



**CITY OF WORCESTER, MASSACHUSETTS**  
Administration & Finance  
Purchasing Division  
455 Main Street – Worcester, MA 01608  
(508) 799-1220  
[www.worcesterma.gov](http://www.worcesterma.gov)



March 9, 2015

To All Bidders:

Subject: **Bid No. 6521-K6, Resurfacing Contract (M16-4) / DPW & Parks**

**ADDENDUM NO. 1**

To Whom It May Concern:

With reference to our bid request relative to the above subject, please refer to the attached changes/modifications/clarifications to the original bid request.

- **General bid clarifications are attached and include: general notes on locations, technical clarifications & revised unit pricing pages. Bidders are instructed to use the attached unit pricing pages with bid submission.**

Bidders are requested to acknowledge and/or include this addendum with bid.

All other terms, conditions and specifications remain unchanged.

Very truly yours,

Kerrilyn Morin  
Senior Buyer

**City of Worcester, MA Addendum No. 1 to  
Contract Documents for  
Resurfacing Contract  
Contract No. M16-4**

The following changes and additional information are hereby made part of the Contract Documents:

**CONTRACT**

**1. Contract General Notes**

- The street list included in the contract has been amended. Francis Carroll Plaza has been removed from this contract in its entirety.
- This list has also been amended to reflect the joining of the sections of Merrifield Street and Franklin Street. The limits have been revised to reflect the entire lengths.

**RESURFACING PROJECT**

M16-4 STREETS/LOCATION	LENGTH	METHOD	LEVELER	BINDER (12.5MM)	TOP (9.5MM)	TOP(12.5MM)
BATES AVE. (#2) - GREENHILL AVE. TO END	680	GRINDING FULL DEPTH		1.75	1.5	
FARADAY ST. - LANCASTER ST. TO HUMBOLDT AVE.	183	PULVI-MILLING		1.75	1.5	
FRANKLIN ST. - FOSTER ST. TO GRAFTON ST.	1055	GRINDING AND MILLING			1.5	
KENDALL ST. - OAK AVE. TO DEAD END	453	GRINDING FULL DEPTH		1.75	1.5	
MAJOR TAYLOR BLVD. - FOSTER ST. TO LINCOLN SQ.	2,686	GRINDING AND MILLING	1			1.75
MERRIFIELD ST. - BELMOT ST. TO EAST SHELBY ST.	1,800	PULVI-MILLING		2.75		2
PLUM ST. - ENTIRE - EAST WORCESTER ST. TO SHREWSBURY ST.	608	GRINDING FULL DEPTH		1.75	1.5	
PORTLAND ST. - ENTIRE - MYRTLE ST. TO FRANKLIN ST.	768	GRINDING AND MILLING	1			1.75
SALEM ST. - ENTIRE - FRANKLIN ST. TO MYRTLE ST.	778	GRINDING AND MILLING	1			1.75
WARDEN ST. - SHREWSBURY ST. TO PLANTATION ST.	320	GRINDING FULL DEPTH		1.75	1.5	

## **TECHNICAL SPECIFICATIONS**

### **1. Special Provisions**

- **Item 971 PEDESTRIAN BRIDGE**

This item will be used for the construction and placement of temporary bridging of newly poured concrete sidewalk where a building entrance directly abuts the back of the sidewalk. This bridge must be sturdy and provide for pedestrian access to the building from the street. The bridge must span from the curb line to the entrance in such a way that it does not interfere with the new underlying concrete. This bridge must also provide sturdy handrails with heights complying with applicable building codes.

- **Item 975 EXTRA STREET LIGHTS DELIVERED**

This item will be used to provide the CITY with additional street lights, identical to those ordered under Item 820. These lights will not be installed, but will be delivered to the City drop off yard at 1065 Millbury Street, in coordination with the Contracting Officer. This item pays for the purchase and delivery to the City yard.

- Lighting plans, for Salem and Portland Streets, have been included with this addendum and are attached. Disregard any portion of the plan regarding Francis Carroll Plaza.

## **BID FORM**

### **1. Bid Pages**

- Bid Pages 1 through 13 have been deleted in their entirety and replaced with new Bid Pages 1 through 13 (See Below).

### **2. Items renumbered/ added/ deleted/ quantities changed**

- Many of the bid items have changed, primarily due to the removal of Francis Carroll Plaza, review the amended bid sheets accordingly.

## **ATTACHMENTS**

Attachment 1 – Bid Pages 1-13

Attachment 2 – Portland-Federal-Southbridge Elec Plan Rev2

Attachment 3 – Lighting Design – Salem Street – 3-7-2016

Resurfacing Contract M16-4

Worcester, MA

Addendum No. 1

3/9/16

## Resurfacing M16-4 6521-K6

THE BIDDER MUST FILL IN THESE UNIT PRICES. Also carry out all extensions and fill in "Computed Totals."  
In case of error or discrepancies, UNIT PRICES govern and written works take precedence over figures.

ITEM NUMBER AND DESCRIPTION	ESTIMATED QUANTITY	COMPUTED TOTALS
104.0000 TREE REMOVAL (LESS THAN 24 INCHES) INCLUDING STUMP		
	Dollars	1.00 \$
(\$ ) EA		
106.0000 TREE REMOVAL (24 INCHES & OVER) INCLUDING STUMP		
	Dollars	2.00 \$
(\$ ) EA		
107.0000 STREET TREE REPLACEMENT		
	Dollars	14.00 \$
(\$ ) EA		
108.0000 STUMP REMOVED (LESS THAN 24 INCHES)		
	Dollars	2.00 \$
(\$ ) EA		
109.0000 STUMP REMOVED (GREATER THAN 24 INCHES)		
	Dollars	2.00 \$
(\$ ) EA		
110.0000 PINE BARK MULCH		
	Dollars	10.00 \$
(\$ ) CY		
116.0000 EXCAVATION		
	Dollars	1,200.00 \$
(\$ ) CY		
126.0000 GRAVEL BORROW		
	Dollars	295.40 \$
(\$ ) CY		
128.0000 SCREENED LOAM BORROW		
	Dollars	336.40 \$
(\$ ) CY		

Resurfacing M16-4  
6521-K6

ITEM NUMBER AND DESCRIPTION	ESTIMATED QUANTITY	COMPUTED TOTALS
150.0000 FURNISH AND SPREAD CALCIUM CHLORIDE		
_____ Dollars	3,551.00	\$ _____
(\$ _____) LB		
156.0000 SEEDING		
_____ Dollars	1,607.70	\$ _____
(\$ _____) SY		
225.0800 8 INCH CATCH BASIN CONNECTION		
_____ Dollars	50.00	\$ _____
(\$ _____) LF		
233.0000 REMODEL EXISTING MANHOLE		
_____ Dollars	2.00	\$ _____
(\$ _____) EA		
235.0000 CATCH BASIN FRAME & GRATE		
_____ Dollars	29.00	\$ _____
(\$ _____) EA		
236.0000 MANHOLE FRAME & COVER		
_____ Dollars	37.00	\$ _____
(\$ _____) EA		
240.0000 WORCESTER STANDARD CATCH BASIN (5 foot diameter)		
_____ Dollars	1.00	\$ _____
(\$ _____) EA		
242.0000 CATCH BASIN REBUILD "D" FRAME TO SQUARE FRAME		
_____ Dollars	7.00	\$ _____
(\$ _____) EA		
244.0000 REBUILD EXISTING CATCH BASINS TO ALTERNATE TYPE		
_____ Dollars	1.00	\$ _____
(\$ _____) EA		

Resurfacing M16-4  
6521-K6

ITEM NUMBER AND DESCRIPTION	ESTIMATED QUANTITY	COMPUTED TOTALS
244.1000 REBUILD EXISTING CATCH BASINS		
_____ Dollars	10.00	\$ _____
(\$ _____) VF		
245.0000 GRANITE INLET STONE		
_____ Dollars	10.00	\$ _____
(\$ _____) EA		
245.1000 EXISTING GRANITE INLET STONE REMOVE & RESET		
_____ Dollars	41.00	\$ _____
(\$ _____) EA		
246.0000 8 INCH GREEN TRAPS		
_____ Dollars	15.00	\$ _____
(\$ _____) EA		
249.0000 CATCH BASIN CLEANING		
_____ Dollars	61.00	\$ _____
(\$ _____) EA		
250.0000 MANHOLE FRAMES, REMOVE, PLATE & RETAIN		
_____ Dollars	29.00	\$ _____
(\$ _____) EA		
252.1000 MANHOLE ADJUSTMENT 12 INCH OR LESS GRAVEL		
_____ Dollars	39.00	\$ _____
(\$ _____) EA		
252.2000 MANHOLE ADJUSTMENT 12 INCH OR LESS RIGID		
_____ Dollars	5.00	\$ _____
(\$ _____) EA		
253.1000 MANHOLE ADJUSTMENT OVER 12 INCH GRAVEL		
_____ Dollars	50.00	\$ _____
(\$ _____) VI		

## Resurfacing M16-4

6521-K6

ITEM NUMBER AND DESCRIPTION	ESTIMATED QUANTITY	COMPUTED TOTALS
253.2000 MANHOLE ADJUSTMENT OVER 12 INCH RIGID		
_____ Dollars	20.00	\$ _____
(\$ _____) VI		
254.1000 CATCH BASIN ADJUST TO LINE AND/OR GRADE 12 INCH OR LESS, GRAVEL		
_____ Dollars	31.00	\$ _____
(\$ _____) EA		
254.2000 CATCH BASIN ADJUST TO LINE AND/OR GRADE 12 INCH OR LESS, RIGID		
_____ Dollars	5.00	\$ _____
(\$ _____) EA		
255.1000 CATCH BASIN ADJUST TO LINE AND/OR GRADE 12 INCH OR OVER, GRAVEL		
_____ Dollars	50.00	\$ _____
(\$ _____) VI		
255.2000 CATCH BASIN ADJUST TO LINE AND/OR GRADE 12 INCH OR OVER, RIGID		
_____ Dollars	20.00	\$ _____
(\$ _____) VI		
260.0800 8 INCH SUBDRAIN COMPLETE		
_____ Dollars	100.00	\$ _____
(\$ _____) LF		
304.0300 Adjust CURB STOP to Grade		
_____ Dollars	39.00	\$ _____
(\$ _____) EA		
304.0400 REPLACING 4" - 12" GATE VALVE BOX, GRAVEL BASE		
_____ Dollars	53.00	\$ _____
(\$ _____) EA		
304.0500 REPLACING 4" - 12" GATE VALVE BOX, RIGID BASE		
_____ Dollars	5.00	\$ _____
(\$ _____) EA		

Resurfacing M16-4  
6521-K6

ITEM NUMBER AND DESCRIPTION	ESTIMATED QUANTITY	COMPUTED TOTALS
304.0600 REMOVE AND RETAIN WATER BOX		
_____ Dollars	35.00	\$ _____
(\$ _____) EA		
304.0700 RETURN AND RESET WATER BOX		
_____ Dollars	15.00	\$ _____
(\$ _____) EA		
304.0800 WATER BOX ADJUST TO GRADE, GRAVEL BASE		
_____ Dollars	24.00	\$ _____
(\$ _____) EA		
304.0900 WATER BOX ADJUST TO GRADE, RIGID BASE		
_____ Dollars	5.00	\$ _____
(\$ _____) EA		
310.6000 HYDRANT PAINTING		
_____ Dollars	27.00	\$ _____
(\$ _____) EA		
402.0000 FINE GRADING, ROLLING AND FINISHING		
_____ Dollars	13,547.40	\$ _____
(\$ _____) SY		
403.0000 GRINDING AND MILLING 1-1/2 INCH		
_____ Dollars	3,725.00	\$ _____
(\$ _____) SY		
403.1000 GRINDING (FULL DEPTH- 6"MAX)		
_____ Dollars	4,250.00	\$ _____
(\$ _____) SY		
403.1100 GRINDING (FULL DEPTH - OVER 6")		
_____ Dollars	2,300.00	\$ _____
(\$ _____) SY		
403.2000 GRINDING AND MILLING 2 INCH		
_____ Dollars	29,200.00	\$ _____
(\$ _____) SY		

Resurfacing M16-4  
6521-K6

ITEM NUMBER AND DESCRIPTION	ESTIMATED QUANTITY	COMPUTED TOTALS
404.0000 PULVI-MILLING		
	Dollars	6,947.40 \$
(\$ ) SY		
405.0000 STRAIGHT CURB (VA-4)		
	Dollars	125.00 \$
(\$ ) LF		
410.0000 CIRCULAR CORNER (WORCESTER STANDARD)		
	Dollars	45.00 \$
(\$ ) EA		
416.0000 CURB REMOVE AND RESET		
	Dollars	9,080.00 \$
(\$ ) LF		
418.0000 CURB REMOVAL & STACK		
	Dollars	60.00 \$
(\$ ) LF		
420.0000 CURB RESET FROM DPW YARD		
	Dollars	87.00 \$
(\$ ) LF		
422.1000 SUPERPAVE 9.5 MM LEVEL 2 (TOP COURSE)		
	Dollars	1,439.70 \$
(\$ ) TN		
422.2000 SUPERPAVE 12.5 MM LEVEL 2 (BINDER COURSE)		
	Dollars	2,328.30 \$
(\$ ) TN		
422.3000 SUPERPAVE 12.5 MM LEVEL 3 (MODIFIED TOP COURSE)		
	Dollars	4,000.00 \$
(\$ ) TN		

Resurfacing M16-4  
6521-K6

ITEM NUMBER AND DESCRIPTION	ESTIMATED QUANTITY	COMPUTED TOTALS
424.0000 BITUMINOUS CONCRETE DRIVEWAY & VARIOUS AREA		
_____ Dollars	135.00	\$ _____
(\$ _____) TN		
426.0000 NEW BITUMINOUS CONCRETE SIDEWALKS		
_____ Dollars	85.00	\$ _____
(\$ _____) TN		
430.0000 EXISTING BITUMINOUS CONCRETE DRIVEWAY REPAIR		
_____ Dollars	1,142.00	\$ _____
(\$ _____) SY		
432.0000 EXISTING BITUMINOUS CONCRETE SIDEWALKS REPAIR		
_____ Dollars	4,252.00	\$ _____
(\$ _____) SY		
435.0000 HOT POURED RUBBERIZED ASPHALT SEALER		
_____ Dollars	18,814.00	\$ _____
(\$ _____) LF		
438.0000 BITUMINOUS CONCRETE BERM MACHINE PLACED		
_____ Dollars	400.00	\$ _____
(\$ _____) LF		
442.0000 CONCRETE SIDEWALK REPAIR		
_____ Dollars	3,455.00	\$ _____
(\$ _____) SY		
445.0000 STAMPED CEMENT CONCRETE ACCENT STRIP		
_____ Dollars	395.00	\$ _____
(\$ _____) SY		
446.0000 CONCRETE DRIVEWAY REPAIR		
_____ Dollars	354.00	\$ _____
(\$ _____) SY		

Resurfacing M16-4  
6521-K6

ITEM NUMBER AND DESCRIPTION	ESTIMATED QUANTITY	COMPUTED TOTALS
446.1000 CLASS B CONCRETE FOR ROADWAY BASE (3,500 P.S.I. 1-1/2 520)		
_____ Dollars	378.00	\$ _____
(\$ _____) CY		
447.0200 EXISTING BRICK SIDEWALKS AND DRIVEWAYS WITH GRAVEL BASE – REMOVE & RESET		
_____ Dollars	13.00	\$ _____
(\$ _____) SY		
450.0000 BOUNDS, REMOVE & RESET		
_____ Dollars	7.00	\$ _____
(\$ _____) EA		
454.0000 WHEELCHAIR RAMP CEMENT CONCRETE - 6" THICK WITH DETECTABLE WARNING PANELS		
_____ Dollars	554.20	\$ _____
(\$ _____) SY		
456.0000 CONCRETE STEP (COMPLETE IN PLACE)		
_____ Dollars	5.00	\$ _____
(\$ _____) EA		
468.0000 GUARDRAIL STEEL TYPE SS		
_____ Dollars	62.00	\$ _____
(\$ _____) LF		
478.0000 METAL PIPE RAIL		
_____ Dollars	45.00	\$ _____
(\$ _____) LF		
501.0000 4 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC) LF		
_____ Dollars	4,850.00	\$ _____
(\$ _____) LF		
502.0000 4 INCH REFLECTORIZED YELLOW LINE (THERMOPLASTIC) LF		
_____ Dollars	13,650.00	\$ _____
(\$ _____) LF		

# Resurfacing M16-4

## 6521-K6

ITEM NUMBER AND DESCRIPTION	ESTIMATED QUANTITY	COMPUTED TOTALS
503.0000 12 INCH REFLECTORIZED WHITE LINE (THERMOPLASTIC) LF	Dollars 8,360.00	\$
504.0000 PAVEMENT ARROW/LEGEND REFLECTORIZED WHITE (THERMOPLASTIC) EACH	Dollars 26.00	\$
505.0000 4 INCH REFLECTORIZED WHITE LINE (WATERBORNE) LF	Dollars 7,000.00	\$
507.0000 12 INCH REFLECTORIZED WHITE LINE (WATERBORNE) LF	Dollars 3,000.00	\$
508.0000 PAVEMENT ARROW/LEGEND REFLECTORIZED WHITE (WATERBORNE) EACH	Dollars 10.00	\$
520.0000 Warning and Regulatory Signs	Dollars 67.00	\$
521.0000 Type "A" Street Name Signs	Dollars 14.00	\$
522.0000 Type "B" Street Name Signs	Dollars 64.00	\$
523.0000 Traffic Sign Poles	Dollars 70.00	\$

Resurfacing M16-4  
6521-K6

ITEM NUMBER AND DESCRIPTION	ESTIMATED QUANTITY	COMPUTED TOTALS
524.0000 Parking Meter Posts		
_____ Dollars	28.00	\$ _____
(\$ _____) EA		
530.0000 POLE PAINTING		
_____ Dollars	12.00	\$ _____
(\$ _____) EA		
804.2000 2-INCH ELECTRICAL CONDUIT (FOOT) TYPE NM PLASTIC (UL)		
_____ Dollars	5,363.00	\$ _____
(\$ _____) LF		
804.3000 3-INCH ELECTRICAL CONDUIT (FOOT) TYPE NM PLASTIC (UL)		
_____ Dollars	50.00	\$ _____
(\$ _____) LF		
810.2000 ELECTRIC HANDHOLE PRECAST CONCRETE (EACH)		
_____ Dollars	4.00	\$ _____
(\$ _____) EA		
812.2000 LIGHT STANDARD FOUNDATION CONCRETE (EACH)		
_____ Dollars	1.00	\$ _____
(\$ _____) EA		
813.3200 CONDUCTOR #6 AWG (FOOT)		
_____ Dollars	246.00	\$ _____
(\$ _____) LF		
813.4300 CONDUCTOR #4 AWG (FOOT)		
_____ Dollars	8,600.00	\$ _____
(\$ _____) LF		
820.0000 DECORATIVE STREET LIGHTING		
_____ Dollars	18.00	\$ _____
(\$ _____) EA		

Resurfacing M16-4  
6521-K6

ITEM NUMBER AND DESCRIPTION	ESTIMATED QUANTITY	COMPUTED TOTALS
821.2000 STREET LIGHTING CONTROL LOAD CENTER (EACH)		
_____ Dollars	1.00	\$ _____
(\$ _____) EA		
859.0000 REFLECTORIZED DRUM		
_____ Dollars	50.00	\$ _____
(\$ _____) Day		
900.0000 Lump Sum Reserve		
_____ Dollars		\$ _____ 250,000.00
two hundred fifty thousand and xx / 100		
917.0020 BRICK AND GRANITE BLOCK REMOVE AND STACK		
_____ Dollars	165.00	\$ _____
(\$ _____) SY		
918.0020 4-INCH ELECTRICAL CONDUIT (FOOT) TYPE NM PLASTIC (UL)		
_____ Dollars	125.00	\$ _____
(\$ _____) LF		
919.0020 STREET LIGHT REMOVED AND STACKED		
_____ Dollars	13.00	\$ _____
(\$ _____) EA		
920.0020 STREET LIGHT REMOVE AND RESET		
_____ Dollars	1.00	\$ _____
(\$ _____) EA		
921.0020 REFLECTORIZED DRUM		
_____ Dollars	40.00	\$ _____
(\$ _____) Day		
922.0020 CONDUCTOR #12 AWG (FOOT)		
_____ Dollars	1,800.00	\$ _____
(\$ _____) LF		

Resurfacing M16-4  
6521-K6

ITEM NUMBER AND DESCRIPTION	ESTIMATED QUANTITY	COMPUTED TOTALS
942.0000 Segmented Block Retaining Wall		
	Dollars	200.00 \$
(\$ ) SF		
971.0000 Pedestrian Bridge		
	Dollars	6.00 \$
(\$ ) EA		
975.0000 EXTRA STREET LIGHTS DELIVERED		
	Dollars	5.00 \$
(\$ ) EA		
1017.0000 Heavy Duty Electric Hand Hold		
	Dollars	1.00 \$
(\$ ) EA		

Resurfacing M16-4  
6521-K6

TOTAL BID PRICE INCLUDING CONTINGENCY

\_\_\_\_\_ Dollars                      and                      \_\_\_\_\_ Cents  
(amount in words)

\$ \_\_\_\_\_  
(amount in figures)

Proposed Starting Date: \_\_\_\_\_

Number of Calendar Days to Complete Project \_\_\_\_\_

This proposal is based on provisions of the following addenda:

No. \_\_\_\_\_

No. \_\_\_\_\_

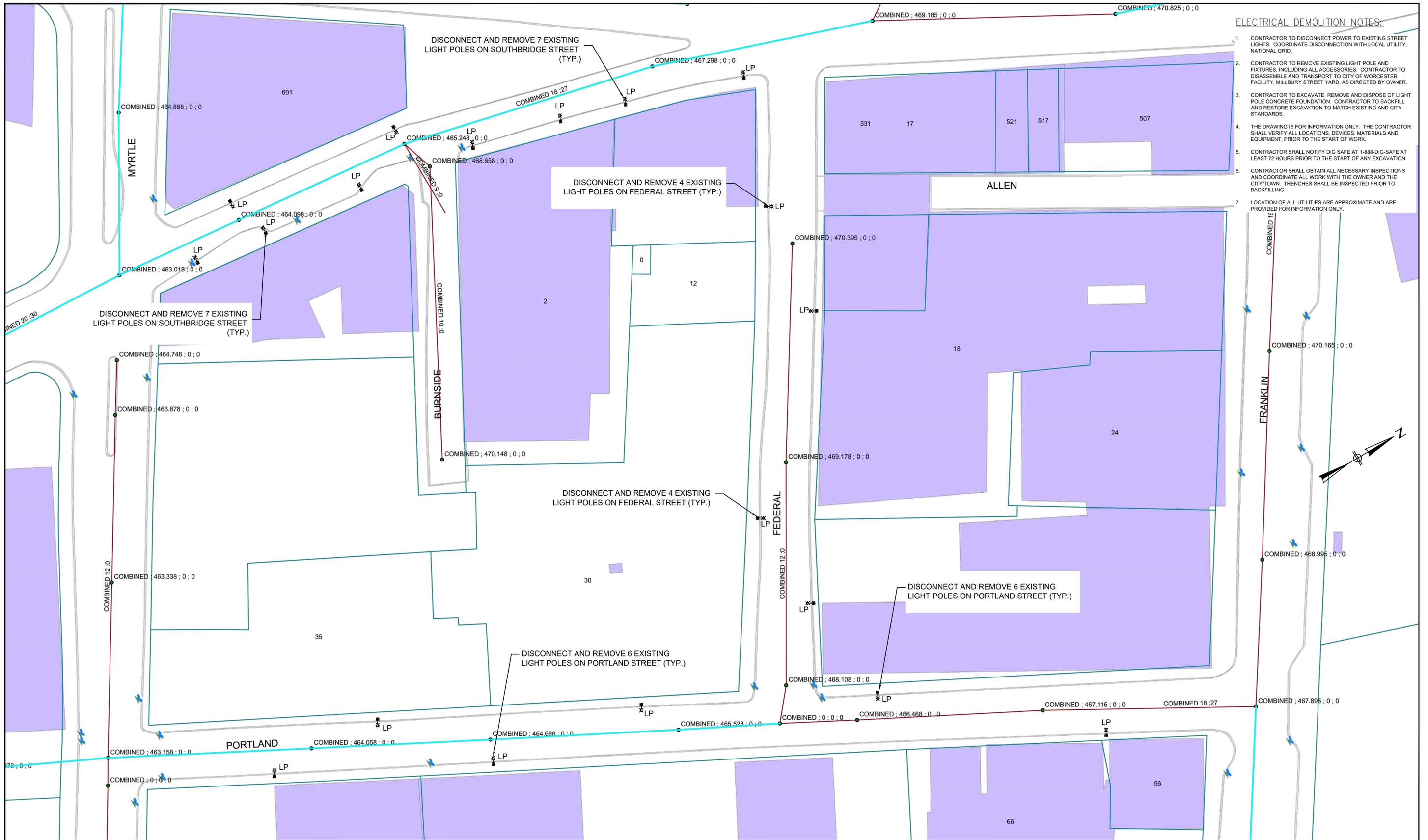
No. \_\_\_\_\_

No. \_\_\_\_\_

All amounts and totals given above will be subject to verification by the City. In case of variation between Unit Bid Price and Totals shown by the Bidder, the Unit Price written in words will be considered to be the bid.

The City reserves the right to reject any and all bids, wholly or in part, and to make awards in a manner deemed in the best interests of the City.

The above estimated quantities form an approximate statement of the extent of the work to be done, based upon the estimate of the Contracting Officer. The City does not expressly or by implication agree that the actual quantity of work will correspond therewith, but reserves the right to increase or decrease the quantity of any class or portion of the work, as may be deemed necessary by the Contracting Officer.



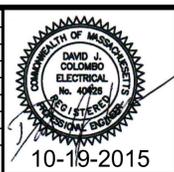
**ELECTRICAL DEMOLITION NOTES:**

1. CONTRACTOR TO DISCONNECT POWER TO EXISTING STREET LIGHTS. COORDINATE DISCONNECTION WITH LOCAL UTILITY, NATIONAL GRID.
2. CONTRACTOR TO REMOVE EXISTING LIGHT POLE AND FIXTURES, INCLUDING ALL ACCESSORIES. CONTRACTOR TO DISASSEMBLE AND TRANSPORT TO CITY OF WORCESTER FACILITY, MILLBURY STREET YARD, AS DIRECTED BY OWNER.
3. CONTRACTOR TO EXCAVATE, REMOVE AND DISPOSE OF LIGHT POLE CONCRETE FOUNDATION. CONTRACTOR TO BACKFILL AND RESTORE EXCAVATION TO MATCH EXISTING AND CITY STANDARDS.
4. THE DRAWING IS FOR INFORMATION ONLY. THE CONTRACTOR SHALL VERIFY ALL LOCATIONS, DEVICES, MATERIALS AND EQUIPMENT, PRIOR TO THE START OF WORK.
5. CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE AT LEAST 72 HOURS PRIOR TO THE START OF ANY EXCAVATION.
6. CONTRACTOR SHALL OBTAIN ALL NECESSARY INSPECTIONS AND COORDINATE ALL WORK WITH THE OWNER AND THE CITY/TOWN. TRENCHES SHALL BE INSPECTED PRIOR TO BACKFILLING.
7. LOCATION OF ALL UTILITIES ARE APPROXIMATE AND ARE PROVIDED FOR INFORMATION ONLY.

No.	DATE	DESCRIPTION
2	10/19/2015	REVISED PER NATIONAL GRID COMMENTS
1	10/13/2015	REVISED PER CLIENT COMMENTS
0	9/18/2015	ISSUED FOR REVIEW

No.	DATE	DESCRIPTION

PROJ. MANAGER:	
CHIEF DESIGNER:	
REVIEWED BY:	



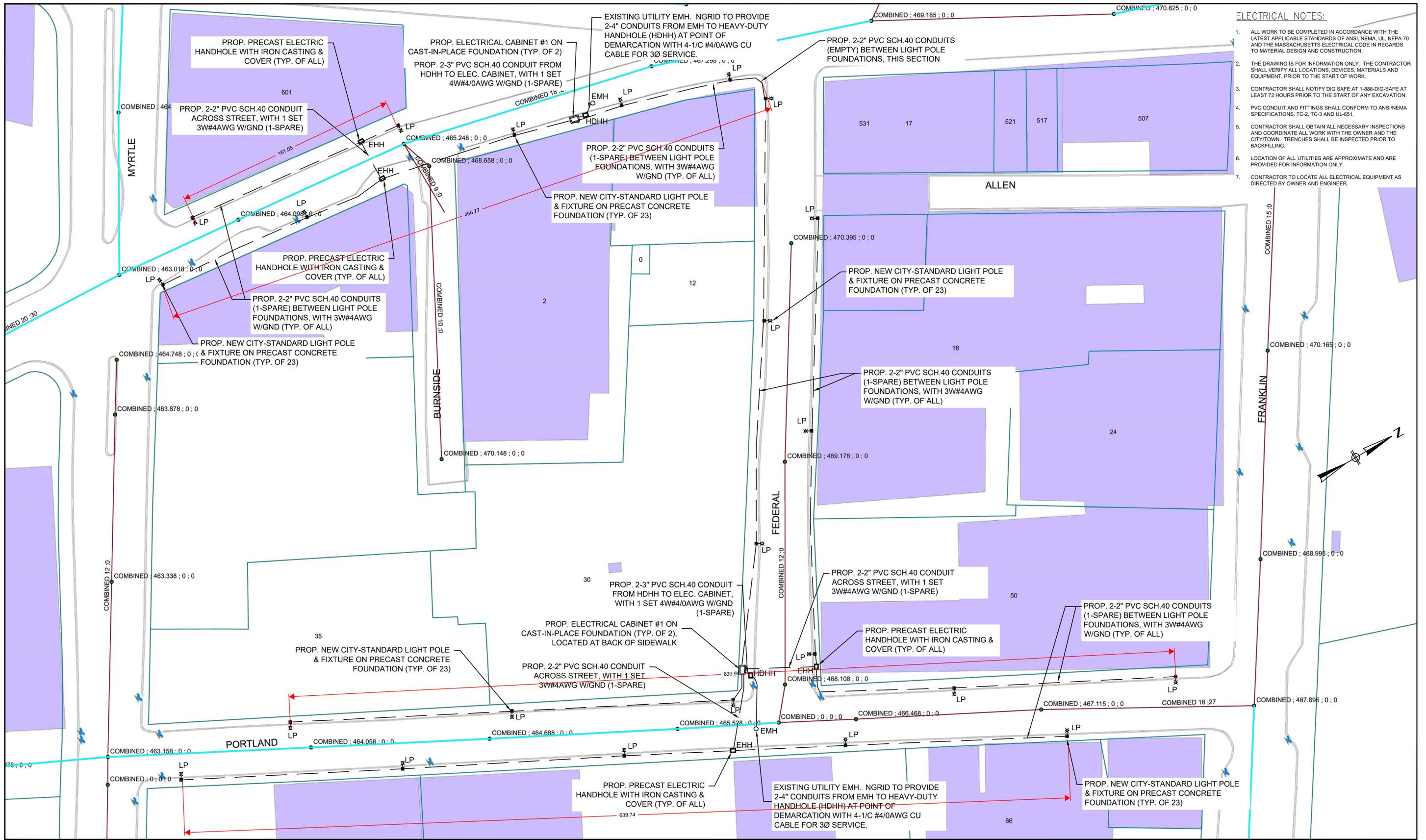
SCALE:	
HORIZ.:	1" = 30'-0"
VERT.:	
DATUM:	
HORIZ.:	
VERT.:	

**POWER ENGINEERS, LLC**  
 37 Fox Den Road  
 Kingston, MA 02364-2150  
 (508) 612-0382  
 www.PowerEngineersLLC.com

*Electrical Engineering, Power, Lighting,  
 Technical Studies and Utility Consulting*

CITY OF WORCESTER  
 PORTLAND / FEDERAL / SOUTHBRIDGE ST  
 LIGHTING DEMOLITION PLAN  
 WORCESTER MASSACHUSETTS

PROJ. No.: 064AI
DATE: SEPT 2015
<b>E-1</b>
SIZE: D   REV: 1

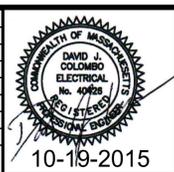


**ELECTRICAL NOTES:**

1. ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE LATEST APPLICABLE STANDARDS OF ANSI, NEMA, UL, NFPA-70 AND THE MASSACHUSETTS ELECTRICAL CODE IN REGARDS TO MATERIAL DESIGN AND CONSTRUCTION.
2. THE DRAWING IS FOR INFORMATION ONLY. THE CONTRACTOR SHALL VERIFY ALL LOCATIONS, DEVICES, MATERIALS AND EQUIPMENT, PRIOR TO THE START OF WORK.
3. CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE AT LEAST 72 HOURS PRIOR TO THE START OF ANY EXCAVATION.
4. PVC CONDUIT AND FITTINGS SHALL CONFORM TO ANSINEMA SPECIFICATIONS, TC-2, TC-3 AND UL-651.
5. CONTRACTOR SHALL OBTAIN ALL NECESSARY INSPECTIONS AND COORDINATE ALL WORK WITH THE OWNER AND THE CITY/TOWN. TRENCHES SHALL BE INSPECTED PRIOR TO BACKFILLING.
6. LOCATION OF ALL UTILITIES ARE APPROXIMATE AND ARE PROVIDED FOR INFORMATION ONLY.
7. CONTRACTOR TO LOCATE ALL ELECTRICAL EQUIPMENT AS DIRECTED BY OWNER AND ENGINEER.

No.	DATE	DESCRIPTION	No.	DATE	DESCRIPTION
2	10/19/2015	REVISED PER NATIONAL GRID COMMENTS			
1	10/13/2015	REVISED PER CLIENT COMMENTS			
0	9/18/2015	ISSUED FOR REVIEW			
REVISIONS					

PROJ. MANAGER:	
CHIEF DESIGNER:	
REVIEWED BY:	DATE



SCALE:	
HORIZ.: 1" = 30'-0"	
VERT.:	
DATUM:	
HORIZ.:	
VERT.:	

**POWER ENGINEERS, LLC**  
 37 Fox Den Road  
 Kingston, MA 02364-2150  
 (508) 612-0382  
 www.PowerEngineersLLC.com  
*Electrical Engineering, Power, Lighting, Technical Studies and Utility Consulting*

CITY OF WORCESTER  
 PORTLAND / FEDERAL / SOUTHBIDGE ST  
 PROPOSED LIGHTING AND ELECTRICAL PLAN  
 WORCESTER MASSACHUSETTS

PROJ. No.: 064AI
DATE: SEPT 2015
<b>E-2</b>
SIZE: D   REV: 2

LEGEND OF FEEDER SIZES - COPPER CONDUCTORS					
FEEDER SYMBOL	CONDUCTORS (3 PHASE, 3 WIRES) WITH GROUND	MINIMUM RACEWAY SIZE	CONDUCTORS (3 PHASE, 4 WIRES) WITH GROUND	MINIMUM RACEWAY SIZE	NOMINAL AMPERE RATING
①	3-6 AWG & 1-10 AWG GND.	3/4"	4-6 AWG & 1-10 AWG GND.	1"	60
②	3-4 AWG & 1-8 AWG GND.	1"	4-4 AWG & 1-8 AWG GND.	1 1/4"	70
③	3-1 AWG & 1-8 AWG GND.	1 1/4"	4-1 AWG & 1-8 AWG GND.	1 1/2"	100
④	3-1 AWG & 1-6 AWG GND.	1 1/2"	4-1 AWG & 1-6 AWG GND.	2"	125
⑤	3-1/0 AWG & 1-6 AWG GND.	1 1/2"	4-1/0 AWG & 1-6 AWG GND.	2"	150
⑥	3-2/0 AWG & 1-6 AWG GND.	2"	4-2/0 AWG & 1-6 AWG GND.	2"	175
⑦	3-3/0 AWG & 1-6 AWG GND.	2"	4-3/0 AWG & 1-6 AWG GND.	2"	200
⑧	3-4/0 AWG & 1-4 AWG GND.	2"	4-4/0 AWG & 1-6 AWG GND.	2 1/2"	225
⑨	3-250 KCMIL & 1-4 AWG GND.	2 1/2"	4-250 KCMIL & 1-4 AWG GND.	3"	250
⑩	3-350 KCMIL & 1-4 AWG GND.	3"	4-350 KCMIL & 1-4 AWG GND.	3"	300
⑪	3-500 KCMIL & 1-3 AWG GND.	3"	4-500 KCMIL & 1-3 AWG GND.	4"	350
⑫	3-600 KCMIL & 1-3 AWG GND.	3"	4-600 KCMIL & 1-3 AWG GND.	4"	400
⑬	6-250 KCMIL & 2-2 AWG GND.	2-2 1/2"	8-250 KCMIL & 2-2 AWG GND.	2-3"	500
⑭	6-350 KCMIL & 2-1 AWG GND.	2-3"	8-350 KCMIL & 2-1 AWG GND.	2-3 1/2"	600
⑮	6-600 KCMIL & 2-1/0 AWG GND.	2-3 1/2"	8-600 KCMIL & 2-1/0 AWG GND.	2-4"	800
⑯	9-400 KCMIL & 3-2/0 AWG GND.	3-3"	12-400 KCMIL & 3-2/0 AWG GND.	3-3 1/2"	1000
⑰	9-600 KCMIL & 3-3/0 AWG GND.	3-3 1/2"	12-600 KCMIL & 3-3/0 AWG GND.	3-3 1/2"	1200
⑱	12-600 KCMIL & 4-4/0 AWG GND.	4-3 1/2"	16-600 KCMIL & 4-4/0 AWG GND.	4-3 1/2"	1600
⑲	15-600 KCMIL & 5-250 KCMIL GND.	5-3 1/2"	20-600 KCMIL & 5-250 KCMIL GND.	5-3 1/2"	2000
⑳	18-600 KCMIL & 6-350 KCMIL GND.	6-3 1/2"	24-600 KCMIL & 6-350 KCMIL GND.	6-3 1/2"	2500
㉑	24-500 KCMIL & 8-400 KCMIL GND.	8-3 1/2"	32-500 KCMIL & 8-400 KCMIL GND.	8-4"	3000
㉒	24-600 KCMIL & 8-500 KCMIL GND.	8-3 1/2"	32-600 KCMIL & 8-500 KCMIL GND.	8-3 1/2"	3200
㉓	27-600 KCMIL & 9-500 KCMIL GND.	9-3 1/2"	36-600 KCMIL & 9-500 KCMIL GND.	9-3 1/2"	3500
㉔	30-600 KCMIL & 10-500 KCMIL GND.	10-3 1/2"	40-600 KCMIL & 10-500 KCMIL GND.	10-3 1/2"	4000

■ DENOTES ADDITIONAL INSULATED/ISOLATED GROUND WIRE REQUIRED FOR ALL FEEDERS TO PANELBOARDS SERVING ISOLATED GROUND RECEPTACLES REFER TO ISOLATED GROUNDING DETAIL FOR ADDITIONAL INFORMATION. Ⓢ DENOTES SINGLE-PHASE 20-W/GND.

\* DENOTES ADDITIONAL NEUTRAL CONDUCTOR REQUIRED (200%) FOR ALL FEEDERS TO PANELBOARD

EXAMPLES

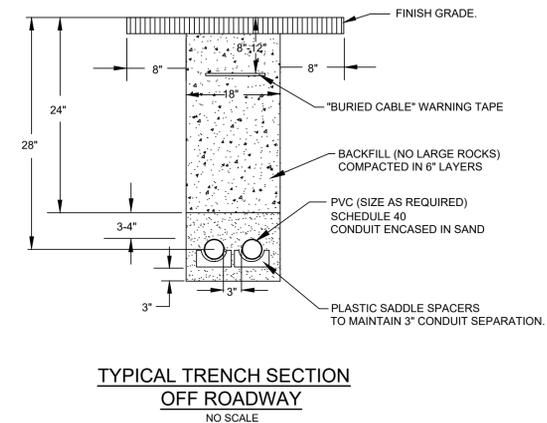
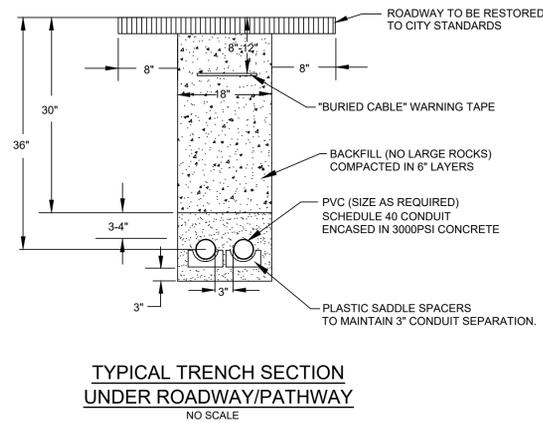
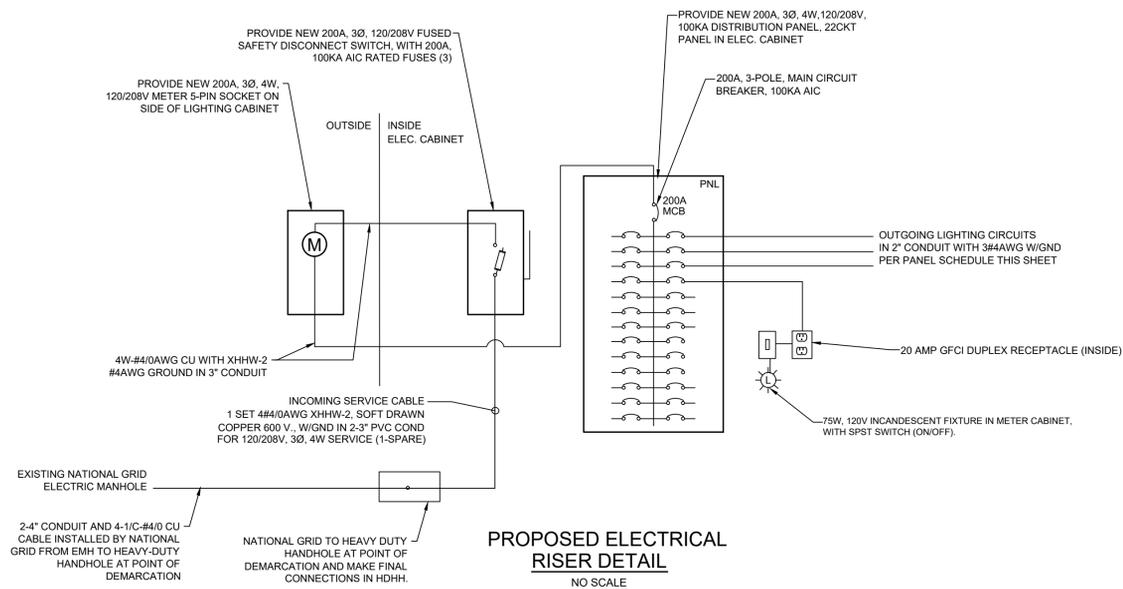
■ ② 4-6 AWG, 1-10 AWG IG & 1-10 AWG GND. - 1" CONDUIT

\* ② 3-6 AWG, 1-1 AWG NEUTRAL & 1-10 AWG GND. - 1 1/2" CONDUIT

BRANCH CIRCUITS SCHEDULE	
120 OR 277 VOLT 1Ø, 2W. CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
30A-1P	2#10+1#10 GND. - 3/4"
40A-1P	2#8+1#10 GND. - 3/4"
50A-1P	2#6+1#10 GND. - 3/4"
60A-1P	2#6+1#10 GND. - 3/4"
208 VOLT 1Ø, 2W. CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
20A-2P	2#12+1#12 GND. - 3/4"
30A-2P	2#10+1#10 GND. - 3/4"
40A-2P	2#8+1#10 GND. - 3/4"
50A-2P	2#6+1#10 GND. - 3/4"
60A-2P	2#6+1#10 GND. - 3/4"
208/120 VOLT, 1Ø, 3W CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
20A-2P	3#12+1#12 GND. - 3/4"
30A-2P	3#10+1#10 GND. - 3/4"
40A-2P	3#8+1#10 GND. - 3/4"
50A-2P	3#6+1#10 GND. - 3/4"
60A-2P	3#6+1#10 GND. - 3/4"
208 OR 480 VOLTS, 3Ø, 3W CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
20A-3P	3#12+1#12 GND. - 3/4"
30A-3P	3#10+1#10 GND. - 3/4"
40A-3P	3#8+1#10 GND. - 3/4"
50A-3P	3#6+1#10 GND. - 3/4"
60A-3P	3#6+1#10 GND. - 3/4"
208Y/120 & 480Y/277 VOLT, 3Ø, 4W CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
20A-3P	4#12+1#12 GND. - 3/4"
30A-3P	4#10+1#10 GND. - 3/4"
40A-3P	4#8+1#10 GND. - 3/4"
50A-3P	4#6+1#10 GND. - 1"
60A-3P	4#6+1#10 GND. - 1"

NEW DISTRIBUTION PANEL - LIGHTING CABINET #1							
PHASE: 3		WIRES: 4		VOLTAGE: 120/208V		MAINS: 200A MAIN C.B. 100KA AIC	
CIRCUIT	FRAME	BREAKER		DESCRIPTION OF LOAD	CABLE	CONDUIT	REMARKS
		POLES(N-NEUTRAL)	TRIP				
M	200	3P	200	MAIN CIRCUIT BREAKER	4W#4/0AWG & #4 GND	2-3" PVC	
1	20	2P	20	NEW STREET LIGHTING (CKT#1)	3W#4AWG & #4 GND	2-2" PVC	
2	20	2P	20	NEW STREET LIGHTING (CKT#2)	3W#4AWG & #4 GND	2-2" PVC	
3	20	2P	20	NEW STREET LIGHTING (CKT#3)	3W#4AWG & #4 GND	2-2" PVC	
4	20	2P	20	NEW STREET LIGHTING (CKT#4)	3W#4AWG & #4 GND	2-2" PVC	
5	20	1P	20	DUPLEX GFCI RECEPTACLE	2W#12AWG & #12 GND	3/4" EMT	
6	20	1P	20	SPARE BREAKERS (QTY: 3)			
7	20	2P	20	SPARE BREAKERS (QTY: 3)			
8							
9							
10							

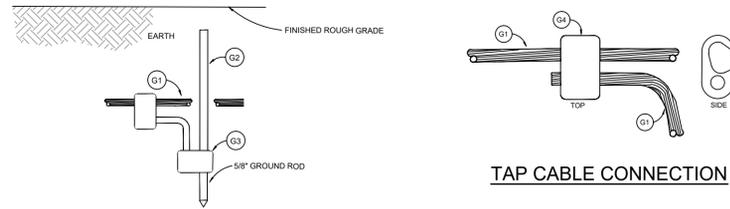
NEW DISTRIBUTION PANEL - LIGHTING CABINET #2							
PHASE: 3		WIRES: 4		VOLTAGE: 120/208V		MAINS: 200A MAIN C.B. 100KA AIC	
CIRCUIT	FRAME	BREAKER		DESCRIPTION OF LOAD	CABLE	CONDUIT	REMARKS
		POLES(N-NEUTRAL)	TRIP				
M	200	3P	200	MAIN CIRCUIT BREAKER	4W#4/0AWG & #4 GND	2-3" PVC	
1	20	2P	20	NEW STREET LIGHTING (CKT#1)	3W#4AWG & #4 GND	2-2" PVC	
2	20	2P	20	NEW STREET LIGHTING (CKT#2)	3W#4AWG & #4 GND	2-2" PVC	
3	20	1P	20	DUPLEX GFCI RECEPTACLE	2W#12AWG & #12 GND	3/4" EMT	
4	20	1P	20	SPARE BREAKERS (QTY: 3)			
5	20	2P	20	SPARE BREAKERS (QTY: 3)			
6							
7							
8							
9							
10							



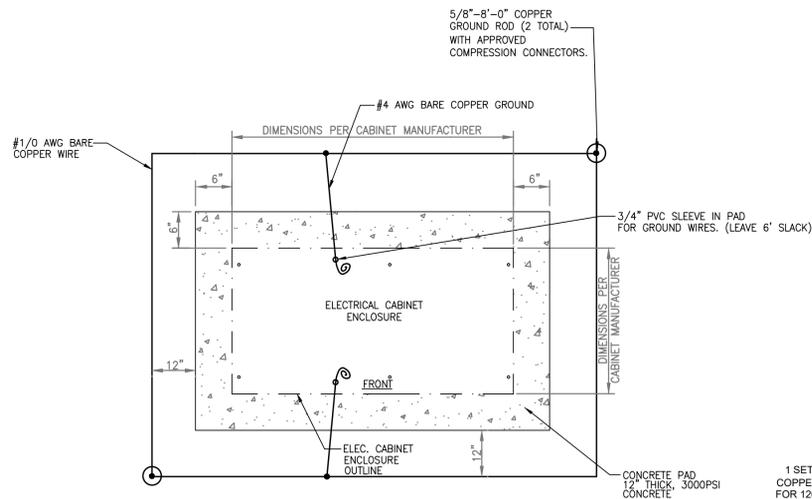
2 10/19/2015 REVISED PER NATIONAL GRID COMMENTS 1 10/13/2015 REVISED PER CLIENT COMMENTS 0 9/18/2015 ISSUED FOR REVIEW		PROJ. MANAGER: CHIEF DESIGNER: REVIEWED BY: DATE			SCALE: HORIZ.: AS NOTED VERT.: DATUM:	<b>POWER ENGINEERS, LLC</b> 37 Fox Den Road Kingston, MA 02364-2150 (508) 612-0382 www.PowerEngineersLLC.com <i>Electrical Engineering, Power, Lighting, Technical Studies and Utility Consulting</i>	CITY OF WORCESTER PORTLAND / FEDERAL / SOUTHBRIDGE ST ELECTRICAL DETAILS WORCESTER MASSACHUSETTS	PROJ. No.: 064AI DATE: SEPT 2015
REVISIONS		REVISIONS			GRAPHIC SCALE			SIZE: D REV: 2

GROUNDING MATERIALS LIST			
SYMBOL	DESCRIPTION	VENDOR	CATALOG #
GROUNDING MATERIALS			
G1	#410 CU SOFT DRAWN STRANDED BARE COPPER CONDUCTOR	---	---
G2	5/8" X 8'-0" COPPERWELD GROUND ROD	BLACKBURN	6258S
G3	COMPRESSION CONNECTOR - #410 TO 5/8" GROUND ROD (GROUND ROD GRID CONNECTOR)	BURNDY	YGLR29C58
G4	COMPRESSION CONNECTOR - #410 TO #410, #410 TO #210 AND #210 TO #210	BURNDY	YGHP29C29

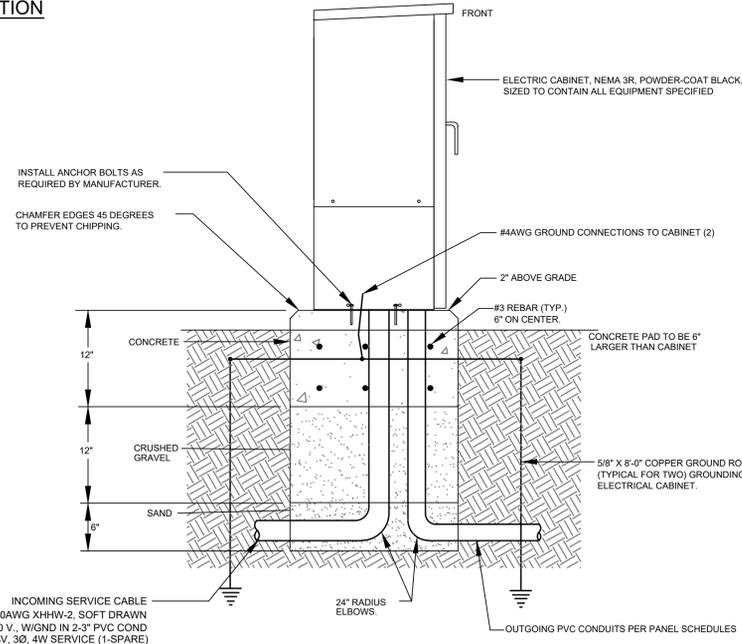
**GROUNDING DETAILS**



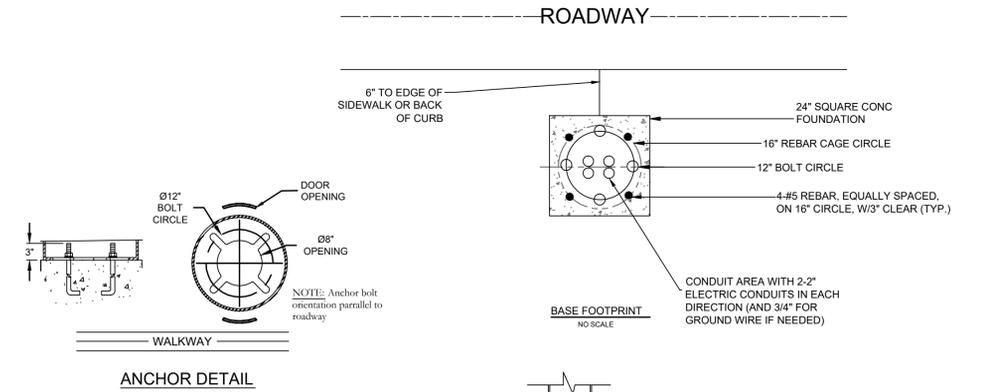
**ROD TO CABLE CONNECTION**



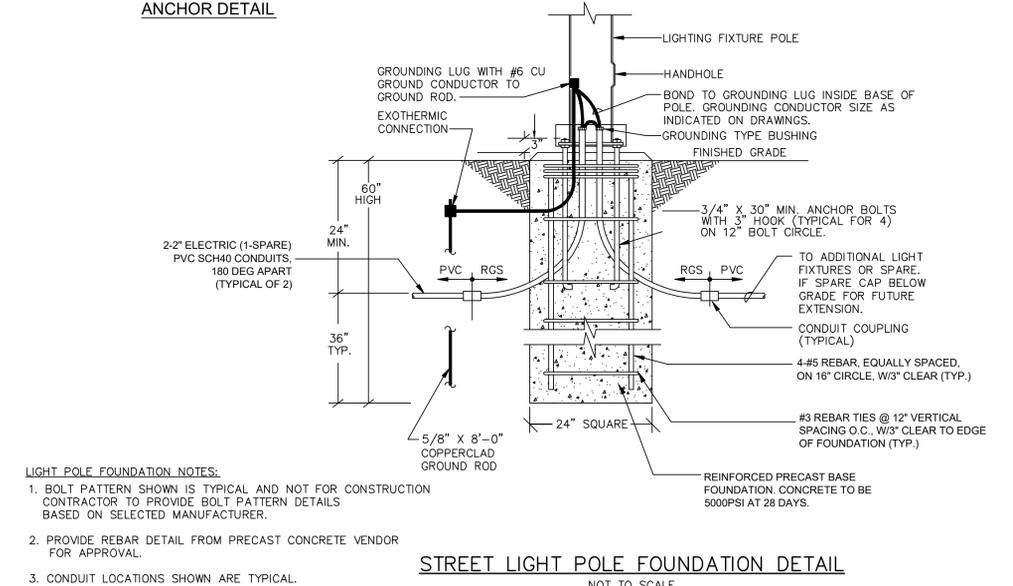
**ELECTRICAL CABINET FOUNDATION PLAN**  
NOT TO SCALE



**METERING CABINET DETAIL**  
NO SCALE



**ANCHOR DETAIL**

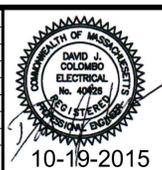


**STREET LIGHT POLE FOUNDATION DETAIL**  
NOT TO SCALE

- LIGHT POLE FOUNDATION NOTES:**
- BOLT PATTERN SHOWN IS TYPICAL AND NOT FOR CONSTRUCTION CONTRACTOR TO PROVIDE BOLT PATTERN DETAILS BASED ON SELECTED MANUFACTURER.
  - PROVIDE REBAR DETAIL FROM PRECAST CONCRETE VENDOR FOR APPROVAL.
  - CONDUIT LOCATIONS SHOWN ARE TYPICAL.

No.	DATE	DESCRIPTION	No.	DATE	DESCRIPTION
2	10/19/2015	REVISED PER NATIONAL GRID COMMENTS			
1	10/13/2015	REVISED PER CLIENT COMMENTS			
0	9/18/2015	ISSUED FOR REVIEW			
REVISIONS					

PROJ. MANAGER:	DATE
CHIEF DESIGNER:	
REVIEWED BY:	

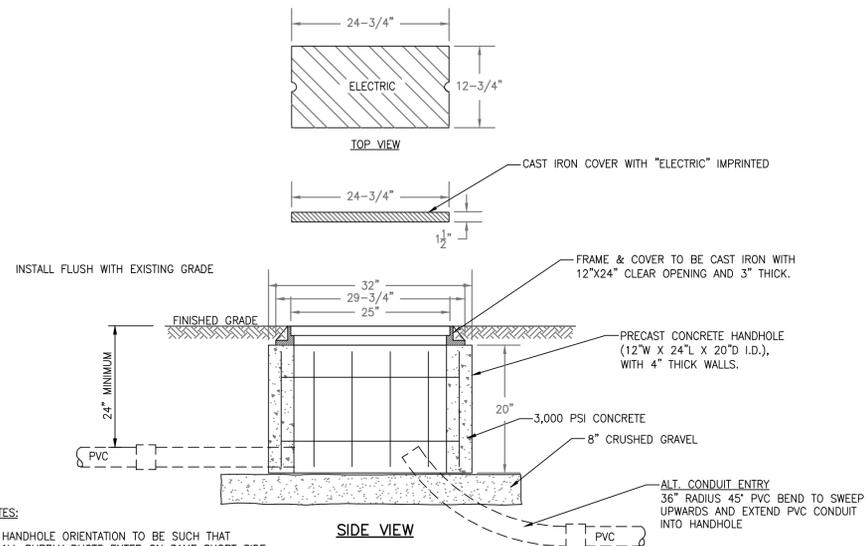


SCALE:
HORZ.: AS NOTED
VERT.:
DATUM:
HORZ.:
VERT.:
0
GRAPHIC SCALE

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 Kingston, MA 02364-2150  
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CITY OF WORCESTER  
 PORTLAND / FEDERAL / SOUTHBRIDGE ST  
 ELECTRICAL DETAILS  
 WORCESTER MASSACHUSETTS

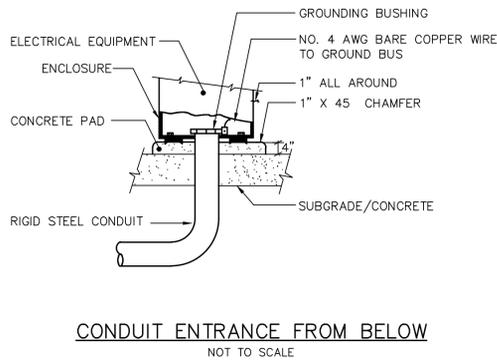
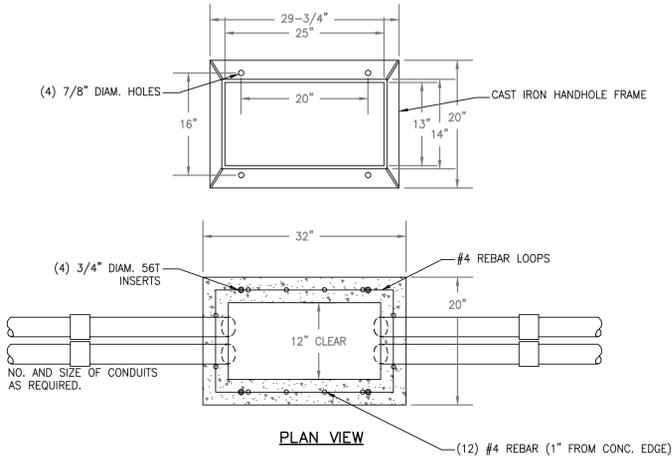
PROJ. No.: 064AI
DATE: SEPT 2015
<b>E-4</b>
SIZE: D   REV: 2



- NOTES:**
- HANDHOLE ORIENTATION TO BE SUCH THAT ALL SUPPLY DUCTS ENTER ON SAME SHORT SIDE.
  - SIZE AND NUMBER OF CONDUITS AS REQUIRED.
  - CONDUIT LOCATIONS SHOWN ARE TYPICAL.

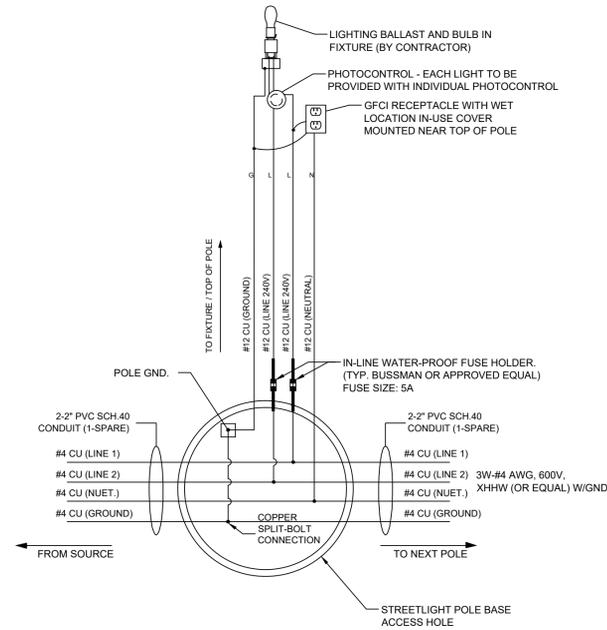
**TYPICAL HANDHOLE INSTALLATION DETAIL**

SCALE: NOT TO SCALE



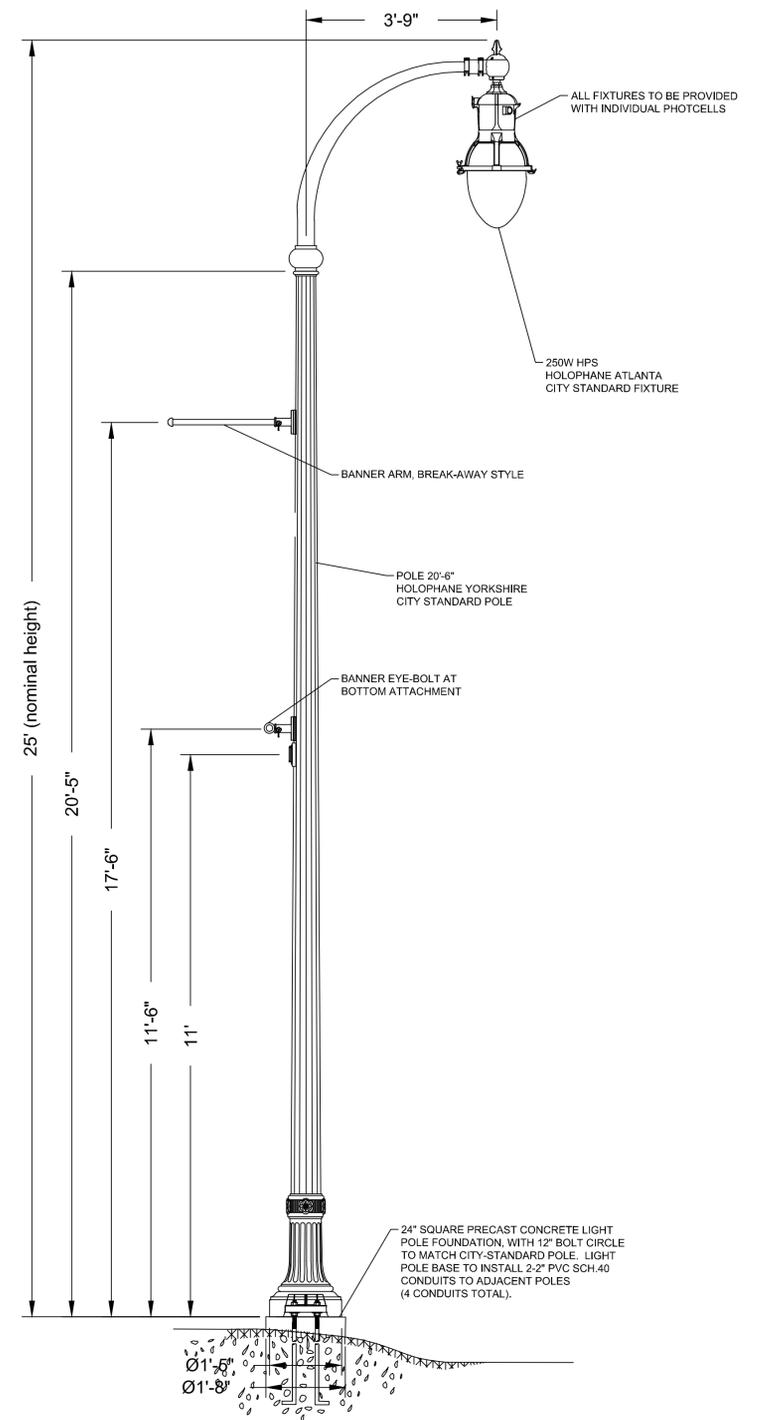
**CONDUIT ENTRANCE FROM BELOW**

NOT TO SCALE



**TYPICAL STREETLIGHT WIRING DETAIL**

NOT TO SCALE

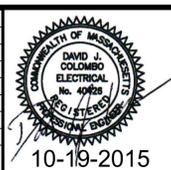


**LIGHT POLE COMPLETE INSTALLATION**

NOT TO SCALE

No.	DATE	DESCRIPTION	No.	DATE	DESCRIPTION
2	10/19/2015	REVISED PER NATIONAL GRID COMMENTS			
1	10/13/2015	REVISED PER CLIENT COMMENTS			
0	9/18/2015	ISSUED FOR REVIEW			
REVISIONS					

PROJ. MANAGER:	
CHIEF DESIGNER:	
REVIEWED BY:	DATE



SCALE:	
HORZ.:	AS NOTED
VERT.:	
DATUM:	
HORZ.:	
VERT.:	

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Technical Studies and Utility Consulting*

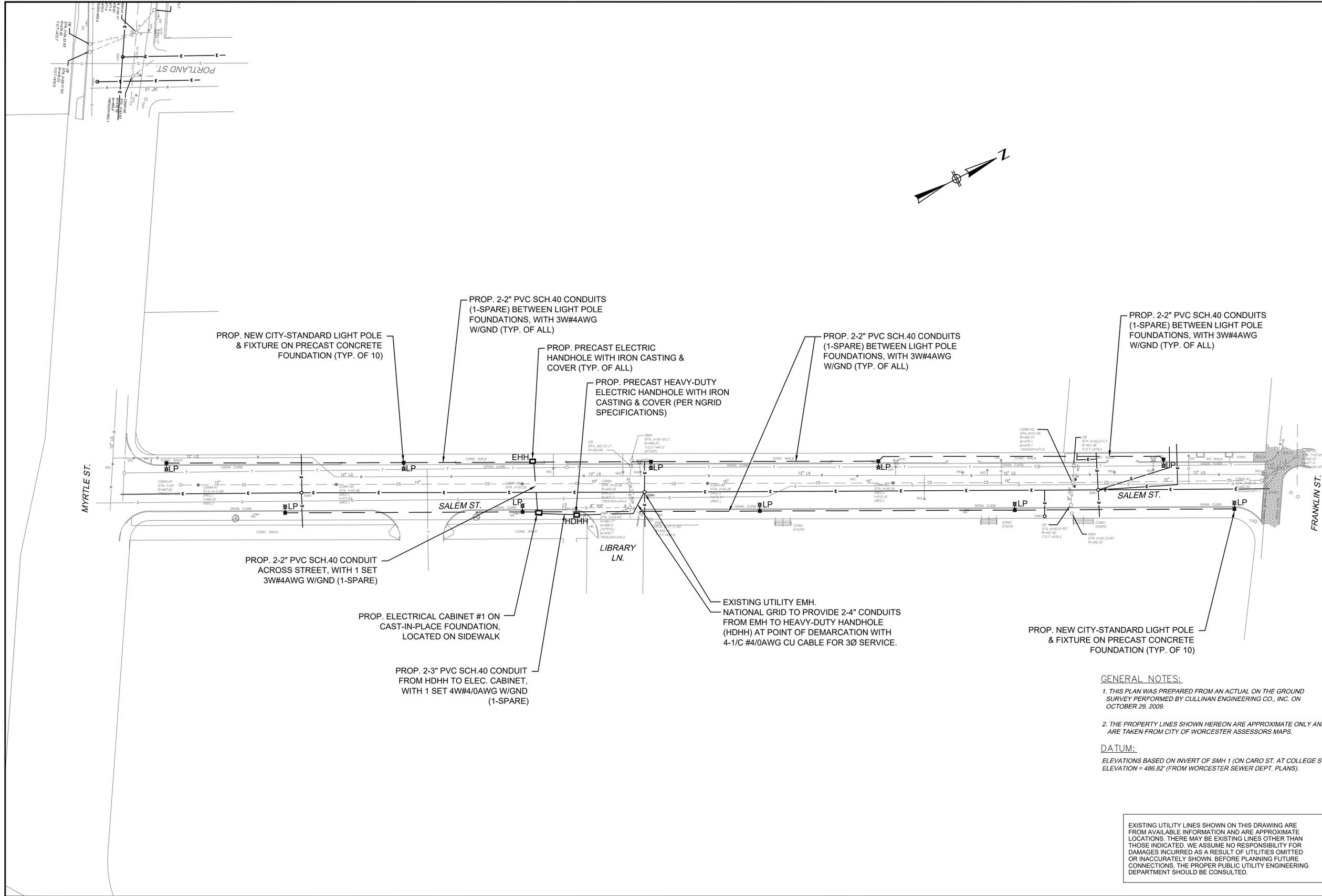
CITY OF WORCESTER  
PORTLAND / FEDERAL / SOUTHBRIDGE ST  
ELECTRICAL DETAILS  
WORCESTER MASSACHUSETTS

PROJ. No.: 064AI
DATE: SEPT 2015
<b>E-5</b>
SIZE: D   REV: 2



**ELECTRICAL NOTES:**

- ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE LATEST APPLICABLE STANDARDS OF ANSI, NEMA, UL, NFPA-70 AND THE MASSACHUSETTS ELECTRICAL CODE IN REGARDS TO MATERIAL DESIGN AND CONSTRUCTION.
- THE DRAWING IS FOR INFORMATION ONLY. THE CONTRACTOR SHALL VERIFY ALL LOCATIONS, DEVICES, MATERIALS AND EQUIPMENT, PRIOR TO THE START OF WORK.
- CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE AT LEAST 72 HOURS PRIOR TO THE START OF ANY EXCAVATION.
- PVC CONDUIT AND FITTINGS SHALL CONFORM TO ANSINEMA SPECIFICATIONS, TC-2, TC-3 AND UL-651.
- CONTRACTOR SHALL OBTAIN ALL NECESSARY INSPECTIONS AND COORDINATE ALL WORK WITH THE OWNER AND THE CITY/TOWN. TRENCHES SHALL BE INSPECTED PRIOR TO BACKFILLING.
- LOCATION OF ALL UTILITIES ARE APPROXIMATE AND ARE PROVIDED FOR INFORMATION ONLY.
- CONTRACTOR TO LOCATE ALL ELECTRICAL EQUIPMENT AS DIRECTED BY OWNER AND ENGINEER.



**LEGEND:**

- |         |                          |
|---------|--------------------------|
| BIT.    | BITUMINOUS               |
| BM      | BENCH MARK               |
| CB      | CATCH BASIN              |
| CONC.   | CONCRETE                 |
| CS      | COMBINED SYSTEM LINE     |
| CSMH    | COMBINED SYSTEM MANHOLE  |
| DMH     | DRAIN MANHOLE            |
| D       | DRAINAGE LINE            |
| E       | ELECTRIC LINE            |
| ELEV.   | ELEVATION                |
| EMH     | ELECTRIC MANHOLE         |
| G       | GAS LINE                 |
| GG      | GAS GATE                 |
| GRAN.   | GRANITE                  |
| HR      | HANDICAP RAMP            |
| HS      | HIGH SERVICE             |
| HYD     | HYDRANT                  |
| I=      | INVERT ELEVATION         |
| LP      | LIGHT POLE               |
| LS      | LOW SERVICE              |
| LT.     | LEFT OF BASELINE         |
| PM      | PARKING METER            |
| PVC     | POLYVINYL CHLORIDE PIPE  |
| R=      | RIM ELEVATION            |
| RCP     | REINFORCED CONCRETE PIPE |
| REC.    | RECORD INFORMATION       |
| RT.     | RIGHT OF BASELINE        |
| S       | SEWER LINE               |
| SMH     | SANITARY SEWER MANHOLE   |
| SN      | SIGN                     |
| STA.    | BASELINE STATION         |
| T       | TELEPHONE LINE           |
| TMH     | TELEPHONE MANHOLE        |
| T.O.T.= | TOP OF TRAP ELEVATION    |
| TS      | TRAFFIC SIGNAL           |
| VCP     | VITRIFIED CLAY PIPE      |
| w/      | WITH                     |
| W       | WATER LINE               |
| WG      | WATER GATE               |

**GENERAL NOTES:**

- THIS PLAN WAS PREPARED FROM AN ACTUAL ON THE GROUND SURVEY PERFORMED BY CULLINAN ENGINEERING CO., INC. ON OCTOBER 29, 2009.
- THE PROPERTY LINES SHOWN HEREON ARE APPROXIMATE ONLY AND ARE TAKEN FROM CITY OF WORCESTER ASSESSORS MAPS.

**DATUM:**

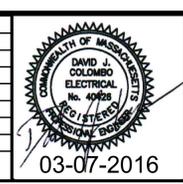
ELEVATIONS BASED ON INVERT OF SMH 1 (ON CARO ST. AT COLLEGE ST.) ELEVATION = 486.82' (FROM WORCESTER SEWER DEPT. PLANS).

EXISTING UTILITY LINES SHOWN ON THIS DRAWING ARE FROM AVAILABLE INFORMATION AND ARE APPROXIMATE LOCATIONS. THERE MAY BE EXISTING LINES OTHER THAN THOSE INDICATED. WE ASSUME NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN. BEFORE PLANNING FUTURE CONNECTIONS, THE PROPER PUBLIC UTILITY ENGINEERING DEPARTMENT SHOULD BE CONSULTED.

No.	DATE	DESCRIPTION
0	3/7/2016	ISSUED FOR REVIEW
REVISIONS		

No.	DATE	DESCRIPTION
REVISIONS		

PROJ. MANAGER:	
CHIEF DESIGNER:	
REVIEWED BY:	DATE



SCALE:	
HORIZ.: 1" = 30'-0"	
VERT.:	
DATUM:	
HORIZ.:	
VERT.:	
30' 15' 0 30'	
GRAPHIC SCALE	

**POWER ENGINEERS, LLC**  
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CITY OF WORCESTER  
**SALEM STREET - LIGHTING**  
 PROPOSED LIGHTING AND ELECTRICAL PLAN  
 WORCESTER MASSACHUSETTS

PROJ. No.: 064AK
DATE: SEPT 2015
<b>E-2</b>
SIZE: D   REV: 0

LEGEND OF FEEDER SIZES - COPPER CONDUCTORS					
FEEDER SYMBOL	CONDUCTORS (3 PHASE, 3 WIRES) WITH GROUND	MINIMUM RACEWAY SIZE	CONDUCTORS (3 PHASE, 4 WIRES) WITH GROUND	MINIMUM RACEWAY SIZE	NOMINAL AMPERE RATING
①	3-6 AWG & 1-10 AWG GND.	3/4"	4-6 AWG & 1-10 AWG GND.	1"	60
②	3-4 AWG & 1-8 AWG GND.	1"	4-4 AWG & 1-8 AWG GND.	1 1/4"	70
③	3-1 AWG & 1-8 AWG GND.	1 1/4"	4-1 AWG & 1-8 AWG GND.	1 1/2"	100
④	3-1 AWG & 1-6 AWG GND.	1 1/2"	4-1 AWG & 1-6 AWG GND.	2"	125
⑤	3-1/0 AWG & 1-6 AWG GND.	1 1/2"	4-1/0 AWG & 1-6 AWG GND.	2"	150
⑥	3-2/0 AWG & 1-6 AWG GND.	2"	4-2/0 AWG & 1-6 AWG GND.	2"	175
⑦	3-3/0 AWG & 1-6 AWG GND.	2"	4-3/0 AWG & 1-6 AWG GND.	2"	200
⑧	3-4/0 AWG & 1-4 AWG GND.	2"	4-4/0 AWG & 1-6 AWG GND.	2 1/2"	225
⑨	3-250 KCMIL & 1-4 AWG GND.	2 1/2"	4-250 KCMIL & 1-4 AWG GND.	3"	250
⑩	3-350 KCMIL & 1-4 AWG GND.	3"	4-350 KCMIL & 1-4 AWG GND.	3"	300
⑪	3-500 KCMIL & 1-3 AWG GND.	3"	4-500 KCMIL & 1-3 AWG GND.	4"	350
⑫	3-600 KCMIL & 1-3 AWG GND.	3"	4-600 KCMIL & 1-3 AWG GND.	4"	400
⑬	6-250 KCMIL & 2-2 AWG GND.	2-2 1/2"	8-250 KCMIL & 2-2 AWG GND.	2-3"	500
⑭	6-350 KCMIL & 2-1 AWG GND.	2-3"	8-350 KCMIL & 2-1 AWG GND.	2-3 1/2"	600
⑮	6-600 KCMIL & 2-1/0 AWG GND.	2-3 1/2"	8-600 KCMIL & 2-1/0 AWG GND.	2-4"	800
⑯	9-400 KCMIL & 3-2/0 AWG GND.	3-3"	12-400 KCMIL & 3-2/0 AWG GND.	3-3 1/2"	1000
⑰	9-600 KCMIL & 3-3/0 AWG GND.	3-3 1/2"	12-600 KCMIL & 3-3/0 AWG GND.	3-3 1/2"	1200
⑱	12-600 KCMIL & 4-4/0 AWG GND.	4-3 1/2"	16-600 KCMIL & 4-4/0 AWG GND.	4-3 1/2"	1600
⑲	15-600 KCMIL & 5-250 KCMIL GND.	5-3 1/2"	20-600 KCMIL & 5-250 KCMIL GND.	5-3 1/2"	2000
⑳	18-600 KCMIL & 6-350 KCMIL GND.	6-3 1/2"	24-600 KCMIL & 6-350 KCMIL GND.	6-3 1/2"	2500
㉑	24-500 KCMIL & 8-400 KCMIL GND.	8-3 1/2"	32-500 KCMIL & 8-400 KCMIL GND.	8-4"	3000
㉒	24-600 KCMIL & 8-500 KCMIL GND.	8-3 1/2"	32-600 KCMIL & 8-500 KCMIL GND.	8-3 1/2"	3200
㉓	27-600 KCMIL & 9-500 KCMIL GND.	9-3 1/2"	36-600 KCMIL & 9-500 KCMIL GND.	9-3 1/2"	3500
㉔	30-600 KCMIL & 10-500 KCMIL GND.	10-3 1/2"	40-600 KCMIL & 10-500 KCMIL GND.	10-3 1/2"	4000

■ DENOTES ADDITIONAL INSULATED/ISOLATED GROUND WIRE REQUIRED FOR ALL FEEDERS TO PANELBOARDS SERVING ISOLATED GROUND RECEPTACLES REFER TO ISOLATED GROUNDING DETAIL FOR ADDITIONAL INFORMATION. Ⓢ DENOTES SINGLE-PHASE 20-W/GND.

\* DENOTES ADDITIONAL NEUTRAL CONDUCTOR REQUIRED (200%) FOR ALL FEEDERS TO PANELBOARD

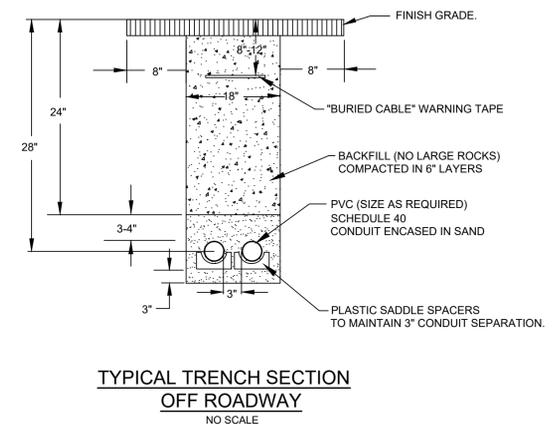
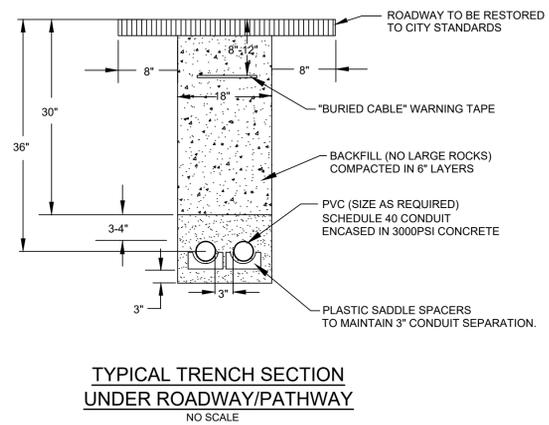
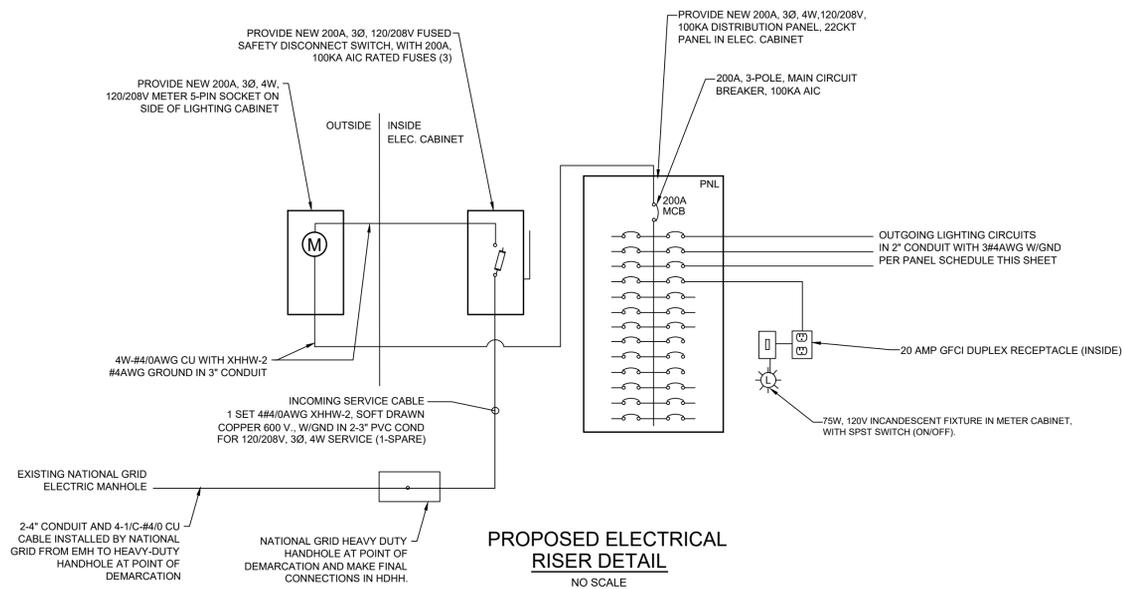
EXAMPLES

■ ② 4-6 AWG, 1-10 AWG IG & 1-10 AWG GND. - 1" CONDUIT

\* ② 3-6 AWG, 1-1 AWG NEUTRAL & 1-10 AWG GND. - 1 1/2" CONDUIT

BRANCH CIRCUITS SCHEDULE	
120 OR 277 VOLT 1Ø, 2W. CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
30A-1P	2#12+1#12 GND. - 3/4"
40A-1P	2#8+1#10 GND. - 3/4"
50A-1P	2#6+1#10 GND. - 3/4"
60A-1P	2#6+1#10 GND. - 3/4"
208 VOLT 1Ø, 2W. CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
20A-2P	2#12+1#12 GND. - 3/4"
30A-2P	2#10+1#10 GND. - 3/4"
40A-2P	2#8+1#10 GND. - 3/4"
50A-2P	2#6+1#10 GND. - 3/4"
60A-2P	2#6+1#10 GND. - 3/4"
208/120 VOLT, 1Ø, 3W CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
20A-2P	3#12+1#12 GND. - 3/4"
30A-2P	3#10+1#10 GND. - 3/4"
40A-2P	3#8+1#10 GND. - 3/4"
50A-2P	3#6+1#10 GND. - 3/4"
60A-2P	3#6+1#10 GND. - 3/4"
208 OR 480 VOLTS, 3Ø, 3W CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
20A-3P	3#12+1#12 GND. - 3/4"
30A-3P	3#10+1#10 GND. - 3/4"
40A-3P	3#8+1#10 GND. - 3/4"
50A-3P	3#6+1#10 GND. - 3/4"
60A-3P	3#6+1#10 GND. - 3/4"
208Y/120 & 480Y/277 VOLT, 3Ø, 4W CIRCUITS	
CIRCUIT BREAKER	CONDUCTOR
20A-3P	4#12+1#12 GND. - 3/4"
30A-3P	4#10+1#10 GND. - 3/4"
40A-3P	4#8+1#10 GND. - 3/4"
50A-3P	4#6+1#10 GND. - 1"
60A-3P	4#6+1#10 GND. - 1"

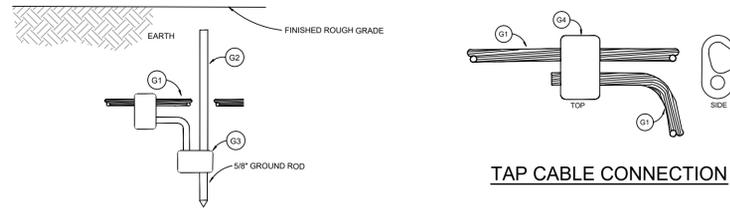
NEW DISTRIBUTION PANEL - LIGHTING CABINET #1							
PHASE: 3		WIRES: 4		VOLTAGE: 120/208V		MAINS: 200A MAIN C.B. 100KA AIC	
CIRCUIT	FRAME	BREAKER		DESCRIPTION OF LOAD	CABLE	CONDUIT	REMARKS
		POLES(N-NEUTRAL)	TRIP				
M	200	3P	200	MAIN CIRCUIT BREAKER	4W#40AWG & #4 GND	2-3" PVC	
1	20	2P	20	NEW STREET LIGHTING (CKT#1) EAST SIDEWALK	3W#4AWG & #4 GND	2-2" PVC	
2	20	2P	20	NEW STREET LIGHTING (CKT#2) WEST SIDEWALK	3W#4AWG & #4 GND	2-2" PVC	
3	20	1P	20	DUPLEX GFCI RECEPTACLE	2W#12AWG & #12 GND	3/4" EMT	
4	20	1P	20	SPARE BREAKERS (QTY: 3)			
5	20	2P	20	SPARE BREAKERS (QTY: 3)			
6							
7							
8							
9							
10							



0 3/7/2016 ISSUED FOR REVIEW No. DATE DESCRIPTION		No. DATE DESCRIPTION		PROJ. MANAGER: CHIEF DESIGNER: REVIEWED BY: DATE	SCALE: HORZ.: AS NOTED VERT.: DATUM: HORZ.: VERT.: GRAPHIC SCALE	<b>POWER ENGINEERS, LLC</b> 37 Fox Den Road Kingston, MA 02364-2150 (508) 612-0382 www.PowerEngineersLLC.com <i>Electrical Engineering, Power, Lighting,          Technical Studies and Utility Consulting</i>	CITY OF WORCESTER SALEM STREET - LIGHTING ELECTRICAL DETAILS WORCESTER MASSACHUSETTS	PROJ. No.: 064AK DATE: MARCH 2016 <b>E-3</b> SIZE: D REV: 0
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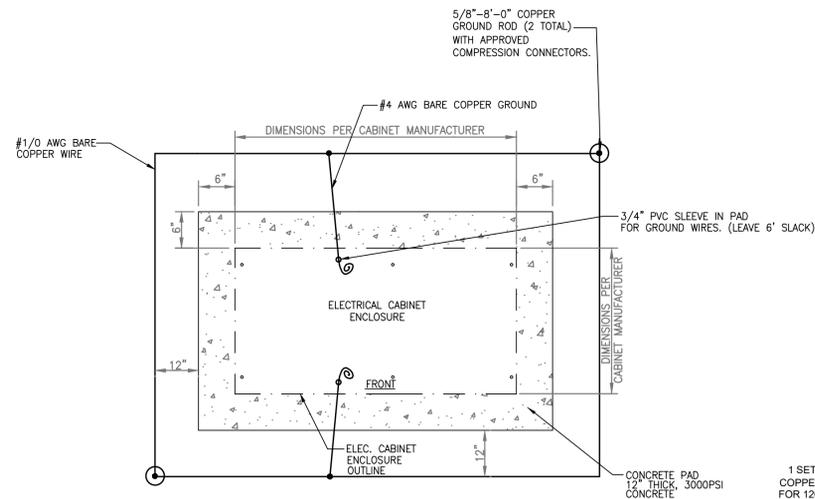
GROUNDING MATERIALS LIST			
SYMBOL	DESCRIPTION	VENDOR	CATALOG #
GROUNDING MATERIALS			
G1	#410 CU SOFT DRAWN STRANDED BARE COPPER CONDUCTOR	---	---
G2	5/8" X 8'-0" COPPERWELD GROUND ROD	BLACKBURN	6258S
G3	COMPRESSION CONNECTOR - #410 TO 5/8" GROUND ROD (GROUND ROD GRID CONNECTOR)	BURNDY	YGLR29C58
G4	COMPRESSION CONNECTOR - #410 TO #410, #410 TO #210 AND #210 TO #210	BURNDY	YGHP29C29

**GROUNDING DETAILS**

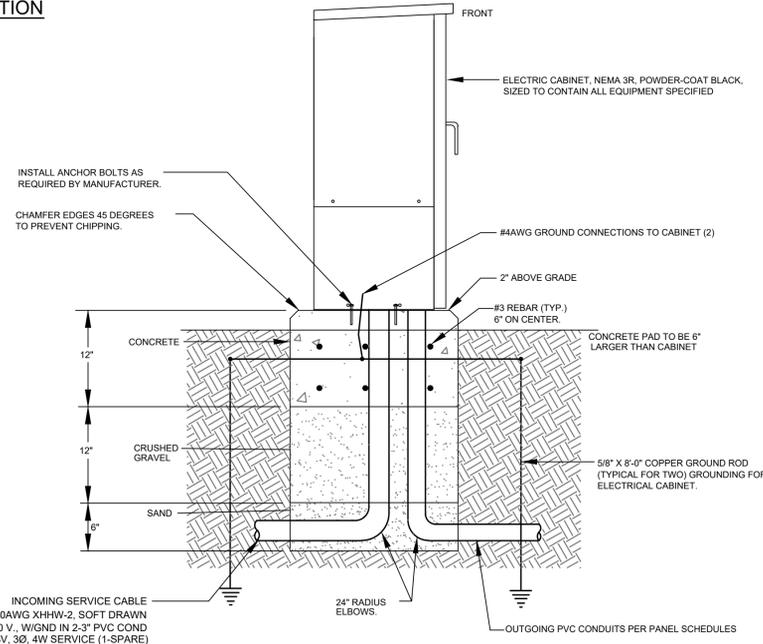


**ROD TO CABLE CONNECTION**

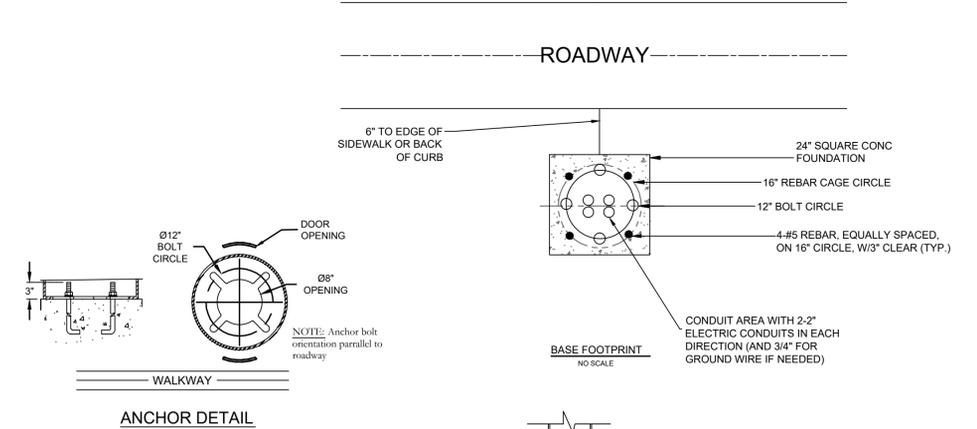
**TAP CABLE CONNECTION**



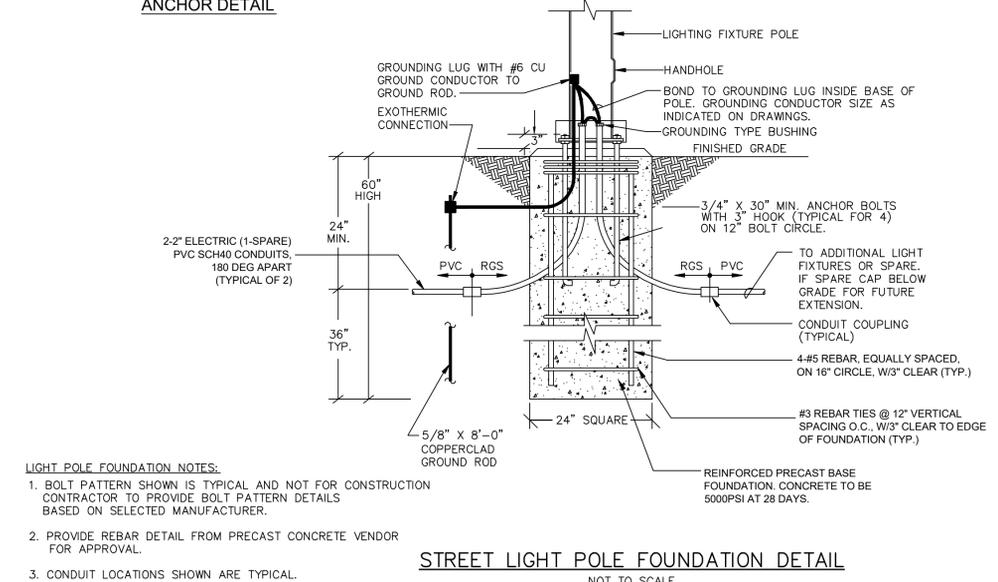
**ELECTRICAL CABINET FOUNDATION PLAN**  
NOT TO SCALE



**METERING CABINET DETAIL**  
NO SCALE



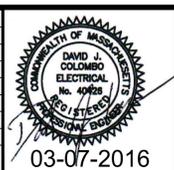
**ANCHOR DETAIL**



**STREET LIGHT POLE FOUNDATION DETAIL**  
NOT TO SCALE

No.	DATE	DESCRIPTION	No.	DATE	DESCRIPTION
0	3/7/2016	ISSUED FOR REVIEW			
REVISIONS					

PROJ. MANAGER:	
CHIEF DESIGNER:	
REVIEWED BY:	DATE



SCALE:	
HORIZ.:	AS NOTED
VERT.:	
DATUM:	
HORIZ.:	
VERT.:	
GRAPHIC SCALE	

**POWER ENGINEERS, LLC**  
 37 Fox Den Road  
 Kingston, MA 02364-2150  
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 ELECTRICAL DETAILS  
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