



PUBLIC WORKS DEPARTMENT

BID SPECIFICATIONS

AND

CONTRACT DOCUMENTS

FOR

CITY HALL GENERATOR

**CITY PROJECT NUMBER:
FAC230080**

October 2025

CITY OF CAMAS, WASHINGTON

PUBLIC WORKS DEPARTMENT

Specifications and Contract Documents

City Hall Generator

in and for the

**City of Camas
a Municipal Corporation**

Consisting of

**CALL FOR BIDS
BIDDING DOCUMENTS
CONTRACT DOCUMENTS
AMENDMENTS TO THE STANDARD SPECIFICATIONS
SPECIAL PROVISIONS
STATE MINIMUM HOURLY PREVAILING WAGE RATES
CONSTRUCTION PLANS**

By Order of the Mayor and City Council

City of Camas

City Project No. FAC230080

Signed by:

James E. Carothers

222ADA9D2B934F1

10/24/2025

Approved for Advertisement, Bidding, and Construction

Date

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CALL FOR BIDS
CITY OF CAMAS PUBLIC WORKS DEPARTMENT
CITY PROJECT NO. FAC230080
CITY HALL GENERATOR

Sealed bids will be received by the City of Camas, Administrative Services, 616 NE 4th Avenue, Camas, Washington, until **10:00AM on Wednesday December 3, 2025**, and will then and there be publicly read. Eligible Contractors shall be listed with MRSC Rosters on the Small Works Roster as of **October 27, 2025**, under Electrical, Earthwork, and Concrete categories for Civil and Facilities construction. Bid Specifications will be emailed to eligible Contractors.

All Bid Proposals shall be accompanied by a Bid Proposal deposit in cash, certified check, cashier's check, or surety bond in an amount equal to five percent (5%) of the amount of such Bid Proposal. Should the successful Bidder fail to enter into such contract and furnish satisfactory performance bond within the time stated in the most current updated version of the Washington State Department of Transportation (WSDOT) Standard Specifications for Road, Bridge, and Municipal Construction (standard specifications), the Bid Proposal deposit shall be forfeited to the City of Camas.

The improvement for which bids will be received follows:

Sealed bids in envelopes marked with the Bidder's name, Project Title and Project number will be received at the time and address noted above.

Statement of Work:

The scope of work includes but is not limited to removal of the existing standby power generator located in the basement garage of Camas City Hall. Installation of a new diesel generator outside the building. The new generator system will be connected to City Hall's existing electrical infrastructure until further electrical improvements can be implemented.

This project is part of a larger initiative to enhance City Hall's mechanical, electrical, and plumbing (MEP) systems in future. Coordination among multiple trades will be required to ensure successful completion of this work. Scope includes but not limited to following tasks:

- Removal and haul off of existing diesel generator located within basement Garage of City Hall.
- Installation of owner provided equipment pre-purchased from Pacific Power in Ridgefield, WA: Diesel Generator and Automatic Transfer Switch.
- Electrical conduits and wiring.
- Construction of Generator Pad involving re-grading of the building exterior to construct concrete generator pad including footing, infilled retaining walls, architectural fence and architectural gate.
- Removal and replacement of existing sidewalks and curbs.
- Installation, replacement, or relocation of existing sanitary sewer lateral line and stormwater lateral lines per construction plans and Engineer direction.
- Coordination between trades and manufacturer for Generator Startup and testing.
- Electrical permits through Labor and Industries as required.
- Generator Permit through Camas Fire Marshal's Office.

For questions please contact Justin Monsrud, PE (360) 817-7232 or jmonsrud@cityofcamas.us at the City of Camas.

The Contractor is obligated to pay Washington State Department of Labor and Industries Prevailing Wages, Rates for Clark County, effective December 3, 2025, the date of bid opening.

Pre-bid Meeting:

A non-mandatory prebid meeting will be held on-site to provide contractors the opportunity to review the site and ask questions to the Engineer of Record and Owner. We highly encourage all bidders to attend this meeting.

Date: Wednesday November 19, 2025

Time: 10:00 A.M. to 11:00 A.M.

Location: Camas City Hall
616 NE 4th Avenue
Camas WA 98607

American Made:

In an effort to maximize the creation of American jobs and restoring economic growth, the City of Camas encourages the use of products and services that are made in the United States of America whenever and wherever possible.

Disadvantaged Businesses:

The City of Camas encourages the solicitation and recruitment, to the extent possible, of certified minority-owned (MBE), women-owned (WBE), emerging small (ESB) businesses, and other disadvantaged companies in the construction of this project.

Civil Rights Act:

The City of Camas is an Equal Employment Opportunity employer. This Information is available in an alternate form by request by contacting 360-834-6864.

Spanish La información está disponible en un idioma alternativo a pedido,
Chinese Simplified kě gēn jù yāo qiú tí gòng tì dài yǔ yán de xìn xī,
Japanese Rikuesuto ni ōjite,-betsu no gengo de jōhō o nyūshu dekimasu,
Korean jeongboneun yocheong si daeche eon-eolo jegongdoebnida,
Vietnamese Thông tin có sẵn bằng ngôn ngữ thay thế theo yêu cầu,
Romanian Informațiile sunt disponibile într-o limbă alternativă la cerere,
Russian Informatsiya dostupna na drugom yazyke po zaprosu, and
Ukrainian Informatsiya dostupna inshoyu movoyu za zapytom.

Title VI Statement:

The City of Camas, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this advertisement, disadvantaged

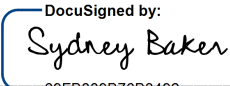
business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

Cooperative Purchasing:

The City participates in cooperative purchasing and that other public agencies may desire to place orders against the awarded contract. Bidders/proposers may be asked to indicate if they agree to allow orders from public agencies that have an interlocal cooperative purchasing agreement with the City.

This document and all associated public records will be released where required by the Public Records Act, Chapter 42.56 RCW (the "Act"). To the extent that public records then in the custody of the Contractor are needed for the City to respond to a request under the Act, as determined by the City, the Contractor agrees to make them promptly available to the City. If the Contractor considers any portion of any record provided to the City under this Agreement, whether in electronic or hard copy form, to be protected from disclosure under law, the Contractor shall clearly identify any specific information that it claims to be confidential or proprietary. If the City receives a request under the Act to inspect or copy the information so identified by the Contractor and the City determines that release of the information is required by the Act or otherwise appropriate, the City's sole obligation shall be to notify the Contractor (a) of the request and (b) of the date that such information will be released to the requester unless the Contractor obtains a court order to enjoin that disclosure pursuant to RCW 42.56.540. If the Contractor fails to timely obtain a court order enjoining disclosure, the City will release the requested information on the date specified.

The City of Camas expressly reserves the right to reject any or all Proposals and to waive minor irregularities or informalities and to Award the Project to the lowest responsible bidder as it best serves the interests of the City. The City of Camas also reserves the right to delete any or all portions of individual bid items.

DocuSigned by:

09FB669B70B3492...
Sydney Baker
City Clerk

PART ONE
BIDDING DOCUMENTS

BIDDER'S INFORMATION PAGE

CITY PROJECT NO. FAC230080

CITY HALL GENERATOR

Proposal Submitted By:

CONTRACTOR

CONTRACTOR MAILING ADDRESS

EMAIL

CITY

STATE

ZIP CODE

PHONE NO.

WASHINGTON STATE CONTRACTORS LICENSE #

EXPIRATION

BID OPENING:

As stated on the Call for Bids

City of Camas City Hall
616 NE 4th Avenue
Camas, Washington 98607

Contacts:

City of Camas
Justin Monsrud, PE
Phone: (360) 817-7232
E-mail: jmonsrud@cityofcamas.us

PROPOSAL

To the Office of the City Clerk
Camas, Washington

The undersigned hereby certifies that they have examined the location of

City Hall Generator Project No. FAC230080

and that the Plans, Specifications and contract governing the work embraced in this improvement, and the method by which payment will be made for said work is understood. The undersigned hereby proposes to undertake and complete the work embraced in this improvement, or as much thereof as can be completed with the money available in accordance with the said Plans, Specifications and contract, and the following schedule of rates and prices:

(Note: Unit prices for all items, all extensions, and total amount of bid should be shown. All entries must be typed or entered in ink.)

Item No.	Qty.	Unit	Description	Unit Price	Total	Spec. *
1	1	CALC	Mobilization			1-09
2	1	FA	Minor Changes (Min. Bid \$ 5,000)	\$5,000	\$5,000	1-04
3	1	LS	Construction Documentation (Min. Bid \$5,000)	\$5,000	\$5,000	1-05 S
4	1	LS	Trench Safety System (Min. Bid \$5,000)	\$5,000	\$5,000	1-11 S
5	1	LS	Site Demolition			1-11 S
6	1	LS	Electrical Site Improvements			1-11 S
7	1	LS	Civil and Architectural Improvements			1-11 S

* "S" Denotes Special Specification

Subtotal	\$
Sales Tax (8.6%)	\$
Contract Total (BASIS OF AWARD)	\$

Signature of Owner or Authorized Corporate Officer

(This is required for a valid bid)

I acknowledged receipt of Addendum #'s____, ____, ____

(This is required for valid bid)

By signing the Bid Proposal, the bidder hereby declares, under penalty of perjury under the laws of the United States that the Non-Collusion Declaration and Notice to All Bidders statements, as provided in these Bid Specifications and Contract Documents, are true and correct.

The City of Camas expressly reserves the right to reject any or all Proposals and to waive minor irregularities or informalities and to Award the Project to the lowest responsible bidder as it best serves the interests of the City. The City of Camas also reserves the right to delete any or all portions of individual bid items.

MANDATORY BIDDER RESPONSIBILITY CRITERIA INFORMATION:

Per RCW 39.04.350 Before award of a public works contract, a bidder must meet the following responsibility criteria to be considered a responsible bidder and qualified to be awarded a public works project. The bidder must provide the following:

CONTRACTOR

NAME OF OWNER OR CORPORATE OFFICER

SIGNATURE OF OWNER OR CORPORATE OFFICER

DATE AND PLACE

DEPARTMENT OF LICENSING CONTRACTOR LICENSE REGISTRATION NUMBER

UNIFIED BUSINESS IDENTIFIER (UBI)/WA STATE TAX REGISTRATION NUMBER

LABOR AND INDUSTRIES WORKERS' COMPENSATION NUMBER

EMPLOYMENT SECURITY DEPARTMENT NUMBER (UNEMPLOYMENT NUMBER)

EXCISE TAX REGISTRATION NUMBER (FEDERAL ID NUMBER)

ELECTRICAL CONTRACTOR'S LICENSE NUMBER (if applicable)

PLUMBING CONTRACTOR'S LICENSE NUMBER (if applicable)

BIDDER IS IN COMPLIANCE WITH L&I PREVAILING WAGE TRAINING REQUIREMENT : ☐ YES ☐ NO

By signing this page, the bidder hereby certifies that, within the three-year period immediately preceding the bid solicitation date, the bidder is not a "willful" violator, as defined in RCW 49.48.082, of any provision of chapters 49.46, 49.48, or 49.52 RCW, as determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction.

I certify under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

NOTE TO BIDDER: Complete and sign this page and submit it with your bid. Incomplete bid packages will be considered non-responsive and may be rejected. Mandatory Bidder Criteria information will be verified immediately for compliance to ensure that all accounts are current. Non-compliance with any of the above agency requirements may be considered grounds for a non-responsive bid.

Verification of Subcontractor Responsibility Criteria

This form provided for the Prime Contractor's use for all Subcontractors

This form is not required to be completed with bid proposal

Per RCW 39.06.020, the Prime Contractor must verify bidder criteria for each first tier subcontractor. Lower-tiered subcontractors must also verify bidder criteria for their subcontractors. Licensing information to verify is the same as listed above under Mandatory Bidder's Criteria. As a courtesy, a blank Subcontractor Mandatory Bidder Responsibility form has been included in these specifications from agency.

SUBCONTRACTOR **MANDATORY BIDDER RESPONSIBILITY CRITERIA**

PROJECT NAME

PROJECT NUMBER

GENERAL CONTRACTOR

Prior to subcontracting any work, the Contractor shall verify that every Subcontractor, first tier and lower, meets the responsibility criteria stated below at the time of subcontract execution. Contractor is to verify that there are not any of the proposed Subcontractors on the 'Debarred Contractors' List.

SUBCONTRACTOR NAME & SIGNATURE OF OWNER OR CORPORATE OFFICER

DATE

SUBCONTRACTOR MAILING ADDRESS

PHONE NUMBER

WA DEPARTMENT OF LICENSING CONTRACTOR LICENSE REGISTRATION NUMBER

UNIFIED BUSINESS IDENTIFIER NUMBER (UBI) / WA STATE TAX REGISTRATION NUMBER

WA STATE LABOR AND INDUSTRIES WORKER COMPENSATION NUMBER

WA STATE EMPLOYMENT SECURITY DEPT. NUMBER (UNEMPLOYMENT NUMBER)

EXCISE TAX REGISTRATION NUMBER (FEDERAL ID NUMBER)

ELECTRICAL OR PLUMBING CONTRACTOR LICENSE NUMBER (if applicable)

BIDDER'S CHECK LIST

The bidder's attention is especially called to the following forms, which must be executed in full as required and submitted at the bid opening:

A. PROPOSAL

Unit prices for all items, all extensions, and total amount of bid must be shown, except those items designated in the estimate of quantities to be paid for as lump sum. Any item shown on the Plans that does not have a bid item shall be considered incidental to the project and the costs thereof shall be included in other bid items of the project. Pay special attention to the Non-Collusion Declaration before signing the proposal. An unsigned bid may be considered a non-responsive bid.

B. BID BOND

Proposals must be accompanied by cash, a certified check, a cashier's check drawn on a bank of good standing, or a bid bond issued by a surety company authorized to issue such bonds in the State of Washington, in an amount of not less than five percent (5%) of the total amount of the bid submitted. The full amount will be returned within five (5) days after the contract has been executed.

C. DID YOU COMPLETE AND SUBMIT THE BIDDER'S INFORMATION PAGE?

D. DID YOU SIGN AND SUBMIT YOUR BID PROPOSAL?

E. DID YOU COMPLETE AND SUBMIT THE MANDATORY BIDDER RESPONSIBILITY CRITERIA INFORMATION FORM?

F. IF APPLICABLE, DID YOU ACKNOWLEDGE RECEIPT OF ADDENDUMS ON YOUR PROPOSAL OR INCLUDE ADDENDUMS WITH PROPOSAL?

G. DID YOU READ THE 'NON-COLLUSION DECLARATION' AND 'NOTICE TO ALL BIDDERS' STATEMENTS?

H. DID YOU COMPLETE AND SUBMIT THE BID BOND ACKNOWLEDGEMENT PAGE?

The following forms are to be executed and submitted to the contracting agency by the successful bidder after the contract is awarded:

- A. CONTRACT**
This agreement is to be executed by the successful bidder.
- B. CONTRACT BOND**
This form is to be executed by the successful bidder and his surety company.
- C. DECLARATION OF OPTION FOR INVESTMENT OF RETAINED PERCENTAGE**
This agreement is to be executed by the successful bidder.
- D. WAGE LAW INTENT AND AFFIDAVIT**
This shall be completed in accordance with State Law.
- E. PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE**
This is to be executed by the successful bidder.
- F. SUBMITTAL OF WEEKLY CERTIFIED PAYROLL REPORTS FOR ALL WORKERS ON THE PROJECT**
Failure to submit correct and timely certified payrolls will delay payment.

NON-COLLUSION DECLARATION

I, by signing the Proposal, hereby declare, under penalty of perjury under the laws of the United States that the following statements are true and correct:

1. That the undersigned person(s), firm, association or corporation has (have) not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the project for which this proposal is submitted.

2. **That by signing the signature page of this proposal, I am deemed to have signed and have agreed to the provisions of this declaration.**

NOTICE TO ALL BIDDERS

To report bid rigging activities call:

1-800-424-9071

The U.S. Department of Transportation (USDOT) operates the above toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m., Eastern Time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of USDOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the USDOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

DOT 272-036I EF

BID BOND
ACKNOWLEDGEMENT

The bidder is hereby advised that by signature of this proposal they are deemed to have acknowledged all requirements and signed all certificates contained herein.

A proposal guaranty in an amount of five percent (5%) of the total bid, based upon the approximate estimate of quantities at the above prices, must be provided as required by law. The following forms as indicated below are acceptable and shall be attached hereto:

_____ CASH	IN THE AMOUNT OF _____
_____ CASHIER'S CHECK	_____ DOLLARS
_____ CERTIFIED CHECK	(\$ _____) PAYABLE TO THE CITY
_____ PROPOSAL BOND	TREASURER OF CAMAS, WASHINGTON, IN
	THE AMOUNT OF 5% OF THE BID.

The failure to furnish a Bid deposit of a minimum of 5 percent (5%) with the Bid or as a physical supplement to the electronic Proposal Form shall make the Bid nonresponsive and shall cause the Bid to be rejected by the Contracting Agency.

SIGNATURE OF OWNER OR AUTHORIZED CORPORATE OFFICER

FIRM NAME _____

ADDRESS _____

PART TWO
CONTRACT DOCUMENTS

CONTRACT

THIS AGREEMENT, made and entered into this _____ day of _____, 20____, between the City of Camas under and by virtue of Title 35A RCW (cities and towns), as amended

And, _____, hereinafter called the Contractor.

WITNESSETH:

That in consideration of the terms and conditions contained herein and attached and made a part of this agreement, the parties hereto covenant and agree as follows:

I. The Contractor shall do all work and furnish all tools, materials and equipment for **City Hall Generator, City of Camas Project No. FAC230080** in accordance with and as described in the attached plans and specifications, and the standard specifications of the Washington State Department of Transportation which are by the reference incorporated herein and made part hereof and, shall perform any changes in the work in accord with the Contract Documents.

The Contractor shall provide and bear the expense of all equipment, work and labor, of any sort whatsoever that may be required for the transfer of materials and for constructing and completing the work provided for in these Contract Documents except those items mentioned therein to be furnished by the City of Camas. In all respects, the Contractor is an independent Contractor, and not an employee of the City of Camas.

II. The City of Camas hereby promises and agrees with the Contractor to employ, and does employ the Contractor to provide the materials and to do and cause to be done the above described work and to complete and finish the same in accord with the attached plans and specifications and the terms and conditions herein contained and hereby contracts to pay for the same according to the attached specifications and the schedule of unit or itemized prices at the time and in manner and upon the conditions provided for in this contract.

III. The Contractor for himself/herself, and for his/her heirs, executors, administrators, successors, assigns, does hereby agree to the full performance of all the covenants herein contained upon the part of the Contractor.

IV. The Contractor shall defend, indemnify and hold the City of Camas, its officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the sole negligence of the City of Camas.

However, should a court of competent jurisdiction determine that this Agreement is subject to RCW 4.24.115, then in the event of liability for damages arising out of bodily injury to persons or damages to property caused by or resulting from the concurrent negligence of the Contractor and the City, its officers, officials, employees, and volunteers, the Contractor's liability hereunder shall be only to the extent of the Contractor's negligence. It is further specifically and expressly understood that the indemnification provided herein constitutes the Contractor's waiver of immunity under Industrial Insurance, Title 51 RCW, solely for the purposes of this indemnification. This waiver has been mutually negotiated by the parties. The provisions of this section shall survive the expiration or termination of this Agreement.

V. The Contractor shall provide a material, labor, and equipment guarantee for the work performed under this contract for a period of one year from the Date of Acceptance as shown on the Notice of Completion for Public Works Projects. All work shall be free of defect in workmanship or materials. Upon notice, the Contractor shall make all repairs promptly at no cost to the City. Failure to repair or replace defects in a manner satisfactory to the Engineer will constitute a breach of this contract.

VI. The Contractor is obligated to affirm its enrollment and participation in the E-Verify program upon request from the contracting agency.

VII. As provided by Title VI of the Civil Rights Act of 1964, and the Civil Rights Restoration Act of 1987, the contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, sex or national origin in the selection and retention of sub-contractors, including procurement of materials and leases of equipment.

City of Camas, Washington in accordance with the provisions of Title VI of the Civil Rights Act of 1964 {78 Stat. 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notified all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, all contractors will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of the owner's race, color, national origin, sex, age, disability, income-level, or LEP in consideration for an award.

VIII. The Contractor is obligated to pay Washington State Department of Labor and Industries Prevailing Wage Rates for Clark County effective the date of bid opening, December 3, 2025.

IX. The Contractor further acknowledges the following provisions and agrees to comply with the conditions as set forth therein:

THIS PROJECT REQUIRES A CONTRACT BOND FOR 100% OF THE CONTRACT AMOUNT.

X. The Contractor shall certify that they are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any State or Federal department or agency.

XI. The Contractor shall not propose or contract with any person or entity that is currently debarred, suspended, and ineligible contractors and grantees.

XII. It is further provided that no liability shall attach to the City of Camas by reason of entering into this contract, except as provided herein.

XIII. The Contractor shall maintain its records and accounts so as to facilitate audit requirements as established by the Office of the State Auditor and shall require subcontractors to do the same.

IN WITNESS WHEREOF, the Contractor has executed this instrument, on the day and year first below written and the Mayor of the City of Camas has caused this instrument to be executed by and in the name of the said City of Camas the day and year first above written.

Executed by the Contractor _____, 20__.

Contractor

Executed by the Local Agency _____, 20__.

City Administrator or Mayor

Approved as to Form

City of Camas Attorney

**DECLARATION OF OPTION FOR INVESTMENT OF RETAINED
PERCENTAGE**

I hereby elect to have the retained percentage of this contract held in a fund by the City of Camas until thirty (30) days following final acceptance of the work.

Signed _____

Date _____

I hereby elect to have the City of Camas invest the retained percentage of this contract from time to time as such retained percentage accrues and in accordance with RCW 60.28.020. The City will select the repository.

I hereby further agree to be fully responsible for payment of all costs or fees incurred as a result of placing said retained percentage in escrow and investing it as authorized by statute. The City of Camas shall not be liable in any way for any costs or fees in connection herewith.

Signed _____

Date _____

CONTRACT BOND

KNOW ALL PERSONS BY THESE PRESENTS, That _____

of _____, as Principal, and _____

as Surety, are jointly and severally held and bound unto the City of Camas, Washington,

in the penal sum of Dollars (\$_____), for the payment of which we jointly and severely bind ourselves, our heirs, executors, administrators, and assigns, and successors and assigns, firmly by these presents.

THE CONDITION of this bond is such that whereas, on the _____
day of _____ A.D., 20____, the said _____,

Principal, herein, executed a certain contract with the City of Camas, Washington,

by the terms, conditions and provisions of which contract the said _____,

Principal, herein, agree to furnish all material and do certain work, to wit: That

_____ will undertake and

complete the construction of these **City Hall Generator, City of Camas Project No. FAC230080**, according to the maps, plans and specifications made a part of said contract, which contract as so executed, is hereunto attached, is now referred to and by reference is incorporated herein and made a part hereof as fully for all purposes as if here set forth at length. The bond shall cover all approved change orders as if they were in the original contract.

NOW, THEREFORE, if the Principal herein shall faithfully and truly observe and comply with the terms, conditions and provisions of said contract in all respects and shall well and truly and fully do and perform all matters and things by **"Forty (40) Working Days"** undertaken to be performed under said contract, upon the terms proposed therein, and within the time prescribed therein, and until the same is accepted, and shall pay all laborers, mechanics, subcontractors and material men, and all persons who shall supply such contractor or subcontractor with provisions and supplies for the carrying on of such work, and shall in all respects faithfully perform said contract according to law, then this obligation to be void, otherwise to remain in full force and effect.

WITNESS our hands this _____ day of _____, 20____

PRINCIPAL

ATTORNEY-IN-FACT, SURETY

NAME AND ADDRESS, LOCAL OFFICE OF AGENT

APPROVED:

CITY OF CAMAS, WASHINGTON

BY: _____
City Administrator or Mayor

DATE: _____, 20____

SURETY BOND NUMBER _____

The United States Department of Transportation
Appendix A of the
Standard Title VI/ Non-Discrimination Assurances
DOT Order No. 1050.2A

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees as follows:

1. Compliance with Regulations: The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.
2. Non-discrimination: The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, national origin, sex, age, disability, income-level, or Limited English Proficiency (LEP) in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations as set forth in Appendix E, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 C.F.R. Part 21.
3. Solicitations for Subcontracts, Including Procurements of Materials and Equipment: In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor’s obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, national origin, sex. Age, disability, income-level or LEP.
4. Information and Reports: The contractor will provide all information and reports required by the Acts, the Regulations and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FHWA to be pertinent to ascertain compliance with such Acts, Regulations and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the FHWA, as appropriate, and will set forth what efforts it has made to obtain the information.
5. Sanctions for Noncompliance: In the event of a contractor’s noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the FHWA may determine to be appropriate, including, but not limited to:
 - a. withholding payments to the contractor under the contract until the contractor complies; and/or
 - b. cancelling, terminating, or suspending a contract, in whole or in part.
6. Incorporation of Provisions: The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the Recipient or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or

supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

The United States Department of Transportation
Appendix E of the
Standard Title VI/ Non-Discrimination Assurances
DOT Order No. 1050.2A

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the “contractor”) agrees to comply with the following non-discrimination statutes and authorities, including, but not limited to:

Pertinent Non-Discrimination Authorities:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat.252), prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq.*), prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, prohibits discrimination on the basis of disability; and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 U.S.C. § 471, Section 47123, as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms “programs or activities” to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 – 12189) as implemented by Department of Transportation regulations 49 C.F.R. parts 37 and 38.
- The Federal Aviation Administration’s Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 *et seq.*).

PART THREE
AMENDMENTS TO THE STANDARD SPECIFICATIONS

INTRODUCTION

The following Amendments and Special Provisions shall be used in conjunction with the current updated 2025 version of the Standard Specifications for Road, Bridge, and Municipal Construction, as of the Call for Bids date.

AMENDMENTS TO THE STANDARD SPECIFICATIONS

WSDOT manuals and publications are updated continuously and revisions are issued periodically. It is the responsibility of bidders to make sure they have the current versions, regardless of the manual format or means of transmission. Publications on the WSDOT web page are the most recent versions and can be downloaded and printed without charge. Please check Standard Specifications Manual at <https://wsdot.wa.gov/Publications/Manuals/M41-10.htm> for the most current specifications.
<https://wsdot.wa.gov/Publications/Manuals/M41-10.htm>

PART FOUR

SPECIAL PROVISIONS

These Special Provisions consist of the following:

*WSDOT M41-10 Standard Specification for Road, Bridge, and Municipal Construction
Division 1- General Requirements*

AND

Technical Specifications

SPECIAL PROVISIONS

INTRODUCTION TO THE SPECIAL PROVISIONS

(July 31, 2007 APWA GSP)

The work on this project shall be accomplished in accordance with the *Standard Specifications for Road, Bridge and Municipal Construction*, current updated version, as issued by the Washington State Department of Transportation (WSDOT) and the American Public Works Association (APWA), Washington State Chapter (hereafter "Standard Specifications"). The Standard Specifications, as modified or supplemented by the Amendments to the Standard Specifications and these Special Provisions, all of which are made a part of the Contract Documents, shall govern all of the Work.

These Special Provisions are made up of both General Special Provisions (GSPs) from various sources, which may have project-specific fill-ins; and project-specific Special Provisions. Each Provision either supplements, modifies, or replaces the comparable Standard Specification, or is a new Provision. The deletion, amendment, alteration, or addition to any subsection or portion of the Standard Specifications is meant to pertain only to that particular portion of the section, and in no way should it be interpreted that the balance of the section does not apply.

The project-specific Special Provisions are not labeled as such. The GSPs are labeled under the headers of each GSP, with the date of the GSP and its source, as follows:

(May 18, 2007 APWA GSP)
(August 7, 2006 WSDOT GSP)
(April 2, 2007 2010 GSP)

Also incorporated into the Contract Documents by reference are:

- *Manual on Uniform Traffic Control Devices for Streets and Highways*, currently adopted edition, with Washington State modifications, if any
- *Standard Plans for Road, Bridge and Municipal Construction*, WSDOT/APWA, current version
- *City of Camas Design Standards Manual*, current edition

Contractor shall obtain copies of these publications, at Contractor's own expense.

DIVISION 1
GENERAL REQUIREMENTS

1-00 GENERAL

(*****)

These Special Provisions add to and are in addition to the current updated version of the Washington State Department of Transportation Standard Specifications for Road, Bridge, and Municipal Construction. They are to be used in conjunction with the Standard Specifications. These Special Provisions, where in conflict with the Standard Specifications, shall take precedence.

The City of Camas Design Standards Manual shall add to and are in addition to the current updated version of the Washington State Department of Transportation Standard Specifications for Road, Bridge, and Municipal Construction, and the current Standard Plans.

APWA Special Provisions have been inserted into these Project Special Provisions and are denoted as such.

(date, APWA GSP) Notes an APWA Special Provision

(*****)

Notes a Project Specific Special Provision.

The Contractor shall meet the requirements of the Standard Specifications along with these Special Provisions.

1-01 DESCRIPTION OF WORK

(*****) October 10, 2025 COC

This contract covers work to be performed at

**Camas City Hall
616 NE 4th Avenue
Camas Washington, 98607.**

The scope of work includes but is not limited to removal of the existing standby power generator located in the basement garage of Camas City Hall. Installation of a new diesel generator outside the building and associative electrical connections. The new generator system will be connected to City Hall's existing electrical infrastructure until further electrical improvements can be implemented.

This project is part of a larger initiative to enhance City Hall's mechanical, electrical, and plumbing (MEP) systems in future. Coordination among multiple trades will be required to ensure successful completion of this work. Scope includes but not limited to following tasks:

- Removal and disposal of existing diesel generator located within basement Garage of City Hall.
- Installation of owner provided equipment pre-purchased from Pacific Power in Ridgefield, WA: Diesel Generator and Automatic Transfer Switch
- Electrical conduits and wiring.
- Construction of Generator Pad involving re-grading of the building exterior to construct concrete generator pad including footing, infilled retaining walls, architectural fence and architectural gate.
- Removal and replacement of existing sidewalks and curbs.
- Installation, replacement, or relocation of existing sanitary sewer lateral line and stormwater lateral lines per construction plans and Engineer direction.

- Coordination between trades and manufacturer for Generator Startup and testing.
- Electrical permits through Labor and Industries as required.
- Generator Permit through Camas-Washougal Fire Marshal's office is required. Contact 360-834-6191.

1-01.3 Definitions

(September 12, 2008 APWA GSP)

This Section is supplemented with the following:

All references in the Standard Specifications to the terms "State", "Department of Transportation", "Washington State Transportation Commission", "Commission", "Secretary of Transportation", "Secretary", "Headquarters", and "State Treasurer" shall be revised to read "Contracting Agency". All references to "State Materials Laboratory" shall be revised to read "Contracting Agency designated location".

The venue of all causes of action arising from the advertisement, award, execution, and performance of the contract shall be in the Superior Court of the County where the Contracting Agency's headquarters are located.

Additive

A supplemental unit of work or group of bid items, identified separately in the proposal, which may, at the discretion of the Contracting Agency, be awarded in addition to the base bid.

Alternate

One of two or more units of work or groups of bid items, identified separately in the proposal, from which the Contracting Agency may make a choice between different methods or material of construction for performing the same work.

Contract Documents

See definition for "Contract".

Contract Time

The period of time established by the terms and conditions of the contract within which the work must be physically completed.

Dates

Bid Opening Date

The date on which the Contracting Agency publicly opens and reads the bids.

Award Date

The date of the formal decision of the Contracting Agency to accept the lowest responsible and responsive bidder for the work.

Contract Execution Date

The date the Contracting Agency officially binds the agency to the contract, and the final work day before Liquidated Damages

Notice to Proceed Date

The date stated in the Notice to Proceed on which the contract time begins.

Substantial Completion Date

The day the Engineer determines the Contracting Agency has full and unrestricted use and benefit of the facilities, both from the operational and safety standpoint, and only minor incidental work, replacement of temporary substitute facilities, or correction or repair remains for the physical completion of the total contract.

Physical Completion Date

The day all of the work is physically completed on the project. All documentation required by the contract and required by law does not necessarily need to be furnished by the Contractor by this date.

Completion Date

The day all the work specified in the contract is completed and all the obligations of the Contractor under the contract are fulfilled by the Contractor. All documentation required by the contract and required by law must be furnished by the Contractor before establishment of this date.

Final Acceptance Date

The date on which the Contracting Agency accepts the work as complete.

Notice of Award

The written notice from the Contracting Agency to the successful bidder signifying the Contracting Agency's acceptance of the bid.

Notice to Proceed

The written notice from the Contracting Agency or Engineer to the Contractor authorizing and directing the Contractor to proceed with the work and establishing the date on which the contract time begins.

Traffic

Both vehicular and non-vehicular traffic, such as pedestrians, bicyclists, wheelchairs, and equestrian traffic.

(*****) October 1, 2020 COC

The following new definitions are added to this section:

City

The City of Camas as determined by the jurisdiction in which the facilities are being constructed.

Standard Details

The City of Camas Design Standards Manual, incorporated into the Contract Documents by reference above, is also referred to as Standard Details

The definition for **Engineer** is replaced with the following:

Engineer or Project Engineer

For improvements constructed by private contract, shall mean the Project Engineer or Project Manager, for purposes of approval of changes to, and final acceptance of, the facilities that are or will become public facilities.

1-02 BID PROCEDURES AND CONDITIONS**1-02.1 Prequalification of Bidders**

Delete this Section and replace it with the following:

1-02.1 Qualifications of Bidder

(*****) October 1, 2020 COC

Bidders must meet the minimum qualifications of RCW 39.04.350(1), as amended:

“Before award of a public works contract, a bidder must meet the following responsibility criteria to be considered a responsible bidder and qualified to be awarded a public works project. The bidder must:

- (a) At the time of bid submittal, have a certificate of registration in compliance with chapter 18.27 RCW;
- (b) Have a current state unified business identifier number;
- (c) If applicable, have industrial insurance coverage for the bidder's employees working in Washington as required in Title 51 RCW; an employment security department number as required in Title 50 RCW; and a state excise tax registration number as required in Title 82 RCW; and
- (d) Not be disqualified from bidding on any public works contract under RCW 39.06.010 or 39.12.065(3).”

Preparation of Proposal

Section 1-02.6 is supplemented with the following:
(August 2, 2004)

The fifth and sixth paragraphs of Section 1-02.6 are deleted.

1-02.9 Delivery of Proposal

(October 1, 2005 APWA GSP)

Revise the first paragraph to read:

Each proposal shall be submitted in a sealed envelope, with the Project Name and Project Number as stated in the Call for Bids clearly marked on the outside of the envelope, or as otherwise stated in the Bid Documents, to ensure proper handling and delivery.

(*****) October 1, 2020 COC

1-02.12 Opening of Proposal

Section 1-02.12 is supplemented with the following:

Date of Opening Bids

Sealed bids will be received at the following location on or before the specified time:

At Administrative Services, 616 NE 4th Avenue, Camas, Washington, 98607 until the date and time listed on the **Call for Bids**. Administrative Services is located on the first floor of Camas City Hall.

Bids delivered in person will be received by Administrative Services on the bid opening date.

Proposals to be delivered to:

Camas City Hall

616 NE 4th Avenue

Camas, WA 98607

Until date and time listed on Call for Bids

1-02.13 Irregular Proposals

(March 25, 2009 APWA GSP)

Revise item 1 to read:

1. A proposal will be considered irregular and will be rejected if:
 - a. The Bidder is not prequalified when so required;
 - b. The authorized proposal form furnished by the Contracting Agency is not used or is altered;
 - c. The completed proposal form contains any unauthorized additions, deletions, alternate Bids, or conditions;
 - d. The Bidder adds provisions reserving the right to reject or accept the award, or enter into the Contract;
 - e. A price per unit cannot be determined from the Bid Proposal;
 - f. The Proposal form is not properly executed;
 - g. The Bidder fails to submit or properly complete a Subcontractor list, if applicable, as required in Section 1-02.6;
 - h. The Bidder fails to submit or properly complete a Disadvantaged, Minority or Women's Business Enterprise Certification, if applicable, as required in Section 1-02.6;
 - i. The Bid Proposal does not constitute a definite and unqualified offer to meet the material terms of the Bid invitation; or
 - j. More than one proposal is submitted for the same project from a Bidder under the same or different names.

1-02.14 Disqualification of Bidders

(March 25, 2009 APWA GSP, Option B)

Delete this Section and replace it with the following:

A Bidder will be deemed not responsible if:

1. the Bidder does not meet the mandatory bidder responsibility criteria in RCW 39.04.350(1), as amended; or
2. evidence of collusion exists with any other Bidder or potential Bidder. Participants in collusion will be restricted from submitting further bids; or
3. the Bidder, in the opinion of the Contracting Agency, is not qualified for the work or to the full extent of the bid, or to the extent that the bid exceeds the authorized prequalification amount as may have been determined by a prequalification of the Bidder; or
4. an unsatisfactory performance record exists based on past or current Contracting Agency work or for work done for others, as judged from the standpoint of conduct of the work; workmanship; or progress; affirmative action; equal employment opportunity practices; termination for cause; or Disadvantaged Business Enterprise, Minority Business Enterprise, or Women's Business Enterprise utilization; or
5. there is uncompleted work (Contracting Agency or otherwise), which in the opinion of the Contracting Agency might hinder or prevent the prompt completion of the work bid upon; or
6. the Bidder failed to settle bills for labor or materials on past or current contracts, unless there are extenuating circumstances acceptable to the Contracting Agency; or
7. the Bidder has failed to complete a written public contract or has been convicted of a crime arising from a previous public contract, unless there are extenuating circumstances acceptable to the Contracting Agency; or
8. the Bidder is unable, financially or otherwise, to perform the work, in the opinion of the Contracting Agency; or

9. there are any other reasons deemed proper by the Contracting Agency.

As evidence that the Bidder meets the bidder responsibility criteria above, the apparent two lowest Bidders must submit to the Contracting Agency within 24 hours of the bid submittal deadline, documentation (sufficient in the sole judgment of the Contracting Agency) demonstrating compliance with all applicable responsibility criteria, including all documentation specifically listed in the supplemental criteria. The Contracting Agency reserves the right to request such documentation from other Bidders as well, and to request further documentation as needed to assess bidder responsibility.

The basis for evaluation of Bidder compliance with these supplemental criteria shall be any documents or facts obtained by Contracting Agency (whether from the Bidder or third parties) which any reasonable owner would rely on for determining such compliance, including but not limited to: (i) financial, historical, or operational data from the Bidder; (ii) information obtained directly by the Contracting Agency from owners for whom the Bidder has worked, or other public agencies or private enterprises; and (iii) any additional information obtained by the Contracting Agency which is believed to be relevant to the matter.

If the Contracting Agency determines the Bidder does not meet the bidder responsibility criteria above and is therefore not a responsible Bidder, the Contracting Agency shall notify the Bidder in writing, with the reasons for its determination. If the Bidder disagrees with this determination, it may appeal the determination within 24 hours of receipt of the Contracting Agency's determination by presenting its appeal to the Contracting Agency. The Contracting Agency will consider the appeal before issuing its final determination. If the final determination affirms that the Bidder is not responsible, the Contracting Agency will not execute a contract with any other Bidder until at least two business days after the Bidder determined to be not responsible has received the final determination.

1-02.15 Pre Award Information

(October 1, 2005 APWA GSP)

Revise this section to read:

Before awarding any contract, the Contracting Agency may require one or more of these items or actions of the apparent lowest responsible bidder:

1. A sworn affidavit that all materials to be used on this project are American made,
2. A complete statement of the origin, composition, and manufacture of any or all materials to be used,
3. Samples of these materials for quality and fitness tests,
4. A progress schedule (in a form the Contracting Agency requires) showing the order of and time required for the various phases of the work,
5. A breakdown of costs assigned to any bid item,
6. Attendance at a conference with the Engineer or representatives of the Engineer,
7. Obtain, and furnish a copy of, a business license to do business in the city or county where the work is located,
8. A copy of State of Washington Contractor's Registration,
9. Or any other information or action taken that is deemed necessary to ensure that the bidder is the lowest responsible bidder.

1-03 AWARD AND EXECUTION OF CONTRACT

1-03.1 Consideration of Bids

(January 23, 2006 APWA GSP)

Revise the first paragraph to read:

After opening and reading proposals, the Contracting Agency will check them for correctness of extensions of the prices per unit and the total price. If a discrepancy exists between the price per unit and the extended amount of any bid item, the price per unit will control. If a minimum bid amount has been established for any item and the bidder's unit or lump sum price is less than the minimum specified amount, the Contracting Agency will unilaterally revise the unit or lump sum price, to the minimum specified amount and recalculate the extension. The total of extensions, corrected where necessary, including sales taxes where applicable and such additives and/or alternates as selected by the Contracting Agency, will be used by the Contracting Agency for award purposes and to fix the Awarded Contract Price amount and the amount of the contract bond.

1-03.3 Execution of Contract

*(*****) October 1, 2020 COC*

Revise this section to read:

Copies of the Contract Provisions, including the unsigned Form of Contract, will be available for signature by the successful bidder on the first business day following award. The number of copies to be executed by the Contractor will be determined by the Contracting Agency.

Within 10 calendar days after the award date, the successful bidder shall return the signed Contracting Agency-prepared contract, an insurance certification as required by Section 1-07.18, and a satisfactory bond as required by law and Section 1-03.4. Before execution of the contract by the Contracting Agency, the successful bidder shall provide any pre-award information the Contracting Agency may require under Section 1-02.15, including a COVID-19 Health and Safety Plan (CHSP) for the project (see 1-07.4(2) below).

Until the Contracting Agency executes a contract, no proposal shall bind the Contracting Agency nor shall any work begin within the project limits or within Contracting Agency-furnished sites. The Contractor shall bear all risks for any work begun outside such areas and for any materials ordered before the contract is executed by the Contracting Agency.

If the bidder experiences circumstances beyond their control that prevents return of the contract documents within the calendar days after the award date stated above, the Contracting Agency may grant up to a maximum of **14** additional calendar days for return of the documents, provided the Contracting Agency deems the circumstances warrant it.

1-03.4 Contract Bond

(October 1, 2005 APWA GSP)

Revise the first paragraph to read:

The successful bidder shall provide an executed contract bond for the full contract amount. This contract bond shall:

1. Be on a Contracting Agency-furnished form;
2. Be signed by an approved surety (or sureties) that:
 - a. Is registered with the Washington State Insurance Commissioner, and

- b. Appears on the current Authorized Insurance List in the State of Washington published by the Office of the Insurance Commissioner,
- 3. Be conditioned upon the faithful performance of the contract by the Contractor within the prescribed time;
- 4. Guarantee that the surety shall indemnify, defend, and protect the Contracting Agency against any claim of direct or indirect loss resulting from the failure:
 - a. Of the Contractor (or any of the employees, subcontractors, or lower tier subcontractors of the Contractor) to faithfully perform the contract, or
 - b. Of the Contractor (or the subcontractors or lower tier subcontractors of the Contractor) to pay all laborers, mechanics, subcontractors, lower tier subcontractors, material person, or any other person who provides supplies or provisions for carrying out the work;
- 5. Be accompanied by a power of attorney for the Surety's officer empowered to sign the bond; and
- 6. Be signed by an officer of the Contractor empowered to sign official statements (sole proprietor or partner). If the Contractor is a corporation, the bond must be signed by the president or vice-president, unless accompanied by written proof of the authority of the individual signing the bond to bind the corporation (i.e., corporate resolution, power of attorney or a letter to such effect by the president or vice-president).

1-05 CONTROL OF WORK

1-05.7 Removal of Defective and Unauthorized Work

(October 1, 2005 APWA GSP)

Supplement this section with the following:

If the Contractor fails to remedy defective or unauthorized work within the time specified in a written notice from the Engineer, or fails to perform any part of the work required by the Contract Documents, the Engineer may correct and remedy such work as may be identified in the written notice, with Contracting Agency forces or by such other means as the Contracting Agency may deem necessary.

If the Contractor fails to comply with a written order to remedy what the Engineer determines to be an emergency situation, the Engineer may have the defective and unauthorized work corrected immediately, have the rejected work removed and replaced, or have work the Contractor refuses to perform completed by using Contracting Agency or other forces. An emergency situation is any situation when, in the opinion of the Engineer, a delay in its remedy could be potentially unsafe, or might cause serious risk of loss or damage to the public.

Direct or indirect costs incurred by the Contracting Agency attributable to correcting and remedying defective or unauthorized work, or work the Contractor failed or refused to perform, shall be paid by the Contractor. Payment will be deducted by the Engineer from monies due, or to become due, the Contractor. Such direct and indirect costs shall include in particular, but without limitation, compensation for additional professional services required, and costs for repair and replacement of work of others destroyed or damaged by correction, removal, or replacement of the Contractor's unauthorized work.

No adjustment in contract time or compensation will be allowed because of the delay in the performance of the work attributable to the exercise of the Contracting Agency's rights provided by this Section.

The rights exercised under the provisions of this section shall not diminish the Contracting Agency's right to pursue any other avenue for additional remedy or damages with respect to the Contractor's failure to perform the work as required.

1-05.12 Final Acceptance

Section 1-05.12 is supplemented with the following:

(*****) October 1, 2020 COC

By signing the Contract the Contractor agrees to provide a material, labor, and equipment warranty for the work performed for a period of one (1) year from the acceptance date, for all work to be free of defect in materials or workmanship. All warranty related repairs will be made promptly upon notification to the Contractor at no cost to the City. The Project Bond shall cover 100% of the work proposed in this contract, and as modified by change order, for a period no shorter than one calendar year (365 Days) from the date of Final Acceptance as established by the contracting agency.

1-05.12(1) Construction Documentation

(*****) October 1, 2020 COC

Description

This work shall include all labor, equipment, and materials to provide satisfactory and complete project documentation as may be required by the City of Camas, various Washington State Agencies, and the Federal Government that is specific to this project. Documentation shall include, but may not be strictly limited to, satisfactory completion of the following: Weekly Certified Payrolls for the Prime Contractor, and ALL Subcontractors; INTENTS and AFFIDAVITS of Wages Paid as required by the Department of Labor and Industries, MBE Documentation, Affidavit of Industrial Insurance Premiums for all contractors, submittal of tickets for all materials used on the project, and any other documentation as may be required by the Project Engineer, as is necessary to properly document the activities of the project.

Requirements

All documentation and other paperwork as may be required by the Contracting Agency, shall be completed correctly and submitted to the appropriate State or Local Agency at regular intervals as the work progresses. The Contracting Agency will review and monitor the documentation requirements as the project progresses and may direct the Contractor to complete various documentation items as may be required from the City of Camas, various State and Federal Funding and Regulatory Agencies, prior to any additional contract payments.

Measurement

Measurement shall include 100% of all Construction Documentation assigned to the Contractor and as required by various state agencies; Local, County, State, and Federal regulatory and funding agencies as required to perform this work in accordance with the Plans and Specifications, and as modified by Change Order or Verbal or written Field Directive as issued by the Contracting Agency, per **Lump Sum**. No measurement or payment of this item shall be issued until the Engineer determines that 100% of the required Project Documentation has been satisfactorily completed and delivered to the Contracting Agency

Payment

Construction Documentation, per Lump Sum

Payment for this item shall be made by the LUMP SUM as determined by the Engineer once all Construction Documentation has been correctly completed and satisfactorily submitted and approved by the Contracting Agency, or otherwise reviewed and Approved by an outside Agency as may be required by State RCW or WAC rule. Partial or monthly payments WILL NOT be made for Project Documentation; rather Full Payment of this item will only occur after the conclusion of the project once the Engineer Determines that the Contractor has submitted all required paperwork and necessary Documentation as required to satisfactorily document and record the activities of the project. The minimum Bid for **“Construction Documentation”, per Lump Sum , for this item minimum bid shall be \$5,000.**

1-07 LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

1-07.1 Laws to be Observed

Section 1-07.1 is supplemented with the following:

(*****) October 1, 2020 COC

In cases of conflict between different safety regulations, the more stringent regulation shall apply.

The Washington State Department of Labor and Industries shall be the sole and paramount administrative agency responsible for the administration of the provisions of the Washington Industrial Safety and Health Act of 1973 (WISHA).

The Contractor shall maintain at the project site office, or other well-known place at the project site, all articles necessary for providing first aid to the injured. The Contractor shall establish, publish, and make known to all employees, procedures for ensuring immediate removal to a hospital, or doctor's care, persons, including employees, who may have been injured on the project site. Employees should not be permitted to work on the project site before the Contractor has established and made known procedures for removal of injured persons to a hospital or a doctor's care.

The Contractor shall have sole responsibility for the safety, efficiency, and adequacy of the Contractor's plant, appliances, and methods, and for any damage or injury resulting from their failure, or improper maintenance, use, or operation. The Contractor shall be solely and completely responsible for the conditions of the project site, including safety for all persons and property in the performance of the work. This requirement shall apply continuously, and not be limited to normal working hours. The required or implied duty of the Engineer to conduct construction review of the Contractor's performance does not, and shall not, be intended to include review and adequacy of the Contractor's safety measures in, on, or near the project site.

(May 13, 2020 APWA GSP)

In response to COVID-19, the Contractor shall prepare a project specific COVID-19 health and safety plan (CHSP) in conformance with Section 1-07.4(2) as supplemented in these specifications, **COVID-19 Health and Safety Plan (CHSP)**.

(*****) October 1, 2020 COC

The contractor shall prepare and submit a company-wide COVID-19 Plan (CHSP) for review with their bid. A job specific plan shall be submitted prior to commencing any work.

1-07.2 State Sales Tax

Delete this section, including its sub-sections, in its entirety and replace it with the following:

1-07.2 State Sales Tax

(October 1, 2005 APWA GSP)

1-07.2(1) General

The Washington State Department of Revenue has issued special rules on the State sales tax. Sections 1-07.2(1) through 1-07.2(4) are meant to clarify those rules. The Contractor should contact the Washington State Department of Revenue for answers to questions in this area. The Contracting Agency will not adjust its payment if the Contractor bases a bid on a misunderstood tax liability.

The Contractor shall include all Contractor-paid taxes in the unit bid prices or other contract amounts. In some cases, however, state retail sales tax will not be included. Section 1-07.2(3) describes this exception.

The Contracting Agency will pay the retained percentage only if the Contractor has obtained from the Washington State Department of Revenue a certificate showing that all contract-related taxes have been paid (RCW 60.28.050). The Contracting Agency may deduct from its payments to the Contractor any amount the Contractor may owe the Washington State Department of Revenue, whether the amount owed relates to this contract or not. Any amount so deducted will be paid into the proper State fund.

1-07.2(2) State Sales Tax — Rule 171

WAC 458-20-171, and its related rules, apply to building, repairing, or improving streets, roads, etc., which are owned by a municipal corporation, or political subdivision of the state, or by the United States, and which are used primarily for foot or vehicular traffic. This includes storm or combined sewer systems within and included as a part of the street or road drainage system and power lines when such are part of the roadway lighting system. For work performed in such cases, the Contractor shall include Washington State Retail Sales Taxes in the various unit bid item prices, or other contract amounts, including those that the Contractor pays on the purchase of the materials, equipment, or supplies used or consumed in doing the work.

1-07.2(3) State Sales Tax — Rule 170

WAC 458-20-170, and its related rules, apply to the constructing and repairing of new or existing buildings, or other structures, upon real property. This includes, but is not limited to, the construction of streets, roads, highways, etc., owned by the state of Washington; water mains and their appurtenances; sanitary sewers and sewage disposal systems unless such sewers and disposal systems are within, and a part of, a street or road drainage system; telephone, telegraph, electrical power distribution lines, or other conduits or lines in or above streets or roads, unless such power lines become a part of a street or road lighting system; and installing or attaching of any article of tangible personal property in or to real property, whether or not such personal property becomes a part of the realty by virtue of installation.

For work performed in such cases, the Contractor shall collect from the Contracting Agency, retail sales tax on the full contract price. The Contracting Agency will automatically add this sales tax to each payment to the Contractor. For this reason, the Contractor shall not include the retail sales tax in the unit bid item prices, or in any other contract amount subject to Rule 170, with the following exception.

Exception: The Contracting Agency will not add in sales tax for a payment the Contractor or a subcontractor makes on the purchase or rental of tools, machinery, equipment, or consumable supplies not integrated into the project. Such sales taxes shall be included in the unit bid item prices or in any other contract amount.

1-07.2(4) Services

The Contractor shall not collect retail sales tax from the Contracting Agency on any contract wholly for professional or other services (as defined in Washington State Department of Revenue Rules 138 and 244).

1-07.4(2) Health Hazards

(May 13, 2020 APWA GSP)

Section 1-07.4(2) is supplemented with the following:

COVID-19 Health and Safety Plan (CHSP)

The Contractor shall prepare a project specific COVID-19 health and safety plan (CHSP). The CHSP shall be prepared and submitted as a Type 2 Working Drawing prior to beginning physical Work. The CHSP shall be based on the most current State and Federal requirements. If the State or Federal requirements are revised, the CHSP shall be updated as necessary to conform to the current requirements.

The Contractor shall update and resubmit the CHSP as the work progresses and new activities appear on the look ahead schedule required under Section 1-08.3(2)D. If the conditions change on the project, or a particular activity, the Contractor shall update and resubmit the CHSP. Work on any activity shall cease if conditions prevent full compliance with the CHSP.

The CHSP shall address the health and safety of all people associated with the project including State workers in the field, Contractor personnel, consultants, project staff, subcontractors, suppliers and anyone on the project site, staging areas, or yards.

COVID-19 Health and Safety Plan (CHSP) Inspection

The Contractor shall grant full and unrestricted access to the Engineer for CHSP Inspections. The Engineer (or designee) will conduct periodic compliance inspections on the project site, staging areas, or yards to verify that any ongoing work activity is following the CHSP plan. If the Engineer becomes aware of a noncompliance incident either through a site inspection or other means, the Contractor will be notified immediately (within 1 hour). The Contractor shall immediately remedy the noncompliance incident or suspend all or part of the associated work activity. The Contractor shall satisfy the Engineer that the noncompliance incident has been corrected before the suspension will end.

1-07.5(3) State Department of Ecology

(*****) October 1, 2020 COC

Item No. 2. in the first paragraph is revised to read:

2. Perform Work in such a manner that all materials and substances not specifically identified in the Contract documents to be placed in the water do not enter waters of the State, including wetlands. These include, but are not limited to, petroleum products, hydraulic fluid, fresh concrete, concrete wastewater, process wastewater, slurry materials and waste from shaft drilling, sediments, sediment-laden water, chemicals, paint, solvents, or other toxic or deleterious materials. **Also included are slurries generated due to saw cutting of cement concrete and asphalt concrete surfaces and structures.**

1-07.17 Utilities and Similar Facilities

(*****) October 1, 2020 COC

Section 1-07.17 is supplemented by the following:

Locations and dimensions shown in the Plans for existing facilities are in accordance with available information obtained without uncovering, measuring, or other verification.

The Contractor shall call the Utility Location Request Center (One Call Center), for field location, not less than two nor more than ten business days before the scheduled date for commencement of excavation which may affect underground utility facilities, unless otherwise agreed upon by the parties involved. A business day is defined as any day other than Saturday, Sunday, or a legal local, State, or Federal holiday. The telephone number for the One Call Center for this project may be obtained from the Engineer. If no one-number locator service is available, notice shall be provided individually to those owners known to or suspected of having underground facilities within the area of proposed excavation.

The Contractor is alerted to the existence of Chapter 19.122 RCW, a law relating to underground utilities. Any cost to the Contractor incurred as a result of this law shall be at the Contractor's expense.

No excavation shall begin until all known facilities, in the vicinity of the excavation area, have been located and marked.

The following addresses and telephone numbers of utility companies known or suspected of having facilities within the project limits are supplied for the Contractor's convenience:

Clark Public Utilities
Construction Services
Wade Hammerstrom
360.992.8721

City of Camas
Water & Sewer Department
Brandon Prather
360.817.7289 / cell: 360.921.2873
bprather@cityofcamas.us

Frontier Communications
Mike Bright
503.667.9781 / cell: 360.930.9031
mike.w.bright@ftr.com

City of Camas
Street Department
Will Noonan
360.817.7983 / cell: 360.518.8164
wnoonan@cityofcamas.us

Northwest Natural Gas
Ryan Winfree
503.226.4211 x 2045 / cell: 773.612.9237
ryan.winfree@nwnatural.com

1-07.18 Public Liability and Property Damage Insurance

Delete this section in its entirety, and replace it with the following:

1-07.18 Insurance

(May 10, 2006 APWA GSP)

1-07.18(1) General Requirements

- A. The Contractor shall obtain the insurance described in this section from insurers approved by the State Insurance Commissioner pursuant to RCW Title 48. The insurance must be provided by an insurer with a rating of A-: VII or higher in the A.M. Best's Key Rating Guide, which is licensed to do business in the state of Washington (or issued as a surplus line by a Washington Surplus lines broker). The Contracting Agency reserves the right to approve or reject the insurance provided, based on the insurer (including financial condition), terms and coverage, the Certificate of Insurance, and/or endorsements.

Extended Coverage for Completed Operations. The Contractor shall maintain Commercial General Liability completed operations coverage for a period of three years following substantial completion of the work for the benefit of the City by naming the City of Camas an additional insured using Insurance Services Office (ISO) Additional Insurance-Completed Operations endorsement CG 20 37 10 01 or an endorsement at least as broad coverage.

- B. The Contractor shall keep this insurance in force during the term of the contract and for thirty (30) days after the Physical Completion date, unless otherwise indicated (see C. below).
- C. If any insurance policy is written on a claims made form, its retroactive date, and that of all subsequent renewals, shall be no later than the effective date of this Contract. The policy shall state that coverage is claims made, and state the retroactive date. Claims-made form coverage shall be maintained by the Contractor for a minimum of 36 months following the Final Completion or earlier termination of this contract, and the Contractor shall annually provide the Contracting Agency with proof of renewal. If renewal of the claims made form of coverage becomes unavailable, or economically prohibitive, the Contractor shall purchase an extended reporting period ("tail") or execute another form of guarantee acceptable to the Contracting Agency to assure financial responsibility for liability for services performed.
- D. The insurance policies shall contain a "cross liability" provision.
- E. The Contractor's and all subcontractors' insurance coverage shall be primary and non-contributory insurance as respects the Contracting Agency's insurance, self-insurance, or insurance pool coverage.
- F. All insurance policies and Certificates of Insurance shall include a requirement providing for a minimum of 30 days prior written notice to the Contracting Agency of any cancellation in any insurance policy.

The Contractor shall provide the City and all Additional Insured for this work with written notice of any policy cancellation within two business days of their receipt of such notice.

- G. Upon request, the Contractor shall forward to the Contracting Agency a full and certified copy of the insurance policy(s), including endorsements, required in this Contract and evidence of all subcontractors coverage.
- H. The Contractor shall not begin work under the contract until the required insurance has been obtained and approved by the Contracting Agency.
- I. Failure on the part of the Contractor to maintain the insurance as required shall constitute a material breach of contract, upon which the Contracting Agency may, after giving five business days' notice to the Contractor to correct the breach, immediately terminate the contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith, with any sums so expended to be repaid to the Contracting Agency on demand, or at the sole discretion of the Contracting Agency, offset against funds due the Contractor from the Contracting Agency.
- J. All costs for insurance shall be incidental to and included in the unit or lump sum prices of the contract and no additional payment will be made.

1-07.18(2) Additional Insured

All insurance policies, with the exception of Professional Liability and Workers Compensation, shall name the following listed entities as additional insured(s):

- The City of Camas and its officers, elected officials, employees, agents, and volunteers

The above-listed entities shall be additional insured(s). If the Contractor maintains higher insurance limits than the minimums shown above, the Public Entity shall be insured for the full available limits of Commercial General and Excess or Umbrella liability maintained by the Contractor, irrespective of whether such limits maintained by the Contractor are greater than those required by this Contract or whether any certificate of insurance furnished to the Public Entity evidences limits of liability lower than those maintained by the Contractor.

1-07.18(3) Subcontractors

The Contractor shall cause each and every Subcontractor to provide insurance coverage that complies with all applicable requirements of the Contractor-provided insurance as set forth herein, except the Contractor shall have sole responsibility for determining the limits of coverage required to be obtained by Subcontractors. The Contractor shall ensure that the City is an additional insured on each and every Subcontractor's Commercial General liability insurance policy using an endorsement at least as broad as ISO CG 20 10 10 01 for ongoing operations and CG 20 37 10 01 for completed operations.

1-07.18(4) Evidence of Insurance

The Contractor shall furnish the Contracting Agency with original Certificate(s) of Insurance and copies of endorsements for each policy of insurance meeting the requirements set forth herein when the Contractor delivers the signed Contract for the work. The certificate and endorsements must conform to the following requirements:

1. An ACORD certificate or a form determined by the Contracting Agency to be equivalent.
2. Copies of all endorsements naming Contracting Agency and all other entities listed in 1-07.18(2) as Additional Insured(s), showing the policy number. The Contractor may submit a copy of any blanket additional insured clause from its policies instead of a separate endorsement. A statement of additional insured status on an ACORD Certificate of Insurance shall not satisfy this requirement.
3. Any other amendatory endorsements to show the coverage required herein.

1-07.18(5) Coverages and Limits

The insurance shall provide the minimum coverages and limits set forth below. Providing coverage in these stated minimum limits shall not be construed to relieve the Contractor from liability in excess of such limits. All deductibles and self-insured retentions must be disclosed and are subject to approval by the Contracting Agency. The cost of any claim payments falling within the deductible shall be the responsibility of the Contractor.

Excess or Umbrella Liability insurance shall be excess over and at least as broad in coverage as the Contractor's Commercial General Liability and Automobile Liability insurance. The Public Entity shall be named as an additional insured on the Contractor's Excess or Umbrella Liability insurance policy. The Excess or Umbrella insurance coverage will drop down when underlying policy aggregate limits are exhausted.

Excess or Umbrella Liability insurance shall be written with limits of not less than **\$ (1,000,000)** per occurrence and annual aggregate. The Excess or Umbrella Liability requirement and limits may be satisfied instead through the Contractor's Commercial General Liability and Automobile Liability insurance, or any combination thereof that achieves the overall required limits.

1-07.18(5)A Commercial General Liability

Commercial General Liability insurance shall be at least as broad as ISO occurrence form CG 00 01 and shall cover liability arising from premises, operations, independent contractors, products-completed operations, stop gap liability, personal injury and advertising injury, and liability assumed under an insured contract. The Commercial General Liability insurance shall be endorsed to provide a per project general aggregate limit using ISO form CG 25 03 05 09 or an endorsement providing at least as broad coverage. There shall be no exclusion for liability arising from explosion, collapse or underground property damage. The Public Entity shall be named as an additional insured under the Contractor's

Commercial General Liability insurance policy with respect to the work performed for the Public Entity using ISO Additional Insured endorsement CG 20 10 10 01 and Additional Insured-Completed Operations endorsement CG 20 37 10 01 or substitute endorsements providing at least as broad coverage.

Per project aggregate

Premises/Operations Liability

Products/Completed Operations – for a period of one year following final acceptance of the work.

Personal/Advertising Injury

Contractual Liability

Independent Contractors Liability

Stop Gap / Employers' Liability

Explosion, Collapse, or Underground Property Damage (XCU)

Blasting (only required when the Contractor's work under this Contract includes exposures to which this specified coverage responds)

Such policy must provide the following minimum limits:

\$2,000,000	Each Occurrence
\$2,000,000	General Aggregate
\$2,000,000	Products & Completed Operations Aggregate
\$1,000,000	Personal & Advertising Injury, each offence

Stop Gap / Employers' Liability

\$1,000,000	Each Accident
\$1,000,000	Disease - Policy Limit
\$1,000,000	Disease - Each Employee

1-07.18(5)B Automobile Liability

Automobile Liability insurance covering all owned, non-owned, hired, and leased vehicles. Coverage shall be at least as broad as ISO form CA 00 01. For Construction and Services Contracts add: Pollution Liability coverage at least as broad as that provided under ISO Pollution Liability Broadened Coverage for Covered Autos Endorsement CA 99 48 shall be provided, and the Motor Carrier Act Endorsement (MCS 90) shall be attached.

\$1,000,000	Minimum combined single limit for bodily injury and property damage per incident
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1-07.18(5)C Workers' Compensation

The Contractor shall comply with Workers' Compensation coverage as required by the Industrial Insurance laws of the state of Washington.

Reduced Insurance Requirement

Section 1-07.18 is revised as follows:

Item number 1 in the first paragraph is deleted.

Item number 2 is revised to read:

2. Commercial General Liability Insurance written under ISO Form CG0001 or its equivalent with minimum limits of \$2,000,000 per occurrence and in the aggregate for each policy year. Products and completed operations coverage shall be provided for a period of one year following final acceptance of the work. The Contracting Agency shall be named as an additional insured on the policy.

1-07.23(1) Construction Under Traffic

(*****) October 1, 2020 COC

Allowable Lane and Road Closure Requirements.

The Contractor shall obtain the City's approval prior to closing any lanes, shall employ sufficient certified flaggers and adequate signage for such conditions, and shall perform all traffic control in accordance with the latest version of the MUTCD and the approved traffic control plan.

Material Delivery Subcontractors

(*****) October 1, 2020 COC

According to prevailing wage laws in the State of Washington (Chapter 39.12 RCW and as defined by WAC 296-127-018), any person that delivers materials such as cement concrete or asphalt to a work site, regardless of the method of material placement, is considered a subcontractor, and is subject to receiving prevailing wages, and all other conditions as required by law.

Offsite Fabrication

(*****) October 1, 2020 COC

According to prevailing wage laws in the State of Washington (Chapter 39.04.010 RCW and as defined by WAC 296-127-010(5)(b)) The offsite fabrication of nonstandard items specifically produced for a public works project is considered public work for which prevailing wages are required. Examples include, but not limited to, fabrication of ducts for HVAC systems, certain concrete tunnel liners, and certain steel or other metal prefabrication. If the item is not fabricated on the public works jobsite, contact L&I for a determination as to whether the work is subject to the payment of prevailing wages, and the appropriate classification of work, if applicable. This determination will be based upon all relevant information, including, but not limited to: (1) whether the item is fabricated in an assembly/fabrication plant set up for, and dedicated primarily to the public works project; (2) whether the item requires assembly, cutting, modification or other fabrication by the supplier; (3) whether the item is typically an inventory item which could reasonably be sold on the general market; and (4) whether the item, although generally defined as "standard," has unusual characteristics such as shape, type of material, strength requirements, or finish, etc., specifically for the public works project.

Cement Concrete and Asphalt

A material supplier delivery driver is to be paid prevailing wages for their covered travel time as outlined in WAC 296-127-018 subsection 1-3. Said material supplier *IS* considered a subcontractor and must comply with the requirements of 39.12 RCW.

Crushed Rock, Gravel, Sand, or other similar materials

A material supplier delivering materials to a designated stockpile (i.e. crushed rock or other similar material) are not subject to prevailing wage as outlined in 39.12 RCW. A "stockpile" is defined as materials delivered to a pile located away from the site of incorporation such that the stockpiled materials must be physically moved from the stockpile and transported to another location on the project site in order to be incorporated into the project (WAC 296-127-018 subsection 4).

1-08 PROSECUTION AND PROGRESS

1-08.0(2) Hours of Work

(*****) October 1, 2020 COC

Except in the case of emergency or unless otherwise approved by the Contracting Agency, the normal straight time working hours for the contract shall be any consecutive 8-hour period between 7:00 a.m. and 5:00 p.m. of a working day with a maximum 1-hour lunch break and a 5-day work week. The normal

straight time 8-hour working period for the contract shall be established at the preconstruction conference or prior to the Contractor commencing the work.

The Contractor shall not be allowed to perform any work on City recognized holidays, Saturdays, Sundays, or before 7:00 a.m. or after 6:00 p.m. on any week day. Camas may require that no work be performed during Camas Days in Late July.

Any work to be performed on Saturdays shall be approved in advance by the Contracting Agency. If approved, work hours shall be limited to 8:00 a.m. to 5:00 p.m. only.

1-08.5 Time for Completion

(*****) October 1, 2020 COC

Section 1-08.5 is supplemented with the following:

This project shall be physically completed within **40 working days** following the date of the Notice to Proceed, unless amended by change order.

The Engineer will give the Contractor written notice of the physical completion date for all work the Contract requires. This date shall constitute the substantial completion date of the Contract but shall not imply the City's acceptance of the work or the contract. Final Acceptance shall be the date the project is accepted as complete by City Council and final payment is issued (final pay estimate).

(*****)

Create New Section 1-11 in its entirety and insert below

Generator Site Improvements

1-11 Generator Site Improvements

(*****) October 15, 2025 COC

1-11.1 Description

(*****) October 15, 2025 COC

This work consists of but is not limited to removing the existing standby power generator located in the basement of City Hall and installing a new diesel-powered generator and transfer switch on the exterior of the building. The new generator system will be connected back into City Hall's existing electrical infrastructure until further electrical improvements can be made to the site. The generator will be enclosed within a shelter requiring construction of an infilled retaining wall and architectural security fencing. This work will require relocation of existing site stormwater downspouts and replacement of a portion of the existing sanitary sewer prior to constructing generator pad. This work is in part of larger improvements to the Camas City Hall building currently under design.

Site Demolition: Will require but not limited to removal of existing generator from Basement garage and all demolition items shown on construction plans to facilitate construction including but not limited to: concrete saw cutting and removal of sidewalk, curb, and driveways, general excavation including material haul-off, utility removal (Sanitary and Stormwater), relocation and protection of City recycling trash bin to facilitate construction, and any additional items noted or implied within the contract documents and construction plans to facilitate construction of improvements.

Electrical Scope will require removal of the existing standby diesel generator located in City Halls Basement and installation of a new owner provided diesel generator and owner provided automatic transfer switch for future use. The new generator will be connected back into City Halls existing electrical system utilizing the sites existing transfer switch. This work will require excavation and installation of new conduits, wiring installations and connections, and coordination between multiple trades and Clark PUD. Electrical contractor is required to secure all necessary permits. The City of Camas will assist in coordinating delivery of the new generator and transfer switch from Pacific Power in Ridgefield, WA. This work will require coordination with City Staff and Public Services.

Required Permit by Electrical Contractor:

LNI electrical permits

Camas Washougal Fire Marshall Generator Permit. Contact 360-834-6191

Any additional permits required by local, state, or federal law.

Civil Scope and Architectural scope will require construction of a new generator shelter requiring relocation of underground utilities. The existing stormwater roof downspouts will need to be relocated to facilitate construction. The existing sanitary sewer lateral has an old section of concrete pipe needing replacement for longevity. The existing trench drain is connected into the sanitary sewer and needs to be relocated to stormwater system. The generator shelter will require construction of footings, retaining walls, reinforced slab and architectural fencing and entrance gate. Establishing of finished grades will require coordination between trades and Owner's representative.

1-11.2 Materials

(*****) October 15, 2025 COC

Refer to technical specifications and construction plans for materials specifications

1-11.3 Construction Requirements

(*****) October 15, 2025 COC

Refer to technical specifications and construction plans for construction requirements.

1-11.4 Measurement

(*****) October 15, 2025 COC

The following bid items will be measured by Lump Sum (LS) as shown on the proposal sheet:

“Trench Safety System (Minimum Bid \$5,000)” shall be measured by **Lump Sum** and include all items required to provide trench safety system to perform work shown within plans. Trench safety system to meet requirements of the Washington Industrial Safety and Health Act (RCW 49.17) and meeting Safety Standards for Construction Work WAC 296-155.

“Site Demolition” shall be measured by **Lump Sum**

“Electrical Site Improvements” shall be measured by **Lump Sum**

“Civil and Architectural Improvements” shall be measured by **Lump Sum**

1-11.5 Payment

(*****) October 15, 2025 COC

“Trench Safety System (Minimum Bid \$5,000)” payment shall be in full for all items required to provide trench safety system meeting Federal and State requirements. A minimum Bid is set at \$5,000 for this bid item.

“Site Demolition” Payment shall be in full for all items required to perform this work in accordance with the plans and specifications.

“Electrical Site Improvements” Payment shall be in full for all items required to perform this work in accordance with the plans and specifications.

“Civil and Architectural Improvements” Payment shall be in full for all items required to perform this work in accordance with the plans and specifications.

PART FIVE CONTINUED

TECHNICAL SPECIFICATIONS

INCLUDES FOLLOWING SECTIONS:

031000 Concrete Formwork
032000 Concrete Reinforcement
220500 Common Work Results for Plumbing
221005 Plumbing Piping
22106 Plumbing Piping Specialties
260505 Selective Demolition for Electrical
260519 Low-Voltage Electrical power Conductors and Cables
260526 Grounding and Bonding for Electrical Systems
260529 Hangers and Supports for Electrical Systems
260533.13 Conduit Electrical Systems
260533.16 Boxes for Electrical Systems
260548 Vibration and Seismic Controls for Electrical Systems
260553 Identification for Electrical Systems
260573 Power System Studies
263213 Engine Generators
323119 Ornamental Fences and Gates

**031000
CONCRETE FORMWORK**

PART 1 GENERAL

1.01 CONTRACT CONDITIONS

- A. All other Contract Documents, including Drawings, Specifications, Project Manual and General and Supplemental Conditions of the Contract, complement the requirements of this section.
- B. Other sections of this Specification may relate to and may impose additional work and/or additional materials upon this section. Coordinate any cross-referencing of Specification sections.

1.02 DESCRIPTION OF WORK

- A. Provide all labor, material, equipment, transportation and services to provide concrete formwork for cast in place concrete as shown on the drawings and herein specified.

1.03 REFERENCES

- A. ACI 301 – Specifications for Structural Concrete for Buildings.
- B. ACI 318 - Building Code Requirements for Reinforced Concrete.
- C. ACI 347 – Guide to Formwork for Concrete.
- D. PS-1 - Construction and Industrial Plywood.
- E. WCLIB 17 – Standard Grading Rules

1.04 DESIGN REQUIREMENTS

- A. Design, engineer and construct and remove formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.
- B. Exposed Concrete: Finish according to ACI 301, Chapter 13, Architectural Concrete and as specified.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 347.
- B. Exposed Concrete: Design and construct forms for exposed concrete in accordance with ACI 301.
- C. Deflection: Where dead and live loads on forms will be more than 20 percent greater than the weight of the concrete, provide framing lumber of required strength and comply with ACI 301 and ACI 347 for design of framing members. Keep deflection within specified tolerances.
- D. Concrete Mix Design: Coordinate formwork with the concrete mix design(s) as specified Section 033000 to ensure that form materials, form surfaces, and formwork strength will produce the desired concrete tolerances and finishes.
- E. Formwork Surface Materials: Provide material and work quality that will produce clean and uniform finished surfaces within the specified tolerances conforming to the following requirements:

1. Concrete Exposed to View: Provide material and work quality that will produce clean, smooth, and uniform concrete surfaces.
 2. Concrete Concealed from View: Provide material and work quality that will produce aligned concrete surfaces free of fins, honeycomb, and stains.
- F. Special Formwork Sections: Provide openings, offsets, sinkages, keyways, recesses, moldings, rustication strips, chamfers, blocking, screeds, bulkheads, anchorages, embedded items, and other features. Select materials and provide workmanship that will ensure indicated finishes and features.
- G. Chamfered Corners: Chamfer all external corners unless otherwise indicated.
- H. Removal Features: Design formwork to be readily removable without impact, shock, and damage to concrete surfaces and adjacent materials
- I. Tolerances for Formed Surfaces: Comply with ACI 301. Coordinate with the requirements specified in Section 033000.
1. Class of Surface for Offset between Adjacent Formwork Pieces:
 - a. Surfaces Permanently Exposed to View: 1/8 inch maximum abrupt or gradual irregularity.
 - b. Permanently Concealed Surfaces: Class C.
 2. Gradual and Abrupt Irregularities Tolerances for Formed Surfaces: In addition to the tolerance requirements of ACI 301, form surfaces permanently exposed to view with abrupt and gradual irregularities conforming to the tolerances specified. Abrupt irregularities include offsets and fins resulting from displaced, mismatched, or misplaced forms, sheathing, or liners or from defects in forming materials. Gradual irregularities include irregularities resulting from warping and similar uniform variations from planeness or true curvature. Check gradual irregularities with a straightedge for plane surfaces or a shaped template for curved or warped surfaces. In measuring irregularities, place the straightedge or template in various places on the surface in various directions. Permitted abrupt or gradual irregularities in formed surfaces as measured within a 5-foot length with a straightedge shall be as follows:

1.06 SUBMITTALS

- A. Shop Drawings
1. Indicate dimensions, materials, bracing, and arrangement of form joints, control and expansion joints and ties.
 2. Indicate locations for sleeves and embedded conduit.
 3. Provide Concrete pour plan, include cold weather plan
 4. Submit to Owner for approval prior to fabrication.

1.07 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for design, fabrication, erection and removal of formwork.
- B. Special Inspections: Comply with requirements of WSBC.

1.08 COORDINATION

- A. Coordinate this Section with other Sections of work which require attachment of components to formwork.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Wood Form Materials:
2. Exterior Exposed Work Material, PS-1 graded and grade-marked: APA High Density Overlay (HDO) Plyform Class I and II, Exterior High Density 60-60 surfacing material, APA PS I and Form V345.
 - a. Thickness: As required to maintain surface smoothness without deflection, but not thinner than 5/8 inch.
 3. Lumber: Boards and framing lumber graded and grade-marked in accordance with WCLIB 17. Provide framing lumber of required strength, conforming with WCLIB 17.
 - a. Boards: Provide all West Coast Species "Construction" or "Standard" boards. Use dressed side of lumber for surface in contact with concrete and provide boards with dressed or tongue-and-groove edges to provide tight joints to prevent mortar leakage.
 - b. Framing Lumber: Provide all West Coast Species.
 - 1) Light Framing: "Construction" or "Standard", dressed or rough. Where loads are not a factor, "Utility" is acceptable.
 - 2) Joists and Planks: "No. 2" dressed or rough.
 - 3) Beams and Stringers: "Standard" or "No. 2", dressed or rough.
 4. Waterproofing Coating for Form Edges: Thompson's Waterseal, or as accepted by Architect.
- B. Form Release Agent: Commercial formulation, silicone-free designed for use on all types of forms.
1. Must not bond with, stain, or adversely affect concrete surfaces.
 2. Must not impair subsequent treatment of concrete surfaces, such as bonding or adhesion.
 3. Must not impede curing concrete surfaces by water or curing compounds.
- C. Form Ties: Plugged Cone Rod Type with ends or end fasteners which can be removed without spalling the concrete and which leave a hole equal in depth to the required reinforcement clearance.
1. Hole left by removed end or end fastener to be easily filled to match the surface of the hardened concrete where specified. Provide removable cones 1-1/4 inches in diameter by 1-1/2 inches deep.
 2. Install preformed mortar plugs to match the color of the finished concrete, recessed 1/4 inch, adhered with epoxy adhesive.
- D. Embedded Items and Inserts: Stainless steel, 300 Series, unless noted otherwise.
1. Anchor Bolts for Attached Items: ASTM A-307, hot-dip galvanized in accordance with requirements of ASTM A153, Class C. Refer to Structural Drawings for anchor bolt diameters, spacing, embedment, and other requirements. Provide stainless steel anchor bolts where in contact with preservative treated wood in accordance with Section 06 05 73.33.
 2. Inserts, Frames, and Sleeves: Size and shapes as required to suit conditions.
- E. Expansion Joint Filler for Exterior Slab on Grade: Standard pre-molded bituminuous impregnated fiber, approximately 1/2 inch thick, except as otherwise indicated in Drawings or specified in Division 32.
- F. Chamfer Strips: PVC, wood, or other as approved by Owner prior to installation. Confirm size and configuration with Owner where not indicated in Drawings.
- G. Blockouts and blanks: Wood, rigid polystyrene or other approved materials. Shape as necessary to provide reveal, relief or other design element as indicated in drawings. Design for proper attachment to formwork.

1. Shape with beveled edges for proper draft, minimum 1/4:12 slope, even where not indicated in Drawings. Verify with Owner.
- H. Other Materials and Accessories: Provide and install as necessary to complete work, including related work of other Sections. Verify with Owner prior to installation.

2.02 FABRICATION

- A. Fabricate forms in accordance with approved Shop Drawings.
1. Fabricate forms for exposed concrete in accordance with ACI 301.
- B. Joints:
1. Arrange form panels in symmetrical patterns conforming to general lines of the structure unless otherwise indicated by Architect.
 2. Orient panels on vertical surfaces with long dimension horizontal and make horizontal joints level and continuous, unless otherwise indicated by Architect.
 3. Align form panels on each side of the panel joint with fasteners common to both panels and in a manner which will result in a continuous, unbroken concrete plane surface.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with Drawings. Beginning work constitutes acceptance of existing conditions.
- B. Do not proceed until shop drawings have been accepted.

3.02 LAYOUT

- A. Locate and stake out all forms and establish all lines, levels, and elevations.
- B. Notify Owner 24 hours prior to completion of layout for Owner's review.

3.03 ERECTION

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Construct accurately in accordance with approved Shop Drawings and in a manner that will produce finished concrete surfaces conforming to indicated design and within specified tolerances. Brace to be unyielding. Shore or strengthen formwork subject to over-stressing by concrete loads. Do not re-shore without Structural Engineer's approval.
- C. Erect shoring and reshoring so that forms may be removed without disturbing adjacent shoring and formwork.
- D. Set form boards for smooth surface concrete. Shim forms as required to assure flush form joints on finished surfaces.
1. Make joints and seams mortar-tight.
- E. Keep wood forms moist prior to pour to prevent shrinkage and warping. Maintain forms clean and free from indentations and warpage.

1. Do not use rust-stained steel surfaces for forms in contact with concrete. Do not sandblast steel form surfaces to remove rust or mill scale; remove these imperfections by grinding.
 2. Moisture cycle OSB facing as herein specified.
- F. Compensate for anticipated deflections: Provide camber in formwork as required to compensate for deflections caused by weight and pressures of fresh concrete and construction loads and as otherwise indicated. Provide camber strips to compensate for deflections due to permanent loads and long-term deflections due to shrinkage and creep as required. Provide positive means for adjustment during placement.
- G. Brace temporary closures to prevent warpage or displacement and set tightly against forms in a manner that will prevent loss of concrete mortar.
- H. Support joints with extra studs or girts and in a manner that will ensure true, square intersections.
- I. Assemble forms in a manner that will facilitate their removal without damage to the concrete.
- J. Construct molding shapes, recesses, and projections with smooth finish materials and install in forms with sealed joints.
- K. Provide construction openings in forms where required for concrete pour pockets, vibrator access holes, and inspection openings to aid in proper placement and consolidation of concrete, and close up openings during placement of concrete as applicable. Provide inspection and cleanout openings in forms at bottom of walls and columns and elsewhere as required. Do not close cleanouts until inspected and accepted by the Architect just before placing concrete.
- L. Drill air escape holes in bottom members of blockouts.
- M. Ensure that formed stair risers within a stair assembly are equal.
- N. Provide fillets and chamfer strips at external corners of exposed concrete, except at flush joints. Verify with architect prior to installation.
 1. Accurately shape fillets and chamfers in a manner that will produce uniformly straight lines and edge joints and which will prevent mortar runs. Extend terminal edges to limits, and miter chamfer strips at changes in direction.
- O. Edge Forms and Screeds for Slabs: Set edge forms or bulkheads and intermediate screeds for slabs to obtain required elevations and contours in the finished slab surface. Support screeds substantially without penetrating waterproof membranes and vapor barriers.

3.04 CONSTRUCTION JOINTS

- A. Locate joints as indicated. Support forms for joints in concrete so as to rigidly maintain their positions during placement, vibration, and curing of concrete. Install keys in all joints.
- B. Locate and install construction joints, for which locations are not indicated, so as not to impair strength and appearance of the structure, and indicate such joints on Shop Drawings. Locations of construction joints require approval of the Structural Engineer.
- C. Position joints perpendicularly to longitudinal axis of slab. Verify with Structural Engineer.
- D. Locate joints in walls vertically as indicated, at top of footing, at top of slabs on grade, at bottom of door openings.

- E. Provide keyways in construction joints in walls, footings and slabs, and between walls and footings unless otherwise indicated. Place construction joints perpendicularly to the main reinforcement. Continue reinforcement across construction.
- F. Align form joints and tighten to make watertight.
- G. Exterior Control Joints: Hand tool joints are accepted for slabs on grade, or utilize plastic joint former, unless otherwise indicated.
 - 1. Saw cut joints not accepted.

3.05 FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendation.
 - 1. Coat steel forms with non-staining, rust-inhibiting form release material or otherwise protect against rusting.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items. Do not allow excess form coating material to accumulate in forms or come into contact with reinforcement.
 - 1. Apply form release material to bolts and rods that are to be removed or that are to be free to move.
- C. Prevent dust, dirt, and other substances which may stain concrete form contaminating forms after coating is applied. Clean and re-coat as necessary.

3.06 INSERTS, EMBEDDED ITEMS, AND OPENINGS

- A. Coordinate with work of other Sections in forming and placing slots, raggles, recesses, sleeves, bolts, anchors, and other components and inserts.
- B. Provide openings required for other trades, including Mechanical and Electrical.
- C. Obtain approval before framing openings that are not shown on Structural Drawings.
- D. Install accessories in accordance with manufacturer's instructions, straight, level, true and plumb. Ensure items are not disturbed during concrete placement.
- E. Anchor Bolts: Set as indicated or as required in accordance with Section 033000 and Structural Drawings.
- F. Inserts, Sleeves, and Conduit: Conform to Chapter 6 of ACI 318.

3.07 FORM REMOVAL

- A. Comply with ACI 301.
- B. Remove forms by methods that will not injure, mar, gouge, or chip concrete surfaces, overstress concrete members, or distort formwork. Use air pressure or other approved methods. Do not pry against concrete. Cut off nails flush, leave surfaces clean and unblemished.
- C. Leave forms in place at least 72 hours unless otherwise approved by Architect prior to removal or as scheduled:
 - 1. Footings: 24 hours.
 - 2. Walls and Columns: Minimum 3 days for concealed concrete and 7 days for exposed

- Architectural Concrete.
3. Bottom of Beams and Slabs: 14 days.
 4. Supporting Forms and Shoring: Leave in place until supported concrete has reached 28-day strength.
- D. When repair of surface defects or finishing is required at an early age, forms may be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations and its own weight.
1. Where exposed surfaces are damaged beyond acceptable repairing measures, remove and replace the damaged concrete with new concrete.
- E. Remove forms and shoring for concrete that must support its own weight only after concrete has reached at least 70% of its design strength. Verify removal with Owner prior to pour.
- F. When shoring and other vertical supports are so arranged that the non-load carrying form facing material may be removed without loosening or disturbing the shoring and supports, the facing material may be removed at an earlier age provided the concrete surfaces are not damaged by such earlier removal.
- G. Plan reshoring operations in a manner that will ensure that areas of new construction will not be required to support their own weight. Place reshoring prior to removing shoring. During reshoring, do not permit live loads on new construction. Do not locate reshoring in a manner and location that will overstress members or induce tensile stresses where reinforcing bars have not been provided.
- H. Coordinate form removal with proper curing as specified Section 033000.

3.08 FORM REUSE

- A. Reuse of form boards: Not accepted.

3.09 FORM CLEANING

- A. Clean forms as erection proceeds to remove foreign matter within forms.
- B. Remove debris and clean out forms and formed cavities of debris before pouring concrete.
- C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- D. During freezing weather conditions, remove ice and snow from within forms with compressed air or other mechanical means. Do not use de-icing salts or water.

3.10 INACCESSIBLE FORMS

- A. Forms are to be removed except where specifically indicated to remain. Provide adequate access for removal.

END OF SECTION

032000
CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 CONTRACT CONDITIONS

- A. All other Contract Documents, including Drawings, Specifications, Project Manual and General and Supplemental Conditions of the Contract, complement the requirements of this section.
- B. Other sections of this Specification may relate to and may impose additional work and/or additional materials upon this section. Coordinate any cross-referencing of Specification sections.

1.02 DESCRIPTION OF WORK

- A. Provide all labor, material, equipment, transportation and services to provide concrete reinforcement as shown on the drawings and herein specified.

1.03 SECTION INCLUDES

- A. Reinforcing steel bars, and accessories for cast-in-place concrete.

1.04 REFERENCES

- A. ACI 301 – Specifications for Structural Concrete for Buildings.
- B. ACI 315 - Manual of Standard Practice for Detailing Reinforced Concrete Structures.
- C. ACI 318 - Building Code Requirements For Reinforced Concrete.
- D. ACI SP-66 - American Concrete Institute - Detailing Manual.
- E. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- F. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- G. ASTM A706 - Low Alloy Steel Deformed Bars for Concrete Reinforcement.
- H. AWS D1.4 - Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.

1.05 SUBMITTALS

- A. Shop Drawings: Indicate bar sizes, spacings, locations, grade, lap splices, and quantities of reinforcing steel and wire fabric, bending and cutting schedules. Prepare in accordance with ACI 315.
- B. Manufacturer's Certificate: Mill test report of reinforcement materials analysis. Certify that products meet or exceed structural and specification requirements.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301, ACI SP-66, ACI 318.

1.07 COORDINATION

- A. Coordinate with placement of formwork, formed openings and other Work.
- B. Do not make alterations to shop formed steel without prior acceptance for each instance by Architect/Structural Engineer.

1.08 REGULATORY REQUIREMENTS

- A. Conform to applicable codes for design, fabrication, and placement of reinforcing steel.
- B. Special Inspections: Comply with requirements of WSBC.

PART 2 PRODUCTS

2.01 REINFORCEMENT

- A. Type, Size and Location: In accordance with Structural Notes and Drawings.
- B. Reinforcing Steel: Unfinished, deformed bar, free from rust, dirt, and loose scale. Factory mark with size and grade.
 - 1. Billet-Steel Reinforcing Bar: ASTM A615, Grade 60 (60,000 psi yield strength), or ASTM A615M Grade 420 (420 MPa yield strength).
 - 2. Low Alloy Steel Reinforcing Bar: ASTM A706, Grade 60, or ASTM A706M, Grade 420. Supply where reinforcing steel is to be welded.
 - 3. Provide epoxy finish for any reinforcing exposed to weather for more than 21 days and located where run-off corrosion will permanently stain adjacent concrete.

2.02 ACCESSORY MATERIALS

- A. Tie Wire: Minimum 16 gage double annealed iron wire.
- B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.
- C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel type; size and shape as required.

2.03 FABRICATION

- A. Fabricate concrete reinforcing in accordance with ACI SP-66, ACI 318.
- B. Reinforcing Splices Not Shown on Drawings: Locate at point of minimum stress.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify installation conditions as satisfactory to receive work of this Section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PLACEMENT

- A. Place in accordance with Contract Documents, References, Codes, and Manufacturer's instructions. Where these may be in conflict, the more stringent requirements govern.
- B. Conform to Drawings and the requirements of ACI 301.
- C. Place, support, and secure reinforcement against displacement. Do not deviate from required position. Clean reinforcing of dirt and debris.
- D. Install supports in conformance with the requirements of reference standard ACI 315.
- E. Formed Openings: Place reinforcing to accommodate.
- F. Soil at Footings: Maintain firm and compacted during steel placing.
- G. Do not drive nails in forms for supporting steel.
- H. Stubs and Other Projecting Bars: Place and secure before pouring.
- I. Field Bending Reinforcing steel: Not permitted, except as accepted by Architect/Structural Engineer.
- J. Torch Cutting: Do not use gas cutting torches in field for correcting fabrication errors in reinforcing steel, except as accepted by Structural Engineer.
- K. Splices: Make only where indicated or approved.
- L. Reinforcing Conflict with Other Construction: Notify Architect. Includes in conflict with conduit, piping, inserts, and sleeves: Do not pour concrete until conflicts are resolved by approved methods.
- M. Clear Distance Between Bars, Contact Splices, and Adjacent Splices or Bars: Not less than nominal diameter of bars, 1-1/3 times maximum size of coarse aggregate, nor less than 1 inch, whichever is less.
- N. Reinforcement Bars Placed in Two or More Parallel Layers: Place bars in upper layer directly above those in bottom. Clear distance between layers not less than 1 inch.
- O. Concrete Cover Over Reinforcing: Not less than 1-1/2 inch, except as otherwise indicated by structural Notes and Drawings.
- P. Maintain concrete cover around reinforcing as follows unless otherwise indicated in Drawings:

<u>Item</u>	<u>Coverage</u>
Column Ties	1-1/2 inch
Walls (exposed to weather or backfill)	2 inch
Footings and Concrete Formed Against Earth	3 inch

Slabs on Fill

Center of slab

3.03 WELDING

- A. Field Welding of Reinforcement: Not permitted, except as indicated by Structural Notes and Drawings, or approved. No welding at bend in bar or at cross bars.

END OF SECTION

033000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 CONTRACT CONDITIONS

- A. All other Contract Documents, including Drawings, Specifications, Project Manual and General and Supplemental Conditions of the Contract, complement the requirements of this section.
- B. Other sections of this Specification may relate to and may impose additional work and/or additional materials upon this section. Coordinate any cross-referencing of Specification sections.

1.02 DESCRIPTION OF WORK

- A. Provide all labor, material, equipment, transportation and services to provide cast-in-place concrete work as shown on the drawings and herein specified.

1.03 REFERENCES

- A. ACI 301 - Structural Concrete for Buildings.
- B. ACI 302 - Guide for Concrete Floor and Slab Construction.
- C. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- D. ACI 305R - Hot Weather Concreting.
- E. ACI 306R - Cold Weather Concreting.
- F. ACI 308 - Standard Practice for Curing Concrete.
- G. ACI 309 - Consolidation of Concrete.
- H. ACI 318 - Building Code Requirements for Reinforced Concrete.
- I. ASTM C31 - Concrete Test Specimens.
- J. ASTM C33 - Concrete Aggregates.
- K. ASTM C94 - Ready-Mixed Concrete.
- L. ASTM C150 - Portland Cement.
- M. ASTM C260 - Air Entraining Admixtures for Concrete.
- N. ASTM C494 - Chemicals Admixtures for Concrete.
- O. ASTM C618 - Fly Ash and Raw or Calcinated Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
- P. ASTM C989 - Standard Specification for Slag Cement for Use in Concrete and Mortars.

1.04 SUBMITTALS

- A. Shop Drawings: Pouring procedures and plans showing locations of expansion joints, control joints, cold joints, and construction joints for slab-on-grade concrete and foundation walls.
- B. Design Mix: Provide design mix with supporting strength test record for each mix to Architect 2 weeks prior to work and as required by Structural Notes. Indicate location where mix is to be used. Do not proceed until design mix is approved.
- C. Product Data: Manufacturer's product data, application, instructions, and installation instructions for proprietary materials and items, including admixtures, bonding agents, joint systems, and chemical floor hardeners. Show compliance with specified requirements.
- D. Samples: Joint filler materials.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301.
- B. Acquire cement and aggregate from same source for all work.
- C. Conform to ACI 305R when concreting during hot weather.
- D. Conform to ACI 306R when concreting during cold weather.
- E. Exposed Concrete: ACI, Section 6, Architectural Concrete.

1.06 COORDINATION

- A. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

1.07 REGULATORY REQUIREMENTS

- A. Comply with provisions of ACI 318 for Building Code Requirements.
- B. Special Inspections: Comply with requirements of WSBC. Required during placement of concrete with specified 28 day strength greater than 2500 psi.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150, Type I - Normal.
- B. Fine and Coarse Aggregates: ASTM C33, Angular Coarse Aggregate.
- C. Water: Potable.
- D. Fly Ash: ASTM C618. Class C or F Pozzolan, must not inhibit air entraining of concrete.
- E. Slag: ASTM C989. Grade 100 or 120 ground granulated blast-furnace slag.
- F. Water Soluble Chloride Content: Maximum 0.15% by weight of cementitious material.

2.02 ADMIXTURES

- A. Air Entrainment: ASTM C260.
- B. Admixtures: High range water-reducing admixture, ASTM C 494, Type F.
 - 1. Submit product data for review by Architect.

2.03 ACCESSORIES

- A. Bonding Agent: ASTM C1059 Type II and ASTM C1042 Type II acrylic emulsion designed to permanently bond new concrete and Portland cement sand mixes to horizontal and vertical in-place concrete at interior and exterior conditions.
 - 1. W.R. Grace, Duraweld C.
 - 2. Larsen Products Corp., Weldcrete.
 - 3. Sonneborn, Sonocrete.
 - 4. L&M Construction Chemical, Inc., Everbond.

2.04 JOINT DEVICES AND FILLER MATERIALS

- B. Joint Filler: As specified in Section 03 10 00.

2.05 CONCRETE MIX DESIGN

- A. Performance Design Mix: Submit mix design to Architect for review, minimum 2 weeks prior to use.
- B. Footings:
 - 1. Strength: minimum 3,000 psi after 28 days.
 - 2. Cement Content: 5 sacks per yard, cementitious, minimum.
 - 3. Water/Cement Ratio: Maximum 0.50, conforming to ASTM C94.
 - 4. Aggregate: Maximum 3/4 inch.
 - 5. Admixtures: Add to batch plant concrete mix, proportion to design mix as instructed by manufacturer.
 - 6. Slumps: Maximum 4 inch.
 - a. Greater slumps permitted with accepted design mix incorporating water reducing admixture.
- C. Exterior Exposed Walls: provide where walls are exposed to view, such as perimeter stem walls.
 - 1. Strength: minimum 3,000 psi after 28 days.
 - 2. Cement Content: 5 1/2 sacks per yard, cementitious, minimum.
 - 3. Water/Cement Ratio: Maximum 0.45, conforming to ASTM C94.
 - 4. Fly Ash or Slag: Add to batch plant concrete mix, 100 pcy minimum, maximum 20% by weight of total cementitious material.
 - 5. Aggregate: Maximum 3/4 inch.
 - 6. Admixtures: Add to batch plant concrete mix, proportion to design mix as instructed by Manufacturer.
 - 7. Slumps: Maximum 4 inch.
 - a. Greater slumps permitted with accepted design mix incorporating water reducing admixture.
- D. Exterior Concrete Slabs:
 - 1. Strength: minimum 4,000 psi after 28 days.
 - 2. Cement Content: 5 1/2 sacks per yard, cementitious, minimum.

3. Water/Cement Ratio: Maximum 0.45, conforming to ASTM C94.
 4. Fly Ash or Slag: Add to batch plant concrete mix, 100 pcy minimum, maximum 20% by weight of total cementitious material.
 5. Air Entrainment: 5 percent +/- 1 percent.
 6. Admixtures: Add to batch plant concrete mix, proportion to design mix as instructed by Manufacturer.
- E. Proportioning and Mixing: Conform to requirements of WSBC and ASTM C94.
- F. Mixing and Delivery: ASTM C94. Sampling at delivery, Alternative Procedure No. 2.
- G. Sampling at Delivery: Comply with ASTM C172, cylinders cured per ASTM C31.
- H. Trip Tickets: Accompany with each load, fully executed and signed. Log in with inspector at time of entry.
- I. Retempering of Concrete: Adding water to concrete on site not permitted, except as accepted in writing by Architect/Structural Engineer.

2.06 FINISH

- A. Exterior Vertical Surfaces Exposed to View: As-cast.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify requirements for concrete cover over reinforcement.
- B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.
- C. Verify installation conditions as satisfactory to receive work of this Section. Do not install until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of conditions as satisfactory.

3.02 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- B. Formwork, Reinforcing, and Embedded Items: In place, and approved before placing.
- C. Adding Water to Concrete: Do not add water or make other changes to concrete mix, except as follows:
1. Obtain prior acceptance from Architect or Architect's Structural Engineer.
 2. Do not exceed water cement ratio for mix design as indicated on trip ticket from ready-mix plant.

3.03 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304.

- B. Consolidate concrete, except slabs on grade, by mechanical vibration as specified and in accordance with ACI 309, "Consolidation of Concrete" for standard practice.
- B. Notify Architect minimum 24 hours prior to commencement of operations.
- C. Ensure reinforcement, inserts, embedded parts, formed joint fillers and joint devices are not disturbed during concrete placement.
- D. Separate slabs on grade from vertical surfaces with 1/4 inch thick joint filler.
- E. Extend joint filler from bottom of slab to within 1/4 inch of finished slab surface. Conform to Section 07 92 00 for finish joint sealer requirements.
- F. Install joint devices in accordance with Manufacturer's instructions.
- G. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- H. Place concrete continuously between predetermined expansion, control, and construction joints.
- I. Exposed concrete Walls: Conform with ACI 301 for Architectural Concrete.
 - 1. Deposit in 2 foot maximum lifts.
 - 2. Vibrate areas 18 inch apart maximum.
 - 3. Extend vibrator vertically at least 6 inch to 12 inch into previous pour to ensure a good blend and avoid pour lines.
- J. Do not interrupt successive placement; do not permit cold joints to occur. Place each lift while previous lift is still plastic.
- K. Slope Surfaces to Drain: Slope exterior surfaces away from stem walls to freely drain, true to line without ponding, evenly graded, 3/16 inch per foot, unless indicated otherwise.

3.04 COLD WEATHER

- A. Conform to ACI 306, Recommended Practice for Cold Weather Concreting.
- B. Do not place concrete on ice or frozen ground.
- C. Temperature of Concrete: Maintain 3 days at 55 degrees minimum curing temperature.
- D. When mean daily temperature is below 40 degrees F during first 5 days after pour, protect from freezing for first 24 hours.
- E. In severe weather gradually decrease temperature at end of protection to ambient over 24 hour period.
- F. Use of Heaters:
 - 1. Do not use carbon-dioxide producing heaters without adequate venting.
 - 2. Maintain uniform temperature throughout heated areas.
 - 3. Prevent rapid drying of new concrete. Elevate heaters and protect floor slabs around them with damp sand.
- G. Insulation: May be used to retain heat in newly placed concrete. See ACI 306, Tables for types and amounts satisfactory for given conditions. Protect corners and edges.

3.05 HOT WEATHER

- A. Conform to ACI 305, Recommended Practice for Hot Weather Concreting.
- B. Temperature of Fresh Concrete: 80 degrees F maximum at time of placing.
- C. Following placement, moist cure for 24 hours whenever ambient temperature exceeds 85 degrees F. After 24 hours concrete may be cured by conventional method.
- D. During finishing, whenever ambient temperature exceeds 85 degrees F, fog water spray to prevent plastic shrinkage.

3.06 FINISH OF FORMED SURFACES

- A. Conform accurately to shape, alignment, grades and Details.
- B. Repair Surface Defects: Repair concrete exposed to view in accordance with Section 033000.
- C. Gravel Pockets and Other Voids and Defects: Patch and repair to match adjacent surfaces.
 - 1. Wet down cavities and adjacent areas with clean water before beginning patching and repair.
 - 2. Install cement mortar to match adjacent areas. Use as little water in mix as possible.
 - 3. Re-temper 2 hours later for shrinkage.
 - 4. Fill voids and finish off to match adjacent surfaces in exposed work.
 - 5. Damp cure patch for 7 days.
- D. Finishing Exposed Surfaces:
 - 1. Leave in as-cast condition unless repairs are required by Architect
- E. Leave below grade surfaces ready for waterproof membrane application.

3.08 SLAB FINISHES

- A. Screed to true level and slopes.
- B. Tool salient edges of concrete.
- C. Do not absorb water with neat cement.
- D. Make sharp arise at wall to floor conditions.
- E. Perform scoring indicated. Build in and maintain expansion and control joints.
- F. No "chatter marks" permitted in finish slab.
- G. Light Broom Finish at Exterior Slabs: Finish in accordance with Section 033500.
 - 1. Float finish slab.
 - 2. Promptly after initial set, broom finish surface uniformly and perpendicularly to traffic in approved texture.

3.09 CURING WALLS AND FLOORS

- A. Conform with ACI 301 Section 5.3.6 and ACI 308.

- B. Water cure to maintain minimal loss, and protect from excessive heat and cold during 7 day curing period or until concrete has reached 70% of average compressive strength (f_c).
- C. Maintain curing for minimum 7 days, except where acceptable to Structural Engineer for high early strength concrete.

3.10 CURING EXTERIOR SLABS

- A. Water cure floor surfaces in accordance with ACI 308.
- B. Cover: As soon as possible after finishing, cover interior and exterior slabs with minimum 6 mil polyethylene vapor barrier and leave in place for 7 days. Maintain water cure. Exterior slabs, not subject to drying conditions, may omit requirement for vapor barrier when approved by Structural Engineer.

3.11 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed in accordance with ACI 301.
- B. Provide free access to Work and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of Work.
- D. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.
- E. Three concrete test cylinders will be taken for every 100 or less cu yds of each class of concrete placed.
- E. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.
- F. One slump test will be taken for each set of test cylinders taken.
- G. Coordinate with manufacturers of finish flooring materials for maximum acceptable moisture emissions from concrete slabs.

3.12 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Structural Engineer.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Structural Engineer for each individual area.

3.13 PROTECTION

- A. Protect in-place concrete in accordance with ACI 301, Section 1.8.
- B. Cover to protect interior exposed concrete slabs with clean, unwrinkled kraft curing paper in foot

traffic areas for duration of Project, except as otherwise directed by Owner.

- C. Lay down plywood or OSB cover board over interior concrete slabs in pathways where heavy foot traffic or rolling loads are anticipated over uncured concrete.
- D. Stack and stockpile materials and equipment in manner to prevent mechanical and chemical damage to concrete surfaces. Maintain stacking and stockpiling loading within structural tolerances.
- E. Contain and promptly clean spills to maintain concrete suitable for bonding to finish flooring and finishing of exposed concrete slabs.

END OF SECTION

**SECTION 220500
COMMON WORK RESULTS FOR PLUMBING**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. The provisions of This Section, Common Work Results for Plumbing, apply to all sections in Division 22.
- C. All Sections of Division 22 are interrelated. When interpreting any direction, material, and method specified in any section of Division 22 consider it within the entirety of Work in Division 22.

1.02 SUMMARY

- A. The intent of Division 22 Specifications and the accompanying Drawings is to provide a complete and workable facility with complete systems as shown, specified and required by applicable codes. Include all work specified in Division 22 and shown on the accompanying Drawings, including appurtenances, connections, etc., in the finished job.
- B. The Division 22 Specifications and the accompanying Drawings are complementary and what is called for by one shall be as binding as if called for by both. Items shown on the Drawings are not necessarily included in the Specifications and vice versa. Specifications shall supersede drawings in case of conflict.
- C. Imperative language is frequently used in Division 22 Specifications. Except as otherwise specified, requirements expressed imperatively are to be performed by the Contractor.
- D. The Drawings that accompany the Division 22 Specifications are diagrammatic. They do not show every offset, bend, tee, or elbow which may be required to install work in the space provided and avoid conflicts. Offsets and transitions shall be assumed at a minimum at each duct crossing, structural penetrations through shear walls or beams, structural grids where ceiling heights are restricted, and at piping mains. Follow the Drawing as closely as is practical to do so and install additional bends, offsets and elbows where required by local conditions from measurements taken at the Building, subject to approval, and without additional cost to the Owner. The right is reserved to make any reasonable changes in fixture location prior to roughing-in, without cost impact.

1.03 RELATED WORK

- A. The General and Supplemental Conditions apply to this Division, including but not limited to:
 - 1. Drawings and specifications.
 - 2. Public ordinances, permits.
 - 3. Include payments and fees required by governing authorities for work of this Division.
- B. Division 1, General Requirements, applies to this Division.

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. All products and equipment shall be prohibited from containing pentabrominated, octabrominated and decabrominated diphenyl ethers. Where products or equipment within this specification contain these banned substances, provide complying products and equipment from approved manufacturers with equal performance characteristics.
 - 2. General: All work and materials shall conform to the local and State codes, and all Federal, State and other applicable laws and regulations.
 - 3. Contractor responsible for obtaining and payment for all permits, licenses, and inspection certificates required in accordance with provisions of Contract Documents.
- B. Materials and equipment shall be new. Work shall be of good quality, free of faults and defects and in conformance with the Contract Documents.

- C. Apparatus shall be built and installed to deliver its full rated capacity at the efficiency for which it was designed.
- D. The entire plumbing system and apparatus shall operate at full capacity without objectionable noise or vibration.
- E. All equipment shall be installed level and true. Housekeeping pads and curbs shall account for floor or roof slope.
- F. Materials and Equipment:
 - 1. Each piece of equipment furnished shall meet all detailed requirements of the Drawings and Specifications and shall be suitable for the installation shown. Equipment not meeting all requirements will not be acceptable, even though specified by name along with other manufacturers.
 - 2. Where two or more units of the same class of equipment are furnished, use products of the same manufacturer. Component parts of the entire system need not be products of same manufacturer.
 - 3. Furnish all materials and equipment of size, make, type, and quality herein specified.
 - 4. Equipment scheduled by performance or model number shall be considered the basis of the design. If other specified manufacturer's equipment is provided in lieu of the basis of design equipment the contractor is responsible for all changes and costs which may be necessary to accommodate this equipment, including different sizes and locations for connections, different electrical characteristics, different dimensions, different access requirements or any other differences which impact the project.
- G. Workmanship:
 - 1. General: All materials shall be installed in a neat and professional manner.
 - 2. Manufacturer's Instructions: Follow manufacturer's directions where they cover points not specifically indicated. If they are in conflict with the Drawings and Division 22 Specifications, obtain clarification before starting work.
- H. Cutting and Patching:
 - 1. Cutting, patching, and repairing for the proper installation and completion of the work specified in this Division including plastering, masonry work, concrete work, carpentry work, and painting shall be performed by skilled craftsmen of each respective trade in conformance with the appropriate Division of Work.
 - 2. Additional openings required in building construction shall be made by drilling or cutting. Use of jackhammer is specifically prohibited.
 - 3. Fill holes which are cut oversize so that a tight fit is obtained around the sleeves passing through.
 - 4. All new or existing work cut or damaged shall be restored to its original condition. Where alterations disturb lawns, paving, walks, etc., the surfaces shall be repaired, refinished, and left in condition existing prior to commencement of work.

1.05 SUBMITTALS

- A. Shop Drawings:
 - 1. The Contract Drawings indicate the general layout of the piping, and various items of equipment. Coordination with other trades and with field conditions will be required. For this purpose, prepare Shop Drawings of all piping, and equipment installations. Shop Drawings shall be new drawings prepared by Contractor and not reproductions or tracings of Architect's Drawings. Overlay drawings with shop drawings of other trades and check for conflicts. All drawings shall be same size as Architect's Drawings with title block similar to Contract Drawings and identifying Architect's Drawing number or any reference drawings. All drawings shall be fully dimensioned including both plan and elevation dimensions. Shop drawings cannot be used to make scope changes.
 - 2. Shop drawings shall be prepared in two-dimensional format.
 - 3. Shop drawings shall include but are not limited to:
 - a. Plumbing site plan drawn to same scale as Site Plan.

- b. Complete floor plans with plumbing to a minimum of 1/4-inch equals 1'-0" scale.
 - c. Plumbing in mechanical rooms to a minimum of 1/2-inch equals 1'-0" scale.
 - d. Sections of congested areas to a minimum of 1/2-inch equals 1'-0" scale.
 - e. Fabricated Equipment: Scale and drawing sizes to suit contractor except equipment shall not be less than 1/2-inch equals 1'-0" scale.
 - f. Superplot plans of below ground work with a colored overlay of all trades including, but not limited to, structural footings and foundation, HVAC piping, civil piping, plumbing piping, and power conduit to a minimum of 1/2-inch equals 1'-0" scale.
 - g. Slab penetration drawings of HVAC, plumbing, sprinklers, lighting and electrical to a minimum of 1/4-inch equals 1'-0" scale.
 - 4. Submit shop drawings for review prior to beginning fabrication. Additional shop drawings may be requested when it appears that coordination issues are not being resolved in the field or when there is a question as to whether contract documents are being complied with or the design intent is being met.
- B. Product Data:
 - 1. In general, submit product data for review on all scheduled pieces of equipment, on all equipment requiring electrical connections or connections by other trades, and as required by each specification section or by Drawing notes. Include manufacturer's detailed shop drawings, specifications and data sheets. Data sheets shall include capacities, RPM, BHP, pressure drop, design and operating pressures, temperatures, and similar data. Manufacturer's abbreviations or codes are not acceptable.
- C. Submission Requirements:
 - 1. Shop Drawings and Product Data:
 - a. Refer to Division 1 for additional requirements related to submittals.
 - b. Submit electronic copies of shop drawings and product data for Work of Division 22 in PDF format with each item filed under a folder and labeled with its respective specification section number, article, and paragraph and mark, if applicable.
 - c. Include a complete index in the original submittal. Indicate both original items submitted and note stragglers that will be submitted at a later date to avoid delay in submitting.
 - d. The bulk of the shop drawings and product data, excepting Controls and Instrumentation, shall be included with the original submittal. Controls and Instrumentation submittals may lag but shall be complete when submitted. Partial submittals will not be accepted. Other stragglers submitted after return of the original binder shall include a tab similar to that originally submitted. Upon receipt of the returned late submittal, insert them in the previously submitted binder.
- D. Contractor Responsibilities: It shall be the Contractor's responsibility to:
 - 1. See that all submittals are submitted at one time and are in proper order.
 - 2. Ensure that all equipment will fit in the space provided.
 - 3. Assure that all deviations from Drawings and Specifications are specifically noted in the submittals. Failure to comply will void review automatically.

1.06 OPERATING AND MAINTENANCE MANUAL, PARTS LISTS, AND OWNER'S INSTRUCTIONS

Refer to Division 1 for additional requirements.

- A. Submit three bound copies of manufacturer's operation and maintenance instruction manuals and parts lists for each piece of equipment or item requiring servicing. Literature shall be on 8-1/2"x11" sheets or catalogs suitable for side binding. Submit data when the work is substantially complete, packaged separately, and clearly identified in durable 3-ring binder. Include name and contact information for location of source parts and service for each piece of equipment. Clearly mark and label in each submittal, the piece of equipment provided with the proper nameplate and model number identified. Provide wiring diagrams for all electrically powered equipment.

- B. Instruct Owner thoroughly in proper operation of equipment and systems, in accordance with manufacturer's instruction manuals. Operating instructions shall cover all phases of control.

END OF SECTION

**SECTION 221005
PLUMBING PIPING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe, pipe fittings, specialties, and connections for piping systems.
 - 1. Sanitary sewer.
 - 2. Storm water.

1.02 REFERENCE STANDARDS

- A. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2020.
- B. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2020.
- C. ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020.
- D. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2016.
- E. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe; 2014 (Reapproved 2021).
- F. ASTM F679 - Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings; 2021.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. List of piping materials indicating the service it is being used for. Do not submit piping product data.
- C. Product data on mechanical couplings and related components.
- D. Test Reports and Certificates: Submit certificates of inspections and pipe tests to owner.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with applicable codes.
- B. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- B. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 SANITARY SEWER PIPING, BURIED BEYOND 5 FEET OF BUILDING

- A. PVC Pipe: ASTM D2665 or ASTM D3034.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.02 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. PVC Pipe: ASTM D2665 or ASTM D3034.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.03 STORM WATER PIPING, BURIED BEYOND 5 FEET OF BUILDING

- A. PVC Pipe: ASTM D3034 DR 35.
 - 1. Fittings: PVC.
 - 2. Joints: Push-on, using ASTM F477 elastomeric gaskets.
- B. PVC Pipe: ASTM D2665 or ASTM D3034.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.04 STORM WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. PVC Pipe: ASTM D2665 or ASTM D3034.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.
- B. PVC Pipe: ASTM D2665, ASTM D3034, or ASTM F679.
 - 1. Fittings: PVC.
 - 2. Joints: Push-on, using ASTM F477 elastomeric gaskets.

2.05 STORM WATER PIPING, ABOVE GRADE

- A. PVC Pipe: ASTM D2665 or ASTM D3034.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

PART 3 EXECUTION

3.01 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- C. Group piping whenever practical at common elevations.
- D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 220516.
- E. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting.
 - 1. Painting of interior plumbing systems and components is specified in Section 099123.
 - 2. Painting of exterior plumbing systems and components is specified in Section 099113.
- F. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- G. Flexible couplings to be used only when expansion, contraction, deflection or noise and vibration is to be dampened, as detailed or specified.
- H. Gaskets shall be molded and produced by the coupling manufacturer, and shall be suitable for the intended service.
- I. Sleeve pipes passing through partitions, walls and floors.

END OF SECTION

**SECTION 221006
PLUMBING PIPING SPECIALTIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cleanouts.

1.02 RELATED REQUIREMENTS

- A. Section 221005 - Plumbing Piping.

1.03 REFERENCE STANDARDS

- A. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers; 2017.
- B. NSF 61 - Drinking Water System Components - Health Effects; 2020.
- C. NSF 372 - Drinking Water System Components - Lead Content; 2020.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.02 CLEANOUTS

- A. Manufacturers:
 - 1. Jay R. Smith Manufacturing Company
 - 2. Zurn Industries, LLC
 - 3. Substitutions: See Section 016000 - Product Requirements.
- B. Cleanouts at Exterior Surfaced Areas:
 - 1. Round cast nickel bronze access frame and non-skid cover.
- C. Cleanouts at Exterior Unsurfaced Areas:
 - 1. Line type with lacquered cast iron body and round epoxy coated gasketed cover.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- C. Encase exterior cleanouts in concrete flush with grade.
- D. Install floor cleanouts at elevation to accommodate finished floor.

**SECTION 260505
SELECTIVE DEMOLITION FOR ELECTRICAL**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical demolition.

1.02 RELATED REQUIREMENTS

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that abandoned wiring and equipment serve only abandoned facilities.
- B. Report discrepancies to Owner before disturbing existing installation.
- C. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
- B. Coordinate utility service outages with utility company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
 - 2. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Perform work for removal and disposal of equipment and materials containing toxic substances regulated under the Federal Toxic Substances Control Act (TSCA) in accordance with applicable federal, state, and local regulations. Applicable equipment and materials include, but are not limited to:
 - 1. PCB-containing electrical equipment, including transformers, capacitors, and switches.
 - 2. PCB- and DEHP-containing lighting ballasts.
 - 3. Mercury-containing lamps and tubes, including fluorescent lamps, high intensity discharge (HID), arc lamps, ultra-violet, high pressure sodium, mercury vapor, ignitron tubes, neon, and incandescent.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

- G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- H. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.
- I. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

3.04 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment that remain or that are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

END OF SECTION

**SECTION 260519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single conductor building wire.
- B. Underground feeder and branch-circuit cable.
- C. Armored cable.
- D. Metal-clad cable.
- E. Wiring connectors.
- F. Electrical tape.
- G. Oxide inhibiting compound.
- H. Wire pulling lubricant.
- I. Cable ties.

1.02 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 260505 - Selective Demolition for Electrical: Disconnection, removal, and/or extension of existing electrical conductors and cables.
- C. Section 260526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2018).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011 (Reapproved 2017).
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).
- E. ASTM B800 - Standard Specification for 8000 Series Aluminum Alloy Wire for Electrical Purposes - Annealed and Intermediate Tempers; 2005 (Reapproved 2015).
- F. ASTM B801 - Standard Specification for Concentric-Lay-Stranded Conductors of 8000 Series Aluminum Alloy Wire for Subsequent Covering of Insulation; 2016.
- G. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2017.
- H. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- I. NECA 104 - Recommended Practice for Installing Aluminum Building Wire and Cable; 2012.
- J. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC); 2012.
- K. NECA 121 - Standard for Installing Nonmetallic-Sheathed Cable (Type NM-B) and Underground Feeder and Branch-Circuit Cable (Type UF); 2007.
- L. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2009.
- M. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.

- N. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- O. UL 4 - Armored Cable; Current Edition, Including All Revisions.
- P. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
- Q. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- R. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- S. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
- T. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.
- U. UL 493 - Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables; Current Edition, Including All Revisions.
- V. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.
- W. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate the installation of direct burial cable with other trades to avoid conflicts with piping or other potential conflicts.
 - 3. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
 - 4. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.
- C. Design Data: Indicate voltage drop and ampacity calculations for aluminum conductors substituted for copper conductors. Include proposed modifications to raceways, boxes, wiring gutters, enclosures, etc. to accommodate substituted conductors.
- D. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.08 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Engineer and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Underground feeder and branch-circuit cable is permitted only as follows:
 - 1. Where not otherwise restricted, may be used:
 - a. For damp, wet, or corrosive locations as a substitute for NFPA 70, Type NMC nonmetallic-sheathed cable, when nonmetallic-sheathed cable is permitted.
 - 2. In addition to other applicable restrictions, may not be used:
 - a. Where exposed to view.
 - b. Where exposed to damage.
- D. Armored cable is permitted only as follows:
 - 1. Where not otherwise restricted, may be used:
 - a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
 - b. Where concealed in hollow stud walls, above accessible ceilings, and under raised floors for branch circuits up to 20 A.
 - 1) Exception: Provide single conductor building wire in raceway for circuit homerun from first outlet to panelboard.
- E. Metal-clad cable is permitted only as follows:
 - 1. Where not otherwise restricted, may be used:
 - a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
 - b. Where concealed in hollow stud walls, above accessible ceilings, and under raised floors for branch circuits up to 20 A.
 - 1) Exception: Provide single conductor building wire in raceway for circuit homerun from first outlet to panelboard.
 - 2. In addition to other applicable restrictions, may not be used:
 - a. Where exposed to damage.
 - b. For damp, wet, or corrosive locations, unless provided with a PVC jacket listed as suitable for those locations.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductors for Grounding and Bonding: Also comply with Section 260526.
- H. Conductors and Cables Installed Exposed in Spaces Used for Environmental Air (only where specifically permitted): Plenum rated, listed and labeled as suitable for use in return air plenums.
- I. Conductor Material:
 - 1. Provide copper conductors except where aluminum conductors are specifically indicated or permitted for substitution. Conductor sizes indicated are based on copper unless

- specifically indicated as aluminum. Conductors designated with the abbreviation "AL" indicate aluminum.
- a. Substitution of aluminum conductors for copper is permitted, when approved by Engineer and authority having jurisdiction, only for the following:
 - 1) Services: Copper conductors size 1/0 AWG and larger.
 - 2) Feeders: Copper conductors size 1/0 AWG and larger.
 - b. Where aluminum conductors are substituted for copper, comply with the following:
 - 1) Size aluminum conductors to provide, when compared to copper sizes indicated, equivalent or greater ampacity and equivalent or less voltage drop.
 - 2) Increase size of raceways, boxes, wiring gutters, enclosures, etc. as required to accommodate aluminum conductors.
2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
 3. Tinned Copper Conductors: Comply with ASTM B33.
 4. Aluminum Conductors (only where specifically indicated or permitted for substitution): AA-8000 series aluminum alloy conductors recognized by ASTM B800 and compact stranded in accordance with ASTM B801 unless otherwise indicated.
- J. Minimum Conductor Size:
1. Branch Circuits: 12 AWG.
 - a. Exceptions:
 - 1) 20 A, 120 V circuits longer than 100 feet: 10 AWG, for voltage drop.
 - 2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
 - 3) 20 A, 277 V circuits longer than 250 feet: 10 AWG, for voltage drop.
 2. Control Circuits: 14 AWG.
- K. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- L. Conductor Color Coding:
1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 2. Color Coding Method: Integrally colored insulation.
 - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
 3. Color Code:
 - a. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
 - b. Equipment Ground, All Systems: Green.

2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Manufacturers:
1. Copper Building Wire:
 - a. Cerro Wire LLC: www.cerrowire.com/#sle.
 - b. Encore Wire Corporation: www.encorewire.com/#sle.
 - c. General Cable Technologies Corporation: www.generalcable.com/#sle.
 - d. Southwire Company: www.southwire.com/#sle.
 - e. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
 2. Aluminum Building Wire (only where specifically indicated or permitted for substitution):
 - a. Encore Wire Corporation: www.encorewire.com/#sle.
 - b. Southwire Company: www.southwire.com/#sle.

- c. Stabiloy, a brand of General Cable Technologies Corporation: www.stabiloy.com/#sle.
 - d. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
- B. Description: Single conductor insulated wire.
- C. Conductor Stranding:
 - 1. Feeders and Branch Circuits:
 - a. Size 10 AWG and Smaller: Solid or stranded.
 - b. Size 8 AWG and Larger: Stranded.
 - 2. Control Circuits: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation:
 - 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.
 - a. Size 4 AWG and Larger: Type XHHW-2.
 - b. Installed Underground: Type XHHW-2.
 - 2. Aluminum Building Wire (only where specifically indicated or permitted for substitution): Type XHHW-2.

2.04 UNDERGROUND FEEDER AND BRANCH-CIRCUIT CABLE

- A. Manufacturers:
 - 1. Cerro Wire LLC: www.cerrowire.com/#sle.
 - 2. Encore Wire Corporation: www.encorewire.com/#sle.
 - 3. Southwire Company: www.southwire.com/#sle.
 - 4. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
- B. Description: NFPA 70, Type UF multiple-conductor cable listed and labeled as complying with UL 493, Type UF-B.
- C. Provide equipment grounding conductor unless otherwise indicated.
- D. Conductor Stranding:
 - 1. Size 10 AWG and Smaller: Solid.
 - 2. Size 8 AWG and Larger: Stranded.
- E. Insulation Voltage Rating: 600 V.

2.05 ARMORED CABLE

- A. Manufacturers:
 - 1. AFC Cable Systems Inc: www.afcweb.com/#sle.
 - 2. Encore Wire Corporation: www.encorewire.com/#sle.
 - 3. Southwire Company: www.southwire.com/#sle.
 - 4. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
- B. Description: NFPA 70, Type AC cable listed and labeled as complying with UL 4, and listed for use in classified firestop systems to be used.
- C. Conductor Stranding:
 - 1. Size 10 AWG and Smaller: Solid.
 - 2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation: Type THHN.
- F. Grounding: Combination of interlocking armor and integral bonding wire.
- G. Armor: Steel, interlocked tape.

2.06 METAL-CLAD CABLE

- A. Manufacturers:
 - 1. AFC Cable Systems Inc: www.afcweb.com/#sle.
 - 2. Encore Wire Corporation: www.encorewire.com/#sle.
 - 3. Southwire Company: www.southwire.com/#sle.
 - 4. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
- B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
- C. Conductor Stranding:
 - 1. Size 10 AWG and Smaller: Solid or stranded.
 - 2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.
- F. Grounding: Full-size integral equipment grounding conductor.
- G. Armor: Steel, interlocked tape.
- H. Provide PVC jacket applied over cable armor where indicated or required for environment of installed location.

2.07 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Wiring Connectors for Splices and Taps:
 - 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
 - 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
 - 3. Connectors for Aluminum Conductors: Use compression connectors or mechanical connectors.
- C. Wiring Connectors for Terminations:
 - 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
 - 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
 - 3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
 - 4. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
 - 5. Aluminum Conductors: Use compression connectors or mechanical connectors for all connections.
 - 6. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
- D. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- E. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
 - 1. Manufacturers:
 - a. 3M: www.3m.com/#sle.

- b. Ideal Industries, Inc: www.idealindustries.com/#sle.
 - c. NSI Industries LLC: www.nsiindustries.com/#sle.
 - d. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
- F. Mechanical Connectors: Provide bolted type or set-screw type.
- 1. Manufacturers:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. IlSCO: www.ilSCO.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 - d. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
- G. Compression Connectors: Provide circumferential type or hex type crimp configuration.
- 1. Manufacturers:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. IlSCO: www.ilSCO.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 - d. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
- H. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.
- 1. Manufacturers:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. IlSCO: www.ilSCO.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 - d. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."

2.08 ACCESSORIES

- A. Electrical Tape:
- 1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. Plymouth Rubber Europa: www.plymouthrubber.com/#sle.
 - c. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
 - 2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
 - 3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
- B. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
- 1. Manufacturers:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. Ideal Industries, Inc: www.idealindustries.com/#sle.
 - c. IlSCO: www.ilSCO.com/#sle.
- C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
- 1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. American Polywater Corporation: www.polywater.com/#sle.

- c. Ideal Industries, Inc: www.idealindustries.com/#sle.
 - d. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
- D. Cable Ties: Material and tensile strength rating suitable for application.
- 1. Manufacturers:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Circuiting Requirements:
 - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 - 2. When circuit destination is indicated without specific routing, determine exact routing required.
 - 3. Arrange circuiting to minimize splices.
 - 4. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
 - 5. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
 - 6. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
 - 7. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Install aluminum conductors in accordance with NECA 104.
- E. Install underground feeder and branch-circuit cable (Type UF-B) in accordance with NECA 121.
- F. Install armored cable (Type AC) in accordance with NECA 120.
- G. Install metal-clad cable (Type MC) in accordance with NECA 120.
- H. Installation in Raceway:
 - 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 - 2. Pull all conductors and cables together into raceway at same time.
 - 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 - 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- I. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

- J. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
 - 1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
 - 2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.
- K. Terminate cables using suitable fittings.
 - 1. Armored Cable (Type AC):
 - a. Use listed fittings and anti-short, insulating bushings.
 - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
 - 2. Metal-Clad Cable (Type MC):
 - a. Use listed fittings.
 - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
- L. Install conductors with a minimum of 12 inches of slack at each outlet.
- M. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- N. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- O. Make wiring connections using specified wiring connectors.
 - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies.
 - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 - 3. Do not remove conductor strands to facilitate insertion into connector.
 - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
 - 5. Connections for Aluminum Conductors: Fill connectors with oxide inhibiting compound where not pre-filled by manufacturer.
 - 6. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 7. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- P. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
- Q. Insulate ends of spare conductors using vinyl insulating electrical tape.
- R. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.
- S. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
- T. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.03 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.

- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
 - 1. Disconnect surge protective devices (SPDs) prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPDs connected.
- D. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

**SECTION 260526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground bars.

1.02 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System; 2012.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify exact locations of underground metal water service pipe entrances to building.
 - 2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.
- C. Project Record Documents: Record actual locations of grounding electrode system components and connections.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

- E. Grounding System Resistance:
 - 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Engineer. Precipitation within the previous 48 hours does not constitute normally dry conditions.
 - 2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
- F. Grounding Electrode System:
 - 1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
 - a. Provide continuous grounding electrode conductors without splice or joint.
 - b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
 - 2. Metal Underground Water Pipe(s):
 - a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet at an accessible location not more than 5 feet from the point of entrance to the building.
 - b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
 - c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
 - 3. Metal In-Ground Support Structure:
 - a. Provide connection to metal in-ground support structure that is in direct contact with earth in accordance with NFPA 70.
 - 4. Concrete-Encased Electrode:
 - a. Provide connection to concrete-encased electrode consisting of not less than 20 feet of either steel reinforcing bars or bare copper conductor not smaller than 4 AWG embedded within concrete foundation or footing that is in direct contact with earth in accordance with NFPA 70.
 - 5. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
 - 6. Ground Bar: Provide ground bar, separate from service equipment enclosure, for common connection point of grounding electrode system bonding jumpers as permitted in NFPA 70. Connect grounding electrode conductor provided for service-supplied system grounding to this ground bar.
 - a. Ground Bar Size: 1/4 by 2 by 12 inches unless otherwise indicated or required.
 - b. Ground Bar Mounting Height: 18 inches above finished floor unless otherwise indicated.
- G. Bonding and Equipment Grounding:
 - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 - 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 - 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 - 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
 - 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.

6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 1. Provide products listed, classified, and labeled as suitable for the purpose intended.
 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:
 1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:
 - 1) Use bare copper conductors where installed underground in direct contact with earth.
 - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:
 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
 3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
 4. Manufacturers - Mechanical and Compression Connectors:
 - a. Advanced Lightning Technology (ALT): www.altfab.com/#sle.
 - b. Burndy LLC: www.burndy.com/#sle.
 - c. Harger Lightning & Grounding: www.harger.com/#sle.
 - d. Thomas & Betts Corporation: www.tnb.com/#sle.
 - e. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
 5. Manufacturers - Exothermic Welded Connections:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. Cadweld, a brand of Erico International Corporation: www.erico.com/#sle.
 - c. thermOweld, subsidiary of Continental Industries; division of Burndy LLC : www.thermoweld.com/#sle.
 - d. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
- D. Ground Bars:
 1. Description: Copper rectangular ground bars with mounting brackets and insulators.
 2. Size: As indicated.
 3. Holes for Connections: As indicated or as required for connections to be made.
 4. Manufacturers:
 - a. Advanced Lightning Technology (ALT): www.altfab.com/#sle.
 - b. Erico International Corporation: www.erico.com/#sle.
 - c. Harger Lightning & Grounding: www.harger.com/#sle.
 - d. thermOweld, subsidiary of Continental Industries; division of Burndy LLC : www.thermoweld.com/#sle.
 - e. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.

- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Make grounding and bonding connections using specified connectors.
 - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 - 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 - 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- D. Identify grounding and bonding system components in accordance with Section 260553.

3.03 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.13.
- D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION

**SECTION 260529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

- A. Section 260548 - Vibration and Seismic Controls for Electrical Systems.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2015.
- D. MFMA-4 - Metal Framing Standards Publication; 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
 - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.

1.06 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with applicable building code.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
 - 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 - 3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be

- supported with a minimum safety factor of 4. Include consideration for vibration, equipment operation, and shock loads where applicable.
4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
 2. Conduit Clamps: Bolted type unless otherwise indicated.
 3. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation
: www.cooperindustries.com/#sle.
 - b. Erico International Corporation: www.erico.com/#sle.
 - c. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - d. Thomas & Betts Corporation: www.tnb.com/#sle.
 - e. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
- C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
1. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation
: www.cooperindustries.com/#sle.
 - b. Erico International Corporation: www.erico.com/#sle.
 - c. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - d. Thomas & Betts Corporation: www.tnb.com/#sle.
 - e. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
- D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
1. Comply with MFMA-4.
 2. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Thomas & Betts Corporation: www.tnb.com/#sle.
 - c. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
 - d. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests."
- E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
- F. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
 2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
 3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
 4. Hollow Masonry: Use toggle bolts.
 5. Hollow Stud Walls: Use toggle bolts.
 6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
 7. Sheet Metal: Use sheet metal screws.
 8. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.

- a. Comply with MFMA-4.
- b. Channel Material: Use galvanized steel.
- c. Manufacturer: Same as manufacturer of metal channel (strut) framing system.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by Owner, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Owner, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Provide required vibration isolation and/or seismic controls in accordance with Section 260548.
- H. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- I. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.
- J. Secure fasteners according to manufacturer's recommended torque settings.
- K. Remove temporary supports.

3.03 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect support and attachment components for damage and defects.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

SECTION 260533.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Intermediate metal conduit (IMC).
- C. PVC-coated galvanized steel rigid metal conduit (RMC).
- D. Flexible metal conduit (FMC).
- E. Liquidtight flexible metal conduit (LFMC).
- F. Electrical metallic tubing (EMT).
- G. Rigid polyvinyl chloride (PVC) conduit.
- H. Conduit fittings.
- I. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260548 - Vibration and Seismic Controls for Electrical Systems.
- D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2015.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2015.
- C. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit (EIMC); 2005.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.
- F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2003.
- G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- H. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit; 2018.
- I. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2013.
- J. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2016.
- K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- L. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
- M. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- N. UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.
- O. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- P. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- Q. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

- R. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
 4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
- B. Sequencing:
1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.
- C. Shop Drawings:
1. Indicate proposed arrangement for conduits to be installed within structural concrete slabs, where permitted.
 2. Indicate proposed arrangement for conduits to be installed where exposed to view in finished locations.
- D. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
1. Under Slab on Grade: Use galvanized steel rigid metal conduit, rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
 2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit or rigid PVC conduit.
 3. Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit, rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
 4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
 5. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends greater than 45 degrees.
- D. Embedded Within Concrete:
1. Within Slab on Grade (within structural slabs only where approved by Structural Engineer) : Use galvanized steel rigid metal conduit, rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).

2. Within Slab Above Ground (within structural slabs only where approved by Structural Engineer): Use galvanized steel rigid metal conduit or rigid PVC conduit.
3. Within Concrete Walls Above Ground: Use galvanized steel rigid metal conduit or rigid PVC conduit.
- E. Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), electrical metallic tubing (EMT), or rigid PVC conduit.
- F. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).
- G. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).
- H. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.
- I. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).
- J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).
- K. Exposed, Exterior: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or PVC-coated galvanized steel rigid metal conduit.

2.02 CONDUIT REQUIREMENTS

- A. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Minimum Conduit Size, Unless Otherwise Indicated:
 1. Branch Circuits: 1/2 inch (16 mm) trade size.
 2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
 3. Underground, Interior: 3/4 inch (21 mm) trade size.
 4. Underground, Exterior: 1 inch (27 mm) trade size.
- D. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Manufacturers:
 1. Allied Tube & Conduit: www.alliedeg.com/#sle.
 2. Republic Conduit: www.republic-conduit.com/#sle.
 3. Wheatland Tube, a Division of Zekelman Industries: www.wheatland.com/#sle.
 4. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests".
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- C. Fittings:
 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 1203 for the classification of the installed location.
 3. Material: Use steel or malleable iron.
 4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 INTERMEDIATE METAL CONDUIT (IMC)

- A. Manufacturers:
 1. Allied Tube & Conduit: www.alliedeg.com/#sle.
 2. Republic Conduit: www.republic-conduit.com/#sle.

3. Wheatland Tube, a Division of Zekelman Industries: www.wheatland.com/#sle.
 4. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests".
- B. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- C. Fittings:
1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 1203 for the classification of the installed location.
 3. Material: Use steel or malleable iron.
 4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.05 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Manufacturers:
1. Thomas & Betts Corporation: www.tnb.com/#sle.
 2. Robroy Industries: www.robroy.com/#sle.
 3. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests".
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.
- C. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil.
- D. PVC-Coated Fittings:
1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
 2. Non-Hazardous Locations: Use fittings listed and labeled as complying with UL 514B.
 3. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 1203 for the classification of the installed location.
 4. Material: Use steel or malleable iron.
 5. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil.
- E. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil.

2.06 FLEXIBLE METAL CONDUIT (FMC)

- A. Manufacturers:
1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
 2. Electri-Flex Company: www.electriflex.com/#sle.
 3. International Metal Hose: www.metalhose.com/#sle.
 4. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests".
- B. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- C. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.

2.07 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Manufacturers:
1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
 2. Electri-Flex Company: www.electriflex.com/#sle.

3. International Metal Hose: www.metalhose.com/#sle.
 4. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests".
- B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- C. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.

2.08 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
1. Allied Tube & Conduit: www.alliedeg.com/#sle.
 2. Republic Conduit: www.republic-conduit.com/#sle.
 3. Wheatland Tube, a Division of Zekelman Industries: www.wheatland.com/#sle.
 4. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests".
- B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use compression (gland) or set-screw type.
 - a. Do not use indenter type connectors and couplings.
 4. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.

2.09 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Manufacturers:
1. Cantex Inc: www.cantexinc.com/#sle.
 2. Carlon, a brand of Thomas & Betts Corporation: www.carlon.com/#sle.
 3. JM Eagle: www.jmeagle.com/#sle.
 4. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests".
- B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- C. Fittings:
1. Manufacturer: Same as manufacturer of conduit to be connected.
 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.10 ACCESSORIES

- A. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
- B. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- C. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.

- D. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- D. Install intermediate metal conduit (IMC) in accordance with NECA 101.
- E. Install PVC-coated galvanized steel rigid metal conduit (RMC) using only tools approved by the manufacturer.
- F. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- G. Conduit Routing:
 - 1. Conduits in the following areas may be exposed, unless otherwise indicated:
 - a. Electrical rooms.
 - b. Mechanical equipment rooms.
 - c. Within joists in areas with no ceiling.
 - 2. Unless otherwise approved, do not route conduits exposed:
 - a. Across floors.
 - b. Across roofs.
 - c. Across building exterior surfaces.
 - 3. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
 - 4. Arrange conduit to maintain adequate headroom, clearances, and access.
 - 5. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
 - 6. Group parallel conduits in the same area together on a common rack.
- H. Conduit Support:
 - 1. Secure and support conduits in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
 - 2. Provide required vibration isolation and/or seismic controls in accordance with Section 260548.
 - 3. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- I. Connections and Terminations:
 - 1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 - 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 - 3. Use suitable adapters where required to transition from one type of conduit to another.
 - 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 - 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 - 6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
 - 7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
- J. Penetrations:

1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 4. Conceal bends for conduit risers emerging above ground.
 5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
 6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
- K. Underground Installation:
1. Minimum Cover, Unless Otherwise Indicated or Required:
 - a. Underground, Exterior: 24 inches.
 2. Underground duct banks (two or more conduits installed in parallel):
 - a. Support ducts on duct spacers suitable for the conduit size used.
 - b. Provide spacer quantity per length per manufacturer's instructions. Stagger spacers at least 6 inches between tiers.
 - c. Secure entire duct assembly together with non-metallic straps.
 - d. Provide concrete encasement of entire duct bank where indicated, otherwise provide sand backfill.
 3. Provide underground warning tape in accordance with Section 260553 along entire conduit length for service entrance where not concrete-encased.
- L. Embedment Within Structural Concrete Slabs (only where approved by Structural Engineer):
1. Secure conduits to prevent floating or movement during pouring of concrete.
- M. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
 2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
 3. Where conduits are subject to earth movement by settlement or frost.
- N. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
1. Where conduits pass from outdoors into conditioned interior spaces.
 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
 3. Where conduits penetrate coolers or freezers.
- O. Provide grounding and bonding in accordance with Section 260526.

3.02 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.

- D. Correct deficiencies and replace damaged or defective conduits.

END OF SECTION

SECTION 260533.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.
- C. Underground boxes/enclosures.

1.02 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and underground boxes/enclosures.
- C. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.

PART 2 PRODUCTS

2.01 BOXES

- A. General Requirements:
 - 1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
 - 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
 - 3. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 - 5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
 - 1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
 - 2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 - 3. Use suitable concrete type boxes where flush-mounted in concrete.
 - 4. Use suitable masonry type boxes where flush-mounted in masonry walls.
 - 5. Use raised covers suitable for the type of wall construction and device configuration where required.
 - 6. Use shallow boxes where required by the type of wall construction.
 - 7. Do not use "through-wall" boxes designed for access from both sides of wall.
 - 8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
 - 9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 - 10. Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.
 - 11. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
 - 12. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
 - 13. Wall Plates: Comply with Section 262726.

14. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation
: www.cooperindustries.com/#sle.
 - b. Hubbell Incorporated; Bell Products: www.hubbell-rtb.com/#sle.
 - c. Hubbell Incorporated; RACO Products: www.hubbell-rtb.com/#sle.
 - d. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - e. Thomas & Betts Corporation: www.tnb.com/#sle.
 - f. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests".
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
 1. Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 2. NEMA EN 10250 Environment Type, Unless Otherwise Indicated:
 - a. Indoor Clean, Dry Locations: Type 1, painted steel.
 - b. Outdoor Locations: Type 3R, painted steel.
 3. Junction and Pull Boxes Larger Than 100 cubic inches:
 - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
- D. Underground Boxes/Enclosures:
 1. Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.
 2. Size: As indicated on drawings.
 3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 12 inches.
 4. Applications:
 - a. Sidewalks and Landscaped Areas Subject Only to Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum SCTE 77 Tier 8 load rating.
 - b. Do not use polymer concrete enclosures in areas subject to deliberate vehicular traffic.
 5. Polymer Concrete Underground Boxes/Enclosures: Comply with SCTE 77.
 - a. Manufacturers:
 - 1) Hubbell Incorporated; Quazite Products: www.hubbellpowersystems.com/#sle.
 - 2) MacLean Highline: www.macleanhigline.com/#sle.
 - 3) Oldcastle Precast, Inc: www.oldcastleprecast.com/#sle.
 - 4) Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests".
 - b. Combination fiberglass/polymer concrete boxes/enclosures are acceptable.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Box Locations:
 1. Locate boxes to be accessible. Provide access panels in accordance with Section 083100 as required.
 2. Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches horizontal separation.

3. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
 - a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
 - b. Do not install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.
4. Locate junction and pull boxes in the following areas, unless otherwise indicated:
 - a. Concealed above accessible suspended ceilings.
 - b. Within joists in areas with no ceiling.
 - c. Electrical rooms.
 - d. Mechanical equipment rooms.
- E. Box Supports:
 1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide required seismic controls in accordance with Section 260548.
 3. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
- F. Install boxes plumb and level.
- G. Flush-Mounted Boxes:
 1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.
- H. Install boxes as required to preserve insulation integrity.
- I. Underground Boxes/Enclosures:
 1. Install enclosure on gravel base, minimum 6 inches deep.
 2. Install additional bracing inside enclosures in accordance with manufacturer's instructions to minimize box sidewall deflections during backfilling. Backfill with cover bolted in place.
- J. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- K. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
- L. Close unused box openings.
- M. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- N. Provide grounding and bonding in accordance with Section 260526.

3.02 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

END OF SECTION

SECTION 260548
VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vibration isolation requirements.
- B. Seismic control requirements.
 - 1. Includes requirements for seismic qualification of equipment not specified in this section.
- C. Seismic restraint systems.

1.02 DEFINITIONS

- A. Electrical Component: Where referenced in this section in regards to seismic controls, applies to any portion of the electrical system subject to seismic evaluation in accordance with applicable codes, including distributed systems (e.g. conduit, cable tray).
- B. Seismic Restraint: Structural members or assemblies of members or manufactured elements specifically designed and applied for transmitting seismic forces between components and the seismic force-resisting system of the structure.

1.03 REFERENCE STANDARDS

- A. ASHRAE (HVACA) - ASHRAE Handbook - HVAC Applications; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. FEMA 413 - Installing Seismic Restraints for Electrical Equipment; 2004.
- C. FEMA E-74 - Reducing the Risks of Nonstructural Earthquake Damage; 2012.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. SMACNA (SRM) - Seismic Restraint Manual Guidelines for Mechanical Systems; 2008.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate selection and arrangement of vibration isolation and/or seismic control components with the actual equipment to be installed.
 - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 4. Seismic Controls:
 - a. Coordinate the arrangement of seismic restraints with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - b. Coordinate the work with other trades to accommodate relative positioning of essential and non-essential components in consideration of seismic interaction.
- B. Sequencing:
 - 1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Design Documents: Prepare and submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, details, and calculations.

1.06 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with applicable building code.

PART 2 PRODUCTS

2.01 VIBRATION ISOLATION REQUIREMENTS

- A. Design and provide vibration isolation systems to reduce vibration transmission to supporting structure from vibration-producing electrical equipment and/or electrical connections to vibration-isolated equipment.
- B. Comply with applicable general recommendations of ASHRAE (HVACA), where not in conflict with other specified requirements:
- C. General Requirements:
 - 1. Select vibration isolators to provide required static deflection.
 - 2. Select vibration isolators for uniform deflection based on distributed operating weight of actual installed equipment.
 - 3. Select seismic type vibration isolators to comply with seismic design requirements, including conditions of equipment seismic certification where applicable.
- D. Conduit Isolation:
 - 1. Use flexible conduit or cable for electrical connections to vibration-isolated equipment, including equipment installed under other sections or by others.

2.02 SEISMIC CONTROL REQUIREMENTS

- A. Design and provide electrical component restraints, supports, and attachments suitable for seismic loads determined in accordance with applicable codes, as well as gravity and operating loads and other structural design considerations of the installed location. Consider wind loads for outdoor electrical components.
- B. Seismic Restraints:
 - 1. Provide seismic restraints for electrical components except where exempt according to applicable codes and specified seismic design criteria, as approved by authorities having jurisdiction.
 - 2. Comply with applicable general recommendations of the following, where not in conflict with applicable codes, seismic design criteria, or other specified requirements:
 - a. ASHRAE (HVACA).
 - b. FEMA 413.
 - c. FEMA E-74.
 - d. SMACNA (SRM).
 - 3. Seismic restraint capacities to be verified by a Nationally Recognized Testing Laboratory (NRTL) or certified by an independent third party registered professional engineer acceptable to authorities having jurisdiction.
- C. Seismic Attachments:
 - 1. Attachments to be bolted, welded, or otherwise positively fastened without consideration of frictional resistance produced by the effects of gravity.
 - 2. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) or qualified evaluation service acceptable to authorities having jurisdiction for compliance with applicable building code, and qualified for seismic applications; concrete anchors to be qualified for installation in both cracked and uncracked concrete.
 - 3. Do not use power-actuated fasteners.
 - 4. Do not use friction clips (devices that rely on mechanically applied friction to resist loads). Beam clamps may be used for supporting sustained loads where provided with restraining straps.

5. Comply with anchor minimum embedment, minimum spacing, minimum member thickness, and minimum edge distance requirements.
6. Concrete Housekeeping Pads:
 - a. Increase size of pad as required to comply with anchor requirements.
 - b. Provide pad reinforcement and doweling to ensure integrity of pad and connection and to provide adequate load path from pad to supporting structure.
- D. Seismic Interactions:
 1. Include provisions to prevent seismic impact between electrical components and other structural or nonstructural components.
 2. Include provisions such that failure of a component, either essential or nonessential, does not cause the failure of an essential component.
- E. Seismic Relative Displacement Provisions:
 1. Use suitable fittings or flexible connections to accommodate:
 - a. Relative displacements at connections between components, including distributed systems (e.g. conduit, cable tray); do not exceed load limits for equipment utility connections.
 - b. Relative displacements between component supports attached to dissimilar parts of structure that may move differently during an earthquake.
 - c. Design displacements at seismic separations.
 - d. Anticipated drifts between floors.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install products in accordance with applicable requirements of NECA 1 (general workmanship).
- C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- D. Secure fasteners according to manufacturer's recommended torque settings.
- E. Install flexible conduit and cable connections to provide sufficient slack for vibration isolation and/or seismic relative displacements as indicated or as required.
- F. Vibration Isolation Systems:
 1. Spring Isolators:
 - a. Position equipment at operating height; provide temporary blocking as required.
 - b. Lift equipment free of isolators prior to lateral repositioning to avoid damage to isolators.
 - c. Level equipment by adjusting isolators gradually in sequence to raise equipment uniformly such that excessive weight or stress is not placed on any single isolator.
 2. Clean debris from beneath vibration-isolated equipment that could cause short circuiting of isolation.
 3. Use elastomeric grommets for attachments where required to prevent short circuiting of isolation.
 4. Adjust isolators to be free of isolation short circuits during normal operation.
 5. Do not overtighten fasteners such that resilient material isolator pads are compressed beyond manufacturer's maximum recommended deflection.
- G. Seismic Controls:
 1. Provide specified snubbing element air gap; remove any factory-installed spacers, debris or other obstructions.
 2. Use only specified components, anchorage, and hardware evaluated by seismic design. Comply with conditions of seismic certification where applicable.
 3. Where mounting hole diameter exceeds bolt diameter by more than 0.125 inch, use epoxy grout, elastomeric grommet, or welded washer to reduce clearance to 0.125 inch or less.

4. Equipment with Sheet Metal Housings:
 - a. Use Belleville washers to distribute stress over a larger surface area of the sheet metal connection interface as approved by manufacturer.
 - b. Attach additional steel as approved by manufacturer where required to transfer loads to structure.
 - c. Where mounting surface is irregular, do not shim housing; reinforce housing with additional steel as approved by manufacturer.
5. Concrete Housekeeping Pads:
 - a. Size in accordance with seismic design to meet anchor requirements.
 - b. Install pad reinforcement and doweling in accordance with seismic design to ensure integrity of pad and associated connection to slab.

END OF SECTION

**SECTION 260553
IDENTIFICATION FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Underground warning tape.

1.02 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.
- B. Section 262726 - Wiring Devices - Lutron: Device and wallplate finishes; factory pre-marked wallplates.

1.03 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. NFPA 70E - Standard for Electrical Safety in the Workplace; 2017.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
 - 1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
 - 2. Do not install identification products until final surface finishes and painting are complete.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Panelboards:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
 - 5) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
 - b. Transfer Switches:
 - 1) Identify voltage and phase.
 - 2) Identify power source and circuit number for both normal power source and standby power source. Include location when not within sight of equipment.
 - 3) Identify short circuit current rating based on the specific overcurrent protective device type and settings protecting the transfer switch.
 - 2. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.

- a. Service equipment.
3. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
 - a. Minimum Size: 3.5 by 5 inches.
 - b. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.
 - c. Service Equipment: Include the following information in accordance with NFPA 70.
 - 1) Nominal system voltage.
 - 2) Available fault current.
 - 3) Clearing time of service overcurrent protective device(s).
 - 4) Date label applied.
- B. Identification for Conductors and Cables:
 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
 2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
 3. Use underground warning tape to identify direct buried cables.
- C. Identification for Devices:
 1. Wiring Device and Wallplate Finishes: Comply with Section 262726.
 2. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
 1. Manufacturers:
 - a. Brimar Industries, Inc: www.brimar.com/#sle.
 - b. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 - c. Seton Identification Products: www.seton.com/#sle.
 - d. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests".
 2. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
 3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
 4. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
 5. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
 6. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.
- B. Identification Labels:
 1. Manufacturers:
 - a. Brady Corporation: www.bradyid.com/#sle.
 - b. Brother International Corporation: www.brother-usa.com/#sle.
 - c. Panduit Corp: www.panduit.com/#sle.

- d. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests".
- 2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
- 3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
 - 1. Minimum Size: 1 inch by 2.5 inches.
 - 2. Text: All capitalized unless otherwise indicated.
 - 3. Minimum Text Height:
 - a. Equipment Designation: 1/2 inch.
 - 4. Color:
 - a. Normal Power System: White text on black background.

2.03 WIRE AND CABLE MARKERS

- A. Manufacturers:
 - 1. Brady Corporation: www.bradyid.com/#sle.
 - 2. HellermannTyton: www.hellermannntyton.com/#sle.
 - 3. Panduit Corp: www.panduit.com/#sle.
 - 4. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests".
- B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
- C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- D. Legend: Power source and circuit number or other designation indicated.
- E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- F. Minimum Text Height: 1/8 inch.
- G. Color: Black text on white background unless otherwise indicated.

2.04 UNDERGROUND WARNING TAPE

- A. Manufacturers:
 - 1. Brady Corporation: www.bradyid.com/#sle.
 - 2. Brimar Industries, Inc: www.brimar.com/#sle.
 - 3. Seton Identification Products: www.seton.com/#sle.
 - 4. Substitutions: Refer to the City of Camas "Call for Bid" section titled "Equipment Substitution Requests".
- B. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
- C. Non-detectable Type Tape: 6 inches wide, with minimum thickness of 4 mil.
- D. Legend: Type of service, continuously repeated over full length of tape.
- E. Color:
 - 1. Tape for Buried Power Lines: Black text on red background.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.

- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
 - 1. Surface-Mounted Equipment: Enclosure front.
 - 2. Flush-Mounted Equipment: Inside of equipment door.
 - 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
 - 4. Elevated Equipment: Legible from the floor or working platform.
 - 5. Branch Devices: Adjacent to device.
 - 6. Interior Components: Legible from the point of access.
 - 7. Conductors and Cables: Legible from the point of access.
 - 8. Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Install underground warning tape above buried lines with one tape per trench at 3 inches below finished grade.
- G. Mark all handwritten text, where permitted, to be neat and legible.

END OF SECTION

**SECTION 260573
POWER SYSTEM STUDIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Protective device coordination study.
- B. Arc flash and shock risk assessment.
 - 1. Includes arc flash hazard warning labels.
- C. Criteria for the selection and adjustment of equipment and associated protective devices not specified in this section, as determined by studies to be performed.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Existing Installations: Coordinate with equipment manufacturer(s) to obtain data necessary for completion of studies.
 - 2. Coordinate the work to provide equipment and associated protective devices complying with criteria for selection and adjustment, as determined by studies to be performed.
- B. Sequencing:
 - 1. Submit study reports prior to or concurrent with product submittals.
 - 2. Do not order equipment until matching study reports and product submittals have both been evaluated by Owner.

1.03 SUBMITTALS

- A. Study reports, stamped or sealed and signed by study preparer.
- B. Product Data: In addition to submittal requirements specified in other sections, include manufacturer's standard catalog pages and data sheets for equipment and protective devices indicating information relevant to studies.
 - 1. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.
 - 2. Include documentation of listed series ratings upon request.
 - 3. Identify modifications made in accordance with studies that:
 - a. Can be made at no additional cost to Owner.
 - b. As submitted will involve a change to the contract sum.

1.04 POWER SYSTEM STUDIES

- A. Scope of Studies:
 - 1. Except where study descriptions below indicate exclusions, analyze system at each bus from primary protective devices of utility source down to each piece of equipment involved, including parts of system affecting calculations being performed (e.g. fault current contribution from motors).
 - 2. Include in analysis alternate sources and operating modes (including known future configurations) to determine worst case conditions.
 - a. Known Operating Modes:
 - 1) Utility as source.
 - 2) Generator as source.
- B. General Study Requirements:
 - 1. Comply with NFPA 70.
 - 2. Perform studies utilizing computer software complying with specified requirements; manual calculations are not permitted.
- C. Data Collection:
 - 1. Compile information on project-specific characteristics of actual installed equipment, protective devices, feeders, etc. as necessary to develop single-line diagram of electrical distribution system and associated input data for use in system modeling.

- a. Utility Source Data: Include primary voltage, maximum and minimum three-phase and line-to-ground fault currents, impedance, X/R ratio, and primary protective device information.
 - 1) Obtain up-to-date information from Utility Company.
- b. Generators: Include manufacturer/model, kW and voltage ratings, and impedance.
- c. Motors: Include manufacturer/model, type (e.g. induction, synchronous), horsepower rating, voltage rating, full load amps, and locked rotor current or NEMA MG 00001 code letter designation.
- d. Transformers: Include primary and secondary voltage ratings, kVA rating, winding configuration, percent impedance, and X/R ratio.
- e. Protective Devices:
 - 1) Circuit Breakers: Include manufacturer/model, type (e.g. thermal magnetic, electronic trip), frame size, trip rating, voltage rating, interrupting rating, available field-adjustable trip response settings, and features (e.g. zone selective interlocking).
 - 2) Fuses: Include manufacturer/model, type/class (e.g. Class J), size/rating, and speed (e.g. time delay, fast acting).
- f. Protective Relays: Include manufacturer/model, type, settings, current/potential transformer ratio, and associated protective device.
- g. Conductors: Include feeder size, material (e.g. copper, aluminum), insulation type, voltage rating, number per phase, raceway type, and actual length.
2. Existing Installations:
 - a. Collect data on existing electrical distribution system necessary for completion of studies, including field verification of available existing data (e.g. construction documents, previous studies). Include actual settings for field-adjustable devices.
- D. Protective Device Coordination Study:
 1. Comply with applicable portions of IEEE 242 and IEEE 399.
 2. Analyze alternate scenarios considering known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).
 3. Analyze protective devices and associated settings for suitable margins between time-current curves to achieve full selective coordination while providing adequate protection for equipment and conductors.
- E. Arc Flash and Shock Risk Assessment:
 1. Comply with NFPA 70E.
 2. Perform incident energy and arc flash boundary calculations in accordance with IEEE 1584 (as referenced in NFPA 70E Annex D), where applicable.
 3. Analyze alternate scenarios considering conditions that may result in maximum incident energy, including but not limited to:
 - a. Maximum and minimum utility fault currents.
 - b. Maximum and minimum motor contribution.
 - c. Known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).
- F. Study Reports:
 1. General Requirements:
 - a. Identify date of study and study preparer.
 - b. Identify study methodology and software product(s) used.
 - c. Identify scope of studies, assumptions made, implications of possible alternate scenarios, and any exclusions from studies.
 - d. Identify base used for per unit values.
 - e. Include single-line diagram and associated input data used for studies; identify buses on single-line diagram as referenced in reports, and indicate bus voltage.
 - f. Include conclusions and recommendations.
 2. Protective Device Coordination Study:

- a. For each scenario, include time-current coordination curves plotted on log-log scale graphs.
 - b. For each protective device, identify fixed and adjustable characteristics with available ranges and recommended settings.
 - 1) Circuit Breakers: Include long time pickup and delay, short time pickup and delay, and instantaneous pickup.
 - 2) Include ground fault pickup and delay.
 - 3) Include fuse ratings.
 - 4) Protective Relays: Include current/potential transformer ratios, tap, time dial, and instantaneous pickup.
 - c. Identify cases where either full selective coordination or adequate protection is not achieved, along with recommendations.
3. Arc Flash and Shock Risk Assessment:
- a. For each scenario, identify at each bus location:
 - 1) Calculated incident energy and associated working distance.
 - 2) Calculated arc flash boundary.
 - 3) Bolted fault current.
 - 4) Arcing fault current.
 - 5) Clearing time.
 - 6) Arc gap distance.
 - b. For purposes of producing arc flash hazard warning labels, summarize the maximum incident energy and associated data reflecting the worst case condition of all scenarios at each bus location.
 - c. Identify locations where the calculated maximum incident energy exceeds 40 calories per sq cm.

1.05 QUALITY ASSURANCE

- A. Study Preparer Qualifications: Professional electrical engineer licensed in the State in which the Project is located and with minimum five years experience in the preparation of studies of similar type and complexity using specified computer software.
- B. Computer Software for Study Preparation: Use the latest edition of commercially available software utilizing specified methodologies.
 1. Acceptable Software Products:
 - a. EasyPower LLC: www.easypower.com/#sle.
 - b. ETAP/Operation Technology, Inc: www.etap.com/#sle.
 - c. Power Analytics Corporation: www.poweranalytics.com/#sle.
 - d. SKM Systems Analysis, Inc: www.skm.com/#sle.

PART 2 PRODUCTS

2.01 ARC FLASH HAZARD WARNING LABELS

- A. Provide warning labels complying with ANSI Z535.4 to identify arc flash hazards for each work location analyzed by the arc flash and shock risk assessment.
 1. Materials: Comply with Section 260553.
 2. Legend: Provide custom legend in accordance with NFPA 70E based on equipment-specific data as determined by arc flash and shock risk assessment.
 - a. Include the following information:
 - 1) Arc flash boundary.
 - 2) Available incident energy and corresponding working distance.
 - 3) Nominal system voltage.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install arc flash warning labels in accordance with Section 260553.

3.02 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Adjust equipment and protective devices for compliance with studies and recommended settings.
- C. Notify Owne of any conflicts with or deviations from studies. Obtain direction before proceeding.

END OF SECTION

**SECTION 263213
ENGINE GENERATORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Packaged engine generator system and associated components and accessories:
 - 1. Engine and engine accessory equipment.
 - 2. Alternator (generator).
 - 3. Generator set control system.

1.02 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260548 - Vibration and Seismic Controls for Electrical Systems.
- D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA/EGSA 404 - Standard for Installing Generator Sets; 2014.
- C. NFPA 37 - Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines; 2018.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. NFPA 110 - Standard for Emergency and Standby Power Systems; 2016.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate compatibility of generator sets to be installed with work provided under other sections or by others.
 - 2. Coordinate the work with other trades to avoid placement of piping, equipment or other potential obstructions within the spaces dedicated for engine generator system.
 - 3. Coordinate arrangement of equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 4. Coordinate the work to provide electrical circuits suitable for the power requirements of the actual auxiliary equipment and accessories to be installed.
 - 5. Notify Owner of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 QUALITY ASSURANCE

- A. Comply with the following:
 - 1. NFPA 70 (National Electrical Code).
 - 2. NFPA 110 (Standard for Emergency and Standby Power Systems); meet requirements for Level 1 system.
 - 3. NFPA 37 (Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines).
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of generator sets and auxiliary equipment are consistent with the indicated requirements.
- C. Verify that rough-ins for field connections are in the proper locations.
- D. Verify that mounting surfaces are ready to receive equipment.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install generator sets and associated accessories in accordance with NECA/EGSA 404.
- D. Arrange equipment to provide minimum clearances and required maintenance access.
- E. Unless otherwise indicated, mount generator set on properly sized, minimum 6 inch high concrete pad constructed.
- F. Provide required support and attachment in accordance with Section 260529.
- G. Provide required vibration isolation and/or seismic controls in accordance with Section 260548.
- H. Use manufacturer's recommended oil and coolant, suitable for the worst case ambient temperatures.
- I. Provide grounding and bonding in accordance with Section 260526.
- J. Identify system wiring and components in accordance with Section 260553.

3.03 FIELD QUALITY CONTROL

- A. Provide services of a manufacturer's authorized representative to prepare and start systems and perform inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.
- B. Notify Owner and Engineer at least two weeks prior to scheduled inspections and tests.
- C. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.
- D. Provide all equipment, tools, and supplies required to accomplish inspection and testing, including load bank and fuel.
- E. Preliminary inspection and testing to include, at a minimum:
 - 1. Inspect each system component for damage and defects.
 - 2. Verify tightness of mechanical and electrical connections are according to manufacturer's recommended torque settings.
 - 3. Check for proper oil and coolant levels.
- F. Prepare and start system in accordance with manufacturer's instructions.
- G. Perform acceptance test in accordance with NFPA 110.
- H. Inspection and testing to include, at a minimum:
 - 1. Verify compliance with starting and load acceptance requirements.
 - 2. Verify voltage and frequency; make required adjustments as necessary.
 - 3. Verify phase sequence.
 - 4. Verify control system operation, including safety shutdowns.
 - 5. Verify operation of auxiliary equipment and accessories (e.g. battery charger, heaters, etc.).

6. Verify fuel piping compliance with manufacturer's recommendations.
- I. Provide field emissions testing where necessary for certification.
- J. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

3.04 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.05 CLOSEOUT ACTIVITIES

- A. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals
 1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.
 2. Operating instructions mounted adjacent to generator location.
 3. Training plan.
- B. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.
 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 2. Provide minimum of four hours of training.
 3. Instructor: Manufacturer's authorized representative.
 4. Location: At project site.
- C. After successful acceptance test and just prior to Substantial Completion, replace air, oil, and fuel filters and fill fuel storage tank.

3.06 PROTECTION

- A. Protect installed engine generator system from subsequent construction operations.

3.07 MAINTENANCE

- A. See Section 017000 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.
- B. Provide to Owner a proposal as an alternate to the base bid, a separate maintenance contract for the service and maintenance of engine generator system for two years from date of Substantial Completion; Include a complete description of preventive maintenance, systematic examination, adjustment, inspection, and testing, with a detailed schedule.
- C. Conduct site visit at least once every three months to perform inspection, testing, and preventive maintenance. Submit report to Owner indicating maintenance performed along with evaluations and recommendations.
- D. Provide trouble call-back service upon notification by Owner:
 1. Provide on-site response within 2 hours of notification.
 2. Include allowance for call-back service during normal working hours at no extra cost to Owner.
 3. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.
- E. Maintain an on-site log listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and parts replaced.

END OF SECTION

323119
ORNAMENTAL FENCES AND GATES

PART 1 GENERAL

1.01 CONTRACT CONDITIONS

- A. Other Contract Documents, including Drawings, Specifications, Project Manual and General and Supplemental Conditions of the Contract, complement the requirements of this section.
- B. Other sections of this Specification may relate to and may impose additional work and/or additional materials upon this section. Coordinate any cross-referencing of Specification sections.

1.02 DESCRIPTION OF WORK

- A. Provide all labor, material, equipment, transportation and services to provide ornamental steel fences and gates as shown on the drawings and herein specified.

1.03 SECTION INCLUDES

- A. Welded ornamental steel fence system.
- B. Gates and hardware.
- C. Drive anchor or concrete post foundations.

1.04 REFERENCES

- A. Reference Standards: Current edition at date of Bid.
- B. American Society of Testing and Materials (ASTM):
 - 1. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM F2408 -- Ornamental Fences Employing Galvanized Steel Tubular Pickets.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company and employees specializing in work of this Section, with minimum 5 years documented experience.
- B. Fencing and Components: Supply from same manufacturer for single source responsibility.

1.06 SUBMITTALS

- A. Shop Drawings: Plan layout, spacing of components, post foundation dimensions, hardware anchorage, and components. Submit to Owner for approval prior to installation.
- B. Product Data: Provide data on pickets, posts, accessories, fittings and hardware.
- C. Samples: Manufacturer's standard color selections.
- D. Manufacturer's Instructions: Include installation instructions.

1.07 WARRANTIES

- A. Manufacturer: Guarantee to provide reimbursement for labor necessary to restore or replace components that have been found to be defective under the terms of Manufacturer's standard 20-year warranty for five years from date of original purchase.
- B. Manufacturer: Provide Manufacturer's standard 20-year warranty against defects in material finish including cracking, peeling, chipping, blistering or corroding.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Ameristar Fence Products, Inc., Montage Plus ATF, "Classic", extended picket, 3-rail welded and rackable fencing system.
 - 1. Commercial weight fencing system meeting vertical and horizontal loading and infill performance in accordance with ASTM F2408.
 - 2. Welded picket and rail intersections.
 - 3. Height: Fencing 4'-0" except where indicated in Drawings. Provide Montage Commercial product at gate and adjacent panels indicated in the Drawings. Gate 6'-0"

2.02 MATERIALS

- A. Steel Framing: Minimum 45,000 psi yield strength with G-60 hot-dip galvanized zinc coating, ASTM A653.
 - 1. Size in accordance with Manufacturer's standards.
- B. Steel Pickets: 3/4 inch by 18-gauge steel tubing, galvanized.
- C. Steel Rails: 1 1/2 inch by 1.4375 inch by 14-gauge steel channels, galvanized.
- D. Expanded Metal Mesh: Manufacturer's standard, galvanized.
- E. Gussets, Uprights, Angle Attachments and Miscellaneous Components: Galvanized steel, size and gauge in accordance with Manufacturer's standards.
- F. Gates: Self-closing with integrated hinge-closer set
 - 1. Accessibility-compliant including variable speed and final snap adjustment.
 - 2. Hinge closer: Exterior-mounted set of (2) tested to a minimum of 500,000 cycles, capable of self-closing up to a maximum gate weight of 260 pounds with maximum weight load capacity of 1,500 pounds.

2.03 FINISHES

- A. Galvanized Steel Materials: Manufacturer's standard acrylic topcoat over epoxy primer on properly prepared galvanized surfaces meeting or exceeding coating performance criteria ASTM F2408.
 - 1. Color: As selected by Owner from Manufacturer's standard palette.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify conditions ready to receive work of this Section. Do no work until unsatisfactory conditions are corrected. Beginning work constitutes acceptance of existing conditions.

3.02 PREPARATION

- A. Field survey and determine fencing lines to confirm actual layout before beginning work.
- B. Locate and mark post positions. Locate in accordance with Manufacturer's recommendations. Do not exceed Manufacturer's maximum on-center spacing.

3.03 INSTALLATION

- A. Install framework, gates, and accessories in accordance with Manufacturer's instructions.
- B. Fence Height: 4 feet, except as otherwise shown on Drawings. Gate Height: 6'-0"
- C. Line Post Spacing: At intervals not exceeding 48 inches on center.
- D. Footings: Set posts plumb in using post-installed concrete anchors.
 - 1. Post-installed concrete anchors: sized as indicated in Drawings.

3.04 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch.
- B. Maximum Offset from True Position: 1 inch.
- C. Do not infringe on adjacent property lines.

3.05 ADJUSTING

- A. Tighten hardware, fasteners, and accessories for rigid installation.

3.06 TOUCH-UP

- A. Remove all metal shavings from cut and drilled areas.
- B. Apply zinc-rich primer to thoroughly cover cut edge or drilled hole. Let primer dry.
- C. Apply 2 coats of Manufacturer's finish paint matching fence color

END OF SECTION

PART SIX

WASHINGTON STATE

HOURLY PREVAILING WAGE RATES

- Journey level wage rates are NOT included in this packet. Journey and apprentice rates applicable to this project can be looked up at the Washington State Department of Labor and Industries web site at **www.lni.wa.gov/TradesLicensing/PrevWage/WageRates/**
 - **Washington State LNI wage rates for Clark County effective the date of bid opening (December 3, 2025).**
 - A printed copy of the wages rates is available for viewing in the Public Works Department at Camas City Hall.
 - The City of Camas will mail a hard copy of the applicable prevailing wage rates upon request.