until auto manufacturing rebounds.	↑
 Galvanizing Steel	Zinc prices have continued to rise over the last quarter. Prices have increased from $0.86 per pound in April of 2020 to $1.54 per pound in December of 2021. Producers are reporting long lead times and price increases for galvanized products.	↑
 China	Chinese steel production continues to decline with a goal of reaching carbon neutrality and to reduce pollution for the Winter Olympic games. In addition, Worldsteel expects Chinese demand to decline as a result of a declining real estate sector. While China is cutting production now, they map ramp up govt. investment in infrastructure and increase demand after the winter Olympics. In the short run, the influence is expected to be positive for FDOT.	↓
 Transportation	Transportation is a factor at all stages of steel production. FDOT products are primarily delivered through ship or truck and fabricators have cited issues with longer than usual lead times. The cost of transportation continues to rise as fuel prices continue to increase.	↑
 Rail	Other material markets are reporting issues with rail, but steel producers have not cited rail issues as a significant problem.	=
 Milling Capacity	While slightly lower than back in September, nationally, capacity utilization rates are still at pre-pandemic levels. Adjusted year-to-date production through January 22nd, 2022 was 5.7 million net tons, at a capacity utilization rate of 82.4%. That is up 4.5% from the same period last year. Nucor and U.S. Steel have announced the construction of new plants that will expand capacity over the next few years.	=
 Labor	Labor costs are still high for producers. There are reports that labor issues are creating bottlenecks and limiting capacity. Producers have mentioned that their most experienced employees are retiring and the cost and time to train is expensive.	↑
 Competition	Currently, competition is not in a place to bring down FDOT's costs. Consolidation of companies is trending and inventory is low.	↑

↑	Exerting negative influence on FDOT's costs; monitor.
=	Currently stable; not influencing FDOT's costs.
↓	Exerting positive influence on FDOT's costs.

Scrap Steel

As shown in **Figure 19**, scrap steel prices remained elevated through the last quarter of 2021, impacting fabricator lead times and bottom lines. Scrap prices in December 2021 were 49% higher than 2020 prices and 112% higher than 2019 prices, underpinning an ever-growing problem in the industry as scrap and parts become more expensive and harder to get amid rising demand. As more countries work to curb their pollution, upgrade infrastructure, and industrialize, demand for scrap steel will continue to increase and impact prices. However, scrap prices tend to follow the general steel market, and as more capacity comes online, overall steel prices may decline. Scrap prices are expected to remain high in the near term, however.

Figure 19. Scrap Steel Price – USA, Delivered to Steel Plant (Jan. 2007 – Dec. 2021)

Source: SteelBenchmarker.
Notes: AMM scrap price data, Jan 2002 – Jan 2007; SteelBenchmarker data begins Feb. 2007.

EU

The U.S. agreed to lift tariffs on some steel and aluminum imports from the EU starting in December 2021[5]. The previous tariff rates of 10% for steel and 25% for aluminum products will now be replaced by a tariff-rate quota system that will allow EU counties to export up to 3.3 million metric tons of steel and 18,366 metric tons of aluminum a year to the U.S. before the standard tariffs go into effect. This change should allow more foreign steel and aluminum to come into the U.S. and expand supply.

China

In recent months, China has continued to reduce steel production with the hopes of reaching carbon neutrality. Although the Chinese steel industry typically slows during the fourth quarter each year, their

[5] Presidential Proclamations 10327 and 10328.

production changes in 2021 are expected to limit global supply even more going into 2022. The World Steel Association's November report outlined China's decline in steel production to be 22%, a slight improvement from their October decline of 23.3%. Due to China's weak demand, the ripple effects are being felt in the manufacturing and construction sectors.

Furthermore, with the 2022 Winter Olympics looming, China's pledge to reduce steel production in order to have "Olympic blue" clear skies is underway. In addition, China's steel exports are tracking lower than 2020 levels, with October 2021 being the lowest for the year. In October, China cleared small volumes of Australian coal after their ban on imports, which created a tight supply of the input material and raised prices. With China's pre-ban intake, it gives hope that they will continue with clearing more volumes.

Iron ore is continuing to see an oversupply issue. Due to weak steel output, the demand for this raw material has been on the downfall since summer and prices for iron ore have been experiencing record lows. In November, iron ore was priced at $96.24 dollars per dry metric ton unit (dmtu), much lower than November 2020's price at $124.36 per dmtu. It is anticipated with the recent rise in COVID-19 cases, and China's zero-tolerance policy, that iron ore prices will further decline as China shuts down areas with outbreaks and supply outpaces demand.

The ripple effects of China's changes in production this year have not been identified in the U.S. as of yet, but 2022 is likely to experience repercussions.

Current Pricing

Based on FDOT bid data, reinforcing steel prices are up 1% through the first six months of 2022 compared to 2021 (**Table 10**). Reinforcing steel costs appear to have stabilized, but have maintained the 37% jump in prices seen in 2021 so far, this fiscal year. Structural steel prices, on the other hand, have risen an additional 26% through December 2021. This escalation is on top of the 51% rise in structural steel prices seen in fiscal year 2021. High steel costs are likely to persist for months to come as supply chain disruptions worsen during the winter months according to FDOT steel fabricators.

Table 10. Steel Price, 2017 – 2022

Fiscal Year	2017	2018	2019	2020	2021	2022*
Price Structural Steel, $/lb.	$2.80	$4.41	$2.79	$2.55	$3.84	$4.84
Annual Percent Change	-45%	57%	-37%	-9%	51%	26%
Price Reinforcing Steel, $/lb.	$0.81	$0.96	$1.00	$0.88	$1.20	$1.22
Annual Percent Change	-6%	19%	4%	-12%	37%	1%

Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.
*Estimates through December.

Forecast

For the second quarter of 2022, regression modeling was performed using pay item data, supply chain variables, and other macroeconomic indicators to identify models that best predicted FDOT's structural and reinforcing steel costs. With bid data through December 2021, projections for structural steel show a less steep incline through the five-year work program than in the previous quarter. The impact of production shortages and COVID-19 disruptions are still being felt, however.

The model considered most likely at this writing estimates the average price for structural steel to range between $4.12 to $5.07 per pound by 2026, indicating that at least a portion of the price increases seen in 2021 are now permanent. According to steel fabricators, while huge price increases are not expected to continue in 2022, costs are not coming down quickly either. With potential geopolitical conflict in the background (Russia/Ukraine, UAE/Yemen, and South China Sea issues), the upper bound considers additional shocks to the steel industry may arise in 2022. The lower bound relies on lower energy costs, indicating decreased market demand.

For Reinforcing Steel, zinc and coal costs and another major event are considered in the most likely estimate, with prices ending at $1.31 per pound by the end of the work program. With increased economic activity, as well as another major event such as pandemic-related lockdowns or military conflict, the upper bound is closer to $1.51 per pound. On the other hand, more constrained construction and economic activity would drive the price of reinforcing steel to the lower bound at $1.14 per pound by 2026.

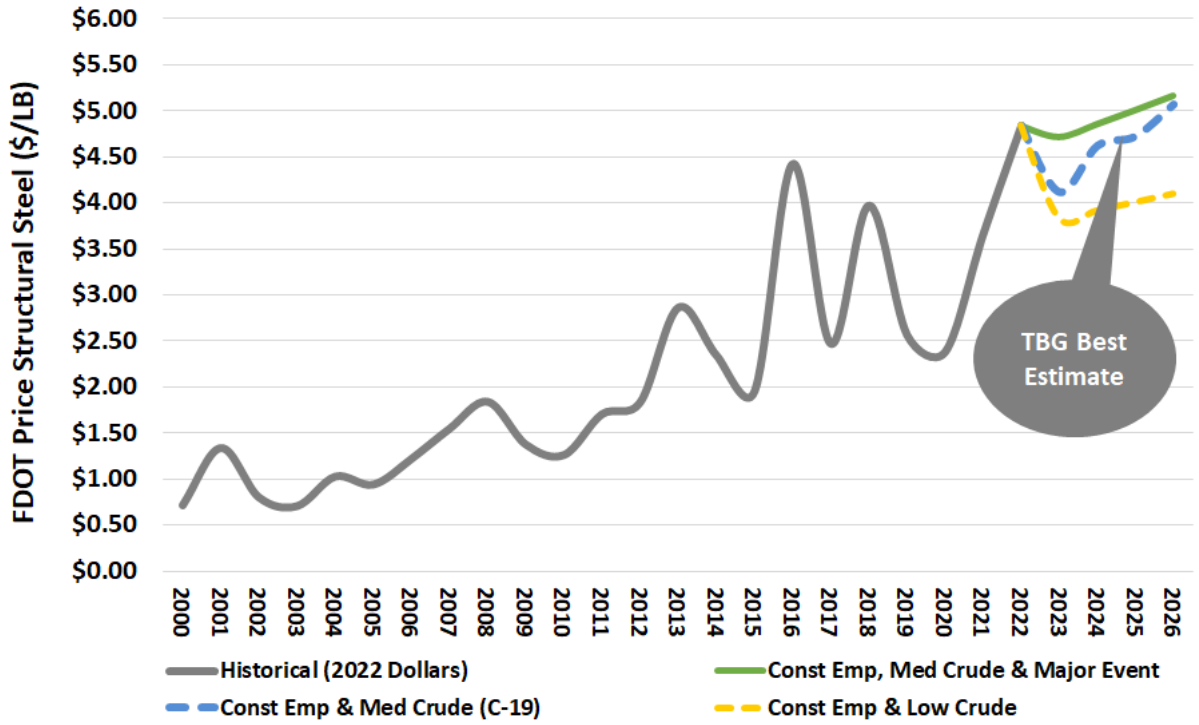
Table 11 provides the forecast average price for structural and reinforcing steel. **Figure 20** and **Figure 21** show the output of several price models and the scenario identified as best estimate for structural steel and reinforcing steel, respectively.

Table 11. Steel Price Forecast Results, 2022 - 2026

Fiscal Year	2022	2023	2024	2025	2026
Price Structural Steel, $/lb.	$4.84	$4.12	$4.62	$4.72	$5.07
Annual Percent Change	26%	-15%	12%	2%	7%
Price Reinforcing Steel, $/lb.	$1.22	$1.25	$1.27	$1.29	$1.31
Annual Percent Change	1%	3%	1%	1%	1%

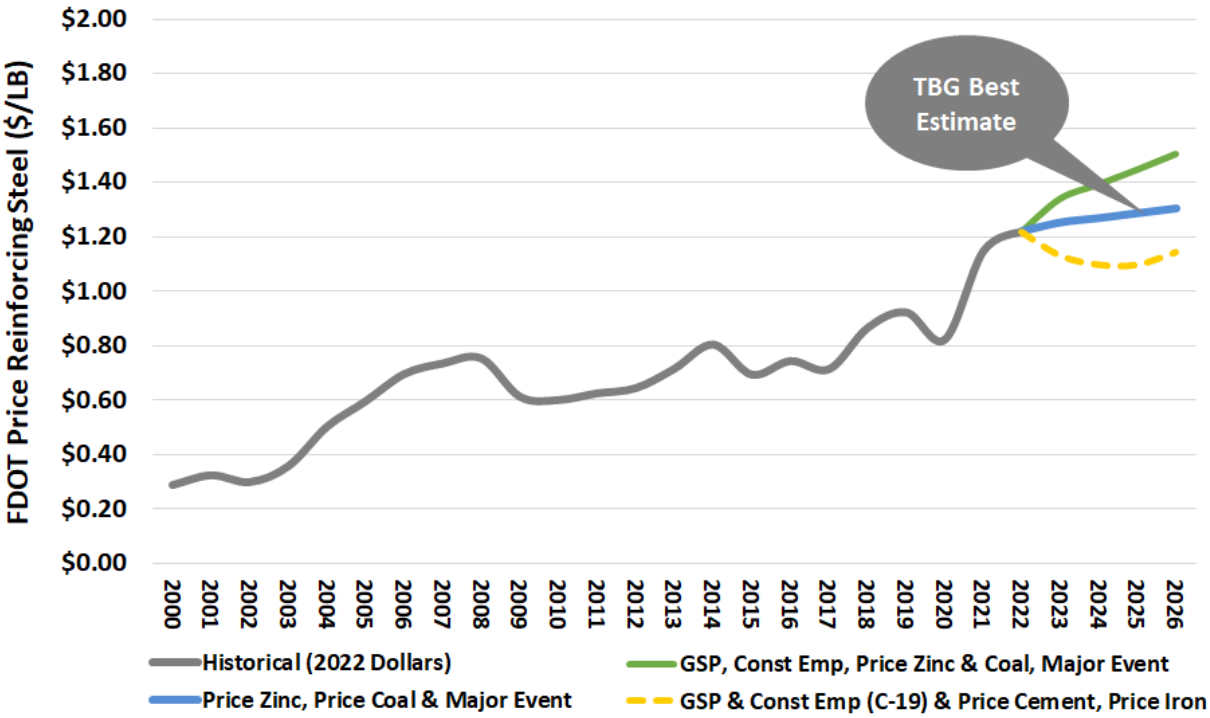
Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

Figure 20. Structural Steel Price, 2022 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources. Historical pricing reflects actual bids and not adjusted for time. (Variable descriptions available in the **Appendix**.)

Figure 21. Reinforcing Steel Price, 2022 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources. Historical pricing reflects actual bids and not adjusted for time. (Variable descriptions available in the **Appendix**.

Aggregate

Summary

- Florida production continued with slight increases compared to 2020. While aggregate base prices increased 9% in fiscal year 2021, they have declined 14% in fiscal year 2022.
- The infrastructure bill and the residential sector will continue to support growth for several years.
- The aggregate industry expects supply chain issues to continue in 2022 for labor, trucking and equipment parts. A federal initiative has launched to address trucker shortages – the "Trucking Action Plan".

FDOT Impacts

- The Florida aggregates market appears to be returning to pre-pandemic pricing, which would be a positive impact for FDOTs costs. Bottlenecks in transportation and distribution in 2022 are expected.
- In addition, higher fuel costs, driver shortages and increased equipment part delays are impacting project site delivery windows and lead times.
- Aggregate supply is sufficient to meet demand. However, interviews indicated slow permitting processes could affect material availability.

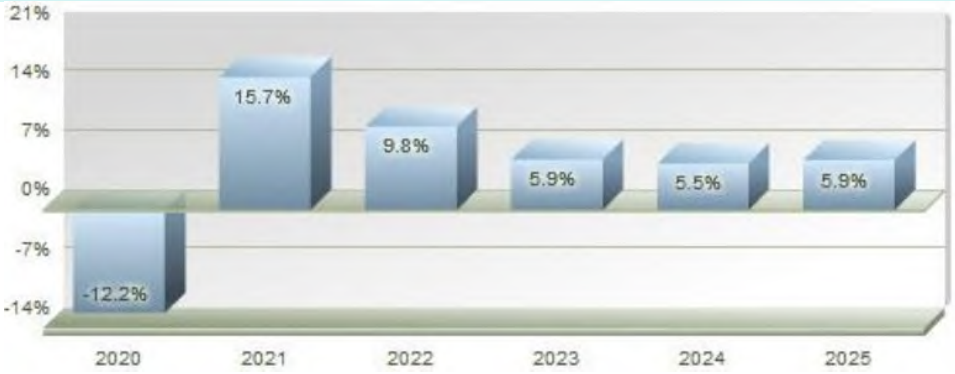
General Industry Update

The USGS[6] has released estimates of construction aggregate produced for consumption for the third quarter of (calendar year) 2021. Overall, USGS reports that while Florida's crushed stone production rose 2% year-over-year and 1% to 70.6 million tons in 2021 through September, Florida' construction aggregates production rose 7% year-over-year but fell 3% in 2021 through September. U.S. crushed stone and construction aggregates production rose by 3 and 7% through September, respectively. Publicly traded companies continue reporting strong results for aggregate. In the third quarter of 2021, only one reported a less than 1% decline in volume, all others reported growth up to 10%. In terms of pricing, all reported growth as high as 6%. It is expected that these will continue in 2022.

Pit & Quarry's most recent U.S. aggregate consumption forecasts show a slightly less optimistic 2.9% growth for 2021 (down from 4.1% reported in the previous report), and 3.2% growth for (up from 2.4% reported in the previous report). They expect the residential sector to continue being strong with 4-6% annual growth for the next years. Non-building will follow in growth as the recently passed infrastructure bill will help, but impacts won't be seen in the near term. Non-residential building was the most affected in 2021, but they expect the sector to have average annual growth between 2 and 3% with warehousing leading the recovery. Other industry forecasts show higher growth rates for nonmetallic mining in the U.S., with revenues increasing more than 10% in 2022 and 6% afterwards (**Figure 22**).

[6] United States Geological Society

Figure 22. Forecast Industry Growth, U.S. Aggregate



Source: First Research

Trucker Shortages

In December, the Biden administration unveiled a "Trucking Action Plan", which includes funding to expedite issuance of CDLs, promotion of trucking apprenticeships and outreach efforts. The plan aims to promote and accelerate the development of new registered apprenticeship programs by recruiting industry associations and employers. The plan also includes outreach to veterans as it is estimated there are 70,000 veterans with trucking experience that may not currently be employed in the market. The idea is for the Departments of Labor and Veterans Affairs to help veterans use their trucking experience to acquire CDLs and develop programs that will help them transition into the trucking industry as well as connect them with employers.

Capital Costs

Given the optimism that exists in the aggregate industry for the next years, it is expected that equipment investments will increase in 2022. While the potential increases in interest rates throughout 2022 could discourage equipment expenditures, it is expected that these will increase as aggregate producers are optimistic about the industry for the next years. With the uncertainty over the pandemic and long-term funding, it has been reported that producers have been postponing new equipment purchases or replacements. The passage of the infrastructure bill as well as the residential sector continuous growth, help to overcome this. In a survey by the Association of Equipment Manufactures (AEM), 75% of respondents reported an increase in new orders for construction equipment and 96% saw an increase in order for construction parts. However, more than 80% saw an increase in backlogs too.

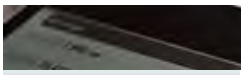
Repairs and Parts

Aggregate producers reported difficulty obtaining parts, and being forced to rent equipment - an expensive proposition – for lack of parts. Aggregate producers expect the supply chain issues for parts to continue in 2022. According to the Institute of Supply Management (ISM), in December 2021 the average commitment lead time for Capital Expenditures in the U.S. was 161 days, for production materials was 91 days and for repair supplies was 48 days. Additionally, deliveries of suppliers to manufacturing organizations was also slower in December. Fabricated Metal Products; Computer & Electronic Products; Chemical Products; and Transportation Equipment all reported slowing deliveries. All these issues that were happening in 2021 will continue in 2022.

Supply Chain Variables for Aggregate

Table 12 provides current status of selected supply chain variables.

Table 12. Aggregate Supply Chain Variables

 **Raw Materials**	AGC's construction outlook survey highlight material shortages and costs due to supply chain disruptions as the top concern for 2022. While shortages of aggregate sources have not been a concern for the industry, supply chain disruptions might affect aggregate producers.	=
 **Access to Land**	Access to land with suitable deposits is key to cost-effective material extraction for FDOT Aggregate. Following the decision to vacate the Navigable Waters Protection Rule, the EPA and the Army Corps published in December the proposed the new rule that would mostly interpret waters of the United States with regulations prior to 2015, but it would also expand some of the definitions of which waters are protected. The rule is in the comment stages, so industry and developers should tread carefully. Aggregate organizations have reacted negatively towards it. Additionally, In November 2021 two Environmental Resource Permits (Individual with No Conceptual Approval permit type) were issued for sand mines in Lake and Polk counties. However, interviews indicated concerns over future material availability due to slow permitting process.	=
 **Rail**	Rail is the primary transportation for aggregates, from Georgia, and from Lake Belt to Central and Northeast Florida. In the third quarter of 2021, aggregate shipments rose 5% year-over-year, but are still down 5% vs. 2019. For the first nine months of 2021, while shipments were down 6% vs. the same timeframe in 2020, revenues in both years were similar. Compared to 2019, shipments and revenue were down 8% and 6%, respectively. Additionally, fuel costs increased 77% year-over-year and on-time arrivals have followed the trend from previous reports, 66% through the first nine months of 2021 (down from 80% in 2020).	↑
 **Trucking**	Constrained truck/driver availability is a major cost factor. Rates have increased as capacity is still tight, competition for drivers and fuel prices have increased. Overall, spot rates have slightly decreased in January 2022 after they were up in December 2021. Despite this, rates are still significantly higher year-over-year, with flatbed rates 18% higher and dry van 35% higher. For the first time since the pandemic started, the U.S. gained more trucking jobs in December 2021 than same month in 2019 according to the BLS. In December, the Biden administration unveiled a "Trucking Action Plan", which includes funding to expedite issuance of CDLs, promoting trucking apprenticeships and outreach efforts to veterans, among other initiatives.	↑
 **Labor**	Labor demand has been increasing since the recovery in aggregate demand. Employment needs for local, state, & municipal projects, and shrinkages of skilled labor in the U.S southeast are likely to decrease long-term supply of labor and thus increase the competition for worker power. Statewide construction employment increased 4.9% year-over-year in November and is above 2019 levels. Metro areas showed growth through the end of the year after some were stagnant during the summer. In AGC's construction outlook even though the majority of respondents expect worker shortages to continue, 74% expect to hire new workers.	↑
 **Competition**	Competition has been steady. FDOT's approved list shows 5 mines approved or under review in 2021 that were not present in 2020 (2 in Canada and 3 in Florida). In 2022, there is a mine in Alabama under review. Additionally, a terminal facility in District 3 was inactivated in December 2021.	=
 **Capital Costs**	Even though it is expected that the Fed will increase interest rates throughout 2022, aggregate producers expect investments for new or replace equipment will also increase in 2022 with the guidance that the infrastructure bill provides over the next years. Reports continue indicating that producers are seeing longer lead times and shortages for equipment parts.	↑

↑	Exerting negative influence on FDOT's costs; monitor.
=	Currently stable; not influencing FDOT's costs
↓	Exerting positive influence on FDOT's costs.

Current Pricing

Based on FDOT bid data, aggregate base prices are down 14% through the first six months of fiscal year 2022 (**Table 13**). The Florida aggregate market appears to be returning to pre-pandemic pricing, rebounding from the 30% seen since 2019. However, trucking and labor issues still abound and may cause further bottlenecks in 2022 for transportation and distribution of material.

Table 13. Aggregate Base Price, 2017 – 2022

Fiscal Year	2017	2018	2019	2020	2021	2022*
Price Aggregate Base, $/Ton	$43.55	$38.40	$37.92	$46.54	$50.59	$43.29
Annual Percent Change	15%	-12%	-1%	23%	9%	-14%

Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.
*Estimates through December 2021.

Forecast

In this quarterly update, regression modeling was performed to estimate aggregate base costs using pay item data, supply chain variables, and other macroeconomic indicators. The most likely trajectory sees continued construction employment growth constrained by the pandemic, an increase in overall crushed stone pricing, higher fuel costs, and a strong FDOT work program through 2026. With updated bid data through December 2021, aggregate prices have moderated in 2022, driving the best estimate down about 20% across the next five years to $47 per ton by 2026.

An upper bound with unconstrained construction employment, crushed stone pricing, and rising energy costs results in a huge spike in prices, but given the trajectory prior to 2020, this scenario seems less likely. The lower bound sees initial price drops due to pandemic constraints, but higher prices in the long run to meet work program demand.

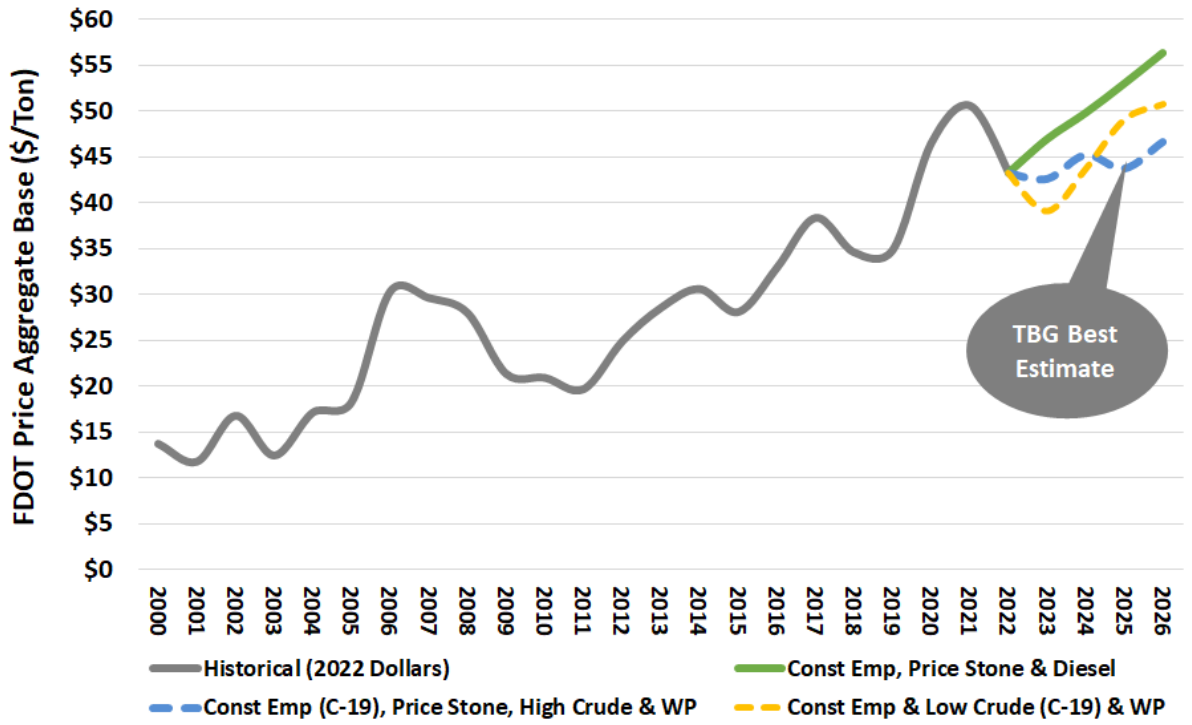
Table 14 provides the best forecast average price for aggregate base this writing, while **Figure 23** shows the output of the price models discussed herein.

Table 14. Aggregate Base Price Forecast Results, 2022 - 2026

Fiscal Year	2022	2023	2024	2025	2026
Price Aggregate Base, $/Ton	$43.29	$42.68	$45.23	$43.78	$46.60
Annual Percent Change	-14%	-1%	6%	-3%	6%

Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

Figure 23. Aggregate Base Price, 2022 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources. Historical pricing reflects actual bids and not adjusted for time. (Variable descriptions available in the **Appendix**.)

Earthworks

Summary

- Earthmoving equipment costs have continued to increase. With demand high and supply low, units sold are now tending to be older.
- Supply of equipment parts and scrap metals is tight.
- While earthworks prices increased 53% in fiscal year 2021, they have declined 16% in fiscal year 2022. Prices are still high compared to 2019.

FDOT Impacts

- Competition for truck drivers continues to be a constraint, causing longer lead times.
- Higher fuel prices are leading to higher costs; fuel prices are not expected to come down for some time.

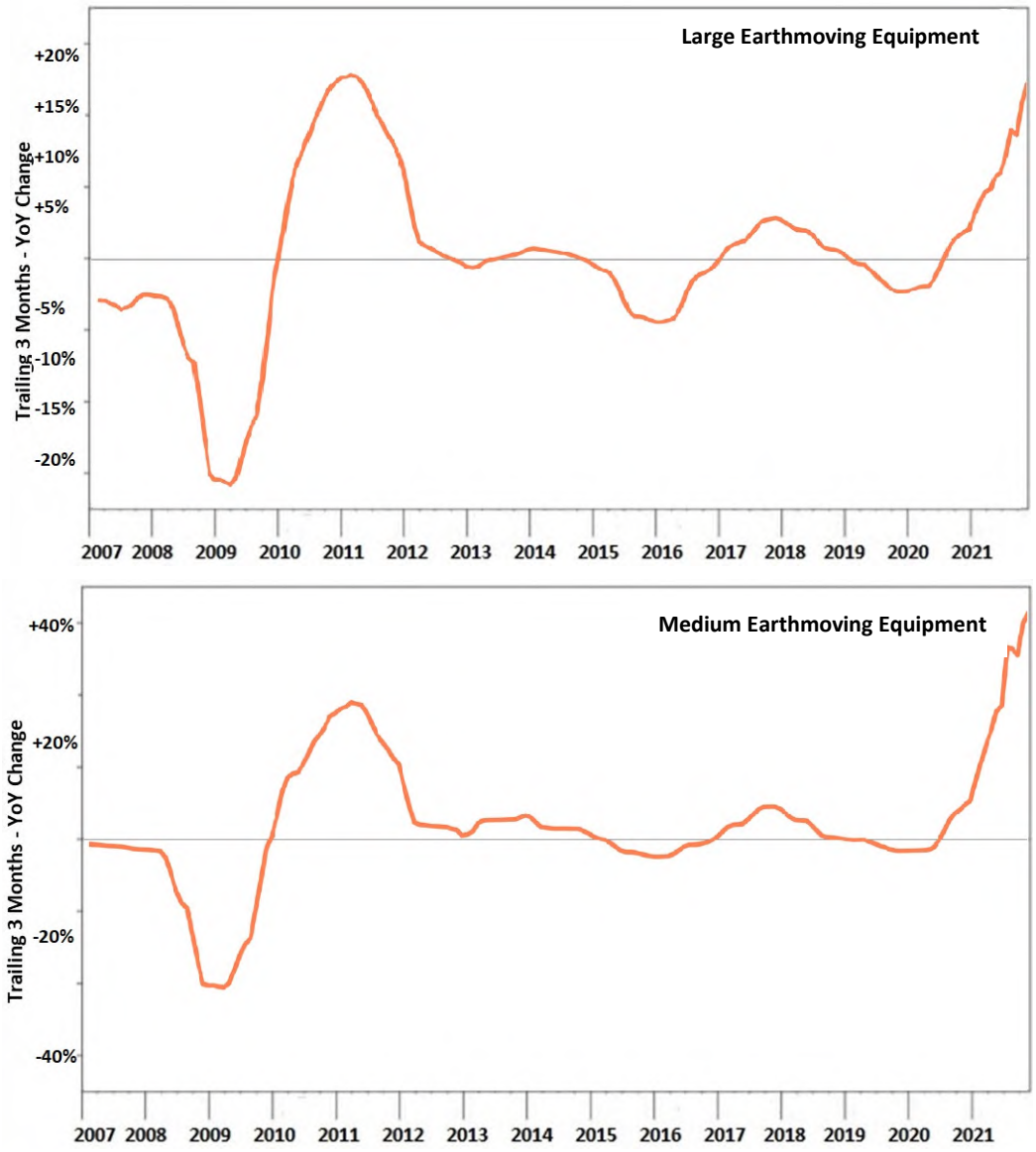
General Trends

Trucking costs are the main factor in this sector. As mentioned throughout the report, the labor market for driver and equipment operators continues to be tight and is not expected to ease in the near term. While there are ongoing efforts by the current Administration to expand the pool of drivers and expedite the process to issue CDLs, high competition will continue to put upward pressure on wages to attract labor. Fuel costs have also increased, so both factors lead to higher trucking costs. Equipment costs have also increased significantly this past year.

Equipment

Inflationary pressures that have been affecting other sectors are also present in the construction equipment industry. The December 2021 used equipment market trends report released by Ritchie Bros. Auctioneers continue showing significant price increases across all categories, causing their U.S. price indexes to be at record levels. For instance, the price indices for medium and large earthmoving equipment sold in the U.S. for the quarter ending in December 2021 continued the upward trend by increasing 45% and 16%, respectively (**Figure 24).** Truck tractors (+65%) and vocational trucks (+44%) also had significant increases since the previous report. Unit volumes were down in 2021 compared to 2020, and the units sold were older (on average 4 years older). The older, more used machines despite higher prices reflects a desperation for equipment, and of course is likely to mean more equipment repairs due to age and deterioration.

Figure 24. Percent Change in Price Indexes for Large and Medium Earthmoving Equipment



Source: Ritchie & Bros. Used Equipment Market Report.

Current Pricing

Based on updated FDOT lettings data, earthworks prices are down 16% through December 2022, but suppliers have retained much of the prices increases seen in 2020 and 2021 (**Table 15**). Besides the ongoing truck driver shortage, equipment costs are also a factor. Material suppliers in most industries are reporting a lack of parts and scrap metals to repair equipment and are now having to turn to renting equipment instead, adding additional cost to their operations.

Table 15. Earthwork Price, 2017 – 2022

Fiscal Year	2017	2018	2019	2020	2021	2022*
Price Earthwork, $/Ton	$6.95	$7.66	$5.90	$8.39	$12.87	$10.82
Annual Percent Change	0%	10%	-23%	42%	53%	-16%

Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.
*Estimates through December 2021.

Forecast

Regression modeling was performed to estimate Earthworks costs using pay item data, supply chain variables, and other macroeconomic indicators. Earthwork prices have declined in 2022, but still remain elevated compared to 2019, making a scenario that includes improved construction employment and moderate housing starts, along with medium crude prices, the best estimate at this time. Updated historical lettings for fiscal year 2022 produced a starting price of $10.82 per ton for the projection period, offsetting previously reported increases. The selected forecast shows earthwork costs rising by 3% through the end of the work program given current pricing trends. With earthmoving and other heavy equipment becoming a bottleneck, elevated prices may be expected until those issues are resolved.

An upper bound that includes COVID-19 impacts and rising crushed stone prices, a parallel cost, show earthwork prices reaching as much as $14.61 per ton by 2026. On the other hand, lower demand and energy costs may reduce earthwork prices to the lower bound.

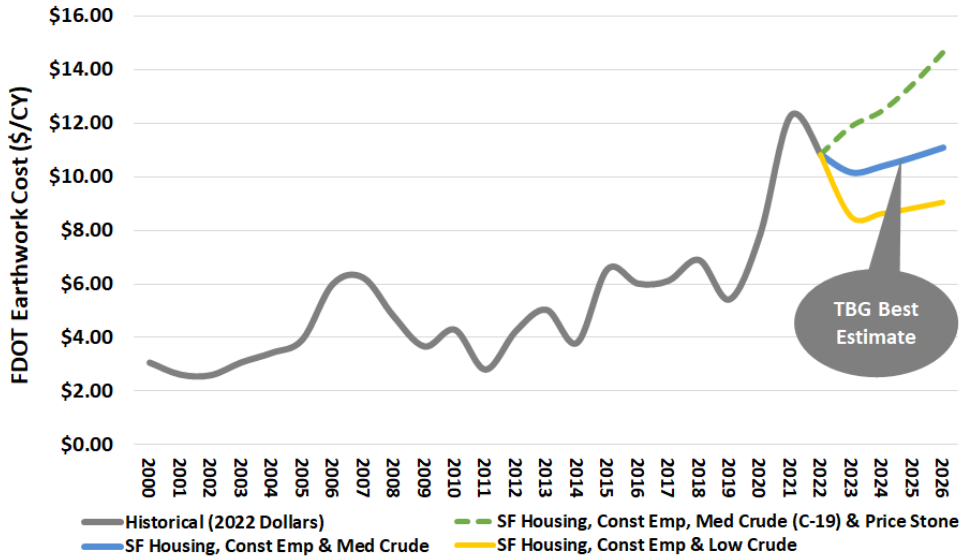
Table 16 provides the forecast average price for earthworks through 2026, which ends up about 15% lower than the previous update. **Figure 25** shows the output of potential price models and the scenario identified as best estimate for earthworks.

Table 16. Earthwork Price Forecast Results, 2022 - 2026

Fiscal Year	2022	2023	2024	2025	2026
Price Earthwork, $/Ton	$10.82	$10.15	$10.39	$10.72	$11.09
Annual Price Change	-16%	-6%	2%	3%	3%

Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

Figure 25. Earthwork Price, 2022 Forecast

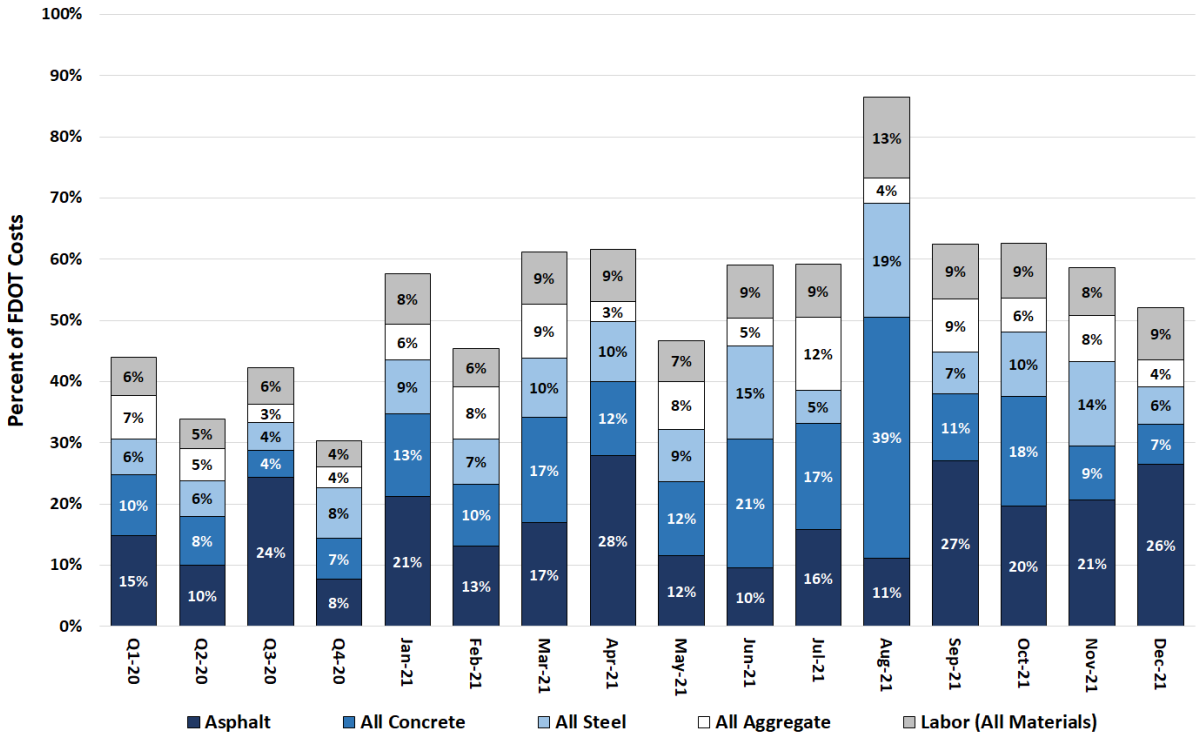


Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources. Historical pricing reflects actual bids and not adjusted for time. (Variable descriptions available in the **Appendix**.)

Appendix

Tracking FDOT's costs by month shows how the cost composition may shift depending on project type, scheduling, and material costs (**Table A-1**). Concrete and steel costs as a share of total costs moderated in December 2021 according to preliminary data. However, steel costs are expected to remain elevated compared to 2020 levels in early 2022. Asphalt and aggregate costs are a greater share of total FDOT costs in Q4 2021 than in Q4 2020. Asphalt costs remain high in 2022, but aggregate costs appear to be easing. Labor costs have been relatively consistent this year as construction labor in general is back to pre-pandemic levels.

Table A-1. Monthly Cost Composition



Source: TBG calculated from data provided by FDOT Estimates Office.

A list of variables used in the updated forecasts is available in **Table A-2**.

Table A-2. Forecast Variable Descriptions

Variable Reference	Description
Const Emp	FL construction employment.
Diesel	Average diesel price.
GSP	FL Gross State Product.
Historical	Historical pricing or quantity.
Housing Starts	FL housing starts.
Low/Med/High Crude	Average crude price (low, medium, or high forecast).
Major Event	Major geo-political, health, or weather-related events that strongly affect market forces; i.e. 9/11, the Great Recession, Hurricane Katrina, the COVID-19 pandemic.

Variable Reference	Description
Non-farm Emp	FL Non-Farm employment.
Price Binder	Average price of HMA binder (PG-76 & higher).
Price Cement	Average price of cement.
Price Coal	Average price of coal.
Price Iron Ore	Average price of iron ore.
Price Stone	Average price of crushed stone.
SF Housing	FL Single-Family housing starts.
WP	FDOT Five-Year Work Program.
C-19	Refers to COVID-19; some variables adjusted for pandemic impacts.

Pay items that are partially or wholly used in the analysis are listed in the next five tables by material type. It should be noted that the lists may include some pay items that are no longer in use by FDOT, or are not represented in the lettings data every year, but are retained for historical record.

Table A- 3. Asphalt Pay Items

Asphalt Pay Item Number				
0102 2200	0334 1 52	0337 7 22	0337 7 48	0337 7 93
0286 2	0334 1 53	0337 7 23	0337 7 54	0337 7 94
0287 1	0334 1 54	0337 7 24	0337 7 55	0339 1
0305 1	0334 1 55	0337 7 25	0337 7 58	0341 70
0315 1	0334 1 56	0337 7 26	0337 7 71	0525 1
0334 1 11	0334 1 57	0337 7 29	0337 7 72	0908333 1
0334 1 12	0334 1 58	0337 7 30	0337 7 73	0909335 1
0334 1 13	0334 1100	0337 7 31	0337 7 74	0909335 2
0334 1 14	0334 1101	0337 7 32	0337 7 80	0911325 1
0334 1 15	0334 1102	0337 7 33	0337 7 81	0914337 2
0334 1 22	0334 1103	0337 7 35	0337 7 82	0914337 4
0334 1 23	0334 1104	0337 7 40	0337 7 83	0914337 5
0334 1 24	0334 1105	0337 7 41	0337 7 85	
0334 1 25	0334 1106	0337 7 42	0337 7 88	
0334 1 33	0334 1107	0337 7 43	0337 7 90	
0334 1 34	0337 7 5	0337 7 45	0337 7 91	

Table A-4. Concrete Pay Items

Concrete Pay Item Number				
0173 79 1	0425 1584	0430721504	0521 8 1	0700 10122
0350 1 1	0425 1585	0430830	0521 8 2	0700 10123
0350 1 3	0425 1587	0430982120	0521 8 3	0700 10124
0350 1 4	0425 1589	0430982121	0521 8 4	0700 21 11
0350 1 5	0425 1601	0430982123	0521 8 5	0700 21 12
0350 1 8	0425 1602	0430982125	0521 8 6	0700 21 13
0350 1 10	0425 1603	0430982129	0521 8 20	0700 21 14
0350 1 11	0425 1604	0430982133	0521 72 2	0700 21 15
0350 1 12	0425 1605	0430982138	0521 72 3	0700 21 16
0350 1 13	0425 1609	0430982140	0521 72 4	0700 21 17

Concrete Pay Item Number				
0350 1 14	0425 1611	0430982141	0521 72 5	0700 21 31
0350 1 20	0425 1619	0430982142	0521 72 6	0700 21 32
0350 2 3	0425 1701	0430982143	0521 72 7	0700 21 33
0350 2 10	0425 1702	0430982144	0521 72 10	0700 21 34
0350 3 1	0425 1703	0430982145	0521 72 11	0700 21 35
0350 3 2	0425 1704	0430982501	0521 72 20	0700 21 36
0350 3 3	0425 1705	0430982502	0521 72 21	0700 22121
0350 3 5	0425 1711	0430982505	0521 72 22	0700 22122
0350 3 7	0425 1712	0430982506	0521 72 23	0700 22123
0350 3 8	0425 1713	0430982510	0522 1	0700 22124
0350 3 9	0425 1714	0430982519	0522 2	0700 22131
0350 3 10	0425 1715	0430982623	0522 3	0700 22132
0350 3 11	0425 1719	0430982625	0522 4	0700 22133
0350 3 12	0425 1725	0430982629	0524 1 1	0700 22134
0350 3 13	0425 1801	0430982633	0524 1 2	0700 22141
0350 3 14	0425 1802	0430982638	0524 1 3	0700 22142
0350 3 17	0425 1803	0430982640	0524 1 4	0700 22143
0350 4 1	0425 1804	0430982641	0524 1 19	0700 22144
0350 4 5	0425 1805	0430982642	0524 1 29	0700 22154
0350 4 11	0425 1811	0430982643	0524 1 49	0700 22220
0350 4 13	0425 1812	0430982645	0524 2 1	0700 22250
0350 30 5	0425 1813	0430984120	0524 2 2	0700 23111
0350 30 13	0425 1814	0430984121	0524 2 4	0700 23112
0353 70	0425 1815	0430984123	0524 2 29	0700 23113
0400 0 11	0425 1841	0430984125	0524 2 49	0700 23114
0400 0 13	0425 1842	0430984129	0524 3	0700 23121
0400 1 1	0425 1843	0430984133	0526 1 1	0700 23122
0400 1 2	0425 1844	0430984138	0526 1 2	0700 23123
0400 1 11	0425 1845	0430984140	0530 4 4	0700 23131
0400 1 15	0425 1851	0430984141	0530 4 9	0700 23132
0400 1 25	0425 1852	0430984142	0530 78	0700 23133
0400 2 1	0425 1853	0430984143	0534 72101	0700 23142
0400 2 2	0425 1855	0430984144	0534 73	0700 23143
0400 2 4	0425 1861	0430984147	0536 7 3	0700 23144
0400 2 5	0425 1863	0430984504	0542 70	0700 23210
0400 2 8	0425 1865	0430984623	0547 70 1	0700 23220
0400 2 10	0425 1881	0430984625	0547 70 2	0700 38045
0400 2 11	0425 1882	0430984629	0548 12	0700 38056
0400 2 12	0425 1883	0430984633	0548 14	0700 38057
0400 2 24	0425 1884	0430984638	0548 20	0700 38063
0400 2 25	0425 1885	0430984640	0641 1	0700 38064
0400 2 41	0425 1887	0430984641	0641 2 11	0700 38065
0400 2 46	0425 1891	0430984642	0641 2 12	0700 38066
0400 2 47	0425 1892	0430984645	0641 2 13	0700 38068
0400 3 1	0425 1893	0430990	0641 2 14	0700 38086

Concrete Pay Item Number				
0400 3 8	0425 1894	0430991	0641 2 15	0700 38097
0400 3 20	0425 1895	0450 1 1	0641 2 16	0700 39 23
0400 4 1	0425 1899	0450 1 2	0641 2 17	0700 39 26
0400 4 2	0425 1901	0450 1 3	0641 2 18	0700 39 27
0400 4 4	0425 1902	0450 1 5	0641 2 19	0700 39 36
0400 4 5	0425 1903	0450 1 7	0641 3163	0700 39 37
0400 4 6	0425 1904	0450 1 78	0641 3169	0700 39 43
0400 4 8	0425 1905	0450 1124	0641 3175	0700 39 46
0400 4 11	0425 1909	0450 1130	0641 3180	0700 41 10
0400 4 22	0425 1910	0450 1201	0641 3186	0700 41 11
0400 4 24	0425 2 41	0450 1202	0641 3263	0700 43055
0400 4 25	0425 2 42	0450 1203	0641 3269	0700 44066
0400 4 40	0425 2 43	0450 1250	0641 3275	0700 45 32
0400 4 41	0425 2 61	0450 1251	0641 3286	0714 1123
0400 4 47	0425 2 62	0450 2 36	0641 14150	0715 4 11
0400 6	0425 2 63	0450 2 45	0641 14152	0715 4 12
0400 8 5	0425 2 71	0450 2 54	0641 14154	0715 4 13
0400 8 25	0425 2 72	0450 2 63	0641 14156	0715 4 14
0400 8 39	0425 2 73	0450 2 72	0641 14158	0715 4 15
0400 8106	0425 2 91	0450 2 78	0641 15150	0715 4 21
0400 8107	0425 2 92	0450 2 84	0641 15152	0715 4 23
0400 10	0425 2 93	0450 2 96	0641 15154	0715 4 24
0400 32	0425 2101	0450 3 11	0641 15156	0715 4 25
0400 72	0425 2102	0450 3 15	0641 15158	0715 4 31
0400153	0425 2103	0450 3 21	0641 17150	0715 4 32
0404 1	0425 2110	0450 3 25	0641 17152	0715 4 33
0404 5 11	0425 3 41	0450 3 26	0641 17154	0715 4 42
0404 5 12	0425 3 42	0450 3 66	0641 17156	0715 4 50
0404 5 22	0425 3 43	0450 3 76	0641 17158	0715 4011
0404 5 25	0425 3 61	0450 3 91	0641 45150	0715 4012
0405 70 1	0425 3 62	0450 3 95	0641 45152	0715 4013
0405 70 2	0425 3 63	0450 4 4	0646 1 11	0715 4019
0405 71	0425 3 81	0450 5	0646 2115	0715 4021
0407 1 11	0425 3 82	0450 6	0649 1 10	0715 4022
0407 1 21	0425 3 83	0450 6 25	0649 1 11	0715 4023
0407 1 52	0425 3 91	0450 8 12	0649 1 12	0715 4029
0425 1201	0425 3 92	0450 8 13	0649 1 13	0715 4031
0425 1202	0425 11	0450 8 21	0649 1 14	0715 4032
0425 1203	0425 78	0450 8 22	0649 1 15	0715 4033
0425 1204	0430141504	0450 8 23	0649 1 16	0715 4111
0425 1205	0430171103	0450 8 24	0649 1 17	0715 4112
0425 1209	0430171104	0450 8 33	0649 2150	0715 4113
0425 1211	0430171125	0450 82	0649 2170	0715 4119
0425 1212	0430171140	0450 83 1	0649 2250	0715 4121
0425 1213	0430171141	0450 88 15	0649 2255	0715 4122

Concrete Pay Item Number				
0425 1214	0430171142	0450 88 18	0649 21 1	0715 4123
0425 1215	0430172102	0450 88 20	0649 21 3	0715 4129
0425 1311	0430172125	0455 3 1	0649 21 4	0715 4131
0425 1312	0430172138	0455 3 2	0649 21 6	0715 4132
0425 1315	0430173112	0455 3 3	0649 21 7	0715 4133
0425 1319	0430173115	0455 3 4	0649 21 8	0715 4139
0425 1321	0430173118	0455 3 5	0649 21 9	0715 4300
0425 1322	0430173124	0455 3 6	0649 21 10	0715 10 2
0425 1325	0430173130	0455 3 8	0649 21 12	0715 19 13
0425 1329	0430173136	0455 4 1	0649 21 13	0715 19111
0425 1331	0430173218	0455 4 2	0649 21 14	0715 19112
0425 1332	0430174112	0455 4 3	0649 21 15	0715 19113
0425 1335	0430174115	0455 4 4	0649 21 17	0715 19119
0425 1341	0430174118	0455 4 5	0649 21 18	0715 19121
0425 1342	0430174124	0455 4 6	0649 21 19	0715 19122
0425 1345	0430174129	0455 14 2	0649 21 20	0715 19123
0425 1349	0430174130	0455 14 3	0649 21 21	0715 19131
0425 1351	0430174136	0455 14 4	0649 21 24	0715 19132
0425 1352	0430174142	0455 14 5	0649 21 26	0715 19133
0425 1355	0430174148	0455 14 23	0649 21 27	0715 19300
0425 1359	0430174154	0455 14 24	0649 31101	0715511315
0425 1361	0430174160	0455 34 2	0649 31102	0715511320
0425 1362	0430174172	0455 34 3	0649 31103	0715511325
0425 1365	0430174215	0455 34 4	0649 31104	0715511330
0425 1369	0430174218	0455 34 5	0649 31105	0715511335
0425 1411	0430174224	0455 34 6	0649 31106	0715511340
0425 1412	0430174230	0455 34 8	0649 31107	0715511345
0425 1415	0430174236	0455 34 23	0649 31108	0715511350
0425 1419	0430174242	0455 34 25	0649 31109	0715512315
0425 1421	0430174248	0455 34203	0649 31110	0715512325
0425 1422	0430175101	0455 34205	0649 31111	0715512330
0425 1425	0430175102	0455 34301	0649 31112	0715512340
0425 1431	0430175103	0455 88 1	0649 31113	0715512350
0425 1432	0430175104	0455 88 2	0649 31114	0715516315
0425 1435	0430175105	0455 88 3	0649 31115	0715516320
0425 1441	0430175112	0455 88 4	0649 31116	0715516325
0425 1442	0430175115	0455 88 5	0649 31117	0715516330
0425 1445	0430175118	0455 88 6	0649 31118	0715516345
0425 1451	0430175124	0455 88 7	0649 31119	0715517325
0425 1452	0430175130	0455 88 8	0649 31201	0715518315
0425 1455	0430175136	0455 88 12	0649 31202	0715518330
0425 1459	0430175142	0455 88 15	0649 31203	0751 32 11
0425 1461	0430175148	0455 88 19	0649 31204	0751 32 12
0425 1462	0430175154	0455 88 20	0649 31205	0751 32 13
0425 1465	0430175160	0455 88 21	0649 31206	0751 32 14

Concrete Pay Item Number				
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0425 1471	0430175172	0455112 3	0649 31208	0785 1 11
0425 1472	0430175184	0455112 4	0649 31209	0785 1 13
0425 1473	0430175201	0455112 5	0649 31210	0905455343
0425 1474	0430175202	0455112 6	0649 31211	0905455345
0425 1475	0430175203	0455143 3	0649 31212	0908350 1
0425 1479	0430175215	0455143 4	0649 31213	0908350 2
0425 1481	0430175218	0455143 5	0649 31214	0908350 3
0425 1483	0430175224	0455143 6	0649 31215	0913548 1
0425 1484	0430175230	0455143 23	0649 31216	2425 1415
0425 1485	0430175236	0455143 25	0649 31217	2425 1435
0425 1489	0430175242	0455143203	0649 31218	2425 1455
0425 1501	0430175248	0455143205	0649 31219	2425 1465
0425 1502	0430175254	0455143301	0649 31299	2425 1515
0425 1503	0430175260	0519 78	0649 31301	2425 1715
0425 1504	0430175266	0520 1 7	0649 31302	2430984504
0425 1505	0430175272	0520 1 8	0649 31303	2455 3 1
0425 1511	0430200 23	0520 1 10	0649 31304	2455 3 2
0425 1512	0430200 25	0520 1 11	0649 31305	2455 3 3
0425 1513	0430200 29	0520 1 12	0649 31306	2455 3 4
0425 1514	0430200 33	0520 2 1	0649 31307	2455 3 5
0425 1515	0430200 38	0520 2 2	0649 31308	2455 3 8
0425 1519	0430200 40	0520 2 4	0649 31309	2455 4 6
0425 1521	0430200 41	0520 2 5	0649 31310	2455 4 8
0425 1522	0430200 42	0520 2 8	0649 31311	2455 14 3
0425 1523	0430200 43	0520 2 9	0649 31312	2455 14 5
0425 1524	0430600125	0520 3	0649 31313	2455 14 11
0425 1525	0430602123	0520 5 11	0649 31314	2455 14 12
0425 1529	0430602125	0520 5 12	0649 31315	2455 34 2
0425 1531	0430602129	0520 5 16	0649 31316	2455 34 3
0425 1532	0430610123	0520 5 21	0649 31317	2455 34 4
0425 1533	0430610125	0520 5 22	0649 31318	2455 34 5
0425 1534	0430610129	0520 5 26	0649 31319	2455 34 6
0425 1535	0430610133	0520 5 41	0649 31999	2455 36 1
0425 1541	0430610225	0520 5 42	0649 33000	2455 88 2
0425 1542	0430610325	0520 5 46	0649415003	2455 88 3
0425 1543	0430610329	0520 5 51	0649417006	2455 88 4
0425 1544	0430611023	0520 6	0659109	2455 88 5
0425 1545	0430611025	0520 70	0659309	2455 88 6
0425 1547	0430611029	0521 1	0700 2 11	2455 88 7
0425 1549	0430611123	0521 1 1	0700 2 12	2455 88 8
0425 1551	0430611125	0521 5 1	0700 2 13	2455 88 9
0425 1552	0430611129	0521 5 2	0700 2 14	2455 88 20
0425 1553	0430611133	0521 5 3	0700 2 15	2455140 11
0425 1554	0430611223	0521 5 4	0700 2 16	2455140 12

Concrete Pay Item Number				
0425 1555	0430611225	0521 5 5	0700 2 17	2455140 13
0425 1557	0430611229	0521 5 6	0700 2 18	2455140 14
0425 1559	0430611233	0521 5 7	0700 2 50	2455140 15
0425 1561	0430611323	0521 5 8	0700 4111	2455140 43
0425 1562	0430611325	0521 5 9	0700 4112	2455140 44
0425 1563	0430611329	0521 5 10	0700 4113	2455140 56
0425 1564	0430611333	0521 5 11	0700 4114	2455143 2
0425 1565	0430612025	0521 5 13	0700 4122	2455143 3
0425 1569	0430612029	0521 5 20	0700 4123	2455143 4
0425 1571	0430612033	0521 6 1	0700 4124	2455143 5
0425 1572	0430613025	0521 6 2	0700 4125	2455143 6
0425 1573	0430613029	0521 6 3	0700 4126	2455145 1
0425 1574	0430613033	0521 6 11	0700 4127	2659109
0425 1575	0430613125	0521 6 12	0700 4128	2659309
0425 1579	0430613129	0521 6 31	0700 4132	
0425 1581	0430613225	0521 6 32	0700 10115	
0425 1582	0430613229	0521 6 34	0700 10116	
0425 1583	0430613325	0521 7 1	0700 10121	

Table A-5. Steel Pay Items

Steel Pay Item Number				
0415 1 1	0649 31108	0700 38056	0715516240	2649121202
0415 1 10	0649 31109	0700 38057	0715516315	2649122102
0415 1 11	0649 31110	0700 38058	0715516320	2649122203
0415 1 12	0649 31111	0700 38063	0715516330	2649122212
0415 1 13	0649 31112	0700 38064	0715516340	2649122304
0415 1 2	0649 31113	0700 38065	0715516435	2649122512
0415 1 3	0649 31114	0700 38066	0715516615	2649123103
0415 1 4	0649 31115	0700 38068	0715517125	2649123105
0415 1 5	0649 31116	0700 38075	0715517135	2649123204
0415 1 6	0649 31117	0700 38086	0715517150	2649123205
0415 1 7	0649 31118	0700 38097	0715517325	2649123305
0415 1 8	0649 31119	0700 39 23	0715518120	2649124105
0415 1 9	0649 31199	0700 39 24	0715518130	2649124205
0415 2 4	0649 31201	0700 39 25	0715518140	2649124306
0415 2 5	0649 31202	0700 39 26	0715518145	2649124312
0415 2 6	0649 31203	0700 39 27	0715518150	2649124407
0415 2 9	0649 31204	0700 39 36	0715518315	2649125512
0435 22250	0649 31205	0700 39 37	0715521135	2649131008
0435 22359	0649 31206	0700 39 43	0715521140	2649132009
0435 22369	0649 31207	0700 39 44	0715521145	2649133010
0435 22445	0649 31208	0700 39 46	0715521150	2649134011
0435 22484	0649 31209	0700 39 47	0715521340	2649135012
0435 32856	0649 31210	0700 39 57	0715522140	2649135512

Steel Pay Item Number				
0435 52 1	0649 31211	0700 39 74	0715526120	2649141101
0435 52 2	0649 31212	0700 41 10	0715530100	2649143102
0435413537	0649 31213	0700 41 11	0715530101	2649145012
0435422439	0649 31214	0700 43055	0715530102	2649145512
0435522224	0649 31215	0700 44066	0715530103	2649311001
0435725675	0649 31216	0700 45 32	0715530104	2649313003
0451 70	0649 31217	0700 48 12	0715536115	2649314004
0455 3 1	0649 31218	0700 48 13	0715536340	2649345012
0455 3 2	0649 31219	0700 48 14	0715540000	2649345512
0455 3 3	0649 31299	0700 48 15	0715550000	2649411001
0455 3 4	0649 31301	0700 48 17	0715560000	2649412002
0455 3 5	0649 31302	0700 48 18	0715561140	2649413002
0455 3 6	0649 31303	0700 48 19	0715571145	2649415003
0455 3 8	0649 31304	0700 48 22	0715571150	2649416004
0455 4 1	0649 31305	0700 48 28	0715572145	2649417006
0455 4 2	0649 31306	0700 48 32	0715572150	2649422203
0455 4 3	0649 31307	0700 48 33	0715573135	2649425203
0455 4 4	0649 31308	0700 48 34	0715573140	2649425504
0455 4 5	0649 31309	0700 48 35	0715573145	2649426504
0455 4 6	0649 31310	0700 48 38	0715573150	2649440
0455 7 2	0649 31311	0700 48 39	0715574140	2649515003
0455 7 4	0649 31312	0700 48 52	0715574145	2649516004
0455 7 5	0649 31313	0700 48 53	0715574150	2649517006
0455 7 6	0649 31314	0700 48 54	0715575115	2649540
0455 7 9	0649 31315	0700 48 55	0715575125	2649711001
0455 7 34	0649 31316	0700 48 56	0715575130	2649713002
0455 8 2	0649 31317	0700 48 57	0715575135	2649715003
0455 8 4	0649 31318	0700 48 58	0715575140	2649716004
0455 8 5	0649 31319	0700 48 59	0715575145	2649717006
0455 8 6	0649 31399	0700 70	0715575150	2649721101
0455 8 9	0649 31999	0700 82	0715575210	2649723102
0455 8 34	0649 32000	0700 83	0715576135	2649724403
0455 14 2	0649 33000	0700 89 2	0715576140	2649725504
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0455 14 4	0649 36100	0700 89113	0715576150	2649731007
0455 14 5	0649 36300	0700 89121	0715577115	2649733008
0455 14 24	0649 36500	0700 89123	0715577130	2649735009
0455 17 1	0649 36700	0700 89131	0715577145	2649736010
0455 17 2	0649 38 3	0700 89141	0715577150	2649737006
0455 17 3	0649 38000	0700 89143	0715578150	2649740
0455 17 4	0649 40101	0700 90 11	0715611201	2650 51511
0455 17 5	0649111001	0700 90 12	0715611401	2650 51512
0455 17 13	0649111008	0700 90 13	0715612102	2650 51513
0455 17 14	0649112002	0700 90 14	0715612202	2650 51521
0455 17 16	0649112009	0714 1123	0715612302	2659101

Steel Pay Item Number				
0455 17 34	0649112012	0715 1 11	0715612402	2659103
0455 17 40	0649113003	0715 1 12	0715614404	2659106
0455 34 2	0649113010	0715 1 13	0715615402	2659107
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0455 34 4	0649114011	0715 1 15	0715616406	2659109
0455 34 5	0649114012	0715 1 16	0715619309	2659110
0455 34 6	0649115012	0715 1 19	0715619409	2659112
0455 34 8	0649121202	0715 1 40	0715621403	2659118
0455 34 23	0649121212	0715 1 50	0715622104	2659119
0455 34 25	0649121303	0715 1 60	0715622204	2659120
0455 34203	0649121412	0715 1 70	0715622304	2659307
0455 34205	0649122102	0715 1 80	0715622404	2659308
0455 34301	0649122203	0715 1110	0715623405	2659309
0455 35 4	0649123103	0715 1111	0715624204	2676110501
0455 35 5	0649123203	0715 1112	0715624304	2715 2123
0455 35 6	0649123204	0715 1113	0715624404	2715 2131
0455 35 7	0649123303	0715 1114	0715624406	2715 2132
0455 35 8	0649123305	0715 1115	0715625107	2715 2133
0455 35 9	0649123312	0715 1116	0715625307	2715 2222
0455 35 20	0649124105	0715 1117	0715625407	2715 2231
0455 35 21	0649124205	0715 1118	0715626408	2715 2232
0455 35 22	0649124306	0715 1119	0715627409	2715 2233
0455 35 23	0649125212	0715 1121	0715628410	2715 2321
0455 39	0649125412	0715 1122	0715631305	2715 2322
0455 81	0649125512	0715 1123	0715631401	2715 2331
0455 81101	0649131001	0715 1124	0715631405	2715 2332
0455 81102	0649131008	0715 1125	0715632406	2715 2333
0455 81104	0649132009	0715 1128	0715636406	2715 2431
0455 81105	0649133010	0715 1129	0715637411	2715 2432
0455 81106	0649133011	0715 1131	0715712402	2715 2433
0455 87	0649134011	0715 1132	0730 76101	2715 2522
0455107 1	0649135012	0715 1135	0730 76102	2715 2532
0455107 2	0649141012	0715 1137	0730 76103	2715 5 11
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0455107 4	0649145012	0715 1148	0730 76105	2715 7 11
0455107 5	0649145512	0715 2 11	0730 76106	2715 7 12
0455107 6	0649211008	0715 2 12	0730 76107	2715 11111
0455107 7	0649212009	0715 2 13	0730 76108	2715 11112
0455107 8	0649213010	0715 2121	0730 76109	2715 11113
0455107 18	0649214011	0715 2125	0730 76110	2715 11115
0455107 20	0649222102	0715 2131	0730 76111	2715 11116
0455107 21	0649222203	0715 2132	0730 76112	2715 11118
0455108	0649223103	0715 2133	0730 76113	2715 11119
0455112 1	0649223204	0715 2134	0730 76114	2715 11123
0455112 3	0649335012	0715 2135	0730 76116	2715 11124

Steel Pay Item Number				
0455112 4	0649411001	0715 2136	0730 76117	2715 11125
0455112 5	0649411003	0715 2221	0730 76119	2715 11126
0455120 3	0649411011	0715 2225	0730 76122	2715 11128
0455120 5	0649412002	0715 2231	0730 76123	2715 11129
0455120 6	0649413002	0715 2232	0730 76124	2715 11137
0455120 7	0649413003	0715 2233	0730 76125	2715 11138
0455120 8	0649413011	0715 2234	0730 76126	2715 11139
0455127 1	0649414002	0715 2235	0730 76130	2715 11212
0455133	0649415003	0715 2236	0730 76131	2715 11218
0455133 1	0649415011	0715 2237	0730 76201	2715 11219
0455133 2	0649416004	0715 2238	0730 76203	2715 11228
0455133 3	0649416011	0715 2321	0730 76204	2715 34 1
0455134	0649416604	0715 2322	0730 76205	2715 35 1
0455140 11	0649417006	0715 2325	0730 76206	2715 91 24
0455140 12	0649421101	0715 2331	0730 76207	2715 91 25
0455140 13	0649423102	0715 2332	0730 76208	2715 91 30
0455140 14	0649423103	0715 2333	0730 76209	2715 91 36
0455140 15	0649423305	0715 2334	0730 76210	2715 91 37
0455140 25	0649424403	0715 2335	0730 76211	2715 96 24
0455140 54	0649425203	0715 2336	0730 76212	2715 96 36
0455140 56	0649425211	0715 2337	0730 76213	2715 96 37
0455140 61	0649425404	0715 2425	0730 76214	2715111101
0455140 90	0649425504	0715 2433	0730 76216	2715111102
0455144 4	0649426204	0715 2434	0730 76217	2715111103
0455144 5	0649426404	0715 2435	0730 76219	2715111104
0455144 6	0649426504	0715 2436	0730 76221	2715111105
0455144 8	0649426605	0715 2437	0730 76222	2715111106
0455144 9	0649427211	0715 2438	0730 76223	2715111107
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0455144 21	0649427411	0715 4 11	0730 76225	2715111109
0455144 22	0649427511	0715 4 12	0730 76226	2715111110
0455144 23	0649427604	0715 4 13	0730 76227	2715111111
0460 1 1	0649427611	0715 4 14	0730 76229	2715111112
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0460 1 7	0649611001	0715 4 25	0730 76306	2715111212
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0460 1 12	0649616004	0715 4 33	0730 76505	2715111615
0460 1 13	0649617006	0715 4 35	0730 76506	2715191 20
0460 1 15	0649633011	0715 4 41	0730 76507	2715191 24
0460 1 17	0649640	0715 4 42	0730 77 01	2715191 25

Steel Pay Item Number				
0460 2 1	0649711001	0715 4 60	0730 77 03	2715191 30
0460 2 2	0649711007	0715 4 70	0730 77 04	2715191 31
0460 2 3	0649712001	0715 4 71	0730 77 05	2715191 32
0460 2 4	0649713002	0715 4011	0730 77 06	2715191 34
0460 2 5	0649713003	0715 4012	0730 77 07	2715191 36
0460 2 6	0649713011	0715 4013	0730 77 09	2715191 37
0460 2 7	0649714002	0715 4019	0730 77 10	2715191 40
0460 2 12	0649715003	0715 4021	0730 77 11	2715191 42
0460 2 13	0649715008	0715 4022	0730 77 13	2715191 43
0460 2 15	0649715009	0715 4023	0730 77 16	2715191 46
0460 2 17	0649716004	0715 4029	0730 77 19	2715411104
0460 2 18	0649717006	0715 4031	0730 77 23	2715411109
0460 2 19	0649721101	0715 4032	0730 77 25	2715411112
0460 2 20	0649723102	0715 4033	0730 82	2715411113
0460 3101	0649724403	0715 4111	0730 83 4	2715411114
0460 3103	0649725203	0715 4112	0730 83 6	2715411115
0460 3104	0649725404	0715 4113	0730 84 4	2715411212
0460 3105	0649725504	0715 4119	0730 88	2715411214
0460 3106	0649726204	0715 4121	0825132210	2715411309
0460 3107	0649726404	0715 4122	0905455343	2715411312
0460 3108	0649726504	0715 4123	0905455345	2715411314
0460 3109	0649726605	0715 4129	1634151409	2715411315
0460 3301	0649731007	0715 4131	1634151605	2715411316
0460 3306	0649733008	0715 4132	1635134415	2715412106
0460 3401	0649735009	0715 4133	1635141415	2715412112
0460 3402	0649736010	0715 4139	1635141507	2715412114
0460 3405	0649740	0715 4300	1635148455	2715412209
0460 3406	0649745011	0715 4400	1644536 91	2715413112
0460 3408	0649915003	0715 4600	1645150109	2715413114
0460 3411	0649921101	0715 5 11	1645150118	2715414114
0460 3606	0649924403	0715 5 12	1645150139	2715415112
0460 3704	0649926605	0715 5 21	1649110107	2715415209
0460 3801	0650 4152	0715 5 30	1649150106	2715416103
0460 3802	0650 51511	0715 5 31	1649150135	2715416105
0460 3803	0650 51512	0715 5 32	1694715	2715416106
0460 3804	0650 51513	0715 5 40	1715132 2	2715416112
0460 3805	0650 51521	0715 5 50	2415 1 1	2715416114
0460 3806	0650 51522	0715 5 51	2415 1 2	2715416115
0460 3808	0659101	0715 7 11	2415 1 3	2715416304
0460 3811	0659102	0715 7 12	2415 1 4	2715416604
0460 5	0659103	0715 7 21	2415 1 5	2715474112
0460 5 1	0659104	0715 7 31	2415 1 6	2715475109
0460 6	0659106	0715 7 41	2415 1 8	2715475112
0460 6 1	0659107	0715 7 42	2415 1 9	2715475114
0460 6 2	0659108	0715 10 2	2415 2 5	2715476106

Steel Pay Item Number				
0460 6 3	0659110	0715 19 11	2415 2 6	2715476206
0460 7	0659111	0715 19 12	2435 22372	2715511105
0460 9 3	0659112	0715 19 13	2435424639	2715511106
0460 10	0659113	0715 19 51	2455 3 1	2715511107
0460 10 7	0659114	0715 19 60	2455 3 2	2715511108
0460 11	0659118	0715 19111	2455 3 3	2715511109
0460 12	0659120	0715 19112	2455 3 4	2715511110
0460 16 1	0659301	0715 19113	2455 3 5	2715511111
0460 70 1	0659303	0715 19119	2455 3 8	2715511112
0460 70 2	0659306	0715 19121	2455 4 6	2715511113
0460 70 3	0659307	0715 19122	2455 4 8	2715511114
0460 71 1	0659310	0715 19123	2455 7 3	2715511115
0460 71 2	0659312	0715 19129	2455 7 6	2715511206
0460 71 4	0659313	0715 19131	2455 7 7	2715511208
0460 73	0659318	0715 19132	2455 7 9	2715511212
0460 81	0659407	0715 19133	2455 7 22	2715511213
0460 81 1	0670114151	0715 19300	2455 7 35	2715511217
0460 88	0676110503	0715 19600	2455 8 3	2715511303
0460 95	0676130504	0715 20 4	2455 8 6	2715511305
0460 98 1	0676140504	0715 21 1	2455 8 7	2715511309
0460 98 2	0685155	0715 21 2	2455 8 9	2715511311
0460101	0685156	0715 26 1	2455 8 22	2715511314
0460101111	0685157	0715 26 2	2455 8 35	2715511315
0460101114	0685158	0715 34 1	2455 14 3	2715511316
0460101121	0685360	0715 35 1	2455 14 5	2715511512
0460101122	0700 1 11	0715 36 12	2455 14 11	2715511608
0460101123	0700 1 12	0715 36 13	2455 14 12	2715511609
0460101124	0700 1 13	0715 36 62	2455 17 1	2715512105
0460101221	0700 1 14	0715 36100	2455 17 2	2715512106
0460101321	0700 1 18	0715 36101	2455 17 4	2715512109
0460101411	0700 1 21	0715 36102	2455 17 5	2715512111
0460101421	0700 1 22	0715 36103	2455 17 16	2715512112
0460104	0700 1 23	0715 37 1	2455 17 33	2715512113
0460106	0700 1 25	0715 37 5	2455 17 35	2715512114
0460108 1	0700 1 31	0715 50	2455 17 40	2715512115
0460108 2	0700 1 32	0715 51	2455 34 2	2715512223
0460110 1	0700 1 33	0715 52 1	2455 34 3	2715512309
0460111 3	0700 1 40	0715 52 2	2455 34 4	2715512315
0460111 11	0700 1 74	0715 91 80	2455 34 5	2715512316
0460111 12	0700 2 11	0715 91 85	2455 34 6	2715512609
0460111 13	0700 2 12	0715 91100	2455 35 4	2715513106
0460111 14	0700 2 13	0715 91110	2455 35 5	2715513107
0460112	0700 2 14	0715 91120	2455 35 6	2715513108
0460113 12	0700 2 15	0715 91130	2455 35 9	2715513109
0460113 13	0700 2 16	0715 91140	2455 35 22	2715513110

Steel Pay Item Number				
0460113 14	0700 2 17	0715 91150	2455 35 23	2715513111
0460113 15	0700 2 18	0715 91160	2455 36 1	2715513112
0460113 16	0700 2 40	0715 93100	2455 87	2715513113
0460113 17	0700 2 50	0715 93120	2455107 1	2715513114
0460113 19	0700 2 60	0715 95100	2455107 3	2715513115
0460114 11	0700 2 80	0715 95120	2455107 4	2715513205
0460114 12	0700 3101	0715 96100	2455107 5	2715513609
0460114 13	0700 3102	0715191 60	2455107 6	2715514107
0460114 14	0700 3103	0715191 65	2455107 7	2715514109
0460114 15	0700 3104	0715191 70	2455120 1	2715514112
0460114 16	0700 3105	0715191 80	2455121 1	2715514114
0460114 17	0700 3106	0715191100	2455121 3	2715514115
0460114 19	0700 3107	0715191120	2455121 4	2715515107
0460115 1	0700 3108	0715191125	2455121 5	2715515109
0460116	0700 3109	0715191130	2455133	2715515112
0460119101	0700 3201	0715191140	2455133 1	2715515114
0460120101	0700 3202	0715191150	2455133 2	2715515115
0460120103	0700 3203	0715193100	2455140 11	2715515202
0460121 11	0700 3204	0715193120	2455140 12	2715515205
0460121 12	0700 3205	0715195 80	2455140 13	2715515207
0460121 13	0700 3206	0715195100	2455140 14	2715515212
0460121 14	0700 3207	0715195120	2455140 15	2715515405
0460121 43	0700 3208	0715196 80	2455140 43	2715515609
0460121 50	0700 3209	0715196100	2455140 44	2715516103
0504 1 1	0700 3210	0715196120	2455140 56	2715516104
0504 1 2	0700 3211	0715411115	2455143 2	2715516105
0504 1 5	0700 3224	0715411120	2455143 3	2715516106
0504 1 10	0700 3225	0715411125	2455143 4	2715516109
0504 2	0700 3226	0715411130	2455143 5	2715516110
0515 1 1	0700 3227	0715411135	2455143 6	2715516112
0515 1 2	0700 3228	0715411140	2455144 4	2715516114
0515 1 3	0700 3229	0715411145	2455144 5	2715516115
0515 1 4	0700 3231	0715411150	2455144 9	2715516203
0515 1 5	0700 3236	0715411230	2455144 22	2715516204
0515 2101	0700 3237	0715411235	2455144 23	2715516305
0515 2102	0700 3238	0715411240	2455145 1	2715516403
0515 2111	0700 3239	0715411320	2460 1 1	2715516603
0515 2201	0700 3240	0715411335	2460 1 4	2715516604
0515 2202	0700 3241	0715411340	2460 1 5	2715517104
0515 2203	0700 3242	0715411345	2460 1 7	2715517106
0515 2211	0700 3245	0715411350	2460 1 12	2715517208
0515 2212	0700 3248	0715411415	2460 1 13	2715517405
0515 2213	0700 3301	0715411545	2460 1 15	2715521105
0515 2221	0700 3302	0715412120	2460 1 18	2715521107
0515 2231	0700 3303	0715412130	2460 2 1	2715521109

Steel Pay Item Number				
0515 2301	0700 3304	0715412135	2460 2 2	2715521111
0515 2302	0700 3401	0715412140	2460 2 3	2715521112
0515 2303	0700 3402	0715412145	2460 2 4	2715521212
0515 2311	0700 3403	0715412150	2460 2 5	2715521309
0515 2313	0700 3404	0715412230	2460 2 6	2715521315
0515 2321	0700 3405	0715412240	2460 2 7	2715522109
0515 2351	0700 3406	0715412350	2460 2 9	2715522112
0515 2403	0700 3407	0715412545	2460 2 11	2715522315
0515 2419	0700 3408	0715413125	2460 2 12	2715523109
0515 3 1	0700 4111	0715413130	2460 2 13	2715523112
0515 3 2	0700 4112	0715413135	2460 2 15	2715523115
0515 4 1	0700 4113	0715413140	2460 2 16	2715525109
0515 4 2	0700 4114	0715413145	2460 2 17	2715525112
0536 1 0	0700 4121	0715413150	2460 3101	2715525405
0536 1 1	0700 4122	0715414135	2460 3103	2715526104
0536 1 2	0700 4123	0715414140	2460 3104	2715526115
0536 1 3	0700 4124	0715414145	2460 3105	2715526305
0536 1 4	0700 4125	0715414150	2460 3106	2715526603
0536 1 5	0700 4126	0715415140	2460 3108	2715527405
0536 1 6	0700 4127	0715415145	2460 3304	2715531112
0536 1 8	0700 4128	0715415150	2460 3307	2715535107
0536 1 9	0700 4132	0715416110	2460 3401	2715536104
0536 1 10	0700 4140	0715416115	2460 3402	2715536305
0536 1 11	0700 4512	0715416120	2460 5	2715536306
0536 1 12	0700 5 11	0715416135	2460 6	2715571109
0536 2	0700 5 21	0715416140	2460 70 1	2715573109
0536 6	0700 5 22	0715416145	2460 70 2	2715573114
0536 7	0700 6 21	0715416150	2460 70 3	2715573115
0536 7 1	0700 6 22	0715416315	2460 71 2	2715574112
0536 7 2	0700 7131	0715416320	2460 73	2715575104
0536 7 3	0700 7132	0715416545	2460 81	2715575107
0536 7 4	0700 7500	0715416610	2460 81 1	2715575109
0536 8	0700 7600	0715416615	2460101121	2715575111
0536 8 1	0700 8115	0715421320	2460101122	2715575112
0536 8 3	0700 8132	0715422145	2460101124	2715575114
0536 8 4	0700 8134	0715426315	2460101211	2715575115
0536 8 5	0700 8135	0715426320	2460101311	2715575206
0536 8 6	0700 8136	0715431145	2460108 2	2715575208
0536 9	0700 8216	0715436315	2460111 11	2715576104
0536 75	0700 8221	0715436320	2460111 12	2715577112
0536 76	0700 8400	0715440000	2460111 13	2715577114
0536 82	0700 9117	0715450000	2460111 14	2715577115
0536 83 1	0700 9137	0715461145	2460112	2715612302
0536 83 4	0700 9400	0715461545	2460113 11	2715612402
0536 84	0700 9500	0715471130	2460113 12	2715614404

Steel Pay Item Number				
0536 85	0700 9600	0715472140	2460113 13	2715616406
0536 85 22	0700 10115	0715473145	2460113 14	2715622404
0536 85 24	0700 10116	0715474135	2460113 15	2715624206
0536 85 25	0700 10121	0715474140	2460113 16	2715625107
0536 85 26	0700 10122	0715474145	2460113 17	2715631405
0536 85 27	0700 10123	0715475125	2460113 18	2715632406
0536 86	0700 10124	0715475130	2460113 19	2715636406
0536 88	0700 10130	0715475135	2460114 11	2715712302
0536 90	0700 10140	0715475140	2460114 12	2715732406
0536 91	0700 11111	0715475145	2460114 13	2730 76101
0649 1 10	0700 11112	0715475150	2460114 14	2730 76102
0649 1 11	0700 11121	0715476135	2460114 15	2730 76103
0649 1 12	0700 11131	0715476615	2460114 16	2730 76104
0649 1 13	0700 11132	0715500 1	2460114 17	2730 76105
0649 1 14	0700 11141	0715500 2	2460114 18	2730 76106
0649 1 15	0700 11142	0715500 3	2460114 19	2730 76107
0649 1 16	0700 11151	0715500 30	2460120103	2730 76108
0649 1 17	0700 11152	0715500100	2504 1 1	2730 76109
0649 1 61	0700 11161	0715511115	2504 1 2	2730 76110
0649 1 62	0700 11162	0715511120	2504 1 4	2730 76111
0649 1 63	0700 11222	0715511125	2504 1 5	2730 76113
0649 1 65	0700 11231	0715511130	2504 1 10	2730 76114
0649 1040	0700 11241	0715511135	2504 2	2730 76116
0649 1046	0700 11251	0715511140	2515 1 1	2730 76119
0649 1101	0700 11261	0715511145	2515 1 2	2730 76122
0649 1102	0700 11262	0715511150	2515 1 3	2730 76123
0649 1146	0700 11263	0715511220	2515 1 4	2730 76124
0649 1230	0700 11321	0715511225	2515 2 22	2730 76125
0649 1232	0700 11391	0715511230	2515 2201	2730 76201
0649 1234	0700 12 11	0715511240	2515 2202	2730 76202
0649 1236	0700 12 12	0715511315	2515 2301	2730 76203
0649 1332	0700 12 21	0715511320	2515 2302	2730 76204
0649 1336	0700 12 22	0715511325	2515 2303	2730 76205
0649 1338	0700 12 31	0715511330	2536 1 1	2730 76206
0649 1340	0700 12 32	0715511335	2536 1 2	2730 76207
0649 1436	0700 20 11	0715511340	2536 1 3	2730 76208
0649 1438	0700 20 12	0715511345	2536 1 5	2730 76210
0649 1440	0700 20 13	0715511350	2536 1 6	2730 76211
0649 1536	0700 20 14	0715511435	2536 1 8	2730 76213
0649 1540	0700 20 15	0715511535	2536 1 9	2730 76214
0649 1640	0700 20 18	0715511540	2536 2	2730 76215
0649 1646	0700 20 19	0715511550	2536 6	2730 76216
0649 1734	0700 20 21	0715511610	2536 7	2730 76217
0649 1738	0700 20 22	0715511615	2536 8	2730 76218
0649 2150	0700 20 31	0715511735	2536 8 1	2730 76219

Steel Pay Item Number				
0649 2170	0700 20 32	0715511740	2536 8 5	2730 76220
0649 2250	0700 20 51	0715512120	2536 8 6	2730 76221
0649 2255	0700 20 52	0715512125	2536 9	2730 76222
0649 2605	0700 21 11	0715512130	2536 75	2730 76223
0649 11 1	0700 21 12	0715512140	2536 76	2730 76224
0649 11001	0700 21 13	0715512145	2536 82	2730 76225
0649 11160	0700 21 14	0715512150	2536 83 1	2730 76226
0649 20	0700 21 15	0715512155	2536 85 1	2730 76228
0649 21 1	0700 21 16	0715512160	2536 85 2	2730 76229
0649 21 3	0700 21 17	0715512220	2536 85 4	2730 76230
0649 21 4	0700 21 31	0715512315	2536 85 5	2730 76307
0649 21 5	0700 21 32	0715512325	2536 85 6	2730 76503
0649 21 6	0700 21 33	0715512330	2536 85 7	2730 76507
0649 21 7	0700 21 34	0715512340	2536 85 8	2730 77 01
0649 21 8	0700 21 35	0715512350	2536 85 9	2730 77 02
0649 21 9	0700 21 36	0715512610	2536 85 10	2730 77 03
0649 21 10	0700 22121	0715512615	2536 85 12	2730 77 04
0649 21 11	0700 22122	0715513125	2536 85 13	2730 77 05
0649 21 12	0700 22123	0715513130	2536 85 22	2730 77 06
0649 21 13	0700 22124	0715513135	2536 85 24	2730 77 09
0649 21 14	0700 22131	0715513140	2536 85 25	2730 77 11
0649 21 15	0700 22132	0715513145	2536 85 26	2730 77 12
0649 21 16	0700 22133	0715513150	2550 75041	2730 77 13
0649 21 17	0700 22134	0715513435	2550 75042	2730 77 14
0649 21 18	0700 22141	0715514120	2649 1024	2730 77 16
0649 21 19	0700 22142	0715514125	2649 1044	2730 77 19
0649 21 20	0700 22143	0715514130	2649 1046	2730 77 22
0649 21 21	0700 22144	0715514135	2649 1050	2730 77 23
0649 21 22	0700 22154	0715514140	2649 1438	2730 77 25
0649 21 23	0700 22220	0715514145	2649 1440	2825132110
0649 21 24	0700 22250	0715514150	2649 1442	2825132210
0649 21 25	0700 23111	0715514325	2649 1536	2825136120
0649 21 26	0700 23112	0715515115	2649 1538	2825136210
0649 21 27	0700 23113	0715515120	2649 1636	2825136220
0649 21101	0700 23114	0715515125	2649 1638	2825141210
0649 21102	0700 23121	0715515130	2649 1644	2825142210
0649 21103	0700 23122	0715515135	2649 1646	2825151210
0649 21104	0700 23123	0715515140	2649 11001	3050120415
0649 21105	0700 23124	0715515145	2649111001	3050130415
0649 21106	0700 23131	0715515150	2649111002	3050150411
0649 21108	0700 23132	0715515225	2649111003	3050150419
0649 22 3	0700 23133	0715515250	2649111004	3622536301
0649 26 1	0700 23134	0715516110	2649111012	3633131415
0649 26 3	0700 23142	0715516115	2649112002	3633145505
0649 26 5	0700 23143	0715516120	2649112012	3634141415

Steel Pay Item Number				
0649 26 7	0700 23144	0715516125	2649113003	3635122415
0649 31101	0700 23210	0715516130	2649113004	3637151606
0649 31102	0700 23220	0715516135	2649114004	3637151615
0649 31103	0700 38033	0715516140	2649115004	3637700
0649 31104	0700 38036	0715516145	2649115005	3644600
0649 31105	0700 38044	0715516150	2649115012	3694715
0649 31106	0700 38045	0715516155	2649115512	E460111900
0649 31107	0700 38048	0715516210	2649121101	

Table A-6. Aggregate Pay Items

Aggregate Pay Item Number				
0121 70	0285701007	0285707994	0285714527	0547 70 3
0125 3	0285701031	0285708283	0285714538	0443 71 1
0210 1 1	0285701032	0285708287	0285715567	0443 72 10
0210 1 8	0285701701	0285708295	0285715982	0443 72 11
0210 1 9	0285702047	0285708991	0285716606	0443 72 12
0210 2	0285702055	0285709327	0285716610	0443 72 13
0285701	0285702999	0285709335	0285716615	0443 72 14
0285702	0285703087	0285709338	0285716631	0443 72 20
0285703	0285703095	0285709352	0285716632	0142 70
0285704	0285703703	0285709709	0285716716	0160 4
0285705	0285703984	0285709989	0285716980	0102 3
0285706	0285703998	0285709990	0285716981	0162 1 11
0285707	0285704123	0285710363	0530 1	0162 1 12
0285708	0285704127	0285710367	0530 1 1	0162 1 21
0285709	0285704152	0285710392	0530 1 2	0162 1 33
0285710	0285704704	0285710983	0530 3 3	0173 77 1
0285711	0285704985	0285711407	0530 3 4	0173 77 2
0285712	0285705166	0285711711	0530 3 5	0173 77 3
0285713	0285705167	0285711986	0530 3 8	0286 1
0285714	0285705170	0285711987	0530 3 9	0288001
0285715	0285705997	0285712441	0530 5 2	0520 7 1
0285716	0285706201	0285712443	0530 74	0530 5 1
0285720	0285706203	0285712447	0530 76 2	0530 5 12
0285721	0285706207	0285712458	0530 76 3	0549 3
0285722	0285706208	0285712472	0530 76 4	0823 11 6
0285724	0285706216	0285712712	0530 76 5	0823 11 8
0285726	0285707247	0285713481	0530 77 2	0823 11 12
0285729	0285707250	0285713487	0530 77 3	0520 7 2
0285730	0285707255	0285713498	0530 77 4	
0285701001	0285707272	0285714521	0547 70 1	
0285701003	0285707993	0285714523	0547 70 2	

Table A-7. Earthwork Pay Items

Earthwork Pay Item Number				
0120 71	0120 6	0120 1900	0120 5	0120 6900
0120 72	0120 2 2	0120 3	0120 6101	0120 11
0120 73	0102 2300	0120 4	0120 6102	
0120 74	0120 1	0120 4900	0120 6103	