

City of Springfield Public Improvement Project

Invitation to Bid for:

**P21102
Downtown Lighting – Phase 2**

The information provided is an abridged version of the complete Invitation to Bid and is provided for review and informational purposes only. To submit a bid for consideration, a complete set of bid documents is required.

A complete set of bid documents may be viewed or purchased at the address shown below:

**City of Springfield
Development and Public Works Department
225 Fifth Street
SE Quad
Springfield, OR 97477**

Contact: Terri White at 541-726-3628 or twhite@springfield-or.gov



**City of Springfield
Community Development Division**

**SPECIFICATIONS
for**

P21102

Downtown Lighting - Phase 2

MANDATORY PRE-BID MEETING

Date: September 28, 2016
Time: 9:00 a.m.
Location: City of Springfield
City Hall
Jesse Maine Room
225 Fifth Street
Springfield, OR 97477

BID OPENING

Date: October 13, 2016
Time: 2:00 p.m.
Location: City of Springfield
City Hall
Jesse Maine Room
225 Fifth Street
Springfield, OR 97477

The deadline for submission of project specific questions prior to bid opening is October 6, 2016 at 12:00 p.m. as specified in Section 3.3 of the Instruction to Bidders.

This Project is funded in full or in part by:

- State Funds
- Neither State nor Federal Funds

Please Take Note: All information required must be submitted as directed.

For your Bid to be considered responsive by the City of Springfield you must include all documents included in the Invitation to Bid with your Bid. Additionally, any addendums or revisions must be acknowledged and submitted with your Bid. *The only exception to this is any plans or drawings, which are not required to be submitted as a part of your Bid.*

A complete description of submittal requirements can be found in the Instruction to Bidders document included in this request for bid under the heading; **5. Bid.**

CITY OF SPRINGFIELD, OREGON
Invitation to Bidders

Public Works Improvement Project

Sealed bids will be received at the office of the Finance Director, Robert Duey at the City of Springfield Finance Department, 225 Fifth Street, Springfield, OR 97477, until, but no later than, 2:00 p.m. Local Time, the 13th day of October, 2016 and opened immediately thereafter, for the construction of the following public works improvement project in the City of Springfield:

Project No. P21102 Title: Downtown Lighting - Phase 2

Description: The installation of pedestrian level street lighting on Main Street between approximately Mill Street and 8th Street. The project will involve purchase and installation of street lights in both new, and over existing, locations. Also included in this project is all associated work to have a fully functioning lighting system, including but not limited to: sidewalk removal and installation, junction boxes, conduit installation, wiring, traffic control, service cabinets and horizontal directional drilling. As bid alternate 1, the project may be extended from 8th Street to 9th Street. As bid alternate 2, the project may be further extended from 9th Street to 10th Street.

Bid documents are available from the Department of Development and Public Works, City of Springfield, 225 Fifth Street, Springfield, OR 97477, for a non-refundable fee of \$25.00 and are available for viewing at this location. Bid documents available on line at <http://www.springfield-or.gov/DPW/InvitationBid.htm> and those on file at plan centers are incomplete and cannot be used to submit bids. The 1994 edition, as most recently amended, of the City's Standard Construction Specifications, with subsequent revisions, are available for a fee of \$42.00 or can be viewed on-line at <http://www.springfield-or.gov/DPW/StandardConstructionSpecifications.htm>.

A **MANDATORY** pre-bid meeting will be held on September 28, 2016 at 9:00 a.m. in the Jesse Maine Room.

All questions should be addressed to Terri White, Engineering Support Specialist, at 541-726-3628 or twhite@springfield-or.gov. The deadline for submission of questions regarding this Invitation to Bid is 12:00 p.m. on October 6, 2016. Contact with any other City officials may be grounds for disqualification of bid.

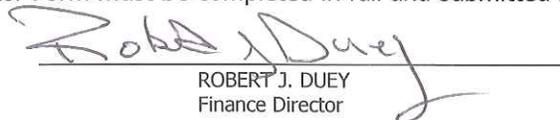
The Contractor performing work on this project shall have a current, valid certificate of licensure issued by the Construction Contractor's Board in accordance with ORS 701 and, if performing work described in ORS 671.520, a current, valid certificate of licensure from the State Landscape Contractor's Board in accordance with ORS 671.560 as applicable in place at the time the quote is presented and unless the bid contains a statement by the bidder as part of his/her bid that the provisions required by ORS 279C.838 through ORS 279C.870 shall be included in his/her contract. Contracts will not be awarded to any contractor whose name appears on the BOLI *Ineligible Contractor's List* or the Construction Contractor's Board *Not Qualified to Hold Public Contracts* list.

In accordance with ORS 279C.365, the City of Springfield will require that each bid must contain a statement as to whether the bidder is a resident bidder, as defined in ORS 279A.120.

The City of Springfield encourages contractors, sub-contractors and vendors who are minority, woman-owned and emerging small businesses to participate in City projects.

The City of Springfield may reject any or all bids not in compliance with all prescribed public bidding procedures and requirements, including the requirement to demonstrate the bidder's responsibility under ORS 279C.375, or waive minor irregularities not affecting substantial rights and may reject for good cause any or all bids upon a finding of the City of Springfield it is in the public interest to do so and accept such bids that in the opinion of the Springfield City Council are in the best interest of the City.

Note: If applicable to this project, the First-Tier Subcontractor Form must be completed in full and submitted by the specified deadline or the bid will be rejected.


ROBERT J. DUEY
Finance Director



City of Springfield
 225 Fifth Street
 Springfield, OR 97477

Bid Submittal

Project No. P21102
Project Title: Downtown Lighting - Phase 2

Bid Items:

Item No.	Description	Approx. Quantity	Per	Unit Price	Total Price Extension
Base Bid					
0060	Mobilization	1	LS		
0061	Temporary Traffic Control	1	LS		
0137	Remove and Replace 4-inch PC Sidewalk	1,000	SF		
0248	Install LED Decorative Lighting Unit	34	EA		
0248b	Install LED Decorative Lighting Unit on Existing Foundation	9	EA		
0248c	Remove Existing Street Light	9	EA		
0248d	LED Decorative Lighting Unit Purchase and Assembly (12 Ft)	41	EA		
0248e	LED Decorative Lighting Unit Purchase and Assembly (16 Ft)	2	EA		
0249	Common Trench Excavation	5	CY		
0401	Horizontal Directional Drill	1,000	LF		
0604	Install JB2 Junction Box	9	EA		
0604a	Install JB3A Junction Box	1	EA		
0605	Remove 100 amp and Replace 200 amp Service Cabinet	1	EA		
0606	Install 100 amp Service Cabinet	1	EA		
0656	Install THWN Conductors	1	LS		
0657	Remove Existing Conductors	1	LS		
Total Base Bid					
Alternate Bid 1					
0060	Mobilization	1	LS		
0061	Temporary Traffic Control	1	LS		
0137	Remove and Replace 4-inch PC Sidewalk	250	SF		
0248	Install LED Decorative Lighting Unit	5	EA		
0248b	Install LED Decorative Lighting Unit on Existing Foundation	2	EA		
0248d	LED Decorative Lighting Unit Purchase and Assembly (12 Ft)	3	EA		
0248e	LED Decorative Lighting Unit Purchase and Assembly (16 Ft)	4	EA		
0401	Horizontal Directional Drill	130	LF		
0604	Install JB2 Junction Box	1	EA		
0656	Install THWN Conductors	1	LS		
0657	Remove Existing Conductors	1	LS		
Total Alternate Bid 1					
Alternate Bid 2					
0060	Mobilization	1	LS		

0061	Temporary Traffic Control	1	LS		
0137	Remove and Replace 4-inch PC Sidewalk	200	SF		
0248	Install LED Decorative Lighting Unit	4	EA		
0248b	Install LED Decorative Lighting Unit on Existing Foundation	2	EA		
0248d	LED Decorative Lighting Unit Purchase and Assembly (12 Ft)	6	EA		
0401	Horizontal Directional Drill	80	LF		
0604	Install JB2 Junction Box	1	EA		
0656	Install THWN Conductors	1	LS		
0657	Remove Existing Conductors	1	LS		
Total Alternate Bid 2					
Total Base Bid + Alternate Bid 1 + Alternate Bid 2					\$

Terms, Declarations and Bid Submittal

Bidder's Understanding

Bidders shall determine for themselves all the conditions and circumstances affecting the projected cost of the proposed work by personal examination of the site, Contract documents, and by such other means they may deem to be necessary. It is understood and agreed that in the event the City has obtained information from data at hand regarding underground or other conditions or obstructions depicted in the Contract documents, there is no expressed or implied agreement that such conditions are fully or correctly shown, and the Bidder must take into consideration the possibility that conditions affecting the cost or quantity of work may differ from those indicated.

The Bidder is familiar with and is satisfied as to all federal, state and local laws and regulations that may affect cost, progress, and performance of the work.

Bid

The undersigned Bidder having examined the Specifications and Contractual Documents and having satisfied themselves as to all conditions to be encountered, hereby proposes to furnish all labor, material and equipment and perform all work necessary to complete Project No P21102 in accordance with this Bid, the Contract Plans, Chapters 100 through 400 of the City of Springfield Standard Construction Specifications, 1994 Edition, and all subsequent modifications, the Special Provisions, and all other Contractual Documents at the prices and on the terms herein contained.

The unit price Bids are submitted with the understanding that the quantities stated are approximate and are given only as the basis of calculation for comparison of Bids and determining that the unit prices are balanced and that final payment for all unit price items will be based on actual quantities.

It is understood that in the instance of a discrepancy between the unit price and the extension (total price extension) the unit price shall govern. The extension shall be determined by multiplying the unit price by the number of units (approximate quantity).

Bid Guarantee

As required by ORS 279C.365(5) each Bid shall be accompanied by a Bid Bond, cash, or a certified or cashier's check written upon a bank in good standing and in a form acceptable to the City, payable to the Finance Director of the City of Springfield, Oregon, in an amount equal to at least 10 percent of the total amount of the Bid. Bid Bonds shall be issued by a surety company registered to issue bonds in the State of Oregon, and utilizing a bond form acceptable to the City. The City will accept AIA Document A310-2010. The Bid Bond may not be altered.

Such Bid Guarantee shall be forfeited and become the property of the City in case the Bidder shall fail or neglect to furnish a satisfactory Performance and/or Payment Bond issued by a viable bond company

acceptable to the City as required by ORS 279C.380 and to execute the Contract within ten (10) days (Saturday, Sunday, and holidays excepted) after receiving Contract from the City for execution. For information regarding Performance and Payment Bond requirements see City of Springfield Contract document, Section 5. City Bonding.

Bid Acceptance Period

This Bid will remain subject to acceptance for a period of 60 days after the bid opening, or for such longer period of time that the Bidder may agree to in writing upon request of the City.

Contract Award

Bids will be accepted and awarded in accordance with Oregon Public Contracting Law and Section 103.01 of the City's most recent version of the Standard Construction Specifications. The lowest responsive Bidder shall be determined based on the Bidder who submits the lowest responsive Bid for the combined total of the Base Bid, Alternate Bid 1 and Alternate Bid 2. However, should the City determine it is not in the best interest of the City to award either or both of the Alternate Bids the lowest responsive Bidder shall be determined as follows:

Award of Base Bid only; the lowest responsive Bidder shall be determined based on the Bidder who submits the lowest responsive Base Bid.

Award of Base Bid and Alternate 1; the lowest responsive Bidder shall be determined based on the Bidder who submits the lowest responsive Bid for the combined total of the Base Bid and Alternate Bid 1.

Prior to awarding the Contract, the City may, at its sole discretion, require Contractors and/or Subcontractors to demonstrate to the City's satisfaction that they have a complete and clear understanding of all requirements of the Prevailing Wage Rate Laws contained in ORS 279C.800 through 279C.870 and possess the expertise necessary for fulfilling their obligations pertaining to these requirements throughout the administration of the Contract. In determining competency, the City may consider Certified Payroll Reports submitted by the Contractor and/or Subcontractor for projects previously performed for the City, copies of Certified Payroll Reports submitted to other public entities, references from other public entities attesting to the Contractor's expertise, or an interview with the Contractor regarding their personnel resources and expertise or their ability to obtain the resources and expertise necessary to meet all contractual responsibilities in accordance with ORS 279C.375.

Time is of the Essence

Time is of the essence in the Contractor's performance of the Contract. Delays in the Contractor's performance of the work may inconvenience the public, interfere with business and commerce, and increase cost to the City. It is essential and in the public interest that the Contractor prosecute the work vigorously to Contract completion. The City does not waive any rights under the Contract by permitting the Contractor to continue to perform the Contract, or any part of it, after the Contract Time of Completion shown below, or as adjusted by Contract Change Order, has expired.

Liquidated Damages

The City of Springfield and the Contractor agree that; (a) the amounts so fixed are reasonable forecasts of just compensation for the harm that is caused by the breach; (b) the harm that is caused by the breach is one that is incapable of or very difficult of accurate estimation; and, (c) the amount so fixed is not fixed as a penalty to coerce performance of the Contract but is rather intended to be a genuine pre-estimation of injury to the City of Springfield in lieu of performance within the contract time by the Contractor.

a. Delay

It is agreed by the City of Springfield and by the Contractor that the need exists for a damage provision in the event the Contractor fails to complete the work within the Contract time specified, or any extension thereof, by the City of Springfield. The City of Springfield and the Contractor further agree that the Contractor shall be liable to the City of Springfield for fixed, agreed and liquidated damages for each and every calendar day of delay in the amount of \$100.00 per day in accordance with Subsection 108.07 of the Standard Construction Specifications.

b. Failure to Report Spills

The Contractor also agrees to liquidated damages in the amount of \$500.00 per incident for failure to report sewage spills plus an amount sufficient to reimburse the City for any civil and administrative penalties paid by the City as a result of the contractor's failure to report. Failure to report sewage spills may subject the City to (1) civil penalties of up to \$32,500.00 per day of violation pursuant to Section 309(d) of the Clean Water Act, 33 U.S.C. § 1319(d); (2) administrative penalties of up to \$11,000.00 per day for each violation, pursuant to Section 309(g) of the Clean Water Act, 33 U.S.C. § 1319(g); or (3) civil action in federal court for injunctive relief pursuant to Section 309(b) of the Clean Water Act, 33 U.S.C. § 1319(b).

Contract Time of Completion

The Contractor shall not begin work under this Bid until written Notice to Proceed has been received. On site work shall begin no earlier than January 2, 2017. The Contractor shall complete the work under this Bid based on the Bid option(s) awarded. All work under this Bid shall be completed within the day count specified below and no later than May 5, 2017.

Base Bid - Contractor shall complete all work within sixty (60) consecutive working days.

Base Bid plus Alternate Bid 1 - Contractor shall complete all work within sixty five (65) consecutive working days.

Base Bid plus Alternate Bids 1 and 2- Contractor shall complete all work within seventy (70) consecutive working days

The Contractor shall apply for any extensions of time as specified in Subsection 108.06 of the Standard Construction Specifications.

Certifications

The undersigned hereby certifies that:

- 1.) If awarded the Contract, that they shall fully comply with all provisions regarding the prevailing wage rates as required by ORS 279C.800 to 279C.870 and/or 40 U.S.C. 2762 as applicable.
- 2.) The Contractor, Subcontractor, suppliers of materials or services, and others engaged by the Contractors, shall comply at all times with and observe all such laws, ordinances, regulations, orders, and decrees; and shall hold harmless and indemnify the City of Springfield and its representatives against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree.
- 3.) The Contractor, Subcontractor or other person doing, or contracting to do, or contracting for the whole or any part of the work on the Contract shall comply with all applicable requirements of Federal and State civil rights and rehabilitation statutes, rules and regulations.
- 4.) In conformance with OAR 137-049-0440(3) and ORS 279A.110(4) the Contractor has not, and will not, discriminate against a Subcontractor in the awarding of a subcontract because the Subcontractor is a minority, women or emerging small business enterprise certified under ORS 200.055 or a business enterprise that is owned or controlled by or that employs a disabled veteran, as defined in ORS 408.225.
- 5.) In accordance with ORS 279C.505, the Contractor will;
 - a.) Make payment promptly, as due, to all persons supplying to the Contractor labor or material for the performance of the work provided for in the Contract.
 - b.) Promptly pay all contributions or amounts due the State Industrial Accident Fund, or private carrier of accident insurance, from such Contractor or Subcontractor incurred in the performance of the Contract. If a private carrier is used, the Contractor shall notify the Engineer as to the carrier's name and address before commencement of work.

- c.) Not permit any lien or claim to be filed or prosecuted against the state or a county, school district, municipality, municipal corporation or subdivision thereof, on account of any labor or material furnished.
 - d.) Pay to the Department of Revenue all sums withheld from employees under ORS 316.167.
 - e.) Have an employee drug testing program in place at the time of signing the contract and will maintain such drug testing program in place over the life of the Contract. Upon request, the Contractor shall furnish a copy of the employee drug testing program to the City.
- 6.) In accordance with ORS 279C.510, If demolition is involved, the Contractor shall salvage or recycle construction and demolition debris, if feasible and cost-effective as required by ORS 279C.510(1). If lawn or landscaping maintenance is involved, the Contractor shall compost or mulch yard waste in an approved site, if feasible and cost-effective as required by ORS 279C.510(2).
- 7.) In accordance with ORS 279C.520, no person will be employed by the Contractor or Subcontractor for more than 10 hours in any one day, or 40 hours in any one week except in cases of necessity, emergency, or where the public policy absolutely requires it, and in such cases the person so employed shall be paid at least time and one-half the regular rate of pay for all times worked in excess of eight hours a day or 40 hours in any one week when the work week is five consecutive days, Monday through Friday; or in excess of 10 hours a day or 40 hours in any one week when the work week is four consecutive days, Monday through Friday; and for all work performed on a Saturday, Sunday and on any legal holiday specified in ORS 279C.540.
- 8.) In compliance with ORS 279C.525 the Contractor has received and reviewed Federal, State and local agencies that may have enacted ordinances, rules or regulations dealing with the prevention of environmental pollution and the preservation of natural resources that may affect the performance of this Contract as identified under Section 13 of the Contract. Accordingly, if the Contractor is delayed or must undertake additional work by reason of ordinances, rules, or regulations relating to the prevention of environmental pollution and the protection of natural resources subsequent to the date of submission or the successful quote, the City may:
- a.) Terminate the Contract,
 - b.) Complete the work itself,
 - c.) Use non-owner forces already under contract with the City of Springfield,
 - d.) Solicit bids for a new contractor to provide the necessary services under competitive bid requirements 279C,
 - e.) Issue the Contractor a change-order setting forth additional work that must be undertaken.
- 9.) In accordance with ORS 279C.530, the Contractor will;
- a.) Promptly, as due, make payments to any person, co-partnership, association or corporation, furnishing medical, surgical, and hospital care or other needed care and attention, incidental to sickness or injury, to the employees of such Contractor, of all sums which the Contractor agrees to pay for such services and all monies and sums which the Contractor:
 1. May or shall have deducted from the wages of his employees for such services pursuant to the terms of Oregon Revised Statutes and any contract entered in pursuant thereto; or
 2. Collected or deducted from the wages of his employees pursuant to any law, contract, or agreement for the purpose of providing or paying for such service; and
 3. All employers working under the Contract are either employers that will comply with ORS 656.017 or employers that are exempt under ORS 656.126. The Contractor shall ensure that each of its Subcontractors complies with these requirements.
- 10.) No Contractor, Subcontractor or any firm, corporation, partnership or association in which the Contractor or Subcontractor has a financial interest who appears on the *List of Contractors Ineligible to*

Receive Public Works Contracts, as established by the Bureau of Labor and Industries, will perform work under this Contract, as specified in ORS 279C.860.

- 11.) No Contractor, Subcontractor or any firm, corporation, partnership or association in which the Contractor or Subcontractor has a financial interest who appears on the Construction Contractor's Board *Not Qualified to Hold Public Contracts* list, will perform work under this Contract, as specified in ORS 701.227(4).
- 12.) The Contractor performing work on this project shall have a current, valid certificate of licensure issued by the Construction Contractor's Board in accordance with ORS 701 and, if performing work described in ORS 671.520, a current, valid certificate of licensure from the State Landscape Contractor's Board in accordance with ORS 671.560 as applicable in place at the time the quote is presented.
- 13.) Prior to performing any work under the Contract all Subcontractors shall have a current, valid certificate of licensure issued by the Construction Contractor's Board in accordance with ORS 701 and, if performing work described in ORS 671.520, a current, valid certificate of licensure from the State Landscape Contractor's Board in accordance with ORS 671.520 as applicable.
- 14.) If the Contract specifies that the project includes Asbestos Abatement, the Contractor and all Subcontractors performing work on the project shall be licensed in accordance with ORS 467A.720 prior to performing any work on the project. Certification of compliance shall be presented to the City upon request.
- 15.) The Contractor shall function as an independent contractor for the purposes of this Contract and shall not be considered an employee of the City of Springfield for any purpose. The Contractor shall assume sole responsibility for any debts or liabilities that may be incurred by the Contractor in fulfilling the terms of this Contract and shall be solely responsible for the payment of all federal, state, and local taxes which may accrue because of this Contract.

Bid Addenda

All Addenda issued are considered to be part of the specifications of the Invitation to Bid and, as such, are as incorporated into the Contract as specified in Section 104.02 of the Standard Construction Specifications.

By signing below, I acknowledge the receipt of the following Addenda documents and certify that the specifications contained in each have been considered and incorporated into the Bid as presented. All Addenda must be included with the Bid submitted.

Addenda Number	Addenda Date

Declarations

As required by ORS 305.385(6), under penalty of perjury, by signing below the Contractor represents that, to the best of their knowledge, neither they nor any applicable Subcontractors performing work under the Contract are in violation of any tax laws as described in ORS 305.380(4) and have complied with the tax laws of this state or a political subdivision thereof including, but not limited to, ORS 305.620 and ORS Chapters 316, 317 and 318. The Contractor shall also covenant to continue to comply with the tax laws of this state or a political subdivision thereof during the term of the Contract and that Contractor's failure to comply with such laws prior to execution of the Contract or during the term thereof is a default for which the City may terminate the Contract and seek damages and other relief available under the terms of the Contract or under applicable law.

The undersigned Bidder declares that the only persons or parties interested in the Bid are those named herein, that this Bid is, in all respects, fair and without fraud, that it is made without collusion with any official of the City, and that the Bid is made without any connection or collusion with any person submitting another Bid on this project.

I have read, fully understand, and agree that as Bidder I, and all Subcontractors, will comply with all of the terms and conditions of the contract for which this Bid is presented. By signing below I attest that I am an officer or a duly authorized representative of the business listed below and that I possess the legal authority to submit this Bid for consideration.

If the Bid is submitted by a joint venture and is in the name of the joint venture, by signing below I certify that all parties have examined this Bid, including all requirements and the Contract terms and conditions and, if successful, the joint venture shall execute a Contract which incorporates the stated requirements, terms and conditions.

Bidder's Signature _____

Bidder's Name (*Please Print*) _____

Title _____

Business Name _____

Business Address _____

City _____ State _____ Zip _____

Phone Number _____ Cell Phone _____

E-mail Address _____ Fax Number _____

Date _____

PREVAILING WAGE RATE INFORMATION

Prevailing Wage Rates information can be found at the following website:

http://www.oregon.gov/boli/WHD/PWR/Pages/PWR_Rate_Publications_2016.aspx

For the proper Prevailing Wage Rates applicable to this project please refer to the following publications:

- 1.) *Prevailing Wage Rate Publication; Prevailing Wage Rates for Public Works Contracts in Oregon with an effective date of July 1, 2016.*
- 2.) *Prevailing Wage Rates State Apprenticeship Rates with an effective date of July 1, 2016.*
- 3.) *The following Amendments to the Prevailing Wage Rates also apply;*
 - a.) *Correction to Prevailing Wage Rates Effective August 9, 2016*
 - b.) *August 9, 2016 PWR Apprenticeship Rates*



CITY OF SPRINGFIELD

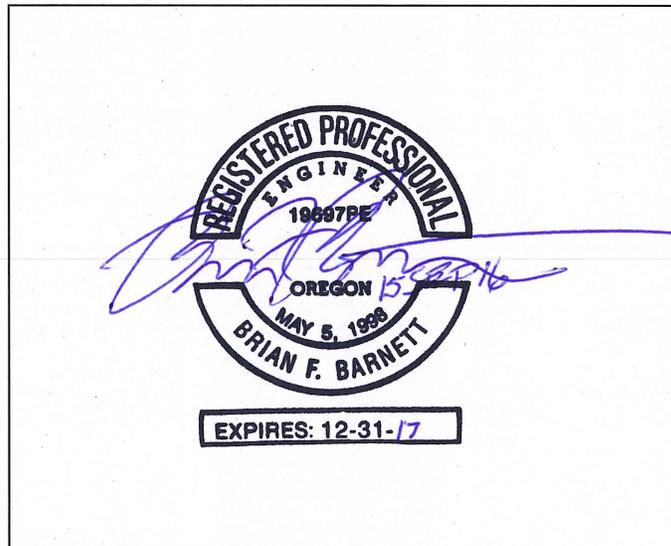
Special Provisions

for

P21102

Downtown Lighting - Phase 2

Engineer's Seal



SPECIAL PROVISIONS

SECTION A – General Requirements

P21102 - Downtown Lighting - Phase 2

A1.1 Codes and Standards

All work shall be performed in accordance with the highest standard of practice in the industry and shall be furnished in conformance with all applicable codes, statutes or standards that apply to this work including, but not limited to, any applicable Federal, State or City of Springfield Codes, Standards and Ordinances.

A1.2 Applicable Standard Specifications

Sections 100 through 400 of the 1994 Edition of the Standard Construction Specifications of the City of Springfield, Oregon, (including all revisions at date of bid opening), and modified Oregon Department of Transportation Drawings as specified shall apply to this Invitation to Bid and the ensuing construction contract except as may be modified herein. In the case of discrepancy, unless noted otherwise herein, the more restrictive provisions shall apply.

A1.3 Form of Proposal

REPLACE SECTION 102.02 "FORM OF PROPOSAL" OF THE STANDARD CONSTRUCTION SPECIFICATIONS:

"The Proposal and the proposal guarantee in the form of a bid bond, certified check, or cashier's check, shall be enclosed in a sealed, labeled and addressed envelope, as required in the Instructions to Bidders and filed as required therein. The outside of the envelope shall plainly identify: (1) The project name and (2) The bid opening date.

All Proposals must be clearly and distinctly typed or written with ink or indelible pencil.

All Proposals shall be on the form furnished by Owner, and in addition to necessary unit price items and total prices in the column of totals to make a complete Bid, all applicable blanks giving general information must be filled in and the Bids signed by an officer or duly authorized representative of the Bidder. Any statement accompanying and tending to qualify a Bid may cause rejection of such Bid, unless such statement is required, in a Proposal embracing alternate Bids. All bid documents except plans must be returned with the Bid.

Unless otherwise specified, Bidders shall bid on all Bid items included in the Proposal, and the low Bidder shall be determined as noted in Subsection 103.01 AWARD OF CONTRACT. Except as provided herein Proposals which are incomplete or fail to comply to all items required in the Proposal may be rejected."

INSERT IN ITS PLACE THE FOLLOWING:

"ALL BID DOCUMENTS, EXCEPT PLANS, MUST BE RETURNED WITH THE BID. This includes all documents contained in the original bid book, whether they require the completion of information or not, and any addendum that may be issued pertaining to the bid in question. The only exceptions to this are any plans or drawings, which are not required to be submitted as a part of your Bid.

The Bid Submittal, Bid Bond, Certified Check, or Cashier's Check shall be enclosed in a sealed and labeled envelope. The outside of the envelope shall plainly identify: (1) The project name and

project number and (2) The Bid opening date. All Bids must be clearly and distinctly typed or written with ink or indelible pencil. Unless otherwise specified, Bidders shall bid on all Bid items, and must include in their Bid prices the entire cost of each item of work set forth in the Bid.

Sealed Bids shall be addressed to and received at the Office of the Finance Director, City Hall, 225 Fifth St. Springfield, Oregon, 97477 at, or before, the time and date noted on the Invitation to Bidders, after which time the Bids will be publicly opened and read aloud.

All Bids shall be on the form furnished by the City, and in addition to necessary unit price items and total prices in the column of totals to make a complete Bid, all applicable blanks giving general information must be filled in and the Bids signed by an officer or duly authorized representative of the Bidder. The only exceptions to this requirement are the Performance Bond, Payment Bond, Statutory Public Works Bond and the Contract documents which are provided here as a reference. However, if you are awarded the Bid, you will be required to submit fully executed copies of these documents upon request. Any statement accompanying and tending to qualify a Bid may cause rejection of such Bid, unless such statement is required in a Bid embracing alternate Bids.

If, in the opinion of the City, the items or prices in any Bid appear unbalanced, incomplete, or fail to comply with all the terms required, the Bid may be rejected."

A1.4 Proposal Guaranty and Organization

REPLACE SECTION 102.05 "PROPOSAL GUARANTY AND ORGANIZATION" OF THE STANDARD CONSTRUCTION SPECIFICATIONS:

"Each Bid must be accompanied by a Bid Bond, cash or a certified or cashier's check upon a bank in good standing, payable to the Finance Director of the City of Springfield, Oregon, in an amount equal to at least 10% of the total amount of the bid. Such Proposal guaranty shall be forfeited and become the property of the City in case the Bidder shall fail or neglect to furnish a satisfactory Performance Bond and Payment Bond and to execute the Contract within 10 days (Saturday, Sunday and holidays excepted) after receiving said Contract from the City for execution. Bid bonds submitted shall be on the form provided by the City in the Bid document."

INSERT IN ITS PLACE THE FOLLOWING:

"As required by ORS 279C.365(4) each Bid shall be accompanied by a Bid Bond, cash, or a certified or cashier's check written upon a bank in good standing and in a form acceptable to the City, payable to the Finance Director of the City of Springfield, Oregon, in an amount equal to at least 10 percent of the total amount of the Bid. Bid Bonds shall be issued by a surety company registered to issue bonds in the State of Oregon, and utilizing a bond form acceptable to the City. The City will accept AIA Document A310-2010 Bid Bond (sample form enclosed). The Bid Bond may not be altered.

Such Bid Guarantee shall be forfeited and become the property of the City in case the Bidder shall fail or neglect to furnish a satisfactory Performance and/or Payment Bond issued by a viable bond company acceptable to the City as required by ORS 279C.380 and to execute the Contract within ten (10) days (Saturday, Sunday, and holidays excepted) after receiving Contract from the City for execution. For information regarding Performance and Payment Bond requirements see City of Springfield Contract document, Section 5. City Bonding."

A1.5 Interpretation of Contract Documents

REPLACE SECTION 102.07 "INTERPRETATION OF CONTRACT DOCUMENTS" OF THE STANDARD CONSTRUCTION SPECIFICATIONS:

"If it should appear to a Bidder that the work to be done, or matters relative thereto, is not sufficiently described or explained in the Contract Documents, or that Contract Documents are not definite and clear, the Bidder may make written inquiry regarding same to the Engineer at least 5 days before the scheduled closing time for filing Bids. Requests to clarify the source of materials, equipment suppliers, or any other such matter which does not modify, change, increase, or decrease the scope of the work require no action by the Owner other than a response to the Bidder requesting the clarification. Clarifications which modify, change, increase, or decrease the scope of work, require issuance of an Addendum by the Owner for the interpretation to become effective. Such addenda will be mailed to all holders of the Contract Documents. Oral instruction or information concerning the Contract Documents or the project given out by officers, employees, or agents of the Owner to prospective Bidders shall not bind the Owner. "

INSERT IN ITS PLACE THE FOLLOWING:

"If it should appear to a Bidder that the work to be done is not sufficiently described or explained in the Contract Documents, or that Contract Documents are not definite and clear, the Bidder shall make written inquiry regarding same to the individual shown, in the manner instructed and within the timeframe indicated in the Invitation to Bid advertisement. Questions received will be evaluated and if, in the judgment of the City, the response does not alter or amend the requirements or scope of the Invitation to Bid, but merely clarifies existing information, the response will be entered on the Clarifications Log and posted to the project webpage as shown in the Invitation to Bid. If, in the judgment of the City, additional information or interpretation is necessary, such information shall be supplied in the form of an addendum to all individuals, firms, and corporations listed on the Plan Holders List and those individuals that attended the Pre-Bid Meeting and provided contact information on the sign-in sheet. Such addenda shall have the same binding effect as though contained in the main body of the Contract Documents. The City is not responsible for any explanation, clarification, interpretation or approval made or given in any manner except by written addenda issued by City."

A1.6 Addenda to Contract Documents

REPLACE SECTION 102.08 "ADDENDA TO CONTRACT DOCUMENTS" OF THE STANDARD CONSTRUCTION SPECIFICATIONS:

"Any addenda issued by the Owner, which may include changes, corrections, additions, interpretations, or information, and issued 48 hours or more before the scheduled closing time for filing the Bids, Saturday, Sunday and legal holidays not included, shall be binding upon the Bidder. Owner shall supply copies of such addenda to all Contractors who have obtained copies of the Contract Documents for the purposes of bidding thereon. Failure of the Contractor to receive or obtain such addenda shall not excuse him from compliance therewith, if he is awarded the Contract."

INSERT IN ITS PLACE THE FOLLOWING:

"Any addenda issued by the City, which may include changes, corrections, additions, interpretations, or information issued 72 hours or more before the scheduled closing time for filing the Bids shall be binding upon the Bidder. Addenda will be posted to the City's website at www.springfield-or.gov/DPW/InvitationBid.htm. The Contractor should check the website frequently for new postings during the open quote period. The City shall make a reasonable effort to notify all individuals, firms, and corporations listed on the Plan Holders List and those individuals that attended the Pre-Bid Meeting and provided contact information on the sign-in sheet when addenda are issued. Failure of the Contractor to receive or obtain such addenda shall not excuse them from compliance, if they are awarded the Contract."

A1.7 Familiarity With Laws and Ordinances

REPLACE THE THIRD PARAGRAPH OF SECTION 102.09 "FAMILIARITY WITH LAWS AND ORDINANCES" OF THE STANDARD CONSTRUCTION SPECIFICATIONS:

"In compliance with ORS 279.318 the Contractor is made award that the following Federal, State, and local agencies have enacted ordinances or regulations relating to the prevention of environmental pollution or the preservation of natural resources which may affect performance of the City of Springfield contracts.

FEDERAL AGENCIES

Department of Agriculture
Forest Service
Soil Conservation Service
Department of the Army-Corp of Engineers
Coast Guard
Dept. of Health & Human Services
Dept. of Interior-of Indian Affairs
Bureau of Land Management
Bureau of Outdoor Recreation
Fish and Wildlife Service
Office of Surface Mining
Reclamation & Enforcement
Department of Labor
Occupational Safety & Health Administration
Mine Safety & Health Admin.
Department of Transportation
Federal Highway Admin.
Environmental Protection Agency

STATE AGENCIES

Department of Agriculture
Department of Energy
Dept. of Environmental Quality
Dept. of Fish & Wildlife
Dept. of Forestry
Dept. of Geology & Minerals
Dept. of Human Resources
Land Conservation and Development Bureau Commission
Division of State Lands
State Soil and Water Conservation Commission
Water Resources Department

LOCAL AGENCIES

Common Council, City of Springfield
County Court, Lane County
Planning Commission, City of Springfield
Planning Commission, Lane County
Lane Regional Air Pollution Authority
Springfield Utility Board"

INSERT IN ITS PLACE THE FOLLOWING:

"In compliance with ORS 279C.525, the Contractor is made aware that the following federal, state, and local agencies have enacted ordinances or regulations relating to the prevention of environmental pollution or the preservation of natural resources which may affect performance of City of Springfield contracts. This is not intended to be a complete listing of agencies. Other agencies may have enacted ordinances or regulations that may apply.

If the Contractor is delayed or must undertake additional work by reason of existing ordinances, rules or regulations of agencies not cited in the Contract or due to the enactment of new or the amendment of existing statutes, ordinances, rules or regulations relating to the prevention of environmental pollution and the preservation of natural resources occurring after the submission of the successful quote, the contracting agency may, at its discretion, terminate the Contract, complete the work itself; use non-agency forces already under contract with the City, require that the underlying property owner be responsible for cleanup, solicit quotes for a new contractor to provide the necessary services or issue the Contractor a change order setting forth the additional work that must be undertaken.

If the Contractor encounters a condition not referred to in the Request for Competitive Price Quote documents, not caused by the Contractor or any Subcontractor employed on the project and not discoverable by a reasonable pre-bid visual site inspection, and the condition requires compliance with the ordinances, rules or regulations referred to under this regulation, the Contractor shall immediately notify the City of the condition.

FEDERAL AGENCIES

Department of Agriculture

Fish and Wildlife Service

Forest Service
Soil Conservation Service
Department of the Army Corps of Engineers
Coast Guard
Department of Health and Human Services
Department of the of Interior
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Outdoor Recreation
Department of Commerce

Office of Surface Mining
Reclamation and Enforcement
Bureau of Reclamation
Department of Labor
Occupational Safety and Health Administration
Mine Safety and Health Admin
Department of Transportation
Federal Highway Administration
Environmental Protection Agency

STATE AGENCIES

Department of Agriculture
Department of Energy
Department of Environmental Quality
Department of Fish and Wildlife
Department of Forestry
Department of Geology and Minerals

Department of Human Resources
Land Conservation and Development Commission
Division of State Lands
State Soil and Water Conservation Commission
Water Resources Department
Oregon Department of Transportation

LOCAL AGENCIES

City of Springfield
Planning Commission, City of Springfield
Springfield Development and Public Works
Metropolitan Wastewater Management Commission
City of Springfield Urban Renewal Districts -
Downtown and Glenwood
Springfield Utility Board

Lane County
Planning Commission, Lane County
Willamalane
Lane Regional Air Protection Authority
Lane Council of Governments
Rainbow Water District
Emerald People's Utility District"

A1.8 Award of Contract

ADD THE FOLLOWING PARAGRAPH TO SECTION 103.01 "AWARD OF CONTRACT" OF THE STANDARD CONSTRUCTION SPECIFICATIONS:

"Prior to awarding the Contract, the City may, at its sole discretion, require Contractors and/or Subcontractors to demonstrate to the City's satisfaction that they have a complete and clear understanding of all requirements of the Prevailing Wage Rate Laws contained in ORS 279C.800 through 279C.870 and possess the expertise necessary for fulfilling their obligations pertaining to these requirements throughout the administration of the Contract. In determining competency, the City may consider Certified Payroll Reports submitted by the Contractor and/or Subcontractor for projects previously performed for the City, copies of Certified Payroll Reports submitted to other public entities, references from other public entities attesting to the Contractor's expertise, or an interview with the Contractor regarding their personnel resources and expertise or their ability to obtain the resources and expertise necessary to meet all contractual responsibilities in accordance with ORS 279C.375."

A1.9 Protection of Property

ADD THE FOLLOWING TO THE END OF SECTION 105.11 "PROTECTION OF PROPERTY" OF THE STANDARD CONSTRUCTION SPECIFICATIONS:

"The Contractor shall provide the Engineer with photographic documentation of pre-construction and post-construction conditions on all private properties affected by the Contractor's work. The Contractor shall provide digital photos of each area of work on private properties sufficient to document the conditions prior to the start of the Contractor's work and immediately after completion of the Contractor's work. All photos shall be submitted to the Engineer by line and street address in an organized manner on compact discs prior to the requesting that the final payment be made.

The Contractor shall obtain a written release from the property owner on the Homeowner Approval and Release Form confirming that the site restoration work is satisfactory to the property owner. The Contractor shall document that a minimum of two attempts were made to secure a release from each property owner by providing a list of property owners by address and indicating the dates and times of each attempt. This list and all signed Homeowner Approval and Release Forms shall be submitted to the Engineer prior to requesting that the final payment be made."

A1.10 Trade Names, Approved Equals or Substitutions

ADD THE FOLLOWING TO THE BEGINNING OF SECTION 107.06 "TRADE NAMES, APPROVED EQUALS OR SUBSTITUTIONS" OF THE STANDARD CONSTRUCTION SPECIFICATIONS:

"Brand Name or Equal Specification means a specification that uses one or more manufacturers' names, makes, catalog numbers or similar identifying characteristics to describe the standard of quality, performance, functionality or other characteristics needed to meet the contracting agency's requirements. The "Equal" product, component or process shall be the same or better than that named in function, performance, reliability, quality and general configuration. Determination of equal in reference to the project design requirements will be made by the Engineer, pursuant to Subsection 106.07. Unless otherwise specified, whenever a manufacturer's name brand or model is mentioned, it is to be understood that the phrase "approved equal" is assumed to follow thereafter, whether it does in fact or not. Such specification authorizes Contractors to offer goods or services that are equivalent or superior to those brands named or described in the specification."

A1.11 Insurance

REPLACE SECTION 107.06 "INSURANCE" OF THE STANDARD CONSTRUCTION SPECIFICATIONS:

"The Contractor shall provide and maintain general liability, auto liability, property, and workers' compensation insurance for life of this Contract.

General Liability Insurance

The Contractor shall maintain an ISO Commercial General Liability insurance policy (or an equivalent policy approved by Owner) with combined single limits of at least \$1,000,000 per occurrence for bodily injury, personal injury, and property damage and an aggregate limit of at least \$2,000,000. The policy shall include coverage for contractual liabilities.

Comprehensive Automobile Liability Insurance

The Contractor shall maintain an automobile liability insurance policy with combined single limits of at least \$1,000,000 per occurrence for bodily injury, personal injury, and property damage.

Additional Insured Endorsement

The general and automobile insurance policies specified above shall include endorsements naming as an additional insured "the City of Springfield, its agents, employees and officials all while acting within their official capacity as such."

Property Insurance

Depending on the nature of the construction contemplated under this contract, Owner may require Contractor to provide property insurance. Refer to Special Provisions section of this Contract.

Workers' Compensation Insurance

Contractor, its subcontractors, if any, and all employers working under this agreement are subject employers under the Oregon Workers' Compensation Law and shall comply with ORS

656.017, which requires them to provide workers' compensation coverage for all their subject workers.

Contractor is responsible for maintaining workers' compensation insurance for his employees and assuring that his subcontractors, if any, also maintain workers' compensation insurance. Contractor shall defend, indemnify, and hold Owner harmless from any liability for any workers' compensation claims costs, fines, or costs whatsoever arising from Contractor's or his subcontractors' failure to comply with ORS 656.017.

Additional Policies and Special Coverages

Refer to the Special Provisions section of this Contract for additional coverages that may be required.

Certificates of Insurance

Certificates of insurance evidencing all policies required by this Contract shall be delivered to the Owner prior to the commencement of any work. All certificates shall include a 30-day notice of cancellation clause and required additional insured endorsements. The Owner has the right to reject any certificate for unacceptable coverage and/or companies."

INSERT IN ITS PLACE THE FOLLOWING:

"INSURANCE

All insurance shall be approved by the City as to terms, conditions and form prior to beginning work.

Public Liability and Property Damage

The Contractor shall maintain in force for the duration of this Contract a Commercial General Liability insurance policy written on an occurrence basis with limits not less than \$2,000,000 per occurrence and \$3,000,000 in the aggregate. The policy will be endorsed with a "per project" aggregate endorsement and shall include Products and Completed Operations coverage. Automobile Liability (owned, non-owned, and hired) insurance with limits not less than \$1,000,000 per occurrence shall be maintained. The City, its employees, officials and agents will be named as Additional Insured's where operations are being conducted related to this Contract on the General and Automobile Liability policies as respects to work or services performed under this agreement to the extent that the death or bodily injury to persons or damage to property arises out of the fault of the Contractor or the fault of the Contractor's agents, representatives or subcontractors. The following statement will appear on the face of the certificate; "The City, its employees, officials and agents are all named as additional insured while acting in their capacity as such." The City's additional insured status for Products and Completed Operations hazards shall extend for at least one year beyond the City's acceptance of the project. This insurance shall be primary and shall be paid and applied first in its entirety prior to any application of insurance the City may carry on its own.

Workers' Compensation

The Contractor shall provide and maintain Workers' Compensation coverage with limits no less than \$500,000 for it employees, officers, agents, or partners, as required by applicable Workers' Compensation laws. If the Contractor is exempt from this coverage a written statement, signed by the Contractor, explaining the reason for the exemption will be provided to the City prior to commencement of any work.

Course of Construction and/or Installation Floater

In the event the Contractor requests advance payment by the City for the purchase of materials pursuant to Section 109.07 of the City of Springfield Standard Construction Specifications the

Contractor shall provide Course of Construction/Installation Floater insurance in an amount equal to the value of the advance payment requested. The policy shall provide coverage for all risks and shall be approved by the City as to terms, conditions and form covering the replacement cost of the applicable materials prior to the release of payment. The policy shall name the City of Springfield as Loss Payee. The coverage shall be maintained in full force for the duration of this Contract. The City, at its option, may elect to obtain additional coverage.

Asbestos Abatement (only applicable to Asbestos Specific Contracts)

If applicable to this Contract, the Contractor shall maintain in full force a Commercial General Liability policy approved by the City as to terms, conditions and form that is Asbestos Specific with a minimum limit of \$2,000,000 per occurrence and \$3,000,000 in the aggregate written on a form that meets the following criteria:

- a. A full occurrence form, or
- b. A limited occurrence form with at least a three-year (3) tail, or
- c. A claims made form with a three-year (3) tail.

Pollution Liability Coverage (only applicable to Pollution Specific Contracts)

If applicable to this Contract, the Contractor shall maintain in full force a Commercial General Liability policy approved by the City as to terms, conditions and form that is Pollution Specific with a minimum limit of \$2,000,000 per occurrence and \$3,000,000 in the aggregate written on a form that meets the following criteria:

- a. A full occurrence form, or
- b. A limited occurrence form with at least a three-year (3) tail, or
- c. A claims made form with a three-year (3) tail.

Professional Liability Coverage (only applicable to Contracts if specified)

If Professional Liability insurance is required, the City must approve the terms, conditions and limits prior to commencement of any work.

Additional Policies and Special Coverages

Refer to the Special Provisions section of this Contract for additional coverages that may be required.

Railroad Protective Liability Coverage

If work being performed under this Contract is near railroad tracks or a railroad right of way and the Railroad requires special insurance (for example: Railroad Protective Liability Coverage) Contractor will be responsible for meeting the Railroad insurance requirements before any work commences. Any insurance required to be purchased by the Railroad is in addition to the insurance required by the City.

Subcontractors

The Contractor shall require all Subcontractors to provide and maintain General Liability, Auto Liability and Workers' Compensation insurance and, as applicable, Professional, Asbestos and Pollution Liability with coverage's equivalent to those required of the General Contractor in this Contract. The Contractor shall require certificates of insurance from all Subcontractors as evidence of coverage.

Additional Insured Endorsement

All certificates of insurance, with the exception of Professional Liability and Railroad Protective Liability, must include an endorsement which lists the City of Springfield as a named additional insured. The following statement will appear on the face of the certificate; "The City, its employees, officials and agents are all named as additional insured while acting in their capacity as such."

Evidence of Coverage and Notice of Cancellation or Material Change in Coverage

Evidence of the required coverages issued by a company satisfactory of the City shall be provided to the City by way of a certificate of insurance before any work or services commence. A 30-day notice of cancellation or material change in coverage clause shall be included.

If the approved insurance company will not provide this 30 day notice, it shall be the responsibility of the Contractor to provide written notice to the City within two (2) days of the Contractor becoming aware that their coverage has been cancelled or materially changed. The Contractor shall e-mail notification directly to Bob Duey, Finance Director at rduey@springfield-or.gov. Regardless of the circumstances causing the Contractor's insurance coverage to cease or be modified, it is the Contractor's responsibility to notify the City as described above.

Failure to maintain the proper insurance or provide notice of cancellation or material change shall, at the City's option, be grounds for immediate termination of this Contract. _____
(Contractor initials)

Equipment and Material

The Contractor shall be responsible for any loss, damage, or destruction of its own property, equipment, and materials used in conjunction with the work."

A1.12 Contract Time

ADD THE FOLLOWING AT THE END OF THE SECOND PARAGRAPH OF 108.04 "CONTRACT TIME" OF THE STANDARD CONSTRUCTION SPECIFICATIONS:

"This provision does not apply to the seasonal suspension of work pursuant to Subsection 108.05."

A1.13 Suspensions of Work

REPLACE SECTION 108.05 "SUSPENSIONS OF WORK" OF THE STANDARD CONSTRUCTION SPECIFICATIONS:

"Suspension by Owner

The Contractor shall immediately suspend work on the project wholly or in part as directed by the Owner for good and sufficient reason. In the event of such suspension, Owner shall, except in emergency, and except as hereinafter provided, give Contractor three days' notice and work shall be resumed within five days after notice has been given by Owner to Contractor to do so. Owner shall allow Contractor an extension of time for completion corresponding to the total period of temporary suspension, and shall reimburse him for necessary rental of unused equipment, services of watchpersons and other unavoidable expenses by reason of the suspension without fault of Contractor. Contractor shall not be entitled to damages, intangible or overhead costs or anticipated profits from such temporary suspension.

Suspension by Engineer

The Contractor shall immediately suspend work on the project wholly or in part as directed by the Engineer pursuant to Subsections 105.01 and 105.02 due to: (1) failure to correct unsafe conditions for working personnel, the general public or Owner's employees, (2) failure to carry out provisions of the Contract Documents, and (3) failure to carry out orders or directions, for such periods as the Engineer may deem necessary due to conditions considered unsuitable for the performance of the work or for any reason deemed to be in the public interest.

The Contractor shall immediately suspend work on the project wholly or in part as directed by the Engineer, for such periods as the Engineer may deem necessary, pursuant to Subsection 105.19 for failure to immediately correct defective and unacceptable work.

Suspension by Contractor

Suspending operations because of seasonal conditions or other unsuitable conditions pursuant to Subsection 108.06 shall require the concurrence of the Engineer.

Responsibility of Contractor

Voluntary or involuntary suspension or slowdown, with or without the approval of the Engineer, and suspension of work ordered by the Engineer will not be grounds for claims or damages, idle equipment or labor, or extra compensation. No allowance or compensation will be made on account of such suspensions of work except as provided hereinbefore and as provided in Subsection 108.06.

At the commencement of, and during any suspensions of work, the Contractor shall be responsible for the care of work performed and take every precaution to prevent any damage or deterioration of the work. The Contractor shall be responsible for work, including temporary protection devices to warn, safeguard, protect, guide and inform traffic during suspension, the same as though its performance had been continuous and without interferences.

The Contractor shall be responsible and bear all costs for providing suitable provisions for traffic control and for maintenance and protection of the work during suspension for cause. If the Contractor fails to provide for temporary traffic control and to maintain the work, the Engineer may immediately proceed to maintain the work. The cost of such maintenance shall be deducted from payments due or to become due to the Contractor.

Resumption of Work

In all cases of suspension, work will be resumed only upon written order of the Engineer or Owner."

INSERT IN ITS PLACE THE FOLLOWING:

"Temporary Suspension of Work by Owner/Engineer

The Contractor shall immediately suspend work on the project wholly or in part as directed by the Owner/Engineer for good and sufficient reason. In the event of such suspension, Owner/Engineer shall, except in emergency, and except as hereinafter provided, give Contractor three days' notice and work shall be resumed within five days after notice has been given by Owner/Engineer to Contractor to do so. Owner/Engineer shall allow Contractor an extension of time for completion corresponding to the total period of temporary suspension, and shall

reimburse him for necessary rental of unused equipment, services of watchpersons and other unavoidable expenses by reason of the suspension without fault of Contractor. Contractor shall not be entitled to damages, intangible or overhead costs or anticipated profits from such temporary suspension. This subsection does not apply to Seasonal Suspension of Work.

Seasonal Suspension of Work by Engineer

The Contractor shall immediately suspend work on the project wholly or in part as directed by the Engineer pursuant to Subsections 105.01 and 105.02 due to seasonal weather conditions determined, at the sole discretion of the Engineer, to be unsuitable for the performance of work. The day count will be suspended during this time. See "Responsibility of Contractor" subsection following for Contractor's responsibilities during the suspension period. Work shall not resume without written approval from the Engineer.

Suspension of Work by Engineer for Failure to Comply

The Contractor shall immediately suspend work on the project wholly or in part as directed by the Engineer pursuant to Subsections 105.01 and 105.02 due to: (1) failure to correct unsafe conditions for working personnel, the general public or Owner's employees, (2) failure to carry out provisions of the Contract Documents, and (3) failure to carry out orders or directions. Work shall be suspended for such periods as the Engineer may deem necessary due to conditions considered unsuitable for the performance of the work or for any reason deemed to be in the public interest.

Suspension of Work by Engineer for Failure to Correct Defective or Unacceptable Work

The Contractor shall immediately suspend work on the project wholly or in part as directed by the Engineer, for such periods as the Engineer may deem necessary, pursuant to Subsection 105.19 for failure to immediately correct defective and unacceptable work.

Suspension of Work by Contractor

Suspending operations because of seasonal conditions or other unsuitable conditions pursuant to Subsection 108.06 shall require the concurrence of the Engineer.

Responsibility of Contractor Under This Subsection

Voluntary or involuntary suspension or slowdown, with or without the approval of the Engineer/Owner, and suspension of work ordered by the Engineer/Owner will not be grounds for claims or damages, idle equipment or labor, or extra compensation. No allowance or compensation will be made on account of such suspensions of work except as provided hereinbefore and as provided in Subsection 108.06.

At the commencement of, and during any suspensions of work, the Contractor shall be responsible for the care of work performed and take every precaution to prevent any damage or deterioration of the work. In the case of pipework, the Contractor shall provide necessary provisions to maintain sanitary sewer and storm water functionality on both the public and private sides. The Contractor shall be responsible for work, including temporary protection devices to warn, safeguard, protect, guide and inform traffic during suspension, the same as though its performance had been continuous and without interferences. The Contractor shall restore fencing or place temporary fencing, to include temporary security fencing, as needed to provide secure restraint for pets and to protect private property.

The Contractor shall be responsible and bear all costs for providing suitable provisions for traffic control and for maintenance and protection of the work during suspension for cause. If the Contractor fails to provide for temporary traffic control and to maintain the work, the Engineer

may immediately proceed to maintain the work. The cost of such maintenance shall be deducted from payments due or to become due to the Contractor.

Resumption of Work

In all cases of suspension, work will be resumed only upon written order of the Engineer or Owner."

A1.14 Submission of Certified Payroll

REPLACE THE SECOND PARAGRAPH OF SECTION 109.07 OF THE STANDARD CONSTRUCTION SPECIFICATIONS:

"Once before the first payment and each time the prevailing wage rates change, and once before final payment is made, Contractor shall supply and file with Owner a statement in writing under oath, in form prescribed by the State Labor Commission and which conforms with ORS Chapter 279, certifying the hourly rate of wages paid each classification of workman not exempt by statute who is employed upon such project and further certifying that no workman employed has been paid less than minimum prevailing wage rate. Each Subcontractor who performed work on the project during the period covered by the payment may be required to file with Owner a similar statement which covers its workmen."

INSERT IN ITS PLACE THE FOLLOWING:

"It shall be the responsibility of the Contractor and any subcontractors to submit certified payroll statements to the City as to the wage rates paid to each worker as follows:

As specified in ORS 279C.845, the Contractor or the Contractor's surety and every Subcontractor or the Subcontractor's surety shall file certified statements with the public agency in writing, on a form prescribed by the Commissioner of the Bureau of Labor and Industries, certifying the hourly rate of wage paid each worker whom the Contractor or the Subcontractor has employed upon the public works, and further certifying that no worker employed upon the public works has been paid less than the prevailing rate of wage or less than the minimum hourly rate of wage specified in the Contract. The certificate and certified statement shall be verified by the oath of the Contractor or the Contractor's surety or Subcontractor or the Subcontractor's surety that the Contractor or Subcontractor has read the certified statement and certificate and knows the contents thereof and that the same is true to the Contractor or Subcontractor's knowledge. Certified statements (also referred to as certified payroll reports) shall be submitted to the City no later than the 5th day of the following month for which the certified statement and certificate are being presented, regardless of whether any actual work is performed on the project or not. This information must be submitted to the City and also retained by the Contractor and Subcontractor(s) for three years.

Contracting agencies and general contractors are required to withhold 25% of amounts to Contractors if certified payrolls are not filed by the Contractor as required for work performed on projects subject to the prevailing wage rate law. Failure of Contractors to comply with the certified payroll filing requirements of the law, therefore, will result in a negative fiscal impact to those Contractors of up to 25% of their amount owed.

Each worker employed in the performance of this contract, either by the Contractor or Subcontractor or other person doing or contracting to do or contracting for the whole or any part of the work of the contract, must be paid not less than the specified minimum hourly rate of wage in accordance with ORS 279C.838 and 279C.840."

A1.15 Progress Payment

REPLACE THE SIXTH PARAGRAPH OF SECTION 109.07 OF THE STANDARD CONSTRUCTION SPECIFICATIONS:

"Progress payment will be made by the Owner on a monthly basis no later than the 20th day of the subsequent month of work performed, except that, additional days may be required when a payment is accompanied by one or more of the following: an extension of completion time, change order or extra bill. Payment may be made via use of checks or warrants at the option of the Owner for the amount of the approved estimate, less retainage."

INSERT IN ITS PLACE THE FOLLOWING:

"Progress payment will be made by the City on a monthly basis in the month subsequent to the work being performed, except that additional days may be required when the Contractor fails to submit complete and accurate certified payroll reports which are in compliance with ORS279C.845 when due, or a payment is accompanied by one or more of the following: an extension of completion time, change order or bill. If the Contractor fails to submit acceptable certified payroll reports when due, or one or more of the previously stated exceptions apply, the progress payment may be made up to fourteen (14) days after the date the certified payroll or other required information in question is received by the City.

The scheduled release of payment will depend upon the method of payment selected by the Contractor. If the Contractor elects to receive payment by check, payment will be released no later than the 20th day of the month. If the Contractor elects to receive payment by electronic Automated Clearing House (ACH) transfer, the funds will be transferred no later than the fourth Friday of the month. City will endeavor to honor Contractor's election to receive payment by ACH transfer, however, City reserves the right to make payment via use of check at the sole discretion of the City."

A1.16 Oregon Products

Contractor's attention is directed to the provisions of Oregon Law, ORS 279A.120 regarding the preference for products that have been manufactured or produced in Oregon. Contractor shall use Oregon-produced or manufactured materials with respect to common building materials such as cement, sand, crushed rock, gravel, plaster, etc., and Oregon-manufactured products in all cases where price, fitness, availability and quality are otherwise equal.

A1.17 Salvage and Debris

Unless otherwise indicated on the drawings or in the specifications, all castings, pipe, equipment, demolition debris, fences, trees, shrubs, spoil or any other discarded material or equipment shall become the property of the Contractor and shall be salvaged or disposed of in a manner compliant with applicable Federal, State and local laws and regulations governing disposal of such waste products. No burning of debris or any other discarded material will be permitted. The Contractor shall perform any demolition for the completion of this project and shall salvage and recycle all construction and demolition debris as is feasible and cost effective, in accordance with ORS 279C.510.

END OF SECTION

SPECIAL PROVISIONS

SECTION B – Electrical Materials, General Construction Practices, Scope of Work and Measurement and Payment

P21102 - Downtown Lighting - Phase 2

B1. GENERAL

B 1.1 Codes and Standards

All work shall be performed in accordance with the highest standard of practice in the industry and shall be furnished in conformance with all applicable codes, statutes or standards that apply to this work including, but not limited to, any applicable Federal, State or City of Springfield Codes, Standards and Ordinances.

All electrical materials and workmanship shall conform to the following standards where applicable:

- American National Standards Institute (ANSI)
- International Municipal Signal Association (IMSA)
- Underwriter's Laboratories, Inc. (UL)
- National Electrical Manufacturers Association (NEMA)
- National Electrical Safety Code (NEC)
- National Electrical Code, Oregon Amended (NEC)
- Standards of the American Society for Testing and Materials (ASTM)
- Local laws

Wherever reference is made to any of the standards mentioned above, the reference means the code, order, or standard in effect on the date the Project is advertised unless otherwise shown or specified in the Specials Provisions.

According to the Oregon Administrative Rule 918-282-0120(1), every person engaged in the installation of electrical equipment and wiring systems shall possess a valid Oregon Electrical Supervising or Journeyman's License, or be registered as an Electrical Apprentice. Every person who installs electrical systems on the Project shall submit a copy of his or her electrical license or apprentice registration to the Engineer prior to performing any work.

B 1.2 Electrical Materials

Common Electrical Materials:

Where shown or specified, furnish and install hardware that is hot-dip galvanized or Type 304 or 316 stainless steel screws, bolts, nuts, and washers.

Metal Conduit:

Furnish metal conduit meeting the following requirements:

- 1.) Rigid Metal Conduit - Galvanized rigid metal manufactured of mild steel conforming to UL 6, Rigid Metal Electrical Conduit.
- 2.) Liquid-Tight Flexible Metal Conduit - Liquid-tight, nonmetallic, sunlight resistant outer jacket over an inner flexible metal core. Conduit shall conform to UL 360 Liquid-Tight Flexible Steel Electrical Conduit.

Nonmetallic Conduit:

Furnish nonmetallic conduit meeting the following requirements:

- 1.) Rigid Nonmetallic Conduit - Heavy wall, extruded, rigid polyvinyl chloride (PVC) conforming to UL 651, Schedule 40 or 80 Rigid PVC Conduit as shown.
- 2.) Liquid-Tight Flexible Nonmetallic Conduit - Meet the requirements of Article 351 of the NEC and shall be UL1660 listed.

Conduit Fittings:

Furnish conduit fittings meeting the following requirements:

- 1.) Expansion Fittings - Weatherproof, hot dip galvanized malleable iron expansion head and body. Where the plans do not specify an equipment grounding wire in the conduit run, furnish fittings with external bonding jumpers. The expansion fitting shall permit a 4 inch conduit movement minimum.
- 2.) Condulets - Hot-dip galvanized malleable iron conduit body with corrosion resistant cover and moisture proof gasket.
- 3.) Metallic Bushings - Galvanized steel or die cast zinc with insulated throat. Include a bonding lug if required.
- 4.) Nonmetallic Bushings - PVC push on end bell style.
- 5.) Conduit Hub - Hot-dip galvanized malleable iron screw-on style with neoprene "O" ring.

Underground Marking Tape:

Provide underground marking tape that is red polyethylene film, 6 inches wide, 4 mils thick minimum, and imprinted with the following or similar legend:

"CAUTION CAUTION CAUTION BURIED ELECTRIC LINE"

Junction Boxes:

Junction boxes and covers in vehicle traffic areas shall be rated for AASHTO H-20 highway loading. Surface-mounted boxes shall have overlapping covers. Junction boxes and covers in incidental vehicle traffic areas shall be rated Tier 22 for the box and Tier 15 for the lid according to ANSI/SCTE 77-2010.

- 1.) Hybrid Junction Boxes - Hybrid junction boxes and covers shall be constructed of polymer, fiberglass, or polymer concrete. Materials shall be resistant to temperature extremes and ultraviolet light exposure. Covers shall have a skid-resistant surface and bolt to the junction box with recessed stainless steel hex-head bolts. All covers shall be recessed and fit the box so that when the cover is set in the box, the top of the cover shall be even with the top of the box.

Cable and Wire

Unless otherwise noted, all electrical conductors shall be stranded copper conforming to ASTM B 3 and ASTM B 8, Class B or C. Insulation shall be 600 V plasticized polyvinyl chloride, polyethylene, or

chemically cross-linked polyethylene, conforming to ASTM D 2220, ASTM D 1351, ASTM D 2655, and ASTM D 2656. Do not use polyethylene compounds where exposed to sunlight. Tape the ends of unused and spare conductors with insulating vinyl plastic tape.

Wire:

Furnish wire meeting the following requirements:

- 1.) THWN Wire - Insulated stranded copper wire rated for 167 ° F operation in wet or dry locations and be UL listed as THWN.
- 2.) Grounding and Bonding Wire - Stranded copper wire. Minimum size shall be No. 6 AWG or as shown. When installed in conduit use type THWN that is green in color.

Electrical Splice Materials:

Furnish electrical splice material meeting the following requirements:

- 1.) Split Bolt - Made of silicon bronze to securely join the wires both mechanically and electrically.
- 2.) Heat-Shrink Tubing - Surface-irradiated tube complying with UL 486, rated at 194 ° F, with 600 V inner melting wall or liner to provide void-free encapsulated insulation.
- 3.) Insulating Rubber Tape - Electrical grade, nondrying, rubber based, elastic type conforming to ASTM D 4388.
- 4.) Insulating Vinyl Plastic Tape - Comply with ASTM D 3005, Type II and UL 510.

In-Line Fuse Holder:

The in-line fuse holder rated for 30 A at 600 V shall be designed to hold a 13/32 inch by 1 1/2 inch 10 A KTK type fuse. In-line fuse connectors to be used on single phase 120/240 V and 240/480V lighting circuits shall be designed for two-pole fusing so both poles disconnect simultaneously from both legs of the line side. The case shall be rigid plastic with a threaded coupling for joining the two halves. When threaded together, the two halves shall completely enclose the fuse and exert pressure against a neoprene "O" ring to provide a waterproof seal. The load side holder shall hold the fuse securely in place, so when the two halves are disconnected, the load side holder will retain the fuse. The line side contact point shall be spring-loaded to provide pressure between the fuse and the contact points. Wire terminals shall be set screw type rated for copper wire.

Ground Rod and Clamp:

Furnish 5/8 inch x 8 foot copper covered steel ground rods with bronze grounding wire clamps.

Conduit Plug:

Furnish conduit plug material used to seal the ends of conduit composed of closed cell polyethylene foam or duct seal meeting the following requirements:

- 1.) Closed Cell Polyethylene Foam - Consisting of precut sections with a plug length of 3 inch and a plug diameter 1/2 inch larger than the conduit diameter being plugged. Approximately one third of the plug length shall be exposed after installation.
- 2.) Duct Seal - UL listed clay putty material designed to seal electrical conduit.

Anchor Rods:

Anchor rods shall conform to manufacture specifications.

Cabinets and Control Devices

Cabinets:

Construct all cabinets from 12 gauge Type 304 stainless steel, or 10 gauge sheet steel and hot-dip galvanize after fabrication according to AASHTO M 111 (ASTM A 123). Post mount cabinets shall be weatherproof, rated as NEMA type 3R, and constructed as shown.

With 3 phase electrical system and/or main circuit breaker of 200 amp or higher, pad-mount cabinet shall be installed as shown. It shall be NEMA type 3R, with hinged double door, 3 point lockable vault handles and stainless steel hardware. Cabinet size is 48 inches x 63 inches x 18 inches deep, or as shown.

The internal wiring of cabinets shall be done by a UL listed facility. Cabinets shall conform to one or more of the following standards where appropriate:

- 1.) UL 50, Cabinets and Boxes
- 2.) UL 67, Panelboards
- 3.) UL 869A, Service Equipment

Use a welded conduit hub to make conduit entrances into cabinets. Hubs shall be of the size required and shall be securely welded to the cabinet before galvanizing. Malleable iron screw-on hubs may be used as approved.

Power service cabinets with live parts exposed shall have a dead-front panel installed with cutouts for operating handles. Each dead-front panel shall have a minimum of two holding latches to maintain rigidity of the panel.

Construct the dead-front panels of stainless steel or code-gauge galvanized steel and treat all cut galvanized steel edges with zinc-rich paint. Prime galvanized steel dead-front panels with vinyl wash primer and finish with exterior polyurethane enamel. The finish color of galvanized steel shall be aluminum.

In all outdoor locations, mounting pans are required when circuit breakers, contactors, relays, switches, transformers or other types of electrical equipment are to be mounted inside the cabinet.

Label circuit breakers and equipment with an engraved permanent label on the dead-front panel to indicate the circuit controlled.

Provide each cabinet with a latching device for a standard City padlock.

Meter base shall be made from 16 gauge galvanized sheet steel (G90), and powder coated inside and out after fabrication, or from 16 gauge Type 304 stainless steel sheet.

Circuit Control Devices

Install circuit breakers, the copper neutral block, and contactors as shown.

Circuit Breakers:

Circuit breakers shall have voltage rating and number of poles shown or specified. Circuit breaker's interrupting rating shall meet or exceed short circuit rating of the specified electrical system. Circuit breakers shall be UL 489 conformed, thermal magnetic molded case circuit breakers and bolt-on type with individually insulated and protected terminals, suitable for surface mounting in the cabinet on a false back or bracket.

All 100 A frame breakers shall be Class 13a for single pole breakers, Class 18a for multiple pole breakers, and 225 A frame breakers shall be Class 20a in Federal Specification W-C-375B, table "Classification of ratings".

Install overcurrent protection and relay equipment, as shown or specified, with materials and installation conforming to the NEC.

Multiple Light Contactors:

Contactors shall be lighting type specifically rated for high-intensity discharge type lamp loads, electrically held. The contactors shall have a 600 V rating. All multiple light contactors shall be unenclosed single-phase, two- or three-pole, open type lighting contactors of the rating shown or specified. Construct contactors for surface mounting on a false back or bracket within a weatherproof cabinet. The contactor coil shall operate on 120 V for 240 V circuits and 240 V, 208 V, and 277 V for 480 V circuits.

Test Switch:

Furnish and install a 277 V AC rated test switch in the control cabinets if shown. The test switch shall be a heavy-duty single-pole switch or circuit breaker rated at 15 A and shall be installed in the control cabinet as a roadway lighting test switch. The switch shall be wired to shunt the photoelectric relay power contactor and energize the lighting circuit contactors.

Photoelectric Relay:

The photoelectric relay shall attach to a three-pole locking receptacle by a twisting motion.

The unit shall have a built-in surge protective device for protection from induced high voltage and follow-through currents. The relay shall meet or exceed the requirements of ANSI C136.10.

Factory set turn-on lights shall be 1.4 footcandle plus or minus 0.2 footcandle at 120 V AC. When operated at 240 V AC, turn-on shall not change more than plus or minus 0.3 footcandle from the 120 V value.

Maximum off-to-on ratio shall be 1.5:1.

The photoelectric relay shall be a cadmium-sulfide photocell encapsulated for humidity protection, or a silicon junction type photo-transistor.

Normal operation shall be designed for dual voltage operation of 105 V - 285 V, 60 Hz.

Power consumption shall be less than 1 W. At the designated voltage, the photoelectric relay shall be capable of controlling a minimum mercury vapor, fluorescent or incandescent lamp load of 1000 W. Minimum operating temperature range shall be from -40 ° F to 150 ° F.

A time-delay control circuit shall prevent false turn-offs by transient light conditions. Provide a fail-safe circuit for the lighting load to remain on or become energized if any functional failure of the photoelectric control circuit occurs.

B 1.3 General Construction Practices

Equipment List and Drawings:

Within 10 calendar days after execution of the Contract, submit two copies of:

- 1.) A list of materials the CONTRACTOR proposes to install. List all material shown or specified by manufacturer's name, size, and identity number of each item. Supplement the list with other data, including but not limited to, detailed scale drawings.
- 2.) Wiring diagrams for all circuits and any nonstandard or special equipment.
- 3.) Brochures, technical bulletins, parts lists, service instructions, working drawings and other technical information relative to products proposed for use on the Project.

Remove existing electrical systems in the order directed. Keep existing electrical systems to be removed in operation until the new electrical systems are ready to be turned on or as directed. Keep authorized downtime to a minimum. Perform the changeover with a minimum disruption to traffic. The City will continue normal maintenance and operations of the existing systems including the furnishing of electrical energy.

Remove existing materials, as specified or approved, which interfere with or which are incompatible with new construction before completion of the new construction. Notify the Engineer at least 4 calendar days in advance of removal.

Remove from the right of way electrical systems as shown. Abandon conduit by removing all wiring, elbows, and risers.

Maintaining Existing and Temporary Illumination Systems:

Protect existing illumination systems and approved temporary replacements. Shutdown of a system may be allowed for alterations or final removal, as approved. Lighting system shutdowns shall not interfere with the regular lighting schedule. Notify the Engineer before performing any work on existing systems.

Determine the exact location of existing conduit runs and pull boxes before using equipment that may damage such facilities or interfere with any system.

Where roadways are to remain open to traffic and existing lighting systems are to be modified, keep the existing systems in operation until the final connection to the modified circuit is made. The modified circuit is to be complete and operating by nightfall of the same day the existing system is disconnected.

Obtain the required permits and have the power service inspected by the utility providing power. Arrange for the utility to make the electrical hookup.

Excavation: It will be the responsibility of the Contractor to make the necessary contacts with utilities and others who have underground facilities in the project area to determine locations of said facilities prior to making any excavations. Any damage to existing facilities shall be repaired by the CONTRACTOR at his own expense.

- 1.) General - Remove and replace sidewalks, paved surfaces, and other materials as needed. Place the conduit under curbs without disturbing curbs. Replace and finish all surfaces to correspond with the existing surfaces. Restore all disturbed landscaping and underground systems to original condition. Use hand excavation if directed. Excavate trenches to lines, grades and cross sections established or approved. Furnish, place, and remove any shoring required to prevent caving of walls. When

excavating in paved areas, cut with an approved pavement cutting saw to a depth of at least 2 inches along the neat boundaries of the area to be removed. Cut sharp and well-defined pavement edges with no evidence of cracking, delaminating, or stressing.

2.) Excavation for Cabinet Foundations - Make all excavations to the neat lines of the foundations. Hand excavation may be required. Place the concrete directly against the sides of the excavation in undisturbed or well-compacted material or place in forms.

3.) Excavation for Conduit - Excavate and backfill conduits as follows:

Minimum Cover from Finished Surface

<u>Type of Conduit</u>	<u>Roadway and Shoulders</u>	<u>Other Areas</u>
Metal	24 inches	18 inches
Rigid Nonmetallic	30 inches	18 inches

Note: Use permit depths if greater than these.

Backfill:

Use Engineer approved general backfill. For rigid nonmetallic conduit, provide bedding, cover, and backfill according to the following:

- 1.) Bedding - Place 2 inches of general backfill in trench bottom before placing conduit.
- 2.) Cover - Cover conduit with 2 inches of additional general backfill.
- 3.) Other Areas - Place selected granular backfill material in layers not greater than 6 inches thick. Compact the selected granular backfill to the top of trench, surrounding ground level or upper limit of excavation. The backfill material shall not contain large, angular stones that could fracture or dent conduit.

Conduit:

Conduit runs shown on the plans are for bidding purposes only. Locations may be changed to avoid obstructions. Larger size conduit than specified may be used at the option and cost of the CONTRACTOR. Use the same size conduit for the entire length, outlet to outlet.

Use non-metallic or rigid metal conduit as shown or specified.

Install a No. 16 AWG THWN stranded copper wire with orange base and blue tracer in all conduits as a locate wire, even if not shown. Extend the wire 2 feet beyond conduit ends and install a wire nut. Do not join multiple locate wires under a common wire nut.

In areas to be paved or landscaped, place all conduit before paving or landscaping.

If corrosive soil conditions exist, coat metallic conduit with a non-metallic coating or wrap with corrosion protection tape at least 10 mils thick.

1.) Conduit in Foundations - Use galvanized, steel conduit and extend it as follows:

- (a) 2 inches to 3 inches vertically above the top of the foundation
- (b) 10 inches to 12 inches horizontally beyond edge or vertically below the foundations

- 2.) Underground Conduit Installation - Make conduit runs continuous between any pole, junction box, or cabinet. Do not cover conduit runs until inspected. Permanently mark all underground open trench conduit runs, except when CLSM is used as backfill, by installing an underground marking tape directly over the conduit.

The underground marking tape shall be:

- (a) Placed 6 inches \pm 1 inch below the surface.
- (b) Continuous between pole bases, junction boxes and cabinet locations.

- 3.) Elbows - Use a standard factory galvanized, steel bend where a conduit bend is required that:

- (a) Has a radius of at least six times the inside diameter of the conduit.
- (b) Is bent without crimping or flattening.

- 4.) Conduit Ends and Couplings - Ream the ends of all conduits to remove burrs and rough edges. Make cuts square and true so the ends will fit together for their full circumference. Slip joints or running threads will not be allowed for coupling conduit. Plug or cap all conduit ends until wiring is installed. After wiring is installed install duct seal compound or precut closed cell polyethylene foam that will prevent debris from entering the conduit system.

- (a) Metallic Conduit - Paint the following with rust-preventative coating:

- Threads on all metal conduit
- Areas where the coating has been damaged so underlying metal is exposed.
- Exposed, ungalvanized threads resulting from field cuts.

- (b) Nonmetallic Conduit - Connect nonmetallic conduit with solvent welds. Use a nonmetallic female threaded connector to connect nonmetallic conduit to metallic conduit.

- (c) Riser - Provide and install conduit risers within junction boxes according to the following:

- Use PVC conduit risers with galvanized steel elbows.

- (d) Bushings - Provide and install bushing according to the following:

- Push on PVC End Bell - Use push on PVC end bells with galvanized steel elbows, PVC risers, nonmetallic junction boxes with nonmetallic lids.
- Metallic Bushing - Use metallic bushings with rigid metallic elbows, metallic risers, and junction boxes containing circuits less than 25 V.
- Metallic Bonding Bushing - Use metallic bonding bushings with rigid metallic elbows, metallic risers, and junction boxes containing 25 V or greater circuits.

- 5.) Conduit in Junction Boxes:

Install conduit in junction boxes according to the following:

- (a) Enter through the bottom of boxes.
- (b) Enter the box from the direction of the run.
- (c) If shown, terminate conduit 1 inch inside the box wall when entering through the side walls.
- (d) Locate conduits near the end walls to leave the major portion of the box clear.

- (e) Orient conduit ends towards the top of the box so that conductors may be pulled out of the conduit from the top of the box without touching the side of the box or other conduits.
- 6.) Conduit Installed for Future Use - If conduit is noted on the plans for future use, with no conductors installed, insert a polyethylene pull line. Include 3 feet of slack in the polyethylene pull line within the conduit and 3 feet outside the conduit.
- 7.) Existing Conduit - Use existing conduit only where shown. Clean existing conduit, without conductors, with a mandrel or cylindrical wire brush, and blow out with compressed air before incorporating into the new system.
- 8.) Conduit In or On Structures - Install conduit in or on structures as shown. Use expansion fittings at all expansion joints in or on a structure.
- 9.) Installation by Horizontal Directional Drilling - If jointed conduit is used, verify the joints have not separated by pulling a mandrel through the conduit after installation.
- 10.) Conduit under Roadway and Shoulders - Install conduit under all roadway and shoulders by horizontal directional drilling.

Foundations:

Construct foundations for posts and cabinets according to Plans.

- 1. Place concrete:
 - (a) With a continuous pour.
 - (b) To the elevation shown or directed.
 - (c) With conduit ends and anchor rods held securely in proper vertical position, to proper height, using a manufacturer's recommended template until the concrete sets.
 - (d) Maintain rebar clearances during concrete pour.
 - (e) Make no adjustment of anchor rods after concrete has set.
 - (f) Set forms square and true to line and grade. Construct forms of rigid materials that remain in position until removed.
 - (g) Remove forms and place subsequent loading per City of Springfield Standard Construction Specifications.
 - (h) Finish tops of foundations to roadway, sidewalk or curb grade, or as directed.
 - (i) Exposed concrete foundations shall present a broom finish and neat appearance. Fill all holes.
 - (j) Where breakaway bases are specified, the post stub projection shall not exceed the limits shown.
- 2.) Treatment for Aluminum-Concrete Contact - Separate the aluminum from the concrete with one layer of 30 pound non-perforated, asphalt-saturated felt. Neatly trim the felt pad to the size and shape of the base contact surface.

Junction Boxes:

Install junction boxes at the approximate locations shown, or, if not shown, no more than 300 feet apart. The CONTRACTOR may, at no additional cost to the City, install additional junction boxes to facilitate the work.

The tops of junction boxes installed in the ground or in sidewalk areas shall be flush with the surrounding grade or top of curb. Place pull boxes as shown. If installed in the roadway or shoulder, leave the top of junction box 1/2 inch below the pavement surface. If installed outside roadways or shoulders, install a portland cement concrete apron around the junction box.

In boxes having an open bottom, construct a sump of reasonably well graded 3/4" - 0 crushed gravel, 12 inches deep covering the approximate area of the box. Do not install conductors until the sump has been constructed.

Cable and Wire:

Arrange wiring neatly within cabinets and junction boxes. Use electrical lubricants when inserting conductors in conduit. Before pulling wires through underground conduit runs, blow the conduit out with 120 cubic feet per minute compressed air.

Before cable and wire installation, clean all existing and new conduit with cylindrical mandrel of the proper size for that conduit and blow out with compressed air. Mechanical pulling methods may be used for conduit cleaning.

Do not use tapes, straps, ties or other binding materials to bundle single conductors or cables together inside conduits or poles. Bundling of conductors or cables will be allowed at the terminating end points for pulling only.

Pull all wire and cable by hand and on a straight line with the conduit opening to prevent damage to wire and cable insulation. If pulls are made with poles or controller cabinet in place, use a pulley device to achieve a straight pull. If an existing pull line is used, replace the existing pull line with a new pull line during the installation.

Wiring Practices:

Install electrical system and electrical system components in a neat and workmanlike manner.

- 1.) In-Line Fuse Holder - Insulate terminal ends using either heat shrink tubing or electrical insulating rubber tape over-wrapped with electrical vinyl plastic tape as specified.

Electrical Service:

Service points shown on the plans are approximate only. The exact location will be determined in the field. Wiring connections to the terminal screws on the circuit breakers and contactors shall make full contact under the screw head. Size and depth of power service conduit shall be as specified by the supplying power company.

Equip each service cabinet with a solid copper neutral bus and the number and size of switches or circuit breakers shown or specified. Notify the local serving utility before making any connections to utility poles. As a part of each service installation, furnish and install a meter base approved by the serving utility (with cover, if required by the utility), when shown.

- 1.) Circuit Breakers - Provide circuit breakers of the rating shown or specified.

Grounding and Bonding:

Make all ground rods, metal conduit, metal poles, grounding wire, metallic junction boxes, metallic junction box covers, and cabinets mechanically and electrically secure to form a continuous, effectively grounded and bonded system. Ground/bond wire shall be No. 6 AWG stranded copper wire or as shown.

- 1.) Ground Rods - Drive ground rods into the ground with the top about 6 inches below the finished grade at the ground rod locations. Ground each above ground metallic structure with a separate ground rod. The equipment ground rod may be placed in the foundation if shown, or in the first junction box nearest the equipment.
- 2.) Services and Cabinets - Bond the neutral conductor, the control cabinets, and the metal base to the grounding electrode system.
- 3.) Structure Mounted Poles and Cabinets - Bond all poles and cabinets mounted on structures or walls to a common ground rod at the end of the structure. Ground the system at the first convenient acceptable location off the structure.
- 4.) Nonmetallic Conduit - In all nonmetallic conduit, run a ground/bond wire continuously between all poles, pedestals, posts, and cabinets. Bond wires are not required in conduit that only contains circuits that operate at less than 25 volts.

Finishing and Testing:

Operate the completed lighting system or subsystem continuously for 24 hours of normal burn. Before completing the work, conduct the following tests on all lighting circuits in the presence of the Engineer.

- 1.) A Megger test on each circuit between the conductor and ground with all switchboards, panelboards, fuse holders, switches, receptacles and overcurrent devices in place. Record all readings. Furnish the Engineer with one copy of the test results identifying observed readings with their respective circuits.
- 2.) Test the insulation resistance between conductor and ground. Resistance shall be as follows on circuits with total single conduction length of:
 - 2,500 feet and over - at least 6 mega-ohm
 - Less than 2,500 feet - at least 8 mega-ohm

Disposition of Waste Materials:

Dispose of all materials according to City of Springfield Standard Construction Specifications.

B 1.4 Scope of Work

The work to be performed under these specifications and drawings consist of the following:

The installation of pedestrian level street lighting on Main Street between approximately Mill Street and 8th Street. The project will involve purchase and installation of street lights in both new, and over existing, locations. Also included in this project is all associated work to have a fully functioning lighting system, including but not limited to: sidewalk removal and installation, junction boxes, conduit installation, wiring, traffic control, service cabinets and horizontal directional drilling.

As bid alternate 1, the project may be extended from 8th Street to 9th Street. As bid alternate 2, the project may be further extended from 9th Street to 10th Street.

To better manage the budgetary aspects of the Downtown Lighting – Phase 2 Project P21102, the City of Springfield is calling for the project to be bid as shown below. The lowest responsive Bidder shall be determined based on the Bidder who submits the lowest responsive Bid for the combined total of the Base Bid, Alternate Bid 1 and Alternate Bid 2. However, should the City determine it is not in the best interest of the City to award either or both of the Alternate Bids the lowest responsive Bidder shall be determined as follows:

Award of Base Bid only; the lowest responsive Bidder shall be determined based on the Bidder who submits the lowest responsive Base Bid.

Award of Base Bid and Alternate 1; the lowest responsive Bidder shall be determined based on the Bidder who submits the lowest responsive Bid for the combined total of the Base Bid and Alternate Bid 1.

Base Bid: The Base Bid will comprise the greater part of the lighting project. The following list outlines the required project sections of the Base Bid:

West End: All Bid Items and quantities required to complete the West End of the lighting project on Main Street from the Willamette Bridge, east to Pioneer Parkway East.

East End: All Bid Items and quantities required to complete the lighting project on Main Street from 6th Street to 8th Street.

See Bid Item List/Schedule of Items "Base Bid" for item quantities associated with the work.

Alternate Bid 1: The following list outlines the project section of Alternate Bid 1:

East End: All Bid Items and quantities required to complete the East End of the lighting project from 8th Street to 9th Street. See Bid Item List/Schedule of Items "Alternate Bid 1" for item quantities associated with this work.

Alternate Bid 2: The following list outlines the project section of Alternate Bid 2:

East End: All Bid Items and quantities required to complete the East End of the lighting project from 9th Street to 10th Street. See Bid Item List/Schedule of Items "Alternate Bid 2" for item quantities associated with this work.

B 1.5 Bid Items

Bid Item No. 0060 Mobilization: See Section 201 of the City of Springfield Standard Construction Specifications.

Payment for Mobilization shall be on a Lump Sum (L.S.) basis, complete.

Bid Item No. 0061 Temporary Traffic Control: This item shall include the submission of a traffic control plan for work within the public right-of-way during all phases of work. Work on Main Street shall conform to Oregon Department of Transportation (ODOT) requirements and may occupy parking along the curb without an ODOT permit. All work that occupies areas other than parking along the curb shall require the CONTRACTOR to obtain all required ODOT user permits. The plan shall show each individual phase of the project with a schedule and map showing placement and description of each temporary traffic control device. The plan shall comply with the Manual on Uniform Traffic Control Devices (including the Oregon Supplements) and the Oregon State Highway Division's "Signing and Flagging Standards for Short-Term Work Zones." The plan must illustrate changes in lane usage, locations and types of traffic control devices, and shall encompass advanced warning for all intersecting streets. Do not begin installations until all permits are obtained and copies are given to the Engineer.

Traffic Control Plan: A traffic control plan must be submitted for all projects in the public right-of-way no later than five (5) working days before work begins. If this plan is not received and approved prior to starting, the Engineer reserves the right to shut down all work at the CONTRACTOR's expense (with a written stop work order to follow within 24 hours) until a plan has been approved and implemented. No work shall be permitted until the area has been signed as per the approved traffic control plan. The

signing shown on the traffic control plan is the minimum required signing. All signs, barricades, cones, flaggers, and other such "devices" to warn, safeguard, protect, guide, and inform the public and the workers during the life of the project shall be furnished, constructed, installed, maintained, moved and removed by the CONTRACTOR.

The devices to be furnished and used by the CONTRACTOR and their placement shall conform to the requirements indicated on the plans. Cases, conditions, and details not covered on the plans shall conform to the applicable provisions of Part IV of the Manual on Uniform Traffic Control Devices for Streets and Highways (M.U.T.C.D.), including the current Oregon Supplements. All temporary traffic control signs shall be constructed of 'Soft' (fabric) type material. All signs shall be mounted on 'flexible' (spring-loaded) sign stands, and be crash proof approved. Hard signs (wood, metal, and plastic-card) may only be mounted on barricades or posts.

Construction Zone Work Hours: Unless otherwise directed by the Engineer, normal right-of-way construction work zones with active project operations are to be conducted between the hours of **8:15 a.m. to 4:15 p.m. daily**. Other circumstances, such as holidays, special events, or other construction) may affect the work zone hours. Any deviation of these work zone hours must be approved by the Engineer prior to construction. Traffic signals or other traffic control devices that need to be turned off by City of Springfield personal shall be requested to the Engineer 48 hours in advance of this activity. Traffic signals that need to be 'reconfigured' due to construction activities that effect lane usage need to be coordinated with the Engineer 72 hours prior to any lane closures.

Business Access: CONTRACTOR shall take all reasonable steps to provide public street and sidewalk access to any business that is closed, partially closed, or difficult or confusing in any way for the traveling public due to operations of the CONTRACTOR. The CONTRACTOR shall provide adequate traffic control, including signs to clarify the alternate or existing access available to the business. CONTRACTOR shall notify business owners at least 48 hours in advance of any parking closures in front of the business along each block face. CONTRACTOR shall not have more than one block face closed upon any single City block at a time.

Payment for Bid Item No. 0061 shall be on a Lump Sum (LS) basis, complete.

Bid Item No. 0137 Remove and Replace 4-inch PC Sidewalk: This work shall include all materials and labor to remove and replace 4-inch PC sidewalk as shown on the plans and/or as directed by the Engineer. This Bid Item does not include the removal and replacement of sidewalk specified as incidental work under Bid Items 0248, 0248b and 0248c.

The work shall include, but not be limited to:

- 1.) Removal and replacement of all necessary PC sidewalk panels as shown on the plans and/or as required by the Engineer.
- 2.) All sidewalk area work shall be replaced as directed by the Engineer.
- 3.) All panels shall be finished with a light broom surface.
- 4.) All environmental requirements to maintain and contain waste materials shall be in place. All waste materials shall be removed from the job site and disposed of by environmentally sound methods.

Payment for Bid Item No. 0137 shall be on a Square Foot (SF) basis, complete.

Bid Item No. 0248 Install LED Decorative Lighting Unit: This bid item shall include all materials, and labor to install, test, and place in service **CONTRACTOR supplied** LED Decorative Lighting unit, complete in place.

The work shall include, but not be limited to:

- 1.) Intercepting an existing electrical conduit, and sweep the conduit(s) into, and out of the pole foundation base as shown on the plan or as directed by the Engineer.
- 2.) Construct a pole foundation base as per attached City of Springfield Standard Drawing 5-24 with the 5/8-inch x 10 foot ground rod placed in the foundation.
- 3.) Install the luminaire and connect the illumination and receptacle circuit(s), and make all electrical connections at the pole base as per the plan, NEC requirements, and the manufacturer's recommendations.
- 4.) Label all circuits with an Engineer approved, weatherproof, yellow, label and black permanent ink marker. Each label shall be marked as to each branch (L1 - R1) line voltage (120/208/240 VAC), and the location of the power source. Labels shall be attached to the respective wire groups with plastic tie-straps.
- 5.) All sidewalk pavement removal and restoration work necessary to accomplish this bid item shall be considered as incidental work. All sidewalk work shall be replaced as directed by the Engineer, and completed with a light broom finish.
- 6.) Assembly of the "Holophane Washington" Postlite Luminaire w/LED Retrofit Kit, and glass globe to provide a functional luminaire.
- 7.) Install luminaire cross arms.
- 8.) All environmental requirements to maintain and contain waste materials shall be in place. All waste materials shall be removed from the job site and disposed of by environmentally sound methods.
- 9.) Each luminaire shall be supplied with a 7 Pin photo control, compatible with the existing City ROAM system to allow for remote control of lighting levels and receptacles.

Payment for Bid Item No. 0248 shall be for the installation of Each (EA) LED Decorative Lighting Unit, complete in place.

Bid Item No. 0248b Install LED Decorative Lighting Unit on Existing Foundation: This work shall include all materials, and labor to install, test, and place in service **CONTRACTOR supplied** LED Decorative Lighting Unit on an existing luminaire or pedestrian pole foundation, complete in place.

The work shall include, but not be limited to:

- 1.) Intercepting an existing electrical conduit, and sweep the conduit(s) into, and out of the pole foundation base as shown on the plan or as directed by the Engineer.
- 2.) Remove the existing 30 foot, steel street light pole, arm, and luminaire, or pedestrian pole, and deliver to the City of Springfield Operations yard at 201 S. 18th Street.
- 3.) Cut off, and grind flat the four (4) 1-3/4-inch or 1-inch anchor bolts flush to the sidewalk grade but do not remove the ground rod. Remove any additional material(s) to create a level surface.
- 4.) Establish a new decorative pole, anchor bolt circle on the existing foundation base using the Hilti HIT-RE 500 Epoxy Anchoring System installed per Hilti specification 3.2.5 HIT-RE 500 Epoxy Anchoring System, or approved equal, to install the four (4) foundation anchor bolts, and install the decorative light unit. See Attachment 1.
- 5.) Connect the illumination and receptacle circuit(s), and make all electrical connections at the pole base as per the plan, NEC requirements, and the manufacturer's recommendations.
- 6.) Label all circuits with an Engineer approved, weatherproof, yellow, label and black permanent ink marker. Each label shall be marked as to circuit branch (L1 - R1) line voltage (120/208/240 VAC), and the location of the power source. Labels shall be attached to the respective wire groups with

plastic tie-straps.

- 7.) All sidewalk pavement removal and restoration work necessary to accomplish this bid item shall be considered as incidental work. All sidewalk area work shall be replaced as directed by the Engineer and completed with a light broom finish.
- 8.) All environmental requirements to maintain and contain waste materials shall be in place. All waste materials shall be removed from the job site and disposed of by environmentally sound methods.
- 9.) All electrical work associated with pedestrian pole lighting conversions shall comply with current ODOT standards. The CONTRACTOR shall discuss the methodology he proposes to accomplish this conversion and work with the Engineer, and the ODOT electrician to achieve a successful outcome.

Payment for Bid Item No. 0248b shall be for the installation of Each (EA) LED Decorative Lighting Unit on existing foundation, complete in place.

Bid Item No. 0248c Remove Existing Street Light: This work shall include all materials, and labor to remove a street light, reconnect the conduit ends and restore the abandoned foundation.

The work shall include, but not be limited to:

- 1.) Intercepting an existing electrical conduit from the street light foundation, reconnect the conduit ends to form a continuous run as shown on the plan or as directed by the Engineer.
- 2.) Remove the existing 30 foot, steel street light pole, arm, and luminaire and deliver to the City of Springfield Operations yard at 201 S. 18th Street.
- 3.) Cut off, and grind flat the four (4) 1-3/4-inch anchor bolts, the ground rod, grind the concrete flush to the sidewalk grade and remove any additional material(s) to create a level surface, or remove to 4-inch below sidewalk grade and replace the sidewalk.
- 4.) All sidewalk pavement removal and restoration work necessary to accomplish this bid item shall be considered as incidental work. All sidewalk area work shall be replaced as directed by the Engineer, and completed with a light broom finish.
- 5.) All environmental requirements to maintain and contain waste materials shall be in place. All waste materials shall be removed from the job site and disposed of by environmentally sound methods.
- 6.) Each luminaire shall be supplied with a 7 Pin photo control, compatible with the existing City ROAM system to allow for remote control of lighting levels and receptacles.

Payment for Bid Item No. 0248c shall be for Each (EA) Street Light removed, complete.

Bid Item No. 0248d LED Decorative Lighting Unit Purchase and Assembly (12 foot) and Bid Item No. 0248e LED Decorative Lighting Unit Purchase and Assembly (16 foot): This work shall consist of the purchase and assembly of all materials to complete a 12 foot or 16 foot LED Decorative Lighting Unit in preparation for installation completed under Bid Items 0248 and 0248b.

The CONTRACTOR shall provide:

- 1.) A 12 foot or 16 foot Aluminum, "Wadsworth", "SiteLink" pole with AC receptacle and listed on Attachments A and B.
- 2.) A "Holophane Washington" luminaire LED Retrofit Kit as listed in Attachment C and as specified in the plans Light Pole Table(s).
- 3.) All labor and equipment to pick up the used LED units at the Booth-Kelly warehouse site located at 303 S 5th St, Springfield, OR 97477, disassemble the units and make ready for powder coating.

- 4.) Provide the all other accessories, pedestrian signal head supports, sign supports, AC outlets, and appurtenances required to complete this bid item.
- 5.) Each luminaire shall be supplied with a 7 Pin photo control, compatible with the existing City ROAM system to allow for remote control of lighting levels and receptacles.
- 6.) The CONTRACTOR shall provide the NODE ID numbers with their matching pole numbers to the project Engineer for inclusion to the City's central ROAM system.

The City shall provide the used "Holophane Washington" Postlite luminaire units to be made available at the Booth-Kelly warehouse located at 303 S 5th St, Springfield, OR 97477. All luminaires will be supplied, four (4) to a pallet, for pickup by the CONTRACTOR.

The work shall include, but not be limited to:

- 1.) Poles: The CONTRACTOR is responsible for the purchase, shipment and assembly of all decorative poles (12 foot or 16 foot), cross arms, GFI AC receptacles, pedestrian signal mounting assemblies, and all other assemblies as listed on the plan set, and as outlined on Attachments A and B.
- 2.) LED Decorative Lighting Unit: The CONTRACTOR is responsible for the purchase, shipment and assembly of all LED Decorative Lighting Units. The CONTRACTOR will coordinate with the City of Springfield project Engineer to pick up the used "Holophane Washington" Postlite luminaires from the Booth-Kelly warehouse located at 303 S 5th St, Springfield, OR 97477. These luminaires will be supplied, four (4) to a pallet, for the CONTRACTOR to disassemble, and make ready to be powder coated. After powder coating the CONTRACTOR shall assemble the light unit(s) with a LED Retrofit Kit for installation in the field.
- 3.) All 12 foot lighting units consist of one (1) LED luminaire. All 16 foot lighting units consist of two (2) LED luminaires, and a cross arm mount.

Powder Coating Light Fixture Specification: CONTRACTOR shall prepare and powder coat "Holophane Washington" Postlite luminaires as required by the bid option(s) awarded. Surface preparation shall ensure a durable, long lasting, and aesthetically pleasing surface. Coating shall ensure a smooth and even texture with consistent coloration; and a durable, long lasting, and aesthetically pleasing surface.

Fixture Surface Preparation: All fixtures shall be scuffed and the remaining surface assessed to determine if further surface preparation is necessary for project success. CONTRACTOR shall determine if additional surface preparation is required. The units may require surface preparation ranging from sanding/scuffing to blasting to bare metal. Prior to powder coating, surfaces shall be cleaned to remove all remaining dust or deleterious material, and threaded holes shall be silicon filled to maintain ability to reattach bolts and screws with normal effort.

Powder used shall be Sherwin-Williams product PBS4-C0010. Powder shall be handled and applied in accordance with all Sherwin-Williams recommended practices and procedures.

The exterior surfaces of the fixture shall be fully coated. The finished surface shall be uniform and sufficient in depth to protect the surface and be durable during handling and outside use in Springfield Oregon environmental conditions. This description of process is general in nature and a CONTRACTOR may deviate from this process provided the delivered product is equal or better to the representative sample previously provided to City. It is the CONTRACTOR's responsibility to use appropriate means and methods, follow manufactures instructions and control the work to meet project objectives.

Product Inspection and Approval: A preapproved powder coating vendor is; Oregon Powder Coating, Tangent, Oregon. Alternative vendors may be acceptable provided they deliver a product equal to or better than the preapproved vendor. To obtain approval for an alternate powder coating vendor the CONTRACTOR shall deliver a sample powder coated light fixture for inspection and final approval to the

project Engineer. If the sample unit is approved the CONTRACTOR shall direct the vendor to proceed with full production.

Payment for Bid Item No. 0248d and 0248e shall be for Each (EA) LED Decorative Lighting Unit purchased and assembled, complete.

Bid Item No. 0249 Common Trench Excavation: This item shall include all labor, materials and equipment to open trench and install electrical conduit(s) as shown on the plan set or as directed by the Engineer.

This work shall include, but not be limited to:

- 1.) Open trench to a depth of 24 inches and the installation of all electrical conduit(s) and conductors.
- 2.) Hold trench width to a practical minimum.
- 3.) Restoration of all trench work.

Payment for Bid Item No. 0249 shall be for each cubic yard (CY) excavated.

Bid Item No. 0401 Horizontal Directional Drill: This work shall include all materials and labor to place conduit below the pavement (sidewalk/roadway) using horizontal direction drill (HDD) to provide a clean raceway for the electrical circuits listed on the plan or as directed by the Engineer.

The work shall include, but not be limited to:

- 1.) Installation of 1.5-inch Schedule 80 PVC Electrical conduit using the trenchless, horizontal directional drill (HDD) method. The HDD system shall have a steerable trenchless method of installing underground pipes, conduits and cables in a shallow arc along a prescribed bore path by using a surface-launched drilling rig, with minimal impact on the surrounding area.
- 2.) HDD operations shall be conducted with respect and cooperation for all effected businesses near drilling sites.
- 3.) Drilling shall not "hump" or deform the pavement and shall be guided. Keep drilling pits at least 2 feet from the edge of pavement unless otherwise authorized in writing. Do not use water to the extent that the pavement might be undermined or subgrade softened. Sand bedding and marking tape are not required with this method.
- 4.) Traffic control, including all required pedestrian closures or detour shall be in place prior to HDD operations.
- 5.) All environmental requirements to maintain and contain waste materials, including all drilling solids and fluids shall be in place prior to HDD operations. All waste materials shall be removed from the job site and disposed of by environmentally sound methods.
- 6.) Removal and restoration of concrete sidewalk shall be paid for under Bid Item 0137.

Payment for Bid Item No. 0401 shall be on a Linear Foot (LF) basis, complete.

Bid Item No. 0604 Install JB2 Junction Box: This item shall include all labor, materials, and equipment to install a Pre-cast Poly Resin - Concrete composite junction box as shown on the plans. All junction boxes used for the street lighting system shall have matching composite lids embossed with the legend "STREET LIGHTING". All junction boxes lids used for the signal system or interconnect system shall be marked with the legend "TRAFFIC SIGNAL". Letter size shall be no smaller than 1/16 of the box width. The tops of junction boxes installed in the ground or in sidewalk areas shall be flush with the surrounding grade or top of curb.

The work shall include, but not be limited to:

- 1.) Removal of the existing JB6 junction box and the installation of a CONTRACTOR supplied JB2 junction box.

Payment for Bid Item No. 0604 shall be for Each (EA) JB2 Junction Box installed, complete in place.

Bid Item No. 0604a Install JB3A Junction Box: This item shall include all labor, materials, and equipment to install a Pre-cast Poly Resin - Concrete composite junction box as shown on the plans. All junction boxes used for the street lighting system shall have matching composite lids embossed with the legend "STREET LIGHTING". All junction boxes lids used for the signal system or interconnect system shall be marked with the legend "TRAFFIC SIGNAL". Letter size shall be no smaller than 1/16 of the box width. The tops of junction boxes installed in the ground or in sidewalk areas shall be flush with the surrounding grade or top of curb. Install a portland cement concrete apron around the junction box.

The work shall include, but not be limited to:

- 1.) Removal of the existing JB6 junction box and the installation of a CONTRACTOR supplied JB3A junction box with a concrete apron as per ODOT Standard Drawing TM418.
- 2.) Restoration of the junction box location.

Payment for Bid Item No. 0604a shall be for Each (EA) JB3A Junction Box installed, complete in place.

Bid Item No. 0605 Remove 100 amp and Replace 200 amp Service Cabinet: This work shall include all materials, and labor to remove an existing pole mounted service cabinet located at Main Street and 8th Street, and install, test, and place in service a 120/240VAC, Pad Mounted 200 amp service as shown on ODOT Standard Drawing TM485 - Modified, Plan Sheet SL14-17, and as described on the plans.

The work shall include, but not be limited to:

- 1.) Removal of the existing 120/240VAC, 100 amp pole mounted service cabinet and meter base.
- 2.) Install a 120/240VAC, 200 amp, pad mounted service cabinet as shown on the Service Cabinet Plan (ODOT TM485 - Modified), as recommended by the manufacture, and/or as directed by the Engineer.
- 3.) Re-direct the existing SUB power into the new service, and connect the illumination and receptacle circuits as shown on Plan Sheet SL13-17.
- 4.) The new service shall be inspected and approved for final use by the City Electrical inspector before SUB power is connected. The CONTRACTOR will obtain the electrical service permit.

Payment for Bid Item No. 0605 shall be for Each (EA) 200 amp Service Cabinet removed and replaced, complete.

Bid Item No. 0606 Install 100 amp Service Cabinet: This work shall include all materials and labor to install a post mounted 100 amp service cabinet located at the southwest corner of Main Street and Pioneer Parkway West. The CONTRACTOR shall install, test, and place in service a 120/208VAC, post mounted 100 amp service as shown on Plan Sheet(s) SL15-17 and SL16-17 (ODOT Standard Drawings TM427 - Modified and TM300 - Modified).

The work shall include, but not be limited to:

- 1.) Install a 120/240VAC, 100 amp, post mounted service cabinet as shown on Plan Sheet(s) SL15-17 and SL16-17 (ODOT Standard Drawings TM427 - Modified and TM300 - Modified), as recommended

by the manufacture, and/or as directed by the Engineer.

- 2.) Remove the existing 2/4 AWG (120VAC) conductors in the existing conduit run from the signal service to the SUB power vault, and install a new 3/4AWG set of conductor cables to feed the new 120/208VAC service, and the existing 120VAC, 70 amp existing signal service located on the signal pole. Re-direct the existing SUB power into the new service, and connect the illumination and receptacle circuits as shown on the plan.
- 3.) The new service shall be inspected and approved for final use by the City Electrical Inspector before SUB power is connected. The CONTRACTOR will obtain the electrical service permit and request any required electrical inspections.

Payment for Bid Item No. 0606 shall be for Each (EA) 100 amp Service Cabinet installed, complete in place.

Bid Item No. 0656 Install THWN Conductors: This work shall include all materials and labor to install various electrical wire conductors in new and/or existing conduit runs to provide power for the downtown lighting project.

The work shall include, but not be limited to:

- 1.) Installation of all THWN copper insulated conductors as shown on the plan or as directed by the Engineer.
- 2.) All connections at the service cabinet, junction boxes, pole bases, luminaires, and receptacles required to complete the circuits as shown on the plans and/or as required by the Engineer.

Payment for Bid Item No. 0656 shall be on a Lump Sum (LS) basis, complete.

Bid Item No. 0657 Remove Existing Conductors: This work shall include all materials and labor to remove electrical wire conductors in existing conduit runs and to provide clean and empty raceways to install the new circuits for the downtown lighting project.

The work shall include, but not be limited to:

- 1.) Removal of all insulated copper conductor(s) as shown on the plans and/or as required by the Engineer, to provide a clean, empty raceway to install the new circuit wiring as shown on the plans and/or as directed by the Engineer.
- 2.) All removed copper conductors shall be coiled and taped into manageable roll of 60 lbs or less. The removed wire will become the property of the City and shall be delivered to the City of Springfield Operations yard at 201 S. 18th Street.

Payment for Bid Item No. 0657 shall be on a Lump Sum (LS) basis, complete.

END OF SECTION

Downtown Lighting Project - P21102 (Phase II)

NOTE:

UTILITY LOCATIONS ARE APPROXIMATE
DO NOT
SCALE OR LOCATE UTILITY LINES OR MAINS
FROM THESE DRAWINGS
CALL FOR UTILITY LOCATES
1-800-332-2344

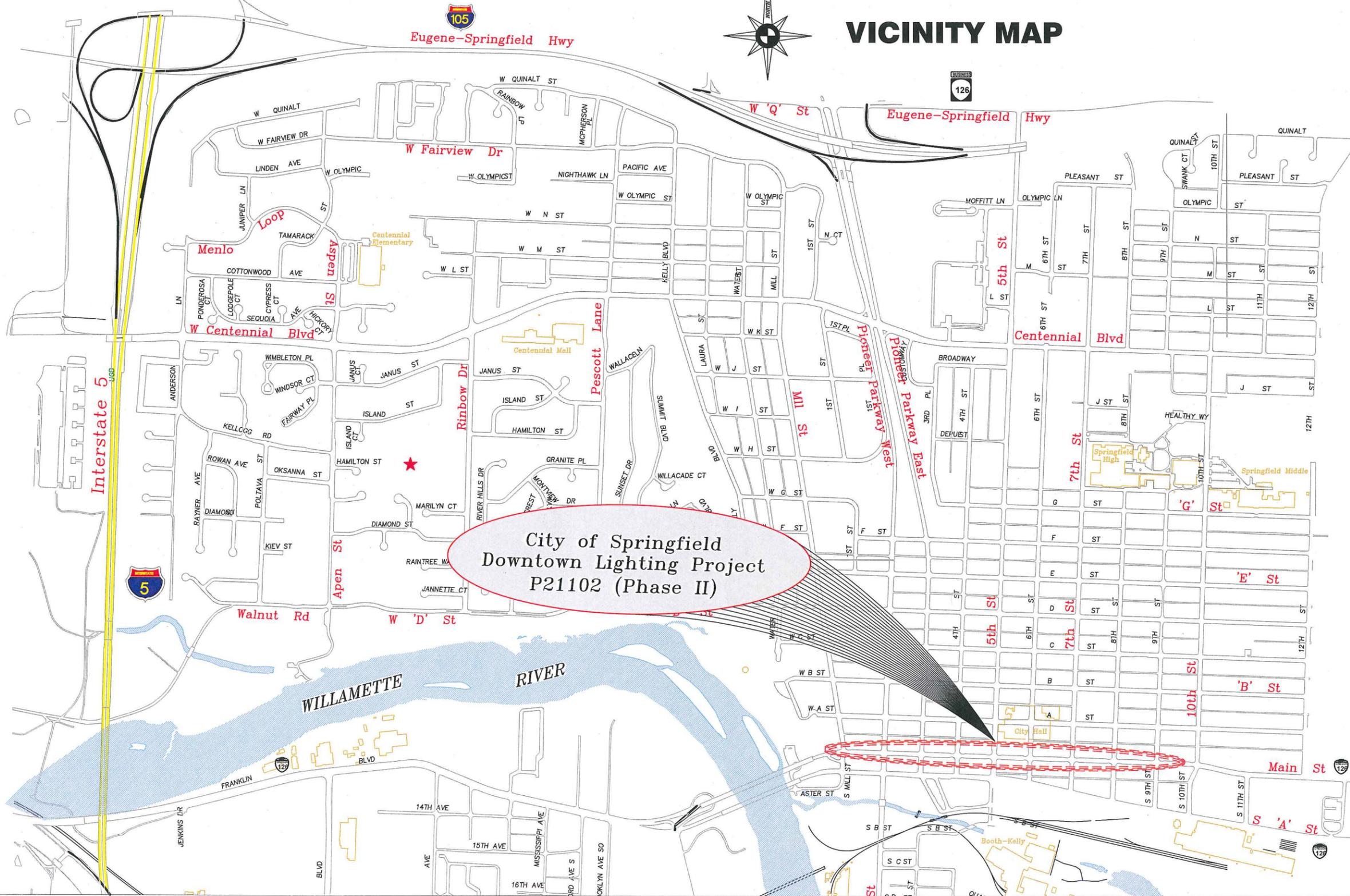
THE CONTRACTOR SHALL BE RESPONSIBLE
FOR DETERMINING UTILITY LOCATIONS PRIOR TO
BEGINNING OF CONSTRUCTION.
THESE PLANS MAY NOT SHOW ALL UTILITIES OR
THE CORRECT LOCATIONS.

SHEET INDEX

DOWNTOWN LIGHTING TITLE SHEET	pg. T1-2
LIGHTING PLANS	pg. SL1-7
LIGHTING LEGEND	pg. SL8
LIGHTING POLE TABLES	pg. SL9-10
LIGHTING CIRCUITS/CABINETS	pg. SL11-16
LED LIGHT & POLE CUT SHEETS	pg. SL17



VICINITY MAP



SCALE	DATE	DRAWN BY	DESIGNED BY	CHECKED BY	NO	REVISION	DATE BY	APPR
None	5/23/2016	DRB	DRB	BFB	1			

REGISTERED PROFESSIONAL ENGINEER
19,697PE
BRIAN F. BARNETT
MAY 5, 1988
OREGON

ENGINEERS STAMP

EXPIRES 12-31-17

Development Services & Public Works Department
* Operations Division *

Downtown Lighting (Phase II) P21102 Illumination Plan Vicinity Map

PROJ # P21102
SHEET # T-1

GENERAL CONSTRUCTION NOTES:

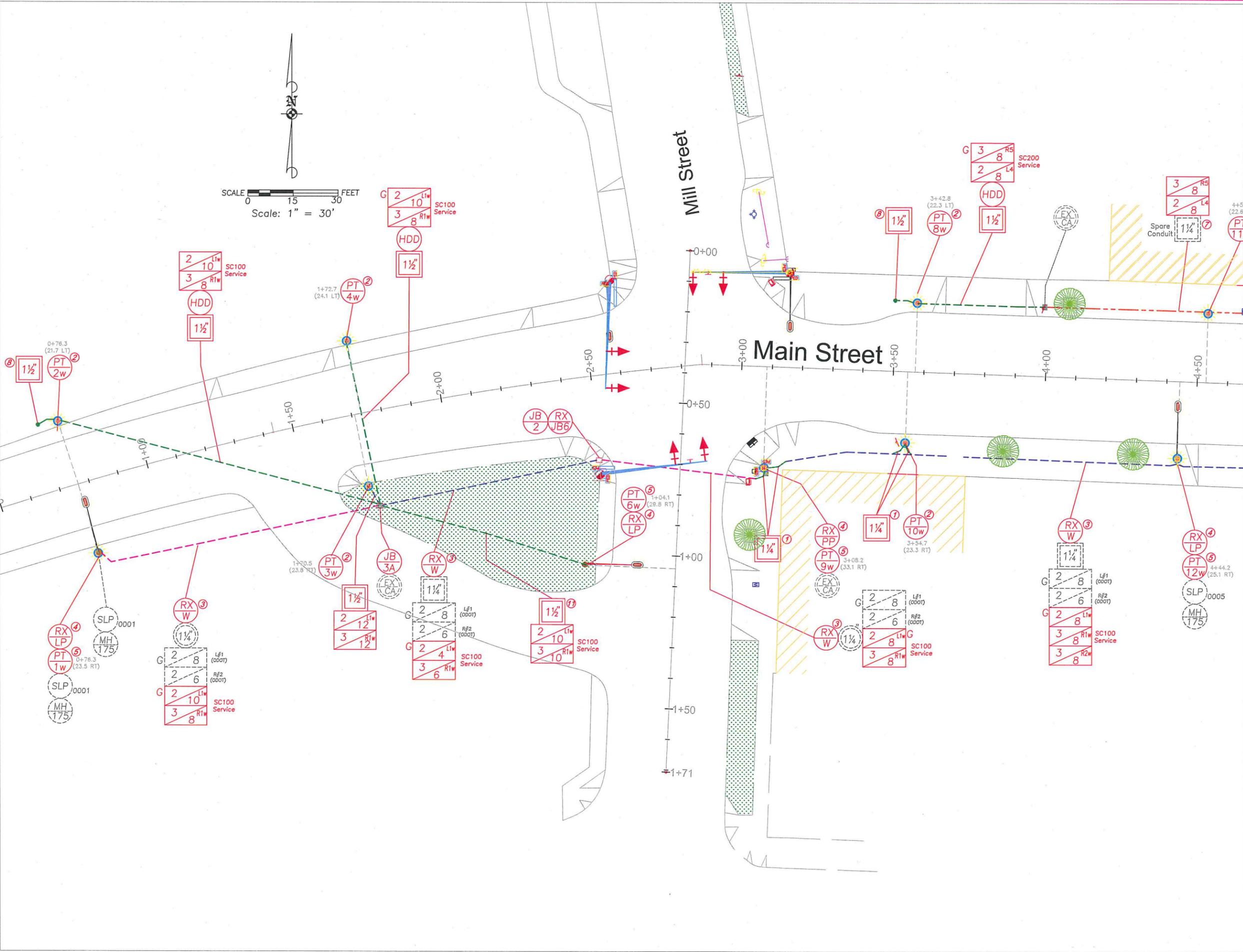
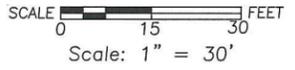
GENERAL CONSTRUCTION NOTES

- A. ALL MATERIALS AND WORKMANSHIP WITHIN THE PUBLIC RIGHT-OF-WAY OR PUBLIC EASEMENTS SHALL MEET CURRENT CITY OF SPRINGFIELD DEPARTMENT OF PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS, AS APPLICABLE IN ADDITION TO THESE PLANS.
- B. OREGON LAW REQUIRES THE CONTRACTOR TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0100. THE CONTRACTOR MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER. NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS (800) 332-2344 OR 811.
- C. LOCATION AND/OR DEPTH OF EXISTING UTILITIES SHOWN ON PLANS ARE APPROXIMATE. ALL UTILITIES MAY NOT APPEAR ON PLANS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT ALL UTILITY COMPANIES FOR UNDERGROUND LOCATION OF FACILITIES AT LEAST 48 HOURS PRIOR TO EXCAVATING OR "POTHOLING". THE "ONE-CALL" NUMBER (800) 332-2344 OR 811.
- D. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH UTILITY COMPANIES ON THE TIMING OF INSTALLATION OF THEIR FACILITIES.
- E. SPRINGFIELD CODE 10.2.1 REQUIRES NOTIFICATION OF OPEN TRENCHING FOR THE PROJECT TO ALLOW POSSIBLE COMMUNICATION CABLE INSTALLATION.
- F. THE CONTRACTOR SHALL PROVIDE ALL TRAFFIC CONTROL DEVICES NECESSARY TO PROTECT AND SAFEGUARD THE PUBLIC AND WORKERS AGAINST INJURY AND PROTECT THE WORK AGAINST DAMAGE. ALL TEMPORARY TRAFFIC CONTROL SIGNING AND DEVICES SHALL BE IN PLACE PRIOR TO BEGINNING WORK. ALL TRAFFIC CONTROL SHALL CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS (MUTCD), CURRENT EDITION, AS SUPPLEMENTED AND AMENDED BY THE OREGON SUPPLEMENTS. FLAGGING SHALL BE PERFORMED AS SHOWN IN THE THE "OREGON TEMPORARY TRAFFIC CONTROL HANDBOOK FOR OPERATIONS OF THREE DAYS OR LESS", 2011 OR CURRENT EDITION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REQUIRED TRAFFIC CONTROL AS FIELD CONDITIONS WARRANT. THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN AT THE PRE-CONSTRUCTION CONFERENCE FOR CITY REVIEW AND APPROVAL.
- G. COMPACTION REQUIREMENTS:
- | LAYER | RATE | TEST |
|------------------------------|------|------|
| SUBGRADE | 95% | T99 |
| CRUSHED ROCK | 95% | T180 |
| ASPHALT (LOCAL) | 90% | RICE |
| ASPHALT (COLLECTOR/ARTERIAL) | 92% | RICE |

- H. CONCRETE COMPRESSIVE STRENGTH REQUIREMENTS (PSI):
- | CONCRETE USE | FIELD | LABORATORY |
|--------------------|-------|------------|
| SIDEWALK/ADA RAMPS | 3000 | 3450 |
| CURBS/GUTTERS | 3500 | 4025 |
| DRIVEWAYS | 3500 | 4025 |
| PAVEMENT | 4000 | 4600 |
- I. THIS PROJECT SHALL COMPLY WITH THE AMERICAN DISABILITIES ACT REQUIREMENTS SUCH AS INCORPORATION OF DESIGN CRITERIA FOR RAMPS, MAXIMUM PROFILE AND CROSS SECTION SLOPES FOR SIDEWALKS, UPGRADING EXISTING FACILITIES WHERE MAJOR CONSTRUCTION IS OCCURRING, AND BUILDING WARNING FOR OBJECTS IN SIDEWALK SUCH AS CURBING OR LANDSCAPING AROUND MAILBOXES.
- J. CONTRACTOR IS RESPONSIBLE TO OBTAIN APPLICABLE PERMITS FROM OTHER AGENCIES WITH JURISDICTIONS SUCH AS LANE COUNTY, OREGON DEPARTMENT OF TRANSPORTATION, OREGON DIVISION OF STATE LANDS, THE ARMY CORPS OF ENGINEERS, OR THE DEPARTMENT OF ENVIRONMENTAL QUALITY.
- K. ALL IMPROVEMENTS THAT WILL BE PRIVATELY OWNED AND MAINTAINED WILL BE BOUND BY THE CURRENT REQUIREMENTS OF THE STATE OF OREGON STRUCTURAL SPECIALTY CODE, PLUMBING SPECIALTY CODE, AND/OR CITY OF SPRINGFIELD BUILDING DIVISION REQUIREMENTS. CONTRACTOR IS RESPONSIBLE TO OBTAIN APPLICABLE PERMITS FROM OTHER CITY DEPARTMENTS PRIOR TO DOING PRIVATE WORK.
- L. EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO THE START OF CONSTRUCTION. SEE EROSION CONTROL PLAN.
- M. A PRE-CONSTRUCTION CONFERENCE IS REQUIRED BEFORE START OF CONSTRUCTION. ALL UTILITIES, CONTRACTORS and CITY REPRESENTATIVES SHALL HAVE RECEIVED THE FINAL APPROVED PLANS AT LEAST 5 WORKING DAYS PRIOR TO THE PRE CONSTRUCTION CONFERENCE.
- N. THE ENGINEER AND/OR CITY HAVE THE RIGHT TO REQUIRE ADDITIONAL WORK NOT SHOWN HEREIN BUT NECESSARY FOR THE SUCCESSFUL COMPLETION OF THE PROJECT. STD.SPEC. 104.08.
- O. REQUESTS BY THE CONTRACTOR FOR CHANGES SHALL BE APPROVED BY THE ENGINEER AND THE CITY IN WRITING PRIOR TO IMPLEMENTATION.
- P. CONTRACTOR SHALL SUBMIT EVIDENCE OF INSURANCE IN ACCORDANCE WITH THE STANDARD SPECIFICATION TO THE CITY FOR APPROVAL PRIOR TO BEGINNING WORK.

PROJ #	P21102	SHEET #	T-2
Downtown Lighting (Phase II) P21102 Illumination Plan Construction Notes			
SCALE: 1" = 30'	NO REVISION	DATE BY APPR.	
DATE: 5/28/2016	1	DRB BFB	
DRAWN BY: DRB			
DESIGNED BY: DRB			
CHECKED BY: BFB			
FILE:			P21102 Downtown Lighting Phase 2.dwg

Begin West End



Match A-A

SCALE: 1" = 30'	NO	REVISION	DATE BY APPR
DATE: 5/23/2016	1		DRB BFB
DRAWN BY: DRB			
DESIGNED BY: DRB			
CHECKED BY: BFB			
FILE:			
P21102 Downtown Lighting Phase 2.dwg			

ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER

19,697 P.E.

OREGON

MAY 5, 2009

BRIAN F. BARNETT

EXPIRES 12-31-17



Development Services & Public Works Department * Operations Division *

Downtown Lighting (Phase II) P21102 Illumination Plan (West End)

PROJ #	P21102
SHEET #	SL1-17



Match A-A

Match B-B

SCALE: 1" = 30'	NO	REVISION	DATE BY	APPR.
DATE: 5/23/2016	1		DRB	BFB
DRAWN BY: DRB				
DESIGNED BY: DRB				
CHECKED BY: BFB				
FILE:				
P21102 Downtown Lighting Phase 2.4wg				

ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER
 19,697 PE
 OREGON
 MAY 5, 2016
 BRIAN F. BRYAN

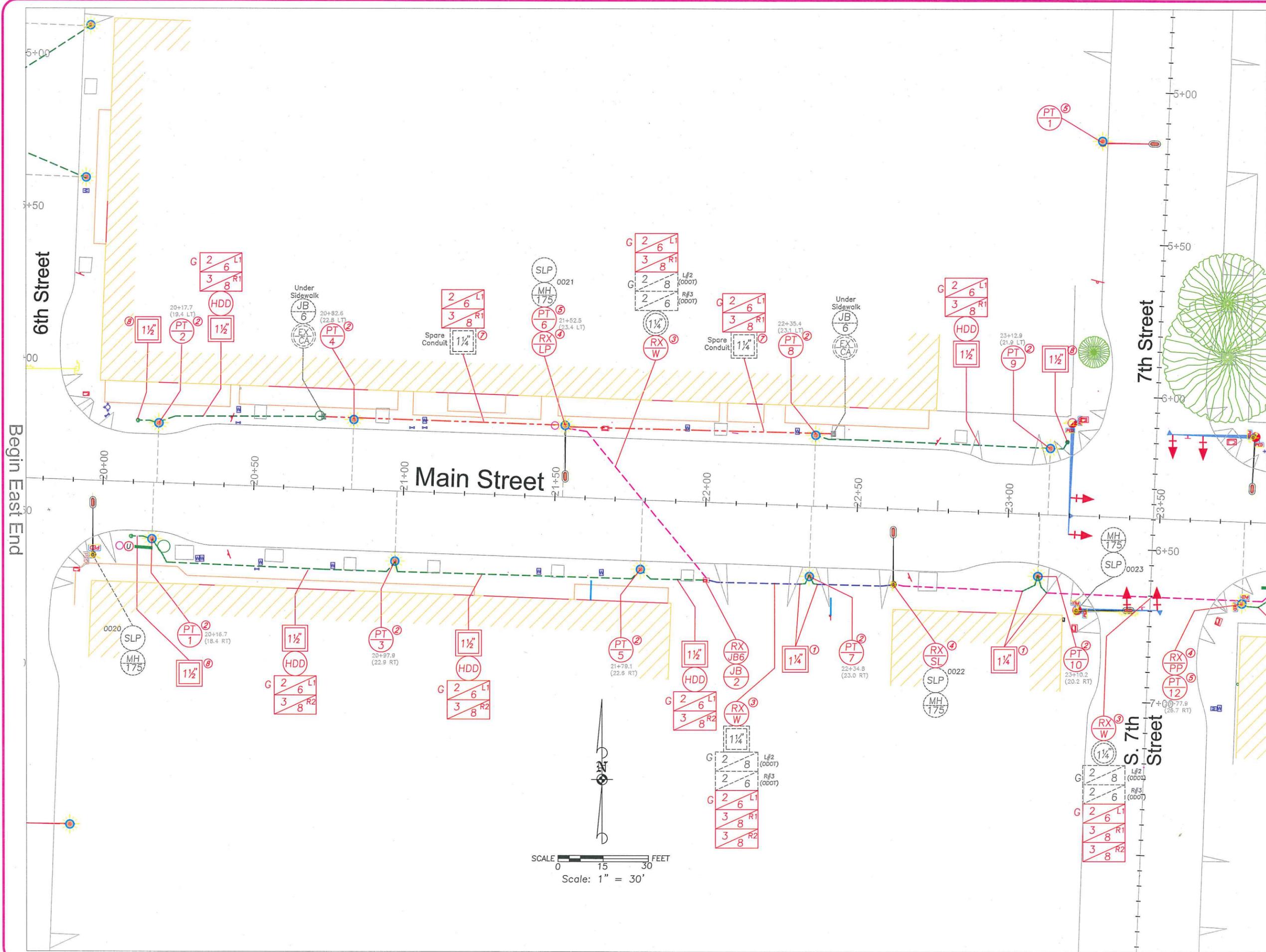
EXPIRES 12-31-17

Development Services & Public Works Department
 * Operations Division *



Downtown Lighting
 (Phase II) P21102
 Illumination Plan
 (West End)

PROJ #	P21102
SHEET #	SL2-17



NO	REVISION	DATE BY	APPR
1		8/4 DRB	BFB

SCALE: 1" = 30'
 DATE: 5/23/2016
 DRAWN BY: DRB
 DESIGNED BY: DRB
 CHECKED BY: BFB

FILE:
 P21102 Downtown
 Lighting Phase 2.dwg

ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER
 19697PE
 OREGON
 MAY 5, 2016
 BRIAN T. BARNETT

Development Services & Public Works Department
 * Operations Division *

EXPIRES 12-31-17

Downtown Lighting
 (Phase II) P21102
 Illumination Plan
 (East End)

PROJ # P21101
 SHEET # SL4-17



NO	REVISION	DATE BY	APPR
1		5/23/2016	DRB BFB

SCALE: 1" = 30'
 DATE: 5/23/2016
 DRAWN BY: DRB
 DESIGNED BY: DRB
 CHECKED BY: BFB

FILE: P21102 Downtown Lighting Phase 2.dwg

ENGINEERS STAMP

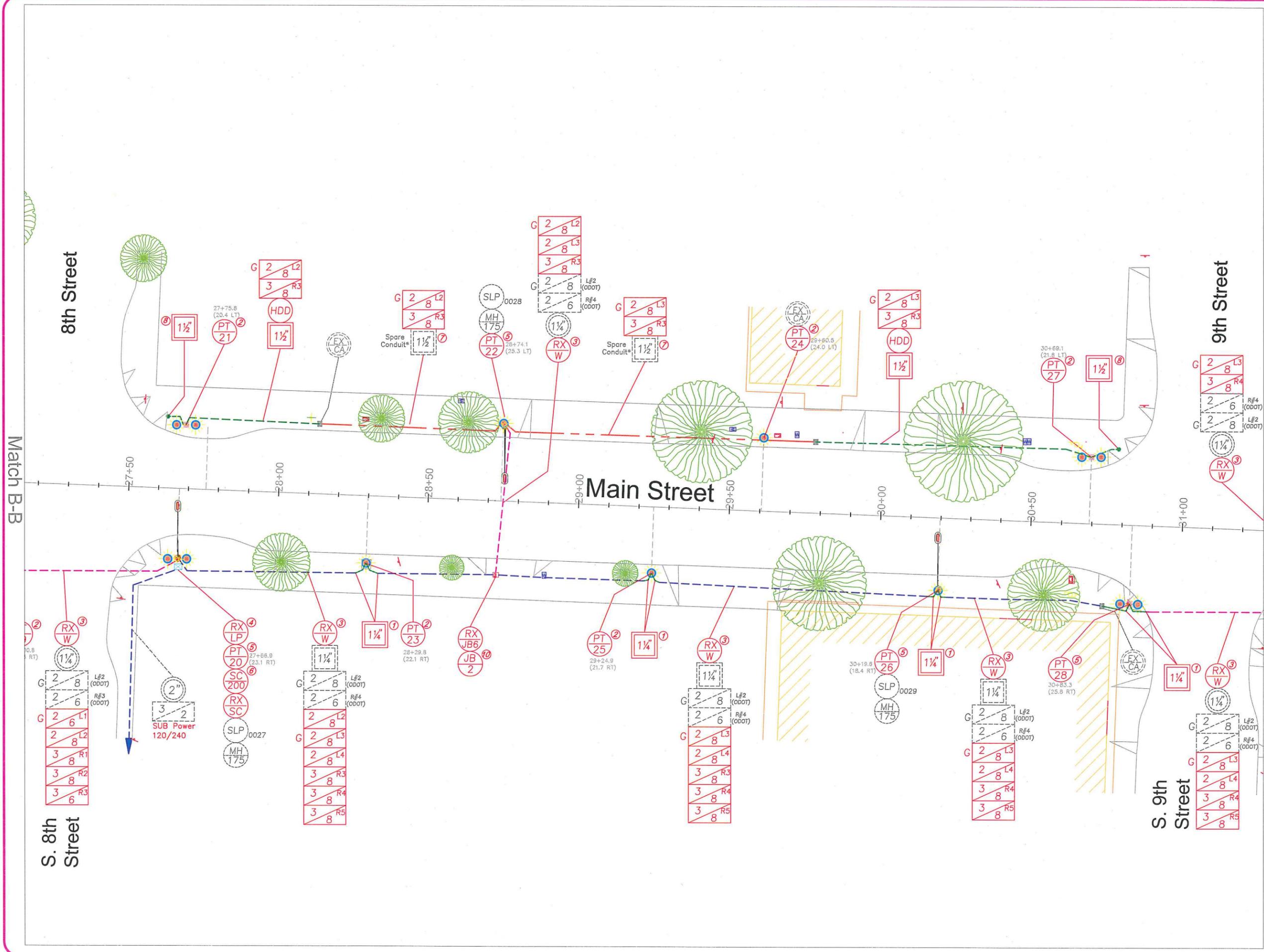
REGISTERED PROFESSIONAL ENGINEER
 19,697PPE
 OREGON
 MAY 5, 2009
 BRIAN F. BIRNENT

Development Services & Public Works Department
 * Operations Division *

PROJ # P21102
 SHEET # SL5-17

Downtown Lighting (Phase II) P21102 Illumination Plan (East End)

EXPIRES 12-31-17



NO	REVISION	DATE	BY	APPR
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SCALE: 1" = 30'
 DATE: 5/23/2016
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 DESIGNED BY: DRB
 CHECKED BY: BFB

FILE: P21102 Downtown Lighting Phase 2.dwg

ENGINEERS STAMP

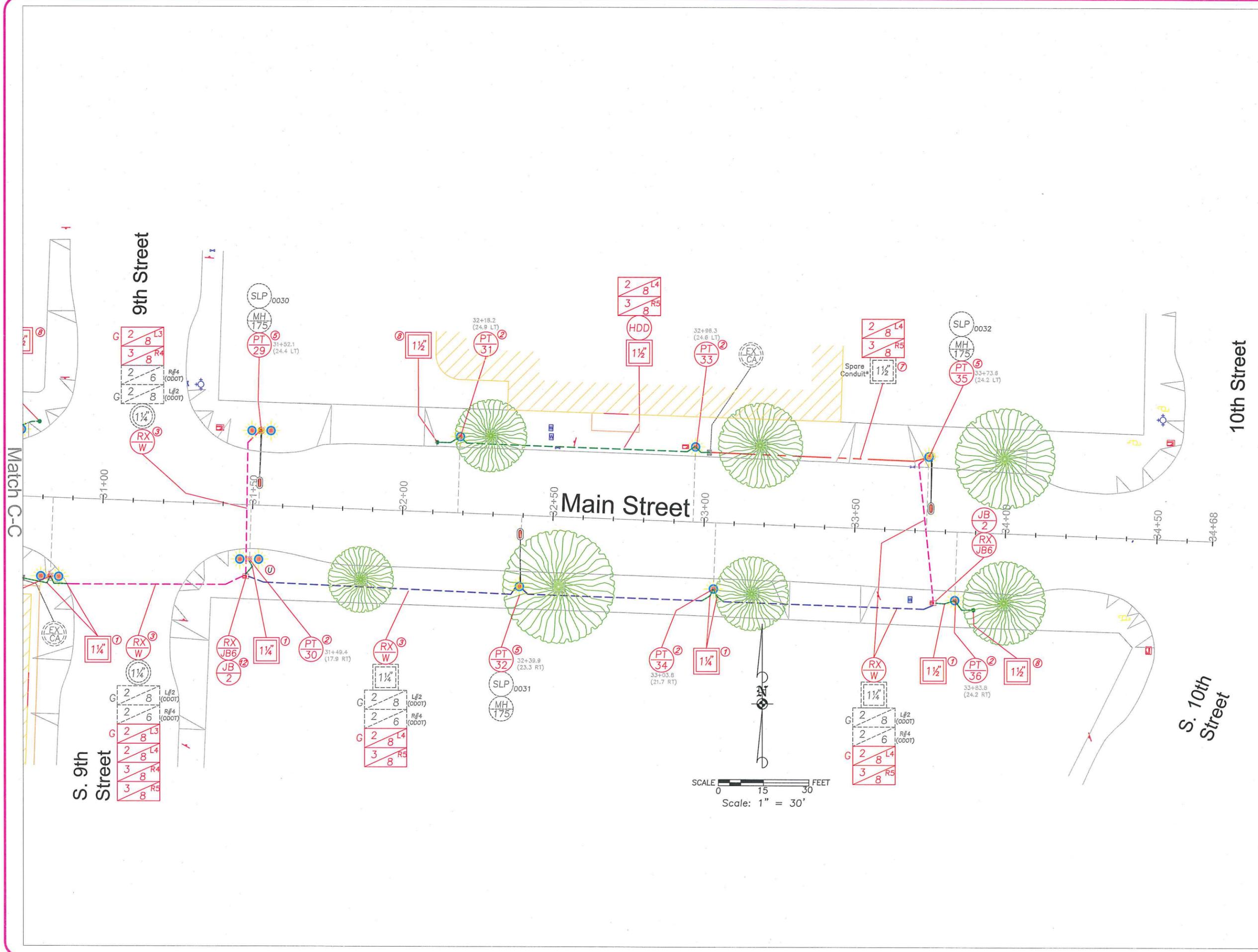
REGISTERED PROFESSIONAL ENGINEER
 19,697 PE
 OREGON
 MAY 5, 2006
 BRIAN F. BRUNETT

EXPIRES 12-31-17

Development Services & Public Works Department
 * Operations Division *

Downtown Lighting
 (Phase II) P21102
 Illumination Plan
 (East End)

PROJ #	P21102
SHEET #	SL6-17



End East End



ENGINEERS STAMP

REGISTERED PROFESSIONAL ENGINEER

19,697PE

OREGON

MAY 5, 2009

BRIAN F. BARNETT

SCALE:	NO.	REVISION	DATE BY	APPR.
1" = 30'	1			
DATE: 5/23/2016				
DRAWN BY: DRB				
DESIGNED BY: DRB				
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P21102 Downtown Lighting Phase 2.dwg				

Downtown Lighting
(Phase II) P21102
Illumination Plan
(East End)

PROJ #	P21102
SHEET #	SL7-17

EXPIRES 12-31-17

Street Lighting Legend

** Notes **

POLES

- Install 'Washington Postlite' light emitting diode (LED) luminaire on a 'SiteLink' Series posts. (See Light Pole Table and Special Provisions)
- Retain and protect existing metal light pole and appurtenances
- Install mast pole type (T) standard traffic signal mast arm pole
- Install mast pole luminaire type (T) traffic signal mast arm pole with luminaire pole extension (35' mounting height)
- Remove existing metal light pole for new LED light.
- Remove existing metal light pole.
- Remove existing pedestrian pole

LUMINAIRES

- Remove existing luminaire and luminaire arm from existing pole
- Install (W) watt, Washington Postlite light emitting diode (LED) luminaire on 12Ft. 'SiteLink' Series posts. (See Special Provisions)
- Install 250watt, LED Luminaire (AEL-ATB260BLEDE70).

CABINETS

- Install Model 170 controller unit in Model 337 cabinet.
- Install 120/240 volt service meter base.
- Install post mounted 100amp service cabinet, 120/208 volt, with circuit breakers for illumination, and receptacles. (See TM427 and Special Provisions)
- Install pad mounted 200amp service cabinet, 120/240 volt metered, for illumination and receptacles. (See TM485 and Special Provisions)
- Remove existing pole mounted, service cabinet. (See Special Provisions Standard Drawing TM485)

CONDUIT

- Install (S=size) in. rigid non-metallic electrical conduit
- Install size (S) galvanized steel electrical conduit.
- Interconnect conduit (See Interconnect Plan)
- Conduit spare (Protect and Maintain)
- Existing conduit (S) size. (Protect and Maintain)
- Install conduit and wiring per Springfield Utility Board requirements
- Install conduit by horizontal directional drilling, open trench not allowed
- Retain and protect existing electrical conduit
- Abandon existing electrical conduit
- Existing PVC to steel conduit adapter (CA).
- Remove existing PVC to steel conduit adapter (CA).

JUNCTION BOXES

- Install 17"x10"x12" (min. dimension) precast fiber-composite junction box
- Install 22"x12"x12" (min. dimension) precast fiber-composite junction box
- Install 22"x12"x12" (min. dimension) precast fiber-composite junction box with concrete apron
- Install 30" x 17" x 12" precast fiber-composite junction box
- Install a 6" x 6" x 4" metal plated junction box.
- Remove existing junction box
- Abandon existing junction box

WIRES

- Install (N) number (G) gage THWN wires. Pull one additional insulated green ground/bonding wire as per NEC code.
- Roadway Illumination Circuit No.(#) (1-3)
- Roadway Receptacle Circuit No.(#) (1-4)
- Install (N) number (G) Gage type THW wire.
- Install pull string 210lbs test. (Protect and Maintain)
- Retain and protect existing wiring
- Remove existing wiring

NOTE: All **GRAY, DASHED** line symbols are EXISTING items. (Protect and maintain) All **RED, SOLID** line symbols are CONSTRUCTION BID items.

NOTE: For 24" x 36 Plan Set
See Sheets No. SL-1 thru SL-3 for Lighting Plan
See Sheet No. SL-4 for Lighting Plan Legend
See Sheet No. SL-5 for Light Pole Chart
See Sheet No. SL-6 for Light Circuits

NOTE: For 11" x 17 Plan Set
See Sheets No. SL-1 thru SL-9 for Lighting Plan
See Sheets No. SL-10 for Lighting Plan Legend
See Sheets No. SL-11 & 12 for Light Pole Charts
See Sheets No. SL-13 thru 15 for Light Circuits
See Sheets No. SL-16 & 17 for Service Cabinets

- 1 **Intercept Existing Electrical Conduit:** Intercept existing electrical conduit, install new conduit sweeps, and re-route into new decorative light pole base, and install wires. (See Special Provision)
- 2 **Install 'Washington Postlite' LED Street Light with Decorative Pole:** Install a 'SiteLink' series aluminum post, and a 100watt 'Washington Postlite' LED luminaire. (See Light Pole Table and Special Provisions)
- 3 **Remove Existing Street Lighting and Receptical Wiring:** Remove the existing wiring in the conduit system (See Special Provision)
- 4 **Remove Existing Luminarie/Pedestrian Pole:** Remove the existing steel street light pole, arm and luminaire and/or pedestrian pole assembly. Reroute and/or reinstall all conduits, wiring, and/or pedestrian equipment. (See Special Provision)
- 5 **Install 'Washington Postlite' LED Luminaire on Existing Foundation:** Install a 'SiteLink' series aluminum post, and a 100watt 'Washington Postlite' LED luminaire on the existing steel pole or pedestrian signal pole foundation using a drill and epoxy method. (See Light Pole Table and Special Provisions)
- 6 **Remove and Install Service Cabinet:** Remove the existing 120-240VAC, metered service, and install new pad mount service cabinet. Re-wire, and label all illumination and receptacle circuits as per plan, and/or as directed by the Engineer. (See TM485, The Light Pole Table, and Special Provisions)
- 7 **Intercept Existing Spare Electrical Conduit:** Intercept existing, spare electrical conduit, install new conduit sweeps, and re-route into new decorative light pole base, and install wires. (See Special Provision)
- 8 **Extend Conduit Sweep:** Install conduit sweep for future use. Install trace wire and cap end. (See Special Provisions.)
- 9 **Install a New Service Cabinet:** Install a new 100Amp Service cabinet at the SW corner of Main Street and Pioneer Parkway West. (See TM427, TM300, Pole Circuit Diagram and Special Provision)
- 10 **NOTE: Base Bid:** Install all illumination and receptacle circuits (L3, L4, R3, R4, & R5). Coil 2ft of the circuit(s) that are not used in the JB2, tape and mark all circuits for future use if no Alternate bid options are constructed. Split connect L3 and R3 circuit(s) for future connections.
- 11 **Trench and Restore:** Use surface trenching method from JB3A to luminaire. See Special Provisions
- 12 **NOTE: Alternate Bid #1:** Install all illumination and receptacle circuits (L3, L4, R4, & R5). Coil 2ft of the R5 circuit in the JB2, tape and mark all circuits for future use if Alternate Bid #2 is not constructed.

GENERAL NOTES:

1. Location of poles, junction boxes, and conduit shall be installed as shown on plans. If conflicts arise, pole, junction box, and conduit locations may be modified in the field per Engineer approval. All equipment must be placed within the right of way. Place conduit in same trench as other conduits where possible.
2. Contractor shall verify location of existing utilities before trenching, directional drilling, or installing foundations. Maintain and protect all utilities unless otherwise noted.. Coordinate all work with utility companies to eliminate conflicts.
3. All materials and workmanship shall conform to the City of Springfield Standard Drawings, the Standard Specifications for Construction, and the Special Provisions for this contract.
4. All new street lights shall be constructed with wire theft deterrents only as directed by the Engineer. Wires terminating into pole bases shall not require additional theft deterrents. Wire terminating in junction boxes shall be glued inside the conduit to a depth of 8 inches at every conduit stub up at underground junction boxes, or as directed by the Engineer. Conduit leading to the pole base shall not be glued. Conduit larger than 1 inch shall have an approved polyester or fiberglass filler material installed 8 inches below the stub up end to prevent the adhesive from slumping. Construction adhesive meeting the following requirements shall be used.
 - One component polyurethane based, moisture-curing adhesive
 - Meets APA AFG-01, ASTM D 3498, ASTM C 557, FHA Bulletin UM-60
 - VOC content < 45 g/L
 - Service temperature:
 - Long term: 0°F to 160°F
 - Short term: 0°F to 250°F

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6/14/DRB											
NO											
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P21102 Downtown Lighting Phase 2.dwg											

Development Services & Public Works Department
* Operations Division *

Downtown Lighting (Phase II) P21102 Illumination Legend

PROJ #	P21102
SHEET #	SL8-17

EXPIRES 12-31-17

LIGHT POLE TABLE - Phase II (West End)

POLE NO.	STATION		LUMINAIRE			COLOR TEMP	POLE HEIGHT (ft)	BASE TYPE	POLE DATA		OPTIONS	OPTIONS DESCRIPTION
			LAMP (Watts)	LINE VOLT	TYPE				SHAFT SIZE	Bolt Circle & Orientation		
1w	0+76.3 (23.5 RT) Existing	Main St.	100W LED	208V	M-C-V	4000K	12	F-Exist	SL4	Standard	SL4-12 W/Epoxy Bolts	Steel Pole
2w	0+76.3 (21.7 LT)	Main St.	100W LED	208V	M-C-III	4000K	12	F	SL4	Standard		
3w	1+70.5 (23.8 RT)	Main St.	100W LED	208V	M-C-V	4000K	12	F	SL4	Standard		
4w	1+72.7 (24.1 LT)	Main St.	100W LED	208V	M-C-III	4000K	12	F	SL4	Standard		
	REMOVED FROM PROJECT											
6w	1+04.1 (29.8 RT) Existing	Mill St.	100W LED	208V	M-C-V	4000K	12	F-Exist	SL4	Standard	SL4-12 W/Epoxy Bolts	Steel Pole
	REMOVED FROM PROJECT											
8w	3+42.8 (22.3 LT) Existing	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
9w	3+08.2 (33.1 RT)	Main St.	100W LED	208V	M-C-III	4000K	12	F-Exist Ped Pole Base	SL4	Standard	Adapt Existing Ped Pole	See Special Provisions
10w	3+54.7 (23.3 RT)	Main St.	100W LED	208V	M-C-III	4000K	12	F	SL4	Standard		
11w	4+52.8 (22.6 LT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
12w	4+44.2 (25.1 RT) Existing	Main St.	100W LED	208V	M-C-III	4000K	12	F-Exist	SL4	Standard	SL4-12 W/Epoxy Bolts	Steel Pole
13w	5+56.9 (23.4 LT) Existing	Main St.	100W LED	240V	M-C-III	4000K	12	F-Exist	SL4	Standard	SL4-12 W/Epoxy Bolts	Steel Pole
14w	5+38.1 (23.6 RT)	Main St.	100W LED	208V	M-C-III	4000K	12	F	SL4	Standard		
15w	6+16.4 (26.5 RT)	Main St.	100W LED	208V	M-C-III	4000K	12	F	SL4	Standard		
16w	7+16.0 (23.9 LT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
17w	7+10.2 (23.1 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
18w	8+05.3 (23.1 LT) Existing	Main St.	100W LED	240V	M-C-III	4000K	12	F-Exist	SL4	Standard	SL4-12 W/Epoxy Bolts	Steel Pole
19w	7+83.7 (23.1 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
20w	8+70.1 (23.2 LT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
21w	8+57.8 (23.1 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
22w	9+35.3 (23.3 LT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
23w	9+35.7 (25.5 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
24w	10+14.8 (27.2 RT) Existing	Main St.	100W LED	240V	M-C-III	4000K	12	Frangible Ped Pole Base	SL4	Standard	Adapt Existing Ped Pole	See Special Provisions

BASE BID
(Part 1/2)

MONTHLY SYSTEM ENERGY UTILIZATION		
CABINET SC-200	1767 KWH @ 365 HR./MO.	
ROADWAY DESIGN VALUES**		
LOCATION	AVERAGE MAINTAINED ILLUMINANCE (fc)	UNIFORMITY (AVG/MIN)
MAIN STREET	1.5	3:1
MAIN STREET/6th STREET	2.2	3:1
MAIN STREET/7th STREET	2.5	3:1
MAIN STREET/8th STREET	2.2	3:1
MAIN STREET/9th STREET	2.2	3:1
MAIN STREET/10th STREET	2.5	3:1
MAIN STREET/PPWK EAST	2.2	3:1
MAIN STREET/PPWK WEST	2.2	3:1
MAIN STREET/MILL STREET	2.2	3:1
5th STREET	1.0	4:1
5th STREET/'A' STREET	1.5	3:1

ROADWAY ACHIEVED VALUES			
	1.7 - 2.4	1.7:1 - 2.4:1	
MAIN STREET	2.5	3.6:1	
MAIN STREET/6th STREET	2.6	3.6:1	
MAIN STREET/7th STREET	1.8	3:1	
MAIN STREET/8th STREET	1.9	2.4:1	
MAIN STREET/9th STREET	2.2	3:1	
MAIN STREET/10th STREET	2.0	4:1	
MAIN STREET/PPWK EAST	1.8	6:1	
MAIN STREET/PPWK WEST	2.3	2.3:1	
MAIN STREET/MILL STREET	1.0	5:1	
5th STREET	1.8	2.6:1	
5th STREET/'A' STREET	2.3	2.6:1	
SIDEWALKS			
	AVG. HORIZONTAL	MIN. VERTICAL	UNIFORMITY
DESIGN	0.7	0.4	4:1
ACHIEVED	0.7 - 1.2	00	2.0/2.3:1

Springfield Downtown Lighting (Phase II) Project
21102

Requirements Common to all Illumination Poles
Pole Series: SiteLink Base: Wadsworth Material: Aluminum
Tenon Size: P07, and P08 on Poles 17, 19-21 & 27-30
Pole Mounts: ABG

Color: Black Options: R138A & R186A (Receptacle Height
138"/186" above Grade,
0 Degrees orientation from hand hole-CCW)
FGFUS-SBKH: Receptacle Type Small in Use.

LED = Light-Emitting Diode M-C-III/V =
Medium-Cutoff-Type 3/5 light distribution
F = Fixed Base Exist = Existing

** - Design values calculated using 'Visual
2012' photometric lighting program. (Main
Street Lighting East West.vsl 2/10/2016)

	DATE BY APPR.						
	REVISION	NO	DATE	BY	APPR.	DRB	BFB
		1					
SCALE: 1" = 30'		DATE: 5/23/2016		DRAWN BY: DRB		DESIGNED BY: DRB	
				CHECKED BY: BFB			
						FILE: P21102 Downtown Lighting Phase 2.dwg	
							
							
Downtown Lighting (Phase II) P21102 Light Pole Table							
PROJ #	P21102			SHEET #	SL9-17		

LIGHT POLE TABLE - Phase II (East End)

POLE NO.	STATION		LUMINAIRE				POLE HEIGHT (ft)	BASE TYPE	POLE SHAFT SIZE	DATA Bolt Circle & Orientation	OPTIONS	OPTIONS DESCRIPTION
			LAMP (Watts)	LINE VOLT	TYPE	COLOR TEMP						
1	20+16.7 (18.4 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
2	20+17.7 (19.7 LT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
3	20+97.9 (22.9 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
4	20+82.6 (22.8 LT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
5	21+79.1 (22.6 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
6	21+52.5 (23.4 LT) Existing	Main St.	100W LED	240V	M-C-III	4000K	12	F-Exist	SL4	Standard	SL4-12 W/Epoxy Bolts	Steel Pole
7	22+34.8 (23.0 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
8	22+35.4 (23.1 LT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
9	23+12.9 (21.9 LT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
10	23+10.2 (20.2 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
11	23+94.6 (19.0 LT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
12	23+77.9 (26.7 RT) Existing	Main St.	100W LED	240V	M-C-III	4000K	12	F-Exist	SL4	Standard	Convert PPole with Decorative SL4-12 W/Epoxy Bolts	Pedestrian Pole
13	25+01.2 (23.3 LT) Existing	Main St.	100W LED	240V	M-C-III	4000K	12	F-Exist	SL4	Standard	SL4-12 W/Epoxy Bolts	Steel Pole
14	24+64.5 (22.6 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
15	25+56.6 (23.4 LT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
16	25+29.1 (24.3 RT) Existing	Main St.	100W LED	240V	M-C-III	4000K	12	F-Exist	SL4	Standard	SL4-12 W/Epoxy Bolts	Steel Pole
17	27+79.0 (19.1 LT)	Main St.	100W LED	240V	M-C-III	4000K	16	F	SL5	Standard	Luminare Arm 2'	
18	26+21.0 (22.6 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
19	27+00.8 (26.3 RT)	Main St.	100W LED	240V	M-C-III	4000K	16	F	SL5	Standard	Luminare Arm 2'	
20	27+66.9 (23.1 RT) Existing (200amp Service Cabinet)	Main St.	100W LED	240V	M-C-III	4000K	16	F-Exist	SL5	Standard	Luminare Arm 2'	Steel Pole
21	27+75.8 (20.4 LT)	Main St.	100W LED	240V	M-C-III	4000K	16	F	SL5	Standard	Luminare Arm 2'	SL5-16 W/Epoxy Bolts
22	28+74.1 (24.0 LT) Existing	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard	Luminare Arm 2'	Steel Pole
23	28+29.8 (22.1 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard	SL4-12 W/Epoxy Bolts	
24	29+60.5 (24.0 LT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
25	29+24.9 (21.7 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
26	30+19.6 (24.4 LT) Existing	Main St.	100W LED	240V	M-C-III	4000K	12	F-Exist	SL4	Standard	SL4-12 W/Epoxy Bolts	Steel Pole
27	30+69.1 (21.8 LT)	Main St.	100W LED	240V	M-C-III	4000K	16	F	SL5	Standard	Luminare Arm 2'	
28	32+18.2 (24.9 LT)	Main St.	100W LED	240V	M-C-III	4000K	16	F	SL5	Standard	Luminare Arm 2'	
29	31+52.1 (24.4 LT) Existing	Main St.	100W LED	240V	M-C-III	4000K	16	F-Exist	SL5	Standard	Luminare Arm 2'	Steel Pole
30	31+49.4 (17.9 RT)	Main St.	100W LED	240V	M-C-III	4000K	16	F	SL5	Standard	Luminare Arm 2'	SL5-16 W/Epoxy Bolts
31	32+18.2 (24.9 LT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
32	32+39.9 (23.3 RT) Existing	Main St.	100W LED	240V	M-C-III	4000K	12	F-Exist	SL4	Standard	SL4-12 W/Epoxy Bolts	Steel Pole
33	32+96.3 (24.6 LT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
34	33+03.8 (21.7 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		
35	33+73.6 (24.2 LT) Existing	Main St.	100W LED	240V	M-C-III	4000K	12	F-Exist	SL4	Standard	SL4-12 W/Epoxy Bolts	Steel Pole
36	33+83.8 (24.2 RT)	Main St.	100W LED	240V	M-C-III	4000K	12	F	SL4	Standard		

**BASE BID
(Part 2/2)**

**ALTERNATE
BID #1**

**ALTERNATE
BID #2**

PROJ #	P21102	SHEET #	SL10-17
Downtown Lighting (Phase II) P21102 Light Pole Table			
Development Services & Public Works Department * Operations Division *			
			
REGISTERED PROFESSIONAL ENGINEER 19697PE BRIAN F. BARNETT OREGON MAY 5 2016			
SCALE: 1" = 30'	DATE: 5/23/2016	DRAWN BY: DRB	DESIGNED BY: DRB
		CHECKED BY: BFP	
NO. 1	REVISION	DATE BY APPR	DRB BFP
FILE: P21102 Downtown Lighting Phase 2.dwg EXPIRES 12-31-17			

Main St. & PPWK West Traffic Signal Service (West End)

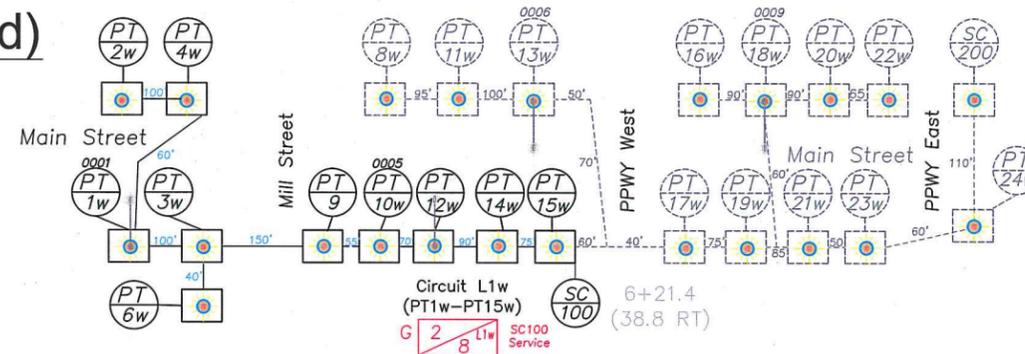
SC100 System (120/208VAC)

Circuit L1w
(PT1w-PT15w)
G 2 8 L1w
SC100
Service
208/30amp

40'
100'
60'
100'
150'
55'
70'
90'
75'
740'
L1w Distance

Illumination Circuits L1w (10 Lights - PT1w-PT4w, PT6w, PT9-15w)

Circuit L1w: 10.4 x 1480' (740' x 2) x 0.60 amps x 12 Lights = 10,656 Circular Mills
10,656 / 10.4 (5% x 208 VAC) = 10,246 Circular Mills = 8 AWG Wire (16,510) 2 x #8 Wires

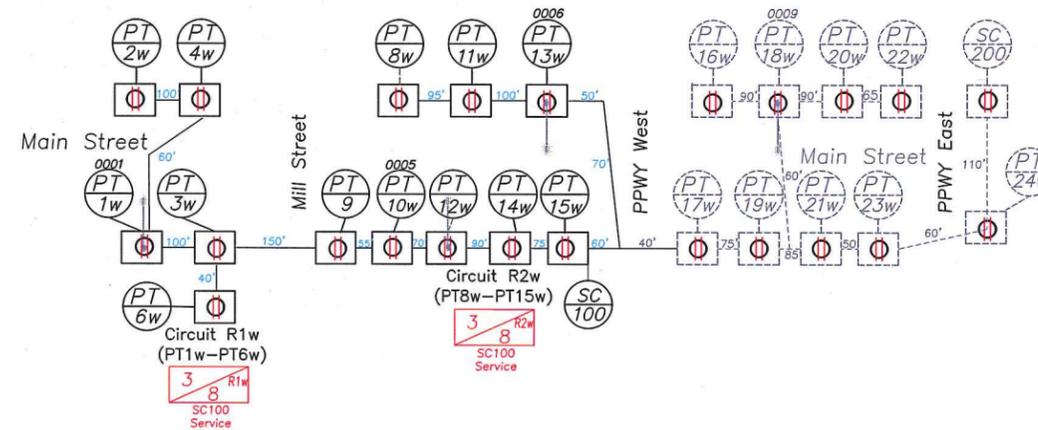


Circuit R1w
(PT1w-PT7w)
3 8 R1w
SC100
Service
120/15a-GFI

40'
60'
100'
150'
55'
70'
90'
75'
640'
R1w Distance

Receptacle Circuits R1w (5 Plugs - PT1w to PT4w, PT6w)

Circuit R1w : 10.4 x 1,280' (640' x 2) x 0.53 amps x 5 Plugs = 35,276 Circular Mills
35,276 / 6.0 (5% x 120 VAC) = 5,879 Circular Mills = 8 AWG Wire (16,510 CM) 3 x #8 Wires



Circuit R2w
(PT8w-PT15w)
3 8 R2w
SC100
Service
120/15a-GFI

40'
55'
70'
100'
50'
90'
75'
290'
375'
665'
R2w Distance

Receptacle Circuits R2w (8 Plugs - PT8w to PT15w)

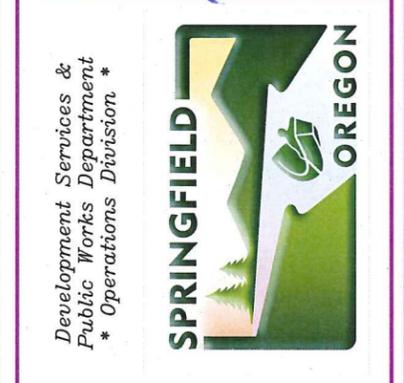
Circuit R2w : 10.4 x 1,330' (665' x 2) x 0.53 amps x 8 Plugs = 58,647 Circular Mills
58,647 / 6.0 (5% x 120 VAC) = 9,774 Circular Mills = 8 AWG Wire (16,510 CM) 3 x #8 Wires

NO.	REVISION	DATE BY	APPR.
1		6/14/DRB	BFB

SCALE: 1" = 30'
DATE: 5/23/2016
DRAWN BY: DRB
DESIGNED BY: DRB
CHECKED BY: BFB

FILE: P21102 Downtown Lighting Phase 2.dwg

REGISTERED PROFESSIONAL ENGINEER
19,697PE
BRIAN F. BARNETT
MAY 5 2005
OREGON
EXPIRES 12-31-17



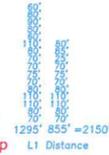
Downtown Lighting
(Phase II) P21102
Illumination
Circuits

PROJ #	P21102
SHEET #	SL12-17

Main St. & 8th Street Service (East End)

SC200 System (120/240VAC)

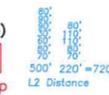
Circuit L1
(PT1-PT10)
240/30amp



Illumination Circuit L#1 (10 Lights - PT1 to PT10)

Circuit L1 : 10.4 x 4300' (2150' x 2) x 0.53 amps x 10 Lights = 135,044 Circular Mills
237016 / 12.0 (5% x 240 VAC) = 19,751 Circular Mills = 6 AWG Wire (26,240 CM) 2 x #8 Wires

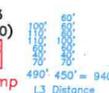
Circuit L2
(PT11-PT23)
240/30amp



Illumination Circuit L#2 (17 Lights - PT11 to PT23)

Circuit L2 : 10.4 x 1440' (720' x 2) x 0.53 amps x 17 Lights = 134,933 Circular Mills
134,933 / 12.0 (5% x 240 VAC) = 11,244 Circular Mills = 8 AWG Wire (16,510 CM) 2 x #8 Wires

Circuit L3
(PT24-PT30)
240/30amp



Illumination Circuit L#3 - (11 Lights - PT24 to PT30)

Circuit L3: 10.4 x 1880' (940' x 2) x 0.53 amps x 11 Lights = 113,988 Circular Mills
113,988 / 12.0 (5% x 240 VAC) = 9,499 Circular Mills = 8 AWG Wire (16,510 CM) 2 x #8 Wires

Circuit L4
(PT31-PT36)
240/30amp



Illumination Circuit L#4 - (6 Lights - PT31 to PT36)

Circuit L4: 10.4 x 1800' (900' x 2) x 0.53 amps x 6 Lights = 59,529 Circular Mills
59,529 / 12.0 (5% x 240 VAC) = 4,960 = 8 AWG Wire (16,510 CM) 2 x #8 Wires

Receptacle Circuits R#1-6 (36 Plugs - SC200 Main & 8th)

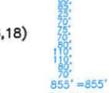
Circuit R1
(PT2,4,6,8,9)
120/15amp



Receptacle Circuit R#1 (5 Plugs - PT2,4,6,8,&9)

Circuit R1 : 10.4 x 2,070' (1035' x 2) x 0.53 amps x 5 Plugs = 57,049 Circular Mills
57,049 / 6.0 (5% x 120 VAC) = 9,508 Circular Mills = 8 AWG Wire (16,580 CM) 3 x #8 Wires

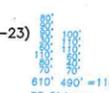
Circuit R2
(PT1,3,5,7,10,12,14,16,18)
120/15amp



Receptacle Circuit R#2 (9 Plugs - PT1,3,5,7,10,12,14,16&18)

Circuit R2 : 10.4 x 1,710' (855' x 2) x 0.53 amps x 9 Plugs = 84,829 Circular Mills
84,829 / 6.0 (5% x 120 VAC) = 14,138 Circular Mills = 8 AWG Wire (16,580 CM) 3 x #8 Wires

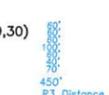
Circuit R3
(PT11,13,15,17,19-23)
120/20amp



Receptacle Circuit R#3 (11 Plugs - PT11,13,15,17,19-27)

Circuit R3 10.4 x 2200' (1100' x 2) x 0.53 amps x 11 Plugs = 133,390 Circular Mills
133,390 / 6.0 (5% x 120 VAC) = 22,31 Circular Mills = 6 AWG Wire (26,240 CM) 3 x #6 Wires

Circuit R4
(PT21,23,25,26,28,29,30)
120/15amp



Receptacle Circuit R#4 (5 Plugs - PT25,26,28,29,&30)

Circuit R4 10.4 x 900' (450' x 2) x 0.53 amps x 5 Plugs = 24,804 Circular Mills
24,804 / 6.0 (5% x 120 VAC) = 4,134 Circular Mills = 8 AWG Wire (16,510 CM) 3 x #8 Wires

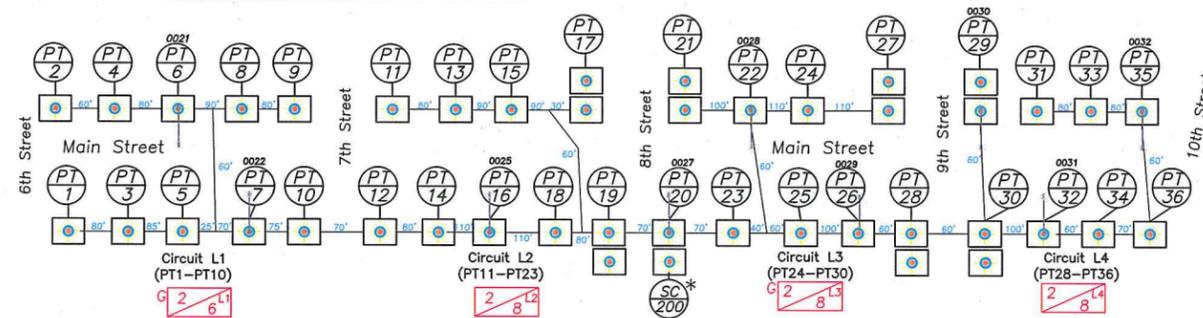
Circuit R5
(PT31-PT36)
120/15amp



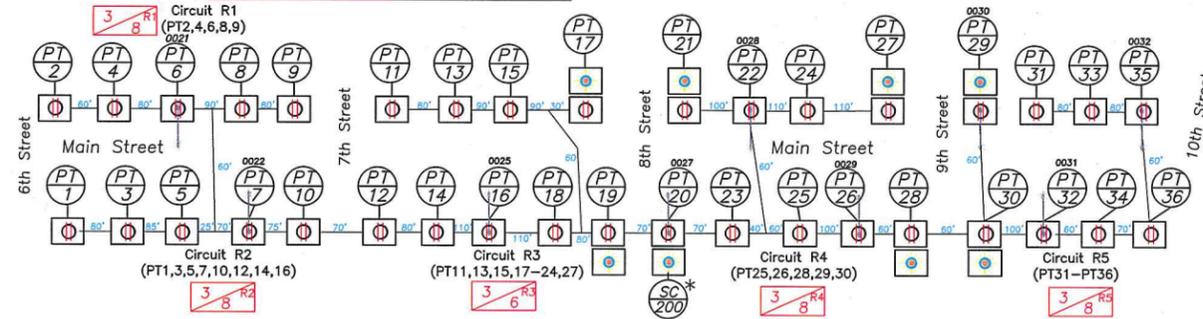
Receptacle Circuit R#5 (6 Plugs - PT31,32,33,34,35,&36)

Circuit R5 10.4 x 2,700' (1350' x 2) x 0.53 amps x 6 Plugs = 89,294 Circular Mills
89,294 / 6.0 (5% x 120 VAC) = 14,882 Circular Mills = 8 AWG Wire (16,510 CM) 3 x #8 Wires

Luminaire Circuits - EAST Main & 8th Street SC200 Service (120/240VAC)



Receptacle Circuits - EAST Main & 8th Street SC200 Service (120/240VAC)



NO	REVISION	DATE	BY	APPR.
1		6/14/2016	DRB	BFB

SCALE: 1" = 30'

DATE: 5/23/2016

DRAWN BY: DRB

DESIGNED BY: DRB

CHECKED BY: BFB

FILE: P21102 Downtown Lighting Phase 2.dwg

REGISTERED PROFESSIONAL ENGINEER
19,697 P.E.
BRIAN F. BARNETT
MAY 6 2006

EXPIRES 12-31-17

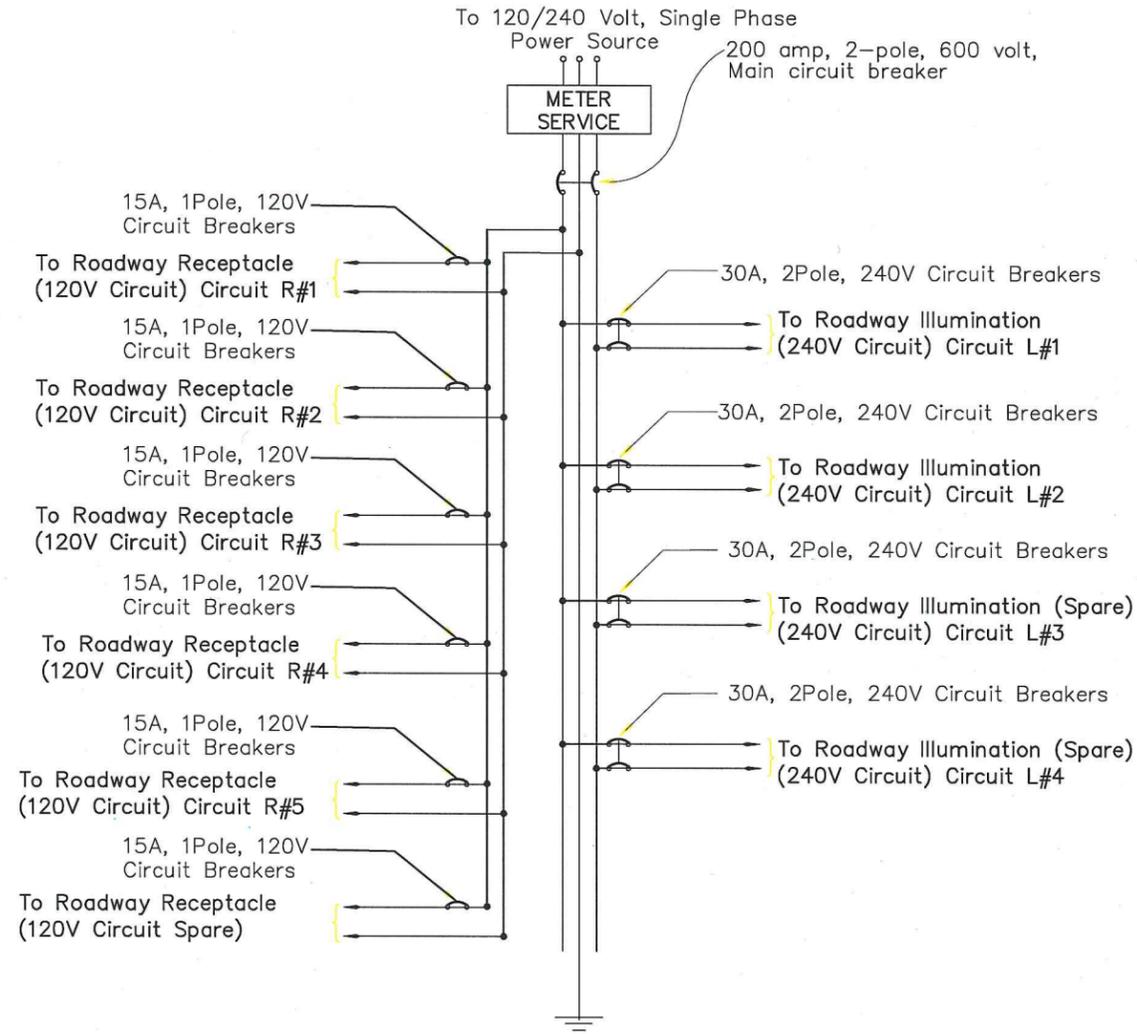
Development Services & Public Works Department
* Operations Division *

Downtown Lighting
(Phase II) P21102
Illumination
Circuits

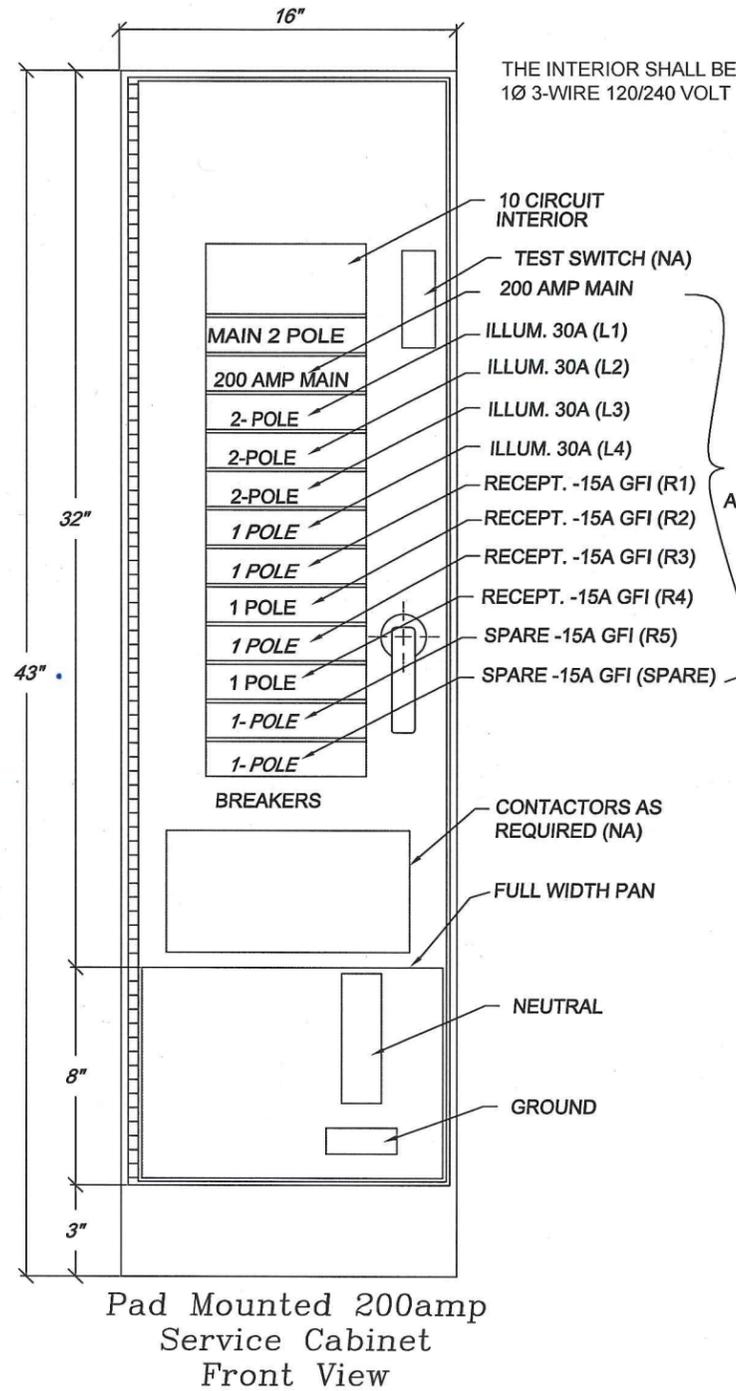
PROJ # P21102

SHEET # SL13-17

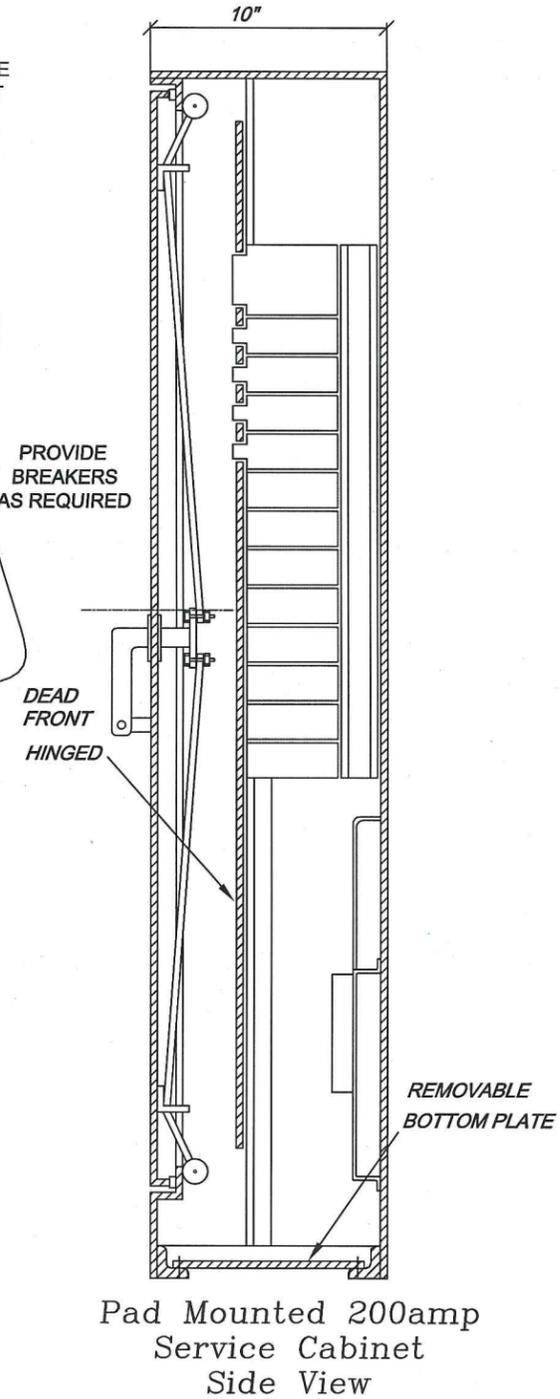
SC200 SERVICE CABINET DETAILS (TM485-Modified)



SC 200
WIRING DIAGRM
BASE-MOUNTED
SERVICE CABINET
(Main & 8th Street Sta. 27+66.9 23.1 RT)



Pad Mounted 200amp
Service Cabinet
Front View



Pad Mounted 200amp
Service Cabinet
Side View

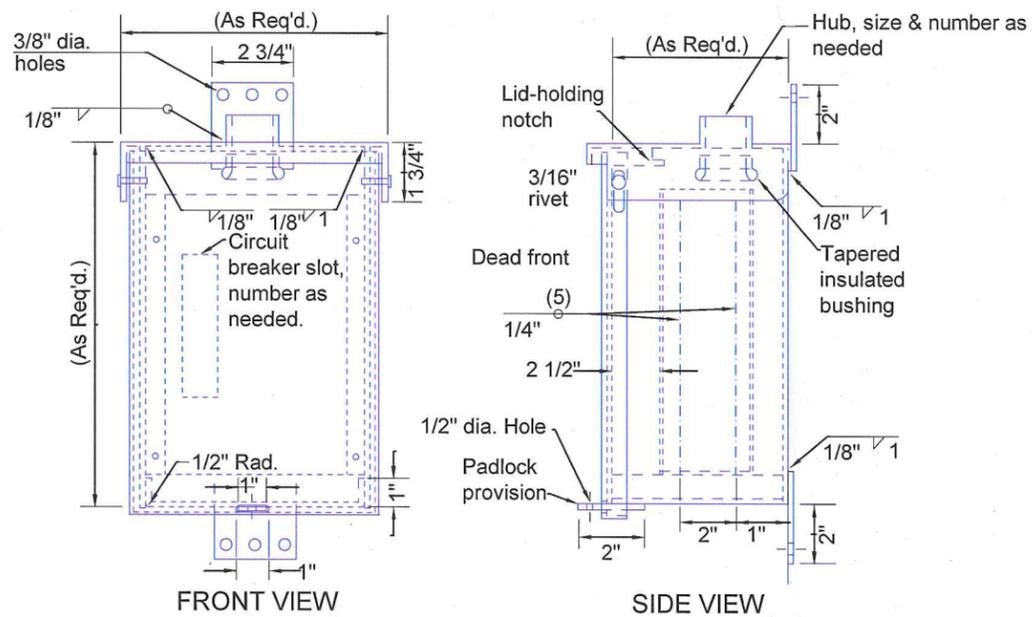
NO	REVISION	DATE	BY	APPR.
1		6/14/16	DRB	BFB

SCALE: 1" = 30"
DATE: 5/23/2016
DRAWN BY: DRB
DESIGNED BY: DRB
CHECKED BY: BFB
FILE: P21102 Downtown Lighting Phase 2.dwg

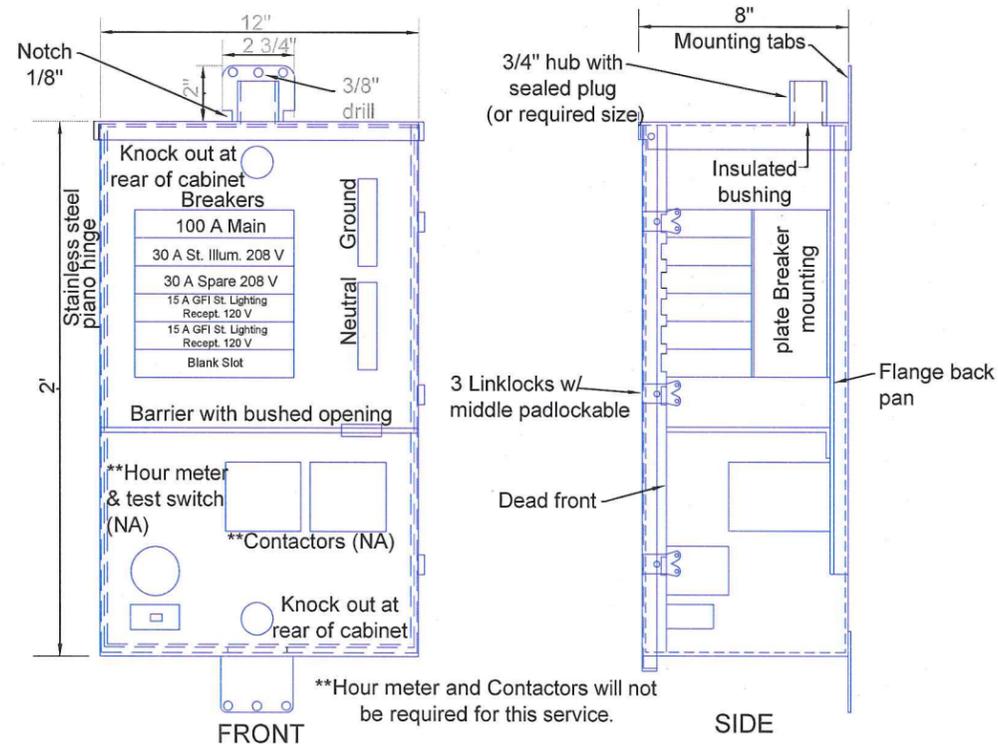


Downtown Lighting
(Phase II) P21102
Illumination
Service Cabinet
Details

PROJ #	P21102	SHEET #	SL14-17
--------	--------	---------	---------



SERVICE CABINET



**TYPE "B" SERVICE CABINET
(FOR NON-ODOT PROJECTS)**

Note: Fabrication: Use 11 gauge 304 #4 stainless steel, spot welded construction, UL listed as service equipment, label cutout box raintight.

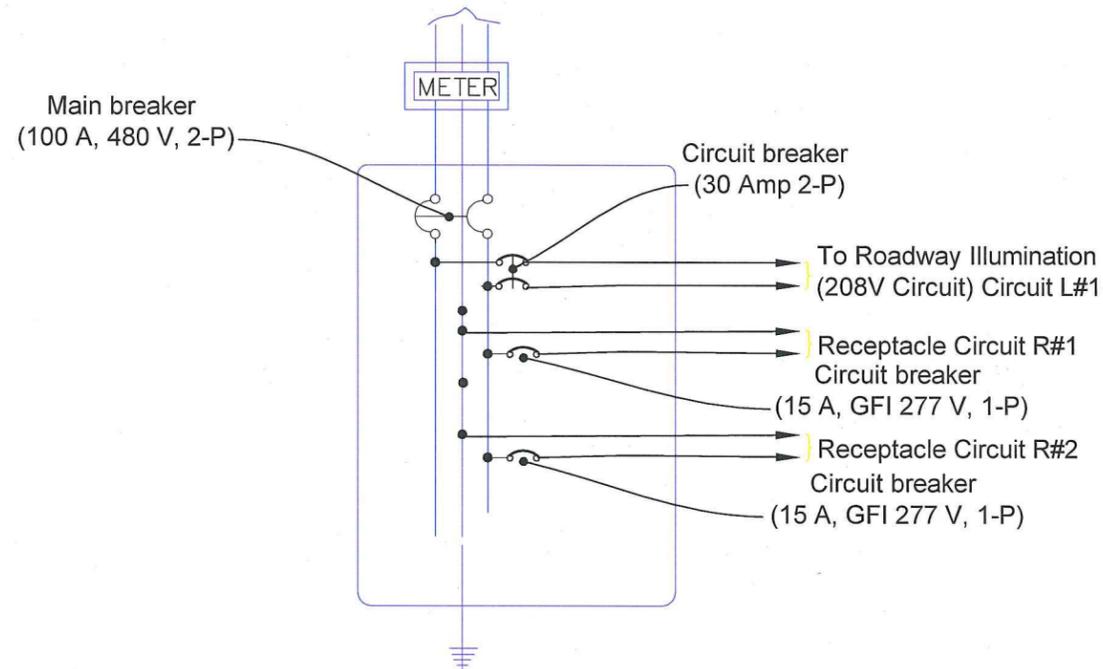
Note: All bolts, nuts and washers shall be stainless steel unless noted otherwise.

See TM424 or TM426 for service type and details

**WIRING DIAGRAM
POLE-MOUNTED
SERVICE CABINET**

(Main & PPWK West Signal Sta. 6+21.4 RT)
ODOT Std. Drawing TM427 (Modified)

**120/208 volt
Single phase
Power source**



**SERVICE CABINET WIRING WITH
208 VOLT ILLUMINATION**

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWING
Modified for Downtown Lighting Project P21102

**SERVICE CABINETS
TM427 (Modified)**

2002

DATE	REVISIONS	DESCRIPTION
5-03	Removed three diagrams	
1-04	Removed Service Cabinet size for wiring diagrams	

NO	REVISION	DATE BY	APPR.
1	TM427 Modified	8/14/DRB	BBB

SCALE: 1" = 30'
DATE: 5/23/2016
DRAWN BY: DRB
DESIGNED BY: DRB
CHECKED BY: BBB

FILE: P21102 Downtown Lighting Phase 2.dwg

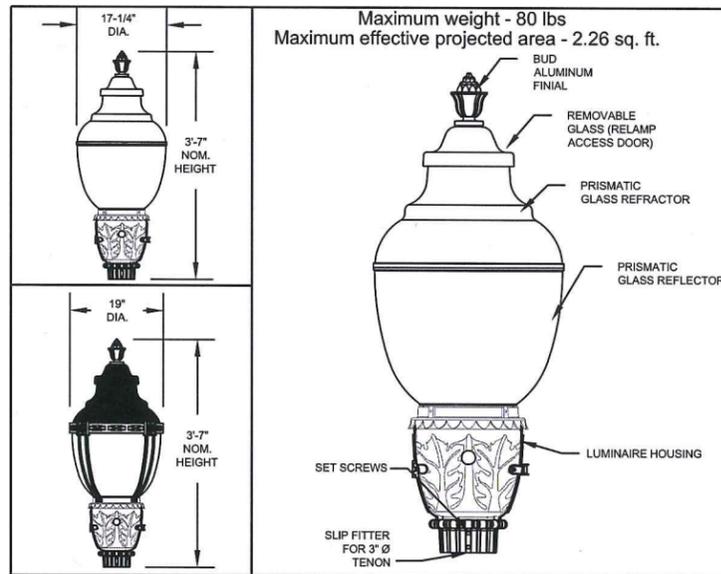
REGISTERED PROFESSIONAL ENGINEER
19,697PE
BRIAN F. BARNETT
MAY 5 2004
EXPIRES 12-31-17

Development Services & Public Works Department * Operations Division *

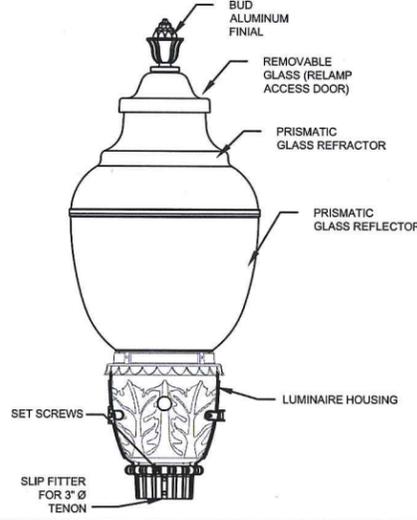


**Downtown Lighting
(Phase II) P21102
Service Cabinet
ODOT TM427**

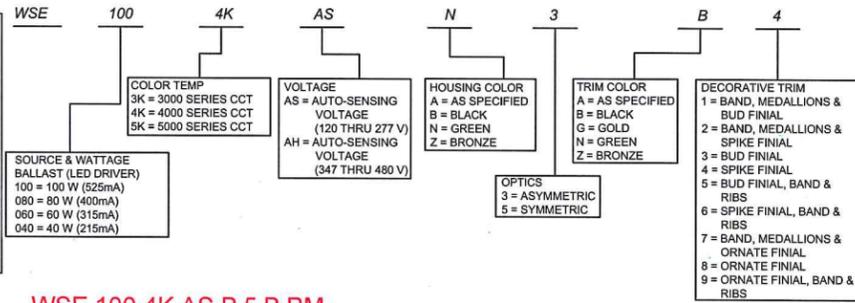
PROJ #	P21102
SHEET #	SL15-17 TM427



Maximum weight - 80 lbs
Maximum effective projected area - 2.26 sq. ft.



ORDERING INFORMATION:



SOURCE & WATTAGE BALLAST (LED DRIVER)
100 = 100 W (525mA)
080 = 80 W (400mA)
060 = 60 W (315mA)
040 = 40 W (215mA)

COLOR TEMP
3K = 3000 SERIES CCT
4K = 4000 SERIES CCT
5K = 5000 SERIES CCT

VOLTAGE
AS = AUTO-SENSING VOLTAGE (120 THRU 277 V)
AH = AUTO-SENSING VOLTAGE (347 THRU 480 V)

HOUSING COLOR
A = AS SPECIFIED
B = BLACK
N = GREEN
Z = BRONZE

TRIM COLOR
A = AS SPECIFIED
B = BLACK
G = GOLD
N = GREEN
Z = BRONZE

DECORATIVE TRIM
1 = BAND, MEDALLIONS & BUD FINIAL
2 = BAND, MEDALLIONS & SPIKE FINIAL
3 = BUD FINIAL
4 = SPIKE FINIAL
5 = BUD FINIAL, BAND & RIBS
6 = SPIKE FINIAL, BAND & RIBS
7 = BAND, MEDALLIONS & ORNATE FINIAL
8 = ORNATE FINIAL
9 = ORNATE FINIAL, BAND & RIBS

OPTIONS

- DM = DIMMING DRIVER
- F = FULL COVER
- H = NEMA TWISTLOCK PHOTOCONTROL RECEPTACLE PHOTOCELL NOT INCLUDED
- L1H = 1.5 FEET OF PREWIRED LEADS
- L03 = 3 FEET OF PREWIRED LEADS
- L10 = 10 FEET OF PREWIRED LEADS
- L20 = 20 FEET OF PREWIRED LEADS
- L25 = 25 FEET OF PREWIRED LEADS
- L30 = 30 FEET OF PREWIRED LEADS
- PND = 0-10V PART NIGHT DIMMING (includes NEMA twistlock photocontrol receptacle)
- PCS = TWISTLOCK PHOTOCONTROL FOR SOLID STATE LIGHTING 120-277V
- P34 = DTL TWISTLOCK PHOTOCONTROL 347V
- P48 = DTL TWISTLOCK PHOTOCONTROL 480V
- PSC = SHORTING CAP
- RM = ROAM 0-10 VOLT DIMMING CONTROL (includes NEMA twistlock photocontrol & dimming driver)
- S = SHOREWOOD STYLE COVER

ACCESSORIES

- WLEDHS90 = HOUSE SIDE SHIELD, 90 DEGREES
- WLEDHS12 = HOUSE SIDE SHIELD, 120 DEGREES
- WLEDHS18 = HOUSE SIDE SHIELD, 180 DEGREES

Washington Postlite Enhanced LED Series Luminaire

DECORATIVE OUTDOOR



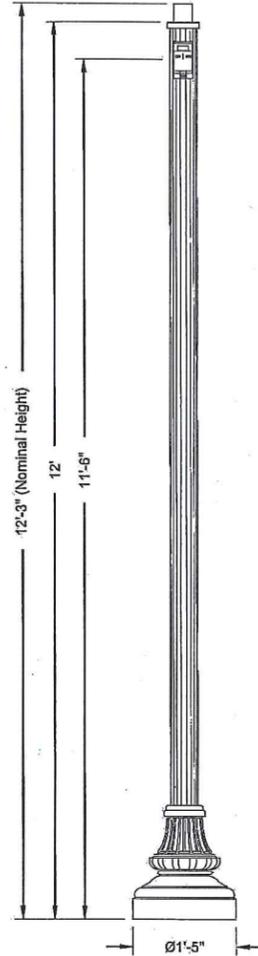
©2009 ACUITY BRANDS LIGHTING INC. All Rights Reserved.

ORDER #:
TYPE: KRW
DRAWN: 4-1-13
DATE: LUM_WSE
DWG #:



TEST #: 501501
TEST LAB: ACUITY BRANDS LIGHTING GRANVILLE LAB ISSUE DATE: 7/18/2012
CATALOG: WAUE/WSE/STLE 100 4K XX X 3XXX DESCRIPTION: WASHINGTON POSTLITE
LED - GLASS SERIES: WASHINGTON POSTLITE LED - GLASS LAMP CAT #: 5
LED 4000K ARRAY
LAMP: 100W 4000K LED ARRAY
LAMP OUTPUT: TOTAL LUMINAIRE LUMENS: 8217.8, ABSOLUTE PHOTOMETRY *
BALLAST / DRIVER: BL-1210, 120 -277V 150W ELECTRONIC DRIVER INPUT WATTAGE: 97.1
LUMINOUS OPENING: VERTICAL CYLINDER (DIA : 17.28", H: 24.96") TER VALUE: 47 (BF = 1)
TER CATEGORY: ROADWAY - TYPE III
MAX CD: 7,464.0 AT HORIZONTAL: 65°, VERTICAL: 72.5° ROADWAY CLASS: MEDIUM, TYPE III

12' Pole: (SL\$-12) Dwg#TSG008421 (WDA 12L4E17 P07 ABG BK R138A-FGIUS_SBK)
16' Pole (SL5-16-T): Dwg# TSG008421 (WDA 16 L5J SL17 P08 ABG BK R186A)



Specifications

POST DESCRIPTION
The lighting post shall consist of an aluminum shaft and a lower decorative base. The shaft profile will consist of 4 mounting tracks and internal passages. The post shall be provided with (1) GFI weatherproof receptacle.

MATERIALS
The base shall be heavy wall, cast aluminum produced from certified ASTM 356.1 ingot per ASTM B-179-95a or ASTM B26-95. The shaft shall be extruded from aluminum, ASTM 6061 alloy. All hardware shall be tamper resistant stainless steel. Anchor bolts to be completely hot dip galvanized.

FINISH
The assembly shall have a standard Holophane black finish.

DIMENSIONS
The post shall be 12' in height with a 17" base. The shaft diameter shall be 4.5" fluted. At the top of the post, an integral Ø3"x3" tenon with a transitional donut provided for luminaire mounting.

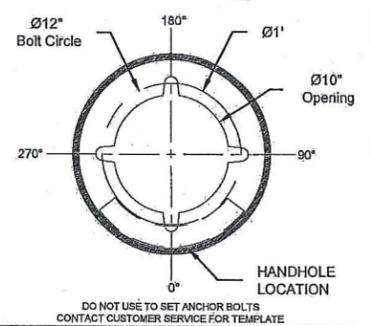
INSTALLATION
The post shall use four, hot dip galvanized L-type anchor bolts to be installed on a 12" diameter bolt circle. A door shall be provided in the base for anchorage and wiring access. A grounding screw shall be provided inside the base opposite the door.

LUMINAIRE
None provided.

Accessory Mounting Detail

RECEPTACLE	Orientation	Height
	0°	11'-6"

Anchorage Detail



DO NOT USE TO SET ANCHOR BOLTS
CONTACT CUSTOMER SERVICE FOR TEMPLATE

Catalog #s:
WDA12L4E17P07ABGBKR138A - FGIUS_SBK

Customer Signature: _____ Date: _____

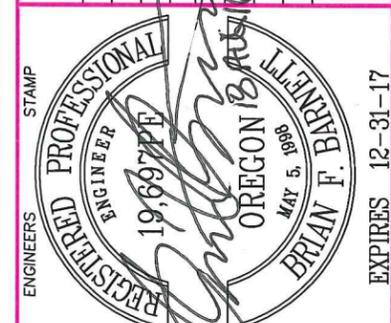


City of Springfield Downtown 4Block Oregon

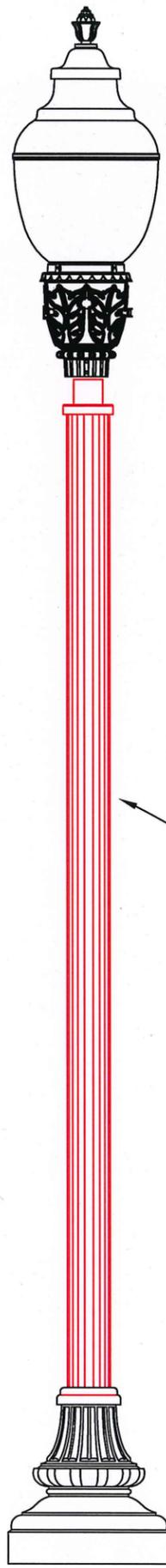
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REVISION: 1	REVISION DATE: 08/18/14	TSG 008421
DRAWN: MAB	ORIGIN DATE: 07/08/14	PAGE: 2 of 6

THIS DRAWING, WHEN APPROVED, SHALL BECOME THE COMPLETE SPECIFICATION FOR THE MATERIAL TO BE FURNISHED BY HOLOPHANE ON THE ORDER NOTED ABOVE. A UNIT OF SIMILAR DESIGN MAY BE SUPPLIED, BUT ONLY AFTER APPROVAL BY THE CUSTOMER IN WRITING. ON POLE ORDERS AN ANCHOR BOLT TEMPLATE PRINT WILL BE SUPPLIED WITH EACH ANCHOR BOLT ORDER TO MATCH THE POLE PROVIDED. THIS PRINT IS THE PROPERTY OF HOLOPHANE AND IS LOANED SUBJECT TO RETURN UPON DEMAND AND UPON EXPRESS CONDITION THAT IT WILL NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO OUR INTERESTS, AND ONLY IN CONNECTION WITH MATERIAL FURNISHED BY HOLOPHANE.

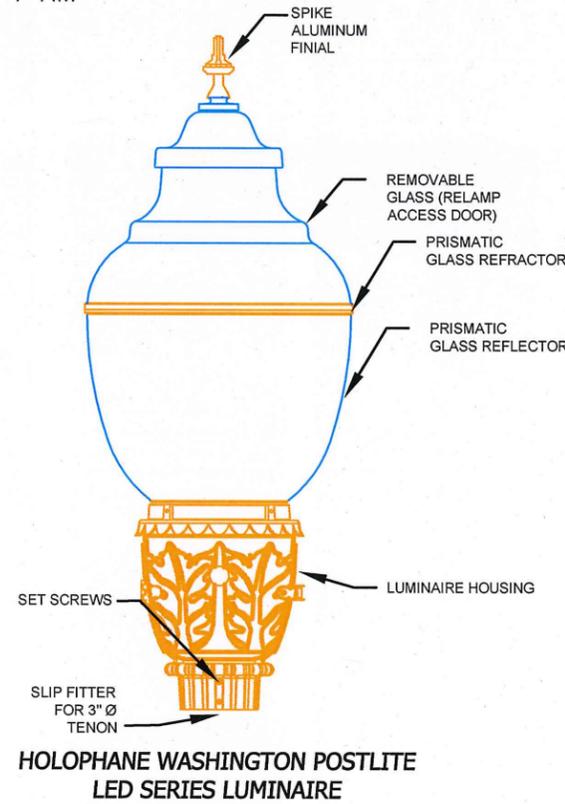
SCALE: 1" = 30'	DATE: 5/23/2016	DESIGNED BY: DRB	CHECKED BY: BFB	NO	REVISION	DATE BY APPR
				1	TW4427 Modified	8/14/DRB BFB



PROJ #	P21102	SHEET #	SL17-17
Downtown Lighting (Phase II) P21102		LED Decorative Luminaire & Pole	

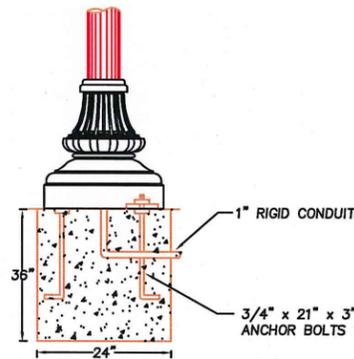


HOLOPHANE WASHINGTON POSTLITE
Enhanced LED SERIES LUMINAIRE
(PART# WSE 100 4K AS B 3 B 4 RM
100 Watt LED Luminaire



HOLOPHANE WASHINGTON POSTLITE
LED SERIES LUMINAIRE

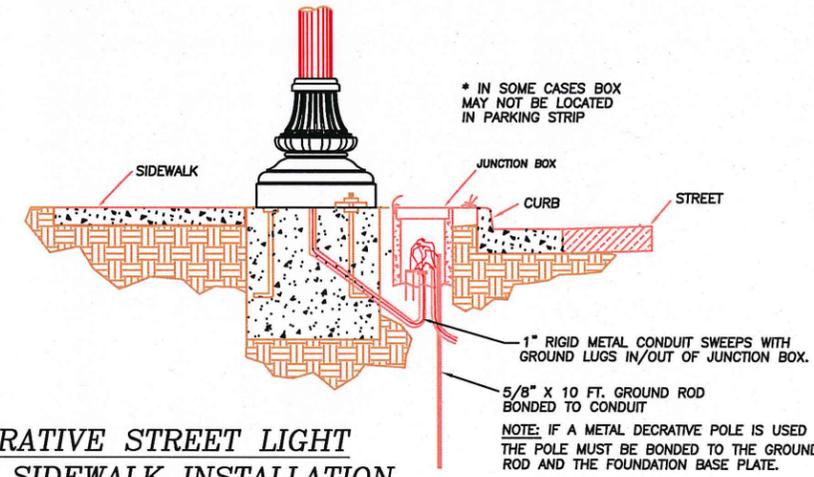
HOLOPHANE WADSWORTH ALUMINUM POLE:
WDA XX(Height) L4E 17 P05 ABG BK (SITELINK SHAFT) or
WDA XX(Height) F5J 17 P05 ABG BK (FLUTED SHAFT)



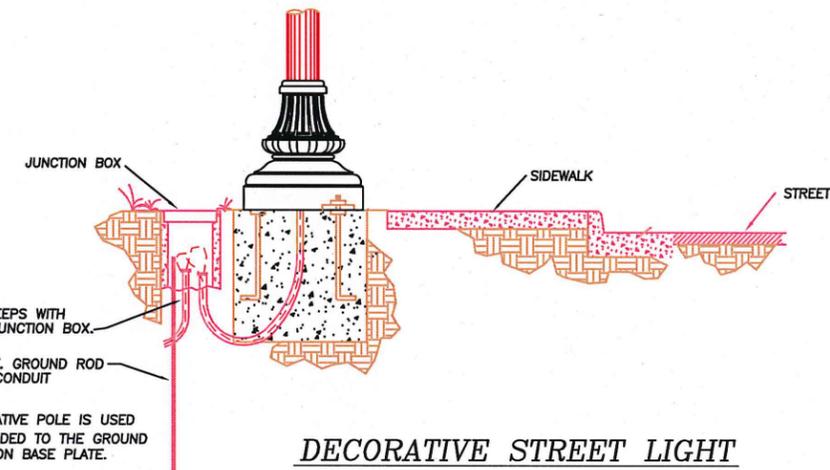
ANCHOR BASE ASSEMBLY

ANCHOR BASE PLATE HAS FOUR 2" x 1" SLOTTED HOLES AT 90°; ACCOMMODATES 3/4" x 21" x 3" ANCHOR BOLTS IN 9"-11" BOLT CIRCLE.

L4E



DECORATIVE STREET LIGHT
SETBACK SIDEWALK INSTALLATION



DECORATIVE STREET LIGHT
CURBSIDE SIDEWALK INSTALLATION

NOTE: DRAWING NOT TO SCALE
ALL EYEBOLTS, BOLTS, NUTS, AND WASHERS SHALL BE GALV. STEEL UNLESS NOTED OTHERWISE, ALL SET SCREWS SHALL BE MIN. DIA. 1/4" STAINLESS STEEL WITH SQUARE OR HEX HEADS. ALL SPANWIRE HANGERS AND PLUMBIZERS SHALL BE CAST BRONZE.

NO	REVISION	DATE	BY	APPR.
1	STD. DWG. 5-24	4/94	DRB	DRB
2	LUMINAIRE/POLE UPDATE	6/96	DRB	DRB
3	STD. DWG. UPDATE	7/01	D.D.	E.B.
4	S.U.B. UPDATE	10/03	D.D.	E.B.
5	CITY STANDARD UPDATE	9/16	DRB	E.B.

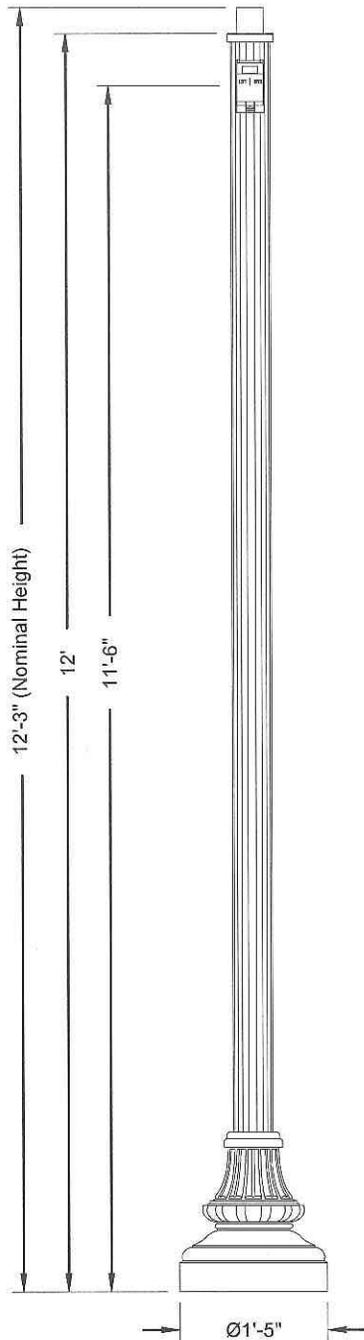
CITY OF SPRINGFIELD
DEPT. OF PUBLIC WORKS
TRANSPORTATION DIVISION
225 FIFTH STREET
SPRINGFIELD, OR 97477
(503) 726-3753



DECORATIVE STREET
LIGHT DETAIL

STANDARD
DRAWING
5-24

Attachment 'A'



Specifications

POST DESCRIPTION

The lighting post shall consist of an aluminum shaft and a lower decorative base. The shaft profile will consist of 4 mounting tracks and internal passages. The post shall be provided with (1) GFI weatherproof receptacle.

MATERIALS

The base shall be heavy wall, cast aluminum produced from certified ASTM 356.1 ingot per ASTM B-179-95a or ASTM B26-95. The shaft shall be extruded from aluminum, ASTM 6061 alloy. All hardware shall be tamper resistant stainless steel. Anchor bolts to be completely hot dip galvanized.

FINISH

The assembly shall have a standard Holophane black finish.

DIMENSIONS

The post shall be 12' in height with a 17" base. The shaft diameter shall be 4.5" fluted. At the top of the post, an integral Ø3"x3" tenon with a transitional donut provided for luminaire mounting.

INSTALLATION

The post shall use four, hot dip galvanized L-type anchor bolts to be installed on a 12" diameter bolt circle. A door shall be provided in the base for anchorage and wiring access. A grounding screw shall be provided inside the base opposite the door.

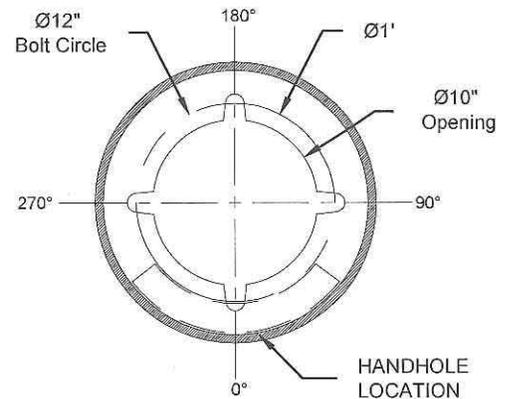
LUMINAIRE

None provided.

Accessory Mounting Detail

	Orientation	Height
RECEPTACLE	0°	11'-6"

Anchorage Detail



DO NOT USE TO SET ANCHOR BOLTS
CONTACT CUSTOMER SERVICE FOR TEMPLATE

Catalog #'s:

WDA12L4E17P07ABGBKR138A - FGIUS_SBK

Customer Signature

Date

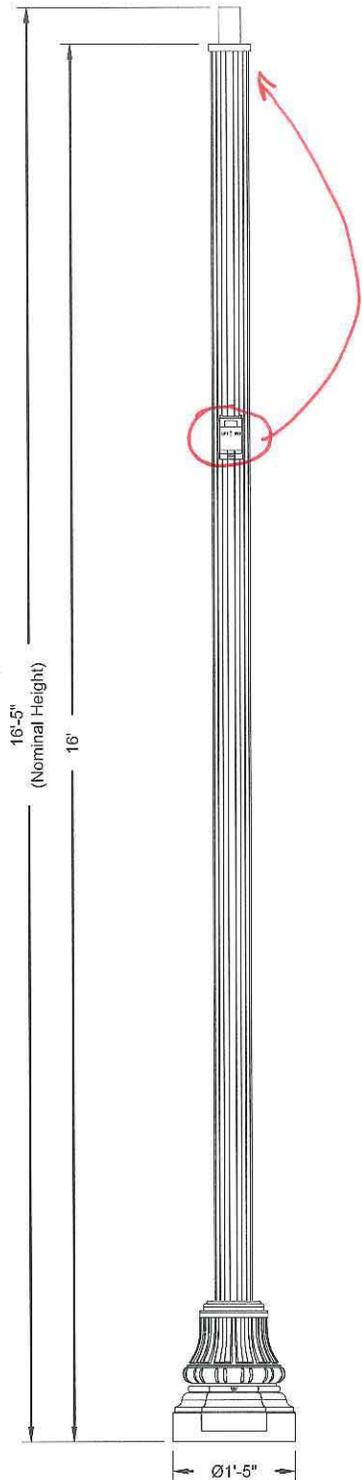


City of Springfield Downtown 4Block Oregon

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REVISION: 1	REVISION DATE: 08/18/14	TSG 008421
DRAWN: MAB	ORIGIN DATE: 07/08/14	PAGE: 2 of 6

THIS DRAWING, WHEN APPROVED, SHALL BECOME THE COMPLETE SPECIFICATION FOR THE MATERIAL TO BE FURNISHED BY HOLOPHANE ON THE ORDER NOTED ABOVE. A UNIT OF SIMILAR DESIGN MAY BE SUPPLIED, BUT ONLY AFTER APPROVAL BY THE CUSTOMER IN WRITING. ON POLE ORDERS AN ANCHOR BOLT TEMPLATE PRINT WILL BE SUPPLIED WITH EACH ANCHOR BOLT ORDER TO MATCH THE POLE PROVIDED. THIS PRINT IS THE PROPERTY OF HOLOPHANE AND IS LOANED SUBJECT TO RETURN UPON DEMAND AND UPON EXPRESS CONDITION THAT IT WILL NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO OUR INTERESTS, AND ONLY IN CONNECTION WITH MATERIAL FURNISHED BY HOLOPHANE.

Attachment 'A'



Specifications

POST DESCRIPTION

The lighting post shall consist of an aluminum shaft and a lower decorative base. The shaft profile will consist of 4 mounting tracks and internal passages. The post shall be provided with (1) GFI weatherproof receptacle.

MATERIALS

The base shall be heavy wall, cast aluminum produced from certified ASTM 356.1 ingot per ASTM B-179-95a or ASTM B26-95. The shaft shall be extruded from aluminum, ASTM 6061 alloy. All hardware shall be tamper resistant stainless steel. Anchor bolts to be completely hot dip galvanized.

FINISH

The assembly shall have a standard Holophane black finish.

DIMENSIONS

The post shall be 16' in height with a 17" base. The shaft diameter shall be 5.25" fluted. At the top of the post, an integral Ø3"x5" tenon with a transitional donut provided for luminaire mounting.

INSTALLATION

The post shall use four, hot dip galvanized L-type anchor bolts to be installed on a 12" diameter bolt circle. A door shall be provided in the base for anchorage and wiring access. A grounding screw shall be provided inside the base opposite the door.

LUMINAIRE

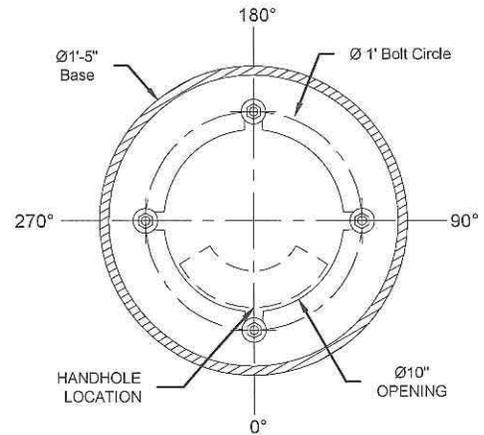
None provided.

Accessory Mounting Detail

	Orientation	Height
RECEPTACLE	0	186"

FILL OUT CHART DURING APPROVAL PROCESS

Anchorage Detail



DO NOT USE TO SET ANCHOR BOLTS
CONTACT CUSTOMER SERVICE FOR TEMPLATE

Catalog #'s:

WDA 16 L5J SL17 P08 ABG BK R186A

Customer Signature

Date



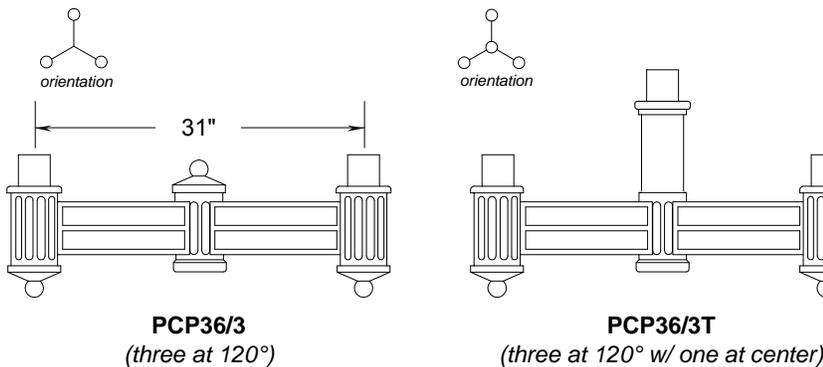
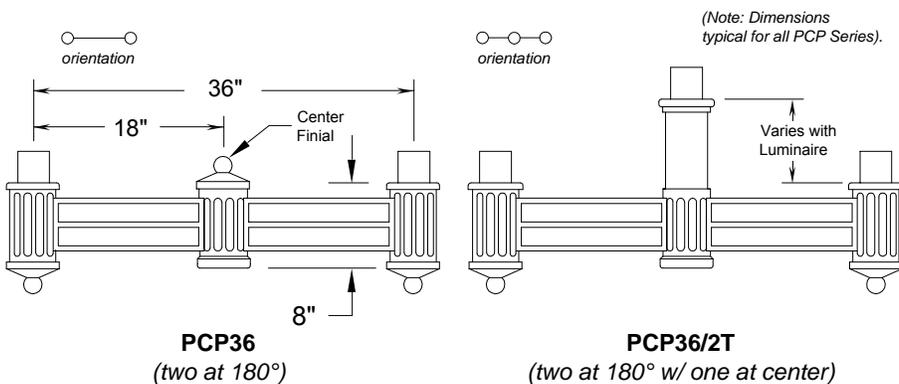
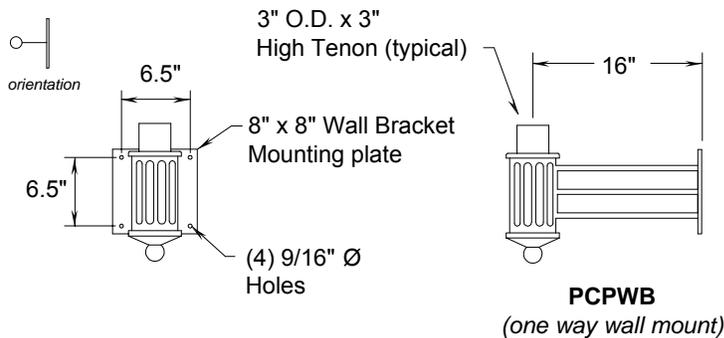
City of Springfield Downtown 4Block
Oregon

ORDER #: 2170-14-10544-9	TYPE: SL5-16-T	DRAWING #:
REVISION: 1	REVISION DATE: 08/18/14	TSG 008421
DRAWN: MAB	ORIGIN DATE: 07/08/14	PAGE: 5 of 6

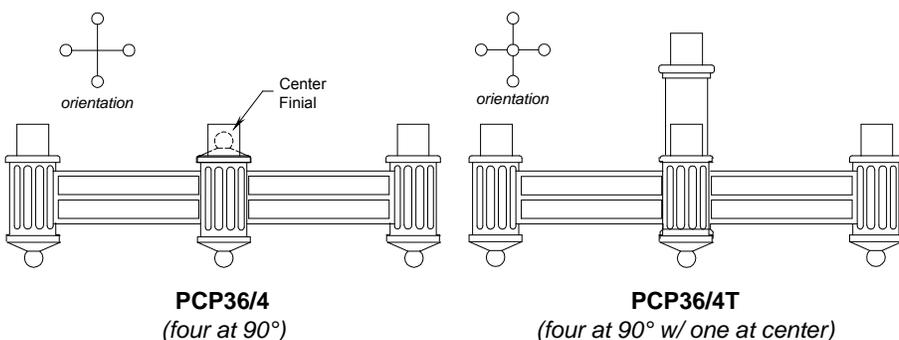
THIS DRAWING, WHEN APPROVED, SHALL BECOME THE COMPLETE SPECIFICATION FOR THE MATERIAL TO BE FURNISHED BY HOLOPHANE ON THE ORDER NOTED ABOVE. A UNIT OF SIMILAR DESIGN MAY BE SUPPLIED, BUT ONLY AFTER APPROVAL BY THE CUSTOMER IN WRITING. ON POLE ORDERS AN ANCHOR BOLT TEMPLATE PRINT WILL BE SUPPLIED WITH EACH ANCHOR BOLT ORDER TO MATCH THE POLE PROVIDED. THIS PRINT IS THE PROPERTY OF HOLOPHANE AND IS LOANED SUBJECT TO RETURN UPON DEMAND AND UPON EXPRESS CONDITION THAT IT WILL NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO OUR INTERESTS, AND ONLY IN CONNECTION WITH MATERIAL FURNISHED BY HOLOPHANE.

PHILADELPHIA Series

Crossarms & Wall Bracket



PCP36-CA/BK = 8 Crossarms



SPECIFICATIONS

CONSTRUCTION

The crossarms and wall brackets shall be one-piece construction. For wall brackets the arms shall be welded to a flat wall plate. All welding shall be per ANSI/AWS D1.2-90. All welders shall be certified per ANSI/AWS D1.2-90 Section 5.

MATERIALS

The crossarms and crossarm finials shall be heavy wall, cast aluminum produced from certified ASTM 356.1 ingot per ASTM B-179-95a or ASTM B26-95. The center luminaire extension piece, and wall bracket mounting plate shall be aluminum, ASTM 6061 alloy, heat treated to a T6 temper. All hardware shall be stainless steel. All exterior hardware shall be temper resistant.

INSTALLATION

The crossarms shall slip-fit a post tenon and attach with socket set screws. The center finial shall be removable. The wall bracket shall have four 9/16" dia. holes for mounting to the wall. (Bracket mounting hardware furnished by others.) Both crossarms and wall bracket shall have 3" O.D. tenons for luminaire mounting.

For finish specifications and color options see "Finish" section in catalog.

ORDERING GUIDE

Arms & Bracket Catalog #s	Number of Luminaires Required
<input type="checkbox"/> PCPWB	one
<input checked="" type="checkbox"/> PCP36	two
<input type="checkbox"/> PCP36/2T	three
<input type="checkbox"/> PCP36/3	three
<input type="checkbox"/> PCP36/3T	four
<input type="checkbox"/> PCP36/4	four
<input type="checkbox"/> PCP36/4T	five

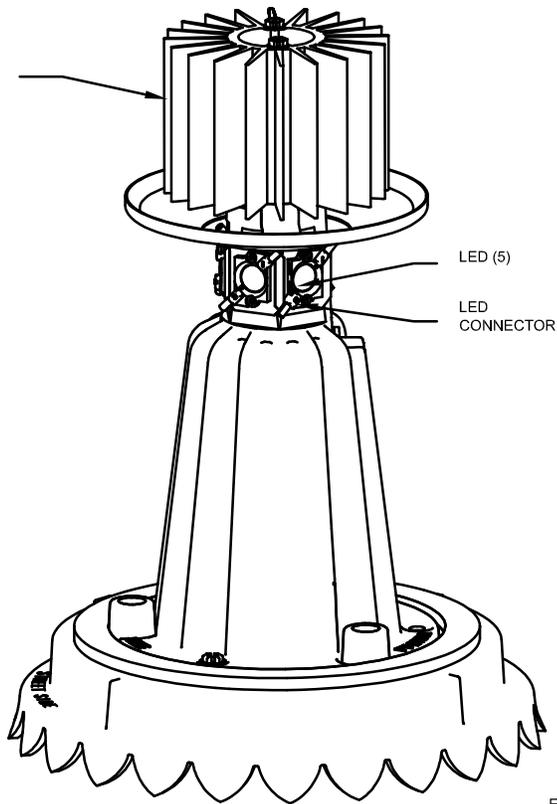
Material / Finish

<input checked="" type="checkbox"/> -CA/BK	Cast Alum/Black
<input type="checkbox"/> -CA/DB	Cast Alum/Dark Bronze
<input type="checkbox"/> -CA/DG	Cast Alum/Dark Green
<input type="checkbox"/> -CA/PP	Cast Alum/Prime Painted
<input type="checkbox"/> -CA/CC	Cast Alum/Custom Color


HOLOPHANE
 LEADER IN LIGHTING SOLUTIONS
 An Acuity Brands Company
 214 OAKWOOD AVENUE - NEWARK, OHIO 43055

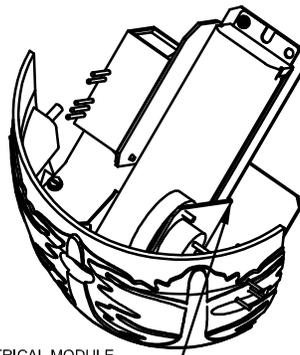
ATTACHMENT 'C'

UPPER HEAT SINK

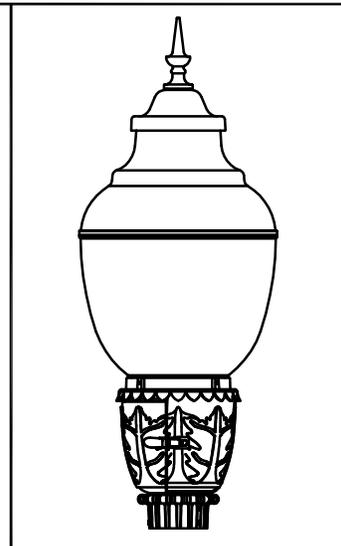


LED (5)

LED CONNECTOR



ELECTRICAL MODULE
(ATTACHED TO CAST DOOR; SPECIFY COLOR)



**WASHINGTON
RETRO LED**

**DECORATIVE
OUTDOOR**



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ORDERING INFORMATION:

WARETRO

CASTING
WARETRO =
WASHINGTON
LED RETROFIT

100

SOURCE & WATTAGE
BALLAST (LED DRIVER)
100 = 100 W (525mA)
80 = 80 W (420mA)
60 = 60 W (315mA)
40 = 40 W (215mA)

5K

COLOR TEMPERATURE
3K = 3000 K CCT
4K = 4000 K CCT
5K = 5000 K CCT

AS

VOLTAGE
AS = AUTO-SENSING
VOLTAGE
(120 THRU 277 V)
AH = AUTO-SENSING
VOLTAGE
(347 THRU 480 V)

B

HOUSING COLOR
A = AS SPECIFIED
B = BLACK
N = GREEN
Z = BRONZE

3

OPTICS
3 = IES TYPE III
DISTRIBUTION
5 = IES TYPE V
DISTRIBUTION

3

DECORATIVE TRIM
1 = BAND, MEDALLIONS & BUD FINIAL
2 = BAND, MEDALLIONS & SOIKE FINIAL
3 = BUD FINIAL
4 = SPIKE FINIAL
5 = BUD FINIAL, BAND & RIBS
6 = SPIKE FINIAL, BAND & RIBS
7 = BAND, MEDALLIONS & ORNATE FINIAL
8 = ORNATE FINIAL
9 = ORNATE FINIAL, BAND & RIBS

WARETRO 100 4K AS B 3 4 RM = 65 Kits

WARETRO 100 4K AS B 5 4 RM = 3 Kits

NOTE: Retrofit Kit uses 2 screws to attach driver door

to fixture housing. Supply door gasket for customer installation.

OPTIONS

DM = DIMMING DRIVER
PND12 = 0-10V PART-NIGHT DIMMING - INCLUDES 120V STYLE PHOTOCONTROL
PR12 = DTL BUTTON STYLE PHOTOCONTROL 120V
PR202427 = DTL BUTTON STYLE PHOTOCONTROL 208-277V
PR34 = DTL BUTTON STYLE PHOTOCONTROL 347V
RM = ROAM 0-10 VOLT DIMMING CONTROL - INCLUDES NEMA TWISTLOCK PHOTOCONTROL RECEPTACLE AND DIMMING DRIVER

NOTE

Actual performance may differ as a result of end-user environment and application.
Actual wattage may differ by +10% / -10% at operating temperature.
60W 347-480V version wattage may differ by +14% / -14% at operating temperature.
Specification subject to change without notice.

THIS DRAWING, WHEN APPROVED, SHALL BECOME THE COMPLETE SPECIFICATION FOR THE MATERIAL TO BE FURNISHED BY HOLOPHANE ON THE ORDER NOTED ABOVE. A UNIT OF SIMILAR DESIGN MAY BE ORDERED USING THE SAME PART NUMBER AS LONG AS THE PRINT WILL BE SUPPLIED WITH EACH ANCHOR BOLT. THE ANCHOR BOLT WILL BE SUPPLIED WITH EACH ANCHOR BOLT ORDER TO MATCH THE POLE PROVIDED. THIS PRINT IS THE PROPERTY OF HOLOPHANE AND IS LOANED SUBJECT TO RETURN UPON DEMAND AND UPON EXPRESS WRITTEN REQUEST. ANY REUSE OR REPRODUCTION OF THIS PRINT IN ANY WAY DETRIMENTAL TO OUR INTERESTS, AND ONLY IN CONNECTION WITH MATERIAL FURNISHED BY HOLOPHANE.

ORDER #:	
TYPE:	
DRAWN:	KRW
DATE:	8/28/12
DWG #:	WARETRO

3.2.5 HIT-RE 500 Epoxy Adhesive Anchoring System

3.2.5.1 Product Description

3.2.5.2 Material Specifications

3.2.5.3 Technical Data

3.2.5.4 Installation Instructions

3.2.5.5 Ordering Information

Listings/Approvals

NSF/ANSI Std 61

certification for use in potable water

European Technical Approval

ETA-04/0027

ETA-08/0105



Independent Code Evaluation

LEED® Credit 4.1-Low Emitting Materials

The Leadership in Energy and Environmental Design (LEED®) Green Building Rating system™ is the nationally accepted benchmark for the design, construction and operation of high performance green buildings.

3.2.5.1 Product description

The Hilti HIT-RE 500 System is a high strength, two part epoxy adhesive.

The system consists of a side-by-side adhesive refill pack, a mixing nozzle, a HIT dispenser with refill pack holder, and either a threaded rod, rebar, HIS internally threaded insert or smooth epoxy coated bar. HIT-RE 500 is specifically designed for fastening into solid base materials such as concrete, grout, stone or solid masonry.

HIT-RE 500 is also suitable for use under exceptional conditions such as:

- Underwater Fastenings
- Oversized Holes
- Diamond Cored Holes

To meet specific handling requirements for those conditions, refer to instructions for use and/or contact Hilti for assistance.

Product features

- Superior bond performance
- Use in diamond cored or pneumatic drilled holes.
- Underwater applications down to 165 ft (50 m)
- Meets DOT requirements for most states. Contact Hilti Technical Services for more information.

- Meets requirements of ASTM C881-90, Type IV, Grade 2 and 3, Class A, B, C except gel times
- Meets requirements of AASHTO specification M235, Type IV, Grade 3, Class A, B, C except gel times
- Mixing tube provides proper mixing, eliminates measuring errors and minimizes waste
- Contains no styrene and virtually odorless
- May be installed in concrete with temperatures ranging from 23°F to 104°F (-5°C to 40°C) with no degrading of bond strength.
- May be installed in concrete with temperatures ranging from 23°F to 104°F (-5°C to 40°C) with no degrading of bond strength.
- Good bond strength in elevated service temperatures
- Excellent resistance to weathering
- Suitable for oversized holes

HIT-RE 500 Epoxy Adhesive Anchoring System 3.2.5

Guide specifications

Master format section:

Previous 2004 Format

03250 03 16 00 Concrete anchors

Related Sections:

03200 03 20 00 Concrete reinforcing

05050 05 50 00 Metal fabrications

05120 05 10 00 Structural metal framing

Injectable adhesive shall be used for installation of all reinforcing steel dowels or threaded anchor rods and inserts into existing concrete. Adhesive shall be furnished in side-by-side refill packs which keep component A and component B separate. Side-by-side packs shall be designed to compress during use to minimize waste volume. Side-by-side packs shall also be designed to accept static mixing nozzle which thoroughly blends component A and component B and allows injection directly into drilled hole. Only injection tools and static mixing nozzles as supplied by manufacturer shall be used. Manufacturer's instructions shall be followed. Injection adhesive shall be formulated to include resin and hardener to provide optimal curing speed as well as high strength and stiffness. Typical curing time at 68°F (20°C) shall be approximately 12 hours.

Injection adhesive shall be HIT-RE 500 as furnished by Hilti.

Anchor rods shall be end stamped to show the grade of steel and overall rod length. Anchor rods shall be manufactured to meet the following requirements:

1. ISO 898 Class 5.8
2. ASTM A193, Grade B7 high strength carbon steel anchor;
3. AISI 304 or AISI 316 stainless steel, meeting the requirements of ASTM F593 condition CW.

Special order length HAS Rods may vary from standard product.

Nuts and washers Shall be furnished to meet the requirements of the above anchor rod specifications.

3.2.5 HIT-RE 500 Epoxy Adhesive Anchoring System

3.2.5.2 Material specifications

Table 1 - Material properties of fully cured HIT-RE 500 adhesive

Bond Strength ASTM C882-91 ¹ 2 day cure 7 day cure	12.4 MPa 12.4 MPa	1,800 psi 1,800 psi
Compressive Strength ASTM D695-96 ¹	82.7 MPa	12,000 psi
Compressive Modulus ASTM D695-96 ¹	1,493 MPa	0.22 x 10 ⁶ psi
Tensile Strength 7 day ASTM D638-97	43.5 MPa	6,310 psi
Elongation at break ASTM D638-97	2.0%	
Heat Deflection Temperature ASTM D648-95	63°C	146°F
Absorption ASTM D570-95	0.06%	
Linear Coefficient of Shrinkage on Cure ASTM D2566-86	0.004	
Electrical resistance DIN IEC 93 (12.93)	6.6 x 10 ¹³ Ω/m	1.7 x 10 ¹² Ω/in.

¹ Minimum values obtained as the result of tests at 23°F, 40°F and 60°F.

HAS-E carbon steel specifications

Carbon steel rods conform to ISO 898 class 5.8 with a minimum tensile strength of 72.5 ksi (500 MPa) and a minimum yield strength of 58 ksi (400 MPa).

HAS-E nuts conform to SAE J995 Grade 5

HAS-E washers conform to ASTM F884, HV, and ANSI B18.22.1 Type A Plain.

HAS-E rod, nut and washer has an electroplated zinc coating conforming to ASTM B633, SC 1

HAS Super high strength specifications

Carbon steel rods manufactured from ASTM A193, Grade B7, with a minimum tensile strength of 125 ksi (862 MPa) and a minimum yield strength of 105 ksi (724 MPa).

HAS Super nuts conform to SAE J995 Grade 5

HAS Super washers conform to ASTM F884, HV, and ANSI B18.22.1 Type A Plain.

HAS Super rods, nuts and washers, except the 7/8-in. diameter, have an electroplated zinc coating conforming to ASTM B633, SC 1
7/8-in. HAS Super rods, nuts and washers are hot-dip galvanized in accordance with ASTM A153

HAS-R 304 stainless steel specifications

3/8-, 1/2- and 5/8-in. rods manufactured from AISI Type 304 stainless steel conforming to ASTM F593 Condition CW with a minimum tensile strength of 100 ksi (689 MPa) and a minimum yield strength of 65 ksi (448 MPa).

3/4-, 1- and 1 1/4-in. rods are manufactured from AISI Type 304 stainless steel conforming to ASTM F593 Condition CW with a minimum tensile strength of 85 ksi (586 MPa) and a minimum yield strength of 45 ksi (310 MPa).

AISI Type 304 stainless steel nuts conform to ASTM F594

AISI Type 304 stainless steel washers conform to ASTM A240 and ANSI B18.22.1 Type A Plain.

HAS-R 316 stainless steel specifications

3/8-, 1/2- and 5/8-in. rods manufactured from AISI Type 316 stainless steel with a minimum tensile strength of 100 ksi (689 MPa) and a minimum yield strength of 65 ksi (448 MPa).

3/4-, 1- and 1 1/4-in. rods are manufactured from AISI Type 316 stainless steel conforming to ASTM F593 Condition CW or cold worked.

AISI Type 316 stainless steel nuts conform to ASTM F594

AISI Type 316 stainless steel washers conform to ASTM A240 and ANSI B18.22.1 Type A Plain.

HIS-N and HIS-NR internally threaded insert specifications

3/8-in. HIS-N is manufactured from 11MnPb30+C carbon steel conforming to DIN 10277-3 with a minimum tensile strength of 71.1 ksi (490 MPa) and a minimum yield strength of 59.5 ksi (410 MPa).

1/2-, 5/8- and 3/4-in. HIS-N is manufactured from 11MnPb30+C carbon steel conforming to DIN 10277-3 with a minimum tensile strength of 66.7 ksi (460 MPa) and a minimum yield strength of 54.4 ksi (375 MPa).

HIS-NR is manufactured from X5CrNiMo 17122 K700 stainless steel conforming to DIN EN 10088-3 with a minimum tensile strength of 101.5 ksi (700 MPa) and a minimum yield strength of 50.8 ksi (350 MPa).

HIT-RE 500 Epoxy Adhesive Anchoring System 3.2.5

3.2.5.3 Technical data

Table 2 - HAS rod installation specifications installed with HIT-RE 500 adhesive anchor system

Setting information	Symbol	Units	Nominal anchor diameter						
			3/8	1/2	5/8	3/4	7/8	1	1-1/4
Drill bit diameter ¹	d _o	in.	7/16	9/16	11/16	13/16	15/16	1-1/16	1-1/2
Standard effective embedment	h _{ef,std}	in. (mm)	3-1/2 (90)	4-1/4 (110)	5 (125)	6-5/8 (170)	7-1/2 (190)	8-1/4 (210)	12 (305)
Installation torque embedment ≥ h _{ef,std}	T _{inst}	ft-lb (Nm)	18 (24)	30 (41)	75 (102)	150 (203)	175 (237)	235 (319)	400 (540)
Installation torque embedment < h _{ef,std}	T _{inst}	ft-lb (Nm)	15 (20)	20 (27)	50 (68)	105 (142)	125 (169)	165 (224)	280 (375)
Minimum concrete member thickness	h _{min}	in. (mm)	h _{ef} +2 h _{ef} +51					h _{ef} +2-1/4 h _{ef} +57	h _{ef} +3 h _{ef} +76

1 Hole may be drilled with rotary hammer drill or Hilti DD EC-1 Diamond Coring System.

Table 3 - HIS-N and HIS-RN installation specifications with HIT-RE 500 adhesive anchor system

Setting information	Symbol	Units	Thread size			
			3/8-16 UNC	1/2-13 UNC	5/8-11 UNC	3/4-10 UNC
Outside diameter of insert	d	in.	0.65	0.81	1.00	1.09
Nominal bit diameter ¹	d _o	in.	11/16	7/8	1-1/8	1-1/4
Standard effective embedment	h _{ef,std}	in. (mm)	4-3/8 (110)	5 (125)	6-5/8 (170)	8-1/4 (210)
Bolt engagement	h _s	minimum	3/8	1/2	5/8	3/4
		maximum	15/16	1-3/16	1-1/2	1-7/8
Installation torque	T _{inst}	ft-lb (Nm)	18 (24)	30 (41)	75 (102)	150 (203)
Minimum concrete member thickness	h _{min}	in. (mm)	5.9 (150)	6.7 (170)	9.1 (230)	10.6 (270)

1 Hole may be drilled with rotary hammer drill or Hilti DD EC-1 Diamond Coring System.

3.2.5

Table 4 - Rebar installation specifications with HIT-RE 500 adhesive anchor system

Setting information	Symbol	Units	Rebar size								
			No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11
Drill bit diameter ^{1,2}	d _o	in.	1/2	5/8	3/4	7/8	1	1-1/8	1-3/8	1-1/2	1-9/16

1 Rebar diameters may vary. Use the smallest diameter drill bit which will accommodate the rebar.

2 Hole may be drilled with rotary hammer drill or Hilti DD EC-1 Diamond Coring System.

Figure 1— HAS rod specifications

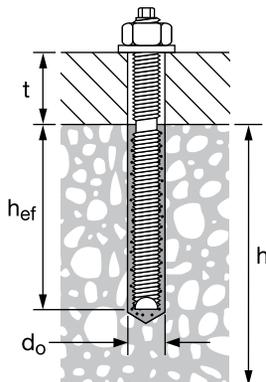
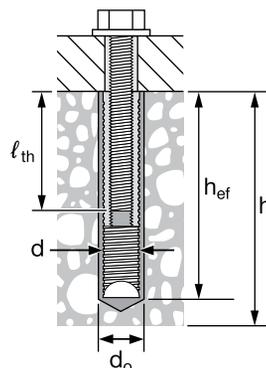


Figure 2— HIS-N and HIS-RN specifications



Combined shear and tension loading

$$\left(\frac{N_d}{N_{rec}} \right)^{5/3} + \left(\frac{V_d}{V_{rec}} \right)^{5/3} \leq 1.0$$

3.2.5 HIT-RE 500 Epoxy Adhesive Anchoring System

Table 5 - HIT-RE 500 allowable and ultimate bond/concrete capacity for HAS rods in normal weight concrete^{1,2,3,4}

Nominal anchor diameter in.	Effective embedment in. (mm)	HIT-RE 500 Allowable bond/concrete capacity				HIT-RE 500 Ultimate bond/concrete capacity			
		Tensile		Shear		Tensile		Shear	
		$f'_c = 2000$ psi (13.8 MPa) lb (kN)	$f'_c = 4000$ psi (27.6 MPa) lb (kN)	$f'_c = 2000$ psi (13.8 MPa) lb (kN)	$f'_c = 4000$ psi (27.6 MPa) lb (kN)	$f'_c = 2000$ psi (13.8 MPa) lb (kN)	$f'_c = 4000$ psi (27.6 MPa) lb (kN)	$f'_c = 2000$ psi (13.8 MPa) lb (kN)	$f'_c = 4000$ psi (27.6 MPa) lb (kN)
3/8	1-3/4 (44)	645 (2.9)	1,095 (4.9)	1,510 (6.7)	2,135 (9.5)	2,580 (11.5)	4,370 (19.4)	4,530 (20.2)	6,405 (28.4)
	3-3/8 (86)	2,190 (9.7)	2,585 (11.5)	3,155 (14.0)	4,460 (19.8)	8,760 (39.0)	10,345 (46.0)	9,460 (42.1)	13,380 (59.5)
	4-1/2 (114)	2,420 (10.8)	2,585 (11.5)	4,855 (21.6)	6,860 (30.5)	9,685 (43.1)	10,335 (46.0)	14,560 (64.8)	20,580 (91.5)
1/2	2-1/4 (57)	1,130 (5.0)	1,965 (8.7)	2,510 (11.2)	3,550 (15.8)	4,530 (20.2)	7,860 (35.0)	7,525 (33.5)	10,640 (47.3)
	4-1/2 (114)	4,045 (18.0)	5,275 (23.5)	5,610 (25.0)	7,935 (35.3)	16,185 (72.0)	21,095 (93.8)	16,820 (74.8)	23,800 (105.9)
	6 (152)	4,775 (21.2)	5,380 (23.9)	8,635 (38.4)	12,210 (54.3)	19,095 (84.9)	21,520 (95.7)	25,900 (115.2)	36,620 (162.9)
5/8	2-7/8 (73)	1,690 (7.5)	3,045 (13.5)	5,245 (23.3)	7,420 (33.0)	6,770 (30.1)	12,175 (54.2)	15,735 (70.0)	22,250 (99.0)
	5-5/8 (143)	6,560 (29.2)	7,355 (32.7)	8,760 (39.0)	12,395 (55.1)	26,240 (116.7)	29,420 (130.9)	26,280 (116.9)	37,180 (165.4)
	7-1/2 (190)	7,320 (32.6)	7,515 (33.4)	13,615 (60.6)	19,080 (84.9)	29,290 (130.3)	30,060 (133.7)	40,480 (180.1)	57,240 (254.6)
3/4	3-3/8 (86)	2,310 (10.3)	4,515 (20.1)	7,335 (32.6)	10,370 (46.1)	9,250 (41.1)	18,065 (80.4)	22,000 (97.9)	31,108 (138.4)
	6-3/4 (172)	8,670 (38.6)	10,755 (47.8)	12,615 (56.1)	17,840 (79.4)	34,685 (154.3)	43,020 (191.4)	37,840 (168.3)	53,520 (238.1)
	9 (229)	10,385 (46.2)	12,995 (57.8)	19,430 (86.4)	27,470 (122.2)	41,535 (184.8)	51,985 (231.2)	58,280 (259.2)	82,400 (366.5)
7/8	4 (101)	3,005 (13.4)	5,665 (25.2)	7,795 (34.7)	11,020 (49.0)	12,030 (53.5)	22,670 (100.8)	23,375 (104.0)	33,050 (147.0)
	7-7/8 (200)	12,495 (55.6)	15,875 (70.6)	17,175 (76.4)	24,290 (108.0)	49,975 (222.3)	63,495 (282.4)	51,520 (229.2)	72,860 (324.1)
	10-1/2 (267)	14,705 (65.4)	16,185 (72.0)	26,440 (117.6)	37,390 (166.3)	58,820 (261.6)	64,730 (287.9)	79,320 (352.8)	112,160 (498.9)
1	4-1/2 (114)	3,945 (17.5)	8,440 (37.5)	10,035 (44.6)	14,190 (63.1)	15,790 (70.2)	33,765 (150.2)	30,104 (133.9)	42,565 (189.3)
	9 (229)	13,845 (61.6)	17,365 (77.2)	22,435 (99.8)	31,720 (141.1)	55,380 (246.3)	69,465 (309.0)	67,300 (299.4)	95,160 (423.3)
	12 (305)	17,935 (79.8)	17,935 (79.8)	34,535 (153.6)	48,830 (217.2)	71,740 (319.1)	71,740 (319.1)	103,600 (460.8)	146,480 (651.6)
1-1/4	5-5/8 (143)	5,760 (25.6)	12,815 (57.0)	14,760 (65.7)	20,870 (92.8)	23,045 (102.5)	51,270 (228.1)	44,280 (197.0)	62,610 (278.5)
	11-1/4 (286)	24,610 (109.5)	31,620 (140.7)	35,050 (155.9)	49,570 (220.5)	9,8430 (437.8)	126,480 (562.6)	105,140 (467.7)	148,710 (661.5)
	15 (381)	34,130 (151.8)	35,270 (156.9)	53,960 (240.0)	76,300 (339.4)	136,525 (607.3)	141,090 (627.6)	161,880 (720.1)	228,900 (1018.2)

- 1 Influence factors for spacing and/or edge distance are applied to allowable concrete/bond values above, and then compared to the steel value. The lesser of the values is to be used for the design.
- 2 Average ultimate concrete shear capacity based on Strength Design Method for standard and deep embedment and based on testing for shallow embedment.
- 3 All values based on holes drilled with carbide bit and installed per manufacturer's instructions. Ultimate tensile concrete/bond loads represent the average values obtained in testing.
- 4 For underwater applications with a maximum depth of 165 ft (50 m), reduce the tabulated concrete/bond values 30% to account for reduced mechanical properties of saturated concrete.

HIT-RE 500 Epoxy Adhesive Anchoring System 3.2.5

Table 6 - Allowable steel strength for carbon steel and stainless steel HAS rods¹

Nominal anchor diameter in.	HAS-E ISO 898 Class 5.8		HAS Super ASTM A193 B7		HAS SS AISI 304/316 SS	
	Tensile	Shear	Tensile	Shear	Tensile	Shear
	lb (kN)	lb (kN)	lb (kN)	lb (kN)	lb (kN)	lb (kN)
3/8	2,640 (11.7)	1,360 (6.0)	4,555 (20.3)	2,345 (10.4)	3,645 (16.2)	1,875 (8.3)
1/2	4,700 (20.9)	2,420 (10.8)	8,100 (36.0)	4,170 (18.5)	6,480 (28.8)	3,335 (14.8)
5/8	7,340 (32.7)	3,780 (16.8)	12,655 (56.3)	6,520 (29.0)	10,125 (45.0)	5,215 (23.2)
3/4	10,570 (47.0)	5,445 (24.2)	18,225 (81.1)	9,390 (41.8)	12,390 (55.1)	6,385 (28.4)
7/8	14,385 (64.0)	7,410 (33.0)	24,805 (110.3)	12,780 (56.9)	16,865 (75.0)	8,690 (38.6)
1	18,790 (83.6)	9,680 (43.0)	32,400 (144.1)	16,690 (74.2)	22,030 (98.0)	11,350 (50.5)
1-1/4	29,360 (130.6)	15,125 (67.3)	50,620 (225.2)	26,080 (116.0)	34,425 (153.1)	17,735 (78.9)

¹ Steel strength as defined in AISC Manual of Steel Construction (ASD):

$$\text{Tensile} = 0.33 \times F_u \times \text{Nominal Area}$$

$$\text{Shear} = 0.17 \times F_u \times \text{Nominal Area}$$

Table 7 - Ultimate steel strength for carbon steel and stainless steel HAS rods¹

Nominal anchor diameter in.	HAS-E ISO 898 Class 5.8			HAS Super ASTM A193 B7			HAS SS AISI 304/316 SS		
	Yield lb (kN)	Tensile lb (kN)	Shear lb (kN)	Yield lb (kN)	Tensile lb (kN)	Shear lb (kN)	Yield lb (kN)	Tensile lb (kN)	Shear lb (kN)
3/8	4,495 (20.0)	6,005 (26.7)	3,605 (16.0)	8,135 (36.2)	10,350 (43.4)	6,210 (27.6)	5,035 (22.4)	8,280 (36.8)	4,970 (22.1)
1/2	8230 (36.6)	10,675 (47.5)	6,405 (28.5)	14,900 (66.3)	18,405 (79.0)	11,040 (49.1)	9,225 (41.0)	14,720 (65.5)	8,835 (39.3)
5/8	13110 (58.3)	16,680 (74.2)	10,010 (44.5)	23,730 (105.6)	28,760 (125.7)	17,260 (76.8)	14,690 (65.3)	23,010 (102.4)	13,805 (61.4)
3/4	19,400 (86.3)	24,020 (106.9)	14,415 (64.1)	35,120 (156.2)	41,420 (185.7)	24,850 (110.5)	15,050 (66.9)	28,165 (125.3)	16,800 (75.2)
7/8	26,780 (119.1)	32,695 (145.4)	19,620 (87.3)	48,480 (215.7)	56,370 (256.9)	33,825 (150.5)	20,775 (92.4)	38,335 (170.5)	23,000 (102.3)
1	35,130 (156.3)	42,705 (190.0)	25,625 (114.0)	63,600 (282.9)	73,630 (337.0)	44,180 (196.5)	27,255 (121.2)	50,070 (222.7)	30,040 (133.6)
1-1/4	56,210 (250.0)	66,730 (296.8)	40,035 (178.1)	101,755 (452.6)	115,050 (511.8)	69,030 (307.1)	43,610 (194.0)	78,235 (348.0)	46,940 (208.8)

¹ Steel strength as defined in AISC Manual of Steel Construction 2nd Ed. (LRFD):

$$\text{Yield} = F_y \times \text{tensile stress area}$$

$$\text{Tensile} = 0.75 \times F_u \times \text{nominal area}$$

$$\text{Shear} = 0.45 \times F_u \times \text{nominal area}$$

3.2.5 HIT-RE 500 Epoxy Adhesive Anchoring System

Table 8 - HIT-RE 500 allowable bond or concrete capacity and steel strength for HIS-N and HIS-RN inserts¹

Thread size in.	Effective embedment in. (mm)	HIT-RE 500 allowable bond/concrete capacity ²		Steel bolt strength ²			
		Tensile (13.8 MPa) lb (kN)	Shear (13.8 MPa) lb (kN)	ASTM A325 carbon steel		ASTM F593 stainless steel	
				Tensile lb (kN)	Shear lb (kN)	Tensile lb (kN)	Shear lb (kN)
3/8-16 UNC	4-3/8 (110)	2,870 (12.8)	1,565 (7.0)	4,370 (19.4)	2,250 (10.0)	3,645 (16.2)	1,875 (8.3)
1/2-13 UNC	5 (127)	4,530 (20.1)	2,890 (12.9)	7,775 (34.6)	4,005 (17.8)	6,480 (28.8)	3,335 (14.8)
5/8-11 UNC	6-5/8 (168)	8,255 (36.7)	4,635 (20.6)	12,150 (54.0)	6,260 (27.8)	10,125 (45.0)	5,215 (23.2)
3/4-10 UNC	8-1/4 (210)	9,030 (40.1)	6,695 (29.8)	17,945 (77.8)	9,010 (40.1)	12,395 (55.1)	6,385 (28.4)

Table 9 - HIT-RE 500 ultimate bond or concrete capacity and steel strength for HIS-N and HIS-RN inserts¹

Thread size in.	Effective embedment in. (mm)	HIT-RE 500 ultimate bond/concrete capacity		Ultimate bolt strength ²			
		Tensile (13.8 MPa) lb (kN)	Shear (13.8 MPa) lb (kN)	ASTM A325 carbon steel		ASTM F593 stainless steel	
				Tensile lb (kN)	Shear lb (kN)	Tensile lb (kN)	Shear lb (kN)
3/8-16 UNC	4-3/8 (110)	11,480 (51.0)	6,260 (27.8)	9,935 (44.2)	5,960 (26.5)	8,280 (36.8)	4,970 (22.1)
1/2-13 UNC	5 (127)	18,115 (80.5)	11,565 (51.4)	17,665 (78.6)	10,600 (47.2)	14,720 (65.5)	8,835 (39.3)
5/8-11 UNC	6-5/8 (168)	33,025 (146.9)	18,550 (82.5)	27,610 (122.8)	16,565 (73.7)	23,010 (102.4)	13,805 (61.4)
3/4-10 UNC	8-1/4 (210)	36,125 (160.6)	26,775 (119.1)	39,760 (176.9)	23,855 (106.1)	28,165 (125.3)	16,900 (75.1)

1 Use lower value of either allowable bond/concrete capacity or steel strength. Minimum concrete compressive strength f'_c is 2,000 psi.

2 Steel values in accordance with AISC

ASTM A325 bolts $F_y = 92 \text{ ksi}$, $F_u = 120 \text{ ksi}$

ASTM F593 (AISI 304/316) $F_y = 65 \text{ ksi}$, $F_u = 100 \text{ ksi}$ for 3/8- through 5/8 in.

$F_y = 45 \text{ ksi}$, $F_u = 85 \text{ ksi}$ for 3/4-in.

Allowable load values **Ultimate load values**

Tension = $0.33 \times F_u \times A_{nom}$ Tension = $0.75 \times F_u \times A_{nom}$

Shear = $0.17 \times F_u \times A_{nom}$ Shear = $0.45 \times F_u \times A_{nom}$

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Table 10 - HIT-RE 500 ultimate bond capacity and steel strength for rebar in concrete

Rebar size	Effective embedment in. (mm)	Concrete compressive strength						Grade 60 rebar	
		$f'_c = 2000$ psi (13.8 MPa)			$f'_c = 4000$ psi (27.6 MPa)			Yield strength lb (kN)	Tensile strength lb (kN)
		Ultimate bond strength lb (kN)	Embed. to develop yield strength ¹ in. (mm)	Embed. to develop tensile strength ¹ in. (mm)	Ultimate bond strength lb (kN)	Embed. to develop yield strength ¹ in. (mm)	Embed. to develop tensile strength ¹ in. (mm)		
#3	3-3/8 (86)	10,105 (45.0)	2-1/4 (57)	3-3/8 (86)	10,810 (48.1)	2-1/8 (54)	3-1/4 (84)	6,600 (29.4)	9,900 (44.0)
	4-1/2 (114)	10,920 (48.6)			10,810 (48.1)				
#4	4-1/2 (114)	15,980 (71.1)	3-3/8 (86)	5-5/8 (143)	18,540 (82.5)	3 (76)	4-3/8 (111)	12,000 (53.4)	18,000 (80.1)
	6 (152)	18,830 (83.8)			18,655 (83.0)				
#5	5-5/8 (143)	20,630 (91.8)	5-1/8 (130)	8-7/8 (225)	27,790 (123.6)	3-7/8 (98)	5-3/4 (146)	18,600 (82.7)	27,900 (124.1)
	7-1/2 (191)	24,870 (110.6)			27,790 (128.6)				
#6	6-3/4 (171)	33,695 (149.9)	5-3/8 (136)	9-3/8 (238)	44,675 (198.7)	4 (102)	6 (152)	26,400 (117.4)	39,600 (176.2)
	9 (229)	38,960 (173.3)			44,870 (200.0)				
#7	7-7/8 (200)	40,525 (180.3)	7 (178)	12-3/8 (314)	59,340 (264.0)	4-7/8 (124)	7-1/4 (184)	36,000 (160.1)	54,000 (240.2)
	10-1/2 (267)	48,460 (215.6)			61,720 (274.6)				
#8	9 (229)	63,940 (284.4)	8-1/4 (210)	12-7/8 (327)	72,820 (323.9)	5-7/8 (149)	8-7/8 (225)	47,400 (210.9)	71,100 (316.3)
	12 (305)	69,610 (309.7)			72,950 (324.5)				
#9	10-1/8 (257)	72,245 (321.4)	8-1/2 (216)	13 (330)	81,235 (361.4)	7-1/2 (191)	12 (305)	60,000 (266.9)	90,000 (400.4)
	13-1/2 (343)	94,205 (419.1)			84,015 (373.7)				
#10	11-1/4 (286)	92,000 (409.3)	9-3/8 (238)	17-7/8 (454)	96,725 (430.3)	8-7/8 (225)	14 (356)	76,200 (339.0)	114,300 (508.5)
	15 (381)	95,850 (426.4)			97,070 (431.8)				
#11	12-3/8 (314)	118,615 (527.6)	9-7/8 (251)	18-3/4 (476)	123,120 (547.7)	9-1/2 (241)	16-1/2 (419)	93,600 (416.4)	140,400 (624.6)
	16-1/2 (419)	123,570 (549.7)			123,790 (550.7)				

1 Based on comparison of average ultimate adhesive bond test values versus minimum yield and ultimate tensile strength of rebar. For more information, contact Hilti.

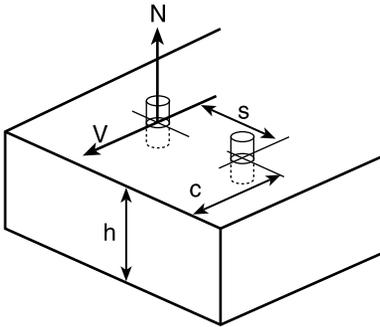
Table 11 - HIT-RE 500 ultimate tensile bond strength for smooth epoxy coated dowel bars in concrete¹

Dowel bar diameter in.	Nominal bit diameter in.	Embedment depth in. (mm)	Ultimate tensile load lb (kN)
1	1-1/8	9 (229)	40,385 (179.7)
1-1/4	1-3/8		
1-1/2	1-5/8		

1 Minimum concrete compressive strength is 2,400 psi.

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Figure 3 - Anchor spacing and edge distance in concrete



Anchor spacing adjustment factors

s = Actual spacing
 h_{ef} = Actual embedment
 $s_{min} = 0.5 h_{ef}$
 $s_{cr} = 1.5 h_{ef}$

Edge distance adjustment factors

c = Actual edge distance
 h_{ef} = Actual embedment
 $c_{min} = 0.5 h_{ef}$ Tension and shear
 $c_{cr} = 1.5 h_{ef}$ Tension
 $= 2.0 h_{ef}$ Shear
 \perp = Perpendicular to edge
 \parallel = Parallel to edge

Note: Tables apply for listed embedment depths. Reduction factors for other embedment depths must be calculated using equations below.

<p>Spacing tension/shear</p> $s_{min} = 0.5 h_{ef}$ $s_{cr} = 1.5 h_{ef}$ $f_A = 0.3(s/h_{ef}) + 0.55$ for $s_{cr} > s > s_{min}$
<p>Edge distance tension</p> $c_{min} = 0.5 h_{ef}$ $c_{cr} = 1.5 h_{ef}$ $f_{RN} = 0.3(c/h_{ef}) + 0.55$ for $c_{cr} > c > c_{min}$
<p>Edge distance shear \perp toward edge</p> $c_{min} = 0.5 h_{ef}$ $c_{cr} = 2.0 h_{ef}$ $f_{RV1} = 0.54(c/h_{ef}) - 0.09$ for $c_{cr} > c > c_{min}$
<p>Edge distance shear \parallel to or away from edge</p> $c_{min} = 0.5 h_{ef}$ $c_{cr} = 2.0 h_{ef}$ $f_{RV2} = 0.36(c/h_{ef}) + 0.28$ for $c_{cr} > c > c_{min}$

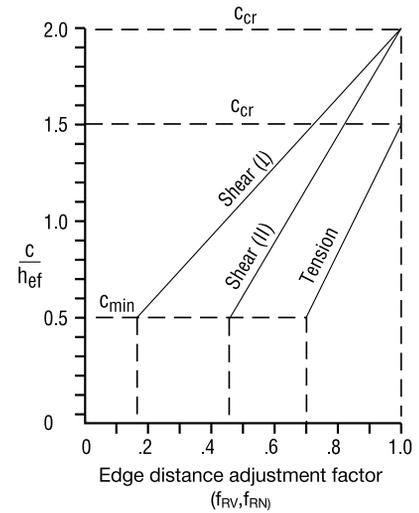
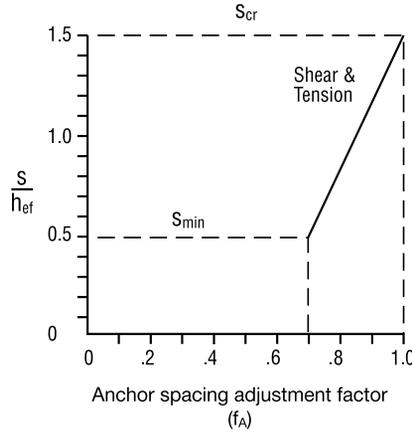


Table 12 - Load adjustment factors for 3/8-in. diameter anchors

Diameter	3/8-in.												
	Spacing tension/shear f_A			Edge distance tension f_{RN}			Edge distance shear (\perp toward edge) f_{RV1}			Edge distance shear (\parallel to or away from edge) f_{RV2}			
Embedment depth, in.	1-3/4	3-3/8	4-1/2	1-3/4	3-3/8	4-1/2	1-3/4	3-3/8	4-1/2	1-3/4	3-3/8	4-1/2	
Spacing (s)/edge distance (c), in.	7/8	0.70		0.70			0.18			0.46			
	1	0.72		0.72			0.22			0.49			
	1 11/16	0.84	0.70	0.84	0.70		0.43	0.18		0.63	0.46		
	2	0.89	0.73	0.89	0.73		0.53	0.22		0.69	0.49		
	2 1/4	0.94	0.75	0.70	0.94	0.75	0.70	0.60	0.27	0.18	0.74	0.52	0.46
	2 5/8	1.00	0.78	0.73	1.00	0.78	0.73	0.72	0.33	0.23	0.82	0.56	0.49
	3		0.82	0.75		0.82	0.75	0.84	0.39	0.27	0.90	0.60	0.52
	3 1/2		0.86	0.78		0.86	0.78	1.00	0.47	0.33	1.00	0.65	0.56
	4		0.91	0.82		0.91	0.82		0.55	0.39		0.71	0.60
	5 1/16		1.00	0.89		1.00	0.89		0.72	0.52		0.82	0.69
	5 1/2			0.92			0.92		0.79	0.57		0.87	0.72
	6			0.95			0.95		0.87	0.63		0.92	0.76
	6 3/4			1.00			1.00		1.00	0.72		1.00	0.82
	8									0.87			0.92
	9									1.00			1.00

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Table 13 - Load adjustment factors for 1/2-in. diameter anchors

Diameter	1/2-in.												
	Spacing tension/shear f_A			Edge distance tension f_{RN}			Edge distance shear (⊥ toward edge) f_{RV1}			Edge distance shear (to or away from edge) f_{RV2}			
Embedment depth, in.	2-1/4	4-1/2	6	2-1/4	4-1/2	6	2-1/4	4-1/2	6	2-1/4	4-1/2	6	
Load adjustment factors for 5/8-in. and 3/4-in. diameter anchors	1-1/8	0.70		0.70			0.18			0.46			
	1-1/2	0.75		0.75			0.27			0.52			
	1-3/4	0.78		0.78			0.33			0.56			
	2	0.82		0.82			0.39			0.60			
	2-1/4	0.85	0.70		0.85	0.70		0.45	0.18		0.64	0.46	
	2-1/2	0.88	0.72		0.88	0.72		0.51	0.21		0.68	0.48	
	3	0.95	0.75	0.70	0.95	0.75	0.70	0.63	0.27	0.18	0.76	0.52	0.46
	3-3/8	1.00	0.78	0.72	1.00	0.78	0.72	0.72	0.32	0.21	0.82	0.55	0.48
	4		0.82	0.75		0.82	0.75	0.87	0.39	0.27	0.92	0.60	0.52
	4-1/2		0.85	0.78		0.85	0.78	1.00	0.45	0.32	1.00	0.64	0.55
	5		0.88	0.80		0.88	0.80		0.51	0.36		0.68	0.58
	6		0.95	0.85		0.95	0.85		0.63	0.45		0.76	0.64
6-3/4		1.00	0.89		1.00	0.89		0.72	0.52		0.82	0.69	
7			0.90			0.90		0.75	0.54		0.84	0.70	
8			0.95			0.95		0.87	0.63		0.92	0.76	
9			1.00			1.00		1.00	0.72		1.00	0.82	
10									0.81			0.88	
11									0.90			0.94	
12									1.00			1.00	

Note: Tables apply for listed embedment depths. Reduction factors for other embedment depths must be calculated using equations below.

<p>Spacing tension/shear</p> $s_{min} = 0.5 h_{ef} \quad s_{cr} = 1.5 h_{ef}$ $f_A = 0.3(s/h_{ef}) + 0.55$ <p>for $s_{cr} > s_{min}$</p>
<p>Edge distance tension</p> $c_{min} = 0.5 h_{ef} \quad c_{cr} = 1.5 h_{ef}$ $f_{RN} = 0.3(c/h_{ef}) + 0.55$ <p>for $c_{cr} > c_{min}$</p>
<p>Edge distance shear ⊥ toward edge</p> $c_{min} = 0.5 h_{ef} \quad c_{cr} = 2.0 h_{ef}$ $f_{RV1} = 0.54(c/h_{ef}) - 0.09$ <p>for $c_{cr} > c_{min}$</p>
<p>Edge distance shear to or away from edge</p> $c_{min} = 0.5 h_{ef} \quad c_{cr} = 2.0 h_{ef}$ $f_{RV2} = 0.36(c/h_{ef}) + 0.28$ <p>for $c_{cr} > c_{min}$</p>

Table 14 - Load adjustment factors for 5/8-in. and 3/4-in. diameter anchors

Diameter	5/8-in.												3/4-in.															
	Spacing tension/shear f_A			Edge distance tension f_{RN}			Edge distance shear (⊥ toward edge) f_{RV1}			Edge distance shear (to or away from edge) f_{RV2}			Spacing tension/shear f_A			Edge distance tension f_{RN}			Edge distance shear (⊥ toward edge) f_{RV1}			Edge distance shear (to or away from edge) f_{RV2}						
Embedment depth, in.	2-7/8	5-5/8	7-1/2	2-7/8	5-5/8	7-1/2	2-7/8	5-5/8	7-1/2	2-7/8	5-5/8	7-1/2	2-7/8	5-5/8	7-1/2	3-3/8	6-3/4	9	3-3/8	6-3/4	9	3-3/8	6-3/4	9	3-3/8	6-3/4	9	
Spacing (s)/edge distance (c), in.	1-7/16	0.70		0.70			0.18			0.46																		
	1-11/16	0.73		0.73			0.23			0.49			0.70			0.70			0.18						0.46			
	2	0.76		0.76			0.29			0.53			0.73			0.73			0.23						0.49			
	2-13/16	0.84	0.70		0.84	0.70		0.44	0.18		0.63	0.46		0.80		0.80			0.36						0.58			
	3-3/8	0.90	0.73		0.90	0.73		0.54	0.23		0.70	0.50		0.85	0.70	0.85	0.70		0.45	0.18				0.64	0.46			
	3-3/4	0.94	0.75	0.70	0.94	0.75	0.70	0.61	0.27	0.18	0.75	0.52	0.46	0.88	0.72	0.88	0.72		0.51	0.21				0.68	0.48			
	4-5/16	1.00	0.78	0.72	1.00	0.78	0.72	0.72	0.32	0.22	0.82	0.56	0.49	0.93	0.74	0.93	0.74		0.60	0.26				0.74	0.51			
	4-1/2		0.79	0.73		0.79	0.73	0.76	0.34	0.23	0.84	0.57	0.50	0.95	0.75	0.95	0.75	0.70	0.63	0.27	0.18			0.76	0.52	0.46		
	5-1/16		0.82	0.75		0.82	0.75	0.86	0.40	0.27	0.91	0.60	0.52	1.00	0.78	1.00	0.78	0.72	0.72	0.32	0.21	0.82	0.55	0.48				
	5-5/8		0.85	0.78		0.85	0.78	0.97	0.45	0.32	0.98	0.64	0.55		0.80	0.74	0.80	0.74	0.81	0.36	0.25	0.88	0.58	0.51				
	5-3/4		0.86	0.78		0.86	0.78	1.00	0.46	0.32	1.00	0.65	0.56		0.81	0.74	0.81	0.74	0.83	0.37	0.26	0.89	0.59	0.51				
	6-3/4		0.91	0.82		0.91	0.82		0.56	0.40		0.71	0.60		0.85	0.78	0.85	0.78	1.00	0.45	0.32	1.00	0.64	0.55				
	8-7/16		1.00	0.89		1.00	0.89		0.72	0.52		0.82	0.69		0.93	0.83	0.93	0.83	0.59	0.42				0.73	0.62			
	10-1/8			0.96			0.96		0.88	0.64		0.93	0.77		1.00	0.89	1.00	0.89	1.00	0.89	0.72	0.52	0.82	0.69				
	11-1/4			1.00			1.00		1.00	0.72		1.00	0.82						0.93						0.88	0.73		
	12									0.77			0.86						0.95						0.87	0.76		
	13-1/2									0.88			0.93						1.00						1.00	0.82		
	15									1.00			1.00												0.81	0.88		
16																								0.87	0.92			
18																								1.00	1.00			

3.2.5

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Table 15 - Load adjustment factors for 7/8-in. diameter anchors

Diameter	7/8-in.												
	Spacing tension/shear f_A			Edge distance tension f_{RN}			Edge distance shear (⊥ toward edge) f_{RV1}			Edge distance shear (to or away from edge) f_{RV2}			
Embedment depth, in.	4	7-7/8	10-1/2	4	7-7/8	10-1/2	4	7-7/8	10-1/2	4	7-7/8	10-1/2	
Spacing (s)/Edge distance (c), in.	2	0.70		0.70			0.18			0.46			
	2-1/2	0.74		0.74			0.25			0.51			
	3	0.78		0.78			0.32			0.55			
	3-1/2	0.81		0.81			0.38			0.60			
	3-15/16	0.85	0.70	0.85	0.70		0.44	0.18		0.63	0.46		
	4-1/2	0.89	0.72	0.89	0.72		0.52	0.22		0.69	0.49		
	5	0.93	0.74	0.93	0.74		0.59	0.25		0.73	0.51		
	5-1/4	0.94	0.75	0.70	0.94	0.75	0.70	0.62	0.27	0.18	0.75	0.52	0.46
	6	1.00	0.78	0.72	1.00	0.78	0.72	0.72	0.32	0.22	0.82	0.55	0.49
	6-1/2		0.80	0.74		0.80	0.74	0.79	0.36	0.24	0.87	0.58	0.50
	7		0.82	0.75		0.82	0.75	0.86	0.39	0.27	0.91	0.60	0.52
	8		0.85	0.78		0.85	0.78	1.00	0.46	0.32	1.00	0.65	0.55
	10		0.93	0.84		0.93	0.84		0.60	0.42		0.74	0.62
	11-13/16		1.00	0.89		1.00	0.89		0.72	0.52		0.82	0.69
	12			0.89			0.89		0.73	0.53		0.83	0.69
	14			0.95			0.95		0.87	0.63		0.92	0.76
	15-3/4			1.00			1.00		1.00	0.72		1.00	0.82
	18									0.84			0.90
	20									0.94			0.97
	21									1.00			1.00

Note: Tables apply for listed embedment depths. Reduction factors for other embedment depths must be calculated using equations below.

Spacing tension/shear
 $s_{min} = 0.5 h_{ef}$ $s_{cr} = 1.5 h_{ef}$
 $f_A = 0.3(s/h_{ef}) + 0.55$
 for $s_{cr} > s > s_{min}$

Edge distance tension
 $c_{min} = 0.5 h_{ef}$ $c_{cr} = 1.5 h_{ef}$
 $f_{RN} = 0.3(c/h_{ef}) + 0.55$
 for $c_{cr} > c > c_{min}$

Edge distance shear
 ⊥ toward edge
 $c_{min} = 0.5 h_{ef}$ $c_{cr} = 2.0 h_{ef}$
 $f_{RV1} = 0.54(c/h_{ef}) - 0.09$
 for $c_{cr} > c > c_{min}$

Edge distance shear
 || to or away from edge
 $c_{min} = 0.5 h_{ef}$ $c_{cr} = 2.0 h_{ef}$
 $f_{RV2} = 0.36(c/h_{ef}) + 0.28$
 for $c_{cr} > c > c_{min}$

Table 16 - Load adjustment factors for 1-in. and 1-1/4-in. diameter anchors

Diameter	1-in.												1-1/4-in.														
	Spacing tension/shear f_A			Edge distance tension f_{RN}			Edge distance shear (⊥ toward edge) f_{RV1}			Edge distance shear (to or away from edge) f_{RV2}			Spacing tension/shear f_A			Edge distance tension f_{RN}			Edge distance shear (⊥ toward edge) f_{RV1}			Edge distance shear (to or away from edge) f_{RV2}					
Embedment depth, in.	4-1/2	9	12	4-1/2	9	12	4-1/2	9	12	4-1/2	9	12	4-1/2	9	12	5-5/8	11-1/4	15	5-5/8	11-1/4	15	5-5/8	11-1/4	15	5-5/8	11-1/4	15
Spacing (s)/Edge distance (c), in.	2-1/4	0.70		0.70			0.18			0.46						0.70			0.70			0.18					0.46
	2-3/4	0.73		0.73			0.24			0.50						0.71			0.71			0.20					0.47
	3	0.75		0.75			0.27			0.52						0.71			0.71			0.20					0.47
	4	0.82		0.82			0.39			0.60						0.76			0.76			0.29					0.54
	4-1/2	0.85	0.70	0.85	0.70		0.45	0.18		0.64	0.46		0.79		0.79			0.34			0.34					0.57	
	5	0.88	0.72	0.88	0.72		0.51	0.21		0.68	0.48		0.82		0.82			0.39			0.39					0.60	
	5-5/8	0.93	0.74	0.93	0.74		0.59	0.25		0.73	0.51		0.85	0.70	0.85	0.70	0.85	0.70	0.45	0.18	0.45	0.18			0.64	0.46	
	6	0.95	0.75	0.70	0.95	0.75	0.70	0.63	0.27	0.18	0.76	0.52	0.46	0.87	0.71	0.87	0.71	0.49	0.20	0.49	0.20			0.66	0.47		
	6-3/4	1.00	0.78	0.72	1.00	0.78	0.72	0.32	0.21	0.82	0.55	0.48	0.91	0.73	0.91	0.73	0.91	0.73	0.56	0.23	0.56	0.23			0.71	0.50	
	7-1/2		0.80	0.74		0.80	0.74	0.81	0.36	0.25	0.88	0.58	0.51	0.95	0.75	0.70	0.95	0.75	0.70	0.63	0.27	0.18	0.76	0.52	0.46		
	8-1/4		0.83	0.76		0.83	0.76	0.90	0.41	0.28	0.94	0.61	0.53	0.99	0.77	0.72	0.99	0.77	0.72	0.70	0.31	0.21	0.81	0.54	0.48		
	9		0.85	0.78		0.85	0.78	1.00	0.45	0.32	1.00	0.64	0.55	1.00	0.79	0.73	1.00	0.79	0.73	0.77	0.34	0.23	0.86	0.57	0.50		
	10		0.88	0.80		0.88	0.80	0.51	0.36		0.68	0.58		0.82	0.75		0.82	0.75	0.87	0.39	0.27	0.92	0.60	0.52			
	11		0.92	0.83		0.92	0.83	0.57	0.41		0.72	0.61		0.84	0.77		0.84	0.77	1.00	0.44	0.31	0.98	0.63	0.54			
	12		0.95	0.85		0.95	0.85	0.63	0.45		0.76	0.64		0.87	0.79		0.87	0.79	0.49	0.34	1.00	0.66	0.57				
	13-1/2		1.00	0.89		1.00	0.89	0.72	0.52		0.82	0.69		0.91	0.82		0.91	0.82	0.56	0.40	0.56	0.40	0.71	0.60			
	14			0.90			0.90	0.75	0.54		0.84	0.70		0.92	0.83		0.92	0.83	0.58	0.41	0.58	0.41	0.73	0.62			
	16-7/8			0.97			0.97	0.92	0.67		0.96	0.79		1.00	0.89		1.00	0.89	0.72	0.52	0.72	0.52	0.82	0.69			
	18			1.00			1.00	1.00	0.72		1.00	0.82			0.91			0.91	0.77	0.56	0.77	0.56	0.86	0.71			
	20								0.81			0.88			0.95			0.95	0.87	0.63	0.87	0.63	0.92	0.76			
	22-1/2								0.92			0.96			1.00			1.00	1.00	0.72	1.00	0.72	1.00	0.82			
	24								1.00			1.00								0.77		0.77	0.86				
	27																			0.88		0.88	0.93				
	30																			1.00		1.00	1.00				

HIT-RE 500 Epoxy Adhesive Anchoring System 3.2.5

Figure 4 - Resistance of HIT-RE 500 to chemicals

Chemical	Chemicals Tested	Resistant	Not Resistant
Alkaline	Concrete drilling mud (10%) pH=12.6	+	
	Concrete drilling mud (10%) pH=13.2	+	
	Concrete potash solution (10%) pH=14.0	+	
Acids	Acetic acid (10%) ¹		-
	Nitric acid (10%) ¹		-
	Hydrochloric acid (10%) 3 month -		-
	Sulfuric acid (10%)		-
Solvents	Benzyl alcohol		-
	Ethanol		-
	Ethyl acetate		-
	Methyl ethyl ketone (MEK)		-
	Trichlorethylene		-
	Xylene (mixture)	+	-
Chemicals used on job sites	Concrete plasticizer	+	
	Diesel oil	+	
	Oil	+	
	Petrol	+	
	Oil for form work (forming oil)	+	
Environmental chemicals	Salt water	+	
	de-mineralized water	+	
	salt spraying test	+	
	SO ₂	+	
	Environment/weather	+	

1 Concrete was dissolved by acid.

Samples of the HIT-RE 500 resin were immersed in the various chemical compounds for up to one year. At the end of the test period, the samples were analyzed. Any samples showing no visible damage and having less than a 25% reduction in bending (flexural) strength were classified as Resistant. Samples that were heavily damaged or destroyed were classified as Not Resistant.

Note: In actual use, the majority of the resin is encased in the base material, leaving very little surface area exposed.

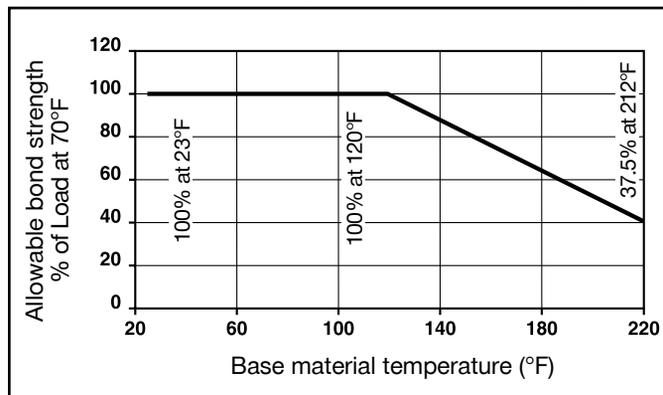
Table 17 - Full cure time

Base material temperature		Approximate full curing time
°F	°C	
23	-5	72 h
32	0	50 h
50	10	24 h
68	20	12 h
86	30	8 h
104	40	4 h

Table 18 - Initial cure time to develop 25% of bond strength

Base material temperature		Approximate initial cure time
°F	°C	
23	-5	36 h
32	0	25 h
50	10	12 h
68	20	6 h
86	30	4 h
104	40	2 h

Figure 5 - Influence of temperature on bond strength^{1,2}



- 1 Test procedure involves the concrete being held at the elevated temperature for 24 hours then removing it from the controlled environment and testing to failure.
- 2 Long term creep test in accordance with ICC-ES Acceptance Criteria AC58 is available; please contact Hilti Technical Services.

Table 19 - Gel time

Base material temperature		Approximate gel time
°F	°C	
23	-5	4 h
32	0	3 h
50	10	2 h
68	20	30 min
86	30	20 min
104	40	12 min

- 1 Minimum product temperature must be maintained above 41°F (5°C) prior/during installation.
- 2 Gel times and full cure times are approximate.

3.2.5

3.2.5 HIT-RE 500 Epoxy Adhesive Anchoring System

3.2.5.4 Installation instructions

Installation Instructions For Use (IFU) are included with each product package. They can also be viewed or downloaded online at www.us.hilti.com (US) and www.hilti.ca (Canada). Because of the possibility of changes, always verify that downloaded IFU are current when used. Proper installation is critical to achieve full performance. Training is available on request. Contact Hilti Technical Services for applications and conditions not addressed in the IFU.

HIT-RE 500 Volume

Table 20 - Threaded rod installation

Nominal anchor diameter in.	Nominal bit diameter in.	Adhesive volume required per Inch of embedment in ³
1/4	5/16	0.055
3/8	7/16	0.095
1/2	9/16	0.133
5/8	3/4	0.261
3/4	7/8	0.326
7/8	1	0.391
1	1-1/8	0.478
1-1/4	1-3/8	0.626

The useable volume of HIT-RE 500 refill cartridge is 16.5 in³ (270 ml)

The useable volume of HIT-RE 500 medium refill is 26.9 in³ (440 ml)

The useable volume of HIT-RE 500 medium refill is 81.8 in³ (1340 ml)

Example:

5/8-in. diameter rod with an embedment of 10 inches:

$$10 \text{ in.} \times 0.26 \text{ in}^3/\text{in.} = 2.6 \text{ in}^3/\text{fastening}$$

$$16.5 \text{ in}^3/\text{cartridge} \div 2.6 \text{ in}^3/\text{fastening} \approx 6 \text{ fastenings/cartridge}$$

$$81.8 \text{ in}^3/\text{cartridge} \div 2.6 \text{ in}^3/\text{fastening} \approx 31 \text{ fastenings/cartridge}$$

Table 21 - Rebar installation¹

Rebar Size	Nominal bit ¹ diameter in.	Adhesive volume required per Inch of embedment in ³
#3	1/2	0.110
#4	5/8	0.146
#5	3/4	0.176
#6	7/8	0.218
#7	1	0.252
#8	1-1/8	0.299
#9	1-3/8	0.601
#10	1-1/2	0.659
#11	1-3/4	1.037

¹ Rebar diameter may vary. Use smallest drill bit which will accommodate rebar.

HIT-RE 500 Epoxy Adhesive Anchoring System 3.2.5

3.2.5.5 Ordering information¹

Fastener components



HAS Threaded Rods



HIS-N Internally Threaded Inserts



Rebar supplied by contractor



Smooth, epoxy coated bar supplied by contractor



HIT RE Mixer



HIT-RE 500 11.1 oz (330 ml)



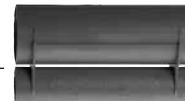
HIT-RE 500 16.9 oz (500 ml)



HIT-RE 500 47.3 oz (1400 ml)



Refill Pack Holder



Refill Pack Holder



HDE 500 Battery Dispenser



P3500 Dispenser



HDM 500 Manual Dispenser



P8000D Dispenser

HIT-RE 500 Epoxy Adhesive

Order information

Description	Package contents	Qty of foil packs
HIT-RE 500 (11.1 fl oz/330 ml)	Includes (1) refill pack and (1) mixer with filler tube	1
HIT-RE 500 MC Master Carton (11.1 fl oz/330 ml)	Includes (25) refill packs and (25) mixer with filler tube	25
HIT-RE 500 (16.9 fl oz/500 ml)	Includes (20) refill packs and (20) mixer with filler tube	20
HIT-RE 500 (47.3 fl oz/1400 ml)	Includes (4) jumbo refill packs and (4) mixer	4

¹ For complete information about Hilti anchors, adhesive anchoring dispensers, drilled hole preparation and other adhesive anchoring accessories, see HIT-HY 200 Anchoring System, Section 3.2.3.5 Ordering Information.