THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF LABOR AND WORKFORCE DEVELOPMENT
DEPARTMENT OF LABOR STANDARDS

Prevailing Wage Rates

As determined by the Director under the provisions of the Massachusetts General Laws, Chapter 149, Sections 26 to 27H

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lt. Governor

JOANNE F. GOLDSTEIN
Secretary

HEATHER E. ROWE
Director

Awarding Authority: Town of Acton

Contract Number:

City/Town: ACTON

Description of Work: Fire Station 1 & 2; Provide 2 new exterior standby diesel generators, ATS, to back-up entire building. Electrical service modifications, metering, main breaker, and all reconnections, etc.

Job Location: 7 Concord Road & 52 School Street

Information about Prevailing Wage Schedules for Awarding Authorities and Contractors

- This wage schedule applies only to the specific project referenced at the top of this page and uniquely identified by the "Wage Request Number" on all pages of this schedule.
- Awarding authorities must request an updated wage schedule from the Department of Labor Standards ("DLS") if it has not opened bids or selected a contractor within 90 days of the date of issuance of the wage schedule.
- The wage schedule shall be incorporated in any advertisement or call for bids for the project as required by M.G.L. c. 149, § 27. Once a contractor has been selected by the awarding authority, the wage schedule shall be made a part of the contract for that project. The wage schedule must be posted in a conspicuous place at the work site during the life of the project in accordance with M.G.L. c. 149, § 27. The wages listed on the wage schedule must be paid to employees performing construction work on the project regardless of whether they are employed by the prime contractor, a filed sub-bidder, or any sub-contractor.
- All apprentices working on the project are required to be registered with the Massachusetts Division of Apprentice Training (DAT). Apprentices must keep his/her apprentice identification card on his/her person during all work hours on the project. If an apprentice rate is listed on the prevailing wage schedule for the trade in which an apprentice is registered with the DAT, the apprentice may be paid the lower apprentice wage rate at the applicable step as provided on the prevailing wage schedule. **If an apprentice rate is not listed on the prevailing wage schedule for the trade in which an apprentice is registered with the DAT, the apprentice must be paid the journeyworker's rate for the trade.**
- The wage rates will remain in effect for the duration of the project, except in the case of multi-year public construction projects. For construction projects lasting longer than one year, awarding authorities must request an updated wage schedule. Awarding authorities are required to request these updates no later than two weeks before the anniversary of the date the contract was executed by the awarding authority and the general contractor. Contractors are required to obtain the wage schedules from awarding authorities, and to pay no less than these rates to covered workers. The annual update requirement is not applicable to 27F "rental of equipment" contracts.
- Every contractor or subcontractor which performs construction work on the project is required to submit weekly payroll reports directly to the awarding authority and keep them on file for three years. Each weekly payroll report must contain: the employee's name, address, occupational classification, hours worked, and wages paid. Do not submit weekly payroll reports to DLS. A sample of a payroll reporting form may be obtained at http://www.mass.gov/dols/pw.
- Contractors with questions about the wage rates or classifications included on the wage schedule have an affirmative obligation to inquire with DLS at (617) 626-6953.
- Employees not receiving the prevailing wage rate set forth on the wage schedule may report the violation to the Fair Labor Division of the office of the Attorney General at (617) 727-3465.
- Failure of a contractor or subcontractor to pay the prevailing wage rates listed on the wage schedule to all employees who perform construction work on the project is a violation of the law and subjects the contractor or subcontractor to civil and criminal penalties.

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
Construction						
(2 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2012	$30.45	$8.91	$8.00	$0.00	$47.36
(3 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2012	$30.52	$8.91	$8.00	$0.00	$47.43
(4 & 5 AXLE) DRIVER - EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2012	$30.64	$9.07	$8.00	$0.00	$47.71
ADS/SUBMERSIBLE PILOT *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2013	$85.47	$9.80	$17.67	$0.00	$112.94
	08/01/2014	$88.62	$9.80	$17.67	$0.00	$116.09
	08/01/2015	$91.77	$9.80	$17.67	$0.00	$119.24
AIR TRACK OPERATOR *LABORERS - ZONE 2*	06/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	12/01/2013	$31.10	$7.10	$11.80	$0.00	$50.00
	06/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	12/01/2014	$32.10	$7.10	$11.80	$0.00	$51.00
	06/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	12/01/2015	$33.10	$7.10	$11.80	$0.00	$52.00
	06/01/2016	$33.60	$7.10	$11.80	$0.00	$52.50
	12/01/2016	$34.35	$7.10	$11.80	$0.00	$53.25
For apprentice rates see "Apprentice- LABORER"						
ASBESTOS REMOVER - PIPE / MECH. EQUIPT. *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	06/01/2013	$29.88	$10.40	$5.95	$0.00	$46.23
	12/01/2013	$30.68	$10.40	$5.95	$0.00	$47.03
	06/01/2014	$31.58	$10.40	$5.95	$0.00	$47.93
	12/01/2014	$32.48	$10.40	$5.95	$0.00	$48.83
	06/01/2015	$33.43	$10.40	$5.95	$0.00	$49.78
	12/01/2015	$34.38	$10.40	$5.95	$0.00	$50.73
ASPHALT RAKER *LABORERS - ZONE 2*	06/01/2013	$30.10	$7.10	$11.80	$0.00	$49.00
	12/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	06/01/2014	$31.10	$7.10	$11.80	$0.00	$50.00
	12/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	06/01/2015	$32.10	$7.10	$11.80	$0.00	$51.00
	12/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	06/01/2016	$33.10	$7.10	$11.80	$0.00	$52.00
	12/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75
For apprentice rates see "Apprentice- LABORER"						
ASPHALT/CONCRETE/CRUSHER PLANT-ON SITE *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$40.34	$10.00	$13.55	$0.00	$63.89
	12/01/2013	$41.12	$10.00	$13.55	$0.00	$64.67
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
BACKHOE/FRONT-END LOADER *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$40.34	$10.00	$13.55	$0.00	$63.89
	12/01/2013	$41.12	$10.00	$13.55	$0.00	$64.67
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
BARCO-TYPE JUMPING TAMPER *LABORERS - ZONE 2*	06/01/2013	$30.10	$7.10	$11.80	$0.00	$49.00
	12/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	06/01/2014	$31.10	$7.10	$11.80	$0.00	$50.00
	12/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	06/01/2015	$32.10	$7.10	$11.80	$0.00	$51.00
	12/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	06/01/2016	$33.10	$7.10	$11.80	$0.00	$52.00
	12/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75
For apprentice rates see "Apprentice- LABORER"						
BLOCK PAVER, RAMMER / CURB SETTER *LABORERS - ZONE 2*	06/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	12/01/2013	$31.10	$7.10	$11.80	$0.00	$50.00
	06/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	12/01/2014	$32.10	$7.10	$11.80	$0.00	$51.00
	06/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	12/01/2015	$33.10	$7.10	$11.80	$0.00	$52.00
	06/01/2016	$33.60	$7.10	$11.80	$0.00	$52.50
	12/01/2016	$34.35	$7.10	$11.80	$0.00	$53.25
For apprentice rates see "Apprentice- LABORER"						
BOILER MAKER *BOILERMAKERS LOCAL 29*	01/01/2010	$37.70	$6.97	$11.18	$0.00	$55.85

Apprentice - *BOILERMAKER - Local 29*

Effective Date - 01/01/2010

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	65	$24.51	$6.97	$11.18	$0.00	$42.66
2	65	$24.51	$6.97	$11.18	$0.00	$42.66
3	70	$26.39	$6.97	$11.18	$0.00	$44.54
4	75	$28.28	$6.97	$11.18	$0.00	$46.43
5	80	$30.16	$6.97	$11.18	$0.00	$48.31
6	85	$32.05	$6.97	$11.18	$0.00	$50.20
7	90	$33.93	$6.97	$11.18	$0.00	$52.08
8	95	$35.82	$6.97	$11.18	$0.00	$53.97

Notes:

Apprentice to Journeyworker Ratio:1:5

BRICK/STONE/ARTIFICIAL MASONRY (INCL. MASONRY WATERPROOFING) *BRICKLAYERS LOCAL 3 (LOWELL)*	03/01/2013	$45.31	$10.18	$17.23	$0.00	$72.72
	09/01/2013	$45.96	$10.18	$17.55	$0.00	$73.69
	03/01/2014	$46.52	$10.18	$17.55	$0.00	$74.25
	09/01/2014	$47.42	$10.18	$17.62	$0.00	$75.22
	03/01/2015	$47.98	$10.18	$17.62	$0.00	$75.78
	09/01/2015	$48.88	$10.18	$17.69	$0.00	$76.75
	03/01/2016	$49.45	$10.18	$17.69	$0.00	$77.32
	09/01/2016	$50.35	$10.18	$17.77	$0.00	$78.30
	03/01/2017	$50.92	$10.18	$17.77	$0.00	$78.87

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *BRICK/PLASTER/CEMENT MASON - Local 3 Lowell*

Effective Date - 03/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.66	$10.18	$17.23	$0.00	$50.07
2	60	$27.19	$10.18	$17.23	$0.00	$54.60
3	70	$31.72	$10.18	$17.23	$0.00	$59.13
4	80	$36.25	$10.18	$17.23	$0.00	$63.66
5	90	$40.78	$10.18	$17.23	$0.00	$68.19

Effective Date - 09/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.98	$10.18	$17.55	$0.00	$50.71
2	60	$27.58	$10.18	$17.55	$0.00	$55.31
3	70	$32.17	$10.18	$17.55	$0.00	$59.90
4	80	$36.77	$10.18	$17.55	$0.00	$64.50
5	90	$41.36	$10.18	$17.55	$0.00	$69.09

Notes:

Apprentice to Journeyworker Ratio:1:5

BULLDOZER/GRADER/SCRAPER *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$39.96	$10.00	$13.55	$0.00	$63.51
	12/01/2013	$40.74	$10.00	$13.55	$0.00	$64.29
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
CAISSON & UNDERPINNING BOTTOM MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2013	$34.20	$7.10	$12.60	$0.00	$53.90
	12/01/2013	$34.95	$7.10	$12.60	$0.00	$54.65
	06/01/2014	$35.70	$7.10	$12.60	$0.00	$55.40
	12/01/2014	$36.45	$7.10	$12.60	$0.00	$56.15
	06/01/2015	$37.20	$7.10	$12.60	$0.00	$56.90
	12/01/2015	$37.95	$7.10	$12.60	$0.00	$57.65
	06/01/2016	$38.70	$7.10	$12.60	$0.00	$58.40
	12/01/2016	$39.70	$7.10	$12.60	$0.00	$59.40
For apprentice rates see "Apprentice- LABORER"						
CAISSON & UNDERPINNING LABORER *LABORERS - FOUNDATION AND MARINE*	06/01/2013	$33.05	$7.10	$12.60	$0.00	$52.75
	12/01/2013	$33.80	$7.10	$12.60	$0.00	$53.50
	06/01/2014	$34.55	$7.10	$12.60	$0.00	$54.25
	12/01/2014	$35.30	$7.10	$12.60	$0.00	$55.00
	06/01/2015	$36.05	$7.10	$12.60	$0.00	$55.75
	12/01/2015	$36.80	$7.10	$12.60	$0.00	$56.50
	06/01/2016	$37.55	$7.10	$12.60	$0.00	$57.25
	12/01/2016	$38.55	$7.10	$12.60	$0.00	$58.25
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
CAISSON & UNDERPINNING TOP MAN *LABORERS - FOUNDATION AND MARINE*	06/01/2013	$33.05	$7.10	$12.60	$0.00	$52.75
	12/01/2013	$33.80	$7.10	$12.60	$0.00	$53.50
	06/01/2014	$34.55	$7.10	$12.60	$0.00	$54.25
	12/01/2014	$35.30	$7.10	$12.60	$0.00	$55.00
	06/01/2015	$36.05	$7.10	$12.60	$0.00	$55.75
	12/01/2015	$36.80	$7.10	$12.60	$0.00	$56.50
	06/01/2016	$37.55	$7.10	$12.60	$0.00	$57.25
	12/01/2016	$38.55	$7.10	$12.60	$0.00	$58.25
For apprentice rates see "Apprentice- LABORER"						
CARBIDE CORE DRILL OPERATOR *LABORERS - ZONE 2*	06/01/2013	$30.10	$7.10	$11.80	$0.00	$49.00
	12/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	06/01/2014	$31.10	$7.10	$11.80	$0.00	$50.00
	12/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	06/01/2015	$32.10	$7.10	$11.80	$0.00	$51.00
	12/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	06/01/2016	$33.10	$7.10	$11.80	$0.00	$52.00
	12/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75
For apprentice rates see "Apprentice- LABORER"						
CARPENTER *CARPENTERS -ZONE 2 (Eastern Massachusetts)*	03/01/2013	$33.92	$9.80	$15.61	$0.00	$59.33
	09/01/2013	$34.53	$9.80	$15.61	$0.00	$59.94
	03/01/2014	$35.13	$9.80	$15.61	$0.00	$60.54
	09/01/2014	$35.90	$9.80	$15.61	$0.00	$61.31
	03/01/2015	$36.67	$9.80	$15.61	$0.00	$62.08

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CARPENTER - Zone 2 Eastern MA*

Effective Date - 03/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$16.96	$9.80	$1.57	$0.00	$28.33
2	60	$20.35	$9.80	$1.57	$0.00	$31.72
3	70	$23.74	$9.80	$10.90	$0.00	$44.44
4	75	$25.44	$9.80	$10.90	$0.00	$46.14
5	80	$27.14	$9.80	$12.47	$0.00	$49.41
6	80	$27.14	$9.80	$12.47	$0.00	$49.41
7	90	$30.53	$9.80	$14.04	$0.00	$54.37
8	90	$30.53	$9.80	$14.04	$0.00	$54.37

Effective Date - 09/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$17.27	$9.80	$1.57	$0.00	$28.64
2	60	$20.72	$9.80	$1.57	$0.00	$32.09
3	70	$24.17	$9.80	$10.90	$0.00	$44.87
4	75	$25.90	$9.80	$10.90	$0.00	$46.60
5	80	$27.62	$9.80	$12.47	$0.00	$49.89
6	80	$27.62	$9.80	$12.47	$0.00	$49.89
7	90	$31.08	$9.80	$14.04	$0.00	$54.92
8	90	$31.08	$9.80	$14.04	$0.00	$54.92

Notes:

Apprentice to Journeyworker Ratio:1:5

CEMENT MASONRY/PLASTERING *BRICKLAYERS LOCAL 3 (LOWELL)*	07/01/2013	$38.45	$10.90	$18.71	$1.30	$69.36
	01/01/2014	$39.29	$10.90	$18.71	$1.30	$70.20
	07/01/2014	$39.97	$10.90	$18.71	$1.30	$70.88
	01/01/2015	$40.80	$10.90	$18.71	$1.30	$71.71
	07/01/2015	$41.48	$10.90	$18.71	$1.30	$72.39
	01/01/2016	$42.32	$10.90	$18.71	$1.30	$73.23

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *CEMENT MASONRY/PLASTERING - Lowell*

Effective Date - 07/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.23	$10.90	$12.21	$1.30	$43.64
2	60	$23.07	$10.90	$13.71	$1.30	$48.98
3	65	$24.99	$10.90	$14.71	$1.30	$51.90
4	70	$26.92	$10.90	$15.71	$1.30	$54.83
5	75	$28.84	$10.90	$16.71	$1.30	$57.75
6	80	$30.76	$10.90	$17.71	$1.30	$60.67
7	90	$34.61	$10.90	$18.71	$1.30	$65.52

Effective Date - 01/01/2014

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.65	$10.90	$12.21	$1.30	$44.06
2	60	$23.57	$10.90	$13.71	$1.30	$49.48
3	65	$25.54	$10.90	$14.71	$1.30	$52.45
4	70	$27.50	$10.90	$15.71	$1.30	$55.41
5	75	$29.47	$10.90	$16.71	$1.30	$58.38
6	80	$31.43	$10.90	$17.71	$1.30	$61.34
7	90	$35.36	$10.90	$18.71	$1.30	$66.27

Notes:

Steps 3,4 are 500 hrs. All other steps are 1,000 hrs.

Apprentice to Journeyworker Ratio:1:3

CHAIN SAW OPERATOR *LABORERS - ZONE 2*	06/01/2013	$30.10	$7.10	$11.80	$0.00	$49.00
	12/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	06/01/2014	$31.10	$7.10	$11.80	$0.00	$50.00
	12/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	06/01/2015	$32.10	$7.10	$11.80	$0.00	$51.00
	12/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	06/01/2016	$33.10	$7.10	$11.80	$0.00	$52.00
	12/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75
For apprentice rates see "Apprentice- LABORER"						
CLAM SHELLS/SLURRY BUCKETS/HEADING MACHINES *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$41.34	$10.00	$13.55	$0.00	$64.89
	12/01/2013	$42.12	$10.00	$13.55	$0.00	$65.67
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
COMPRESSOR OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$28.19	$10.00	$13.55	$0.00	$51.74
	12/01/2013	$28.74	$10.00	$13.55	$0.00	$52.29
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DELEADER (BRIDGE) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2013	$45.01	$7.80	$15.60	$0.00	$68.41

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.51	$7.80	$0.00	$0.00	$30.31
2	55	$24.76	$7.80	$3.52	$0.00	$36.08
3	60	$27.01	$7.80	$3.84	$0.00	$38.65
4	65	$29.26	$7.80	$4.16	$0.00	$41.22
5	70	$31.51	$7.80	$13.68	$0.00	$52.99
6	75	$33.76	$7.80	$14.00	$0.00	$55.56
7	80	$36.01	$7.80	$14.32	$0.00	$58.13
8	90	$40.51	$7.80	$14.96	$0.00	$63.27

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

DEMO: ADZEMAN *LABORERS - ZONE 2*	12/01/2011	$31.80	$7.10	$12.45	$0.00	$51.35
For apprentice rates see "Apprentice- LABORER"						
DEMO: BACKHOE/LOADER/HAMMER OPERATOR *LABORERS - ZONE 2*	12/01/2011	$32.80	$7.10	$12.45	$0.00	$52.35
For apprentice rates see "Apprentice- LABORER"						
DEMO: BURNERS *LABORERS - ZONE 2*	12/01/2011	$32.55	$7.10	$12.45	$0.00	$52.10
For apprentice rates see "Apprentice- LABORER"						
DEMO: CONCRETE CUTTER/SAWYER *LABORERS - ZONE 2*	12/01/2011	$32.80	$7.10	$12.45	$0.00	$52.35
For apprentice rates see "Apprentice- LABORER"						
DEMO: JACKHAMMER OPERATOR *LABORERS - ZONE 2*	12/01/2011	$32.55	$7.10	$12.45	$0.00	$52.10
For apprentice rates see "Apprentice- LABORER"						
DEMO: WRECKING LABORER *LABORERS - ZONE 2*	12/01/2011	$31.80	$7.10	$12.45	$0.00	$51.35
For apprentice rates see "Apprentice- LABORER"						
DIRECTIONAL DRILL MACHINE OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$39.96	$10.00	$13.55	$0.00	$63.51
	12/01/2013	$40.74	$10.00	$13.55	$0.00	$64.29
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
DIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2013	$56.98	$9.80	$17.67	$0.00	$84.45
	08/01/2014	$59.08	$9.80	$17.67	$0.00	$86.55
	08/01/2015	$61.18	$9.80	$17.67	$0.00	$88.65
DIVER TENDER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2013	$56.98	$9.80	$17.67	$0.00	$84.45
	08/01/2014	$59.08	$9.80	$17.67	$0.00	$86.55
	08/01/2015	$61.18	$9.80	$17.67	$0.00	$88.65
DIVER TENDER (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2013	$61.05	$9.80	$17.67	$0.00	$88.52
	08/01/2014	$63.30	$9.80	$17.67	$0.00	$90.77
	08/01/2015	$65.55	$9.80	$17.67	$0.00	$93.02

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
DIVER/SLURRY (EFFLUENT) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2013	$85.47	$9.80	$17.67	$0.00	$112.94
	08/01/2014	$88.62	$9.80	$17.67	$0.00	$116.09
	08/01/2015	$91.77	$9.80	$17.67	$0.00	$119.24
DRAWBRIDGE OPERATOR (Construction) *ELECTRICIANS LOCAL 103*	03/01/2013	$43.52	$13.00	$14.16	$0.00	$70.68
	09/01/2013	$44.20	$13.00	$14.18	$0.00	$71.38
	03/01/2014	$44.92	$13.00	$14.20	$0.00	$72.12
	09/01/2014	$45.60	$13.00	$14.22	$0.00	$72.82
	03/01/2015	$46.32	$13.00	$14.24	$0.00	$73.56
	09/01/2015	$47.27	$13.00	$14.27	$0.00	$74.54
	03/01/2016	$48.23	$13.00	$14.30	$0.00	$75.53
For apprentice rates see "Apprentice- ELECTRICIAN"						
ELECTRICIAN *ELECTRICIANS LOCAL 103*	03/01/2013	$43.52	$13.00	$14.16	$0.00	$70.68
	09/01/2013	$44.20	$13.00	$14.18	$0.00	$71.38
	03/01/2014	$44.92	$13.00	$14.20	$0.00	$72.12
	09/01/2014	$45.60	$13.00	$14.22	$0.00	$72.82
	03/01/2015	$46.32	$13.00	$14.24	$0.00	$73.56
	09/01/2015	$47.27	$13.00	$14.27	$0.00	$74.54
	03/01/2016	$48.23	$13.00	$14.30	$0.00	$75.53

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELECTRICIAN - Local 103*

Effective Date - 03/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$17.41	$13.00	$0.52	$0.00	$30.93
2	40	$17.41	$13.00	$0.52	$0.00	$30.93
3	45	$19.58	$13.00	$10.53	$0.00	$43.11
4	45	$19.58	$13.00	$10.53	$0.00	$43.11
5	50	$21.76	$13.00	$10.85	$0.00	$45.61
6	55	$23.94	$13.00	$11.19	$0.00	$48.13
7	60	$26.11	$13.00	$11.51	$0.00	$50.62
8	65	$28.29	$13.00	$11.85	$0.00	$53.14
9	70	$30.46	$13.00	$12.17	$0.00	$55.63
10	75	$32.64	$13.00	$12.51	$0.00	$58.15

Effective Date - 09/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$17.68	$13.00	$0.53	$0.00	$31.21
2	40	$17.68	$13.00	$0.53	$0.00	$31.21
3	45	$19.89	$13.00	$10.54	$0.00	$43.43
4	45	$19.89	$13.00	$10.54	$0.00	$43.43
5	50	$22.10	$13.00	$10.86	$0.00	$45.96
6	55	$24.31	$13.00	$11.20	$0.00	$48.51
7	60	$26.52	$13.00	$11.53	$0.00	$51.05
8	65	$28.73	$13.00	$11.86	$0.00	$53.59
9	70	$30.94	$13.00	$12.19	$0.00	$56.13
10	75	$33.15	$13.00	$12.53	$0.00	$58.68

Notes: :

App Prior 1/1/03; 30/35/40/45/50/55/65/70/75/80

Apprentice to Journeyworker Ratio:2:3***

ELEVATOR CONSTRUCTOR *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2012	$52.45	$8.78	$6.96	$0.00	$68.19

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *ELEVATOR CONSTRUCTOR - Local 4*

Effective Date - 01/01/2012

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$26.23	$8.78	$0.00	$0.00	$35.01
2	55	$28.85	$8.78	$6.96	$0.00	$44.59
3	65	$34.09	$8.78	$6.96	$0.00	$49.83
4	70	$36.72	$8.78	$6.96	$0.00	$52.46
5	80	$41.96	$8.78	$6.96	$0.00	$57.70

Notes:

Steps 1-2 are 6 mos.; Steps 3-5 are 1 year

Apprentice to Journeyworker Ratio:1:1

ELEVATOR CONSTRUCTOR HELPER *ELEVATOR CONSTRUCTORS LOCAL 4*	01/01/2012	$38.59	$8.78	$6.96	$0.00	$54.33
FENCE & GUARD RAIL ERECTOR *LABORERS - ZONE 2*	06/01/2013	$30.10	$7.10	$11.80	$0.00	$49.00
	12/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	06/01/2014	$31.10	$7.10	$11.80	$0.00	$50.00
	12/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	06/01/2015	$32.10	$7.10	$11.80	$0.00	$51.00
	12/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	06/01/2016	$33.10	$7.10	$11.80	$0.00	$52.00
	12/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75
For apprentice rates see "Apprentice- LABORER"						
FIELD ENG.INST.PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	05/01/2013	$38.50	$10.00	$13.02	$0.00	$61.52
	11/01/2013	$39.26	$10.00	$13.02	$0.00	$62.28
	05/01/2014	$40.03	$10.00	$13.02	$0.00	$63.05
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.PARTY CHIEF-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	05/01/2013	$39.91	$10.00	$13.02	$0.00	$62.93
	11/01/2013	$40.68	$10.00	$13.02	$0.00	$63.70
	05/01/2014	$41.45	$10.00	$13.02	$0.00	$64.47
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIELD ENG.ROD PERSON-BLDG,SITE,HVY/HWY *OPERATING ENGINEERS LOCAL 4*	05/01/2013	$21.17	$10.00	$13.02	$0.00	$44.19
	11/01/2013	$21.63	$10.00	$13.02	$0.00	$44.65
	05/01/2014	$22.08	$10.00	$13.02	$0.00	$45.10
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FIRE ALARM INSTALLER *ELECTRICIANS LOCAL 103*	03/01/2013	$43.52	$13.00	$14.16	$0.00	$70.68
	09/01/2013	$44.20	$13.00	$14.18	$0.00	$71.38
	03/01/2014	$44.92	$13.00	$14.20	$0.00	$72.12
	09/01/2014	$45.60	$13.00	$14.22	$0.00	$72.82
	03/01/2015	$46.32	$13.00	$14.24	$0.00	$73.56
	09/01/2015	$47.27	$13.00	$14.27	$0.00	$74.54
	03/01/2016	$48.23	$13.00	$14.30	$0.00	$75.53
For apprentice rates see "Apprentice- ELECTRICIAN"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
FIRE ALARM REPAIR / MAINTENANCE / COMMISSIONING *ELECTRICIANS LOCAL 103*	03/01/2013	$32.64	$13.00	$12.51	$0.00	$58.15
	09/01/2013	$33.15	$13.00	$12.52	$0.00	$58.67
	03/01/2014	$33.69	$13.00	$12.54	$0.00	$59.23
	09/01/2014	$34.20	$13.00	$12.56	$0.00	$59.76
	03/01/2015	$34.74	$13.00	$12.57	$0.00	$60.31
	09/01/2015	$35.45	$13.00	$12.59	$0.00	$61.04
	03/01/2016	$36.17	$13.00	$12.62	$0.00	$61.79
For apprentice rates see "Apprentice- TELECOMMUNICATIONS TECHNICIAN"						
FIREMAN (ASST. ENGINEER) *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$33.73	$10.00	$13.55	$0.00	$57.28
	12/01/2013	$34.39	$10.00	$13.55	$0.00	$57.94
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
FLAGGER & SIGNALER *LABORERS - ZONE 2*	06/01/2013	$20.50	$7.10	$11.80	$0.00	$39.40
	12/01/2013	$20.50	$7.10	$11.80	$0.00	$39.40
	06/01/2014	$20.50	$7.10	$11.80	$0.00	$39.40
	12/01/2014	$20.50	$7.10	$11.80	$0.00	$39.40
	06/01/2015	$20.50	$7.10	$11.80	$0.00	$39.40
	12/01/2015	$20.50	$7.10	$11.80	$0.00	$39.40
	06/01/2016	$20.50	$7.10	$11.80	$0.00	$39.40
	12/01/2016	$20.50	$7.10	$11.80	$0.00	$39.40
For apprentice rates see "Apprentice- LABORER"						
FLOORCOVERER *FLOORCOVERERS LOCAL 2168 ZONE I*	03/01/2013	$38.61	$9.80	$16.71	$0.00	$65.12
	09/01/2013	$38.61	$9.80	$16.71	$0.00	$65.12
	03/01/2014	$38.61	$9.80	$16.71	$0.00	$65.12

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *FLOORCOVERER - Local 2168 Zone I*

Effective Date - 03/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.31	$9.80	$1.79	$0.00	$30.90
2	55	$21.24	$9.80	$1.79	$0.00	$32.83
3	60	$23.17	$9.80	$11.34	$0.00	$44.31
4	65	$25.10	$9.80	$11.34	$0.00	$46.24
5	70	$27.03	$9.80	$13.13	$0.00	$49.96
6	75	$28.96	$9.80	$13.13	$0.00	$51.89
7	80	$30.89	$9.80	$14.92	$0.00	$55.61
8	85	$32.82	$9.80	$14.92	$0.00	$57.54

Effective Date - 09/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.31	$9.80	$1.79	$0.00	$30.90
2	55	$21.24	$9.80	$1.79	$0.00	$32.83
3	60	$23.17	$9.80	$11.34	$0.00	$44.31
4	65	$25.10	$9.80	$11.34	$0.00	$46.24
5	70	$27.03	$9.80	$13.13	$0.00	$49.96
6	75	$28.96	$9.80	$13.13	$0.00	$51.89
7	80	$30.89	$9.80	$14.92	$0.00	$55.61
8	85	$32.82	$9.80	$14.92	$0.00	$57.54

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

FORK LIFT/CHERRY PICKER *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$40.34	$10.00	$13.55	$0.00	$63.89
	12/01/2013	$41.12	$10.00	$13.55	$0.00	$64.67
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GENERATOR/LIGHTING PLANT/HEATERS *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$28.19	$10.00	$13.55	$0.00	$51.74
	12/01/2013	$28.74	$10.00	$13.55	$0.00	$52.29
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
GLAZIER (GLASS PLANK/AIR BARRIER/INTERIOR SYSTEMS) *GLAZIERS LOCAL 35 (ZONE 2)*	01/01/2013	$35.51	$7.80	$14.60	$0.00	$57.91

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *GLAZIER - Local 35 Zone 2*

Effective Date - 01/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$17.76	$7.80	$0.00	$0.00	$25.56
2	55	$19.53	$7.80	$3.25	$0.00	$30.58
3	60	$21.31	$7.80	$3.54	$0.00	$32.65
4	65	$23.08	$7.80	$3.84	$0.00	$34.72
5	70	$24.86	$7.80	$12.83	$0.00	$45.49
6	75	$26.63	$7.80	$13.13	$0.00	$47.56
7	80	$28.41	$7.80	$13.42	$0.00	$49.63
8	90	$31.96	$7.80	$14.01	$0.00	$53.77

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

HOISTING ENGINEER/CRANES/GRADALLS *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$40.34	$10.00	$13.55	$0.00	$63.89
	12/01/2013	$41.12	$10.00	$13.55	$0.00	$64.67

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *OPERATING ENGINEERS - Local 4*

Effective Date - 06/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$22.19	$10.00	$0.00	$0.00	$32.19
2	60	$24.20	$10.00	$13.55	$0.00	$47.75
3	65	$26.22	$10.00	$13.55	$0.00	$49.77
4	70	$28.24	$10.00	$13.55	$0.00	$51.79
5	75	$30.26	$10.00	$13.55	$0.00	$53.81
6	80	$32.27	$10.00	$13.55	$0.00	$55.82
7	85	$34.29	$10.00	$13.55	$0.00	$57.84
8	90	$36.31	$10.00	$13.55	$0.00	$59.86

Effective Date - 12/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$22.62	$10.00	$0.00	$0.00	$32.62
2	60	$24.67	$10.00	$13.55	$0.00	$48.22
3	65	$26.73	$10.00	$13.55	$0.00	$50.28
4	70	$28.78	$10.00	$13.55	$0.00	$52.33
5	75	$30.84	$10.00	$13.55	$0.00	$54.39
6	80	$32.90	$10.00	$13.55	$0.00	$56.45
7	85	$34.95	$10.00	$13.55	$0.00	$58.50
8	90	$37.01	$10.00	$13.55	$0.00	$60.56

Notes:

Apprentice to Journeyworker Ratio:1:6

HVAC (DUCTWORK) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2013	$42.32	$9.82	$18.24	$2.11	$72.49
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (ELECTRICAL CONTROLS) *ELECTRICIANS LOCAL 103*	03/01/2013	$43.52	$13.00	$14.16	$0.00	$70.68
	09/01/2013	$44.20	$13.00	$14.18	$0.00	$71.38
	03/01/2014	$44.92	$13.00	$14.20	$0.00	$72.12
	09/01/2014	$45.60	$13.00	$14.22	$0.00	$72.82
	03/01/2015	$46.32	$13.00	$14.24	$0.00	$73.56
	09/01/2015	$47.27	$13.00	$14.27	$0.00	$74.54
	03/01/2016	$48.23	$13.00	$14.30	$0.00	$75.53
For apprentice rates see "Apprentice- ELECTRICIAN"						
HVAC (TESTING AND BALANCING - AIR) *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2013	$42.32	$9.82	$18.24	$2.11	$72.49
For apprentice rates see "Apprentice- SHEET METAL WORKER"						
HVAC (TESTING AND BALANCING -WATER) *PIPEFITTERS LOCAL 537*	03/01/2013	$49.34	$8.75	$14.39	$0.00	$72.48
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HVAC MECHANIC *PIPEFITTERS LOCAL 537*	03/01/2013	$49.34	$8.75	$14.39	$0.00	$72.48

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
HYDRAULIC DRILLS *LABORERS - ZONE 2*	06/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	12/01/2013	$31.10	$7.10	$11.80	$0.00	$50.00
	06/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	12/01/2014	$32.10	$7.10	$11.80	$0.00	$51.00
	06/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	12/01/2015	$33.10	$7.10	$11.80	$0.00	$52.00
	06/01/2016	$33.60	$7.10	$11.80	$0.00	$52.50
	12/01/2016	$34.35	$7.10	$11.80	$0.00	$53.25
For apprentice rates see "Apprentice- LABORER"						
INSULATOR (PIPES & TANKS) *HEAT & FROST INSULATORS LOCAL 6 (BOSTON)*	09/01/2012	$41.46	$10.65	$11.50	$0.00	$63.61
	09/01/2013	$43.06	$10.65	$11.50	$0.00	$65.21
	09/01/2014	$45.06	$10.65	$11.50	$0.00	$67.21

Apprentice - *ASBESTOS INSULATOR (Pipes & Tanks) - Local 6 Boston*

Effective Date - 09/01/2012

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.73	$10.65	$8.60	$0.00	$39.98
2	60	$24.88	$10.65	$9.18	$0.00	$44.71
3	70	$29.02	$10.65	$9.76	$0.00	$49.43
4	80	$33.17	$10.65	$10.34	$0.00	$54.16

Effective Date - 09/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.53	$10.65	$8.60	$0.00	$40.78
2	60	$25.84	$10.65	$9.18	$0.00	$45.67
3	70	$30.14	$10.65	$9.76	$0.00	$50.55
4	80	$34.45	$10.65	$10.34	$0.00	$55.44

Notes:

Steps are 1 year

Apprentice to Journeyworker Ratio:1:4

IRONWORKER/WELDER *IRONWORKERS LOCAL 7 (LAWRENCE AREA)*	03/16/2013	$35.82	$7.70	$18.35	$0.00	$61.87

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *IRONWORKER - Local 7 Lawrence*

Effective Date - 03/16/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$21.49	$7.70	$18.35	$0.00	$47.54
2	70	$25.07	$7.70	$18.35	$0.00	$51.12
3	75	$26.87	$7.70	$18.35	$0.00	$52.92
4	80	$28.66	$7.70	$18.35	$0.00	$54.71
5	85	$30.45	$7.70	$18.35	$0.00	$56.50
6	90	$32.24	$7.70	$18.35	$0.00	$58.29

Notes:

Structural 1:6; Ornamental 1:4

Apprentice to Journeyworker Ratio:

JACKHAMMER & PAVING BREAKER OPERATOR *LABORERS - ZONE 2*	06/01/2013	$30.10	$7.10	$11.80	$0.00	$49.00
	12/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	06/01/2014	$31.10	$7.10	$11.80	$0.00	$50.00
	12/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	06/01/2015	$32.10	$7.10	$11.80	$0.00	$51.00
	12/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	06/01/2016	$33.10	$7.10	$11.80	$0.00	$52.00
	12/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75

For apprentice rates see "Apprentice- LABORER"

LABORER *LABORERS - ZONE 2*	06/01/2013	$29.85	$7.10	$11.80	$0.00	$48.75
	12/01/2013	$30.35	$7.10	$11.80	$0.00	$49.25
	06/01/2014	$30.85	$7.10	$11.80	$0.00	$49.75
	12/01/2014	$31.35	$7.10	$11.80	$0.00	$50.25
	06/01/2015	$31.85	$7.10	$11.80	$0.00	$50.75
	12/01/2015	$32.35	$7.10	$11.80	$0.00	$51.25
	06/01/2016	$32.85	$7.10	$11.80	$0.00	$51.75
	12/01/2016	$33.60	$7.10	$11.80	$0.00	$52.50

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *LABORER - Zone 2*

Effective Date - 06/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$17.91	$7.10	$11.80	$0.00	$36.81
2	70	$20.90	$7.10	$11.80	$0.00	$39.80
3	80	$23.88	$7.10	$11.80	$0.00	$42.78
4	90	$26.87	$7.10	$11.80	$0.00	$45.77

Effective Date - 12/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$18.21	$7.10	$11.80	$0.00	$37.11
2	70	$21.25	$7.10	$11.80	$0.00	$40.15
3	80	$24.28	$7.10	$11.80	$0.00	$43.18
4	90	$27.32	$7.10	$11.80	$0.00	$46.22

Notes:

Apprentice to Journeyworker Ratio:1:5

LABORER: CARPENTER TENDER *LABORERS - ZONE 2*	06/01/2013	$29.85	$7.10	$11.80	$0.00	$48.75
	12/01/2013	$30.35	$7.10	$11.80	$0.00	$49.25
	06/01/2014	$30.85	$7.10	$11.80	$0.00	$49.75
	12/01/2014	$31.35	$7.10	$11.80	$0.00	$50.25
	06/01/2015	$31.85	$7.10	$11.80	$0.00	$50.75
	12/01/2015	$32.35	$7.10	$11.80	$0.00	$51.25
	06/01/2016	$32.85	$7.10	$11.80	$0.00	$51.75
	12/01/2016	$33.60	$7.10	$11.80	$0.00	$52.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: CEMENT FINISHER TENDER *LABORERS - ZONE 2*	06/01/2013	$29.85	$7.10	$11.80	$0.00	$48.75
	12/01/2013	$30.35	$7.10	$11.80	$0.00	$49.25
	06/01/2014	$30.85	$7.10	$11.80	$0.00	$49.75
	12/01/2014	$31.35	$7.10	$11.80	$0.00	$50.25
	06/01/2015	$31.85	$7.10	$11.80	$0.00	$50.75
	12/01/2015	$32.35	$7.10	$11.80	$0.00	$51.25
	06/01/2016	$32.85	$7.10	$11.80	$0.00	$51.75
	12/01/2016	$33.60	$7.10	$11.80	$0.00	$52.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: HAZARDOUS WASTE/ASBESTOS REMOVER *LABORERS - ZONE 2*	12/01/2011	$29.35	$7.10	$11.55	$0.00	$48.00
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
LABORER: MASON TENDER *LABORERS - ZONE 2*	06/01/2013	$30.10	$7.10	$11.80	$0.00	$49.00
	12/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	06/01/2014	$31.10	$7.10	$11.80	$0.00	$50.00
	12/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	06/01/2015	$32.10	$7.10	$11.80	$0.00	$51.00
	12/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	06/01/2016	$33.10	$7.10	$11.80	$0.00	$52.00
	12/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75
For apprentice rates see "Apprentice- LABORER"						
LABORER: MULTI-TRADE TENDER *LABORERS - ZONE 2*	06/01/2013	$29.85	$7.10	$11.80	$0.00	$48.75
	12/01/2013	$30.35	$7.10	$11.80	$0.00	$49.25
	06/01/2014	$30.85	$7.10	$11.80	$0.00	$49.75
	12/01/2014	$31.35	$7.10	$11.80	$0.00	$50.25
	06/01/2015	$31.85	$7.10	$11.80	$0.00	$50.75
	12/01/2015	$32.35	$7.10	$11.80	$0.00	$51.25
	06/01/2016	$32.85	$7.10	$11.80	$0.00	$51.75
	12/01/2016	$33.60	$7.10	$11.80	$0.00	$52.50
For apprentice rates see "Apprentice- LABORER"						
LABORER: TREE REMOVER *LABORERS - ZONE 2*	06/01/2013	$29.85	$7.10	$11.80	$0.00	$48.75
	12/01/2013	$30.35	$7.10	$11.80	$0.00	$49.25
	06/01/2014	$30.85	$7.10	$11.80	$0.00	$49.75
	12/01/2014	$31.35	$7.10	$11.80	$0.00	$50.25
	06/01/2015	$31.85	$7.10	$11.80	$0.00	$50.75
	12/01/2015	$32.35	$7.10	$11.80	$0.00	$51.25
	06/01/2016	$32.85	$7.10	$11.80	$0.00	$51.75
	12/01/2016	$33.60	$7.10	$11.80	$0.00	$52.50
This classification applies to the wholesale removal of standing trees including all associated trimming of branches and limbs, and applies to the removal of branches at locations not on or around utility lines. For apprentice rates see "Apprentice- LABORER"						
LASER BEAM OPERATOR *LABORERS - ZONE 2*	06/01/2013	$30.10	$7.10	$11.80	$0.00	$49.00
	12/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	06/01/2014	$31.10	$7.10	$11.80	$0.00	$50.00
	12/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	06/01/2015	$32.10	$7.10	$11.80	$0.00	$51.00
	12/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	06/01/2016	$33.10	$7.10	$11.80	$0.00	$52.00
	12/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75
For apprentice rates see "Apprentice- LABORER"						
MARBLE & TILE FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	08/01/2013	$36.66	$10.18	$16.83	$0.00	$63.67
	02/01/2014	$37.11	$10.18	$16.83	$0.00	$64.12
	08/01/2014	$37.82	$10.18	$16.90	$0.00	$64.90
	02/01/2015	$38.27	$10.18	$16.90	$0.00	$65.35
	08/01/2015	$38.98	$10.18	$16.97	$0.00	$66.13
	02/01/2016	$39.43	$10.18	$16.97	$0.00	$66.58
	08/01/2016	$40.13	$10.18	$17.05	$0.00	$67.36
	02/01/2017	$40.59	$10.18	$17.05	$0.00	$67.82

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MARBLE & TILE FINISHER - Local 3 Marble & Tile*

Effective Date - 08/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$18.33	$10.18	$16.83	$0.00	$45.34
2	60	$22.00	$10.18	$16.83	$0.00	$49.01
3	70	$25.66	$10.18	$16.83	$0.00	$52.67
4	80	$29.33	$10.18	$16.83	$0.00	$56.34
5	90	$32.99	$10.18	$16.83	$0.00	$60.00

Effective Date - 02/01/2014

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$18.56	$10.18	$16.83	$0.00	$45.57
2	60	$22.27	$10.18	$16.83	$0.00	$49.28
3	70	$25.98	$10.18	$16.83	$0.00	$52.99
4	80	$29.69	$10.18	$16.83	$0.00	$56.70
5	90	$33.40	$10.18	$16.83	$0.00	$60.41

Notes:

Apprentice to Journeyworker Ratio:1:3

MARBLE MASONS,TILELAYERS & TERRAZZO MECH *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	08/01/2013	$48.10	$10.18	$18.15	$0.00	$76.43
	02/01/2014	$48.66	$10.18	$18.15	$0.00	$76.99
	08/01/2014	$49.56	$10.18	$18.22	$0.00	$77.96
	02/01/2015	$50.12	$10.18	$18.22	$0.00	$78.52
	08/01/2015	$51.02	$10.18	$18.29	$0.00	$79.49
	02/01/2016	$51.59	$10.18	$18.29	$0.00	$80.06
	08/01/2016	$52.49	$10.18	$18.37	$0.00	$81.04
	02/01/2017	$53.06	$10.18	$18.37	$0.00	$81.61

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MARBLE-TILE-TERRAZZO MECHANIC - Local 3 Marble & Tile*

Effective Date - 08/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.05	$10.18	$18.15	$0.00	$52.38
2	60	$28.86	$10.18	$18.15	$0.00	$57.19
3	70	$33.67	$10.18	$18.15	$0.00	$62.00
4	80	$38.48	$10.18	$18.15	$0.00	$66.81
5	90	$43.29	$10.18	$18.15	$0.00	$71.62

Effective Date - 02/01/2014

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$24.33	$10.18	$18.15	$0.00	$52.66
2	60	$29.20	$10.18	$18.15	$0.00	$57.53
3	70	$34.06	$10.18	$18.15	$0.00	$62.39
4	80	$38.93	$10.18	$18.15	$0.00	$67.26
5	90	$43.79	$10.18	$18.15	$0.00	$72.12

Notes:

Apprentice to Journeyworker Ratio:1:5

MECH. SWEEPER OPERATOR (ON CONST. SITES) *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$39.96	$10.00	$13.55	$0.00	$63.51
	12/01/2013	$40.74	$10.00	$13.55	$0.00	$64.29
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MECHANICS MAINTENANCE *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$39.96	$10.00	$13.55	$0.00	$63.51
	12/01/2013	$40.74	$10.00	$13.55	$0.00	$64.29
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
MILLWRIGHT (Zone 2) *MILLWRIGHTS LOCAL 1121 - Zone 2*	04/01/2013	$32.47	$9.80	$15.76	$0.00	$58.03
	10/01/2013	$33.06	$9.80	$15.76	$0.00	$58.62
	04/01/2014	$33.66	$9.80	$15.76	$0.00	$59.22
	10/01/2014	$34.42	$9.80	$15.76	$0.00	$59.98
	04/01/2015	$35.19	$9.80	$15.76	$0.00	$60.75

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *MILLWRIGHT - Local 1121 Zone 2*

Effective Date - 04/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$17.86	$9.80	$4.32	$0.00	$31.98
2	65	$21.11	$9.80	$13.01	$0.00	$43.92
3	75	$24.35	$9.80	$13.80	$0.00	$47.95
4	85	$27.60	$9.80	$14.58	$0.00	$51.98

Effective Date - 10/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	55	$18.18	$9.80	$4.32	$0.00	$32.30
2	65	$21.49	$9.80	$13.01	$0.00	$44.30
3	75	$24.80	$9.80	$13.80	$0.00	$48.40
4	85	$28.10	$9.80	$14.58	$0.00	$52.48

Notes:

Steps are 2,000 hours

Apprentice to Journeyworker Ratio:1:5

MORTAR MIXER *LABORERS - ZONE 2*	06/01/2013	$30.10	$7.10	$11.80	$0.00	$49.00
	12/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	06/01/2014	$31.10	$7.10	$11.80	$0.00	$50.00
	12/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	06/01/2015	$32.10	$7.10	$11.80	$0.00	$51.00
	12/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	06/01/2016	$33.10	$7.10	$11.80	$0.00	$52.00
	12/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75
For apprentice rates see "Apprentice- LABORER"						
OILER (OTHER THAN TRUCK CRANES,GRADALLS) *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$21.17	$10.00	$13.55	$0.00	$44.72
	12/01/2013	$21.59	$10.00	$13.55	$0.00	$45.14
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OILER (TRUCK CRANES, GRADALLS) *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$24.57	$10.00	$13.55	$0.00	$48.12
	12/01/2013	$25.06	$10.00	$13.55	$0.00	$48.61
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
OTHER POWER DRIVEN EQUIPMENT - CLASS II *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$39.96	$10.00	$13.55	$0.00	$63.51
	12/01/2013	$40.74	$10.00	$13.55	$0.00	$64.29
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PAINTER (BRIDGES/TANKS) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2013	$45.01	$7.80	$15.60	$0.00	$68.41

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 - BRIDGES/TANKS*

Effective Date - 01/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$22.51	$7.80	$0.00	$0.00	$30.31
2	55	$24.76	$7.80	$3.52	$0.00	$36.08
3	60	$27.01	$7.80	$3.84	$0.00	$38.65
4	65	$29.26	$7.80	$4.16	$0.00	$41.22
5	70	$31.51	$7.80	$13.68	$0.00	$52.99
6	75	$33.76	$7.80	$14.00	$0.00	$55.56
7	80	$36.01	$7.80	$14.32	$0.00	$58.13
8	90	$40.51	$7.80	$14.96	$0.00	$63.27

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, NEW) *	01/01/2013	$35.91	$7.80	$15.60	$0.00	$59.31

* If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 2*

Apprentice - *PAINTER Local 35 Zone 2 - Spray/Sandblast - New*

Effective Date - 01/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$17.96	$7.80	$0.00	$0.00	$25.76
2	55	$19.75	$7.80	$3.52	$0.00	$31.07
3	60	$21.55	$7.80	$3.84	$0.00	$33.19
4	65	$23.34	$7.80	$4.16	$0.00	$35.30
5	70	$25.14	$7.80	$13.68	$0.00	$46.62
6	75	$26.93	$7.80	$14.00	$0.00	$48.73
7	80	$28.73	$7.80	$14.32	$0.00	$50.85
8	90	$32.32	$7.80	$14.96	$0.00	$55.08

Notes:

Apprentice to Journeyworker Ratio:1:1

PAINTER (SPRAY OR SANDBLAST, REPAINT)	01/01/2013	$33.97	$7.80	$15.60	$0.00	$57.37

PAINTERS LOCAL 35 - ZONE 2

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PAINTER Local 35 Zone 2 - Spray/Sandblast - Repaint*

Effective Date - 01/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$16.99	$7.80	$0.00	$0.00	$24.79
2	55	$18.68	$7.80	$3.52	$0.00	$30.00
3	60	$20.38	$7.80	$3.84	$0.00	$32.02
4	65	$22.08	$7.80	$4.16	$0.00	$34.04
5	70	$23.78	$7.80	$13.68	$0.00	$45.26
6	75	$25.48	$7.80	$14.00	$0.00	$47.28
7	80	$27.18	$7.80	$14.32	$0.00	$49.30
8	90	$30.57	$7.80	$14.96	$0.00	$53.33

Notes:

Apprentice to Journeyworker Ratio:1:1

PAINTER (TRAFFIC MARKINGS) *LABORERS - ZONE 2*	06/01/2013	$29.85	$7.10	$11.80	$0.00	$48.75
	12/01/2013	$30.35	$7.10	$11.80	$0.00	$49.25
	06/01/2014	$30.85	$7.10	$11.80	$0.00	$49.75
	12/01/2014	$31.35	$7.10	$11.80	$0.00	$50.25
	06/01/2015	$31.85	$7.10	$11.80	$0.00	$50.75
	12/01/2015	$32.35	$7.10	$11.80	$0.00	$51.25
	06/01/2016	$32.85	$7.10	$11.80	$0.00	$51.75
	12/01/2016	$33.60	$7.10	$11.80	$0.00	$52.50
For Apprentice rates see "Apprentice- LABORER"						
PAINTER / TAPER (BRUSH, NEW) * * If 30% or more of surfaces to be painted are new construction, NEW paint rate shall be used.*PAINTERS LOCAL 35 - ZONE 2*	01/01/2013	$34.51	$7.80	$15.60	$0.00	$57.91

Apprentice - *PAINTER - Local 35 Zone 2 - BRUSH NEW*

Effective Date - 01/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$17.26	$7.80	$0.00	$0.00	$25.06
2	55	$18.98	$7.80	$3.52	$0.00	$30.30
3	60	$20.71	$7.80	$3.84	$0.00	$32.35
4	65	$22.43	$7.80	$4.16	$0.00	$34.39
5	70	$24.16	$7.80	$13.68	$0.00	$45.64
6	75	$25.88	$7.80	$14.00	$0.00	$47.68
7	80	$27.61	$7.80	$14.32	$0.00	$49.73
8	90	$31.06	$7.80	$14.96	$0.00	$53.82

Notes:

Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PAINTER / TAPER (BRUSH, REPAINT) *PAINTERS LOCAL 35 - ZONE 2*	01/01/2013	$32.57	$7.80	$15.60	$0.00	$55.97

Apprentice - *PAINTER Local 35 Zone 2 - BRUSH REPAINT*

Effective Date - 01/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$16.29	$7.80	$0.00	$0.00	$24.09
2	55	$17.91	$7.80	$3.52	$0.00	$29.23
3	60	$19.54	$7.80	$3.84	$0.00	$31.18
4	65	$21.17	$7.80	$4.16	$0.00	$33.13
5	70	$22.80	$7.80	$13.68	$0.00	$44.28
6	75	$24.43	$7.80	$14.00	$0.00	$46.23
7	80	$26.06	$7.80	$14.32	$0.00	$48.18
8	90	$29.31	$7.80	$14.96	$0.00	$52.07

Notes:
Steps are 750 hrs.

Apprentice to Journeyworker Ratio:1:1

PANEL & PICKUP TRUCKS DRIVER *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2012	$30.28	$9.07	$8.00	$0.00	$47.35
PIER AND DOCK CONSTRUCTOR (UNDERPINNING AND DECK) *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2013	$40.70	$9.80	$17.67	$0.00	$68.17
	08/01/2014	$42.20	$9.80	$17.67	$0.00	$69.67
	08/01/2015	$43.70	$9.80	$17.67	$0.00	$71.17
PILE DRIVER *PILE DRIVER LOCAL 56 (ZONE 1)*	08/01/2013	$40.70	$9.80	$17.67	$0.00	$68.17
	08/01/2014	$42.20	$9.80	$17.67	$0.00	$69.67
	08/01/2015	$43.70	$9.80	$17.67	$0.00	$71.17

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *PILE DRIVER - Local 56 Zone 1*

Effective Date - 08/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$20.35	$9.80	$17.67	$0.00	$47.82
2	60	$24.42	$9.80	$17.67	$0.00	$51.89
3	70	$28.49	$9.80	$17.67	$0.00	$55.96
4	75	$30.53	$9.80	$17.67	$0.00	$58.00
5	80	$32.56	$9.80	$17.67	$0.00	$60.03
6	80	$32.56	$9.80	$17.67	$0.00	$60.03
7	90	$36.63	$9.80	$17.67	$0.00	$64.10
8	90	$36.63	$9.80	$17.67	$0.00	$64.10

Effective Date - 08/01/2014

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$21.10	$9.80	$17.67	$0.00	$48.57
2	60	$25.32	$9.80	$17.67	$0.00	$52.79
3	70	$29.54	$9.80	$17.67	$0.00	$57.01
4	75	$31.65	$9.80	$17.67	$0.00	$59.12
5	80	$33.76	$9.80	$17.67	$0.00	$61.23
6	80	$33.76	$9.80	$17.67	$0.00	$61.23
7	90	$37.98	$9.80	$17.67	$0.00	$65.45
8	90	$37.98	$9.80	$17.67	$0.00	$65.45

Notes:

Apprentice to Journeyworker Ratio:1:3

PIPEFITTER & STEAMFITTER *PIPEFITTERS LOCAL 537*	03/01/2013	$49.34	$8.75	$14.39	$0.00	$72.48

Apprentice - *PIPEFITTER - Local 537*

Effective Date - 03/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$19.74	$8.75	$6.50	$0.00	$34.99
2	45	$22.20	$8.75	$14.39	$0.00	$45.34
3	60	$29.60	$8.75	$14.39	$0.00	$52.74
4	70	$34.54	$8.75	$14.39	$0.00	$57.68
5	80	$39.47	$8.75	$14.39	$0.00	$62.61

Notes:

** 1:3; 3:15; 1:10 thereafter / Steps are 1 yr.
Refrig/AC Mechanic **1:1;1:2;2:4;3:6;4:8;5:10;6:12;7:14;8:17;9:20;10:23(Max)

Apprentice to Journeyworker Ratio:**

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
PIPELAYER *LABORERS - ZONE 2*	06/01/2013	$30.10	$7.10	$11.80	$0.00	$49.00
	12/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	06/01/2014	$31.10	$7.10	$11.80	$0.00	$50.00
	12/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	06/01/2015	$32.10	$7.10	$11.80	$0.00	$51.00
	12/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	06/01/2016	$33.10	$7.10	$11.80	$0.00	$52.00
	12/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75
For apprentice rates see "Apprentice- LABORER"						
PLUMBERS & GASFITTERS *PLUMBERS & GASFITTERS LOCAL 12*	03/01/2013	$49.31	$9.32	$13.29	$0.00	$71.92

Apprentice - *PLUMBER/GASFITTER - Local 12*

Effective Date - 03/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$17.26	$9.32	$4.97	$0.00	$31.55
2	40	$19.72	$9.32	$5.61	$0.00	$34.65
3	55	$27.12	$9.32	$7.53	$0.00	$43.97
4	65	$32.05	$9.32	$8.81	$0.00	$50.18
5	75	$36.98	$9.32	$10.09	$0.00	$56.39

Notes:

** 1:2; 2:6; 3:10; 4:14; 5:19/Steps are 1 yr
Step4 with lic$53.29 Step5 with lic$59.49

Apprentice to Journeyworker Ratio:**

PNEUMATIC CONTROLS (TEMP.) *PIPEFITTERS LOCAL 537*	03/01/2013	$49.34	$8.75	$14.39	$0.00	$72.48
For apprentice rates see "Apprentice- PIPEFITTER" or "PLUMBER/PIPEFITTER"						
PNEUMATIC DRILL/TOOL OPERATOR *LABORERS - ZONE 2*	06/01/2013	$30.10	$7.10	$11.80	$0.00	$49.00
	12/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	06/01/2014	$31.10	$7.10	$11.80	$0.00	$50.00
	12/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	06/01/2015	$32.10	$7.10	$11.80	$0.00	$51.00
	12/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	06/01/2016	$33.10	$7.10	$11.80	$0.00	$52.00
	12/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75
For apprentice rates see "Apprentice- LABORER"						
POWDERMAN & BLASTER *LABORERS - ZONE 2*	06/01/2013	$30.85	$7.10	$11.80	$0.00	$49.75
	12/01/2013	$31.35	$7.10	$11.80	$0.00	$50.25
	06/01/2014	$31.85	$7.10	$11.80	$0.00	$50.75
	12/01/2014	$32.35	$7.10	$11.80	$0.00	$51.25
	06/01/2015	$32.85	$7.10	$11.80	$0.00	$51.75
	12/01/2015	$33.35	$7.10	$11.80	$0.00	$52.25
	06/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75
	12/01/2016	$34.60	$7.10	$11.80	$0.00	$53.50
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
POWER SHOVEL/DERRICK/TRENCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$40.34	$10.00	$13.55	$0.00	$63.89
	12/01/2013	$41.12	$10.00	$13.55	$0.00	$64.67
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (CONCRETE) *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$40.34	$10.00	$13.55	$0.00	$63.89
	12/01/2013	$41.12	$10.00	$13.55	$0.00	$64.67
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
PUMP OPERATOR (DEWATERING, OTHER) *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$28.19	$10.00	$13.55	$0.00	$51.74
	12/01/2013	$28.74	$10.00	$13.55	$0.00	$52.29
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
READY-MIX CONCRETE DRIVER *TEAMSTERS LOCAL 170*	05/01/2010	$22.04	$6.50	$5.44	$0.00	$33.98
RECLAIMERS *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$39.96	$10.00	$13.55	$0.00	$63.51
	12/01/2013	$40.74	$10.00	$13.55	$0.00	$64.29
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
RESIDENTIAL WOOD FRAME (All Other Work) *CARPENTERS -ZONE 2 (Residential Wood)*	04/01/2011	$24.24	$8.67	$15.51	$0.00	$48.42
RESIDENTIAL WOOD FRAME CARPENTER ** ** The Residential Wood Frame Carpenter classification applies only to the construction of new, wood frame residences that do not exceed four stories including the basement.*CARPENTERS -ZONE 2 (Residential Wood)*	05/01/2011	$24.24	$6.34	$6.23	$0.00	$36.81

As of 9/1/09 Carpentry work on wood-frame residential WEATHERIZATION projects shall be paid the RESIDENTIAL WOOD FRAME CARPENTER rate.

Apprentice - *CARPENTER (Residential Wood Frame) - Zone 2*

Effective Date - 05/01/2011

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$14.54	$6.34	$0.00	$0.00	$20.88
2	60	$14.54	$6.34	$6.23	$0.00	$27.11
3	65	$15.76	$6.34	$6.23	$0.00	$28.33
4	70	$16.97	$6.34	$6.23	$0.00	$29.54
5	75	$18.18	$6.34	$6.23	$0.00	$30.75
6	80	$19.39	$6.34	$6.23	$0.00	$31.96
7	85	$20.60	$6.34	$6.23	$0.00	$33.17
8	90	$21.82	$6.34	$6.23	$0.00	$34.39

Notes:

Apprentice to Journeyworker Ratio:1:5

RIDE-ON MOTORIZED BUGGY OPERATOR *LABORERS - ZONE 2*	06/01/2013	$30.10	$7.10	$11.80	$0.00	$49.00
	12/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	06/01/2014	$31.10	$7.10	$11.80	$0.00	$50.00
	12/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	06/01/2015	$32.10	$7.10	$11.80	$0.00	$51.00
	12/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	06/01/2016	$33.10	$7.10	$11.80	$0.00	$52.00
	12/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
ROLLER/SPREADER/MULCHING MACHINE *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$39.96	$10.00	$13.55	$0.00	$63.51
	12/01/2013	$40.74	$10.00	$13.55	$0.00	$64.29
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
ROOFER (Inc.Roofer Waterproofng &Roofer Damproofg) *ROOFERS LOCAL 33*	08/01/2013	$38.31	$10.50	$10.70	$0.00	$59.51
	02/01/2014	$39.21	$10.50	$10.70	$0.00	$60.41
	08/01/2014	$40.11	$10.50	$10.70	$0.00	$61.31
	02/01/2015	$41.01	$10.50	$10.70	$0.00	$62.21
	08/01/2015	$41.91	$10.50	$10.70	$0.00	$63.11
	02/01/2016	$42.81	$10.50	$10.70	$0.00	$64.01

Apprentice - *ROOFER - Local 33*

Effective Date - 08/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.16	$10.50	$3.38	$0.00	$33.04
2	60	$22.99	$10.50	$10.70	$0.00	$44.19
3	65	$24.90	$10.50	$10.70	$0.00	$46.10
4	75	$28.73	$10.50	$10.70	$0.00	$49.93
5	85	$32.56	$10.50	$10.70	$0.00	$53.76

Effective Date - 02/01/2014

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$19.61	$10.50	$3.38	$0.00	$33.49
2	60	$23.53	$10.50	$10.70	$0.00	$44.73
3	65	$25.49	$10.50	$10.70	$0.00	$46.69
4	75	$29.41	$10.50	$10.70	$0.00	$50.61
5	85	$33.33	$10.50	$10.70	$0.00	$54.53

Notes: ** 1:5, 2:6-10, the 1:10; Reroofing: 1:4, then 1:1
Step 1 is 2000 hrs.; Steps 2-5 are 1000 hrs.

Apprentice to Journeyworker Ratio:**

ROOFER SLATE / TILE / PRECAST CONCRETE *ROOFERS LOCAL 33*	08/01/2013	$38.56	$10.50	$10.70	$0.00	$59.76
	02/01/2014	$39.46	$10.50	$10.70	$0.00	$60.66
	08/01/2014	$40.36	$10.50	$10.70	$0.00	$61.56
	02/01/2015	$41.26	$10.50	$10.70	$0.00	$62.46
	08/01/2015	$42.16	$10.50	$10.70	$0.00	$63.36
	02/01/2016	$43.06	$10.50	$10.70	$0.00	$64.26
For apprentice rates see "Apprentice- ROOFER"						
SHEETMETAL WORKER *SHEETMETAL WORKERS LOCAL 17 - A*	02/01/2013	$42.32	$9.82	$18.24	$2.11	$72.49

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SHEET METAL WORKER - Local 17-A*

Effective Date - 02/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$16.93	$9.82	$4.00	$0.00	$30.75
2	40	$16.93	$9.82	$4.00	$0.00	$30.75
3	45	$19.04	$9.82	$8.00	$1.11	$37.97
4	45	$19.04	$9.82	$8.00	$1.11	$37.97
5	50	$21.16	$9.82	$8.75	$1.19	$40.92
6	50	$21.16	$9.82	$9.00	$1.20	$41.18
7	60	$25.39	$9.82	$10.24	$1.36	$46.81
8	65	$27.51	$9.82	$10.99	$1.45	$49.77
9	75	$31.74	$9.82	$12.49	$1.62	$55.67
10	85	$35.97	$9.82	$13.49	$1.78	$61.06

Notes:
Steps are 6 mos.

Apprentice to Journeyworker Ratio:1:4

SIGN ERECTOR *PAINTERS LOCAL 35 - ZONE 2*	06/01/2013	$25.81	$7.07	$7.05	$0.00	$39.93

Apprentice - *SIGN ERECTOR - Local 35 Zone 2*

Effective Date - 06/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$12.91	$7.07	$0.00	$0.00	$19.98
2	55	$14.20	$7.07	$2.45	$0.00	$23.72
3	60	$15.49	$7.07	$2.45	$0.00	$25.01
4	65	$16.78	$7.07	$2.45	$0.00	$26.30
5	70	$18.07	$7.07	$7.05	$0.00	$32.19
6	75	$19.36	$7.07	$7.05	$0.00	$33.48
7	80	$20.65	$7.07	$7.05	$0.00	$34.77
8	85	$21.94	$7.07	$7.05	$0.00	$36.06
9	90	$23.23	$7.07	$7.05	$0.00	$37.35

Notes:
Steps are 4 mos.

Apprentice to Journeyworker Ratio:1:1

SPECIALIZED EARTH MOVING EQUIP < 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2012	$30.74	$8.91	$8.00	$0.00	$47.65
SPECIALIZED EARTH MOVING EQUIP > 35 TONS *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2012	$31.03	$8.91	$8.00	$0.00	$47.94
SPRINKLER FITTER *SPRINKLER FITTERS LOCAL 550 - (Section A)*	03/01/2013	$52.58	$8.42	$12.60	$0.00	$73.60

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *SPRINKLER FITTER - Local 550*

Effective Date - 03/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	35	$18.40	$8.42	$8.00	$0.00	$34.82
2	40	$21.03	$8.42	$8.00	$0.00	$37.45
3	45	$23.66	$8.42	$8.00	$0.00	$40.08
4	50	$26.29	$8.42	$8.00	$0.00	$42.71
5	55	$28.92	$8.42	$8.00	$0.00	$45.34
6	60	$31.55	$8.42	$8.00	$0.00	$47.97
7	65	$34.18	$8.42	$8.00	$0.00	$50.60
8	70	$36.81	$8.42	$8.00	$0.00	$53.23
9	75	$39.44	$8.42	$8.00	$0.00	$55.86
10	80	$42.06	$8.42	$8.00	$0.00	$58.48

Notes:

Steps are 850 hours

Apprentice to Journeyworker Ratio:1:1

STEAM BOILER OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$39.96	$10.00	$13.55	$0.00	$63.51
	12/01/2013	$40.74	$10.00	$13.55	$0.00	$64.29
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TAMPERS, SELF-PROPELLED OR TRACTOR DRAWN *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$39.96	$10.00	$13.55	$0.00	$63.51
	12/01/2013	$40.74	$10.00	$13.55	$0.00	$64.29
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TELECOMMUNICATION TECHNICIAN *ELECTRICIANS LOCAL 103*	03/01/2013	$32.64	$13.00	$12.51	$0.00	$58.15
	09/01/2013	$33.15	$13.00	$12.52	$0.00	$58.67
	03/01/2014	$33.69	$13.00	$12.54	$0.00	$59.23
	09/01/2014	$34.20	$13.00	$12.56	$0.00	$59.76
	03/01/2015	$34.74	$13.00	$12.57	$0.00	$60.31
	09/01/2015	$35.45	$13.00	$12.59	$0.00	$61.04
	03/01/2016	$36.17	$13.00	$12.62	$0.00	$61.79

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TELECOMMUNICATION TECHNICIAN - Local 103*

Effective Date - 03/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$13.06	$13.00	$0.39	$0.00	$26.45
2	40	$13.06	$13.00	$0.39	$0.00	$26.45
3	45	$14.69	$13.00	$9.78	$0.00	$37.47
4	45	$14.69	$13.00	$9.78	$0.00	$37.47
5	50	$16.32	$13.00	$10.03	$0.00	$39.35
6	55	$17.95	$13.00	$10.28	$0.00	$41.23
7	60	$19.58	$13.00	$10.53	$0.00	$43.11
8	65	$21.22	$13.00	$10.78	$0.00	$45.00
9	70	$22.85	$13.00	$11.03	$0.00	$46.88
10	75	$24.48	$13.00	$11.27	$0.00	$48.75

Effective Date - 09/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	40	$13.26	$13.00	$0.40	$0.00	$26.66
2	40	$13.26	$13.00	$0.40	$0.00	$26.66
3	45	$14.92	$13.00	$9.79	$0.00	$37.71
4	45	$14.92	$13.00	$9.79	$0.00	$37.71
5	50	$16.58	$13.00	$10.04	$0.00	$39.62
6	55	$18.23	$13.00	$10.29	$0.00	$41.52
7	60	$19.89	$13.00	$10.54	$0.00	$43.43
8	65	$21.55	$13.00	$10.79	$0.00	$45.34
9	70	$23.21	$13.00	$11.04	$0.00	$47.25
10	75	$24.86	$13.00	$11.29	$0.00	$49.15

Notes:

Apprentice to Journeyworker Ratio:1:1

TERRAZZO FINISHERS *BRICKLAYERS LOCAL 3 - MARBLE & TILE*	08/01/2013	$47.00	$10.18	$18.15	$0.00	$75.33
	02/01/2014	$47.56	$10.18	$18.15	$0.00	$75.89
	08/01/2014	$48.46	$10.18	$18.22	$0.00	$76.86
	02/01/2015	$49.02	$10.18	$18.22	$0.00	$77.42
	08/01/2015	$49.92	$10.18	$18.29	$0.00	$78.39
	02/01/2016	$50.49	$10.18	$18.29	$0.00	$78.96
	08/01/2016	$51.39	$10.18	$18.37	$0.00	$79.94
	02/01/2017	$51.96	$10.18	$18.37	$0.00	$80.51

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Apprentice - *TERRAZZO FINISHER - Local 3 Marble & Tile*

Effective Date - 08/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.50	$10.18	$18.15	$0.00	$51.83
2	60	$28.20	$10.18	$18.15	$0.00	$56.53
3	70	$32.90	$10.18	$18.15	$0.00	$61.23
4	80	$37.60	$10.18	$18.15	$0.00	$65.93
5	90	$42.30	$10.18	$18.15	$0.00	$70.63

Effective Date - 02/01/2014

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	50	$23.78	$10.18	$18.15	$0.00	$52.11
2	60	$28.54	$10.18	$18.15	$0.00	$56.87
3	70	$33.29	$10.18	$18.15	$0.00	$61.62
4	80	$38.05	$10.18	$18.15	$0.00	$66.38
5	90	$42.80	$10.18	$18.15	$0.00	$71.13

Notes:

Apprentice to Journeyworker Ratio:1:3

TEST BORING DRILLER *LABORERS - FOUNDATION AND MARINE*	06/01/2013	$34.45	$7.10	$12.60	$0.00	$54.15
	12/01/2013	$35.20	$7.10	$12.60	$0.00	$54.90
	06/01/2014	$35.95	$7.10	$12.60	$0.00	$55.65
	12/01/2014	$36.70	$7.10	$12.60	$0.00	$56.40
	06/01/2015	$37.45	$7.10	$12.60	$0.00	$57.15
	12/01/2015	$38.20	$7.10	$12.60	$0.00	$57.90
	06/01/2016	$38.95	$7.10	$12.60	$0.00	$58.65
	12/01/2016	$39.95	$7.10	$12.60	$0.00	$59.65

For apprentice rates see "Apprentice- LABORER"

TEST BORING DRILLER HELPER *LABORERS - FOUNDATION AND MARINE*	06/01/2013	$33.17	$7.10	$12.60	$0.00	$52.87
	12/01/2013	$33.92	$7.10	$12.60	$0.00	$53.62
	06/01/2014	$34.67	$7.10	$12.60	$0.00	$54.37
	12/01/2014	$35.42	$7.10	$12.60	$0.00	$55.12
	06/01/2015	$36.17	$7.10	$12.60	$0.00	$55.87
	12/01/2015	$36.92	$7.10	$12.60	$0.00	$56.62
	06/01/2016	$37.67	$7.10	$12.60	$0.00	$57.37
	12/01/2016	$38.67	$7.10	$12.60	$0.00	$58.37

For apprentice rates see "Apprentice- LABORER"

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TEST BORING LABORER *LABORERS - FOUNDATION AND MARINE*	06/01/2013	$33.05	$7.10	$12.60	$0.00	$52.75
	12/01/2013	$33.80	$7.10	$12.60	$0.00	$53.50
	06/01/2014	$34.55	$7.10	$12.60	$0.00	$54.25
	12/01/2014	$35.30	$7.10	$12.60	$0.00	$55.00
	06/01/2015	$36.05	$7.10	$12.60	$0.00	$55.75
	12/01/2015	$36.80	$7.10	$12.60	$0.00	$56.50
	06/01/2016	$37.55	$7.10	$12.60	$0.00	$57.25
	12/01/2016	$38.55	$7.10	$12.60	$0.00	$58.25
For apprentice rates see "Apprentice- LABORER"						
TRACTORS/PORTABLE STEAM GENERATORS *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$39.96	$10.00	$13.55	$0.00	$63.51
	12/01/2013	$40.74	$10.00	$13.55	$0.00	$64.29
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
TRAILERS FOR EARTH MOVING EQUIPMENT *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2012	$31.32	$8.91	$8.00	$0.00	$48.23
TUNNEL WORK - COMPRESSED AIR *LABORERS (COMPRESSED AIR)*	06/01/2013	$45.33	$7.10	$13.00	$0.00	$65.43
	12/01/2013	$46.08	$7.10	$13.00	$0.00	$66.18
	06/01/2014	$46.83	$7.10	$13.00	$0.00	$66.93
	12/01/2014	$47.58	$7.10	$13.00	$0.00	$67.68
	06/01/2015	$48.33	$7.10	$13.00	$0.00	$68.43
	12/01/2015	$49.08	$7.10	$13.00	$0.00	$69.18
	06/01/2016	$49.83	$7.10	$13.00	$0.00	$69.93
	12/01/2016	$50.83	$7.10	$13.00	$0.00	$70.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - COMPRESSED AIR (HAZ. WASTE) *LABORERS (COMPRESSED AIR)*	06/01/2013	$47.33	$7.10	$13.00	$0.00	$67.43
	12/01/2013	$48.08	$7.10	$13.00	$0.00	$68.18
	06/01/2014	$48.83	$7.10	$13.00	$0.00	$68.93
	12/01/2014	$49.58	$7.10	$13.00	$0.00	$69.68
	06/01/2015	$50.33	$7.10	$13.00	$0.00	$70.43
	12/01/2015	$51.08	$7.10	$13.00	$0.00	$71.18
	06/01/2016	$51.83	$7.10	$13.00	$0.00	$71.93
	12/01/2016	$52.83	$7.10	$13.00	$0.00	$72.93
For apprentice rates see "Apprentice- LABORER"						
TUNNEL WORK - FREE AIR *LABORERS (FREE AIR TUNNEL)*	06/01/2013	$37.40	$7.10	$13.00	$0.00	$57.50
	12/01/2013	$38.15	$7.10	$13.00	$0.00	$58.25
	06/01/2014	$38.90	$7.10	$13.00	$0.00	$59.00
	12/01/2014	$39.65	$7.10	$13.00	$0.00	$59.75
	06/01/2015	$40.40	$7.10	$13.00	$0.00	$60.50
	12/01/2015	$41.15	$7.10	$13.00	$0.00	$61.25
	06/01/2016	$41.90	$7.10	$13.00	$0.00	$62.00
	12/01/2016	$42.90	$7.10	$13.00	$0.00	$63.00
For apprentice rates see "Apprentice- LABORER"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
TUNNEL WORK - FREE AIR (HAZ. WASTE) *LABORERS (FREE AIR TUNNEL)*	06/01/2013	$39.40	$7.10	$13.00	$0.00	$59.50
	12/01/2013	$40.15	$7.10	$13.00	$0.00	$60.25
	06/01/2014	$40.90	$7.10	$13.00	$0.00	$61.00
	12/01/2014	$41.65	$7.10	$13.00	$0.00	$61.75
	06/01/2015	$42.40	$7.10	$13.00	$0.00	$62.50
	12/01/2015	$43.15	$7.10	$13.00	$0.00	$63.25
	06/01/2016	$43.90	$7.10	$13.00	$0.00	$64.00
	12/01/2016	$44.90	$7.10	$13.00	$0.00	$65.00
For apprentice rates see "Apprentice- LABORER"						
VAC-HAUL *TEAMSTERS JOINT COUNCIL NO. 10 ZONE B*	12/01/2012	$30.74	$8.91	$8.00	$0.00	$47.65
WAGON DRILL OPERATOR *LABORERS - ZONE 2*	06/01/2013	$30.10	$7.10	$11.80	$0.00	$49.00
	12/01/2013	$30.60	$7.10	$11.80	$0.00	$49.50
	06/01/2014	$31.10	$7.10	$11.80	$0.00	$50.00
	12/01/2014	$31.60	$7.10	$11.80	$0.00	$50.50
	06/01/2015	$32.10	$7.10	$11.80	$0.00	$51.00
	12/01/2015	$32.60	$7.10	$11.80	$0.00	$51.50
	06/01/2016	$33.10	$7.10	$11.80	$0.00	$52.00
	12/01/2016	$33.85	$7.10	$11.80	$0.00	$52.75
For apprentice rates see "Apprentice- LABORER"						
WASTE WATER PUMP OPERATOR *OPERATING ENGINEERS LOCAL 4*	06/01/2013	$40.34	$10.00	$13.55	$0.00	$63.89
	12/01/2013	$41.12	$10.00	$13.55	$0.00	$64.67
For apprentice rates see "Apprentice- OPERATING ENGINEERS"						
WATER METER INSTALLER *PLUMBERS & GASFITTERS LOCAL 12*	03/01/2013	$49.31	$9.32	$13.29	$0.00	$71.92
For apprentice rates see "Apprentice- PLUMBER/PIPEFITTER" or "PLUMBER/GASFITTER"						
Outside Electrical - East						
CABLE TECHNICIAN (Power Zone) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	03/03/2013	$25.18	$8.20	$4.17	$0.00	$37.55
	09/01/2013	$25.66	$8.70	$4.48	$0.00	$38.84
For apprentice rates see "Apprentice- LINEMAN"						
CABLEMAN (Underground Ducts & Cables) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	03/03/2013	$35.67	$8.20	$4.98	$0.00	$48.85
	09/01/2013	$36.55	$8.70	$6.58	$0.00	$51.83
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN CDL *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	03/03/2013	$29.38	$8.20	$5.68	$0.00	$43.26
	09/01/2013	$29.94	$8.70	$6.05	$0.00	$44.69
For apprentice rates see "Apprentice- LINEMAN"						
DRIVER / GROUNDMAN -Inexperienced (<2000 Hrs) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	03/03/2013	$23.08	$8.20	$3.94	$0.00	$35.22
	09/01/2013	$23.52	$8.70	$5.24	$0.00	$37.46
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class A CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	03/03/2013	$35.67	$8.20	$8.98	$0.00	$52.85
	09/01/2013	$36.35	$8.70	$9.43	$0.00	$54.48
For apprentice rates see "Apprentice- LINEMAN"						
EQUIPMENT OPERATOR (Class B CDL) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	03/03/2013	$31.48	$8.20	$6.19	$0.00	$45.87
	09/01/2013	$32.08	$8.70	$6.59	$0.00	$47.37
For apprentice rates see "Apprentice- LINEMAN"						
GROUNDMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	03/03/2013	$23.08	$8.20	$3.42	$0.00	$34.70
	09/01/2013	$23.52	$8.70	$3.72	$0.00	$35.94
For apprentice rates see "Apprentice- LINEMAN"						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
GROUNDMAN -Inexperienced (<2000 Hrs.) *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	03/03/2013	$18.89	$8.20	$2.61	$0.00	$29.70
	09/01/2013	$19.25	$8.70	$2.85	$0.00	$30.80
For apprentice rates see "Apprentice- LINEMAN"						
JOURNEYMAN LINEMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	03/03/2013	$41.97	$8.20	$11.26	$0.00	$61.43
	09/01/2013	$42.77	$8.70	$11.78	$0.00	$63.25

Apprentice - *LINEMAN (Outside Electrical) - East Local 104*

Effective Date - 03/03/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$25.18	$8.20	$3.92	$0.00	$37.30
2	65	$27.28	$8.20	$4.36	$0.00	$39.84
3	70	$29.38	$8.20	$5.06	$0.00	$42.64
4	75	$31.48	$8.20	$5.76	$0.00	$45.44
5	80	$33.58	$8.20	$6.46	$0.00	$48.24
6	85	$35.67	$8.20	$7.17	$0.00	$51.04
7	90	$37.77	$8.20	$8.36	$0.00	$54.33

Effective Date - 09/01/2013

Step	percent	Apprentice Base Wage	Health	Pension	Supplemental Unemployment	Total Rate
1	60	$25.66	$8.70	$4.24	$0.00	$38.60
2	65	$27.80	$8.70	$4.71	$0.00	$41.21
3	70	$29.94	$8.70	$5.43	$0.00	$44.07
4	75	$32.08	$8.70	$6.16	$0.00	$46.94
5	80	$34.22	$8.70	$6.88	$0.00	$49.80
6	85	$36.35	$8.70	$7.62	$0.00	$52.67
7	90	$38.49	$8.70	$8.83	$0.00	$56.02

Notes:

Apprentice to Journeyworker Ratio:1:2

TELEDATA CABLE SPLICER *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	07/16/2012	$26.33	$4.18	$2.79	$0.00	$33.30
TELEDATA LINEMAN/EQUIPMENT OPERATOR *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	07/16/2012	$24.78	$4.18	$2.74	$0.00	$31.70
TELEDATA WIREMAN/INSTALLER/TECHNICIAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	07/16/2012	$24.78	$4.18	$2.74	$0.00	$31.70
TREE TRIMMER *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	01/29/2012	$17.18	$3.37	$0.00	$0.00	$20.55
This classification applies only to the trimming of branches on and around utility lines.						
TREE TRIMMER GROUNDMAN *OUTSIDE ELECTRICAL WORKERS - EAST LOCAL 104*	01/29/2012	$15.15	$3.37	$0.00	$0.00	$18.52
This classification applies only to the trimming of branches on and around utility lines.						

Classification	Effective Date	Base Wage	Health	Pension	Supplemental Unemployment	Total Rate

Additional Apprentice Information:

Minimum wage rates for apprentices employed on public works projects are listed above as a percentage of the pre-determined hourly wage rate established by the Commissioner under the provisions of the M.G.L. c. 149, ss. 26-27D. Apprentice ratios are established by the Division of Apprenticeship Training pursuant to M.G.L. c. 23, ss. 11E-11L.

All apprentices must be registered with the Division of Apprenticeship Training in accordance with M.G.L. c. 23, ss. 11E-11L.

All steps are six months (1000 hours) unless otherwise specified.

* Ratios are expressed in allowable number of apprentices to journeymen or fraction thereof.
** Multiple ratios are listed in the comment field.
*** APP to JM; 1:1, 2:2, 2:3, 3:4, 4:4, 4:5, 4:6, 5:7, 6:7, 6:8, 6:9, 7:10, 8:10, 8:11, 8:12, 9:13, 10:13, 10:14, etc.
**** APP to JM; 1:1, 1:2, 2:3, 2:4, 3:5, 4:6, 4:7, 5:8, 6:9, 6:10, 7:11, 8:12, 8:13, 9:14, 10:15, 10:16, etc.

WEEKLY PAYROLL RECORDS REPORT
& STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c. 149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided. A Payroll Form has been printed on the reverse of this page and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract.

In addition, every contractor and subcontractor is required to submit a copy of their weekly payroll records to the awarding authority. This is required to be done on a weekly basis. Once collected, the awarding authority is also required to preserve those records for three years from the date of completion of the project.

Each such contractor or subcontractor shall furnish to the awarding authority directly within 15 days after completion of its portion of the work, a statement, executed by the contractor, subcontractor or by any authorized officer thereof who supervised the payment of wages, this form.

STATEMENT OF COMPLIANCE

_____, 20_____

I,_____,_____
(Name of signatory party) (Title)
do hereby state:
That I pay or supervise the payment of the persons employed by
_____ on the _____
(Contractor, subcontractor or public body) (Building or project)
and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty nine of the General Laws.

Signature _____
Title _____

MASSACHUSETTS WEEKLY CERTIFIED PAYROLL REPORT FORM

Company's Name:	Address:	Phone No.:	Payroll No.:

Employer's Signature:	Title:	Contract No:	Tax Payer ID No.	Work Week Ending:

Awarding Authority's Name:	Public Works Project Name:	Public Works Project Location:	Min. Wage Rate Sheet No.

General / Prime Contractor's Name:	Subcontractor's Name:

Employee Name & Complete Address	Employee is OSHA 10 Certified (?)	Work Classification:	Appr. Rate (%)	Hours Worked Su.	Mo.	Tu.	We.	Th.	Fr.	Sa.	Project Hours (A) / All Other Hours	Hourly Base Wage (B)	"Employer" Hourly Fringe Benefit Contributions: Health & Welfare Insurance (C')	ERISA Pension Plan (D)	Supp. Unemp. (E)	Total Hourly Prev. Wage (F) (B+C+D+E)	Project Gross Wages (G) (A x F) / Total Gross Wages	Check No. (H)

NOTE: Pursuant to MGL Ch. 149 s.27B, every contractor and subcontractor is required to submit a "true and accurate" copy of their weekly payroll records directly to the awarding authority. Failure to comply may result in the commencement of a criminal action or the issuance of a civil citation.

Date recieved by awarding authority

/ /

GENERATOR UPGRADE
AT DISTRICT ONE & TWO FIRE STATIONS
ACTON, MA

State of_____)

County of_____)

_____, being first duly sworn, deposes and says that:

(1) He is_____of_____,
the Bidder that has submitted the attached Bid;

(2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such a Bid;

(3) Such a Bid is genuine and is not a collusive or sham Bid.

(4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, and employees of parties in interest, has in any way colluded, conspired, connived, or agreed, directly or indirectly with any other Bidder, firm, or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm, or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit, or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Town of Acton or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this.

Signed_____

Subscribed and sworn before me

this _____day of_____, 2013.

Title
My Commission expires

GENERATOR UPGRADE
AT DISTRICT ONE & TWO FIRE STATIONS
ACTON, MA

SUPPLEMENTARY GENERAL CONDITIONS

Items contained in theses supplementary conditions are in addition to or complimentary to the general conditions, contract drawings and or project specifications. The contractor is responsible for provision of the greater quality or quantity as provided within any of the contract documents as required to complete his work scope.

Any reference to general contractor, fire protection contractor, sprinkler contractor, or contractor are meant to be one and the same and by reference means the contractor performing the work of this contract.

The General Contractor shall be responsible for coordination of all work and the various trades as required for complete performance of all work as specified.

Direct all bid questions to the Town facsimile. All questions received at least five (5) days prior to the proposed bid date will be answered and copies of these answers will be provided to all bidders in the form of an addendum, which must be acknowledged on the enclosed bid forms. Failure to acknowledge addendum could lead to the disqualification of your bid. The enclosed bid form must be used for submission of all bids. No other bid form will be accepted.

Pre-bid Walkthrough: A walkthrough to view existing conditions is scheduled in the Invitation to Bid.

Liquidated Damages: $400.00/day, not as a penalty but to help cover daily costs incurred by the facility. If determined at the judgment of the Town that the contractor incurred delays that were beyond their control the Town at its discretion may decide to waive some or all of the assessment associated to late completion of this project.

Prevailing wage project: Wage rates are enclosed.

Permit: The contractor is responsible for all required permits and approvals in accordance with local authority and state requirements. Each respective trade is responsible for obtaining sign-offs, as required by the proper authority during the construction process to enable construction to proceed on a timely basis.

Contractor Guarantee: The contractor shall provide a one-year written guarantee against failure on all labor and materials supplied under this contract in addition to all other warranty or guarantees called for in the individual project sections. This warranty is not meant to cover items damaged by others but is provided to protect against installation and or product defects. The contractor by this warranty will agree to repair, at their cost, any defective item or work that fails within this one-year period. This warranty will commence upon final completion of this project and will run in conjunction with any and all other warranties specified within these documents including any and all manufacturer's warranties requested or implied.

Submittals: Provide six (6) copies of product literature on all required items that provide a full description of the product intended to be incorporated in this project. Provide shop drawings detailing lay out of all proposed equipment and furnishings for review and approval, including any exposed conduit. Provide samples of items as requested. Submittal cover sheet should include as a minimum the following: project identification, contractor name and address, manufacturer name and address, supplier name and address, section number, product description, date of submission, if a substitution is to be submitted provide an analysis (side by side) detailing the benefits of the product that is intended for use and to what extent it differs from that specified. The Engineer will review all submittals in a timely fashion and return same to the contractor marked up as follows: "Approved", "Approved as Noted", "Approved as Noted, Resubmit", "Rejected, Resubmit". Engineer approval of a submittal does not relieve the contractor of their contractual responsibility to provide as specified materials. It is the contractor's sole responsibility to

determine that the products submitted meet the intent of the drawings and specifications as well as determining that they properly fit into the project to provide its intended purpose and performance.

Examination of Site & Documents: it is the responsibility of every bidder to examine the site and all contract documents prior to the submittal of any bid for this project. The Engineer or Town will not be responsible for errors, omissions, and or charges for extra work due to the General Bidders or Sub-Bidders failure to familiarize themselves with the contract documents and or existing work conditions as it relates to this project. By submitting a bid for this work each bidder agrees and warrants that they have familiarized themselves with the working conditions as it relates to the specifications, plans and documents.

Insurances: Provide all insurances required by Massachusetts General Law. Refer to the General Conditions at the front end of these specifications.

Temporary Precautions: Provide noise and dust protection as required to perform the work scope of this contract to the satisfaction of the Engineer and Town during the entire construction process. Provide barriers and floor protection to protect all trafficked work areas that construction personnel may damage during their operations. The contractor will be responsible for restoring any damaged area, to the satisfaction of the Engineer and Town back to its original state, at his expense.

The contractor will be responsible for notifying the facilities department of all work, schedule and locations prior to each phase/ start of construction. The contractor is to cooperate fully with the Engineer, Town and the Town representative to minimize conflicts during construction operations. The contractor is to utilize sub-contractors/installers normally engaged in the field of expertise for each work category of this contract with demonstrated experience on projects with similar size and for each work category of this contract with demonstrated experience on projects with similar size and complexity.

The contractor will be required to have an on-site contract person during performance of all work operations who is available 24 hours a day in case of emergency. This contact person's phone number(s) is to be provided to the Engineer and Town at the project's commencement. In the case of an emergency where the contractor is unable to or does not respond to the Engineer or Town on an immediate basis, the Engineer and Town reserves it's right to utilize their personnel or alternate forces to repair and or cleanup the situation as needed to ensure the safety of Town property, personnel, the general public and/or Town contact personnel. The Engineer or Town for expenses associated with any intervention of this sort will be processed following the presentation of documentation of actual costs.

The contractor will be responsible for supervising this project in a manner acceptable to the Engineer and Town over the course of the construction process. The Engineer and Town reserves the right to require a change in contractor supervisory personnel should there occur any supervision problems in the conduct of the work. The contractor's supervisor must posses a construction supervisor's license from the state of Massachusetts. Provide a copy of this license to the Town as part of the submittal phase. Weekend work will be considered but must be approved by Town project representative at least 48 hours in advance.

A line item breakdown, estimated construction schedule and project directory is to be provided for review and acceptance prior to the commencement of construction. A pre-construction conference will be held prior to stating work to review all procedures and scheduling and to familiarize the contractor with Town rules and regulations. Payments will be made on monthly requisition in accordance with General Conditions.

The contractor will not be allowed to utilize the bathroom facilities located within the contract work area.

Hoisting and staging is to be supplied by the contractor as required.

The contractor may use the existing facility electrical supply during performance of their work scope. The contractor will be responsible for supplying all connections, extension cords etc. as required for facilitating their work.

Provide disposal containers for removal and legal disposal of all debris generated by this work, including waste generated by sub-trades. The container is to be located in an area approved by the Engineer and Town, but not readily accessible to untrained Town personnel. The contractor, at its option, may want to consider placing a cover over its onsite disposal container(s) to deter disposal from unwanted sources.

No onsite storage is available for contractor's equipment and supplies. The Town at their discretion may allow the use of one (1) onsite storage container at a location to be agreed upon. The contractor may use this area to store materials and equipment required for contract performance only.

Onsite parking is very limited. The contractor must obtain temporary parking permits from The Town for all contractor vehicles. The Town reserves its right to limit the quantity of vehicles to receive "Temporary Parking Passes" and may require contractor vehicles to use general parking areas.

The contractor is responsible for the security and protection of all work areas under this control until the project has been completed and accepted by the Engineer and Town as 100%. The Engineer and Town will take no responsibility for damage that may occur to any work area while under the contractor's control.

The contractor is responsible for final cleanup as well as ongoing clean up during construction. Field sub-bid trades are responsible for cleaning up debris they generate and disposing of same in an onsite container or vehicle as provided by the general contractor. Final cleaning will be performed by experts normally engaged in this endeavor as acceptable to the Town project representative. The Town may revoke these privileges at anytime due to contractor misuse.

It is the contractor's sole responsibility to contact all appropriate regulatory agencies including Dig-safe (888-344-7233) and the Town's Buildings and Grounds Department for additional information that may be required prior to commencement of any excavation work.

The contractor is solely responsible for following, all local, state and federal building codes, laws, rules and regulations including all OSHA guidelines while performing work of this contract and agrees to repair at their expense any work found that does not conform to these statues.

No smoking is allowed within any town building. The contractor must strictly enforce this rule. Any contractor employee or sub-contract employee caught smoking within any Town building will be required to be dismissed and will no longer be welcome onsite.

END OF SECTION

SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Instructions to Bidders, AIA Document A201, "The General Conditions of the Contract for Construction", 2007 Edition, the Supplementary General Conditions and Division 1, General Requirements, are a part of this Section and shall be binding on the Contractor and/or Subcontractor who performs this work.

1.2 PROJECT DESCRIPTION

A. The Project consists of the Generator Upgrade at the District One & Two Fire Stations as shown on Contract Documents prepared by Garcia Galuska DeSousa, Inc.

B. The Work consists of:

1. Providing two new exterior standby diesel fired generators, automatic transfer switches, to back-up entire building.

2. Electrical service modifications, metering, main breaker, and all reconnections.

3. Backfeeding two existing 200A, 120/240V, 1Ø, 3W panelboards.

4. Phasing and demolition during occupied buildings.

5. All trenching, backfilling, and repaving or reseeding to match existing.

6. Coordinate with utility companies.

1.3 WORK SEQUENCE

A. The Work will be conducted in a manner to provide the least possible interference to the activities of the building. The building will remain occupied during the contract work.

1.4 CONTRACTOR USE OF PREMISES

A. General: Limit use of the premises to construction activities only in areas indicated on the Contract Drawings, allow for Owner occupancy and use by the public.

1. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.

2. Confine the parking of workmen's and construction vehicles, and the storage of construction materials to the staging area.

3. Keep driveways and entrances serving the premises clear and available to the Owner and the Owner's employees at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to before and after business hours and minimize space and time requirements for storage of materials and equipment on site.

B. Use of the Existing Building: Maintain the existing building in a weathertight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.

1. Repair damage caused by damaged or interrupted utilities.

1.5 OWNER OCCUPANCY

A. Full Owner Occupancy: The Owner will occupy the site and existing building during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and maintain a fully operational facility. Perform the work so as not to interfere with the Owner's operations.

1. Coordinate all Work with the Engineer and Owner's Representatives to insure that operational and environmental conditions, satisfactory to the Owner and Engineer, are maintained during all phases of Construction. Schedule and coordinate the work to minimize the shut down of any portions of the building or systems at any specific time.

2. Obtain prior approval for the shut down of any portions of the building or systems at times designated by the Owner.

3. Ensure safe, barrier-free access to, safe, barrier-free egress from, and security of existing areas and equipment by the staff and the public.

a. The safety of the visitors and staff requires that nothing shall be done, in any way, to block the passageways in or about the exits themselves. Neither shall there be any unauthorized interference with the free and unobstructed use of hallways, stairways, toilets and rooms.

4. Schedule and coordinate the work so as not to disrupt access to the building. Obtain prior approval from the local Building Official and Fire Department, and Town before commencement of work that may disrupt safe, barrier-free access to the building by the staff and public.

a. It is the intent that work shall start on **October 1, 2013.** The work shall conclude no later than **January 31, 2014**. Work may be performed during normal working hours, 7:00 a.m. – 4:30 p.m.

b. When necessary for tradesmen to work in any portion of the premises normally occupied by the Town, application must be made, before entering, to the Owner, who will perfect a working agreement with the building occupants, so that work may be carried forward in a manner to interfere as little as possible.

B. Project Completion: Achieve Full Completion for the entire project no later than 5:00 p.m. on the respective dates mentioned above. At this date the occupancy permit shall be in hand and the facility ready for occupancy.

1.6 INTENT

A. These Specifications with the accompanying Drawings are intended to describe and illustrate all material, labor, and equipment necessary to complete the Generator Upgrade at District 1 and District 2 Fire Stations.

B. For convenience of reference, these Specifications are separated into titled Divisions and Sections. Such separations shall not, however, operate to make the Engineer an arbiter to establish limits to Contracts between the Contractor and Subcontractors. The Divisions of the Specifications do not necessarily define the limits of the Contractor's subcontracts, the work of anyone subcontract may include items specified in several Divisions or Sections. The Contractor may sublet work as he sees fit, but it is his responsibility to see that all work shown on the Drawings and/or specified is completed in accordance with the Contract and required by codes.

C. Furnish all materials and accomplish all work in strict accordance with the grades or standards of materials, standards of workmanship, and manufacturer's specifications listed or mentioned in these documents.

D. The listing or mention of materials shall be sufficient indication that all such materials shall be furnished by the Contractor, in accordance with the grades or standards indicated, free from defects impairing strength, durability or appearance and in sufficient quantity for the proper and complete execution of the work, unless specifically stated otherwise.

E. The listing or mention of any method of installation, erection, fabrication or workmanship shall not operate to make the contractor an agent, but shall be for the sole purpose of setting a standard of quality for the finished work. Contractor is free to use any alternate method, provided only that, prior to the start of the work, such alternate method is approved in writing by the Engineer, as resulting in quality equal to that intended by these documents. Unless an alternate method is approved, all work shall be in strict accordance with all methods if installation, erection, fabrication and workmanship listed or mentioned herein.

1.7 SOCIAL SECURITY TAXES

A. The Contractor and each Subcontractor shall pay the taxes measured by the wages of all their employees as required by the Federal Social Security Act and all amendments thereto, and accept the exclusive liability for said taxes. The Contractor shall also indemnify and hold the Owner, and its respective officers, agents and servants and the Engineer harmless on account of any tax measured by the wages aforesaid of employees of the Contractor and his subcontractors, assessed against the Owner under authority of said law.

1.8 UNEMPLOYMENT INSURANCE

A. The Contractor and each Subcontractor shall pay unemployment insurance measured by the wages of his employees as required by law and accept the exclusive liability for said contributions. The Contractor shall also indemnify and hold harmless the Owner on account of any contribution measured by the wages of aforesaid employees of the Contractor and his Subcontractors, assessed against the Owner under authority of law.

1.9 OCCUPATIONAL SAFETY AND HEALTH ACT

A. The Contractor shall comply with the requirements of the Occupational Safety and Health Act of 1970 and the Construction Safety Act of 1969, including all standards and regulations which have been promulgated by the Governmental Authorities which administer such Acts and said requirements, standards and regulations are incorporated herein by reference.

B. The Contractor shall comply with said regulations, requirements and standards and require and be directly responsible for compliance therewith on the part of his agents, employees, material men and Subcontractors; and shall directly receive and be responsible for all citations, assessments, fines or penalties which may be incurred by reason of his agents, employees, material men or Subcontractors failing to so comply.

C. The Contractor shall indemnify the Owner and Engineer and save them harmless from any and all losses, costs and expenses, including fines and reasonable attorney's fees incurred by the Owner and Engineer by reason of the real or alleged violation of such laws, ordinances, regulations and directives, Federal, State, and Local, which are currently in effect or which become effective in the future, by the Contractor, his Subcontractors or material men.

PART 2 - PRODUCTS (Not applicable).

PART 3 - EXECUTION (Not applicable).

END OF SECTION 01010

SECTION 01040 - PROJECT COORDINATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Instructions to Bidders, AIA Document A201, "The General Conditions of the Contract for Construction", 2007 Edition, the Supplementary General Conditions and Division 1, General Requirements, are a part of this Section and shall be binding on the Contractor and/or Subcontractor who performs this work.

1.2 SUMMARY

A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:

1. Coordination.
2. Progress Meetings.
3. Administrative and supervisory personnel.
4. General installation provisions.
5. Cleaning and protection.

1.3 COORDINATION

A. Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.

No claim for extra compensation or extension of Contract time will be allowed for conditions resulting from a lack of said coordination and cooperation.

1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.

2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

3. Make adequate provisions to accommodate items scheduled for later installation.

B. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project Close-out activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

1.4 PRE-CONSTRUCTION CONFERENCE

A. The Engineer will schedule a pre-construction conference and organizational meeting at the Project site no later than 15 days after execution of the Agreement and prior to commencement of construction activities. Attend the meeting to review responsibilities and personnel assignments.

B. Attendees: The Owner, Engineer and their consultants, the Contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.

1. Notify and arrange for attendance by all parties except the Engineer and Owner.

C. Agenda: Items of significance that could affect progress will be discussed, including such topics as:

1. Tentative construction schedule.
2. Critical Work sequencing.
3. Designation of responsible personnel.
4. Procedures for processing field decisions and Change Orders.
5. Procedures for processing Applications for Payment.
6. Distribution of Contract Documents.
7. Submittal of Shop Drawings, Product Data and Samples.
8. Preparation of record documents.
9. Use of the premises.
10. Office, Work and storage areas. .
11. Equipment deliveries and priorities.
12. Safety procedures.
13. First aid.
14. Security.
15. Housekeeping.
16. Working hours.

1.5 SUBMITTALS

A. Staff Names: Within 15 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.

1.6 COORDINATION MEETINGS

A. Conduct Project coordination meetings at regularly scheduled times convenient for all parties involved. Project coordination meetings are in addition to regular progress meetings.

B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.

C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.7 PROGRESS MEETINGS

A. The Engineer will conduct progress meetings at the Project site at regularly scheduled intervals. Coordinate dates of meetings with preparation of the payment request.

B. Attendees: Notify each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities, to attend these meetings. Persons familiar with the Project and authorized to conclude matters relating to progress shall be represented.

C. Agenda: Review and correction or approval of minutes of the previous progress meeting. Review of other items of significance that could affect progress. Topics for discussion as appropriate to the current status of the Project.

1. Contractor's Construction Schedule: Prepare a written report including progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

2. Review of present and future needs of each entity present, including such items as:

a. Interface requirements.
b. Time.
c. Sequences.
d. Deliveries.
e. Off-site fabrication problems.
f. Access.
g. Site utilization.
h. Temporary facilities and services.
i. Hours of Work.
j. Hazards and risks.
k. Housekeeping.
1. Quality and Work standards.
m. Change Order proposals.
n. Documentation of information for payment requests.

D. Reporting: The Engineer will prepare and distribute copies of minutes of the meeting to each party present. Contractor shall distribute copies to other parties who should have been present.

1. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions ,and recommendations are more explicit or stringent than requirements contained in Contract Documents.

C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Engineer for final decision.

F. Recheck measurements and dimensions, before starting each installation.

G. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Engineer for final decision.

3.2 CLEANING AND PROTECTION

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

END OF SECTION 01040

SECTION 01330

SUBMITTALS

PART 1 - GENERAL

1.1 TRADE CONTRACT

A. Work of this Section is part of the Electrical trade contract. Refer to Section 16000 for additional information about this trade contract.

1.2 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. Shop drawings are drawings, diagrams, schedules and other data which shall be specifically prepared for the Work by the Contractor, manufacturer, supplier or distributor to illustrate some portion of the work.

B. Product data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished to illustrate a material, product or system for some portion of the work.

C. Samples are physical examples which shall illustrate materials, equipment, or workmanship, and shall establish standards by which work is judged.

D. The Contractor shall review, approve and submit with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Owner or any separate contractor all shop drawings, project data and samples required by the Contract Documents.

E. By approving and submitting shop drawings, product data and samples, the Contractor represents that he has determined and verified all materials, field measurements and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained with such submittals with the requirement of the work and of the Contract Documents.

F. The Engineer will review and take appropriate action upon submittal of Shop Drawings, Product Data and Samples, but only for conformance with the design concept of the Work and the information given on the Contract Documents. Such action will be taken with reasonable promptness so as to cause no delay. The Engineer's acceptance of a specific item shall not indicate approval of an assembly of which the item is a component. The Engineers review of a Shop Drawing does not include the checking of dimensions, clearness, or quantities nor the verification of actual field conditions which shall be the Contractor's responsibility.

G. The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Engineer's approval of Shop Drawings, Product Data or Samples unless the Contractor has specifically informed the Engineer in writing of such deviation at the time of submission and the Engineer has given written acceptance of the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in Shop Drawings, Product Data or Samples by the Engineer's approval thereof.

H. The Contractor shall direct specific attention, in writing on resubmitted Shop Drawings, Product Data, or Samples, to revisions other than those requested by the Engineer on previous submittals.

I. No portion of the Work requiring submission of a Shop Drawing, Product Data, or Sample shall be commenced until the submittal has been approved by the Engineer as provided herein. All such portions of the Work shall be in accordance with accepted submittals.

1.3 SUBMITTAL REQUIREMENTS

A. Standard manufactured items - submit a minimum of six (6) of manufacturer's data sheets, showing illustrated cuts of the item(s) to be furnished, scale details, sizes, dimensions, capacities, performance characteristics, wiring diagrams, controls, and other pertinent information. If more than one size or type is shown, indicate clearly each item(s) to be furnished. When approved or disapproved, the Engineer will retain one copy. Submit sufficient copies for all other parties. No "Not Approved" or "Amend and Resubmit" copies shall be sent to the job site.

B. For all other shop drawings, submit one (1) reproducible transparency until final approval is obtained. Maximum size of shop drawing shall be 24" x 36". On completion of checking, the Engineer will obtain record prints of each transparency, returning the transparency to the Contractor.

C. Transparencies returned "approved" and/or "approved as noted", shall be distributed and processed as set forth below.

D. The Contractor shall obtain and distribute adequate prints for construction, including one print of each for the Owner's project representative, and then return the transparencies to the Contractor supplier from whom he originally received them.

E. Transparencies returned "amend and resubmit" or "not approved" shall be processed as set forth below.

F. The Contractor shall first obtain a record print and then forward the transparencies to source for correction of original drawings, and resubmission of a new transparency as above.

G. Each drawing shall have the title block on the right hand side containing the following data:

- Name of Product

- Engineer

- General Contractor

- Contractor

- Date of Submission

H. Each drawing shall have a clear space on the right hand side for approval stamp of both the Engineer and the Contractor. The Engineer's stamp shall contain the following data:

_____ Approved

_____ Approved as Noted

_____ Amend & Resubmit

_____ Not Approved

The Engineer and Contractor shall insert the date of action taken and an identification of the person taking the action.

1.4 SHOP DRAWING GRADING

- Approved: No corrections, no marks

- Approved as Noted: Resubmission not required. Minor amount of corrections; all items can be fabricated without further corrections to original drawing; checking is complete and all corrections are deemed obvious without ambiguity.

- Amend & Resubmit: Resubmission required. Items must not be fabricated without further corrections. Checking is not complete; details of items checked are to be clarified further before full approval can be given. Resubmit new drawings with noted corrections.

- Not Approved" Drawing is rejected as not in accord with the contract. When returning drawing reasons for rejection will be stated. Correct and resubmit. Do not fabricate.

1.5 PROGRESS SCHEDULE

A. In order to facilitate coordination and fitting, prepare a "Plan of Operations and Progress Schedule" which shall show concisely the manner in which work will be started, prosecuted, and how the interrelationship of the work is to be completed. The overall timing shall conform to the requirements of the Owner agreement. The Plan of Operations and Progress Schedule shall be "weighted" to schedule each trade in proportion to the entire project.

B. The Plan of Operations and Progress Schedule shall be specific in nature within any particular sub-trade; e.g., the Contractor's Schedule shall indicate the start and finish of the various portions of work within the scope of his work. The schedule shall reveal the commencement date and completion date for each and every phase of the work such as underground duct banks, utility co. scheduling, switchboard modifications, etc.

C. In preparing the above Plan of Operations and Progress Schedule the Contractor shall assure that the methods, dates and other pertinent matter are acceptable to the Engineer and, when completed, he shall submit to and obtain approval from the Engineer.

D. After approval of the above Plan of Operations and Progress Schedule the Contractor shall be responsible for seeing that it is adhered to and for ascertaining that proper coordination is maintained between work of all trades. Approval of the above Plan of Operations and Progress Schedule will not relieve the Contractor from completing the project on time.

E. If for any reason the progress schedule should fall behind schedule by 15 calendar days (maximum), the Contractor shall prepare a new progress schedule which shall be changed to indicate the manner in which the Contractor will complete the project within the time allowed for construction.

1.6 SCHEDULE OF MATERIALS

A. Within two (2) weeks after the award of Contract, the Contractor shall submit to the Engineer a schedule of any materials specified for the work which are likely to cause delay due to unavailability, extended delivery dates, or any other reason.

B. The schedule shall contain a list of materials, the name of the supplier or suppliers that the Contractor contacted in attempting to purchase the material, the project delivery dates and the reason for the anticipated delay.

C. The Contractor shall assume full responsibly for delay attributed to unavailability, insufficient time for delivery and/or installation of material or performance of the work, unless he has conformed with paragraphs A. and B. above, except as noted in paragraph D. below.

D. Delays in delivery of material caused by factors beyond the Contractor's control and occurring after the time stipulated in Paragraph A. above, shall not be deemed to be the responsibility of the Contractor.

1.7 SCHEDULE OF VALUES

A. Prior to the first request for payment, the Contractor shall submit to the Engineer and the Owner a Schedule of Values of the various portions of the work in sufficient detail to reflect various major components of each trade, including quantities when requested, aggregating the total contract sum, and divided so as to facilitate payments for work under each Section in accordance with the Contract Form. The schedule shall be prepared in such form as specified or as the Engineer or Owner may approve, and it shall include data to substantiate its accuracy. Each item in the Schedule of Values, including breakdown and values, requires the approval of the Engineer and the Owner and shall be used only as a basis for the Contractor's request for payment.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION 01330

SECTION 01770 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

A. This section includes administrative and procedural requirements for contract closeout including, but not limited to the following:

1. Final Cleaning
2. Landscape Repairs
3. As Built Drawings
4. Operating and Maintenance Requirements
5. Demonstration and Training
6. Closeout Requirements and Submittals
7. Guarantees and Warranties

1.3 FINAL CLEANING

A. Unless otherwise specified under the various Sections of the Specifications, the General Contractor shall perform final cleaning operations as herein specified prior to final inspection.

B. Maintain project site free from accumulations of waste, debris, and rubbish, caused by operations. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for occupancy.

C. Cleaning shall include all surfaces, interior and exterior in which the Contractor has had access whether existing or new.

D. Refer to Sections of the Specifications for cleaning of specific products or work.

E. Use only those materials which will not create hazards to health or property and which will not damage surfaces.

F. Use only those cleaning materials and methods that are recommended by the manufacturer of surface material to be cleaned.

G. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.

H. Repair, patch, and touch up marred surfaces to specified finish to match adjacent surfaces.

I. Broom clean exterior paved surfaces and rake clean other surfaces of the grounds.

J. Leave pipe and duct spaces, plenums, furred spaces and the like clean of debris and decayable materials.

K. At the end of the project, General Contractor and each Subcontractor shall remove all his tools, equipment, machinery, and surplus materials from the job site. The General Contractor shall remove all waste materials and rubbish from the project at this time. All temporary structures shall be removed and the project shall be left clean.

1.4 LANDSCAPE REPAIRS

A. All lawn areas used for contractor parking and material storage shall have the topsoil removed, the subsoil shall be loosened to 12" below finished grade, the topsoil shall be replaced and amended with a complete, slow release fertilizer, proof rolled and seeded with a restoration seem mix consisting of:

PURE SEED	GERM.
34.72% KENTUCKY BLUE GRASS 85/80	95%
24.68% CREEPING RED FESCUE	85%
19.82% OMEGA III PERENNIAL RYE GRASS	95%
19.78% SATURN PERENNIAL RYEGRASS	95%

1.5 AS-BUILT DRAWINGS

A. As-built Drawings shall consist of all the Contract Drawings. As-built Drawings shall be kept up-to-date. Information from on-going Work shall be recorded on As-built Drawings within 48 hours of Work being performed.

B. The General Contractor and all Subcontractors shall be required to maintain one set of As-built Drawings, as the work relates to their Sections of the Specifications, at the site.

C. The As-built Drawings shall be stored and maintained in the General Contractor's field office apart from other documents used for construction. The Record Drawings shall be maintained in a clean, dry and legible condition and shall not be used for construction purposes.

D. As-built Drawings, as submitted by the General Contractor shall be verified in the field by the Designer or his Consultants. Verification by the Designer shall occur during the construction process and prior to the related work being completed and covered up.

E. The following information shall be indicated on the As-built Drawings:

1. Record all changes, including change orders, in the location, size, number and type both horizontally and vertically of all elements of the project which deviate from those indicated on all the Contract Drawings.

2. Each of the utilities and appurtenances shall be referenced by showing a tag number, area served and function on the As-built Drawings.

F. At the end of each month and before payment for materials installed, the General Contractor, his Subcontractors, and agents of the Commonwealth shall review As-built Drawings for purpose of payment. IF THE CHANGES IN LOCATION OF ALL INSTALLED ELEMENTS ARE NOT SHOWN ON THE AS-BUILT DRAWINGS AND VERIFIED IN THE FIELD, THEN THE MATERIAL SHALL NOT BE CONSIDERED AS INSTALLED AND PAYMENT WILL BE WITHHELD.

1.6 OPERATING AND MAINTENANCE REQUIREMENTS

A. At least two weeks prior to the time of turning over this contract to the Operating Agency for Use and Occupancy, or Final Acceptance, the General Contractor shall secure and deliver to the Operating Agency via the Designer, three (3) complete, indexed files, containing approved operating and maintenance manuals, shop drawings, record of paint colors, floor and ceiling materials and other data as follows.

1. Operating manuals and operating instructions for each model and type of equipment in each of the various systems. Include operating instructions for systems integrating several pieces of equipment.

2. Catalog data sheets for each item of mechanical or electrical or equipment actually installed including performance curves, rating data and parts lists.

3. Catalog sheets, maintenance manuals, and approved shop drawings of all mechanical or electrical equipment controls and fixtures with all details clearly indicated, including size of lamps and other maintenance supplies.

4. Operating procedures, including startup, shutdown, seasonal and weekend operations.

5. Description of controls and sequence of operations.

6. Maintenance Data:

a. Manufacturer's information, including list of spare parts.
b. Name, address, and telephone number of Installer or supplier.
c. Maintenance procedures.
d. Maintenance and service schedules for preventive and routine maintenance.
e. Maintenance record forms.
f. Sources of spare parts and maintenance materials.
g. Copies of maintenance service agreements.
h. Copies of warranties and bonds.
i. Name, address and telephone numbers of repair and service companies for each of the systems installed.

7. Names, addresses and telephone numbers of all Sub-contractors and suppliers, together with repair and service companies for each of the major systems installed under this contract.

1.7 DEMONSTRATION AND TRAINING

A. Instruction: Instruct Owner’s personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Provide instructors experienced in operation and maintenance procedures.

2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.

3. Schedule training with Owner’s personnel with at least fourteen (14) days' advance notice.

4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.

1.8 CLOSEOUT REQUIREMENTS AND SUBMITTALS

A. Procedural Requirements Prior to Use and Occupancy: Punch List:

1. During the finishing stages of the project, the Contractor shall make frequent inspections with subcontractors, the Designer, and the Owner, so as to progressively check for and correct faulty work.

2. During the course of construction of the project, the Contractor shall procure and maintain test records and certificates that will be required prior to issuance of the Department of Public Safety (DPS) Certificate of Occupancy.

1.9 GUARANTEES AND WARRANTIES

A. Submit to the Designer all extended guarantees and warranties that have been specified in various, individual Sections of the Specifications. Guarantees shall be assembled by Specification No. and Section in accordance with Specifications Table of Contents.

1. Guarantees and warranties shall be enforceable in the Commonwealth of Massachusetts and subject to interpretation in accordance with the laws of the Commonwealth of Massachusetts.

B. Unless more stringent requirements are otherwise specified, guarantee all work against defects of materials, equipment and workmanship for one year from the date of Final Acceptance or the date of issue of Certificate of Use/Occupancy for the building or portion thereof, whichever occurs first.

C. Place in satisfactory condition in every particular all guaranteed work and correct all defects.

D. Make good all damage to building, site equipment, or contents thereof, including redecoration which, in the opinion of the Designer, results from the use of material, equipment or workmanship which are inferior, defective or not in accord with the terms of the Contract.

E. Delivery of any warranty required does not relieve the Contractor from any obligation assumed under other provisions of the Contract.

F. Deliver guarantees and warrantees to the Designer before or with the application for Final Payment.

G. At the end of the Contractor’s one (1) year guarantee period, the Contractor shall transfer manufacturers’ equipment and material warranties that are still in force to the Operating Agency.

H. The general warranty set forth in the General Conditions is in addition to, exclusive of, and not in substitution of such guarantees as may be required in the Specifications.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION

SECTION 02100 - SITE PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Contracting Requirements and Division 01 General Requirements apply to this Section.

1.2 DESCRIPTION OF WORK

A. Provide all labor, materials, equipment, services and accessories necessary to furnish and install the work of this Section, complete and functional, as indicated in the Contract Documents and as specified herein.

B. The principal work of this Section includes, but may not be limited to, the following:

1. Clearing, grubbing, and disposing of vegetation, including bushes, trees, stumps, roots and debris within work limit lines.
2. Stripping and storage of topsoil within the stockpile areas to be designated by the Engineer or shown on the drawings.
3. Protection of trees and other vegetation, stone walls, and objects indicated on the drawings or designated by the Engineer.
4. Removal of existing pavements, curbs, sidewalks, steps, signage and posts, fencing and all other site improvements that interfere with construction as indicated on the drawings. Pavement shall be properly disposed of at an off-site landfill.
5. Coordination of the disconnection and capping of utilities and/or removal or relocation of utilities and utility poles as required.

1.3 RELATED WORK

A. Carefully examine all of the Contract Document for requirements which affect the work of this Section. Other specifications which directly relate to the work of this Section include, but are not limited to, the following:

1. Section 02200 -- EARTHMOVING
2. Section 02510 -- BITUMINOUS CONCRETE PAVING
3. Section 02515 – PORTLAND CEMENT CONCRETE SITEWORK
4. Section 02580 – PAVEMENT MARKINGS
5. Section 02740 -- SITE UTILITIES

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.1 PERFORMANCE

A. The Contractor shall accept the site as he finds it and shall remove all stumps, rocks, paving, improvements, and rubbish in the contract area. When the Contractor is ready to proceed with the clearing of trees from the site, he shall notify the Engineer who will clearly identify in the field all trees to be saved. All other trees and brush shall be cleared from the area as directed. All rocks, strips, obstructions to work and undesirable material shall be removed

from the site a properly and legally disposed of at an approved land fill site.

B. All trees and shrubs to remain shall be protected during the entire progress of the work. This includes protection of the root system. All trees shall be fenced with snow fencing as detailed on the drawings and maintained during course of construction.

C. Prior to excavating and after tree, stump, brush, etc., removal, strip the topsoil from the area of the buildings and the excavation and grading boundaries and stockpile on the site where directed by the Engineer.

D. All topsoil must be stripped from areas to be occupied by either site improvements or building construction prior to the on-site storage of any materials or the installation of any temporary construction facilities.

E. Any existing abandoned/unused foundation members, cesspools, septic tanks, or similar subsurface facilities encountered within the project area are to be destroyed and removed in their entirety.

F. Construct around stockpiles, a silt barrier consisting of hay bales, snow fence, and environmental fabric as detailed on the drawings. This installation shall be coordinated as to timing and placement with the Engineer.

END OF SECTION

SECTION 02200

EARTH MOVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Contracting Requirements and Division 01 General Requirements apply to this Section.

1.02 DESCRIPTION OF WORK

A. The work to be performed is shown on the Drawings listed on the contract form. The work shall be performed in accordance with Commonwealth of Massachusetts Highway Department (MHD) Standard Specifications for Highways and Bridges, Latest Edition. Said documents are by reference made a part of the contract.

B. The Work to be performed under this Section shall include furnishing all labor, materials and equipment required to do all the Earthwork and related work as shown on the Drawings or herein specified. The Work shall further include all appurtenant items not specifically shown or itemized but which are implied or required to complete the Work in accordance with the reasonable intent of the Contract Documents.
   1. Site grading
   2. Excavation and backfilling for new construction.
   3. Regrading of disturbed areas
   4. Filling and compacting of all areas where excavation occurs
   5. Excavation and gravel bases for pavements (concrete and bituminous)
   6. Excavation and backfill for utility work including removals such as piping.
   7. Excavation for any new subsurface equipment, structure, light pole base, or any other excavation which is required to accomplish the Work described in the Drawings or Specifications
   8. Hauling and disposal of all debris not approved to be left on the site as fill.
   9. Stripping and stockpiling top soil for reuse.
   10. Remove and dispose of bituminous concrete paving required to be removed to complete excavation and regrading. (Paving may be ground & used in accordance with MHD approved recycled base material.)

1.03 RELATED WORK

A. Carefully examine all of the Contract Documents for requirements that affect the work of this Section. Other specifications that directly relate to the work of this section include, but are not limited to, the following:
   1. Section 16000 – Electrical
   2. Section 02510 – Bituminous Concrete Paving.
   3. Section 02515 – Portland Cement Concrete Sitework
   4. Section 02740 – Site Utilities

1.04 SUBSURFACE CONDITIONS

A. Protect all pipe lines, sewers, drains, poles, wiring, and the like that interfere in any way with the work whether or not they are specifically shown on the Drawings. Notify the proper authorities that items are protected, supported, and/or relocated as necessary to adjust them to the new work.

B. Verify inverts and locations of all existing utilities having a direct bearing on the work of this Section prior to installation of any work of this Section. Transmit above information to the Engineer who shall make any alterations to the Contract Drawings as required by the existing conditions.

C. No extra compensation will be made for compliance with the above.

D. Notify public utilities companies, in writing, at least 72 hours before excavating a public way in accordance with the provision of Chapter 82, Section 40A, of the Massachusetts General Laws, in order to prevent accidental damage.

1.05 INTERPRETATION OF SITE CONDITIONS

A. During the course of construction, all interpretations of soil conditions, classification of materials and soil suitability, determine acceptability of methods and soil suitability, determining acceptability of methods and equipment to carry out the intent of the Specifications, shall be made by the Engineer and/or Soils Laboratory. The decision of the Engineer shall be final and binding on the Contractor.

1.06 DEFINITIONS

A. "Piping" includes, in addition to pipe, all fittings, valves, supports, and other accessories relating to such piping.

B. "Invert" means the elevation datum at the inside bottom of pipe or channel.

C. "Fill" and "Backfill" shall be, for the purpose of this Specification, considered interchangeable terms and shall mean material to be used to bring existing or construction grades up to finish grade levels.

D. "Rock Excavation", for purposes of contract price adjustment for rock excavation and removal, is material which cannot be broken and removed by power excavation equipment and requires the use of drills or explosives and is, in addition, limited to the following items:
1. Rock or stone in original ledge.
2. Hard shale in original ledge.
3. Boulders over 1 cubic yard in trenches and 2 cubic yards in open cut.

E. All excavation, except rock excavation, including paving and paving foundations, is "earth" insofar as excavation and removal of material is concerned.

F. "Trench" shall be defined as an excavation of any length where the width is less than twice the depth. All other excavations shall be classed as open.

G. "Finish grades" as used herein mean the required final grade elevations indicated on the Drawings.

H. "Building area" shall mean the area within the limits of the foundation walls and the area five (5) feet immediately surrounding these limits.

1.07 CODES, ORDINANCES AND PERMITS

A. The Specification requirements shall be adhered to where they are in excess of the minimum requirements of the rules of the "Governing Authorities".

B. Obtain all required Certificates of Inspection for work and deliver same to the Engineer for approval before request for acceptance and final payment of the work.

1.08 CONTRACT DOCUMENTS

A. It is the intention of these Specifications and Drawings to call for finished work, tested, and ready for operation. Any apparatus, appliance, material, or work not shown on the Drawings, but mentioned in the Specifications, or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished, delivered, and installed under this Section without additional expense to the Owner.

B. The Drawings are generally diagrammatic and are intended to convey the scope of work and indicate general arrangement of equipment, conduits and piping. The locations of all items shown on the Drawings or called for in the Specifications that are not definitely fixed by dimensions or invert elevations are approximate only. If directed by the Engineer, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of the other trades or for proper execution of the work.

1.09 CLEANING AND PROTECTION

A. Protect all materials and equipment during shipment, on-site storage and installation to prevent damage for the life of the project. Assume full responsibility for all work herein installed until final acceptance of the project.

B. Keep the job site free from accumulations of waste material or rubbish caused by this operation. At the completion of the work, remove all rubbish, tools, construction equipment, and surplus materials from the job site and leave the premise in a clean condition.

C. Active utilities shall be adequately protected from damage and removed or relocated only as indicated or specified. Inactive and abandoned utilities encountered in excavation and grading operations shall be removed, plugged, or capped unless noted otherwise. Report in writing to the Engineer, the locations of such abandoned utilities.

D. The Contractor shall keep adjacent roads clean at all times during construction. Street sweeping shall be carried out as required. Maintain dust control measures. No excavated area for utility structures or conduits shall be left open overnight. All excavated areas must be backfilled before end of work day.

1.10 MEASUREMENTS AND PAYMENT

A. Excavation and removal of rock shall be paid for as an extra only after removal of such materials has been authorized by the Engineer. The quantities of excavation and removal involving an extra or other adjustment of the Contract price shall be subject to measurement verification and approval by the Engineer prior to the removal of such materials.

B. Payment Lines: The following payment lines shall be used to determine changes in volume of materials to be excavated or removed or both.
   1. Utility Structures: One foot outside of the outer walls and six inches below the bottom of the structures. Measure banks of excavation vertically.
   2. Utility Trenches: Width shall be the outside diameter of the pipe or ductbank plus two feet. Maximum depth shall not exceed six inches below the bottom of the pipes, etc. Banks or trenches shall be vertical.

C. Rock Excavation: When, during the process of excavation, rock is encountered, such material shall be uncovered and exposed. Notify the Engineer before proceeding further. Employ qualified personnel acceptable to the Engineer, to take cross-section of rock before removal of same, and provide computations of cross-section within the payment line limits. Do not proceed with the excavation of material claimed as rock until the material has been classified by the Engineer. Failure to uncover such material, or notify the Engineer, or take cross-sections, shall forfeit the right-of-claim to any payments. The quantity of rock removed will be based on the payment limits as established herein.
   1. When explosives are used, work shall be executed by experienced powdermen or persons who are licensed or otherwise authorized to use explosives. Explosives shall be stored, handled, and used in accordance with local requirements and regulations and the “Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Incorporated an all OSHA Regulations.
   2. Prior to starting work, supply to the Engineer, Insurance coverage with limits as indicated in the General Conditions.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Obtain off-site material as herein specified consisting of clean granular material from off-site Borrow Pits as approved by the Soils Laboratory prior to trucking to the site.
   1. Maintain borrow source material in a clean condition, uncontaminated by organic soils or other deleterious materials. If borrow material from the cut sectors is stockpiled, such stockpiles shall be suitable protected, drained, and maintained to insure full availability of the materials.
   2. Material weighing less than 100 lbs. per cubic foot (maximum laboratory dry weight) is not acceptable as fill material. Placed material shall be free of all objectionable material such as leaves, grass, and roots.

2.02 GRANULAR FILL

A. Wherever granular fill is called for in the Drawings or Specifications, the material shall be brought from off-site sources and shall be free of ice, snow, sod, rubbish, or other deleterious material and conform to the following gradation:

Sieve Size	% finer by weight
6 inch	100
No. 10	30-95
No. 40	0-70
No. 200	0-10

2.03 GRAVEL

A. Gravel borrow fill where called for on the Drawings and Specifications shall be from off-site sources and shall conform to the following gradation requirements of MHD Standard M1.03.0 Type 'B'.

Sieve Size	% finer of weight
3 inch	100
1/2 inch	50-85
No. 4	40-75
No. 50	8-28
No. 200	0-10

2.04 3/4 INCH STONE

A. Where designated on the Drawings and Specifications as 3/4 inch stone, the material shall consist of 3/4 inch processed stone and shall conform to the following gradation requirements of MHD Standard M2.04.4.

Sieve Size	% finer by weight
1 inch	100
3/4 inch	90-100
1/2 inch	10-50
3/8 inch	0-20
No. 4	0-5

2.05 GRAVEL BASE COURSE

A. Base course under walks and roads or wherever "Mass Specs" appear shall be hard, durable particles from sources approved by the Engineer, free from organic matter and clay, and conforming to the following gradation requirements of MHD Standard M2.01.7.

Sieve Size	% by weight passing
2 inch	100
1-1/2 inch	70-100
3/4 inch	50-85
No. 4	30-55
No. 50	8-24
No. 200	3-10

PART 3 - EXECUTION

3.01 ENVIRONMENTAL CONTROLS

A. Prior to commencement of any work, provide the Engineer with detailed drawings, reports, etc., as required to adequately define proposed methods to protect the environment of the project and the surrounding area in accordance with local, state, and federal regulations and as herein described.

B. Be responsible for and maintain, during the course of operations on the project, existing drainage ways both into and from the project. All proposed drainage systems, as shown on the project plans, or which may be required during the course of the work, shall be maintained functional at all times. The exposed areas of subgrade in both cut and fill sectors shall be graded to positively drain. In impounded surface water areas, no additional fill material shall be placed.

Failure to maintain positive drainage of the subgrade shall be adequate cause for the Engineer to order temporary suspension of the work.

C. Provide and maintain, for the entire course of the operations of the project, erosion and silt control measures to prevent the intrusion of any silt, oil, chemical, or other pollutants to any downstream drainage way, conduit, stream, etc., or abutting property beyond the project limit lines. In the event of failure to comply, the Contractor assumes the cost of all damages resultant there from.

D. Provide for the control of dust to the satisfaction of the Engineer.

3.02 REFERENCE POINTS

A. Locate and maintain bench marks, monuments, and other reference points. If destroyed or disturbed, place as directed by the Engineer and/or local and state authorities.

3.03 LAYOUT

A. Provide and pay for the services of a Registered Land Surveyor who will provide the following:
1. Monuments or stakes on all property corners so that the entire locus is staked in the field.
2. Utility Layouts.

B. Protect and preserve all such monumentation after being established and replace same if damaged.

C. The Surveyor shall locate and maintain as-built drawings, including swing ties to all valves, stubs, manholes, angle, points, etc., herein installed. At the completion of the work, submit as-built drawings for submission to the Engineer.

3.04 EQUIPMENT

A. All Earth Work under this Section shall be performed with earth moving equipment capable of efficiently completing the scope of the work and subject to the approval of the Soils Laboratory and/or the Engineer.

3.05 PROTECTION OF SUBGRADE

A. The Contractor shall employ special measures as herein specified and/or as directed in the field by the Engineer to avoid disturbing the strength of the natural subgrade in an approved manner shall be made during the course of the construction.

B. Provide and operate pumps or other equipment as necessary, to keep excavation free from water at all times, until succeeding operations are begun.

C. As original ground surface is worked and fill is added, daily provisions shall be made for drainage of surface water away from the exposed subgrade.

D. Properly compact layers of subgrade fill as soon as they are placed.

3.06 ROUGH GRADING

A. Upon completion of the site clearing work for each operation, the area of operation shall be rough graded. All organic materials, unsuitable fill, debris, and other deleterious materials, shall be removed from areas to be filled or backfilled. Frozen material shall not be used in filling.

B. Dispose of or supply all borrow of specified types, necessary to complete the rough grading to the required elevations.

C. Bring the areas within the contract limit lines to the subgrade levels as shown on the plans.

D. If field conditions cause yardage to change for any reason, dispose of or furnish all fill as required at no cost.

E. The finished subgrade surface shall be protected from the action of the elements. Any settlement or washing out that may occur from that, or any other cause prior to the acceptance of the work shall be repaired, and grades, re-established to the required elevations and slopes.

F. Newly graded areas shall be protected from the action of the elements. Any settlement or washing out that may occur from that, or any other cause prior to the acceptance of the work shall be repaired, and grades, re-established to the required elevations and slopes.

G. Areas under pavements bearing on ground shall be graded to required levels using acceptable material for fill and be thoroughly compacted.

H. During the performance of rough grading operations, the subgrade shall be examined critically and any areas discovered which, in the opinion of the Soils Laboratory, are soft and unstable, shall be excavated to such depths as may be necessary to insure satisfactory supporting properties. These areas of excavation shall be backfilled immediately and shall be brought back to the elevation of the surrounding area with approved fill material and in accordance with the earth fill construction procedure.

I. Redress areas as required and/or directed before placing of pavements, walks, and slabs and/or granular fill in the above areas.

3.07 FILLING AND COMPACTION

A. After the clearing and stripping of topsoil and removal of debris and other deleterious material, the areas to receive fill shall be drained and/or pumped free of all standing water.

B. Fill shall not be placed upon frozen subgrade within building limits or below pavements where raise in grade is less than 3 feet. Overnight frost, not more than 2 inches thick, shall be broken up by cleats or crawler or other acceptable means prior to placing fill.

C. Fill may be placed upon frozen subgrade in landscaped areas or below pavement where raise in grade exceeds 3 feet provided that:
   1. All snow is removed.
   2. All free ice or water is removed first.

D. The following are minimum procedures to be utilized in the placing and compaction of all fill. The final compaction methods shall be subject to the approval of the Soils Laboratory. Critical areas are defined as all fill below building limit lines and the upper most 12 inches of subgrade under parking lot, bank-run gravel under paving, and base course under paving. Less critical areas are those under landscaped areas and below 12 inches under the paved areas.

1. Compaction Method: Hand operated vibratory plate or light roller (in confined areas only)

   Maximum Stone Size: 2"

   Maximum Loose Lift Thickness: Critical areas - 4", less critical areas - 6"
   Minimum # of Passes: Critical Areas – 4, less critical areas - 4

2. Compaction Method: Hand operated vibratory drum rollers weighing at least 1000#, or light crawler tractor (in confined areas only)

   Maximum Stone Size: 4"

   Maximum Loose Lift Thickness: Critical Areas - 6", less critical areas - 8"
   Minimum # of Passes: Critical areas – 4, less critical areas - 4

E. The following compaction requirements shall apply, in each case expressed as percentage of maximum dry density achieved by laboratory ASTM Modified Proctor Method D1557:

Top 12" of subgrade underlying granular fill below pavement	95%
Below floor slabs, but above foundation	95%
Deeper than 12" from top of subgrade underlying gravel below pavement	95%
Landscaping areas	90%

F. The moisture content of placed material shall not deviate from the optimum by more than 2 percent. Moisture content of any material which displays pronounced deformation under construction equipment shall not exceed the optimum. Drying of wet soil shall be expedited by the use of plows, discs, harrows, or other approved methods. If additional water is required, it should be uniformly distributed through the use of approved water wagons and shall be thoroughly incorporated into the material by means of discs or other suitable mixing equipment. Care shall be taken to avoid trapping water within the fill.

G. The fill and borrow areas should be maintained in a freely draining conditions at all times. Proper drainage shall be provided for any water or springs which may be encountered.

H. Frozen fill shall not be placed nor shall any acceptable fill be placed on frozen or snow covered surface except as outlined in (D) above.

I. All cut areas shall be rolled and compacted to produce a compaction equal to that of the filled areas. If soft, yielding material is encountered in cuts, or in fills as a result of trapping water, and cannot be satisfactorily stabilized by moisture control and compaction, the unstable material shall be excavated to the depth required by the Soils Laboratory. The excavation shall then be filled with suitable material and compacted in accordance with the requirements outlined above.

3.08 SUBGRADE PREPARATION

A. After the subgrade is compacted to the specified requirements, the subgrade shall be fine graded to within 1/10 of a foot of the required elevations. Proof roll the entire subgrade in the presence of the Soils Laboratory.

B. Proof roll with vibratory drum roller 10,000 lbs. with minimum of two complete coverage in each direction.

C. Any suspect areas revealed by proof rolling shall be investigated by backhoe excavation. Deficiencies shall be corrected as directed by the Soils Laboratory.

3.09 GRANULAR FILL

A. Immediately upon completion of subgrade under areas to be paved and after approval by Soils Laboratory, place, compact, and grade the granular fill as specified to within 1 inch of the required elevations as shown on the plans.

B. At the time the site is ready for pavement base material, place additional granular fill as required to meet the elevations shown, the proof roll the same as 3.07 above.

C. Take precautions to protect granular fill during subsequent operations so as to keep it clean and free draining and segregated from other deleterious materials.

3.10 EXCAVATION

A. Material of every nature encountered in the performance of this Contract shall be excavated to indicated lines, elevations, and grades.

B. Excavate properly to provide sufficient work space to permit the placing, inspection, and completion of the work embraced in the completion of the Project. Excavations shall be made to elevations and dimensions indicated on the drawings, and shall include the removal of unusable earth and debris. All pumping, drainage, bailing, and shoring where such is required, shall be included.

C. All space beneath foundations, resulting from unauthorized excavations or from slides or cave-ins shall be refilled with approved concrete and foundations shall be laid at the excavated level as directed, or other methods acceptable to the Soils Laboratory.

D. After completion and approval of the subgrade within the building area, excavate for footings and foundations carrying all excavations so that all bearing area will be either or virgin soil or on controlled compacted fill.

E. Excavated materials not required or not suitable for backfilling and rough grading, and debris, shall be removed from the site at no additional cost to the Owner.

3.11 BACKFILLING

A. Backfill as soon as permanent work has been completed and walls have attained sufficient set and strength.

B. Except where otherwise specified, backfilling shall be done with granular fill and done promptly so as to protect the foundation from frost. Place backfill in layers as stated in Para. 3.07. Compact before placing succeeding layer. When sheeting, bracing, or shoring is removed, fill voids.

C. Exercise extreme care in backfilling against newly placed walls. Walls with fill on one side shall be properly supported laterally, either with the designed structure by temporary means. Walls with fill on both sides shall have fill placed in alternate layers on each side of the wall. Place no more than one (1) foot at a time, compacted each list as herein specified.

3.12 EXCAVATION AND BACKFILLING FOR UTILITIES

A. Excavate and backfill for all underground utilities and structures.

B. Utilities shall not be laid directly on ledge or boulders or remains of old foundation or structure. This material shall be removed to a minimum of 6 inches below the utilities and backfilled and compacted as hereinafter specified.

C. In general, the width of trenches shall be kept to a minimum and in the case of piping shall not exceed the sum of the pipe o.d. plus 2' - 0" to at least 12 inches above the pipe. Trench walls may be cut back from 12 inches above the pipe to subgrade.

D. Excavation shall be carried to 6 inches below utility or structure and to the required line or grade. Machine excavation will be permitted. Immediately upon excavation of trench in the case of piping or excavation for manholes or other structures, place and compact 6 inches of 3/4" inch processed stone as herein specified in paragraph 2.04 at the proper line and grade, digging bell holes to insure bearing throughout the pipe barrel in the case of piping.

E. Backfilling within the area of the utility work shall be carried to the lines and levels required for the grades shown on the drawings and as specified. Backfilling shall not be started until conditions have been inspected and approved by the Engineer, nor any fill placed until structural members involved have sufficient strength to withstand the pressure to be imposed.

F. Fill material shall be as detailed on the drawings, placed in the dry horizontal layers and approved of each layer shall be obtained from the Soils Laboratory before proceeding with the next. Each layer shall be compacted to 95% of maximum dry density and at a water content equal to optimum water content plus-or-minus 2%. The maximum dry density and optimum water content shall be determined by the Soils Laboratory.

G. Backfill trenches only after conduit has been inspected, tested, and locations of conduits and appurtenances have been recorded. Backfill by hand around pipe and for a depth of 2 feet above the pipe, and tamp firmly in lifts not exceeding 6 inches in thickness, taking care not to disturb the pipe. Compact the remainder of the backfill, in maximum 9 inch layers, thoroughly with a rammer of suitable weight, or approved mechanical tampers to a minimum relative density of 95%. Trenches shall not be left open overnight.

H. Backfill material for utility structure shall be placed symmetrically on all sides, in 9 inch layers. Each layer shall be compacted with mechanical or hand tampers to a minimum relative density of 95%. Excavated areas for structures shall not be left open overnight.

END OF SECTION 31 20 00

SECTION 02510 - BITUMINOUS CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Contracting Requirements and Division 01 General Requirements apply to this Section.

1.2 DESCRIPTION OF WORK

A. The work to be performed is shown on the Drawings listed on the contract form. The work shall be performed in accordance with the local D.P.W. Specifications, Latest Edition and the Commonwealth of Massachusetts Highway Department (MHD) Standard Specifications for Highways and Bridges, Latest Edition. Said documents are by reference made a part of the contract.

B. The Work to be performed under this Section shall include furnishing all labor, materials and equipment required to do all the Bituminous Concrete Paving and related work as shown on the Drawings or herein specified. The Work shall further include all appurtenant items not specifically shown or itemized but which are implied or required to complete the Work in accordance with the reasonable intent of the Contract Documents.

C. The principal work of this Section includes, but may not be limited to the following:

1. New Bituminous Concrete Paving for Walks, Parking Areas, Bituminous Concrete Berms, and other areas as shown.
2. Paving to consist of a two (2) course hot placed and compacted pavement of mineral aggregate, mineral filler, and bituminous material, to the various depths and cross sections shown on the documents.
3. Fine grading of the gravel base course.

1.3 RELATED WORK

A. Carefully examine all of the Contract Documents for requirements that affect the work of this Section. Other specifications that directly relate to the work of this section include, but are not limited to, the following:

1. Section 02200 - EARTH MOVING
2. Section 02515 - PORTLAND CEMENT CONCRETE SITEWORK
3. Section 02740 - SITE UTILITIES

1.4 QUALITY ASSURANCE

A. The following Specifications and all related items and methods shall meet Commonwealth of Massachusetts Department of Public Works Construction Standards and Materials Specifications, latest Edition. Method of payment part of each Section is deleted and shall not be included.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Asphalt Paving and Materials

1. All materials shall meet the requirements of the Commonwealth of Massachusetts Highway Department for Highways and Bridges, Latest Edition, Standard Specifications for Type I-1 Bituminous Concrete Paving, and the materials selected shall be of the highest quality. Prior to starting work, submit job mix formula for review and approval.

2. Bituminous prime coat shall be medium curing Type MC-D or MC-1 conforming to the Commonwealth of Massachusetts Highway Department (MHD) Standard Specifications for Highways and Bridges, Latest Edition. Asphalt cement shall be of a typical penetration grade for the local area. All bituminous material shall meet the minimum requirements of AASHO specifications.

3. Bituminous concrete aggregates and fine aggregates shall conform to MHD Section M3 as amended.

4. Bituminous concrete shall meet the following requirements when tested by the Marshall method. The requirements are based on the bituminous concrete being compacted with 50 blows and tested at 140 degrees F.

Physical Test	Surface Course	Binder Course	Asphalt Base
Stability	1000 PSI	1000 PSI	800 PSI
Flow 1/100"	6 - 18	6 - 18	6 - 20
Total Voids	2 - 5	3 - 6	3 - 8

5. Asphalt cement content to be determined by three point Marshall curve. The amount of asphalt cement shall be selected from the maximum density obtained and within the above minimum requirements.

PART 3 - EXECUTION

3.1 PAVEMENT FOUNDATION CONDITIONS

A. Subgrade materials and preparation are specified in Section 312000. Gravel base material, thickness, and compaction is detailed on the Drawings. Fine grading is specified herein.

3.2 ESTABLISHMENT OF GRADES

A. Establish grade stakes from the Contract Drawings Site Grading Plan. The grade stakes shall be set to desired section and elevation and due allowances shall be made for existing improvements, proper drainage and adjoining property rights.

3.3 PROTECTION OF WORK BY OTHERS

A. Protect all work previously installed such as manholes, catch basins, sewer cleanouts, lighting posts, bases, curbs, sidewalks, etc. Repair any damage to this work caused by work of this Section.

3.4 PAVEMENT TRIMMING

A. Only sawcutting (without overcuts) shall be allowed as a means of creating the final (permanent) edge between existing and new hot-mix asphalt. All overcuts shall be filled with bituminous joint sealer. The standard cutback for all permanent pavement patches shall be 24" beyond the original pavement cuts made to perform the Contractor's work.

3.5 PAVEMENT APPLICATION

A. The gravel base course shall be fine graded in accordance with the Drawings and the maximum allowable deviation shall be 1/2 inch in ten (10) feet. Spread additional screening into any area showing segregation and roll into the surface until all voids in the base course have been completely filled. Rolling of the entire base shall be performed in the presence of the Soils Laboratory.

B. The bituminous prime coat shall be applied to the base course at the rate of 0.05 gallons per square yard. The base course shall be relatively dry at the time the primer is applied. The prime coat shall be allowed to cure for a minimum of twenty-four (24) hours.

C. Bituminous concrete shall be installed to the minimum thickness as specified. The compacted thickness shall be equal to or greater than the thickness specified. No skin patching will be accepted. Compaction of the bituminous concrete shall be equal to 97% of that obtained in the Laboratory. Bituminous concrete shall be rolled with a ten-ton roller as soon after placing as is practical.

D. Provide a slope for drainage as indicated on the Drawings. Slope to catch basins as provided.

E. The surface of the finished pavement shall be free of roller depressions. When tested with water, the surface shall not contain any irregularities which will impede water flow.

F. Bituminous concrete paving shall abut concrete curbs and walls making a smooth, even, clean joint as indicated on the Drawings.

3.6 FIELD QUALITY CONTROL

A. As directed by the Engineer, the Owner will furnish the services of a testing laboratory to perform compaction and thickness testing. All testing is to be performed in accordance with ASTM or AASHO recommended procedures.

END OF SECTION

GENERATOR UPGRADE
AT DISTRICT ONE & TWO FIRE STATIONS
ACTON, MA

SECTION 02515

PORTLAND CEMENT CONCRETE SITE WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Contracting Requirements and Division 01 General Requirements apply to this Section.

1.02 DESCRIPTION OF WORK

A. The Work to be performed under this Section shall include furnishing all labor, materials and equipment required to do all the Portland Cement Concrete Site Work and related work as shown on the Drawings or herein specified. The Work shall further include all appurtenant items not specifically shown or itemized but which are implied or required to complete the Work in accordance with the reasonable intent of the Contract Documents.

B. The principal work of this Section includes, but may not be limited to, the following:
   1. Concrete Pads for Emergency Generator and Electrical Equipment

1.03 RELATED WORK

A. Carefully examine all of the Contract Documents for requirements which affect the work of this Section. Other Specifications which directly relate to the work of this Section include, but are not limited to, the following:
   1. Section 16000 - Electrical
   2. Section 03300 - Cast-In-Place Concrete
   3. Section 02200 - Earth Moving
   4. Section 02740 - Site Utilities

1.04 SUBMITTALS

A. Submit for approval Shop Drawings for the following:
   1. Batch Plant Concrete Mix Formula
   2. Welded Wire Mesh

1.05 QUALITY ASSURANCE

A. The following Specifications and all related items and methods shall meet The Commonwealth of Massachusetts Department of Public Works Construction Standards and Materials Specifications, Latest Edition. Method of payment part of each Section is deleted and shall not be included.

PART 2 - PRODUCTS

2.01 CONCRETE PADS FOR ELECTRICAL EQUIPMENT

A. Conform to the Concrete Section of this specification for 4,000 psi 6% air entrained, reinforced concrete.

B. Form, thickness, and finish as detailed.

PART 3 - EXECUTION

3.01 GENERAL

A. Place reinforcing and concrete in forms as specified in Concrete Section of these Specifications. See Drawings and dimensions, finishes, and type of reinforcing.

END OF SECTION

GENERATOR UPGRADE
AT DISTRICT ONE & TWO FIRE STATIONS
ACTON, MA

SECTION 02580

PAVEMENT MARKING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Contracting Requirements and Division 01 General Requirements apply to this Section.

1.02 DESCRIPTION OF WORK

A. The work to be performed is shown on the Drawings listed on the contract form. The work shall be performed in accordance with Commonwealth of Massachusetts Highway Department (MHD) Standard Specifications for Highways and Bridges, Latest Edition. Said documents are by reference made a part of the contract.

B. The Work to be performed under this Section shall include furnishing all labor, materials and equipment required to do all the Earthwork and related work as shown on the Drawings or herein specified. The Work shall further include all appurtenant items not specifically shown or itemized but which are implied or required to complete the Work in accordance with the reasonable intent of the Contract Documents.

1.03 RELATED WORK UNDER OTHER SECTIONS

A. Carefully examine all of the Contract Documents for requirements which affect the work of this Section. Other Specifications which directly relate to the work of this Section include, but are not limited to, the following:

1. Section 02510 – Bituminous Concrete Paving

1.04 REFERENCES

A. Work shall conform to codes and standards of the following:

1. Massachusetts Highway Department Standard Specifications for Highways and Bridges (MHD Specifications), Latest Edition.

1.05 LAYOUT OF WORK

A. The Contractor shall furnish to the Engineer for approval a schedule of pavement marking operations in accordance with MHD Specifications Section 860.61.

1.06 TRAFFIC CONTROL

A. Suitable warning signs shall be placed near the beginning of the work site and well ahead of the work site for alerting approaching traffic from both directions.

B. Place traffic cones along newly painted lines to control traffic and prevent damage to newly painted surfaces. Remove when paint has dried fully.

C. Painting equipment shall be marked with large warning signs indicating slow moving painting equipment in operation.

PART 2 - PRODUCTS

2.01 PAVEMENT STRIPING

A. Materials for pavement markings shall conform to MHD Specifications Section 860.40 as applicable for the particular material required.

B. Paint shall be in sealed containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's name, formulation number and directions, all of which shall be plainly legible at time of use.

C. Paint shall be homogeneous, easily mixed to smooth consistency, and shall show no hard settlement or other objectionable characteristics during a storage period of six months.

D. Paint color for handicap parking symbol, parking stall stripes, stop lines and other traffic related items shall be white traffic paint.

2.02 MARKING EQUIPMENT

A. Machines, tools and equipment used in the application of pavement markings shall conform to MHD Specifications Section 860.60 and shall be approved and maintained in satisfactory operating condition.

B. Push-type machines of a type commonly used for application of paint to pavement surfaces shall be acceptable for marking roadway and parking areas. Applicator machine shall have the necessary paint tanks and spraying nozzles, and shall be capable of applying paint uniformly at coverage specified. Hand-operated spray guns shall be provided for use in areas where push-type machines cannot be used.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

A. New pavement surfaces shall be allowed to cure for a period of not less than 48 hours before application of marking materials.

B. Dust, dirt, and other granular surface deposits shall be removed by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods, as required. Rubber deposits, surface laitance, existing paint markings, and other coatings adhering to the pavement shall be completely removed using scrapers, wire brushes, sandblasting, approved chemicals, or mechanical abrasion, as directed.

3.02 PAVEMENT MARKING

A. Marking materials shall be applied to clean, dry surfaces in accordance with the requirements of MHD Specifications Section 860.62.

B. Paint shall be applied pneumatically with approved equipment.

C. Pavement marking materials shall be applied evenly to the pavement surface to be coated at a rate specified in MHD Specifications Section 860.62.

D. Guidelines and templates shall be employed as necessary to control paint application. Special precautions shall be taken in marking numbers, letters, and symbols.

E. Edges of markings shall be sharply outlined.

F. Maximum drying time requirements of the paint manufacturer shall be enforced to prevent undue softening of bitumen, and pickup, displacement or discoloration by vehicle tires.

G. If markings require more drying time than stated by the paint manufacturer, painting operations shall be discontinued until cause of the slow drying is determined and corrected.

3.03 PROTECTION OF MARKINGS

A. Markings shall remain protected in accordance with MHD Specifications Section 860.63.

END OF SECTION

SECTION 02740 - SITE UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Contracting Requirements and Division 01 General Requirements apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. All labor, materials, and operations in connection with the installation of the Site Utilities Work.

2. The principal work of this Section includes, but is not necessarily limited to the following:

a. Concrete Encasement for Electrical Duct Bank

B. The following related work is specified under the designated Sections:

1. Division 16 - Electrical
2. Section 02200 – EARTH MOVING

1.3 REFERENCE STANDARDS, SPECIFICATIONS, AND CODES

A. The following are hereby made a part of this SECTION by reference thereto:

1. All work installed under this SECTION shall comply with all Local, State, County and Federal Codes, Laws, Statutes, and Authorities having jurisdiction. Include any and all permit, connection, and/or inspection fees in the bid.

2. Give all requisite notices and file all requisite plans relating to this work with the proper Authorities, secure all permits for this work, and pay all fees for same.

3. All Site Utilities related materials and methods shall conform to the Commonwealth of Massachusetts Highway Department (MHD) Standard Specifications for Highways and Bridges, Latest Edition.

1.4 SUBMITTALS

A. Submit for approval Shop Drawings for the following:

1. Batch Plant Concrete Mix.

1.5 RECORD DRAWINGS

A. Maintain on the site at all times one (1) set of black or blue line on white Drawings which shall at all times be accurate, clear and complete, showing the actual location of all piping and structures as installed in colored pencil.

B. The Contractor shall, as part of the application for substantial completion, provide the Owner a set of “As-Built” drawings for the scope of work provided under this section. “As-Built” drawings shall be prepared and endorsed by a Massachusetts Registered Professional Engineer or Land Surveyor and shall bear the seal of such professional. Drawings shall depict, in relationship to the design plan, the “As-Built” condition of all the utility systems including but not limited to: Drainage, Sewer, Subsurface Sewage Disposal System, Electric, CATV, Telephone, Alarm, Data, Water and Underground Tanks. “As-Built” shall identify the location, elevations, pipe size, pipe material of all site utilities related to grade components.

1.6 CONTRACT DOCUMENTS

A. It is the intent of these Specifications and Drawings to call for finished work, tested, and ready for operation. Any apparatus, appliance, materials, or work not shown on the Drawings but mentioned in the Specifications, or vice-versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished, and installed.

B. The Drawings are generally diagrammatic and are intended to convey the scope of work and indicate general arrangements of equipment, conduits, and piping. The locations of all items shown on the Drawings or called for in the Specifications that are not definitely fixed by dimensions or invert elevations are approximate only. If directed by the Engineer, make reasonable modifications in the layout as needed to prevent conflict with other work or for proper execution of work.

PART 2 - PRODUCTS

2.1 GENERAL

A. Material and equipment for installation under this Section of the Specifications shall be new, unused, free of defects, and the best quality of a manufacturer of established reputation. Any defective or damaged material shall be immediately removed from the Site.

B. Specifications for materials included herein are intended for the purpose of establishing minimum quality requirements, and all materials are subject to approval by the Engineer.

2.2 CONCRETE

A. Conform to the Concrete Section of the specification for 4,000 PSI 6% air entrained concrete for all concrete structures for the work of this section. Including reinforcing steel where detailed.

PART 3 - EXECUTION

3.1 GENERAL

A. Furnish the services of a Registered Land Surveyor for layout of Site Utility Systems.

B. Protect all pipe lines, sewers, drains, poles, wiring and the like that interfere in any way with the work whether or not they are specifically shown on the Drawings. Notify the proper Authorities that items are protected, supported and/or relocated as necessary to adjust them to the new work.

3.2 PROTECTION, SHORING AND PUMPING

A. Protect open excavations with fencing, warning lights and/or other suitable safeguards and as may be additionally required by the Authorities having jurisdiction.

B. Protect bottom of excavation from frost. Do not place new work on frozen ground. Shore and brace excavation and provide sheet piling, if necessary, to prevent cave-ins and to conform to Local, State, and Federal Safety Regulations. Remove shoring and piling before backfilling is completed, but not until permanent supports are in place.

C. Provide all necessary pumps, well points and pumping facilities, including attendants, to keep all excavation free from water from whatever source at all times when work is in progress and when necessary for protection and integrity of the work in place. Trenches shall be kept water-free during jointing and for sufficient time thereafter to allow the jointing material to become fully set and completely resistant to water penetration. Pump discharge to be in such a manner that it does not flood, interfere or damage any other area of work and meets with approval of Conservation Commission.

3.3 INSTALLATION OF DUCT BANK

A. Trenches shall be opened only to such extent as approved by the Engineer and the total lengths of open trench shall be as short as practical at all times. Immediately upon opening of trench, bedding shall be placed, compacted, and dressed as specified.

END OF SECTION 02740

GENERATOR UPGRADE
AT DISTRICT ONE & TWO FIRE STATIONS
ACTON, MA

SECTION 02870 - SITE IMPROVEMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Contracting Requirements and Division 01 General Requirements apply to this Section.

1.2 DESCRIPTION OF WORK

A. Work Included: Providing and installing all site improvements shown on the Drawings and as specified herein, including:

1. Steel Bollards

1.3 RELATED WORK DESCRIBED ELSEWHERE

A. Carefully examine all of the Contract Document for requirements which affect the work of this Section. Other specifications which directly relate to the work of this Section include, but are not limited to, the following:

1. Section 02200 – EARTH MOVING
2. Section 02510 – BITUMINOUS CONCRETE PAVING
3. Section 02515 – PORTLAND CEMENT CONCRETE SITEWORK
4. Section 03300 – CAST IN PLACE CONCRETE

1.4 SUBMITTALS

A. Shop Drawings: Contractor shall provide fully dimensioned shop drawings and manufacturer's technical literature for all improvements and confirm fabrication, reinforcing, and anchoring systems for approval.

PART 2 - PRODUCTS

2.1 METAL BOLLARDS: Schedule 40 galvanized seamless pipe including concrete core and schedule 40 galvanized steel dome welded to pipe and ground smooth. Install as per detail.

A. Reflective tape, 3M, Reflexite, or approved equal.

B. Prime and paint. Colors to be approved by Engineer.

2.2 CONCRETE: SECTIONS 02515 AND 03300.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

A. Confirm completion of pavements and other improvements are properly sequenced prior to installation of specified improvements.

3.2 BOLLARDS:

A. Fabricate and finish bollards as detailed. Install bollards where and as detailed. Hold bollards at a constant alignment.

B. Install collapsible bollards in concrete footings in accordance with manufacturer recommendations. Minimum depth 42" below finish grade. Hold top of footing 3" below bottom of adjacent bituminous concrete.

3.3 PROTECTION/CLEAN UP

A. Protect: until acceptance of the project. Replace or refinish the surfaces if damaged prior to acceptance.

B. Clean up all debris from installation procedures.

END OF SECTION 02870

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Contracting Requirements and Division 01 General Requirements apply to this Section.

1.2 DESCRIPTION OF WORK

A. Labor, materials, equipment, services and transportation required to complete cast-in-place concrete work shown on Drawings, as specified herein, or both, including but not limited to items noted below.

1. Furnishing and placing of reinforcing steel and related positioning and securing accessories.
2. Installation of anchor bolts.
3. Furnishing and installation of concrete pads, inertia blocks, and foundations for electrical equipment.
4. Installation of items furnished by other sections (such as anchors, sleeves, bolts and plates), and required to be cast into concrete.
5. Make provisions in forms for proper location and installation of pipe sleeves, keys, bolts, anchors, inserts, and similar items, as required by other trades. Notify appropriate trades when items noted are ready for installation.
6. Unless specifically excluded, furnishing and installation of any other items of cast-in-place concrete work indicated on drawings, specified, or obviously needed to make work of this Section complete.

1.3 RELATED WORK

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Division 26 – ELECTRICAL
2. Section 02200 – EARTH MOVING
3. Section 02515 – PORTLAND CEMENT CONCRETE SITEWORK

1.4 REFERENCE STANDARDS, SPECIFICATIONS, AND CODES

A. Except as otherwise specified herein, perform work in accordance with specifications noted below, including latest editions of applicable specifications, codes, and standards cited therein, and latest applicable addenda and supplements. Keep copies of these items available in shop and field.

1. "Detailing Manual" (ACI SP-66), 1994, American Concrete Institute.
2. "Manual of Standard Practice" (MSP-1-96), Concrete Reinforcing Steel Institute (CRSI).
3. American Society for Testing and Materials (ASTM) Standards referenced in this Section.

B. Any material or operation specified by reference to published specifications of manufacturer or published standard shall comply with said specification or standard. In case of conflict between referenced specifications, most stringent requirement shall govern. In case of conflict between referenced specifications and Project Specifications, Project Specifications shall govern unless otherwise indicated by Engineer in writing.

PART 2 - PRODUCTS

2.1 CONCRETE CONSTITUENTS

A. Cement: shall be domestic-made Portland Cement, free from water soluble salts or alkalis which will cause efflorescence on exposed surfaces. Portland Cement shall be Type II, ASTM C150. Do not use air entraining cements. Use only one brand of cement for each type of cement throughout project. No visual variations in color shall result in exposed concrete.

B. Fly Ash: ASTM C618, Type C of F; fly ash shall not exceed 25% of cement content by weight.

C. Normal-weight Fine Aggregate: shall be washed, inert, natural sand conforming to ASTM C33 and following additional requirements:

Sieve	**Retained Percent**
#4	0 - 5
#16	25 - 40
#50	70 - 87
#100	93 - 97
Fineness Modulus	2.80 (Plus/Minus 0.20)
Organic	Plate 2 maximum
Silt	2.0 percent maximum
Mortar Strength	100 percent minimum compression ratio
Soundness	5 percent max. loss, magnesium sulfate, five cycles

D. Normal-weight Coarse Aggregate: shall be well-graded crushed stone or washed gravel conforming to ASTM C33 and following additional requirements:

Designated Size (inches)							
	3	2	1-1/2	1	3/4	1/2	3/8
FM (+/- 0.2)	7.95	7.45	7.20	6.95	6.70	6.10	5.50
Organic	Plate 1 maximum						
Silt	1.0 percent maximum						
Soundness	5 percent maximum loss, magnesium sulfate, five cycles.						

1. Maximum designated sizes for normal-weight coarse aggregate to be used in concrete sections shall be as noted below, except that sizes shall also be chosen in conjunction with required clearances.

   a. One and one-half inches for sections over ten inches in thickness.

   b. One inch for sections more than eight and up to ten inches in thickness.

   c. Three-quarter inch for sections more than three and up to eight inches in thickness.

E. Water: shall be from approved source, potable, clean and free from oils, acids, alkali, organic matter and other deleterious material.

F. Admixtures:

1. Water-reducing admixture: Shall comply with ANSI/ASTM C494, Type A and contain no more than .05% chloride ions.

   a. "WRDA with Hycol", W.R. Grace & Co.
   b. "Eucon WR-75", The Euclid Chemical Co.
   c. "Pozzolith 220N", Master Builder's Co.
   d. Or approved equivalent conforming to ASTM C494.

2.2 REINFORCEMENT AND ACCESSORIES

A. Reinforcing Steel Bars: shall be newly rolled billet steel conforming to ASTM A615. Bars shall be bent cold.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine work prepared by other trades to receive work of this Section and report any defects affecting installation to the Contractor for correction. Commencement of work will be construed as complete acceptance of preparatory work by others.

3.2 HANDLING, STORAGE, AND PROTECTION OF MATERIALS

A. Handle and store materials separately in such manner as to prevent intrusion of foreign matter, segregation, or deterioration. Do not use foreign materials or those containing ice. Remove improper and rejected materials immediately from point of use and from the site. Cover materials, including steel reinforcement and accessories, during construction period. Stockpile concrete constituents properly to assure uniformity throughout project.

3.3 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Start curing before concrete has dried and immediately after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.

C. Curing Methods: Keep concrete surface continuously wet by moist curing, by moisture-retaining cover curing, by curing compound, and by combinations thereof, as herein specified.

3.4 CLEANING

A. Clean concrete surfaces of objectionable stains as determined by the Engineer. Do not use materials containing acid in any form or methods which will damage "skin" of concrete surfaces. Engineer may reject any exposed-to-view concrete with damaged “skin”.

3.5 INSPECTION AND TESTING

A. Requirements of this section are generally written for purpose of securing best workmanship and end result. Certain deviations may be desirable under certain project conditions, however, and may be allowed after examination by and upon written approval of Engineer. Any such approved deviation shall not be construed as a waiver of requirements of Specifications.

B. Notify Construction Manager, Engineer and Testing Agency prior to start of any phase of concrete work so as to afford them reasonable opportunity to schedule site visit. Such notification shall be made at least 36 hours in advance.

END OF SECTION 03300

GENERATOR UPGRADE
AT DISTRICT ONE & TWO FIRE STATIONS
ACTON, MA

SECTION 16000

ELECTRICAL INDEX

PART 1 - GENERAL

1.1 RELATED DOCUMENTS 1
1.2 WORK TO BE PERFORMED 1
1.3 DEFINITIONS 2
1.4 ITEMS TO BE FURNISHED ONLY 2
1.5 ITEMS TO BE INSTALLED ONLY 2
1.6 RELATED WORK 2
1.7 CONTRACT COST BREAKDOWN 2
1.8 INSPECTION OF SITE 3
1.9 CONTRACTOR'S REPRESENTATIVE 3
1.10 COOPERATION 3
1.11 CODES, ORDINANCES, AND PERMITS 3
1.12 ELECTRICAL ROOMS OR SPACES 3
1.13 SUBMITTALS 4
1.14 GUARANTEE 4
1.15 ELECTRICAL CHARACTERISTICS 4
1.16 TEMPORARY ELECTRICAL SUPPORT FACILITIES 4
1.17 TEMPORARY LIGHT & POWER 5
1.18 INSPECTIONS AND TESTS 5
1.19 RECORD DRAWINGS 5
1.20 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS 6
1.21 PHASING, DEMOLITION AND MAINTAINING EXISTING SERVICES 6
1.22 ALTERNATES 7

PART 2 - PRODUCTS

2.1 GENERAL 7
2.2 RACEWAYS AND FITTINGS 7
2.3 CONDUCTORS 10
2.4 ACCESS PANELS 11
2.5 SLEEVES, INSERTS, AND OPENINGS 12
2.6 WIRING DEVICES 12
2.7 LIGHTING FIXTURES 13
2.8 ELECTRICAL POWER EQUIPMENT 13
2.9 ELECTRICAL SYSTEM CONTROLS AND INSTRUMENTS 14
2.10 GROUNDING SYSTEM 15
2.11 UNDERGROUND DUCTBANKS 15
2.12 SEALS 17
2.13 STANDBY ELECTRICAL SYSTEM 18
2.14 PANELBOARDS 22

PART 3 - EXECUTION

3.1 WORK COORDINATION AND JOB OPERATIONS 23
3.2 PLANS AND SPECIFICATIONS 24
3.3 IDENTIFICATION 24
3.4 PROTECTION AND CLEANUP 25
3.5 PORTABLE OR DETACHABLE PARTS 25

3.6 SAFETY PRECAUTIONS 25
3.7 MOUNTING HEIGHTS 25
3.8 WORKMANSHIP AND INSTALLATION METHODS 26
3.9 FEEDER CIRCUITS 32
3.10 BRANCH CIRCUITS 32
3.11 FIREPROOFING AND WATERPROOFING 33
3.12 CUTTING AND PATCHING 33
3.13 DISTRIBUTION EQUIPMENT TESTING 33
3.14 DEMOLITION, REMOVAL AND RELOCATION WORK 36

END OF INDEX 16000

GENERATOR UPGRADE
AT DISTRICT ONE & TWO FIRE STATIONS
ACTON, MA

SECTION 16000

ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. All the Contract Documents and General Provisions of the Contract including, but not limited to General Conditions and Division 1 Specifications Sections, apply to work of this section.

1.2 WORK TO BE PERFORMED

A. Work described herein shall be interpreted as work to be done by the Electrical Contractor. When reference is made to Electrical Contractor or Subcontractor or General Contractor, it shall mean the General Contractor as one and the same.

B. Provide all labor, materials, tools, and equipment, including scaffolding, to complete the installation of the electrical system. Install, equip, adjust, and put into operation the respective portions of the installation specified, and so interconnect various items or sections of work in order to form a complete and operating whole. Systems may reference in singular or plural terms, also refer to drawings to confirm quantities. The work shall consist of, but shall not necessarily be limited to the following:

1. Generators, transfer switches, remote annunciators, ductbanks, generator pads, grounding, etc.

2. Service modifications, backfeeding existing panels, coordination with utility company, metering, feeders and subfeeders.

3. All raceway systems, including boxes, couplings, and fittings.

4. All branch circuit wiring systems, including wiring devices, plates, etc.

5. Connections for all building equipment as indicated on plans.

6. All testing of equipment installed.

7. Any other item of work hereinafter specified or indicated on Electrical Drawings.

8. Drilling, coring, cutting and patching of holes for electrical conduit, systems, and equipment.

9. Systems Identification.

10. Scaffolding, Rigging, and Staging for all Electrical Work.

11. Fire stopping shall be performed by this Contractor.

12. Provide Seismic Restraints for all Electrical Systems conforming to the requirements of State Building Code.

13. Temporary Lighting and Power.

14. Phasing and Demolition.

15. Alternates affecting this section.

1.3 DEFINITIONS

A. Most terms used within the documents are industry standard. Certain words or phrases shall be understood to have specific meanings as follows:

1. Provide: Furnish and install completely connected up and in operable condition.

2. Furnish: Purchase and deliver to a specific location within the building or site.

3. Install: With respect to equipment furnished by others, install means to receive, unpack, move into position, mount and connect, including removal of packaging materials.

4. Conduit: Raceways of the metallic type which are not flexible. Specific types as specified.

5. Connect: To wire up, including all branch circuitry, control and disconnection devices so item is complete and ready for operation.

6. Subject to Mechanical Damage: Equipment and raceways installed exposed and less than eight feet above finished floor in mechanical rooms or other areas where heavy equipment may be in use or moved.

1.4 ITEMS TO BE FURNISHED ONLY

A. Furnish the following items for installation under designated sections.

1. None

1.5 ITEMS TO BE INSTALLED ONLY

A. Install the following items furnished under designated sections.

1. None.

1.6 RELATED WORK

A. The following related work is to be performed under designated sections.

1. Payment for energy for temporary light and power will be made by the Owner.

1.7 CONTRACT COST BREAKDOWN

A. Submit a breakdown of contract price to aid Architect in determining value of work installed as job progresses.

1.8 INSPECTION OF SITE

A. Electrical bidders will be permitted to inspect site. Failure to inspect existing conditions or to fully understand work which is required shall not excuse the Electrical Subcontractor from his obligations to supply and install work in accordance with specifications and the Drawings and under all site conditions as they exist.

1.9 CONTRACTOR'S REPRESENTATIVE

A. Retain a competent representative on the project.

1.10 COOPERATION

A. Work shall be carried on under usual construction conditions, in conjunction with other Contractor's work. Cooperate with other contractors, coordinate work and proceed in a manner as not to delay progress.

B. Before proceeding, examine all Construction Drawings and consult other Contractors to coordinate installation and avoid interference.

C. In case of dispute, the Architect will render a decision in accordance with General and Supplementary General Conditions.

1.11 CODES, ORDINANCES, AND PERMITS

A. Codes and Ordinances:

1. All material and work provided shall be in accordance with the following codes and standards as most recently amended.

Commonwealth of Massachusetts Building Code 8th Edition
Massachusetts Electric Code, 2011 Edition
State Department of Public Safety
NFPA 101 "Life Safety Code"
NFPA Standards
Standards of the Underwriters Laboratories (UL)
Occupational Safety and Health Act (OSHA)
Americans with Disabilities Act (ADA)
Energy Conservation Code
Town of Acton

2. Where contract documents indicate more stringent requirements than codes, the contract documents shall take precedence.

B. Permits: Be responsible for filing documents, and securing of inspection and approvals. Permit fees shall be paid by this Contractor. Utility Company back charges will be paid directly by the Owner.

1.12 ELECTRICAL ROOMS OR SPACES

A. Be responsible for ensuring that the dedicated space and clearances required in the NEC, Sections 110-16 and 110-26 are maintained for all electrical equipment.

B. Call other contractors' attention to the requirements contained in the above mentioned code sections, prior to the installation of equipment by other contractors, in order to ensure no violations.

1.13 SUBMITTALS

A. Refer to Supplementary General Conditions for information relative to submission of Shop Drawings. Six (6) copies are required. No equipment for which review is required shall be installed prior to review, except at Contractor's own risk.

B. Notwithstanding any restrictions upon contractor proposed substitutions, should apparatus or materials be permitted by Architect to be substituted for those specified for good cause, and such substitution necessitates changes in or additional connections, piping, supports, or construction, same shall be provided. Assume cost and entire responsibility thereof.

C. Submit the following samples:

1. Items as may be requested.

1.14 GUARANTEE

A. Keep work in repair without expense to Owner as far as concerns defects in workmanship or materials for a period of not less than one year from date of substantial completion.

1.15 ELECTRICAL CHARACTERISTICS

A. In general, and unless specifically indicated otherwise, all building service, heating, ventilating, air conditioning, and plumbing equipment shall be of the following characteristics:

1. Motors up to and including 1/3 HP shall be suitable for 120 volts, one phase operation.

2. Motors larger than 1/3 HP shall be suitable for 240 volts, single phase operation.

3. Electric heating equipment 1.5 KW and less shall be suitable for 120 volt, single phase operation. Over 1.5 KW shall be 240 volt, single phase.

B. Power Factor: All equipment provided rated greater than 1,000 watts and lighting equipment greater than 15 watts with an inductive reactance load component shall have a power factor of not less than 90% under rated load conditions.

1.16 TEMPORARY ELECTRICAL SUPPORT FACILITIES

A. Provide own field office and/or storage facilities which shall be located as directed or permitted be the Owner and in accordance with local regulations. Provide all tools, equipment, ladders, and temporary construction required for execution of the work.

B. All scaffolding, ladders, and other temporary construction shall be rigidly built in accordance with all local and state requirements, and shall be removed upon completion.

1.17 TEMPORARY LIGHT & POWER

A. The Electrical Subcontractor shall furnish and install feeders of sufficient size from the existing electrical service for the electric light and power requirements for the building while under construction and until the permanent feeders and related equipment have been installed and are in operation. Existing lights may be used for temporary lighting.

B. All necessary transformers, meters, cables, panelboards, switches, temporary lamp replacements and accessories required for the temporary light and power installation shall be provided by the Electrical Subcontractor.

C. The Electrical Subcontractor shall install and maintain the wiring and accessories for the offices of the General Contractor and the Clerk of the Works as specified in the contract form.

D. All temporary electrical work shall meet the requirements of the Massachusetts Electrical Code Article 590 Temporary Wiring, the Local Utility Company, and all Federal Standards and Laws.

E. All Temporary wiring and accessories thereto installed by the Electrical Subcontractor shall be removed after their purposes have been served.

F. The Town will pay for the cost of electric energy consumed by Contractor and by all of his Subcontractors as described in Division 1, unless otherwise indicated.

G. Provide all temporary lighting and power required above during the normal working hours of the project or a total of ten (10) hours per normal working day; Saturdays, Sundays and legal holidays are excluded. The ten hours per day shall include manning the temporary power and lighting ½ hour before and ½ hour after a normal eight (8) hour working day. In addition to the above, provide and maintain, to the satisfaction of the local authorities having jurisdiction, all temporary lighting and power that may be required for safety purposes.

1.18 INSPECTIONS AND TESTS

A. Inspection: If inspection of materials installed shows defects, such defective work, materials, and/or equipment shall be replaced and inspection and tests repeated.

B. Tests: Make reasonable tests and prove integrity of work and leave electrical installation in correct adjustment and ready to operate. All panels and switchboards shall have phases balanced as near as practical. A consistent phase orientation shall be adhered to at all terminations.

1.19 RECORD DRAWINGS

A. Provide two sets of black or blue line on white Drawings to maintain and submit Record Drawings, one set shall be maintained at site and which shall be accurate, clear, and complete showing actual location of all equipment as installed. Record Drawings shall be updated at least monthly. Record Drawings shall show outlet from which homeruns are taken, and location of all junction boxes and access panels. These Drawings shall be available to Architect/Engineer field representative.

B. Any addenda sketches and Supplementary Drawings issued during course of construction shall be attached to Drawings.

C. At completion, submit an accurate checked set of Drawings.

D. After approval of these Drawings, photo reproductions of original tracings shall be revised to incorporate changes, including addenda sketches and Supplementary Drawings. These "as-built" photo reproductions shall be certified as correct and delivered to the Architect in electronic autocad format along with two sets of black line prints.

1.20 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

A. Operating Instructions: Furnish operating instructions to Owner's designated representative with respect to operations, functions and maintenance procedures for equipment and systems installed. Cost of such instruction up to a full three days of Electrical Subcontractor's time shall be included in contract. Cost of providing a manufacturer's representative at site for instructional purposes shall also be included.

B. Maintenance Manuals:

1. At completion of the project, provide four copies of complete manuals containing the following:

a. Complete Shop Drawings of equipment.
b. Operation description of systems.
c. Names, addresses, and telephone numbers of suppliers of systems.
d. Vendors' P.O. numbers for equipment installed.
e. Preventive maintenance instructions for systems.
f. Spare parts list of system components.

2. All information shall be in one binder.

1.21 PHASING, DEMOLITION AND MAINTAINING EXISTING SERVICES

A. During the execution of the work, required relocation, rerouting, etc., of existing equipment and systems in the existing building areas where new work is to be installed or new connections are scheduled to be made, shall be performed by the Electrical Contractor, as required by job conditions and as determined by the Architect in the field, to facilitate the installation of the new system, while demolition, relocation work or new tie-ins will be performed. Outages required for construction purposes shall be scheduled for the shortest practical periods of time, in coordination with the Owner’s designated representative, for specified, mutually agreeable periods of time, after each of which the interruption shall cease and the service shall be restored. This procedure shall be repeated to suit the Owner’s working schedule, as many times as required until all work is complete. Any outages of service shall be approved by the Owner, prior to commencing the work. No outages or shutdowns of service shall occur without the written authorization of the Owner prior to commencing the work. Give notice of any scheduled shutdowns, a minimum of two weeks in advance. Owner shall make their best effort to meet this request without adversely affecting the electric service to the existing building.

B. Prior to any deactivation and relocation or demolition work, consult the drawings and arrange a conference with the Owner’s representative in the field to inspect each of the items to be deactivated, removed or relocated. Care shall be taken to protect all equipment designated to be relocated and reused or to remain in operation and be integrated with the new systems.

C. Where existing outlets are to be reused and are cut off by the remodeling, they shall be reconnected to existing circuits as required by field conditions. Where existing outlets are to be abandoned, they shall be removed and blank plates installed. Each bidder shall, before submitting his bid, visit the site and make a thorough examination of the conditions in the existing building in order to determine the extent of the work to be done.

D. All deactivation, relocation and temporary tie-ins of electrical systems and equipment shall be provided by the Electrical Subcontractor. All demolition and removal of electrical systems and equipment designated to be demolished shall be by the Electrical Subcontractor. Stack all demolished electrical materials except hazardous materials PCB lighting ballasts, fluorescent lamps, etc.) nearby for removal by the General Contractor. All hazardous electrical materials shall be legally disposed by the electrical subcontractor.

E. The Owner reserves the right to inspect the material scheduled for removal and salvage any items he deems usable as spare parts.

F. Phasing

1. The Electrical Subcontractor shall construct the subject in phases as directed by the Architect to suit the project progress schedule, as well as the completion date of the project.

PART 2 - PRODUCTS

2.1 GENERAL

A. Product specifications are written in such a manner so as to specify what materials may be used in a particular location or application and therefore do not indicate what is not acceptable or suitable for a particular location or application. As an example: non-metallic sheathed cable is not specified; therefore, it is not acceptable.

B. For purpose of establishing a standard of quality and not for purpose of limiting competition, the basis of this Specification is upon specified models and types of equipment and materials, as manufactured by specified manufacturers.

C. In all cases, standard cataloged materials and systems have been selected. Materials such as lighting fixtures specially manufactured for this particular project and not part of a manufacturers' standard product line will not be acceptable. In the case of systems, the system components shall be from a single source regularly engaged in supplying such systems. A proposed system made up of a collection of various manufacturers' products will be unacceptable.

D. Where Specifications list manufacturers' names and/or "as approved" or "equal approved by Architect", other manufacturers' equipment will be considered if equipment meets Specification requirements and has all features of the specified items as are considered essential by Architect.

E. All material shall be new and shall be UL listed.

2.2 RACEWAYS AND FITTINGS

A. Raceways - General:

1. No raceway shall be used smaller than 3/4" diameter and shall have no more than four 90 degree bends in any one run, and where necessary, pull boxes shall be provided. Only rigid metal conduit or intermediate metal conduit is allowed for slab work. Cable systems, if allowed to be used by other sections of this specification, shall not be used exposed or in slabs, whether listed by "UL" for such use or not.

2. Rigid metal conduit conforming to, and installed in accordance with, Article 344 shall be heavy wall zinc coated steel conforming to American Standard Specification C80-1 and may be used for service work, exterior work, slab work, and below grade level slab, wet locations, and in penthouse for drops down to equipment from elevations below eight feet and also where raceway may be subject to mechanical damage.

3. Electrical Metallic Tubing (EMT), conforming to, and installed in accordance with, Article 358 shall be zinc coated steel, conforming to industry standards, may be used in masonry block walls, stud partitions, above furred ceilings, where exposed but not subject to mechanical damage, and shall be used for any fire alarm work.

4. Surface metal raceways conforming to, and installed in accordance with, Article 386 may be used only where raceways cannot be run concealed in finish spaces, and then, if only specifically approved.

5. Flexible metal conduit shall be used for final connections to recessed lighting fixtures from above ceiling junction boxes and for final flexible connections to motors and other rotating or vibrating equipment. Liquid tight flexible metal conduit shall be used for the above connections which are located in moist locations. Moist locations shall include mechanical rooms, penthouses and exterior locations with mechanical equipment. All flexible connections shall include an insulated grounding conductor.

6. Rigid non-metallic conduit shall be used for underground electric feeders and shall be polyvinyl chloride (PVC) schedule 40, 90 degrees C. Rigid steel conduit shall be used through walls and slabs and where exposed on exterior, etc.

7. Acceptable manufacturers:
   Pittsburgh Standard Conduit Company
   Republic Steel and Tube
   Youngstown Sheet and Tube Company
   Carlon
   Or Equal

8. Fittings:

   a. Provide insulated bushings on all raceways 1 inch diameter or larger.
   b. Manufacturer's standard fittings shall be used for raceway supports.
   c. Expansion Fittings: Expansion fittings shall be used where structural and concrete expansion joints occur and shall include a ground strap.
   d. Couplings for rigid metal and intermediate metal conduit shall be threaded type.

e. Threadless fittings for EMT shall be watertight compression type (wet locations) or set-screw type (dry-locations). All fittings shall be concrete tight. No diecast fittings allowed except for raceways larger than 1 inch diameter.

f. Cable supports in vertical raceways shall be of the split wedge type. Armored cable supports for vertical runs to be of wire mesh basket design.

g. Wall entrance seals shall be equal to O.Z. Gedney type "WSK".

h. Couplings, elbows and other fittings used with rigid nonmetallic conduit shall be of the solvent cemented type to secure a waterproof installation.

i. Acceptable manufacturers:

O.Z.
Crouse Hinds
Appleton
EFCOR
Steel City
Or Equal

B. Outlets, Pull and Junction Boxes:

1. Outlets:

a. Each outlet in wiring or raceway systems shall be provided with an outlet box to suit conditions encountered. Boxes installed in normally wet locations or surface mounted shall be of the cast-metal type having hubs. Concealed boxes shall be cadmium plated or zinc coated sheet metal type. Old work boxes with Madison clamps not allowed in new construction. Thru the wall boxes are not permitted.

b. Each box shall have sufficient volume to accommodate number of conductors in accordance with requirements of Code. Boxes shall not be less than 1-1/2" deep unless shallower boxes are required by structural conditions and are specifically approved by Architect. Ceiling and bracket outlet boxes shall not be less than 4" octagonal except that smaller boxes may be used where required by particular fixture to be installed. Flush or recessed fixtures shall be provided with separate junction boxes when required by fixture terminal temperature requirements. Switch and receptacle boxes shall be 4" square or of comparable volume.

c. Far side box supports shall be Caddy J-1A.

d. Acceptable manufacturers:

Appleton
Crouse Hinds
Steel City
RACO
Or Equal

2. Pull and Junction Boxes: Where indicated on plans, and where necessary to terminate, tap off, or redirect multiple raceway runs or to facilitate conductor installation, furnish, and install appropriately designed boxes. Boxes shall be fabricated from code gauge steel assembled with corrosion resistant machine screws. Box size shall be as required by Code.

   Boxes in moist or wet areas shall be galvanized type. Boxes larger than 4-11/16 inches square shall have hinged covers. Boxes larger than 12 inches in one dimension will be allowed to have screw fastened covers, if a hinged cover would not be capable of being opened a full 90 degrees due to installation location.

   a. Acceptable Manufacturers:
      Brasch
      Hoffman
      Keystone
      Lee Products Co.
      McKinstry Inc.
      Eldon Inc.
      Or Equal

2.3 CONDUCTORS

A. All conductors shall be a minimum size of #12 AWG except for control wiring and fire alarm wiring where #14 AWG may be used. For all exit sign circuits, normal/emergency circuits, exterior lighting circuits, and also where distance from panelboard to first outlet exceeds 100' @ 120 volts, #10 AWG shall be minimum size wire allowed. All feeder and branch circuit conductors shall be color coded as follows:

1.	240V/120V	Phase A	Black
2.	240V/120V	Phase B	Red
3.	Grounded Conductor	120/240	White
8.	Equipment Ground	120/240	Green

B. All conductors not installed in accordance with color scheme shall be replaced. All conductors larger than #6 AWG must be identified with colored tape.

C. Connections throughout the entire job shall be made with solderless type devices.

   1. For #10 AWG and smaller: spring type.
   2. For #8 AWG and larger: circumferential compression type.
   3. Acceptable manufacturers:

      3M "Scotchlock"
      IDEAL "Wingnut"
      BURNDY
      MAC
      Or Equal

   4. Any splices made up in ground mounted pull boxes shall be resin cast waterproof type or waterproof pressure type.

D. Conductors shall be copper, soft drawn, and annealed of 98% conductivity. Conductors larger than #10 AWG shall be stranded; #10 AWG and smaller shall be solid. Conductors shall be insulated for 600 volts and be of following types:

1. All conductors shall have heat/moisture resistant thermoplastic insulation type THHN/THWN (75°C) except as follows:

   a. In sizes #1 AWG and larger: Crosslinked polyethylene insulation type XHHW (75°C - 90°C) may be used.
   b. Fire alarm system conductors shall be #14 AWG, type THHN, solid. Color coding of fire alarm conductors shall be in accordance with fire codes.
   c. Fixture whips #16AWG type "SF".

E. Stranded conductors for all wiring systems except fire alarm will be allowed if installed and terminated as specified under Execution Section.

F. Mineral-Insulated Metal-Sheathed Fire-Resistive Cables (Type MI) - Cables shall consist of a factory assembly of one or more solid copper conductors insulated with highly-compressed magnesium oxide and enclosed in a seamless, liquid-and-gas-tight continuous copper sheath. Cables shall be rated for 600 volts and less. Cables shall comply with Article 332 of the National Electrical Code. Cables shall be classified by Underwriters Laboratories, Inc. as having a 2-hour fire resistive rating. Cable terminations shall be made with UL listed mineral-insulated cable fittings. Approved Manufacturer - Pyrotenax USA, Inc. or approved equal.

G. Type MC cable may be used for branch circuits and fire alarm system above ceilings and in hollow spaces where concealed and allowed by code and not subject to damage if installed and terminated as specified under Execution Section. Armor to be galvanized steel and shall be UL listed for 2 hour fire wall penetration, equal to AFC Cable Systems of New Bedford, MA. Fire Alarm MC Cable armor shall be red.

H. Acceptable manufacturers:

AFC Cable Systems
American Wire & Cable
Anaconda
Cerro
Cornish
Cresent
Essex
Okonite
Rome
Or Equal

2.4 ACCESS PANELS

A. Provide access panels for access to concealed junction boxes and to other concealed parts of system that require accessibility for operation and maintenance. In general, electrical work shall be laid out so access panels are not required.

B. Access panels shall be located in a workmanlike manner in closets, storage rooms, and/or other non-public areas, positioned so that junction can be easily reached and size shall be sufficient for purpose (minimum size 12" x 12"). When access panels are required in corridors, lobbies, or other habitable areas, they shall be located as directed by the Architect.

C. Access panels shall be prime painted and equipped with screwdriver operated cam locks.

D. Acceptable manufacturers:

Inland Steel Products Company - Milcor
Miami Carey
Walsh-Hannon-Gladwin, Inc. - Way Locator
Or Equal

Specific types:

1.	Acoustical Tile Ceiling	"Milcor Type AT"
2.	Plastered Surfaces	"Milcor Type K"
3.	Masonry Construction	"Milcor Type M"
4.	Drywall Construction	"Milcor Type DW"

E. Furnish Access Panel Shop Drawings.

2.5 SLEEVES, INSERTS, AND OPENINGS

A. Sleeves: Provide sleeves of proper sizes for all openings required in concrete floors and walls. Sleeves passing through floors shall be set with top of sleeve 1" above finished floor. Core drilling will also be acceptable if in accordance with any structural standards. Any unsleeved openings shall be waterproofed.

B. Inserts: Provide inserts or other anchoring devices in concrete and masonry construction as required to support raceways and equipment.

C. Openings: Where an opening is required in concrete slabs to allow passage of a multitude of raceways, give adequate notice to General Contractor so he may box out opening in form work.

D. Any openings through fire rated surfaces shall be closed off with fireproofing materials providing the same rating as the surface penetrated.

Acceptable Manufacturers:

Specified Technologies Inc.
Thomas & Betts
International Protective Coatings Corp.
3M Fire Protection Products
Dow Corning
Or Equal

2.6 WIRING DEVICES

A. RECEPTACLES: Receptacles shall be flush mounted. All standard 20 ampere devices to be of same manufacturer.

Acceptable Manufacturers:

Twenty (20) ampere duplex grounding type NEMA 5-20R,
Hubbell 5362I,
Or Equal

B. Switches: 20 ampere,
Hubbell 1221,
Or Equal

C. Composition material of wiring devices to be nylon with finish to match existing.

D. Coverplates: Brushed US 302 stainless steel

Provide gaskets on all wiring device plates where devices are on walls separating conditioned and non-conditioned spaces.

2.7 LIGHTING FIXTURES

A. Provide lighting fixtures complete with lamps, ballasts, and other devices as required for a first class installation. Furnish Ceiling Subcontractor with instructions concerning openings necessary, and provide frames for NEMA standard ceiling types or special mounting frames, as may be required. Fixtures shall be supported independently of hung ceiling construction.

B. Non-electronic fluorescent ballasts shall be for operation on 277 volts, be ETL/CBM high power factor class "P" low profile, low temperature with internally protected automatic resetting thermal cutouts equal to Advance Mark III.

1. Sound rating of ballasts shall be "A" for 430 ma, "B" for 800 ma, and "D" for 1500 ma. All ballasts in a particular type of lighting fixture shall be of same manufacturer.

C. Electronic ballasts shall be equal to Advance Mark V in single, two, and three lamp versions and input current total harmonic Distortion not exceeding 10%.

D. All specialized lamps to be of a type recommended by the fixture manufacturers in their photometric reports.

E. All T-8 fluorescent lamps shall be Sylvania Octron 3500 K.

F. Fixture types shall be as scheduled. Standard cataloged products have been selected. Fixtures specially manufactured for this particular project and not part of a manufacturers standard line will not be acceptable.

G. All fluorescent ballasts shall have a ballast factor greater than 0.97.

2.8 ELECTRICAL POWER EQUIPMENT

A. Disconnect Switches:

1. Disconnect (safety) switches shall conform to industrial standards of NEMA, be UL listed and shall be heavy duty type, quick-make, quick-break type with interlocking cover mechanism and provisions for padlocking switch handle in "OFF" position.

Three pole toggle switches are not acceptable as substitute for disconnect switches.

2. Disconnect switches shall be of fused or unfused type as indicated with number of disconnecting poles indicated. The grounded conductor shall not be switched. Switches for use with current limiting fuses shall be rejection type and those used in conjunction with motors shall be horsepower rated. Provide oversize termination lugs if required by conductor size.

3. Enclosures shall be of proper NEMA type for intended location and shall be phosphate coated or equivalent code gauge galvanized sheet steel with ANSI #24 dark gray baked enamel finish.

4. Acceptable Manufacturers:
Square D/Groupe Schneider
Or Equal

D. Fuses:

1. Provide a complete set of fuses for each item of fusible type equipment. Fusible equipment furnished by other contractors will be complete with fuses, unless noted otherwise on Electrical Drawings.

2. Turn over to authorized representative of Owner upon completion a spare set of fuses of each different type and ampere rating installed. These spares shall be bound with twine and tagged.

3. Secondary system fuses, rated at 600 volts or less, shall be UL listed and constructed in conformance with the applicable standards set forth by NEMA and ANSI. All fuses of a particular class shall be of same manufacturer.

4. All fuses in distribution panelboards and switchboards shall be class "L" above 600 amperes and class "RK1" for 600 amperes and below.

5. Acceptable Manufacturers:

Bussmann, Division of McGraw
Gould/Shawmut
GEC-ALSTHOM
Or Equal

2.9 ELECTRICAL SYSTEM CONTROLS AND INSTRUMENTS

A. Provide a complete power system consisting of branch circuits, motor disconnect switches, pushbutton stations, motor starters, and other devices to connect up and leave in operating condition each piece of electrically operated equipment provided either under this section or other Divisions.

B. All control wiring, not indicated in the Electrical Specifications or not shown on Electrical Drawings, will be provided by Temperature Control Subcontractor.

2.10 GROUNDING SYSTEM

A. All equipment and systems shall be grounded. Refer especially to NEC Section 250 Requiring Connections to Building Steel, Foundation, Water Service, and Interior Piping. Provide generator pad grounding.

B. The grounded conductor shall be supplemented by an equipment grounding system.

C. The equipment grounding system shall be installed so all conductive items in close proximity to electrical circuits operate continuously at ground potential and provide a low impedance path for ground fault currents.

D. Grounding conductors shall be so installed as to permit shortest and most direct path to ground.

E. Maximum measured resistance to ground of 5.0 ohms shall not be exceeded. Ground separately derived systems (dry type transformers) in accordance with Article 250-26 by grounding neutral to transformer ground lug and providing insulated grounding electrode conductor to nearest effectively grounded building steel or, if unavailable, to nearest available effectively grounded metal water pipe.

F. Equipment grounding conductors and straps shall be sized in compliance with Code Table 250.

G. Grounding conductors shall be insulated with green color. Grounding conductors for use on isolated ground receptacles shall be green with trace color to differentiate between normal ground conductors.

H. Branch circuits shall consist of phase, grounded and grounding conductor installed in common metallic raceway. The raceway system may not serve as the grounding conductor only. All circuits shall have a separate insulated grounding conductor installed. Any flexible cable system or non-metallic raceway system shall have an insulated grounding conductor. Any cable system for use on isolated ground circuits shall have both an isolated ground conductor as well as an equipment ground conductor, both of which shall be insulated.

I. Each electrical expansion fitting shall be furnished with a bonding jumper. Provide grounding bushings and ground connections for all raceways terminating below equipment where there is no metal-to-metal continuity.

J. Continuity between all metallic and non-metallic raceway systems and equipment shall be maintained.

K. Outdoor lighting fixtures shall be grounded and bonded in common with building system via a separate grounding conductor.

2.11 UNDERGROUND DUCTBANKS

A. General: Furnish and install the ductbanks as herein specified and as shown on drawings.

B. Division of Work:

1. The General Contractor shall be responsible for the work and material required for the following:

a. Excavation
b. Backfill
c. Installation of handholes
d. Brick or concrete collars to bring handhole frames and covers up to grade. Installation of frames and collars which are to be furnished by the Electrical Contractor.
e. Concrete encasement.

2. All other material, equipment, and labor required for the complete ductbank shall be furnished and installed by the Electrical Contractor under this Section, including the following:

a. Service raceways.
b. Grounding material.
c. Ductbank warning tape.
d. Pre-cast handholes.
e. Conduit spacers.

C. Materials:

1. Conduit: UL listed, schedule 40 PVC in accordance with NEMA standard TC-2.

2. Conduit Supports (duct system): Shall be molded plastic with interlocking lugs and skeletonized structure, minimum separation 3”.

3. Tags: Non-ferrous metal or fiber, ¼” high letters.

4. Warning tape shall be yellow polyethylene 4 mil thick, 6” wide terratape, and shall be installed above all ductbanks both high and low tension.

D. Duct System:

1. The duct system shall consist of Schedule 40 PVC conduit except where otherwise specified. The size and number of conduits shall be as indicated on the drawings. Provide a pull wire in each conduit.

2. The entire length between handholes and end of ductbank shall be excavated and graded before any conduit is laid.

3. The ductbank shall be set on undisturbed earth.

4. The conduit shall be installed so that top is a minimum of 36” below finished grade unless otherwise indicated, and shall be laid to a minimum grade of 4” for each 100 feet of length. Duct system shall drain to manholes/handholes.

5. Changes in direction shall be made by long sweep bends, minimum radius 25 feet except that at the end of a run, within 10 feet of termination. Manufactured ends may be used having a minimum radius of 36 inches.

6. Conduit base and intermediate spacers shall be installed a maximum of 5 feet on centers. Spacers shall not be placed one above the other, but shall be staggered a minimum of 6”.

7. All conduit joints shall be made watertight by means of a sealing compound before the coupling is installed. Joints in conduit shall be staggered, minimum space between joints in adjacent conduit shall be 6".

8. When the required number of conduits have been installed, securely tie the assembly together at distances not exceeding 7 feet. Tie shall consist of three turns of No. 18 iron wire. Separate ties required for low tension and high tension conduit runs.

9. Duct envelope shall be vibrated to eliminate voids.

10. Ductbanks shall not be covered until the conduit installation has been observed by the utility company and Architect.

11. Warning tape shall be installed during backfilling and shall be placed approximately 12" above the conduits.

12. After the installation is completed, each conduit shall be cleaned and identified. A standard flexible mandrel and a stiff bristle brush shall be pulled through each conduit. The mandrel shall not be less than 12" long and the diameter approximately ¼" less than the conduit.

2.12 SEALS

A. Water Tight Seals

1. Conduits entering from the exterior or below grade shall have water tight fittings on the outside and on the inside of the conduit.

a. Fittings on the outside of the conduit shall be O-Z Gedney type FSK or approved equal. Provide type WSK if penetration is within two feet of the high water table. Provide grounding attachment.

b. Fittings on the inside of the conduit shall be O-Z Gedney type CSBI or approved equal. Provide type CSBG if penetration is within two feet of the high water table. Provide a blank fitting to seal spare or empty conduits.

c. O-Z Gedney type CSM fitting may be used when sealing within a sleeve or cored hole.

2. Submit on seals to be used.

B. Environmental Seals

1. Provide seals on raceways exposed to widely different temperatures, as in refrigerating or cold storage areas. Install seal to prevent circulation of air from warmer to colder sections through the raceway.

C. Hazardous Area Seals

1. Provide explosion proof seals as required by the Electric Code for the following areas.

a. None.

D. Smoke and Fire Stopping Seals

1. Provide a seal around raceways or cables penetrating full height walls (slab to slab), floors or ventilation or air handling ducts so that the spread of fire or products of combustion shall not be substantially increased.

2. Penetrations through fire-resistant-rated walls, partitions, floors or ceilings shall be firestopped using approved methods and NRTL listed products to maintain the fire resistance rating.

3. Fire stopping in sleeves or in areas that may require the addition or modification of installed cables or raceways shall be a soft, pliable, non-hardening fire stop putty. Putty shall be water resistant and intumescent. Provide for all sleeves and raceways.

4. Firestopping in locations not likely to require frequent modification shall be NRTL listed putty, caulk or mortar to meet the required fire resistant rating.

5. Box penetrations into a fire rated wall or shaft shall have a fire stopping pad installed on the back of the box.

6. Firestopping of cable trays or busways through walls shall be with a non-hardening putty or with seal bags.

7. Firestopping materials shall be NRTL listed to UL 1479 (ASTM E814). Installation methods shall conform to a UL firestopping system. Submit specifications and installation drawings for the type of material to be used. Firestopping materials shall be as manufactured by 3M, International Protective Coatings Corp., RayChem or approved equal.

2.13 STANDBY ELECTRICAL SYSTEM

A. Provide (2) 50 KW, 50 KVA, 120/240 volt, single phase, 3 wire at 1.0 PF standby power rated diesel generator sets mounted in perfect alignment on an all welded, fabricated steel sub-bases which shall allow for attachment of all necessary engine and generator accessories.

Acceptable Manufacturers:
Kohler
Onan/Cummings
Caterpillar
Generac
Onsite Energy
Baldor
Or Equal

B. Engine:

Water cooled with unit-mounted radiator.

Dry-type replaceable element air cleaners.

Full flow lube oil filters and bypass oil filter.

Twelve (12) volt starting motor, 12 volt, 3 ampere battery charging alternator.

Engine instrument panel to include ammeter, lube oil pressure gauge, lube oil temperature gauge, water temperature gauge, and hour meter.

Engine-mounted safety control to provide alarm signals for engine shutdown in event of low oil pressure, high coolant temperature, overspeed, over crank, and pre-alarms for high water temperature and low oil pressure.

Jacket water heater, 2,000 watt, 120 or 240 volt, single phase or as recommended by generator manufacturer.

C. Generator: 50KW, 50 kVA, 120/240 volt, 1 phase, 3 wire, 60 Hz, 1800 RPM revolving field type main generator with brushless exciter.

Voltage regulation ± 1% for any constant load between no load and full load.

D. Cooling System: Unit-mounted radiator with duct flange attached.

E. Starting System: 12 volt heavy duty lead acid storage battery, connected for 12 volt DC output.

Battery rack, cables, and connectors shall be provided.

Provide LaMarche Model A18-J-12 volt battery charger fed from a 120 volt, single phase, 60 Hz service. Battery charger to include high and low battery voltage alarm relays for derangement panel. Battery charger shall meet NFPA 110 standards.

F. Exhaust System: Furnish one Maxim M-51 3" critical silencer, 3" side inlet, and one 3" end outlet complete with two (2) 3" companion flanges.

Furnish one 3" x 18" flexible stainless steel exhaust connector, flanged on one end, threaded nipple on opposite end.

Generator shall meet all applicable emissions standards and regulations.

G. Vibration Isolators: Set of four (4) Korfund rubber type vibration isolators for installation between steel base and concrete foundation.

H. Generator Control Panel:

1. To completely control operation of engine generator set. Panel to have automatic start control, AC volt meter, AC ammeter, pointer type frequency meter, volt meter, ammeter and selector switch. Alarm signals to indicate pre-low oil pressure, pre-high coolant temperature, and alarm signals to shut down engine in event of a low oil pressure, high coolant temperature, engine overspeed, or overcrank. Lights on face of panel to indicate failure. Provide dry contacts for remote disarrangement signal & louvers.

2. Terminal strip shall be included with alarms and prewarning devices prewired for remote annunciator specified herein. Provide wiring between generator and remote annunciator panel. Generator control switch shall be mounted on control panel face. A flashing light for selector switch "OFF" shall be included.

3. Provide molded case line circuit breakers mounted on generator in oversized terminal box.

I. Automatic Transfer Switches:

1. Provide automatic transfer switches as shown in Drawings for operation on 120/240 volts, 1 phase, 3 wire operation. Units to be housed in a NEMA 1 enclosures.

   Switches shall be listed under UL 1008.
   Switches shall be rated for 22,000 arms at rated voltage.

   Acceptable Manufacturers:

   Russ Electric
   ASCO
   Onan
   Or Equal

2. Units shall be provided with standard accessories as follows.

   a. Voltage and Frequency Sensing:

      1. Close differential voltage sensing on all phases of normal pickup adjustable 85-100%. Dropout 75-98%

      2. Voltage sensing of emergency source. Adjustable pickup 85-100%.

      3. Frequency sensing of emergency source. Adjustable pickup 90-100%.

   b. Time Delays:

      1. Time delay to override momentary normal source outages. Adjustable 0.5 to 6 seconds.

      2. Retransfer to normal with 5 minute cooldown timer.

   c. Engine Control:

      1. Contact to close when normal source fails.

      2. Contact to open when normal source fails.

      3. Test switch to simulate normal source failure.

   d. Indicators: Pilot lights to indicate switch in normal position or emergency position.

   e. Auxiliary Contacts: Two (2) to close on normal. Two (2) to close on emergency.

3. Provide the following:

   a. Plant exerciser.

J. Remote Annunciator Panel: Panel shall meet NFPA 110 standards.

Audible signal shall have a silencing switch. A lamp test button shall be provided.

K. Factory Testing: A certified factory test to be conducted at 1.0 power factor. Test for four (4) hours, one hour each at 25%, 50%, 75% and 100% load. Take standard readings and submit test reports for approval prior to shipment. Perform field test with load bank at same ratings of unit to be tested for 2 hours, in addition to the 2 hour load test specified below.

L. Miscellaneous: Necessary lube oil and anti-freeze.

M. Equipment Testing and Instruction Manual and Drawings:

1. Operating instruction and maintenance manuals shall contain the following information:

   Operating Instruction
   Replacement Parts
   Wiring Diagram
   Maintenance

2. The entire emergency system shall be field test operated for two (2) hours. A normal power failure shall be simulated. The engine generator unit shall automatically start, come up to speed, and assume full emergency load.

3. Custodians of the equipment shall be present during test. At that time they shall be instructed in operation and maintenance.

4. Upon completion of tests, written reports containing results shall be submitted. Test reports shall contain readings taken at 30 minute intervals along with all other pertinent test information.

   Ambient Temperature
   Oil Pressure
   Battery Charge Rate
   AC Volts
   AC Amperes All Phases
   Frequency
   Kilowatts
   Power Factor

N. Generator Outdoor Housing

1. The engine generating set shall be factory installed in a weatherproof outdoor housing. The housing shall provide year round generating set protection against adverse weather and environmental conditions. The enclosure shall be sound attenuated and meet Federal Specifications.

2. The weatherproof shelter shall be constructed or welded and bolted reinforced aluminum, 14 gauge walls and 14 gauge floor plate minimum. All metal parts shall be prime coated and finished painted.

3. The shelter assembly shall have shuttered air openings on front and sides with mesh screens covering side shutters. The air shutters shall be opened by four 22 volt AC motors when the generating set operates. Motors shall be spring loaded to close shutters when set stops.

4. Hinged double doors on each side and one door in rear of the shelter shall allow easy access to engine generator and controls. All door handles shall be key lock design.

5. Vibration isolators of the open coil spring type, selected for 3 inch (76mm) static deflection, shall be furnished and installed. The number of isolators shall be as recommended by the generator set manufacturer, and complete details shall be included in the Submittal. Anchor bolts, nuts and sleeves shall be supplied with recommended Foundation Plan.

6. Provide an integral minimum 200 gallon base mounted tank, double wall containment with alarms. Include conduit entry provisions for tank. Tank shall be supplied in accordance with the state Fuel Storage Codes for above ground diesel fuel tanks. Provide 100 gallons of diesel.

7. The weatherproof housing shall allow installation of the silencer outside or inside the enclosure. Provide critical type silencer.

8. Provide sound deadening materials, baffles, hoods required to reduce noise levels to a maximum of 65DBA at 3 meters in any direction. The unit shall meet federal guidelines.

9. Color to be selected by Architect.

2.14 PANELBOARDS

A. Panelboards shall be dead-front, door in door safety type equipped with single or multi-pole circuit breakers suitable for 120/240 volt, 1 phase, 3 wire operation.

B. Buses shall be copper. Panelboards shall have a circuit directory card mounted in a frame with plastic cover on inside of door. Panelboards to have a copper ground bus with terminals for each circuit. Panelboards serving isolated ground receptacles shall have a separate ground bus for terminations of the isolated grounds. The isolated ground bus shall be mounted to the panel tub via non-conducting means with a separate grounding conductor run to the normal panel ground bus. Provide oversize lugs for any termination requiring same due to oversize conductors.

C. Cabinets shall be minimum of 20 inches wide and be made of code gauge steel. Surface type shall be ordered without knockouts.

D. Trims shall be made of code gauge steel, surface or flush as indicated. Panelboards shall be keyed alike. Trims shall be provided with full length piano hinge on one side, and secured to tub with sufficient quantity of latches opposite the hinge side to allow trim to fit flush with tub and when released, allow full access to wiring gutters. Inner door shall allow access to circuit breakers only.

E. Panelboards shall be of the following types with minimum circuit breaker frame sizes listed below. Refer to schedules for larger circuit breaker frame sizes due to fault current availability.

1. 120/240 volt, single phase, three wire. Symmetrical interrupting capacity 22,000 AIC.

Style	
Cutler-Hammer type PRL-2	GHB Breakers (bolt-on)
Square D type NEHB	EHB Breakers (bolt-on)
Siemens type CDP-7	BQCH Breakers (bolt-on)
General Electric type AE	TEY Breakers (bolt-on)

3. Distribution Panels:

a. Where scheduled as circuit breaker type, symmetrical interrupting capacity 22,000 AIC.

Cutler-Hammer type PRL-3	FD Breakers
Square D I-Line type	FA Breakers
Siemens SPP	FXD6 Breakers
General Electric Spectra	THED Breakers

F. Panelboards and distribution panels shall be of same manufacturer.

PART 3 - EXECUTION

3.1 WORK COORDINATION AND JOB OPERATIONS

A. Equipment shall not be installed in congested and possible problem areas without first coordinating installation of same with other trades. Relocate electrical equipment installed in congested or problem areas should it interfere with the proper installation of equipment to be installed by other trades.

B. Particular attention shall be directed to coordination of lighting fixtures and other electrically operated equipment requiring access which is to be installed in ceiling areas. Coordinate with other trades, the elevations of equipment in hung ceiling areas to insure adequate space for installation of recessed fixtures before said equipment is installed. Conflicts in mounting heights and clearances above hung ceilings for installation of recessed lighting fixtures or other electrically operated equipment requiring access shall be brought to the attention of Architect for a decision prior to equipment installation.

C. Furnish to General Contractor and other Subcontractors information relative to portions of electrical installation that will affect other trades sufficiently in advance so that they may plan their work and installation.

D. Obtain from other trades information relative to electrical work which he, the Electrical Subcontractor, is to execute in conjunction with installation of other trades' equipment.

E. Lighting fixtures in mechanical spaces or utility/ storage rooms shall only be installed after all mechanical equipment is in place.

3.2 PLANS AND SPECIFICATIONS

A. Plans:

1. Drawings showing layout of electrical systems indicate approximate location of raceways, outlets, and apparatus. Runs of feeders and branch circuits are schematic and are not intended to show exact routing. Final determination as to routing shall be governed by structural conditions and as indicated on the approved coordination Drawings.

B. Specifications:

1. Specifications supplement Drawings and provide specifics pertaining to methods and material to be used.

3.3 IDENTIFICATION

A. Equipment shall be marked for ease of identification as follows.

1. Provide screw-on nameplates on switchboards, panelboards, F.A. terminal cabinets, starters, and disconnect switches. Nameplates to be of black phenolic with white engraving. For starters and disconnect switches lettering shall be minimum of 1/4" high. Nameplates on panelboards shall have the following information.

a. Line 1 - Panel designation in 1/2" high letters.
b. Line 2 - Utilization voltage in 3/8" high letters.
c. Line 3 - Distribution source "Fed from " in 1/4" high letters.

2. Neatly typed directory cards listing circuit designations shall be fastened inside the cover of panelboards. Spare circuits shall be penciled.

3. Color coding schedules. If there is more than a single system voltage, different voltages shall have separate color codes, as previously specified. A copy of the color code schedule shall be affixed to each secondary switchboard and distribution panel and shall be of the phenolic nameplate type as previously specified. A typewritten color code schedule shall also be affixed, under plastic, inside each panelboard door.

4. Outlet boxes both concealed and exposed shall be identified as to panel origination and circuit number by means of fibre pen on the inside of coverplate.

5. Wiring device plates on devices connected to normal-emergency circuits shall be red in color.

6. All conductors in boxes larger than standard outlet boxes, in all wireways, trench headers, etc. shall be grouped logically and be identified.

7. Grounding conductors and neutrals shall be labeled in panels, wireways, etc. as to circuits associated with.

3.4 PROTECTION AND CLEANUP

A. Protection:

1. Materials and equipment shall be suitably stored and protected from weather.

2. During progress of work, pipe and equipment openings shall be temporarily closed so as to prevent obstruction and damage.

3. Be responsible for maintenance and protection of material and equipment until final acceptance.

B. Cleanup:

1. Keep job site free from accumulation of waste material and rubbish. Remove all rubbish, construction equipment, and surplus materials from site and leave premises in a clean condition.

2. At completion, equipment with factory finished surfaces shall be cleaned and damaged spots touched up with the same type paint applied at factory.

3. Particular attention is called to Section 110-12(c) of the NEC, which requires that internal parts of electrical equipment not be contaminated by construction operations.

3.5 PORTABLE OR DETACHABLE PARTS

A. Retain possession of and be responsible for spare parts, portable and detachable parts, and other removable portions of installation including fuses, keys, locks, blocking clips, inserts, lamps, instructions, Drawings, and other devices or materials that are relative to and necessary for proper operation and maintenance of the system until final acceptance, at which time such parts shall be installed or turned over to the Owner, as the case may be.

3.6 SAFETY PRECAUTIONS

A. Provide proper guards, signage, and other necessary construction required for prevention of accidents and to insure safety of life and property. Remove any temporary safety precautions at completion.

3.7 MOUNTING HEIGHTS

A. All electrical equipment shall be mounted at the following heights unless noted or detailed otherwise on Drawings. Notes on architectural Drawings shall supersede those noted below or detailed on the electrical Drawings. If mounting height of an electrical component is questionable, obtain clarification from Architect before installation.

1. Duplex convenience outlets, - 18 inches.

2. Light switches, pushbutton stations, HOA switches, and all other toggle or control switches for the operation of heating, ventilating, and air conditioning, plumbing, and general service - 48 inches.

3. Panelboards for lighting, power, telephone, and other auxiliary systems - 78" to top.

4. Exterior and interior wall brackets shall be as detailed on architectural Drawings or as directed by Architect.

B. Mounting heights given are from finished floor to centerline. In the case of a raised floor, surface of raised floor is the finished floor.

3.8 WORKMANSHIP AND INSTALLATION METHODS

A. Work shall be installed in first-class manner consistent with best current trade practices. Equipment shall be securely installed plumb and/or level. Flush-mounted outlet boxes shall have front edge flush with finished wall surface. No electrical equipment shall be supported by work of other trades. Cable systems shall be supported and not draped over ducts and piping or laid on ceiling suspension members. Lighting fixtures shall be installed to agree with Architects reflected ceiling plans.

B. Supports:

1. Support work in accordance with best industry practice and by use of standard fittings.

2. In general, walls and partitions will not be suitable for supporting weight of panelboards, dry type transformers and the like. Provide supporting frames or racks extending from floor slab to structure above.

3. Provide supporting frames or racks for equipment, intended for vertical surface mounting in free standing position where no walls exist.

4. Supporting frames or racks shall be of standard angle, standard channel or specialty support system steel members, rigidly bolted or welded together and adequately braced to form a substantial structure. Racks shall be of ample size to assure a workmanlike arrangement of equipment.

5. Provide 3/4" thick painted plywood mounting surfaces in all electric and telephone areas and for all equipment on free standing racks. All plywood shall be fire retardant and painted both sides and edges with 2 coats of white paint.

6. No work for exposed installations in damp locations shall be mounted directly on any building surface. In such locations, flat bar members or spacers shall be used to create a minimum of 1/4" air space between building surfaces and work.

7. Nothing (including outlet, pull and junction boxes and fittings) shall depend on electric raceways or cables for support. All outlet, pull, and junction boxes shall be independently supported.

8. Nothing shall rest on, or depend for support on, suspended ceiling or its mounting members.

9. Support surface or pendant mounted lighting fixtures:

a. From outlet box by means of an interposed metal strap, where weight is less than five pounds.

b. From outlet box by means of a hickey or other direct threaded connection, where weight is from five to fifty pounds.

c. Directly from structural slab, deck or framing member, where weight exceeds fifty pounds.

d. Pendant lighting fixtures shall be supported by threaded rods in non-public areas and by manufacturers standard tube hangers with swivel aligner and canopy in public areas. Provide non-standard pendant lengths where required to mount fixtures at elevations either called for on Drawings or as shown in architectural elevations.

10. Support recessed lighting fixtures directly from structural slabs, decks or framing members, by means of jack chain or air craft cable, one at each end of fixture at opposite corners.

11. Where support members must of necessity penetrate air ducts, provide airtight sealing provisions which allow for a relative movement between the support members and the duct walls.

12. Provide channel sills or skids for leveling and support of all floor mounted electrical equipment.

13. Where permitted loading is exceeded by direct application of electrical equipment to a slab or deck, provide proper dunnage as required to distribute the weight in a safe manner.

14. Support metallic raceways by either running within steel frame or hung from the building frame. Anything hung from building frame shall be attached with metallic fasteners.

C. Fastenings:

1. Fasten electric work to building structure in accordance with the best industry practice.

2. Where weight applied to attachment points is 100 pounds or less, fasten to building elements of:

a. Wood -- with wood screws.
b. Concrete and solid masonry -- with bolts and expansion shields.
c. Hollow construction -- with toggle bolts.
d. Solid metal -- with machine screws in tapped holes or with welded studs.

3. Where weight applied to attachment points exceeds 100 pounds, fasten as follows:

a. At field poured concrete slabs, provide inserts with 18" minimum length slip-through steel rods, set transverse to reinforcing steel.

b. Where building is steel framed, utilize suitable auxiliary channel or angle iron bridging between structural steel elements to establish fastening points. Bridging members shall be suitably welded or clamped to building steel. Provide threaded rods or bolts to attach to bridging members.

4. Floor mounted equipment shall not be held in place solely by its own dead weight. Provide floor anchor fastenings. Floor mounted equipment over 72 inches in height shall also be braced to nearest wall or overhead structural elements.

5. For items which are shown as being mounted at locations where fastenings to the building construction element above is not possible, provide suitable auxiliary channel or angle iron bridging to building structural elements.

6. Fastenings for metallic raceways using the fastening as support shall be of the metallic type. Fastenings to hold raceways or cables in place may be via tyraps.

D. General Raceway Installation:

1. Install the various types of raceways in permitted locations as previously specified. All raceways shall be run concealed. Consult Architect for instruction for raceways which must be exposed in public spaces.

2. Raceways for normal-emergency or emergency only wiring cannot contain other conductors.

3. Raceways shall be properly aligned, grouped, and supported in accordance with code. Exposed raceways shall be installed at right angles to or parallel with structural members. Concealed raceways may take most direct route between outlets.

4. Raceways run on trapeze hangers shall be secured to the trapeze.

5. Raceways shall be continuous and shall enter and be secured to all boxes in such a manner that each system shall be electrically continuous from service to all outlets. Provide grounding bushings and bonding jumpers where raceways attach to painted enclosures or terminate below equipment.

6. Where raceways enter boxes, cabinets, tap boxes, other than those having threaded hubs, a standard locknut shall be used on the outside and locknut and bushing on the inside.

7. Where raceways terminate below equipment and there is no direct metal to metal continuity, provide grounding bushings on raceways and interconnect with equipment grounding conductor.

8. All empty raceways shall be provided with a pull wire.

9. All raceway sleeves, stub-ups, or stub-outs, where not connected to a box or cabinet, shall be terminated with a bushing.

10. All raceway joints shall be made up tight and no running threads will be permitted.

11. Where raceways are cut, the inside edge shall be reamed smooth to prevent injury to conductors.

12. All vertical raceways passing through floor slabs shall be supported.

13. Raceways shall not be installed in concrete slabs above grade or below waterproofed slabs.

14. Electric raceways and/or sleeves passing through floors or walls shall be of such size and in such location as not to impair strength of construction. Where raceways alter structural strength or the installation is questionable, the structural engineer shall be contacted for approval.

15. Raceways shall not run directly above or below heat producing apparatus such as boilers, nor shall raceways run parallel within 6 inches of heated pipes. Raceways crossing heated pipes shall maintain at least a 1 inch space from them.

16. Raceways shall be installed in such a manner as to prevent collection of trapped condensates, and all runs shall be arranged to drain.

17. Raceways passing between refrigerated and non-refrigerated spaces and those penetrating enclosures with air movement shall be provided with seals.

18. Raceways feeding fire and jockey pumps shall be rigid metal conduit either run below slab or inside 2 hour rated enclosure. Final connections to motors shall be liquidtite flexible conduit.

19. Where two alternate wiring methods interconnect such as EMT to flexible metal conduit, an outlet box shall be provided.

20. All empty raceways entering building and all sleeves or core drilled openings through floors shall be sealed.

21. Rigid non-metallic raceways where allowed and run as a ductbank encased in concrete shall be installed with plastic spacers to ensure a separation of 3 inches between raceways.

22. Elbows and extensions of rigid non-metallic raceway systems which penetrate slabs shall be rigid or intermediate metal conduit.

23. Raceways used for transformer connections shall be flexible type and shall contain a grounding conductor.

24. Raceways entering building through foundation wall into a basement area shall be provided with wall entrance seals or with other acceptable waterproofing method.

E. General Outlet Box Installation:

1. Boxes shall be set flush with finish surface and provided with proper type extension rings or plaster covers. Thru the wall boxes are not permitted. Check device or fixture to be mounted to box to ensure box orientation is proper.

2. In addition to boxes shown, install additional boxes where needed to prevent damage to cables and wires during pulling-in operation.

3. Remove knockouts only as required and plug unused openings.

4. Where required for horizontal and vertical alignment of boxes in stud partitions, bar hangers spanning two studs shall be used. Device boxes for insertion type receptacles shall be provided with far side box supports where there are less than two entering nonflexible raceways, and where bar rangers are not provided.

5. Boxes flush mounted in fire rated partitions and on opposite sides of the partition shall be separated by a distance of 24 inches in accordance with UL listing for the box.

6. Locations of outlets indicated on Drawings are approximate. For items exposed to view, refer to architectural Drawings and coordinate locations with masonry joints, panel joints, ceiling grids, structural members, etc.

7. In case of conflict with standard mounting heights and device alignment, consult Architect prior to roughing.

8. Check all door swings on architectural Drawings to ensure lighting switches are installed on strike side of door.

9. The right to make any reasonable change in location of outlets prior to roughing is reserved by Architect. "Reasonable change" shall be interpreted as movement within 10 feet of location shown.

10. Obtain dimensioned plan from Architect for floor outlets.

11. Outlet boxes for use where surface metal raceways are allowed shall be of a type specifically designed to be used with such surface metal raceway systems.

12. Outlet boxes shall not line up back to back in partition walls.

F. Conductor Installation:

1. No conductors shall be pulled into individual raceways until such raceway system is complete and free of debris. No harmful lubricants shall be used to ease pulling.

2. All conductors shall be wired so that grounded conductor is unbroken; switches in all cases being connected in ungrounded conductor.

3. Connections throughout the entire job shall be made with solderless type devices of approved design satisfactory to Inspector of Wires.

4. All taps and splices shall be insulated equal to that of conductor insulation.

5. All conductors of each feeder in pull boxes etc. shall be grouped, tied together, supported, and identified.

6. All conductors in panelboards and other wiring enclosures shall be neatly formed and grouped.

7. All conductors of emergency only and/or normal/emergency shall be run in separate raceway systems to final outlet box.

8. Provide support for conductors in vertical raceways in accordance with Article 300-19.

9. Strip insulation from conductors with approved tools and only of sufficient length for proper termination. Cutting of conductor stranding is unacceptable.

10. Taps from paralleled conductors shall be of a type which tap each conductor, such as ILSCO "PTA" series.

11. Grounding conductors are to be identified as to associated power circuits.

G. Type MC Cable Installation:

1. Where cable is permitted under the products section, the installation of same shall be done in accordance with code and the following:

a. Cable shall be supported in accordance with code. Tie wire is not an acceptable means of support. Horizontally run cable supports such as Caddy WMX-6, and clamps on vertical runs such as Caddy CJ6 shall be used. Where cables are supported by the structure and only need securing in place, then ty-raps will also be acceptable. Ty-raps are not acceptable as a means of support. All fittings, hangers, and clamps for support and termination of cables shall be of types specifically designed for use with cable, i.e., romex connectors not acceptable.

b. Armor of cable shall be removed with rotary cutter device equal to roto-split by Seatek Co., not with hacksaw.

c. Use split "insuliner" sleeves at terminations.

d. Any cable system used in conjunction with isolated ground circuits shall have both an isolated ground conductor and an equipment ground conductor.

H. Stranded Conductor Installation:

1. If Contractor selects stranded conductors for # 10 AWG and smaller, terminate such conductors as follows:

a. No stranded conductor may be terminated under a screwhead. Provide insulated terminal lugs for all screw connections equal to Thomas & Betts "STA-KON" type RC with forked tongue and turned up toes. Installation of lugs shall be done with compression tool such as T&B WT-145C which prevents opening of tool until full compression action is completed.

b. Backwired wiring devices shall be of clamp type; screw tightened. Force fit connections not allowed.

2. Stranded conductors will not be allowed for fire alarm work.

I. Accessibility:

1. Electrical equipment requiring service or manual operation shall be accessible.

2. Work switches for equipment within accessible hung ceiling spaces, such as fan powered terminal boxes, shall be located at terminal box, and so located so as to be accessible.

J. Vibration Elimination: All equipment connections to rotating equipment or equipment capable of vibration shall be made up by flexible raceways.

K. Wiring Device Gaskets: Provide wiring device gaskets at coverplates where device is mounted in wall separating conditioned and non-conditioned spaces.

3.9 FEEDER CIRCUITS

A. Provide feeders as called for on the Drawings.

B. Feeders shall be defined as any circuit originating from the main building switchboard and/or distribution panels.

C. All feeder conductors shall be continuous from origin to panel or equipment termination without splicing.

D. All feeders shall be conductors pulled into raceways. Cable systems are not allowed for feeders unless specifically indicated.

3.10 BRANCH CIRCUITS

A. Provide all branch circuit wiring and outlets for a complete and operating system. The system shall consist of insulated conductors connected to the panelboards and run in raceways or as cable systems if permitted under products section, as required to the final outlet and shall include outlet boxes, supports, fittings, receptacles, plates, fuses, etc.

B. Physical arrangement of branch circuit wiring shall correspond to circuit numbering on Drawings. Combining of circuits and raceways will be allowed up to a 3 phase, 4 wire circuit in a single raceway, unless shared neutrals are not allowed by other sections of this Division, or are indicated as separate neutrals on the Drawings. Any combination of homeruns such as this, however, shall be indicated on record Drawings. Combining of conductors and raceways for tenant fitup work is allowed only for fitup boxes in accordance with details on Drawings. When a common grounded conductor is used for more than one circuit, the arrangement shall be such that a receptacle, fixture, or other device may be removed or disconnected without disconnecting the grounded conductor for other circuits. Ground fault circuit breakers and isolated ground outlets shall be wired with separate neutrals and separate grounding conductors per circuit. A consistent phase orientation shall be adhered to throughout project at terminations.

C. Circuits feeding three phase equipment shall not be combined into common raceways, unless specifically indicated.

D. All wiring in panelboards and cabinets shall be neatly formed and grouped.

3.11 FIREPROOFING AND WATERPROOFING

A. Fireproof and waterproof all openings in slabs and walls.

3.12 CUTTING AND PATCHING

A. All cutting of surfaces, including core drilling of walls and slabs, shall be done by Electrical Subcontractor.

B. Patching will be provided by this Contractor.

3.13 DISTRIBUTION EQUIPMENT TESTING

A. All individual motor starters, panels, motor controls, feeder conductors, and emergency systems shall be tested in accordance with the following. In general, all tests shall be done in accordance with the 1995 Acceptance Testing Specifications of the International Electrical Testing Association.

B. The Testing Subcontractor may be an independent contractor or a manufacturer of the equipment, which is to be tested.

C. Test report forms, delineating tests to be made, and method of recording same shall be submitted prior to commencing work. Test reports when submitted shall include interpretation of results and recommendation for any corrective work required.

D. Main Distribution Panels:

1. Visual Inspection:

a. Check for foreign material within bus enclosure.
b. Check for missing hardware.
c. Inspect entire assemblies for transit damage or factory defects.
d. Check for all bus dimensions and bracing per specifications.
e. Check ratings of current transformers and potential transformers.
f. Check ratings of all protective relays per drawings.

2. Physical Inspection:

a. Torque all bus hardware to proper tension.
b. Circuit breaker interlocks all work properly.
c. All doors and hinged panels open and close properly.
d. Relay blocking removed from all control and protective relays.
e. All circuit breakers operate, close and trip mechanically.
f. Torque all feeder conductors to terminal manufacturers' recommendations.

3. Electrical Testing:

a. Breakers operated electrically trip and close from local and remote positions.

b. All circuit breakers calibrated to manufacturer's respective time current curves as specified.

(1) Long time pick-up amps.
(2) Long time delay tripping at 300% of current setting.

(3) Resets okay at 80% of pick-up value.
(4) Short time pick-up current.
(5) Short time delay trip time at 105% of setting.
(6) Instantaneous minimum pick-up current.

c. All protective relays calibrated to manufacturer's characteristic time curves for pick-up, drop-out, instantaneous and time delay.
d. All instruments calibrated for accuracy.
e. Protective relay schemes to be electrically tested by primary injection of current through current transformers and the tripping of associated circuit breakers.
f. Insulation resistance tests made on all circuit breakers, line to load breaker open, line to ground breaker closed, 3 poses tested individually. Switchgear bus to be tested phase to phase and phase to ground with Megohometer type instrument. Relays also to be insulation resistance tested.

D. Magnetic Starters:

1. Visual inspection to determine:
   a. Shipping damage.
   b. Proper bussing and contactor sizes.
   c. Correct overload relay heater ratings. Any incorrectly sized overloads shall be replaced by the contractor who originally provided same.

2. Electrical Testing:

   a. Electrical operation of control relays, timing relay, and contactor coils.
   b. Insulation resistance test on all current carrying bus to ground and between phases.

   c. Calibration check of overload heater to ascertain tripping point and time delay at 300% of heater rating.

E. Conductors: All new secondary conductors and all feeder conductors from switchboards and distribution panels shall be tested.

1. Visual and mechanical inspection: Conductors to be inspected for physical damage and proper connection and sizing in accordance with single line diagram.
   Conductor connections shall be torque tested to manufacturer's recommended values.

2. Electrical Tests: Perform insulation resistance test on each conductor with respect to ground and adjacent conductor.

   Perform continuity test to insure proper conductor connection.

F. Emergency Systems:

1. Engine Generator - Prior to the emergency generator test specified under the emergency generator specification, the testing contractor shall perform the following:

   a. Visual and Mechanical Inspection:

(1) Inspect for physical damage.

(2) Compare nameplate rating and connection with specifications and single line diagram.

(3) Inspect for proper anchorage and grounding. Verify engine cooling and fuel system integrity.

b. Electrical and Mechanical Tests:

(1) Perform a dielectric absorption test on generator winding with respect to ground. Determine polarization index.

(2) Perform phase rotation test to determine compatibility with load requirements.

(3) Test protective relay devices in accordance with applicable sections of these specifications.

(4) Perform dc over potential test between winding and ground.

2. Automatic Transfer Switches:

a. Visual and Mechanical Inspection:

(1) Inspect for physical damage.

(2) Verify that the short circuit withstand rating exceeds the available short circuit duty.

(3) Compare equipment nameplate information and connections with single line diagram and report any discrepancies.

(4) Check switch to ensure positive interlock between normal and alternate sources. (Mechanical and Electrical).

(5) Check tightness of all control and power connections.

(6) Perform manual transfer operation.

(7) Ensure manual transfer warnings are attached and visible to operator.

b. Electrical Tests:

(1) Perform insulation resistance tests phase-to-phase and phase-to-ground with switch in both source positions.

(2) Measure contact resistance in normal and alternate source position.

(3) Set and calibrate in accordance with the project electrical engineer's specifications.

a) Voltage and frequency sensing relays.

b) All time delay relays.

c) Engine start and shutdown relay.

(4) Perform automatic transfer by tests.

a) Simulating loss of normal power.
b) Return to normal power.
c) Simulating loss of emergency power on return to normal.
d) Simulate all forms of single phase conditions.

(5) Monitor and verify correct operation and timing.

a) Normal voltage sensing relays.
b) Engine start sequence.
c) Time delay upon transfer.
d) Alternate voltage sensing relays.
e) Automatic transfer operation.
f) Interlocks and limit switch function.
g) Timing delay and retransfer upon normal power restoration.
h) Engine cooldown and shutdown feature.

G. Grounding Grids or Electrodes: Measurement of resistance from ground grids or electrodes to earth to determine adequacy of grounding system in building and compliance with specifications and/or electrical code.

H. Settings of Adjustable Devices: Using the result of the fault current and coordination study specified hereinafter, the Testing Contractor shall set all adjustable devices.

3.14 DEMOLITION, REMOVAL AND RELOCATION WORK

A. The Electrical Subcontractor shall be responsible for disconnection and removal of existing electrical equipment and wiring. Refer to drawings for extent of work.

END OF SECTION 16000