



The Economic and Job Impacts of the Construction of the Red Line Mass Transit System on Baltimore City

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Richard Clinch
Director of Economic Research
The Jacob France Institute

www.ubalt.edu/jfi
410.837.4727

The Jacob
france
Institute



Executive Summary

The Baltimore City Department of Transportation retained the Jacob France Institute of the Merrick School of Business at the University of Baltimore (JFI) to conduct an analysis of the economic and job impacts of and labor market supply and demand factors impacting the construction of the proposed Red Line mass transit system. The goals of this analysis are to:

- Estimate the economic impacts of the construction of the Red Line mass transit system on the City of Baltimore economy;
- Develop projections of the types of jobs created by the construction of the Red Line (labor demand);
- Identify and analyze the demographic characteristics of the residents of the communities impacted by the Red Line's construction (labor supply) in order to assess the potential to place residents of the impacted communities in the jobs created; and
- Identify and describe the major occupations in which jobs are expected to be created.

The major findings of this analysis are as follows:

- The construction of the Red Line will generate a total of \$2.1 billion in economic activity in Baltimore City over the construction period;
- The construction of the Red Line will create or support a total of 9,801 direct construction and related jobs earning \$539.7 million in salaries and wages over the overall construction period;
- A total of 1,307 direct construction and planning related jobs are projected to be created during the initial design and planning phase of the Red Line project and a total of 8,494 direct construction jobs are projected to be created during the construction phase of the Red Line project;
- Including multiplier effects, the construction of the Red Line will generate \$2.1 billion in economic activity in Baltimore City and create or support a total of 15,006 jobs earning \$775.2 million in salaries and wages over the overall construction period;
- The initial design and planning phase of the Red Line project will generate \$273.4 million in economic activity in Baltimore City and create or support 2,057 jobs earning \$102.7 million in salaries and wages;
- The construction phase of Red Line project will generate \$1.8 billion in economic activity in Baltimore City and create or support 12,949 jobs earning \$672.5 million in salaries and wages;
- A large percentage (83%) of the jobs created or supported by the construction of the Red Line are entry-level/lower skill jobs, requiring less than an Associate's Degree (see Chart below);
- A slightly higher percentage of the City's employed residents in the Red Line construction area are employed in construction-related occupations and in transportation and materials moving occupations where the majority of the jobs associated with the construction of the Red Line will be concentrated.

A core goal of the Red Line Community Compact is to place the residents of the impacted communities into jobs created by the construction of the Red Line. Based on the JFI's analysis of both the jobs created by the construction of the Red Line (workforce demand) and the

demographic and workforce-related characteristics of the community residents (workforce demand), this goal appears both realistic and attainable.

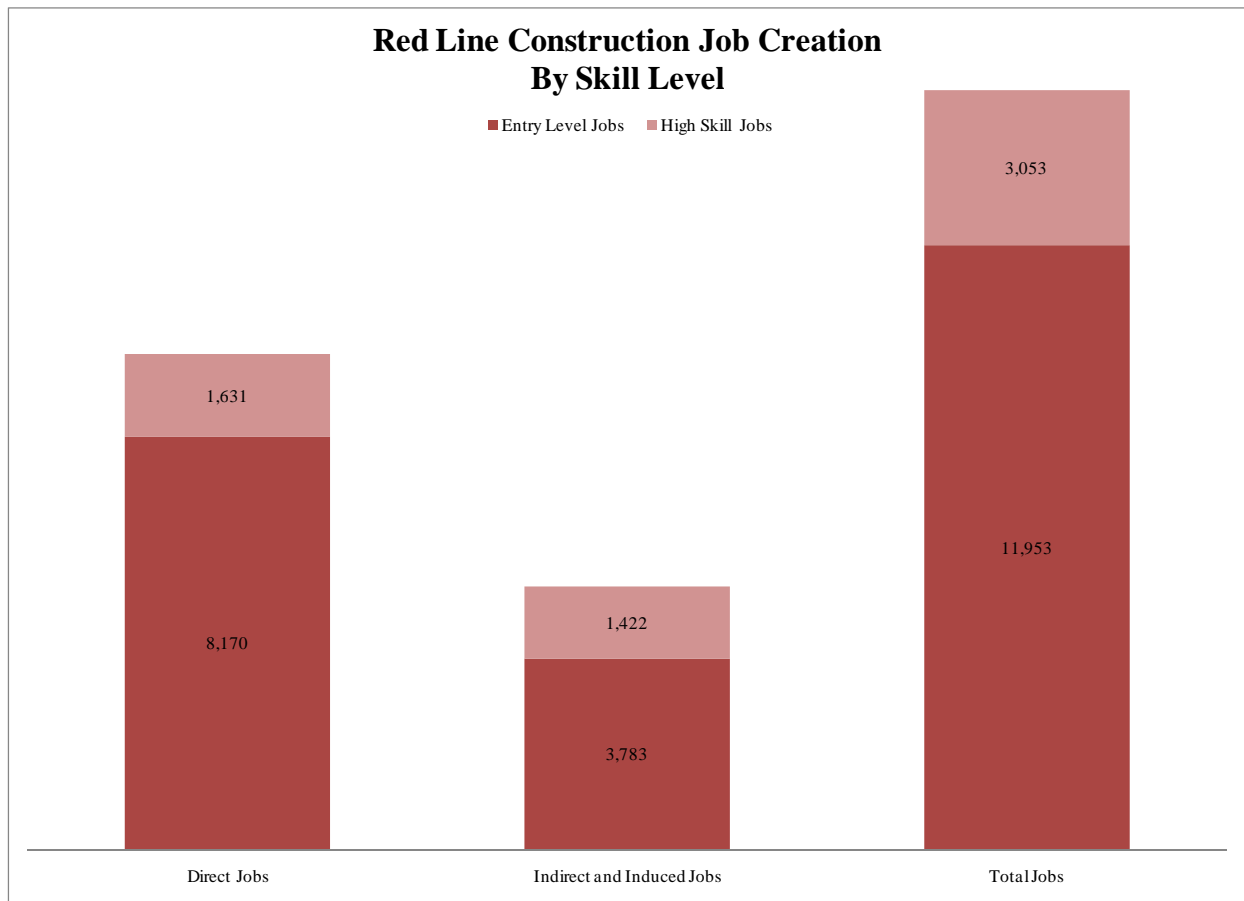


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Introduction

The Baltimore City Department of Transportation retained the Jacob France Institute of the Merrick School of Business at the University of Baltimore (JFI) to conduct an analysis of the economic and job impacts of and labor market supply and demand factors impacting the construction of the proposed Red Line mass transit system. The goals of this analysis are to:

- Develop projections of the types of jobs created by the construction of the Red Line (labor demand);
- Identify and analyze the demographic characteristics of the residents of the communities impacted by the Red Line's construction (labor supply) in order to assess the potential to place residents of the impacted communities in the jobs created; and
- Identify and describe the major occupations where jobs are expected to be created (in Appendix A);
- Estimate the economic impacts of the construction of the Red Line mass transit system on the City of Baltimore economy.

The analysis was conducted to support the goals established in the Red Line Community Compact¹ to ensure that the construction and operation of the Red Line provide the greatest benefit to the citizens of the City. A core goal of the Community Compact is to create employment opportunities and the compact specifically establishes the following goal and tasks:²

Recruit and Prepare Baltimore Residents to Work on the Red Line:

- MTA will require Red Line contractors to register available jobs with the Baltimore City Office of Employment Development which will then undertake outreach to ensure that community residents are aware of the job opportunities.
- The City and MTA will work with local educational institutions to promote transportation-related professions for young people. MTA will work with Red Line contractors to encourage transportation career opportunities and advancement over the course of the project.
- MTA will encourage project contractors to participate in the City's YouthWorks program.
- MTA will explore strategies to connect existing pre-apprenticeship programs for skilled trades to actual employment opportunities associated with the Red Line project.
- The Maryland Department of Labor, Licensing and Regulation will aggressively enforce wage and hour laws to ensure that a fair day's work results in a fair day's pay.
- MTA will establish a grassroots marketing strategy for Red Line employment opportunities, using existing resources such as established community-based organizations, the One-Stop Career Shops, Office of Employment Development, members of the Job Opportunities Task Force, Small Business Resource Center, and others.

Red Line Construction Spending

The first step in this economic and jobs analysis was to determine the total spending associated with the construction of the Red Line. The JFI worked with the architecture and

¹ See <http://www.gobaltimoreredline.com/compact.asp>.

² See http://www.gobaltimoreredline.com/downloads/Community_Compact_3_24_09.pdf - page 7.

engineering firm of Rummel, Klepper, & Kahl, LLP (RK&K), the lead planning firm for the construction of the Red Line, to identify the total construction budget for the entire Red Line project. The construction budget was divided into two time periods:

- 1) The initial design and planning phase – three years; and
- 2) The construction phase – four years.

The total construction budget for the current alignment of the Red Line is presented in Table 1. As presented in Table 1, the total construction budget for the Red Line is \$1.6 billion,³ with design and planning phase expenditures of \$216.6 million and construction phase expenditures of \$1.4 billion. It is important to note that these construction figures are for the construction of the Red Line only. They do not include any related Transit Oriented Development projects expected to occur along the proposed route with the initiation of this project.

Table 1
Red Line Construction Spending by FTA - Standard Cost Category, By Year
(Millions of Dollars)

| Item | Design and Planning Phase (3 Year) | Construction Phase (4 Year) | Total |
|--|---------------------------------------|--------------------------------|-----------|
| Total | \$216.6 | \$1,411.4 | \$1,628.0 |
| 10 - Guideway and Track Elements | \$0.0 | \$595.5 | \$595.5 |
| 20 - Stations, Stops, Terminals, Intermodal | \$0.0 | \$178.2 | \$178.2 |
| 30 - Support Facilities: Yards, Shops, Admin. Bldgs | \$0.0 | \$49.8 | \$49.8 |
| 40 - Sitework & Special Conditions | \$0.0 | \$141.2 | \$141.2 |
| 50 - Systems | \$0.0 | \$91.2 | \$91.2 |
| 60 - ROW, Land, Existing Improvements | \$37.1 | \$0.0 | \$37.1 |
| 70 - Vehicles | \$0.0 | \$134.3 | \$134.3 |
| 80 - Professional Services | \$179.5 | \$158.4 | \$337.9 |
| 90 - Unallocated Contingency | \$0.0 | \$63.0 | \$63.0 |

Source: JFI and RKK

³ All financial figures are in constant 2009 dollars. Totals may not sum due to rounding.

RK&K provided a detailed budget for the construction of the Red Line by major area of spending. In order to provide the most conservative estimate of the economic and job impacts of the construction of the Red Line, the JFI reduced this total construction budget to include only the estimated share of expenditures likely to be made locally. The JFI worked with RK&K to analyze the detailed Red Line construction budget to identify and exclude items such as the major specialized systems and vehicles⁴ that are highly likely to be provided by companies or suppliers from outside of the City.⁵ The results of this analysis and the share of each category of spending that is estimated to be spent locally are presented in Table 2.⁶

Table 2
Estimated Local Construction Spending by FTA - Standard Cost Category

| Item | Estimated of Local Purchases |
|--|---------------------------------|
| 10 - Guideway and Track Elements | 100% |
| 20 - Stations, Stops, Terminals, Intermodal | 100% |
| 30 - Support Facilities: Yards, Shops, Admin. Bldgs | 90% |
| 40 - Sitework & Special Conditions | 100% |
| 50 - Systems | 30% |
| 60 - ROW, Land, Existing Improvements | 11% |
| 70 - Vehicles | 0% |
| 80 - Professional Services | 100% |
| 90 - Unallocated Contingency | n.a. (1) |
| (1) Unallocated contingencies were reallocated to FTA-SCC categories 10-80 | |
| Source: JFI and RKK | |

⁴ In the past a portion of the vehicles used in Baltimore mass transit projects were made by AAI in Baltimore County. Assuming that all the vehicles are made locally could increase the total economic impact by as much as \$156.3 million and total employment by 411 jobs.

⁵ The IMPLAN model used in this analysis (see the methodology section below) uses local data – Regional Purchase Coefficients – to estimate the likely local impacts attributable to an economic activity. However, because of the specialized nature of the transportation investment being analyzed here and the lack of a specific transportation-related construction industry sector in the IMPLAN model, this analysis excluded likely out-of-state purchases as determined by the JFI and RK&K.

⁶ The JFI and RK&K identified areas where purchases of goods and services could likely be made locally. Estimates were made based on RK&K's knowledge of mass transit projects and the JFI's understanding of the local economy. Purchases of land and of specialized transportation related items, such as the trains themselves, where no City supplier exists, were excluded.

The JFI applied the estimated share of Red Line construction spending projected to be made locally to the total construction budget (summarized in Table 1) to estimate construction and related spending that is likely to be made locally. The results of this analysis are presented in Table 3. The JFI estimates that 84% of the Red Line construction expenditures will be made locally for a total of \$1.368 billion in local expenditures.

Table 3
Red Line Estimated Local Construction Spending by FTA - Standard Cost Category, By Year
(Millions of Dollars)

| Item | Design and Planning Phase (3 Year) | Construction Phase (4 Year) | Total |
|--|---------------------------------------|--------------------------------|-----------|
| Total | \$174.7 | \$1,192.9 | \$1,367.6 |
| 10 - Guideway and Track Elements | \$0.0 | \$627.0 | \$627.0 |
| 20 - Stations, Stops, Terminals, Intermodal | \$0.0 | \$187.7 | \$187.7 |
| 30 - Support Facilities: Yards, Shops, Admin. Bldgs | \$0.0 | \$46.9 | \$46.9 |
| 40 - Sitework & Special Conditions | \$0.0 | \$148.9 | \$148.9 |
| 50 - Systems | \$0.0 | \$28.6 | \$28.6 |
| 60 - ROW, Land, Existing Improvements | \$4.2 | \$0.0 | \$4.2 |
| 70 - Vehicles | \$0.0 | \$0.0 | \$0.0 |
| 80 - Professional Services | \$170.5 | \$153.7 | \$324.2 |
| 90 - Unallocated Contingency | \$0.0 | \$0.0 | \$0.0 |

Source: JFI and RKK

Economic Impact of the Construction of the Red Line

Methodology

This report analyzes the impact of the construction of the Red Line mass transit system on the City of Baltimore's economy using the IMPLAN model⁷ for Baltimore City.⁸ The IMPLAN model is based on economic multipliers, which describe the response of an economy to a change in demand or production. The IMPLAN model uses multipliers to estimate the economic impacts of a project or activity. Multiplier effects occur as an initial round of spending is spent and re-spent in the City economy. For example, an industry pays a worker a salary, a portion of which is then spent on goods and services from local companies, which in turn becomes income for other workers and supplier firms. Thus, each dollar of spending creates more than one dollar in economic activity, as that spending is earned and, in turn, spent by others in the City.

This analysis focuses on three measures of economic activity or impact: output (a figure similar to business sales activity); employment; and employee compensation. Multipliers capture the effect of the introduction of a new source of economic activity in an economy. Multiplier effects occur as the spending associated with an economic activity are earned and then re-spent by others in the local economy, through three types of impacts:

- *Direct Impacts* are those impacts occurring in the impacted sector and related industries as a direct result of the activity being studied, in this case the direct construction expenditures associated with the construction of the Red Line mass transit system;
- *Indirect Impacts* are those impacts created as a result of the in-City expenditures estimated by the IMPLAN model as likely to occur based on structural conditions in the City of Baltimore's economy, for example the purchase of goods and services to support the construction of the Red Line; and
- *Induced Impacts* are estimated based on the resident spending associated with the increase in Baltimore City incomes attributable to the Red Line construction activities.

The total impacts presented above are the aggregation of these direct, indirect and induced impacts and are greater than the direct effects as a result of the induced and indirect – “multiplier” impacts occurring because of the construction of the Red Line mass transit system.

Results

The estimated level of local spending for each construction and related sector were entered into the appropriate industry in the IMPLAN model. The results of this economic impact analysis are included in Tables 4 through 7. As presented in these Tables:

- The \$1.368 billion in Direct Impacts from the construction of the Red Line will generate \$405.1 million in *Indirect Impacts* from local purchases made to support the construction of the Red Line and \$305.1 million in *Induced Impacts* from the increase in City incomes attributable to the construction of the Red Line over the entire construction period;

⁷ See www.implan.com.

⁸ A portion of the Red Line will be constructed in Baltimore County. All construction expenditures, however, are modeled as if they occurred in Baltimore City.

- Including *Direct*, *Indirect* and *Induced* Impacts, the construction of the Red Line will generate a total of just under \$2.1 billion in economic activity in Baltimore City over the construction period;
- The construction of the Red Line will create or support a total of 9,801 direct construction and related jobs earning \$539.7 million in salaries and wages over the construction period;
- Including multiplier effects, the construction of the Red Line will create or support a total of 15,006 jobs earning \$775.2 million in salaries and wages over the construction period;
- The initial design and planning phase of the Red Line project will generate \$273.4 million in economic activity in Baltimore City and create or support 2,057 jobs earning \$102.7 million in salaries and wages; and
- The construction phase of Red Line project will generate \$1.8 billion in economic activity in Baltimore City and create or support 12,949 jobs earning \$672.5 million in salaries and wages.

The economic output impacts of the construction of the Red Line are presented by sector in Table 5, the employment impacts by sector in Table 6 and the employment compensation impacts are presented in Table 7. As presented in these tables, outside of the construction sector, the multiplier impacts are concentrated in the: professional, scientific & technical services; manufacturing and financial sectors.

Table 4
Economic Impact of the Red Line Estimated Local Construction Spending

| Item | Design and Planning Phase (3 Year) | Construction Phase (4 Year) | Total |
|---------------------------------|--|--------------------------------|-----------|
| Direct Impact (Mil \$.) | \$174.7 | \$1,192.9 | \$1,367.6 |
| Employment (# of Jobs) | 1,307 | 8,494 | 9,801 |
| <u>Economic Impact</u> | | | |
| Output (Mil. \$) | \$273.4 | \$1,804.4 | \$2,077.8 |
| Employment (# of Jobs) | 2,057 | 12,949 | 15,006 |
| Employee Compensation (Mil. \$) | \$102.7 | \$672.5 | \$775.2 |

Source: JFI and IMPLAN

Table 5
Output Impact
Of the Construction of the Red Line
(Millions of Dollars)

| Item | Direct Impact | Indirect Impact | Induced Impact | Total Impact |
|---------------------------------------|-------------------------|-----------------------|-----------------------|-------------------------|
| Total | <u>\$1,367.6</u> | <u>\$405.1</u> | <u>\$305.1</u> | <u>\$2,077.8</u> |
| Ag, Forestry, Fish & Hunting | \$0.0 | \$0.0 | \$0.0 | \$0.0 |
| Mining | \$0.0 | \$0.0 | \$0.0 | \$0.0 |
| Utilities | \$0.0 | \$8.2 | \$9.2 | \$17.5 |
| Construction | \$1,142.3 | \$2.4 | \$2.0 | \$1,146.7 |
| Manufacturing | \$28.6 | \$41.1 | \$15.4 | \$85.2 |
| Wholesale Trade | \$0.0 | \$24.9 | \$14.4 | \$39.3 |
| Retail trade | \$0.0 | \$11.2 | \$27.4 | \$38.5 |
| Transportation & Warehousing | \$4.2 | \$21.4 | \$7.8 | \$33.3 |
| Information | \$0.0 | \$13.5 | \$9.7 | \$23.2 |
| Finance & Insurance | \$20.3 | \$29.1 | \$29.6 | \$79.0 |
| Real estate & Rental | \$0.0 | \$34.6 | \$55.8 | \$90.4 |
| Professional, Scientific & Tech. Svcs | \$172.2 | \$143.0 | \$14.4 | \$329.7 |
| Management of Companies | \$0.0 | \$2.3 | \$0.7 | \$3.0 |
| Administrative & Waste Services | \$0.0 | \$29.2 | \$7.1 | \$36.3 |
| Educational Services | \$0.0 | \$0.2 | \$7.7 | \$7.9 |
| Health & Social Services | \$0.0 | \$0.0 | \$59.0 | \$59.0 |
| Arts, Entertainment & Recreation | \$0.0 | \$1.4 | \$4.9 | \$6.4 |
| Accommodation & Food Services | \$0.0 | \$11.3 | \$19.5 | \$30.8 |
| Other Services | \$0.0 | \$25.9 | \$14.2 | \$40.2 |
| Government | \$0.0 | \$5.3 | \$6.3 | \$11.6 |

Source: JFI and IMPLAN

Table 6
Employment Impact
Of the Construction of the Red Line
 (Number of Jobs)

| Item | Direct Impact | Indirect Impact | Induced Impact | Total Impact |
|---------------------------------------|---------------------|---------------------|---------------------|----------------------|
| Total | <u>9,801</u> | <u>2,918</u> | <u>2,287</u> | <u>15,006</u> |
| Ag, Forestry, Fish & Hunting | 0 | 0 | 0 | 0 |
| Mining | 0 | 0 | 0 | 0 |
| Utilities | 0 | 6 | 7 | 13 |
| Construction | 8,215 | 20 | 10 | 8,244 |
| Manufacturing | 75 | 130 | 41 | 245 |
| Wholesale Trade | 0 | 129 | 75 | 204 |
| Retail trade | 0 | 160 | 398 | 559 |
| Transportation & Warehousing | 29 | 156 | 62 | 246 |
| Information | 0 | 39 | 29 | 68 |
| Finance & Insurance | 126 | 97 | 96 | 319 |
| Real estate & Rental | 0 | 125 | 82 | 207 |
| Professional, Scientific & Tech. Svcs | 1,357 | 1,159 | 102 | 2,619 |
| Management of Companies | 0 | 12 | 4 | 16 |
| Administrative & Waste Services | 0 | 448 | 105 | 553 |
| Educational Services | 0 | 2 | 86 | 88 |
| Health & Social Services | 0 | 0 | 567 | 567 |
| Arts, Entertainment & Recreation | 0 | 42 | 116 | 158 |
| Accommodation & Food Services | 0 | 146 | 269 | 415 |
| Other Services | 0 | 205 | 201 | 406 |
| Government | 0 | 42 | 39 | 82 |

Source: JFI and IMPLAN

Table 7
Employee Compensation Impact
Of the Construction of the Red Line
(Millions of Dollars)

| Item | Direct Impact | Indirect Impact | Induced Impact | Total Impact |
|---------------------------------------|-----------------------|-----------------------|----------------------|-----------------------|
| Total | <u>\$539.7</u> | <u>\$137.5</u> | <u>\$98.0</u> | <u>\$775.2</u> |
| Ag, Forestry, Fish & Hunting | \$0.0 | \$0.0 | \$0.0 | \$0.0 |
| Mining | \$0.0 | \$0.0 | \$0.0 | \$0.0 |
| Utilities | \$0.0 | \$1.1 | \$1.3 | \$2.4 |
| Construction | \$453.4 | \$1.1 | \$0.6 | \$455.1 |
| Manufacturing | \$7.4 | \$7.4 | \$2.1 | \$16.8 |
| Wholesale Trade | \$0.0 | \$9.1 | \$5.3 | \$14.4 |
| Retail trade | \$0.0 | \$4.2 | \$10.1 | \$14.2 |
| Transportation & Warehousing | \$1.3 | \$7.8 | \$2.9 | \$12.0 |
| Information | \$0.0 | \$3.3 | \$2.2 | \$5.5 |
| Finance & Insurance | \$9.4 | \$9.7 | \$10.0 | \$29.1 |
| Real estate & Rental | \$0.0 | \$4.9 | \$2.7 | \$7.5 |
| Professional, Scientific & Tech. Svcs | \$68.3 | \$56.9 | \$5.4 | \$130.6 |
| Management of Companies | \$0.0 | \$0.9 | \$0.3 | \$1.2 |
| Administrative & Waste Services | \$0.0 | \$13.4 | \$3.1 | \$16.5 |
| Educational Services | \$0.0 | \$0.1 | \$4.5 | \$4.6 |
| Health & Social Services | \$0.0 | \$0.0 | \$30.1 | \$30.1 |
| Arts, Entertainment & Recreation | \$0.0 | \$0.4 | \$1.5 | \$1.9 |
| Accommodation & Food Services | \$0.0 | \$4.1 | \$7.2 | \$11.2 |
| Other Services | \$0.0 | \$10.2 | \$6.1 | \$16.3 |
| Government | \$0.0 | \$3.0 | \$2.8 | \$5.8 |

Source: JFI and IMPLAN

Occupational Analysis of the Jobs Created By the Construction of the Red Line

In addition to quantifying the economic impacts described above, a second core goal of this analysis was to identify the type of jobs created by the construction of the Red Line. The intent of this analysis is to estimate the types of jobs being created by the construction of the Red Line in order to meet the goal of the Red Line Community Compact to place community residents into the jobs created. Thus, this analysis focused not only on estimating the number of jobs created, but the occupational and educational/skills profile of these jobs. The JFI conducted analysis of both the direct construction and related jobs and the multiplier effect (*Induced* and *Indirect Impacts*) jobs estimated to be created in the economic impact analysis (above). For both construction-related and multiplier effect jobs, the number of jobs created was converted into the estimated occupational employment using occupational employment data by industry from the U.S. Bureau of Labor Statistics (BLS).⁹ For each of these occupations, the educational and training requirements were identified using BLS occupational data.¹⁰

The employment estimates presented are for the total number of jobs over the design and construction periods. The employment number includes both full and part time jobs and because they were estimated over the multi-year design and construction periods can be viewed as the total number of job-person years – i.e. the same construction job occurring over the four year City’s projected 4-year construction period would be counted as 4 jobs.

The total construction jobs created by level of education and training required by construction phase are presented in Table 8 and the top 25 construction occupations experiencing the most job growth are presented in Table 9. As presented in Table 4 (above), during the overall construction period, the construction of the Red Line will create an estimated 9,801 construction and construction-related jobs. As presented in Table 8, the overwhelming number of these construction jobs created is low skill, with 83% of the jobs created requiring only on-the-job training or post secondary vocational training. As presented in Table 9, the leading construction occupations experiencing job growth are: Construction Laborers, with 1,821 total jobs created over the entire construction period; Operating Engineers/Construction Equipment Operators, with 1,314 jobs; First Line Supervisors of Construction workers, with 575 jobs; Carpenters, with 433 jobs; and Civil Engineers, with 272 jobs.¹¹ Of the top 25 impacted construction occupations only three – Civil Engineers, Construction Managers, and General and Operations Managers -- require a bachelor’s degree or above. Descriptions of the leading construction-related occupations where jobs are created are presented in Appendix A.

The multiplier effect – *Indirect* and *Induced Effect* – jobs created by level of education and training required by phase of construction are presented in Table 10 and the top 20 multiplier

⁹ The JFI used two sets of data for the occupational analysis. Because the IMPLAN model has only a highly aggregated sector for Other Non-Residential construction – which includes mass transit systems as well as a large number of other non-residential projects, the JFI used the BLS occupational matrix for NAICs code 2379 Other Heavy Construction, which includes Mass Transit Construction. For Induced and Indirect “multiplier effect” jobs, the JFI used an IMPLAN-developed industry occupational matrix based on BLS data based on the IMPLAN industries. It is also important to note that this approach may undercount the number of specialized trades jobs created by the construction of the Red Line because the occupational staffing analysis was based on the available total budget, not on a detailed budget that includes expected subcontracting expenditures (not available at this time).

¹⁰ See <http://www.bls.gov/emp/empetd1.htm>.

¹¹ All of these job estimate figures are over the entire construction period.

effect jobs experiencing the most job growth are presented in Table 11. As presented in Table 6 (above), there are a total of 5,205 multiplier effect jobs created in Baltimore City as a result of the construction of the Red Line. As presented in Table 10, the majority number of these multiplier effect jobs created is low skill, with 72% of the jobs created requiring only on-the-job training or post secondary vocational training. As presented in Table 11, the leading multiplier effect occupations experiencing job growth are: Retail Salespersons; Office Clerks; Cashiers; Laborers; and Janitors. Sixteen of the top twenty multiplier effect jobs are lower skill and only three require a Bachelors Degree and one requires an Associate Degree.

Table 8
Construction Jobs Created by the Construction of the Red Line by Year by Level of
Education and Training Required
 (# of Jobs)

| Education Level / Year | Design and Planning Phase (3 Year) | Construction Phase (4 Year) | Total |
|---|---------------------------------------|--------------------------------|--------------|
| Total | <u>1,307</u> | <u>8,494</u> | <u>9,801</u> |
| First Professional Degree | 31 | 28 | 58 |
| Doctoral Degree | 1 | 1 | 3 |
| Master's Degree | 23 | 26 | 48 |
| Degree plus work Experience | 91 | 284 | 376 |
| Bachelor's Degree | 281 | 712 | 994 |
| Associate Degree | 67 | 86 | 152 |
| Postsecondary vocational award | 78 | 273 | 351 |
| Work experience in a related occupation | 94 | 877 | 971 |
| Long-term on-the-job training | 72 | 926 | 998 |
| Moderate-term on-the-job training | 439 | 4,482 | 4,922 |
| Short-term on-the-job training | 128 | 799 | 927 |
| Unallocated | 0 | 0 | 0 |
| % of Total | <u>100%</u> | <u>100%</u> | <u>100%</u> |
| First Professional Degree | 2% | 0% | 1% |
| Doctoral Degree | 0% | 0% | 0% |
| Master's Degree | 2% | 0% | 0% |
| Degree plus work Experience | 7% | 3% | 4% |
| Bachelor's Degree | 22% | 8% | 10% |
| Associate Degree | 5% | 1% | 2% |
| Postsecondary vocational award | 6% | 3% | 4% |
| Work experience in a related occupation | 7% | 10% | 10% |
| Long-term on-the-job training | 6% | 11% | 10% |
| Moderate-term on-the-job training | 34% | 53% | 50% |
| Short-term on-the-job training | 10% | 9% | 9% |
| Unallocated | 0% | 0% | 0% |

Source: JFI

Table 9
Top 25 Construction Jobs Created by the Construction of the Red Line by Year by Level of Education and Training Required
 (# of Jobs)

| Occupation | Education and Training Level | Number of Jobs | | Total |
|---|---|---------------------------------------|--------------------------------|-------|
| | | Design and Planning Phase (3 Year) | Construction Phase (4 Year) | |
| Construction laborers | Moderate-term on-the-job training | 112 | 1,709 | 1,821 |
| Operating engineers and other construction equipment operators | Moderate-term on-the-job training | 80 | 1,234 | 1,314 |
| First-line supervisors/managers of construction trades and extraction workers | Work experience in a related occupation | 36 | 539 | 575 |
| Carpenters | Long-term on-the-job training | 27 | 406 | 433 |
| Civil engineers | Bachelor's degree | 54 | 218 | 272 |
| Truck drivers, heavy and tractor-trailer | Moderate-term on-the-job training | 31 | 218 | 249 |
| Office clerks, general | Short-term on-the-job training | 40 | 195 | 235 |
| Construction managers | Bachelor's degree | 16 | 195 | 211 |
| Secretaries, except legal, medical, and executive | Moderate-term on-the-job training | 31 | 144 | 175 |
| Mobile heavy equipment mechanics, except engines | Postsecondary vocational award | 11 | 162 | 172 |
| General and operations managers | Bachelor's plus experience | 26 | 142 | 168 |
| Welders, cutters, solderers, and brazers | Long-term on-the-job training | 10 | 147 | 157 |
| Bookkeeping, accounting, and auditing clerks | Moderate-term on-the-job training | 23 | 129 | 152 |
| Cement masons and concrete finishers | Moderate-term on-the-job training | 9 | 133 | 141 |
| Pile-driver operators | Moderate-term on-the-job training | 8 | 131 | 140 |
| Plumbers, pipefitters, and steamfitters | Long-term on-the-job training | 9 | 131 | 140 |
| Laborers and freight, stock, and material movers, hand | Short-term on-the-job training | 13 | 123 | 136 |
| Landscaping and groundskeeping workers | Short-term on-the-job training | 12 | 113 | 126 |
| Executive secretaries and administrative assistants | Moderate-term on-the-job training | 29 | 93 | 122 |
| Excavating and loading machine and dragline operators | Moderate-term on-the-job training | 7 | 114 | 121 |
| Cost estimators | Work experience in a related occupation | 9 | 111 | 120 |
| Structural iron and steel workers | Long-term on-the-job training | 6 | 94 | 100 |
| Electricians | Long-term on-the-job training | 6 | 84 | 90 |
| Maintenance and repair workers, general | Moderate-term on-the-job training | 8 | 78 | 86 |
| Architectural and civil drafters | Postsecondary vocational award | 31 | 47 | 78 |

Source: JFI

Table 10
Multiplier Effect Jobs Created by the Construction of the Red Line by Year by Level
of Education and Training Required
 (# of Jobs)

| Education Level / Year | Design and Planning Phase (3 Year) | Construction Phase (4 Year) | Total |
|---|---------------------------------------|--------------------------------|--------------|
| Total | <u>751</u> | <u>4,455</u> | <u>5,205</u> |
| First Professional Degree | 11 | 71 | 82 |
| Doctoral Degree | 5 | 29 | 34 |
| Master's Degree | 9 | 57 | 66 |
| Degree plus work Experience | 35 | 206 | 241 |
| Bachelor's Degree | 95 | 647 | 742 |
| Associate Degree | 33 | 219 | 252 |
| Postsecondary vocational award | 38 | 269 | 307 |
| Work experience in a related occupation | 47 | 283 | 330 |
| Long-term on-the-job training | 30 | 181 | 211 |
| Moderate-term on-the-job training | 137 | 831 | 967 |
| Short-term on-the-job training | 305 | 1,651 | 1,955 |
| Unallocated | 7 | 11 | 18 |
| % of Total | <u>100%</u> | <u>100%</u> | <u>100%</u> |
| First Professional Degree | 2% | 2% | 2% |
| Doctoral Degree | 1% | 1% | 1% |
| Master's Degree | 1% | 1% | 1% |
| Degree plus work Experience | 5% | 5% | 5% |
| Bachelor's Degree | 13% | 15% | 14% |
| Associate Degree | 4% | 5% | 5% |
| Postsecondary vocational award | 5% | 6% | 6% |
| Work experience in a related occupation | 6% | 6% | 6% |
| Long-term on-the-job training | 4% | 4% | 4% |
| Moderate-term on-the-job training | 18% | 19% | 19% |
| Short-term on-the-job training | 41% | 37% | 38% |
| Unallocated | 1% | 0% | 0% |

Source: JFI

Table 11
Top 20 Multiplier Effect Jobs Created by the Construction of the Red Line by Year by Level of Education and Training
Required
 (# of Jobs)

| Occupation | Education and Training Level | Number of Jobs | | Total |
|--|-----------------------------------|---------------------------------------|--------------------------------|-------|
| | | Design and Planning Phase (3 Year) | Construction Phase (4 Year) | |
| Retail salespersons | Short-term on-the-job training | 19 | 132 | 150 |
| Office clerks, general | Short-term on-the-job training | 22 | 121 | 143 |
| Cashiers, except gaming | Short-term on-the-job training | 17 | 111 | 128 |
| Laborers and freight, stock, and material movers, hand | Short-term on-the-job training | 16 | 83 | 99 |
| Janitors and cleaners, except maids and housekeeping cleaners | Short-term on-the-job training | 16 | 82 | 98 |
| Waiters and waitresses | Short-term on-the-job training | 18 | 78 | 96 |
| Combined food preparation and serving workers, including fast food | Short-term on-the-job training | 17 | 76 | 93 |
| Customer service representatives | Moderate-term on-the-job training | 16 | 77 | 93 |
| Truck drivers, heavy and tractor-trailer | Moderate-term on-the-job training | 10 | 79 | 88 |
| Bookkeeping, accounting, and auditing clerks | Moderate-term on-the-job training | 13 | 75 | 88 |
| Secretaries, except legal, medical, and executive | Moderate-term on-the-job training | 12 | 72 | 84 |
| Executive secretaries and administrative assistants | Moderate-term on-the-job training | 12 | 70 | 81 |
| Registered nurses | Associate degree | 13 | 69 | 82 |
| General and operations managers | Bachelor's plus experience | 11 | 69 | 80 |
| Civil engineers | Bachelor's degree | 6 | 71 | 77 |
| Maids and housekeeping cleaners | Short-term on-the-job training | 10 | 52 | 62 |
| Landscaping and groundskeeping workers | Short-term on-the-job training | 9 | 52 | 61 |
| Accountants and auditors | Bachelor's degree | 10 | 55 | 65 |
| Receptionists and information clerks | Short-term on-the-job training | 9 | 49 | 57 |
| Stock clerks and order fillers | Short-term on-the-job training | 7 | 49 | 56 |

Source: JFI

Workforce Supply

In order to describe the workforce development issues related to the Red Line construction, the JFI analyzed available data on the workforce-related demographic characteristics of the residents in the neighborhoods impacted by the construction of the Red Line. The Baltimore Neighborhood Indicators Alliance of the Jacob France Institute (BNIA-JFI) collected and analyzed Claritas data at the census tract level for the area along the Red Line route. The current Red Line alignment and the census tracts included in this analysis are presented in Map 1. The list of census tracts analyzed is also included in Appendix B – which includes the core tract level information for this analysis.

The JFI's analysis of available Claritas workforce-related demographic information on the population along the Red Line route and compared to the City¹² yielded the following results:

- A total of 19% of Baltimore City's population and 20% of Baltimore City's households are located in the Red Line construction area (Table 12);
- The population of the Red Line construction area is 33% White and 61% African-American compared to Baltimore City at 30% White and 64% African-American¹³ (Table 12);
- The population of the City Red Line construction area is older than the City's average with an average age of 38.0 years compared to 35.4 for Baltimore City. Twenty five percent (25%) of the residents of the Red Line communities are aged 55 or older compared to 22% in the City as a whole (Table 12);
- The population of the City's Red Line construction area is more reliant on mass-transit, with 39% of households lacking access to an automobile compared to 35% of Baltimore City households (Table 13);
- The income of population of the City Red Line construction area is similar to the City as a whole, with a per capita income of \$20,722, compared to \$20,316 in Baltimore City. The median household income in the Red Line construction area is \$31,286, compared to \$33,769 in Baltimore City (Table 14);
- City Red Line construction area residents have a slightly lower level of workforce participation than the City as a whole, with 55% of Red Line construction area residents aged 16 years or older are engaged in work activities, compared to 57% of City residents (Table 15);
- The population of the Red Line construction area has a low level of educational attainment. Thirty-five percent (35%) of the City Red Line construction area

¹² The Red Line includes several tracts located in Baltimore County. This demographic analysis focuses on the tracts located in Baltimore City, but also presents the information for Baltimore County tracts.

¹³ Does not sum to 100% because of other races, such as Asian or Hispanic.

residents have not completed high school compared to 31% of Baltimore City households (Table 16);

- Comparable to the City as a whole, 5% of the City's employed residents in the Red Line construction area are employed in the construction sector (Table 17) and a slightly higher percentage of the City's employed residents in the Red Line construction area are employed in construction-related occupations – 5% versus 4% citywide (Table 18);
- A slightly higher percentage of the City's employed residents in the Red Line construction area are employed in transportation and materials moving occupations – 8% versus 7% citywide (Table 18); and
- A slightly higher percentage of the City's employed residents in the Red Line construction area are employed in lower skilled blue collar occupations than the citywide average – 22% versus 20% Citywide (Table 19).

The communities surrounding planned Red Line route have a slightly lower share of residents employed and a slightly higher share of residents not engaged in work activities than the City-as-a-whole. Furthermore, these communities have a higher share of residents employed in construction and transportation and materials moving related occupations than the City-as-a-whole. Thirteen percent of the City's employed residents in the Red Line construction area are employed in the construction or transportation and materials moving occupations where the job opportunities created by the construction of the Red Line are concentrated. Thus, the construction of the Red Line may create employment opportunities for residents of the impacted communities.

Proposed Red Line Route and Stations

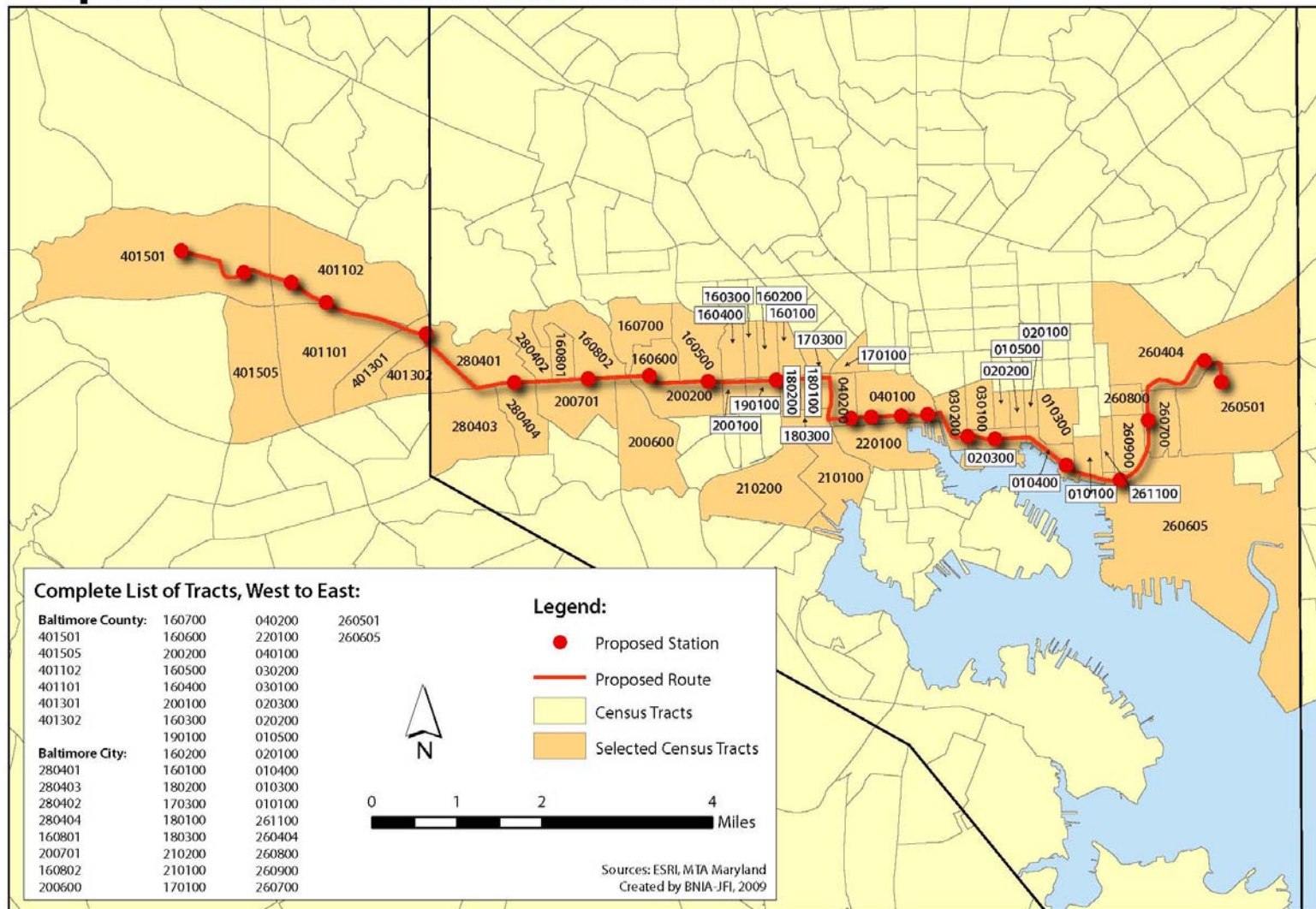


Table 12
Basic Demographics - Red Line Communities

| Demographic Indicators | Total Baltimore City | Redline Baltimore City | Redline Baltimore County | Total Redline |
|----------------------------------|---------------------------------|-----------------------------------|-------------------------------------|--------------------------|
| Population | 631,822 | 120,484 | 27,364 | 147,848 |
| Number of Households | 256,850 | 51,531 | 10,695 | 62,226 |
| Average Age | 35.40 | 38.04 | 35.52 | 37.57 |
| Number of White Alone Residents | 186,581 | 39,884 | 6,246 | 46,130 |
| Number of Black Alone Residents | 405,802 | 73,371 | 18,072 | 91,443 |
| Total Population 0-17 Years Old | 157,626 | 28,452 | 7,415 | 35,867 |
| Total Population 18-34 Years Old | 154,343 | 28,583 | 6,015 | 34,598 |
| Total Population 35-54 Years Old | 175,980 | 34,003 | 8,693 | 42,696 |
| Total Population 55-64 Years Old | 66,096 | 12,871 | 2,554 | 15,425 |
| Total Population 65 and Over | 77,777 | 16,575 | 2,687 | 19,262 |
| <u>% of Total</u> | | | | |
| Number of White Alone Residents | 30% | 33% | 23% | 31% |
| Number of Black Alone Residents | 64% | 61% | 66% | 62% |
| Total Population 0-17 Years Old | 25% | 24% | 27% | 24% |
| Total Population 18-34 Years Old | 24% | 24% | 22% | 23% |
| Total Population 35-54 Years Old | 28% | 28% | 32% | 29% |
| Total Population 55-64 Years Old | 10% | 11% | 9% | 10% |
| Total Population 65 and Over | 12% | 14% | 10% | 13% |

Source: BNIA-JFI, Claritas and Bureau of the Census

Table 13
Vehicle Ownership - Red Line Communities

| Transportation Indicators | Total Baltimore City | Redline Baltimore City | Redline Baltimore County | Total Redline |
|---|---------------------------------|-----------------------------------|-------------------------------------|--------------------------|
| Number of Households | 256,850 | 51,531 | 10,695 | 62,226 |
| Number of Homes with 0 Vehicles | 90,076 | 20,266 | 1,001 | 21,267 |
| Number of Homes with 1 Vehicles | 104,510 | 20,311 | 4,534 | 24,845 |
| Number of Homes with 2 Vehicles | 49,560 | 8,801 | 3,974 | 12,775 |
| Number of Homes with 3 or More Vehicles | 12,704 | 2,153 | 1,186 | 3,339 |
| <u>% of Total</u> | | | | |
| Number of Homes with 0 Vehicles | 35% | 39% | 9% | 34% |
| Number of Homes with 1 Vehicles | 41% | 39% | 42% | 40% |
| Number of Homes with 2 Vehicles | 19% | 17% | 37% | 21% |
| Number of Homes with 3 or More Vehicles | 5% | 4% | 11% | 5% |

Source: BNIA-JFI, Claritas and Bureau of the Census

Table 14
Income - Red Line Communities

| Income Indicators | Total Baltimore City | Redline Baltimore City | Redline Baltimore County | Total Redline |
|--------------------------|-------------------------------------|---------------------------------------|---|--------------------------|
| Per Capita Income | \$20,316 | \$20,722 | \$23,249 | \$20,751 |
| Median Household Income | \$33,769 | \$31,286 | \$50,456 | \$32,300 |
| Average Household Income | \$47,417 | \$45,266 | \$58,521 | \$46,319 |

Source: BNIA-JFI, Claritas and Bureau of the Census

Table 15
Labor Force Indicators - Red Line Communities

| Labor Force Indicators | Total Baltimore City | Redline Baltimore City | Redline Baltimore County | Total Redline |
|-------------------------------|---------------------------------|---------------------------------------|-------------------------------------|--------------------------|
| Total | 491,760 | 95,195 | 20,791 | 115,986 |
| Population in Armed Forces | 425 | 156 | 28 | 184 |
| Population Employed | 249,688 | 46,583 | 14,226 | 60,809 |
| Population Unemployed | 29,157 | 6,065 | 688 | 6,753 |
| Population Not in Labor Force | 212,490 | 42,391 | 5,849 | 48,240 |
| <u>% of Total</u> | | | | |
| Population in Armed Forces | 0% | 0% | 0% | 0% |
| Population Employed | 51% | 49% | 68% | 52% |
| Population Unemployed | 6% | 6% | 3% | 6% |
| Population Not in Labor Force | 43% | 45% | 28% | 42% |

Source: BNIA-JFI, Claritas and Bureau of the Census

Table 16
Educational Attainment - Red Line Communities

| Educational Attainment Indicators | Total Baltimore City | Redline Baltimore City | Redline Baltimore County | Total Redline |
|--|-----------------------------|-------------------------------|---------------------------------|----------------------|
| Persons Aged 25+ | 403,013 | 81,084 | 17,657 | 98,741 |
| Less than 9th Grade | 37,235 | 9,229 | 936 | 10,165 |
| Some High School (No Diploma) | 87,758 | 19,438 | 1,707 | 21,145 |
| High School Graduate | 112,402 | 22,050 | 5,156 | 27,206 |
| Some College (No Degree) | 71,363 | 12,753 | 4,201 | 16,954 |
| Associates Degree | 14,257 | 2,699 | 1,340 | 4,039 |
| Bachelor's Degree | 43,485 | 8,580 | 2,846 | 11,426 |
| Master's Degree | 23,223 | 3,701 | 1,022 | 4,723 |
| Professional Degree | 8,665 | 1,848 | 355 | 2,203 |
| Doctorate Degree | 4,625 | 786 | 94 | 880 |
| <u>% of Total</u> | | | | |
| Less than 9th Grade | 9% | 11% | 5% | 10% |
| Some High School (No Diploma) | 22% | 24% | 10% | 21% |
| High School Graduate | 28% | 27% | 29% | 28% |
| Some College (No Degree) | 18% | 16% | 24% | 17% |
| Associates Degree | 4% | 3% | 8% | 4% |
| Bachelor's Degree | 11% | 11% | 16% | 12% |
| Master's Degree | 6% | 5% | 6% | 5% |
| Professional Degree | 2% | 2% | 2% | 2% |
| Doctorate Degree | 1% | 1% | 1% | 1% |

Source: BNIA-JFI, Claritas and Bureau of the Census

Table 17
Industry of Employment Indicators - Red Line Communities

| Industry of Employment Indicators | Total Baltimore City | Redline Baltimore City | Redline Baltimore County | Total Redline |
|--|---------------------------------|-----------------------------------|-------------------------------------|--------------------------|
| Total Population Employed | 249,688 | 46,583 | 14,226 | 60,809 |
| Agriculture, Forestry, Fishing, Hunting, and Mining | 275 | 85 | 18 | 103 |
| Construction | 12,546 | 2,439 | 557 | 2,996 |
| Manufacturing | 19,500 | 4,056 | 973 | 5,029 |
| Wholesale Trade | 6,710 | 1,248 | 426 | 1,674 |
| Retail Trade | 22,287 | 4,375 | 1,383 | 5,758 |
| Transportation, Warehousing, and Utilities | 13,853 | 2,785 | 1,058 | 3,843 |
| Information | 8,095 | 1,574 | 443 | 2,017 |
| Finance, Insurance, Real Estate, and Rental and Leasing | 17,142 | 3,286 | 1,301 | 4,587 |
| Professional, Scientific, and Technical Services | 13,952 | 2,830 | 931 | 3,761 |
| Management of Companies and Enterprises | 68 | 17 | 20 | 37 |
| Administrative and Support and Waste Management Services | 11,458 | 2,148 | 522 | 2,670 |
| Educational Services | 27,754 | 4,379 | 1,204 | 5,583 |
| Health Care and Social Assistance | 39,237 | 7,104 | 1,986 | 9,090 |
| Arts, Entertainment, and Recreation | 4,090 | 670 | 134 | 804 |
| Accommodation and Food Services | 16,449 | 3,348 | 662 | 4,010 |
| Other Services | 13,023 | 2,253 | 757 | 3,010 |
| Public Administration | 23,249 | 3,986 | 1,851 | 5,837 |
| <u>% of Total</u> | | | | |
| Agriculture, Forestry, Fishing, Hunting, and Mining | 0% | 0% | 0% | 0% |
| Construction | 5% | 5% | 4% | 5% |
| Manufacturing | 8% | 9% | 7% | 8% |
| Wholesale Trade | 3% | 3% | 3% | 3% |
| Retail Trade | 9% | 9% | 10% | 9% |
| Transportation, Warehousing, and Utilities | 6% | 6% | 7% | 6% |
| Information | 3% | 3% | 3% | 3% |
| Finance, Insurance, Real Estate, and Rental and Leasing | 7% | 7% | 9% | 8% |
| Professional, Scientific, and Technical Services | 6% | 6% | 7% | 6% |
| Management of Companies and Enterprises | 0% | 0% | 0% | 0% |
| Administrative and Support and Waste Management Services | 5% | 5% | 4% | 4% |
| Educational Services | 11% | 9% | 8% | 9% |
| Health Care and Social Assistance | 16% | 15% | 14% | 15% |
| Arts, Entertainment, and Recreation | 2% | 1% | 1% | 1% |
| Accommodation and Food Services | 7% | 7% | 5% | 7% |
| Other Services | 5% | 5% | 5% | 5% |
| Public Administration | 9% | 9% | 13% | 10% |

Source: BNIA-JFI, Claritas and Bureau of the Census

Table 18
Occupation of Employment Indicators - Red Line Communities

| Occupation of Employment Indicators | Total Baltimore City | Redline Baltimore City | Redline Baltimore County | Total Redline |
|---|---------------------------------|-----------------------------------|-------------------------------------|--------------------------|
| Total Population Employed | 249,688 | 46,583 | 14,226 | 60,809 |
| Management Occupations | 15,696 | 3,015 | 1,058 | 4,073 |
| Farmers and Farm Managers | 96 | 27 | 11 | 38 |
| Business Operation Specialists | 5,174 | 936 | 450 | 1,386 |
| Financial Specialists | 4,560 | 914 | 391 | 1,305 |
| Computer and Mathematical Occupations | 5,239 | 1,018 | 664 | 1,682 |
| Architecture and Engineering | 3,137 | 682 | 361 | 1,043 |
| Life, Physical, and Social Sciences | 3,710 | 725 | 150 | 875 |
| Community and Social Services | 6,717 | 1,215 | 305 | 1,520 |
| Legal | 3,942 | 919 | 168 | 1,087 |
| Education, Training, and Library | 15,297 | 2,538 | 605 | 3,143 |
| Arts, Design, Entertainment, Sports and Media | 5,244 | 919 | 167 | 1,086 |
| Healthcare Practitioners and Technical | 13,165 | 2,495 | 637 | 3,132 |
| Healthcare Support | 8,299 | 1,613 | 232 | 1,845 |
| Protective Service | 8,255 | 1,453 | 623 | 2,076 |
| Food Preparation and Serving Related | 12,845 | 2,605 | 518 | 3,123 |
| Building and Grounds Cleaning and Maintenance | 11,879 | 2,247 | 462 | 2,709 |
| Personal Care and Service | 8,130 | 1,340 | 434 | 1,774 |
| Sales and Related | 22,556 | 4,283 | 1,232 | 5,515 |
| Office and Administrative Support | 45,184 | 7,464 | 3,103 | 10,567 |
| Farming, Fishing, and Forestry | 254 | 64 | 0 | 64 |
| Construction and Extraction | 10,810 | 2,201 | 426 | 2,627 |
| Installation, Maintenance, and Repair | 6,465 | 1,137 | 552 | 1,689 |
| Production | 15,196 | 3,033 | 786 | 3,819 |
| Transportation and Material Moving | 17,838 | 3,740 | 891 | 4,631 |
| <u>% of Total</u> | | | | |
| Management Occupations | 6% | 6% | 7% | 7% |
| Farmers and Farm Managers | 0% | 0% | 0% | 0% |
| Business Operation Specialists | 2% | 2% | 3% | 2% |
| Financial Specialists | 2% | 2% | 3% | 2% |
| Computer and Mathematical Occupations | 2% | 2% | 5% | 3% |
| Architecture and Engineering | 1% | 1% | 3% | 2% |
| Life, Physical, and Social Sciences | 1% | 2% | 1% | 1% |
| Community and Social Services | 3% | 3% | 2% | 2% |
| Legal | 2% | 2% | 1% | 2% |
| Education, Training, and Library | 6% | 5% | 4% | 5% |
| Arts, Design, Entertainment, Sports and Media | 2% | 2% | 1% | 2% |
| Healthcare Practitioners and Technical | 5% | 5% | 4% | 5% |
| Healthcare Support | 3% | 3% | 2% | 3% |
| Protective Service | 3% | 3% | 4% | 3% |
| Food Preparation and Serving Related | 5% | 6% | 4% | 5% |
| Building and Grounds Cleaning and Maintenance | 5% | 5% | 3% | 4% |
| Personal Care and Service | 3% | 3% | 3% | 3% |
| Sales and Related | 9% | 9% | 9% | 9% |
| Office and Administrative Support | 18% | 16% | 22% | 17% |
| Farming, Fishing, and Forestry | 0% | 0% | 0% | 0% |
| Construction and Extraction | 4% | 5% | 3% | 4% |
| Installation, Maintenance, and Repair | 3% | 2% | 4% | 3% |
| Production | 6% | 7% | 6% | 6% |
| Transportation and Material Moving | 7% | 8% | 6% | 8% |

Source: BNIA-JFI, Claritas and Bureau of the Census

Table 19
Occupation of Employment Indicators - Red Line Communities

| Occupation of Employment Indicators | Total Baltimore City | Redline Baltimore City | Redline Baltimore County | Total Redline |
|--|---------------------------------|-----------------------------------|-------------------------------------|--------------------------|
| Total Population Employed | 249,688 | 46,583 | 14,226 | 60,809 |
| Blue collar | 50,309 | 10,111 | 2,655 | 12,766 |
| White collar | 149,621 | 27,123 | 9,291 | 36,414 |
| Service and Farm | 49,758 | 9,349 | 2,280 | 11,629 |
| <u>% of Total</u> | | | | |
| Blue collar | 20% | 22% | 19% | 21% |
| White collar | 60% | 58% | 65% | 60% |
| Service and Farm | 20% | 20% | 16% | 19% |

Source: BNIA-JFI, Claritas and Bureau of the Census

Summary and Conclusion

The construction of the Red Line will generate significant economic benefits to Baltimore City. It will increase total economic activity in the City by just under \$2.1 billion over the construction period. It will also create significant employment opportunities and will create or support a total of 9,801 direct construction and related jobs earning \$539.7 million in salaries and wages over the construction period and when multiplier effects are included, the construction of the Red Line will create or support a total of 15,006 jobs earning \$775.2 million in salaries and wages over the construction period. The overwhelming majority of the construction jobs created is low skill, with 83% of the jobs created requiring only on-the-job training or post secondary vocational training. The majority of the multiplier effect jobs created is also low skill, with 72% of the jobs created requiring only on-the-job training or post secondary vocational training. The communities surrounding planned Red Line route have a slightly lower share of residents employed and a slightly higher share of residents not engaged in work activities than the City-as-a-whole. Furthermore, these communities have a higher share of residents employed in construction and transportation and materials moving related occupations than the City-as-a-whole. As a result, the construction of the Red Line may create job opportunities for residents of the impacted communities, especially if the City provides employment training and job placement opportunities in the impacted communities.

Suggested Workforce Development Options

A core goal of the Red Line Community Compact is to place the residents of the impacted communities into jobs created by the construction of the Red Line. Based on the JFI's analysis of both the jobs created by the construction of the Red Line (labor demand) and the demographic and workforce-related characteristics of the community residents (labor supply), this goal appears both realistic and attainable. Workforce participation among residents of the impacted communities is lower than the City as-a-whole and workforce participation rates in the City are lower than the regional and state-wide averages. This indicates both a community and a city-wide need for the jobs created. A slightly higher share of community residents are employed in the construction and transportation and materials moving occupations in which the JFI's occupational analysis has identified that the majority of Red Line construction jobs will be created. This indicates that the community can supply a workforce consistent with the occupational demands of the Red Line construction project. It is also important to note that the demographic data employed in this analysis was based on estimates that pre-date the key parts of the recent recession. Construction activity in the City, region and the State of Maryland has declined significantly with the current economic downturn. Thus, the community demand for these jobs is quite likely to be higher than is reflected in the data presented here. Furthermore, the fact that the overwhelming majority (83%) of the construction jobs created by the construction of the Red line are lower skilled jobs – requiring only on-the-job training or post secondary vocational training; makes the jobs created accessible to the residents of the impacted community in terms of skills and training levels given that 63% of community residents have only a high school degree or less. Provided with specialized skills training, many community residents could become ready for employment in the jobs created.

The Red Line Community Compact calls for job outreach, placement and training/apprenticeship programs and services targeted to placing community residents in the jobs created by the construction of the Red Line. Based on this workforce supply and demand analysis, the proposed Red Line Community Compact workforce strategy should consider the following elements:

1. Several of the leading occupations in which the Red Line job impacts will be concentrated, most importantly Construction Laborers, require only modest levels of education and training. Baltimore City should consider programs to provide community residents with access to City or community-based job training programs that provide the skills necessary for these Red Line construction jobs. Targeted training programs could be developed, marketed to and focused on residents of the impacted communities;
2. In addition to the Community Compact's requirement that MTA require Red Line contractors to register jobs with the Baltimore City Office of Employment Development, Baltimore City should promote formal and informal linkages between contractors and City and community construction job programs that target construction skills and training. At a minimum, contractors could be asked to post job openings or participate in jobs fairs with these programs. Formal hiring goals for community residents who complete training should also be considered;
3. Given the higher than average concentration of residents in construction and materials moving occupations, community job fairs and outreach can be conducted to promote hiring of local residents; and

4. Many of the jobs created by the construction of the Red Line require above an entry level of skills and training, but only moderate levels of formal and on-the-job training. Baltimore City should consider developing targeted training and apprenticeship programs to upgrade the skills of community residents already employed in the construction trades to enter the higher skill level positions, such as Construction Supervisors; Plumbers, pipefitters, and steamfitters; and Electricians – created by the construction of the Red Line.

APPENDIX A – LEADING RED LINE CONSTRUCTION OCCUPATIONS

The occupations in which the most jobs are created by the construction of the Red Line are described below. The description of each occupation includes the total number of jobs created (from Table 9 above) by the construction of the Red Line over the entire construction period. The total number of annual openings in the City, Baltimore Region, and State for each occupation is also listed along with the education and training requirements, occupational requirements, and required skills of each job.

Construction Laborers

1,821 Jobs

- City Annual Openings: 15
- Regional Annual Openings: 385
- State Annual Openings: 831

Perform tasks involving physical labor at building, highway, and heavy construction projects, tunnel and shaft excavations, and demolition sites. May operate hand and power tools of all types: air hammers, earth tampers, cement mixers, small mechanical hoists, surveying and measuring equipment, and a variety of other equipment and instruments. May clean and prepare sites, dig trenches, set braces to support the sides of excavations, erect scaffolding, clean up rubble and debris, and remove asbestos, lead, and other hazardous waste materials. May assist other craft workers.

Baltimore City Annual Salary: \$28,407

Education and Training Requirements

| | |
|--------------------|--|
| Overall Experience | No previous work-related skill, knowledge, or experience is needed for these occupations. For example, a person can become a cashier even if he/she has never worked before. |
| Job Training | Employees in these occupations need anywhere from a few days to a few months of training. Usually, an experienced worker could show you how to do the job. |
| Education | These occupations may require a high school diploma or GED certificate. Some may require a formal training course to obtain a license. |

Occupational Requirements

- Clean and prepare construction sites to eliminate possible hazards.
- Read and interpret plans, instructions, and specifications to determine work activities.
- Control traffic passing near, in, and around work zones.
- Signal equipment operators to facilitate alignment, movement, and adjustment of machinery, equipment, and materials.
- Dig ditches or trenches, backfill excavations, and compact and level earth to grade specifications, using picks, shovels, pneumatic tampers, and rakes.
- Position, join, align, and seal structural components, such as concrete wall sections and pipes.

- Measure, mark, and record openings and distances to lay out areas where construction work will be performed.
- Load, unload, and identify building materials, machinery, and tools, and distribute them to the appropriate locations, according to project plans and specifications.
- Erect and disassemble scaffolding, shoring, braces, traffic barricades, ramps, and other temporary structures.
- Build and position forms for pouring concrete, and dismantle forms after use, using saws, hammers, nails, or bolts.

Required Skills

| Skills | Skill Definitions |
|-----------------------|---|
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Coordination | Adjusting actions in relation to others' actions. |
| Equipment Selection | Determining the kind of tools and equipment needed to do a job. |
| Speaking | Talking to others to convey information effectively. |
| Instructing | Teaching others how to do something. |
| Monitoring | Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action. |
| Equipment Maintenance | Performing routine maintenance on equipment and determining when and what kind of maintenance is needed. |
| Learning Strategies | Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Mathematics | Using mathematics to solve problems. |

Operating Engineers and Other Construction and Other Construction Equipment Operators **1,314 Jobs**

- City Annual Openings: 7
- Regional Annual Openings: 150
- State Annual Openings: 2,44

Operate one or several types of power construction equipment, such as motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, tractors, or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement. May repair and maintain equipment in addition to other duties.

Baltimore City Annual Salary: \$44,475

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. |
| Job Training | Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. |
| Education | Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree. |

Occupational Requirements

- Learn and follow safety regulations.
- Take actions to avoid potential hazards and obstructions, such as utility lines, other equipment, other workers, and falling objects.
- Adjust handwheels and depress pedals to control attachments, such as blades, buckets, scrapers, and swing booms.
- Start engines, move throttles, switches, and levers, and depress pedals to operate machines such as bulldozers, trench excavators, road graders, and backhoes.
- Locate underground services, such as pipes and wires, prior to beginning work.
- Monitor operations to ensure that health and safety standards are met.
- Align machines, cutterheads, or depth gauge makers with reference stakes and guidelines or ground or position equipment, following hand signals of other workers.
- Load and move dirt, rocks, equipment, and materials, using trucks, crawler tractors, power cranes, shovels, graders, or related equipment.
- Drive and maneuver equipment equipped with blades in successive passes over working areas to remove topsoil, vegetation, and rocks, and to distribute and level earth or terrain.
- Coordinate machine actions with other activities, positioning or moving loads in response to hand or audio signals from crew members.

Required Skills

| Skills | Skill Definitions |
|------------------------------|---|
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Equipment Maintenance | Performing routine maintenance on equipment and determining when and what kind of maintenance is needed. |
| Equipment Selection | Determining the kind of tools and equipment needed to do a job. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Operation and Control | Controlling operations of equipment or systems. |
| Operation Monitoring | Watching gauges, dials, or other indicators to make sure a machine is working properly. |
| Active Learning | Understanding the implications of new information for both current and future problem-solving and decision-making. |
| Installation | Installing equipment, machines, wiring, or programs to meet specifications. |
| Instructing | Teaching others how to do something. |
| Judgment and Decision Making | Considering the relative costs and benefits of potential actions to choose the most appropriate one. |

First-Line Supervisors/Managers of Construction Trades and Extraction Workers

575 Jobs

- City Annual Openings: 22
- Regional Annual Openings: 272
- State Annual Openings: 611

Directly supervise and coordinate activities of construction or extraction workers.

Baltimore City Annual Salary: \$55,831

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. |
| Job Training | Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. |
| Education | Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree. |

Occupational Requirements

- Examine and inspect work progress, equipment, and construction sites to verify safety and to ensure that specifications are met.
- Read specifications such as blueprints to determine construction requirements and to plan procedures.
- Estimate material and worker requirements to complete jobs.
- Supervise, coordinate, and schedule the activities of construction or extractive workers.
- Confer with managerial and technical personnel, other departments, and contractors in order to resolve problems and to coordinate activities.
- Coordinate work activities with other construction project activities.
- Order or requisition materials and supplies.
- Locate, measure, and mark site locations and placement of structures and equipment, using measuring and marking equipment.
- Record information such as personnel, production, and operational data on specified forms and reports.
- Assign work to employees, based on material and worker requirements of specific jobs.

Required Skills

| Skills | Skill Definitions |
|------------------------------|---|
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Time Management | Managing one's own time and the time of others. |
| Equipment Selection | Determining the kind of tools and equipment needed to do a job. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Coordination | Adjusting actions in relation to others' actions. |
| Speaking | Talking to others to convey information effectively. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Mathematics | Using mathematics to solve problems. |
| Instructing | Teaching others how to do something. |
| Judgment and Decision Making | Considering the relative costs and benefits of potential actions to choose the most appropriate one. |

Carpenters

433 Jobs

- City Annual Openings: 59
- Regional Annual Openings: 419
- State Annual Openings: 1,158

Construct, erect, install, and repair structures and fixtures of wood, plywood, and wallboard, using carpenter's hand tools and power tools.

Baltimore City Annual Salary: \$40,893

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. |
| Job Training | Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. |
| Education | Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree. |

Occupational Requirements

- Examine and inspect work progress, equipment, and construction sites to verify safety and to ensure that specifications are met.
- Read specifications such as blueprints to determine construction requirements and to plan procedures.
- Estimate material and worker requirements to complete jobs.
- Supervise, coordinate, and schedule the activities of construction or extractive workers.
- Confer with managerial and technical personnel, other departments, and contractors in order to resolve problems and to coordinate activities.
- Coordinate work activities with other construction project activities.
- Order or requisition materials and supplies.
- Locate, measure, and mark site locations and placement of structures and equipment, using measuring and marking equipment.
- Record information such as personnel, production, and operational data on specified forms and reports.
- Assign work to employees, based on material and worker requirements of specific jobs.

Required Skills

| Skills | Skill Definitions |
|------------------------------|---|
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Time Management | Managing one's own time and the time of others. |
| Equipment Selection | Determining the kind of tools and equipment needed to do a job. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Coordination | Adjusting actions in relation to others' actions. |
| Speaking | Talking to others to convey information effectively. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Mathematics | Using mathematics to solve problems. |
| Instructing | Teaching others how to do something. |
| Judgment and Decision Making | Considering the relative costs and benefits of potential actions to choose the most appropriate one. |

- City Annual Openings: 39
- Regional Annual Openings: 142
- State Annual Openings: 298

Perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures, and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, water and sewage systems, and waste disposal units. Includes architectural, structural, traffic, ocean, and geo-technical engineers.

Baltimore City Annual Salary: \$63,531

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified. |
| Job Training | Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training. |
| Education | Most of these occupations require a four - year bachelor's degree, but some do not. |

Occupational Requirements

- Manage and direct staff members and the construction, operations, or maintenance activities at project site.
- Provide technical advice regarding design, construction, or program modifications and structural repairs to industrial and managerial personnel.
- Inspect project sites to monitor progress and ensure conformance to design specifications and safety or sanitation standards.
- Estimate quantities and cost of materials, equipment, or labor to determine project feasibility.
- Test soils and materials to determine the adequacy and strength of foundations, concrete, asphalt, or steel.
- Compute load and grade requirements, water flow rates, and material stress factors to determine design specifications.
- Plan and design transportation or hydraulic systems and structures, following construction and government standards, using design software and drawing tools.
- Analyze survey reports, maps, drawings, blueprints, aerial photography, and other topographical or geologic data to plan projects.
- Prepare or present public reports on topics such as bid proposals, deeds, environmental impact statements, or property and right-of-way descriptions.
- Direct or participate in surveying to lay out installations and establish reference points, grades, and elevations to guide construction.

Required Skills

| Skills | Skill Definitions |
|-----------------------------------|---|
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Time Management | Managing one's own time and the time of others. |
| Writing | Communicating effectively in writing as appropriate for the needs of the audience. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Coordination | Adjusting actions in relation to others' actions. |
| Speaking | Talking to others to convey information effectively. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Management of Personnel Resources | Motivating, developing, and directing people as they work, identifying the best people for the job. |
| Complex Problem Solving | Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions. |
| Judgment and Decision Making | Considering the relative costs and benefits of potential actions to choose the most appropriate one. |

- City Annual Openings: 65
- Regional Annual Openings: 389
- State Annual Openings: 747

Drive a tractor-trailer combination or a truck with a capacity of at least 26,000 GVW, to transport and deliver goods, livestock, or materials in liquid, loose, or packaged form. May be required to unload truck. May require use of automated routing equipment. Requires commercial drivers' license.

Baltimore City Annual Salary: \$39,884

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Some previous work-related skill, knowledge, or experience may be helpful in these occupations, but usually is not needed. For example, a teller might benefit from experience working directly with the public, but an inexperienced person could still learn to be a teller with little difficulty. |
| Job Training | Employees in these occupations need anywhere from a few months to one year of working with experienced employees. |
| Education | These occupations usually require a high school diploma and may require some vocational training or job-related course work. In some cases, an associate's or bachelor's degree could be needed. |

Occupational Requirements

- Follow appropriate safety procedures for transporting dangerous goods.
- Check vehicles to ensure that mechanical, safety, and emergency equipment is in good working order.
- Maintain logs of working hours and of vehicle service and repair status, following applicable state and federal regulations.
- Obtain receipts or signatures for delivered goods and collect payment for services when required.
- Check all load-related documentation to ensure that it is complete and accurate.
- Maneuver trucks into loading or unloading positions, following signals from loading crew and checking that vehicle and loading equipment are properly positioned.
- Drive trucks with capacities greater than 3 tons, including tractor-trailer combinations, to transport and deliver products, livestock, or other materials.
- Secure cargo for transport, using ropes, blocks, chain, binders, or covers.
- Read bills of lading to determine assignment details.
- Report vehicle defects, accidents, traffic violations, or damage to the vehicles.

Required Skills

| Skills | Skill Definitions |
|------------------------------|---|
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Time Management | Managing one's own time and the time of others. |
| Equipment Maintenance | Performing routine maintenance on equipment and determining when and what kind of maintenance is needed. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Coordination | Adjusting actions in relation to others' actions. |
| Speaking | Talking to others to convey information effectively. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Mathematics | Using mathematics to solve problems. |
| Troubleshooting | Determining causes of operating errors and deciding what to do about it. |
| Judgment and Decision Making | Considering the relative costs and benefits of potential actions to choose the most appropriate one. |

- City Annual Openings: 200
- Regional Annual Openings: 964
- State Annual Openings: 2,227

Perform duties too varied and diverse to be classified in any specific office clerical occupation, requiring limited knowledge of office management systems and procedures. Clerical duties may be assigned in accordance with the office procedures of individual establishments and may include a combination of answering telephones, bookkeeping, typing or word processing, stenography, office machine operation, and filing.

Baltimore City Annual Salary: \$27,392

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Some previous work-related skill, knowledge, or experience may be helpful in these occupations, but usually is not needed. For example, a teller might benefit from experience working directly with the public, but an inexperienced person could still learn to be a teller with little difficulty. |
| Job Training | Employees in these occupations need anywhere from a few months to one year of working with experienced employees. |
| Education | These occupations usually require a high school diploma and may require some vocational training or job-related course work. In some cases, an associate's or bachelor's degree could be needed. |

Occupational Requirements

- Collect, count, and disburse money, do basic bookkeeping, and complete banking transactions.
- Communicate with customers, employees, and other individuals to answer questions, disseminate or explain information, take orders, and address complaints.
- Answer telephones, direct calls, and take messages.
- Compile, copy, sort, and file records of office activities, business transactions, and other activities.
- Complete and mail bills, contracts, policies, invoices, or checks.
- Operate office machines, such as photocopiers and scanners, facsimile machines, voice mail systems, and personal computers.
- Compute, record, and proofread data and other information, such as records or reports.
- Maintain and update filing, inventory, mailing, and database systems, either manually or using a computer.
- Open, sort, and route incoming mail, answer correspondence, and prepare outgoing mail.
- Review files, records, and other documents to obtain information to respond to requests.

Required Skills

| Skills | Skill Definitions |
|------------------------|---|
| Oral Comprehension | The ability to listen to and understand information and ideas presented through spoken words and sentences. |
| Oral Expression | The ability to communicate information and ideas in speaking so others will understand. |
| Speech Clarity | The ability to speak clearly so others can understand you. |
| Speech Recognition | The ability to identify and understand the speech of another person. |
| Near Vision | The ability to see details at close range (within a few feet of the observer). |
| Written Comprehension | The ability to read and understand information and ideas presented in writing. |
| Information Ordering | The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations). |
| Number Facility | The ability to add, subtract, multiply, or divide quickly and correctly. |
| Mathematical Reasoning | The ability to choose the right mathematical methods or formulas to solve a problem. |
| Selective Attention | The ability to concentrate on a task over a period of time without being distracted. |

- City Annual Openings: 47
- Regional Annual Openings: 259
- State Annual Openings: 509

Plan, direct, coordinate, or budget, usually through subordinate supervisory personnel, activities concerned with the construction and maintenance of structures, facilities, and systems.

Participate in the conceptual development of a construction project and oversee its organization, scheduling, and implementation.

Baltimore City Annual Salary: \$80,950

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified. |
| Job Training | Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training. |
| Education | Most of these occupations require a four - year bachelor's degree, but some do not. |

Occupational Requirements

- Schedule the project in logical steps and budget time required to meet deadlines.
- Confer with supervisory personnel, owners, contractors, and design professionals to discuss and resolve matters such as work procedures, complaints, and construction problems.
- Prepare contracts and negotiate revisions, changes and additions to contractual agreements with architects, consultants, clients, suppliers and subcontractors.
- Prepare and submit budget estimates and progress and cost tracking reports.
- Interpret and explain plans and contract terms to administrative staff, workers, and clients, representing the owner or developer.
- Plan, organize, and direct activities concerned with the construction and maintenance of structures, facilities, and systems.
- Take actions to deal with the results of delays, bad weather, or emergencies at construction site.
- Inspect and review projects to monitor compliance with building and safety codes, and other regulations.
- Study job specifications to determine appropriate construction methods.
- Select, contract, and oversee workers who complete specific pieces of the project, such as painting or plumbing.

Required Skills

| Skills | Skill Definitions |
|-----------------------------------|---|
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Time Management | Managing one's own time and the time of others. |
| Writing | Communicating effectively in writing as appropriate for the needs of the audience. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Coordination | Adjusting actions in relation to others' actions. |
| Speaking | Talking to others to convey information effectively. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Management of Personnel Resources | Motivating, developing, and directing people as they work, identifying the best people for the job. |
| Troubleshooting | Determining causes of operating errors and deciding what to do about it. |
| Judgment and Decision Making | Considering the relative costs and benefits of potential actions to choose the most appropriate one. |

- City Annual Openings: 97
- Regional Annual Openings: 493
- State Annual Openings: 710

Perform routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.

Baltimore City Annual Salary: \$ 30,717

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Some previous work-related skill, knowledge, or experience may be helpful in these occupations, but usually is not needed. For example, a teller might benefit from experience working directly with the public, but an inexperienced person could still learn to be a teller with little difficulty. |
| Job Training | Employees in these occupations need anywhere from a few months to one year of working with experienced employees. |
| Education | These occupations usually require a high school diploma and may require some vocational training or job-related course work. In some cases, an associate's or bachelor's degree could be needed. |

Occupational Requirements

- Operate office equipment such as fax machines, copiers, and phone systems, and use computers for spreadsheet, word processing, database management, and other applications.
- Answer telephones and give information to callers, take messages, or transfer calls to appropriate individuals.
- Greet visitors and callers, handle their inquiries, and direct them to the appropriate persons according to their needs.
- Set up and maintain paper and electronic filing systems for records, correspondence, and other material.
- Locate and attach appropriate files to incoming correspondence requiring replies.
- Open, read, route, and distribute incoming mail and other material and answer routine letters.
- Complete forms in accordance with company procedures.
- Make copies of correspondence and other printed material.
- Review work done by others to check for correct spelling and grammar, ensure that company format policies are followed, and recommend revisions.
- Compose, type, and distribute meeting notes, routine correspondence, and reports.

Required Skills

| | |
|-----------------------|---|
| Active Learning | Understanding the implications of new information for both current and future problem-solving and decision-making. |
| Coordination | Adjusting actions in relation to others' actions. |
| Social Perceptiveness | Being aware of others' reactions and understanding why they react as they do. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Time Management | Managing one's own time and the time of others. |
| Learning Strategies | Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things. |
| Monitoring | Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Speaking | Talking to others to convey information effectively. |
| Writing | Communicating effectively in writing as appropriate for the needs of the audience. |

- City Annual Openings: 8
- Regional Annual Openings: 31
- State Annual Openings: 69

Diagnose, adjust, repair, or overhaul mobile mechanical, hydraulic, and pneumatic equipment, such as cranes, bulldozers, graders, and conveyors, used in construction, logging, and surface mining.

Baltimore City Annual Salary: \$27,392

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified. |
| Job Training | Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training. |
| Education | Most of these occupations require a four - year bachelor's degree, but some do not. |

Occupational Requirements

- Test mechanical products and equipment after repair or assembly to ensure proper performance and compliance with manufacturers' specifications.
- Repair and replace damaged or worn parts.
- Operate and inspect machines or heavy equipment to diagnose defects.
- Diagnose faults or malfunctions to determine required repairs, using engine diagnostic equipment such as computerized test equipment and calibration devices.
- Dismantle and reassemble heavy equipment using hoists and hand tools.
- Clean, lubricate, and perform other routine maintenance work on equipment and vehicles.
- Examine parts for damage or excessive wear, using micrometers and gauges.
- Schedule maintenance for industrial machines and equipment, and keep equipment service records.
- Read and understand operating manuals, blueprints, and technical drawings.
- Overhaul and test machines or equipment to ensure operating efficiency.

Required Skills

| Skills | Skill Definitions |
|------------------------------|---|
| Repairing | Repairing machines or systems using the needed tools. |
| Equipment Maintenance | Performing routine maintenance on equipment and determining when and what kind of maintenance is needed. |
| Equipment Selection | Determining the kind of tools and equipment needed to do a job. |
| Installation | Installing equipment, machines, wiring, or programs to meet specifications. |
| Operation Monitoring | Watching gauges, dials, or other indicators to make sure a machine is working properly. |
| Operation and Control | Controlling operations of equipment or systems. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Complex Problem Solving | Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions. |
| Troubleshooting | Determining causes of operating errors and deciding what to do about it. |
| Judgment and Decision Making | Considering the relative costs and benefits of potential actions to choose the most appropriate one. |

- City Annual Openings: 169
- Regional Annual Openings: 700
- State Annual Openings: 1,416

Plan, direct, or coordinate the operations of companies or public and private sector organizations. Duties and responsibilities include formulating policies, managing daily operations, and planning the use of materials and human resources, but are too diverse and general in nature to be classified in any one functional area of management or administration, such as personnel, purchasing, or administrative services. Includes owners and managers who head small business establishments whose duties are primarily managerial.

Baltimore City Annual Salary: \$ 77,322

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. |
| Job Training | Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. |
| Education | Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree. |

Occupational Requirements

- Oversee activities directly related to making products or providing services.
- Direct and coordinate activities of businesses or departments concerned with the production, pricing, sales, or distribution of products.
- Review financial statements, sales and activity reports, and other performance data to measure productivity and goal achievement and to determine areas needing cost reduction and program improvement.
- Manage staff, preparing work schedules and assigning specific duties.
- Direct and coordinate organization's financial and budget activities to fund operations, maximize investments, and increase efficiency.
- Establish and implement departmental policies, goals, objectives, and procedures, conferring with board members, organization officials, and staff members as necessary.
- Determine staffing requirements, and interview, hire and train new employees, or oversee those personnel processes.
- Plan and direct activities such as sales promotions, coordinating with other department heads as required.

- Determine goods and services to be sold, and set prices and credit terms, based on forecasts of customer demand.
- Locate, select, and procure merchandise for resale, representing management in purchase negotiations.

Required Skills

| | |
|-----------------------------------|---|
| Coordination | Adjusting actions in relation to others' actions. |
| Complex Problem Solving | Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Time Management | Managing one's own time and the time of others. |
| Judgment and Decision Making | Considering the relative costs and benefits of potential actions to choose the most appropriate one. |
| Management of Personnel Resources | Motivating, developing, and directing people as they work, identifying the best people for the job. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Speaking | Talking to others to convey information effectively. |
| Monitoring | Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action. |

- City Annual Openings: 5
- Regional Annual Openings: 38
- State Annual Openings: 95

Use hand-welding or flame-cutting equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.

Baltimore City Annual Salary: \$35,920

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Some previous work-related skill, knowledge, or experience may be helpful in these occupations, but usually is not needed. For example, a teller might benefit from experience working directly with the public, but an inexperienced person could still learn to be a teller with little difficulty. |
| Job Training | Employees in these occupations need anywhere from a few months to one year of working with experienced employees. |
| Education | These occupations usually require a high school diploma and may require some vocational training or job-related course work. In some cases, an associate's or bachelor's degree could be needed. |

Occupational Requirements

- Operate safety equipment and use safe work habits.
- Weld components in flat, vertical, or overhead positions.
- Ignite torches or start power supplies and strike arcs by touching electrodes to metals being welded, completing electrical circuits.
- Clamp, hold, tack-weld, heat-bend, grind or bolt component parts to obtain required configurations and positions for welding.
- Detect faulty operation of equipment or defective materials and notify supervisors.
- Operate manual or semi-automatic welding equipment to fuse metal segments, using processes such as gas tungsten arc, gas metal arc, flux-cored arc, plasma arc, shielded metal arc, resistance welding, and submerged arc welding.
- Monitor the fitting, burning, and welding processes to avoid overheating of parts or warping, shrinking, distortion, or expansion of material.
- Examine workpieces for defects and measure workpieces with straightedges or templates to ensure conformance with specifications.
- Recognize, set up, and operate hand and power tools common to the welding trade, such as shielded metal arc and gas metal arc welding equipment.
- Lay out, position, align, and secure parts and assemblies prior to assembly, using straightedges, combination squares, calipers, and rulers.

Required Skills

| Skills | Skill Definitions |
|------------------------------|---|
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Mathematics | Using mathematics to solve problems. |
| Equipment Selection | Determining the kind of tools and equipment needed to do a job. |
| Time Management | Managing one's own time and the time of others. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Equipment Maintenance | Performing routine maintenance on equipment and determining when and what kind of maintenance is needed. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Speaking | Talking to others to convey information effectively. |
| Troubleshooting | Determining causes of operating errors and deciding what to do about it. |
| Judgment and Decision Making | Considering the relative costs and benefits of potential actions to choose the most appropriate one. |

- City Annual Openings: 68
- Regional Annual Openings: 371
- State Annual Openings: 947

Compute, classify, and record numerical data to keep financial records complete. Perform any combination of routine calculating, posting, and verifying duties to obtain primary financial data for use in maintaining accounting records. May also check the accuracy of figures, calculations, and postings pertaining to business transactions recorded by other workers.

Baltimore City Annual Salary: \$ 34,292

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. |
| Job Training | Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. |
| Education | Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree. |

Occupational Requirements

- Check figures, postings, and documents for correct entry, mathematical accuracy, and proper codes.
- Operate computers programmed with accounting software to record, store, and analyze information.
- Comply with federal, state, and company policies, procedures, and regulations.
- Debit, credit, and total accounts on computer spreadsheets and databases, using specialized accounting software.
- Classify, record, and summarize numerical and financial data to compile and keep financial records, using journals and ledgers or computers.
- Calculate, prepare, and issue bills, invoices, account statements, and other financial statements according to established procedures.
- Compile statistical, financial, accounting or auditing reports and tables pertaining to such matters as cash receipts, expenditures, accounts payable and receivable, and profits and losses.
- Code documents according to company procedures.
- Access computerized financial information to answer general questions as well as those related to specific accounts.

- Operate 10-key calculators, typewriters, and copy machines to perform calculations and produce documents.

Required Skills

| | |
|-----------------------|---|
| Mathematics | Using mathematics to solve problems. |
| Time Management | Managing one's own time and the time of others. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Learning Strategies | Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things. |
| Active Learning | Understanding the implications of new information for both current and future problem-solving and decision-making. |
| Social Perceptiveness | Being aware of others' reactions and understanding why they react as they do. |
| Writing | Communicating effectively in writing as appropriate for the needs of the audience. |
| Speaking | Talking to others to convey information effectively. |

- City Annual Openings: 5
- Regional Annual Openings: 84
- State Annual Openings: 182

Smooth and finish surfaces of poured concrete, such as floors, walks, sidewalks, roads, or curbs using a variety of hand and power tools. Align forms for sidewalks, curbs, or gutters; patch voids; use saws to cut expansion joints.

Baltimore City Annual Salary: \$39,453

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. |
| Job Training | Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. |
| Education | Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree. |

Occupational Requirements

- Check the forms that hold the concrete to see that they are properly constructed.
- Set the forms that hold concrete to the desired pitch and depth, and align them.
- Spread, level, and smooth concrete, using rake, shovel, hand or power trowel, hand or power screed, and float.
- Mold expansion joints and edges, using edging tools, jointers, and straightedge.
- Monitor how the wind, heat, or cold affect the curing of the concrete throughout the entire process.
- Signal truck driver to position truck to facilitate pouring concrete, and move chute to direct concrete on forms.
- Produce rough concrete surface, using broom.
- Operate power vibrator to compact concrete.
- Direct the casting of the concrete and supervise laborers who use shovels or special tools to spread it.
- Mix cement, sand, and water to produce concrete, grout, or slurry, using hoe, trowel, tamper, scraper, or concrete-mixing machine.

Required Skills

| | |
|-------------------------|---|
| Coordination | Adjusting actions in relation to others' actions. |
| Mathematics | Using mathematics to solve problems. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Active Learning | Understanding the implications of new information for both current and future problem-solving and decision-making. |
| Complex Problem Solving | Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions. |
| Equipment Selection | Determining the kind of tools and equipment needed to do a job. |

- City Annual Openings:
- Regional Annual Openings:
- State Annual Openings:

Operate pile drivers mounted on skids, barges, crawler treads, or locomotive cranes to drive pilings for retaining walls, bulkheads, and foundations of structures, such as buildings, bridges, and piers.

Baltimore City Annual Salary: \$NA

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Some previous work-related skill, knowledge, or experience may be helpful in these occupations, but usually is not needed. For example, a teller might benefit from experience working directly with the public, but an inexperienced person could still learn to be a teller with little difficulty. |
| Job Training | Employees in these occupations need anywhere from a few months to one year of working with experienced employees. |
| Education | These occupations usually require a high school diploma and may require some vocational training or job-related course work. In some cases, an associate's or bachelor's degree could be needed. |

Occupational Requirements

- Move hand and foot levers of hoisting equipment to position piling leads, hoist piling into leads, and position hammers over pilings.
- Conduct pre-operational checks on equipment to ensure proper functioning.
- Drive pilings to provide support for buildings or other structures, using heavy equipment with a pile driver head.
- Move levers and turn valves to activate power hammers, or to raise and lower drophammers that drive piles to required depths.
- Clean, lubricate, and refill equipment.

Required Skills

| | |
|-----------------------|---|
| Operation and Control | Controlling operations of equipment or systems. |
| Coordination | Adjusting actions in relation to others' actions. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Instructing | Teaching others how to do something. |
| Equipment Maintenance | Performing routine maintenance on equipment and determining when and what kind of maintenance is needed. |
| Equipment Selection | Determining the kind of tools and equipment needed to do a job. |
| Operation Monitoring | Watching gauges, dials, or other indicators to make sure a machine is working properly. |
| Mathematics | Using mathematics to solve problems. |
| Repairing | Repairing machines or systems using the needed tools. |

- City Annual Openings: 18
- Regional Annual Openings: 226
- State Annual Openings: 517

Assemble, install, alter, and repair pipelines or pipe systems that carry water, steam, air, or other liquids or gases. May install heating and cooling equipment and mechanical control systems.

Baltimore City Annual Salary: \$ 45,963

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. |
| Job Training | Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. |
| Education | Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree. |

Occupational Requirements

- Cut, thread, and hammer pipe to specifications, using tools such as saws, cutting torches, and pipe threaders and benders.
- Assemble and secure pipes, tubes, fittings, and related equipment, according to specifications, by welding, brazing, cementing, soldering, and threading joints.
- Attach pipes to walls, structures and fixtures, such as radiators or tanks, using brackets, clamps, tools or welding equipment.
- Inspect, examine, and test installed systems and pipe lines, using pressure gauge, hydrostatic testing, observation, or other methods.
- Measure and mark pipes for cutting and threading.
- Lay out full scale drawings of pipe systems, supports, and related equipment, following blueprints.
- Plan pipe system layout, installation, or repair according to specifications.
- Select pipe sizes and types and related materials, such as supports, hangers, and hydraulic cylinders, according to specifications.
- Cut and bore holes in structures, such as bulkheads, decks, walls, and mains, prior to pipe installation, using hand and power tools.
- Modify, clean, and maintain pipe systems, units, fittings, and related machines and equipment, following specifications and using hand and power tools.

Required Skills

| | |
|------------------------------|---|
| Installation | Installing equipment, machines, wiring, or programs to meet specifications. |
| Coordination | Adjusting actions in relation to others' actions. |
| Active Learning | Understanding the implications of new information for both current and future problem-solving and decision-making. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Instructing | Teaching others how to do something. |
| Judgment and Decision Making | Considering the relative costs and benefits of potential actions to choose the most appropriate one. |
| Equipment Selection | Determining the kind of tools and equipment needed to do a job. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Repairing | Repairing machines or systems using the needed tools. |

- City Annual Openings: 141
- Regional Annual Openings: 802
- State Annual Openings: 1,431

Manually move freight, stock, or other materials or perform other unskilled general labor. Includes all unskilled manual laborers not elsewhere classified.

Baltimore City Annual Salary: \$ 22,193

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Some previous work-related skill, knowledge, or experience may be helpful in these occupations, but usually is not needed. For example, a teller might benefit from experience working directly with the public, but an inexperienced person could still learn to be a teller with little difficulty. |
| Job Training | Employees in these occupations need anywhere from a few months to one year of working with experienced employees. |
| Education | These occupations usually require a high school diploma and may require some vocational training or job-related course work. In some cases, an associate's or bachelor's degree could be needed. |

Occupational Requirements

- Attach identifying tags to containers, or mark them with identifying information.
- Read work orders or receive oral instructions to determine work assignments and material and equipment needs.
- Record numbers of units handled and moved, using daily production sheets or work tickets.
- Move freight, stock, and other materials to and from storage and production areas, loading docks, delivery vehicles, ships, and containers, by hand or using trucks, tractors, and other equipment.
- Sort cargo before loading and unloading.
- Assemble product containers and crates, using hand tools and precut lumber.
- Load and unload ship cargo, using winches and other hoisting devices.
- Connect hoses and operate equipment to move liquid materials into and out of storage tanks on vessels.
- Pack containers and re-pack damaged containers.
- Carry needed tools and supplies from storage or trucks, and return them after use.

Required Skills

| | |
|-----------------------|---|
| Coordination | Adjusting actions in relation to others' actions. |
| Time Management | Managing one's own time and the time of others. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Instructing | Teaching others how to do something. |
| Learning Strategies | Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things. |

Landscaping and Groundskeeping Workers

126 Jobs

- City Annual Openings: 21
- Regional Annual Openings: 358
- State Annual Openings: 783

Landscape or maintain grounds of property using hand or power tools or equipment. Workers typically perform a variety of tasks, which may include any combination of the following: sod laying, mowing, trimming, planting, watering, fertilizing, digging, raking, sprinkler installation, and installation of mortarless segmental concrete masonry wall units.

Baltimore City Annual Salary: \$ 22,138

Education and Training Requirements

| | |
|--------------------|--|
| Overall Experience | No previous work-related skill, knowledge, or experience is needed for these occupations. For example, a person can become a cashier even if he/she has never worked before. |
| Job Training | Employees in these occupations need anywhere from a few days to a few months of training. Usually, an experienced worker could show you how to do the job. |
| Education | These occupations may require a high school diploma or GED certificate. Some may require a formal training course to obtain a license. |

Occupational Requirements

- Operate powered equipment such as mowers, tractors, twin-axle vehicles, snow blowers, chain-saws, electric clippers, sod cutters, and pruning saws.
- Mow and edge lawns, using power mowers and edgers.
- Shovel snow from walks, driveways, and parking lots, and spread salt in those areas.
- Care for established lawns by mulching, aerating, weeding, grubbing and removing thatch, and trimming and edging around flower beds, walks, and walls.
- Use hand tools such as shovels, rakes, pruning saws, saws, hedge and brush trimmers, and axes.
- Prune and trim trees, shrubs, and hedges, using shears, pruners, or chain saws.
- Gather and remove litter.
- Maintain and repair tools, equipment, and structures such as buildings, greenhouses, fences, and benches, using hand and power tools.
- Mix and spray or spread fertilizers, herbicides, or insecticides onto grass, shrubs, and trees, using hand or automatic sprayers or spreaders.
- Provide proper upkeep of sidewalks, driveways, parking lots, fountains, planters, burial sites, and other grounds features.

Required Skills

| | |
|-----------------------|---|
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Equipment Maintenance | Performing routine maintenance on equipment and determining when and what kind of maintenance is needed. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Equipment Selection | Determining the kind of tools and equipment needed to do a job. |
| Repairing | Repairing machines or systems using the needed tools. |
| Speaking | Talking to others to convey information effectively. |
| Time Management | Managing one's own time and the time of others. |

- City Annual Openings: 58
- Regional Annual Openings: 316
- State Annual Openings: 818

Provide high-level administrative support by conducting research, preparing statistical reports, handling information requests, and performing clerical functions such as preparing correspondence, receiving visitors, arranging conference calls, and scheduling meetings. May also train and supervise lower-level clerical staff.

Baltimore City Annual Salary: \$ 39,983

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. |
| Job Training | Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. |
| Education | Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree. |

Occupational Requirements

- Manage and maintain executives' schedules.
- Prepare invoices, reports, memos, letters, financial statements and other documents, using word processing, spreadsheet, database, or presentation software.
- Read and analyze incoming memos, submissions, and reports to determine their significance and plan their distribution.
- Open, sort, and distribute incoming correspondence, including faxes and email.
- File and retrieve corporate documents, records, and reports.
- Greet visitors and determine whether they should be given access to specific individuals.
- Prepare responses to correspondence containing routine inquiries.
- Perform general office duties such as ordering supplies, maintaining records management systems, and performing basic bookkeeping work.
- Prepare agendas and make arrangements for committee, board, and other meetings.
- Make travel arrangements for executives.

Required Skills

| | |
|-----------------------|---|
| Time Management | Managing one's own time and the time of others. |
| Speaking | Talking to others to convey information effectively. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Service Orientation | Actively looking for ways to help people. |
| Coordination | Repairing machines or systems using the needed tools. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Writing | Communicating effectively in writing as appropriate for the needs of the audience. |
| Active Learning | Understanding the implications of new information for both current and future problem-solving and decision-making. |
| Monitoring | Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action. |

- City Annual Openings: 2
- Regional Annual Openings: 15
- State Annual Openings: 35

Operate or tend machinery equipped with scoops, shovels, or buckets, to excavate and load loose materials.

Baltimore City Annual Salary: \$ 39,692

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Some previous work-related skill, knowledge, or experience may be helpful in these occupations, but usually is not needed. For example, a teller might benefit from experience working directly with the public, but an inexperienced person could still learn to be a teller with little difficulty. |
| Job Training | Employees in these occupations need anywhere from a few months to one year of working with experienced employees. |
| Education | These occupations usually require a high school diploma and may require some vocational training or job-related course work. In some cases, an associate's or bachelor's degree could be needed. |

Occupational Requirements

- Move levers, depress foot pedals, and turn dials to operate power machinery such as power shovels, stripping-shovels, scraper loaders, or backhoes.
- Set up and inspect equipment prior to operation.
- Observe hand signals, grade stakes, and other markings when operating machines so that work can be performed to specifications.
- Become familiar with digging plans, machine capabilities and limitations, and with efficient and safe digging procedures in a given application.
- Operate machinery to perform activities such as backfilling excavations, vibrating or breaking rock or concrete, and making winter roads.
- Create and maintain inclines and ramps, and handle slides, mud, and pit cleanings and maintenance.
- Lubricate, adjust, and repair machinery, and replace parts such as gears, bearings, and bucket teeth.
- Move materials over short distances, such as around a construction site, factory, or warehouse.
- Measure and verify levels of rock or gravel, bases, and other excavated material.
- Receive written or oral instructions regarding material movement or excavation.

Required Skills

| | |
|-----------------------|---|
| Equipment Maintenance | Performing routine maintenance on equipment and determining when and what kind of maintenance is needed. |
| Operation and Control | Controlling operations of equipment or systems. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Operation Monitoring | Watching gauges, dials, or other indicators to make sure a machine is working properly. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Equipment Selection | Determining the kind of tools and equipment needed to do a job. |
| Repairing | Repairing machines or systems using the needed tools. |
| Troubleshooting | Determining causes of operating errors and deciding what to do about it. |
| Coordination | Adjusting actions in relation to others' actions. |

- City Annual Openings: 11
- Regional Annual Openings: 116
- State Annual Openings: 246

Prepare cost estimates for product manufacturing, construction projects, or services to aid management in bidding on or determining price of product or service. May specialize according to particular service performed or type of product manufactured.

Baltimore City Annual Salary: \$ 56,595

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified. |
| Job Training | Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training. |
| Education | Most of these occupations require a four - year bachelor's degree, but some do not. |

Occupational Requirements

- Consult with clients, vendors, personnel in other departments or construction foremen to discuss and formulate estimates and resolve issues.
- Analyze blueprints and other documentation to prepare time, cost, materials, and labor estimates.
- Prepare estimates for use in selecting vendors or subcontractors.
- Confer with engineers, architects, owners, contractors and subcontractors on changes and adjustments to cost estimates.
- Prepare estimates used by management for purposes such as planning, organizing, and scheduling work.
- Prepare cost and expenditure statements and other necessary documentation at regular intervals for the duration of the project.
- Assess cost effectiveness of products, projects or services, tracking actual costs relative to bids as the project develops.
- Set up cost monitoring and reporting systems and procedures.
- Conduct special studies to develop and establish standard hour and related cost data or to effect cost reduction.
- Review material and labor requirements to decide whether it is more cost-effective to produce or purchase components.

Required Skills

| | |
|------------------------------|---|
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Writing | Communicating effectively in writing as appropriate for the needs of the audience. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Mathematics | Using mathematics to solve problems. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Speaking | Talking to others to convey information effectively. |
| Judgment and Decision Making | Considering the relative costs and benefits of potential actions to choose the most appropriate one. |
| Active Learning | Understanding the implications of new information for both current and future problem-solving and decision-making. |
| Complex Problem Solving | Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions. |
| Persuasion | Persuading others to change their minds or behavior. |

- City Annual Openings: 1
- Regional Annual Openings: 38
- State Annual Openings: 58

Raise, place, and unite iron or steel girders, columns, and other structural members to form completed structures or structural frameworks. May erect metal storage tanks and assemble prefabricated metal buildings.

Baltimore City Annual Salary: \$ 53,144

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Some previous work-related skill, knowledge, or experience may be helpful in these occupations, but usually is not needed. For example, a teller might benefit from experience working directly with the public, but an inexperienced person could still learn to be a teller with little difficulty. |
| Job Training | Employees in these occupations need anywhere from a few months to one year of working with experienced employees. |
| Education | These occupations usually require a high school diploma and may require some vocational training or job-related course work. In some cases, an associate's or bachelor's degree could be needed. |

Occupational Requirements

- Read specifications and blueprints to determine the locations, quantities, and sizes of materials required.
- Verify vertical and horizontal alignment of structural-steel members, using plumb bobs, laser equipment, transits, and/or levels.
- Connect columns, beams, and girders with bolts, following blueprints and instructions from supervisors.
- Hoist steel beams, girders, and columns into place, using cranes, or signal hoisting equipment operators to lift and position structural-steel members.
- Bolt aligned structural-steel members in position for permanent riveting, bolting, or welding into place.
- Ride on girders or other structural-steel members to position them, or use rope to guide them into position.
- Fabricate metal parts such as steel frames, columns, beams, and girders, according to blueprints or instructions from supervisors.
- Pull, push, or pry structural-steel members into approximate positions for bolting into place.
- Cut, bend, and weld steel pieces, using metal shears, torches, and welding equipment.
- Fasten structural-steel members to hoist cables, using chains, cables, or rope.

Required Skills

| | |
|-----------------------|---|
| Active Learning | Understanding the implications of new information for both current and future problem-solving and decision-making. |
| Equipment Maintenance | Performing routine maintenance on equipment and determining when and what kind of maintenance is needed. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Equipment Selection | Determining the kind of tools and equipment needed to do a job. |
| Coordination | Repairing machines or systems using the needed tools. |
| Speaking | Talking to others to convey information effectively. |
| Time Management | Managing one's own time and the time of others. |
| Mathematics | Using mathematics to solve problems. |
| Troubleshooting | Determining causes of operating errors and deciding what to do about it. |
| Installation | Installing equipment, machines, wiring, or programs to meet specifications. |

- City Annual Openings: 45
- Regional Annual Openings: 308
- State Annual Openings: 708

Install, maintain, and repair electrical wiring, equipment, and fixtures. Ensure that work is in accordance with relevant codes. May install or service street lights, intercom systems, or electrical control systems.

Baltimore City Annual Salary: \$ 47,253

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. |
| Job Training | Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. |
| Education | Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree. |

Occupational Requirements

- Maintain current electrician's license or identification card to meet governmental regulations.
- Connect wires to circuit breakers, transformers, or other components.
- Repair or replace wiring, equipment, and fixtures, using hand tools and power tools.
- Assemble, install, test, and maintain electrical or electronic wiring, equipment, appliances, apparatus, and fixtures, using hand tools and power tools.
- Test electrical systems and continuity of circuits in electrical wiring, equipment, and fixtures, using testing devices such as ohmmeters, voltmeters, and oscilloscopes, to ensure compatibility and safety of system.
- Use a variety of tools and equipment such as power construction equipment, measuring devices, power tools, and testing equipment including oscilloscopes, ammeters, and test lamps.
- Plan layout and installation of electrical wiring, equipment and fixtures, based on job specifications and local codes.
- Inspect electrical systems, equipment, and components to identify hazards, defects, and the need for adjustment or repair, and to ensure compliance with codes.
- Direct and train workers to install, maintain, or repair electrical wiring, equipment, and fixtures.

- Diagnose malfunctioning systems, apparatus, and components, using test equipment and hand tools, to locate the cause of a breakdown and correct the problem.

Required Skills

| | |
|------------------------------|---|
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Complex Problem Solving | Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Judgment and Decision Making | Considering the relative costs and benefits of potential actions to choose the most appropriate one. |
| Operation Monitoring | Watching gauges, dials, or other indicators to make sure a machine is working properly. |
| Quality Control Analysis | Conducting tests and inspections of products, services, or processes to evaluate quality or performance. |
| Repairing | Repairing machines or systems using the needed tools. |
| Monitoring | Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action. |
| Troubleshooting | Determining causes of operating errors and deciding what to do about it. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |

- City Annual Openings: 9
- Regional Annual Openings: 133
- State Annual Openings: 379

Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs.

Baltimore City Annual Salary: \$ 34,940

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. |
| Job Training | Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. |
| Education | Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree. |

Occupational Requirements

- Repair or replace defective equipment parts, using hand tools and power tools, and reassemble equipment.
- Perform routine preventive maintenance to ensure that machines continue to run smoothly, building systems operate efficiently, or the physical condition of buildings does not deteriorate.
- Inspect drives, motors, and belts, check fluid levels, replace filters, or perform other maintenance actions, following checklists.
- Use tools ranging from common hand and power tools, such as hammers, hoists, saws, drills, and wrenches, to precision measuring instruments and electrical and electronic testing devices.
- Assemble, install or repair wiring, electrical and electronic components, pipe systems and plumbing, machinery, and equipment.
- Diagnose mechanical problems and determine how to correct them, checking blueprints, repair manuals, and parts catalogs as necessary.
- Inspect, operate, and test machinery and equipment to diagnose machine malfunctions.
- Record type and cost of maintenance or repair work.
- Clean and lubricate shafts, bearings, gears, and other parts of machinery.

- Dismantle devices to access and remove defective parts, using hoists, cranes, hand tools, and power tools.

Required Skills

| | |
|-----------------------|---|
| Repairing | Repairing machines or systems using the needed tools. |
| Equipment Maintenance | Performing routine maintenance on equipment and determining when and what kind of maintenance is needed. |
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Equipment Selection | Determining the kind of tools and equipment needed to do a job. |
| Coordination | Repairing machines or systems using the needed tools. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Operation Monitoring | Watching gauges, dials, or other indicators to make sure a machine is working properly. |
| Troubleshooting | Determining causes of operating errors and deciding what to do about it. |
| Installation | Installing equipment, machines, wiring, or programs to meet specifications. |

- City Annual Openings: 7
- Regional Annual Openings: 29
- State Annual Openings: 59

Prepare detailed drawings of architectural and structural features of buildings or drawings and topographical relief maps used in civil engineering projects, such as highways, bridges, and public works. Utilize knowledge of building materials, engineering practices, and mathematics to complete drawings.

Baltimore City Annual Salary: \$43,700

Education and Training Requirements

| | |
|--------------------|---|
| Overall Experience | Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job. |
| Job Training | Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations. |
| Education | Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. |

Occupational Requirements

- Analyze building codes, by-laws, space and site requirements, and other technical documents and reports to determine their effect on architectural designs.
- Operate computer-aided drafting (CAD) equipment or conventional drafting station to produce designs, working drawings, charts, forms and records.
- Coordinate structural, electrical and mechanical designs and determine a method of presentation to graphically represent building plans.
- Obtain and assemble data to complete architectural designs, visiting job sites to compile measurements as necessary.
- Draw rough and detailed scale plans for foundations, buildings and structures, based on preliminary concepts, sketches, engineering calculations, specification sheets and other data.
- Lay out and plan interior room arrangements for commercial buildings using computer-assisted drafting (CAD) equipment and software.

- Supervise, coordinate, and inspect the work of draftspersons, technicians, and technologists on construction projects.
- Represent architect on construction site, ensuring builder compliance with design specifications and advising on design corrections, under architect's supervision.
- Check dimensions of materials to be used and assign numbers to lists of materials.
- Determine procedures and instructions to be followed, according to design specifications and quantity of required materials

Required Skills

| | |
|-------------------------|---|
| Active Listening | Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times. |
| Coordination | Adjusting actions in relation to others' actions. |
| Active Learning | Understanding the implications of new information for both current and future problem-solving and decision-making. |
| Complex Problem Solving | Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions |
| Mathematics | Using mathematics to solve problems. |
| Reading Comprehension | Understanding written sentences and paragraphs in work related documents. |
| Critical Thinking | Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. |
| Operations Analysis | Analyzing needs and product requirements to create a design. |
| Instructing | Teaching others how to do something. |
| Speaking | Talking to others to convey information effectively |
| Time Management | Managing one's own time and the time of others. |
| Writing | Communicating effectively in writing as appropriate for the needs of the audience. |

APPENDIX B – CENSUS TRACT DATA

Appendix Table B-1

| Tract | City/County | Population | Number of | Percentage | Number of | Percentage |
|--------|-------------|------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | | | White Alone Residents | White Alone Residents | Black Alone Residents | Black Alone Residents |
| 401501 | County | 10,032 | 1,559 | 16% | 6,826 | 68% |
| 401505 | County | 3,543 | 1,317 | 37% | 1,792 | 51% |
| 401102 | County | 1,108 | 182 | 16% | 830 | 75% |
| 401101 | County | 6,432 | 1,516 | 24% | 4,415 | 69% |
| 401301 | County | 3,616 | 1,062 | 29% | 2,356 | 65% |
| 401302 | County | 2,633 | 610 | 23% | 1,853 | 70% |
| 280401 | City | 3,712 | 556 | 15% | 3,077 | 83% |
| 280403 | City | 5,244 | 1,412 | 27% | 3,668 | 70% |
| 280402 | City | 1,695 | 17 | 1% | 1,639 | 97% |
| 280404 | City | 3,484 | 97 | 3% | 3,343 | 96% |
| 160801 | City | 3,319 | 16 | 0% | 3,235 | 97% |
| 200701 | City | 4,125 | 24 | 1% | 4,043 | 98% |
| 160802 | City | 3,257 | 23 | 1% | 3,159 | 97% |
| 200600 | City | 2,742 | 987 | 36% | 1,630 | 59% |
| 160700 | City | 5,941 | 26 | 0% | 5,799 | 98% |
| 160600 | City | 3,457 | 12 | 0% | 3,398 | 98% |
| 200200 | City | 3,233 | 62 | 2% | 3,130 | 97% |
| 160500 | City | 4,500 | 27 | 1% | 4,360 | 97% |
| 160400 | City | 2,849 | 14 | 0% | 2,805 | 98% |
| 200100 | City | 1,779 | 6 | 0% | 1,733 | 97% |
| 160300 | City | 1,415 | 34 | 2% | 1,366 | 97% |
| 190100 | City | 2,339 | 63 | 3% | 2,216 | 95% |
| 160200 | City | 2,280 | 21 | 1% | 2,187 | 96% |
| 160100 | City | 2,730 | 13 | 0% | 2,674 | 98% |
| 180200 | City | 1,117 | 41 | 4% | 1,064 | 95% |
| 170300 | City | 1,580 | 11 | 1% | 1,556 | 98% |
| 180100 | City | 1,844 | 24 | 1% | 1,776 | 96% |
| 180300 | City | 2,066 | 593 | 29% | 1,317 | 64% |
| 210200 | City | 3,342 | 1,501 | 45% | 1,461 | 44% |
| 220100 | City | 2,072 | 672 | 32% | 1,300 | 63% |
| 170100 | City | 1,925 | 283 | 15% | 1,535 | 80% |
| 040200 | City | 1,666 | 722 | 43% | 624 | 37% |
| 210100 | City | 4,220 | 3,207 | 76% | 794 | 19% |
| 040100 | City | 2,225 | 844 | 38% | 937 | 42% |
| 030200 | City | 1,127 | 842 | 75% | 172 | 15% |
| 030100 | City | 2,494 | 375 | 15% | 2,001 | 80% |
| 020300 | City | 2,419 | 2,050 | 85% | 104 | 4% |
| 020200 | City | 2,035 | 1,183 | 58% | 290 | 14% |
| 010500 | City | 1,766 | 1,348 | 76% | 134 | 8% |
| 020100 | City | 1,865 | 1,292 | 69% | 274 | 15% |
| 010400 | City | 2,147 | 1,911 | 89% | 48 | 2% |
| 010300 | City | 2,101 | 1,876 | 89% | 58 | 3% |
| 010100 | City | 2,829 | 2,641 | 93% | 76 | 3% |
| 261100 | City | 1,820 | 1,605 | 88% | 80 | 4% |
| 260404 | City | 1,623 | 815 | 50% | 682 | 42% |
| 260800 | City | 2,551 | 1,708 | 67% | 547 | 21% |
| 260900 | City | 2,370 | 2,134 | 90% | 106 | 4% |
| 260700 | City | 1,828 | 1,365 | 75% | 150 | 8% |
| 260501 | City | 4,891 | 3,960 | 81% | 410 | 8% |
| 260605 | City | 3,901 | 2,853 | 73% | 647 | 17% |
| 260604 | City | 2,559 | 618 | 24% | 1,766 | 69% |

Source: BNIA-JFI, Claritas and Bureau of the Census

Appendix Table B-2

| Tract | City/County | Percentage | Percentage | Percentage | Percentage | Percentage |
|--------|-------------|------------|-------------|-------------|-------------|-------------|
| | | 0-17 Years | 18-34 Years | 35-54 Years | 55-64 Years | |
| | | Old | Old | Old | Old | 65 and Over |
| 401501 | County | 30% | 25% | 32% | 8% | 6% |
| 401505 | County | 22% | 17% | 28% | 11% | 21% |
| 401102 | County | 21% | 25% | 36% | 9% | 9% |
| 401101 | County | 27% | 21% | 31% | 10% | 11% |
| 401301 | County | 28% | 20% | 33% | 9% | 10% |
| 401302 | County | 26% | 21% | 34% | 10% | 9% |
| 280401 | City | 26% | 19% | 30% | 13% | 12% |
| 280403 | City | 28% | 23% | 29% | 10% | 9% |
| 280402 | City | 21% | 19% | 26% | 15% | 19% |
| 280404 | City | 30% | 22% | 25% | 11% | 12% |
| 160801 | City | 29% | 23% | 25% | 10% | 13% |
| 200701 | City | 24% | 19% | 25% | 11% | 21% |
| 160802 | City | 26% | 22% | 26% | 12% | 14% |
| 200600 | City | 27% | 21% | 28% | 10% | 14% |
| 160700 | City | 28% | 22% | 26% | 10% | 15% |
| 160600 | City | 27% | 20% | 26% | 10% | 17% |
| 200200 | City | 27% | 22% | 26% | 10% | 14% |
| 160500 | City | 28% | 23% | 25% | 10% | 15% |
| 160400 | City | 29% | 22% | 26% | 10% | 12% |
| 200100 | City | 26% | 22% | 27% | 12% | 14% |
| 160300 | City | 24% | 22% | 26% | 9% | 19% |
| 190100 | City | 30% | 23% | 29% | 9% | 8% |
| 160200 | City | 34% | 22% | 27% | 8% | 9% |
| 160100 | City | 26% | 20% | 28% | 11% | 15% |
| 180200 | City | 18% | 18% | 28% | 13% | 23% |
| 170300 | City | 24% | 19% | 26% | 11% | 19% |
| 180100 | City | 37% | 22% | 25% | 7% | 9% |
| 180300 | City | 23% | 28% | 33% | 9% | 7% |
| 210200 | City | 30% | 24% | 28% | 9% | 11% |
| 220100 | City | 25% | 25% | 32% | 10% | 8% |
| 170100 | City | 26% | 28% | 32% | 9% | 6% |
| 040200 | City | 6% | 42% | 28% | 9% | 15% |
| 210100 | City | 10% | 30% | 29% | 13% | 18% |
| 040100 | City | 7% | 39% | 36% | 10% | 8% |
| 030200 | City | 8% | 28% | 38% | 11% | 15% |
| 030100 | City | 32% | 21% | 30% | 10% | 6% |
| 020300 | City | 9% | 36% | 32% | 12% | 12% |
| 020200 | City | 20% | 31% | 30% | 10% | 9% |
| 010500 | City | 17% | 28% | 33% | 10% | 13% |
| 020100 | City | 17% | 33% | 31% | 8% | 10% |
| 010400 | City | 9% | 35% | 30% | 12% | 13% |
| 010300 | City | 15% | 25% | 31% | 12% | 16% |
| 010100 | City | 11% | 27% | 30% | 11% | 21% |
| 261100 | City | 17% | 25% | 31% | 11% | 17% |
| 260404 | City | 26% | 23% | 30% | 9% | 12% |
| 260800 | City | 24% | 23% | 27% | 12% | 15% |
| 260900 | City | 19% | 22% | 29% | 13% | 17% |
| 260700 | City | 24% | 22% | 31% | 11% | 13% |
| 260501 | City | 21% | 17% | 29% | 12% | 22% |
| 260605 | City | 21% | 19% | 31% | 13% | 17% |
| 260604 | City | 44% | 23% | 21% | 6% | 6% |

Source: BNIA-JFI, Claritas and Bureau of the Census

Appendix Table B-3

| Tract | City/County | Number of Households | Number of Homes with 0 Vehicles | Percentage of Homes with 0 Vehicles |
|---------------|-------------|-------------------------|---------------------------------------|---|
| 401501 | County | 3,985 | 384 | 10% |
| 401505 | County | 1,380 | 167 | 12% |
| 401102 | County | 479 | 43 | 9% |
| 401101 | County | 2,286 | 110 | 5% |
| 401301 | County | 1,370 | 151 | 11% |
| 401302 | County | 1,195 | 146 | 12% |
| 280401 | City | 1,618 | 289 | 18% |
| 280403 | City | 2,179 | 271 | 12% |
| 280402 | City | 643 | 124 | 19% |
| 280404 | City | 1,483 | 773 | 52% |
| 160801 | City | 1,227 | 356 | 29% |
| 200701 | City | 1,630 | 626 | 38% |
| 160802 | City | 1,095 | 345 | 32% |
| 200600 | City | 1,064 | 241 | 23% |
| 160700 | City | 2,183 | 875 | 40% |
| 160600 | City | 1,326 | 628 | 47% |
| 200200 | City | 1,142 | 582 | 51% |
| 160500 | City | 1,685 | 629 | 37% |
| 160400 | City | 1,021 | 684 | 67% |
| 200100 | City | 650 | 342 | 53% |
| 160300 | City | 460 | 282 | 61% |
| 190100 | City | 967 | 636 | 66% |
| 160200 | City | 842 | 540 | 64% |
| 160100 | City | 1,201 | 749 | 62% |
| 180200 | City | 431 | 286 | 66% |
| 170300 | City | 817 | 588 | 72% |
| 180100 | City | 769 | 612 | 80% |
| 180300 | City | 884 | 468 | 53% |
| 210200 | City | 1,296 | 590 | 46% |
| 220100 | City | 839 | 427 | 51% |
| 170100 | City | 964 | 479 | 50% |
| 040200 | City | 656 | 311 | 47% |
| 210100 | City | 2,299 | 580 | 25% |
| 040100 | City | 1,262 | 582 | 46% |
| 030200 | City | 514 | 117 | 23% |
| 030100 | City | 1,111 | 729 | 66% |
| 020300 | City | 1,512 | 201 | 13% |
| 020200 | City | 826 | 217 | 26% |
| 010500 | City | 913 | 274 | 30% |
| 020100 | City | 872 | 372 | 43% |
| 010400 | City | 1,307 | 297 | 23% |
| 010300 | City | 1,118 | 388 | 35% |
| 010100 | City | 1,473 | 435 | 30% |
| 261100 | City | 903 | 194 | 21% |
| 260404 | City | 585 | 230 | 39% |
| 260800 | City | 1,092 | 492 | 45% |
| 260900 | City | 1,104 | 346 | 31% |
| 260700 | City | 745 | 207 | 28% |
| 260501 | City | 2,189 | 693 | 32% |
| 260605 | City | 1,750 | 493 | 28% |
| 260604 | City | 884 | 686 | 78% |

Source: BNIA-JFI, Claritas and Bureau of the Census

Appendix Table B-4

| Tract | City/County | Per Capita Income | Median Household Income | Average Household Income |
|---------------|-------------|-------------------|-------------------------|--------------------------|
| 401501 | County | \$20,942 | \$45,747 | \$52,985 |
| 401505 | County | \$25,940 | \$63,333 | \$67,765 |
| 401102 | County | \$23,544 | \$46,085 | \$54,254 |
| 401101 | County | \$24,133 | \$58,514 | \$66,388 |
| 401301 | County | \$20,671 | \$49,500 | \$54,153 |
| 401302 | County | \$24,261 | \$51,412 | \$55,584 |
| 280401 | City | \$28,930 | \$44,722 | \$66,350 |
| 280403 | City | \$26,850 | \$54,677 | \$65,023 |
| 280402 | City | \$22,469 | \$50,563 | \$59,450 |
| 280404 | City | \$16,197 | \$32,213 | \$38,155 |
| 160801 | City | \$17,186 | \$34,625 | \$47,365 |
| 200701 | City | \$12,600 | \$29,063 | \$32,072 |
| 160802 | City | \$10,557 | \$35,071 | \$31,584 |
| 200600 | City | \$15,682 | \$32,722 | \$40,359 |
| 160700 | City | \$13,766 | \$31,739 | \$36,915 |
| 160600 | City | \$13,594 | \$28,854 | \$36,123 |
| 200200 | City | \$14,932 | \$32,500 | \$42,324 |
| 160500 | City | \$13,373 | \$25,400 | \$36,129 |
| 160400 | City | \$10,805 | \$22,083 | \$29,515 |
| 200100 | City | \$12,486 | \$24,729 | \$34,115 |
| 160300 | City | \$9,909 | \$23,636 | \$28,291 |
| 190100 | City | \$12,743 | \$18,911 | \$31,036 |
| 160200 | City | \$13,156 | \$24,866 | \$35,391 |
| 160100 | City | \$13,381 | \$22,882 | \$32,560 |
| 180200 | City | \$19,053 | \$22,000 | \$43,093 |
| 170300 | City | \$15,262 | \$14,915 | \$30,508 |
| 180100 | City | \$12,724 | \$13,360 | \$29,660 |
| 180300 | City | \$16,169 | \$27,997 | \$36,470 |
| 210200 | City | \$11,624 | \$23,104 | \$29,728 |
| 220100 | City | \$16,406 | \$27,100 | \$38,713 |
| 170100 | City | \$13,607 | \$19,152 | \$26,362 |
| 040200 | City | \$10,746 | \$12,783 | \$21,284 |
| 210100 | City | \$40,190 | \$55,303 | \$74,462 |
| 040100 | City | \$22,828 | \$26,416 | \$37,856 |
| 030200 | City | \$34,210 | \$30,833 | \$63,866 |
| 030100 | City | \$21,499 | \$32,300 | \$44,321 |
| 020300 | City | \$50,774 | \$63,821 | \$81,119 |
| 020200 | City | \$32,498 | \$66,627 | \$80,119 |
| 010500 | City | \$36,462 | \$51,831 | \$69,523 |
| 020100 | City | \$27,185 | \$42,774 | \$57,137 |
| 010400 | City | \$42,235 | \$54,378 | \$69,623 |
| 010300 | City | \$31,685 | \$42,571 | \$58,785 |
| 010100 | City | \$40,915 | \$50,909 | \$79,850 |
| 261100 | City | \$25,439 | \$37,763 | \$50,188 |
| 260404 | City | \$15,755 | \$26,328 | \$31,589 |
| 260800 | City | \$15,842 | \$25,526 | \$36,847 |
| 260900 | City | \$24,582 | \$41,042 | \$52,308 |
| 260700 | City | \$15,474 | \$28,034 | \$37,913 |
| 260501 | City | \$19,157 | \$35,333 | \$41,851 |
| 260605 | City | \$20,834 | \$37,769 | \$45,775 |
| 260604 | City | \$7,056 | \$9,999 | \$19,455 |

Source: BNIA-JFI, Claritas and Bureau of the Census

Appendix Table B-5

| Tract | City/County | Less Than High School | High School Graduate | Some College (No Degree) | Associate s Degree | Bachelor's Degree and Above |
|---------------|-------------|--------------------------|-------------------------|-----------------------------|-----------------------|-----------------------------------|
| 401501 | County | 13% | 27% | 25% | 6% | 29% |
| 401505 | County | 17% | 30% | 18% | 7% | 29% |
| 401102 | County | 14% | 24% | 36% | 6% | 20% |
| 401101 | County | 18% | 30% | 22% | 10% | 20% |
| 401301 | County | 14% | 33% | 27% | 7% | 19% |
| 401302 | County | 12% | 31% | 24% | 11% | 22% |
| 280401 | City | 18% | 23% | 18% | 4% | 36% |
| 280403 | City | 14% | 22% | 28% | 5% | 30% |
| 280402 | City | 31% | 37% | 21% | 4% | 6% |
| 280404 | City | 33% | 36% | 17% | 5% | 9% |
| 160801 | City | 31% | 37% | 21% | 4% | 8% |
| 200701 | City | 40% | 32% | 20% | 3% | 5% |
| 160802 | City | 47% | 28% | 18% | 4% | 3% |
| 200600 | City | 39% | 34% | 17% | 3% | 7% |
| 160700 | City | 46% | 27% | 20% | 1% | 6% |
| 160600 | City | 36% | 41% | 15% | 2% | 6% |
| 200200 | City | 47% | 27% | 17% | 3% | 6% |
| 160500 | City | 32% | 36% | 18% | 3% | 12% |
| 160400 | City | 48% | 31% | 15% | 1% | 5% |
| 200100 | City | 39% | 41% | 11% | 4% | 5% |
| 160300 | City | 45% | 32% | 12% | 7% | 5% |
| 190100 | City | 44% | 34% | 13% | 4% | 4% |
| 160200 | City | 42% | 27% | 19% | 8% | 4% |
| 160100 | City | 40% | 39% | 16% | 1% | 4% |
| 180200 | City | 57% | 28% | 8% | 2% | 6% |
| 170300 | City | 53% | 27% | 10% | 3% | 7% |
| 180100 | City | 55% | 31% | 7% | 2% | 5% |
| 180300 | City | 39% | 20% | 23% | 0% | 18% |
| 210200 | City | 50% | 35% | 7% | 3% | 5% |
| 220100 | City | 36% | 32% | 13% | 2% | 16% |
| 170100 | City | 30% | 22% | 18% | 3% | 27% |
| 040200 | City | 36% | 19% | 11% | 4% | 30% |
| 210100 | City | 16% | 11% | 9% | 2% | 62% |
| 040100 | City | 29% | 10% | 16% | 1% | 45% |
| 030200 | City | 22% | 19% | 21% | 5% | 33% |
| 030100 | City | 41% | 30% | 9% | 1% | 19% |
| 020300 | City | 15% | 13% | 11% | 4% | 58% |
| 020200 | City | 35% | 22% | 16% | 4% | 23% |
| 010500 | City | 27% | 12% | 13% | 6% | 42% |
| 020100 | City | 31% | 23% | 12% | 4% | 30% |
| 010400 | City | 23% | 15% | 16% | 4% | 43% |
| 010300 | City | 32% | 19% | 20% | 4% | 25% |
| 010100 | City | 28% | 18% | 14% | 3% | 36% |
| 261100 | City | 28% | 21% | 18% | 4% | 30% |
| 260404 | City | 42% | 37% | 11% | 4% | 6% |
| 260800 | City | 49% | 36% | 11% | 0% | 4% |
| 260900 | City | 31% | 29% | 16% | 9% | 16% |
| 260700 | City | 51% | 25% | 18% | 3% | 3% |
| 260501 | City | 41% | 32% | 14% | 4% | 8% |
| 260605 | City | 38% | 36% | 15% | 4% | 7% |
| 260604 | City | 50% | 32% | 12% | 1% | 5% |

Source: BNIA-JFI, Claritas and Bureau of the Census

Appendix Table B-6

| Tract | City/County | Percentage of Population in Armed Forces | Percentage of Population Employed | Percentage of Population Unemployed | Percentage of Population Not in Labor Force |
|--------|-------------|--|---|---|---|
| 401501 | County | 0% | 73% | 4% | 23% |
| 401505 | County | 1% | 58% | 2% | 40% |
| 401102 | County | 0% | 74% | 0% | 26% |
| 401101 | County | 0% | 65% | 4% | 31% |
| 401301 | County | 0% | 70% | 4% | 27% |
| 401302 | County | 0% | 70% | 4% | 26% |
| 280401 | City | 0% | 61% | 5% | 34% |
| 280403 | City | 1% | 68% | 4% | 28% |
| 280402 | City | 0% | 55% | 7% | 38% |
| 280404 | City | 0% | 53% | 9% | 38% |
| 160801 | City | 0% | 52% | 10% | 38% |
| 200701 | City | 0% | 43% | 11% | 46% |
| 160802 | City | 0% | 41% | 8% | 52% |
| 200600 | City | 0% | 50% | 4% | 45% |
| 160700 | City | 0% | 43% | 8% | 49% |
| 160600 | City | 0% | 44% | 9% | 47% |
| 200200 | City | 0% | 40% | 8% | 51% |
| 160500 | City | 0% | 46% | 10% | 44% |
| 160400 | City | 0% | 37% | 10% | 53% |
| 200100 | City | 0% | 43% | 9% | 48% |
| 160300 | City | 0% | 34% | 8% | 58% |
| 190100 | City | 0% | 42% | 8% | 50% |
| 160200 | City | 1% | 46% | 4% | 49% |
| 160100 | City | 0% | 40% | 10% | 50% |
| 180200 | City | 0% | 34% | 5% | 61% |
| 170300 | City | 0% | 27% | 14% | 58% |
| 180100 | City | 0% | 32% | 11% | 58% |
| 180300 | City | 1% | 42% | 8% | 49% |
| 210200 | City | 0% | 44% | 4% | 52% |
| 220100 | City | 1% | 48% | 8% | 44% |
| 170100 | City | 1% | 47% | 11% | 40% |
| 040200 | City | 0% | 34% | 3% | 64% |
| 210100 | City | 0% | 59% | 2% | 39% |
| 040100 | City | 0% | 47% | 5% | 48% |
| 030200 | City | 0% | 49% | 4% | 47% |
| 030100 | City | 0% | 42% | 8% | 51% |
| 020300 | City | 1% | 73% | 2% | 25% |
| 020200 | City | 1% | 62% | 8% | 29% |
| 010500 | City | 0% | 63% | 3% | 34% |
| 020100 | City | 0% | 57% | 4% | 40% |
| 010400 | City | 0% | 59% | 5% | 35% |
| 010300 | City | 0% | 53% | 2% | 45% |
| 010100 | City | 0% | 56% | 4% | 40% |
| 261100 | City | 0% | 59% | 2% | 39% |
| 260404 | City | 0% | 54% | 1% | 44% |
| 260800 | City | 0% | 46% | 6% | 48% |
| 260900 | City | 0% | 60% | 1% | 38% |
| 260700 | City | 0% | 40% | 7% | 53% |
| 260501 | City | 0% | 45% | 2% | 53% |
| 260605 | City | 0% | 52% | 5% | 43% |
| 260604 | City | 0% | 35% | 16% | 49% |

Source: BNIA-JFI, Claritas and Bureau of the Census

Appendix Table B-7

| Tract | City/County | Percentage Employed in Blue collar Occupations | Percentage Employed in White collar Occupations | Percentage Employed in Service and Farm Occupations | Percentage Employed in Construcion Occupations | Percentage Employed in Transportation and Material Moving Occupations |
|--------|-------------|--|---|---|--|---|
| 401501 | County | 16% | 68% | 16% | 2% | 5% |
| 401505 | County | 14% | 71% | 15% | 2% | 3% |
| 401102 | County | 14% | 71% | 14% | 1% | 4% |
| 401101 | County | 22% | 59% | 19% | 3% | 7% |
| 401301 | County | 20% | 66% | 13% | 5% | 9% |
| 401302 | County | 26% | 59% | 15% | 4% | 10% |
| 280401 | City | 15% | 70% | 15% | 2% | 5% |
| 280403 | City | 13% | 67% | 20% | 2% | 7% |
| 280402 | City | 16% | 58% | 27% | 3% | 6% |
| 280404 | City | 23% | 53% | 24% | 4% | 9% |
| 160801 | City | 22% | 53% | 25% | 0% | 9% |
| 200701 | City | 29% | 46% | 24% | 3% | 18% |
| 160802 | City | 23% | 55% | 22% | 3% | 7% |
| 200600 | City | 27% | 53% | 20% | 5% | 10% |
| 160700 | City | 25% | 45% | 30% | 3% | 12% |
| 160600 | City | 26% | 39% | 34% | 4% | 10% |
| 200200 | City | 28% | 50% | 22% | 5% | 14% |
| 160500 | City | 20% | 48% | 32% | 4% | 8% |
| 160400 | City | 23% | 42% | 35% | 5% | 3% |
| 200100 | City | 28% | 41% | 32% | 9% | 9% |
| 160300 | City | 34% | 38% | 28% | 9% | 18% |
| 190100 | City | 33% | 38% | 29% | 6% | 11% |
| 160200 | City | 26% | 45% | 29% | 3% | 9% |
| 160100 | City | 27% | 36% | 37% | 3% | 12% |
| 180200 | City | 23% | 56% | 21% | 6% | 7% |
| 170300 | City | 28% | 37% | 35% | 1% | 18% |
| 180100 | City | 5% | 50% | 45% | 0% | 2% |
| 180300 | City | 17% | 63% | 19% | 5% | 6% |
| 210200 | City | 39% | 40% | 21% | 10% | 16% |
| 220100 | City | 29% | 50% | 21% | 8% | 13% |
| 170100 | City | 10% | 69% | 21% | 2% | 4% |
| 040200 | City | 6% | 83% | 11% | 0% | 4% |
| 210100 | City | 2% | 93% | 4% | 0% | 0% |
| 040100 | City | 12% | 84% | 4% | 6% | 1% |
| 030200 | City | 17% | 68% | 15% | 8% | 6% |
| 030100 | City | 16% | 66% | 19% | 9% | 4% |
| 020300 | City | 9% | 79% | 12% | 3% | 3% |
| 020200 | City | 23% | 60% | 17% | 5% | 6% |
| 010500 | City | 17% | 74% | 9% | 3% | 8% |
| 020100 | City | 22% | 59% | 18% | 9% | 8% |
| 010400 | City | 12% | 74% | 13% | 4% | 3% |
| 010300 | City | 18% | 65% | 17% | 6% | 4% |
| 010100 | City | 14% | 77% | 9% | 7% | 2% |
| 261100 | City | 22% | 70% | 8% | 7% | 5% |
| 260404 | City | 40% | 42% | 18% | 14% | 12% |
| 260800 | City | 38% | 42% | 20% | 11% | 6% |
| 260900 | City | 23% | 60% | 17% | 2% | 9% |
| 260700 | City | 39% | 44% | 17% | 12% | 15% |
| 260501 | City | 32% | 48% | 20% | 8% | 11% |
| 260605 | City | 37% | 45% | 18% | 7% | 15% |
| 260604 | City | 22% | 51% | 27% | 5% | 5% |

Source: BNIA-JFI, Claritas and Bureau of the Census