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Celebrating 40 YEARS 1978-2018

MARKET INTELLIGENCE REPORT 2018

Immigration, Infrastructure and Investment Spur Stable Growth

December, 2017

Global Development & Infrastructure Consultants

BTY.COM

MESSAGE FROM THE CEO

OUR INDUSTRY:
adaptable, resilient and balanced

TOBY MALLINDER
CEO

Stronger than anticipated economic performance in 2017 saw Canada emerge as a global growth leader with an energized economy that supported robust construction activity across multiple sectors.

There are many reasons for continued optimism: a higher oil price that is expected to hold firm, the strengthening Canadian dollar, signs that commodity prices are poised to rise after several challenging years, sustained high immigration and strong population growth, and the first increase in real business investment in three years in 2017. Collectively, these factors augur well for continued economic strength that supports healthy construction levels.

BALANCED GROWTH AT A SLOWER PACE

We see stable construction growth in 2018 at a slightly slower pace, notwithstanding concerns over the outcome of NAFTA negotiations. Put-in-place construction projections call for rising investment in Canada's non-residential building sectors – commercial, industrial and institutional. Infrastructure spending is also expected to remain strong at both the federal and provincial levels – with an anticipated boost from the Canada Infrastructure Bank.

We expect that this strength across sectors, especially transportation infrastructure and energy, will balance continued moderation in the rate of house price increases following 2017's interest rate hikes and continued tightening of regulations, as well as potential for further hikes in 2018. Overall, housing starts are expected to fall from 215,000 in 2017 to 195,000 in 2018, with analysts estimating that the country needs about 190,000 starts a year to keep pace with demand from new-household formation. New home-building activity will remain healthiest in urban areas where immigrant settlement is highest, in particular the Greater Toronto Area and Metro Vancouver.

BALANCE ACROSS SECTORS AND SERVICES

The Canadian construction industry's ability to maintain balanced growth across sectors – and swings in the economy – mirrors BTY's own expansion of services that now cover the entire life-cycle of a project – and Canada from coast to coast.

Coming up to our 40th year in business, we have grown from three offices in Western Canada providing one service line to now having offices across Canada and the United States, the United Kingdom, Ireland and Turkey – all of which provide BTY clients full project development solutions.

We have achieved this growth by ensuring we remain the top choice for both our clients and for the diverse talented professionals whose hard work has cemented BTY's reputation as an industry leader. We have developed three additional major service lines: Lenders' Services, P3 Advisory Services and Project Delivery Services to serve new industry and geographic markets. Today, BTY can assist clients at any stage of a project, in any sector, in any location in the country.

The expertise and services we developed at home have also driven our expansion across the United States, as well as Europe and the Middle East. Over the past two years our Lenders' Technical Advisory Services – part of our P3 Advisory service line – have been consistently ranked #1 in North America and in the top 10 globally. The October 2017 Inframation League Tables ranked BTY as the #1 Lenders' Technical Advisor globally for PPP projects by deal count.

GLOBAL EXPERIENCE GUIDES PERCEPTION OF LOCAL PERFORMANCE

The exposure and experience gained across – and beyond – Canada informs our perception of how adaptable, resilient and balanced the Canadian construction industry has become. Over the decades we've been through devastating natural disasters, wrenching currency and commodity price swings, and multiple financial crises. And we as a country and an industry have emerged stronger for them, which is why we remain positive in the face of current challenges.

#1 LENDERS' TECHNICAL ADVISOR GLOBALLY
Inframation Deals, PPP deal count, 2017

TECHNICAL ADVISOR OF THE YEAR SILVER AWARD WINNER
P3 Partnerships Awards 2017, Washington, D.C.

CANADA CONSTRUCTION OUTLOOK

CANADA CONSTRUCTION OUTLOOK

OVERVIEW

1.28 Million New Immigrants Between 2017 and 2020	**$80 Billion** Federal Investment in Infrastructure Over the Next Decade	**2.1%** GDP Growth for 2018

Escalation Forecast For 2018: Uneven Across Canada

LOW TO MODERATE IN PRAIRIE AND ATLANTIC PROVINCES; HIGHER IN BC, ON AND QC

We see three pillars supporting balance across construction sectors in 2018: immigration, infrastructure and investment.

The first pillar is Canada's healthy population growth of 1.0% on average over the past five years, the highest in the G7. Sustained high immigration of nearly 300,000 a year has been the main driver, with two-thirds of the nation's population growth from 2011 to 2016 coming from migratory increase (the difference between the number of immigrants and emigrants). From 2017 to 2020, Canada is set to welcome 1.28 million new immigrants.

With more than 35 million people in Canada, the average growth of 1.0% amounts to adding almost 350,000 people a year to the national total – roughly the population of Greater Victoria, British Columbia. That growth drives demand not only for housing, but also construction of schools, hospitals and commercial establishments from sports and recreational facilities to restaurants.

The federal government's housing strategy announced in November 2017 to create 100,000 new units and repair another 300,000 over the coming decade will help allay some of the current – and future – supply concerns for affordable housing.

ENERGY, TRANSIT & TRANSPORTATION, WATER & WASTEWATER INFRASTRUCTURE

The second pillar is infrastructure – the hydro dams, oil and gas pipelines, renewable energy facilities, roads, bridges, transit, water and wastewater treatment plants that enable economic activity. The federal government's infrastructure plan announced in early 2017 allocates more than $80 billion in spending over the next decade, with a strong emphasis on green infrastructure and energy.

All told, more than $186 billion has been invested in the biggest infrastructure projects currently under development in Canada. Seven of the top ten projects are in the energy sector, which has 29 projects valued at $83 billion. Transit comes second with 23 projects valued at $48.5 billion. The third is the transportation sector, with 18 of the largest projects valued at $33 billion.

Foreign direct investment is the third pillar that helps support balance across sectors. It increased by 4.7% to $825.7 billion in 2016. Manufacturing remained the top industry for foreign direct investment in Canada with a 22.8% share at the end of 2016, just ahead of mining and oil and gas extraction with 22.7%. These increases were spread among most industries, with wholesale and retail trade (+10.1%), manufacturing (+5.0%) and mining and oil and gas extraction (+3.2%) leading the way.

2018 OUTLOOK VARIES BY PROVINCE

Most provinces, however, can expect to experience some upward pressure on labour costs from changes to raise the minimum wage. Ontario's increase is sharpest, from $11.60 per hour in October 2017 to $14 per hour by January 2018, then to $15 per hour by 2019. Alberta's minimum wage will also jump from $13.60 per hour to $15 per hour by October 2018.

ONTARIO will see infrastructure activity strengthen as housing starts moderate before they make a comeback to meet high demand from continuing population growth.

BRITISH COLUMBIA will lose some of the momentum that made it a growth leader over the past two years, but booming tech, movie and industrial sectors and sustained infrastructure investment will cushion a pullback in housing.

ALBERTA will charge ahead after three tough years to regain its position as one of Canada's growth leaders, sparked by investments in energy, particularly in pipelines and expanded oil production, and projected high in-migration.

SASKATCHEWAN will also rebound from two subpar years, led by new investments in pipelines, heavy oil plants, and power stations.

MANITOBA can expect lower activity levels as major hydro projects wind down, with a steady residential sector and major commercial projects providing stability.

QUEBEC has a full roster of infrastructure projects and continuing strength in office building in Montréal – all underpinned by solid economic performance.

THE ATLANTIC PROVINCES will see little or modest growth overall. All lack the healthy net migration and population growth that is helping to sustain or expand construction activity in the other provinces.

The Bank of Canada raised its benchmark interest rate twice in 2017 to the current 1% and could do so again should the economy continue its stronger than expected performance in 2018. A higher rate would help to dampen inflation, which would also serve to restrain overall construction escalation. The Bank expects the economy to grow by 3.1% in 2017, and by 2.1% in 2018. Major private sector forecasters differ only slightly, expecting that Canada's GDP will increase by 3.1% in 2017 and 2.2% in 2018.

ESCALATION FORECAST

Ontario	2% – 4%
British Columbia	5% – 7%
Alberta	0% – 2%
Saskatchewan	1% – 3%
Manitoba	1% – 3%
Quebec	4% – 6%
Atlantic Provinces	1% – 3%

UPWARD PRESSURE IS COMING FROM:

- Increased spending on infrastructure
- Continued high immigration
- Higher oil prices

DOWNWARD PRESSURE IS COMING FROM:

- Forecast for slowing growth in 2018
- Anticipated cooling in most residential markets
- Still soft commodity prices
- Stronger Canadian dollar

Sources: *Statistics Canada, CBC, Renew Canada, Conference Board of Canada*

REGIONAL SNAPSHOTS

ONTARIO

Infrastructure activity strengthens as housing starts moderate

ROBUST POPULATION GROWTH, ESPECIALLY IN TORONTO, WILL SUSTAIN RESIDENTIAL DEMAND

Ontario's economy was on a roll in 2017, but will slow slightly in 2018. With Canada's largest and most diverse construction market, it will be able to shift gears as housing starts level off in 2018 after several years of strong, sustained growth. Housing starts are projected to decrease from 82,200 in 2017 to 71,500 in 2018.

Even so, with consistently strong population increases, propelled by a net migration of some 112,000 in 2017, there will still be growing demand for new housing. Toronto's population alone is projected to grow by 1.4%. Over the next five years, projections are for more than 375,000 new housing units to be added to the province's housing stock.

In the near-term, infrastructure projects will replace residential building as the primary source of construction activity growth. Some $190 billion in investments will be made over a 13-year period that began in 2014. Over half of this investment is dedicated to public transit, highways and other transportation projects. Current and upcoming projects include the Eglinton Crosstown LRT, the Ottawa LRT, the Hamilton LRT, the Hurontario LRT and the expansion of GO Transit's Regional Express Rail (RER).

Non-transportation infrastructure projects include York University's planned $250-million Markham campus, for which BTY is providing Project Management services, and the renovation of the Macdonald Block Complex, the administrative hub of the Ontario government. Major commercial projects in the GTA include Westbank's redevelopment of Honest Ed's and Mirvish Village, the redevelopment of the LCBO lands, and a flood protection project for the Portlands, a major revitalization project initiative along the east side of Toronto's waterfront.

Investment in ICI building is expected to grow by 3% in 2018. Modest manufacturing growth in the province is expected to add to industrial building developments over the next few years, creating an additional 9,800 construction jobs. Demand remains strong for warehousing and distribution centres that support e-commerce.

In the resource sector, the provincial government is moving ahead with the long-awaited all-season road to the Ring of Fire chromite mining development in Northern Ontario. The funding is part of the government's promise to invest $1 billion in infrastructure in the region. It is estimated that there is $60 billion in mineral deposits in the area, including chromite, an essential component in making stainless steel; nickel; gold; platinum; copper; vanadium; and zinc. Road building for this development is scheduled to start in 2019.

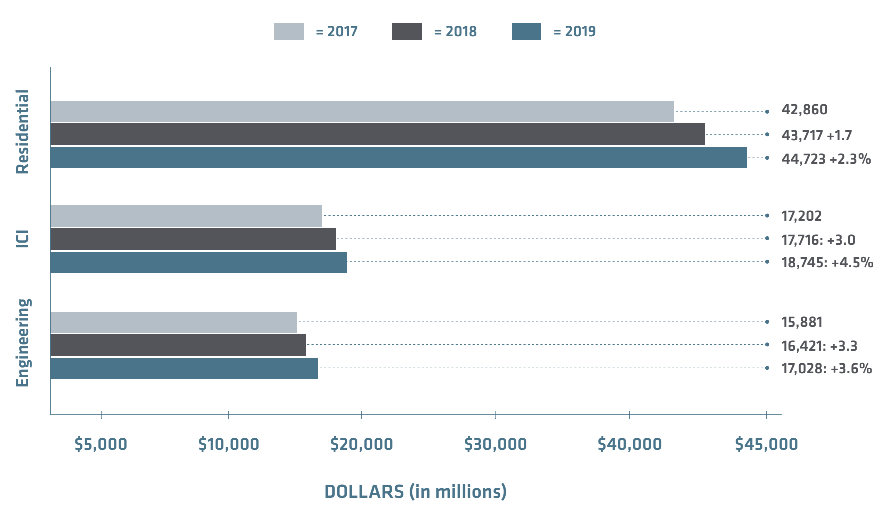
FORECAST HOUSING STARTS

82,200
IN 2017

71,500
IN 2018

ONTARIO OUTLOOK

PRELIMINARY PUT-IN-PLACE CONSTRUCTION INVESTMENT PROJECTIONS FOR 2018
(Constant 2007 Canadian $ Millions)



Sources: *Conference Board of Canada, Scotiabank, Royal Bank, BMO, Statistics Canada, PIP Spring 2017 (CanaData)*

PROJECTED GDP GROWTH FOR 2017

3.2%

PROJECTED GDP GROWTH FOR 2018

2%

ESCALATION RATE

2% – 4%

"The size and diversity of Ontario's construction sector will enable it to shift smoothly from residential to infrastructure and non-residential building without missing a beat."

PENNY PHELAN Senior Project Manager

REGIONAL SNAPSHOTS

BRITISH COLUMBIA

Strong economy keeps construction levels high

TIGHT LABOUR MARKETS IN METRO VANCOUVER AND VANCOUVER ISLAND TO CONTINUE

BC had one of Canada's best performing economies in 2017, but will lose a step in 2018 while still staying above the national average. Strong population growth supported by healthy in-migration, high employment levels, booming exports and thriving tech, movie and tourism sectors will help keep the economy, and construction activity, humming in 2018.

Better than expected housing performance in 2017 will cool slightly in 2018 but still remain at a high level. Labour markets will tighten even further; strong homebuilding has already stretched labour availability to the limit in construction, especially in Metro Vancouver and Vancouver Island. The tight market will contribute to upward pressure on labour costs.

Between 2015 and 2017, developers delivered nearly 2.3 million square feet of new office space in Vancouver's downtown market. Even so, demand for space has increased dramatically, especially from technology companies.

A new round of downtown office towers are expected to be launched in 2018; they would come on the market between 2021-2022. Demand for industrial space is also helping to fuel construction in that sector, especially in Metro Vancouver, which has the lowest availability of industrial land in North America. While a low Canadian dollar continues to lift exports in general, protectionist measures in the U.S., wildfires and losses due to the mountain pine beetle are expected to lower timber production and lumber exports in 2017.

Engineering activity remains strong despite the cancellation of the $2-billion Massey Tunnel Replacement in Metro Vancouver and the Petronas LNG plant on the northwest coast. Construction commenced in 2017 on both the $1.4-billion Woodfibre LNG plant in Squamish and the $525-million Lions Gate Secondary Wastewater Treatment Plant in Metro Vancouver.

The provincial government has committed $14.6 billion over three years for all taxpayer-funded capital projects. Priorities will focus on developing more social infrastructure, including affordable housing, the Pattullo Bridge replacement, transit expansion in Metro Vancouver and accelerating Highway 1 upgrades to the Alberta border. The 2017 budget allocates $3.1 billion of that amount to capital spending for hospitals and healthcare infrastructure over the coming three years.

Despite contention over the Kinder Morgan pipeline, infrastructure work will remain robust in BC with a $1.8-billion expansion of YVR, the $10.7-billion Site C Clean Energy Project, the $2-billion Roberts Bank Terminal 2 Project, the Phase 1 redevelopment of the Royal Columbian Hospital and the new St. Paul's Hospital and Healthcare Campus.

"Expect BC to enjoy robust construction levels despite setbacks from cancelled infrastructure and energy projects. A thriving economy and growing population continue supporting strong residential and non-residential building."

PING PANG Director

FORECAST HOUSING STARTS

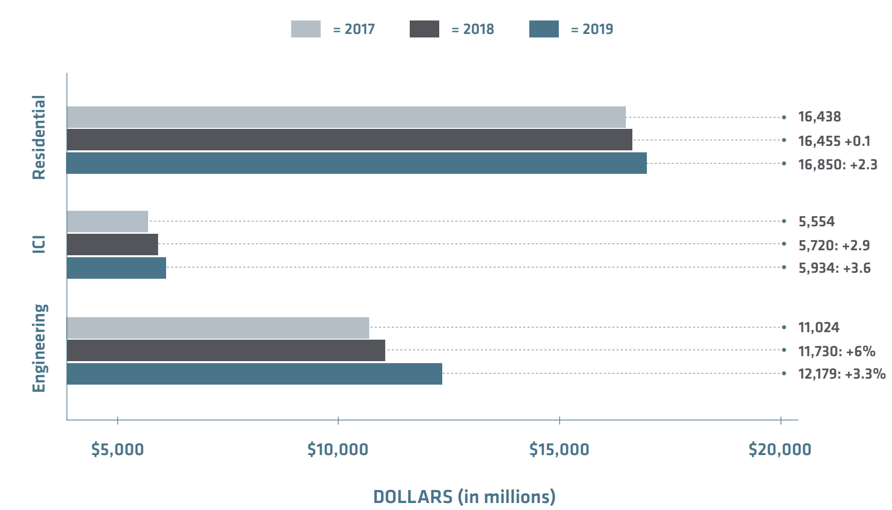
41,000 IN 2017

37,000 IN 2018

BRITISH COLUMBIA OUTLOOK

PRELIMINARY PUT-IN-PLACE CONSTRUCTION INVESTMENT PROJECTIONS FOR 2018

(Constant 2007 Canadian $ Millions)



PROJECTED GDP GROWTH FOR 2017	PROJECTED GDP GROWTH FOR 2018	ESCALATION RATE
3.2%	2.7%	5% – 7%

Sources: Conference Board of Canada Scotiabank, Royal Bank, BMO, Statistics Canada, PIP Spring 2017 (CanaData), Vancouver Sun

REGIONAL SNAPSHOTS

ALBERTA

Mega energy projects leading rebound

PIPELINES, HIGHER OIL PRICE PROPEL RECOVERY

Alberta is expected to be one of Canada's growth leaders in 2018 after rebounding in 2017. There is renewed confidence in the energy sector spurred by federal governments pursuing approvals of pipeline expansions – the $7.4-billion Keystone XL by the U.S. and the Trans Mountain, also valued at $7.4 billion, by Canada. The prospect of increased production and exports as oil prices climb from recent lows is cause for optimism that has seen Alberta lead all provinces in real household spending that is forecast to remain strong in 2018.

Oil production is expected to grow steadily in 2017 and 2018, with several oil sands projects that had been approved but suspended now being reconsidered. The Frontier Oil Sands Mine, a $20.6-billion project was recently proposed and is expected to commence construction in 2019. In the longer term, the $16.2-billion Mackenzie Gas Pipeline Project, connecting natural gas from Beaufort Sea into Alberta is expected to commence in 2022.

The promise of job growth driven by energy expansion is expected to help keep in-migration and population growth healthy. The labour market is staging a comeback from negative territory as the economy rebounds, with employment growing by 0.6% from September 2016 to September 2017. Over the past five years Alberta's population has grown by nearly 11.6%. That steady growth is expected to keep housing starts stable in 2018 after reportedly jumping by 13.7% from 2016 to 2017.

The provincial government's continued investment in infrastructure will help keep construction levels healthy. The 2017 budget announced a four-year Capital Plan to invest $29.5 billion in critical infrastructure such as schools, hospitals, roads, bridges and clean water projects. Alberta Transportation's more than $7-billion, four-year Capital Plan includes over $5-billion for work on the province's 31,400-km provincial highway network.

Calgary is beginning to bounce back as well, with major projects underway. Stonegate Landing, soon to be the largest AAA business park in Western Canada, is under construction at an estimated cost of $3-billion and the $1.4-billion Calgary Cancer Centre is scheduled to start construction by the end of 2017. Edmonton's downtown core remains a development hotspot with $5.5 billion worth of work proposed or underway, including the 66-storey Stantec Tower and 54-floor JW Marriott Hotel-Legends Private Residences.

FORECAST HOUSING STARTS

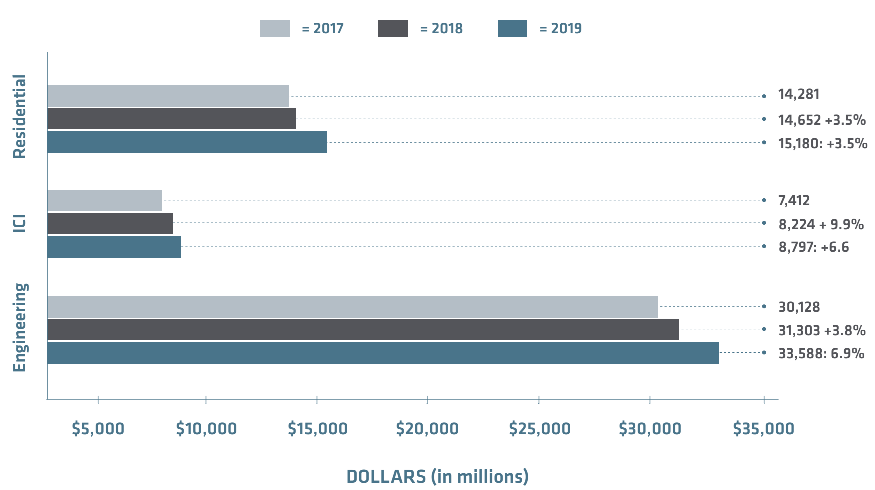
29,700
IN 2017

29,000
IN 2018

ALBERTA OUTLOOK

PRELIMINARY PUT-IN-PLACE CONSTRUCTION INVESTMENT PROJECTIONS FOR 2018

(Constant 2007 Canadian $ Millions)



Sources: Conference Board of Canada, Scotiabank, Royal Bank, BMO, Statistics Canada, PIP Spring 2017 (CanaData), Calgary Herald, Government of Alberta

PROJECTED GDP GROWTH FOR 2017

6.7%

PROJECTED GDP GROWTH FOR 2018

2.1%

ESCALATION RATE

0% – 2%

"Alberta charged back as a growth leader in 2017 after several rough years and will keep the momentum going in 2018, although at a slightly slower rate. As usual, population growth and oil and gas investment are the drivers for construction growth."

NATHAN GERBRECHT Director

REGIONAL SNAPSHOTS

SASKATCHEWAN

Energy, infrastructure investment spur growth

GROWING POPULATION STEADIES DEMAND FOR HOUSING

Saskatchewan's economy is expected to climb out of two years of recession in 2017 and stabilize in 2018. As in Alberta, energy projects are providing a boost. The Enbridge Line 3 replacement program and Keystone XL pipeline are both expected to give the provincial economy and construction industry a much-needed lift. The 1,660-km Enbridge pipeline project is expected to cost more than $8 billion.

Saskatchewan is also investing in thermal heavy oil plants. Husky Energy plans to spend more than $1 billion on three new steam-assisted heavy oil extraction plants. The plants are expected to commence operation in 2020.

SaskPower will build and operate a new natural gas plant that will be set to launch in 2019 and is budgeted at $700 million. Another of its projects, now in the RFP stage, will add 200 megawatts of utility-scale wind capacity as part of the plan to increase wind generating capacity from 5% to 30% by 2030.

Despite still weak potash prices, Encanto Potash Corp. and the Muskowekwan First Nation commence work on their potash mine reserve project, valued at $2.8 billion. Investment in the energy and mineral sectors will provide a welcome boost to the construction industry.

The province's 2017-18 Budget includes $3.7 billion for investment into Saskatchewan's infrastructure; $1.3 billion of that will go to SaskPower, primarily to renew distribution and transmission systems, along with the expansion and renewal of electricity generation assets.

Another $302 million goes to SaskTel to increase and upgrade its wireless and wireline networks and continue the roll out of its high bandwidth broadband service. SaskEnergy is forecast to spend $292 million to ensure safe and reliable service that meets continually growing customer demand.

With one of Canada's highest population growth rates – 1.6% in 2016 – housing demand will remain strong and help keep housing starts stable. With a strengthening economy and a healthy construction sector, the province is projected to add 4,360 jobs per year between 2017 and 2021.

"Renewed investment in the energy sector and one of Canada's highest population growth rates that support strong housing demand are setting Saskatchewan back on the path to prosperity."

BEN WEISHAUPT Senior Project Consultant

FORECAST HOUSING STARTS

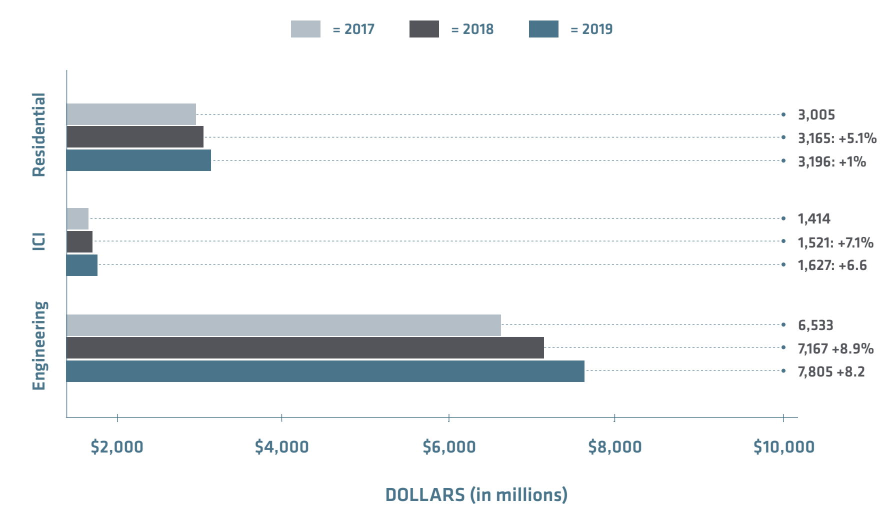
5,100
IN 2017

4,800
IN 2018

SASKATCHEWAN OUTLOOK

PRELIMINARY PUT-IN-PLACE CONSTRUCTION INVESTMENT PROJECTIONS FOR 2018

(Constant 2007 Canadian $ Millions)



PROJECTED GDP GROWTH FOR 2017	PROJECTED GDP GROWTH FOR 2018	ESCALATION RATE
2.1%	1.6%	1% – 3%

Sources: Conference Board of Canada, Scotiabank, Royal Bank, BMO, Statistics Canada, PIP Spring 2017 (CanaData), Government of Saskatchewan

REGIONAL SNAPSHOTS

MANITOBA

Residential activity helps to offset decline in infrastructure investment

HOUSING PICKS UP SLACK AS MAJOR ENERGY PROJECTS WIND DOWN

The recovery in the energy sector in Alberta and Saskatchewan is expected to boost Manitoba's economy as well, lifting the manufacturing sector in particular as projections call for the province to achieve higher GDP growth in 2018.

Over the past five years, Manitoba's population has grown by 5.8%, slightly above the national average. Most of the gain came from international migration. That influx has helped to spur a rise of 8.1% in new housing investment as growth in non-residential building investment remained moderate. The steady rise in the number of residents lifted housing starts from 5,300 in 2016 to 7,300 in 2017, and will help keep the number above 6,000 in 2018 and 2019.

The robust activity in the residential sector will help offset a decline in activity as multi-year major utility and transmission projects wind down in 2017. Spending on transportation and flood protection infrastructure investment is expected to decline by 1.6% in 2017. Hydro development project requirements will also ease over the next four years.

FORECAST HOUSING STARTS

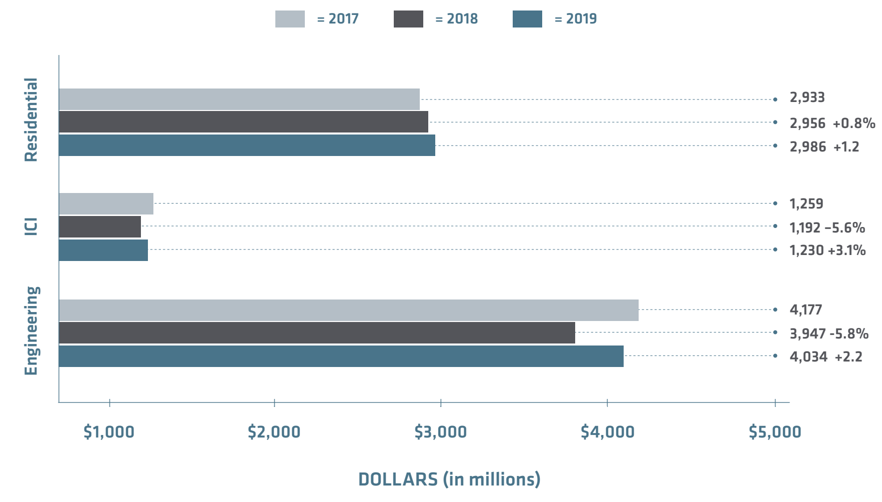
7,300
IN 2017

6,000
IN 2018

MANITOBA OUTLOOK

PRELIMINARY PUT-IN-PLACE CONSTRUCTION INVESTMENT PROJECTIONS FOR 2018

(Constant 2007 Canadian $ Millions)



Sources: *Conference Board of Canada, Scotiabank, Royal Bank, BMO, Statistics Canada, PIP Spring 2017 (CanaData), Government of Manitoba*

PROJECTED GDP GROWTH FOR 2017

2.9%

PROJECTED GDP GROWTH FOR 2018

1.3%

ESCALATION RATE

1% – 3%

The Bipole III Transmission Line, one of the 20 largest projects under construction in North America, is expected to be completed in 2018, and the Keeyask Generating Station is expected to commence service in November of 2019. The proposed $350-million Manitoba-Minnesota Transmission project would provide a final link to enable increased energy exports to the United States. The line's projected in-service date is mid-2020.

A further challenge will be a 9.5% drop in infrastructure spending for 2017-2018, a decrease of $184 million from the 2016-17 budget. Even so, wastewater treatment plant projects in Winnipeg and Portage la Prairie, and multiple school builds and roadway improvements will help sustain construction levels.

Work on two major developments in downtown Winnipeg will help cushion the impact. One is a $165-million, 40-storey tower that will become the city's tallest. The other is True North Square, a $400-million mixed-use development currently under construction that includes a luxury hotel, flagship liquor store, a grocery store, public plaza, and four towers with more than a million square feet of space.

"While Manitoba's residential sector will see a drop in 2018 after a stellar 2017, it can expect a strong economy and international immigration to help sustain high levels of activity in the longer term."

STEVE BOTSIO Senior Project Consultant

QUEBEC

Infrastructure and non-residential building lead growth

STRONG ECONOMIC PERFORMANCE SPARKS ROBUST ACTIVITY

Quebec's construction sector is projected to thrive in 2018, with transportation infrastructure and non-residential building leading the way. The expansion comes supported by a strengthening economy and the provincial government's improved fiscal stability.

It is expected that GDP growth in 2017 of 2.7% will be the strongest in 15 years.

Manufacturing output is a leader in the economic performance, and is on track to expand by 4% in 2017. It is the fastest increase since 2000, with particular strength in pharmaceutical and automation equipment manufacturing. The province's 10-year Infrastructure Plan announced in 2017 allocates $91.1 billion in spending over the coming decade, an increase of $2.4 billion from the 2016 plan.

The shift to infrastructure and non-residential construction will offset anticipated declines in new housing starts following slowing population growth. This trend is expected to continue into the coming decade. With a projected population growth rate of 0.9%, primarily supported by international immigration, Montréal will be the major focus of construction growth even with the residential decline. Montréal's own three-year, $6.4-billion infrastructure plan, and a current building boom in the downtown core, further strengthen the city's position as the growth leader.

Major transportation projects in the region include the Champlain Bridge and Turcot Interchange, and the Bonaventure and Ville-Marie Expressways. Major transit projects in the pipeline should keep the momentum going. The $6-billion REM, an integrated rail network, is the largest public transportation infrastructure project since the Montréal metro. An updated $28 billion transit plan leading into 2025 proposes to extend the Metro's Blue Line, upgrade stations for mobility, add 1,230 hybrid buses and 14 new trains, and renovate and build new Metro garages.

In social infrastructure spending, some $400 million has been pledged over the next four years to help maintain and refurbish deficient school facilities in the province, as well as $400 million over the next three years for additional classroom space. Another $200 million has been pledged to expand emergency room capacity and add specialized equipment to improve the current health network infrastructure. Nearly $150 million is committed to sports facilities and more than $200 million to build 3,000 new social housing units for vulnerable families.

"A strong economy that supports non-residential investment and the promise of sustained higher infrastructure spending are creating healthy levels of activity, especially in the Montréal area."

MICHAEL ZEGARELLI Director

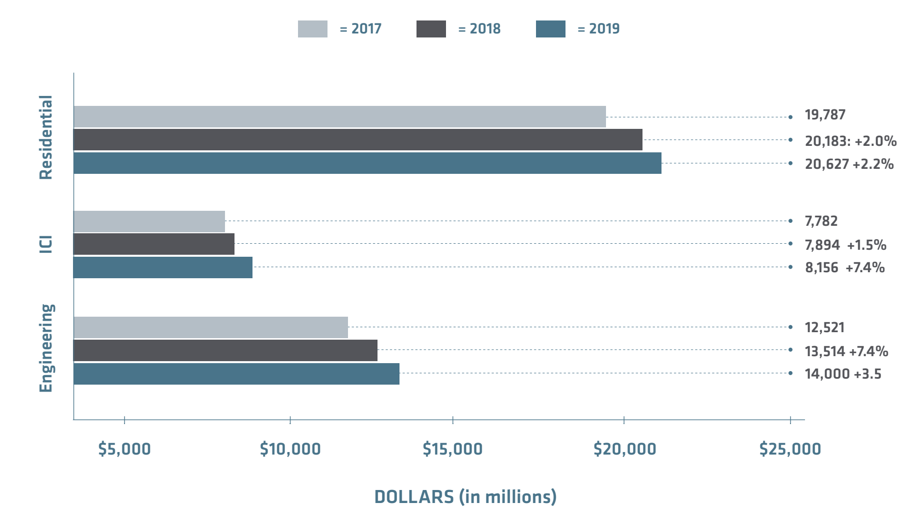
FORECAST HOUSING STARTS

42,100
IN 2017

39,500
IN 2018

QUEBEC OUTLOOK

PRELIMINARY PUT-IN-PLACE CONSTRUCTION INVESTMENT PROJECTIONS FOR 2018
(Constant 2007 Canadian $ Millions)



PROJECTED GDP GROWTH FOR 2017	PROJECTED GDP GROWTH FOR 2018	ESCALATION RATE
3.2%	2.0%	4% – 6%

Sources: Conference Board of Canada Scotiabank, Royal Bank, BMO, Statistics Canada, PIP Spring 2017 (CanaData), Newswire, Government of Quebec

REGIONAL SNAPSHOTS

ATLANTIC PROVINCES

Construction levels range from modest growth to slight decline

NEW BRUNSWICK AND PEI ADVANCE, NOVA SCOTIA AND NEWFOUNDLAND AND LABRADOR LAG

New Brunswick

Despite being the only province to experience a population decline in the 2016 census and a forecast drop in GDP from 1.5% in 2017 to 0.8% in 2018, New Brunswick can expect balanced construction activity led by stronger infrastructure spending in transportation, water and wastewater treatment, and water storage and transmission facilities. An influx of new immigrants and returning residents will help keep the residential sector stable with housing starts forecast to rise from 1,900 in 2017 and 2,000 in 2018.

Prince Edward Island

Prince Edward Island is expected to lead the Atlantic Provinces in economic growth in 2017 with a projected 2.3% rise in GDP. A slight pullback to 1.3% is expected in 2018, but the longer term prospects are good with higher net migration and many planned renewable energy projects in wind, tidal, hydro, as well as improved transmission infrastructure. Housing starts are forecast at 900 in 2017 and 800 in 2018.

Nova Scotia

Halifax continues to be the bright spot for new construction in Nova Scotia, which overall can expect continued decline in both residential and non-residential building. The province's population grew by just 0.2% from 2011 to 2016, while Halifax's grew by 3.3%, attracting both immigrants and people from other parts of the province. GDP growth is forecast to decline from 1.3% in 2017 to 1% in 2018. Housing starts are also projected to fall from 4,000 in 2017 to 3,000 in 2018.

Newfoundland and Labrador

The end of a long boom in engineering investment and the lengthy period of low oil prices continues to drag on the province's economy, which is forecast to have GDP rise, from -3.1% in 2017 to 2.4% in 2018. Construction activity is projected to decline in every sector except residential. The government is continuing to support commitments to investment in infrastructure such as the $120-million Cornerbrook Long-term Care facility, a P3 project for which BTY is proving Lenders' Technical Advisor services. The province's population grew by 1% from 2011 to 2016, helping to maintain demand in residential investment, if only at a considerably lower level than the boom years. Housing starts are forecast at 1,200 in 2017 and 1,300 in 2018.

"Investment in infrastructure and energy projects – especially renewables – will help offset reduced levels of activity in residential and non-residential building in 2018."

LOUIS GUILBEAULT Director of Project Delivery

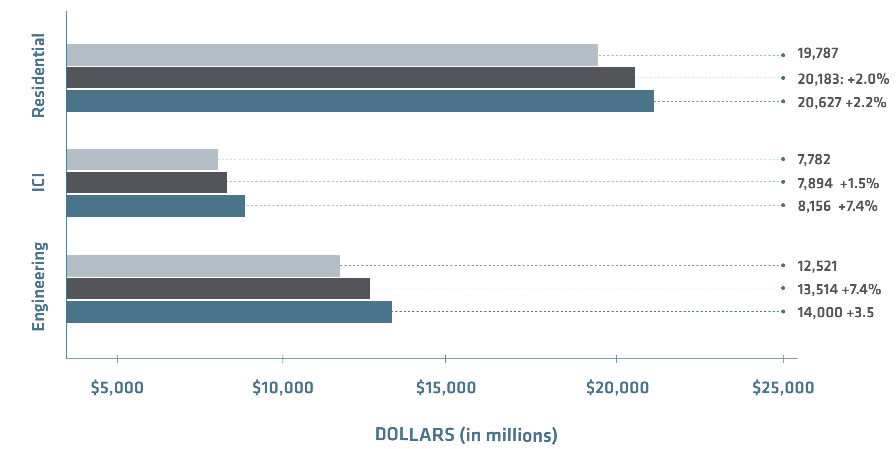
ATLANTIC PROVINCES OUTLOOK

PRELIMINARY PUT-IN-PLACE CONSTRUCTION INVESTMENT PROJECTIONS FOR 2018

(Constant 2007 Canadian $ Millions)

= 2017 = 2018 = 2019

Sources: Conference Board of Canada, Scotiabank, Royal Bank, BMO, Statistics Canada, PIP Spring 2017 (CanaData)



PROJECTED GDP GROWTH FOR 2017

New Brunswick	Prince Edward Island	Nova Scotia	Newfoundland & Labrador
1.5%	2.3%	1.3%	-3.1%

PROJECTED GDP GROWTH FOR 2018

New Brunswick	Prince Edward Island	Nova Scotia	Newfoundland & Labrador
0.8%	1.3%	1.0%	2.4%

ESCALATION RATE

1% – 3%

CANADIAN COST DATA PARAMETERS COMPARISON

BTY has been publishing the annual Market Intelligence Report and a comparison of Cost Data Parameters since 2003. The Cost Data includes unit rates for selected project categories, based on in-house data surveyed on a provincial level, and tendered data where available. The comparison provides actual data for 2017 and forecast data for 2018, using escalation levels generated by BTY.

PROJECT CATEGORY	BRITISH COLUMBIA				ALBERTA			
	ACTUAL 2017		FORECAST 2018		ACTUAL 2017		FORECAST 2018	
	$/m²	$/ft²	$/m²	$/ft²	$/m²	$/ft²	$/m²	$/ft²
HEALTH CARE								
Residential Care	2,560 - 2,860	238 - 266	2,690 - 3,000	250 - 279	2,600 - 3,130	242 - 291	2,630 - 3,160	244 - 294
Ambulatory Care	5,070 - 5,260	471 - 489	5,320 - 5,520	494 - 513	4,660 - 5,090	433 - 473	4,710 - 5,140	438 - 478
Acute Care	6,270 - 7,090	583 - 659	6,580 - 7,440	611 - 691	6,000 - 7,010	557 - 651	6,060 - 7,080	563 - 658
LABORATORIES								
Research Laboratories	6,390 - 7,090	594 - 659	6,710 - 7,440	623 - 691	6,250 - 6,930	581 - 644	6,310 - 7,000	586 - 650
Teaching Laboratories	4,980 - 5,510	463 - 512	5,230 - 5,790	486 - 538	5,100 - 5,940	474 - 552	5,150 - 6,000	478 - 557
Animal Research	7,940 - 8,820	738 - 819	8,340 - 9,260	775 - 860	7,430 - 8,140	690 - 756	7,500 - 8,220	697 - 764
HIGH-RISE RESIDENTIAL								
Rental Units	2,320 - 2,770	216 - 257	2,490 - 2,980	231 - 277	2,320 - 2,770	216 - 257	2,330 - 2,780	216 - 258
Market Units Mid End Specifications	2,750 - 3,170	255 - 295	2,960 - 3,410	275 - 317	2,550 - 2,950	237 - 274	2,560 - 2,960	238 - 275
Market Units High End Specifications	2,960 - 3,840	275 - 357	3,180 - 4,130	295 - 384	2,860 - 3,710	266 - 345	2,870 - 3,730	267 - 347
LOW- & MID-RISE RESIDENTIAL								
Rental Units	1,630 - 1,900	151 - 177	1,750 - 2,040	163 - 190	1,400 - 1,830	130 - 170	1,410 - 1,850	131 - 172
Market Units Mid End Specifications	1,800 - 2,400	167 - 223	1,940 - 2,580	180 - 240	1,670 - 2,240	155 - 208	1,690 - 2,260	157 - 210
Market Units High End Specifications	2,350 - 2,800	218 - 260	2,530 - 3,010	235 - 280	2,290 - 2,925	213 - 272	2,310 - 2,950	215 - 274
TOWNHOUSES (WOOD FRAME)								
Rental Units	1,320 - 1,650	123 - 153	1,400 - 1,750	130 - 163	1,130 - 1,510	105 - 140	1,140 - 1,530	106 - 142
Market Units Mid End Specifications	1,440 - 1,890	134 - 176	1,530 - 2,000	142 - 186	1,350 - 1,620	125 - 151	1,360 - 1,640	126 - 152
Market Units High End Specifications	1,730 - 2,350	161 - 218	1,830 - 2,490	170 - 231	1,690 - 2,280	157 - 212	1,710 - 2,300	159 - 214
SHOPPING CENTRES								
Strip Plaza	1,400 - 2,400	130 - 223	1,470 - 2,520	137 - 234	1,350 - 2,350	125 - 218	1,360 - 2,360	126 - 219
Enclosed Mall	2,480 - 3,550	230 - 330	2,600 - 3,730	242 - 347	2,390 - 3,110	222 - 289	2,400 - 3,130	223 - 291
Anchor/Department Store	2,180 - 2,640	203 - 245	2,290 - 2,770	213 - 257	2,230 - 2,880	207 - 268	2,240 - 2,890	208 - 268
Supermarket	1,690 - 2,250	157 - 209	1,770 - 2,360	164 - 219	1,760 - 2,210	164 - 205	1,770 - 2,220	164 - 206
Discount Store	1,310 - 1,900	122 - 177	1,380 - 2,000	128 - 186	1,710 - 2,210	159 - 205	1,720 - 2,220	160 - 206
OFFICE								
Under 5 Storeys	1,990 - 2,400	185 - 223	2,090 - 2,520	194 - 234	1,910 - 2,710	177 - 252	1,920 - 2,720	178 - 253
5–10 Storeys	2,160 - 2,790	201 - 259	2,270 - 2,930	211 - 272	2,220 - 2,840	206 - 264	2,230 - 2,850	207 - 265
10–20 Storeys	2,370 - 3,020	220 - 281	2,490 - 3,170	231 - 295	2,300 - 2,970	214 - 276	2,310 - 2,980	215 - 277
20–30 Storeys	2,720 - 3,760	253 - 349	2,860 - 3,950	266 - 367	2,600 - 3,690	242 - 343	2,610 - 3,710	242 - 345
EDUCATIONAL								
Elementary Schools	2,090 - 2,840	194 - 264	2,190 - 2,980	203 - 277	2,170 - 2,850	202 - 265	2,190 - 2,880	203 - 268
Secondary Schools	2,330 - 3,180	216 - 295	2,450 - 3,340	228 - 310	2,290 - 2,960	213 - 275	2,310 - 2,990	215 - 278
Higher Education	2,800 - 4,140	260 - 385	2,940 - 4,350	273 - 404	2,690 - 3,770	250 - 350	2,720 - 3,810	253 - 354
LIGHT INDUSTRIAL								
Warehouse	980 - 1,310	91 - 122	1,020 - 1,360	95 - 126	1,075 - 1,510	100 - 140	1,080 - 1,520	100 - 141
HOTELS								
Low Rise	1,980 - 2,790	184 - 259	2,080 - 2,930	193 - 272	2,045 - 2,475	190 - 230	2,060 - 2,490	191 - 231
ROADS - PAVING	$/Lane km		$/Lane km		$/Lane km		$/Lane km	
Paved Highway - Linear Roadworks	992,600 - 1,252,400		1,027,300 - 1,296,200		954,500 - 1,191,800		964,000 - 1,023,700	
ROAD OVERPASS BRIDGE STRUCTURE	$/m²		$/m²		$/m²		$/m²	
Highway Overpass Structures	4,000 - 5,500		4,200 – 5,700		3,700 - 5,800		3,800 - 5,900	

PROJECT CATEGORY	SASKATCHEWAN				ONTARIO				QUEBEC			
	ACTUAL 2017		FORECAST 2018		ACTUAL 2017		FORECAST 2018		ACTUAL 2017		FORECAST 2018	
	$/m²	$/ft²	$/m²	$/ft²	$/m²	$/ft²	$/m²	$/ft²	$/m²	$/ft²	$/m²	$/ft²
HEALTH CARE												
Residential Care	2,790 - 3,080	259 - 286	2,850 - 3,140	265 - 292	2,520 - 2,870	234 - 267	2,570 - 2,930	239 - 272	2,680 - 3,050	249 - 283	2,810 - 3,200	261 - 297
Ambulatory Care	5,050 - 5,710	469 - 530	5,150 - 5,820	478 - 541	4,640 - 5,230	431 - 486	4,730 - 5,330	439 - 495	4,920 - 5,480	457 - 509	5,170 - 5,750	480 - 534
Acute Care	5,840 - 6,780	543 - 630	5,960 - 6,920	554 - 643	6,050 - 6,500	562 - 604	6,170 - 6,630	573 - 616	5,360 - 6,850	498 - 636	5,630 - 7,190	523 - 668
LABORATORIES												
Research Laboratories	6,720 - 7,610	624 - 707	6,850 - 7,760	636 - 721	6,280 - 7,090	583 - 659	6,410 - 7,230	596 - 672	6,520 - 7,490	606 - 696	6,850 - 7,860	636 - 730
Teaching Laboratories	5,470 - 5,940	508 - 552	5,580 - 6,060	518 - 563	5,310 - 6,100	493 - 567	5,420 - 6,220	504 - 578	5,410 - 6,440	503 - 598	5,680 - 6,760	528 - 628
Animal Research	8,720 - 8,950	810 - 831	8,890 - 9,130	826 - 848	6,260 - 8,190	582 - 761	6,390 - 8,350	594 - 776	6,630 - 8,680	616 - 806	6,960 - 9,110	647 - 846
HIGH-RISE RESIDENTIAL												
Rental Units	2,200 - 2,710	204 - 252	2,230 - 2,750	207 - 255	2,270 - 2,930	211 - 272	2,290 - 2,960	213 - 275	1,890 - 2,420	176 - 225	1,980 - 2,540	184 - 236
Market Units Mid End Specifications	2,530 - 3,170	235 - 295	2,570 - 3,220	239 - 299	2,620 - 3,380	243 - 314	2,650 - 3,410	246 - 317	2,310 - 2,940	215 - 273	2,430 - 3,090	226 - 287
Market Units High End Specifications	2,910 - 3,700	270 - 344	2,950 - 3,760	274 - 349	3,140 - 4,060	292 - 377	3,170 - 4,100	295 - 381	2,840 - 4,200	264 - 390	2,980 - 4,410	277 - 410
LOW- & MID-RISE RESIDENTIAL												
Rental Units	1,340 - 1,730	124 - 161	1,350 - 1,750	125 - 163	1,290 - 1,520	120 - 141	1,300 - 1,540	121 - 143	1,260 - 1,490	117 - 138	1,320 - 1,560	123 - 145
Market Units Mid End Specifications	1,540 - 2,140	143 - 199	1,560 - 2,160	145 - 201	1,520 - 1,780	141 - 165	1,540 - 1,800	143 - 167	1,370 - 1,730	127 - 161	1,440 - 1,820	134 - 169
Market Units High End Specifications	2,270 - 2,620	211 - 243	2,290 - 2,650	213 - 246	1,880 - 2,240	175 - 208	1,900 - 2,260	177 - 210	1,790 - 2,210	166 - 205	1,880 - 2,320	175 - 216
TOWNHOUSES (WOOD FRAME)												
Rental Units	1,100 - 1,300	102 - 121	1,110 - 1,310	103 - 122	1,240 - 1,460	115 - 136	1,250 - 1,470	116 - 137	1,050 - 1,420	98 - 132	1,100 - 1,490	102 - 138
Market Units Mid End Specifications	1,200 - 1,600	111 - 149	1,210 - 1,620	112 - 151	1,360 - 1,580	126 - 147	1,370 - 1,600	127 - 149	1,370 - 1,690	127 - 157	1,440 - 1,770	134 - 164
Market Units High End Specifications	1,600 - 2,200	149 - 204	1,620 - 2,220	151 - 206	1,580 - 1,930	147 - 179	1,600 - 1,950	149 - 181	1,580 - 2,210	147 - 205	1,660 - 2,320	154 - 216
SHOPPING CENTRES												
Strip Plaza	1,300 - 2,300	121 - 214	1,310 - 2,320	122 - 216	1,370 - 1,710	127 - 159	1,390 - 1,740	129 - 162	1,248 – 1,650	116 - 153	1,310 – 1,733	122 – 161
Enclosed Mall	2,390 - 3,050	222 - 283	2,410 - 3,080	224 - 286	1,710 - 2,040	159 - 190	1,740 - 2,070	162 - 192	2,250 - 3,100	209 - 288	2,360 - 3,260	219 - 303
Anchor/Department Store	2,300 - 2,900	214 - 269	2,320 - 2,930	216 - 272	2,070 - 2,440	192 - 227	2,100 - 2,480	195 - 230	1,920 - 2,560	178 - 238	2,020 - 2,690	188 - 250
Supermarket	1,300 - 2,200	121 - 204	1,310 - 2,220	122 - 206	1,530 - 1,960	142 - 182	1,550 - 1,990	144 - 185	1,280 - 1,760	119 - 164	1,340 - 1,850	124 - 172
Discount Store	1,300 - 1,800	121 - 167	1,310 - 1,820	122 - 169	1,240 - 1,470	115 - 137	1,260 - 1,490	117 - 138	1,230 - 1,610	114 - 150	1,290 - 1,690	120 - 157
OFFICE												
Under 5 Storeys	2,190 - 3,650	203 - 339	2,210 - 3,690	205 - 343	1,710 - 2,040	159 - 190	1,740 - 2,070	162 - 192	1,540 - 1,870	143 - 174	1,620 - 1,960	151 - 182
5–10 Storeys	2,350 - 3,510	218 - 326	2,370 - 3,550	220 - 330	1,830 - 2,270	170 - 211	1,860 - 2,300	173 - 214	1,870 - 2,350	174 - 218	1,960 - 2,470	182 - 229
10–20 Storeys	2,420 - 3,020	225 - 281	2,440 - 3,050	227 - 283	2,060 - 2,510	191 - 233	2,090 - 2,550	194 - 237	1,920 - 2,590	178 - 241	2,020 - 2,720	188 - 253
20–30 Storeys	2,790 - 3,430	259 - 319	2,820 - 3,460	262 - 321	2,320 - 2,890	216 - 268	2,350 - 2,930	218 - 272	2,440 - 3,130	227 - 291	2,560 - 3,290	238 - 306
EDUCATIONAL												
Elementary Schools	2,300 - 2,900	214 - 269	2,350 - 2,960	218 - 275	1,720 - 2,050	160 - 190	1,750 - 2,080	163 - 193	1,710 - 2,040	159 - 190	1,800 - 2,140	167 - 199
Secondary Schools	2,400 - 3,200	223 - 297	2,450 - 3,260	228 - 303	1,830 - 2,270	170 - 211	1,860 - 2,300	173 - 214	1,820 - 2,300	169 - 214	1,910 - 2,420	177 - 225
Higher Education	2,700 - 3,700	251 - 344	2,750 - 3,770	255 - 350	2,100 - 2,550	195 - 237	2,130 - 2,590	198 - 241	2,680 - 4,280	249 - 398	2,810 - 4,490	261 - 417
LIGHT INDUSTRIAL												
Warehouse	1,300 - 2,200	121 - 204	1,310 - 2,220	122 - 206	1,050 - 1,280	98 - 119	1,060 - 1,290	98 - 120	860 - 1,180	80 - 110	900 - 1,240	84 - 115
HOTELS												
Low Rise	1,870 - 2,550	174 - 237	1,890 - 2,580	176 - 240	1,790 - 2,350	166 - 218	1,810 - 2,370	168 - 220	1,820 - 2,460	169 - 229	1,910 - 2,580	177 - 240
ROADS - PAVING	$/Lane km		$/Lane km		$/Lane km		$/Lane km		$/Lane km		$/Lane km	
Paved Highway - Linear Roadworks	1,177,300 - 1,330,800		1,212,600 - 1,370,700		889,700 - 1,085,500		907,500 - 1,107,200		1,267,900 - 1,423,100		1,312,300 - 1,472,900	
ROAD OVERPASS BRIDGE STRUCTURE	$/m²		$/m²		$/m²		$/m²		$/m²		$/m²	
Highway Overpass Structures	4,500 - 6,400		4,700 - 6,600		3,900 - 6000		4,000 - 6,200		4,800 - 6,900		5,000 - 7,200	

Note: *The unit rates reflect hard construction costs, including general requirements and fees, and exclude site works and tenant improvements. Variances in unit rates and escalation will occur due to the remoteness of some regions and prevailing local market conditions. Construction costs can also be affected by a multitude of factors that may not be limited to market conditions.*

BTY strongly recommends that readers seek the advice of a Professional Quantity Surveyor (PQS) prior to establishing a budget for their specific projects.

UNITED STATES CONSTRUCTION OUTLOOK

UNITED STATES CONSTRUCTION OUTLOOK

OVERVIEW

Stable growth forecast for 2018 and 2019

HIGHER INTEREST RATES AND COMMODITY PRICES WITH LOWER LABOUR AVAILABILITY COULD DAMPEN PROSPECTS

The outlook for the U.S. construction market for 2018 is positive overall. The rate of growth is expected to slow but still outpace the country's economic expansion, which is forecast to range between 2.0% and 2.5% in 2018.

Almost all of the markets forecast to be best for overall development are in the west and south, with the exception of Nashville and Boston, which rank 9 and 10, respectively. In the top spot is Seattle, followed by Austin, Raleigh-Durham, Dallas-Fort Worth, Fort Lauderdale, Los Angeles and San Jose.

Prime homebuilding markets are distributed more evenly, with Indianapolis, Westchester, NY/Fairfield CT, Spokane WA/Coeur d'Alene, ID, Salt Lake City and Cincinnati comprising the top five, followed by Tucson, Dallas-Forth Worth, Charleston, SC, Cape Coral/Ft. Myers/Naples FL, and Seattle.

NON-RESIDENTIAL TO SEE MODEST GAIN

Strong performance in early 2017 gave rise to more robust growth projections in non-residential construction, but indications in the latter half of the year point to more modest gains of between 3.5% and 4.0% for the balance of 2017 and 2018.

The commercial sector is forecast to drop from a robust 8.8% growth in 2017 to 4% in 2018, while industrial building is expected to bounce back from negative territory to 1.1% growth in 2018. Institutional construction is forecast to rise from 3.5% in 2017 to 4.1% in 2018.

"We see both residential and non-residential sectors posting moderate gains in 2018, with engineering and civil construction also performing well. But rising commodity prices, tight labour availability and a potential rise in interest rates could act as a constraint on growth."

RYAN BRADY Partner

RESIDENTIAL TO DECLINE IN LONGER TERM

Total housing starts are forecast to rise from 1,196,000 in 2017 to 1,253,000 in 2018, an increase of 4.6%. Single-family units are projected to increase from 840,000 in 2017 to 903,000 in 2018, a 7% gain, while multi-family starts are expected to decline from 356,000 to 350,000 a year-over-year decrease of 1.7%.

Even with household sizes growing smaller (and generating greater demand for more but smaller housing types), a lower overall level of demand for new housing is expected over the following years due in part to lower population growth of 0.7% in 2016, the lowest since 1937. For comparison, growth averaged 1.2% over 20 years before the recession. With 0.7% growth, new demand would be slightly more than half of what it would be at 1.2% – and most housing is built for new demand.

ENGINEERING AND CIVIL SPENDING REBOUNDS IN 2018

Put in place projections for engineering and civil construction show a projected 4.2% decrease in spending in 2017 and a 3.4% increase in 2018. Growth is expected to be strongest in these subsectors: Power (-3.5% to 6.2%), Highway and Street (-4.8% to 3.3%) and Water Supply (-9.5% to 2.4%).

FACTORS THAT COULD CONSTRAIN GROWTH

The prospect of rising interest rates that slow economic growth could have a longer-term effect of dampening construction activity. A rise in cost of materials may do so sooner. Demand – and prices – for construction commodities have started to reverse a multi-year downward trend.

Prices for products related to oil such as diesel fuel and asphalt have been increasing at a rate of nearly 20% over the past year. Steel, copper and aluminum have risen by close to 10%, and gypsum lumber and plywood are rising at single digit rates. The substantial tariff levied on Canadian softwood lumber in 2017 has also helped push up prices and reduce supply, which hits homebuilders particularly hard. Canada typically supplies nearly 30% of the U.S. soft-wood lumber supply.

Another ongoing issue is labour availability. As the unemployment rate in the construction industry has dropped from almost 20% in 2010 to much closer to the rate for the whole economy, about 4.6%, options for increasing the workforce in construction are limited, especially since immigrant labour accounts for nearly 30% of the construction labour force. Since much of that labour force demographic comprises Hispanics, the focus on immigration reform could restrict their availability.

REBUILDING AFTER DISASTERS

As several communities in Texas and Florida recover from damage due to hurricanes, and communities in California continue dealing with the aftermath of several wildfires, there will be further demand for labour and materials in the affected markets, with corresponding impacts on prices and affordability.

***Sources:** American Institute of Architects (AIA) Consensus Construction Forecast, Forbes Magazine, PriceWaterhouseCoopers Emerging Real Estate Trends, National Association of Home Builders Economic and Housing Forecast, Construct Connect, CNBC*

The rate of growth is expected to slow but still outpace the country's economic expansion, which is forecast to range between 2.0% and 2.5% in 2018.

UNITED STATES CONSTRUCTION OUTLOOK

US P3 PIPELINE

US P3 Pipeline for 2018: Diverse, Ambitious and Growing

The pace of progress for P3s securing approval in the U.S. may be slow compared to the process in Canada, which is one of the world's fastest jurisdictions for fulfilling P3 projects. However, the U.S. P3 pipeline is growing more diverse and ambitious by the year.

There is an increased appetite for accelerating project delivery, as well as advancing projects that have stalled, or made part of a state budget for which there is funding.

To date, 37 states have passed enabling legislation for P3s as a project delivery mechanism.

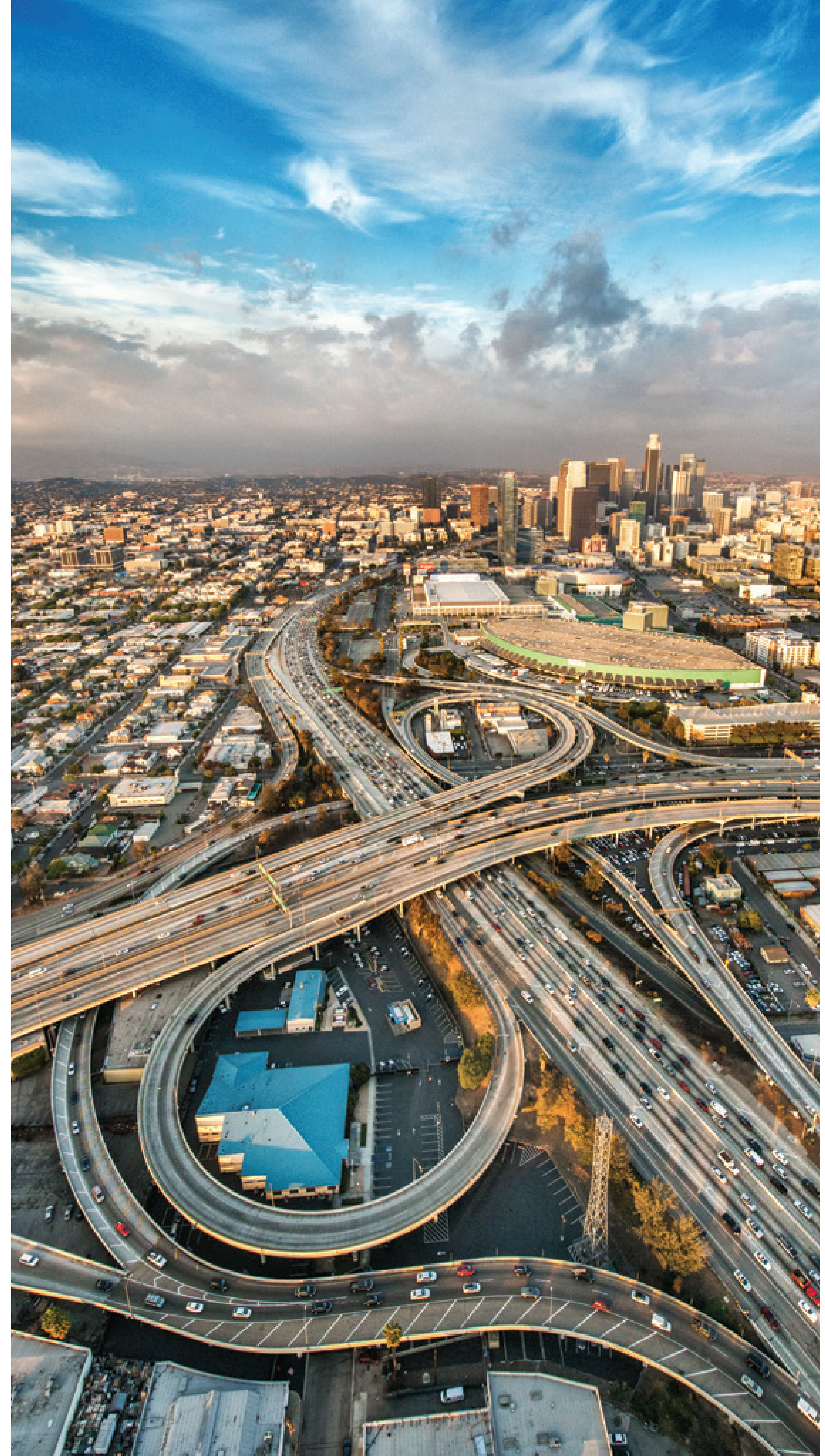
The diversity of the more than 120 P3 projects in various stages from Pre-launch (49) through Expressions of Interest (18) to Preferred Proponent Selected (7) from October 2016 to October 2017 confirms that the appeal of P3s continues growing favourably across sectors and states.

EXPANDING SECTOR DIVERSITY

Traditionally, the majority of U.S. P3s have been in transportation, and accounted for 2% to 5% of the annual highway and bridge construction market activity. The P3 models for transportation projects are becoming an increasingly important financing tool for new capacity, and are now being used more frequently for social infrastructure in a variety of applications, from courts and city halls to student housing and leisure facilities.

Transportation is still dominant, accounting for nearly half the P3 projects. There are more than 20 roads projects, including the US$450-million I-395 Project in Virginia that achieved financial close in July 2017. In all, there are a dozen interstate highway P3 projects. The proposed P3 projects with the highest value include bridges and tunnels, led by the US$25-billion Hudson River Tunnel Replacement and the US$3.3-billion Hampton Bridge Tunnel Project.

The aviation sector currently comprises 21 deals, including the US$4-billion LaGuardia Central Terminal Building Project and the US$10-billion JFK Ring Road Project. Rail and light rail projects (10) include the US$8-billion Honolulu Rail Transit Project. There are also P3 projects in the pipeline for ports, social housing, car parks, energy generation, street lighting, and multiple water and wastewater projects, as well as telecommunications and wireless transmission.



PROJECTS IN 31 STATES FROM COAST TO COAST

There are now P3 projects in the pipeline in 31 states. California is the leader with 19, followed by New York, Texas and Florida with 10 each, Georgia with 8, Pennsylvania with 6, Arizona and Massachusetts with 5 each, and Colorado and Virginia with 4 each.

POTENTIAL ROADBLOCKS TO P3s: UNCERTAINTY OVER FEDERAL FUNDING

A recent trend in P3 projects is the increased use of availability payments, in which the public project sponsor makes payments to the private concessionaire based on project milestones or facility performance standards. Funding availability at the state and local level has been a concern for states seeking to use the P3 model. As states experience difficulty programming funding for new projects due to federal funding uncertainty, they are less able to provide the new commitments necessary for mega-P3 projects that are funded with availability payments.

PRIVATE ACTIVITY BONDS

The federal government has played a large role in supporting P3 projects, primarily through Private Activity Bonds (PABs), which have been issued on behalf of private developers by a government agency at tax-exempt rates, and Transportation Infrastructure Finance and Innovation Act (TIFIA) loans.

As of this writing, the proposed new federal tax reform bill (Tax Cuts and Jobs Act) would eliminate PABs, which have helped several P3 projects achieve financial close.

The absence of the tax-free advantage that PABs offer investors in P3s would reduce the incentive for private sector investment, which has been a key element in the administration's yet-to-be-released US$1-trillion plan to stimulate infrastructure development. The elimination of the PAB would further slow the progress of P3s in the United States.

***Sources:** Inframation, PriceWatehouseCoopers: Public-private partnerships in the US: The state of the market and the road ahead*

"P3s will continue to gain wider acceptance as more projects advance through the pipeline – and governments at every level recognize their benefits. An independent analysis estimated that, on average, P3s save 24.6% in project costs."

MARIE FOLEY Director, P3 Advisory, North America

INTERNATIONAL MARKETS IN FOCUS

UNITED KINGDOM

UK construction shifts to housing and infrastructure to cushion Brexit impact

BUILD-TO-RENT (BTR) BRIGHT SPOT AS OFFICE AND RETAIL PREPARE FOR DECLINE

As the United Kingdom grapples with the uncertainties of a post-Brexit economy, the construction industry is shifting its focus from office and retail to housing and infrastructure. Build-to-Rent Housing and mega transportation and energy infrastructure projects are the bright spots driving construction growth in the UK.

GDP growth is forecast to slow from 1.5% in 2017 to 1.4% in 2018, as is consumer spending. A weaker pound is expected to improve exports, but also raise the cost of imported construction materials.

Overall construction output is expected to be flat in 2018 and rise slightly in 2019. Private sector housing and infrastructure spending will help offset sharp declines in office building over these two years.

ONE MILLION NEW HOMES BY 2020

A UK government white paper in early 2017 stated that the UK needs 250,000 new homes a year. The current government has promised to build a million homes by 2020 and another half a million by 2022. Over the past three years, about 190,000 new homes have been built annually in the UK, 26% more than in the preceding three-year period.

The government's Help to Buy Equity Loan, a popular program that helps first-time buyers as well as existing homeowners to purchase a new-build home with only a 5% deposit, is helping to sustain house building despite the slowdown in the general housing market. In October 2017, the UK government invested a further £10 billion in the Help to Buy Equity Loan. More than 130,000 homes have been purchased through the program. The new funding means that up to 135,000 more people could use the program to buy homes by 2021.

Part of the UK housing undersupply is due to there having been relatively few purpose-built buildings constructed for the Private Rent Sector (PRS) in the UK over the past quarter century. There is simply not enough supply to meet demand. The Royal Institution of Chartered Surveyors estimates the UK has a shortfall of 1.8 million rental properties.

The huge mismatch between supply and demand in the residential property market has created a significant opportunity in the build-to-rent (BTR) sector, which originated in North America and is now gaining ground rapidly in the UK, most notably in London, Liverpool and Manchester.

As of October 2017, there are over 96,000 build-to-rent homes completed, under construction or in planning. London leads the expansion with Manchester, Leeds, Liverpool and Birmingham catching up fast. The size of build-to-rent schemes is growing, with 34 developments currently in the pipeline providing more than 500 new rented homes each – compared to 24 developments at the start of the year.

BTY is among a handful of firms with long-term experience in BTR schemes in North America as well as Employers' Agent services in the UK offering our expertise as the sector builds momentum in the UK – and developers face a steep learning curve in planning, development, construction and operations considerations specific to the sector. The firm's MRICS/PQS professionals provide owners, developers and architects project solutions from early concept design and business case development right through to finalisation of design and construction project controls.

INFRASTRUCTURE POISED TO PLAY MAJOR ROLE

Infrastructure projects promise to become a major contributor to the construction industry for the first time in several years with multiple, multi-billion projects in the pipeline. The UK's National Infrastructure and Construction Pipeline, announced in December 2016, laid out more than £500 billion of planned investment, with more than £300 billion of this to be invested by 2020/21, through 720 projects and programmes across transport, housing and digital technology to reinvigorate the nation's infrastructure.

Major projects in rail, water and sewage, and energy include the £56-billion (CAD$94-billion) High Speed 2 rail line between London and Northern England, and the £4.2-billion (CAD$7.1-billion) Thames Tideway Tunnel, and the £20-billion (CAD$33.7-billion) nuclear power station at Hinkley Point in Somerset. Road construction is also expected to ramp up with the government's £15.2-billion (CAD$25.6-billion) Roads Investment Strategy.

Other major rail projects include the £563-million (CAD$950.3-million) upgrade of Bank Station in central London and the electrification of cross-country rail routes including the Great Western Railway and the northwest network.

To help attract private sector investment in UK infrastructure, the government has established the UK Guarantees Scheme. It offers a government-backed guarantee to help infrastructure projects access debt finance where they have been unable to raise funds in the financial markets.

In October 2017, Inframation ranked BTY the world's #1 Lenders' Technical Advisor (LTA). Our team members have provided a wide range of services on nearly 200 PPP (the North American equivalent of PFI and PF2 in the UK) projects for vertical as well as horizontal infrastructure over the past 14 years.

Sources: *Construction Products Association (CPI), Financial Times, The Guardian, Construction Enquirer, and Government of UK, MRICS, PriceWaterhouseCoopers*

"A shift in residential investment to Build-to-Rent schemes, and the government's commitment to increase infrastructure investment will create opportunities for the industry to adapt to a post-Brexit construction market."

JOE CUTLER Director

INTERNATIONAL MARKETS IN FOCUS

IRELAND

Ireland ramps up capital spending

STRONG GROWTH PROSPECTS AND INFRASTRUCTURE INVESTMENT BUOY POST-BREXIT OUTLOOK

The Irish government's Budget 2018 increases capital spending by €790 million (CAD$1.17 billion), including spending on roads, schools and hospitals. Capital spending in 2018 will total €5.3 billion (CAD$7.87 billion). The budget allocation follows through with spending for priorities in the six-year capital plan worth €27 billion announced in 2015.

The capital programme aims to provide for major infrastructure projects, including a new rapid transit system from Dublin city centre to Dublin Airport and Swords. The increased spending comes as Ireland prepares to support the country's post-Brexit economic performance with expanded infrastructure investments.

STRONG ECONOMIC PERFORMANCE EXPECTED

The increased capital spending in the 2018 budget comes as forecasts call for the country to post continued robust economic growth of 5% in 2017 and 4% in 2018, with strong household spending. The overall unemployment rate is expected to average 6.1% in 2017 and 5.4% through 2018. As the economy approaches full employment, constraints at the mid-levels of the labour market between ages 25 and 35 are becoming an increasing headwind, applying upward pressure on cost to deliver much needed housing nationally.

Despite these headwinds, the construction sector is set to assume a growing importance in the domestic economy over the medium term. The capital programme's largest blocks of spending will be committed across a range of sectors.

Transport will receive €10 billion (CAD$14.84 billion), with €2.4 billion committed to the 16.5km Metro link from Dublin city to the airport, the Dart line extension, €4.4 billion for road upgrades and €1.6 billion for new road projects.

Education is allocated €3.8 billion (CAD$5.64 billion), for 19,000 extra primary school places by 2018, and an additional 43,000 secondary school places by 2022, plus €110 million for Higher Education facilities. An extra €200 million will go to the third-level sector public private partnerships.

Healthcare will get €3 billion (CAD$4.45 billion) for a new National Children's Hospital at St James's Hospital in Dublin, with satellite centres, a new National Forensic Mental Health Services facility in Portrane, new specialist intensive care rehabilitation units at Galway, Cork and Portrane, and new cancer care departments at Cork University Hospital and University Hospital Galway. There will also be more than 80 new primary care facilities across the country, and €300 million is committed to refurbishing care facilities for the elderly and people with disabilities.

Housing will get €3 billion (CAD$4.45 billion) for 35,000 additional social housing units by 2020, supplying housing needs for 75,000 households through new rental opportunities in the private market, and €300 million for social housing under public private partnerships.

Sports and Recreation is allocated €285 million (CAD$435 million) for sports facilities at a local and national level, including funding for a National Indoor Arena at National Sports Campus.

HOUSING FORECAST IS ALSO FAVOURABLE

Several years of low investment in residential construction following the financial crisis have contributed to current shortages in key areas, Dublin in particular. The undersupply is expected to support strong demand for new home construction. The government's help-to-buy (HTB) scheme is also expected to support expanded residential construction. The HTB program helps first-time buyers with the deposit they need to buy or build a new house or apartment. The Central Bank's recently loosened mortgage lending rules are also expected to boost ownership, and home building.

Sources: *Government of Ireland, Economic and Social Research Institute, Irish Times, The Journal.ie*

"The balance of private and expanded public sector investment in construction – underpinned by a growing economy – augurs well for the overall health of the industry."

JACK MCINERNEY Director

INTERNATIONAL MARKETS IN FOCUS

TURKEY

Growth in construction built on expanding infrastructure and housing investment

Turkey's construction industry is forecast to expand by just over 5% between 2016 and 2020. Slow but steady population growth, a strengthening economy, increasing urbanisation and public and private investment in infrastructure, energy, industrial and residential construction projects are propelling the expansion.

Despite political uncertainty and ongoing regional conflicts, the country's Vision 2023 program is proceeding. The program seeks to develop the country into one of the world's largest economies by 2023. An ambitious infrastructure investment program to support economic development is a key part of Vision 2023.

HEALTHCARE EXPANSION LEADS IN PPPs

Turkey has created one of the world's largest social infrastructure expansion programs in its healthcare sector, with Private Public Partnership (PPP) procurement playing a key role in its delivery. The healthcare PPP pipeline – with 34 projects announced – has an estimated capacity of 50,000 plus beds with a US$16 billion investment.

Over the past four years, BTY has served as Lenders' Technical Advisors – and continues to serve as Construction Monitors – on four of the country's most notable hospital PPP projects: Izmir, Kocaeli, Konya, and Manisa. The firm also provided Construction Labour Audits on the Etlik project, and is providing Operations and Maintenance Technical Advisory Services for the newly announced Tekirdag PPP City Hospital project.

PPPs IN THE TRANSPORTATION SECTOR

Another key sector for Turkish PPPs is transportation. The government has used the model for mega-projects such as the US$1.7-billion North Marmara Motorway Third Bosphorus Bridge, the US$6.4-billion Gebze-Izmir Motorway and the US$6.9-billion Third Istanbul Airport. It now plans to employ PPP procurement for a number of major railway expansion projects that would more than double the length of Turkey's rail network. There are also plans to expand the road network to 70,000 km by 2023. Divided highways will make up to 36,500 km and 8,000 km will be standard highways.

The government also intends to use PPPs for a number of projects in the renewable, coal and nuclear energy sectors, and plans to further expand PPP use for educational facilities, water treatment and sewage systems, and natural gas pipelines.

RESIDENTIAL TO REMAIN LARGEST SECTOR IN CONSTRUCTION

Despite the dramatic expansion of infrastructure investment, residential construction will remain the largest market in the construction industry. Demand for housing is supported by ongoing population growth in urban and metropolitan areas (75% of the population lives in cities) estimated at 1.6%, and positive developments in regional economic conditions. Efforts to balance demand and supply for housing through the construction of affordable housing units will also promote growth.

The strength of the residential sector will also benefit from the ongoing 20-year Turkey Urban Renewal Project, a far-reaching plan to demolish some 7 million buildings and rebuild earthquake-resistant structures in their place. The plan began in 2012 with an estimated cost of $400 billion over its lifespan.

EXPANDING SOURCES OF FINANCING

To support the unprecedented investment in infrastructure construction projects, Turkey's parliament approved the national Sovereign Wealth Fund (SWF) in August 2016. Through the fund, the government seeks to resolve financing issues for mega construction projects that do not have a build-operate-finance model.

Another source of funding that is coming to the fore in supporting infrastructure development in Turkey is Islamic finance, which has been growing rapidly across the globe. A recent report by the Islamic Financial Services Board, the Islamic finance market currently stands around US$1.9 trillion. The first hospital deal in Turkey involving Islamic finance was the Konya Integrated Health care Campus, for which BTY provided Lenders' Technical Advisory Services, and is providing Construction Monitoring Services.

BTY's work in Turkey has been a significant factor in the firm's consistently high rankings on the Inframation League Tables over the past two years and the industry's recognition of its work. In October 2017, BTY ranked #1 for PPP Lenders' Technical Advisory Services globally. In late September, the firm won the Silver Award for Technical Advisor of the Year at the annual P3 Awards hosted by P3 Partnerships.

Sources: *Worldbank, OECD Economic Outlook, PriceWaterhouseCoopers, Garanti BBVa Group*

"Turkey continues expanding the use of P3s. Successes in transportation and healthcare projects are creating opportunities in education, water treatment and energy sectors."

TUNCA ATAOGLU Director

MAJOR TRENDS SHAPING CONSTRUCTION

MAJOR TRENDS SHAPING CONSTRUCTION

PRODUCTIVITY CHALLENGES

Improving productivity in construction

GLOBAL INDUSTRY LAGS BEHIND IN ADDING VALUE; EMBRACING CHANGES IN TECHNOLOGY, DESIGN, PROCUREMENT, AND EXECUTION ARE KEYS TO PROGRESS

Construction is one of the largest sectors of the global economy, but has posted one of the smallest gains in productivity over the past 20 years. The industry's labour productivity (value added per hour) has grown by just 1% per year compared to manufacturing's 3.6% gain. In some countries – including Canada and the U.S. – productivity has actually declined.

With an annual global shortfall of $1 trillion in infrastructure spending and mushrooming demand for affordable housing, even a small increase in productivity would bring significant benefits, including lower costs and speedier completions.

WHAT'S BEHIND THE DECLINE?

Multiple studies have identified an array of factors contributing to the productivity gap: extensive regulation, dependence on public-sector demand (governments account for 20% to 30% of total construction spending in Europe and North America), fragmentation, boom-and-bust cycles, weak project management, corruption, inadequate design processes, and underinvestment in technology. Construction remains one of the least digitized industries, and has the lowest profit margins except for retail.

The boom-and-bust cycles, fragmentation, low margins and a tendency to stay with tried-and-true building methods all contribute to lower capital investment that could improve productivity. Larger firms that focus on major infrastructure, industrial and residential projects are better positioned to make such investments and withstand downturns. They also tend to have much higher productivity – 20% to 40% higher – than smaller companies in specialized trades such as mechanical, electrical, and plumbing work that subcontract or work on smaller projects.

TECHNOLOGIES AND PRACTICES THAT IMPROVE PRODUCTIVITY

There is already a broad range of available technologies and practices that can improve productivity. Some are new, others are as old as the approaches that built the pyramids. Over the past four decades BTY has been a consistent innovator in adopting technologies and techniques that enable our clients to deliver projects more efficiently with Full Project Development Solutions that cover the entire life-cycle of a project.

"Technology is commonly seen as a path to improved productivity but a major study found that improving basic project-management skills carries the most potential to improving site performance, while the concept-and-design phase is where the most project value can be gained – or lost."

DARREN CASH Director

BUILDING INFORMATION MODELLING

Over the past decade there has been wider adoption of Building Information Modelling (BIM) that aggregates all the information related to a building project in a single location. Based on 3D models, BIM tools integrate design, engineering and fabrication workflow, with 4D models offering project phasing and construction sequencing, and 5D for managing cost, time, and resources.

BIM supports projects from planning through construction and maintenance during operations. Governments are increasingly mandating the use of BIM in projects. Its impressive capabilities are especially notable in terms of scale. A prime example of its implementation is Sweden's new Karolinska Hospital, which is due for completion in 2017. It is the largest hospital P3 in the world to utilize BIM for optimizing construction, handover and operations and maintenance requirements. Implementing BIM has made it possible for all project parties – from the authority to the project companies, to the designers, builders and operators – to use the same model to develop the hospital, which allows for significant increase in efficiencies.

3D PRINTING

The world's first 3D-printed steel pedestrian bridge is scheduled to be printed in December 2017 and installed shortly thereafter in Amsterdam. In addition to speed and time of construction, 3D-printing technology offers environmental benefits, such as minimal waste. Materials savings through optimized shapes mean that 3D printing is a highly eco-friendly technology.

The Chinese firm Winsun is pioneering large-scale 3D printing. After printing its first house in 2014, the firm created a printed housing development. Winsun has since delivered the first 3D-printed office building in Dubai. Compared with traditional on-site construction, the Winsun process saved about 80% on construction costs and 60% on both labour and waste.

PRACTICES TO IMPROVE PERFORMANCE

While these and other technologies, including modular construction, off-site fabrication, and drone surveying offer great promise, improving fundamental construction practices can provide the greatest benefits.

A McKinsey & Company analysis of more than $1 trillion worth of capital projects over the past five years found that improving "basic" project-management skills offers the most potential to improving site performance. The analysis further identified the concept-and-design phase is where the most project value can be gained or lost.

Integration of project participants – and aligning interests – is key to ensuring optimum understanding, planning, design, contracting and procurement and execution. Other key practices included ensuring appropriate risk allocation, considering life-cycle costing and developing effective schedule management. Each of these practices is embedded in BTY's Full Project Development Solutions, which are rooted in four decades of advising owners and developers in real estate and infrastructure projects. Our solutions integrate the complete range of services critical to supporting sound decision-making and optimal resource allocation throughout the development process.

Sources: *McKinsey & Co., The Economist, World Economic Forum*

MAJOR TRENDS SHAPING CONSTRUCTION

HOUSING

Canada's changing housing landscape

SHIFT TO DIFFERENT HOUSING TYPES AND MARKETS TO ACCELERATE AS SINGLE-FAMILY HOME CONSTRUCTION PEAKS

The construction of single-family homes across Canada is forecast to peak in 2017 at about 75,000 units before starting a sharp decline to near 66,000 in 2018 and 2019.

Multi-family building is expected to dip only slightly in that time frame, remaining the top housing type with a forecast of more than 130,000 units a year on average for the next two years.

Two out of three new homes built today are now multifamily, up from less than half in the mid-2000s.

The trend away from traditional single-family homes will continue as a growing, increasingly urban – and aging – population seeks housing solutions in multigenerational households, condos, purpose built-rentals and seniors' housing.

GROWING DEMAND FOR HOUSING

Canada's population grew at 1% per year from 2011 to 2016, the highest rate in the G7. Two-thirds of Canada's population growth in that period came from migratory increases (the difference between the number of immigrants and emigrants).

Most of the 1,212,075 newcomers over those five years – and the additional 300,000 plus expected in 2017 – settled in the largest metropolitan areas, as they traditionally have. While an increasing number are choosing cities in the Prairies region, Toronto remains the top choice, followed by Vancouver and Montréal. Add in the natural population increase, city-loving millennials forming new households, down-sizing boomers seeking condos in the urban core, the appeal of real estate in Canada's top rated livable cities to foreign investors, limited land availability (especially in Toronto as well as Vancouver), and demand overwhelms supply – and, increasingly, affordability.

In Toronto, 33.4% of households were spending 30% or more of their average monthly total income on shelter costs in 2016. In Vancouver, the proportion was 32%, and nationally, 24.1%.

"There is no one-size-fits-all solution to the housing challenges many Canadians face. The range of trends we see shows the variability of demand, and the adaptability needed to develop different responses to meet it."

CONNOR FALLS Director

NEW FEDERAL HOUSING STRATEGY

The federal government housing strategy announced in November 2017 will create 100,000 new housing units and repair another 300,000 over the coming decade. It comes with the pledge to invest $11.2 billion to address the urgent housing needs of 530,000 vulnerable families and individuals.

MILLENNIALS ARE MOVING HOME

One response for young adults caught in the squeeze has been to move back home. The latest census data show that 6.3% of Canada's population lives in multigenerational households, which have grown the fastest of all household types since 2001.

Seven of Canada's top ten urban markets have seen increases in the numbers of young adults living in their parents' home over the past 10 years. Among the greatest increases were Calgary (3.3%), Montréal (3.2%), Toronto (2.8%) and Winnipeg (2.7%). Nationally, the rate is 1.6%.

MOVING AWAY FROM THE CITY

Another option for Canadians – especially millennials – involves choosing to move farther away from major urban cores as they seek affordable housing.

Some are even moving to new cities, while others opt to raise families in condos – or larger units in family-oriented buildings.

MOVING INTO CONDOS

The number of households living in condos rose by 1.1% between 2011 and 2016. Today, those 1.9 million households comprise 13.3% of the total.

About 67% are owners, the balance represented by renters. In Vancouver, condos comprise 30.6% of all local households. Calgary ranked second with 21.8%, followed by Abbotsford-Mission, B.C., with 21.5%, Kelowna with 21.3% and Toronto with 20.9%.

PERMANENT APARTMENT RENTERS

The choice to forego homeownership and become lifelong renters is easiest in markets such as Quebec – the demographics of which have long been comfortable with renting – and have ample, if older housing stock as well as new purpose-built rentals in desirable locations. The greater Montréal area has about 500,000 rental apartments, compared with 100,000 in Metro Vancouver, which has about half the population of Montréal. Toronto has about 300,000 units.

Both Toronto and Metro Vancouver, which have had next to no significant investment in purpose-built rental properties for decades, are seeing increased interest in these type of property developments due to the combination of changes in mortgage rules and high home prices pushing home ownership out of reach for many people, and young adults in particular.

HOUSING FOR SENIORS

While millennials have eclipsed boomers as the single largest demographic, the population of seniors ages 75-years and older in Canada is expected to grow by 111.2% between 2014 and 2034, while the total population of Canada is only expected to increase by 19.1% over the same period.

The anticipation of meeting seniors' housing needs has driven the sector's growth into a multibillion-dollar market, with a growing trend among wealthier seniors to demand larger and more luxurious accommodations resulting in private retirement homes that can rival a luxury hotel.

Sources: Canada Mortgage and Housing Corporation, PriceWaterhouseCoopers: Emerging Trends in Real Estate, CBRE, Statistics Canada, First National Financial LLP

MAJOR TRENDS SHAPING CONSTRUCTION

ENVIRONMENTAL EVENTS

How extreme weather events affect the construction industry

ASSESSING RISK AND BUILDING RESILIENCE

The economic impact of global warming is costing the world more than $1.2 trillion a year, and climate change is already contributing to loss of life at nearly 400,000 people a year. Extreme weather events are a prime cause of life and material destruction, and pose increased risk around the globe. This year in particular has proven that North America is not immune to the toll of extreme weather events.

In 2017, Hurricanes Harvey and Irma caused an estimated $290 billion in damages in the U.S. while one of the worst wildfire seasons on record ravaged many parts of the province of British Columbia and the state of California. These natural disasters came just a year after the Fort McMurray wildfires caused Canada's costliest natural disaster – estimated at $8.9 billion – and four years after the devastating floods in Southern Alberta and Toronto caused nearly $3 billion in combined damages.

CONSTRUCTION IS A WEATHER DEPENDENT INDUSTRY

Local conditions, such as topography and weather, determine to a significant degree where, when and how projects are built. Climate governs the development of building strategies and selection of building materials, and the lion's share of construction work itself takes place outside in the elements. Beyond their impact on residents, extreme weather events can cause delays and cancellations, putting workers at risk and driving up costs.

IMPACT ON LABOUR AND MATERIALS

Rebuilding after these most recent hurricanes and wildfires has put an even greater strain on an already tight labour market. Most contractors report having serious difficulty finding workers, even at significantly higher wages. Lumber prices have shot up as the added demand has sparked a huge supply shortage. The 20% tariff on Canadian softwood, which had traditionally accounted for 30% of U.S. supply, has only widened the gap between supply and demand – and put more pressure on prices.

Extreme weather can also make it more difficult to source and purchase construction materials. Flooding in areas where resources are being extracted or processed can reduce the supply of key ingredients for construction materials and even energy; it's estimated that Hurricane Harvey temporarily knocked out 20% to 25% of the United States' oil refining capacity. Drought can also prevent sites from securing water critical to operations.

"Developing a strategy for dealing with the effects of extreme environmental events is becoming standard practice for firms seeking to protect their people and their projects."

BEN CONNOR Senior Project Consultant

DEVELOPING STRATEGIES FOR BUILDING RESILIENCE

Many firms are already engaged in creating strategies for protecting their people, equipment, supply and projects in the event of extreme weather conditions. Another key element to building resiliency at the company level is improving planning and communication to enable organizations to respond effectively when extreme weather events occur.

Canada's National Research Council is conducting research, evaluations, and risk analyses to develop new solutions to factor climate resilience into the design of future buildings and infrastructure in Canada. This includes houses, roads, bridges, water systems, and rapid transit networks.

As total annual precipitation, and the frequency and severity of wildfires, heat waves, high winds, floods, and droughts, continue placing stresses on built structures, it is clear that the industry as a whole needs to adapt mitigation measures through the full life-cycle of asset development and management. The Council is planning to put forth guidance on adapting buildings and infrastructure to withstand the risk factors associated with environmental events.

The Government of Canada is investing $40 million into these efforts, which once in place, are expected to reduce the costs of rehabilitation and replacement of buildings and infrastructure affected by extreme weather events. New specifications and guidelines are expected to be released as soon as 2020.

__Sources:__ Green Building Climate Resilience, CMIC, CBC, Government of Canada National Research Council, Vox, The Guardian, Washington Post, Climate Vulnerability Monitor: A Guide to the Cold Calculus of A Hot Planet

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