BUILDFORCE CANADA

National Capital Region Heavy and Civil Construction Sector:

Construction Demand Outlook and Environmental Scan to Support the Development of Successful Recruitment Strategies

Prepared for:
Kathryn Sutherland
Executive Director
National Capital Heavy Construction Association

Prepared by:
BuildForce Canada
220 Laurier Avenue
Suite 1150
Ottawa, ON
K1P 5Z9

JULY 2021

CONTENTS

Prepared by Prism Economics and Analysis in cooperation with BuildForce Canada.

Prism Economics and Analysis (Prism) is an established labour market economics consultancy firm specializing in the analysis of labour markets and human resource planning issues. Prism works with employers, governments, post-secondary institutions, trade unions, and professional associations to deliver credible research that provides practical human resource solutions.

BuildForce Canada is a national industry-led organization that represents all sectors of Canada's construction industry. Its mandate is to provide accurate and timely labour market data and analysis, as well as programs and resources to support the industry with its efforts to build and maintain the labour force capacity required to meet the needs of the Canadian economy.

EXECUTIVE SUMMARY

This report consists of three elements. The first is a recruitment demand outlook for the Ottawa region based on investment demands and industry demographic trends. The second is a job matching exercise looking at professions in the Ottawa region with the greatest matching potential to the essential and technical skills required by the sector that could provide the industry with a possible pool of workers for recruitment. The final element is an environmental scan and literature review of recruitment strategies that have yielded some successes in recruiting workers into the construction sector.

INDUSTRY RECRUITMENT DEMAND OUTLOOK

The heavy and civil construction sector is expected to see employment rise to a peak of 8,500 workers by 2022 – an increase of 870 jobs, or an 11% increase compared to the 7,620 workers active in the sector in 2020. Growth is driven by an expected 15% rising in engineering investment following the anticipated timing of the OLRT Confederation Line (East-West) and Trillium Line Expansion projects. Moderate growth in other civil infrastructure (including sewer and water) and increased site preparation activity is expected to coincide with an anticipated surge in major hospital and government building construction between 2024 and 2026.

The trades helpers and labourers group, which includes skilled and unskilled workers, accounts for the largest employment and hiring requirements in the heavy and civil sector. Employment is estimated to increase by 13% to 3,140 workers by 2022. Near-term demands will be disproportionately driven by demand for concrete forming and finishing by major transportation projects.

In addition to meeting near-term expansion requirements, Ottawa's heavy and civil sector will also need to replace an estimated 1,660 retiring workers, or approximately 22% of the 2020 workforce, between 2021 and 2029. When coupled with demand, the net hiring requirements for the industry over the course of the decade is just over 1,490 workers. This figure excludes turnover, which can be as high as 30-40% among new hires for labourers.

RECRUITMENT STRATEGIES

Several potential recruitment strategies can be utilized by the industry to meet the anticipated worker requirements over the coming decade. The most prominent professions within the sector are drivers, heavy equipment operators, and labourers.

Of particular importance is the age profile of the workforce in the heavy and civil construction sector. Compared to building construction and to the specialty trades contractors, the heavy and civil construction sector has a markedly *lower* share of its workforce that is younger than 35 years of age: 33.4% vs. 44.7% for the specialty trades. This is a troubling finding as it suggests that the heavy and civil construction sector has been *less* successful in attracting and retaining workers under the age of 35 than other sectors of the construction industry.

The sector is also dependant upon workers from the Gatineau region, with approximately 15-20% of workers employed by the sector residing in the province of Quebec. The Commission de la Construction du Québec (CCQ) in 2020 estimated that 1,218 individuals registered in the Outaouais work in the civil

engineering and roads sector. Although data tracking the interprovincial movement of these workers is not available, it is assumed that a share of this overall workforce is active on both sides of the Ottawa river.

Historically, the rural labour pool has been an important source for recruiting new workers into the National Capital Region's heavy and civil construction sector. However, this labour pool is stagnant or declining. To meet its future skill requirements, the sector will need to identify other potential labour pools from which to recruit. An analysis of skill transferability indicates that some of the occupations in these labour pools have skills that are partially transferrable to the heavy and civil construction sector. However, a significant investment in training will be required for most of these workers.

While perceptions of the industry can be a significant obstacle to recruitment, a shift toward a more *positive* view of the skilled trades appears underway. To take advantage of this change in attitudes, the heavy and civil construction sector may need to explore ways to strengthen the role of apprenticeship or workers' skills certification, as both appear tied to the changing attitudes of students toward careers in construction. Career pathways are important to students, and the perception that the heavy and civil construction sector does not offer career paths is an important factor in a young worker's decision to avoid the construction industry, to leave the industry, or to move to a different sector in the industry where these pathways are more evident. Investing in a high school-focused recruitment initiative has potential if it operates within the framework of the Ontario Youth Apprenticeship Program (i.e., leads to a formal apprenticeship and trade qualification).

In addition to youth, there is a large and likely growing pool of workers in their twenties and thirties who are stuck in low-paid, menial, and often precarious jobs. Among the industries that could be included in this category are landscaping, warehouses, courier and delivery services, assembling and machine operator jobs in manufacturing, non-residential building cleaning, and window cleaning. While many of these workers may not be interested in (or suitable to) construction, there will be individuals in this pool of workers for whom the wages, benefits, and career opportunities in heavy and civil construction are attractive.

The sector should also consider developing stronger ties to community immigrant settlement organizations that serve recently arrived newcomers and refugees. These organizations can be extremely helpful in the promotion of the industry as a viable career option, as well as in the identification of suitable candidates. The educational and occupational profiles of many of these individuals in the refugee pool, in particular, align well with the needs of the heavy and civil construction sector. Enhancing industry links with these settlement organizations and community connectors could yield positive outcomes, as employers that have adopted such strategies reported satisfactory results.

To help generate additional interest in the sector, a successful marketing campaign must be developed that is focused on the specific segments of the overall market that will be most receptive to the marketing message. Important to this effort will be to find channels that will reach these segments of the market. Based on industry experience to date, there are two marketing messages that have the potential to gain traction. The first is the wages and benefits that the heavy and civil construction sector offers. This message will primarily be of interest to young workers who are "stuck" in low-wage, precarious, and marginal employment. The second and related message is that the sector and its employers offer career opportunities, i.e., a pathway to advancement. This raises an important question for the sector, which is how it sees the role of the formal trades and apprenticeship system fitting into a strategy to meet future skill needs.

INTRODUCTION

This regional heavy and civil sector labour market outlook forecasts the industry's labour force requirements for selected construction trades and occupations specific to the Ottawa region for the 2021–2029 period.

BuildForce Canada maintains a scenario-based forecasting system used to assess current and future construction labour requirements in the heavy-industrial, residential, and non-residential construction markets. This labour market information (LMI) system tracks 34 trades and occupations. The heavy and civil sector outlook is based on a custom run to isolate the Ottawa region within BuildForce Canada's outlook for Eastern Ontario[1]. The civil module provides detailed projections on investment, construction employment, retirements, and total hiring requirements specific to Ottawa's heavy and civil construction sector.

The next section of the report presents the results of an analysis of skills transferability. The purpose of the analysis is to identify occupations that require skills and knowledge that are at least partially transferrable to the heavy and civil construction sector. Identifying these occupations and the industries that employ them provides a basis for assessing how much scope there may be for a recruitment strategy that targets workers with skills and knowledge that are at least partially transferrable to the heavy and civil construction sector, thereby reducing the required up-front investment in training by employers.

The final section of the report presents the findings of an environmental scan that summarizes the results of a literature review, a statistical review, and interviews with industry stakeholders. The purpose of the scan is to set out the best available evidence on the trends that need to be considered when formulating a long-term strategy to meet the skill needs of the National Capital Region's heavy and civil construction sector.

STATISTICAL PROFILE OF THE SECTOR

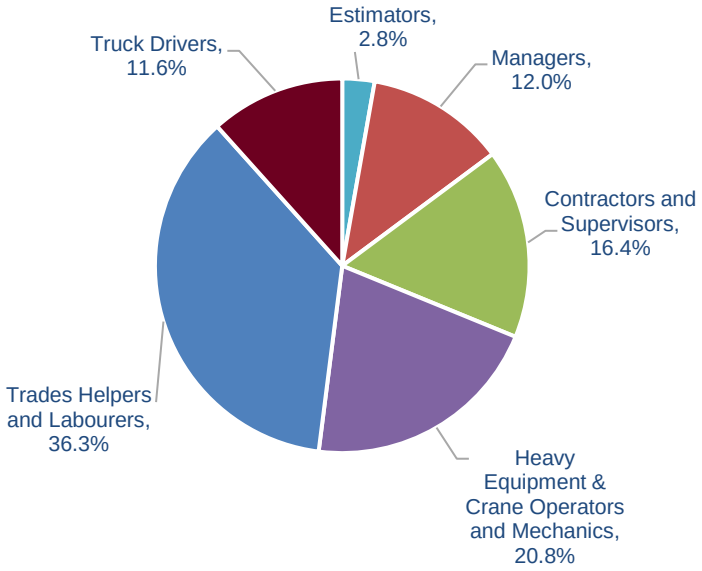
This profile draws on two sources of data to profile the heavy and civil construction sector. The first is the Census. The second is the BuildForce Model. The Census data is useful for some purposes but has two drawbacks. First, the most recent Census data is for 2016. Second, the Census reports workers based on where their primary residence is located. In the case of the National Capital Region's heavy and civil construction sector, this leads to a serious under-estimation of its actual size, as the sector draws in a significant number of workers from the Quebec side of the Ottawa River and, to some degree, from outside the region.

The BuildForce Model addresses the drawbacks in the Census data and therefore provides a more accurate profile of the region's heavy and civil construction sector. The BuildForce estimates are more current and are updated annually. BuildForce also estimates employment based on where the work is taking place.

[1] The Eastern Ontario region includes the economic regions of both Ottawa and Kingston-Pembroke, including the Census Metropolitan Areas (CMAs) of Ottawa and Kingston. Cities include Cornwall, Brockville, Belleville, and Petawawa.

Using the BuildForce Model, the heavy and civil construction sector in the National Capital Region employed just over 7,600 workers in 2020. This is projected to increase to 8,500 workers in 2022, if skills shortages do not constrain the sector. Figure 1 shows the estimated occupational composition of the heavy and civil construction sector.

Figure 1: Occupational Composition of the Heavy and Civil Construction Sector in Ottawa, BuildForce Model 2020



In addition to the workers shown in Figure 1, the heavy and civil construction sector also employs form workers and concrete finishers. Some of these workers are employed directly by members of the National Capital Heavy Construction Association. Some may be employed by sub-contractors in the forming sector.

Interviews conducted with employers and unions as part of this report suggest that around:

- 10-15% of employees are entry-level
- 30-50% are semi-skilled
- 30-40% are skilled
- 10-15% are highly skilled and experienced

The above estimates are approximations and will vary across companies. Collective agreements establish classifications to reflect the above skill differences. Non-union companies use their own classification systems.

Census data indicate that, in 2016, within the “trades, transport, and equipment operation” category of employees in the heavy and civil construction sector, 2.2% of workers were women. This is somewhat, but not significantly, lower than the 2.7% overall share for the Ottawa construction industry. Within the total workforce for the heavy and civil construction sector in Ottawa, the Indigenous share of employment was 3.7%. The share for the construction industry in Ottawa was 3.9%

Census data also indicate that, in 2016, compared to building construction and specialty trades, the heavy and civil construction sector had a *lower* share of its workforce that was younger than 35 years of age (see Figure 2). This is a troubling finding.

Figure 2: Share of Workers Aged 15-34 in the Workforce: Heavy and Civil Construction Compared to Specialty Trades, Ottawa, Statistics Canada, Census 2016

In the specialty trades (e.g., the electrical and mechanical trades, carpentry, masonry, etc.), 44.7% of the workforce in the Ottawa-Gatineau region was under 35 years of age in 2016. Roughly one worker in six (16.2%) was under age 25. This suggests that, in the specialty trades, the skill pool is being replenished. In part, this is because the specialty trades have been comparatively successful in attracting young workers, which is not surprising, as they tend to offer a larger number of apprenticeship opportunities.

By contrast, in the heavy and civil sector, only a third (33.4%) of the workforce is under age 35, and only one worker in eight (12.8%) is under age 25. The implication of this demographic profile is that the heavy and civil sector has been markedly *less* successful in attracting and retaining younger workers. This is fundamental to understanding the labour shortage challenge faced by the heavy and civil sector.

Table 1 summarizes Census data on educational attainment for heavy equipment operators and trades helpers and labourers in the Ottawa region. It should be noted that these data are for the construction industry as a whole.

Table 1: Highest Educational Attainment, Heavy Equipment Operators and Construction Labourers, All Sectors, Ottawa-Gatineau Region (Ontario Side), Statistics Canada, 2016 Census

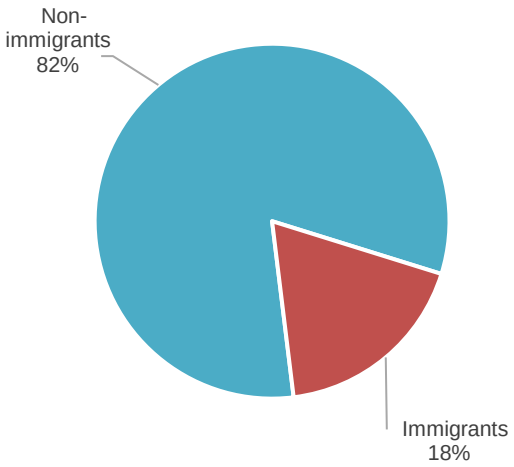
	Heavy Equipment Operators	Trades Helpers and Labourers
Less than high school – no trades qualification	24.6%	25.0%
High school – no trades qualification	44.7%	42.8%
Apprenticeship trades qualification	15.1%	9.2%
Other trades certification	8.0%	4.5%
Other qualification above high school – no trades qualification	7.5%	18.4%
Total	100.0%	100.0%

Notable from these data is that, on an industry-wide basis, two-thirds of workers in both occupations had *no* trades qualification. Roughly one in four heavy equipment operators held a trade qualification or other related certification (usually from a private training body). For trades helpers and labourers, the ratio was around one in seven.

This qualification rate was lower, as would be expected, than in the compulsory trades (e.g., Electrician), but it is also lower than the qualification rate in many of the voluntary trades. For example, the qualification rate (including private training bodies) for bricklayers is 37.8%, for carpenters 33.2%, for concrete finishers 22.9%, for drywall installers and plasterers 36.9%, for glaziers 48.5%, and for insulators 38.5%. In the competition for recruits to replace exiting or retiring workers, occupations and sectors that under-weight the importance of trade qualifications may be at a competitive disadvantage in attracting *career-oriented* workers. This is consistent with the research into the changing views of parents and youth related to careers in the construction sector. Those interested in the pursuit of a career in the industry tend to be drawn to apprenticeships, as they view those trades as offering a career pathway.

The 2016 Census also provides data on immigration status by occupation. These data apply to the construction industry as a whole. The Census indicates that immigrants accounted for 18% of workers in the trades helpers and labourers occupation in the Ottawa region (see Figure 3). By comparison, in the Greater Toronto Area, the corresponding proportion of immigrants in the trades helpers and labourers occupation is 51%. The Census data also indicate that recent immigrants (persons in Canada for five or fewer years) accounted for only 3% of the workforce in the trades helpers and labourers occupation in Ottawa. In the Greater Toronto Area, the proportion was roughly 8%.

Figure 3: Immigrant Share of Trades Helpers and Labourers Group in Ottawa-Gatineau (Ontario Side), Statistics Canada, Census 2016



While differences exist between the Greater Toronto Area and the Ottawa region, the data suggest the industry in Ottawa has been less successful in recruiting immigrants to the industry than its counterpart in Toronto.

WAGE DIFFERENTIALS

It is difficult to precisely compare wages and working conditions across sectors owing to differences in classification systems and hours of work. The union rates provide an indication of approximate relativities in pay across sectors.

The heavy and civil construction sector does *not* appear to be positioned advantageously to attract skilled labour from the ICI (industrial, commercial, institutional) sector or the demolition sector. For example, a labourer working as a Construction Craft Worker or a Mason Tender in the ICI sector would earn approximately 6-7% more per hour than a skilled labourer in the roads sector. A Journeyperson Cement Finisher would earn around 15% more per hour. A Journeyperson HazMat Labourer in the demolition sector would earn 10% more per hour. These differences would be greater if the comparison were to a labourer in the utility sector. However, the heavy and civil construction sector is positioned advantageously to draw labour from the low-rise residential sector, the low-rise renovation sector, and the landscaping sector. Statistics Canada data suggest that wages in the low-rise residential sector may be as much as 30% lower. A scan of posted jobs on Indeed.com for landscape workers also suggests that offered wages are significantly lower than wages in the heavy and civil construction sector.

Given the relative wages between the ICI sector and the heavy and civil construction sector, there is likely to be attrition from the heavy and civil construction sector to the ICI sector when there are employment opportunities in the ICI sector. This attrition may be more evident among skilled workers whose construction skills are largely transferable to the ICI sector.

These comparisons, however, should be used cautiously. In the heavy and civil construction sector, the work week is typically 50 hours compared to 40 hours in the ICI sector. Overtime may also be more

available in the heavy and civil construction sector, especially on asphalt jobs that fall behind schedule. The additional hours may be a discouragement for some workers, whereas others may welcome the additional earnings from those extra hours. In the low-rise residential sector, remuneration is commonly paid based on piece-rates. Some workers are attracted to this model as it allows them to increase their remuneration by increasing their effort. On balance, the comparative wage data suggest that the heavy and civil construction sector will tend to lose skilled workers to other construction sectors that pay a higher hourly wage, but that the sector can potentially replace some of these workers by recruiting *and* training less-skilled workers drawn from the low-rise residential sector, the low-rise renovation sector, and the landscaping sector.

SCOPE OF ANALYSIS

The heavy and civil construction sector is defined to include the following market segments:

- roads and bridges
- site preparation
- major civil infrastructure
- other civil (including sewer and water)
- civil sector maintenance

Civil construction investment is estimated as a share of total heavy and civil engineering construction. Road, highway, and bridge investment is isolated based on the Infrastructure Economic Accounts[2].

- Site preparation is estimated as a share of total other civil engineering construction based on a share of new residential and ICI construction investment.
- Major civil infrastructure is based on a share of major transportation and warehousing projects tracked by BuildForce Canada.
- Civil sector maintenance includes a portion of non-residential investment attributed to roads, highways, and bridges and other engineering tracked in the BuildForce Canada system.

The analysis covers several core trades and occupations as identified by heavy and civil construction employers. Key trades include those listed in Table 2.

[2] Statistics Canada. Table 36-10-0608-01

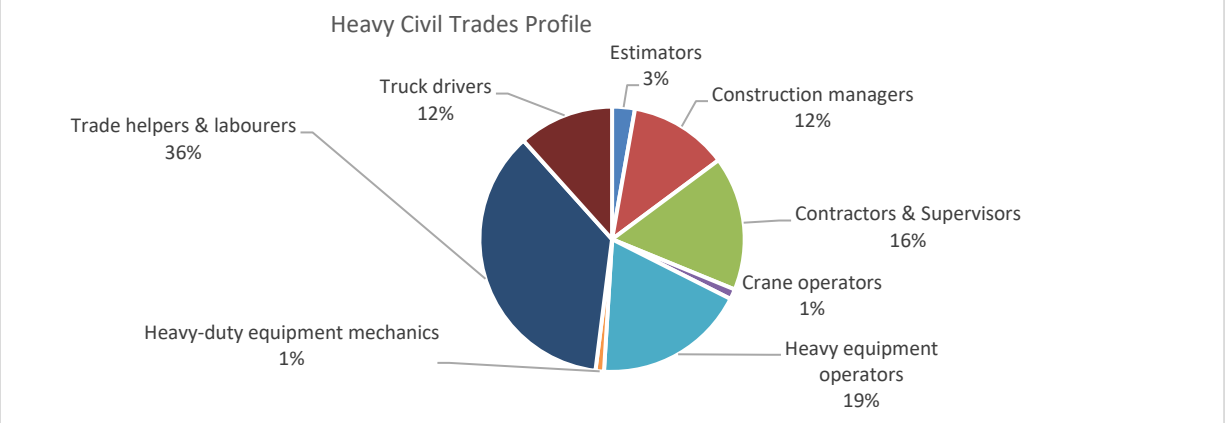
Table 2: Heavy and Civil Construction Sector NOC-4 Trades Classifications and Related Job Functions in the Ottawa Construction Industry

NOC-4 Trade Classification	Job Function/Role
Construction estimators (2234)	Estimators
Construction managers (0711)	Project managers, superintendents
Contractors and supervisors (7201-05 and 7301-02)	Foreman, junior foremen
Crane operators (7371)	Mobile crane operators
Heavy equipment operators except crane (7521)	Dozer, excavator, …
Heavy-duty equipment mechanics (7312)	Mechanics
Trades helpers and labourers (7611,7612)	Labourers, skilled labourers, lead hand, pipelayers, deckman, grade men, flagger
Truck drivers (7511)	Truck drivers

The heavy and civil construction sector is estimated to have employed just over 7,600 workers in the Ottawa region in 2020. This estimate is made on a place-of-work basis, rather than place of residence of workers, and includes workers drawn in from outside the Ottawa Census Metropolitan Area (CMA).

The distribution defining the key trades and occupations for the heavy and civil construction sector was based on consultations with industry stakeholders. Just over one-third (36%) of workers in the heavy and civil construction sector are employed as trades helpers and labourers, which includes a broad range of unskilled, semi-skilled, and skilled workers trained for specific functions. Heavy equipment operators are the second-largest trade group, accounting for roughly 19% of the workforce (see Figure 4). Crane operators and heavy-duty equipment mechanics are grouped together with heavy equipment operators due to relatively small numbers.

Figure 4: Heavy and Civil Construction Sector Employment Distribution by Trade in the Ottawa Construction Industry



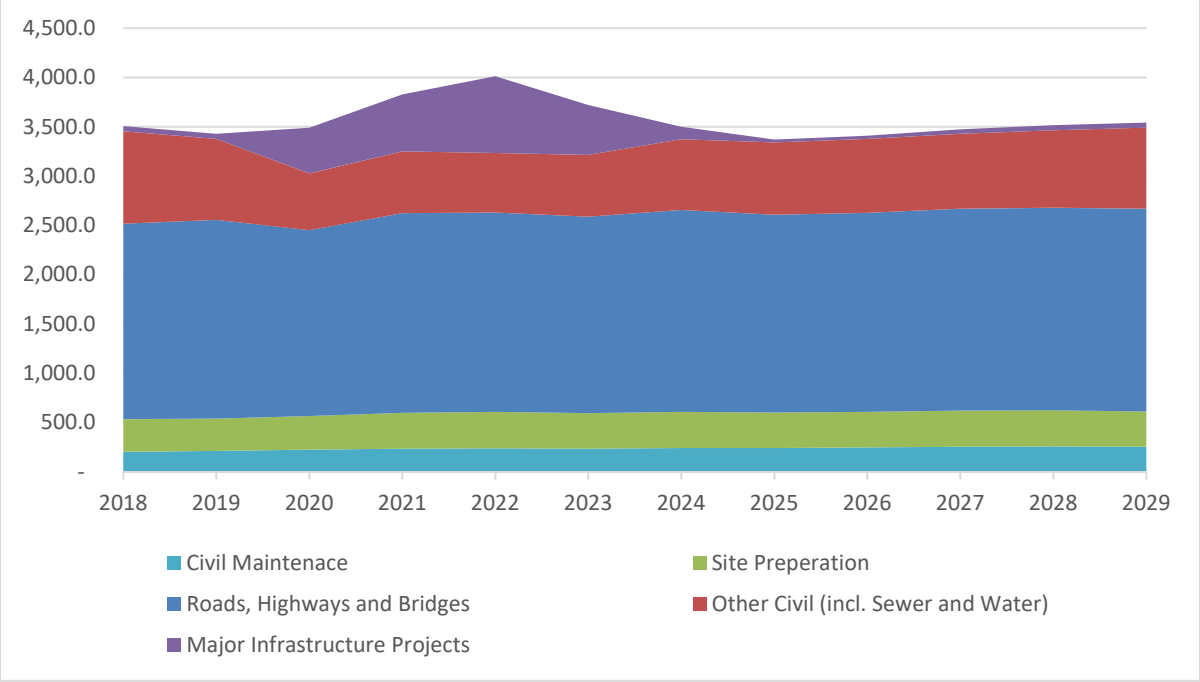
1. WORKFORCE DEMANDS, 2021–2029

HEAVY AND CIVIL CONSTRUCTION INVESTMENT OUTLOOK

Construction activity in the Ottawa region was sustained in 2020 by record-high levels of apartment building construction and increased major transportation infrastructure activity. The pace of growth is expected to accelerate through the second half of 2021 as the grip of COVID-19 loosens and the broader economy reopens, supporting a recovery across all sectors. Overall, ICI building construction is bolstered by a significant increase in institutional investment driven by major projects, including the scheduled start of a new hospital in Ottawa.

Ottawa's heavy and civil sector experienced a modest increase in activity through 2020, as major transportation project work and site preparation activity accelerated. Investment is estimated to rise by 10% in 2021 driven by the continued ramping up of work on the Ottawa LRTs, alongside increased road, highway, and bridge construction, site preparation, and other civil infrastructure. Heavy civil investment is projected to reach a peak in 2022, rising 15% above 2020 levels, following the anticipated timing of the OLRT Confederation Line (East-West) and Trillium Line Expansion projects (see Figure 5).

Figure 5: Civil Engineering Investment, Ottawa

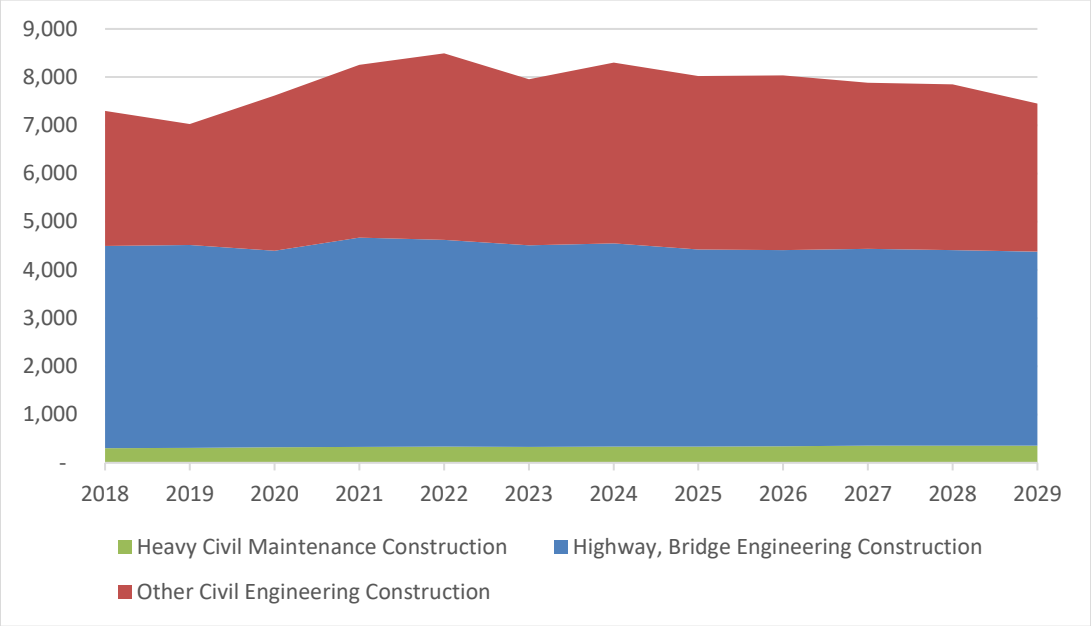


As current major projects wind down, moderate growth will be supported by projected stable levels of road, highway, and bridge work, moderate growth in other civil infrastructure (including sewer and water), and increased site preparation activity related to an expected surge in major hospital, government buildings, and multi-unit residential construction between 2024 and 2026.

HEAVY AND CIVIL CONSTRUCTION EMPLOYMENT OUTLOOK

Ottawa's heavy and civil construction sector is expected to see employment peak at 8,500 workers by 2022 – an increase of 870 workers (+11%) compared to 7,620 in 2020 (see Figure 6).

Figure 6: Civil Engineering Employment, by Segment, Ottawa



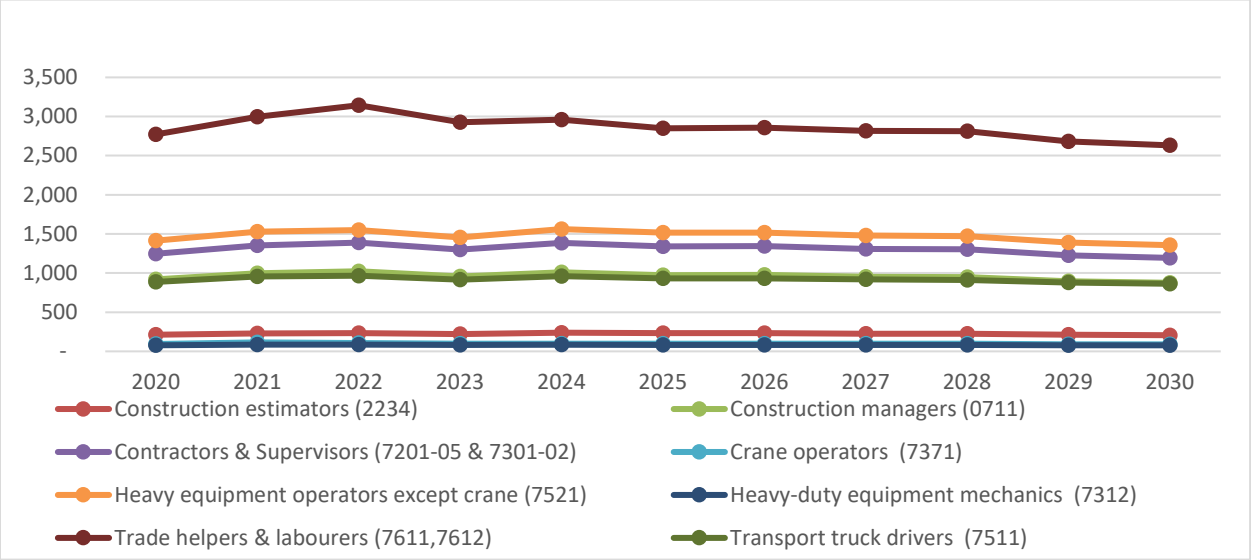
The strongest growth is expected in 2021, with increased transportation infrastructure and road and bridge work expected to add 640 employment opportunities. Requirements are expected to ebb in 2023, based on current project schedules, followed by further growth in 2024, buoyed by increases in site preparation and other civil infrastructure requirements partly related to the rise in major health and other institutional building requirements.

The 2021–2029 BuildForce Canada scenario shows the completion of tracked major projects alongside the slowing pace of population and new-housing construction. This outlook contributes to a moderation in heavy civil construction activity after 2026, although employment remains near 2020 levels.

The trades helpers and labourers group, which includes skilled and unskilled workers, accounts for the largest employment and hiring requirements in the heavy and civil sector. Employment is estimated to increase by 13% to 3,140 workers by 2022 – an increase of approximately 375 workers compared to 2020 levels (see Figure 7). Near-term demands will be disproportionately driven by demand for concrete forming and finishing by major transportation projects.

Heavy equipment and crane operator employment is expected to rise by 10% to 2022 and then reach a scenario peak of nearly 1,750 workers in 2024, in-line with the expected peak in civil infrastructure and site preparation activity related to major institutional building construction.

Figure 7: Civil Engineering Employment, by Trade, Ottawa



REPLACEMENT DEMANDS AND HIRING REQUIREMENTS

In addition to meeting near-term expansion requirements, Ottawa's heavy and civil sector will need to replace an estimated 1,660 workers expected to retire over the next 10 years and fill additional vacancies caused by career progression and turnover. Taken together, retirement and expansion demands are likely to present two distinct pinch points for the heavy and civil sector. The first occurs between 2021 and 2022 and is driven by transportation infrastructure project demands. The second occurs in 2024 and is driven by civil infrastructure related to major institutional building construction.

Total net hiring requirements, accounting for both employment growth and retirements between 2021 and the anticipated peak in 2024, are estimated at approximately 1,460 workers, with retirements accounting for just over 780 workers. This figure is the number of workers that need to be recruited *and retained* and excludes turnover, which can be as high as 30-40% among new hires for labourers. See table 3.

Labourers account for the largest number of anticipated new hires over the next two years. The heavy and civil sector will likely need to recruit and retain an additional 470 new labourers over this period. This represents approximately 17% of the current workforce. Including attrition, the hiring requirements are likely closer to 600 workers. Estimated requirements also exclude workers that need to be replaced as they progress away from the trade into management or supervisory positions. See table 3.

Hiring requirements for heavy equipment and crane operators and equipment mechanics are expected to experience a double peak (2021 and 2024). Hiring requirements across the 2021–2024 period is estimated at just under 340 workers, or 21% of the 2020 trade's civil workforce. As workers in this trade tend to be older than labourers, a greater proportion of hiring requirements are driven by expected retirements. A similar trend is expected for truck drivers. See table 3.

The sector will also face significant hiring requirements for managerial and supervisory positions. It is estimated that hiring requirements in these occupations will be for contractors and supervisors (293), project managers (202), and estimators (48). These roles tend to require significantly more experience and can be challenging to fill. Figure 8 shows cumulative hiring requirements across three periods: the near-term peak, 2021–2022; the medium term, 2021–2024; and the entire scenario period, 2021–2029. See Table 3.

Figure 8: Civil Engineering Hiring Requirements, by Trade, Across Cumulative Periods, 2021–2022, 2021–2024, 2021–2029, Ottawa

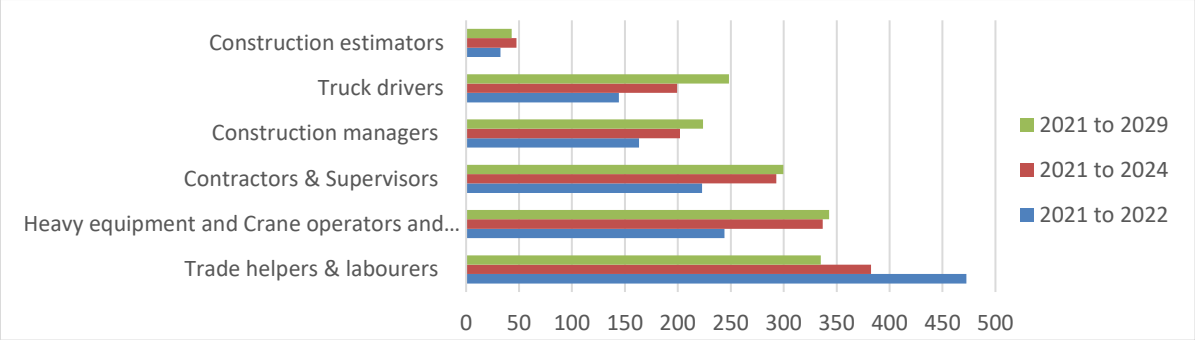


Table 3: Civil Engineering Hiring Requirements, Total Trades and Occupations, Ottawa Region

	2020	2021–2022	2021–2024	2021–2029
Total trades and occupations	**7,621**			
Employment (change)	595	872	679	-170
Retirement	197	407	783	1,663
Total net hiring	792	1,279	1,462	1,493
Share of 2020 employment (%)	*10%*	*17%*	*19%*	*20%*
Construction estimators	**212**			
Employment (change)	13	21	27	0
Retirement	5	11	21	43
Total net hiring	18	33	48	43
Share of 2020 employment (%)	*9%*	*15%*	*23%*	*20%*
Construction managers	**918**			
Employment (change)	73	105	90	-22
Retirement	28	59	112	246
Total net hiring	100	163	202	224
Share of 2020 employment (%)	*11%*	*18%*	*22%*	*24%*
Contractors and supervisors	**1,247**			
Employment (change)	102	142	140	-21
Retirement	39	80	153	321
Total net hiring	141	223	293	300
Share of 2020 employment (%)	*11%*	*18%*	*24%*	*24%*

Continued

Continued

Heavy equipment and crane operators and mechanics	**1,587**			
Employment (change)	114	151	160	-28
Retirement	46	93	177	370
Total net hiring	160	244	337	343
Share of 2020 employment (%)	10%	15%	21%	22%
Trades helpers and labourers	**2,770**			
Employment (change)	265	374	188	-89
Retirement	45	99	194	424
Total net hiring	311	472	383	335
Share of 2020 employment (%)	*11%*	*17%*	*14%*	*12%*
Truck drivers	**887**			
Employment (change)	28	79	74	-10
Retirement	33	65	126	259
Total net hiring	62	144	199	248
Share of 2020 employment (%)	*7%*	*16%*	*22%*	*28%*

2. OCCUPATION MATCHING RESULTS

The purpose of this component of the analysis is to identify occupations that require skills and knowledge that are at least partially transferrable to the heavy and civil construction sector. The primary focus is on work activities, skills, and knowledge that are at least partially transferrable to heavy equipment operators (NOC 7521) and construction trades helpers and labourers (NOC 7611). Identifying these occupations, and the industries that employ them, provides a basis for assessing how much scope there may be for a recruitment strategy that targets workers with skills and knowledge that are at least partially transferrable to the heavy and civil construction sector.

To the extent that it is practical, there are two advantages of such a recruitment strategy. First, the strategy targets workers who are more likely to be suited to working in the heavy and civil construction sector, owing to a similarity in work activities. Second, these workers may require less up-front investment in training.

The analysis that follows was conducted using a machine learning clustering algorithm to gauge the degree of transferability of skills across occupations. This analysis can serve two purposes. First, it provides a measure of the availability of workers in the Ottawa region in other industries that could be suitable recruits for the heavy and civil construction sector. Second, the skill transferability analysis assists employers in identifying the training that will be required when hiring workers with a background in a different industry.

The basis for the skills transferability analysis was occupational profiles in the U.S.-based O*Net database. The O*Net dataset identifies the work activities and rates the skills and knowledge for thousands of occupations. The O*Net dataset is much more detailed than the description of knowledge and skills in Canada's system of National Occupational Classifications (NOCs).

HEAVY EQUIPMENT OPERATORS

This occupation is engaged in the operation of heavy equipment for the construction and maintenance of infrastructure, mining, and other handling work. The analysis identified five occupations as having at least partially transferrable skills and knowledge. Some of these occupations would not be strong prospects for recruitment into the heavy equipment operators occupation in the heavy and civil construction sector, either because their current earnings make a transfer unlikely, or there are only a small number employed in Ottawa and its environs. Crane operators (NOC 7371), for example, usually have a higher hourly wage than heavy equipment operators.

The five occupations identified by the analysis are:

- Logging machinery operators (NOC 8241)
- Water transport deck and engine room crew (NOC 7532)
- Crane operators (NOC 7371)
- General farm workers (NOC 8431)
- Residential and commercial installers and servicers (NOC 7441)

The following table sets out the employment of these occupations in the Ottawa region.

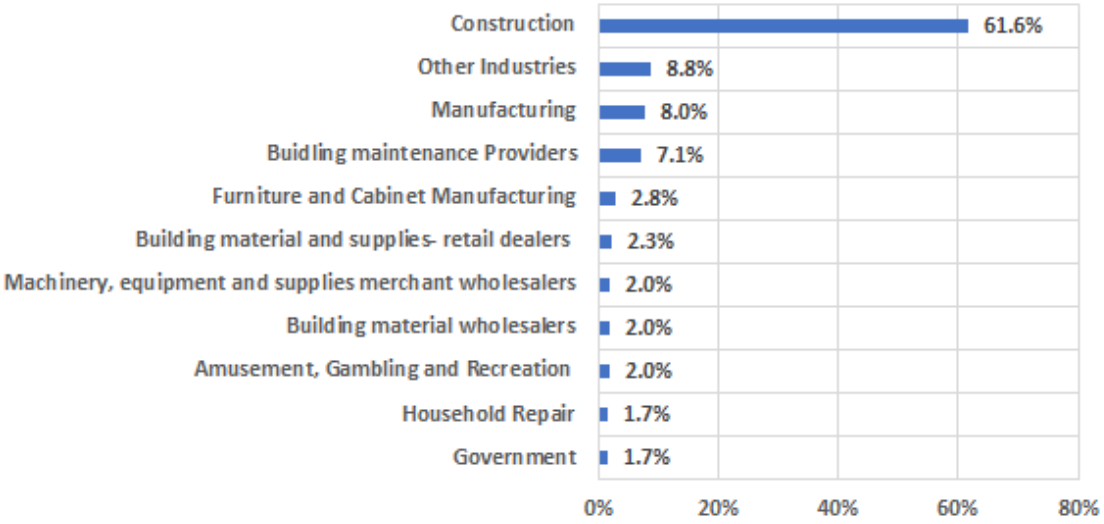
Table 4: Employment in Ottawa and Environs of Occupations Identified as Having Partially Transferrable Skills and Knowledge, Statistics Canada Census, 2016

	Ontario Side			Quebec Side		
NOC Occupation	Employed	Self-Employed	Total	Employed	Self-Employed	Total
8241 Logging machinery operators	10	-	10	20	-	20
7532 Water transport deck and engine room crew	10	-	10	10	-	10
7371 Crane operators	85	-	85	65	10	75
8431 General farm workers	600	125	725	140	45	185
7441 Residential and commercial installers and servicers	740	260	1,000	460	175	635

Not surprisingly, general farm workers, a group from which the sector already recruits heavily, was identified as offering the greatest potential. Secondarily, however, was the installers and servicers group, which appears to offer considerable promise both in terms of their potential numbers and their relative earnings. The heavy and civil construction sector has a history of recruiting general farm workers and should continue to do so, where possible. Installers and servicers are employed predominantly, but not solely, in the construction industry. Figure 9 shows the industry distribution of this occupation.

Expanding recruitment efforts to focus on commercial installers and servicers not presently working in the construction industry could help the sector in meeting its future skills requirements.

Figure 9: Distribution by Industry of Residential and Commercial Installers and Servicers (NOC 7441), Ottawa-Gatineau (Ontario Side), Statistics Canada, Census 2016



CONSTRUCTION TRADES HELPERS AND LABOURERS

The occupation construction trades helpers and labourers (NOC 7611) provides general help at construction sites and supports the activities of tradespersons. Some of the tasks they engage in include moving construction materials, spreading asphalt, removing debris, and other construction activities.

The following occupations were identified as having partially transferrable skills and knowledge:

- Roofers and shinglers (NOC 7291)
- Tilesetters (NOC 7283)
- Residential and commercial installers and servicers (NOC 7441)
- Plasterers, drywall installers and finishers, and lathers (NOC 7284)
- Structural metal and platework fabricators and fitters (NOC 7235)
- Insulators (NOC 7293)

Installers and servicers were discussed above. In the ICI sector, the wages of the other trades would likely discourage movement from that sector to the heavy and civil construction sector. In residential new construction, it is difficult to assess relative wages because the residential sector often utilizes piece-rate remuneration and employs workers as self-employed sub-contractors (or “independent operators”). These are likely to be impediments to successful recruiting. However, there may be more recruitment potential in the residential repair and renovation sector, where wages are generally lower and employment is often less permanent.

3. FINDINGS FROM INTERVIEWS AND RESEARCH

1. Historically, the rural labour pool has been an important source for recruiting new workers into the National Capital Region's heavy and civil construction sector. However, this labour pool is declining. To meet its future skill requirements, the sector will need to identify other potential labour pools from which to recruit.

Interviews with industry stakeholders indicated that young workers with a rural background have historically constituted an import source of new recruits. The occupational matching exercise confirmed that such a strategy holds significant merit, as these workers typically hold the technical skills required to be successful in the sector. These workers are motivated, used to working both outdoors and long hours, and are familiar with the operation of heavy equipment.

Studies of Ontario's rural population consistently confirm two trends. First, the population is significantly older. The median age in Ontario's rural areas is 47.0 compared to 39.8 in metropolitan areas.[3] Second, the reason that the rural population is so much older on average is that a growing proportion of persons over the age of 20 move to metropolitan centres. The impact of these two trends is evident in the population trends projected by the Ontario Ministry of Finance.

Consider the age group 20-34, which is the prime age group for hiring new recruits into the heavy and civil construction sector. In Eastern Ontario, the Ministry of Finance estimates that, in 2021, the population of Eastern Ontario between the age of 20 and 34 that lives *outside* of the Ottawa Census Metropolitan Area is 153,908 persons.[4] The Ministry projects that by 2031, that number will decline to 153,043. *All* the population growth will occur in Ottawa, where the 20-34 cohort will increase by 7.9% over the decade.

The rural labour pool from which the National Capital Region's heavy and civil construction sector tended to recruit is, at best, stagnant and likely shrinking. To meet its future skill requirements, the sector needs to broaden its recruitment strategy, reaching out to new labour pools. At a minimum, this will require new recruitment strategies. It may also require new human resources management strategies to better align with the career expectations of workers in these labour pools.

2. The civil sector in Ottawa benefits from its proximity to the Gatineau region. Interviews suggest that workers from the Gatineau region account for approximately 15-20% of the sector's labour force.

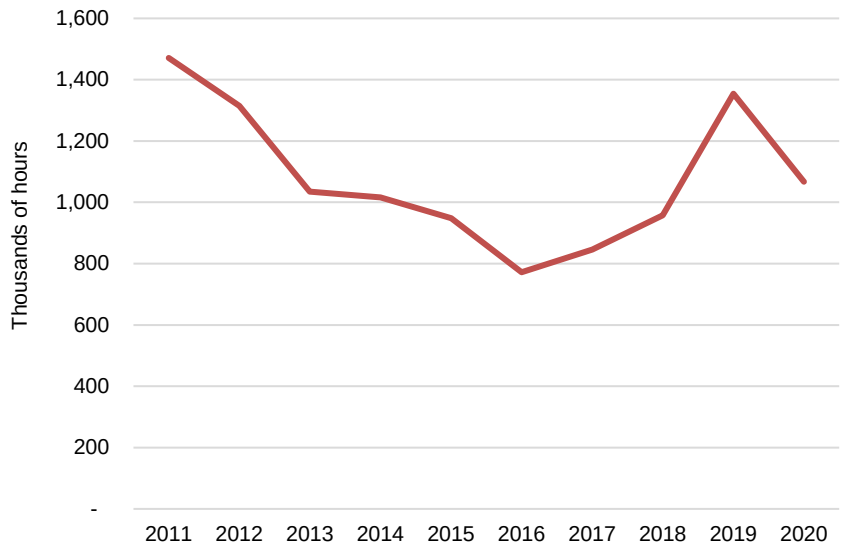
Based on interviews, it appears that 15-20% of workers employed by contractors in the National Capital Region's heavy and civil construction sector are recruited from Quebec. This proportion varies depending on the availability of work in Quebec. Administrative data compiled by the Commission de la Construction du Québec (CCQ) indicate that in 2020, there were 7,811 construction workers registered with the CCQ in

[3] Smale, B., & Holliday, C. (2020*). A Profile of Wellbeing in Rural Ontario. A Report by the Canadian Index of Wellbeing* prepared for the Rural Ontario Institute. Waterloo, ON: Canadian Index of Wellbeing and the University of Waterloo

[4] Based on tables published at www.fin.gov.on.ca/en/economy/demographics/projections/table12.html

the Outaouais region. Of these, 1,218 individuals worked in the civil engineering and roads sector in 2020. As Figure 10 indicates, the hours worked in the civil engineering and roads sector in the Outaouais region declined by almost 50% between 2011 and 2016. This would have led to the unemployment of around 600 experienced workers. During this period, contractors on the Ontario side of the Ottawa River were able to recruit these workers. This augmentation of the labour pool reduced the skills shortage pressure on the members of the National Capital Region Heavy Construction Association.

Figure 10: Hours Worked in the Civil Engineering and Roads Sector, Outaouais Region (Commission de la Construction du Québec)



After 2016, there was a partial recovery in the civil engineering and roads sector in the Outaouais region. In 2019, employment hours returned to 1,354,000 and then fell back to 1,062,000 in 2020. The implication is that in 2016 there was a potential pool of around 600 *experienced* workers available to contractors on the Ontario side of the Ottawa River. To this experienced pool we can add as many as 2,000 Outaouais-resident construction workers who needed employment, but who had no experience in the civil engineering and roads sector. By 2020, however, the pool of experienced workers had declined to around 300 workers.

The CCQ's five-year outlook for the Outaouais region suggests that employment will remain at or above the current level. Consequently, the Quebec labour pool that is available to contractors on the Ontario side of the Ottawa River will be significantly *smaller* in the coming years than it was a few years ago.

3. There has been a shift in attitudes toward a more positive view of the skilled trades among both parents and students. This creates an opportunity for the heavy and civil construction sector if the sector's strategy aligns with this change in attitudes.

Over the past decade, governments and industry-based organizations have made substantial investments in providing career information on the skilled trades to both youth and parents. Survey data suggest that this investment is having an impact on attitudes.

In 2015, the Canadian Council of Directors of Apprenticeship (CCDA) and Statistics Canada, with the support of the Council of Ministers of Education Canada (CMEC) and Employment and Social Development Canada (ESDC), commissioned a study of the opinions held by high school students about pursuing a career in the skilled trades.[5] Among the key findings from the study:

- Across Canada, 8% of youth reported that they "definitely" planned to pursue a career in the skilled trades.
- A further 18% reported that they would "consider" pursuing a skilled trade.

Surveys commissioned by the Canadian Apprenticeship Forum (CAF) in 2004 and 2014 found that:[6]

- In 2014, 32% of youth reported that their parents encouraged them to consider the skilled trades.
- In 2004, 29% of youth said they would consider a career in the skilled trades. By 2014, this had increased to 42%.

Regardless of whether one relies on the CAF survey or the more conservative findings of the CCDA survey, it is difficult to avoid the conclusion that attitudes toward the skilled trades are changing. Somewhere between 26-42% of youth would consider a career in the skilled trades.

The change in attitudes is positive for the sectors of the construction industry that use the apprenticeship system to meet their skill needs. However, there is likely to be less benefit, perhaps even competitive disadvantage, for the sectors in which the apprenticeship system does not play a central role. This may have implications for the heavy and civil construction sector. While apprenticeship and trade certification play some role in the heavy and civil construction sector, the sector could be at a disadvantage when competing with other sectors in which apprenticeship and trade certification play a much greater role. This may affect not only how many young workers are attracted to the heavy and civil construction sector, but also their calibre.

The survey data suggest that the change in attitudes toward the skilled trades and apprenticeship is creating a more advantageous recruitment environment for the construction industry. Career pathways for youth and their parents are important, which apprenticeship and formal trade certification provides. To share in that advantage, the heavy and civil construction sector may need to explore ways to strengthen the role of apprenticeship and trade certification in the sector, as the attraction of apprenticeship and formal trade qualifications appear to be important factors in the changing attitudes of high school students.

[5] Deussing, Marie-Anne. 2016. *Youth attitudes towards the trades: Canadian results from the 2012 OECD Programme for International Student Assessment (PISA)*. Employment and Social Development Canada. Presented at the Canadian Apprenticeship Forum Conference, June 2016, Vancouver BC.

[6] Canadian Apprenticeship Forum - Forum canadien sur l'apprentissage 2014, *Apprenticeship analysis: parent perceptions of careers in the skilled trades*, CAF-FCA, Ottawa.

4. The perception that the construction industry does not offer career paths is an important factor in a young worker's decision to avoid the industry, to leave the industry, or to move to a different sector in the industry where a career path is more evident.

Although surveys suggest that attitudes are changing, there are still many young persons, parents, and guidance counsellors who see the construction industry as offering jobs with limited potential for advancement. This finding is confirmed in a survey commissioned by the Independent Contractors and Businesses Association (ICBA).[7] That survey found that fewer than half of students in the survey believed that trades jobs in construction provided long-term careers with opportunities for training and advancement. A majority believed that construction jobs were limiting and that you get stuck in a particular trade or job.

A study prepared for RESCON stresses the need for the construction industry to set out clear career pathways for its younger employees. The authors of the report believe that the perception of a lack of career pathways is an important factor behind young workers leaving the industry or changing to a different sector within the industry.[8]

5. Young women perceive significant barriers to working in construction over and above the barriers that are more widely held by all young workers.

In addition to concerns about seasonality, the physical nature of jobs, and the lack of a career pathway, young women also see the construction industry as being unaccepting of women.[9] This perception of an unaccepting work environment is reinforced by the attitudes of some male workers and the absence of measures taken by employers to accommodate female employees.

Recent marketing efforts may have had some effect on changing perceptions and may have an impact in the future. These marketing efforts include those by the Canadian Association of Women in Construction (www.cawic.ca); the Office to Advance Women Apprentices (www.womenapprentices.ca/#thrive-footer), which does not operate in Ontario; Build Together (www.buildtogether.ca/our-focus/women), sponsored by the Building Trades Unions; Canadian Construction Women (www.switcanada.caf-fca.org); and Supporting Women in Trades (www.constructionwomen.org), sponsored by the Canadian Apprenticeship Forum. The Provincial Building and Construction Trades Council is also launching a promotion program (supported by the Ministry of Labour, Training and Skills Development) under the auspices of the Ontario Building and Construction Tradeswomen, which the Council recently established.

Organizations such as Women Building Futures (www.womenbuildingfutures.ca) have also been successful in attracting women into the trades and placing them with employers. The organization offers pre-apprenticeship training, professional Class 1 driving instruction, Heavy Equipment Operator training, as well as several other programs focused on facilitating the entry of women into the industry. The organization works with employers such as Suncor, Syncrude, Imperial Oil, and LNG Canada, and with CLAC. In 2020, the organization connected more than 127 graduates with employment opportunities in the construction and oil and gas sectors, with 75% of graduates employed within six months of

[7] https://icba.ca/2014/11/28/inaccurate-perceptions-trade-jobs-new-study-reveals/
[8] Callegher, J, Millard, B & Langschmidt, T 2019, *Retaining employees in the skilled trades*, Residential Construction Council of Ontario (RESCON).
[9] Construction Sector Council, *The State of Women in Construction in Canada* (2010).

graduation.[10] Additionally, Aecon and LIUNA, Local 183 piloted a successful project to recruit women in the heavy and civil construction sector.

6. In the Ottawa-Gatineau region, the Indigenous share of the construction workforce is approximately proportionate to the Indigenous share of the region's overall workforce. There are distinct channels for recruiting Indigenous workers that parallel traditional channels.

Census data from 2016 indicate that there were 865 Indigenous persons working in construction in Ottawa-Gatineau (Ontario side). This represented 3.3% of construction industry employment. This was somewhat higher than the overall proportion of Indigenous persons in the regional labour force (2.5%). The Indigenous workforce in construction was approximately equally divided between Métis and persons with status as members of First Nations. There are three reserves in or near the Ottawa-Gatineau region:

- Pikwakanagan: near Pembroke; population approximately 432.
- Akwesasne Reserve 59: near Cornwall. This reserve is part of the Iroquois of St. Regis, which has a distinct treaty status that makes them independent of both the U.S. and Canada. They do not participate in the Canadian Census. The population of the Cornwall Island community is approximately 1,500.
- Tyendinaga Mohawk Reserve: near Belleville; population approximately 2,525.

A study by the Canadian Apprenticeship Forum highlights distinct barriers to recruiting Indigenous youth in the construction trades[11]. Lack of knowledge about the trades and the industry are critical barriers. Additionally, it is considered important to recruit through trusted channels. The Operating Engineers Training Institute of Ontario manages direct outreach programs to Indigenous youth and endeavours to make its residence-based training centre welcoming to Indigenous culture.

The Aboriginal Apprenticeship Board of Ontario manages information campaigns and supports employers in connecting to Indigenous youth interested in apprenticeship opportunities. In Eastern Ontario, there are several bodies that are contracted to deliver employment counselling to Indigenous youth under the federally supported *Indigenous Skills and Employment Training Program* (ISET):

- Aboriginal Labour Force Development Circle (ALFDC), Shannonville
- Kagita Mikam: Shannonville, Curve Lake, Hiawatha, Bala, Ottawa, Kingston, Peterborough (see https://kagitamikam.com/contact)
- Akwesasne Aboriginal Area Management Board (AAAMB), Cornwall
- Apatisiwin Odawa Native Friendship Centre, Ottawa
- Métis Nation of Ontario (MNO), Kingston and Ottawa
- Tungasuvvingat Inuit (TI), Ottawa

Canada's Building Trades Unions (CBTU) are also very active in the promotion and recruitment of Indigenous youth into the construction sector. In June of 2020, the CBTU launched Virtual Indigenous Training for the construction industry. The training is offered through four modules, each of which can be customized to a unique audience and region. The modules are meant to create a baseline understanding

[10] https://womenbuildingfutures.com/docs/default-source/default-document-library/wbf-2020-annual-report_final70669d9fde3e64639d68ff01006f5d52.pdf?sfvrsn=4b58f9ae_0

[11] Canadian Apprenticeship Forum, *Promoting Careers in the Skilled Trades to Indigenous Youth in Canada* (2019) and *Hiring and Retaining Aboriginal Apprentices*

of the history of Indigenous peoples in Canada, provide context on current situations taking place within the construction industry, and prepare course participants with career development tools. [12]

7. While there have been some changes in recent years, relatively few students transition directly from high school into the construction industry, and even less so into the heavy and civil construction sector. Family and friends are by far the most important factors generating the current flow of workers into the construction industry. These informal channels, however, may no longer be sufficient to meet the needs of the National Capital Region's heavy and civil construction sector.

Interviews with employers and with unions suggest that it is *uncommon* to hire someone into the heavy and civil construction sector straight out of high school. The overwhelming majority of persons who enter the sector have prior employment experience. Family and informal networks (co-workers, teammates, and friends) brought them to the construction industry and to the heavy and civil construction sector.

Survey data underscore the importance of family and informal networks. While not specific to the heavy and civil construction sector, a study by RESCON found that[13]:

- 42% of workers in the skilled trades were influenced by a family member to pursue a career in the trades.
- 31% were influenced by a friend to get into the trades.
- 8% were influenced by a summer job or work camp.

A report for the Ontario Construction Secretariat found that 71% of locals in Ontario reportedly recruit new members "often" or "very often" through member referrals.[14] Interviews with employers confirmed that many employers have instituted referral bonuses to encourage current employees to recommend candidates for possible recruitment.

Until comparatively recently, informal channels were sufficient to meet most of the recruitment needs of Ottawa's heavy and civil construction sector. What has changed is that the construction industry has grown significantly. There is consequently more competition *within* the construction industry for new recruits to replace exiting or retiring workers.

In Ontario, in 2000 there were 320,100 individuals working in construction. The construction industry accounted for 5.5% of total employment. By 2019 (the last year prior to COVID-19), there were 540,000 individuals working in construction. These jobs accounted for 7.3% of provincial employment. This is a significant change in the economic landscape. In a region like Ottawa, the staffing of major infrastructure projects compounds the competition for labour. Those construction sectors and trades that aligned their recruitment strategies with the aspirations of young workers have been largely successful in meeting their skill needs. Sectors whose recruitment strategies have been less well-aligned experienced skills

[12] https://buildingtrades.ca/2020/06/18/cbtu-launches-virtual-indigenous-training-for-the-construction-industry
[13] Callegher, J, Millard, B & Langschmidt, T 2019, *Retaining employees in the skilled trades*, Residential Construction Council of Ontario (RESCON).
[14] Ontario Construction Secretariat 2019, *Demographics and Diversity: A Portrait of Ontario's Unionized Construction Industry*, prepared by Prism Economics and Analysis.

shortages and possibly also a deterioration in the calibre of their new recruits and their ability to retain their recruits.

8. Investing in a high school-focused recruitment initiative has potential if it operates within the framework of the Ontario Youth Apprenticeship Program (i.e., leads to a formal apprenticeship and trade qualification).

For more than 30 years, the Ontario Ministry of Education has operated the *Ontario Youth Apprenticeship Program* (OYAP). The purpose of OYAP is to enable a high school student to complete a portion of their apprenticeship training while also completing their high school education. Students are eligible to participate in OYAP after grade 10. OYAP is now integrated with co-operative education programs so that students also obtain relevant on-the-job experience and accrue hours toward their trade qualification requirements. OYAP is administered by individual boards of education. The boards appoint one or more OYAP co-ordinators to advise students and liaise with industry. There are OYAP programs in the Ottawa-Carleton District School Board and in the various school boards throughout Eastern Ontario.

Given the strong commitment of the Ministry of Education to OYAP, if the sector aligns its recruitment goals to the OYAP framework, it could improve career promotion and partnerships with supportive boards of education. While the heavy and civil construction sector has not historically employed large numbers of apprentices, there is potential to utilize OYAP for the Heavy Equipment Operator trades, Mobile Crane Operator trade, and the Construction Craft Worker trade.

9. In the construction industry, the most common type of career promotion is one that markets a trade as a career. However, there are some career promotion programs that focus on an industry or a sector, rather than a trade.

In the construction industry, career promotion is chiefly focused on marketing a career in a trade. While the industry context of the trade is evident in these promotion activities, the marketing message focuses on the trade, not on the industry. There are numerous examples in Canada and elsewhere of career promotion efforts that focus on specific trades. Many of these promotion activities also highlight the industry's support for training centres. Examples of this type of promotion activity include those by the Ontario Masonry Contractors' Association, the Interior Systems Contractors Association of Ontario, and the Roofing Contractors Association. The building trades unions all promote their trade as a career choice.

BuildForce sponsors the Careers in Construction website (www.careersinconstruction.ca). The website provides general information about the construction industry, including a page on engineering construction. The site provides links to a broad range of individual construction trades and occupations, and also includes videos, as well as current information on job postings.

The Ontario Construction Careers Alliance (OCCA) promotes construction industry careers. While the OCCA website (www.myocca.ca) links to apprenticeshipsearch.com, OCCA's site differs from other marketing efforts in that it does not emphasize the apprenticeable trades, but rather jobs in the construction industry. The job examples are primarily from the heavy and civil construction sector. OCCA is an alliance of LIUNA, the Residential Construction Council of Ontario (RESCON), the Ontario Sewer and Watermain Contractors Association (OSWCA), the Ontario Stone Sand and Gravel Association (OSSGA), the Heavy Construction Association of Toronto (HCAT), and the Ontario Road Builders' Association (ORBA). OCCA does classroom presentations, conducts "construction days," and sponsors career days.

In the United States, the Heavy Construction Careers website (www.heavyconstructioncareers.com) is sponsored by a group of construction companies in California, known as The Beavers. The site primarily promotes technical careers. Its job posting board is currently inactive.

Caterpillar, not surprisingly, promotes careers as a Heavy Equipment Operator.[15] Private career colleges similarly promote careers as a Heavy Equipment Operator. For example, Fifth Wheel Training Institute[16] and Canada Heavy Equipment College (www.chectraining.com).

In New Zealand, the Just the Job website promotes careers across a range of industries. A YouTube video provides information on road construction.[17]

In Australia, the Civil Contractors Federation (www.careerincivil.com) promotes careers in the sector. The focus, however, is on apprenticeships as a pathway. (In Australia, there are a range of trades for the civil and engineering construction sector. Many of these trades also apply to the resources sector.)

In the U.K., the University and Colleges Admission Services (UCAS) provides a range of information on careers, including Road Worker.[18] However, most of the careers highlighted by UCAS are tied to post-secondary qualifications.

Although not related to career promotion, the Ontario government is currently exploring the creation of a skilled trades training academy to support the need for skilled labour in P3 projects and major infrastructure projects.[19] The academy would be modelled on the Tunneling and Underground Construction Academy, which was established in London, U.K., to support construction of the Crossrail project. The focus of the academy proposal (and it is only a proposal) is on expanding the skilled trades in the civil and engineering sector. Although the skilled trades training academy proposal is still in an exploratory stage, the proposal indicates that the provincial government sees the need for an increased role for the formal trades and apprenticeship system in the civil and engineering sector.

10. Within the construction industry, the heavy and civil construction sector's main competitive advantage for recruitment purposes is in comparison with the residential repair and renovation sector.

Hourly wages in the heavy and civil construction sector are somewhat lower than in the ICI sector, although weekly earnings are likely on par, considering the longer work week in the heavy and civil sector. Seasonal layoffs, however, are less pronounced in the ICI sector. The same trends broadly apply to the condo and apartment sector. Stakeholder interviews indicate that the heavy and civil construction sector tends to experience attrition to the ICI sector, and possibly also to the condo and apartment sector. Aside from workers who drop out of the sector after one season, interviews suggest that this attrition is more heavily concentrated among workers with three to five years of experience and mid-level skills.

[15] www.cat.com/en_US/campaigns/awareness/lets-do-the-work/services.html?utm_content=enterprise_an_educational_brand&utm_source=google&utm_medium=cpc&utm_campaign=brand_paid_search_ldtw_generic_exact&utm_term=brand_paid_search_ldtw_generic_exact&kxconf=uazngscs0&gclid=Cj0KCQjw2tCGBhCLARIsABJGmZ6MzPXm62TEscYF6fEPn0TSi7dVakzYxyTyCPAb7SqdZ_XF2irLQC4aAtd0EALw_wcB

[16] https://5thwheeltraining.com/become-a-heavy-equipment-operator-in-ontario/

[17] www.youtube.com/watch?v=f8a95Nkg2fA

[18] www.ucas.com/ucas/after-gcses/find-career-ideas/explore-jobs/job-profile/road-worker

[19] Ministry of Labour, Training and Skills Development, Request for Information No. 14734 issued June 11, 2021.

The heavy and civil construction sector may have a remuneration advantage when compared to the low-rise residential sector. However, there are other factors that come into play. The low-rise sector predominantly remunerates workers on a piece-rate basis, which is often attractive to younger workers. Many of these workers are also classified as self-employed sub-contractors, which some workers find extremely advantageous. As a result, the remuneration advantage of the heavy and civil construction sector may be offset by the perceived advantages (to young workers) of piece-rate remuneration, self-employed sub-contractor status, and less pronounced seasonality.

When the heavy and civil construction sector is compared to the residential repair and renovation sector, a remuneration advantage becomes apparent. Table 5 summarizes current offered wages as advertised for the Ottawa area on the Indeed.ca job board.

Table 5: Average Offered Hourly Wages for Shinglers, Installers, and Painters (Chiefly Residential Repair and Renovation Sector), Ottawa, June 2016, Indeed.ca Job Board

	Average Low	Average High	Mid-Range	Observations
Installers	$17.25	$17.50	$17.38	8
Painters	$18.80	$26.38	$22.59	13
Shinglers	$22.81	$29.81	$26.31	4

The skills required in the heavy and civil construction sector are markedly different than in the low-rise repair and renovation sector, as are the workplace safety protocols (which are largely non-existent in the repair and renovation sector). Transitioning workers from the repair and renovation sector to the heavy and civil construction sector will entail investments in new skills, including safety skills. However, these workers are used to working a construction schedule. They also have the means to get to a job site. The repair and renovation sector constitutes a pool of labour from which it may be possible to recruit new hires for the heavy and civil construction sector.

11. There is a large and likely growing pool of workers in their twenties and thirties who are stuck in low-paid, precarious jobs that offer little opportunity for advancement. Among the industries that could be included in this category are landscaping, warehouses, courier and delivery services, assembling and machine operator jobs in manufacturing, non-residential building cleaning, and window cleaning. While many of these workers may not be interested in (or suitable to) construction, there will be individuals in this pool of workers for whom the wages, benefits and career opportunities in heavy construction are attractive.

Table 6 shows the offered wages as advertised for the Ottawa area on the Indeed.ca job board. Many of these jobs pay only marginally above the minimum wage. Amazon's offer wage is $16.50 for warehouse workers.

Table 6: Average Offered Hourly Wages for Various Low-Wage Industries, Ottawa, June 2016, Indeed.ca Job Board

Occupation	Average Low	Average High	Mid-Range	Observations
Kitchen staff (excluding cooks)	$14.66	$16.25	$15.46	15
Building cleaner (non-residential)	$15.56	$16.56	$16.06	9
Warehouse worker	$16.44	$17.36	$16.90	18
Window cleaner	$16.53	$19.83	$18.18	10
Landscape labourer	$17.70	$22.30	$20.00	10
Machine operator (production)	$17.97	$19.93	$18.95	11
Delivery driver	$18.58	$21.20	$19.89	13

The 2016 Census provides an indication of the potential size of the low-wage workforce in the above occupations. Table 7 identifies only persons in the age groups 20–24 and 25–34, as this would be the prime recruiting age for the heavy and civil construction sector. For some occupations (e.g., store shelf stockers and food counter and kitchen helpers), the data likely include many students who are doing these jobs to support their post-secondary education. On the other hand, we know that there has been a significant increase in the number of warehouse workers and delivery and courier service drivers since the 2016 Census.

Even when allowances are made for the student share of this workforce, the number of workers who are stuck in low-wage jobs with a lack of career development are substantial. Few of these workers have any experience or knowledge of the construction industry. The required investment in job and safety training would be significant. However, this pool of workers is a potential source of recruits for the heavy and civil construction sector, where remuneration, benefits, training opportunities, and career prospects are decidedly superior.

Table 7 provides an estimate of the number of workers in low-wage jobs with a lack of career development in these sectors.

Table 7: Estimate of the Size of the Low-Wage Labour Pool, Ottawa-Gatineau (Ontario Side), Age Groups 20–24 and 25–34, Statistics Canada, 2016 Census

	Number of Persons (2016 Census)		
Occupation (NOC Code)	Age 20–24	Age 25–34	Age 15–34 Total
Store shelf stockers and order fillers (6622)	1,240	785	2,025
Food-counter attendants, kitchen helpers, and related (6711)	3,080	1,565	4,645
Janitors, caretakers, and building superintendents (6733)	465	800	1,265
Specialized cleaners (including window, auto, carpet, ducts, etc.) (6732)	205	190	395
Materials handlers (warehouse workers) (7452)	490	645	1,135
Delivery and courier service drivers (7514)	185	400	585
Landscaping and grounds maintenance labourers (8612)	770	555	1,325
Manufacturing			
Processing and manufacturing machine operators and related (94)	120	325	445
Assemblers in manufacturing (95)	110	195	305
Labourers in processing, manufacturing, and utilities (96)	155	260	415
Total	6,820	5,720	12,540

12. Immigration criteria under the Federal Skilled Worker program do not align with the construction industry's labour requirements. There may be some scope for using the Ontario Immigrant Nominee Program and the existing refugee pool as potential sources of new recruits.

In 2019, Canada admitted 341,180 persons as immigrants. Of these, 153,396 (45.0%) settled, at least initially, in Ontario. Table 8 shows the composition of Ontario's immigration intake for 2019.

Table 8: Permanent Resident Admissions, 2019, Initial Settlement in Ontario, Citizenship and Immigration Canada, Report to Parliament, 2020

Admission Program	Number of Persons	Percent of Ontario Total
Federal Skilled Worker program	64,229	41.9%
Federal Caregiver Program	4,942	3.2%
Federal Businesses Immigration Program	635	0.4%
Provincial Nominee Program	12,341	8.0%
Family total	42,570	27.8%
Protected persons and refugees total	25,546	16.7%
Humanitarian and other total	3,132	2.0%
Total	153,395	100.0%

Persons admitted under the *Federal Skilled Worker* program typically have a post-secondary qualification. They are unlikely to have any attraction to construction trades professions unless it is in a technical or professional role. Similarly, persons admitted under the federal *Caregiver Program* or the federal *Business Immigration Program* are unlikely to have any affinity for construction work.[20]

In 2019, the *Provincial Nominee Program* accounted for 8% of admissions. Currently, Ontario prioritizes four streams: French-speaking skilled workers, Human Capital Priorities stream (typically requiring a post-secondary qualification), Skilled Trades stream, and the Entrepreneur stream.[21] The Skilled Trades stream encompasses occupations that are recognized as a trade in Ontario. In addition, Ontario administers the Ontario Job Offer Stream, which enables expedited immigration to someone with a firm job offer in a "high-demand" occupation. Heavy equipment operators and trades helpers and labourers are classed as "high-demand" occupations. The Ontario Job Offer Stream, therefore, potentially could be used to address some of the skill shortages faced by the heavy and civil construction sector in the National Capital Region. The drawback of this option is the required investment in offshore recruitment and application processing.

A potentially more fruitful avenue for recruitment is the large pool of persons who are admitted to Canada as refugees. These individuals have a more diverse profile than persons admitted under the *Federal Skilled Worker* program. For example, around half of the persons admitted as refugees did not complete high school. Many had worked in manual labour or construction jobs before becoming refugees. Only a small minority are fluent in English, and this minority is usually composed of persons with a professional background. Reaching out to refugees requires building links to "community connectors" that assist refugees to settle in. One employer whom we interviewed invested in this outreach and reported that the results met his expectations and needs.

[20] See also the discussion of immigration policy in BuildForce Canada's *Immigration Trends in the Canadian Construction Sector* (2020) report prepared by Prism Economics and Analysis, www.buildforce.ca/en/immigration.
[21] www.ontario.ca/page/ontario-immigrant-nominee-program-oinp

13. The marketing challenge is to identify the specific pools of workers that the heavy and civil construction sector wants to target for recruitment. Facebook or short YouTube advertisement videos may be the most efficient way to identify and target these workers.

Marketing resources that are expended on delivering a message to non-receptive or indifferent segments of the market are wasted. Consequently, the key to a successful marketing campaign is to determine the marketing message, identify the specific segments of the overall market that will be most receptive to the marketing message, and then to find channels that will reach these segments. This scan and research report suggests the following for consideration:

Marketing Messages:
There are two key messages that have the potential to gain traction. The first is the wages and benefits that the heavy and civil construction sector offers. This message will primarily be of interest to young workers who are "stuck" in low-wage jobs with a lack of career development. The second and related message is that the sector and its employers offer career opportunities, i.e., a pathway to advancement. This raises an important question for the sector, which is how it sees the role of the formal trades and apprenticeship system fitting into a strategy to meet future skill needs.

Potential Focus for Marketing:
This scan and research suggests that there may be potential for recruiting from the following pools of labour:

- the repair and renovation sector, especially lower-paid, semi-skilled occupations
- workers in low-wage jobs with a lack of career development in landscaping, building cleaning, window cleaning, kitchen helpers, warehouse workers, delivery drivers, and machine operators and materials handlers in manufacturing
- persons admitted to Canada under the refugee program

Additionally, the research noted the potential for recruiting more Indigenous workers. Nationally, of the total number of Indigenous people working in the construction sector, approximately 80% are employed in on-site trades and occupations. Given the predisposition of Indigenous people to consider careers in on-site construction, there could be additional scope to increase overall recruitment from Indigenous communities in the region.

The research also showed the underrepresentation of women, which is a characteristic of all segments of construction and all construction trades. The research also found that attitudes of youth to construction and the trades have changed over the past decade, owing in part to significant investments in making more career information available. However, it was also noted that this interest in construction careers is strongly tied to a desire for career paths and for formal qualifications (i.e., apprenticeships).

Marketing Channels and Outreach:
This scan and research suggests that there are several marketing and outreach channels that the sector could explore. These include:

- social media, such as Facebook or YouTube advertisements, that enable marketing messages to be targeted to specific user profiles; this may be the most cost-efficient way to reach youth, workers in the repair and renovation sector, and workers in low-wage professions; LIUNA is currently running a series of YouTube ads designed to promote careers in construction

- immigrant and refugee settlement organizations
- employment counselling organizations
- OYAP
- career days

14. The heavy and civil construction sector needs to meet hiring needs arising from growth in the sector (also known as economic demand), replacement demand (caused by mortality and retirement), and attrition (caused by quits). The BuildForce Model indicates that the growth demand and the replacement demand, while significant, could be manageable with a well-designed and well-resourced recruitment marketing strategy. The attrition demand, however, poses a significant challenge, which may suggest a need to reappraise or recalibrate human resources management strategies.

The BuildForce Model estimates that, between 2021 and 2029, the heavy and civil construction sector will need to hire just under 1,500 persons to meet growth demand and replacement demand (retirements and mortality). Much of this demand occurs in the next few years.

While significant, these hiring requirements could be met by a well-designed and well-resourced recruitment strategy. However, a compounding challenge is the sector's hiring needs that arise from attrition. Attrition is chiefly the result of workers not returning after the winter lay-off, or quitting mid-season. Some of these workers migrate to other sectors of the construction industry, while others simply leave the construction industry altogether. Because the attrition rate varies across contractors, it is difficult to formulate a precise estimate for the sector as a whole. However, interviews suggest that, on a sector basis, the attrition rate is at least 3%, and probably higher. This implies an additional hiring need of at least 200 to 250 workers per year, which is over and above the hiring needed to meet growth requirements and demographic replacement.

Adding the attrition demand to the growth demand and the demographic replacement demand creates an overall hiring requirement that will be difficult to meet, even with a well-designed and well-resourced recruitment marketing strategy. To meet its long-run human resources needs, the sector will need to reduce its attrition rate. This may suggest a need to reappraise or recalibrate human resources management strategies, especially as they relate to career paths and advancement prospects.

CONCLUDING OBSERVATIONS

Construction activity in the Ottawa region was sustained in 2020, and the pace of growth is expected to accelerate through the second half of 2021. Ottawa's heavy and civil construction sector is expected to see employment peak at 8,500 workers by 2022 – an increase of 870 workers (+11%) compared to 7,620 in 2020. In addition to meeting near-term expansion requirements, Ottawa's heavy and civil sector will need to replace an estimated 1,660 workers expected to retire over the next 10 years and fill additional vacancies caused by career progression and turnover. Total net hiring requirements, accounting for both employment growth and retirements between 2021 and the anticipated peak in 2024, are estimated at approximately 1,460 workers, with retirements accounting for just over 780 workers. This figure is the

number of workers that need to be recruited *and retained,* and excludes turnover, which can be as high as 30-40% among new hires for labourers.

Until comparatively recently, informal recruitment channels were sufficient to meet most of the hiring needs of Ottawa's heavy and civil construction sector. What has changed is that the construction industry has grown significantly. To meet its future skill requirements, the sector needs to broaden its recruitment strategy, reaching out to new labour pools. At a minimum, this will require new recruitment strategies. It may also require new human resources management strategies to better align with the career expectations of workers in these labour pools and an increased investment in training.

The sector, however, does have a remuneration advantage when compared to some service-sector occupations, particularly over those low-wage industries offering limited career development opportunities. A greater focus on career promotion to these groups could help the industry address a portion of its hiring requirements. Groups traditionally underrepresented in the construction industry also provide significant potential to help the industry meet its future labour force needs. Women, Indigenous people and individuals from racialized communities, and recent immigrants and refugees all provide possible recruitment potential for the industry. Better-targeted marketing, as well as the use of community connectors, should help facilitate the recruitment process. Greater use of the Ontario *Provincial Nominee Program* could also help alleviate long-term recruitment challenges, particularly as retirement rates increase over the course of the decade.

With regard to Indigenous people, given the number of communities in the region, there is potential to increase overall recruitment from these communities. National data show approximately 80% of Indigenous workers in the industry are employed in on-site construction professions. Given the Indigenous community's predisposition to consider careers in on-site construction, a strong industry commitment to promotion and training could help increase overall recruitment of Indigenous workers into the sector.

A change in attitudes toward careers in the skilled trades and apprenticeship has also created a more advantageous recruitment environment for the construction industry. To share in that advantage, the heavy and civil construction sector may need to explore ways to expand the role of apprenticeships in the sector or to provide an equivalent career pathway. Career pathways are important to parents when advising their children on possible career options. Apprenticeable trades are increasingly viewed by many parents as viable career options. However, the limited number of apprenticeable trades in the heavy and civil construction sector can be detrimental to the recruitment of youth interested in pursuing a career in construction.

There are various options open to the sector to respond to the need for career pathways. The first is to expand the role of apprenticeship in the sector and thereby take advantage of the favourable shift in attitudes toward the apprenticeable trades and the funding that is available for delivering apprenticeship training. The second option is to work with the Ontario government to introduce industry-validated and recognized micro-credentials that will formalize career training in the sector. Finally, the third option is to implement human resources management strategies that more clearly set out the career pathways within a firm.

APPENDIX

Table 9: Annual Civil Engineering Hiring Requirements, By Trade, Ottawa Region

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Total										
Employment (change)	595	637	235	-537	344	-279	14	-152	-35	-397
Retirement	197	202	205	190	186	186	180	176	170	167
Total net hiring	792	839	440	-347	530	-93	195	24	135	-230
Construction estimators										
Employment (change)	13	17	4	-13	18	-7	0	-6	-1	-13
Retirement	5	6	6	5	5	5	5	5	4	4
Total net hiring	18	23	10	-8	23	-2	5	-1	3	-9
Construction managers										
Employment (change)	73	77	27	-66	51	-34	1	-22	-5	-52
Retirement	28	29	30	27	26	27	27	27	26	27
Total net hiring	100	106	57	-38	77	-7	28	5	21	-25
Contractors and supervisors										
Employment (change)	102	106	36	-89	87	-45	2	-34	-7	-77
Retirement	39	40	40	37	35	36	35	34	32	31
Total net hiring	141	146	77	-52	122	-10	37	0	26	-46
Heavy equipment and crane operators and mechanics										
Employment (change)	114	140	11	-101	109	-52	3	-39	-9	-90
Retirement	46	47	46	43	42	42	40	39	37	36
Total net hiring	160	186	58	-58	151	-11	43	0	28	-54
Trades helpers and labourers										
Employment (change)	265	228	146	-219	33	-111	8	-38	-7	-129
Retirement	45	48	51	48	48	48	47	46	45	44
Total net hiring	311	276	197	-171	81	-63	55	8	37	-85
Truck drivers										
Employment (change)	28	69	10	-50	45	-29	0	-13	-6	-36
Retirement	33	33	32	30	30	29	28	26	26	25
Total net hiring	62	101	43	-19	75	-1	27	13	20	-11

Table 10: Annual Civil Engineering Employment, By Trade and Market Segment, Ottawa Region

Segment/Trade	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Highway, Bridge Engineering Construction	4,209	4,077	4,340	4,287	4,180	4,212	4,083	4,070	4,088	4,055	4,027
Construction estimators (2234)	114	110	118	116	113	114	111	110	111	110	109
Construction managers (0711)	513	497	529	523	510	514	498	496	499	495	491
Contractors and supervisors (7201-05 & 7301-02	644	624	664	656	640	645	625	623	626	621	616
Crane operators (7371)	48	46	49	49	47	48	46	46	46	46	46
Heavy equipment operators, except crane (752	784	760	809	799	779	785	761	759	762	756	751
Heavy-duty equipment mechanics (7312)	63	61	65	65	63	63	62	61	62	61	61
Trades helpers and labourers (7611, 7612)	1,397	1,353	1,441	1,423	1,387	1,398	1,355	1,351	1,357	1,346	1,337
Transport truck drivers (7511)	645	624	665	657	640	645	625	623	626	621	617
Other Civil Engineering Construction	2,509	3,223	3,587	3,871	3,445	3,750	3,599	3,621	3,442	3,436	3,070
Construction estimators (2234)	85	101	112	117	107	124	121	121	115	115	102
Construction managers (0711)	332	421	466	500	448	495	476	479	455	454	405
Contractors and supervisors (7201-05 & 7301-02	501	623	688	733	660	742	717	721	684	682	609
Crane operators (7371)	35	49	65	56	52	52	50	52	50	51	46
Heavy equipment operators, except crane (752	528	654	719	749	677	777	754	758	719	717	639
Heavy-duty equipment mechanics (7312)	14	17	19	20	18	21	20	21	19	19	17
Trades helpers and labourers (7611, 7612)	799	1,096	1,226	1,386	1,206	1,222	1,153	1,161	1,108	1,107	991
Transport truck drivers (7511)	215	263	291	310	276	316	307	308	292	292	260
Heavy and Civil Maintenance Construction	309	322	332	335	332	338	339	344	353	358	353
Total Heavy and Civil Construction	7,027	7,622	8,258	8,493	7,957	8,301	8,021	8,035	7,883	7,849	7,451