

PROJECT MANUAL
SPECIFICATIONS
DRAWINGS

**Ferdinand Campground
Improvements
Ferdinand State Forest
DEPARTMENT OF NATURAL RESOURCES**
6583 East State Road 264, Ferdinand, IN. 47532



Owner:

**Indiana Department of Natural Resources
Division of State Parks**
Indiana Government Center South
402 W. Washington Street, Rm. W298
Indianapolis, IN 46204

Designed and Prepared By:

**Indiana Department of Natural Resources
Division of Facilities, Fleet, Asset Management,
& Engineering**

March 10, 2025, IDNR Project ENG2209631441

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STATE OF INDIANA

MIKE BRAUN, Governor

DEPARTMENT OF ADMINISTRATION

Public Works Division

402 West Washington Street, Room W462

Indiana Government Center – South

Indianapolis, Indiana 46204-2746

PHONE: (317) 232-3001

NOTICE TO BIDDERS

BY STATE OF INDIANA DEPARTMENT OF ADMINISTRATION, PUBLIC WORKS DIVISION FOR A PUBLIC WORKS CONSTRUCTION PROJECT ESTIMATED AT ONE HUNDRED FIFTY THOUSAND DOLLARS OR ABOVE

SECURED ELECTRONIC BIDS FOR:

Public Works Project No. ENG2209631441
Ferdinand Campground Improvements
Ferdinand State Forest Dubois County, IN

will be received from Contractors, holding a current Certificate of Qualification, at Department of Administration, Public Works Division Email Bid Box publicworks bids@idoa.in.gov
(Note, do not cc: any other party)

Subject line MUST contain “Bid- Project No; - ENG2209631441- (Your firm)”

Bid File (PDF) MUST be named- “(Bidding Firm name) Bid Project No; ENG2209631441-Ferdinand Campground Improvements” and not exceed 9Mb

Until 2:31 P.M (Indianapolis Time), 04/17/2025, after which all bids will be publicly opened and read online in a Microsoft Teams Live Event at 3:00PM – https://on.in.gov/IDNR_FSFCR

Minority Contractors are encouraged to submit bids on this project as a prime contractor or through a prime contractor.

Copies of the detailed Instructions to Bidders and Drawings and/or Specifications dated March 10, 2025 may be obtained from: Department of Natural Resources Division of Engineering Website <http://www.in.gov/dnr/engineer/bidding> for a non-refundable fee of \$0.00. Contractors are responsible for checking this website for additional documents or addenda that may be added before the bid opening date.

Bids shall be taken from Prime Contractors pre-qualified by the Public Works Certification Board in the following classification(s): 1542.02 Commercial Buildings (Offices, Stores, Restaurants) or 611.01 Concrete Construction of Roads and Curbing, or 1611.02 Asphalt Construction of Roads and Parking Lots.

The Specified construction period is through June 15, 2026. The State of Indiana reserves the right to reject any and all bids.

Project goal of 7% MBE, 5% WBE and 3% IVOSB. Link <https://www.in.gov/idoa/mwbe/2494.htm>

Director, Asset Management & Engineering:

Greg Sorrels

Greg Sorrels, Director, IDNR Division of AM&E

Director of Public Works:

Robert Grossman

Robert Grossman, Director, IDOA Public Works

Pre-Bid Information: April 7, 2025, at
10:00AM (EST) at the Ferdinand Campground
6583 East State Road 264, Ferdinand IN, 47532
Project Manager: Dean Illingworth
Dillingworth@DNR.in.gov

INSTRUCTIONS TO BIDDERS

PROJECT ESTIMATED BY DEPARTMENT OF ADMINISTRATION, PUBLIC WORKS DIVISION TO
BE BID AT ONE HUNDRED FIFTY THOUSAND DOLLARS (\$150,000) AND ABOVE

01 GENERAL

- A. This project is estimated by the Public Works Division, Indiana Department of Administration (the Owner), as stated in the Notice to Bidders, at One Hundred Fifty Thousand Dollars (\$150,000) and above.
- B. QUALIFICATION BY THE CERTIFICATION BOARD IS REQUIRED FOR THIS PROJECT PRIOR TO BID OPENING DATE. For information and procedure contact Executive Secretary, Certification Board, Indiana Department of Administration, 402 W. Washington St., Room W462, Indianapolis, Indiana 46204, E-mail: _____ or phone (317) 232-3005.

02 PROJECT NUMBER, DESCRIPTION AND LOCATION is as stated in the Notice to Bidders.

03 TITLE AND DEFINITIONS

Said building and/or land upon which it stands is the property of the State of Indiana. All references to the title owner of said property hereinafter will be by the term "State" and all references to the person, firm, or corporation awarded the contract for the project will be by the term "Contractor". All references to Designer shall refer to the consulting person or firm employed to contract with the Public Works Division, Indiana Department of Administration to provide architectural, engineering or other consulting services for the project, or to the Public Works Division. The preparation and issuance of contracts for this project are the responsibility of the Commissioner of the Indiana Department of Administration acting with approval of the Governor.

Contract: A written agreement between two or more parties enforceable by law.

Contractor: A person who has entered into or seeks to enter into a contract with Public Works Division.

Prime Contractor: A person or business which is primarily responsible for providing goods and service or performing a specific service, etc. under contract. A prime contractor can also be a Minority Business Enterprise, a Women's Business Enterprise or an Indiana Veteran Owned Small Business Enterprise.

Subcontractor: A person or a business who has a direct contract with a prime contractor who is under contract to provide goods and services or perform a specific service.

Joint Venture: An association of two or more businesses to carry out a single business enterprise for profit for which purpose they combine their property, capital, efforts, skills and knowledge.

Manufacturer: A supplier that produces goods from raw materials or substantially alters them before resale.

Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE): A business concern which is certified as at least fifty-one percent (51%) owned and controlled by one or more of the individuals classified as a minority group which includes: African Americans, Hispanic Americans, Native Americans, Asian Americans, and other racial minority groups as defined by 13 CFR 124.103, or at least fifty-one percent (51%) owned and controlled by a woman or women.

Supplier: Any person or entity engaged to furnish goods, materials and/or equipment, but no on-site labor, is capable of furnishing such goods, materials and/or equipment either directly from its own stock or by ordering materials and/or equipment directly from a manufacturer, and is engaged to furnish such goods, materials and/or equipment directly to a prime contractor or one of its subcontractors.

Indiana Veteran Owned Small Business Enterprise (IVOSB): means an Indiana small business enterprise which is certified as at least fifty-one percent (51%) owned and controlled by a veteran.

04 PRE-BIDDING, BIDDING AND POST BIDDING REQUIREMENTS

- A. The Director, Public Works Division, will authorize the Designer to issue bidding documents, construction documents and addenda to bidders.
- B. It is recommended that all Bidders visit the site prior to submitting bid and become thoroughly familiar with the existing site conditions and work to be performed, as indicated in the bidding documents, construction documents and addenda. Extra compensation or extension of time will not be allowed for failure to examine the site prior to bidding.
- C. During the bidding period, should questions arise as to the meaning of any part of the bidding documents, construction documents or addenda that may affect the Bidder, the Bidder shall contact the Designer and/or Public Works Division and

submit a written request for clarification. The Designer and/or Public Works Division will make such clarification only by written Addendum that will be emailed to each document holder or may be obtained at the office of the Designer and/or Public Works Division. By submitting a bid, the Bidder acknowledges procurement of all Addenda. No written request for clarification will be accepted by the Designer and/or Public Works Division later than fourteen (14) calendar days prior to the scheduled bid date.

- D. Bid as described in Contractor's Bid (DAPW 13) shall include Base Bid (in figures and in words) and Alternates as specified in Section entitled Alternates. In verifying bids, word amounts shall have precedence over figure amounts.
- E. Alternate amount(s) shall be listed where indicated. Add Alternates are not to be included in the Base Bid Scope of Work. Deduct Alternates are to be included in the Base Bid Scope of Work. The bid form must be signed. Note that by signing the bid document, the Bidder is acknowledging the procurement of all addenda and is certifying that the bid recognizes all items in all addenda.
- F. A bid by a corporation shall be in the legal name of the corporation followed by the word "by" and the signature of the president. The secretary of the corporation shall sign indicating his/her authority to sign. A Certificate of Corporate Resolution (DAPW 41) is required with and as a part of the bid if anyone other than the president of the corporation is signing bid documents.
- G. *The Form 96A-Questionnaire and Financial Statement is no longer required to be submitted.* The Director, Public Works Division reserves the right to request additional financial information or contractor experience as a basis for rejection of bid or award of contract.
- H. Each Bidder must file with his bid a Non-Collusion Statement (DAPW-121) signed by the same authorized person(s) who signed the bid.
- I. Each Bidder must file with his bid a completely filled in and executed Bid Bond (DAPW 15A) in accordance with IC 4-13.67-5. The bid bond penal sum shall be the minimum amount of ten percent (10%) of the bid including all additive alternates.
- J. Each Bidder must file with his bid a completed MBE/WBE/IVOSB Participation Plan (DAPW 26) and Good Faith Effort Work Sheet (DAPW 26 SUP2). Refer to the Supplement to the General Conditions for MBE/WBE/IVOSB Participation Policy (DAPW 26 SUP1) for specific requirements.
- K. Each Bidder must file with his bid, the completed Contractor's Affidavit of Subcontractors Employed (DAPW 12) only if he proposes to perform any work with a subcontract amount of \$150,000.00 or more.
- L. Each bidder must file with his bid an Employee Drug Testing Plan (DAPW 150A) in accordance with IC 4-13-18 or evidence that the contractor is subject to a collective bargaining agreement containing drug testing requirements that comply with IC 4-13-18.
- M. Each Bidder must include his Federal ID number or Social Security number on page 1 of 3 of the Bid Form (DAPW 13). All required bid documents must contain original handwritten signatures.
- N. All documents required by statute, rule or these instructions to be included in the bid must be submitted together in a single email file, plainly marked on the subject line and in the email file with the Name of Bidder, Project Identification, Project Number, Bid Time and Bid Date. Bids shall be rejected if all required documents are not in the single email file.
- O. A Bidder with proper identification may withdraw his bid at any time prior to the scheduled time for receipt of the bids; however, no bid may be withdrawn without written consent of the Director, Public Works Division for a *period of sixty (60) days after the date of the bid opening*, or unless extended in accordance with IC 4-13.6-4. Bids received after the designated due time for any reason, shall be rejected and returned unopened to the Bidder. The Director, Public Works Division, reserves the right to reject any or all bids.
- P. Subcontractors whose work will equal or exceed One Hundred Fifty Thousand Dollars (\$150,000.00) must attain a Certificate of Qualification by the Certification Board before commencing any work on this project. Note paragraph 01. (B) above. Q. All Bidders (corporations or other business entities) must be in good standing with the Indiana Secretary of State.

05 SIGNATURE AFFIDAVIT

- A. A Signature Affidavit (DAPW 14) containing the Bidder's authorized signature(s), properly notarized, may be submitted as a signature supplement to all other bid documents, except the bid bond, including:

1. Contractor's Bid (DAPW 13)
 2. Non-Collusion Statement (DAPW121)
 3. Contractor's Affidavit of Subs Employed (DAPW 12)
 4. MBE/WBE/IVOSB Participation Plan and Good Faith Effort Worksheet (DAPW 26 SUP 2)
- B. All documents herein before required with the bid may be unsigned if the signature affidavit is submitted, except for the BID BOND. BIDDER MUST SIGN THE BID BOND.

NOTE: SIGNING THE SIGNATURE AFFIDAVIT OR BID FORM IS ACKNOWLEDGMENT OF PROCUREMENT OF ALL ADDENDA AND CERTIFICATION BY BIDDER THAT THE BID RECOGNIZES ALL ITEMS IN ALL ADDENDA.

06 WORK BY CONTRACTOR

The Contractor shall perform a minimum of 15% of the value of work (measured in dollars of the total contract price) with his own forces, and not more than 85% of the value of work is to be subcontracted.

07 SUBSTITUTIONS

The materials, products, systems and equipment described in the bidding documents, construction documents and addenda establish a standard or required function, dimension, appearance and quality that shall also be met by any proposed substitution. No substitution by manufacturer, or trade name of product named, or of a quality specified will be considered unless written request for approval has been submitted by the Bidder and has been received by the Designer and/or Public Works Division at least fourteen (14) calendar days prior to the date for receipt of bids. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including drawings, cuts, performance and test data and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or work that incorporation of the substitute would require shall be included. The burden of proof of the merit of the proposed substitute is upon the proposer. The Designer and/or Public Works Division decision of approval or disapproval of the proposed substitution shall be final. Products, materials or systems not specified or approved prior to bidding, shall not be accepted for use in this project. All such substitutions accepted shall be acknowledged by addendum. See paragraph. 04 (C).

08 NONDISCRIMINATION

Pursuant to IC 22-9-1-10, the Contractor and subcontractors, if any, shall not discriminate against any employee or applicant for employment, to be employed in the performance of this contract, with respect to his hire, tenure, terms, conditions or privileges of employment, or any matter directly or indirectly related to employment, because of his race, religion, color, sex, disability, national origin, or ancestry. Breach of this covenant may be regarded as a material breach of the contract. Pursuant to IC 5-16-6-1, the contractor agrees:

- A. that in the hiring of employees for the performance of work under this contract or any subcontract hereunder, no contractor, or subcontractor, nor any person acting on behalf of such contractor or subcontractor shall, by reason of race, religion, color, sex, disability, national origin or ancestry, discriminate against any citizen of the State of Indiana who is qualified and available to perform the work to which the employment relates; and
- B. that no contractor, subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this contract on account of race, religion, color, sex, national origin or ancestry; and
- C. that there may be deducted from the amount payable to the contractor by the State of Indiana or by any municipal corporation thereof, under this contract, a penalty of five dollars (\$5.00) for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the contract; and
- D. that this contract may be canceled or terminated by the State of Indiana or by any municipal corporation thereof, and all money due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this section of the contract.

09 EMPLOYMENT ELIGIBILITY VERIFICATION

The Contractor affirms under the penalties of perjury that he/she/it does not knowingly employ an unauthorized alien.

The Contractor shall enroll in and verify the work eligibility status of all his/her/its newly hired employees through the E-Verify program as defined in IC 22-5-1.7-3. The Contractor is not required to participate should the E-Verify program cease to exist. Additionally, the Contractor is not required to participate if the Contractor is self-employed and does not employ any employees.

The Contractor shall not knowingly employ or contract with an unauthorized alien. The Contractor shall not retain an employee or contract with a person that the Contractor subsequently learns is an unauthorized alien.

The Contractor shall require his/her/its subcontractors, who perform work under this contract, to certify to the Contractor that the subcontractor does not knowingly employ or contract with an unauthorized alien and that the subcontractor has enrolled and is participating in the E-Verify program. The Contractor agrees to maintain this certification throughout the duration of the term of a contract with a subcontractor.

The State may terminate for default if the Contractor fails to cure a breach of this provision no later than thirty (30) days after being notified by the State.

The contractor shall submit, before work begins the E-Verify case verification number for each individual who is required to be verified under IC 22-5-1.7. An individual who is required to be verified under IC 22-5-1.7 whose final case result is final non-confirmation may not be employed on the public works project.

A contractor may not pay cash to any individual employed by the contractor for work done by the individual on the public works project.

A contractor must follow the federal Fair Labor Standards Act of 1938, as amended (29 U.S.C. 201- 209) and IC 222-2. A contractor must be in compliance with IC 22-3-5-1 and IC 22-3-7-34. A contractor must be in compliance with IC 22-4-1 through IC 22-4-39.5. A contractor must be in compliance with IC 4-13-18.

10 NOTICE OF AWARD

- A. Prior to execution of the Contract, in accordance with IC 4-13.6-5-2, the Director of Public Works may require additional submittals from Bidder/s to clarify contractor's experience and plans for performing the proposed work. Submittals which may be required include a critical path construction schedule which coordinates all significant tasks sequences and durations; schedule of values, and documentation of efforts to include minority, woman, and veteran owned businesses in the proposed work. The Director may require Bidder/s to provide a comprehensive list of subcontractors and suppliers within 24 hours of receipt of bids.
- B. Prior to execution of the Contract, the successful Bidder shall furnish a completed Domestic Steel Affidavit (DAPW 11) to Public Works Division, Indiana Department of Administration as part of the contract. The Domestic Steel Affidavit is included for Bidder's review but need not be submitted at the time of the bid opening. Definition of Steel Products:
- "Steel products" means products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated, or otherwise similarly processed, or processed by a combination of two (2) or more of such operations, from steel made in the United States by the open hearth, basic oxygen, electric furnace, Bessemer or other steel making process.
- C. Prior to execution of the Contract, the successful Bidder shall furnish a completed Contractor's Bond for Construction (DAPW 15) (combined performance and payment bond) to Public Works Division, Department of Administration as part of the contract. The Bond form is included for Bidder's review but need not be submitted at the time of the bid opening.
- D Prior to execution of the Contract, the successful Bidder shall furnish a completed Contractor's Certificate of Insurance (DAPW 16) to Public Works Division, Department of Administration as part of the contract. The Insurance form is included for Bidder's review but need not be submitted at the time of the bid opening.
- E. Prior to execution of the Contract, the State of Indiana will issue to the successful Bidder an email letter stating that its bid was the lowest responsible and responsive bid and that the attached electronic format contract document is submitted to Contractor for its consideration. If Contractor finds it in accordance with the bid documents, Contractor will electronically sign the contract within ten (10) calendar days after receipt. Further state agency approvals are required, and Contractor is cautioned that a contract is not binding on the State until it is approved by all signatories required. Failure to execute the proper contract and furnish the ancillary documents shall constitute reason to surrender the bid bond.
- F. Concurrent with execution of the Contract, the successful Bidder may be required to furnish executed copies of ContractorSubcontractor agreements as required in Article 5 of the General Conditions.

11 SUMMARY

All required bid documents must contain original handwritten signatures. Complete documents to be submitted with this bid:

- A. The Bid Bond (DAPW 15A) must be signed by both the Bidder and Bonding Company. The Bonding Company must also attach a Power of Attorney. Bid bond information, may be on the Bonding Company's standard form.
- B. The Contractor's Bid (DAPW 13)
 - Page 1: State the amount of the bid in figures and words.
 - Page 2: State the amount of the alternate(s), indicate add, deduct or no change (READ CAREFULLY).
 - Page 3: Authorized signature of the Company. If the signature affidavit is completed and submitted with the bid, this page must be submitted but need not be signed or notarized.
- C. The Signature Affidavit (DAPW 14) must contain the completed authorized signatures properly notarized and submitted with the bid as a supplement.

This Signature Affidavit shall fulfill all of the signature requirements. NOTE: The Signature Affidavit does not apply to the Bid Bond (DAPW 15A). The Bid Bond document must be fully completed with all required signatures and submitted with the bid.
- D. The Non-Collusion Statement (DAPW 121) must be signed by the same authorized person(s) who signed the bid documents. If the signature affidavit is completed and submitted with bid, this form shall be submitted, but need not be signed.
- E. For corporations, if anyone other than the president of the corporation signs, a Certificate of Corporate Resolution (DAPW 41) giving signature authority for the signer must be included.
- F. MBE/WBE/IVOSB Participation Plan and MBE/WBE/IVOSB Good Faith Effort Worksheet (DAPW 26 SUP2) must be completed and signed by the same authorized person who signed the bid documents.
- G. The completed Contractor's Affidavit of Subcontractors Employed (DAPW 12) whose subcontract amount will be \$150,000.00 or more.
- H. The completed plan for Contractor's Employee Drug Testing Plan (or statement of collective bargaining agreement).
- I. One copy only of the Bid Documents is required. Bidders may remove and use the Documents included in the project specifications or use reproductions of the Documents.

12 INDIVIDUAL BIDS SHALL BE REJECTED BY THE DIRECTOR, PUBLIC WORKS DIVISION, FOR THE FOLLOWING REASONS (IC 4-13.6-5-2; IC 4-13.6-6-1; 25 IAC 2-6-5)

- A. If the bid email subject line and bid form heading does not clearly identify the project number and description; if the name of the Bidder is not clearly indicated in the email and/or if the email is not received and date stamped within the Public Works Division electronic bid receipt mailbox prior to the stated time for receipt of bids.
- B. If the estimated base bid cost exceeds \$150,000.00 and the bidding contractor is not certified by Public Works Certification Board to offer bids in one of the specified categories.
- C. If the bidding contractor is under suspension by the Director of Public Works or by the Public Works Certification Board.
- D. If the bidding contractor is a trust and does not identify all beneficiaries and empowered settlors of the trust.
- E. If the contractor's drug plan is not included in the bid documents pursuant to and complies with IC 4-13-18.

13 INDIVIDUAL BIDS MAY BE REJECTED BY THE DIRECTOR, PUBLIC WORKS DIVISION, FOR THE FOLLOWING REASONS (25 IAC 2-6-5)

- A. If the Contractor's Bid (DAPW 13), Non-Collusion Statement (DAPW 121), and/or Bid Bond (DAPW 15A) are not signed and notarized as required by these instructions, or the Signature Affidavit (DAPW 14) and the Bid Bond (DAPW 15A) are not signed and notarized as allowed as an alternative.

- B. If all required bid or alternate(s) amounts, or unit prices are not submitted with the bid when specifically called for by the specifications issued for the project.

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DAPW 30

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- C. When the Bidder adds any provision reserving the right to accept or reject the award, or if the Bidder adds conditions or alternates to his bid not requested (voluntary alternates), or if there are unauthorized additions or irregularities of any kind which tend to make the proposal incomplete, indefinite or ambiguous as to its meaning or amount.
- D. When no bids received are under or within funds that can be appropriated, or within the Designer's estimate or when situations develop which make it impossible or not practical to proceed with the proposed work.
- E. If, subsequent to the opening of the bids, facts exist which would disqualify the Bidder, or that such Bidder is not deemed by the Director, Public Works Division, to be responsive or responsible.
- F. If an out-of-state contractor is not registered with the Indiana Secretary of State or if any bidding contractor is not in good standing with the Secretary of State.

CONTRACTOR'S AFFIDAVIT OF SUBS EMPLOYED

Public Works Project Number: _____ Date: _____

Project Description: _____

Prime Contractor:

Form _____ Submitted _____ for _____ Bid: _____

Contract: _____ or Payment No.: _____

The following companies are subcontractors on this project for the amount indicated:

Subcontractor Name	Subcontract For	Subcontract Amount	Revised Amount	DAPW Certified Y/N	MBE WBE	On Site Y/N

_____ being duly sworn upon oath, deposes and says that he
is _____ of the firm of _____ and is
familiar with the affidavit herewith and that these entries are complete and true.

STATE OF

} }

SS:

COUNTY OF

}

_____ personally appeared before me, a Notary Public, in and for said
County and State, this day of 20_, after being duly sworn upon his oath, says that the facts alleged in the foregoing
affidavit are true.

My Commission Expires: _____

(SEAL)

STATE FORM
21243

NOTARY PUBLIC - SIGNATURE

NOTARY PUBLIC PRINTED NAME

DAPW 12
REV 7/01

GENERAL BID FOR PUBLIC WORKS

CONTRACTOR'S BID

For _____
(Insert class of work)

Project Number _____

Project Description (Title) _____

Date _____

To: Department of Administration, Public Works Division
Room W467
402 West Washington Street Indianapolis,
Indiana 46204

Pursuant to notices given, the undersigned proposes to furnish and install work in
accordance with the construction documents prepared by:

(Designer Name, Address, Telephone)

for the sum of _____
(State amount in words)

_____ \$ _____
(State amount in figures)

If required add attachment for all unit prices called for in the Specifications.

_____ Federal I.D. Number or Social Security Number

Contractor's Email address _____
(Contract and Purchase Order will be sent to email address provided)

Bidder ID Number _____

(If you do not have an Indiana Department of Administration Bidder ID Number, please obtain one online at: <http://www.in.gov/idoa/2464.htm>)

ALTERNATE BIDS

Add Alternates Are Not to be included as part of the Base Bid Scope of Work.

Deduct Alternates are items of work that Are to be included in the Base Bid Scope of Work, and deducted from the project as described herein.

The work shall be as described in Section, ALTERNATES.

Bidder shall provide a response to each alternate specified. Response must indicate the amount to be ADDED to the base bid, DEDUCTED from the base bid, or that there is NO CHANGE.

Failure to respond to all alternates may cause the bid to be rejected.

BIDDER SHALL CHECK APPLICABLE BOX for each listed alternate.

Alternate No. ___ ADD ___ DEDUCT ___ NO CHANGE ___ AMOUNT \$ _____

Alternate No. ___ ADD ___ DEDUCT ___ NO CHANGE ___ AMOUNT \$ _____

Alternate No. ___ ADD ___ DEDUCT ___ NO CHANGE ___ AMOUNT \$ _____

Alternate No. ___ ADD ___ DEDUCT ___ NO CHANGE ___ AMOUNT \$ _____

Alternate No. ___ ADD ___ DEDUCT ___ NO CHANGE ___ AMOUNT \$ _____

Alternate No. ___ ADD ___ DEDUCT ___ NO CHANGE ___ AMOUNT \$ _____

Alternate No. ___ ADD ___ DEDUCT ___ NO CHANGE ___ AMOUNT \$ _____

Alternate No. ___ ADD ___ DEDUCT ___ NO CHANGE ___ AMOUNT \$ _____

Alternate No. ___ ADD ___ DEDUCT ___ NO CHANGE ___ AMOUNT \$ _____

Ethics Compliance. The Contractor and its agents shall abide by all ethical requirements that apply to persons who have a business relationship with the State, as set forth in Indiana Code § 4-2-6 et seq., the regulations promulgated there under, and Executive Order 04-08, dated April 27, 2004. If the Contractor is not familiar with these ethical requirements, the Contractor should refer any questions to the Indiana State Ethics Commission, or visit the Indiana State Ethics Commission website at <<<<http://www.in.gov/ethics/>>>>. If the Contractor or its agents violate any applicable ethical standards, the State may, in its sole discretion, terminate this contract immediately upon notice to the Contractor. In addition, the Contractor may be subject to penalties under Indiana Code § 4-2-6-12.

Pursuant to IC 22-9-1-10, the Contractor and subcontractors, if any, shall not discriminate against any employee or applicant for employment, to be employed in the performance of this contract, with respect to his hire, tenure, terms, conditions or privileges of employment, or any matter directly or indirectly related to employment, because of his race, religion, color, sex, disability, national origin, or ancestry. Breach of this covenant may be regarded as a material breach of the contract.

IN TESTIMONY WHEREOF, the Bidder (a sole proprietor) has hereunto set his hand this
day of _____, 20__.

Proprietorship (Company Name)

(INDIVIDUAL)

Bidder (Owner)

IN TESTIMONY WHEREOF, the Bidder (a partnership) has hereunto set their hands this
day of _____, 20__.

Company Name

Partner

Partner

IN TESTIMONY WHEREOF, the Bidder (a corporation) has caused this proposal to be signed by its
President or other authorized signatory and Secretary this _____ day of _____, 20__.

Corporation Name

By President or Other Authorized Signatory

Secretary

If the bid is signed by other than the President, a Corporation Resolution designating other authorized signatory shall be submitted with this bid unless already on file with the Certification Board of the Public Works Division.

BY SIGNING THIS BID THE BIDDER ACKNOWLEDGES PROCUREMENT OF ALL ADDENDA AND CERTIFIES THAT THIS BID RECOGNIZES ALL ITEMS IN ALL ADDENDA.

SIGNATURE AFFIDAVIT

PROJECT NO: _____

STATE OF _____ }
COUNTY OF _____ } SS:

Before me, the undersigned notary public, appeared _____ and being duly
(name of bidder)

sworn, on his oath says that he/she is _____
(president, general partner, owner)

of _____, bidder on Project No. _____, and
(name of company)

Affirmed that:

1. This bid is submitted in good faith in the amount stated herein, and will be fulfilled according to the Contract Documents (contract, general and supplemental conditions, technical specification, drawings and addenda thereto), if this bid is accepted; and
2. The statements are true contained in the Non-Collusion Statement, and as applicable, the Contractor's Affidavit of Subs Employed and the MBE, WBE and IVOSB Participation Plan and Good Faith Efforts Worksheet.

By: _____
(Signature)

(Printed name)

(Printed or typed name of company)

(must be signed by principal of organization)

STATE OF _____ }
COUNTY OF _____ } SS:

_____ personally appeared before me, a Notary Public, in and for said County and State, this _____ day of _____, 20____, after being duly sworn upon his oath, says that the facts alleged in the foregoing affidavit are true.

My Commission Expires:

NOTARY PUBLIC – SIGNATURE

NOTARY PUBLIC PRINTED NAME

(SEAL)

State Form 33060R1

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Rev. 10/21

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____
(Contractor's Name and Address)

as Principal, hereinafter called the Principal, and the _____
(Bonding Company Name)

a corporation duly organized under the laws of the State of _____
as Surety, hereinafter called the Surety, are held and firmly bound unto Public Works Division/Department of
Administration, State of Indiana, as Obligee, hereinafter called the Obligee,

in the sum of _____ for the payment of which sum well and truly to be
made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and
assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for: (insert State Project Number, Description and Location)

Project No. _____

Project Description: _____

Project Location: _____

NOW THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a contract
with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the
bidding or contract documents with good and sufficient surety for the faithful performance of such contract and for
the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the
Principal to enter such contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference
not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee
may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be
null and void, otherwise to remain in full force and effect.

Signed and sealed this _____ day of _____, 20__.

(Witness)

(Principal)

By:

(Title)

(Surety)

Witness)

(Attorney-in-fact)

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Indiana Department of Administration

MBE/WBE and IVOSB Participation Policy for Public Works Projects

I. Introduction

The Indiana Department of Administration (“IDOA”) in its commitment to Minority, Women’s and Indiana Veteran Owned Small Business participation in the state’s procurement and contracting process, expects MBE, WBE and IVOSB participation in bids for construction services \$150,000 and over with subcontracting opportunities.

II. Definitions

“Certification for MBE and WBE” means certification by the Indiana Department of Administration, Minority and Women's Business Enterprises Division. ("MWBED").

“Certification for IVOSB” means certification by the Indiana Department of Administration.

"Commercially useful function" Determination that an enterprise performs a commercially useful function will be made based on the following considerations:

- (1) An MBE or a WBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the MBE or WBE must also be responsible, with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself. To determine whether an MBE or a WBE is performing a commercially useful function, one must evaluate the following:
 - (A) The amount of work subcontracted.
 - (B) Industry practices.
 - (C) Whether the amount the enterprise is to be paid under the contract is commensurate with the work it is actually performing.
 - (D) The credit claimed for its performance of the work. (E) Other relevant factors.
- (2) An MBE or a WBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of MBE or WBE participation. In determining whether an MBE or a WBE is such an extra participant, one must examine similar transactions, particularly those in which MBEs or WBEs do not participate.
- (3) In the case of construction contracts, if:
 - (A) an MBE or a WBE does not perform or exercise responsibility for at least the agency’s requisite percent of the total cost of its contract with its own workforce; or (B) the MBE or WBE subcontracts a greater portion of the work of a contract than would be expected on the basis of normal industry practice for the type of work involved;it is presumed that the enterprise is not performing a commercially useful function.
- (4) IVOSB contractors and suppliers must perform a commercially useful function. A commercially useful function is generally deemed to be when an IVOSB contractor or supplier is responsible

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Rev 03/18

for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, an IVOSB contractor or supplier must also be responsible, with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself. An IVOSB contractor or supplier does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of IVOSB participation.

“Letter of Commitment” means a letter obtained from the MBE, WBE and IVOSB by the Bidders. The Letter of Commitment is a signed letter(s), on company letterhead, from the minority, women’s and/or Indiana Veteran Owned certified business. It must be produced no later than 24 hours after the bid due date and time. This letter(s) shall state and will serve as acknowledgement from the minority, women and/or Indiana Veteran Owned certified business of their level of participation in this solicitation, the dollar amount of the commitment, the scope of service or product to be provided and the anticipated dates of utilization.

“Minority and Women Business Enterprises Division (MWBED)” means the Division which acts on behalf of the State to actively promote, monitor, and enforce the MBE and WBE program. MWBED is the final authority on all matters pertaining to the maintenance and administration of the MBE and WBE program and compliance thereto.

“Minority Business Enterprise (MBE) and Women’s Business Enterprise (WBE)” means a business concern which is certified as at least fifty-one percent (51%) owned and controlled by a woman or women or one or more of the individuals classified as a minority group which includes: African Americans, Hispanic Americans, Asian Americans, American Indians and other racial minorities. The MBE and WBE must meet the eligibility requirements of 25 IAC 5.

“Indiana Veteran Owned Small Business Enterprise (IVOSB)” means an Indiana business which is certified as at least fifty-one percent (51%) owned and controlled by a veteran.

“Participation Plan” means the IDOA prescribed document that sets forth the MBE, WBE and IVOSB subcontractors that will perform work under the contract.

III. Minority and Women Business Enterprise Certification

MBE and WBEs must be listed on the IDOA directory of certified firms at the time the bid is submitted to be eligible to meet the contract goals. The bidder should verify that a firm is certified before the bid is submitted.

Questions regarding Certification should be addressed to the following:

Indiana Department of Administration
Minority and Women's Business Enterprises Division
402 West Washington Street, Room W469
Indianapolis, IN 46204 (317)
232-3061
mwbe@idoa.in.gov

IV. Indiana Veteran Owned Small Business Enterprise

IVOSBs must be listed on the IDOA directory of certified firms at the time the bid is submitted to be eligible to meet the contract goals. The bidder should verify that a firm is certified before the bid is submitted. Questions regarding Certification should be addressed to the following:

Indiana Department of Administration
402 W. Washington St., Room W478
Indianapolis, IN 46204
(317) 233-1494
Indianaveteranspreference@idoa.in.gov

V. Bidding Process

IDOA will review projects for viable subcontracting opportunities. All projects will be governed by this policy unless otherwise stated.

A representative from MWBED may attend most pre-bid meetings to discuss and answer questions related to the MBE, WBE and IVOSB participation goals. The MWBED will be available to assist Bidders in locating MBE, WBE or IVOSB firms to engage in the contract.

The 2018-2019 Contract Goals for construction projects are 7% for MBE's, 5% for WBE's and 3% for IVOSBs.

The following procedures will be implemented in the acceptance and evaluation of responsive and responsible bids.

Bidders are expected to submit a Participation Plan on the approved form listing the utilization of MBE, WBE and IVOSB subcontractors who will be providing a commercially useful function on the project and a Letter of Commitment from MBE, WBE and IVOSB firms they plan to engage in the contract, if successful on the bid.

By submission of a bid, a bidder thereby acknowledges and agrees to be bound by the regulatory process set forth in 25 IAC 5.

A bidder who knowingly or intentionally misrepresents the truth about either the status of a firm that is being proposed as an MBE and WBE or who misrepresents the level of the nature of the amount to be subcontracted to the MBE and WBE may suffer penalties pursuant to Indiana Code 5-16-6.5-5.

A Contractor who knowingly or intentionally misrepresents the truth about his/her status as an MBE and WBE or who misrepresents the level or the nature of the amount subcontracted to his/her firm may suffer penalties pursuant to Indiana Code 35-44.1-2-1.

VI. Compliance

Contractors shall contract with all MBE, WBE and IVOSB firms listed on the Participation Plan. The subcontract or purchase order shall be for an amount that is equal to, or greater than, the total dollar amount listed on the form.

Contractors shall notify MWBED immediately if any firm listed on the Participation Plan refuses to enter into a subcontract or fails to perform according to the requirements of the subcontract.

The Contractor's proposed MBE, WBE and IVOSB Contract Goals will become incorporated into and a requirement of the Contract. Contractors shall not substitute, replace or terminate any MBE, WBE and IVOSB firm without prior written authorization from MWBED and the Owner.

Contractors shall cooperate and participate in compliance reviews as determined necessary by MWBED. Contractors shall provide all necessary documentation to show proof of compliance with the requirements as requested by MWBED.

VII. Non Compliance

When a Respondent submits a Minority, Women and Indiana Veteran Owned Business Enterprises Participation Plan in accordance with IC 4-13-16.5, 25 IAC 5 and 25 IAC 9, (the "Plan"), Respondent will be held to those commitments.

After the bid is awarded, and if it is determined by MWBED that the Contractor is not in compliance with its Participation Plan, MWBED will notify the Contractor within ten (10) days after the initial compliance review or the site visit and will identify the deficiencies found and the required corrective action that should be taken to remedy the deficiencies within a specific time period.

If a Contractor is found non-compliant, the Contractor must submit, in writing, a specific commitment, in writing, to correct the deficiencies. The commitment must include the precise action to be taken and the date for completion.

If MWBED determines the Contractor has failed to comply with the provisions of this Participation Program, Contractor's Utilization Statement, 25 IAC 5, or 25 IAC 9, IDOA may impose any or all of the following sanctions:

- a. Withholding payment on the Contract until such time that satisfactory corrective measures are made.
- b. Adjustment to payments due or the permanent withholding of retainages of the Contract.
- c. Suspension or termination of the specific Contract in which the deficiency is known to exist. In the event this sanction is employed, the Contractor will be held liable for any consequential damages arising from the suspension or termination of the Contract, including damages caused as a result of the delay or from increased prices incurred in securing the performance of the balance of the work by other Contractors.
- d. Recommendation to the certification board to revoke the contractor's certification status with the Public Works Division of IDOA. This recommendation may result in the suspension or revocation of the contractor's ability to perform on future state contracts for a period no longer than thirty-six (36) months.
- e. Continued non-compliance may be deemed a material breach of the agreement between MWBED and Contractor, whereupon MWBED shall have all the rights and remedies available to it under the Contract or at law.

- f. Suspension, revocation, or denial of the MBE, WBE or IVOSB certification and eligibility to participate in the MBE, WBE or IVOSB program for a period of not more than thirty-six (36) months.

VIII. Forms and Attachments

Minority, Women's and Indiana Veteran Owned Business Enterprises Participation Plan

**I. MINORITY, WOMEN'S AND INDIANA VETERAN OWNED BUSINESS
ENTERPRISES PARTICIPATION PLAN**

When a Respondent submits a Minority, Women's and Indiana Veteran Owned Business Enterprises Participation Plan in accordance with IC 4-13-16.5, 25 IAC 5 and 25 IAC 9, (the "Plan"), Respondent will be held to those commitments. The Plan must show that there are, participating in the proposed contract, Minority Business Enterprises (MBE), Women's Business Enterprises (WBE), and Indiana Veteran Owned Small Business Enterprises (IVOSB) listed in the Minority and Women's Business Enterprises Division (MWBED) directory and the IVOSB directory of certified firms. Respondents must indicate the name of the MBE, WBE and IVOSB with which it will work, the contact name and phone number at the firm(s), the service supplied by the firm(s), the specific dollar amount from this contract that will be directed toward each firm, and the approximate date these products and/or services will be utilized. If participation is met through use of vendors who supply products and/or services, the Respondent must also indicate the vendor's tax ID number as well as provide a description of products and/or services provided to the Respondent that are directly related to this proposal and the cost of direct supplies for this proposal. All prime contractors, including MBE, WBE and IVOSB prime contractors, are expected to meet the contract goals through use of subcontractors.

The Indiana Department of Administration ("IDOA") in its commitment to Minority, Women's and Indiana Veteran Owned Small Business participation in the state's procurement and contracting process, expects MBE, WBE and IVOSB participation in bids for public works projects with subcontracting opportunities. The Department reserves the right to verify all information included in the Plan.

Respondents may contact MWBED if they have any questions regarding their Participation Plan. A complete list of all currently certified MBE's and WBE's is located at this link: <http://www.in.gov/idoa/mwbe/2743.htm>. The complete list of certified IVOSBs can be found at this link http://www.in.gov/idoa/files/ivbe_certification_list.xls.

**Minority, Women's and Indiana Veteran Owned Business Enterprises Participation Letter
of Commitment**

A signed letter(s), on company letterhead, from the MBE, WBE and/or IVOSB must accompany the Plan. This letter(s) shall state and will serve as acknowledgement from the MBE, WBE and/or IVOSB of its amount of participation, the scope of products and/or services, and approximate date these products and/or services will be utilized.

By submission of the Proposal, the Respondent acknowledges and agrees to be bound by the regulatory processes involving the State's MBE, WBE and IVOSB Programs. Questions involving the regulations governing the Plan should be directed to MWBED's Compliance Unit at 317/232-3061 or to IDOA at 317/233-1494.

MBE/WBE and IVOSB PARTICIPATION PLAN

RFP # / Bid # / Quote # _____ DUE DATE _____ (Circle One)

RFP / BID / QUOTE NAME _____

(Circle One)

RESPONDENT _____

ADDRESS _____

CITY/STATE/ZIP _____

PHONE () _____

The following MBEs and/or WBEs listed in the MWBED directory will be participating in the contract:

<u>MBE/WBE</u>	<u>PHONE</u>	<u>COMPANY NAME</u>	<u>SCOPE OF PRODUCTS/SERVICES</u>	<u>UTILIZATION DATE</u>	<u>AMOUNT</u>

The following IVOSBs listed in the IVOSB directory will be participating in the contract:

<u>IVOSB</u>	<u>PHONE</u>	<u>COMPANY NAME</u>	<u>SCOPE OF PRODUCTS/SERVICES</u>	<u>UTILIZATION DATE</u>	<u>AMOUNT</u>

***If additional room is necessary, indicate here_____.** Please attach a separate page.

**Indiana Department of Administration
Public Works and State Office Building Commission
GOOD FAITH EFFORTS WORKSHEET**

BIDDER _____

BID/PROJECT NUMBER _____

CONTRACT GOALS 7% MBE 5% WBE

List the M/WBEs contacted and complete the following information for each. Copies of all communications to and from each vendor should be maintained.

Company Name and Address	MBE	WBE	Type of Contact	Date of Contact	Date Response Due	Goods Or Services Requested	Result (Include Price Quote)

Indicate **Good Faith Efforts** made to utilize MWBEs. Check and explain all that apply or should be considered. Please provide evidence of the efforts that you want to be considered. A complete description of each criteria may be found in the **Indiana Department of Administration Public Works and State Office Building Commission MWBE Participation Policy**.

MBE and WBE Barrier Assistance	Describe
Advertisement	Describe
Agency Assistance	Describe
Other Criteria	Describe

Rev 7/07

Corporate Resolution Form
Approved by Attorney General

CERTIFICATE OF CORPORATE RESOLUTION

I, _____, do hereby certify that I am the Secretary
Type Name
of _____, a corporation duly organized and
existing under and by virtue of the Laws of the State of Indiana;

I further certify that a regular/special meeting of the members of the Board of Directors of said corporation, duly called held and convened in conformity with the Charter and By Laws of said corporation, on the _day of _____, 20__, a quorum being present and voting thereon, the following resolution was duly adopted, to-wit:

I further certify that the foregoing resolution is a full, true, and complete copy as the same appears on record in the Minute Record Book of said corporation of which I am the legal custodian; that the same has not been altered, amended or repealed and is now in full force and effect.

In Witness Whereof, I have hereunto set my hand for said corporation this _____ day of _____, 20__.

By: _____
(Signature)

(must be signed by principal of organization)
STATE OF }
 } SS:
COUNTY OF }

_____ personally appeared before me, a Notary Public, in and for said County and State,
this _day of_, 20__, after being duly sworn upon his oath, says that the facts alleged in the foregoing affidavit are true.

My Commission Expires:

NOTARY PUBLIC - SIGNATURE

(SEAL)

NOTARY PUBLIC PRINTED NAME

STATE FORM DAPW 41 26481 Rev 7/01
NON-COLLUSION STATEMENT

The undersigned attests, subject to the penalties for perjury, that the undersigned is the Contractor, or that the undersigned is the properly authorized representative, agent, member or officer of the Contractor. Further, to the undersigned's knowledge, neither the undersigned nor any other member, employee, representative, agent or officer of the Contractor, directly or indirectly, has entered into or been offered any sum of money or other consideration for the execution of this Contract other than that which appears upon the face hereof. **Furthermore, if the undersigned has knowledge that a state officer, employee, or special state appointee, as those terms are defined in IC 4-2-6-1, has a financial interest in the Contract, the Contractor attests to compliance with the disclosure requirements in IC 4-2-6-10.5.**

Signature

Printed Name

Title

Company

Date

**STATE OF INDIANA DRUG-FREE WORKPLACE CERTIFICATION**

State Form 44260 (R2 / 12-22)

Pursuant to Executive Order No. 90-5, April 12, 1990, issued by Governor Evan Bayh, the Indiana Department of Administration requires the inclusion of this certification in all contracts with and grants from the State of Indiana in excess of \$25,000. No award of a contract or grant shall be made, and no contract, purchase order or agreement, the total amount of which exceeds \$25,000, shall be valid unless and until this certification has been fully executed by the Contractor or Grantee and attached to the contract or agreement as part of the contract documents. False certification or violation of the certification may result in sanctions including, but not limited to, suspension of contract payments, termination of the contract or agreement and/or debarment of contracting opportunities with the State for up to three (3) years.

The Contractor/Grantee certifies and agrees that it will provide a drug-free workplace by:

- (a) Publishing and providing to all of its employees a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; and
- (b) Establishing a drug-free awareness program to inform employees about (1) the dangers of drug abuse in the workplace; (2) the Contractor's policy of maintaining a drug-free workplace; (3) any available drug counseling, rehabilitation, and employee assistance programs; and (4) the penalties that may be imposed upon an employee for drug abuse violations occurring in the workplace;
- (c) Notifying all employees in the statement required by subparagraph (a) above that as a condition of continued employment the employee will (1) abide by the terms of the statement; and (2) notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction;
- (d) Notifying in writing the contracting State Agency and the Indiana Department of Administration within ten (10) days after receiving notice from an employee under subdivision (c) (2) above, or otherwise receiving actual notice of such conviction;
- (e) Within thirty (30) days after receiving notice under subdivision (c) (2) above of a conviction, imposing the following sanctions or remedial measures on any employee who is convicted of drug abuse violations occurring in the workplace: (1) take appropriate personnel action against the employee, up to and including termination; or (2) require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State or local health, law enforcement, or other appropriate agency; and
- (f) Making a good faith effort to maintain a drug-free workplace through the implementation of subparagraphs (a) through (e) above.

THE UNDERSIGNED AFFIRMS, UNDER PENALTIES OF PERJURY, THAT HE OR SHE IS AUTHORIZED TO EXECUTE THIS CERTIFICATION ON BEHALF OF THE DESIGNATED ORGANIZATION.

THE UNDERSIGNED ALSO AGREES THAT BY TYPING THEIR NAME ONTO THIS FORM, THEY AGREE TO THE USE OF THEIR DIGITAL NAME AS A LEGAL SIGNATURE

Printed Name of Organization

Authorized Representative

Title

Contract/Grant ID Number

Date

CONTRACTOR'S EMPLOYEE DRUG TESTING

IC 4-13-18 Chapter 18. Drug Testing of Employees of Public Works Contractors

4-13-18-1	Applicability
4-13-18-2	"Bid"
4-13-18-3	"Contractor"
4-13-18-4	"Public works contract"
4-13-18-5	Employee drug testing plan required in bid; collective bargaining agreements
4-13-18-6	Employee drug testing program requirements
4-13-18-7	Contract cancellation for noncompliance

IC 4-13-18-1 Applicability

Sec. 1. This chapter applies only to a public works contract awarded after June 30, 2006.

As added by P.L.160-2006, SEC.2.

IC 4-13-18-2 "Bid"

Sec. 2. As used in this chapter, "bid" includes a quotation.

As added by P.L.160-2006, SEC.2.

IC 4-13-18-3 "Contractor"

Sec. 3. (a) As used in this chapter, "contractor" refers to a person who:

(1) submits a bid to do work under a public works contract; or

(2) does any work under a public works contract.

(b) The term includes a subcontractor of a contractor.

As added by P.L.160-2006, SEC.2.

IC 4-13-18-4 "Public works contract"

Sec. 4. As used in this chapter, "public works contract" refers to:

(1) a public works contract covered by [IC 4-13.6](#);

(2) a public works contract covered by [IC 5-16](#) and entered into by a state agency; or

(3) a state highway contract covered by [IC 8-23-9](#);

(4) a public works contract covered by [IC 36-1-12](#); when the estimated cost of the public works project is one hundred fifty thousand dollars (\$150,000) or more.

As added by P.L.160-2006, SEC.2. Amended by P.L.72-2018, SEC.10.

IC 4-13-18-5 Employee drug testing plan required in bid; collective bargaining agreements

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Sec. 5. (a) A solicitation for a public works contract must require each contractor that submits a bid for the work to submit with the bid a written plan for a program to test the contractor's employees for drugs.

(b) A public works contract may not be awarded to a contractor whose bid does not include a written plan for an employee drug testing program that complies with this chapter.

(c) A contractor that is subject to a collective bargaining agreement shall be treated as having an employee drug testing program that complies with this chapter if the collective bargaining agreement establishes an employee drug testing program that includes the following:

- (1) The program provides for the random testing of the contractor's employees.
- (2) The program contains a five (5) drug panel that tests for the substances identified in section 6(a)(3) of this chapter.
- (3) The program imposes disciplinary measures on an employee who fails a drug test. The disciplinary measures must include at a minimum, all the following:
 - (A) The employee is subject to suspension or immediate termination.
 - (B) The employee is not eligible for reinstatement until the employee tests negative on a five (5) drug panel test certified by a medical review officer.
 - (C) The employee is subject to unscheduled sporadic testing for at least one (1) year after reinstatement.
 - (D) The employee successfully completes a rehabilitation program recommended by a substance abuse professional if the employee fails more than one (1) drug test. A copy of the relevant part of the collective bargaining agreement constitutes a written plan under this section.

As added by P.L.160-2006, SEC.2.

IC 4-13-18-6 Employee drug testing program requirements

Sec. 6. (a) A contractor's employee drug testing program must satisfy all of the following:

- (1) Each of the contractor's employees must be subject to a drug test at least one (1) time each year.
- (2) Subject to subdivision (1), the contractor's employees must be tested randomly. At least two percent (2%) of the contractor's employees must be randomly selected each month for testing.
- (3) The program must contain at least a five (5) drug panel that tests for the following:
 - (A) Amphetamines.
 - (B) Cocaine.
 - (C) Opiates (2000 ng/ml).
 - (D) PCP.
 - (E) THC.
- (4) The program must impose progressive discipline on an employee who fails a drug test. The discipline must have at least the following progression: (A) After the first positive test, an employee must be:

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- (i) suspended from work for thirty (30) days;
 - (ii) directed to a program of treatment or rehabilitation; and
 - (iii) subject to unannounced drug testing for one (1) year, beginning the day the employee returns to work.
- (B) After a second positive test, an employee must be:
- (i) suspended from work for ninety (90) days;
 - (ii) directed to a program of treatment or rehabilitation; and
 - (iii) subject to unannounced drug testing for one (1) year, beginning the day the employee returns to work.
- (C) After a third or subsequent positive test, an employee must be:
- (i) suspended from work for one (1) year;
 - (ii) directed to a program of treatment or rehabilitation; and
 - (iii) subject to unannounced drug testing for one (1) year, beginning the day the employee returns to work.

The program may require dismissal of the employee after any positive drug test or other discipline more severe than is described in this subdivision.

(b) An employer complies with the requirement of subsection (a) to direct an employee to a program of treatment or rehabilitation if the employer does either of the following:

- (1) Advises the employee of any program of treatment or rehabilitation covered by insurance provided by the employer.
- (2) If the employer does not provide insurance that covers drug treatment or rehabilitation programs, the employer advises the employee of agencies known to the employer that provide drug treatment or rehabilitation programs. *As added by P.L.160-2006, SEC.2.*

IC 4-13-18-7 Contract cancellation for noncompliance

Sec. 7. (a) The public works contract must provide for the following:

- (1) That the contractor implement the employee drug testing program described in the contractor's plan.
- (2) Cancellation of the contract by the agency awarding the contract if the contractor:
 - (A) fails to implement its employee drug testing program during the term of the contract;
 - (B) fails to provide information regarding implementation of the contractor's employee drug testing program at the request of the agency; or
 - (C) provides to the agency false information regarding the contractor's employee drug testing program.

(b) The provisions of the public works contract relating to cancellation of the contract by the agency awarding the contract apply to cancellation of the public works contract under this section.

As added by P.L.160-2006, SEC.2.

DOMESTIC STEEL AFFIDAVIT

STATE OF

} }

SS:

COUNTY OF

}

PROJECT NO: _____

I hereby swear, under penalties of perjury, that the steel products furnished for this project shall conform to the following Indiana Code Definitions and contract provisions:

5-16-8-1 Definitions:

"Steel products" means products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated, or otherwise similarly processed, or processed by a combination of two (2) or more of such operations, from steel made in the United States by the open hearth, basic oxygen, electric furnace, Bessemer or other steel making process.

"United States" means the United States of America and includes all territory, continental or insular, subject to the jurisdiction of the United States.

5-16-8-2 Public agency contract provisions; rules for determining reasonable pricing.

Sec. 2. (a) Each public agency shall require that every contract for the construction, alteration, repair, improvement or maintenance of Public Works contain a provision that, if any steel products are to be used or supplied in the performance of the contract or subcontract, only steel products as defined by this chapter shall be used or supplied in the performance of the contract or any of the subcontracts unless the head of the public agency determines, in writing, that the cost of steel products is deemed to be unreasonable.

(Signature)

(Printed name)

(Attest)

(Vice President/Secretary/Treasurer)

(Printed or typed name of company)

STATE OF

} }

SS:

COUNTY OF

}

_____ personally appeared before me, a Notary Public, in and for said County and State, this _day of _20_, after being duly sworn upon his oath, says that the facts alleged in the foregoing affidavit are true.

My Commission Expires:

(SEAL)

NOTARY PUBLIC - SIGNATURE

NOTARY PUBLIC PRINTED NAME

CONTRACTOR'S BOND FOR CONSTRUCTION

KNOW ALL MEN BY THESE PRESENT, that _____
(Contractor)
of _____
(Address) (City, State)
as principal and _____
(Bonding Company)

(Address) (City, State) (Zip Code)

as surety, are firmly bound unto the State of Indiana in the penal sum of \$ _____ Dollars, for the payment of which, well and truly to be made, we bind ourselves, jointly and severally, and our joint and several heirs, executors, administrators and assigns, firmly by these present, this ____ day of _____, 20____.

THE CONDITIONS OF THE ABOVE OBLIGATION ARE SURE, THAT, WHEREAS the State of Indiana acting by and through the Commissioner, Department of Administration, has entered into a certain written contract dated _____ of _____

(Project Number and Description)
_____ situated in _____

_____ Indiana, in accordance with the construction documents approved and adopted by said Commissioner, Department of Administration, which are made a part of this bond.

NOW THEREFORE, if the said _____
(Contractor)

_____, shall well and faithfully do and perform the same in all respects according to the plans and specifications adopted by said Commissioner, Department of Administration, and according to the time, terms and conditions specified in said contract and incurred by him or any subcontractor in the prosecution of said work, including labor, service and materials furnished, then this obligation shall be void; otherwise to remain in full force, virtue and effect. This bond shall adhere to the requirements of IC 4-13.6-7-6 and IC 4-13.6-7-7.

IN WITNESS WHEREOF, we hereunto set our hands and seals this _____ day
of _____, 20_____.

By: _____ (Seal)
(Contractor)

By: _____ (Seal)
(Bonding Company)

By: _____
(Attorney-in-fact)

CONTRACTOR'S CERTIFICATE OF INSURANCE

This certifies to the addressee shown below that the following described policies, subject to their terms, conditions, and exclusions, have been issued to:

NAME AND ADDRESS OF INSURED:

COVERING (show State project number, name and location)

ADDRESSEE: PUBLIC WORKS DIVISION/DEPARTMENT OF ADMINISTRATION

DATE:

TYPE OF INSURANCE	POLICY NUMBER	EFFECTIVE DATE	EXPIRATION DATE	LIMITS	
1. General Liability				Each Person - Premises and Operations	\$
				Each Person - Elevators	\$
a. Bodily Injury				~~Each Person - Independent Contractor~~	\$
Including Personal Injury				~~Each Person - Products Completed~~	
				~~Including Operations~~	\$
					\$
				Each Person - Contractual	\$
				Each Occurrence -	\$
				Aggregate - Products Completed	
				Including Operations	
b. Property Damage				Each Occurrence - Premises and Operations	\$
				~~Each Occurrence - Elevators~~	\$
				~~Each Occurrence - Independent Contractor~~	\$
				Each Occurrence - Products Completed	
				Including Operations	\$
					\$
					\$
				Each Occurrence - Contractual	\$
				Aggregate -	
				Aggregate - Operations Protective	
				Products and Contractual	
2. Automobile Liability				Each Person	\$
a. Bodily Injury				~~Each Occurrence~~	
b. Property Damage				~~Each Accident~~	

					_____ _____ \$ _____
3. Excess Liability Umbrella					\$ _____
4. a. Workmen s Compensation b. Employer s Liability				Statutory Workmen s Compensation _____ One Accident And Aggregate Disease _____	\$ _____ \$ _____
5. Builder s Risk					\$ _____

UNDER GENERAL LIABILITY POLICY OR POLICIES

YES NO

1. Does Property Damage Liability Insurance shown include coverage for **XC** and **U** hazards?

2. Is Occurrence Basis Coverage provided under Property Damage Liability?.. _____
- 3, Is Broad Form Property Damage Coverage provided for this Project?.....

- 4. Is Personal Injury Coverage included?.....

- 5. Is coverage provided for Contractual Liability (including indemnification provision) assumed by insured?.....

- UNDER AUTOMOBILE LIABILITY POLICY OR POLICIES 1. Does coverage shown above apply to non-owned and hired automobiles?....

2. Is Occurrence Basis Coverage provided under Property Damage Liability?.. _____

In the event of cancellation, fifteen (15) days written notice shall be given to the party to whom this certificate is addressed.

NAME OF INSURANCE COMPANY

ADDRESS

SIGNATURE OF AUTHORIZED REPRESENTATIVE



**INDIANA DEPARTMENT OF ADMINISTRATION
PUBLIC WORKS DIVISION**

GENERAL CONDITIONS

Indiana Department of Administration
Public Works Division
402 W. Washington Street, W462

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STATE OF INDIANA**GENERAL CONDITIONS****ARTICLE 1 CONTRACT DOCUMENTS**

1.1 Definitions

1.1.1 Contract Documents

The Contract Documents consist of the Contract, the Instructions to Bidders, the Contractor's Proposal (Bid), the Conditions of the Contract (General and Supplementary), Drawings, Specifications, and Addenda issued prior to bidding, Change Orders, any written interpretation issued as a field order by the Designer pursuant to Article 1.2, and all field orders for minor changes in the Work by the Designer pursuant to Article 12.3.

1.1.2 Contract

The Contract Documents form the Contract for construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral.

1.1.3 Work

All labor, material, equipment, systems and services necessary to produce the result called for in the Contract Documents.

1.1.4 Project

The Project is the total construction project designed by the Designer of which the Work performed under the Contract Documents may be the whole or a part of the whole Project.

1.2 Execution, Correlation, Intent and Interpretations

1.2.1 The Contract Documents shall be signed by the Owner and the Contractor. The signature process may be done electronically at the discretion of the Owner.

1.2.2 By executing the Contract, the Contractor represents that Contractor has visited the site and correlated its observations with the requirements of the Contract Documents and has no major question pertaining thereto.

1.2.3 The Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. The intention of the Contract Documents is to include all labor, equipment, supervision and materials, for the proper execution and completion of the Work, and also to include those things that may be reasonably inferable from the Contract Documents as being necessary to produce the intended results. Words that have a well-known technical or trade meaning are used herein, in accordance with such recognized meaning.

1.2.4 Written interpretations necessary for the proper execution of the Work, in the form of drawings or otherwise will be issued with reasonable promptness by the Designer. Such interpretations shall be consistent with and reasonably inferable from the Contract Documents, and may be issued by field order subject to Owner's approval.

1.3 Copies Furnished and Ownership

1.3.1 The Contractor will be furnished 5 copies of drawings and specifications and any other information necessary for the execution of the Work.

1.3.2 All drawings, specifications, and copies thereof furnished by the Designer are the Designer's property. They are not to be used on any other Project, and, with the exception of one Contract set for each party to the Contract, are to be returned on request to the Designer at the completion of the Work.

ARTICLE 2 DESIGNER

2.1 Definition

2.1.1. The Designer is the person or organization identified as Designer of the Project and is referred to throughout the Contract Documents as if singular in number and, in some places, masculine in gender. The terms Designer, Engineer, Architect, (and in certain projects Director, Public Works Division, or his/her authorized representative), shall mean the Designer.

2.2 Administration of the Contract

- 2.2.1 The Designer will provide general administration of the Contract, including the functions hereinafter described.
- 2.2.2 Unless stated otherwise, the Designer shall be the Owner's representative during the construction phase. Designer shall have authority to act on behalf of the Owner only to the extent expressly provided in the Contract Documents or otherwise in writing, which will be shown to the Contractor. The Designer will advise and consult with the Owner and all of the Owner's instructions to the Contractor shall be issued through the Designer.
- 2.2.3 The Designer shall have access to the Work at all times wherever it is in storage, preparation and progress. The Contractor shall provide facilities for such access so that the Designer and Owner's Site Representative may perform their functions under the Contract Documents.
- 2.2.4 The Designer will make no less than weekly visits to the site when work is in progress to familiarize itself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. Designer will not be required to make exhaustive or continuous on-site inspection to check the quality or quantity of the Work. On the basis of Designer's on-site observations, Designer will keep the Owner informed of the progress of the Work and will endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor.
- 2.2.5 Based on such observation and the Contractor's applications for payment, the Designer will determine the amount owed to the Contractor and will issue Certificates for Payment in such amounts.
- 2.2.6 The Designer will be, in the first instance, the interpreter of the requirements of the Contract Documents and the judge of the performance thereunder. Designer will promptly render such interpretations as Designer may deem necessary for the proper execution or progress of the Work.
- 2.2.7 All interpretations and decisions of the Designer will be consistent with the intent of the Contract Documents. Designer will exercise its best efforts to insure faithful performance by the Contractor.
- 2.2.8 Claims, disputes and other matters in question relating to the execution or progress of the Work or interpretation of the Contract Documents shall be referred initially to the Designer for decision and be subject to written appeal within fifteen (15) days by the Contractor. The Designer's decision shall be submitted promptly in writing to the Director, Public Works Division, who shall have full authority to render the final and binding decision.
- 2.2.9 The Designer will have responsibility to recommend to the Owner the rejection of work that does not conform to the Contract Documents. Whenever the Designer considers it necessary or advisable, Designer shall recommend to the Owner the stoppage of the Work or any portion thereof, and to recommend special examination or testing of the Work (whether or not fabricated, installed, or completed).
- 2.2.10 The Designer will review and approve or take other appropriate action upon the Contractor's submittals such as shop drawings, product data and samples, but only for conformance with the design concept of the Work and with the information given in the Contract Documents. Such action shall be taken with reasonable promptness so as to cause no delay. The Designer's approval of a specific item shall not indicate approval of all assembly of which the item is a component.
- 2.2.11 The Designer will prepare change orders in accordance with Article 12.
- 2.2.12 The Designer will conduct reviews to determine the dates of Substantial Completion and Final Completion, will receive and forward to the Owner for the Owner's review written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of Article 9.7.
- 2.2.13 The Designer, together with representatives from the Contractor and the Owner will conduct a review of the Work nine (9) months after the date of substantial completion to determine any work not in compliance with the Contract Documents at that time. A list of items to be corrected or completed will be forwarded to the Contractor for corrective action prior to the expiration of the one year warranty period.

- 2.2.14 The duties, responsibilities and limitations of authority of the Designer as the Owner's representative during construction as set forth in Articles 1 through 14 of these General Conditions shall not be modified or extended without written consent of the Owner.
- 2.2.15 The Designer will not be responsible for the acts or omissions of the Contractor, Subcontractor, or any of their superintendents, supervisory staffs, agents or employees, or any other persons performing any of the Work.
- 2.2.16 In case of the termination of the employment of the Designer, the Owner shall appoint a Designer against whom the Contractor makes no reasonable objections, whose status under the Contract shall be that of Designer.

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ARTICLE 3
OWNER

3.1 Definition

3.1.1 The Owner is the State of Indiana, represented by the Commissioner, Department of Administration, acting through the Director, Public Works Division, and the Director's designated project manager.

3.2 Information and Service Required of the Owner

3.2.1 The Owner will furnish, through the Designer, surveys, describing known physical characteristics, legal limits and utility locations for the property on which the Project is to be erected, if in the Owner's possession.

3.2.2. Information or services under the Owner's control shall be furnished by the Owner with promptness to avoid delay in the orderly progress of the Work.

3.2.3 The Owner shall issue all instructions to the Contractor through the Designer unless specified elsewhere in these documents.

3.2.4 If the Contractor fails to correct defective work as required by Article 13 or persistently fails to carry out the Work in accordance with the Contract Documents, the Owner, by a written order may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Article 6.1.

3.3 Owner's Site Representative

3.3.1 Notwithstanding the obligations of the Designer as Owner's representative during construction, the Owner may employ an on-site representative to observe the progress of the Work.

3.3.2 The Owner's Site Representative shall function as an observer only. Owner's Site Representative shall report his/her findings to the Designer for review and any required further action. The Owner's Site Representative is not authorized to make changes in the Work or to interpret the Contract Documents.

3.3.3 The Owner's Site Representative shall have at all times access to the Work wherever it is in storage, preparation and progress. Owner's Site Representative may attend meetings at the site and he/she may review and approve the Contractor payment requests.

ARTICLE 4 CONTRACTOR

4.1 Definition

4.1.1 The Contractor is the person or organization identified as such in the Contract. The Contractor is referred to throughout the Contract Documents as if singular in number and, in some places, masculine in gender. The term Contractor means the Contractor or its authorized representative.

4.2 Review of Contract Documents

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to the Designer and the Owner any error, inconsistency or omission Contractor may discover. The Contractor shall perform no portion of the Work at any time without Contract Documents or, where required, approved shop drawings, product data or samples for such portion of the Work.

4.3 Supervision and Construction Procedures

4.3.1 The Contractor shall supervise and direct the Work, using its best skill and attention. Contractor shall be solely responsible for the quality of the Work and for all construction techniques, sequences, and procedures, and for coordinating all portions of the Work.

4.3.2 The Contractor shall not be relieved from its obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the Designer in administration of the Contract, or by inspections, tests or approvals required or performed under Paragraph 7.9 by persons other than the Contractor.

4.4 Labor and Materials

4.4.1 Unless otherwise specified in Division 1, the Contractor shall provide and pay for all labor, material, equipment, tools, construction equipment, machinery, transportation, and other facilities and services necessary for the proper execution of the Work.

4.4.2 Unless otherwise specified in Division 1, the Contractor shall provide and pay for all electric current, water, heat, and telephone services and shall maintain necessary discipline to prevent waste.

4.4.3 If any item of work shall be the subject of a jurisdictional dispute as to the craft to be used for said work, the Contractor shall aid in such inter-craft resolution and if arbitrated, abide by the decision, holding the Owner free of involvement in the dispute, and if time is lost by the dispute, extra work days will only be considered through the provisions of Article 12.2. Contractor will endeavor to eliminate any embarrassment to the Owner caused by the dispute.

4.4.4. The Contractor shall at all times enforce strict discipline and good order among its employees and shall not employ on the Work any unfit person or any one employee unskilled in the Work assigned or unqualified as a tradesman in the trade involved.

4.5 Warranty and Guarantee

4.5.1 The Contractor warrants and guarantees that all materials and equipment incorporated in the Project shall be new unless otherwise specified, and all work will be of the highest quality, free from faults and defects, and in strict conformance with the Contract Documents for a period of one year from the date of substantial completion. All work not so conforming to the Contract Documents may be considered defective. If required by the Designer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. The warranties and guarantees provided in this Article and elsewhere in the Contract Documents shall be in addition to and not in limitation of any other warranty or guarantee or remedy called for the Contract Documents or otherwise prescribed by law. The Contractor, together with the Designer and representatives from the Owner, shall review the Work nine (9) months after the date of substantial completion to determine any work not in compliance with the Contract Documents. The Contractor shall correct such non-complying work prior to the expiration of the one year warranty.

4.6 Permits, Fees and Notices

4.6.1 The Contractor shall secure and pay for all permits, fees and licenses necessary for the execution of the Work.

4.6.2 The Contractor and Subcontractors must submit an "Exemption Certificate for Construction Contractors" (Form ST-105) to each supplier in order to obtain exemption from the Indiana Gross Tax (i.e., sales and use tax).

4.6.3 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, and orders of any public authority bearing on the conduct of the Work. If Contractor observes that any of the Contract Documents are at variance therewith in any respect, Contractor shall promptly notify the Designer in writing, and any necessary changes shall be adjusted by change order. If Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Designer, Contractor shall bear all cost arising from such non-conformance.

4.7 Cash Allowances

4.7.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. These allowances cover the net cost of the materials and equipment delivered and unloaded at the site which cost shall be determined by the Owner through proper procedures for receiving quotes or bids as required by law. The Contractor's handling costs on the site, labor, installation costs, overhead, profit, and other expenses shall be included in the Contract sum and not in the allowance. The Contractor shall cause the Work required by these allowances to be performed by such persons as the Designer may direct, but Contractor will not be required to employ persons against whom Contractor has a reasonable objection. If the net cost above, when determined, is more than or less than the allowance, the Contract Sum will be adjusted accordingly by change order.

4.8 Superintendent

4.8.1 The Contractor shall keep on the Project, during the entire contract time, a competent superintendent and necessary assistants, all satisfactory to the Designer, and the superintendent shall not be changed, except with the consent of the Owner, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in Contractor's employ. The superintendent shall represent the Contractor and shall have full authority to act on its behalf. All communications given the superintendent shall be as binding as if given by the Contractor. Important communications shall be confirmed in writing.

4.9 Responsibility for Those Performing the Work

4.9.1 The Contractor shall be responsible for the quality of the Work, for acts and omissions of all the Subcontractors, their superintendents, their supervisory staffs, agents, or employees and of all other persons performing any of the Work under a Contract with the Contractor.

4.10 Progress Schedule

4.10.1 Unless otherwise indicated in Division 1, the Contractor, immediately after being awarded the Contract, shall prepare and submit for the Designer's approval a progress schedule for the Work in relation to the entire Project. This schedule in bar graph form, or other form approved by the Owner, shall indicate the dates for the starting and completion of the various stages of construction, and in addition, will state the contractual completion date. The contract completion date, based on the construction period stated in the notice to bidders, shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by change order. A more detailed schedule may be required elsewhere in the documents.

4.11 Record Documents at the Site

4.11.1 The Contractor shall maintain for the Owner as part of the Contract one record copy of all drawings, specifications, addenda, shop drawings, change orders and other modifications at the site in good order, and marked to record all changes made during construction. These shall be available to the Designer and the Owner's Site Representative at all times while Work is in progress. All changes made during construction shall be recorded monthly and reviewed by the Designer before approval of each partial progress payment. The record documents shall be submitted to the Designer prior to the Contractor's final payment.

4.12 Shop Drawings and Samples

4.12.1 Shop drawings are all drawings, diagrams, illustrations, schedules, brochures, and other data, which are prepared by the Contractor, or any Subcontractor, manufacturer, supplier, or distributor, and which illustrate the Work.

4.12.2 The Contractor shall submit all shop drawings and samples required by the Contract or by the Designer in a timely manner, allowing sufficient time for the Designer's review so as not to cause any delay in the Work or in work by any other Contractor.

4.12.3 At the time of such submission, the Contractor shall furnish or verify all field measurements, field construction criteria, materials, catalog numbers, and the like and shall individually check, coordinate and stamp with its approval each submission, and shall in writing call the Designer's attention to any deviations in the shop drawings or samples from the requirements of the Contract Documents.

4.12.4 The Designer will check and approve, with reasonable promptness so as to cause no delay, these shop drawings and samples only for conformance with the design concept of the Project, and with the information given in the Contract Documents. The Designer's approval of a separate item will not indicate approval of the assembly in which the item functions.

4.12.5 The Designer's approval of shop drawings or samples shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has in writing called the Designer's attention to such deviation at the time of submission and the Designer has given written approval to the specific deviation, nor shall this relieve the Contractor from errors or omissions in the shop drawings or samples.

4.12.6 No work requiring a shop drawing or sample submission shall be commenced until the submission has been approved by the Designer. All such work shall be in accordance with approved shop drawings and samples.

4.13 Use of Premises

4.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents, and shall not unreasonably encumber the premises with any materials or equipment.

4.14 Cutting and Patching

4.14.1 The Contractor shall do all cutting, fitting or patching of its work that may be required to make its several parts come together properly and shall not endanger any work by cutting, excavating, or otherwise altering the Work or any part of it. Costs caused by defective or ill-timed work shall be borne by the party responsible therefore.

4.15 Cleaning Up

4.15.1 The Contractor shall at all times keep the premises free from accumulation of waste materials or rubbish caused by its operations. At the completion of the Work, Contractor shall remove all waste material and rubbish from and about the building as well as all its tools, scaffolding and surplus materials. Contractor shall clean all glass surfaces, lights and fixtures, ceilings, walls and shall leave the Work dusted, swept and wet mopped clean, unless more exactly specified.

4.15.2 In case of dispute the Owner may remove the rubbish and charge the cost to the several Contractors as the Designer shall determine to be just.

ARTICLE 5 SUBCONTRACTORS

5.1 Definition

As used in this article "contractor tier" refers collectively to the following classes of contractors on a public works project:

- (1) "Tier 1 contractor" includes each person that has a contract with the public agency to perform some part of the work on, supply some of the materials for, or supply a service for, a public works project. A person included in this tier is also known as a "prime contractor" or a "general contractor".
- (2) "Tier 2 contractor" includes each person that has a contract with a tier 1 contractor to perform some part of the work on, supply some of the materials for, or supply a service for, a public works project. A person included in this tier is also known as a "subcontractor".
- (3) "Tier 3 contractor" includes each person that has a contract with a tier 2 contractor to perform some part of the work on, supply some of the materials for, or supply a service for, a public works project. A person included in this tier is also known as a "sub-subcontractor".
- (4) "Lower tier contractor" includes each person that has a contract with a tier 3 contractor or lower tier contractor to perform some part of the work on, supply some of the materials for, or supply a service for, a public works project. A person included in this tier is also known as a "lower tier subcontractor".

A Subcontractor is a person or entity who has a direct Contract with the Contractor to perform any of the Work at the site. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and, in some places, masculine in gender

and means a Subcontractor or its authorized representative. The term Subcontractor does not include any separate Contractor or its Subcontractors.

5.2 Award of Subcontracts and Other Contracts for Portions of the Work

5.2.1 Unless otherwise required by the Contract, the Contractor shall furnish to the Owner, with its bid on the prescribed form, the names of all persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work with an installed value of \$150,000.00 or more. The Designer will promptly reply to the Contractor in writing stating whether or not the Owner or the Designer, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Designer to reply within fourteen (14) days shall constitute notice of no reasonable objection.

5.2.2 The Contractor shall not subcontract with any such proposed person or entity to which the Owner or the Designer has made reasonable objection. The Contractor shall not be required to subcontract with anyone to whom Contractor has a reasonable objection.

5.2.3 If the Owner or the Designer has reasonable objection to any such proposed person or entity, the Contractor shall submit a substitute to whom the Owner or the Designer has no reasonable objection.

5.2.4 The Contractor shall make no substitution of any Subcontractor, person or entity previously selected, if the Owner or Designer makes reasonable objection to such substitution.

5.2.5 The Contractor and its subcontractors shall employ only licensed plumbers and shall provide to the Owner the names and license numbers of all plumbers engaged in the Work. The Contractor shall submit this documentation with any monthly progress payment request that includes plumbing labor.

5.3 Sub Contractual Relations

5.3.1 By an appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner. Said agreement shall preserve and protect the rights of the Owner under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the Owner. Provisions of Article 9 for progress payments, retainage and payment for stored material shall be incorporated without modification in all Contractor-Subcontractor agreements. The Contractor shall require each Subcontractor to enter into similar agreements with Subcontractor's Sub-subcontractors. Prior to execution of the Contractor-Subcontractor agreement, the Contractor shall provide all Subcontractors a complete copy of all proposed Contract Documents for the Project to which the Subcontractor will be bound by this Paragraph 5.3. Each Subcontractor shall similarly make available to its Sub-Subcontractors copies of such Documents. Executed copies of all agreements shall remain on file with the Contractor and be available for review by the Owner at the Owner's discretion.

ARTICLE 6 SEPARATE CONTRACTS

6.1 Owner's Right to Let Separate Contracts

6.1.1 The Owner reserves the right to let other contracts in connection with other portions of the Project under these or similar General Conditions.

6.1.2 When separate contracts are awarded for different portions of the Project, the "Contractor" in the Contract Documents in each case shall be the Contractor who signs each separate contract with the Owner.

6.1.3 When separate contracts are awarded for portions of the Project, the General Construction Contractor shall be responsible for the overall coordination of all separate contracts for the Project.

6.2 Mutual Responsibility of Contractors

- 6.2.1 The Contractor shall afford each other Contractor reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and each shall properly connect and coordinate its work with all others as coordinated by the General Contractor.
- 6.2.2 If any part of the Contractor's work depends on proper execution or results upon the work of any other separate Contractor, the Contractor shall inspect and promptly report to the Designer any discrepancies or defects that shall cause its work to fail or be non-conforming. Failure of the Contractor to so inspect and report shall constitute an acceptance of the other Contractor's work as fit and proper for the reception of its work.
- 6.2.3 Should the Contractor cause damage to any separate Contractor on the Project, the General Contractor agrees, upon due notice, to settle with such other Contractor by agreement, if at all possible, without involving the Owner. The Owner will be involved only after evidence is presented that sureties cannot settle the problem.
- 6.2.4 Any costs caused by defective or ill-timed work shall be borne by the party responsible.

ARTICLE 7 MISCELLANEOUS PROVISIONS

7.1 Delinquent State Taxes (IC. 4-13-2-14.5). The Public Works Division may allow the Department of State Revenue access to the name of each person who is either:

- (1) Bidding on a Contract to be awarded under this chapter; or (2)
- A Contractor or Subcontractor under this chapter.

If the Public Works Division is notified by the Department of State Revenue that a bidder is on the most recent tax warrant list, a Contract may not be awarded to that bidder until the bidder provides a statement from the Department of State Revenue that the Bidder's delinquent tax liability has been satisfied. The Department of State Revenue may notify:

- (1) The Department of Administration; and
- (2) The Auditor of State;

that a Contractor or Subcontractor under this chapter is on the most recent tax warrant list, including the amount owed in delinquent taxes. The Auditor of State shall deduct from the Contractor's or Subcontractor's payment the amount owed in delinquent taxes. The Auditor of State shall remit this amount to the Department of State Revenue and pay the remaining balance to the Contractor or Subcontractor.

7.2 Choice of Law

- 7.2.1 The Contract shall be governed by the laws of the State of Indiana.

7.3 Assignment

- 7.3.1 The Contractor shall not assign the Contract or sublet it as a whole without the written consent of the Owner, nor shall the Contractor assign any monies due or to become due to it hereunder, without the previous written consent of the Owner.

7.4 Written Notice

- 7.4.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or to an officer of the corporation for whom it was intended, or sent by electronic mail (email), or by registered or certified mail to the last business address known to the person who gives the notice.

7.5 Claims for Damages

- 7.5.1 Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or any of its employees, agents or others for whose acts the party is legally liable, claim shall be made in writing to such other party within seven (7) days of the first observance of such injury or damage.

7.6 Performance Bond and Labor and Material Payment Bond

- 7.6.1 For projects advertised with an estimated base bid amount of One Hundred Fifty Thousand Dollars (\$150,000) or more, the Contractor shall furnish and pay for an approved one hundred percent (100%) combination performance and payment bond (Contractor's Bond for Construction, Public Works Division Form DAPW 15). This bond shall adhere to the requirements of IC. 4- 13.6-7-6 and IC. 4-13.6-7-7 as amended and shall cover the faithful performance of the Contract and the payment of all obligations arising thereunder, including reimbursement for any stored materials paid for but returned to materialmen, with such sureties as the Owner may approve. The combination bond shall remain in effect throughout the entire construction period and in addition for a period of one year from the date of final acceptance. The Contractor shall deliver the required bonds to the Owner prior to execution of the Contract by the Owner unless authorized to the contrary in writing by the Owner. All bonds must be issued by bonding companies, which are licensed and approved by the Indiana Insurance Commission.

7.7 Owner's Right to Carry Out the Work

- 7.7.1 If the Contractor should default or neglect to carry out the Work properly or fail to perform any provision of the Contract, the Owner may, after giving seven (7) days written notice to the Contractor, without prejudice to any other remedy it may have, make good such deficiencies. In such case, an appropriate change order shall be issued deducting the cost thereof including the cost of the Designer's additional service made necessary by such default, neglect, or failure of the Contractor, from the payments then or thereafter due the Contractor, provided, however, that the Designer shall approve both such action and the amount charged to the Contractor. If such payments due to the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

7.8 Royalties and Patents

- 7.8.1 The Contractor shall pay all royalties and license fees. Contractor shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from liability of any nature or kind including costs and expenses for or on account of any patented or unpatented invention, process, article or appliance manufactured or used in the performance of this Contract, including its use by the Owner.

7.9 Tests & Substitution of Materials

- 7.9.1 If the Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction require any work to be inspected, tested, or approved, the Contractor will give the Designer timely notice of its readiness and of the date fixed for such inspection, testing, or approval so that the Designer may observe the same. The Contractor shall bear all cost of such inspections, tests, and approvals unless otherwise provided.
- 7.9.2 If, after the commencement of the Work, the Designer, with approval of the Owner in writing, determines that the Work requires special inspection, testing, or approval for which subparagraph 7.9.1 does not provide, Designer will, upon written authorization from the Owner, order such special inspection, testing or approval. If such special inspection or test reveals a failure of the Work to fulfill the requirements of the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, the Contractor shall bear all costs thereof; otherwise, the Owner shall bear such costs. An appropriate change order shall be issued.
- 7.9.3 Required certificates of inspection, testing or approval shall be secured by the Contractor and promptly delivered by Contractor to the Designer.

- 7.9.4 Observations by the Designer of the inspections, tests, or approvals required by Article 7 will be promptly made, and where practicable at the source of supply at no additional cost to the Owner.
- 7.9.5 Neither the observations of the Designer in its administration of the Contract, nor inspections, tests or approvals by persons other than the Contractor shall relieve the Contractor from its obligations to perform the Work in accordance with the Contract Documents.
- 7.9.6 All building construction and work, alterations, repairs, plumbing, mechanical, and electrical installations and appliances connected therewith, shall comply with the Rules and Regulations of the Indiana Department of Homeland Security, the Indiana Department of Health, local ordinances, Rules for Licensure of Building Trades, and other statutory provisions pertaining to this class of work; such rules and regulations and local ordinances to be considered as a part of these specifications.
- 7.9.7 Where in these specifications, one or more certain materials, trade names, or articles of certain manufacture are mentioned, it is done for the express purpose of establishing a basis of durability and efficiency and not for the purpose of limiting competition. Approval of other acceptable products for those specified may be obtained by requesting to the Designer no later than fourteen (14) days in advance of bid date with all documentation required for the Designer to evaluate any approval. If approval is granted, the subject product will be added by addendum.
- 7.9.8 Should there be a reason for change of materials after award of the Contract, the following criteria shall apply:
 - a. Original material no longer manufactured,
 - b. Delivery not possible within time specified for job, and/or
 - c. Unavailability due to causes beyond the control of the Contractor.
- 7.9.9 After agreement by the Designer and the Owner that a change is necessary, the Contractor shall present a request for substitution to the Designer. The burden of proof of the merit of the proposed substitute is upon the proposing party. The decision of the Designer and the Owner regarding the substitution shall be final.
- 7.10 Certificate of Qualification
 - 7.10.1 In accordance with IC. 4-13.6-4 as amended, all Contractors and Subcontractors performing work for the State of Indiana on projects estimated to be in excess of one hundred fifty thousand dollars (\$150,000.00), must hold a valid Certificate of Qualification issued by the Public Works Certification Board. The Instructions to Bidders define the procedure for certification and bidding.
 - 7.10.2 The Contractor must perform at least fifteen (15) percent of the total Contract Sum of the Work with its own forces. The Contractor shall submit copies of its payroll records, if requested by the Owner, showing the hours, rates and total costs for all personnel on its payroll detailed to the degree to ensure compliance with this paragraph and any Wage Determination provisions, if required.
- 7.11 Appropriation
 - 7.11.1 The Contract specifically limits payments to be made in accordance with appropriations made and funds made available under laws of the State of Indiana.
- 7.12 Federal Wage Determination, if required
 - 7.12.1 If a Davis-Bacon wage determination is included in the Contract Documents, it shall be used as the minimum wage and benefits to be paid for the trades indicated.
 - 7.12.2 Contractor shall submit a schedule of hourly wages to be paid to each employee (including those of its subcontractors) engaged in work on the site. This submittal shall be on Contractor's letterhead stationery and shall be signed by the Contractor and notarized. A copy of this submittal shall be conspicuously posted at the site.

- 7.12.3 Said rates shall in no case be less than those set out in the Davis-Bacon wage schedule a copy of which is herein bound or is on file with the Owner if it is required.
- 7.12.4 The Contractor shall provide (and require each Subcontractor to provide) weekly payroll records listing employees engaged in work on the site for the week and the hourly rates for base pay and benefits paid to each employee listed. The payroll record form shall include a statement by the Contractor/Subcontractor certifying the accuracy and completeness of the information provided. Payroll records shall be maintained by the Contractor during the course of the Work until the end of the required warranty period.
- 7.13 Out-of-State Contractors
- 7.13.1 Out-of-State business entities must be authorized to do business in the State, pursuant to Indiana Code Title 23, prior to submitting bids. Forms may be obtained by contacting the Secretary of State, State of Indiana, Indianapolis, Indiana.
- 7.14 Material Delivery
- 7.14.1 Shipments of material to be used by the Contractor or any Subcontractor under this Contract should be delivered to the job site only during the regular working hours of the Contractor or Subcontractor. If a delivery is made during other than the normal working hours of the Contractor or Subcontractor, its authorized agent must be on duty to receive such material. No employee of the Owner is authorized to receive any shipments designated for the Contractor or Subcontractor.
- 7.15 Weather
- 7.15.1 The Contractor shall at all times provide protection against weather, rain, wind, storms, frost or heat, so as to maintain all work, materials, apparatus and fixtures free from injury or damage. At the end of the day's work, all new work likely to be damaged shall be covered.
- 7.15.2 During cold weather, the Contractor shall protect all work from damage. If low temperature makes it impossible to continue operations safely, in spite of cold weather precaution, the Contractor shall cease work and shall so notify the Owner and Designer.
- 7.15.3 Any work damaged by failure to provide protection above required, shall be removed and replaced with new work at the Contractor's expense.
- 7.15.4 The Contractor shall provide and maintain on the premises, where directed, watertight storage shed (or sheds) for storage of all materials, which might be damaged by exposure to weather.
- 7.16 Fire Hazards
- 7.16.1 Wherever and whenever any burning, welding, cutting or soldering operation is in progress, or equipment is in use, or any work involving a fire hazard, is performed, the Contractor responsible for such operation shall have at all times acceptable fire extinguisher or protection within five (5) feet of the operation.
- 7.17 Dismissal
- 7.17.1 Any foreman or workman employed by the Contractor or by any Subcontractor who, in the opinion of the Director, Public Works Division and/or the Designer, does not perform his/her work in a proper and skillful manner, or is disrespectful, intemperate, disorderly, intoxicated or otherwise objectionable shall at the written request of either of the above, be forthwith discharged by the Contractor or Subcontractor employing such foreman or workman and said employee shall not be employed again on any portion of the Work without the written consent of the Director of the Division of Public Works and the Designer. Should the Contractor fail to furnish suitable and sufficient machinery, equipment or personnel for the proper prosecution of the Work, the Owner or Designer may withhold all payments that are or may become due, or may suspend the Work until such orders are upheld.

ARTICLE 8 TIME

8.1 Definitions

- 8.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for Substantial Completion of the Work as defined herein, including authorized adjustments thereto.
- 8.1.2 The date of commencement of the Work is the date established in a notice to proceed. If there is no notice to proceed, it shall be the date of the approval by the final state approving agency on the Owner-Contractor Contract or such other date as may be established therein.
- 8.1.3 The Date of Substantial Completion of the Work, or designated portion thereof, is the date certified by the Director, Public Works Division, when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner may occupy or utilize the Work, or designated portion thereof, for the use for which it is intended.
- 8.1.4 The term day as used in the Contract Documents shall mean calendar day unless otherwise specifically designated.

8.2 Progress and Completion

- 8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.
- 8.2.2 The Contractor shall begin the Work on the date of commencement as defined herein. Contractor shall carry the Work forward expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.
- 8.2.3 The Owner fully expects the Contractor to employ any and all means necessary to complete the Work within the Contract Time. Conduct of the Owner's affairs, such as unforeseen site conditions or delay in processing change orders, shall not be viewed as justification for delaying the Project unless the Owner can be shown to have breached the Contract. Contractor must employ all reasonable means to execute the Project in a timely manner and in conformance with the Contract Documents even if the Contractor or Designer seeks legal remedy against the Owner for claim of damage.

8.3 Delays and Extensions of Time

8.3.1 If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the Owner or the Designer, or by any employee of either, or by any separate Contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in transportation, adverse weather conditions not reasonable to anticipate, unavoidable casualties, or any causes beyond the Contractor's control, or by delay authorized by the Owner pending arbitration, or by any other cause which the Designer determines may justify the delay, then the Contract Time shall be extended by a Change Order for such reasonable time as the Designer may determine.

8.3.2 Claims for extension of time shall be made in writing to the Designer. In case of a continuing delay only one claim is necessary. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the Work.

8.3.3 If no agreement is made stating the dates upon which interpretations as provided in Article 2.2 shall be furnished, then no claim for delay shall be allowed on account of failure to furnish such interpretations until fifteen days after written request is made for them, and not unless such claim is reasonable.

8.3.4 This Paragraph 8.3 does not exclude the recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

9.1 Contract Sum

- 9.1.1 The Contract Sum is the total amount payable by the Owner for the performance of the Work under the Contract Documents.

9.2 Schedule of Values

9.2.1 Before the first application for payment, the Contractor shall submit to the Owner a schedule of various parts of the Work, including quantities if required by the Owner, aggregating the total Contract Sum, divided so as to facilitate payments to Subcontractors in accordance with Article 5.3, made out in such form as the Owner and the Contractor may agree upon, and supported by such data to substantiate its correctness as the Owner may require. Each item in the Schedule of Values shall include its proper share of overhead, profit, and other general charges. This schedule, when approved by the Owner, shall be used as a basis for the Contractor's Applications for Progress and Final Payments.

9.3 Progress Payments

9.3.1 Completed work: The Contractor shall submit to the Designer an itemized Application for Payment, supported by such data substantiating the Contractor's right to payment as the Designer may direct. The Owner shall make payments on account of the Contract, upon issuance of Certificates of Payment certified by the Designer and the Owner's Representative, for labor and materials incorporated into the Work at the rate of ninety-four (94%) percent of such value until fifty (50%) percent of the value of the Work is completed. After that fifty (50%) percent, no further retainage will be deducted. The Director, Public Works Division has the option to require that three (3%) percent of the value of the Work be retained throughout the duration of the entire Contract. The retainage schedule shall be determined prior to award of Contract. Retainage may be paid with final payment at the discretion of the Director, Public Works Division, but shall not be paid in any event until a minimum of sixty-one (61) days after all work is completed.

9.3.2 Materials Stored: Payments may be made on account for materials or equipment not incorporated in the Work, but delivered and suitably stored at the site. With written approval of the Owner, materials may be stored at another location other than the Work site if properly identified as the property of the Owner and properly protected. Storage of material at the place of business of the vendor is not acceptable (25 IAC 2-9-2). Such payments shall be conditional upon the submission by the Contractor of one of the following: 1) receipts marked by the supplier as paid; 2) supplier's final waiver of lien listing specific materials involved; 3) invoice with copy of canceled check showing payment; or 4) such other evidence of payment as the Owner may require in lieu thereof to establish ownership of all items except those listed as miscellaneous materials below. For the aggregate of miscellaneous stored materials for which payment is requested and above proof of payment is not available, a complete list will be provided along with the affidavit of payment. Upon certification by the Owner's representative that the listed materials are suitably stored, payment can be made. Miscellaneous materials are defined as pipe, fittings, wire, conduit, etc., normally stored as stock items in Contractor's warehouse. For materials stored other than at the construction site applicable insurance and transportation to the site shall be provided by the Contractor.

9.3.3 As stored materials are incorporated into the Work, the value shall be removed from the total value of stored materials requested in successive payments. Proof of ownership through one of the above methods will be required for additional materials. When, in the judgment of the Owner, retainage for completed work is not sufficient in relation to excessive amounts requested for stored materials or equipment, the Owner may elect to place the retainage for such materials or equipment in escrow. This retainage shall apply as a credit toward retainage due to be held for completed work on future payments.

9.3.4 The Contractor warrants that title to all work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon the receipt by the Contractor of payment, whichever occurs first, free and clear of all liens, claims, security interest or encumbrances, hereinafter referred to in this Article 9 as "liens"; and that no Work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

9.3.5 The Contractor shall accompany each application for payment request with a certification that all Subcontractors (fabricators) have been paid within ten (10) days of receipt of payment that pro rata amount of funds Contractor has received from the Owner for the value of work or services (fabricated materials or equipment) performed by the Subcontractor (supplied by fabricator) contained in previous progress payments. The Contractor's inclusion of a value of subcontract work in its progress pay estimate is prima facie evidence of acceptance of work having such a value; therefore, if the Owner receives a certification from a Subcontractor that Subcontractor has not been paid such amounts as were included in the Contractor's partial billing and subsequently paid to the Contractor by the Owner, then the Owner will hold all subsequent partial payment requests until satisfactory evidence is received from the Subcontractor that Subcontractor has been paid such amounts presented to the Owner by the Contractor, paid to the Contractor by the Owner, and not distributed by the Contractor to the Subcontractor. The making of an incorrect certification of either partial payment or final payment may be considered by the Owner to be a breach of contract, and Owner may exercise all of its prerogatives set out in the Contract in addition to the remedies for falsifying an affidavit. Such an action could result in a suspension of qualification with the State Certification Board for a period of up to two (2) years.

9.4 Certificates for Payment

9.4.1 When the Contractor has made application for payment as above, the Designer will issue a Certificate of Payment to the Owner for such amount as Designer determines to be properly due, or state in writing its reasons for withholding a certificate as provided in Articles 9.5.1.

9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Designer to the Owner, based on the Designer's observations at the site as provided in Article 2.2.4 and the data comprising the Application for Payment, that the Work has progressed to the point indicated, and that, to the best of its knowledge, information and belief, the quality of work is in accordance with the Contract Documents subject to an evaluation of the Work as a functioning whole upon substantial completion, to the results of any subsequent tests called for in the Contract documents, to minor deviations correctable prior to the next certificate for payment and to any specific qualifications stated in its certificate, and that the Contractor is entitled to payment in the amount certified.

9.4.3 The Designer's final Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth in Article 9.7 have been fulfilled. However, by issuing a Certificate, the Designer shall not thereby be deemed to represent that Designer has made any examination to ascertain how or for what purpose the Contractor has used the monies paid on account of the Contract Sum.

9.4.4 The Owner shall make payment as soon as the fiscal procedure of the State can process same after receipt from the Designer of the Certificate for Payment. The fiscal procedure by the State can include, but not be limited to, review by the Owner's using agency, verification of the Certificate by the Owner's Site Representative, review for accuracy of form and calculation by the Owner's accountant, review by the Owner's project management and execution by the Director, Public Works Division, and others.

9.4.5 No certificate for a progress payment or progress payment for partial or entire occupancy of the Project by the Owner shall constitute an acceptance of work not in accordance with the Contract Documents.

9.4.6 Pursuant to IC. 4-13.6-7-2 all Contract awards of One Million Dollars (\$1,000,000) or above, if elected by the Contractor, an escrow agent will be selected by the State with whom the retainage funds for this Contract will be deposited and held until receipt of notice from the Director, Public Works Division (Escrow Form DAPW 32A) and from all other necessary parties as specified in and in accordance with the procedures and provisions of said Act.

9.5 Payments Withheld

9.5.1 The Designer (or Owner) will not approve an application in whole or in part, if in Designer's opinion, Designer is unable to make representations to the Owner as provided in Article 9.4. The Designer (or Owner) will not approve Application for Payment or, because of subsequent inspections, may nullify the whole or any part of the Certificate for Payment previously issued to such extent as may be necessary in Designer's opinion to protect the Owner from loss because of:

- A. defective work not remedied,
- B. claim filed or reasonable evidence indicating probable filing of claims,
- C. failure of the Contractor to make payments properly to Subcontractors or for materials, equipment or labor, D. reasonable doubt that the Contract can be completed for the unpaid balance,
- E. damage to another Contractor,
- F. reasonable indication that the Owner may be damaged by delay in receiving use of the Work as scheduled, or,
- G. unsatisfactory prosecution of the Work by the Contractor.

9.5.2 When the above grounds are removed, payment shall be processed for amounts withheld.

9.6 Failure of Payment

9.6.1 If the Designer should fail to issue any Certificate for Payment, through no fault of the Contractor, or if the Owner should fail to pay the Contractor in a reasonable time considering the fiscal procedures of the State for processing same after receipt from the Designer the amount certified by the Designer, then the Contractor may, after seven (7) additional days, give written notice to the Owner and Designer, that work will stop until payment of the amount owing has been received.

9.7 Substantial Completion and Final Payment

9.7.1 When advised by the Contractor that the Work or a designated portion thereof is substantially complete, the Designer; the Director, Public Works Division, and the Contractor shall determine jointly by inspection that the Work is substantially complete. If they determine that the Work is substantially complete, the Contractor shall then prepare a Certificate of Substantial Completion with an accompanying list of incomplete items of work (punch list) and submit it to the Designer for

its signature and subsequent forwarding for approval by the Director, Public Works Division. The Certificate shall fix the date of Substantial Completion and shall state the responsibilities of the Owner and the Contractor for maintenance, heat, utilities and insurance.

- 9.7.2 Upon approval of the above, and notice that the Work is ready for final acceptance, the Designer, the Contractor and Owner will promptly make final review, and when they find the Work acceptable under the Contract and the Contract fully performed, the Contractor shall promptly submit the final Certificate for Payment with all other required documents, showing that the Work has been completed in accordance with the terms and conditions of the Contract, and that the entire balance in said final certificate, is due and payable.
- 9.7.3 Neither the final payment nor any part of the retained percentage shall become due until the Contractor shall submit to the Designer releases or waivers of all liens arising out of the Contract; an affidavit that the releases and waivers include all the labor, materials, and equipment for which a lien could be filed and that all payrolls, material bills, and other indebtedness connected with the Work for which the Owner or its property might in any way be responsible have been paid or otherwise satisfied; and such other data establishing payment or satisfaction of all such obligations as the Owner may require. If any such lien or claim remains unpaid, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such lien or claim, including all costs.
- 9.7.4 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor, and the Designer so confirms, the Owner shall, upon certification by the Designer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted, or such portion as may be available from funds not already released to an escrow agent pursuant to IC 4-13.6-7. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.
- 9.7.5 The making of final payment shall constitute a waiver of all claims by the Owner except those arising from:
- A. unsettled liens,
 - B. faulty work appearing after Substantial Completion,
 - C. failure of the Work to comply with the requirements of the Contract Documents,
 - D. terms of any special guarantees required by the Contract Documents.
- 9.7.6 If upon Substantial Completion of the Work there are any remaining uncompleted minor items, the Owner shall withhold, until those items are completed, an amount equal to two hundred percent (200%) of the value of each item as determined by the Designer or Owner.
- 9.7.7 The acceptance of final payment shall constitute a waiver of all claims by the Contractor, except those previously made in writing and still unsettled and covered by other agreed arrangements.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

10.1 Safety Precautions and Programs

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

10.2 Safety of Person and Property

10.2.1 The Contractor shall take all necessary precautions for the safety of, and will provide all necessary protection to prevent damage, injury, or loss to:

- A. all employees on the Project and all other persons who may be affected thereby,
- B. all the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, and,
- C. other property at the site or adjacent thereto, including trees, shrubs, lawns, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss. Contractor shall erect and

maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent utilities.

- 10.2.3 All damage or loss to all property specified herein caused directly or indirectly, in whole or in part, by the Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be remedied by the Contractor, except damage or loss attributable solely to faulty Contract Documents or to the acts or omissions of the Owner, or Designer or their employees, or for those whose acts either of them may be liable.
- 10.2.4 The Contractor shall designate a responsible member of its organization on the Work whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent, unless otherwise designated in writing by the Contractor to the Owner and the Designer.
- 10.2.5 When the use or storage of explosives or other hazardous materials or equipment is necessary for the prosecution of the Work, the Contractor shall carry on such activities under the supervision of properly qualified personnel.
- 10.2.6 The Contractor shall not overload, or permit any part of the Work to be loaded so as to endanger its safety.
- 10.2.7 All excavations creating a trench of five (5) or more feet in depth shall strictly adhere to the shoring and other safety requirements called for and described under Indiana OSHA Regulation 29 C.F.R. 1926, Subpart "P", for trench safety systems.

10.3 Emergencies

10.3.1 In an emergency affecting the safety of persons or property, the Contractor shall act, at its discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor because of emergency work shall be determined as provided for in Article 12, Changes in the Work, and Contractor shall notify the Owner of such a decision within seven (7) days of the event giving rise to such claim.

ARTICLE 11 INSURANCE

11.1 General Requirements for Insurance

11.1.1 The Contractor will be required to furnish to the Owner, evidence of its compliance with all items of insurance listed herein and in the Contract. All insurance policies/certificates shall be on file with the Owner prior to release of the signed Contract and commencement of work.

11.1.2 The Contractor shall purchase and maintain, with a company or companies licensed to do business in Indiana, such insurance as will protect Contractor from claims set forth below, arising out of or resulting from the Contractor's operations under the Contract, whether such operations be by the Contractor or by any Subcontractor or by anyone directly or indirectly employed by any of them:

- A. claims under Workmen's Compensation Acts and other employee benefit acts;
- B. claims for damages because of bodily injury, personal injury, occupational sickness or disease, or death of its employees;
- C. claims for damages because of bodily injury, personal injury, sickness, disease or death of any person other than its employees;
- D. claims for damages to tangible property, including loss of use thereof.

11.1.3 This insurance shall be written for not less than any limits of liability specified herein, or required by law, whichever is greater. Policies or certificates of insurance, acceptable to the Owner, shall be filed with the Owner prior to execution of the Contract. These Certificates shall contain a provision that coverages afforded under the policies will be for the life of the Work.

11.1.4 Policies (certificates) shall show name and complete address of the Company, expiration date or dates, and policy number or numbers. Policies shall not be canceled until at least thirty (30) days prior written notice has been given to the Owner and acknowledged by the Owner in writing.

11.2 Property Insurance

11.2.1 The Contractor shall furnish and maintain, at the Contractor's expense, Fire, Extended Coverage, Vandalism, and Malicious Mischief Insurance (Builder's Risk), in the sum of 100% of the Contract amount. Builder's Risk insurance shall cover the structure on/in which the Work of this Contract is to be done including items of labor and material connected therewith, whether in or adjacent to the structure insured; material in place or to be used as part of the permanent construction, including surplus materials; shanties, protective fences, bridges, or temporary structures; miscellaneous materials and supplies incident to the Work; scaffolding, staging, towers, forms, and equipment, if included in the cost of the Work. This insurance need not cover any tools owned by mechanics, or any tools, equipment, scaffolding, staging, towers, and forms owned or rented by the Contractor, the capital value of which is not included in the cost of the Work.

11.2.3 Any loss under this Article 11.2 is to be adjusted with the Owner and made payable to the Owner as trustee for the insured, as their interests may appear.

11.3 Liability Insurance

11.3.1 The Contractor and their subcontractors (if any) shall secure and keep in force during the term of this Contract the following insurance coverages (if applicable) covering the Contractor for any and all claims of any nature which may in any manner arise out of or result from Contractor's performance under this Contract:

- A. Commercial general liability, including contractual coverage, and products or completed operations coverage (if applicable), with minimum liability limits not less than \$700,000 per person and \$5,000,000 per occurrence unless additional coverage is required by the State. The State is to be named as an additional insured on a primary, non-contributory basis for any liability arising directly or indirectly under or in connection with this Contract.
- B. Automobile liability for owned, non-owned and hired autos with minimum liability limits of \$700,000 per person and \$5,000,000 per occurrence. The State is to be named as an additional insured on a primary, non-contributory basis.
- C. The Contractor shall provide proof of such insurance coverage by tendering to the undersigned State representative a certificate of insurance prior to the commencement of this Contract and proof of workers' compensation coverage meeting all statutory requirements of IC §22-3-2. In addition, proof of an "all states endorsement" covering claims occurring outside the State is required if any of the services provided under this Contract involve work outside of Indiana.
- D. The Contractor's insurance coverage must meet the following additional requirements:
 - 1. The insurer must have a certificate of authority or other appropriate authorization to operate in the state in which the policy was issued.
 - 2. Any deductible or self-insured retention amount or other similar obligation under the insurance policies shall be the sole obligation of the Contractor.
 - 3. The State will be defended, indemnified and held harmless to the full extent of any coverage actually secured by the Contractor in excess of the minimum requirements set forth above. The duty to indemnify the State under this Contract shall not be limited by the insurance required in this Contract.
 - 4. The insurance required in this Contract, through a policy or endorsement(s), shall include a provision that the policy and endorsements may not be canceled or modified without thirty (30) days' prior written notice to the undersigned State agency.
 - 5. The Contractor waives and agrees to require their insurer to waive their rights of subrogation against the State of Indiana.
- E. Failure to provide insurance as required in this Contract may be deemed a material breach of contract entitling the State to immediately terminate this Contract. The Contractor shall furnish a certificate of insurance and all endorsements to the State before the commencement of this Contract.

- F. Boiler and Machinery Explosion Insurance shall be required when the Work includes boiler, other pressure

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vessels or steam piping installation or repair.

- G. After June 30, 2015, this entire Article will apply to **any** contractor that will be on the construction site pursuant to IC 5-16-13 and an acceptable certificate of insurance will be provided by each and every contractor.

ARTICLE 12 CHANGES IN THE WORK

12.1 Change Orders

12.1.1 The Owner, without invalidating the Contract, may order changes in the Work consisting of additions, deletions, or modifications, with the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by Change Order, and shall be executed under the applicable conditions of the Contract Documents.

12.1.2 A Change Order is a written order to the Contractor compiled and reviewed by the Designer, prepared by the Owner and then signed by the Owner and the Contractor. The order is issued after the execution of the Contract authorizing a change in the Work, and documenting any adjustment in the Contract Sum and/or the Contract Time. The Contract Sum may be changed only by change order.

12.1.3 The value of any work involved in a change in the Work shall be determined in one or more of the following ways, in order of priority listed:

- A. by mutual acceptance of a lump sum. For all amounts over \$500, the Contractor shall provide a complete listing of quantities and unit prices of materials, hours of labor with cost per hour, and separate agreed percentages for any overhead and profit. The maximum aggregate increase for overhead and profit (including all home office and field office overhead) for any Subcontractor or for the Contractor performing its own work is fifteen (15%) percent; the maximum increase for a Contractor on work performed by a Subcontractor is five (5%) percent. If the cost of performance and payment bond(s) is shown as a separate line item in the Contractor's schedule of values for the project, then an increase will be permitted to provide for the additional cost of the bond(s). If the cost of the bond(s) is not indicated on the Contractor's schedule of values for the Project, any increase in cost for bond(s) shall be included in the Contractor's allowed overhead. For listings under \$500, list lump sum for each item, or, B. by unit prices named in the Contract or subsequently agreed upon, or,
- C. by cost plus a mutually acceptable fixed or percentage fee.

12.1.4 Should conditions be encountered below the surface of the ground that are:

- A. at variance with the conditions indicated by the Contract Documents, and
- B. different than could be expected after a reasonable viewing of the site by the bidders, and C. not evident from available soil samples,

then the Contract sum may be equitably adjusted by Change Order upon claim by Contractor made within a reasonable time after the first observance of the conditions.

12.1.5 If the Contractor claims that a written interpretation issued pursuant to Article 1.2 or a written order for a minor change issued pursuant to Article 12.3 involves additional cost or time, the Contractor shall make such claim as provided in Article 12.2.

12.2 Claims for Additional Cost or Time

12.2.1 If the Contractor wishes to make a claim under the provisions of the Contract Documents for an increase in the Contract Sum or an extension in the Contract Time, Contractor shall give the Designer written notice thereof within fifteen (15) days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor and authority received in writing from the Owner before proceeding to execute the Work, except in an emergency endangering life or property. No such claim shall be valid unless so made. Any approved change in the Contract Sum or Contract Time resulting from such claim shall be incorporated in a Change Order, initiated by the Designer and executed by the Owner. If the Designer does not initiate or the Owner execute a Change Order within a reasonable time in response to the request, such lack of action shall be construed as prima facie evidence of rejection of the request. For the purpose of this section "reasonable time" is expected not to exceed 30 days after receipt by the Owner.

12.3 Minor Changes in the Work

12.3.1 The Designer shall have authority, with Owner's approval, to order minor changes in the Work not involving an increase in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such change may be affected by written field order, with copy transmitted to the Owner. Such minor changes need not be approved in writing by the Owner; however, the Owner may provide written approval of any substitution of significant materials or equipment.

12.4 Field Orders

12.4.1 The Designer may issue written field orders, which interpret the Contract Documents in accordance with Article 1.2.4 without change in Contract Sum or Contract Time. The Contractor shall carry out such field orders promptly. The Designer shall

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transmit copies of field orders to the Owner.

ARTICLE 13 EXAMINATION AND CORRECTION OF WORK

13.1 Examination of Work

13.1.1 If any portion of the Work should be covered contrary to the request of the Designer or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Designer, be uncovered for Designer's observation and shall be replaced at the Contractor's expense.

13.1.2 Examination of questioned work may be ordered by the Designer with the approval of the Owner, and if so ordered the Work must be uncovered by the Contractor. If such work were found in accordance with the Contract Documents, the cost of re-examination and replacement shall, by appropriate change order, be charged to the Owner. If such work be found not in accordance with the Contract Documents, the Contractor shall pay such costs, unless it is found that the defect in the Work was caused by a separate Contractor employed as provided in Article 6 and in that event, the separate Contractor shall pay such costs.

13.2 Correction of Work before Substantial Completion

13.2.1 The Contractor shall promptly remove from the site all work rejected by the Designer as failing to conform to the Contract Documents, whether or not incorporated in the Project, and the Contractor shall promptly replace and re-execute its own work in accordance with the Contract Documents and without cost to the Owner and shall bear the cost of repair to or replacement of all work of separate Contractors destroyed or damaged by such removal or replacement.

13.2.2 If the Contractor does not remove such rejected work within a reasonable time, fixed by written notice from the Designer, the Owner may remove and store the material at the expense of the Contractor. If the Contractor does not agree to pay or credit the Contract with the cost of such removal within ten days thereafter, the Owner may acquire a lien upon such property and materials. If proceeds of lien foreclosure do not cover all costs, which the Owner has then borne, the difference shall be deducted from the amount to be paid to the Contractor.

13.3 Correction of Work after Substantial Completion

- 13.3.1 The Contractor shall correct all faults and deficiencies in the Work which appear within one year of the date of substantial completion or such longer period of time as may be prescribed by the terms of any special guarantees called for by the Contract Documents, and Contractor shall pay for all damage to other work caused thereby. The Contractor shall remove all defective work where necessary.
- 13.3.2 If the Contractor does not correct such faulty or defective work and remove defective work where necessary, within a reasonable time fixed by the Designer in writing, the Owner may do the corrective work and remove the defective work, as described in Article 13.2 above.
- 13.3.3 All costs attributable to correcting and removing faulty or defective work shall be borne by the Contractor.
- 13.3.4 The obligations of the Contractor under this Article 13.3 shall be in addition to and not a limitation of any obligations imposed upon Contractor by special guarantees called for by the Contract Documents or otherwise prescribed by law.

ARTICLE 14 TERMINATION OF THE CONTRACT

14.1 Termination by the Contractor

14.1.1 If the Work is stopped for a period of thirty days under an order of any court or other public authority through no act of fault of the Contractor or of anyone employed by the Contractor, or if the Work should be stopped for a period of thirty days by the Contractor for the Designer's failure to issue a Certificate for payment as provided in Article 9.6, or for the Owner's failure to make payment thereon as provided in said Article, then the Contractor may, upon seven days' written notice to the Owner and the Designer, terminate the Contract and recover from the Owner, in satisfaction of all claims of the Contractor, payment for all work executed, except those items involved in Designer's failure to issue Certificate, or Owner's failure to make payment.

14.2 Termination by the Owner

14.2.1 If the Contractor should be adjudged bankrupt, or if Contractor should make a general assignment for the benefit of its creditors, or if a receiver should be appointed on account of Contractor's insolvency, or if Contractor should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if Contractor should fail to make prompt payment to Subcontractors for materials or labor, or persistently disregard laws, ordinances, rules, regulations or orders of any public authority or otherwise be guilty of a substantial violation of a provision of the Contract Documents, then the Owner, upon certification by the Designer that sufficient cause exists to justify such action, may without prejudice to any right or remedy against the Contractor or its surety and after giving the Contractor and its surety seven days written

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02/23 notice,
terminate the
employment of
the Contractor
and take
possession of
the site and of
all materials,
equipment,
tools, and
construction
equipment and
machinery
thereon owned
by the
Contractor and
finish the Work
by whatever
method the
Owner deems
expedient. In
such case the

Contractor
shall not be
entitled to
receive any
further
payment until
the Work is
completed,
and an
accounting
made as set
out below.

14.2.2 If the unpaid balance of the Contract sum exceeds the cost of finishing the Work, including compensation for the Designer's additional services such excess shall be paid to the Contractor. If such cost exceeds such unpaid balance, the Contractor shall pay the difference to the Owner. The Designer shall certify the cost incurred by the Owner as herein provided.

END

**STATE OF INDIANA'S STANDARD CONTRACT FOR PUBLIC WORKS
CONSTRUCTION PROJECT
(For projects estimated more than \$150,000)**

Contract # _____

THIS PUBLIC WORKS CONSTRUCTION CONTRACT ("Contract"), entered into by and between the Indiana Department of Administration's Public Works Division ("State") and **XXXXXXXXXX** ("Contractor"), is executed pursuant to the terms and conditions set forth herein and is governed by Indiana Code 4-13.6, *et seq.* In consideration of those mutual undertakings and covenants, the parties agree as follows for the following Public Works Project:

Project Number:	XXXXXXXXXX
Project Name:	XXXXXXXXXX
Designer (if applicable):	XXXXXXXXXX
Purchase Order Number:	XXXXXXXXXX
Institution/Department:	XXXXXXXXXX
Req. No:	XXXXXXXXXX

1. Definitions. The following definition of "Contract Documents" applies throughout this Contract for the State's Public Works Project Number **XXXXXX** ("Project").

The term "Contract Documents" shall mean and include the following: this Contract and the Project Bid Package, which includes but is not limited to the Contractor's Application for Pre-Qualification, the Public Work's Solicitation for Quotation (DAPW 30), Bid Documentation, PreContract Document, General Conditions (DAPW 26), Supplementary Conditions, Instructions to Bidders, Drawings, Specifications, and Addenda issued by the State in connection with the Project and prior to the submission of the Contractor's Proposal.

Subject to Section 39, *Order of Precedence, Incorporation by Reference*, of this Contract, Contract Documents shall also consist of the Contractor's Proposal and Response, as well as any other documentation submitted by it in response to the Project (hereinafter collectively referred to as "Contractor's Proposal").

Additionally, Contract Documents shall include any subsequent amendments, change orders and any written interpretations issued as field orders by the Designer pursuant to General Conditions, Article 1.2 (DAPW 26) and all field orders for minor changes by the Designer pursuant to General Conditions, Article 12.3 (DAPW 26). Change orders and amendments shall be executed in the manner authorized by Section 35, *Merger and Modification*, of this Contract.

When applicable, Contract Documents shall include the Performance Bond and/or the Labor and Materials Payment Bond, as required by IC 4-13.6-7-6 and IC 4-13.6-7-7, and fully described and captured in the General Conditions (DAPW 26).

The Contract Documents are specifically and collectively incorporated herein by reference.

2. **Duties of Contractor.** The Contractor shall furnish all labor and materials, perform all of the work, and otherwise fulfill all of its obligations in conformance with the Contract Documents. These duties are described and captured in the Contract Documents. The Contractor agrees that not less than fifteen percent (15%) of the work, measured in dollar volume, will be performed by its own forces. Any subcontractor employed for any part of this Contract awarded in excess of One Hundred Fifty Thousand Dollars (\$150,000.00) shall be qualified with the State of Indiana's Public Works Division Certification Board and shall have a valid Certificate of Qualification in the prime classification of work for this Contract.

3. **Consideration.** All payments provided herein are subject to appropriations made and funds allocated as provided by laws of the State of Indiana. The State shall pay the Contractor for performance of this Contract in current funds as follows:

BASE BID: \$XXXXXXX.XX

ALTERNATE(S):

TOTAL CONTRACT PRICE: \$XXXXXXX.XX

4. **Term.** The term of this Contract is [X year(s) and/or xx month(s)] commencing on the date of the last state signatory to this Contract.

5. **Licensing Standards.** The Contractor and its employees and subcontractors shall comply with all applicable licensing standards, certification standards, accrediting standards and any other laws, rules or regulations governing services to be provided by the Contractor pursuant to this Contract. The State shall not be required to pay the Contractor for any services performed when the Contractor, its employees or subcontractors are not in compliance with such applicable standards, laws, rules or regulations. If licensure, certification or accreditation expires or is revoked, or if disciplinary action is taken against the applicable licensure, certification or accreditation, the Contractor shall notify the State immediately and the State, at its option, may immediately terminate this Contract.

6. **Escrow Agreement.** Contemporaneously with the execution of this Contract, the parties may provide for the escrow of retained portions of payments to the Contractor by entering into a separate Escrow Agreement, pursuant to IC 4-13.6-7, with an escrow agent described in IC 4-13.6-7-2(b). Should the Contractor elect to escrow retainage, the Escrow Agreement will become a part of this contract as if fully contained herein.

7. **Contractor's Certification.** The Contractor certifies that it has been pre-qualified by the State of Indiana's Public Works Division Certification Board to perform the work and furnish the services required by this Project. The Contractor further certifies that all information and documentation submitted by it in its Application for Prequalification Certification, the Contractor's Proposal and submitted in response to the Project, is true, accurate and complete as of the date of this Contract's effectiveness. The Contractor shall immediately notify the State of any material change to such information. The Contractor shall immediately notify the State if, during the course of performance of this Contract, it or any of its principals are proposed for debarment or ineligibility, or become debarred or declared ineligible, from entering into contracts with the federal government or any department, agency or political subdivision of the State.

8. Contractor Employee Drug Testing. Pursuant to IC 4-13-18, the Contractor shall implement the employee drug testing program submitted as part of its Contractor's Proposal. The State may cancel this Contract if it determines that the Contractor:

- A. Has failed to implement its employee drug testing program during the term of this Contract;
- B. Has failed to provide information regarding implementation of the Contractor's employee drug testing program at the request of the State; or
- C. Has provided to the State false information regarding the Contractor's employee drug testing program.

9. Access to Records. The Contractor and its subcontractors, if any, shall maintain all books, documents, papers, accounting records, and other evidence pertaining to all costs incurred under this Contract. They shall make such materials available at their respective offices at all reasonable times during this Contract, and for three (3) years from the date of final payment under this Contract, for inspection by the State or its authorized designees. Copies shall be furnished at no cost to the State if requested.

10. Assignment; Successors.

A. The Contractor binds its successors and assignees to all the terms and conditions of this Contract. The Contractor may assign its right to receive payments to such third parties as the Contractor may desire without the prior written consent of the State, provided that the Contractor gives written notice (including evidence of such assignment) to the State thirty (30) days in advance of any payment so assigned. The assignment shall cover all unpaid amounts under this Contract and shall not be made to more than one party.

B. The Contractor shall not assign or subcontract the whole or any part of this Contract without the State's prior written consent. Additionally, the Contractor shall provide prompt written notice to the State of any change in the Contractor's legal name or legal status so that the changes may be documented and payments to the successor entity may be made.

11. Assignment of Antitrust Claims. As part of the consideration for the award of this Contract, the Contractor assigns to the State all right, title and interest in and to any claims the Contractor now has, or may acquire, under state or federal antitrust laws relating to the products or services which are the subject of this Contract.

12. Audits. The Contractor acknowledges that it may be required to submit to an audit of funds paid through this Contract. Any such audit shall be conducted in accordance with IC § 5-11-1, *et seq.*, and audit guidelines specified by the State.

The State considers the Contractor to be a "Contractor" under 2 C.F.R. 200.331 for purposes of this Contract. However, if it is determined that the Contractor is a "subrecipient" and if required by applicable provisions of 2 C.F.R. 200 (Uniform Administrative Requirements, Cost Principles, and Audit Requirements), Contractor shall arrange for a financial and compliance audit, which complies with 2 C.F.R. 200.500 *et seq.*

13. Authority to Bind Contractor. The signatory for the Contractor represents that he/she has been duly authorized to execute this Contract on behalf of the Contractor and has obtained all necessary or applicable approvals to make this Contract fully binding upon the Contractor when his/her signature is affixed, and accepted by the State.

14. Changes in Work. The Contractor shall not commence any additional work or change the scope of the work until authorized in writing by the State. The Contractor shall make no claim for additional compensation in the absence of a prior written approval and amendment executed by all signatories hereto. This Contract may only be amended, supplemented or modified by a written document executed in the same manner as this Contract.

15. Compliance with Laws.

- A. The Contractor shall comply with all applicable federal, state, and local laws, rules, regulations, and ordinances, and all provisions required thereby to be included herein are hereby incorporated by reference. The enactment or modification of any applicable state or federal statute or the promulgation of rules or regulations thereunder after execution of this Contract shall be reviewed by the State and the Contractor to determine whether the provisions of this Contract require formal modification.
- B. The Contractor and its agents shall abide by all ethical requirements that apply to persons who have a business relationship with the State as set forth in IC § 4-2-6, *et seq.*, IC § 4-2-7, *et seq.* and the regulations promulgated thereunder. **If the Contractor has knowledge, or would have acquired knowledge with reasonable inquiry, that a state officer, employee, or special state appointee, as those terms are defined in IC § 4-2-6-1, has a financial interest in the Contract, the Contractor shall ensure compliance with the disclosure requirements in IC § 4-2-6-10.5 prior to the execution of this Contract.** If the Contractor is not familiar with these ethical requirements, the Contractor should refer any questions to the Indiana State Ethics Commission, or visit the Inspector General's website at <http://www.in.gov/ig/>. If the Contractor or its agents violate any applicable ethical standards, the State may, in its sole discretion, terminate this Contract immediately upon notice to the Contractor. In addition, the Contractor may be subject to penalties under IC §§ 4-2-6, 4-2-7, 35-44.1-1-4, and under any other applicable laws.
- C. The Contractor certifies by entering into this Contract that neither it nor its principal(s) is presently in arrears in payment of taxes, permit fees or other statutory, regulatory or judicially required payments to the State of Indiana. The Contractor agrees that any payments currently due to the State of Indiana may be withheld from payments due to the Contractor. Additionally, further work or payments may be withheld, delayed, or denied and/or this Contract suspended until the Contractor is current in its payments and has submitted proof of such payment to the State.
- D. The Contractor warrants that it has no current, pending or outstanding criminal, civil, or enforcement actions initiated by the State, and agrees that it will immediately notify the State of any such actions. During the term of such actions, the Contractor agrees that the State may delay, withhold, or deny work under any supplement, amendment, change order or other contractual device issued pursuant to this Contract.
- E. If a valid dispute exists as to the Contractor's liability or guilt in any action initiated by the State or its agencies, and the State decides to delay, withhold, or deny work to the Contractor, the Contractor may

request that it be allowed to continue, or receive work, without delay. The Contractor must submit, in writing, a request for review to the Indiana Department of Administration (IDOA) following the procedures for disputes outlined herein. A determination by IDOA shall be binding on the parties. Any payments that the State may delay, withhold, deny, or apply under this section shall not be subject to penalty or interest, except as permitted by IC § 5-17-5.

- F. The Contractor warrants that the Contractor and its subcontractors, if any, shall obtain and maintain all required permits, licenses, registrations, and approvals, and shall comply with all health, safety, and environmental statutes, rules, or regulations in the performance of work activities for the State. Failure to do so may be deemed a material breach of this Contract and grounds for immediate termination and denial of further work with the State.
- G. The Contractor affirms that, if it is an entity described in IC Title 23, it is properly registered and owes no outstanding reports to the Indiana Secretary of State.
- H. As required by IC § 5-22-3-7:
 - (1) The Contractor and any principals of the Contractor certify that:
 - (A) the Contractor, except for de minimis and nonsystematic violations, has not violated the terms of:
 - (i) IC §24-4.7 [Telephone Solicitation Of Consumers];
 - (ii) IC §24-5-12 [Telephone Solicitations]; or
 - (iii) IC §24-5-14 [Regulation of Automatic Dialing Machines]; in the previous three hundred sixty-five (365) days, even if IC § 24-4.7 is preempted by federal law; and
 - (B) the Contractor will not violate the terms of IC § 24-4.7 for the duration of the Contract, even if IC §24-4.7 is preempted by federal law.
 - (2) The Contractor and any principals of the Contractor certify that an affiliate or principal of the Contractor and any agent acting on behalf of the Contractor or on behalf of an affiliate or principal of the Contractor, except for de minimis and nonsystematic violations,
 - (A) has not violated the terms of IC § 24-4.7 in the previous three hundred sixty-five (365) days, even if IC §24-4.7 is preempted by federal law; and
 - (B) will not violate the terms of IC § 24-4.7 for the duration of the Contract, even if IC §24-4.7 is preempted by federal law.

16. Condition of Payment. All services provided by the Contractor under this Contract must be performed to the State's reasonable satisfaction, as determined at the discretion of the undersigned State representative and in accordance with all applicable federal, state, local laws, ordinances, rules and regulations. The State shall not be required to pay for work found to be unsatisfactory, inconsistent with this Contract or performed in violation of and federal, state or local statute, ordinance, rule or regulation.

17. Confidentiality of State Information. The Contractor understands and agrees that data, materials, and information disclosed to the Contractor may contain confidential and protected information. The

Contractor covenants that data, material, and information gathered, based upon or disclosed to the Contractor for the purpose of this Contract will not be disclosed to or discussed with third parties without the prior written consent of the State.

The parties acknowledge that the services to be performed by Contractor for the State under this Contract may require or allow access to data, materials, and information containing Social Security numbers maintained by the State in its computer system or other records. In addition to the covenant made above in this section and pursuant to 10 IAC 5-3-1(4), the Contractor and the State agree to comply with the provisions of IC § 4-1-10 and IC § 4-1-11. If any Social Security number(s) is/are disclosed by Contractor, Contractor agrees to pay the cost of the notice of disclosure of a breach of the security of the system in addition to any other claims and expenses for which it is liable under the terms of this contract.

18. Continuity of Services.

- A. The Contractor recognizes that the service(s) to be performed under this Contract are vital to the State and must be continued without interruption and that, upon Contract expiration, a successor, either the State or another contractor, may continue them. The Contractor agrees to:
 - 1. Furnish phase-in training; and
 - 2. Exercise its best efforts and cooperation to effect an orderly and efficient transition to a successor.
- B. The Contractor shall, upon the State's written notice:
 - 1. Furnish phase-in, phase-out services for up to sixty (60) days after this Contract expires; and
 - 2. Negotiate in good faith a plan with a successor to determine the nature and extent of phase-in, phase-out services required. The plan shall specify a training program and a date for transferring responsibilities for each division of work described in the plan, and shall be subject to the State's approval. The Contractor shall provide sufficient experienced personnel during the phase-in, phase-out period to ensure that the services called for by this Contract are maintained at the required level of proficiency.
- C. The Contractor shall allow as many personnel as practicable to remain on the job to help the successor maintain the continuity and consistency of the services required by this Contract. The Contractor also shall disclose necessary personnel records and allow the successor to conduct on-site interviews with these employees. If selected employees are agreeable to the change, the Contractor shall release them at a mutually agreeable date and negotiate transfer of their earned fringe benefits to the successor.
- D. The Contractor shall be reimbursed for all reasonable phase-in, phase-out costs (i.e., costs incurred within the agreed period after contract expiration that result from phase-in, phase-out operations).

19. Debarment and Suspension.

- A. The Contractor certifies by entering into this Contract that neither it nor its principals nor any of its subcontractors are presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from entering into this Contract by any federal agency or by any department, agency or political subdivision of the State of Indiana. The term "principal" for purposes of this Contract means an officer, director, owner, partner, key employee or other person with primary management or

supervisory responsibilities, or a person who has a critical influence on or substantive control over the operations of the Contractor.

B. The Contractor certifies that it has verified the state and federal suspension and debarment status for all subcontractors receiving funds under this Contract and shall be solely responsible for any recoupment, penalties or costs that might arise from use of a suspended or debarred subcontractor. The Contractor shall immediately notify the State if any subcontractor becomes debarred or suspended, and shall, at the State's request, take all steps required by the State to terminate its contractual relationship with the subcontractor for work to be performed under this Contract.

20. Default by State. If the State, sixty (60) days after receipt of written notice, fails to correct or cure any material breach of this Contract, the Contractor may cancel and terminate this Contract and institute measures to collect monies due up to and including the date of termination.

21. Disputes.

A. Should any disputes arise with respect to this Contract, the Contractor and the State agree to act immediately to resolve such disputes. Time is of the essence in the resolution of disputes.

B. The Contractor agrees that, the existence of a dispute notwithstanding, it will continue without delay to carry out all of its responsibilities under this Contract that are not affected by the dispute. Should the Contractor fail to continue to perform its responsibilities regarding all non-disputed work, without delay, any additional costs incurred by the State or the Contractor as a result of such failure to proceed shall be borne by the Contractor, and the Contractor shall make no claim against the State for such costs.

C. If the parties are unable to resolve a contract dispute between them after good faith attempts to do so, a dissatisfied party shall submit the dispute to the Commissioner of the Indiana Department of Administration for resolution. The dissatisfied party shall give written notice to the Commissioner and the other party. The notice shall include: (1) a description of the disputed issues, (2) the efforts made to resolve the dispute, and (3) a proposed resolution. The Commissioner shall promptly issue a Notice setting out documents and materials to be submitted to the Commissioner in order to resolve the dispute; the Notice may also afford the parties the opportunity to make presentations and enter into further negotiations. Within thirty (30) business days of the conclusion of the final presentations, the Commissioner shall issue a written decision and furnish it to both parties. The Commissioner's decision shall be the final and conclusive administrative decision unless either party serves on the Commissioner and the other party, within ten (10) business days after receipt of the Commissioner's decision, a written request for reconsideration and modification of the written decision. If the Commissioner does not modify the written decision within thirty (30) business days, either party may take such other action helpful to resolving the dispute, including submitting the dispute to an Indiana court of competent jurisdiction. If the parties accept the Commissioner's decision, it may be memorialized as a written Amendment to this Contract if appropriate.

D. The State may withhold payments on disputed items pending resolution of the dispute. The unintentional nonpayment by the State to the Contractor of one or more invoices not in dispute in accordance with the terms of this Contract will not be cause for the Contractor to terminate this Contract, and the Contractor may bring suit to collect these amounts without following the disputes procedure contained herein.

E. With the written approval of the Commissioner of the Indiana Department of Administration, the parties may agree to forego the process described in subdivision C. relating to submission of the dispute to the Commissioner.

F. This paragraph shall not be construed to abrogate provisions of IC § 4-6-2-11 in situations where dispute resolution efforts lead to a compromise of claims in favor of the State as described in that statute. In particular, releases or settlement agreements involving releases of legal claims or potential legal claims of the state should be processed consistent with IC § 4-6-2-11, which requires approval of the Governor and Attorney General.

22. Drug-Free Workplace Certification. As required by Executive Order No. 90-5 dated April 12, 1990, issued by the Governor of Indiana, the Contractor hereby covenants and agrees to make a good faith effort to provide and maintain a drug-free workplace. The Contractor will give written notice to the State within ten (10) days after receiving actual notice that the Contractor, or an employee of the Contractor in the State of Indiana, has been convicted of a criminal drug violation occurring in the workplace. False certification or violation of this certification may result in sanctions including, but not limited to, suspension of contract payments, termination of this Contract and/or debarment of contracting opportunities with the State for up to three (3) years.

In addition to the provisions of the above paragraph, if the total amount set forth in this Contract is in excess of \$25,000.00, the Contractor certifies and agrees that it will provide a drug-free workplace by:

- A. Publishing and providing to all of its employees a statement notifying them that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the Contractor's workplace, and specifying the actions that will be taken against employees for violations of such prohibition;
- B. Establishing a drug-free awareness program to inform its employees of (1) the dangers of drug abuse in the workplace; (2) the Contractor's policy of maintaining a drug-free workplace; (3) any available drug counseling, rehabilitation and employee assistance programs; and (4) the penalties that may be imposed upon an employee for drug abuse violations occurring in the workplace;
- C. Notifying all employees in the statement required by subparagraph (A) above that as a condition of continued employment, the employee will (1) abide by the terms of the statement; and (2) notify the Contractor of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction;
- D. Notifying the State in writing within ten (10) days after receiving notice from an employee under subdivision (C)(2) above, or otherwise receiving actual notice of such conviction;
- E. Within thirty (30) days after receiving notice under subdivision (C)(2) above of a conviction, imposing the following sanctions or remedial measures on any employee who is convicted of drug abuse violations occurring in the workplace: (1) taking appropriate personnel action against the employee, up to and including termination; or (2) requiring such employee to satisfactorily participate in a drug abuse assistance or rehabilitation

program approved for such purposes by a federal, state or local health, law enforcement, or other appropriate agency; and

- F. Making a good faith effort to maintain a drug-free workplace through the implementation of subparagraphs (A) through (E) above.

23. Employment Eligibility Verification As required by IC § 22-5-1.7, the Contractor swears or affirms under the penalties of perjury that the Contractor does not knowingly employ an unauthorized alien. The Contractor further agrees that:

A. The Contractor shall enroll in and verify the work eligibility status of all his/her/its newly hired employees through the E-Verify program as defined in IC § 22-5-1.7-3. The Contractor is not required to participate should the E-Verify program cease to exist. Additionally, the Contractor is not required to participate if the Contractor is self-employed and does not employ any employees.

B. The Contractor shall not knowingly employ or contract with an unauthorized alien. The Contractor shall not retain an employee or contract with a person that the Contractor subsequently learns is an unauthorized alien.

C. The Contractor shall require his/her/its subcontractors, who perform work under this Contract, to certify to the Contractor that the subcontractor does not knowingly employ or contract with an unauthorized alien and that the subcontractor has enrolled and is participating in the E-Verify program. The Contractor agrees to maintain this certification throughout the duration of the term of a contract with a subcontractor.

The State may terminate for default if the Contractor fails to cure a breach of this provision no later than thirty (30) days after being notified by the State.

24. Employment Option. If the State determines that it would be in the State's best interest to hire an employee of the Contractor, the Contractor will release the selected employee from any non-competition agreements that may be in effect. This release will be at no cost to the State or the employee.

25. Force Majeure. In the event that either party is unable to perform any of its obligations under this Contract or to enjoy any of its benefits because of natural disaster or decrees of governmental bodies not the fault of the affected party (hereinafter referred to as a "Force Majeure Event"), the party who has been so affected shall immediately give notice to the other party and shall do everything possible to resume performance. Upon receipt of such notice, all obligations under this Contract shall be immediately suspended. If the period of nonperformance exceeds thirty (30) days from the receipt of notice of the Force Majeure Event, the party whose ability to perform has not been so affected may, by giving written notice, terminate this Contract.

26. Funding Cancellation. As required by Financial Management Circular 3.3 and IC § 5-22-17-5, when the Director of the State Budget Agency makes a written determination that funds are not appropriated or otherwise available to support continuation of performance of this Contract, this Contract shall be canceled. A determination by the Director of State Budget Agency that funds are not appropriated or otherwise available to support continuation of performance shall be final and conclusive.

27. Governing Law. This Contract shall be governed, construed, and enforced in accordance with the laws of the State of Indiana, without regard to its conflict of laws rules. Suit, if any, must be brought in the State of Indiana.

28. HIPAA Compliance. If this Contract involves services, activities or products subject to the Health Insurance Portability and Accountability Act of 1996 (HIPAA), the Contractor covenants that it will appropriately safeguard Protected Health Information (defined in 45 CFR 160.103), and agrees that it is subject to, and shall comply with, the provisions of 45 CFR 164 Subpart E regarding use and disclosure of Protected Health Information.

29. Indemnification. The Contractor agrees to indemnify, defend, and hold harmless the State, its agents, officials, and employees from all claims and suits including court costs, attorney's fees, and other expenses caused by any act or omission of the Contractor and/or its subcontractors, if any, in the performance of this Contract. The State shall **not** provide such indemnification to the Contractor.

30. Independent Contractor; Workers' Compensation Insurance. The Contractor is performing as an independent entity under this Contract. No part of this Contract shall be construed to represent the creation of an employment, agency, partnership or joint venture agreement between the parties. Neither party will assume liability for any injury (including death) to any persons, or damage to any property, arising out of the acts or omissions of the agents, employees or subcontractors of the other party. The Contractor shall provide all necessary unemployment and workers' compensation insurance for the Contractor's employees, and Contractor shall provide the State with a Certificate of Insurance evidencing such coverage prior to starting work under this Contract.

31. Indiana Veteran Owned Small Business Enterprise Compliance. Award of this Contract was based, in part, on the Indiana Veteran Owned Small Business Enterprise ("IVOSB") participation plan, as detailed in the IVOSB Subcontractor Commitment Form, commonly referred to as "Attachment A-1" in the procurement documentation and incorporated by reference herein. Therefore, any changes to this information during the Contract term must be approved by IDOA's Division of Supplier Diversity and may require an amendment. It is the State's expectation that the Contractor will meet the subcontractor commitments during the Contract term. The following certified IVOSB subcontractor(s) will be participating in this Contract: **[Add additional IVOSBs using the same format.]**

IVOSB	COMPANY NAME	PHONE	EMAIL OF CONTACT PERSON	PERCENT

Briefly describe the IVOSB service(s)/product(s) to be provided under this Contract and include the estimated date(s) for utilization during the Contract term:

A copy of each subcontractor agreement must be submitted to the Division of Supplier Diversity within thirty (30) days of the effective date of this Contract. The subcontractor agreements may be uploaded into Pay Audit (Indiana's subcontractor payment auditing system), emailed to

IndianaVeteransPreference@idoa.IN.gov, or mailed to IDOA, 402 W. Washington Street, Room W-462, Indianapolis, IN 46204. Failure to provide a copy of any subcontractor agreement may be deemed a violation of the rules governing IVOSB procurement and may result in sanctions allowable under 25 IAC 9-5-2. Requests for changes must be submitted to IndianaVeteransPreference@idoa.IN.gov for review and approval before changing the participation plan submitted in connection with this Contract.

The Contractor shall report payments made to certified IVOSB subcontractors under this Contract on a monthly basis using Pay Audit. The Contractor shall notify subcontractors that they must confirm payments received from the Contractor in Pay Audit. The Pay Audit system can be accessed on the IDOA webpage at: www.in.gov/idoa/mwbe/payaudit.htm. The Contractor may also be required to report IVOSB certified subcontractor payments directly to the Division of Supplier Diversity, as reasonably requested and in the format required by the Division of Supplier Diversity.

The Contractor's failure to comply with the provisions in this clause may be considered a material breach of the Contract.

32. Information Technology Enterprise Architecture Requirements. If this Contract involves information technology-related products or services, the Contractor agrees that all such products or services are compatible with any of the technology standards found at <https://www.in.gov/iot/2394.htm> that are applicable, including the assistive technology standard. The State may terminate this Contract for default if the terms of this paragraph are breached.

33. Insurance

- A. The Contractor and their subcontractors (if any) shall secure and keep in force during the term of this Contract the following insurance coverages (if applicable) covering the Contractor for any and all claims of any nature which may in any manner arise out of or result from Contractor's performance under this Contract. The required limits of liability can be obtained with a combination of primary and excess liability policies.
1. Commercial general liability, including contractual coverage, and products or completed operations coverage (if applicable), with minimum liability limits not less than \$700,000 per person and \$5,000,000 per occurrence unless additional coverage is required by the State. The State is to be named as an additional insured on a primary, non-contributory basis for any liability arising directly or indirectly under or in connection with this Contract.
 2. Automobile liability for owned, non-owned and hired autos with minimum liability limits of \$700,000 per person and \$5,000,000 per occurrence. The State is to be named as an additional insured on a primary, non-contributory basis.
 3. The Contractor shall secure the appropriate Surety or Fidelity Bond(s) as required by the state department served or by applicable statute.
 4. The Contractor and their subcontractors shall provide proof of such insurance coverage by tendering to the undersigned State representative a certificate of insurance prior to the

commencement of this Contract and proof of workers' compensation coverage meeting all statutory requirements of IC §22-3-2. In addition, proof of an "all states endorsement" covering claims occurring outside the State is required if any of the services provided under this Contract involve work outside of Indiana.

- B. The Contractor's insurance coverage must meet the following additional requirements:
 - 1. The insurer must have a certificate of authority or other appropriate authorization to operate in the state in which the policy was issued.
 - 2. Any deductible or self-insured retention amount or other similar obligation under the insurance policies shall be the sole obligation of the Contractor.
 - 3. The State will be defended, indemnified and held harmless to the full extent of any coverage actually secured by the Contractor in excess of the minimum requirements set forth above. The duty to indemnify the State under this Contract shall not be limited by the insurance required in this Contract.
 - 4. The insurance required in this Contract, through a policy or endorsement(s), shall include a provision that the policy and endorsements may not be canceled or modified without thirty (30) days' prior written notice to the undersigned State agency.
 - 5. The Contractor waives and agrees to require their insurer to waive their rights of subrogation against the State of Indiana.
- C. Failure to provide insurance as required in this Contract may be deemed a material breach of contract entitling the State to immediately terminate this Contract. The Contractor shall furnish a certificate of insurance and all endorsements to the State before the commencement of this Contract.

34. Key Person(s).

- A. If both parties have designated that certain individual(s) are essential to the services offered, the parties agree that should such individual(s) leave their employment during the term of this Contract for whatever reason, the State shall have the right to terminate this Contract upon thirty (30) days' prior written notice.
- B. In the event that the Contractor is an individual, that individual shall be considered a key person and, as such, essential to this Contract. Substitution of another for the Contractor shall not be permitted without express written consent of the State.

Nothing in Sections A and B, above shall be construed to prevent the Contractor from using the services of others to perform tasks ancillary to those tasks which directly require the expertise of the key person. Examples of such ancillary tasks include secretarial, clerical, and common labor duties. The Contractor shall, at all times, remain responsible for the performance of all necessary tasks, whether performed by a key person or others.

Key person(s) to this Contract is/are:

35. Merger & Modification. This Contract constitutes the entire agreement between the parties. No understandings, agreements, or representations, oral or written, not specified within this Contract will be valid provisions of this Contract. This Contract may not be modified, supplemented, or amended, except by written agreement signed by all necessary parties.

36. Minority and Women's Business Enterprises Compliance. Award of this Contract was based, in part, on the Minority and/or Women's Business Enterprise ("MBE" and/or "WBE") participation plan as detailed in the Minority and Women's Business Enterprises Subcontractor Commitment Form, commonly referred to as "Attachment A" in the procurement documentation and incorporated by reference herein. Therefore, any changes to this information during the Contract term must be approved by the Division of Supplier Diversity and may require an amendment. It is the State's expectation that the Contractor will meet the subcontractor commitments during the Contract term.

The following Division of Supplier Diversity certified MBE and/or WBE subcontractors will be participating in this Contract: **[Add additional MBEs and WBEs using the same format.]**

MBE or WBE	COMPANY NAME	PHONE	EMAIL OF CONTACT PERSON	PERCENT

Briefly describe the MBE and/or WBE service(s)/product(s) to be provided under this Contract and include the estimated date(s) for utilization during the Contract term:

A copy of each subcontractor agreement must be submitted to the Division of Supplier Diversity within thirty (30) days of the effective date of this Contract. The subcontractor agreements may be uploaded into Pay Audit (Indiana's subcontractor payment auditing system), emailed to MWBECompliance@idoa.IN.gov, or mailed to Division of Supplier Diversity, 402 W. Washington Street, Indianapolis IN 46204. Failure to provide a copy of any subcontractor agreement may be deemed a violation of the rules governing MBE/WBE procurement and may result in sanctions allowable under 25 IAC 5-7-8. Requests for changes must be submitted to MWBECompliance@idoa.IN.gov for review and approval before changing the participation plan submitted in connection with this Contract.

The Contractor shall report payments made to Division of Supplier Diversity certified subcontractors under this Contract on a monthly basis using Pay Audit. The Contractor shall notify subcontractors that they must confirm payments received from the Contractor in Pay Audit. The Pay Audit system can be accessed on the IDOA webpage at: www.in.gov/idoa/mwbe/payaudit.htm. The Contractor may also be required to report Division of Supplier Diversity certified subcontractor payments directly to the Division of Supplier Diversity, as reasonably requested and in the format required by the Division of Supplier Diversity.

The Contractor's failure to comply with the provisions in this clause may be considered a material breach of the Contract.

37. Nondiscrimination. Pursuant to the Indiana Civil Rights Law, specifically including IC § 22-9-1-10, and in keeping with the purposes of the federal Civil Rights Act of 1964, the Age Discrimination in Employment Act, and the Americans with Disabilities Act, the Contractor covenants that it shall not discriminate against any employee or applicant for employment relating to this Contract with respect to the hire, tenure, terms, conditions or privileges of employment or any matter directly or indirectly related to employment, because of the employee's or applicant's race, color, national origin, religion, sex, age, disability, ancestry, status as a veteran, or any other characteristic protected by federal, state, or local law ("Protected Characteristics"). Contractor certifies compliance with applicable federal laws, regulations, and executive orders prohibiting discrimination based on the Protected Characteristics in the provision of services. Breach of this paragraph may be regarded as a material breach of this Contract, but nothing in this paragraph shall be construed to imply or establish an employment relationship between the State and any applicant or employee of the Contractor or any subcontractor.

The State is a recipient of federal funds, and therefore, where applicable, Contractor and any subcontractors shall comply with requisite affirmative action requirements, including reporting, pursuant to 41 CFR Chapter 60, as amended, and Section 202 of Executive Order 11246 as amended by Executive Order 13672.

38. Notice to Parties. Whenever any notice, statement or other communication is required under this Contract, it will be sent by E-mail or first-class U.S. mail service to the following addresses, unless otherwise specifically advised. Such notice, statement or other communication shall include the Public Works Project Number in the subject line of the E-mail and the body of the notice or other communication.

A. Notices to the State shall be sent to: Public Works Division, Director
Indiana Department of Administration
402 W Washington St Room W462
Indianapolis, IN 46204
E-mail: rgrossman@idoa.IN.gov

B. Notices to the Contractor shall be sent to: [INSERT CONTRACTOR NAME]
[INSERT CONTRACTOR'S
ADDRESS]
E-mail: _____

As required by IC § 4-13-2-14.8, payments to the Contractor shall be made via electronic funds transfer in accordance with instructions filed by the Contractor with the Indiana Auditor of State.

39. Order of Precedence; Incorporation by Reference. Any inconsistency or ambiguity in this Contract shall be resolved by giving precedence in the following order: (1) this Contract, (2) the Project Bid Package, (3) attachments prepared by the State; (4) Contractor's Proposal; and (5) attachments prepared by the Contractor. All of the foregoing are incorporated fully by reference. All attachments, and all documents referred to in this paragraph are hereby incorporated fully by reference.

40. Ownership of Documents and Materials.

A. All documents, records, programs, applications, data, algorithms, film, tape, articles, memoranda, and other materials (the "Materials") not developed or licensed by the Contractor prior to execution of this Contract, but specifically developed under this Contract shall be considered "work for hire" and the Contractor hereby transfers and assigns any ownership claims to the State so that all Materials will be the property of the State. If ownership interest in the Materials cannot be assigned to the State, the Contractor grants the State a non-exclusive, non-cancelable, perpetual, worldwide royalty-free license to use the Materials and to use, modify, copy and create derivative works of the Materials.

B. Use of the Materials, other than related to contract performance by the Contractor, without the prior written consent of the State, is prohibited. During the performance of this Contract, the Contractor shall be responsible for any loss of or damage to the Materials developed for or supplied by the State and used to develop or assist in the services provided while the Materials are in the possession of the Contractor. Any loss or damage thereto shall be restored at the Contractor's expense. The Contractor shall provide the State full, immediate, and unrestricted access to the Materials and to Contractor's work product during the term of this Contract.

41. Payments.

A. All payments shall be made thirty five (35) days in arrears in conformance with State fiscal policies and procedures and, as required by IC §4-13-2-14.8, the direct deposit by electronic funds transfer to the financial institution designated by the Contractor in writing unless a specific waiver has been obtained from the Indiana Auditor of State. No payments will be made in advance of receipt of the goods or services that are the subject of this Contract except as permitted by IC § 4-13-2-20.

B. If the Contractor is being paid in advance for the maintenance of equipment, software or a service as a subscription, then pursuant to IC § 4-13-2-20(b)(14), the Contractor agrees that if it fails to fully provide or perform under this Contract, upon receipt of written notice from the State, it shall promptly refund the consideration paid, pro-rated through the date of non-performance.

42. Penalties/Interest/Attorney's Fees. The State will in good faith perform its required obligations hereunder and does not agree to pay any penalties, liquidated damages, interest or attorney's fees, except as permitted by Indiana law, in part, IC § 5-17-5, IC § 34-54-8, IC § 34-13-1 and IC § 34-52-2.

Notwithstanding the provisions contained in IC § 5-17-5, any liability resulting from the State's failure to make prompt payment shall be based solely on the amount of funding originating from the State and shall not be based on funding from federal or other sources.

43. Progress Reports. The Contractor shall submit progress reports to the State upon request. The report shall be oral, unless the State, upon receipt of the oral report, should deem it necessary to have it in written form. The progress reports shall serve the purpose of assuring the State that work is progressing in line with the schedule, and that completion can be reasonably assured on the scheduled date.

44. Public Record.

The Contractor acknowledges that the State will not treat this Contract as containing confidential information, and the State will post this Contract on the transparency portal as required by Executive

Order 05-07 and IC § 5-14-3.5-2. Use by the public of the information contained in this Contract shall not be considered an act of the State.

45. Renewal Option. This Contract may be renewed under the same terms and conditions, subject to the approval of the Commissioner of the Department of Administration and the State Budget Director in compliance with IC § 5-22-17-4. The term of the renewed contract may not be longer than the term of the original contract.

46. Severability. The invalidity of any section, subsection, clause or provision of this Contract shall not affect the validity of the remaining sections, subsections, clauses or provisions of this Contract.

47. Substantial Performance. This Contract shall be deemed to be substantially performed only when fully performed according to its terms and conditions and any written amendments or supplements.

48. Taxes. The State is exempt from most state and local taxes and many federal taxes. The State will not be responsible for any taxes levied on the Contractor as a result of this Contract.

49. Termination for Convenience. This Contract may be terminated, in whole or in part, by the State, which shall include and is not limited to the Indiana Department of Administration and the State Budget Agency whenever, for any reason, the State determines that such termination is in its best interest. Termination of services shall be effected by delivery to the Contractor of a Termination Notice at least thirty (30) days prior to the termination effective date, specifying the extent to which performance of services under such termination becomes effective. The Contractor shall be compensated for services properly rendered prior to the effective date of termination. The State will not be liable for services performed after the effective date of termination. The Contractor shall be compensated for services herein provided but in no case shall total payment made to the Contractor exceed the original contract price or shall any price increase be allowed on individual line items if canceled only in part prior to the original termination date. For the purposes of this paragraph, the parties stipulate and agree that the Indiana Department of Administration shall be deemed to be a party to this agreement with authority to terminate the same for convenience when such termination is determined by the Commissioner of IDOA to be in the best interests of the State.

50. Termination for Default.

A. With the provision of thirty (30) days' notice to the Contractor, the State may terminate this Contract in whole or in part if the Contractor fails to:

1. Correct or cure any breach of this Contract; the time to correct or cure the breach may be extended beyond thirty (30) days if the State determines progress is being made and the extension is agreed to by the parties;
2. Deliver the supplies or perform the services within the time specified in this Contract or any extension;
3. Make progress so as to endanger performance of this Contract; or 4. Perform any of the other provisions of this Contract.

B. If the State terminates this Contract in whole or in part, it may acquire, under the terms and in the manner the State considers appropriate, supplies or services similar to those

terminated, and the Contractor will be liable to the State for any excess costs for those supplies or services. However, the Contractor shall continue the work not terminated.

- C. The State shall pay the contract price for completed supplies delivered and services accepted. The Contractor and the State shall agree on the amount of payment for manufacturing materials delivered and accepted and for the protection and preservation of the property. Failure to agree will be a dispute under the Disputes clause. The State may withhold from these amounts any sum the State determines to be necessary to protect the State against loss because of outstanding liens or claims of former lien holders.
- D. The rights and remedies of the State in this clause are in addition to any other rights and remedies provided by law or equity or under this Contract.

51. Travel. No expenses for travel will be reimbursed unless specifically authorized by this Contract. Permitted expenses will be reimbursed at the rate paid by the State and in accordance with the *Indiana Department of Administration's Travel Policies and Procedures* in effect at the time the expenditure is made. Out-of-state travel requests must be reviewed by the State for availability of funds and for conformance with *Travel Policy* guidelines.

52. Waiver of Rights. No right conferred on either party under this Contract shall be deemed waived, and no breach of this Contract excused, unless such waiver is in writing and signed by the party claimed to have waived such right. Neither the State's review, approval or acceptance of, nor payment for, the services required under this Contract shall be construed to operate as a waiver of any rights under this Contract or of any cause of action arising out of the performance of this Contract, and the Contractor shall be and remain liable to the State in accordance with applicable law for all damages to the State caused by the Contractor's negligent performance of any of the services furnished under this Contract.

53. Work Standards. The Contractor shall execute its responsibilities by following and applying at all times the highest professional and technical guidelines and standards. If the State becomes dissatisfied with the work product of or the working relationship with those individuals assigned to work on this Contract, the State may request in writing the replacement of any or all such individuals, and the Contractor shall grant such request.

THE REMAINDER OF THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK.

Non-Collusion and Acceptance

The undersigned attests, subject to the penalties for perjury, that the undersigned is the Contractor, or that the undersigned is the properly authorized representative, agent, member or officer of the Contractor. Further, to the undersigned's knowledge, neither the undersigned nor any other member, employee, representative, agent or officer of the Contractor, directly or indirectly, has entered into or been offered any sum of money or other consideration for the execution of this Contract other than that which appears upon the face hereof. **Furthermore, if the undersigned has knowledge that a state officer, employee, or special state appointee, as those terms are defined in IC 4-2-6-1, has a financial interest in the Contract, the Contractor attests to compliance with the disclosure requirements in IC 4-2-6-10.5.**

Agreement to Use Electronic Signatures

I agree, and it is my intent, to sign this Contract by accessing State of Indiana Supplier Portal using the secure password assigned to me and by electronically submitting this Contract to the State of Indiana. I understand that my signing and submitting this Contract in this fashion is the legal equivalent of having placed my handwritten signature on the submitted Contract and this affirmation. I understand and agree that by electronically signing and submitting this Contract in this fashion I am affirming to the truth of the information contained herein. I understand that this Contract will not become binding on the State until it has been approved by the Department of Administration, the State Budget Agency, and the Office of the Attorney General, which approvals will be posted on the Active Contracts Database:

<https://secure.in.gov/apps/idoa/contractsearch/>

IN WITNESS WHEREOF, the Contractor and the State have, through their duly authorized representatives, entered into this Contract for Public Works Project Number **XXXXXX**. The parties, having read and understood the foregoing terms of this Contract, do by their respective signatures dated below agree to the terms thereof.

Contractor: XXXXXXXXXXXX

**Department of Administration
Public Works Division**

By: _____

Printed Name: _____

Title: _____

Date: _____

By: _____

Robert Grossman, Director

For IDOA Commissioner if less than \$10,000,000

Date: _____

Approved by:

Department of Administration

Approved by:

State Budget Agency

By: _____ (for)

Rebecca Holwerda, Commissioner

By: _____ (for)

Zachary Q. Jackson, Director

Date: _____

Date: _____

Approved as to Form and Legality:

Form approval has been granted by the

Office of the Attorney General pursuant to IC

4-13-2-14.3(e) on October 5, 2022.

FA 22-49

This document prepared and reviewed by:

Counsel, Indiana Department of Administration

TEMPLATE

**STATE OF INDIANA'S PUBLIC WORKS CONSTRUCTION CONTRACT CHANGE
ORDER/AMENDMENT #_ Contract # _____**

THIS IS AMENDMENT # [] to the Public Works Construction Contract ("Contract") entered into by and between the Indiana Department of Administration's Public Works Division ("State") and XXXXXXXXXX ("Contractor"), executed pursuant to the terms and conditions set forth herein, governed by Indiana Code 4-13.6, *et seq.* and approved by the last State signatory on [] .

In consideration of the mutual undertakings and covenants hereinafter set forth, the parties agree to amend the Contract as follows:

1. A written change has been requested by the Contractor, as detailed in Amendment # [] Exhibit A, attached hereto and incorporated herein, in connection with the following Public Works Project:

Project Number: XXXXXXXXXX
Project Name: XXXXXXXXXX
Designer (if applicable): XXXXXXXXXX
Purchase Order Number: XXXXXXXXXX Institution
Department: XXXXXXXXXX
Req. No: XXXXXXXXXX
Change Order No: XXXXXXXXXX

2. [] The Designer has recommended the Contractor's change in writing, as evidenced by Amendment # [] Exhibit [] , attached hereto and incorporated herein. [] No Designer has been contracted for this Project.

3. The State has approved the change request, as detailed in Amendment # [] Exhibit B, attached hereto and incorporated herein.

4. The consideration for this Amendment # [] is as follows:

ORIGINAL CONTRACT VALUE	\$ _____	TOTAL	PREVIOUS	AMENDMENT	VALUE
\$ _____					
PRE-AMENDMENT CONTRACT TOTAL				\$ _____	
[] INCREASE/[] DECREASE THIS AMENDMENT			\$ _____	INCREASE/[] DECREASE	
[] REMEDIATION ALLOWANCE	\$ _____				
NEW CONTRACT TOTAL REMUNERATION				\$ _____	

This change represents a \$XX,XXX [] increase/[] decrease in the original contract and a \$XX,XXX [] increase/[] decrease in remediation allowance, for a total [] increase/[] decrease of \$XX,XXX. Retainage [] will/ [] will not be withheld on this change order amount.

5. The term of this Contract is hereby [] extended for an additional XXX days.
[] decreased by XXX days.
[] remains the same.

Therefore, the Contract shall terminate on [] .

6. **A. Minority and Women’s Business Enterprises Compliance.** *Include one of the options, as applicable; delete the inapplicable option.*

OPTION 1-to be used if the MBE and/or WBE subcontractor(s) will continue to be utilized during the extension period.

As required by 25 IAC 5-6-2(b), the following Division of Supplier Diversity certified MBE or WBE subcontractor(s) will be participating in this Contract under this Change Order/Amendment. This participation represents [] the same percentage or [] an increase of [] % above the original MBE and/or WBE commitment. **[Add additional MBEs and WBEs using the same format.]**

MBE or WBE	COMPANY NAME	PHONE	EMAIL OF CONTACT PERSON	PERCENT

Briefly describe the MBE and/or WBE service(s)/product(s) to be provided under this Amendment and include the estimated date(s) for utilization during the extension period:

A copy of each subcontractor agreement must be submitted to the Division of Supplier Diversity within thirty (30) days of the effective date of this Amendment. The subcontractor agreements may be uploaded into Pay Audit (Indiana’s subcontractor payment auditing system), emailed to MWBECompliance@idoa.IN.gov, or mailed to Division of Supplier Diversity, 402 W. Washington Street, RoomW-462, Indianapolis IN 46204. Failure to provide a copy of any subcontractor agreement may be deemed a violation of the rules governing MBE/WBE procurement and may result in sanctions allowable under 25 IAC 5-7-8. Requests for changes must be submitted to MWBECompliance@idoa.IN.gov for review and approval before changing the participation plan submitted in connection with this Amendment.

The Contractor shall report payments made to Division of Supplier Diversity certified subcontractors under this Contract on a monthly basis using Pay Audit. The Contractor shall notify subcontractors that they must confirm payments received from Contractor in Pay Audit. The Pay Audit system can be accessed on the IDOA webpage at: www.in.gov/idoa/mwbe/payaudit.htm. Contractor may also be required to report Division of Supplier Diversity certified subcontractor payments directly to the Division of Supplier Diversity, as reasonably requested and in the format required by the Division of Supplier Diversity.

Contractor’s failure to comply with the provisions in this clause may be considered a material breach of the Contract.

OPTION 2 – to be used if the original Contract identified subcontractors in this clause, but the Contractor will not be utilizing the MBE and WBE subcontractors during the extension period.

No certified MBE or WBE subcontractors will be participating in this Contract under this Change Order/Amendment.

B. Indiana Veteran Owned Small Business Enterprises Compliance. *Include one of the options, as applicable; delete the inapplicable option.*

OPTION 1-to be used if the IVOSB subcontractor(s) will continue to be utilized during the extension period.

As required by 25 IAC 9-4-1(b), the following certified IVOSB subcontractors will be participating in this Contract under this Change Order/Amendment. This participation represents [] the same percentage or [] an increase of [] % above the original IVOSB commitment. [Add additional IVOSBs using the same format.]

IVOSB	COMPANY NAME	PHONE	EMAIL OF CONTACT PERSON	PERCENT

Briefly describe the IVOSB service(s)/product(s) to be provided under this Amendment and include the estimated date(s) for utilization during the extension period:

A copy of each subcontractor agreement must be submitted to IDOA's Division of Supplier Diversity within thirty (30) days of the effective date of this Amendment. The subcontractor agreements may be uploaded into Pay Audit (Indiana's subcontractor payment auditing system), emailed to IndianaVeteransPreference@idoa.IN.gov, or mailed to IDOA, 402 W. Washington Street, Room W-462, Indianapolis, IN 46204. Failure to provide a copy of any subcontractor agreement may be deemed a violation of the rules governing IVOSB procurement and may result in sanctions allowable under 25 IAC 9-5-2. Requests for changes must be submitted to IndianaVeteransPreference@idoa.IN.gov for review and approval before changing the participation plan submitted in connection with this Amendment.

The Contractor shall report payments made to certified IVOSB subcontractors under this Contract on a monthly basis using Pay Audit. The Contractor shall notify subcontractors that they must confirm payments received from Contractor in Pay Audit. The Pay Audit system can be accessed on the IDOA webpage at: www.in.gov/idoa/mwbe/payaudit.htm. The Contractor may also be required to report IVOSB certified subcontractor payments directly to the Division of Supplier Diversity, as reasonably requested and in the format required by the Division of Supplier Diversity.

The Contractor's failure to comply with the provisions in this clause may be considered a material breach of the Contract.

OPTION 2 – to be used if the original Contract identified subcontractors in this clause, but the Contractor will not be utilizing the IVOSB subcontractors during the extension period.

No certified IVOSB subcontractors will be participating in this Contract under this Change Order/Amendment.

All matters set forth in the original Contract and not affected by this Amendment shall remain in full force and effect.

Non-Collusion and Acceptance

The undersigned attests, subject to the penalties for perjury, that the undersigned is the Contractor, or that the undersigned is the properly authorized representative, agent, member or officer of the Contractor. Further, to the undersigned's knowledge, neither the undersigned nor any other member, employee, representative, agent or officer of the Contractor, directly or indirectly, has entered into or been offered any sum of money or other consideration for the execution of this Amendment other than that which appears upon the face hereof. **Furthermore, if the undersigned has knowledge that a state officer, employee, or special state appointee, as those terms are defined in IC 4-2-6-1, has a financial interest in the Contract, the Contractor attests to compliance with the disclosure requirements in IC 4-2-6-10.5.**

Agreement to Use Electronic Signatures

I agree, and it is my intent, to sign this Contract by accessing State of Indiana Supplier Portal using the secure password assigned to me and by electronically submitting this Contract to the State of Indiana. I understand that my signing and submitting this Contract in this fashion is the legal equivalent of having placed my handwritten signature on the submitted Contract and this affirmation. I understand and agree that by electronically signing and submitting this Contract in this fashion I am affirming to the truth of the information contained therein. I understand that this Contract will not become binding on the State until it has been approved by the Department of Administration, the State Budget Agency, and the Office of the Attorney General, which approvals will be posted on the Active Contracts Database: <https://secure.in.gov/apps/idoa/contractsearch/>

In Witness Whereof, the Contractor and the State have, through their duly authorized representatives, entered into this Amendment for Public Works Project Number **XXXXXX**. The parties, having read and understood the foregoing terms of this Amendment, do by their respective signatures dated below agree to the terms thereof.

Contractor: XXXXXXXXXXXX

**Department of Administration
Public Works Division**

By: _____
Printed Name: _____
Title: _____
Date: _____

By: _____
Robert Grossman, Director
For IDOA Commissioner if less than \$10,000,000
Date: _____

Approved by:
Department of Administration

Approved by:
State Budget Agency *PURSUANT TO IC 4-13-2-14.1*
APPROVAL OF THE BUDGET AGENCY
IS NOT REQUIRED FOR CONTRACTS
UNDER \$100,000.00

By: _____ (for) _____
Holwerda, Commissioner

By: _____ (for) Rebecca
Zachary Q. Jackson, Director

Date: _____

Date: _____

Approved as to Form and Legality:

*Form approval has been granted by the
Office of the Attorney General pursuant to IC
4-13-2-14.3(e) on October 5, 2022.
FA 22-48*

This document prepared and reviewed by:

Counsel, Indiana Department of Administration

TEMPLATE

CONSTRUCTION CONTRACT CHANGE ORDER/AMENDMENT #

AMENDMENT # EXHIBIT A

See Documents to Follow for Exhibit

CONSTRUCTION CONTRACT CHANGE ORDER/AMENDMENT #

AMENDMENT # EXHIBIT B

See Documents to Follow for Exhibit



CERTIFICATE OF SUBSTANTIAL COMPLETION

State Form 1084 (R / 10-22) / DAPW 5

INDIANA PUBLIC WORKS PROJECT NUMBER:

PROJECT _____

NAME: _____

TO: Department of Administration
State of Indiana

THROUGH: Director Public Works

DESIGNER: _____

CONTRACTOR: _____

CONTRACT FOR: _____

(GENERAL, MECHANICAL, ELECTRICAL, OTHER)

CONTRACT DATE: _____ CONTRACTOR P.O.NO: _____
PROJECT OR _____ DESIGNATED AREA SHALL INCLUDE:

The contractor hereby certifies the Work of this project to be in complete conformance to the Contract Documents and to be substantially complete, enabling the Owner to make use of the Work as intended.

By his signature below the Contractor further requests Designer and Owner to inspect the Work and to concur in the Work's substantial completion by their signature and/or to provide in a timely manner to Contractor a listing of work items adjudged by them as remaining to be completed or corrected. Contractor agrees to complete and correct all work items representative of such listing within ___ days from date of receipt from designer.

Contractor Company Name _____

By (written) (typed or printed)
(Shall be signed by same representative who signed Contract)

_____ Date

A list of items to be completed or corrected, verified by the Designer and Owner, is (is not) appended hereto. Failure to include any incomplete items on such list does not alter the responsibility of the Contractor to provide all Work in complete conformance with the Contract Documents.

Designer Company Name _____

By (written) (typed or printed)
(Shall be signed by Designer of Record with Certification Responsibility to the State of Indiana)

_____ Date

The Work performed under this Contract has been reviewed and found to be substantially complete by the Director of Public Works who has hereby established the Date of Substantial Completion as _____ which is also the date of commencement of all warranties and guarantees required by the Contract Documents. The Date of Substantial Completion of the Work or designated portion thereof is the date established by the Director of Public Works when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner may occupy the Work, or designated portion thereof, for the use for which it is intended.

The Owner accepts the Work or designated portion thereof as substantially complete and assumes full possession thereof, in accordance with the contract documents.

STATE OF INDIANA

Owner

By: Director Public Works

Date

(Shall be signed by Director of Public Works as Owner's representative)

The responsibilities of the Owner and the Contractor for maintenance, heat, utilities, and insurance shall be as set out in the Contract Documents.

Campground Improvements Base Bid and Alternates

**Ferdinand State Forest
Department of Natural Resources
Dubois County, IN**

**Public Works Project No.
CDC2409631016 / ENG2209631441**



Amanda J Withers

**SPECIFICATIONS
March 2025**

CDC2409631016 / ENG2209631441
CAMPGROUND IMPROVEMENTS – BASE BID AND ALTERNATES
FERDINAND STATE FOREST/DEPARTMENT OF NATURAL RESOURCES

MARCH 2025

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CDC2409631016
CAMPGROUND IMPROVEMENTS – BASE BID AND ALTERNATES
FERDINAND STATE FOREST/DEPARTMENT OF NATURAL RESOURCES

DIVISION 01 – GENERAL REQUIREMENTS

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DIVISION 1 - GENERAL REQUIREMENTS
Section 01110 - Summary of Project

PART 1 GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. General:

1. The project name is Ferdinand State Forest, Project CDC2409631016 Campground Improvements – Base Bid and Alternates as shown on the Contract Documents prepared by Crawford, Murphy & Tilly, Inc., Indianapolis, Indiana.
2. Owner and Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto, his partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.
3. Crawford, Murphy & Tilly, Inc., Consulting Engineers, 8790 Purdue Road, Indianapolis, Indiana 45268-6128, is hereinafter called Engineer and will have the right and authority assigned to Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

B. General Description of the Work:

1. The Phase 1 Base Bid work includes, but is not limited to the following:
 - a. Site preparation and erosion control measures,
 - b. Site grading as required for proposed site,
 - c. Road and camp site improvements (compacted stone),
 - d. Comfort station installation including foundation and hookup,
 - e. Electrical work including but not limited to installing a new transformer, panelboard, conduit and wire,
 - f. Mound system (Presby) and sewer installation as shown,
 - g. Water main installation and water hookup to comfort station, VIP site and one sanitary yard hydrant for general use, and
 - h. Concrete for building foundation, sidewalks and ADA campsite.
2. Nine alternates as described in Section 01230 - Alternates for additional campsites, water services and hydrants and additional sitework.

C. Summary by Reference:

1. The COMPLETE WORK can be summarized by reference to requirements of various contract documents, which in turn make reference to requirements of other applicable provisions which control or influence work; and these references can be summarized but are not necessarily limited to following:

- a. Executed Owner-Contractor Agreement.
- b. General and Supplementary Conditions, which are bound herewith.
- c. Drawings, which are listed in an "Index to Sheets" as of the date of these contract documents, and bound herewith as indicated on the cover sheet of the drawings.
- d. Specifications Sections, which are bound herewith and are listed in "Table of Contents" bound herewith.
- e. Addenda and Change Orders, which will be distributed by transmittal subsequent to binding hereof.
- f. *Governing regulations, which have a bearing on performance of work; copies can be obtained from or reviewed at local, State or Federal Agency responsible for regulation in each case.
- g. Submittals of every kind, copies of which shall be retained by the Contractor on site.

1.02 EXTENT OF CONTRACT

- A. Extent of contract shall be defined as shown on drawings and specified herein.

1.03 ASSIGNMENT OF CONTRACT

- A. No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

1.04 SPECIFICATION AND DRAWING SECTIONS

- A. Specifications and Drawings are separated into discipline sections for convenience or reference only. Each Contractor shall be responsible for Complete Work, implemented by his own forces and his various subcontractors. Each Contractor is responsible for coordination between subcontractors.
- B. Further, it is not the intent that any work called out in a titled section be allocated to any specific trade. Allocation of this work to trades is considered a function of each Contractor.
- C. Contractor shall also be responsible for work as specifically cross-referenced in other Sections of Specifications though not specifically mentioned herein and for all information shown on drawings as applicable to their portions of work.

1.05 CONTRACTOR RESPONSIBILITIES

- A. The Contractor shall be fully responsible for Complete Work of all Contract Documents including, but not limited to, providing of labor, materials and equipment necessary to furnish and install complete work as described by Specifications, Divisions 1 thru 48, and as shown on Drawings.

- B. The Contractor may fulfill certain parts of above obligation through several prime Subcontractors and other subcontractors. The Contractor shall be responsible for letting of subcontracts in such a manner as to produce Complete Work required by Contract Documents.
- C. The Contractor shall employ, establish and identify all required administrative, supervisory and operational personnel, including personnel responsible for coordination of mechanical and electrical work, necessary for adequate performance of work. Do not change or replace established key personnel, during conduct of work. Furnish to Owner's representative, in writing, the names, addresses and telephone numbers of responsible persons employed by contractors who are to be contacted in event of an out-of-hours emergency at construction site. The Contractor shall provide a coordinator, in his employ, who shall coordinate all subcontracted work.
- D. Contractor shall make the following representations as part of the contract Agreement:
 - 1. Contractor has familiarized himself with the nature and extent of the Contract Documents, Work, locality, and with all local conditions and federal, state and local laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the Work.
 - 2. Contractor has studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which were relied upon by Engineer in the preparation of the Drawings and Specifications and which have been identified in the Supplementary General Conditions.
 - 3. Contractor has made or caused to be made examinations, investigations and tests and studies of such reports and related data in addition to those referred to in paragraph 2 as he deems necessary for the performance of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are or will be required by Contractor for such purposes.
 - 4. Contractor has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the Contract Documents.
 - 5. Contractor has given Engineer written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Contractor.

1.06 SCHEDULE

- A. Contractor shall commence work as stated in the "Notice to Proceed" issued by Owner and in accordance with the schedule set forth in these Contract Documents.
- B. Contractor shall submit, within five (5) calendar days of Notice to Proceed, a proposed schedule, sequence and description of methods of construction he proposes for work. This review shall in no way limit Contractor's means or methods of construction, nor shall it serve as an approval of Contractor's means

or methods of construction. Contractor shall at all times be responsible for means and methods of construction and all consequences resulting from those operations as required by Contract Documents. The proposed schedule and sequence shall allow for coordination among the sub-contractors.

1.07 CONTRACT TIME

- A. The Contractor shall complete all work in accordance with the contract per the Agreement Form.

1.08 SPECIAL SEQUENCES

- A. Before work under this Contract is begun, Contractor shall confer with Engineer and Owner and agree on a sequence of procedure, means of access to premises; space for temporary storage of materials and equipment; cooperation with all trades and other work outside of this contract; and use of approaches.
- B. Hours of operation of Owner's facility are 8:00 AM to 7:00 PM, local time. If Contractor requires access to site outside these hours, he shall arrange access with Owner.
- C. Unless otherwise approved by the Engineer and Owner, the work shall progress according to the following general sequence of construction.

1.09 GENERAL SEQUENCE OF CONSTRUCTION (NOT USED).

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 01110

DIVISION 1 - GENERAL REQUIREMENTS
Section 01130 – Available Project Information

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Description of supplemental information to be provided to the bidders including subsurface investigation information as well as stakeout data points and various photographs.

1.02 SUBSURFACE INVESTIGATION INFORMATION

- A. Copies of the subsurface investigation information with respect to the site are available in electronic format from Owner. The information is titled as follows:
 - 1. Soil Evaluation for Onsite Sewerage Systems
Indiana State Department of Health, state form 481400
DNR -Ferdinand State Forest Campground Project
Dubois County, Ferdinand, Indiana
Dated: October 1, 2024
Prepared by Soil Tech, Inc.,
Newburgh, Indiana.
- B. The report identifies properties of below grade conditions and was prepared for the use of Engineers and Contractors.
- C. The recommendations implied or described shall not be construed as a requirement of this Contract, unless specifically referenced in the Contract Documents.
- D. The soil sampling and report cannot reveal all conditions that exist on the site and do not relieve Bidder of its responsibility to take additional borings as it deems appropriate to determine the subsurface conditions that will be encountered or to assume the risk of encountering conditions which may not be consistent with the available borings.
- E. During prosecution of the Work, should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations may be made in accordance with the Supplemental General Conditions.
- F. If the encountered subsurface conditions for the top of rock differ substantively from those that would be reasonably interpreted from the provided Soils Report, such differences will be considered as an unforeseen condition. i.e. greater than a +/- 1'-0" tolerance range on the elevation of the top of rock. The contract may be adjusted according to the associated impact as agreed to between Owner and Contractor.

1.03 STAKEOUT DATA INFORMATION

- A. Copies of the proposed stakeout data points for the Campground Improvements project will be provided to Bidders in electronic format from Owner. The information is titled as follows:
 - 1. Ferdinand State Forest Campground Improvements
Stakeout Data Points
Dated: February 20, 2025 (29 pages)
Prepared by Crawford, Murphy & Tilly
Evansville, Indiana.
- B. A PDF copy of the stakeout data points is attached as part of the specifications after this section, in addition an Excel spreadsheet will be provided for Contractors use.
- C. Contractor shall be responsible for staking out the campsites and coordinating an early coordination meeting and site visit with Owner and Engineer with 7-days notice to review the campsite layout and determine tree removal requirements.
- D. Any modifications to the campsite layout determined at the early coordination meeting will be captured and a revised stakeout data point list provided to the Contractor for their use during construction.

1.04 STRUCTURE INFORMATION

- A. Copies of the general layout, schedules and details for the proposed Norway Pine Comfort Station will be provided to Bidders in electronic format from Owner. The information is titled as follows:
 - 1. Huffcutt Concrete, Inc. plan set
Dated: October 23, 2023 (6 pages)
Prepared by Huffcutt Concrete, Inc.
Chippewa Falls, Wisconsin.

1.05 ACQUISITION OF INFORMATION

- A. Electronic copies of the available information referenced above will be given to each Prime Bidder along with an electronic copy of the contract documents. Questions can be directed to the Indiana Department of Natural Resources Manager, preferably via e-mail.
 - 1. Dean Illingworth, FAIA
Division of Engineering, Department of Natural Resources
317-407-6418 cell, dillingworth@dnr.in.gov

PART 1 PRODUCTS – NOT USED

PART 2 EXECUTION – NOT USED

END OF SECTION 01130

Stakeout Data Points as of 2-20-25

Point No.	Easting	Westing	Elevation	Point Description
100	1096364.02	3041807.856	624.58	Campsite 1
101	1096359.808	3041794.165	624.70	Campsite 1
102	1096355.596	3041780.474	625.41	Campsite 1
103	1096347.173	3041753.093	625.46	Campsite 1
104	1096340.929	3041749.775	625.25	Campsite 1
105	1096334.236	3041751.822	624.97	Campsite 1
106	1096329.848	3041737.479	624.91	Campsite 1
107	1096325.46	3041723.136	624.90	Campsite 1
108	1096342.194	3041718.017	624.86	Campsite 1
109	1096358.927	3041712.898	624.26	Campsite 1
110	1096363.315	3041727.241	624.92	Campsite 1
111	1096367.703	3041741.584	625.54	Campsite 1
112	1096365.702	3041745.296	625.68	Campsite 1
113	1096370.614	3041761.355	626.01	Campsite 1
114	1096374.363	3041764.785	626.06	Campsite 1
115	1096379.178	3041763.163	626.01	Campsite 1
120	1096468.733	3041811.616	624.16	Campsite 2
121	1096459.894	3041807.669	624.32	Campsite 2
122	1096443.345	3041803.878	624.89	Campsite 2
123	1096426.796	3041800.088	625.24	Campsite 2
124	1096420.806	3041803.845	625.20	Campsite 2
125	1096419.243	3041810.668	625.00	Campsite 2
126	1096404.622	3041807.319	625.07	Campsite 2
127	1096390.002	3041803.97	625.14	Campsite 2
128	1096393.909	3041786.913	625.57	Campsite 2
129	1096397.816	3041769.855	625.57	Campsite 2
130	1096412.436	3041773.204	625.37	Campsite 2
131	1096427.057	3041776.553	624.94	Campsite 2
132	1096429.277	3041780.139	625.02	Campsite 2
133	1096442.765	3041783.229	624.73	Campsite 2
134	1096447.966	3041781.24	624.44	Campsite 2
140	1096497.366	3041856.651	623.29	Campsite 3
141	1096488.527	3041852.704	623.49	Campsite 3
142	1096476.045	3041849.845	623.95	Campsite 3
143	1096463.563	3041846.987	624.02	Campsite 3
144	1096457.573	3041850.744	624.03	Campsite 3
145	1096454.224	3041865.364	623.72	Campsite 3
146	1096437.865	3041861.617	623.91	Campsite 3
147	1096421.505	3041857.87	624.16	Campsite 3
148	1096424.854	3041843.25	624.40	Campsite 3
149	1096421.097	3041837.26	624.54	Campsite 3
150	1096407.15	3041834.065	624.42	Campsite 3
151	1096393.203	3041830.871	624.16	Campsite 3
152	1096388.002	3041832.861	624.03	Campsite 3
153	1096381.227	3041807.604	625.02	Campsite 3
154	1096397.313	3041819.502	624.73	Campsite 3

Stakeout Data Points as of 2-20-25

155	1096410.545	3041822.533	624.68	Campsite 3
156	1096423.776	3041825.563	624.67	Campsite 3
157	1096429.319	3041823.756	624.72	Campsite 3
158	1096444.051	3041827.13	624.62	Campsite 3
159	1096462.038	3041831.25	624.44	Campsite 3
160	1096466.242	3041835.29	624.30	Campsite 3
161	1096477.505	3041837.87	623.96	Campsite 3
162	1096482.706	3041835.88	623.73	Campsite 3
170	1096532.027	3041911.169	622.29	Campsite 4
171	1096523.189	3041907.222	622.39	Campsite 4
172	1096487.427	3041899.031	623.16	Campsite 4
173	1096481.438	3041902.789	623.11	Campsite 4
174	1096478.089	3041917.409	622.79	Campsite 4
175	1096461.73	3041913.662	622.99	Campsite 4
176	1096445.37	3041909.915	623.05	Campsite 4
177	1096448.719	3041895.295	623.49	Campsite 4
178	1096444.962	3041889.305	623.63	Campsite 4
179	1096427.865	3041885.389	623.58	Campsite 4
180	1096422.664	3041887.378	623.44	Campsite 4
181	1096408.004	3041866.607	623.63	Campsite 4
182	1096416.843	3041870.554	623.76	Campsite 4
183	1096432.242	3041874.081	623.78	Campsite 4
184	1096447.641	3041877.608	623.71	Campsite 4
185	1096453.184	3041875.8	623.65	Campsite 4
186	1096472.091	3041880.131	623.48	Campsite 4
187	1096485.903	3041883.294	623.42	Campsite 4
188	1096490.106	3041887.335	623.28	Campsite 4
189	1096512.167	3041892.388	622.67	Campsite 4
190	1096517.368	3041890.398	622.60	Campsite 4
200	1096566.886	3041965.69	620.93	Campsite 5
201	1096558.135	3041961.805	621.26	Campsite 5
202	1096540.381	3041957.739	621.75	Campsite 5
203	1096522.627	3041953.672	621.86	Campsite 5
204	1096516.637	3041957.429	621.88	Campsite 5
205	1096513.288	3041972.05	621.98	Campsite 5
206	1096496.929	3041968.303	621.91	Campsite 5
207	1096480.57	3041964.556	621.75	Campsite 5
208	1096483.918	3041949.935	622.64	Campsite 5
209	1096480.161	3041943.946	622.63	Campsite 5
210	1096462.526	3041939.906	622.38	Campsite 5
211	1096457.326	3041941.896	622.32	Campsite 5
212	1096442.666	3041921.125	622.71	Campsite 5
213	1096451.505	3041925.072	622.71	Campsite 5
214	1096467.172	3041928.66	622.61	Campsite 5
215	1096482.84	3041932.249	622.64	Campsite 5
216	1096488.383	3041930.441	622.59	Campsite 5
217	1096503.115	3041933.815	622.42	Campsite 5

Stakeout Data Points as of 2-20-25

218	1096521.102	3041937.935	622.12	Campsite 5
219	1096525.306	3041941.976	621.98	Campsite 5
220	1096546.829	3041946.905	621.69	Campsite 5
221	1096552.029	3041944.916	621.48	Campsite 5
230	1096602.323	3042020.386	620.66	Campsite 6
231	1096593.572	3042016.5	620.75	Campsite 6
232	1096575.699	3042012.407	621.16	Campsite 6
233	1096557.826	3042008.313	621.34	Campsite 6
234	1096551.836	3042012.07	621.42	Campsite 6
235	1096548.487	3042026.691	621.47	Campsite 6
236	1096532.128	3042022.944	621.35	Campsite 6
237	1096515.769	3042019.197	620.76	Campsite 6
238	1096519.117	3042004.576	621.35	Campsite 6
239	1096515.36	3041998.586	621.64	Campsite 6
240	1096497.241	3041994.436	621.32	Campsite 6
241	1096492.028	3041996.444	621.04	Campsite 6
242	1096477.328	3041975.643	621.39	Campsite 6
243	1096486.166	3041979.59	621.39	Campsite 6
244	1096502.103	3041983.24	621.96	Campsite 6
245	1096518.039	3041986.89	622.00	Campsite 6
246	1096523.583	3041985.082	621.93	Campsite 6
247	1096542.49	3041989.413	621.50	Campsite 6
248	1096556.301	3041992.576	621.28	Campsite 6
249	1096560.505	3041996.616	621.25	Campsite 6
250	1096582.077	3042001.557	620.87	Campsite 6
251	1096587.29	3041999.55	620.71	Campsite 6
260	1096644.004	3042084.718	619.89	Campsite 7
261	1096635.253	3042080.832	620.02	Campsite 7
262	1096613.246	3042075.792	620.29	Campsite 7
263	1096591.239	3042070.751	620.68	Campsite 7
264	1096585.249	3042074.509	620.70	Campsite 7
265	1096583.686	3042081.332	620.57	Campsite 7
266	1096569.066	3042077.983	620.90	Campsite 7
267	1096554.445	3042074.634	621.05	Campsite 7
268	1096556.008	3042067.811	621.05	Campsite 7
269	1096552.25	3042061.821	620.96	Campsite 7
270	1096538.922	3042058.768	620.77	Campsite 7
271	1096533.709	3042060.776	620.69	Campsite 7
272	1096533.61	3042066.361	620.70	Campsite 7
273	1096512.433	3042030.303	620.59	Campsite 7
274	1096521.183	3042034.189	620.83	Campsite 7
275	1096538.949	3042038.258	621.25	Campsite 7
276	1096556.715	3042042.327	621.23	Campsite 7
277	1096562.259	3042040.519	621.25	Campsite 7
278	1096576.99	3042043.893	621.07	Campsite 7
279	1096578.776	3042036.096	621.16	Campsite 7
280	1096583.65	3042037.212	621.06	Campsite 7

Stakeout Data Points as of 2-20-25

281	1096581.864	3042045.01	620.99	Campsite 7
282	1096591.5	3042047.217	620.71	Campsite 7
283	1096595.704	3042051.257	620.54	Campsite 7
284	1096617.514	3042056.253	620.40	Campsite 7
285	1096622.727	3042054.245	620.28	Campsite 7
290	1096630.574	3042121.695	619.34	Campsite 8
291	1096626.764	3042117.677	619.46	Campsite 8
292	1096619.604	3042116.037	619.66	Campsite 8
293	1096613.614	3042119.794	619.77	Campsite 8
294	1096610.265	3042134.415	619.55	Campsite 8
295	1096593.906	3042130.668	620.22	Campsite 8
296	1096577.546	3042126.921	620.72	Campsite 8
297	1096580.895	3042112.3	620.91	Campsite 8
298	1096577.138	3042106.31	620.76	Campsite 8
299	1096568.444	3042104.319	620.71	Campsite 8
300	1096563.231	3042106.326	620.69	Campsite 8
301	1096563.131	3042111.911	620.74	Campsite 8
302	1096548.187	3042085.488	620.95	Campsite 8
303	1096556.938	3042089.373	620.82	Campsite 8
304	1096568.377	3042091.993	620.59	Campsite 8
305	1096579.817	3042094.613	620.51	Campsite 8
306	1096604.267	3042097.136	620.37	Campsite 8
308	1096585.36	3042092.806	620.54	Campsite 8
309	1096618.079	3042100.3	620.02	Campsite 8
310	1096622.283	3042104.34	619.81	Campsite 8
311	1096640.228	3042108.451	619.51	Campsite 8
312	1096652.722	3042108.107	619.32	Campsite 8
313	1096656.34	3042103.309	619.38	Campsite 8
314	1096628.351	3042126.757	619.26	Campsite 8
320	1096570.648	3042170.193	619.84	Campsite 9
321	1096565.699	3042167.95	619.99	Campsite 9
322	1096559.244	3042168.919	619.99	Campsite 9
323	1096555.042	3042174.605	619.77	Campsite 9
324	1096556.081	3042181.527	619.45	Campsite 9
325	1096541.248	3042183.753	619.51	Campsite 9
326	1096526.414	3042185.979	619.51	Campsite 9
327	1096523.817	3042168.674	618.97	Campsite 9
328	1096521.22	3042151.368	618.16	Campsite 9
329	1096536.054	3042149.142	619.77	Campsite 9
330	1096550.887	3042146.916	620.17	Campsite 9
331	1096554.264	3042149.443	620.20	Campsite 9
332	1096564.694	3042147.878	620.34	Campsite 9
333	1096568.683	3042144.551	620.30	Campsite 9
340	1096634.971	3041857.515	621.07	Campsite 10
341	1096626.343	3041853.831	621.28	Campsite 10
342	1096601.861	3041848.49	621.81	Campsite 10
343	1096577.38	3041843.149	622.41	Campsite 10

Stakeout Data Points as of 2-20-25

344	1096571.856	3041845.014	622.36	Campsite 10
345	1096552.905	3041840.88	622.29	Campsite 10
346	1096539.061	3041837.86	622.53	Campsite 10
347	1096534.816	3041833.863	622.63	Campsite 10
348	1096522.822	3041831.247	622.97	Campsite 10
349	1096510.827	3041828.63	623.28	Campsite 10
350	1096505.662	3041830.652	623.39	Campsite 10
351	1096491.232	3041810.105	623.66	Campsite 10
352	1096500.217	3041814.034	623.44	Campsite 10
353	1096518.796	3041818.087	622.83	Campsite 10
354	1096537.374	3041822.14	622.30	Campsite 10
355	1096543.324	3041818.321	622.28	Campsite 10
356	1096546.521	3041803.666	622.08	Campsite 10
357	1096562.918	3041807.243	622.17	Campsite 10
358	1096579.316	3041810.82	622.47	Campsite 10
359	1096576.119	3041825.475	622.50	Campsite 10
360	1096579.938	3041831.425	622.49	Campsite 10
361	1096595.716	3041834.868	622.44	Campsite 10
362	1096611.494	3041838.31	621.94	Campsite 10
363	1096616.812	3041836.055	621.93	Campsite 10
364	1096616.455	3041830.29	622.09	Campsite 10
365	1096641.634	3041864.12	620.76	Campsite 10
370	1096671.064	3041912.821	618.78	Campsite 11
371	1096661.699	3041908.622	619.42	Campsite 11
372	1096637.072	3041903.249	619.90	Campsite 11
373	1096612.444	3041897.877	620.59	Campsite 11
374	1096606.92	3041899.742	620.61	Campsite 11
375	1096590.523	3041896.165	621.04	Campsite 11
376	1096574.125	3041892.588	621.60	Campsite 11
377	1096569.88	3041888.591	621.86	Campsite 11
378	1096557.73	3041885.94	622.05	Campsite 11
379	1096545.862	3041883.351	622.27	Campsite 11
380	1096540.414	3041885.312	622.34	Campsite 11
381	1096525.984	3041864.764	622.73	Campsite 11
382	1096534.969	3041868.693	622.50	Campsite 11
383	1096553.704	3041872.78	622.15	Campsite 11
384	1096572.438	3041876.867	622.01	Campsite 11
385	1096578.388	3041873.048	621.81	Campsite 11
386	1096581.585	3041858.394	622.05	Campsite 11
387	1096597.982	3041861.971	621.71	Campsite 11
388	1096614.38	3041865.548	621.42	Campsite 11
389	1096611.183	3041880.203	621.31	Campsite 11
390	1096615.002	3041886.153	620.99	Campsite 11
391	1096633.362	3041890.159	620.41	Campsite 11
392	1096651.723	3041894.164	619.94	Campsite 11
393	1096656.932	3041892.077	619.92	Campsite 11
394	1096656.921	3041886.465	620.05	Campsite 11

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400	1096702.64	3041967.428	613.89	Campsite 12
401	1096692.12	3041962.337	614.40	Campsite 12
402	1096669.814	3041957.471	615.19	Campsite 12
403	1096647.508	3041952.604	616.33	Campsite 12
404	1096641.984	3041954.47	616.47	Campsite 12
405	1096625.587	3041950.893	617.58	Campsite 12
406	1096609.189	3041947.315	618.56	Campsite 12
407	1096604.944	3041943.319	618.98	Campsite 12
408	1096592.649	3041940.636	619.58	Campsite 12
409	1096580.353	3041937.954	620.10	Campsite 12
410	1096575.176	3041939.994	620.28	Campsite 12
411	1096560.736	3041919.424	621.38	Campsite 12
412	1096569.721	3041923.353	621.06	Campsite 12
413	1096588.612	3041927.474	620.26	Campsite 12
414	1096607.502	3041931.595	619.70	Campsite 12
415	1096613.452	3041927.776	619.77	Campsite 12
416	1096616.649	3041913.121	620.04	Campsite 12
417	1096633.046	3041916.698	619.65	Campsite 12
418	1096649.444	3041920.276	619.21	Campsite 12
419	1096646.247	3041934.93	618.27	Campsite 12
420	1096650.066	3041940.881	617.61	Campsite 12
421	1096667.334	3041944.648	616.49	Campsite 12
422	1096684.602	3041948.415	615.58	Campsite 12
423	1096689.713	3041946.469	615.60	Campsite 12
430	1096716.497	3042019.613	617.13	Campsite 13
431	1096703.165	3042011.825	617.10	Campsite 13
432	1096689.177	3042008.773	617.45	Campsite 13
433	1096675.189	3042005.721	617.35	Campsite 13
434	1096669.665	3042007.587	617.80	Campsite 13
435	1096653.268	3042004.01	618.27	Campsite 13
436	1096636.871	3042000.432	618.99	Campsite 13
437	1096632.625	3041996.436	619.02	Campsite 13
438	1096615.876	3041992.782	619.55	Campsite 13
439	1096610.699	3041994.822	619.82	Campsite 13
440	1096595.902	3041974.216	620.04	Campsite 13
441	1096604.799	3041978.084	619.46	Campsite 13
442	1096619.991	3041981.398	619.00	Campsite 13
443	1096635.183	3041984.712	618.28	Campsite 13
444	1096641.133	3041980.893	617.46	Campsite 13
445	1096644.33	3041966.238	616.17	Campsite 13
446	1096660.727	3041969.815	615.13	Campsite 13
447	1096677.125	3041973.393	614.80	Campsite 13
448	1096673.928	3041988.047	616.10	Campsite 13
449	1096677.747	3041993.998	616.44	Campsite 13
450	1096694.071	3041997.559	616.44	Campsite 13
451	1096710.396	3042001.12	615.66	Campsite 13
452	1096715.117	3041999.647	615.14	Campsite 13

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460	1096628.378	3042024.43	620.15	Campsite 14
461	1096637.131	3042028.315	619.93	Campsite 14
462	1096658.024	3042033.098	619.52	Campsite 14
463	1096678.918	3042037.88	619.14	Campsite 14
464	1096684.907	3042034.122	618.87	Campsite 14
465	1096686.469	3042027.299	618.53	Campsite 14
466	1096701.09	3042030.646	618.28	Campsite 14
467	1096715.711	3042033.993	618.37	Campsite 14
468	1096711.806	3042051.051	619.14	Campsite 14
469	1096707.902	3042068.109	619.05	Campsite 14
470	1096693.281	3042064.762	619.27	Campsite 14
471	1096678.659	3042061.415	619.60	Campsite 14
472	1096676.439	3042057.829	619.60	Campsite 14
473	1096665.651	3042055.36	619.74	Campsite 14
474	1096654.864	3042052.891	619.91	Campsite 14
475	1096649.651	3042054.898	619.97	Campsite 14
480	1096558.932	3041779.622	621.64	Campsite 15
481	1096566.423	3041780.852	621.76	Campsite 15
482	1096573.938	3041779.777	621.71	Campsite 15
483	1096586.788	3041775.88	621.45	Campsite 15
484	1096599.638	3041771.982	621.45	Campsite 15
485	1096612.488	3041768.085	621.34	Campsite 15
486	1096625.338	3041764.188	621.08	Campsite 15
487	1096628.672	3041757.952	620.80	Campsite 15
488	1096626.64	3041751.254	620.54	Campsite 15
489	1096640.994	3041746.9	620.62	Campsite 15
490	1096655.347	3041742.547	620.70	Campsite 15
491	1096660.426	3041759.293	621.00	Campsite 15
492	1096665.505	3041776.039	620.61	Campsite 15
493	1096651.152	3041780.392	621.60	Campsite 15
494	1096636.798	3041784.745	621.98	Campsite 15
495	1096633.091	3041782.735	621.91	Campsite 15
496	1096618.915	3041787.034	622.43	Campsite 15
497	1096604.739	3041791.334	622.67	Campsite 15
498	1096601.256	3041795.313	622.89	Campsite 15
499	1096603.293	3041800.193	622.90	Campsite 15
500	1096609.213	3041804.675	622.80	Campsite 16
501	1096616.113	3041808.608	622.65	Campsite 16
502	1096623.898	3041810.179	622.31	Campsite 16
503	1096635.59	3041812.045	622.03	Campsite 16
504	1096646.515	3041816.608	621.59	Campsite 16
505	1096656.061	3041823.613	621.10	Campsite 16
506	1096663.693	3041832.665	620.53	Campsite 16
507	1096666.441	3041836.842	620.20	Campsite 16
508	1096673.365	3041838.272	619.58	Campsite 16
509	1096685.897	3041830.03	618.82	Campsite 16
510	1096695.119	3041844.052	618.02	Campsite 16

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511	1096704.341	3041858.074	617.22	Campsite 16
512	1096691.81	3041866.316	617.89	Campsite 16
513	1096690.38	3041873.241	618.17	Campsite 16
514	1096693.127	3041877.418	617.97	Campsite 16
515	1096698.005	3041886.907	617.74	Campsite 16
516	1096700.759	3041897.214	617.68	Campsite 16
517	1096701.264	3041907.87	617.62	Campsite 16
518	1096699.496	3041918.391	617.34	Campsite 16
519	1096698.772	3041928.329	616.72	Campsite 16
520	1096684.909	3041899.791	618.95	Campsite 16
521	1096687.681	3041893.746	618.62	Campsite 16
522	1096685.737	3041888.716	618.70	Campsite 16
523	1096683.101	3041884.012	618.87	Campsite 16
524	1096680.354	3041879.835	619.05	Campsite 16
525	1096675.101	3041877.306	619.45	Campsite 16
526	1096665.878	3041863.284	619.92	Campsite 16
527	1096656.656	3041849.262	620.55	Campsite 16
528	1096656.415	3041843.436	620.69	Campsite 16
529	1096648.889	3041833.371	621.21	Campsite 16
530	1096643.036	3041828.548	621.52	Campsite 16
531	1096636.635	3041829.259	621.76	Campsite 16
532	1096636.245	3041835.688	621.64	Campsite 16
533	1096750.313	3042054.637	618.12	Campsite 17
534	1096754.315	3042052.067	617.89	Campsite 17
535	1096760.783	3042040.342	617.50	Campsite 17
536	1096767.252	3042028.617	616.24	Campsite 17
537	1096765.289	3042021.824	615.50	Campsite 17
538	1096759.161	3042018.443	615.04	Campsite 17
539	1096766.406	3042005.31	613.61	Campsite 17
540	1096773.652	3041992.176	612.13	Campsite 17
541	1096788.974	3042000.63	612.96	Campsite 17
542	1096804.296	3042009.083	613.96	Campsite 17
543	1096797.05	3042022.216	615.23	Campsite 17
544	1096789.805	3042035.349	616.48	Campsite 17
545	1096785.746	3042036.495	616.54	Campsite 17
546	1096777.946	3042050.633	617.80	Campsite 17
547	1096773.51	3042058.675	618.33	Campsite 17
548	1096773.769	3042063.925	618.52	Campsite 17
550	1096806.776	3042056.22	617.76	Campsite 18
551	1096813.034	3042048.786	616.82	Campsite 18
552	1096819.754	3042036.605	616.28	Campsite 18
553	1096826.474	3042024.425	615.47	Campsite 18
554	1096824.511	3042017.632	614.93	Campsite 18
555	1096818.382	3042014.25	614.54	Campsite 18
556	1096825.628	3042001.117	613.52	Campsite 18
557	1096832.874	3041987.984	612.57	Campsite 18
558	1096848.196	3041996.437	613.61	Campsite 18

Stakeout Data Points as of 2-20-25

559	1096863.518	3042004.89	615.35	Campsite 18
560	1096856.272	3042018.024	614.76	Campsite 18
561	1096849.027	3042031.157	616.18	Campsite 18
562	1096844.968	3042032.303	616.22	Campsite 18
563	1096841.14	3042039.242	616.22	Campsite 18
564	1096841.616	3042044.783	617.00	Campsite 18
565	1096846.92	3042046.456	618.26	Campsite 18
570	1096870.848	3042039.278	618.29	Campsite 19
571	1096879.352	3042034.786	617.49	Campsite 19
572	1096885.531	3042027.416	616.49	Campsite 19
573	1096893.464	3042013.035	616.85	Campsite 19
574	1096901.398	3041998.655	616.88	Campsite 19
575	1096899.435	3041991.862	616.58	Campsite 19
576	1096893.307	3041988.481	616.05	Campsite 19
577	1096900.552	3041975.348	615.81	Campsite 19
578	1096907.798	3041962.214	615.15	Campsite 19
579	1096923.12	3041970.668	616.30	Campsite 19
580	1096938.442	3041979.121	617.21	Campsite 19
581	1096931.196	3041992.254	617.25	Campsite 19
582	1096923.951	3042005.387	617.28	Campsite 19
583	1096919.892	3042006.534	617.24	Campsite 19
584	1096913.899	3042017.397	617.04	Campsite 19
585	1096914.38	3042022.946	617.38	Campsite 19
586	1096919.697	3042024.606	618.43	Campsite 19
590	1096992.962	3042002.802	618.94	Campsite 20
591	1097001.491	3041998.264	618.60	Campsite 20
592	1097007.662	3041990.831	618.44	Campsite 20
593	1097018.905	3041970.176	618.34	Campsite 20
594	1097030.148	3041949.521	618.21	Campsite 20
595	1097028.147	3041942.739	618.12	Campsite 20
596	1097022	3041939.392	618.14	Campsite 20
597	1097029.17	3041926.218	617.62	Campsite 20
598	1097036.341	3041913.044	616.69	Campsite 20
599	1097051.711	3041921.41	617.09	Campsite 20
600	1097067.081	3041929.776	616.98	Campsite 20
601	1097059.91	3041942.951	617.53	Campsite 20
602	1097052.739	3041956.125	617.85	Campsite 20
603	1097048.687	3041957.294	617.95	Campsite 20
604	1097035.878	3041980.827	618.07	Campsite 20
605	1097036.393	3041986.375	618.20	Campsite 20
606	1097041.723	3041988.001	618.83	Campsite 20
610	1097050.928	3041985.201	618.78	Campsite 21
611	1097059.356	3041980.658	618.28	Campsite 21
612	1097065.458	3041973.281	617.23	Campsite 21
613	1097076.891	3041952.278	617.41	Campsite 21
614	1097088.323	3041931.275	616.33	Campsite 21
615	1097086.322	3041924.493	616.10	Campsite 21

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616	1097080.174	3041921.147	616.19	Campsite 21
617	1097087.345	3041907.973	615.41	Campsite 21
618	1097094.516	3041894.799	613.65	Campsite 21
619	1097109.886	3041903.165	613.17	Campsite 21
620	1097125.256	3041911.531	613.58	Campsite 21
621	1097118.085	3041924.705	615.01	Campsite 21
622	1097110.914	3041937.879	615.89	Campsite 21
623	1097106.862	3041939.049	616.05	Campsite 21
624	1097094.028	3041962.626	616.73	Campsite 21
625	1097094.577	3041968.215	617.40	Campsite 21
626	1097099.974	3041969.769	618.03	Campsite 21
630	1097120.64	3041963.012	617.52	Campsite 22
631	1097128.864	3041958.464	616.90	Campsite 22
632	1097134.828	3041951.202	615.28	Campsite 22
633	1097142.988	3041936.211	614.81	Campsite 22
634	1097151.147	3041921.221	613.33	Campsite 22
635	1097149.146	3041914.439	612.96	Campsite 22
636	1097142.998	3041911.093	612.72	Campsite 22
637	1097150.169	3041897.919	610.68	Campsite 22
638	1097157.34	3041884.745	608.92	Campsite 22
639	1097172.71	3041893.111	610.31	Campsite 22
640	1097188.08	3041901.477	611.64	Campsite 22
641	1097180.909	3041914.651	612.57	Campsite 22
642	1097173.738	3041927.825	613.81	Campsite 22
643	1097169.686	3041928.995	613.91	Campsite 22
644	1097164.95	3041937.695	614.44	Campsite 22
645	1097165.618	3041943.422	614.93	Campsite 22
646	1097171.239	3041944.711	615.87	Campsite 22
650	1096827.029	3042068.938	618.54	Campsite 23
651	1096818.139	3042073.728	618.46	Campsite 23
652	1096811.87	3042081.645	618.12	Campsite 23
653	1096805.7	3042093.899	617.81	Campsite 23
654	1096799.531	3042106.153	617.77	Campsite 23
655	1096801.748	3042112.867	617.35	Campsite 23
656	1096808	3042116.015	616.98	Campsite 23
657	1096801.255	3042129.412	616.33	Campsite 23
658	1096794.51	3042142.809	614.98	Campsite 23
659	1096778.88	3042134.94	615.51	Campsite 23
660	1096763.25	3042127.071	615.75	Campsite 23
661	1096769.995	3042113.674	616.96	Campsite 23
662	1096776.74	3042100.277	618.07	Campsite 23
663	1096780.753	3042098.978	618.14	Campsite 23
664	1096784.726	3042091.087	618.42	Campsite 23
665	1096784.05	3042085.577	618.65	Campsite 23
666	1096778.704	3042084.086	618.78	Campsite 23
670	1096889.019	3042050.272	618.16	Campsite 24
671	1096880.167	3042055.065	617.98	Campsite 24

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672	1096873.923	3042062.96	617.47	Campsite 24
673	1096867.883	3042074.955	616.97	Campsite 24
674	1096861.844	3042086.95	617.06	Campsite 24
675	1096864.062	3042093.664	617.09	Campsite 24
676	1096870.314	3042096.812	616.62	Campsite 24
677	1096863.569	3042110.209	615.90	Campsite 24
678	1096856.823	3042123.606	614.42	Campsite 24
679	1096841.193	3042115.737	615.98	Campsite 24
680	1096825.564	3042107.867	616.92	Campsite 24
681	1096832.309	3042094.47	617.39	Campsite 24
682	1096839.054	3042081.073	617.34	Campsite 24
683	1096843.066	3042079.774	617.30	Campsite 24
684	1096847.066	3042071.829	616.92	Campsite 24
685	1096846.443	3042066.381	617.29	Campsite 24
686	1096841.197	3042064.782	618.38	Campsite 24
690	1096952.235	3042031.531	618.54	Campsite 25
691	1096943.506	3042036.134	618.23	Campsite 25
692	1096937.238	3042043.757	617.99	Campsite 25
693	1096930.481	3042056.44	617.78	Campsite 25
694	1096923.725	3042069.124	617.54	Campsite 25
695	1096925.787	3042075.887	617.27	Campsite 25
696	1096931.965	3042079.178	617.17	Campsite 25
697	1096924.913	3042092.416	616.60	Campsite 25
698	1096917.861	3042105.654	615.05	Campsite 25
699	1096902.416	3042097.427	616.07	Campsite 25
700	1096886.972	3042089.2	616.80	Campsite 25
701	1096894.024	3042075.961	617.27	Campsite 25
702	1096901.076	3042062.723	617.61	Campsite 25
703	1096905.117	3042061.517	617.65	Campsite 25
704	1096909.691	3042052.932	617.77	Campsite 25
705	1096909.142	3042047.408	617.95	Campsite 25
706	1096903.831	3042045.795	618.17	Campsite 25
710	1097010.249	3042014.274	618.49	Facilities
711	1097012.768	3042022.664	618.45	Facilities
712	1097014.498	3042028.427	618.43	Facilities
713	1097018.333	3042041.203	618.38	Facilities
714	1097011.149	3042043.359	618.41	Facilities
715	1097014.743	3042055.331	618.37	Facilities
716	1097018.336	3042067.302	618.28	Facilities
717	1096998.224	3042073.339	618.32	Facilities
718	1096978.111	3042079.376	618.07	Facilities
719	1096974.518	3042067.405	618.24	Facilities
720	1096970.924	3042055.433	618.38	Facilities
721	1096963.741	3042057.589	618.28	Facilities
722	1096959.681	3042044.061	617.90	Facilities
723	1096955.62	3042030.533	618.58	Facilities
724	1096970.718	3042086.576	617.85	CORNER SEPTIC TANK

Stakeout Data Points as of 2-20-25

725	1096964.607	3042097.766	617.38	CORNER SEPTIC TANK
726	1096959.078	3042094.747	617.33	CORNER SEPTIC TANK
727	1096965.188	3042083.556	617.84	CORNER SEPTIC TANK
730	1097124.447	3042027.908	615.33	Campsite 26
731	1097116.552	3042029.01	615.56	Campsite 26
732	1097103.459	3042033.041	615.94	Campsite 26
733	1097090.366	3042037.073	616.37	Campsite 26
734	1097087.059	3042043.323	616.17	Campsite 26
735	1097089.118	3042050.012	615.69	Campsite 26
736	1097074.783	3042054.426	616.25	Campsite 26
737	1097060.448	3042058.84	617.04	Campsite 26
738	1097055.299	3042042.116	617.60	Campsite 26
739	1097050.149	3042025.392	617.98	Campsite 26
740	1097064.484	3042020.978	617.75	Campsite 26
741	1097078.819	3042016.564	617.47	Campsite 26
742	1097082.535	3042018.558	617.25	Campsite 26
743	1097093.205	3042015.273	617.04	Campsite 26
744	1097096.608	3042011.608	617.10	Campsite 26
750	1097159.253	3041966.417	616.27	Campsite 27
751	1097156.091	3041971.212	615.92	Campsite 27
752	1097159.738	3041975.739	615.70	Campsite 27
753	1097165.362	3041974.2	615.50	Campsite 27
754	1097181.522	3041978.731	614.91	Campsite 27
755	1097197.682	3041983.261	614.33	Campsite 27
756	1097201.686	3041987.5	614.03	Campsite 27
757	1097218.215	3041992.134	613.24	Campsite 27
758	1097234.744	3041996.768	612.34	Campsite 27
759	1097243.789	3041997.59	612.08	Campsite 27
760	1097217.312	3042007.86	612.59	Campsite 27
761	1097213.669	3042003.321	612.96	Campsite 27
762	1097198.447	3041999.053	613.70	Campsite 27
763	1097192.283	3042002.518	613.81	Campsite 27
764	1097188.234	3042016.96	613.41	Campsite 27
765	1097172.074	3042012.43	614.45	Campsite 27
766	1097155.914	3042007.899	614.82	Campsite 27
767	1097159.963	3041993.457	615.63	Campsite 27
768	1097156.499	3041987.293	615.89	Campsite 27
769	1097146.606	3041984.519	616.10	Campsite 27
770	1097136.713	3041981.746	616.06	Campsite 27
771	1097129.509	3041982.446	616.21	Campsite 27
780	1097219.638	3041939.707	614.80	Campsite 28
781	1097217.061	3041944.658	614.21	Campsite 28
782	1097221.593	3041949.169	613.74	Campsite 28
783	1097227.217	3041947.63	613.68	Campsite 28
784	1097245.894	3041952.866	613.31	Campsite 28
785	1097259.537	3041956.691	612.93	Campsite 28
786	1097263.541	3041960.929	612.79	Campsite 28

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787	1097276.599	3041964.59	612.11	Campsite 28
788	1097289.657	3041968.251	611.58	Campsite 28
789	1097304.118	3041967.96	611.06	Campsite 28
790	1097275.708	3041980.14	611.95	Campsite 28
791	1097272.079	3041975.785	612.03	Campsite 28
792	1097260.302	3041972.483	612.55	Campsite 28
793	1097254.138	3041975.948	612.59	Campsite 28
794	1097250.089	3041990.39	612.21	Campsite 28
795	1097233.929	3041985.859	612.85	Campsite 28
796	1097217.769	3041981.329	613.72	Campsite 28
797	1097221.818	3041966.886	613.86	Campsite 28
798	1097218.354	3041960.723	614.07	Campsite 28
799	1097209.274	3041958.177	614.41	Campsite 28
800	1097200.195	3041955.631	614.10	Campsite 28
801	1097191.882	3041954.752	615.08	Campsite 28
802	1097183.745	3041956.662	615.79	Campsite 28
810	1097260.532	3041907.207	613.81	Campsite 29
811	1097259.498	3041912.021	613.59	Campsite 29
812	1097263.09	3041915.387	612.87	Campsite 29
813	1097268.635	3041916.734	612.37	Campsite 29
814	1097274.201	3041914.999	612.35	Campsite 29
815	1097288.888	3041918.564	611.93	Campsite 29
816	1097306.819	3041922.918	611.20	Campsite 29
817	1097310.97	3041927.013	610.95	Campsite 29
818	1097317.124	3041928.507	610.69	Campsite 29
819	1097325.649	3041926.663	610.25	Campsite 29
820	1097322.776	3041944.122	610.61	Campsite 29
821	1097319.444	3041941.418	610.74	Campsite 29
822	1097308.139	3041938.673	611.24	Campsite 29
823	1097302.101	3041942.352	611.44	Campsite 29
824	1097298.562	3041956.928	611.40	Campsite 29
825	1097282.253	3041952.969	612.12	Campsite 29
826	1097265.944	3041949.009	612.70	Campsite 29
827	1097269.483	3041934.433	612.59	Campsite 29
828	1097265.804	3041928.395	612.73	Campsite 29
829	1097255.726	3041925.948	612.71	Campsite 29
830	1097245.079	3041925.698	613.76	Campsite 29
831	1097235.294	3041929.901	614.35	Campsite 29
840	1097329.761	3041967.596	610.20	Campsite 30
841	1097335.392	3041973.898	609.74	Campsite 30
842	1097341.022	3041980.199	609.23	Campsite 30
843	1097348.082	3041980.597	608.65	Campsite 30
844	1097353.302	3041975.933	608.11	Campsite 30
845	1097363.295	3041987.118	607.68	Campsite 30
846	1097373.289	3041998.303	607.28	Campsite 30
847	1097360.239	3042009.962	608.20	Campsite 30
848	1097347.19	3042021.622	608.45	Campsite 30

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849	1097337.196	3042010.436	609.20	Campsite 30
850	1097327.203	3041999.251	609.71	Campsite 30
851	1097327.465	3041995.042	609.80	Campsite 30
852	1097325.582	3041992.934	609.89	Campsite 30
853	1097311.713	3041985.051	610.45	Campsite 30
860	1097378.958	3041850.021	607.29	Campsite 31
861	1097376.469	3041858.335	607.49	Campsite 31
862	1097374.582	3041874.463	607.67	Campsite 31
863	1097372.695	3041890.592	607.21	Campsite 31
864	1097377.08	3041896.139	607.00	Campsite 31
865	1097384.032	3041896.952	606.73	Campsite 31
866	1097382.289	3041911.85	605.32	Campsite 31
867	1097380.546	3041926.747	605.06	Campsite 31
868	1097363.165	3041924.714	607.38	Campsite 31
869	1097345.785	3041922.68	609.03	Campsite 31
870	1097347.528	3041907.783	608.90	Campsite 31
871	1097349.271	3041892.885	608.70	Campsite 31
872	1097352.595	3041890.289	608.46	Campsite 31
873	1097353.994	3041878.332	608.72	Campsite 31
874	1097350.947	3041873.134	609.21	Campsite 31
880	1097422.624	3041722.588	606.73	Campsite 32
881	1097427.855	3041729.134	606.56	Campsite 32
882	1097438.631	3041738.743	606.20	Campsite 32
883	1097449.407	3041748.353	605.80	Campsite 32
884	1097456.466	3041747.949	605.48	Campsite 32
885	1097461.124	3041742.725	605.46	Campsite 32
886	1097472.319	3041752.708	605.15	Campsite 32
887	1097483.514	3041762.69	604.53	Campsite 32
888	1097471.867	3041775.751	604.34	Campsite 32
889	1097460.22	3041788.811	604.22	Campsite 32
890	1097449.026	3041778.828	605.23	Campsite 32
891	1097437.831	3041768.846	606.13	Campsite 32
892	1097437.615	3041764.634	606.16	Campsite 32
893	1097430.056	3041757.893	606.42	Campsite 32
894	1097424.885	3041756.977	606.60	Campsite 32
900	1097415.537	3041682.999	606.45	Campsite 33
901	1097427.385	3041687.16	606.23	Campsite 33
902	1097438.975	3041688.134	606.07	Campsite 33
903	1097444.376	3041683.571	605.87	Campsite 33
904	1097444.963	3041676.596	605.61	Campsite 33
905	1097459.909	3041677.852	605.50	Campsite 33
906	1097474.856	3041679.109	605.16	Campsite 33
907	1097473.39	3041696.546	605.20	Campsite 33
908	1097471.924	3041713.984	605.31	Campsite 33
909	1097456.977	3041712.727	605.64	Campsite 33
910	1097442.031	3041711.471	606.20	Campsite 33
911	1097439.328	3041708.233	606.30	Campsite 33

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912	1097432.101	3041707.626	606.41	Campsite 33
913	1097424.874	3041707.018	606.48	Campsite 33
914	1097420.756	3041708.637	606.60	Campsite 33
920	1097378.353	3041635.966	605.57	Campsite 34
921	1097387.325	3041636.404	605.42	Campsite 34
922	1097401.227	3041634.56	605.22	Campsite 34
923	1097415.129	3041632.717	604.97	Campsite 34
924	1097419.428	3041627.103	604.63	Campsite 34
925	1097418.508	3041620.164	604.30	Campsite 34
926	1097433.377	3041618.192	603.99	Campsite 34
927	1097448.246	3041616.221	603.47	Campsite 34
928	1097450.546	3041633.568	604.01	Campsite 34
929	1097452.847	3041650.915	604.55	Campsite 34
930	1097437.978	3041652.887	605.09	Campsite 34
931	1097423.108	3041654.859	605.63	Campsite 34
932	1097419.776	3041652.275	605.70	Campsite 34
933	1097411.812	3041653.331	605.99	Campsite 34
934	1097403.849	3041654.387	606.10	Campsite 34
935	1097399.935	3041657.317	606.19	Campsite 34
940	1097322.262	3041652.947	606.17	Campsite 35
941	1097330.117	3041666.601	607.29	Campsite 35
942	1097346.743	3041679.083	607.62	Campsite 35
943	1097353.743	3041678.087	607.59	Campsite 35
944	1097362.748	3041666.091	606.81	Campsite 35
945	1097376.17	3041676.168	606.79	Campsite 35
946	1097389.591	3041686.244	606.91	Campsite 35
947	1097380.586	3041698.239	607.30	Campsite 35
948	1097381.582	3041705.239	607.48	Campsite 35
949	1097399.591	3041718.76	607.30	Campsite 35
950	1097405.234	3041719.007	607.18	Campsite 35
951	1097407.866	3041743.717	607.17	Campsite 35
952	1097400.179	3041734.206	607.39	Campsite 35
953	1097387.279	3041724.52	607.61	Campsite 35
954	1097374.378	3041714.835	607.75	Campsite 35
955	1097368.579	3041714.232	607.82	Campsite 35
956	1097356.492	3041705.159	607.89	Campsite 35
957	1097341.736	3041694.08	607.80	Campsite 35
958	1097339.539	3041688.679	607.77	Campsite 35
959	1097326.677	3041679.023	607.58	Campsite 35
960	1097313.816	3041669.367	607.07	Campsite 35
961	1097309.524	3041668.535	606.64	Campsite 35
962	1097306.22	3041671.391	607.06	Campsite 35
970	1097299.843	3041689.754	607.60	Campsite 36
971	1097300.345	3041704.394	607.31	Campsite 36
972	1097308.973	3041716.247	608.78	Campsite 36
973	1097320.83	3041725.148	608.86	Campsite 36
974	1097332.686	3041734.05	608.74	Campsite 36

Stakeout Data Points as of 2-20-25

975	1097339.687	3041733.053	608.64	Campsite 36
976	1097348.692	3041721.058	608.24	Campsite 36
977	1097362.113	3041731.135	608.43	Campsite 36
978	1097375.535	3041741.211	607.95	Campsite 36
979	1097366.529	3041753.206	608.02	Campsite 36
980	1097367.526	3041760.206	607.98	Campsite 36
981	1097383.169	3041771.95	607.89	Campsite 36
982	1097398.812	3041783.694	606.93	Campsite 36
983	1097403.568	3041784.378	606.78	Campsite 36
984	1097394.812	3041802.804	607.04	Campsite 36
985	1097387.056	3041789.873	607.42	Campsite 36
986	1097373.689	3041779.837	608.19	Campsite 36
987	1097360.322	3041769.802	608.28	Campsite 36
988	1097354.522	3041769.199	608.44	Campsite 36
989	1097341.101	3041759.123	608.70	Campsite 36
990	1097327.679	3041749.047	608.92	Campsite 36
991	1097325.482	3041743.646	608.90	Campsite 36
992	1097314.312	3041735.26	609.01	Campsite 36
993	1097303.142	3041726.874	609.04	Campsite 36
994	1097297.846	3041726.43	608.21	Campsite 36
995	1097295.142	3041731.006	608.82	Campsite 36
1000	1097295.961	3041761.654	609.84	Campsite 37
1001	1097298.74	3041772.459	609.44	Campsite 37
1002	1097305.942	3041780.979	609.82	Campsite 37
1003	1097317.91	3041789.965	609.40	Campsite 37
1004	1097324.911	3041788.968	609.46	Campsite 37
1005	1097333.916	3041776.973	609.07	Campsite 37
1006	1097347.337	3041787.049	608.87	Campsite 37
1007	1097360.759	3041797.126	608.49	Campsite 37
1008	1097351.753	3041809.121	608.48	Campsite 37
1009	1097352.75	3041816.121	608.52	Campsite 37
1010	1097362.104	3041823.143	608.38	Campsite 37
1011	1097376.943	3041826.948	607.73	Campsite 37
1012	1097364.652	3041842.429	608.37	Campsite 37
1013	1097362.656	3041838.563	608.43	Campsite 37
1014	1097354.101	3041832.14	608.61	Campsite 37
1015	1097345.546	3041825.717	608.74	Campsite 37
1016	1097339.746	3041825.114	608.85	Campsite 37
1017	1097327.66	3041816.04	609.29	Campsite 37
1018	1097312.903	3041804.962	609.83	Campsite 37
1019	1097310.706	3041799.561	609.86	Campsite 37
1020	1097303.76	3041794.346	609.72	Campsite 37
1021	1097298.624	3041793.823	610.14	Campsite 37
1030	1097378.782	3041580.325	603.68	Campsite 38
1031	1097381.646	3041572.941	602.79	Campsite 38
1032	1097374.692	3041569.15	602.53	Campsite 38
1033	1097356.936	3041573.152	602.80	Campsite 38

Stakeout Data Points as of 2-20-25

1034	1097339.179	3041577.154	603.10	Campsite 38
1035	1097321.423	3041581.157	603.40	Campsite 38
1036	1097313.82	3041582.87	603.50	Campsite 38
1037	1097303.07	3041583.316	603.34	Campsite 38
1038	1097291.57	3041579.239	603.05	Campsite 38
1039	1097285.433	3041581.642	602.99	Campsite 38
1040	1097282.629	3041588.055	603.09	Campsite 38
1041	1097268.886	3041582.047	602.70	Campsite 38
1042	1097255.143	3041576.038	602.30	Campsite 38
1043	1097262.153	3041560.004	602.08	Campsite 38
1044	1097269.163	3041543.971	601.85	Campsite 38
1045	1097282.907	3041549.979	602.20	Campsite 38
1046	1097296.65	3041555.988	602.60	Campsite 38
1047	1097298.14	3041559.914	602.71	Campsite 38
1048	1097307.316	3041562.3	602.90	Campsite 38
1049	1097316.778	3041561.703	602.95	Campsite 38
1050	1097336.273	3041557.309	602.60	Campsite 38
1051	1097355.768	3041552.915	602.25	Campsite 38
1052	1097375.263	3041548.521	601.95	Campsite 38
1053	1097394.316	3041546.116	601.65	Campsite 38
1054	1097413.477	3041547.399	601.70	Campsite 38
1055	1097427.181	3041548.692	601.70	Campsite 38
1056	1097440.932	3041548.091	601.90	Campsite 38
1057	1097467.54	3041541.29	602.51	Campsite 38
1100	1096379.336	3041786.7	625.68	New Edge of Pavement
1101	1096376.139	3041800.944	625.22	New Edge of Pavement
1102	1096376.4	3041811.763	624.85	New Edge of Pavement
1103	1096378.983	3041822.272	624.28	New Edge of Pavement
1104	1096383.767	3041831.979	623.96	New Edge of Pavement
1105	1096387.867	3041838.427	623.94	New Edge of Pavement
1106	1096394.597	3041849.013	623.91	New Edge of Pavement
1107	1096401.327	3041859.598	623.64	New Edge of Pavement
1108	1096411.928	3041876.272	623.43	New Edge of Pavement
1109	1096422.529	3041892.945	623.21	New Edge of Pavement
1110	1096435.989	3041914.116	622.74	New Edge of Pavement
1111	1096446.59	3041930.79	622.35	New Edge of Pavement
1112	1096457.191	3041947.463	621.96	New Edge of Pavement
1113	1096470.651	3041968.634	621.29	New Edge of Pavement
1114	1096480.07	3041983.449	621.17	New Edge of Pavement
1115	1096489.49	3041998.264	620.88	New Edge of Pavement
1116	1096491.929	3042002.029	620.79	New Edge of Pavement
1117	1096505.784	3042023.413	620.44	New Edge of Pavement
1118	1096516.575	3042040.069	620.60	New Edge of Pavement
1119	1096527.366	3042056.724	620.60	New Edge of Pavement
1120	1096541.538	3042078.598	620.89	New Edge of Pavement
1121	1096555.451	3042100.072	620.45	New Edge of Pavement
1122	1096569.364	3042121.546	620.74	New Edge of Pavement

Stakeout Data Points as of 2-20-25

1123	1096572.746	3042126.765	620.70	New Edge of Pavement
1124	1096579.668	3042134.259	620.43	New Edge of Pavement
1125	1096588.701	3042139	620.04	New Edge of Pavement
1126	1096598.801	3042140.44	619.73	New Edge of Pavement
1127	1096608.799	3042138.412	619.46	New Edge of Pavement
1128	1096614.429	3042135.504	619.38	New Edge of Pavement
1140	1096367.707	3041783.052	625.62	New Edge of Pavement
1141	1096364.181	3041799.934	624.88	New Edge of Pavement
1142	1096364.505	3041813.349	624.38	New Edge of Pavement
1143	1096367.709	3041826.38	623.81	New Edge of Pavement
1144	1096373.641	3041838.417	623.30	New Edge of Pavement
1145	1096377.74	3041844.866	623.13	New Edge of Pavement
1146	1096384.471	3041855.451	622.89	New Edge of Pavement
1147	1096391.201	3041866.037	622.67	New Edge of Pavement
1148	1096401.802	3041882.71	622.46	New Edge of Pavement
1149	1096412.402	3041899.384	622.21	New Edge of Pavement
1150	1096425.863	3041920.555	621.78	New Edge of Pavement
1151	1096436.463	3041937.228	621.37	New Edge of Pavement
1152	1096447.064	3041953.901	620.91	New Edge of Pavement
1153	1096460.524	3041975.072	620.05	New Edge of Pavement
1154	1096469.944	3041989.887	619.84	New Edge of Pavement
1155	1096479.391	3042004.746	619.56	New Edge of Pavement
1156	1096495.713	3042029.938	619.06	New Edge of Pavement
1157	1096506.504	3042046.594	619.50	New Edge of Pavement
1158	1096517.295	3042063.249	619.65	New Edge of Pavement
1159	1096531.467	3042085.123	619.79	New Edge of Pavement
1160	1096545.38	3042106.597	620.17	New Edge of Pavement
1161	1096559.293	3042128.071	620.54	New Edge of Pavement
1162	1096562.675	3042133.29	620.53	New Edge of Pavement
1163	1096567.566	3042139.478	620.50	New Edge of Pavement
1164	1096574.285	3042148.265	620.06	New Edge of Pavement
1165	1096576.506	3042156.05	619.94	New Edge of Pavement
1166	1096576.007	3042164.66	619.90	New Edge of Pavement
1167	1096572.611	3042172.588	619.72	New Edge of Pavement
1168	1096570.629	3042175.627	619.80	New Edge of Pavement
1169	1096566.05	3042182.645	620.02	New Edge of Pavement
1200	1096440.685	3041764.008	624.30	New Edge of Pavement
1201	1096448.101	3041775.673	624.31	New Edge of Pavement
1202	1096461.755	3041797.149	624.29	New Edge of Pavement
1203	1096475.409	3041818.625	624.07	New Edge of Pavement
1204	1096482.841	3041830.313	623.84	New Edge of Pavement
1205	1096493.442	3041846.987	623.49	New Edge of Pavement
1206	1096504.042	3041863.66	623.14	New Edge of Pavement
1207	1096510.772	3041874.246	622.93	New Edge of Pavement
1208	1096517.503	3041884.831	622.71	New Edge of Pavement
1209	1096528.103	3041901.504	622.42	New Edge of Pavement
1210	1096538.704	3041918.178	622.12	New Edge of Pavement

Stakeout Data Points as of 2-20-25

1211	1096545.434	3041928.763	621.79	New Edge of Pavement
1212	1096552.164	3041939.349	621.49	New Edge of Pavement
1213	1096560.603	3041952.621	621.09	New Edge of Pavement
1214	1096573.534	3041972.58	620.77	New Edge of Pavement
1215	1096580.462	3041983.273	620.63	New Edge of Pavement
1216	1096587.389	3041993.965	620.62	New Edge of Pavement
1217	1096598.181	3042010.62	620.60	New Edge of Pavement
1218	1096608.972	3042027.276	620.61	New Edge of Pavement
1219	1096615.899	3042037.968	620.37	New Edge of Pavement
1220	1096622.827	3042048.66	620.24	New Edge of Pavement
1221	1096633.618	3042065.316	620.16	New Edge of Pavement
1222	1096644.409	3042081.971	619.92	New Edge of Pavement
1223	1096655.974	3042099.822	619.53	New Edge of Pavement
1230	1096482.315	3041799.666	623.78	New Edge of Pavement
1231	1096494.996	3041819.61	623.76	New Edge of Pavement
1232	1096505.542	3041836.198	623.35	New Edge of Pavement
1233	1096512.372	3041846.939	623.10	New Edge of Pavement
1234	1096519.201	3041857.681	622.91	New Edge of Pavement
1235	1096529.748	3041874.269	622.64	New Edge of Pavement
1236	1096540.294	3041890.857	622.28	New Edge of Pavement
1237	1096547.124	3041901.599	621.98	New Edge of Pavement
1238	1096553.953	3041912.341	621.65	New Edge of Pavement
1239	1096564.522	3041928.95	621.17	New Edge of Pavement
1240	1096575.091	3041945.558	620.37	New Edge of Pavement
1241	1096582.119	3041956.405	620.22	New Edge of Pavement
1242	1096589.147	3041967.252	620.18	New Edge of Pavement
1243	1096599.881	3041983.819	619.85	New Edge of Pavement
1244	1096610.614	3042000.386	620.03	New Edge of Pavement
1245	1096621.728	3042017.539	620.25	New Edge of Pavement
1246	1096628.701	3042028.33	620.36	New Edge of Pavement
1247	1096635.674	3042039.121	620.20	New Edge of Pavement
1248	1096642.613	3042049.802	619.98	New Edge of Pavement
1249	1096649.552	3042060.483	619.96	New Edge of Pavement
1250	1096660.356	3042077.16	619.71	New Edge of Pavement
1251	1096668.552	3042089.81	619.36	New Edge of Pavement
1252	1096671.161	3042093.836	619.31	New Edge of Pavement
1300	1096662.549	3041894.086	619.74	New Edge of Pavement
1301	1096677.79	3041920.155	618.12	New Edge of Pavement
1302	1096689.984	3041941.006	616.01	New Edge of Pavement
1303	1096701.755	3041961.138	614.30	New Edge of Pavement
1304	1096709.114	3041975.429	613.72	New Edge of Pavement
1305	1096714.901	3041990.425	614.35	New Edge of Pavement
1306	1096719.05	3042005.954	615.48	New Edge of Pavement
1307	1096721.513	3042021.838	617.11	New Edge of Pavement
1308	1096723.281	3042039.417	618.55	New Edge of Pavement
1309	1096725.05	3042056.996	618.90	New Edge of Pavement
1310	1096724.274	3042068.604	618.90	New Edge of Pavement

Stakeout Data Points as of 2-20-25

1311	1096719.737	3042079.317	618.91	New Edge of Pavement
1312	1096711.939	3042087.95	618.90	New Edge of Pavement
1313	1096701.741	3042093.551	618.93	New Edge of Pavement
1314	1096672.908	3041888.029	619.54	New Edge of Pavement
1315	1096678.581	3041897.73	619.29	New Edge of Pavement
1316	1096684.254	3041907.432	618.82	New Edge of Pavement
1317	1096695.599	3041926.835	617.04	New Edge of Pavement
1318	1096701.271	3041936.537	615.95	New Edge of Pavement
1319	1096706.944	3041946.238	615.06	New Edge of Pavement
1320	1096718.289	3041965.641	613.45	New Edge of Pavement
1321	1096722.16	3041972.688	612.92	New Edge of Pavement
1322	1096725.647	3041979.932	613.10	New Edge of Pavement
1323	1096728.742	3041987.352	613.48	New Edge of Pavement
1324	1096731.434	3041994.928	613.92	New Edge of Pavement
1325	1096733.717	3042002.637	614.56	New Edge of Pavement
1326	1096735.583	3042010.457	615.14	New Edge of Pavement
1327	1096737.028	3042018.366	615.72	New Edge of Pavement
1328	1096738.047	3042026.341	616.53	New Edge of Pavement
1329	1096738.906	3042034.883	617.31	New Edge of Pavement
1330	1096739.724	3042039.662	617.68	New Edge of Pavement
1331	1096743.291	3042048.656	617.98	New Edge of Pavement
1332	1096745.971	3042052.697	618.12	New Edge of Pavement
1333	1096749.757	3042056.881	618.25	New Edge of Pavement
1334	1096757.461	3042062.369	618.32	New Edge of Pavement
1335	1096764.594	3042065.166	618.39	New Edge of Pavement
1336	1096773.461	3042066.379	618.59	New Edge of Pavement
1337	1096778.58	3042066.042	618.58	New Edge of Pavement
1338	1096783.547	3042064.975	618.48	New Edge of Pavement
1339	1096793.882	3042061.955	618.34	New Edge of Pavement
1340	1096799.049	3042060.445	618.37	New Edge of Pavement
1400	1097139.239	3041973.67	616.73	New Edge of Pavement
1401	1097060.893	3041998.871	618.28	New Edge of Pavement
1402	1097079.08	3041998.238	617.36	New Edge of Pavement
1403	1097095.011	3042006.714	617.37	New Edge of Pavement
1404	1097112.491	3042019.939	616.19	New Edge of Pavement
1405	1097132.287	3042029.348	614.96	New Edge of Pavement
1406	1097150.234	3042034.035	614.09	New Edge of Pavement
1407	1097168.719	3042035.571	612.93	New Edge of Pavement
1408	1097187.194	3042033.91	611.99	New Edge of Pavement
1409	1097205.109	3042029.102	611.51	New Edge of Pavement
1410	1097219.589	3042023.533	611.35	New Edge of Pavement
1411	1097233.851	3042017.426	611.27	New Edge of Pavement
1412	1097254.11	3042007.724	611.31	New Edge of Pavement
1413	1097267.582	3042001.095	611.30	New Edge of Pavement
1414	1097281.051	3041994.467	611.15	New Edge of Pavement
1415	1097295.897	3041987.162	610.99	New Edge of Pavement
1416	1097307.995	3041981.208	610.65	New Edge of Pavement

Stakeout Data Points as of 2-20-25

1417	1097319.231	3041973.674	610.62	New Edge of Pavement
1418	1097328.084	3041963.446	610.41	New Edge of Pavement
1419	1097332.26	3041956.313	610.05	New Edge of Pavement
1420	1097335.696	3041948.795	609.78	New Edge of Pavement
1421	1097338.356	3041940.969	609.60	New Edge of Pavement
1422	1097340.215	3041932.914	609.53	New Edge of Pavement
1423	1097341.252	3041924.714	609.43	New Edge of Pavement
1424	1097341.457	3041916.451	609.40	New Edge of Pavement
1425	1097340.829	3041908.209	609.37	New Edge of Pavement
1426	1097339.373	3041900.072	609.71	New Edge of Pavement
1427	1097338.73	3041890.509	609.71	New Edge of Pavement
1428	1097130.381	3041979.128	616.14	New Edge of Pavement
1429	1097124.665	3041987.824	616.64	New Edge of Pavement
1430	1097123.104	3041996.736	616.76	New Edge of Pavement
1431	1097124.393	3042004.113	616.61	New Edge of Pavement
1432	1097127.893	3042010.734	616.19	New Edge of Pavement
1433	1097133.263	3042015.954	615.69	New Edge of Pavement
1434	1097139.98	3042019.265	615.17	New Edge of Pavement
1435	1097155.123	3042022.651	614.14	New Edge of Pavement
1436	1097170.614	3042023.545	613.83	New Edge of Pavement
1437	1097186.046	3042021.921	613.14	New Edge of Pavement
1438	1097201.012	3042017.823	612.66	New Edge of Pavement
1439	1097214.19	3042012.773	612.40	New Edge of Pavement
1440	1097227.867	3042006.959	612.19	New Edge of Pavement
1441	1097241.32	3042000.644	612.02	New Edge of Pavement
1442	1097252.531	3041995.127	611.97	New Edge of Pavement
1443	1097262.734	3041990.106	611.93	New Edge of Pavement
1444	1097272.937	3041985.086	611.89	New Edge of Pavement
1445	1097287.817	3041977.763	611.57	New Edge of Pavement
1446	1097302.697	3041970.441	611.11	New Edge of Pavement
1447	1097311.282	3041964.684	610.85	New Edge of Pavement
1448	1097318.047	3041956.869	610.66	New Edge of Pavement
1449	1097322.785	3041948.413	610.61	New Edge of Pavement
1450	1097325.666	3041941.337	610.43	New Edge of Pavement
1451	1097327.758	3041933.989	610.23	New Edge of Pavement
1452	1097329.036	3041926.456	610.08	New Edge of Pavement
1453	1097329.484	3041918.829	610.00	New Edge of Pavement
1454	1097328.845	3041909.118	610.15	New Edge of Pavement
1455	1097326.864	3041899.589	610.36	New Edge of Pavement
1456	1097323.421	3041891.813	610.41	New Edge of Pavement
1457	1097317.933	3041885.316	610.54	New Edge of Pavement
1458	1097310.843	3041880.619	610.81	New Edge of Pavement
1459	1097302.72	3041878.101	611.18	New Edge of Pavement
1460	1097294.219	3041877.963	611.46	New Edge of Pavement
1461	1097286.02	3041880.216	611.95	New Edge of Pavement
1462	1097274.804	3041888.38	613.28	New Edge of Pavement
1500	1097293.032	3041831.925	611.85	New Edge of Pavement

Stakeout Data Points as of 2-20-25

1501	1097295.119	3041846.913	611.81	New Edge of Pavement
1502	1097301.411	3041856.423	611.35	New Edge of Pavement
1503	1097310.798	3041862.898	610.85	New Edge of Pavement
1504	1097321.923	3041865.402	610.22	New Edge of Pavement
1505	1097333.179	3041863.573	609.52	New Edge of Pavement
1506	1097342.471	3041859.614	609.24	New Edge of Pavement
1507	1097351.317	3041854.737	608.99	New Edge of Pavement
1508	1097359.625	3041848.993	608.62	New Edge of Pavement
1509	1097367.312	3041842.44	608.27	New Edge of Pavement
1510	1097380.077	3041830.393	607.38	New Edge of Pavement
1511	1097388.33	3041821.447	607.11	New Edge of Pavement
1512	1097395.27	3041811.448	607.02	New Edge of Pavement
1513	1097400.763	3041800.586	606.71	New Edge of Pavement
1514	1097404.706	3041789.071	606.71	New Edge of Pavement
1515	1097406.704	3041780.739	606.89	New Edge of Pavement
1516	1097409.343	3041764.594	607.07	New Edge of Pavement
1517	1097410.122	3041755.736	607.09	New Edge of Pavement
1518	1097410.352	3041739.702	607.09	New Edge of Pavement
1519	1097407.709	3041714.931	607.03	New Edge of Pavement
1520	1097401.473	3041690.812	606.69	New Edge of Pavement
1521	1097390.267	3041668.643	606.53	New Edge of Pavement
1522	1097373.313	3041650.488	606.10	New Edge of Pavement
1523	1097354.447	3041635.297	605.83	New Edge of Pavement
1524	1097347.586	3041631.698	605.88	New Edge of Pavement
1525	1097339.871	3041630.977	604.62	New Edge of Pavement
1526	1097327.547	3041636.862	606.18	New Edge of Pavement
1527	1097346.346	3041873.186	609.49	New Edge of Pavement
1528	1097353.827	3041867.194	609.11	New Edge of Pavement
1529	1097365.172	3041859.837	608.27	New Edge of Pavement
1530	1097375.548	3041851.167	607.53	New Edge of Pavement
1531	1097388.313	3041839.121	606.75	New Edge of Pavement
1532	1097397.692	3041828.955	606.39	New Edge of Pavement
1533	1097405.578	3041817.592	606.40	New Edge of Pavement
1534	1097411.82	3041805.249	606.47	New Edge of Pavement
1535	1097416.3	3041792.163	606.53	New Edge of Pavement
1536	1097421.266	3041765.958	606.66	New Edge of Pavement
1537	1097422.345	3041739.308	606.72	New Edge of Pavement
1538	1097419.535	3041712.891	606.72	New Edge of Pavement
1539	1097412.84	3041686.964	606.44	New Edge of Pavement
1540	1097407.207	3041673.604	606.49	New Edge of Pavement
1541	1097400.12	3041661.744	606.27	New Edge of Pavement
1542	1097380.839	3041641.142	605.76	New Edge of Pavement
1543	1097371.573	3041633.68	605.59	New Edge of Pavement
1544	1097366.732	3041627.99	605.43	New Edge of Pavement
1545	1097364.316	3041620.92	605.16	New Edge of Pavement
1546	1097364.664	3041613.458	603.72	New Edge of Pavement
1547	1097367.725	3041606.643	603.89	New Edge of Pavement

Stakeout Data Points as of 2-20-25

1548	1097371.792	3041602.352	604.06	New Edge of Pavement
1549	1097341.137	3041881.231	609.46	New Edge of Pavement
2000	1096366.339	3041826.88	623.69	Grading - Daylight
2001	1096371.022	3041840.082	623.14	Grading - Daylight
2002	1096374.682	3041846.81	622.91	Grading - Daylight
2003	1096380.279	3041858.116	622.52	Grading - Daylight
2004	1096386.101	3041869.279	622.13	Grading - Daylight
2005	1096396.993	3041885.768	621.99	Grading - Daylight
2006	1096407.829	3041902.291	621.83	Grading - Daylight
2007	1096421.256	3041923.484	621.34	Grading - Daylight
2008	1096431.896	3041940.132	620.97	Grading - Daylight
2009	1096441.719	3041956.395	620.51	Grading - Daylight
2010	1096452.644	3041980.082	619.28	Grading - Daylight
2011	1096462.673	3041994.51	619.08	Grading - Daylight
2012	1096471.97	3042009.464	618.74	Grading - Daylight
2013	1096488.901	3042034.183	618.50	Grading - Daylight
2014	1096501.102	3042050.094	618.66	Grading - Daylight
2015	1096512.445	3042066.392	618.79	Grading - Daylight
2016	1096528.591	3042086.986	619.41	Grading - Daylight
2017	1096520.576	3042147.071	617.95	Grading - Daylight
2018	1096516.115	3042148.888	617.49	Grading - Daylight
2019	1096515.699	3042152.197	617.54	Grading - Daylight
2020	1096521.623	3042168.833	618.74	Grading - Daylight
2021	1096697.268	3041842.639	617.94	Grading - Daylight
2022	1096700.863	3041847.092	617.66	Grading - Daylight
2023	1096710.206	3041854.217	616.16	Grading - Daylight
2024	1096711.74	3041857.045	616.01	Grading - Daylight
2025	1096710.741	3041859.321	616.33	Grading - Daylight
2026	1096706.805	3041861.819	617.01	Grading - Daylight
2027	1096694.689	3041868.138	617.74	Grading - Daylight
2028	1096693.339	3041872.828	617.86	Grading - Daylight
2029	1096697.331	3041879.53	617.70	Grading - Daylight
2030	1096700.027	3041886.127	617.63	Grading - Daylight
2031	1096705.24	3041936.91	615.67	Grading - Daylight
2032	1096710.513	3041944.151	615.01	Grading - Daylight
2033	1096725.69	3041964.97	613.15	Grading - Daylight
2034	1096733.994	3041969.736	611.21	Grading - Daylight
2035	1096732.741	3041975.606	612.29	Grading - Daylight
2036	1096733.999	3041985.324	613.05	Grading - Daylight
2037	1096734.855	3041995.628	613.83	Grading - Daylight
2038	1096736.613	3042005.422	614.80	Grading - Daylight
2039	1096745.014	3042008.822	614.80	Grading - Daylight
2040	1096756.585	3042020.328	615.20	Grading - Daylight
2041	1096760.374	3042001.982	613.10	Grading - Daylight
2042	1096764.449	3041987.099	611.70	Grading - Daylight
2043	1096768.275	3041981.215	611.14	Grading - Daylight
2044	1096775.398	3041979.209	610.84	Grading - Daylight

Stakeout Data Points as of 2-20-25

2045	1096779.595	3041981.323	611.08	Grading - Daylight
2046	1096794.596	3041992.049	612.19	Grading - Daylight
2047	1096806.791	3042002.871	613.39	Grading - Daylight
2048	1096813.485	3042004.351	613.60	Grading - Daylight
2049	1096816.351	3041995.999	612.92	Grading - Daylight
2050	1096820.757	3041981.299	611.59	Grading - Daylight
2051	1096825.545	3041976.042	611.53	Grading - Daylight
2052	1096832.182	3041974.859	611.82	Grading - Daylight
2053	1096838.516	3041977.757	612.31	Grading - Daylight
2054	1096852.579	3041988.491	613.53	Grading - Daylight
2055	1096863.367	3041998.191	614.90	Grading - Daylight
2056	1096879.468	3041991.074	615.31	Grading - Daylight
2057	1096891.47	3041986.507	615.83	Grading - Daylight
2058	1096898.332	3041974.123	615.60	Grading - Daylight
2059	1096901.616	3041967.259	615.38	Grading - Daylight
2060	1096903.665	3041959.934	614.73	Grading - Daylight
2061	1096907.233	3041957.29	614.64	Grading - Daylight
2062	1096909.891	3041958.42	614.86	Grading - Daylight
2063	1096923.838	3041969.367	616.25	Grading - Daylight
2064	1096940.893	3041989.813	617.37	Grading - Daylight
2065	1096957.866	3041985.541	617.58	Grading - Daylight
2066	1096976.198	3041980.926	618.07	Grading - Daylight
2067	1096993.267	3041976.63	618.50	Grading - Daylight
2068	1097007.857	3041972.957	618.59	Grading - Daylight
2069	1097014.928	3041956.175	618.48	Grading - Daylight
2070	1097065.309	3041927.418	616.95	Grading - Daylight
2071	1097070.192	3041927.726	616.84	Grading - Daylight
2072	1097070.288	3041915.766	616.33	Grading - Daylight
2073	1097082.881	3041902.572	615.38	Grading - Daylight
2074	1097090.77	3041901.68	614.61	Grading - Daylight
2075	1097092.707	3041893.814	613.71	Grading - Daylight
2076	1097093.944	3041891.88	613.43	Grading - Daylight
2077	1097096.228	3041891.653	613.21	Grading - Daylight
2078	1097109.57	3041896.05	612.45	Grading - Daylight
2079	1097122.779	3041904.596	612.93	Grading - Daylight
2080	1097126.528	3041906.468	612.91	Grading - Daylight
2081	1097138.595	3041902.823	611.66	Grading - Daylight
2082	1097140.413	3041892.608	610.30	Grading - Daylight
2083	1097143.522	3041877.223	608.36	Grading - Daylight
2084	1097150.676	3041866.364	607.08	Grading - Daylight
2085	1097165.439	3041866.949	607.08	Grading - Daylight
2086	1097179.148	3041881.282	609.21	Grading - Daylight
2087	1097192.058	3041894.168	611.08	Grading - Daylight
2088	1097199.722	3041911.374	612.85	Grading - Daylight
2089	1097207.386	3041928.58	614.42	Grading - Daylight
2090	1097366.369	3041583.86	603.20	Grading - Daylight
2091	1097349.322	3041591.768	603.40	Grading - Daylight

Stakeout Data Points as of 2-20-25

2092	1097326.187	3041606.522	604.73	Grading - Daylight
2093	1097304.004	3041629.893	605.51	Grading - Daylight
2094	1097282.751	3041645.809	605.07	Grading - Daylight
2095	1097290.527	3041607.846	604.27	Grading - Daylight
2096	1097316.494	3041559.134	602.09	Grading - Daylight
2097	1097335.55	3041554.1	601.50	Grading - Daylight
2098	1097354.917	3041549.136	600.96	Grading - Daylight
2099	1097373.904	3041542.487	599.89	Grading - Daylight
2100	1097383.73	3041539.183	599.22	Grading - Daylight
2101	1097394.12	3041539.448	599.43	Grading - Daylight
2102	1097404.681	3041541.563	600.08	Grading - Daylight
2103	1097413.815	3041545.345	601.01	Grading - Daylight
2104	1097416.789	3041585.838	602.40	Grading - Daylight
2105	1097392.018	3041602.472	603.82	Grading - Daylight
2106	1097402.089	3041625.484	604.80	Grading - Daylight
2107	1097441.47	3041664.741	605.35	Grading - Daylight
2108	1097459.051	3041727.726	605.64	Grading - Daylight
2109	1097474.327	3041777.219	604.20	Grading - Daylight
2110	1097463.627	3041791.85	603.88	Grading - Daylight
2111	1097460.386	3041792.906	604.03	Grading - Daylight
2112	1097457.76	3041790.945	604.33	Grading - Daylight
2113	1097448.074	3041779.896	605.27	Grading - Daylight
2114	1097431.287	3041789.022	606.20	Grading - Daylight
2115	1097424.031	3041799.479	606.23	Grading - Daylight
2116	1097416.774	3041809.935	606.27	Grading - Daylight
2117	1097407.887	3041819.428	606.29	Grading - Daylight
2118	1097376.273	3041888.811	607.06	Grading - Daylight
2119	1097384.735	3041892.769	606.69	Grading - Daylight
2120	1097387.288	3041894.413	606.62	Grading - Daylight
2121	1097388.12	3041898.096	606.61	Grading - Daylight
2122	1097394.787	3041909.033	604.15	Grading - Daylight
2123	1097396.269	3041913.486	603.56	Grading - Daylight
2124	1097395.902	3041919.764	603.48	Grading - Daylight
2125	1097394.941	3041928.432	603.52	Grading - Daylight
2126	1097392.58	3041933.68	603.72	Grading - Daylight
2127	1097387.888	3041937.012	604.18	Grading - Daylight
2128	1097382.154	3041937.51	604.75	Grading - Daylight
2129	1097377.563	3041935.999	605.23	Grading - Daylight
2130	1097362.638	3041929.218	607.34	Grading - Daylight
2131	1097353.749	3041925.848	608.35	Grading - Daylight
2132	1097346.158	3041929.495	609.01	Grading - Daylight
2133	1097345.235	3041933.809	609.10	Grading - Daylight
2134	1097343.588	3041942.457	608.99	Grading - Daylight
2135	1097339.953	3041950.486	609.27	Grading - Daylight
2136	1097335.198	3041957.839	609.70	Grading - Daylight
2137	1097330.987	3041962.827	610.10	Grading - Daylight
2138	1097331.026	3041966.466	610.13	Grading - Daylight

Stakeout Data Points as of 2-20-25

2139	1097336.892	3041971.492	609.57	Grading - Daylight
2140	1097353.784	3041969.097	607.73	Grading - Daylight
2141	1097358.872	3041970.956	607.51	Grading - Daylight
2142	1097368.376	3041982.579	607.28	Grading - Daylight
2143	1097379.968	3041992.335	606.16	Grading - Daylight
2144	1097382.703	3041996.992	605.93	Grading - Daylight
2145	1097380.953	3042001.806	606.35	Grading - Daylight
2146	1097375.262	3042004.172	607.27	Grading - Daylight
2147	1097362.592	3042012.596	608.07	Grading - Daylight
2148	1097353.152	3042019.477	608.49	Grading - Daylight
2149	1097349.198	3042023.869	608.30	Grading - Daylight
2150	1097347.596	3042024.902	608.20	Grading - Daylight
2151	1097344.875	3042023.69	608.27	Grading - Daylight
2152	1097335.768	3042011.713	609.11	Grading - Daylight
2153	1097254.977	3042009.509	611.01	Grading - Daylight
2154	1097235.35	3042020.535	610.75	Grading - Daylight
2155	1097221.146	3042027.367	610.72	Grading - Daylight
2156	1097206.744	3042033.604	610.80	Grading - Daylight
2157	1097187.878	3042037.757	611.50	Grading - Daylight
2158	1097168.726	3042037.51	612.71	Grading - Daylight
2159	1097117.068	3042030.685	615.45	Grading - Daylight
2160	1097103.527	3042036.571	615.74	Grading - Daylight
2161	1097097.205	3042053.813	615.06	Grading - Daylight
2162	1097095.225	3042057.025	614.98	Grading - Daylight
2163	1097091.697	3042058.386	615.10	Grading - Daylight
2164	1097076.452	3042059.844	615.97	Grading - Daylight
2165	1097066.838	3042062.647	616.45	Grading - Daylight
2166	1097069.268	3042079.457	615.74	Grading - Daylight
2167	1097059.179	3042081.126	616.67	Grading - Daylight
2168	1097046.413	3042075.705	617.31	Grading - Daylight
2169	1097037.269	3042067.34	617.80	Grading - Daylight
2170	1096954.542	3042067.727	618.00	Grading - Daylight
2171	1096921.509	3042107.598	615.02	Grading - Daylight
2172	1096918.364	3042111.05	614.59	Grading - Daylight
2173	1096914.015	3042110.164	614.50	Grading - Daylight
2174	1096897.087	3042097.029	616.13	Grading - Daylight
2175	1096886.945	3042090.552	616.69	Grading - Daylight
2176	1096880.872	3042093.577	616.52	Grading - Daylight
2177	1096870.949	3042097.544	616.54	Grading - Daylight
2178	1096865.4	3042111.982	615.72	Grading - Daylight
2179	1096864.179	3042125.416	613.82	Grading - Daylight
2180	1096859.739	3042130.753	613.38	Grading - Daylight
2181	1096853.749	3042129.712	613.97	Grading - Daylight
2182	1096846.086	3042121.547	615.49	Grading - Daylight
2183	1096818.907	3042111.599	616.89	Grading - Daylight
2184	1096807.513	3042118.618	616.85	Grading - Daylight
2185	1096801.313	3042133.786	616.07	Grading - Daylight

Stakeout Data Points as of 2-20-25

2186	1096799.234	3042145.188	614.74	Grading - Daylight
2187	1096796.343	3042148.628	614.46	Grading - Daylight
2188	1096791.786	3042148.219	614.48	Grading - Daylight
2189	1096779.653	3042141.955	614.82	Grading - Daylight
2190	1096761.21	3042131.121	615.74	Grading - Daylight
2191	1096757.549	3042123.407	616.04	Grading - Daylight
2192	1096766.64	3042107.602	617.35	Grading - Daylight
2193	1096772.207	3042093.141	618.35	Grading - Daylight
2194	1096752.25	3042097.307	617.80	Grading - Daylight
2195	1096741.801	3042100.271	617.82	Grading - Daylight
2196	1096730.992	3042103.762	617.75	Grading - Daylight
2197	1096722.529	3042107.567	617.62	Grading - Daylight
2198	1096714.065	3042111.371	617.49	Grading - Daylight
2199	1096936.069	3042074.714	617.40	Grading - Daylight
2200	1096708.888	3042107.835	618.77	New Edge of Pavement
2201	1096720.848	3042103.327	618.83	New Edge of Pavement
2202	1096735.352	3042098.333	618.80	New Edge of Pavement
2203	1096749.855	3042093.339	618.78	New Edge of Pavement
2204	1096761.999	3042089.46	618.77	New Edge of Pavement
2205	1096774.143	3042085.58	618.77	New Edge of Pavement
2206	1096783.914	3042082.38	618.80	New Edge of Pavement
2207	1096793.685	3042079.18	618.84	New Edge of Pavement
2208	1096807.199	3042074.875	618.88	New Edge of Pavement
2209	1096810.534	3042066.414	618.72	Grading - Interior
2210	1096795.502	3042071.011	618.84	Grading - Interior
2211	1096780.471	3042075.607	618.95	Grading - Interior
2212	1096765.815	3042080.395	618.99	Grading - Interior
2213	1096751.159	3042085.183	619.02	Grading - Interior
2214	1096736.502	3042089.97	619.06	Grading - Interior
2215	1096721.846	3042094.758	619.10	Grading - Interior
2216	1096706.051	3042100.612	619.05	Grading - Interior
2217	1096714.848	3042088.984	618.88	Grading - Interior
2218	1096726.363	3042084.867	618.83	Grading - Interior
2219	1096734.967	3042081.896	618.78	Grading - Interior
2220	1096743.571	3042078.924	618.73	Grading - Interior
2221	1096752.175	3042075.953	618.68	Grading - Interior
2222	1096760.779	3042072.981	618.63	Grading - Interior
2223	1096769.304	3042069.976	618.62	Grading - Interior
2224	1096683.62	3042079.473	619.25	Grading - Interior
2225	1096500.343	3041796.516	622.81	Grading - Interior
2226	1096744.588	3042027.223	616.45	Grading - Interior
2227	1096747.388	3042045.213	617.70	Grading - Interior
2228	1096798.85	3042043.619	616.79	Grading - Interior
2229	1096871.245	3042022.096	616.45	Grading - Interior
2230	1097384.117	3041618.103	604.66	Grading - Interior
2231	1097342.124	3041650.607	606.61	Grading - Interior
2232	1097395.395	3041755.872	607.54	Grading - Interior

Stakeout Data Points as of 2-20-25

2233	1097323.753	3041702.086	608.20	Grading - Interior
2234	1097316.111	3041762.612	609.37	Grading - Interior
2235	1097378.764	3041808.344	607.94	Grading - Interior
2236	1097324.131	3041844.313	609.71	Grading - Interior
2237	1097302.639	3041834.188	610.37	Grading - Interior
2238	1097316.374	3041910.1	610.56	Grading - Interior
2239	1097301.397	3041899.806	611.60	Grading - Interior
2240	1097285.853	3041898.004	612.06	Grading - Interior
2241	1097250.81	3041939.407	613.25	Grading - Interior
2242	1097187.318	3041966.189	614.96	Grading - Interior
2243	1097140.821	3041999.039	615.89	Grading - Interior
2244	1097055.5	3042069.276	617.00	Grading - Interior
2245	1097044.091	3042053.151	617.76	Grading - Interior
2246	1097035.372	3042033.009	618.29	Grading - Interior
2247	1097031.552	3042015.887	618.32	Grading - Interior
2248	1097019.531	3042047.012	618.36	Grading - Interior
2249	1096991.037	3042049.396	618.39	Grading - Interior
2250	1096696.404	3042051.115	619.20	Grading - Interior
2251	1096656.998	3041986.912	616.65	Grading - Interior
2252	1096629.317	3041933.795	618.85	Grading - Interior
2253	1096594.253	3041879.068	621.58	Grading - Interior
2254	1096559.189	3041824.34	622.25	Grading - Interior
2255	1096523.432	3041800.091	622.17	Grading - Interior
2256	1096546.382	3041855.32	622.39	Grading - Interior
2257	1096581.368	3041910.031	620.77	Grading - Interior
2258	1096614.59	3041964.357	618.59	Grading - Interior
2259	1096647.447	3042016.765	619.45	Grading - Interior
2260	1096605.915	3042083.249	620.39	Grading - Interior
2261	1096567.757	3042026.183	621.32	Grading - Interior
2262	1096532.558	3041971.542	621.76	Grading - Interior
2263	1096506.367	3041920.503	622.58	Grading - Interior
2264	1096483.076	3041868.59	623.63	Grading - Interior
2265	1096454.793	3041819.584	624.63	Grading - Interior
2266	1096408.529	3041790.262	625.46	Grading - Interior
2267	1096441.772	3041844.56	624.29	Grading - Interior
2268	1096466.156	3041891.387	623.46	Grading - Interior
2269	1096500.836	3041951.246	622.34	Grading - Interior
2270	1096536.035	3042005.886	621.35	Grading - Interior
2271	1096571.234	3042060.527	620.96	Grading - Interior
2272	1096596.074	3042113.212	620.60	Grading - Interior
2273	1096949.918	3042037.777	617.98	Grading - Interior
2274	1096942.993	3042056.246	617.92	Grading - Interior
2275	1097273.686	3041601.084	603.56	Campsite 38
2276	1097267.864	3041586.353	602.94	Campsite 38
2277	1097265.742	3041580.984	602.71	Campsite 38
2278	1097257.238	3041578.141	602.01	Campsite 38
2279	1097253.521	3041577.713	601.53	Campsite 38

Stakeout Data Points as of 2-20-25

2280	1097252.262	3041576.547	601.36	Campsite 38
2281	1097252.225	3041574.762	601.24	Campsite 38
2282	1097259.414	3041561.934	601.53	Campsite 38
2283	1097262.84	3041548.601	600.62	Campsite 38
2284	1097264.891	3041540.052	600.02	Campsite 38
2285	1097267.899	3041537.914	599.95	Campsite 38
2286	1097271.534	3041538.55	599.88	Campsite 38
2287	1097279.619	3041543.044	600.39	Campsite 38
2288	1097284.508	3041546.317	600.87	Campsite 38
2289	1097288.986	3041549.236	601.30	Campsite 38
2290	1097298.069	3041553.589	601.67	Campsite 38
2291	1097307.671	3041560.424	602.29	Campsite 38
2292	1097303.537	3041606.604	604.43	Campsite 38

DIVISION 1 – GENERAL REQUIREMENTS
Section 01200 – Payment Procedures

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Procedures for preparation and submittal of schedule of values and applications for payment.
- B. Related Requirements
 - 1. Bidding and Contracting Documents.
 - 2. Section 01250 – Contract Modification Procedures: Procedures for changes to the Work.
 - 3. Section 01320 – Construction Schedules.
 - 4. Section 01330 – Submittal Procedures: Procedural requirements for submittals.
 - 5. Section 01780 – Closeout Procedures: Final payment.

1.02 SCHEDULE OF VALUES

- A. Contractor shall submit Schedule of Values:
 - 1. Submit to Engineer, Schedule of Values at least 14 days prior to submitting first Application for Payment.
 - 2. Upon request by Engineer, support values given with data that will substantiate their correctness.
 - 3. List separate values of designated materials and labor to install item.
 - 4. List values of each item of work by subcontractors and suppliers.
 - 5. Use Schedule of Values only as basis for Contractor's Application for Payment.
- B. Form of Submittal:
 - 1. Submit typewritten Schedule of Values.
 - 2. Use Bid Booklet Table of Contents as basis of format for listing costs of work for Sections under Division 2-16. Include labor separate from material cost.
 - 3. Identify each line item with a title as listed in Bid Booklet Table of Contents and with name of subcontractor or supplier.
- C. Update:
 - 1. Update Schedule of Values when:
 - a. Directed by Engineer.
 - b. Change of subcontractor or supplier occurs.
 - c. Change or product or equipment occurs.
 - 2. Send separate letter of notification to Engineer explaining reason for change to schedule of values.

1.03 PAYMENT APPLICATIONS

- A. Present required information in legible form on Application for Payment.
- B. Execute certification by signature of authorized officer.
- C. Use itemized breakdown data from approved Contractor's Schedule of Values. Provide dollar value in each column for each line item for portion of Work Completed and for Material Stored.
- D. List each authorized Change Order as an extension Pay Application Continuation Sheet, listing Change Order number and dollar amount as for an original item of Work.
- E. Prepare Application for Final Payment as specified in Section 01780 – Closeout Procedures.

1.04 SUBMITTAL PROCEDURES

- A. Submit electronic copies of each Application for Payment.
- B. Submit the draft Application for review and approval by the Engineer on or before the 10th of each month.
- C. Upon review and approval of the application for payment by the Engineer by the 15th of the month, the application will be forwarded to the Owner for authorizing the payment within 10-days of receipt of application for payment.
- D. Submit an updated construction schedule with each Application for Payment.

1.05 SUBSTANTIATING DATA

- A. When Engineer requires substantiating information, submit data justifying dollar amounts in question.
- B. Provide one (1) copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.
- C. Include the following with the application:
 - 1. Partial release of liens from major subcontractors and vendors related to work covered by previous payment and from contractor for current payment.
 - 2. Construction progress schedules, revised and current as specified in Section 01320 – Construction Schedules.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION 01200

DIVISION 1 – GENERAL REQUIREMENTS
Section 01210 – Allowances

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Procedures for adjusting cash allowances.
- B. Related Requirements:
 - 1. Bidding and Contracting Documents.
 - 2. Section 01250 – Contract Modification Procedures: Procedural requirements for Change Order.

1.02 COSTS

- A. Costs Included in Cash Allowances: Cost of Product to Contractor, less applicable trade discounts, to include delivery to site and applicable taxes.
- B. Costs Not Included in Cash Allowances but Included in the Contract Price: Product handling at the site, including unloading, uncrating, storage, protection of Products from elements and from damage, and labor for installation, finishing, starting, and adjusting.
- C. Differences in Cash Allowances and actual costs will be adjusted by Change Order, accompanied by proper supporting documentation.

1.03 RESPONSIBILITIES

- A. Engineer Responsibilities:
 - 1. Consult with Contractor for consideration and selection of Products.
 - 2. Select Products in consultation with Owner and transmit decision to Contractor.
 - 3. Prepare Change Order.
- B. Contractor Responsibilities:
 - 1. Assist Engineer in selection of Products.
 - 2. Obtain proposals from suppliers and offer recommendations.
 - 3. On notification of selection by Engineer execute purchase agreement with designated supplier.
 - 4. Arrange for and process shop drawings, product data, and samples.
 - 5. Arrange for delivery.
 - 6. Promptly inspect Products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
 - 7. Submit information for Change Order as required by Section 01250 – Contract Modification Procedures. This includes detailed estimates of labor, materials and equipment needed to complete the work.

8. Upon completion of the work, provide itemized invoices detailing the labor, materials and equipment used to complete the work.

1.04 REMEDIATION ALLOWANCE

- A. Contractor shall include an allowance of \$5,000.00 in the Base Bid for remediation of unforeseen constraints. This amount shall be included as a separate item in the Schedule of Values adding up to the total bid price.
- B. Such constraints may include but are not necessarily limited to unforeseen subsurface conditions particular to this construction site; improperly recorded or unrecorded physical properties and conditions at the site; obstruction of or delays to reasonable work sequences by the Property, or the Owner; uncommon adverse weather or site conditions; and conflict within or omissions from the Contract Documents.
- C. All remediation work shall be proposed to and authorized by the Director of Public Works Division prior to execution, jointly documented by Contractor and Designer, and recorded in Contractor's As-built and Designer's Project Record Documents.
- D. If any portion of the allowance is not used during the project, that portion will revert to the owner and will not be included in the contractor's final payment.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 01210

DIVISION 1 – GENERAL REQUIREMENTS
Section 01230 – Alternates

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. General Requirements for Alternates.
 - 2. Schedule and Description of Alternates.
- B. Definition:
 - 1. An alternate bid is an amount proposed by Bidders and stated on the Proposal for certain items that may be deducted from or added to the Total Lump Sum Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in products, equipment, systems or installation methods described in the Contract Documents.
- C. Extent:
 - 1. It is mandatory for all Bidders to submit Alternate Bid amounts for the items named in this section. Failure to do so shall be considered justification for rejection of bid.
 - 2. Items of work to be performed under this Section include Alternate Bids which are not included in the Total Lump Sum Bid amount.
- D. Related Sections:
 - 1. Lump Sum Bid Form.
 - 3. Agreement Form: List of alternates will be incorporated into Work by executed Agreement.

1.02 REQUIREMENTS OF OTHER SECTIONS

- A. Applicable portions of all Sections of these Specifications shall become a part of this Section as if written out in full herein.

1.03 COORDINATION

- A. Coordinate related work and modify or adjust adjacent work as necessary to ensure that work affected by each accepted alternate is complete and fully integrated into Project to provide complete and operational systems.

1.04 NOTIFICATION

- A. Immediately following Contract award, prepare and distribute to each party involved, notification of status of each alternate. Indicate whether Alternate Bids have been accepted, rejected or deferred for consideration at later date. Include complete description of negotiated modifications to alternates.

1.05 GENERAL REQUIREMENTS

- A. Include, in each alternate, all changes in the Work attributable to the alternate whether specifically described by or reasonably implied from the description of the alternate.
- B. Request clarification or interpretation of Contract documents with respect to alternates in accordance with the Bidding and Contracting Documents.
- C. Alternate Bids are required to be submitted with Proposal and are described below. Each Alternate Bid shall state net dollar amount to be either added to the Total Base Bid amount in the event an Alternate Bid is accepted.
- D. Complete list of Alternate Bids shall be considered by Contractor to furnish and install labor, materials and equipment necessary for portion of work hereinafter described. Completely fill in blank spaces that are provided in Proposal for all Alternate Bids described herein.
- E. Acceptance of, or rejection of, Alternate Bids is subject to Owner's discretion. Alternate Bids shall be taken into consideration by Owner.
- F. All work performed on Alternate Bids shall be in accordance with pertinent parts of Contract Documents.
- G. Alternate Bid amount shall include, but is not limited to:
 - 1. Labor, material and equipment.
 - 2. All applicable taxes.
 - 3. Handling, insurance, overhead and profit costs.
 - 4. All costs for construction changes required for changes in structures, piping, buildings, mechanical, electrical work, controls, accessories, etc. as required to provide a complete and operational system to accommodate the Alternate Bid.
 - 5. All changes in cost, either additive or deductive, resulting from work of all trades affected by Alternate Bid.

1.06 SCHEDULE AND DESCRIPTION OF ALTERNATES

- A. Alternate Bid No. 1 – Add Six (6) Campsites
 - 1. The BASE BID includes six (6) campsites on the east side of the main road as shown and detailed in the plans (camp sites #23 through #28).
 - 2. The ALTERNATE NO. 1 includes an adder for the additional six (6) campsites on the west side of the main road including electric and sitework as shown in the plans (campsites #17 through #22) and as specified.
- B. Alternate Bid No. 2 – Add Campsites #29 and #30
 - 1. The BASE BID includes six (6) campsites on the east side of the main road as shown and detailed in the plans (camp sites #23 through #28).
 - 2. The ALTERNATE NO. 2 includes an adder for the two (2) sites on the north end of the east side of the main road noted as sites #29 and #30 including electric and sitework as shown in the plans and as specified.

- C. Alternate Bid No. 3 – Add Water Services (Base Bid)
1. The BASE BID includes a 2-inch water main from the connection point near the existing shelter to the north end of the Base Bid work including connection to the comfort station, VIP site and one sanitary yard hydrant as shown in the plans and as specified.
 2. The ALTERNATE NO. 3 includes an adder for 1-inch water service lines and sanitary yard hydrants for the all 13 campsites in the Base Bid, Alternate No. 1 and Alternate No. 2 as shown in the plans and as specified.
- D. Alternate Bid No. 4 – Add Sixteen (16) Campsites to South
1. The BASE BID includes six (6) campsites on the east side of the main road as shown and detailed in the plans (camp sites #23 through #28).
 2. The ALTERNATE NO. 4 includes an adder for the additional sixteen (16) campsites south of the base bid area (camp sites #1 through #16) including 2-inch watermain extension, two sanitary yard hydrants, electric for campsites and sitework as shown on the plans and as specified.
- E. Alternate Bid No. 5 – Add Water Services (Alternate 4)
1. The BASE BID includes a 2-inch water main from the connection point near the existing shelter to the north end of the Base Bid and ALTERNATE NO. 4 includes a main extension to the south area as shown in the plans.
 2. The ALTERNATE NO. 5 includes an adder for 1-inch water service lines and sanitary yard hydrants as shown in the plans and as specified for the additional 16 campsites in Alternate No. 4 as described above.
- F. Alternate Bid No. 6 – Add Eight (8) Campsites to North
1. The BASE BID includes six (6) campsites on the east side of the main road as shown and detailed in the plans (camp sites #23 through #28).
 2. The ALTERNATE NO. 6 includes an adder for the additional eight (8) campsites north of the base bid area (camp sites #31 through #38) including 2-inch watermain extension, two sanitary yard hydrants, electric for campsites and sitework as shown on the plans and as specified.
- G. Alternate Bid No. 7 – Add Water Services (Alternate 6)
1. The BASE BID includes a 2-inch water main from the connection point near the existing shelter to the north end of the Base Bid area and ALTERNATE NO. 6 includes a main extension to the north area as shown in the plans.
 2. The ALTERNATE NO. 7 includes an adder for 1-inch water service lines and sanitary yard hydrants as shown in the plans and as specified for the additional 8 campsites in Alternate No. 6 as described above.
- H. Alternate Bid No. 8 – Asphalt - Gravel Roads and Parking
1. The BASE BID, ALTERNATE NO. 4 and ALTERNATE NO. 6 include road modifications using gravel as shown and detailed in the plans.
 2. The ALTERNATE NO. 8 includes an adder for finish grading as needed and asphalt pavement and markings for all the gravel roads and parking in the designated campground area as shown in the plans and as specified.
- I.

Alternate Bid No. 9 – Asphalt - Gravel Campsites

1. The BASE BID, ALTERNATE NO. 4 and ALTERNATE NO. 6 include campsite modifications using gravel as shown and detailed in the plans.
2. The ALTERNATE NO. 9 includes an adder for finish grading as needed and asphalt pavement and markings for all thirty-five (35) gravel campsites in the campground area as shown in the plans and as specified.

PART 2 PRODUCTS – (Not Applicable)

PART 3 EXECUTION – (Not Applicable)

END OF SECTION 01230

DIVISION 1 – GENERAL REQUIREMENTS
Section 01250 – Contract Modification
Procedures

PART 1 GENERAL

1.01 SUMMARY

- A. This section specifies administrative and procedural requirements for handling and processing contract modifications and includes:
 - 1. Procedural Requirements for:
 - a. Request for Interpretation.
 - b. Field Order.
 - c. Work Change Directive.
 - d. Change Order.

1.02 RELATED SECTION

- A. Bidding and Contracting Documents
- B. Section 01200 – Payment Procedures.
- C. Section 01320 – Construction Schedules.
- D. Section 01780 – Closeout Procedures.

1.03 DEFINITIONS

- A. Request for Interpretation: A formal, written request from Contractor for clarification by Engineer about an item of work insufficiently described or detailed in the Contract Documents.

1.04 SUBMITTALS

- A. Submit name of the individual authorized to receive change documents.
- B. Be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
- C. Use the appropriate submittal forms from bidding and contracting documents.
- D. Address all RFI correspondence to Owner's representative.
- E. Submit completed form that includes sufficiently detailed descriptive information and signature of Contractor's authorized representative.
- F. Number each RFI in consecutive sequence starting with number 1.
- G. Engineer will respond to RFI with one or more of the following:
 - 1. Response written on RFI form.
 - 2. Field Order.
 - 3. Proposal Request.

1.05 DOCUMENTATION OF CHANGE IN CONTRACT PRICE AND CONTRACT TIME

- A. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Work.
- B. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.
- C. Provide additional data to support computations:
 - 1. Quantities of products, labor, and equipment.
 - 2. Taxes, insurance, and bonds.
 - 3. Overhead and profit.
 - 4. Justification for any change in Contract Time.
 - 5. Credit for deletions from Contract, similarly documented.
- D. Support each claim for additional costs, and for work done, with additional information:
 - 1. Origin and date of claim.
 - 2. Dates and times work was performed, and by whom.
 - 3. Time records and wage rates paid.
 - 4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

1.06 CHANGE PROCEDURES

- A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Price or Contract Time as authorized by the General Conditions by issuing supplemental instructions as a field order.
- B. The Engineer may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within 14 days.

1.07 WORK DIRECTIVE CHANGE

- A. Engineer may issue a document, signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. The document will describe changes in the Work, and will designate method of determining any change in Contract Price or Contract Time.
 - 2. Promptly execute the change in Work.

1.08 STIPULATED PRICE CHANGE ORDER

- A. Based on Proposal Request and Contractor's fixed price quotation.

1.09 UNIT PRICE CHANGE ORDER

- A. For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis.
- B. For unit costs or quantities of units of work, which are not pre-determined, execute Work under a Work Directive Change.
- C. Changes in Contract Price or Contract Time will be computed as specified in General Conditions.

1.10 ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, base each Change Order proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 - 3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
 - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within thirty (30) days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than thirty (30) days after such authorization.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

1.11 TIME AND MATERIAL CHANGE ORDER

- A. Submit itemized account and supporting data after completion of change, within time limits included in the General Conditions.
- B. Engineer will determine the change allowable in Contract Price and Contract Time as provided in the Contract Documents.
- C. Maintain detailed records of work performed.

- D. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

1.12 EXECUTION OF CHANGE ORDERS

- A. Engineer will issue Change Orders for signatures of parties as provided in the General Conditions.
- B. No work will be paid for if done prior to receiving a properly executed Change Orders.

1.13 CORRELATION OF CONTRACTOR SUBMITTALS

- A. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Price.
- B. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- C. Promptly enter changes in Project Record Documents.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION 01250

DIVISION 1 – GENERAL REQUIREMENTS
Section 01320 – Construction Schedules

PART 1 GENERAL

1.01 SUMMARY

- A. Construction schedule requirements and procedures.
- B. RELATED SECTIONS
 - 1. Section 01330 – Submittal Procedures.

1.02 FORM OF SCHEDULES

- A. Prepare a standard horizontal bar chart.
 - 1. Provide separate horizontal bar column for each class of work, activity or long-lead equipment item.
 - 2. Columns should follow table of contents of the specifications.
 - 3. Critical path work items shall be highlighted in some manner.

1.03 CONTENT OF SCHEDULES

- A. Indicate complete sequence of construction by activity.
 - 1. Submittals: In accordance with Section 01330 - Submittal Procedures.
 - a. Submittal dates.
 - b. Dates when reviewed copies will be required.
 - 2. Product procurement date, fabrication time and delivery dates.
 - 3. Dates for beginning, and completion of, each element of construction.
- B. Indicate cumulative percentage of work completed as of first day of each month.
- C. Furnish separate schedule, showing submittals, review item, procurement schedules and delivery dates as required.
- D. Define critical portions of entire schedule.

1.04 UPDATING

- A. Update monthly. Indicate:
 - 1. Progress of each activity since previous submission.
 - 2. Projected completion dates for all activities.
 - 3. Activities modified since previous submission.

1.05 SUBMITTALS

- A. Submit initial schedule at the preconstruction meeting.
 - 1. The Engineer and Owner shall review schedules and return reviewed copy within ten business days after receipt.
 - 2. When directed, resubmit within five business days after return of reviewed copy.

- B. Submit monthly updated schedules accurately depicting progress to first day of each month.

1.06 DISTRIBUTION

- A. Distribute copies of approved schedules by uploading into Bluebeam Revu software and distribute to Subcontractors and suppliers on as-needed basis.
- B. Instruct recipients to report any inability to comply with projected completion dates, and to furnish a detailed explanation together with suggested remedies.

1.07 ACCELERATION

- A. If at any time during the project Contractor fails to complete an activity by its latest scheduled completion date, which late completion will impact the end date of the work past the Contract completion date, submit within five (5) calendar days plans to reorganize the work force to return to the current schedule.
- B. The Owner may require Contractor to add to equipment, or construction forces, as well as increase working hours, if operations fall behind schedule at any time.
- C. Addition of equipment or construction forces, increasing working hours, or other method, manner, or procedure to return to the contractually required completion date will not be justification for Contract modification.
- D. Contractor shall plan, schedule, and coordinate construction operations and activities in a manner that will facilitate simultaneous progress of work.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION 01320

DIVISION 1 – GENERAL REQUIREMENTS
Section 01330 – Submittal Procedures

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Submittal procedures and general requirements for submittals during the progress of the work.
 - 1. Administrative Submittals
 - 2. Shop Drawings
 - 3. Product Data
 - 4. Samples
 - 5. Test Specimens
 - 6. Certificates of Compliance
 - 7. O & M Manuals
 - 8. Record Documents
 - 9. Contractor's Construction Schedule
 - 10. Subcontract List
 - 11. Applications for Payment
 - 12. Schedule of Values
 - 13. List of items to be completed or corrected (punch list)
- B. The Owner and Engineer each reserve the right to direct and modify the procedures and requirements for submittals as necessary to accomplish the specific purpose of each submittal.
- C. Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Engineer for Contractor's use in preparing submittals.

1.02 RELATED SECTIONS

- A. Bidding and Contracting Documents
- B. Section 01200 – Payment Procedures.
- C. Section 01320 – Construction Schedules.
- D. Section 01450 – Quality Requirements.
- E. Section 01780 – Closeout Procedures.
- F. Section 01782 – Operation and Maintenance Data.
- G. Divisions 2 through 4 Sections for specific requirements for submittals in those Sections.

1.03 DEFINITIONS

- A. Action or Technical Submittals: Written and graphic information that requires Engineer's responsive action.
- B. Administrative Submittals: Written information that does not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.04 ADMINISTRATIVE SUBMITTALS

- A. Administrative Submittals include the following items:
 - 1. Preconstruction submittals.
 - 2. Schedules.
 - 3. Certificates and Certifications.
 - 4. Test and inspection reports.
 - 5. Construction photographs.
 - 6. Meeting minutes.
 - 7. Material Safety Data Sheets (MSDSs).
 - 8. Closeout submittals.
- B. Provide all of the submittals as listed above and any others specifically required in other parts of the Contract Documents in portable document format (pdf).
- C. Failure to comply promptly with requirements for submittals, as required by law, to applicable federal, state, or local agencies may result in the withholding of progress payments and make the Contractor liable for other prescribed action and sanctions.
- D. Submit to the Owner and Engineer a copy of all letters relative to the Contract, transmitting notifications, reports, certifications, payrolls, and the like, that are submitted directly to a federal, state, or other governing agency.
- E. On a daily basis during the progress of the Work, maintain, and submit to the Engineer, full and correct information as to:
 - 1. The number of persons employed in connection with each subdivision of the Work.
 - 2. The classification, rate of pay, citizenship status, and address of each of these persons.
 - 3. The cost, source, and amount of each class of materials delivered, equipment received, and major construction equipment used in each subdivision of the Work.
- F. When requested by the Engineer, submit to the Engineer two (2) copies of each purchase order for all materials and equipment furnished under this Contract for incorporation in the Work. Each purchase order shall show:
 - 1. Supplier's name.
 - 2. Manufacturer's name.
 - 3. Materials, type, model number, size, quantity, accessory list of the material and equipment ordered.
 - 4. Requested delivery date of the material and equipment ordered.

1.05 TECHNICAL SUBMITTALS

- A. General:
 - 1. Requirements in this section are in addition to any specific requirements for submittals specified in other Divisions and Sections of the Specifications. The Contractor shall be responsible for the accuracy and completeness of all information contained in each submittal.

- a. Address all hard copies of submittals and correspondence to:
Indiana Department of Natural Resources
C/O Crawford, Murphy & Tilly, Inc.
915 Main Street, Suite 408
Evansville, IN 47635
 - b. Submit all technical submittals in Construction/Project Management software.
2. Submit descriptive information, which will enable the Engineer to advise the Owner whether the Contractor's proposed materials, equipment, or methods of work are in general conformance to the design concept and in compliance with the Drawings and Specifications.
3. Submit Shop Drawings and Product Data for all material and equipment to be incorporated into the Work, whether or not specifically called for elsewhere in these Contract Documents. The information to be submitted shall consist of drawings, specifications, descriptive data, certificates, samples, test results, design calculations, fabrication and installation drawings, and such other information, all as required by the Engineer to evaluate the material and equipment for compliance with the requirements of these Contract Documents.
4. Equipment and materials delivered without meeting the above requirements **will not** be considered for pay requests involving the installation of said equipment and materials until the above information is received, reviewed and approved by the Engineer.
5. The Contractor shall be responsible for the accuracy and completeness of the information contained in each and every submittal and shall assure that the material, equipment or method of work shall be as described in the submittal. The Contractor shall indicate by a signed stamp on each submittal that:
 - a. Contractor has checked and approved the submittal.
 - b. Material and equipment described in the submittal conforms to the requirements of the Specifications and Drawings.
 - c. Material and equipment described in the submittal have been checked for dimensions and coordination with other work.
6. If the information contained in a submittal shows deviations from the Specifications or Drawings, include in the submittal verification that there is no conflict with portions of the Work covered by other submittals and notify the Engineer in each and every case where the submittal may affect the work of another Contractor or the Owner.
7. Ensure coordination of submittals among the related crafts and subcontractors.
8. Should the Contractor fail to submit acceptable shop drawings on the second submittal, the cost of the Engineer's time to review subsequent submittals on the unacceptable item will be deducted from the Contract amount.
9. Review, acceptance, or approval of schedules, shop drawings, lists of materials, and procedures submitted or requested by the Contractor shall not add to the Contract amount, and all additional costs which may result therefrom shall be solely the obligation of the Contractor.

10. Shop Drawing submittals processed by the Engineer do not become Contract Documents and are not Change Orders. The purpose of the Shop Drawing review is to establish a reporting procedure and is intended for the Contractor's convenience in organizing his work and to permit the Engineer to monitor the Contractor's progress and understanding of the design.
11. It shall not be the responsibility of the Owner to provide engineering or other services to protect the Contractor from additional costs accrued from such approvals.
12. No equipment or material for which listings, drawings, or descriptive material is required shall be fabricated, purchased, or installed until the Engineer has on hand copies of such approved lists and the appropriately stamped final Shop Drawings.
13. Submittals will be acted upon by the Engineer as promptly as possible, and returned to the Contractor not later than the time allowed for review in Shop Drawing Submittal Procedure. Delays caused by the need for resubmittals shall not constitute reason for an extension of Contract time.
14. The Contractor's authorization stamp shall appear on each copy of each submittal and likewise the Engineer's review stamp shall appear on each copy of each submittal.
15. For all materials and/or products falling under the jurisdiction of the American Iron and Steel requirements, a certification letter must be accompanied with the technical submittal before submittal will be reviewed and approved, refer to Sections 00 45 60B and 00 86 10A.

B. Transmittal Procedure:

1. General - Submit through Bluebeam Revu electronically utilizing Construction/Project Management software.
2. Submittal Numbering System - The submittal numbering system shall be coordinated with the Engineer's document control system. Each submittal shall be numbered in consecutive sequence starting with number 1, then number 2, etc. Resubmittals are to be numbered with the original submittal number and the appropriate alphabetic letter. Example: If submittal number 12 is to be resubmitted, the resubmittal will be number 12A (Consecutive Alphabetical Designation) until the submittal is "NO EXCEPTIONS TAKEN" or "EXCEPTIONS TAKEN AS NOTED".
3. Deviation From the Contract – There shall be no deviations from the Contract.
4. Submittal Completeness – Submittals which do not have all the information required to be submitted, including deviations, are not acceptable and will be returned without review. The practice of submitting incomplete or unchecked shop drawings for the Engineer to correct or finish will not be acceptable, and shop drawings which, in the sole opinion of the Engineer, clearly indicate that they have not been checked by the Contractor will be considered as not complying with the intent of the Contract Documents and will be returned to the Contractor without review for resubmission in the proper form. Should the Contractor submit incomplete or unchecked shop drawings on the second submittal they will be returned to the Contractor without review for resubmission in the proper form. The cost of the

Engineer's time to review subsequent resubmittals will be deducted from the Contract amount.

5. Review Procedure - When the Contract Documents require a submittal, the Contractor shall submit sufficient copies such that the Engineer will retain three (3) copies of all submittal information following Shop Drawing approval. Unless otherwise specified, within thirty (30) calendar days after receipt of the submittal, the Engineer shall review the submittal. The returned submittal shall indicate one of the following actions:
 - a. NO EXCEPTIONS TAKEN: If the review indicated that the material, equipment, or work method is in general conformance with the design concept and complies with the drawings and specifications, submittal copies will be marked "NO EXCEPTIONS TAKEN". In this event the Contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal.
 - b. EXCEPTIONS TAKEN AS NOTED: If the review indicates limited corrections are required, copies will be marked "EXCEPTIONS TAKEN AS NOTED". The Contractor may begin implementing the work method or incorporating the material and equipment covered by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in O&M data, a corrected copy shall be provided.
 - c. RESUBMIT WITH CORRECTIONS: If the review reveals that the submittal is insufficient or contains incorrect data, or indicates that the material, equipment or work method is not in general conformance with the design concept or in compliance with the Drawings and Specifications, copies of the submittal will be marked "RESUBMIT WITH CORRECTIONS". Submittals with deviations which have not been identified clearly may be rejected. The Contractor shall not undertake work covered by such submittals until a new submittal is submitted and returned marked either "NO EXCEPTIONS TAKEN" or "EXCEPTIONS TAKEN AS NOTED".
 - d. The Engineer will not recommend payment for any work done without a submittal marked either "NO EXCEPTIONS TAKEN" or "EXCEPTIONS TAKEN AS NOTED".
6. Effect of Review of Contractor's Submittals: The review of Shop Drawings, methods of work, or information regarding materials or equipment the Contractor proposes to provide, shall not relieve the Contractor of his responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the Engineer or the Owner, or by any officer or employee thereof, and the Contractor shall have no claim under the contract on account of the failure, or partial failure, of the method of work, material, or equipment so reviewed.

- a. A mark of "NO EXCEPTIONS TAKEN" or "EXCEPTIONS TAKEN AS NOTED" shall mean that the Owner has no objection to the Contractor, upon his own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed.
 - b. Submittals with deviations from the contract requirements which have not been clearly identified by the Contractor at the time the submittal is transmitted to the Engineer for review may be rejected by the Owner and/or Engineer at a later date, even though the submittal may have been marked "NO EXCEPTIONS TAKEN" or "EXCEPTIONS TAKEN AS NOTED".
- C. Record Documents
 - 1. Record documents shall be prepared and maintained onsite.
 - 2. Upon satisfactory completion of the Contract, submit record documents to the Engineer. Accompany submittal with transmittal containing submittal date, Contract title and number, the Contractor's name and address, title and number of each record document, certification that each document as submitted is complete and accurate, and the Contractor's signature.
 - 3. The contract closeout and final payment under this contract **will not** be finalized and approved until a complete and accurate set of record documents have been submitted to the Engineer, reviewed for accuracy and accepted.
- D. Operation and Maintenance Manual (O&M)
 - 1. O & M Manuals shall be prepared and submitted to the Engineer in accordance with Section 01782 – Operation and Maintenance Manuals.
 - 2. The contract closeout and final payment under this contract **will not** be finalized and approved until O & M Manuals have been submitted to the Engineer, reviewed for accuracy and accepted.
- E. Shop Drawings
 - 1. The Shop Drawing submittal shall be made after the award of contract and before fabrication.
 - 2. Shop Drawings may be detailed on 8-1/2 by 11-inch and/or 11 by 17-inch sheets.
- F. Professional Seals
 - 1. Provide seal on drawings of structural components and assemblies that are submitted for review and where required by the Specifications.
 - 2. Each copy of a submittal requiring a Professional Seal shall bear an original seal. Reproductions of Professional Seals will not be accepted.
- G. Samples and Test Specimens
 - 1. Where required in the Specifications, and as determined necessary by the Engineer, test specimens or samples of materials, appliances, and fittings to be used or offered for use in connection with the Work shall be submitted to the Engineer at the Contractor's expense, with information as to their sources, with all cartage charges prepaid, and in such quantities and sizes as may be required for proper examination and tests to establish the quality or equality thereof, as applicable.

2. All samples and test specimens shall be submitted in ample time to enable the Engineer to make any tests or examinations necessary, without delay to the Work. The Contractor will be held responsible for any loss of time due to his neglect or failure to deliver the required samples to the Engineer, as specified.
3. The Contractor shall submit additional samples as required by the Engineer to ensure equality with the original approved sample and/or for determination of Specification compliance.
4. Laboratory tests and examinations that are not required by the Specifications and that the Owner elects to make will be made at no cost to the Contractor, except that, if a sample of any material or equipment proposed for use by the Contractor fails to meet the Specifications, the cost of testing subsequent samples shall be borne by the Contractor.
5. Submit, in duplicate, to the Engineer test results that are certified by laboratory as specified in Section 01450 - Quality Requirements. The samples furnished and the cost for the laboratory services shall be at the expense of the Contractor and included in the prices bid for the associated work.

H. Certificates of Compliance:

1. Furnish a Certificate of Compliance for materials specified to a recognized standard or code prior to the use of any such materials in the work. The Engineer may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance. The certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall state that the materials involved comply in all respects with the requirements of the Specifications. A Certificate of Compliance shall be furnished with each lot of material delivered to the work and the lot so certified shall be clearly identified in the certificate.
2. All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the Work which conforms to the requirements of the Contract Documents and any such material not conforming to such requirements will be subject to rejection whether in place or not.
3. The Engineer reserves the right to refuse permission for use of material on the basis of a Certificate of Compliance.
4. The form of the Certificate of Compliance and its disposition shall be as directed by the Engineer.
5. Provide a letter certification for compliance with the American Iron and Steel requirements for those products and/or materials under its jurisdiction.

PART 2 PRODUCTS – NOT USED.

PART 3 EXECUTION – NOT USED.

END OF SECTION 01330

DIVISION 1 - GENERAL REQUIREMENTS
Section 01450 – Quality Requirements

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor will employ and pay for an independent testing firm to perform specified quality assurance/quality control tests and services.
- B. This Section includes administrative and procedural requirements for quality assurance and quality control.
- C. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Engineer or Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.02 RELATED SECTIONS

- A. Requirements for an independent testing firm for the following work items:
 - 1. Division 2 – Sitework.
 - a. Backfilling and Compacting.
 - i. Standard Proctor Density tests.
 - ii. On-site compaction testing.
 - iii. Proofrolling of subgrades.
 - b. Pavement
 - i. Concrete Pavement testing per INDOT requirements.
 - ii. Asphalt Pavement testing per INDOT requirements.
 - 2. Division 3 – Concrete.
 - a. Cast-in-Place Concrete.
 - i. Cylindrical compression tests.
 - ii. Slump tests.
 - iii. Air entrainment tests.
 - 3. Section 01720 – Field Engineering
 - a. Establishing the horizontal and vertical control points and to check the Contractor's layout. The Contractor shall be responsible for all field measurements to layout the work.

1.03 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.
- D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- F. Product Testing: Tests and inspections that are performed by an NRTL, and NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory or testing firm shall mean the same as testing agency.
- J. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and

scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.04 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Engineer for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.
- C. Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notice, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.05 LIMITS OF AUTHORITY OF TESTING SERVICE

- A. Laboratory is not authorized to:
 - 1. Release, revoke, alter or enlarge on, Contract requirements.
 - 2. Approve or accept any portion of work.

3. Perform any duties of the Contractor.

1.06 CONTRACTOR'S RESPONSIBILITIES

- A. Coordinate with Laboratory personnel, provide access to work, to manufacturer's operations.
- B. Furnish copies of mill test reports.
- C. Furnish verification of compliance with Contract requirements for all materials and equipment.
- D. Furnish casual labor and facilities:
 1. To provide access to work to be tested.
 2. To facilitate inspections and tests.
 3. For laboratory's exclusive use for storage and curing of test samples.
- E. Notify laboratory sufficiently in advance of operations to allow for its assignment of personnel and scheduling of tests.
- F. Correct work which is defective or which fails to conform to Contract Documents in accordance with General Conditions. Corrective work shall not delay project schedule or work of other contractors.
- G. Patch all surfaces and areas disturbed by testing operations.

1.07 ADDITIONAL TESTING BY OWNER

- A. Owner may also at his option, obtain additional inspections and tests in accordance with General Conditions.

1.08 REINSPECTION

- A. In the event that accuracy or adequacy of any inspection or test is challenged by any parties, and reinspection, or retesting is required, all costs for reinspection or retesting shall be paid by party challenging the original report unless the reinspection or retesting results in taking actions differing from that based on the original report which in that case, the party paying for the original tests shall pay for the additional inspection and tests.
- B. Such inspections or tests will be considered only when performed by a Testing Laboratory or Consultant approved by Owner in writing.

1.09 SCHEDULE OF TESTS

- A. Tests and inspections are listed in the specification section for the products or work requiring the test or inspection.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
 - 2. Comply with the requirements for Section 03050 – Common Work Results for Concrete.
 - 3. Protect construction exposed by or for quality-control service activities.
- B. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01450

DIVISION 1 – GENERAL REQUIREMENTS
Section 01500 – Temporary Construction
Facilities and Controls

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall provide controls over environmental conditions at the construction site and related areas under the Contractor's control.
- B. The Contractor shall remove physical evidence of temporary controls at completion of work or as directed.
- C. Requirements for provision and maintenance of temporary utilities during construction period to include:
 - 1. Contractor may use onsite pit toilets.
 - 2. Payment of all utility, field office telephone, and fuel bills, service charges, and installation charges.
 - 3. Drinking water for Contractor's forces.
 - 4. Non-potable water required for Contractor's work.
 - 5. Work area lighting as required.
 - 6. Safety lighting for barriers and other safety obstacles for work activities under the responsibility or control of Contractor.
 - 7. Electrical costs for all construction tools and equipment.
- D. The Contractor shall provide and maintain a field office in a location to be coordinated with Owner.
- E. Provide and maintain suitable barriers to prevent unauthorized entry into open excavations, and to protect the work, existing facilities and utilities, trees and plants from construction operations.
 - 1. Remove when no longer needed, at completion of the work or as directed
- F. Provide and maintain vehicular access to site and within site.

1.02 RELATED SECTIONS/REQUIREMENTS

- A. Division 2 – Sitework.
- B. Indiana Design Manual, latest edition.

1.03 DESCRIPTION

- A. General Construction
 - 1. Structurally sound foundation and superstructure.
 - 2. Weathertight, with raised floors; compatible with occupancy and storage requirements.
 - 3. Temperature transmission resistance: Compatible with occupancy and storage requirements.

4. Exterior finish surfaces: Weather resistant, in neat condition.
 5. Interior finishes of offices:
 - a. Walls, ceilings: Sheet-type materials, prefinished or painted.
 - b. Floors: Resilient floor covering.
 6. At Contractor's option, portable buildings or mobile homes may be used for offices.
 - a. Mobile homes, when used, shall be modified to convert spaces for office use.
 - b. Do not use field offices for living quarters.
- B. Trailer for Engineer (NOT USED)
- C. Contractor's office and facilities
1. Size: Contractor's option. Suitable for specified use.
 2. Light and temperature sufficient for Contractor's use.
 3. Telephone: As required by contractor.
 4. Furnishings in meeting area.
 - a. Conference table and chairs for at least six persons.
 - b. Racks and files for project record documents in, or adjacent to, meeting area.
 - c. Other furnishings: Contractor's option.
 - d. Equipment and supplies
 - i. First aid equipment.
 - ii. One 10-inch outdoor-type mercury thermometer.
 - iii. For visitor's use: Six adjustable-band protective helmets.
 5. Fire extinguishers
 - a. One standard dry chemical (ABC) type for each office.
- D. Identification
1. Provide a 36 in. x 24 in. sign on each office structure to identify occupants and function.
 2. "Emergency First Aid" sign.
 3. Signs for Notices in accord with Federal and State rules and regulations.

1.04 TEMPORARY ENVIRONMENTAL CONTROLS

- A. Noise Control.
1. All engines and engine driven equipment used for hauling or construction shall be equipped with an adequate muffler in constant operation and properly maintained to prevent excessive or unusual noise.
- B. Dust Control.
1. Provide dust control materials to minimize dust from construction operations. Prevent air-borne dust from dispersing into the atmosphere.
- C. Water Control.
1. Provide methods to control surface water to prevent damage to the project, the site or adjoining properties.

2. Provide, operate and maintain hydraulic equipment of adequate capacity to control surface water.
 3. Dispose of drainage water in a manner to prevent flooding, erosion, silting or runoff of silt or sediment or other damage to all portions of the site or to adjoining areas.
 4. Provide methods to control surface and rainwater runoff so that water is not allowed into open excavations.
- D. Debris Control.
1. Maintain all areas under Contractor's control free of extraneous debris.
 2. Initiate and maintain a specific program to prevent accumulation of debris at construction site, storage and parking areas or along access roads and haul routes.
 - a. Provide containers for deposit of debris as specified in 01 70 00 - Cleaning.
 - b. Prohibit overloading of trucks to prevent spillages on access and haul routes and provide daily inspection of traffic areas to enforce requirements.
 3. Schedule collection and disposal of debris as specified in 01 70 00 - Cleaning.
 - i. Provide additional collections and disposals of debris whenever regular schedule is inadequate to prevent accumulation.
- E. Pollution Control.
1. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.
 2. Provide equipment and personnel, perform emergency measures required to contain all spillages, and to remove contaminated soils or liquids.
 3. Take special measures to prevent harmful substances from entering public waters.
 - a. Prevent disposal of wastes, effluents, chemicals or other such substances adjacent to streams, drainage ditches, or in sanitary or storm sewers.
 4. Provide systems for control of atmospheric pollutants.
 - a. Prevent toxic concentrations of chemicals.
 - b. Prevent harmful dispersal of pollutants into the atmosphere.
- F. Erosion Control.
1. Obtain and pay for stormwater permits as required by the Indiana Department of Environmental Management (IDEM).
 2. Plan and execute construction and earthwork in a manner to control surface drainage from cuts and fills, and from soil staging areas, to prevent erosion and sedimentation.
 3. The design and implementation of erosion control measures and construction activities in accordance with the Indiana Design Manual, latest edition.

- i. Minimize the areas of bare soil exposed at one time.
 - ii. Provide temporary control measures such as berms, dikes and drains.
 - iii. Provide temporary control measures to prevent silting or runoff of silt or sediment from site.
- 4. Construct fills and waste areas by selective placement to eliminate surface silts or clays which will erode.
- 5. Periodically inspect earthwork to detect evidence of the start of erosion. Apply corrective measures to control erosion.

1.05 TEMPORARY UTILITIES

A. Description of Utility Systems.

- 1. Electrical service as required for Contractor's field office.
- 2. The Contractor shall make necessary arrangements and provide all temporary electric service and lighting required during entire construction period including required fees and permits. Cost of electricity shall be borne by the Contractor. The temporary electric service shall comply with all NEC and OSHA requirements for temporary service.
- 3. Telephone Service – Coordinate installation with local phone company.
- 4. Toilets – Contractor shall be allowed to use the onsite pit toilets, no temporary toilet facilities are needed.

B. Costs of Installation, Operation, Maintenance and Consumables.

- 1. Installation, Operation and Maintenance:
 - a. The Contractor shall make all arrangements necessary and pay all costs associated with permits, fees, the installation, operation, maintenance, restoration and warranty extension of temporary utilities until substantial completion.
- 2. Consumables:
 - a. The Contractor shall pay all costs of consumables for temporary utilities until substantial completion.
 - i. Electrical power.
 - ii. Telephone charges.
 - iii. Drinking water.

C. Monitor Temporary Utilities.

- 1. The Contractor shall be responsible for all damage to his work or to that of other contractors caused by a defect in such utility.
 - a. Enforce compliance with applicable codes and standards.
 - b. Enforce safe practices.
 - c. Prevent abuse of services and utilities.
 - d. Prevent damage to finishes.

D. Requirements of Regulatory Agencies

- 1. Request and obtain Owner's prior written authorization to obtain and pay for:
 - a. Permits and inspections required by governing authorities.
- 2. Comply with specified codes and regulations:

- a. National Electric Code (ANSI C1).
- b. National Electrical Safety Code.
- c. National Fire Protection Association Pamphlet.
- d. Federal and State requirements.
- e. Utility company regulations.

1.06 ROADS AND PARKING AREAS

- A. Construct roads, drives, walks and parking facilities to provide uninterrupted access to construction offices, mobilization, work, storage areas and other areas required for execution of the Contract.
 - 1. Location: Where shown on drawings. Consult with Engineer regarding all desired deviations therefrom.
 - 2. Size of parking facilities: Adequate to provide for personnel needs of all contractors.
- B. Provide access for emergency vehicles. Maintain driveways a minimum of 15 feet wide between and around combustible materials in storage and mobilization areas.
- C. Keep fire hydrants and water control valves free from obstruction and accessible for use.

1.07 EXISTING PAVEMENTS

- A. Subject to approval of the Owner, existing on-site streets and driveways may be used for construction traffic.
- B. The Contractor shall restore existing roadways which are damaged during the construction activities and as a result of construction activities to their original condition, at no expense to the Owner, and to the satisfaction of the Owner. The Contractor, Engineer and Owner shall inspect the condition of the existing roadways jointly at the pre-construction meeting in order to establish their condition prior to construction activities. The same parties shall inspect and agree to the satisfactory condition of the existing roadways following construction and prior to final acceptance.
- C. Use of existing parking facilities for construction personnel or for contractor's vehicles or equipment will not be permitted.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Materials may be new or used, but shall be adequate for purposes used, shall not create unsafe or unsanitary conditions, nor violate specified codes. Comply with Federal and State regulations.
- B. Electrical Power System:
 - 1. Provide and maintain all required facilities, including transformers, poles, conductors, raceways, breakers, fuses and switches.

- 2. Receptacles, fixtures:
 - a. Standard products, meeting UL requirements.
 - b. Provide heavy-duty guards on fixtures.
 - c. Provide appropriate types of fixtures and receptacles for environment in which used, in accordance with NEC and NEMA standards.
- C. Telephone:
 - 1. Coordinate installation with local phone company, if applicable.
- D. Toilets: N/A

2.02 FENCING

- A. Furnish and maintain fencing around the perimeter of all open excavations. The fencing shall be a minimum of 3 feet in height and shall be installed at the end of each workday and when the excavation is left unattended.
- B. The fencing shall be held upright with reinforcing bars, steel posts or wooden stakes with the fence securely tied with wire to the bars, posts or stakes.

PART 3 EXECUTION

3.01 ALL TEMPORARY UTILITIES

- A. Comply with Federal and State regulations.
- B. Install work in neat and orderly manner.
- C. Make structurally, mechanically and electrically sound throughout.
- D. Maintain to give safe, continuous service, and to provide safe working conditions.
- E. Modify and extend systems as work progress requires.
- F. Do not interfere with Owner's operations.
- G. Maintain fences during entire construction period
- H. Relocate fences as construction progresses.

3.02 INSTALLATION

- A. Electrical:
 - 1. Do not run branch circuits on ground.
 - 2. Wire all safety devices specified for operation of equipment.
 - 3. Check operation of all safety devices.
- B. Telephone:
 - 1. Coordinate installation with local phone company, if applicable.
- C. Toilets: N/A

- D. Contractor's Field Office:
 - 1. Construct temporary field offices on adequate foundations, with connections for services.
 - a. Raise portable buildings or mobile homes, when used.
 - b. Provide steps and landings at entrance doors.
 - 2. Mount thermometer at convenient location, not in direct sunlight.
 - 3. Mount fire extinguishers in prominent locations with clear access to use.
 - 4. Mount sign adjacent to entrance doors of appropriate structures, in conspicuous location.
- E. Temporary Roads
 - 1. Construction methods at Contractor's option for temporary facilities which will be removed when no longer needed; adequate to provide specified results.
 - 2. Comply with respective specification sections for preparation and construction for work which will become part of permanent construction.

3.03 MAINTENANCE

- A. Each Contractor is responsible for cleaning, maintaining and keeping their trailer neat, orderly and workmanlike.
- B. Maintain roads, walks and parking areas in a sound, clean condition. Repair or replace all portions damaged during construction work progress.

3.04 REMOVAL

- A. Upon Owner's prior written authorization, completely remove temporary materials and equipment.
- B. Repair all damage caused by installation. Restore to original conditions. Refer to Specification Section 01760, Article 1.13 Survey to Establish Authenticity of Possible Damage Claims.
- C. Remove temporary field offices, contents and services, at completion of construction operations, or as directed by Engineer.
- D. Remove foundations, debris; grade to indicated elevations and clean area.

END OF SECTION 01500

DIVISION 1 – GENERAL REQUIREMENTS
Section 01630 – Product Substitution
Procedures

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Procedures and requirements for proposing product substitutions during bidding and construction.
 - 2. General rules and procedures for evaluation of proposed substitutions.
- B. Related Requirements:
 - 1. Section 01250 – Contract Modification Procedures.
 - 2. Section 01330 – Submittal Procedures.
- C. Unless expressly stated otherwise, proposed product substitutions must meet the specified product requirements including the requirements implied by the proprietary designation of a product that establishes the quality, performance, function, dimension, and appearance of the product specified.

1.02 SUBSTITUTIONS PROPOSED WITH BID

- A. List substitutions in Proposal according to Instructions to Bidders.
- B. Proposed substitutions will be evaluated in accordance with Instructions to Bidders.

1.03 SUBSTITUTIONS PROPOSED DURING CONSTRUCTION

- A. No substitutions shall be considered after Notice of Award except under one or more of the following conditions:
 - 1. Substitutions required for compliance with requirements of governing authority, final interpretations of code requirements, or insurance regulations.
 - 2. Specified product is unavailable or cannot be provided within Contract Time through no fault of Contractor.
 - 3. Subsequent information discloses inability of specified product to perform properly or to fit in designated space.
 - 4. Manufacturer refusal to certify or guarantee performance of specified product as specified.
 - 5. Substitution would be substantially in Owner's best interests.

1.04 SUBSTITUTION REQUIREMENTS

- A. Submit Substitution requests in the form and in accordance with procedures required for Change Order Proposals.
- B. Submit four (4) copies of each request for substitution for consideration.
- C. Request for substitution will be considered if received within sixty (60) days after

commencement of work. Requests received more than sixty (60) days after commencement of work may be considered or rejected at discretion of Engineer.

1.05 CONTENTS OF SUBSTITUTION PROPOSAL

- A. Complete Substitution Request contained in Section 00 63 33 – Product Substitution Request. Include information noted below.
- B. Include related Specification Section and Drawing numbers.
- C. Include complete data substantiating the following:
 - 1. Compliance of proposed substitution with Contract Documents.
 - 2. Conformance of proposed Substitution to requirements specified for product listed in Contract Documents.
 - 3. Equivalence of proposed Substitution to the requirements implied by the proprietary designation of the product listed in the Contract Documents.
- D. Include complete product identification, including supplier's and manufacturer's name, address, telephone number, fax number and email address.
- E. Include the following manufacturer's literature:
 - 1. Product description.
 - 2. Performance and test data.
 - 3. Reference standards.
- F. Include samples when requested or appropriate.
- G. Include name and address of similar projects on which product was used and date of installation.
- H. Include itemized comparison of proposed substitution with product specified.
- I. Include detailed description of changes in construction schedule.
- J. Include description of effect of proposed substitution on overall Contract Time.
- K. Include description of changes or coordination required.
- L. Include accurate cost data on proposed substitution in comparison with product specified, including a proposal of net change, if any, in Contract Sum.
- M. Include Certification by Contractor that substitution proposed is equal to or better in every significant respect to that required by Contract Documents, and that it will perform adequately in application indicated.
- N. Include Contractor's waiver of rights to additional payment or time, which may subsequently become necessary because of failure of substitution to perform adequately.

1.06 REPRESENTATIONS IMPLIED BY SUBSTITUTION PROPOSAL

- A. In making request for Substitution, Contractor represents:

1. Contractor has personally investigated proposed product and determined that it is equal or superior in all respects to the specified product.
 2. Contractor shall provide the same guarantee for the Substitution as for the product specified.
 3. Contractor shall coordinate installation of accepted substitutions in work, making all changes for work to be complete in all respects.
 4. Cost data furnished is complete and includes all related costs under Contract, but excludes:
 - a. Engineer redesign.
 - b. Administrative costs of Engineer.
 5. Contractor shall pay all additional costs and expenses for Owner and Engineer as required by General Conditions.
- B. In listing Substitutions in Proposal, Bidder makes representations equivalent to those listed for Contractor above.

1.07 SUBSTITUTION WILL NOT BE CONSIDERED WHEN:

- A. Substitution Proposal does not meet the requirements of this Section.
- B. Substitution is indicated or implied on shop drawings or product data submittals without formal request submitted in accordance with this section.
- C. Acceptance will require substantial revision of Contract Documents.
- D. Request is not directly related to an "or equal" clause or similar language in Contract Documents.

1.08 SUBSTITUTION EVALUATION

- A. Within two (2) weeks of receipt of request for substitution, Engineer will request additional information or documentation necessary for evaluation of request.
- B. Within two (2) weeks of receipt of request, or receipt of the additional information or documentation, whichever is later, Engineer will notify Contractor of acceptance or rejection of proposed substitution.
- C. If a decision on use of a proposed substitute cannot be made or obtained within time allocated, use product specified.
- D. Acceptance will be in form of a Work Directive Change or Change Order.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION 01630

DIVISION 1 - GENERAL REQUIREMENTS
Section 01660 - Product Storage and
Handling Requirements

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: General product requirements that apply to all areas of the Work.
- B. Related Sections:
 - 1. Bidding and Contracting Documents
 - 2. Section 01330 – Submittal Procedures.

1.02 BASIC PRODUCT REQUIREMENTS

- A. All products provided under this Contract shall be new and of suitable grade for the purpose intended.
- B. All products in contact with potable water during normal operation shall be tested and certified by Underwriters Laboratory or NSF International (as an ANSI accredited certifier) against NSF 61: Drinking Water System Components – Health Effects.
- C. Submit product data in accordance with Section 01330 – Submittal Procedures for all products. Product data shall be sufficient to clearly demonstrate that the product, material, or equipment described conforms to the intent of the Contract Documents.
- D. No products shall contain asbestos materials or lead based paint.

1.03 PRODUCT SUBSTITUTIONS – NOT USED

1.04 PREPARATION FOR SHIPMENT

- A. When practical, equipment shall be factory assembled. The equipment parts and assemblies that are shipped unassembled shall be furnished with an assembly plan and instructions. Individual parts and components shall be tagged or otherwise piece-marked and keyed to the assembly plan and instructions. The separate parts and assemblies shall be match-marked or tagged in a manner to facilitate proper field assembly.
- B. Generally, machined and unpainted parts subject to damage by the elements shall be protected with an application of a strippable protective coating.
- C. Equipment shall be packaged or crated in a manner that will provide protection from damage during shipping, handling, and storage.
- D. The outside of the package or crate shall be adequately marked or tagged to indicate its contents by name and equipment number, if applicable; approximate weight; state any special precautions for handling; and indicate the recommended requirements for storage prior to installation.

1.05 RECEIVING

- A. The Contractor shall unload and record the receipt of all equipment and materials at the jobsite. Report daily receipts to Engineer in writing.
- B. Inspect and accept responsibility of all Owner supplied equipment and materials at the jobsite.

1.06 INSPECTION

- A. Immediately upon receipt of equipment and materials at the jobsite, the Contractor shall inspect for completeness and any evidence of damage during shipment. Should there appear to be any damage, notify the Engineer immediately and inform the manufacturers and the transportation company of the extent of damage. If, in the opinion of Engineer and Owner, the item or items require replacing, the Contractor shall take the necessary measures to expedite the replacement at no extra cost to the contract.
- B. Inspect materials and equipment for conformation to the Contract Documents and Shop Drawings and notify Engineer of deviations prior to incorporating into the Work.

1.07 HANDLING

- A. Handle equipment and materials received for installation on this project in accordance with the manufacturer's recommendations, and in a manner that will prevent damage.

1.08 STORAGE AND LAYDOWN

- A. Store equipment and materials prior to installation as recommended by the manufacturer.
- B. Store all materials off the ground and out of mud and standing water prior to installation.
- C. Store all items subject to the elements, vandalism, or theft such that they are protected and/or secure.
- D. Do not store any materials on private property without written permission of the property owner or lessee. Provide copy of written permission to Owner and Engineer.

1.09 INSURANCE

- A. Refer to the General Conditions for Contractor's insurance requirements for materials delivered but not yet incorporated into the work.

1.10 INVENTORY CONTROL

- A. Store equipment and materials in a manner that provides easy access for inspection and inventory control. The Contractor shall keep a running account of all materials in storage to facilitate inspection and to estimate progress payments for materials delivered but not installed in the Work.

1.11 EQUIPMENT MAINTENANCE PRIOR TO OWNER'S ACCEPTANCE

- A. The Contractor shall provide the required or manufacturer's recommended equipment maintenance during storage, during installation, and until such time as the Owner accepts the equipment for full-time operation.

1.12 SPARE PARTS

- A. Provide spare parts as described in Divisions 2 – 46 of these specifications.

PART 2 PRODUCTS – NOT USED.

PART 3 EXECUTION – NOT USED.

END OF SECTION 01660

DIVISION 1 – GENERAL REQUIREMENTS
Section 01720 – Field Engineering

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Quality assurance, submittals, and project record document requirements for the Contractor's survey and field engineering as applicable for any supplemental work necessary for quality control.
- B. Related Sections:
 - 1. Section 01450 – Quality Requirements

1.02 QUALITY ASSURANCE

- A. The Contractor is responsible for general construction staking; the Contractor shall be fully responsible for ensuring consistency and compliance with the Contract Documents. This may necessitate the need for the Contractor to employ a Land Surveyor to assist with their Quality Control Program.
- B. If the Contractor, sub-contractor, or vendor cause a field change requiring design or re-design of any facility, the Contractor shall employ a Professional Engineer of the required discipline, licensed in the State of Illinois, to complete the work.

1.03 SUBMITTALS FOR REVIEW

- A. Submit name, address, telephone number and fax number of Surveyor before starting survey work.
- B. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.
- C. On request, submit documentation verifying accuracy of survey work.
- D. Submit a copy of site drawing signed by the Land Surveyor that the elevations and locations of the Work are in conformance with Contract Documents.
- E. Submit name, address, telephone number and fax number of Engineer before starting field engineering work.

1.04 PROJECT RECORD DOCUMENTS

- A. Maintain a complete and accurate log of control and survey work as it progresses and submit project record documents after construction work is completed.
- B. On completion of foundation walls and major site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.

1.05 EXAMINATION

- A. Verify locations of survey control points with the Engineer prior to starting work.

- B. Verify the consistency of the staking points with the plan dimensions prior to construction. Notify the Engineer of any discrepancies discovered in accordance with the General Conditions.
- C. Field check benchmarks and other points for disturbance prior to using them for layout or grade control.

1.06 SURVEY REFERENCE POINTS

- A. Protect survey control, benchmarks, and reference points in accordance with the General Conditions.
- B. Control datum for survey is that indicated on Drawings.

1.07 AS-BUILT SURVEYING

- A. The Contractor shall allow the Owner's Engineer reasonable access to the work for the collection of as-built data. The Contractor shall notify the Engineer a minimum of one (1) working day prior to backfilling trenches and other excavations.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION 01720

DIVISION 1 - GENERAL REQUIREMENT
Section 01740 - Cleaning

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Requirements for site maintenance during progress of the Work and for final cleaning.
- B. Related Sections:
 - 1. Section 01110 - Summary of Project.
 - 2. Section 01500 - Temporary Facilities and Controls
 - 3. Divisions 2 - 46: Cleaning requirements for specific products or work.

1.02 GENERAL

- A. At all times maintain areas covered by the Contract, public properties, and adjacent properties free of waste, debris and rubbish caused by construction operations.
- B. At completion of work, or at such other times as directed by the Engineer, remove all waste, debris, rubbish, tools, equipment, machinery and surplus materials. Clean all sight-exposed surfaces; leave work clean and ready for occupancy.
- C. At completion of project, leave project clean and ready for occupancy.

1.03 QUALITY REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- B. Do not burn or bury rubbish or waste materials on project site.
- C. Do not dispose of volatile, harmful or dangerous materials into drainage systems or sanitary drains. Do not dispose of wastes into streams or waterways.
- D. Remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.
- E. Provide approved on-site containers for collection and disposal of waste materials, debris, and rubbish as required.
- F. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.

1.04 SAFETY REQUIREMENTS

- A. Standards:
 - 1. Maintain project in accordance with following safety and insurance standards:
 - a. Applicable Federal and State requirements.
 - b. National Fire Protection Association 241 (NFPA).

- B. Hazards Control:
 - 1. Store volatile wastes in covered metal containers separate from other waste and remove from premises every three (3) days.
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS

- A. Select and use all cleaning materials and equipment with care to avoid scratching, marring, defacing, staining or discoloring surfaces cleaned.
- B. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.01 DURING CONSTRUCTION

- A. During execution of work, clean site and public properties and dispose of waste materials, debris, and rubbish to assure that site and public properties are maintained free from accumulations of waste materials and rubbish.
- B. Wet down materials and rubbish to lay dust and to prevent blowing dust.
- C. Vacuum interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until building is ready for Substantial Completion or Occupancy.
- D. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from exposed and semi-exposed surfaces that are the finished surface.
- E. Repair, patch, and touch up marred surfaces to specified finish to match adjacent surfaces.
- F. Broom clean paved and smooth surfaces; rake clean other surfaces.
- G. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- H. Conduct daily cleanup of adjacent roads as required due to truck traffic and transportation of materials and workers onsite and offsite.

3.02 FINAL CLEANING

- A. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
- B. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion in accordance with Section 01 78 00 - Closeout Procedures.
 - 1. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 - 2. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean.
 - 3. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
 - 4. Clean the site, including landscaping development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.
 - 5. Remove grease, dust, dirt, stains, labels, fingerprints, protection and other foreign materials from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to specified finish.
 - 6. Repair, patch and touch up marred surfaces to specified finish to match adjacent surfaces.
 - 7. Sweep and mop clean all resilient flooring.
 - 8. Vacuum clean all carpet.
 - 9. Replace air handling (conditioning) filters if units were operated during construction.
 - 10. Vacuum clean ducts, blowers and coils, if air handling (conditioning) units were operated without filters during construction.
 - 11. Maintain finally cleaned areas until project or designated portion thereof, is accepted by Owner.
 - 12. Remove wasted drilling materials and leave the premises in a neat and presentable condition, equal to or better than that prior to the start of the drilling operation.
- C. Removal of Protection:
 - 1. Remove temporary protection and facilities installed for protection of work during construction.

- D. Compliance:
1. Where extra materials of value remaining after completion of associated work have become Owner's property, arrange for disposition of these materials as directed.

END OF SECTION 01740

DIVISION 1 – GENERAL REQUIREMENTS
Section 01750 – Starting and Adjusting

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for starting and adjusting equipment and products during construction.
- B. Related Sections:
 - 1. Section 01820 – Demonstration and Training.

1.02 GENERAL

- A. Provide starting and adjusting as required by specification sections for particular equipment and systems and as required below. Conduct thorough and systematic performance test of each element of the Work.
- B. Conduct thorough and systematic performance test of each element of the Work.
- C. Conduct starting, adjusting, and testing in accordance with manufacturer's instructions and applicable industry standards.
- D. Complete satisfactory pressure testing of piping prior to starting hydraulic systems.
- E. Preliminary starting, adjusting, and testing of chemical feed equipment shall be with plant water as the pumped fluid. Final starting, adjusting, and testing shall use chemicals furnished by Owner.

1.03 SUBMITTALS

- A. Submit a written report in accordance with Section 01330 – Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.04 COORDINATION

- A. Coordinate starting and adjusting with requirements of Section 01820 – Demonstration and Testing.
- B. Notify Engineer ten (10) days in advance of starting or testing equipment or systems.

1.05 STARTING

- A. Prior to starting, verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
- B. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- C. Verify that wiring and support components for equipment are complete and tested.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 GENERAL

- A. Water main will require start-up and testing using water.

3.02 PREPARATION

- A. Contractor shall have completed all of the aforementioned test preparation and coordination prior to initiating start-up and testing.
- B. Contractor shall notify the Owner and Engineer of his intent to begin start-up and testing.
- C. Contractor shall prepare a plan that details the means and methods for start-up and testing of the water main and electrical system and submit it to the Owner and Engineer for review and approval.

3.03 EXECUTION

- A. The tables below outline the required testing and start-up applicable to each of the facility components that requires water to perform the test. Contractor shall prepare a testing and start-up plan utilizing the information in the table below.

Table A1 – Start-up Table

TREATMENT COMPONENT	MECHANICAL START-UP	PROCESS START-UP	TESTING	WATER SOURCE
Process Piping	Not Applicable	Not Applicable	Leakage: Hydrostatic	Potable Water

Table A2 – Hydrostatic Testing Table

TREATMENT COMPONENT	APPROXIMATE VOLUME, GALLONS	APPROXIMATE FILL ELEVATION / DEPTH	HYDROSTATIC TEST STANDARD, % ALLOWABLE
Presby Mound System			0.075% Loss/day
Process Piping			240 gallons/inch diameter/mile/day

- B. Contractor shall document the filling, start-up, testing and draining of pipelines using a Pipeline Pressure Testing Record form.

END OF SECTION 01750

DIVISION 1 - GENERAL REQUIREMENTS
Section 01760 – Safety Requirements and
Protection of Property

PART 1 GENERAL

1.01 CONTRACTOR'S RESPONSIBILITY FOR SAFETY

- A. The Contractor shall do whatever work is necessary for safety and be solely and completely responsible for conditions of the jobsite, including safety of all persons (including employees) and property during the Contract period. This requirement shall apply continuously and not be limited to normal working hours.

1.02 FEDERAL, STATE, AND LOCAL SAFETY REQUIREMENTS

- A. Safety provisions shall conform to the Federal and State Departments of Labor Occupational Safety and Health Act (OSHA), and all other applicable federal, state, county, and local laws, ordinances, codes, the requirements set forth herein, and any regulations that may be specified in other parts of these Contract Documents. Where any of these are in conflict, the more stringent requirement shall be followed. The Contractor's failure to thoroughly familiarize himself with the aforementioned safety provisions shall not relieve him from compliance with the obligations and penalties set forth therein.

1.03 SAFE ACCESS BY FEDERAL, STATE, AND LOCAL GOVERNMENT OFFICIALS

- A. The Contractor shall at all times provide proper facilities for safe access to the work by authorized government officials.

1.04 CONSTRUCTION SAFETY PROGRAM

- A. The Contractor shall develop and maintain for the duration of this Contract, a safety program that will effectively incorporate and implement all required safety provisions. The Contractor shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety program.
- B. The duty of the Engineer to conduct construction review of the Contractor's performance is not intended to include a review or approval of the adequacy of the Contractor's safety supervisor, the safety program, or any safety measures taken in, on, or near the construction site.

1.05 SAFETY EQUIPMENT

- A. The Contractor, as part of his safety program, shall maintain at his office or other well-known place at the jobsite, safety equipment applicable to the work as prescribed by the governing safety authorities, all articles necessary for giving first-aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of any person who may be injured on the jobsite.

- B. The performance of all work and all completed construction, particularly with respect to ladders, platforms, structure openings, scaffolding, shoring, lagging, machinery guards and the like, shall be in accordance with the applicable governing safety authorities.

1.06 INCIDENT REPORTS

- A. If death or serious injuries or serious damages are caused, the incident shall be reported immediately by telephone or messenger to the Engineer. In addition, the Contractor must promptly report in writing to the Engineer all incidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses.
- B. If a claim is made by anyone against the Contractor or any subcontractor on account of any incident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

1.07 TRAFFIC SAFETY AND ACCESS TO PROPERTY

- A. Comply with all rules and regulations of the city, state, and county authorities regarding closing or restricting the use of public streets or highways. No public or private road shall be closed, except by express permission of the Owner. Conduct the work so as to assure the least possible obstruction to traffic and normal commercial pursuits. Protect all obstructions within traveled roadways by installing approved signs, barricades, and lights where necessary for the safety of the public. The convenience of the general public and residents adjacent to the project, and the protection of persons and property are of prime importance and shall be provided for in an adequate and satisfactory manner. The Contractor shall clean public roads in the project vicinity as required by the city, state and county authorities, and Owner.

1.08 FIRE PREVENTION AND PROTECTION

- A. The Contractor shall perform all work in a fire-safe manner. He shall supply and maintain on the site adequate fire-fighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable federal, local, and state fire-prevention regulations. Where these regulations do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

1.09 USE OF EXPLOSIVES

- A. Explosives shall not be used on this project.

1.10 CONTRACTOR TO SAFEGUARD EXISTING UTILITIES

- A. The Contractor shall perform all work, in such a manner as to avoid damage to existing fire hydrants, power poles, lighting standards, and all other existing utilities, public or private. See Division 1.

1.11 PROTECTION OF TREES

- A. Protect from damage all trees outside the limits of the work and trees within the limits of the work which are designated on the Drawings to remain undisturbed.

1.12 TREE REMOVAL

- A. No trees shall be removed without the express approval of the Engineer. Removed trees shall be disposed of in a legal manner off the worksite by the Contractor.

1.13 SURVEY TO ESTABLISH AUTHENTICITY OF POSSIBLE DAMAGE CLAIMS

- A. After the Contract is awarded and before the commencement of work, the Contractor shall make a thorough examination of all existing right-of-way, easements, buildings, structures, landscaping, pavement, patios and other improvements in the vicinity of the work, as applicable, which might be damaged by his operations.
- B. Records in triplicate of all observations shall be prepared by the Contractor and every copy of every document shall be signed by the authorized representative of the Contractor. Photographs shall be made by the Contractor and signed in the manner specified above. One signed copy of every document and photograph will be kept on file in the office of the Engineer. Photos and videos shall have the date of capture embedded in the file and visible when viewing. For video files, Contractor shall include a signed log of videos identifying the location, direction of viewing and landmarks for reference.
- C. The above records and photographs are intended for use as indisputable evidence in ascertaining the extent of any damage which may occur as a result of the Contractor's operations and are for the protection of the adjacent property owners, the Contractor, and the Owner, and will be a means of determining whether and to what extent damage, resulting from the Contractor's operations, occurred during the Contract work.
- D. Contractor shall not be allowed to start work until submission of the records described in this section are submitted to the Owner and Engineer.

1.14 PROTECTION OF PRIVATE PROPERTY

- A. When working on private property and in easements, Contractor shall take the necessary steps to protect that property from damage as a result of the work. This may include, but is not limited to, laying down plates, plywood or other barriers to protect driveways, patios, lawn, landscaping, buildings and other features from damage as a result of Contractor's work.
- B. Contractor shall notify property owners in advance of needing to access private property. Owner and Engineer shall be copied on any correspondence and made aware of any communication with the property owner.
- C. Contractor shall restore any damage to private property to a condition equal or better than it existed prior to the start of work on the property. Documentation as

obtained and provided in Section 1.13 of this specification shall be referenced in discussions regarding private property damage.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 01760

DIVISION 1 – GENERAL REQUIREMENTS
Section 01780 – Closeout Procedures

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Administrative and procedural requirements for contract closeout.
- B. Related Requirements Specified Elsewhere:
 - 1. Section 01110 – Summary of Project.
 - 2. Section 01330 – Submittal Procedures.
 - 3. Section 01782 – Operation and Maintenance Manuals.
 - 4. Divisions 2 – 46: Closeout submittals required in various Sections.

1.02 PRELIMINARY SUBSTANTIAL COMPLETION PROCEDURES

- A. Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in request.
 - 1. Prepare list of items to be completed or corrected (Punch List).
 - 2. In Application for Payment that coincides with, or first follows date Substantial Completion is claimed, show 100% completion for portion of work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to Contract Sum.
 - 3. If 100% completion cannot be shown, include a list of incomplete items, value of incomplete construction, and reasons work is not complete.
 - 4. Advise Owner of pending insurance change-over requirements.
 - 5. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
 - 6. Obtain and submit releases enabling Owner unrestricted use of work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
 - 7. Deliver tools, spare parts, extra stock and similar items.
 - 8. Make final change-over of permanent locks and transmit keys to Owner. Advise Owner's personnel of change-over in security provisions.
 - 9. Complete start-up testing of systems and instruction of Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from site, along with construction tools, mock-ups and similar elements.
 - 10. Complete final clean up requirements in accordance with Section 01740 – Cleaning. Touch-up and otherwise repair and restore marred exposed finishes.

1.03 SUBSTANTIAL COMPLETION - INSPECTION PROCEDURES

- A. On receipt of a request for inspection, Engineer will either proceed with inspection or advise Contractor of unfilled requirements. Engineer will prepare Certificate of Substantial Completion following inspection or advise Contractor of construction that must be completed or corrected before certificate will be issued.
- B. Engineer will repeat inspection when requested and assured that work has been substantially completed.
- C. Results of completed inspection will form basis of requirements for final acceptance.

1.04 FINAL ACCEPTANCE - PRELIMINARY PROCEDURES

- A. Before requesting final inspection for certification of final acceptance and final payment, complete following. List exceptions in request.
 - 1. Submit final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 - 2. Submit written declaration that all aspects of contract documents have been complied with.
 - 3. Submit an updated final statement, accounting for final additional changes to Contract Sum.
 - 4. Submit certified copy of Engineer's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.
 - 5. Submit final meter readings for utilities, measured record of stored fuel, and similar data as of date of Substantial Completion, or when Owner took possession of and responsibility for corresponding elements of work.
 - 6. Submit a final liquidated damages settlement statement.
 - 7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - 8. Submit Project Record Drawings in accordance with Section 01330 – Submittal Procedures.
 - 9. Submit Operation and Maintenance Manuals in accordance with Section 01782 – Operation and Maintenance Manuals and Section 01330 – Submittal Procedures.

1.05 REINSPECTION PROCEDURES

- A. Engineer will reinspect work upon receipt of notice that work, including inspection list items from earlier inspections, has been completed in accordance with contract documents, except items whose completion has been delayed because of circumstances acceptable to Engineer.
- B. Upon completion of reinspection, Engineer will prepare a certificate of final acceptance, or advise Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

- C. If necessary, reinspection will be repeated. Contractor shall pay the cost of reinspection over two (2) times.

1.06 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three (3) copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 - 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Engineer / Architect and Project Representative.
 - d. Name of Contractor.
 - e. Page number.

1.07 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Engineer / Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 by 11-inch (215 by 280-mm) paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.08 FINAL APPLICATION FOR PAYMENT - SUBMITTAL ITEMS

- A. Application for Payment.
- B. Consent of Surety Company to Final Payment.
- C. Contractor's Affidavit of Release of Liens.
- D. Contractor's Affidavit of Debts and Claims.
- E. Final Waivers of Lien from Subcontractors and Suppliers.
- F. Duly execute all submittals before delivery to Engineer.
- G. Engineer will process final application in accordance with General Conditions.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 EXECUTION

3.01 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

- d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Touch and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - i. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - m. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Replace parts subject to unusual operating conditions.
 - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - q. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - s. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess material on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01780

DIVISION 1 - GENERAL REQUIREMENTS
Section 01782 - Operation and Maintenance
Manuals

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work Includes:
 - 1. Compile product data and related information appropriate for Owner's maintenance and operation of products provided under Contract.
 - 2. Instruct Owner's personnel in maintenance of products and in operation of equipment and systems.
 - 3. Each Contractor and Sub-Contractor shall prepare copies of Manuals as specified herein and deliver to Engineer.

1.02 RELATED SECTIONS

- A. Section 01780 – Closeout Procedures
- B. Section 01820 – Demonstration and Training

1.03 SUBMITTALS

- A. Form:
 - 1. Manufacturer's standard product or equipment data of same type and form furnished to manufacturer's maintenance personnel.
- B. Booklet shall be bound in three-ring-loose-leaf binder with following title lettered on the front, "Record and Information Booklet" and shall include official project title. No sheets larger than 8-1/2" x 11 inches shall be used except sheets that may be neatly folded to 8-1/2 x 11 inches and used as pull-out.

1.04 MANUAL CONTENT

- A. Neatly typewritten table of contents for each volume, arranged in systematic order. Follow Project Manual format.
 - 1. Contractor, name of responsible principal, address and telephone number.
 - 2. List of each product required to be included, indexed to volume content.
 - 3. List with each product, the name, address and telephone number of:
 - a. Subcontractor
 - b. Maintenance contractor, as appropriate
 - c. Identify area of responsibility of each
 - d. Local supply source for parts and replacement

- B. Product Data:
 - 1. Include only sheets pertinent to specific product.
 - 2. For equipment items, include model and serial numbers on the cover page.
 - 3. Annotate each sheet to:
 - a. Clearly identify specific product or part installed.
 - b. Clearly identify data applicable to installation.
 - c. Delete references to inapplicable installation.
- C. Drawings:
 - 1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relationship of component parts of equipment and systems.
 - b. Control and flow diagrams.
 - 2. Coordinate drawings with information in Product Record Documents to assure correct illustration of completed installation.
 - 3. Do not use Project Record Documents as maintenance drawings.
- D. Written text, as required to supplement product data for particular installation:
 - 1. Organize in consistent format under separate headings for different procedures.
 - 2. Provide logical sequence of instructions for each procedure.
- E. Copy of each warranty, bond and service contract issued.
 - 1. Provide information sheet for Owner's personnel. Give:
 - a. Proper procedures in event of failure.
 - b. Instances which might affect validity of warranties or bonds.
- F. Emergency instructions.
- G. Spare parts list.

1.05 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two copies of complete manual in final form.
- B. Content for architectural products, applied materials and finishes:
 - 1. Manufacturer's data, giving full information on products.
 - a. Catalog number, size, composition.
 - b. Color and texture designations.
 - c. Information required for re-ordering special-manufactured products.
 - 2. Instructions for care and maintenance.
 - a. Manufacturer's recommendations for types of cleaning agents and methods.
 - b. Cautions against cleaning agents and methods detrimental to product.
 - c. Recommended cleaning and maintenance schedule.

- C. Content, for moisture-protection and weather-exposed products.
 - 1. Manufacturer's data, giving full product information.
 - a. Applicable standards
 - b. Chemical composition
 - c. Installation details
 - 2. Instructions for inspection, maintenance and repair.
- D. Additional maintenance data requirements - Respective Specification Sections.
- E. Provide complete information for products specified in all sections of Specifications.

1.06 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit three (3) copies (two for Owner, one for Engineer) of complete manual in final form.
- B. Content, for each unit of equipment and system, as appropriate:
 - 1. Description of unit and component parts.
 - a. Function, normal operating characteristics and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of all replaceable parts.
 - 2. Operating Procedures:
 - a. Start-up, break-in, routine and normal operating instructions.
 - b. Regulation, control, stopping, shut-down and emergency instructions.
 - c. Summer and winter operating instructions.
 - d. Special operating instructions.
 - 3. Maintenance procedures:
 - a. Routine operations.
 - b. "Trouble-shooting" guide.
 - c. Disassembly, repair and reassembly.
 - d. Alignment, adjusting and checking.
 - 4. Servicing and lubrication schedule:
 - a. List of required lubricants.
 - 5. Manufacturer's current printed operating and maintenance instructions.
 - 6. Description of sequence of operation by control manufacturer.
 - 7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
 - a. Predicted life of parts subject to wear.
 - b. Items recommended to be stocked as spare parts.
 - 8. As-installed control diagrams by control manufacturer.
 - 9. Each contractor's coordination drawings.
 - a. As-installed color-coded piping diagrams.
 - 10. Charts of valve tag numbers, with location and function of each valve.
 - 11. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.

12. Other data as required in pertinent specification sections.
- C. Content, for each electric and electronic system, as appropriate:
1. Description of system and component parts:
 - a. Function, normal operating characteristics and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 2. Circuit directories of panelboards.
 - a. Electrical service
 - b. Controls
 - c. Communications
 3. As-installed color-coded wiring diagrams.
 4. Operating procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Special operating instructions.
 - d. Passwords, where applicable.
 5. Maintenance procedures:
 - a. Routine operations.
 - b. "Trouble-shooting" guide.
 - c. Disassembly, repair and reassembly
 - d. Adjustment and checking.
 6. Manufacturer's current printed operating and maintenance instructions.
 7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 8. Other data as required in pertinent specification sections.
- D. Prepare and include additional data when need for such data becomes apparent during instruction of Owner's personnel.
- E. Additional requirements for operating and maintenance data - respective Specification Sections.
- F. Provide complete information for products specified in:
1. Plumbing Systems
 2. HVAC Systems
 3. Controls and Instrumentation
 4. Motors (Electrical)
 5. Power Transmission
 6. Service and Distribution
 7. Lighting
 8. Special Systems
 9. Water and wastewater equipment

1.07 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 - 1. Type of emergency.
 - 2. Emergency instructions.
 - 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 - 1. Fire.
 - 2. Flood.
 - 3. Gas leak.
 - 4. Water leak.
 - 5. Power failure.
 - 6. Water outage.
 - 7. System, subsystem, or equipment failure.
 - 8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
 - 1. Instructions on stopping.
 - 2. Shutdown instructions for each type of emergency.
 - 3. Operating instructions for conditions outside normal operating limits.
 - 4. Required sequences for electric or electronic systems.
 - 5. Special operating instructions and procedures.

1.08 SUBMITTAL SCHEDULE

- A. Submit two (2) copies of draft of proposed formats and outlines of contents 30 business days prior to Substantial Completion.
 - 1. Engineer/Architect will review draft and return one copy with comments within five (5) business days after receipt.
- B. Submit one (1) copy of completed data in final form 15 business days prior to Substantial Completion.
 - 1. Copy will be returned within five business days after Substantial Completion, with comments.
- C. Submit specified number of copies of approved data in final form at least 10 business days before final acceptance or approval.

1.09 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in operation, adjustment and maintenance of all products, equipment and systems.
- B. Arrange for each installer of equipment that requires regular maintenance to meet with Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives.
Include a detailed review of the following items:
 - 1. Maintenance manuals.
 - 2. Record documents.
 - 3. Spare parts and materials.
 - 4. Tools.
 - 5. Lubricants.
 - 6. Fuels.
 - 7. Identification systems.
 - 8. Control sequences.
 - 9. Hazards.
 - 10. Cleaning.
 - 11. Warranties and bonds.
 - 12. Maintenance agreements and similar continuing commitments.

PART 2 PRODUCTS – (NOT APPLICABLE)

PART 3 EXECUTION

3.01 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Manual for Materials and Finish: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
1. Do not use original Project Record Documents as part of operation and maintenance manuals.
- G. Comply with Section 01780 - Closeout Procedures for schedule for submitting operation and maintenance documentation.

END OF SECTION 01782

DIVISION 1 – GENERAL REQUIREMENTS
Section 01820 – Demonstration and
Training

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Requirements for demonstration of operation and training of Owner's personnel for equipment, systems, and complete Work, excluding Owner furnished equipment.
- B. Related Sections:
 - 1. Section 01782 - Operation and Maintenance Manuals: Preliminary O&M manual requirements

1.02 SUBMITTALS

- A. For each equipment or system provided, submit approval of formal training procedure by equipment or system manufacturer or authorization of instructor by equipment or system manufacturer.
- B. Submit schedule of demonstration and training sessions.

1.03 COORDINATION

- A. Coordinate demonstration and training with Owner.
- B. Coordinate demonstration and training with equipment and system manufacturers.

1.04 TRAINING

- A. Provide training as required by specification sections for particular equipment and systems and as required below.
- B. Provide formal training by manufacturer's authorized instructor or as approved by manufacturer for all systems and equipment.
- C. Provide preliminary O&M Manuals as required by Section 01782 - Operation and Maintenance Manuals to serve as the basis for training.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

- E. Provide training to Owner's personnel selected by Owner (not to exceed 10 persons).

1.05 DEMONSTRATION

- A. Provide demonstration as required by specification sections for particular equipment and systems and as required below.
- B. For all equipment and systems, demonstrate compliance with the requirements of the Contract Documents, start-up, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment to Engineer and Owner's personnel.
- C. Demonstrate operation and maintenance of Products to Owner's personnel two (2) weeks prior to date of final inspection.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

1.06 QUALITY ASSURANCE

- A. Facilitator Qualifications: (Reserved)
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Photographer Qualifications: (Reserved).
- D. Preinstruction Conference: (Reserved)

1.07 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Engineer.

PART 2 PRODUCTS

2.01 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:

1. Motorized doors, including overhead coiling doors, overhead coiling grilles, and automatic entrance doors.
 2. Equipment, including stage equipment, projection screens, loading dock equipment, waste compactors, food-service equipment, residential appliances, and laboratory fume hoods.
 3. Fire-protection systems, including fire alarm, fire pumps, and fire-extinguishing systems.
 4. Intrusion detection systems.
 5. Conveying systems, including elevators, wheelchair lifts, escalators and cranes.
 6. Medical equipment, including medical gas equipment and piping.
 7. Laboratory equipment, including laboratory air and vacuum equipment and piping.
 8. Heat generation, including boilers, feedwater equipment, pumps, steam distribution piping and water distribution piping.
 9. Refrigeration systems, including chillers, cooling towers, condensers, pumps and distribution piping.
 10. HVAC systems, including air-handling equipment, air distribution systems and terminal equipment and devices.
 11. HVAC instrumentation and controls.
 12. Electrical service and distribution, including transformers, switchboards, panelboards, uninterruptible power supplies and motor controls.
 13. Packaged engine generators, including transfer switches.
 14. Lighting equipment and controls.
 15. Communication systems, including intercommunication, surveillance, clocks and programming, voice and data and television equipment.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project Record Documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing

commitments.

3. Emergencies: Include the following, as applicable.
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning.
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and

- d. reassembly instructions.
- e. Instructions for identifying parts and components.
- e. Review of spare parts needed for operation and maintenance.

PART 3 EXECUTION

3.01 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.
- B. Set up instructional equipment at instruction location.

3.02 INSTRUCTION

- A. Facilitator: (Reserved)
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Engineer/Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 - 2. Owner will furnish an instructor to describe Owner's operational philosophy.
 - 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner through Project Representative with at least seven (7) day's advance notice.
- D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.03 DEMONSTRATION AND TRAINING VIDEOS (RESERVED)

END OF SECTION 01820

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CAMPGROUND IMPROVEMENTS – BASE BID AND ALTERNATES
FERDINAND STATE FOREST/DEPARTMENT OF NATURAL RESOURCES

DIVISION 02 – SITE WORK

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DIVISION 2 - SITEWORK
Section 02220 - Site Demolition

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. Demolition of structures, paving, and utilities.
 - 2. Filling voids created as a result of removals or demolition.
- B. Related Sections
 - 1. Section 02100 – Site Preparation
 - 2. Section 02305 – Excavation and Backfill for Utilities
 - 3. Section 02317 – Backfilling and Compaction for Structures
 - 4. Section 02370 – Erosion and Sedimentation Control (SWPPP)

1.02 REGULATORY REQUIREMENTS

- A. Conform to applicable State and local codes for demolition of structures, safety of adjacent structures, dust control, and runoff control.
- B. Obtain required permits and licenses from appropriate authorities. Pay associated fees including disposal charges.
- C. Notify affected utility companies before starting work and comply with their requirements.
- D. Do not close or obstruct public or private roadways, sidewalks, or fire hydrants without appropriate permits or written authorization.
- E. Conform to applicable regulatory procedures when hazardous or contaminated materials are discovered.
- F. Test soils around buried tanks for contamination.

1.03 SUBMITTALS

- A. Project Record Documents: Accurately record actual locations of capped utilities and subsurface obstructions that will remain after demolition. Notify Engineer that underground elements are exposed and allow Engineer the opportunity to observe and record the point. Submit record as part of closeout submittals.

1.04 PROJECT CONDITIONS

- A. Structures to be demolished will be discontinued from use and vacated prior to start of work.
- B. Owner assumes no responsibility for condition of structures to be demolished.
- C. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as reasonably practical. Variations within structures may occur by Owner's removal and salvage operations prior to start of demolition work.
- D. Unless otherwise indicated in Contract Documents or specified by the Owner, items of salvageable value to Contractor shall be removed from site and

structures. Storage or sale of removed items on site will not be permitted and shall not interfere with other work specified.

PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. Fill material shall be as specified in Section 02305 – Excavation and Backfill for Utilities and Section 02317 – Backfilling and Compaction for Structures.

PART 3 EXECUTION

3.01 PREPARATION

- A. Provide, erect, and maintain erosion control devices, temporary barriers, and security devices at locations indicated on Construction Drawings.
- B. Protect existing landscaping materials, appurtenances, and structures, which are not to be demolished. Repair damage to existing items to remain caused by demolition operations.
- C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring as necessary.
- D. Mark location of utilities. Protect and maintain in safe and operable condition utilities that are to remain. Prevent interruption of existing utility service to occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities as acceptable to governing authorities and Owner.
- E. Notify adjacent property owners of work that may affect their property, potential noise, utility outages, or other disruptions. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon, or limit access to their property. Coordinate notice with Owner.

3.02 GENERAL DEMOLITION REQUIREMENTS

- A. Conduct demolition to minimize interference with adjacent structures or pavements to remain.
- B. Cease operations immediately if adjacent structures appear to be in danger. Notify authority having jurisdiction. Do not resume operations until directed by authority.
- C. Conduct operations with minimum of interference to public or private access. Maintain ingress and egress at all times.
- D. Sprinkle work with water to minimize dust. Provide hoses and water connections for this purpose.
- E. Comply with governing regulations pertaining to environmental protection.
- F. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to start of work.

3.03 DEMOLITION

- A. Demolish site improvements designated to be removed as shown on the drawings. Site improvements shall include but not be limited to structures, retaining walls, foundations, pavements, curbs and gutters, drainage structures, utilities, signage or landscaping.
- B. Disconnect and cap or remove utilities to be abandoned as shown on the drawings.
- C. Fill or remove underground tanks, piping, and appurtenances as shown.
- D. Demolish buildings completely and remove from site using methods as required to complete work within limitations of governing regulations. Small structures may be removed intact when acceptable to Owner and authorities having jurisdiction.
- E. Locate demolition equipment and remove materials to prevent excessive loading to supporting walls, floors, or framing.
- F. Demolish concrete and masonry in small sections. Break up concrete slabs-on-grade that are 2-feet or more below proposed subgrade to permit moisture drainage. Remove slabs-on-grade and below grade construction within 2-feet of proposed subgrade.

3.04 FILLING BASEMENTS AND VOIDS

- A. Completely fill below grade areas and voids resulting from demolition or removal of structures, underground fuel storage tanks, wells, cisterns, etc., using aggregate fill materials consisting of stone, gravel, or sand free from debris, trash, frozen materials, roots, and other organic matter.
- B. Areas to be filled shall be free of standing water, frost, frozen or unsuitable material, trash, and debris prior to fill placement.
- C. Place fill materials in accordance with Section 02305 and 02317 unless subsequent excavation for new work is required.
- D. Grade surface to match adjacent grades and to provide flow of surface drainage after fill placement and compaction.

3.05 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from site debris, rubbish, and other materials resulting from demolition operations. Leave areas of work in clean condition.
- B. No burning of any material, debris, or trash on-site or off-site will be allowed.
- C. Transport materials removed from demolished structures with appropriate vehicles and dispose off-site to areas that are approved for disposal by governing authorities and appropriate property owners.

END OF SECTION 02220

DIVISION 02 – SITEWORK
Section 02315 – Excavation and Fill

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Excavation, stockpiling, placement and compaction, of earth materials as required under the project.
- B. Backfilling and compacting for structures, pavements, and general site
- C. Site rough and finish grading
- D. Preparation of subgrade for slabs, pavements, and installation of footings
- E. Standard Proctor density testing and compaction testing
- F. Excavation and backfill for utilities and piping
- G. Related Sections
 - 1. Section 01500 – Temporary Construction Facilities and Controls
 - 2. Section 02370 – Erosion Control – SWPPP
 - 3. Section 02500 – Buried Piping
 - 4. Division 02 – Sitework
 - 5. Division 03 – Concrete
 - 6. Division 16 – Electrical
- H. Reference to Standards
 - 1. American Safety for Testing and Materials (ASTM).
 - 2. Indiana Department of Transportation (INDOT): Standard Specifications for Road and Bridge Construction latest edition and applicable sections of the Supplemental Specifications and Recurring Special Provisions latest edition, hereinafter referred to as INDOT Standard Specifications.
 - 3. Occupational Safety and Health Administration (OSHA): Current OSHA Occupational Safety and Health Standards - Excavations, 29 CFR Part 1926, including any successor regulations.
 - 4. ASTM D698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).
 - 5. ASTM D 4253 Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 - 6. ASTM D 4254 Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.

I. Regulatory Requirements

1. Perform excavation and backfilling work in compliance with applicable requirements of governing authorities having jurisdiction.
2. Prior to the commencement of construction, the Contractor shall be aware of, and become familiar with applicable local, state and federal safety regulations, including the current OSHA Occupational Safety and Health Standards - Excavations, 29 CFR Part 1926, including any successor regulations.
3. Additionally, the Contractor shall be aware that slope height, slope inclination and excavation depths (including utility trench excavations) should in no case exceed those specified in local, state or federal safety regulations.

1.03 DEFINITIONS

- A. Suitable Soil: Suitable soil is a soil having less than 6% organic matter by weight as determined by Loss on Ignition Test (determine weight loss caused by heating sample to 500 degrees C for six hours after drying in accordance with ASTM D-2216, "Laboratory Determination of Moisture Content of Soil").
- B. Unsuitable Soil: Unsuitable soil is a soil that contains 6% or more organic matter as determined by the Loss on Ignition test, soils with a Proctor maximum dry density less than 100 pcf, soils with a Plasticity Index of less than 4, shale, weathered shale, coal, rubbish, vegetable matter of any kind, roots and rocks larger than two inches in dimension which might interfere with the proper bonding to adjacent surfaces, or as otherwise determined unsuitable by Engineer or the Contractor's qualified independent testing laboratory.
- C. Stable Soil: soil is considered sufficiently stable when it
 1. Prevents rutting and shoving during standard construction practices
 2. Limits the amount of rebound deflections under wheel loadings (pumping)
 3. Provides good support of placement and compaction of subsequent layers of fill.
- D. Cohesionless Soils: Soils which do not demonstrate a well-defined moisture-density relationship in compaction testing. Also referred to as granular soils.
- E. Cohesive Soils: Soils which demonstrate a well-defined moisture-density relationship in compaction testing.
- F. Pavement or Paved Surfaces: Existing or proposed surface treatments of bituminous asphalt, Portland cement concrete, or compacted aggregate.

1.04 COORDINATION

- A. Do not interrupt existing utilities serving facilities occupied and used by Owner or others except when permitted in writing by the Engineer and then only after acceptable temporary utility services have been provided. Provide minimum of 48 hour notice prior to enacting an approved temporary interruption.

1.05 SUBMITTALS

- A. Submit under the provisions of Division 1, Section 01330 – Submittal Procedures. All materials shall be submitted for approval. Samples shall be submitted when requested by the Engineer.
- B. Manufacturer's Certificate and Product Data: Certify that products meet or exceed specified requirements.
- C. The Contractor shall submit a list of equipment intended to be utilized on this project to the Engineer.

1.06 FIELD TESTING

- A. Provide in accordance with Division 1, Section 01450 – Quality Requirements.
- B. Compaction Tests
 - 1. Standard Proctor Density Testing and Compaction Testing of fill materials and inspection of subgrades and fill layers will be performed by the Contractor's qualified independent testing laboratory. Contractor shall inform Engineer 24 hours in advance of soil compaction operations.
 - 2. If in the opinion of the Engineer or the Contractor's qualified independent testing firm, based on proofrolls, field density tests, or inspections, subgrades and fills which have been placed below the specified density or subgrades and fills which exhibit the characteristics of unstable soils, the Contractor shall provide additional compaction and/or removal and replacement of the material at no additional cost to the Owner.
 - 3. When, during progress of work, tests indicate that compacted materials will not meet specifications, remove defective work, replace and retest at no additional cost to the Owner.
 - 4. Ensure that all compacted fills are tested before proceeding with placement of surface materials.

PART 2 PRODUCTS

2.01 STRUCTURAL FILL MATERIALS

- A. General
 - 1. Unless otherwise specified on the plans, structural fill for all structures shall meet the requirements per the plans or shall be composed of suitable lean (silty or sandy) clay with liquid limit no greater than 50% and plasticity index no greater than 25%. The on-site lean clay materials obtained from excavations may be used as structural fill provided that it is not deemed unsuitable per Article 1.03 of this Section.
 - 2. Contractor shall engage a qualified independent testing laboratory to test materials from on-site and off-site sources to test materials for conformance to this specification.

2.02 FILL AND BACKFILL MATERIALS

- A. Base Materials: Under floors, structural slabs, pads, concrete landings, exterior walks, steps, or grade slabs, base material shall be INDOT No. 53 crushed

limestone Class C Quality material with a Plasticity Index (PI) range of 0 to 4, minimum of 6 inches in depth unless otherwise shown. All materials to be compacted to 97% Standard Proctor Density in accordance with ASTM D-698.

- B. Granular Materials: When called for on the plans, granular backfill under steps, concrete landings, walks, slabs and against substructure walls is defined as granular soils INDOT No. 53 aggregate quality with a Plasticity Index (PI) range of 0 to 4.
- C. Cohesive Materials: Provide acceptable soil materials in accordance with geotechnical report provided that it is not deemed unsuitable per Article 1.03 of this Section.

2.03 FILTER FABRIC

- A. Nonwoven needle punched geotextile composed of polypropylene filaments formed into a stable network. Filter fabric shall be inert to biological degradation and to naturally encountered chemicals, alkalines and acids.
- B. Filter fabric shall be Mirafi 1100N or an equal material conforming to the properties listed on the following page:

PROPERTY	TEST METHOD	UNIT	MINIMUM AVERAGE VALUE
Weight	ASTM D-5261	oz/yd ²	10.3
Thickness	ASTM D-5199	mils	100
Grab Tensile Strength	ASTM D-4632	lbs.	250
Grab Tensile Elongation	ASTM D-4632	%	50
Mullen Burst Strength	ASTM D-3786	psi	500
Puncture Strength	ASTM D-4833	lbs.	155
Trapezoid Tear Strength	ASTM D-4533	lbs.	100
Apparent Opening Size	ASTM D-4751	U.S. Std. Sieve	100
Permittivity	ASTM D-4491	Sec ⁻¹	1.0
Permeability	ASTM D-4491	inch/sec	0.2
Flow Rate	ASTM D-4355	gpm/ft ²	75

- C. Filter fabric shall be shipped in roll sizes to minimize the number of laps required during installation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Information

1. Data indicated on subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner, and Engineer will not be responsible for interpretations or conclusions drawn therefrom by Contractor. Data are made available for convenience of Contractor.
2. Contractor shall be responsible for determining the actual ground water elevation and soil conditions at the specific site prior to commencing with the excavation. It may be expedient to drill auger holes, excavate test pits or make additional soil borings at or adjacent to the construction area immediately prior to construction to determine the prevailing soil conditions and water table elevation. It is the Contractor's responsibility to make auger holes, excavate test pits or make additional soil borings as he deems appropriate to determine the ground water and soil conditions that will be encountered. Additional test borings and other exploratory operations made by the Contractor shall be at no cost to the Owner.

3.02 PREPARATION

- A. Establish extent of excavated areas.
- B. Set specified lines, levels, contours and grades.
- C. Maintain bench marks, monuments and other reference points.
- D. Before starting excavation, establish location and extent of underground utilities occurring in work area. Contact Joint Utility Locating Information For Excavators (J.U.L.I.E.) (800) 892-0123, or 811 and all other utility companies on the project site which are not members of this system. If the Contractor ruptures or causes damage to such objects while digging or during any construction, it is the responsibility of the party performing the construction work to pay the utility company for repairs and such costs shall not be borne by the Owner or the Engineer.
- E. Maintain, reroute or extend existing utility lines to remain which pass through work area.
- F. Provide all items and perform all preparation and work for access roads and culverts in accord with INDOT Standard Specifications.
- G. Backfilling and compaction shall not occur until the following conditions are satisfied:
 1. Acceptance by the Engineer of construction below finish grade including, where applicable, dampproofing, geocomposite wall drain, perimeter insulation and filter fabric.
 2. Inspection, testing, approval and recording locations of underground utilities.
 3. Removal of concrete formwork.
 4. Removal of trash and debris, vegetation, snow or ice, water, unsatisfactory soil materials, obstructions and deleterious materials.

5. Removal of shoring and bracing and backfilling of voids with satisfactory material.
6. Ensure that ground surface within excavated area to be backfilled is not frozen.
7. When existing ground surface has a density less than that specified under Article 3.04-C of this Section for particular area classification, break up ground surface, pulverize, moisture-condition to optimum moisture content and compact to required depth and percentage of maximum density. Ground conditioning shall be performed at no additional cost to the Owner.

3.03 EXCAVATION

A. General

1. Excavation consists of removal of material encountered when establishing required grade and subgrade elevations and cross sections.
2. The Contractor is solely responsible for designing and constructing stable excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. All excavations shall comply with applicable local, state and federal safety regulations including the current OSHA Occupational Safety and Health Standards - Excavations, 29 CFR Part 1926, including any successor regulations.
3. All sheeting, shoring and bracing of trenches, pits and excavations shall be the sole responsibility of the Contractor.
4. Construction site safety is the sole responsibility of the Contractor, including but not limited to, the means, methods, and sequencing of construction operations.
5. Earth excavation consists of removal and disposal of pavements and other obstructions visible on ground surface, underground structures and utilities indicated to be demolished and removed, material of any classification indicated in data on sub-surface conditions, and other materials encountered that are not classified as unauthorized excavation.

B. Dewatering

1. Dewatering of excavations, including pipe and utility trenches, shall be performed in accordance with INDOT standards.

C. Unauthorized Excavation

1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at Contractor's expense. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, only when determined necessary by the Engineer. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by the Engineer.

D. Additional Excavation

1. When the excavation has reached the required sub-grade elevations, Contractor shall notify the Contractor's qualified independent testing firm who will make an inspection of conditions. If wet conditions or otherwise unsuitable bearing materials are encountered at the required sub-grade elevations, Contractor shall modify their dewatering activities and allow the subgrade to dry to the optimum moisture content. If, after sufficient time to dry the subgrade, the soil continues to provide unsuitable bearing as determined by the qualified independent testing firm, the Contractor shall carry excavations deeper and replace the excavated material. Removal of unsuitable material and its replacement shall be performed at no additional cost to the Owner.

E. Material Storage

1. Stockpile satisfactory excavated materials until required for backfill or fill. Place, grade and shape stockpiles for proper drainage. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain. Contain excavated silt/soil runoff with silt fences in accordance with the project SWPPP.

F. Excavation for Structure

1. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction and for inspection.
2. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement or base material is placed. Trim bottoms to required lines and grades to leave solid base to receive other work. After completion of excavation and prior to placement of base material, excavations shall be inspected by the Engineer or the Contractor's qualified independent testing firm to insure that suitable bearing has been obtained. Twenty-four (24) hours notice shall be given to the Engineer.
3. Placing of footings and foundations on earth fill will not be permitted. Fill excess cuts under footings and foundations with INDOT No. 53 aggregate compacted to 100% Standard Proctor ASTM D698 and fill any excess cuts under slabs with lean concrete.

G. Excavation Near Utilities

1. Protect, support, shore, brace, etc. all utility services uncovered by excavation.
2. Accurately locate and record abandoned and active utility lines rerouted or extended, on Project Record Documents.
3. Repair damaged utilities to the satisfaction of the Utility Owner.

H. Disposal of Excess and Waste Materials

1. Removal from Owner's Property
 - a. Remove waste materials, trash and debris and legally dispose of it off Owner's property at no expense to Owner.

2. Excess Material
 - a. Excess excavated material shall be removed from the site and properly disposed of.

3.04 BACKFILLING AND COMPACTION

A. General

1. Definition
 - a. Backfilling shall consist of placing and compacting the necessary fill materials within the space excavated for the structures to the grade limits shown on the drawings or as directed by the Engineer.
2. Place acceptable material in layers to required subgrade elevations, for each area classification listed below.
 - a. In lawn or unpaved areas, use satisfactory excavated or borrow fill material.
 - b. Buildings, structures, pavements, walks, steps, and slabs, use granular fill or base material as indicated.

B. Placement and Compaction

1. Place backfill, base and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand operated tampers. Heavy equipment including compaction equipment shall not operate within 2 feet of substructure walls. Compaction in these areas shall be obtained with hand operated compaction equipment or devices.
2. Before compaction, moisten or aerate each layer as necessary to provide a placement with moisture content between 2% below and 3% above the optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen or contain frost or ice.
3. Place backfill and fill materials evenly adjacent to structure to required elevations. Take necessary precautions to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.
4. Allow the Engineer or the qualified independent testing firm to inspect and test each fill layer before further construction work is performed.

C. Percentage of Maximum Density Requirements

1. Unless otherwise noted on the plan sheets, the Contractor shall compact each layer of soil to not less than the following percentages of maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D698, Standard Proctor Compaction Test; and not less than the following percentages of relative density, determined in accordance with ASTM D 4253 and ASTM D 4254, for soils which will not exhibit a well-defined moisture-density relationship (cohesionless soils).

REQUIRED COMPACTIVE EFFORT				
MATERIAL TESTED	PROCTOR TYPE	MIN % DRY DENSITY	MOISTURE CONTENT	MIN FREQUENCY OF TESTING
Structural Fill	Standard	97%	-2 to +3%	1 per 2,500 sf of fill placed
Base Under Slabs and Pavements	Standard	97%	-2 to +3%	1 per 2,500 sf of fill placed
Landscape Fill (non-load bearing)	Standard	90%	-2 to +3%	1 per 5,000 sf of fill placed
Utility Trench	Standard	97%	-2 to +3%	1 per 200 lf of backfill placed

D. Moisture Control

1. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to top surface of subgrade or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
2. For subgrade soil materials that are too wet to permit compaction to the specified density and optimum moisture content, scarify and air-dry or remove and replace with suitable materials meeting the satisfaction of the Engineer.

E. Grading

1. General
 - a. Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth finished surface within specified tolerances. Compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.
 - b. Loosen grades of lawn areas not receiving additional topsoil to a minimum depth of 4". Remove stones over 1-1/2" in any dimension and sticks, roots, rubbish and other extraneous matter.
 - c. Grading Outside Building Lines:
 - i. Grade areas adjacent to building lines to drain away from structures and to prevent ponding.
 - ii. Finish surfaces free from irregular surface changes within 0.10' above or below proposed subgrade elevation.
2. Grading Surface of Backfill Under Walks and Slabs
 - a. Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/4" when tested with a 10' straightedge.
3. Compaction
 - a. After grading, compact subgrade surfaces to the depth and percentage of maximum or relative density for each area classification.

F. Maintenance

1. Protection of Graded Areas
 - a. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
 - b. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

2. Reconditioning Compacted Areas
 - a. Where completed fill areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape and compact to required density prior to further construction.
3. Settling
 - a. Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance quality and condition of surface or finish to match adjacent work and eliminate evidence of restoration to greatest extent possible.

3.05 FILTER FABRIC INSTALLATION

- A. Install filter fabric as shown on the drawings and in accordance with manufacturer's installation procedures, including lap splice and anchorage requirements. Minimum lap splice of filter fabric shall be 2'-0".

3.06 FIELD QUALITY CONTROL

- A. **The Contractor shall allow bearing surfaces at the bottom of excavations to be inspected by the Contractor's qualified independent testing firm prior to placement of any base materials, lean concrete mud slabs, or backfill materials.**
- B. Subgrades:
 1. Proofrolling: Subgrades for pavements and large structures shall be proofrolled to detect areas of insufficient bearing, insufficient compaction, or areas of unstable soils. Proofrolling shall be accomplished by making minimum of 2 complete passes with fully-loaded tandem-axle dump truck with a maximum weight of 20 tons, or approved equal, in each of 2 perpendicular directions while under the supervision and direction of the Contractor's qualified independent testing firm. Areas of failure shall be excavated and recompacted as specified herein. Continual failure areas shall be stabilized at no additional cost to Owner. Subgrade exposed longer than 48 hours or on which precipitation has occurred shall be re-proofrolled.
 2. Visual inspections: subgrades for small or deep excavations or for excavations that are not feasible to proofroll, the Contractor's qualified independent testing firm shall visually inspect and approve subgrades prior to the placement of base materials or mud slabs
- C. The qualified independent testing firm, employed by and paid by the Contractor shall conduct compaction testing at intervals no less than the minimum requirements defined in INDOT Standard Specifications or as specified herein.
- D. Allow the Engineer and the qualified independent testing firm to inspect and test subgrades and fill layers before further construction work is performed.
- E. If in the opinion of the Engineer or the Contractor's qualified independent testing firm, based on proofrolls, field density tests, or inspections, subgrades and fills which have been placed below the specified density or subgrades and fills which exhibit the characteristics of unstable soils, the Contractor shall provide additional

compaction, soil stabilization, and/or removal and replacement of the material at no additional cost to the Owner.

3.07 PROTECTION

A. Stability of Excavation

1. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible either because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
2. Comply with current OSHA Occupational Safety and Health Standards - Excavations, 29 CFR Part 1926, including any successor regulations.
3. Where indicated on the drawings, sloped and vertical sides of excavations shall be stabilized with an erosion control system as specified in Section 02370 – Erosion Control.

B. Cold Weather Protection

1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F (1°C).

C. Protection of Persons and Property

1. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights during hours from dusk to dawn each day and as otherwise required by authorities having jurisdiction.
2. Protect structures, landscaping, utilities, sidewalks, pavements or other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
3. Comply with current OSHA Occupational Safety and Health Standards - Excavations, 29 CFR Part 1926, including any successor regulations.

END OF SECTION 02315

DIVISION 02 - SITEWORK

Section 02370 – Erosion and Sedimentation Control (Including SWPPP)

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes
 - 1. Installation of temporary and permanent erosion and sedimentation control systems.
 - 2. Installation of temporary and permanent slope protection systems.
 - 3. Storm water Pollution Prevention Plan (SWPPP).
- B. Related Sections and Documents
 - 1. Section 02220 – Site Demolition
 - 2. Section 02315 – Excavation and Fill
 - 3. Section 02730 – Aggregate Surface
 - 4. Section 02740 – Asphalt Paving
 - 5. Section 02930 – Planting
 - 6. Storm Water Pollution Prevention Plan
 - 7. Erosion & Sedimentation Control Plans
 - 8. Erosion Control Details
- C. Reference to Standards
 - 1. Indiana Department of Transportation (INDOT): Standard Specifications for Road and Bridge Construction, Section 205 Stormwater Management, latest edition.
 - 2. Indiana Storm Water Quality Manual, latest edition.
 - 3. Indiana Construction Stormwater General Permit (CSGP) administered by IDEM, latest edition.
- D. ENVIRONMENTAL REQUIREMENTS
 - 1. Protect adjacent properties, any identified endangered or threatened species and/or critical habitat, any identified cultural or historic resources, and receiving water resources from erosion and sediment damage until final stabilization is achieved. All storm water controls and systems must be installed & functioning as designed and free of accumulated sediment and debris before final project approval.

1.03 SUBMITTALS

- A. Contractor shall submit shop drawings or material certifications for all manufactured erosion and sediment control materials.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Seed, sod, and ground covers for the establishment of vegetation in accordance with Section 02930 - Planting.
- B. All erosion control products, sediment control devices, or materials for non-storm water BMPs as specified herein and on the Construction Drawings.
- C. Rolled erosion control products according to Erosion Control Technology Council (ECTC) standard specifications.
 - 1. Erosion Control Blanket for slope installations shall be North American Green ERONET S150 Short-term Photodegradable Double-Net Straw Blanket or approved equal
 - 2. Erosion Control Blanket for channel installations shall be North American Green ERONET C125 Long-Term Photodegradable Double-Net Coconut Blanket or approved equal
- D. Temporary mulches such as loose straw, wood cellulose, or hydraulically applied materials.
- E. Rip-Rap (stone protection) as specified on Plans.
- F. Temporary and permanent outfall structures as specified on the drawings.

PART 3 EXECUTION

3.01 PREPARATION

- A. Review the drawings and Storm Water Pollution Prevention Plan.
- B. Conduct storm water pre-construction meeting with Site Contractor, all ground-disturbing Sub-contractors, site engineer of record or their representative who is familiar with the site and SWPPP, and state or local agency personnel if available.
- C. Revise SWPPP as necessary to address potential pollution from site identified after issuance of the SWPPP at no additional cost to owner.

3.02 EROSION AND SEDIMENTATION CONTROL AND SLOPE PROTECTION IMPLEMENTATION

- A. Place erosion and sediment control systems in accordance with the drawings and Storm Water Pollution Prevention Plan or as may be dictated by site conditions in order to maintain the intent of the specifications and permits.
- B. Storm Water Pollution Prevention Plan and Site Maps shall be maintained, corrected, or modified by the Contractor as site conditions progress throughout construction. Contractor must obtain approval from the Owner's Engineer prior to modifying or substituting Best Management Practices.
- C. Contractor shall modify installed Best Management Practices to conform to changing conditions throughout construction. Contractor shall also be required to maintain all installed Best Management Practices in accordance with Indiana Storm Water Quality Manual.

- D. The Contractor shall maintain an up-to-date site plan of installed BMP's at an on-site location during construction until a Notice of Termination is filed. Critical information shall be maintained directly on the site plan including dates of installation for each BMP, dates of maintenance, replacement, repair or removal.
- E. The Contractor shall be responsible for conducting required inspections under the Indiana Construction Stormwater General Permit (CSGP) administered by IDEM. on behalf of the Owner. Copies of Inspection Reports shall be provided to all parties (the Owner, the Engineer, and the Contractor) after each inspection. All observed deficiencies which are resulting in sediment leaving the project site shall be mitigated immediately upon notification by the Engineer. Other deficiencies with the SWPPP and general maintenance of BMPs shall be remedied by the Contractor within 48 hours of notification. In the event that remedy is not possible within 48 hours of notification due to site conditions (i.e. weather), the Contractor shall provide a proposal to the Owner and Engineer within 24 hours detailing steps to be undertaken to remedy the non-compliance as soon as possible.
- F. The Owner has authority to limit surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations and to direct Contractor to provide immediate permanent or temporary stormwater pollution control measures.
- G. The Contractor shall maintain erosion and sedimentation control BMP's as dictated by site conditions, indicated in the construction documents, or as directed by governing authorities or Owner to prevent erosion and control sediment until final stabilization. Contractor shall respond to maintenance or remedial work ordered by the Owner, by the Engineer, or by governing authorities immediately or as set forth within the time frames in Article 3.02-E (above) at no additional cost to the Owner.
- H. The Contractor shall incorporate permanent erosion control features, permanent slope stabilization, and vegetation into the project at the earliest practical time to minimize need for temporary controls. Temporary stabilization, including temporary seeding shall be utilized to ensure compliance with CSGP at no additional cost to the Owner.
- I. Permanently seed and mulch disturbed areas as construction proceeds in order to minimize the amount of unstabilized areas.
- J. Disturbed areas that will not be graded or actively worked for the time frame established in the SWPPP and General Permit, shall be temporarily stabilized as work progresses with vegetation or other acceptable means in accordance with Section 02390 - Planting. In the event it is not practical to seed areas, slopes shall be temporarily stabilized with mulch and tackifier, bonded fiber matrix, netting, blankets or other means to reduce the erosive potential of the area.

END OF SECTION 02370

STORM WATER POLLUTION PREVENTION PLAN
FOR
CONSTRUCTION ACTIVITIES
AT

Ferdinand State Forest Campground Improvements

Project No. CDC2409631016
Ferdinand, Indiana

Prepared for:

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November 2024

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

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PART 5 SUMMARY OF PERMIT AND PROGRAM REQUIREMENTS

- 5.01 The Storm Water Pollution Prevention Plan (SWPPP) includes, but is not limited to, Specification Section 31 25 00 (which includes the SWPPP with appendices), the Erosion and Sedimentation Control Plans included in the Construction Drawings with the Detail Sheets, the Notice of Intent, Permit Authorization (Notice of Coverage), General Permit, Notice of Termination, all records of inspections and activities which are created during the course of the project, and other documents as may be included by reference to this SWPPP. Changes, modifications, revisions, additions, or deletions shall become part of this SWPPP as they occur.
- 5.02 The Owner of the Project has completed the Owner's Certification of the Storm Water Pollution Prevention Plan, incorporated into this SWPPP as Appendix A.
- 5.03 The Contractor shall fill out the Certification of Qualifications letter included in Appendix B. All signed certifications must be kept in the jobsite SWPPP Binder and be available for inspection on the construction site. Signed documents including permits, certifications and qualification forms cannot be modified or revised in the field.
- 5.04 The General Contractor and all subcontractors involved with a construction activity that disturbs site soil or who implement a pollutant control measure identified in the SWPPP must complete and submit a copy of the Contractor/Subcontractor Certification form located in Appendix C and comply with the requirements of the General Permit and any local governing agency having jurisdiction concerning NPDES, storm water, erosion and sedimentation control.
- 5.05 General Permit Information
- A) Facilities which are operating under approved local sediment and erosion plans, grading plans, or storm water management plans, in addition to submitting electronic copies of the Notice of Intent, shall also submit notification of the intended construction activities to the local agency approving such plans in accordance with the deadlines of the General Permit.
 - B) **Prohibition on Non-Storm Water Discharges.** All discharges covered by this permit shall be composed entirely of storm water except as noted below.
 - 1. Discharges of materials other than storm water must be in compliance with a NPDES permit (other than the permit for this project) issued for the discharge.
 - 2. The following non-storm water discharges may be authorized by this permit provided the non-storm water component of the discharges is in compliance with Part IV.D.5 of the General Permit: discharges from fire fighting activities, fire hydrant flushings, waters used to wash vehicles where detergents are not used, waters used to control dust, potable water sources including uncontaminated waterline flushings, landscape irrigation drainages, routine external building washdown which does not use detergents; pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used; uncontaminated air conditioning condensate, springs; uncontaminated ground water and foundation or footing drains where flows are not contaminated with process materials such as solvents.

3. The following non-storm water discharges are prohibited by the Indiana Construction Stormwater General Permit (CSGP) and include concrete and wastewater from washout of concrete (unless managed by an appropriate control), drywall compound, wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials, fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance, soaps, solvents or detergents, toxic or hazardous substances from a spill or other release, or any other pollutant that could cause or tend to cause water pollution.
- C) **Discharges into Receiving Waters with an Approved Total Maximum Daily Load (TMDL).** Discharges to waters for which there is a TMDL allocation for sediment or a parameter that addressed sediment (such as total suspended solids, turbidity, or siltation) are not eligible for coverage under the permit unless a SWPPP that is consistent with the assumptions and requirements in the approved TMDL is developed and certified.
1. Discharges covered by the General Permit, alone or in combination with other sources, shall not cause or contribute to a violation of any applicable water quality standard.
 2. For any site which discharges directly to an impaired water identified on the Agency's website for 303(d) listing for suspended solids, turbidity, or siltation, the storm water pollution prevention plan shall be designed for a storm event equal to or greater than a 25-year, 24-hour rainfall event. If required by federal regulations or the Indiana Department of Environmental Management, the storm water pollution prevention plan shall adhere to a more restrictive design criterion. Refer to the Agency's website at <https://www.epa.gov/tmdl/impaired-waters-and-tmdls-region-5#state-tmdl-programs>
- D) **Public Posting.** A copy of the letter of Notification of Coverage along with the General NPDES Permit for Storm Water Discharges from Construction Site Activities or other indication that storm water discharges from the site are covered under a NPDES permit shall be posted at the site in a prominent place for public viewing, such as alongside a building permit except for those portions of the permit claimed as confidential in accordance with 40 CFR Part 2.
1. All storm water pollution prevention plans and all completed inspection forms/reports required under this permit are considered reports that shall be available to the public at any reasonable time upon request.
- E) **Keeping Plans Current.** The Contractor shall amend the SWPPP whenever there is a change in design, construction, operation, or maintenance, which has a significant effect on the potential for the discharge of pollutants to Waters of the State and which has not otherwise been addressed in the plan or if the storm water pollution prevention plan proves to be ineffective in eliminating or significantly minimizing pollutants from sources identified in the Erosion and Sediment Control Plan sheets, or in otherwise achieving the general objectives of controlling pollutants in storm water discharges associated with construction site activity. In addition, the plan shall be amended to identify any new contractor and/or subcontractor that will implement a measure of the SWPPP. Any revisions of the documents for the storm water pollution prevention plan shall be kept on site at all times.

1. This SWPPP intends to control water-borne, air-borne and liquid pollutant discharges by some combination of interception, sedimentation, filtration, and containment. The General Contractor and subcontractors implementing this SWPPP must remain alert to the need to periodically refine the update the SWPPP in order to accomplish the intended goals. **The General Contractor is ultimately responsible for all site conditions and permit compliance.**
- F) **Inspections.** Qualified personnel, provided by the Owner, shall inspect disturbed areas of the construction site that have not been finally stabilized, structural control measures, and location where vehicles enter or exit the site at least once every seven (7) calendar days and within twenty-four (24) hours of the end of a storm that is 0.5 inches or greater or equivalent snowfall. Qualified personnel means a person knowledgeable in the principles and practices of erosion and sediment control measures, such as a licensed Professional Engineer (P.E.), a certified Professional in Erosion and Sediment Control (CPESC), a Certified Erosion Sediment and Storm Water Inspector (CESSWI) or other knowledgeable person who possesses the skills to assess conditions at the construction site that could impact storm water quality, assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activities, and is empowered to implement BMPs in order to increase effectiveness to an acceptable level.
1. Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the plan shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of offsite sediment tracking.
 2. Based on the results of the inspection, the description of potential pollutant sources identified in this plan shall be revised as appropriate as soon as practicable after such inspection. Such modifications shall provide for timely implementation of any changes to the plan within seven (7) calendar days following the inspection. General maintenance of BMPs shall be remedied by the Contractor within 48 hours of notification.
 3. The Owner or their duly authorized representative shall be responsible to notify the appropriate Agency Field Operations Section office by emailing a completed Incidence of Noncompliance (ION) form. Please see Appendix E. In addition, a hard copy of the signed original must be submitted by mail twithin 5 days
- G) **Retention of Records.** The Contractor, on behalf of the Owner, shall retain a copy of the SWPPP and any revisions to said plan required by the General Permit at the construction site from the date of project initiation to the date of final stabilization.
1. After final stabilization, the Contractor shall turn all SWPPP documentation over to the Owner who shall retain the documentation, in its entirety, for a period of at least three (3) years from the date that the permit coverage expires or is terminated. This period may be extended by request of the

IDEM at any time.

- H) **Notice of Termination.** When the site has been finally stabilized and all storm water discharges from construction sites that are authorized by this permit are eliminated, the Owner or their duly authorized representative shall submit an electronic copy of the Notice of Termination (NOT), which shall be certified by the Owner.
1. Final Stabilization means that all soil disturbing activities at the site have been completed, and either of the two following conditions are met:
 - a. A uniform (e.g. evenly distributed, without large bare areas) perennial vegetative cover with a density of 70 percent of the native background vegetative cover for the area has been established on all unpaved areas and areas not covered by permanent structures, or
 - b. Equivalent permanent stabilization measures (such as the use of rip rap, gabions, or geotextiles) have been employed.

PART 6 SITE SPECIFIC PLAN CONTENTS

- 6.01 **Introduction.** This SWPPP has been prepared for activities associated with the construction of:

Ferdinand State Forest Campground Improvements
Project No: CDC2409631016
Ferdinand, Indiana

This SWPPP, including the applicable General Permit, includes the elements necessary to comply with the General Permit for construction activities administered by the U.S. Environmental Protection Agency (USEPA) under the National Pollutant Discharge Elimination System (NPDES) program and all local governing agency requirements. This SWPPP must be implemented at the start of construction.

Information contained in this section is for SWPPP purposes and information only and not to be used for quantity calculations in bidding.

Construction phase pollutant sources anticipated at the site are disturbed soil, vehicle fuels and lubricants, chemicals and coatings associated with site or building construction and pavement installation, construction-generated litter and debris, and building materials. Without adequate control there is a potential for each type of pollutant to be transported by storm water.

- 6.02 **Site Description.** Included as part of this SWPPP, are the project Construction Drawings – “[Ferdinand State Forest Campground Improvements – Base Bid and Alternates](#)”. Refer to the Construction Drawings for detailed site information. The following is a description of the construction activity which is the subject of this plan:

The campground improvements project will be at Ferdinand State Forest located 6 miles northeast of Ferdinand at 6583 E. State Road 264 in Ferdinand, Indiana. The site for the base bid work is approximately 3 acres, with the overall area disturbed just under 9 acres west of Fossil Lake and south of Campground Pond. The forest is owned by the State of Indiana and the improvements project is being administered through the INDNR Division of

Engineering. All areas to be disturbed are either currently planted in turf grasses, rock, covered with pavement, or otherwise developed.

6.03 Project Sequencing.

Sequence of Construction

1. Install stabilized construction entrance & silt fence/straw wattles and other perimeter erosion controls.
2. Strip topsoil from areas to be disturbed, stockpile, temporarily seed and mulch.
3. Begin site rough grading after forestry staff removes trees as needed.
4. Temporarily stabilize, throughout construction, denuded areas per the SWPPP and General Permit.
5. Construct concrete washout areas per Indiana Storm Water Quality Manual.
6. Construct spoil disposal area complete with diversion channels, check dams and temporary seeding.
7. Commence construction of major structures.
8. Install underground utilities, piping and other below-grade control devices.
9. Construct remaining improvements including paving, lighting, and appurtenances.
10. Complete final grading and installation of permanent stabilization over all disturbed areas.

6.04 **Rainfall Information.** The following table provides the average monthly rainfall data for the project area.

	Jan	Feb	Mar	April	May	Jun	July	Aug	Sep t	Oct	Nov	Dec	Total
Average rainfall in inches	3.22	3.02	4.24	4.64	5.88	4.31	4.34	3.30	3.80	3.73	4.26	3.75	48.49

6.05 Site Soils.

Soil type and texture:

An NRCS web soil survey report was prepared for the project area which identified Sawmill silty clay loam as the predominant soil type for the project area. This soil is a poorly drained soil with less than 10" of topsoil and is subject to frequent flooding.

Average depth to groundwater: Based on soil borings advanced in the geotechnical study, depth to ground water ranged from 15 to 25 feet deep. The geotechnical report also mentions that ground water levels should be expected to fluctuate with changes in season being lower in dry periods and higher during wet weather.

6.06 Total Site Area, Area to be Disturbed, and Runoff Coefficient

The project site contains mild slopes between 3 and 8% but is mostly flat with turf grass areas under moderate tree canopy with gravel campsites and asphalt access roads. The entire site is approximately 9 acres that will be impacted during development which will add one building, a comfort station in the central campground area.

Approximate Pre-Construction Runoff Coefficient "C" = 0.20

Approximate Post-Construction Runoff Coefficient "C" = 0.25

6.07 **Site Topography.**

The highest existing elevation on the site is located in the south campground area with elevations of approximately 625 ft. above mean sea level. From that location, the site slopes towards the north, the central area where the comfort station will be placed is at about 618 ft and then continues down to about 604 ft near the Campground Pond area, which is the lowest area around the project area.

Vegetation: The area to be disturbed is entirely in established turf grasses with surrounding tree coverage. The forest staff will remove trees as needed.

6.08 **Receiving Surface Waters.**

Receiving waters: All storm water runoff from the facility flows overland towards Hurricane Creek which is located approximately one-half mile east of the site.

Receiving water quality: Hurricane Creek is not currently on the Indiana 303(d) list of Impaired Waters. The stream is listed on the Medium Priority listing and is shown to be impaired for dissolved oxygen.

Discharge criteria include: There are no project-specific discharge water quality criteria associated with this site.

6.09 **Erosion and Sedimentation Control Plan**

See the corresponding drawings. Required details are included on the respective sheets.

PART 7 STORM WATER POLLUTION PREVENTION MEASURES AND CONTROLS

7.01 A variety of storm water pollutant controls are recommended for this project. Some controls are intended to function temporarily and will be used as needed for pollutant control during the construction period such as silt fence, sediment basins and stabilized construction entrances. Permanent stabilization will be accomplished in all disturbed areas by such measures as covering the soil with pavement or stone, or permanent vegetation.

7.02 Erosion and Sediment Controls

A) Minimization of Disturbed Areas

Note to General Contractor: the Owner has authority to limit surface area of exposed earth material created by clearing, grubbing, excavation, borrow and embankment operations and to direct General Contractor to provide immediate permanent or temporary pollution control measures to provide compliance with the Indiana Construction Stormwater General Permit (CSGP).

B) Soil Stabilization

The purpose of soil stabilization is to prevent soil from eroding and leaving the site. In the natural condition, soil is stabilized by native vegetation. The primary

technique to be used at this project for stabilizing site soils will be to provide a protective cover of grass for either temporary or permanent installation.

1. Temporary Seeding or Stabilization – All denuded areas that will be inactive for 7 days or more (unless they are to be reworked within 14 days), must be stabilized temporarily with the use of fast-germinating annual grass/grain varieties appropriate for site soil and climate conditions, straw/hay mulch, wood cellulose fibers, tackifiers, netting and/or blankets. Stockpiles and diversion ditches/berms must be stabilized to prevent erosion and dust issues.

Note to General Contractor: Temporary stabilization is not achieved simply through seeding. Mulch, hydromulch, rolled erosion control products of tackifiers must also be used. In order for an area or stockpile to be sufficiently stabilized via temporary vegetation, seed must germinate, grow and provide adequate vegetative density.

2. Permanent Seeding, Sod or Mulching – All areas at final grade must be seeded or covered with sod as soon as practicable after completion of work in that area and within the periods specified in the General Permit. Seed immediately after final grade is achieved and soils are prepared to take advantage of soil moisture and seed germination conditions. At the completion of ground-disturbing activities the entire site must have permanent vegetative cover, meeting minimum vegetative density requirements, or be covered with hardwood mulch per landscape plan, in all areas not covered by hardscape (pavement, buildings, stone etc.).

Seeded areas shall be protected with straw mulch, hydraulic mulch or a rolled erosion control product on slopes 3:1 or steeper. Straw mulch must be tackified or crimped by disc or other machinery and rolled erosion control products must be installed per manufacturer recommendations.

To minimize the potential for erosion and maximize seed germination & growth, the General Contractor must evaluate the short and long-term local forecast prior to applying permanent seed or sod.

Final site stabilization is achieved when perennial vegetative cover provides permanent stabilization with a density greater than **70 percent** over the entire area to be stabilized by vegetative cover. This area is exclusive of areas that are covered with stone, (crushed granite, gravel, etc.) hardwood landscape mulch, pavement or have a building or other permanent structure on them.

C) Structural Controls

Silt fence (with wire backing) shall be placed in specified down slope areas to filter sediments out of storm water in areas of sheet flow in conformance with INDOT Standard Specifications. Silt fence shall not be used in areas of concentrated flow and shall be placed along the topographic contour of an area.

Straw wattles may be installed per INDOT Standard Specifications placed in

downslope locations where slopes are relatively flat as shown on the Drawings. If soil stockpiling takes place, silt fence must be installed at the toe-of-slope of the stockpile.

Sediment traps shall be used to capture concentrated flow from areas where high sediment yield can be expected and installed per INDOT Standard Specifications. Sediment traps should not be used for areas greater than 5 acres of drainage and are intended to be temporary. Traps must be constructed to accommodate sediment storage and should be cleaned out when they are filled to one-half of sediment storage capacity. Interior slopes of sediment traps shall be temporary stabilized upon construction to prevent them from generating sediment during the term of their use.

Diversion ditches shall be used to convey concentrated storm flow away from sheet flow areas to a point where they can be treated by some other structural control and must be installed per INDOT Standard Specifications. Applications include above steep slopes to limit surface runoff onto the slope, below steep grades where flooding, seepage problems, or sediment deposition may occur and around buildings to areas that are subject to damage from runoff. Channel cut slopes shall not be steeper than 3:1 or 2:1 if permanently vegetated. Ditches shall be designed with velocities which do not exceed design limits established in the Indiana Storm Water Quality Manual and shall use ditch checks (stone, synthetic or wattles) to control velocity. Disturbed side slopes of diversion ditches must be temporarily or permanently stabilized within 14 days after their construction is complete.

Ditch checks, also known as check dams shall be used in diversion ditches or other areas of concentrated flow to "check" water velocities to limit erosive potential within the ditch itself and to allow transported sediment to settle out as needed. Ditch checks may include rock check dams, pre-manufactured ditch checks or straw wattles or other rolled erosion control products. Check dams shall be designed and installed per the Indiana Storm Water Quality Manual or manufacturer's recommendations. Check dams shall be cleaned out when they are filled to no more than half their height of sediment and upon removal shall have established vegetation repaired or replanted.

Stabilized construction entrances shall be used at all points of ingress/egress to the site and be constructed in accordance with INDOT Standard Specifications. In addition, they shall also be used at internal locations to minimize tracking within the site when large amounts of exposed soil within a construction site may occur such as at excess soil disposal areas. Construction entrances shall be designed in conformance with the INDOT Standard Specifications to prevent the tracking of sediment by vehicle tires onto offsite areas. Periodic topdressing or replacement with open graded stone may be required when open spaces fill with tracked sediment rendering the entrance ineffective at preventing the tracking of sediment. The contractor shall maintain a sufficient quantity of replacement open graded stone to maintain the stabilized construction entrance in workable condition at all times.

Rock outlet protection is required at any point where concentrated channel or pipe flow is returned to an unreinforced earthen area such as at the end of a culvert or ditch. The purpose is to prevent scour erosion, to protect the structure and to minimize the potential for downstream erosion by reducing the velocity of the storm

water runoff. This protection should be used at culvert outlets and pipe conduits from sediment basin where velocities are 10 feet per seconds or less. Size of the rock as well as dimensions of the rock protection should be selected based on criteria in the INDOT Standard Specifications, Section 205 Stormwater Management.

Inlet protection is required anytime that stormwater is being conveyed from any type of surface flow by storm drains or curbed inlet structures to a piped conveyance system to help minimize sediment in the storm sewer system. They should be used any time after a storm sewer inlet is installed up until the time the watershed has been permanently stabilized. The type of inlet protection must change and adapt to grading conditions. Immediately after rough grading conditions when structures are first installed inlet protection may consist of block and gravel or fabric drops. However, after pavements are installed or after areas are graded and seeded, less rigorous protection may be more suitable such as various pre-manufactured curbed inlet protection.

Mulching for seeding and soil stabilization must be performed whenever turf seeding is performed whether it is for temporary or permanent stabilization. Mulch should conform to INDOT Standard Specifications and is intended to prevent erosion from raindrop impact, reduce crusting, conserve moisture and check the velocity of overland flow, all of which are beneficial to fostering the growth of vegetation. Mulch should only be applied on slopes of 4H:1V or less unless measures are taken to anchor the mulch in place.

Erosion control blankets must be installed on planted surfaces, usually when they are permanently seeded for the same purposes as mulch in accordance with INDOT Standard Specifications. Erosion control blankets are usually made with straw, wood cellulose fibers, coconut husks or blends thereof and bound by plastic or durable mesh netting. Erosion control blankets should be selected and installed based on manufacturer's design criteria and instructions. Care must be taken during installation to keep the blanket in contact with the surface and not bridge any void spaces which can develop into erosion channels.

Temporary concrete washout facilities must be installed at every site for cleaning out cement trucks, stucco mixers, mortar mixers or other cementitious containing materials. Washout facilities may be either incised into the ground and lined or may be constructed above ground and lined per INDOT Standard Specifications.

D) Other Pollutant Controls. This section includes the controls of pollutants other than sediment and additional requirements of the General Permit.

1. **Dust Control.** Construction traffic must enter and exit the site at the stabilized construction exit. The purpose is to trap dust and mud that would otherwise be carried beyond the permitted project area by construction traffic. Large areas of soil that are denuded of vegetation and have no protection from particles being picked up and carried by wind should be protected with a temporary cover or kept under control with water or other soil adhering products to limit wind transported particles exiting the site perimeter.

Water trucks or other dust control agents will be used as needed during construction to minimize dust generated on the site. Tackifiers may be used to hold soil in place and prevent dust. Manufacturer recommendations for application locations and rates must be used for dust control applications. Dust control must be provided by the General Contractor to a degree that is in compliance with applicable local and state dust control regulations.

2. **Dewatering.** Verify discharges from dewatering activities are allowed non-storm water discharges under the General Permit. Obtain a dewatering permit according to local regulations, if necessary. Discharges from dewatering operations must be directed through an appropriate pollution prevention/treatment measure, such as a pump discharge filter bag, sediment trap or sediment basin prior to being discharged from the site. Under no circumstances are discharges from dewatering operations to be discharged directly into streams, rivers, lakes or other areas beyond the permitted project area. Likewise, discharges into storm sewer systems that do not drain to a suitable on-site treatment facility, such as a basin, are also prohibited. Discharges from dewatering operations must also be conducted in a manner sufficient to prevent erosion from the discharge runoff.

Use best management practices when dewatering. Place intake hose on a flotation or similar device and do not pump directly from the bottom of the basin, trench, etc. Always pump through a sediment control BMP and dewater within the permitted limits of disturbance to ensure discharge criteria are achieved. Do not discharge on a slope greater than three percent or within 20' of a surface water body.

3. **Solid Waste Disposal.** No solid materials, including building materials, are allowed to be discharged from the site with storm water. All solid waste, including disposable materials incidental to the major construction activities, must be collected and placed in containers. The containers will be emptied when 95% full, or as necessary, by a certified trash disposal service and hauled away from the site. Covers for the containers will be provided as necessary to meet state and local requirements. Construct covers as practicable, or required, to prevent storm water contact and pollutant discharges from solid waste receptacles. The location of solid waste receptacles shall be shown on the Site Maps.

Substances that have the potential for polluting surface and/or groundwater must be controlled by whatever means necessary in order to ensure that they do not discharge from the site. As an example, special care must be exercised during equipment fueling and servicing operations. If a spill occurs, it must be contained and disposed of so that it will not flow from the site or enter groundwater, even if this requires removal, treatment, and disposal of soil. In this regard, potentially polluting substances should be handled in a manner consistent with the impact they represent.

4. **Sanitary Facilities.** All personnel involved with construction activities must comply with state and local sanitary or septic system regulations. Temporary sanitary facilities will be provided at the site throughout the construction phase. They must be utilized by all construction personnel and

will be serviced by a commercial operator. The location of sanitary facilities shall be shown on the Site Maps. Portable toilets must be securely anchored and are not allowed within 30' of inlets or permitted limit of disturbance or within 50' of a water of the State.

5. **Non-Storm Water Discharges.** Only those non-storm water discharges specifically mentioned in the Indiana Construction Stormwater General Permit may be released along with storm water. Those allowed discharges are discharges from fire fighting activities, fire hydrant flushings, waters used to wash vehicles where detergents are not used, waters used to control dust, potable water sources including uncontaminated waterline flushings, landscape irrigation drainages, routine external building washdown which does not use detergents, pavement wash waters where spills or leaks of toxic or hazardous material have not occurred (unless all spilled materials have been removed) and where detergents are not used, uncontaminated air conditioning condensate, springs, uncontaminated ground water and foundation or footing drains where flows are not contaminated with process materials such as solvents.

When non-storm water is discharged from the site, it must be done in a manner such that it does not cause erosion of the soil during discharge. Process water such as power washing which uses detergents and concrete cutting must be collected for treatment and disposal. It is not to be flushed into the site storm drain system.

Fuel Tanks. Temporary on-site fuel tanks for construction vehicles shall meet all state and federal regulations. Tanks shall have approved spill containment with the capacity required by the applicable regulations. From NFPA 30: All tanks shall be provided with secondary containment (i.e. containment external to and separate from primary containment). Secondary containment shall be constructed of materials of sufficient thickness, density, and composition so as not to be structurally weakened as a result of contact with the fuel stored and capable of containing discharged fuel for a period of time equal to or longer than the maximum anticipated time sufficient to allow recovery of discharged fuel. It shall be capable of containing 110% of the volume of the primary tank if a single tank is used, or in the case of multiple tanks, 150% of the largest tank or 10% of the aggregate, whichever is larger.

The tanks shall be in sound condition free of rust or other damage which might compromise containment. Fuel storage areas will meet all EPA, OSHA and other regulatory requirements for signage, fire extinguisher, etc. Hoses, valves, fittings, caps, filler nozzles, and associated hardware shall be maintained in proper working condition at all times. The location of fuel tanks shall be shown on the Site Maps and shall be located to minimize exposure to weather and surface water drainage features.

A Spill Prevention, Control and Countermeasure (SPCC) Plan must be developed if aboveground oil storage *capacity* at the construction site exceeds 1,320-gallons. Containers with a storage capacity of less than 55-gallons are not included when calculating site storage capacity. The General Contractor shall work with the Engineer to develop and implement a

SPCC Plan in accordance with the Oil Pollution Prevention regulation at Title 40 of the Code of Federal Regulations, Part 112, (40 CFR 112).

6. **Hazardous Material Management and Spill Reporting Plan.** Any hazardous or potentially hazardous material that is brought onto the construction site will be handled properly in order to reduce the potential for storm water pollution. All materials used on this construction site will be properly stored, handled, dispensed and disposed of following all applicable label directions. Flammable and combustible liquids will be stored and handled according to 29 CFR 1926.152. Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids.

Material Safety Data Sheets (MSDS) information will be kept on site for any and all applicable materials.

In the event of an accidental spill, immediate action will be undertaken by the General Contractor to contain and remove the spilled material. All hazardous materials, including contaminated soil and liquid concrete waste, will be disposed of by the Contractor in the manner specified by federal, state and local regulations and by the manufacturer of such products. As soon as possible, the spill will be reported to the appropriate agencies. As required under the provisions of the Clean Water Act, any spill or discharge entering waters of the United States will be properly reported. The General Contractor will prepare a written record of any spill and associated clean-up activities of petroleum products or hazardous materials in excess of the Reportable Quantity. The General Contractor will provide notice to Owner immediately upon identification of a reportable spill.

Any spills of petroleum products or hazardous materials in excess of Reportable Quantities as defined by EPA or the state or local agency regulations, shall be immediately reported to the EPA National Response Center (1-800-424-8802) and the Indiana Emergency Management Agency (317-232-3980).

A spill of 25 gallons of petroleum is considered a Reportable Quantity by the State of Illinois. In addition, any size release which causes a sheen on receiving waters must be reported also. The reportable quantity for hazardous materials can be found in 40 CFR 302 and in the "List of Lists" published by the U.S. EPA.

In order to minimize the potential for a spill of petroleum product or hazardous materials to come in contact with storm water, the following steps will be implemented:

- a) All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, additives for soil stabilization, concrete, curing compounds and additives, etc.) will be stored in a secure location, under cover and in appropriate, tightly sealed containers when not in use.
- b) The minimum practical quantity of all such materials will be kept on

the job site and scheduled for delivery as close to time of use as practical.

- c) A spill control and containment kit (containing for example, absorbent material such as kitty litter or sawdust, acid neutralizing agent, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided on the construction site and location(s) shown on Site Maps.
- d) All of the product in a container will be used before the container is disposed of. All such containers will be triple rinsed, with water prior to disposal. The rinse water used in these containers will be disposed of in a manner in compliance with state and federal regulations and will not be allowed to mix with storm water discharges.
- e) All products will be stored in and used from the original container with the original product label.
- f) All products will be used in strict compliance with instructions on the product label.
- g) The disposal of excess or used products will be in strict compliance with instructions on the products label.

E) **Long-Term Pollutant Controls.** Storm water pollutant control measures installed during construction that will also provide storm water management benefits after construction are included in this project. The primary control will be grassed filter strips adjacent to area inlets. This system will allow for nutrient and sediment removal after construction is complete.

F) **“Best Management Practices” (BMPs).** Owner has authority to limit surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations and to direct the General Contractor to provide immediate permanent or temporary pollution control measures.

During the construction phase, the General Contractor shall implement the following measures:

1. Any materials resulting from clearing and grubbing or excavation operations shall be stockpiled up slope from adequate sedimentation controls. Materials removed to sites beyond the permitted project area shall be protected with appropriate controls and properly permitted and otherwise comply with applicable laws, all in accordance with this SWPPP, including Section V.D. below.
2. The General Contractor shall designate areas on the Site Maps for equipment cleaning, maintenance, and repair. The General Contractor and subcontractors shall utilize such designated areas. Cleaning, maintenance, and repair areas shall be protected by a temporary perimeter berm, shall not occur within 150 feet of any waterway, water body or wetland, and in areas located as far as practical from storm sewer inlets.
3. Use of detergents for large scale washing is prohibited (i.e. vehicles, buildings, pavement surfaces, etc.).
4. Chemicals. Paints, solvents, fertilizers, and other toxic materials must be stored in waterproof containers. Except during application, the containers,

the contents must be kept in trucks or within storage facilities. Runoff containing such material must be collected, removed from the site, treated, and disposed of at an approved solid waste and chemical disposal facility.

- 7.03 **Inspections and System Maintenance.** Between the time this SWPPP is implemented and final Notice of Termination has been submitted, all disturbed areas and pollutant controls must be inspected once every seven (7) calendar days and within 24 hours of the end of a storm that is 0.5 inches or greater or equivalent snowfall. Inspections may be suspended for up to one month when ground conditions are frozen but must be resumed if there is a storm event of 0.5 inches or greater or discharges due to snowmelt conditions. The purpose of site inspections is to assess performance of pollutant controls. The inspections will be conducted by the Contractor's designated inspector with copies of the inspection reports provided to the Owner. Based on the results of these inspections, the General Contractor may be required to modify or add additional BMP's in order to prevent pollutants from leaving the site via storm water runoff. The General Contractor has the duty to cause pollutant control measures to be repaired, modified, supplemented, or take additional steps as necessary in order to achieve effective pollutant control.

Examples of specific items to evaluate during site inspections are listed below. This list is not intended to be comprehensive. During each inspection, the inspector must evaluate overall pollutant control system performance as well as particular details of individual system components. Additional factors should be considered as appropriate to the circumstances. The General Contractor is responsible for measuring and recording site-specific rainfall amounts.

- A) **Construction Entrance and Track Out.** Locations where vehicles enter and exit the site must be inspected for evidence of sediment tracking beyond the permitted project area. A stabilized construction entrance shall be constructed where vehicles enter and exit. Entrances shall be maintained or supplemented with additional rock as necessary to prevent the release of sediment from vehicles leaving the site. Any sediment deposited on the roadway shall be swept as necessary throughout the day and disposed of in an appropriate manner. Sediment shall NOT be washed into storm sewer systems.
- B) **Erosion Control Devices.** Rolled erosion control products (nets, blankets, turf reinforcement mats) and marginally vegetated areas (areas not meeting required vegetative densities for final stabilization) must be inspected daily. Formation of rills, rutting and other signs of erosion indicate the erosion control device is not functioning properly and additional erosion control devices are warranted.
- C) **Sediment Control Devices.** Sediment barriers, silt fence, traps and basins must be inspected and they must be cleaned out at such time as their original capacity has been reduced by 50 percent. All material excavated from behind sediment barriers or in traps and basins shall be incorporated into on-site soils or spread out on an upland portion of the site and stabilized. To minimize the potential for sediment releases from the project site perimeter control devices shall be inspected with consideration given to changing up-gradient conditions.
- D) **Material Storage Areas.** Material storage areas should be located to minimize the exposure of stored materials to weather. Such materials would include bagged goods (cement, mortar) lubricants, fuel, oils, greases or any other materials which may decompose and pollute if subject to rain or inclement conditions. Inspections shall evaluate disturbed areas and areas used for storing materials that are exposed

to rainfall for evidence of, or the potential for, pollutants entering the drainage system or discharging from the site. If necessary, the materials must be covered or original covers must be repaired or supplemented. Also, protective berms must be constructed, if needed, in order to contain runoff from material storage areas. All state and local regulations pertaining to material storage areas will be adhered to.

- E) **Vegetation.** Consideration must be given to anticipated climate and seasonal conditions when specifying and planting seed. Seed shall be free of weedy species and appropriate for site soils and regional climate. Seed and mulch per the construction drawings and specifications immediately after topsoil is applied and final grade is reached. Grassed areas shall be inspected to confirm that a healthy stand of grass is maintained. The site has achieved final stabilization once all areas are covered with building foundation or pavement, or have a stand of grass with a minimum of 70 percent density or greater of natural background cover over the entire vegetated area in accordance with the General Permit requirements. Vegetated areas must be watered, fertilized, and reseeded as needed to achieve this requirement. The vegetative density must be maintained through project completion to be considered stabilized. Areas protected by erosion control blankets are not permanently stabilized until the applicable General Permit requirement for final vegetative density is achieved.

Rip-rap, mulch, gravel, decomposed granite or other equivalent permanent stabilization measures may be employed in lieu of vegetation based on site-specific conditions and governing authority approval.

- F) **Discharge Points.** All discharge points must be inspected to determine whether erosion and sediment control measures are effective in preventing discharge of sediment from the site or impacts to receiving waters.

- G) **Sediment Releases.** The Inspection Report Form must identify all deficiencies, any corrections, whether they are identified during the current inspection or have occurred since the previous inspection, and any additional comments. Based on inspection results, any modification necessary to increase effectiveness of this SWPPP to an acceptable level must be made immediately but no longer than within 48 hours of the inspection. The inspection reports must be complete and additional information should be included if needed to fully describe a situation. An important aspect of the inspection report is the description of additional measures that need to be taken to enhance plan effectiveness. The inspection report must identify whether the site was in compliance with the SWPPP at the time of inspection and specifically identify all incidents of non-compliance and complete an Incidence of Noncompliance (ION) form and submit it to the Owner and the Agency.

A responsible corporate officer must sign a form with the site superintendent as the authorized position for conducting the required inspections. A copy of this form is included in Appendix B. The inspector must be considered a "Storm water Professional". Inspection reports must include an original, authorized signature and date of the inspection. Inspection reports must be retained by the General Contractor as an integral part of this SWPPP for at least three years from the date of submission of the Notice of Termination of permit coverage.

Ultimately, it is the responsibility of the General Contractor to assure the adequacy of site pollutant discharge controls. Actual physical site conditions or contractor practices could make it necessary to install more structural controls than are shown on the plans. For example, localized concentrations of runoff could make it

necessary to install additional sediment barriers. Assessing the need for additional controls and implementing them or adjusting existing controls will be a continuing aspect of this SWPPP until the site achieves final stabilization. Any modifications, additions or deletions of sediment control devices that may alter the hydraulic design of the site or are located in areas of potential high flow (basins, traps, check dams, diversions, etc.) should be approved by the Engineer of Record through the request for information process (RFI).

7.04 **Best Management Practices for Post-Construction Storm Water Management.** The Construction Stormwater General Permit requires a description of the measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed along with an explanation of the technical basis of their selection. The following list is intended to discuss the selection basis for permanent post-construction BMP's that will be used at this site.

- A. Diversions. An existing storm water diversion which allows upstream storm water flows from adjacent areas to bypass the site will be maintained. Although this existing structure is already in place, allowing it to remain will reduce water which would otherwise have to be handled if it were not in place.
- B. Permanent vegetation. All areas which are not required to be paved for access will be planted in short grass vegetation which is suited to the climate in this area. Maintenance of this short grass vegetation will allow for more infiltration of rainfall as it runs off of paved areas and allow trash and debris to be more easily seen.
 - 1. Grassed swales. Grassed swales will be used in those areas where sheet flow concentrates and needs to be channeled away from structures or pavements. While not suitable for areas of high quantity or high energy flows, grassed swales allow for increased nutrient uptake by vegetation and for dissipation of energy. Limited infiltration is also achieved for small flows and first flush volumes.
 - 2. Vegetated strips. Often used in combination with grassed swales, vegetated strips are used as a transitional BMP to take sheet runoff from, usually paved areas, and direct it into areas of shallow concentrated flow, such as diversion ditches and grassed swales. Vegetated strips are often the first BMP's for stormwaters running off of pavements and are useful for the removal of suspended sediments, metals and organic materials. A well established vegetated strip will also mitigate velocity of sheet flow run off and promote limited infiltration into the relatively porous topsoil layer.
- C. Rocked outlet protection. Rocked outlet protection will be maintained at all location where storm water is discharged from the end of a culvert into unpaved, earthen or grassed areas. The primary purpose is to slow the velocity of storm water discharges from piped conveyances to prevent erosion in adjacent earthen areas. In the process of slowing the water velocity, any entrained sediment is given a chance to drop out of suspension and is usually spread out over a larger area. The rocked outlet protection also protects the discharge structure itself by limiting scour around the mouth of the discharge structure also protecting the slope area around the discharge structure itself.

APPENDIX A	OWNER'S CERTIFICATION OF THE SWPPP
APPENDIX B	CERTIFICATION OF QUALIFICATIONS
APPENDIX C	CONTRACTOR/SUBCONTRACTOR CERTIFICATION
APPENDIX D	NOTICE OF INTENT (NOI)
APPENDIX E	INCIDENCE OF NONCOMPLIANCE (ION) FORM - RESERVED
APPENDIX F	NOTICE OF TERMINATION (NOT)
APPENDIX G	CONSTRUCTION STORMWATER GENERAL PERMIT
APPENDIX H	RECORD OF SITE RAINFALL
APPENDIX I	INSPECTOR DESIGNATION
APPENDIX J	INSPECTION FORMS

APPENDIX A

OWNER'S SWPPP CERTIFICATION

[Owner's SWPPP Certification – reproduce the following on company letterhead]

Date: _____

RE: **Ferdinand State Forest Campground Improvements**

Address: 6583 E. State Road 264, Ferdianand, IN 47532

**CERTIFICATION OF THE
STORM WATER POLLUTION PREVENTION PLAN**

**GENERAL PERMIT FOR STORM WATER DISCHARGES
FROM CONSTRUCTION ACTIVITIES**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage this system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

Signature

Printed Name

Title

Organization

APPENDIX B

CERTIFICATION OF QUALIFICATIONS

Certification of Qualifications
Ferdinand State Forest Campground Improvements
Certification of Compliance Officer for Storm Water Qualifications

I certify under penalty of law that the Compliance Officer: _____
Print Name

Compliance Officer E-mail Address

- 1) is an Officer of the Corporation and a Storm Water Professional; and
- 2) is able to adequately identify and implement storm water sediment and erosion control practices and effectively instruct employees and contractors in the implementation of such practices.

Contractor Company Name

Date

Name of Officer of the Company

Signature of Officer

Title

Certification of Project Superintendent Storm Water Qualifications

I certify under penalty of law that the superintendent:

Print Name

State or local Certificate #, as applicable _____

Superintendent E-mail Address

- 1) is a Storm water Professional* ; and
- 2) is able to adequately identify and implement storm water sediment and erosion control practices and effectively instruct employees and contractors in the implementation of such practices.

Contractor Company Name

Date

Name of Officer of the Company

Signature of Officer

Title

*A Storm water Professional is a person knowledgeable of the principles and practices of erosion and sediment control measures, such as a Professional Engineer (PE), a Certified Professional in Erosion and Sediment Control (CPESC), a Certified Erosion Sediment and Storm Water Inspector (CESSWI), or other knowledgeable person who possess the skills to assess conditions at the construction site that could impact storm water quality, assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activities, and is empowered to implement BMPs in order to increase effectiveness to an acceptable level.

NOTE: Only one (1) Compliance Officer and one (1) Superintendent can be certified on this form. Additional Compliance Officers and Superintendents associated with this project must complete and execute (obtain officer signature) a separate form and save in the SWPPP Binder on top of old/obsolete forms.

APPENDIX C

CONTRACTOR/SUBCONTRACTOR CERTIFICATION

CONTRACTOR/SUBCONTRACTOR CERTIFICATION

Ferdinand State Forest Campground Improvements

The General Contractor and all contractors and/or subcontractors that will implement and maintain the pollution control measures in the SWPPP and/or are involved in ground-disturbing activities on the site must be identified below. An authorized representative (an Officer of the Corporation) from each company on the construction project must sign this form certifying that company representatives understand the General Permit authorizing storm water discharges during construction. These certifications must be maintained in the SWPPP file.

Contractor/Subcontractor Employee Name

Trade

Company Name

Business Phone Number

Business Address

City, State Zip

CERTIFICATION (Indiana Construction Stormwater General Permit, CSGP):

"I certify under penalty of law that I understand the term and conditions of the National Pollutant Discharge Elimination System (NPDES) General Permit (CSGP) that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification. The SWPPP and General Permit have been made available to me to review and I agree to stay in compliance with the permit."

Signature

Date

Printed Name

Title (Must be an Officer of company if form is a permit requirement. See Note below.)

*** All employees of contractors and subcontractors have the responsibility of notifying the General Contractor's Superintendent of any Storm water BMP deficiencies or damage.**

The above listed contractor is responsible for the following BMPs: (check all that apply)

✓	Best Management Practice	✓	Best Management Practice	✓	Best Management Practice
	Construction Exit		Diversions		Solid Waste
	Silt Fence		Sediment Traps		Sanitary Waste
	Check Dams		Sediment Basins		Hazardous Waste Management
	Inlet Protection		Dust Control		Record Keeping
	Erosion Control		Concrete Wash-out		SWPPP modifications
	Vegetation		Fuel Storage/Containment		

Note: This form is a requirement of the State of Indiana and must be signed by an officer of the Corporation.

APPENDIX D
NOTICE OF INTENT (NOI)

The Notice of Intent form as been replaced with an online NPDES eReporting Tool that is hosted and maintained by the US Environmental Protection Agency. Upon award of the project, the Engineer will prepare the electronic Notice of Intent and the Owner will electronically certify the document in order to obtain the Notice of Coverage under the Indiana Construction Stormwater General Permit (CSGP) for Stormwater related to Construction Activities.

APPENDIX E

INCIDENCE OF NONCOMPLIANCE (ION) FORM (RESERVED)

APPENDIX F

NOTICE OF TERMINATION (NOT)

Once the Contractor has satisfactorily stabilized the project as specified herein, the Engineer will a Notice of Termination on the US EPA's NPDES eReporting Tool website. The Owner will then certify the Notice of Termination thereby terminating coverage under the Indiana Construction Stormwater General Permit (CSGP) Permit for Stormwater related to Construction Activities.

APPENDIX G

INDIANA CONSTRUCTION STORMWATER GENERAL PERMIT (CSGP)

(To be included later)

APPENDIX H
RECORD OF SITE RAINFALL

RECORD OF SITE RAINFALL

[illegible]

APPENDIX I

INSPECTOR DESIGNATION

[Owner's Inspector Designation – reproduce the following on company letterhead]

Re: Indiana Department of Natural Resources
Ferdinand State Forest Campground Improvements
Stormwater Permit # _____
Inspection Designation of the Storm Water Pollution Prevention Plan as required by General
NPDES Permit for Storm Water Discharges from Construction Site Activities

This letter serves to designate the specifically described person or entity as an authorized representative for signing storm water inspection reports and as required by the Indiana Construction Stormwater General Permit until further notice is provided in writing. This authorization cannot be used for signing a NPDES NOI, NOT or SWPPP Certification.

_____ is hereby authorized to conduct inspections and complete inspection reports as required to comply with the CSGP for the duration of this project.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage this system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Authorized Signatory (Printed)

Title

Signature

Date

APPENDIX J
INSPECTION FORMS

Stormwater Construction Site Inspection Report

General Information			
Project Name			
NPDES Tracking No.		Location	
Date of Inspection		Start/End Time	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			
Type of Inspection: ☐ Regular ☐ Pre-storm event ☐ During storm event ☐ Post-storm event			
Weather Information			
Has there been a storm event since the last inspection? ☐ Yes ☐ No If yes, provide: Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):			
Weather at time of this inspection? ☐ Clear ☐ Cloudy ☐ Rain ☐ Sleet ☐ Fog ☐ Snowing ☐ High Winds ☐ Other: Temperature: ° F			

Site-specific BMPs

No.	BMP	BMP Location	BMP Maintenance Required?	Corrective Action Needed and Notes
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	

No.	BMP	BMP Location	BMP Maintenance Required?	Corrective Action Needed and Notes
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	

Overall Site Condition

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action(s) Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	☐ Yes ☐ No	☐ Yes ☐ No	
2	Are natural resource areas protected with barriers or similar BMPs?	☐ Yes ☐ No	☐ Yes ☐ No	
3	Are perimeter controls and sediment barriers adequately installed?	☐ Yes ☐ No	☐ Yes ☐ No	
4	Are discharge points and receiving waters free of any sediment deposits?	☐ Yes ☐ No	☐ Yes ☐ No	
5	Are storm drain inlets properly protected?	☐ Yes ☐ No	☐ Yes ☐ No	
6	Is the construction exit preventing sediment from being tracked into the street?	☐ Yes ☐ No	☐ Yes ☐ No	
7	Is trash/litter from work areas collected and placed in dumpsters?	☐ Yes ☐ No	☐ Yes ☐ No	
8	Are concrete washout facilities available and maintained?	☐ Yes ☐ No	☐ Yes ☐ No	
9	Are equipment fueling, cleaning, and maintenance areas free of spills or leaks?	☐ Yes ☐ No	☐ Yes ☐ No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	☐ Yes ☐ No	☐ Yes ☐ No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	☐ Yes ☐ No	☐ Yes ☐ No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action(s) Needed and Notes
12	(Other)	☐ Yes ☐ No	☐ Yes ☐ No	

Notes:

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: _____

Signature: _____ **Date:** _____

SWPPP Punchlist

Date:

No.	Date Observed	Description	Date Resolved

DIVISION 02 – SITEWORK
Section 02500 – Buried Piping

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This section covers the work necessary to install and test all sanitary sewer piping, plant process piping, utility piping and storm drainage piping installed outside of buildings and other structures.
- B. Related Sections:
 - 1. Section 01330 – Submittal Procedures.
 - 2. Section 01660 - Product Storage and Handling Requirements
 - 3. Section 02315 – Excavation and Fill
- C. Reference to Standards
 - 1. 10-States Standards: “Recommended Standards for Water Works” as issued by the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, latest Edition.
 - 2. 10-States Standards: “Recommended Standards for Wastewater Facilities” as issued by the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, latest Edition.
 - 3. Indiana Department of Transportation (INDOT): Standard Specifications for Road and Bridge Construction, latest edition.
 - 4. Occupational Safety and Health Administration (OSHA): Current OSHA Occupational Safety and Health Standards – Excavations, 29 CFR Part 1926, including any successor regulations.
 - 5. Fittings for Water, as published by American Water Works Association.
 - 6. ANSI/AWWA C105/21.5-99, American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems, as published by American Water Works Association.
 - 7. ANSI/AWWA C600, AWWA Standard for Installation of Ductile-Iron Water Mains and their Appurtenances, as published by American Water Works Association.
 - 8. ANSI/AWWA C605, AWWA Standard for Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water, as published by American Water Works Association.
 - 9. ANSI/AWWA C651, AWWA Standard for Disinfecting Water Mains, published by American Water Works Association.
 - 10. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

11. ASTM D2774 – Standard Practice for Underground Installation of Thermoplastic Pressure Piping
12. ASTM D3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
13. ASTM F2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings
14. Ductile Iron Pipe Research Associate (DIPRA) “Polyethylene Encasement Installation Guide,” latest edition.
15. Ductile Iron Pipe Research Associate (DIPRA) “Installation Guide for Ductile Iron Pipe,” latest edition.
16. ASTM C1479 – Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations
17. AWWA C800 – AWWA Standard for Underground Service Line Valves and Fittings
18. ASTM F1417 – Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air
19. ASTM F2164 – Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping System Using Hydrostatic Pressure

1.03 SUBMITTALS

- A. Submittals shall be made in accordance with Section 01330 – Submittal Procedures. In addition, the following specific information shall be provided by the Contractor:
 1. Submit certification that each manufacturer meets the applicable manufacturer’s qualifications stated in this section.
- B. Submit the following specific information for welded steel piping prior to the start of work:
 1. Procedure specifications and qualification records of all welding procedures for all pipe and associated structural welding to be performed under this Section, in accordance with Section IX of the ASME Boiler and Pressure Vessel Code except as modified by the code listed in Code Requirements of this Section.
 2. Welders qualifications shall be submitted for each individual welder scheduled to execute welding work.
- C. Submit a copy of the most current published NSF 61 listing of each pipe type, diameter, and lining, to be furnished for potable water service.

1.04 QUALITY ASSURANCE

- A. The manufacturer shall have established an on-going program of quality assurance and shall, upon request, provide auditable records to the Engineer of quality control documentation for the specified materials and equipment through its manufacturing process.
- B. The pipe manufacturers shall have been in the design, manufacture, and testing of the specified type of pipe, fittings, supports and associated equipment for ten (10) years minimum.

1.05 WARRANTY

- A. The Contractor shall provide warranty for all items under this section for one year from the date of acceptance by the Owner. During that one year, the Contractor shall at his expense replace any part or parts which malfunction or corrode due to defective manufacture or installation.

1.06 DELIVERY, STORAGE AND HANDLING

- A. In addition to the requirements in Section 01660 – Product Storage and Handling Requirements, the ends of pipe shall be covered during shipping.
- B. If possible, store PVC and CPVC pipe inside. When this is not possible, store pipe on level ground which is dry and free from sharp objects.
 - 1. Store different schedules of PVC and CPVC pipe that are stacked together with the pipe with the thickest walls on the bottom.
 - 2. If the PVC and CPVC pipe is on pallets, the pallets should be stacked with the pallet boards touching, rather than pallet boards being placed on the pipe to prevent damage to or bowing of the pipe.
 - 3. If the PVC and CPVC pipe is stored in racks, it shall be continuously supported along its length. If this is not possible, the spacing of the supports shall not exceed three feet (3').
 - 4. The PVC and CPVC pipe shall be protected from the sun and be in an area with proper ventilation to lessen the effects of ultraviolet rays and help prevent heat build-up.

PART 2 PRODUCTS

2.01 GENERAL

- A. The materials to be used for each piping system are shown on the Drawings and as stated in this section.
- B. Bolts, nuts, and washers shall be stainless steel unless otherwise specified herein.

2.02 PIPE IDENTIFICATION

- A. Detectable line marking tape with No. 12 insulated copper wire shall be used on all lines. Water lines shall have tape that reads "WARNING: Water Line." Sewer lines shall have tape that reads "WARNING: Sewer Line." All tape shall be placed approximately 18" above the line.
- B. Pressures lines shall have a No. 12 insulated copper tracer wire run in the ditch, immediately above the pipe and a termination box placed at each end of the pipe run.

2.03 PIPING TRANSITION PROVISIONS

- A. For connecting two pipes of the same nominal size but with different O.D.'s, a solid-sleeve transition coupling shall be used with low alloy steel bolts and nuts where connecting to ductile iron pipe.
- B. Couplings shall be PowerSeal Model 3501, Ford Meter Box Model FC2A or equal.

2.04 WALL PENETRATIONS (RESERVED)

2.05 DUCTILE-IRON PIPE AND FITTINGS

- A. Ductile-Iron Pipe shall be manufactured by one of the following:
 - 1. American Cast Iron Pipe Company
 - 2. U. S. Pipe and Foundry Company
 - 3. Clow Water Systems Company
 - 4. No substitutions will be allowed
- B. Ductile-Iron Fittings shall be manufactured by one of the following:
 - 1. American Cast Iron Pipe Company
 - 2. U. S. Pipe and Foundry Company
 - 3. Clow Water Systems Company
 - 4. Star Pipe Company
 - 5. Sigma Corporation
 - 6. No substitutions will be allowed
- C. Buried Piping
 - 1. Material and Wall Thickness
 - a. Material and Wall Thickness – Ductile iron pipe shall conform to ANSI/AWWA C150/A21.50 and ANSI/AWWA C151/A21.51. All pipe shall have a Brinell Hardness of less than 230 BHN.
 - i. Buried pipe 12-inch diameter and smaller shall be AWWA C151 Pressure Class 350.
 - ii. Buried pipe larger than 12-inch diameter shall be AWWA C151 Pressure Class 350.
 - 2. Joints
 - a. Push-On – Shall conform to ANSI/AWWA C111/A21.11, American Fastite Joint or Equal.
 - i. Tyton Joint complete with Tyton gasket and lubricant supplied by pipe manufacturer.
 - ii. Fastite Joint complete with Fastite gasket and lubricant supplied by pipe manufacturer.
 - b. Restrained Push- On – Shall conform to ANSI/AWWA C111/A21.11, American Fastite Joint or Equal with American Fast-Grip restraining gaskets, or equal with tools and lubricant included.
 - i. Tyton Joint complete with Field-Lok gasket and lubricant supplied by pipe manufacturer.
 - ii. Fastite Joint complete with Fast-Grip gasket and lubricant supplied by pipe manufacturer.
 - iii. Tyton Joint with Sure-Stop Gaskets

- c. Mechanical Joint – Shall conform to ANSI/AWWA C111/A21.11. Bolts and nuts shall be Alloy Steel (Corten or US alloy type) and be cathodic to ductile iron and cast iron. Mechanical glands shall provide pipe restraint and conform to the following: The restraining mechanism shall consist of individually actuated wedges that increase their resistance to pullout as pressure or external forces increase. The device shall be capable of full mechanical joint deflection during assembly and the flexibility of the joint shall be maintained after burial. Torque limiting twist-off nuts shall be used to insure proper actuation of the restraining wedges. The joint restraint ring and its wedging components shall be made of ductile iron conforming to ASTM A536. The wedges shall be ductile iron heat treated to a minimum hardness of 370 BHN. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell conforming to ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of the latest revision. The mechanical joint restraint shall have a rated working pressure of 250 psi minimum. The devices shall be listed by Underwriters Laboratories up through the twenty-four inch (24") size. The MJ restraint shall be the Series 1100 Mega lug Restraint manufactured by EBBA Iron, Inc. or ROMAC RomaGrip.
- 3. Fittings
 - a. Unless otherwise shown on drawings, all fittings shall be cast iron or ductile iron with mechanical joints conforming to AWWA C110 or shall be compact fittings meeting AWWA 153. Fittings 24" in diameter and smaller shall be for 350 psi maximum working pressure. Fittings larger than 24" shall be for 250 psi maximum working pressure.
 - b. All mechanical joint fittings shall have Series 1100 Mega lug Restraint manufactured by EBBA Iron, Inc. or ROMAC RomaGrip MJ restraint.
- 4. Lining
 - a. Cement Linings: ANSI A21.4 or AWWA C104 unless otherwise indicated, all ductile iron pipe and fittings for wastewater applications located inside the plant site shall be cement lined. Pipe used for air service shall not be cement-lined.
 - b. Ceramic epoxy: utilize Protecto 401 corrosion lining on all Ductile-Iron pipe and fittings for sanitary and combined sewer service.
- 5. Exterior Coating
 - a. Bituminous coating as specified in AWWA C151.
- 6. Polyethylene Encasement
 - a. All buried ductile iron pipe, including all appurtenances (fittings, valves, etc.) shall have a polyethylene encasement meeting AWWA C105. Encasement shall be installed per the Ductile Iron Pipe Association (DIPRA) installation guide.

7. Boltless Restrained Joints
 - a. Joints shall conform to applicable sections of AWWA C111, shall be a boltless-type joint that is capable deflection after assembly. Restrained joints shall be one of the following:
 - i. Flex-Ring bell-ends and factory spigot-ends or Flex-Ring bell-ends and Field Flex Rings for field-cut pipe-ends, as manufactured by American Cast Iron Pipe Company.
 - ii. TR Flex bell-ends and factory spigot-ends or TR Flex bell-ends and TR Flex Gripper Rings for field-cut pipe-ends, as manufactured by United States Pipe and Foundry Company.
 - iii. SNAP-LOK – Tyton bell-ends and factory spigot-ends for 6-inch through 24-inch diameter piping. SNAP-LOK – Fastite bell-ends and factory spigot-ends for 30-inch through 48-inch diameter piping. SNAP-LOK FC – Tyton for 6-inch through 24-inch diameter field-cut pipe.
 - iv. Super-Lock bell ends and factory spigot ends or Super-Lock bell ends and Field Rings for field-cut pipe ends, as manufactured by Clow Water Systems Company
 8. Gaskets
 - a. For push-on, restrained push-on, mechanical, restrained mechanical, and boltless restrained joints shall be SBR, styrene butadiene rubber, conforming to AWWA C111. Where contaminated soil is encountered, elastomers that are compatible with and chemically resistant to the soil contaminants shall be provided. Gaskets for restrained push-on joints shall have stainless steel wedging elements manufactured as part of the gasket.
 - b. Gaskets shall be manufactured or supplied by the following pipe manufacturers:
 - i. American Cast Iron Pipe Company
 - ii. U. S. Pipe and Foundry Company
 - iii. Clow Water Systems Company
 - iv. No substitutions will be allowed
- D. Lubricant for piping shall be the pipe manufacturer's standard only, no substitutes will be permitted.

2.06 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

- A. Gravity Pipe
 1. Manufacturers - High Density Polyethylene (HDPE) Pipe for storm sewer applications shall be manufactured by one of the following:
 - a. ADS N-12 WT
 - b. Hancor Mega Green WT
 - c. Prinsco Goldflo WT
 - d. Or approved equal
 2. Material – HDPE pipe shall conform to ASTM F2306 and ASTM F2648. Pipe shall be dual-wall smooth interior/annular exterior unless otherwise shown on the Drawings.
 3. Joints – Bell and Spigot shall conform to ASTM D3212 with rubber gaskets that conform to ASTM F477.

B. Pressure Pipe

1. Manufacturers – High Density Polyethylene (HDPE) Pipe for pressure applications shall be manufactured by one of the following:
 - a. JM Eagle
 - b. Isco Pipe
 - c. WL Plastics
 - d. Or approved equal
2. Material and Wall Thickness
 - a. Pipe sizes 4" and larger: ASTM D3035, DR 11
 - b. Pipe O.D. sizes shall be ductile iron pipe sizes (DIPs)
 - c. The pipe material shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material.
3. Joints – Heat butt fused joints per ASTM F2620 and per pipe manufacturer's recommendations. Jointing shall be carried out by certified operators with prior experience fusing polyethylene pipe with similar equipment.
4. Fittings – Butt fusion fittings per ASTM D3261
5. Accessories
 - a. Molded Butt Fusion MJ Adapter, SR 11, in nominal DIPs sizes shall be used to transition to other pressure pipe materials and to install ductile iron fittings. Adapters shall be manufactured by Integrity Fusion Products or approved equal.
 - b. Electrofusion Couplers shall be allowed only to make final tie-ins where it is impractical to have butt fusion equipment in the pipe trench. Couplers shall be SDR 11 in nominal DIPs sizes and shall be manufactured by Integrity Fusion Products or approved equal.

2.07 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

A. Manufacturers - PVC Pipe shall be manufactured by one of the following:

1. Diamond Plastics.
2. CertainTeed Corporation
3. JM Eagle
4. North American Pipe Corporation
5. Or approved equal

B. Pressure Pipe

1. Material and Wall Thickness
 - a. Pipe sizes 4" and larger: AWWA C900, DR 18
 - b. For directional drilling applications, pipe shall be Certalok C905/RJ pipe by the North American Pipe or approved equal
 - c. Pipe designated for potable water lines shall be AWWA C900, DR 14
2. Joints: Push-on type with rubber gaskets meeting the requirements of ASTM D3139

- a. PVC pipe shall have rubber gasketed joints. Rubber gaskets shall meet ASTM Specification F477.
 - b. All pipe shall be furnished with a painted ring or other acceptable marking suitable for determining whether or not the pipe has been properly inserted into the coupling. Each pipe shall be clearly marked with the nominal diameter, manufacturer's name, class pressure rating and identification code.
 - c. Integral Restrained Joint for C905/RJ pipe shall be a restraining system manufactured integrally into the pipe bell and spigot.
 - 3. Fittings: ANSI A21.11 (AWWA C153), ductile iron standard body mechanical joint type as specified herein. All fittings shall be restrained with the Series 1100 Mega lug Restraint manufactured by EBBA Iron, Inc. or RomaGrip as manufactured by Romac Industries, Inc. No substitutions will be allowed.
 - a. Restraining Devices, where needed, shall be Series 2800 Bell Restraint Harness by EBAA Iron Inc., or approved equal.
- C. Gravity Pipe
 - 1. Material and Wall Thickness:
 - a. Pipe sizes 4" through 15" shall be ASTM D3034
 - i For sewers fifteen feet (15') deep or less, SDR 35
 - ii For sewers deeper than fifteen feet (15'), SDR 26
 - b. Pipe sizes 18" through 48" shall be ASTM F679
 - i For sewers fifteen feet (15') deep or less, PS 46
 - ii For sewers deeper than fifteen feet (15'), PS 115
 - c. Where required to meet the horizontal and vertical separation requirements for water mains and sewer construction, the sewer shall be constructed of AWWA C900, DR 18 pipe as specified herein
 - 2. Joints: Push-on type with rubber gaskets meeting the requirements of ASTM D3212
 - a. PVC pipe shall have rubber gasketed joints. Rubber gaskets shall meet ASTM Specification F477.
 - b. All pipe shall be furnished with a painted ring or other acceptable marking suitable for determining whether or not the pipe has been properly inserted into the coupling. Each pipe shall be clearly marked with the nominal diameter, manufacturer's name, class pressure rating and identification code.

2.08 POLYVINYL CHLORIDE (PVC) SCHEDULE PIPE AND FITTINGS

- A. PVC Schedule pipe and fittings shall be used for PVC applications with pipes less than 4" in diameter.
 - 1. Non-pressure Applications: Schedule 40
 - a. Pressure Applications: Schedule 80
- B. PVC Schedule pipe and fittings shall be manufactured from virgin rigid PVC (polyvinyl chloride) vinyl compounds meeting the requirements of ASTM D1784, ASTM D1785, and ASTM D2665, and ANSI/NSF 61/14.
- C. PVC Schedule pipe shall be Iron Pipe Size (IPS)
 - 1. PVC Schedule 80 fittings shall conform to ASTM D 2467.

2. PVC Schedule 80 threaded fittings shall conform to ASTM D 2464.
 3. PVC Schedule 40 pipe shall be Iron Pipe Size (IPS) conforming to ASTM D 1785.
 4. PVC Schedule 40 fittings shall conform to ASTM D 2466.
 5. Unions and flanges meet the requirements of ASTM F 1970 with gasket that is compatible with intended service.
 6. Solvent cement and primer shall conform to ASTM D 2564 and shall be as recommended by the pipe and fitting manufacturer. Cement shall be listed by manufacturer for compatibility with specific chemical service. Cement for chemical piping systems shall be IPS Weld-On CPVC 724 or Ipex Zirtec 24 CPVC cement or shall be listed by manufacturer for compatibility with specific chemical service.
 7. Pipe and fittings shall be manufactured as a system and be the product of one manufacturer.
 8. All pipe and fittings shall be manufactured in the United States.
- D. Unless noted otherwise, provide solvent-cement joints, except where connecting to valves and equipment with flanged or threaded connections that may require future disassembly.
- E. Threaded joints shall be sealed with PTFE tape or non-hardening compound that is NSF 61 listed and compatible with the intended service conditions. Thread seal tape shall meet MIL spec T-27730A-rated and be TT50 260P Pink Plumbers Teflon Thread Seal Tape manufactured by Seal Fast, Inc., or equal. Joint compound shall meet Federal Spec. TT-S-1732 and be Real-Tuff manufactured by Hercules Chemical Company, Inc., or equal for water and compatible chemical service.

2.09 CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPE AND FITTINGS

- A. CPVC Pipe and fittings shall be manufactured from virgin rigid CPVC (chlorinated polyvinyl chloride) vinyl compounds with a Cell Class of 23447-B (Type IV, Grade 1) as identified in ASTM D 1784.
1. CPVC Schedule 80 pipe shall be Iron Pipe Size (IPS) conforming to ASTM F 441.
 2. CPVC Schedule 80 fittings shall conform to ASTM F 439.
 3. CPVC Schedule 80 threaded fittings shall conform to ASTM F 437.
 4. Unions and flanges meet the requirements of ASTM F 1970 with gasket that is compatible with intended service.
 5. Solvent cement and primer shall conform to ASTM F 493 and shall be as recommended by the pipe and fitting manufacturer. Cement shall be listed by manufacturer for compatibility with specific chemical service. Cement for chemical piping systems shall be IPS Weld-On CPVC 724 or Ipex Zirtec 24 CPVC cement or shall be listed by manufacturer for compatibility with specific chemical service.
 6. Pipe and fittings shall be manufactured as a system and be the product of one manufacturer.
 7. All pipe and fittings shall be manufactured in the United States.
 8. Pipe and fittings shall conform to NSF Standard 61 and NSF Standard 14.

- B. Provide solvent-cement joints, except where connecting to unions, valves, and equipment with flanged or threaded connections that may require future disassembly and where noted otherwise.
- C. Threaded joints shall be sealed with PTFE tape or non-hardening compound that is NSF 61 listed and compatible with the intended service conditions. Thread seal tape shall meet MIL spec T-27730A-rated and be TT50 260P Pink Plumbers Teflon Thread Seal Tape manufactured by Seal Fast, Inc., or equal. Joint compound shall meet Federal Spec. TT-S-1732 and be Real-Tuff manufactured by Hercules Chemical Company, Inc., or equal for water and compatible chemical service.

2.10 COPPER AND COPPER ALLOY PIPE AND FITTINGS

- A. Tubing: Copper, seamless, ASTM B88, type and temper as follows:
 - 1. Buried: Type K, annealed soft or hard, drawn, temper.
 - 2. Exposed: Type L, hard, drawn, temper.
- B. Fittings: Commercially pure wrought copper, socket joint, ASTM B75, dimensions conforming to ASME B16.22. Cast copper fittings shall conform to ASME B 16.18.
- C. Solder: 95-5 wire solder (95 percent tin, 5 percent antimony), ASTM B32, Grade 95 TA. Cored solder is unacceptable.

2.11 REINFORCED CONCRETE PIPE

- A. ASTM C76 Class III unless otherwise noted on the Drawings
 - 1. Joints: ASTM C-361, Bell and Spigot compressive type with resilient seals embedded in both ends and joined with rubber gaskets per ASTM C443.
 - 2. RCP shall not have lifting holes. RCP 42" and larger shall be supplied with Dayton Superior P-75 Utility Anchors or equivalent lifting anchors.
 - 3. Each concrete pipe section shall be tested at the manufacture site with low pressure air or equivalent vacuum test. The test shall be conducted in a manner using a cap, plug and gasket of the type and size to be used in the field to include the tongue and bell sealing surface. End to end testing using foam plates is not acceptable. Reference ASTM C924 Pipe passing the test shall be clearly marked "Air Tested."
 - 4. Provide spigot cap or bell plug per ASTM C-361 where called for on the drawings.
- B. Flared End Sections for concrete or HDPE pipe shall be per AASHTO M170.

2.12 CORRUGATED STEEL (METAL) PIPE (CSP OR CMP)

- A. Corrugated Steel (Metal) Pipe (CSP or CMP): ASTM A760, 16 gauge. Galvanized, aluminized (Type 1R), or bituminous coated as specified on Drawings. Corrugated steel pipe may be round pipe or arch pipe as indicated on Drawings.
 - 1. Pipe ends for CMP shall be re-corrugated and installed with semi-corrugated "Hugger" type bands and "O" ring gaskets in accordance with pipe manufacturer's installation requirements to assure a watertight joint.

2.13 STEEL CASING PIPE

- A. At the locations shown on the drawings, pipelines shall be installed in a steel casing pipe. The steel casing pipe shall be bituminous coated and shall be of leakproof

construction, capable of withstanding the anticipated loadings. The steel casing pipe shall have minimum yield strength of 35,000 psi and shall meet the requirements of ASTM A139, Grade B. Ring deflection shall not exceed 2% of the nominal diameter. The steel casing pipe shall be delivered to the jobsite with beveled ends to facilitate field welding. The minimum wall thickness of the steel casing pipe shall be as follows:

Steel Casing Minimum Diameter (Inches)	Wall thickness (Inches)
16" and smaller	0.250
18"	0.250
20"	0.281
22"	0.312
24"	0.344
26"	0.375
28" and 30"	0.469
32"	0.438
34" and 36"	0.469
38", 40" and 42"	0.500
48"	0.563
54"	0.625

- B. Casing pipe diameter shall be such that there is a minimum of 3" clearance between the largest diameter part of the carrying pipe being installed and minimum inside diameter of the casing pipe including welds. To facilitate the installation of the inner pipe, that pipe shall be fitted with at least three casing insulators per pipe length. The casing insulators shall be Model 4810 as manufactured by Power Seal Pipeline Products Corporation of Wichita Falls, Texas, Advance Products & Systems Model SSI, or equal.
- C. The ends of the casing pipes shall be sealed with rubber end seals by Advance Products & Systems or approved equal. End seals shall be installed per manufacturer's recommendations.

2.14 GLASS-FIBER-REINFORCED POLYMER MORTAR (GFRPM) PIPE

- A. Manufacturers - Pipe shall be manufactured by one of the following:
 - 1. Hobas Pipe USA, Houston TX
- B. Material – fiberglass sewer pressure pipe per ASTM D3754, stiffness class SN46, pressure class PN50 unless otherwise shown on the Drawings.
- C. Joints – push-on type coupling joints per ASTM D4161 with rubber gaskets per ASTM F477. Pipe shall be supplied with couplings factory installed.
- D. Closure Couplings – mechanical couplings shall have stainless steel bodies and fasteners with elastomeric sealing sleeves and as per pipe manufacturer's recommendations. Closure coupling working pressure shall meet or exceed the working pressure of the pipe.
- E. Fittings – Flanges, elbows, reducers, tees, wyes, laterals, and other fittings shall be GFRPM capable of withstanding all operating conditions when installed. They may be contact molded or manufactured from mitered sections of pipe jointed by glass-fiber-reinforced overlays.

- F. Concrete Encasement – concrete encasement for trust restraint is required at all GFRPM fittings as per the details contained within the Drawings. Concrete and reinforcing shall meet or exceed the requirements of the Division 3 specifications.

2.15 DOUBLE-WALL AND TRIPLE-WALL POLYPROPYLENE PIPE (PP)

- A. Manufacturer: pipe shall be manufactured by one of the following:
 - 1. Advanced Drainage System, Inc.
 - 2. Or Accepted Equal
- B. Material: Dual wall pipe and fittings 12 inch through 24 inch diameter and triple wall pipe 30 inch through 60 inch shall conform to ASTM F2764, except as otherwise specified herein. Dual wall polypropylene pipe shall have a smooth interior and annular exterior corrugations. Triple wall polypropylene pipe shall have a smooth interior and exterior with annular inner corrugations. Pipe shall have a minimum pipe stiffness of 46 psi when tested in accordance with ASTM D2412.
- C. Joints: Pipe shall be joined with an integral bell and spigot joint on all sizes. The joints shall be watertight in accordance with ASTM D3212. The spigot shall have two gaskets meeting the requirements of ASTM F477. The gaskets shall be installed by the pipe manufacturer and shall be covered with a removable, protective wrap to ensure the gaskets are free from debris. A joint lubricant shall be used on the gasket and pipe bell during assembly. Pipe shall have a reinforced bell with a polymer composite band installed by the manufacturer.
- D. Fittings: Fittings shall conform to ASTM F2764 and be capable of withstanding all operating conditions when installed. Fittings may be molded or fabricated. Fabricated fittings shall be welded at all accessible interior and exterior junctions.

2.16 SANITARY SERVICE LATERALS

- A. Service lateral connections to newly installed sanitary sewers shall be gasketed PVC tees or wye fittings meeting the specifications defined in ASTM D3034, as manufactured by NAPCO or approved equal.
- B. Service lateral connections to existing sanitary sewers shall be Inserta-Tee by Inserta Fittings Co.

2.17 VALVES

- A. Valves for buried service to be provided as noted on the plans.

2.18 FIRE HYDRANTS (RESERVED)

2.19 YARD HYDRANTS

- A. Woodford Model S3 and S4H (for ADA sites). Sanitary yard hydrants shall be self-draining, non-freezing with a 1" NST nozzle at a 3-foot bury depth. Hydrant shall be self-draining, non-freezing and are to be factory painted red. Hydrants shall be installed per manufacturer's recommendations and as specified in the Contract Documents. Install where indicated on the Drawings.

2.20 MONITOR HYDRANTS (RESERVED)

2.21 TAPPING SLEEVES

- A. Tapping sleeves shall be ductile iron body with bituminous coating meeting NSF-61 or epoxy coated carbon steel. Tapping sleeves shall be MJ outlet.
- B. Manufacturers:
 - 1. Smith-Blair MJ Outlet Tapping Sleeve
 - 2. Mueller H-615 MJ Tapping Sleeve
 - 3. American Series 2800-C Tapping Sleeve

2.22 REPAIR COUPLINGS

- A. Pressure piping systems – repair couplings for PVC and Ductile Iron piping systems under pressure shall be mechanical joint ductile iron solid sleeves as specified herein
- B. Gravity piping systems – shall be gasketed, solid-body PVC repair couplings meeting the specifications defined in ASTM D3034, as manufactured by NAPCO or approved equal. Fernco style couplings are not acceptable.

PART 3 EXECUTION

3.01 GENERAL

- A. Proper and suitable tools and appliances for the safe and convenient handling and placing of the pipes shall be used. All pieces shall be carefully examined for defects and no piece shall be laid which is known to be defective. If any defective piece should be discovered after having been laid, it shall be removed and replaced with a sound piece, in a satisfactory manner, by the Contractor at his own expense.
- B. The pipes shall be thoroughly cleaned before they are placed, shall be kept clean until they are accepted in the completed work, and when laid shall conform accurately to the lines and elevations given by the Engineer, or as specified.

3.02 PIPE PREPARATION AND HANDLING

- A. Each pipe and fitting shall be carefully inspected before the buried pipe or fitting is lowered into the trench. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after laying.
- B. Use proper implements, tools, and equipment for the safe and proper protection of the pipe. Carefully handle pipe in such a manner as to avoid any physical damage to the pipe and coatings. Do not drop or dump pipe into trenches under any circumstances.
- C. Ream, clean, and remove burrs from piping before making up joints.
- D. Cut copper pipe square and remove burrs. Clean both inside of copper fittings and outside of pipe before sweating. Take care to prevent annealing of fittings and hard-drawn tubing when making connections.
- E. Bends in soft temper copper pipe shall be long sweep, wherever possible. Bends shall be shaped with bending tools and shall be made without appreciable flattening, buckling, or thinning of the tube wall at any point.

3.03 INSTALLATION OF BURIED PIPING

A. General

1. Buried piping shall be installed in accordance with the "Standard Specifications for Water and Sewer Construction in Indiana", "10-States Standards", "IEPA Technical Policy Statements", "IEPA Recommended Standards for Sewage Works", AWWA C600 and AWWA C605, ASTM D3221 and ASTM D2774, ASTM C1479, and the DIPRA Installation Guide for Ductile Iron Pipe. Contractor shall install buried piping according to the above listed standards except for requirements regarding measurement and payment and as modified herein.
2. Assembly of buried pipe and fittings shall be in accordance with the manufacturer's written instructions and recommendations.
3. Field cut pipe shall be cut square, beveled, field-gauged, and rounded in accordance with manufacturers written instructions and recommendations.
4. D.I.P. solid sleeves shall be installed with buried piping where proposed piping connects to existing site piping. Provide a make-up pipe spacer to fill the gap between pipe ends covered by the sleeve. The pipe spacer shall be cut from the same pipe material as adjacent pipe and shall be cut to length such that all adjacent joints remain fully seated.
5. All buried piping shall be uniformly sloped and installed to the line and grade indicated on the drawings. Minimum depth of cover shall be 4'-0" unless noted otherwise.
6. If a grade conflict is determined, the Contractor shall notify the Engineer, who shall then determine what adjustments are required.

B. Excavation, bedding, and backfill – Backfill requirements under pavement shall extend five feet (5') beyond the edge of pavement.

C. Thrust block all crosses, tees, wyes, bends, plugs, fire hydrants and valves against undisturbed earth as detailed in the drawings. Backfill thrust blocks a minimum of 24 hours after placement. Thrust blocks or misplaced concrete shall not contact the bell face or fasteners of any pipe, fitting, or valve.

D. Ductile-Iron Pipe

1. Care shall be taken not to damage the cement lining when handling the pipe. Cut pipe with milling type cutter, rolling pipe cutter, or abrasive saw cutter. Do not flame cut. Dress cut ends of pipe in accordance with the type of joint to be made. Dress cut ends of push-on joint pipe by beveling, as recommended by the pipe manufacturer. Dress cut ends of pipe for flexible couplings and flanged coupling adapters as recommended by the coupling or adapter manufacturer.
2. Push-On and Restrained Push-on pipe joint assembly shall conform to AWWA C111, Appendix B. Join pipe in accordance with the manufacturer's written instructions and recommendations. Provide all special tools and devices, such as special jacks, chokers, and similar items required for proper installation. Lubricant for the pipe gaskets shall be furnished by the pipe manufacturer, and no substitutes will be permitted.
3. Mechanical and Restrained Mechanical joint assembly shall conform to AWWA C111, Appendix A. Join pipe in accordance with the manufacturer's written instructions and recommendations. Provide all special tools and

devices, such as special jacks, chokers, and similar items required for proper installation. Lubricant for the pipe gaskets shall be furnished by the pipe manufacturer, and no substitutes will be permitted. Torque-limiting wrenches shall be used to ensure uniform bolt tightening.

E. PVC Pipe

1. Buried plastic pipe shall be installed in trench bottoms which are smooth and regular in either undisturbed soil or a layer of compacted backfill. The trench bottom should be smooth, free of rocks and debris, continuous, and provide uniform support. If ledge rock, hardpan or large boulders are encountered, the trench bottom should be padded with bedding of compacted granular material to a thickness of at least four inches.
2. Plastic pipe subject to freezing should be installed below the frost level which is 3-feet 6-inches of cover. The minimum cover for lines not subject to freezing but subject to heavy overhead traffic is 24-inches.
3. A smooth trench bottom is necessary to support the pipe over its entire length on firm stable material. Pipe must lie evenly on this surface throughout the entire length of its barrel. Blocking should not be used to change pipe grade or to intermittently support pipe over low sections in the trench.
4. Buried plastic pipe shall be laid by snaking the pipe from one side of the trench to the other. Offset shall be as recommended by the manufacturer for the maximum temperature variation between time of solvent welding and during operation.
5. Install plastic pipe in accordance with ASTM D 2321 "Underground Installation of Thermoplastic pipe for sewers and other gravity-flow applications."

3.04 TESTING

A. General:

1. Conduct pressure and leakage tests on all newly installed pipelines or segments of pipelines. Furnish all necessary equipment and material and make all permanent or temporary connections or plugs to the pipe, as required to perform testing on pipe segments. Properly restrain all segments to be tested. The Engineer will monitor the tests. Test pressures and type of test shall be as specified and as shown on the Drawings.
2. Testing New Pipe Which Connects to Existing Pipe: New pipelines which are to be connected to existing pipelines shall be tested by isolating the new pipe with special valves or blind flanges as necessary. Costs of valves and blind flanges used for this testing shall be incidental to new pipeline being tested.

B. Sanitary Sewer Testing - shall be per the Standard Specifications for Water & Sewer Construction in Indiana, latest edition, provisions and as specified herein.

1. The Contractor shall be required to test all the sanitary sewers and gravity drain lines installed on this project and all sections will be required to pass testing as outlined.
2. Leakage tests shall be performed after the lines have been cleaned and the trench backfilled.
3. All gravity sanitary sewers and gravity drain lines shall be tested by

exfiltration of water or exfiltration of air. Along the section of sewer to be tested, the Contractor shall determine the groundwater level at each end manhole and at all intermediate manholes. The groundwater level outside each manhole shall be measured outside the manhole by excavating down to the sewer to be tested or shall be measured in the manhole by the use of clear tubing and piping which extends through the manhole wall at or below the top of the sewer pipe to be tested. The hole through the manhole shall be sealed following successful completion of all leakage testing.

a. Exfiltration of water:

Test shall be conducted on accordance with the Standard Specifications for Water and Sewer Construction in Indiana, latest edition. The Contractor shall furnish the water to be used during the test when the water exfiltration method of testing is used. If a public water system is used, all water shall be metered and the Contractor shall pay the utility according to their current rates. All sewers shall be required to meet allowable leakage criteria. If any section fails to meet the tests, the section shall be repaired or replaced at the Contractor's expense and retested until it meets the leakage limits. Pressure grout or concrete encasement will not be acceptable methods of repair of joints.

b. Exfiltration of air:

If used, the air test shall, as a minimum, conform to the test procedure described in Section 31-1.11B of the Standard Specifications for Water and Sewer Main Construction in Indiana. The specifications shall require that the time required for a pressure drop from 3.5 to 2.5 PSIG not be less than the time specified in the Air Test Table in Appendix C.

6. Deflection Testing:

a. The Contractor shall be required to conduct deflection testing on each type of flexible sewer pipe or drain pipe. Sections of flexible pipe to be tested shall be tested no sooner than 30 days after the sewer has been installed. Where feasible testing shall be initiated at the downstream sections of the sewer and be followed by the upstream sections. Testing shall be performed by pulling through the sewer by hand a mandrel having an outside diameter equal to 95% of the base inside diameter of the pipe as established in the ASTM Standard D3034.

b. Deflection of flexible pipe shall not exceed 5% of the base inside diameter.

c. Where deflection is found to be in excess of 5% of the original pipe diameter, the Contractor shall excavate to the point of excess deflection and carefully compact around the point where excess deflection was found. The line shall then be retested for deflection. However, should after the initial testing the deflected pipe fail to return to the original size (inside diameter) the line shall be replaced.

C. Pressure Tests for Pressure Pipe

1. All buried piping shall be subject to pressure tests as specified herein. After the pipe had been laid and backfilled, the pipe shall be subjected to

hydrostatic pressure tests in accordance with Section 41-2.12A and 41-2.12B of the "Standard Specifications for Water and Sewer Main construction in Illinois", latest edition. The test pressure shall be a minimum of 1.5 times the maximum operating pressure of the pipe system.

2. The duration of each pressure test shall be for a period of not less than two hours and not more than six hours. The basic provisions of AWWA C600 shall be applicable.
3. Each section of pipe to be tested shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump pipe connection and all necessary apparatus including gauges and meters shall be furnished by the Contractor. Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at points of highest elevation and afterwards tightly plugged. Any cracked or defective pipes, fittings, valves, or hydrants discovered in consequence of this pressure test shall be removed and replaced by the Contractor at the Contractor's expense with sound material and the test shall be repeated until satisfactory to the Engineer.

D. Leakage Tests for Pressure Pipe

1. Concurrently with the pressure test, a leakage test shall be conducted to determine the quantity of water lost by leakage under the specified test pressure. Applicable provisions of AWWA C600 shall apply. Duration of each leakage test shall be a minimum of two hours. Allowable leakage is defined in AWWA C600.

E. Joint Tests

1. On pipe sizes 48" and larger, joint testing may be performed in lieu of pressure tests and leakage tests.
2. The Contractor shall follow all procedures outlined by the testing equipment manufacturer and the pipe manufacturer, including but not limited to:
 - a. Safety procedures
 - b. Minimum and maximum test pressures
 - c. Duration of the test procedure
 - d. Allowable leakage rates
3. Joint testing shall be conducted immediately following backfilling and shall progress as the pipe installation progresses.
4. Any joints that fail the test shall be removed and replaced by the Contractor at the Contractor's expense in order to create a sound joint and the test shall be repeated until satisfactory to the Engineer.

F. Test Records: Records shall be made of each piping system installation during the test and recorded on a form. These records shall include but not limited to the following:

1. Date of test.
2. Description and identification of piping tested.
3. Test fluid.
4. Test pressure.
5. Remarks, to include such items as:

- a. Leaks (type, location).
- b. Repairs made on leaks

6. Certification by Contractor and signed acknowledgement by Engineer.

3.05 DISINFECTION

- A. Before being placed in service, all new pipelines which will carry potable water or any valved sections thereof shall be disinfected to guard against a contaminated water supply.
- B. Disinfection shall be accomplished in accordance with the provisions of AWWA Specifications C-651, latest revisions and the Standard Specification for Water and Sewer Main Construction in Indiana, latest edition. Where conflicts between two specifications exist, the more stringent specification shall apply.
- C. In the process of disinfecting newly laid pipe, valves and other appurtenances shall be operated while the pipeline is filled with the disinfection agent. Following disinfection, all treated water shall be thoroughly flushed from the newly laid pipe at the extremity until the replacement water throughout its length shall, upon test, both chemically and bacteriologically, be proved equal to the water quality served the public from the existing water supply.
- D. Repetition of Procedure: Should the initial treatment fail to result in satisfactory results, as specified above, the original disinfection procedure will be repeated until satisfactory results are obtained. The Results of Laboratory examination by Indiana Environmental Protection Agency or other State certified laboratory shall be conclusive in determining whether the water quality is acceptable.

3.06 FINAL CLEANING

- A. Following assembly and testing and prior to final acceptance, all pipelines installed under this section, except plant process air lines and instrument air lines, shall be flushed with water and all accumulated construction debris and other foreign matter removed. Cone strainers shall be inserted in the connections to attached equipment and left there until cleaning has been accomplished to the satisfaction of the Engineer. Accumulated debris shall be removed through drains 2-inch and larger or by removing spools and valves.

3.07 CORROSION PROTECTION FOR EXPOSED PIPE

- A. All exposed steel or ductile iron pipe piping shall be painted in accordance with the manufacturer's recommendations.

END OF SECTION 02500

DIVISION 02 – SITEWORK
Section 02530 – Sewerage Piping

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This section covers the work necessary to provide all sewerage piping installed outside of buildings and other structures – new and replacement.
- B. Related Sections:
 - 1. Section 01330 - Submittals
 - 2. Section 01660 – Product Storage and Handling Requirements
 - 3. Section 02500 – Buried Piping
- C. Reference to Standards
 - 1. 10-States Standards: “Recommended Standards for Wastewater Facilities” as issued by the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, latest Edition.
 - 2. Indiana Department of Transportation (INDOT): Standard Specifications for Road and Bridge Construction, latest edition.
 - 3. Indiana Department of Transportation (INDOT): Supplemental Specifications and recurring Special Provisions, adopted, latest edition.
 - 4. Occupational Safety and Health Administration (OSHA): Current OSHA Occupational Safety and Health Standards – Excavations, 29 CFR Part 1926, including any successor regulations.
 - 5. ANSI/AWWA C104/A21.4-03, American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water, as published by American Water Works Association.
 - 6. ANSI/AWWA C105/21.5-99, American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems, as published by American Water Works Association.
 - 7. ANSI/AWWA C110/A21.10-03, American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in. for Water and Other Liquids, as published by American Water Works Association.
 - 8. ANSI/AWWA C111/A21.11-00, American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings, as published by American Water Works Association.
 - 9. ANSI/AWWA C116/A21.16-03, AWWA Standard for Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service, as published by American Water Works Association.

10. ANSI/AWWA C150/A21.50-02, AWWA Standard for Thickness Design of Ductile-Iron Pipe, as published by American Water Works Association.
11. ANSI/AWWA C151/A21.51-02, American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water, as published by American Water Works Association.
12. ANSI/AWWA C600-93, AWWA Standard for Installation of Ductile-Iron Water Mains and their Appurtenances, as published by American Water Works Association.
13. ANSI/AWWA C605-94, AWWA Standard for Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water, as published by American Water Works Association.
14. ANSI/AWWA C900, AWWA Standard for Polyvinyl Chloride (PVC) Pressure pipe and Fabricated Fittings, 4-Inch through 60-Inch for Water Distribution.
15. ASTM B32-04 - Standard Specification for Solder Metal.
16. ASTM D 1784-03 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
17. ASTM D2241-09 Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
18. ASTM D2321-04 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
19. ASTM D2564-04 Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
20. ASTM D3034 Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
21. ASTM D3139 Standard Specification for Joint for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
22. ASTM D3212 Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
23. ASTM D3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
24. ASTM D3517 Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting-Resin) Pressure Pipe
25. ASTM D3754 Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting-Resin) Sewer and Industrial Pressure Pipe
26. ASTM D4161 Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals
27. ASTM F477 Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
28. ASTM F493-04 Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
29. ASTM F2306 Standard Specification for 12 to 60 in. [300 to 1500mm] Annular Corrugated Profile-Wall Polyethylene (PE) Pipe and Fittings for Gravity-Flow Storm Sewer and Subsurface Drainage Applications.

30. ASTM F2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings
31. ASTM F2648 Standard Specification for 2 to 60 inch [50 to 1500mm] Annular Corrugated Profile Wall Polyethylene (PE) Pipe and Fittings for Land Drainage Applications.
32. NSF/ANSI Standard 14: Plastic Piping System Components and Related Materials.
33. AASHTO M252: Standard Specifications for Corrugated Polyethylene Drainage Pipe (3"-10")
34. Ductile Iron Pipe Research Associate (DIPRA) "Polyethylene Encasement Installation Guide," latest edition.
35. Ductile Iron Pipe Research Associate (DIPRA) "Installation Guide for Ductile Iron Pipe," latest edition.

1.03 SUBMITTALS

- A. Submittals shall be made in accordance with Section 01330 – Submittal Procedures. In addition, the following specific information shall be provided by the Contractor:
 1. Submit certification that each manufacturer meets the applicable manufacturer's qualifications stated in this section.
- B. Submit the following specific information for welded steel piping prior to the start of work:
 1. Procedure specifications and qualification records of all welding procedures for all pipe and associated structural welding to be performed under this Section, in accordance with Section IX of the ASME Boiler and Pressure Vessel Code except as modified by the code listed in Code Requirements of this Section.
 2. Welders qualifications shall be submitted for each individual welder scheduled to execute welding work.
- C. Submit a copy of the most current published NSF 61 listing of each pipe type, diameter, and lining, to be furnished for potable water service.

1.04 QUALITY ASSURANCE

- A. The manufacturer shall have established an on-going program of quality assurance and shall, upon request, provide auditable records to the Engineer of quality control documentation for the specified materials and equipment through its manufacturing process.
- B. The pipe manufacturers shall have been in the design, manufacture, and testing of the specified type of pipe, supports and associated equipment for ten (10) years minimum.

1.05 WARRANTY

- A. The Contractor shall provide warranty for all items under this section for one year from the date of acceptance by the Owner. During that one year, the Contractor shall at his expense replace any part or parts which malfunction or corrode due to defective manufacture or installation.

1.06 DELIVERY, STORAGE AND HANDLING

- A. In addition to the requirements in Section 01660 – Product Storage and Handling Requirements, the ends of pipe shall be covered during shipping.
- B. If possible, store PVC pipe inside. When this is not possible, store pipe on level ground which is dry and free from sharp objects.
 - 1. Store different schedules of PVC pipe that are stacked together with the pipe with the thickest walls on the bottom.
 - 2. If the PVC pipe is on pallets, the pallets should be stacked with the pallet boards touching, rather than pallet boards being placed on the pipe to prevent damage to or bowing of the pipe.
 - 3. If the PVC pipe is stored in racks, it shall be continuously supported along its length. If this is not possible, the spacing of the supports shall not exceed three feet (3').
 - 4. The PVC pipe shall be protected from the sun and be in an area with proper ventilation to lessen the effects of ultraviolet rays and help prevent heat build-up.

PART 2 PRODUCTS

2.01 GENERAL

- A. The materials to be used for each piping system are shown on the Drawings and as stated in this section.
- B. Bolts, nuts and washers used in flanged joints shall be stainless steel.

2.02 PIPE IDENTIFICATION

- A. Detectable line marking tape with No. 12 insulated copper wire shall be used on all sewer lines that reads "WARNING: Sewer Line." All tape shall be placed approximately 18" above the line.
- B. Pressures lines shall have a No. 12 insulated copper tracer wire run in the trench, immediately above the pipe.

2.03 PIPING TRANSITION PROVISIONS

- A. For connecting two pipes of the same nominal size but with different O.D.'s, a solid-sleeve transition coupling shall be used with low alloy steel bolts and nuts where connecting to ductile iron pipe.
- B. Couplings shall be PowerSeal Model 3501, Ford Meter Box Model FC2A or equal.

2.04 SERVICE SADDLES FOR FERROUS METAL PIPING (RESERVED)

2.05 DUCTILE-IRON PIPE AND FITTINGS (RESERVED)

2.06 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS (RESERVED)

2.07 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

- A. Manufacturers - PVC Pipe shall be manufactured by one of the following:
 - 1. Diamond Plastics.
 - 2. IPS
 - 3. CertainTeed Corporation
 - 4. JM Eagle
 - 5. Or approved equal
- B. Pressure Rated Pipe
 - 1. Material and Wall Thickness
 - a. Pipe sizes 4" to 36": ASTM D2241.
 - b. Pipe sizes 4" to 60": AWWA C900, DR 18.
 - c. For directional drilling applications, pipe shall be Certalok C900/RJ pipe by the North American Pipe or approved equal
 - 2. Joints: Push-on type with rubber gaskets.
 - a. PVC pipe shall have rubber gasketed joints. Rubber gaskets shall meet ASTM Specification F477.
 - b. For all PVC pipe, additives and fillers, including but not limited to stabilizers, antioxidants, lubricants, colorants, etc. shall not exceed ten (10) parts by weight per one hundred (100) parts of the resin in the compound. Manufacturers will be required to certify that their pipe compound meets this requirement as well as cell classification.
 - c. All pipe shall be furnished with a painted ring or other acceptable marking suitable for determining whether or not the pipe has been properly inserted into the coupling. Each pipe shall be clearly marked with the nominal diameter, manufacturer's name, class pressure rating and identification code.
 - d. Integral Restrained Joint for C905/RJ pipe shall be a restraining system manufactured integrally into the pipe bell and spigot.
 - 3. Fittings: ANSI A21.11 (AWWA C153), ductile iron standard body mechanical joint type as specified herein. All fittings shall be restrained with the Series 1100 Mega lug Restraint manufactured by EBBA Iron, Inc. or RogaGrip as manufactured by Romac Industries, Inc. No substitutions will be allowed.
 - a. Restraining Devices shall be Series 2800 Bell Restraint Harness by EBAA Iron Inc. or approved equal.
- C. Non-Pressure Rated Pipe
 - 1. Pipe sizes 4" to 15": ASTM D3034. Joints shall be flexible elastomeric seals per ASTM D3212 and F477.
 - 2. Pipe sizes 18" to 48": ASTM F679. Joints shall be flexible elastomeric seals per ASTM D3212 and F477.
 - 3. Pipe buried 15 feet deep or less, pipe class shall be SDR 35. Pipe buried greater than 15 feet but less than 30 feet deep, pipe class shall be SDR26.

2.08 DOUBLE-WALL AND TRIPLE-WALL POLYPROPYLENE PIPE (PP) (RESERVED)

2.09 REINFORCED CONCRETE PIPE

- A. ASTM C76 Class [choose appropriate class of pipe based on fill height: classes I -V per INDOT Standard Specifications Article 543.02] unless otherwise noted on the Drawings.
 - 1. Joints: ASTM C-361, Bell and Spigot compressive type with resilient seals embedded in both ends and joined with rubber gaskets per ASTM C443.
 - 2. Each concrete pipe section shall be tested at the manufacture site with low pressure air or equivalent vacuum test. The test shall be conducted in a manner using a cap, plug and gasket of the type and size to be used in the field to include the tongue and bell sealing surface. End to end testing using foam plates is not acceptable. Reference ASTM C924. Pipe passing the test shall be clearly marked "Air Tested."
 - B. Flared End Sections shall be per AASHTO M170.
- 2.10 VITRIFIED CLAY PIPE (RESERVED)
- 2.11 STEEL CASING PIPE (RESERVED)
- 2.12 GLASS-FIBER-REINFORCED POLYMER MORTAR (GFRPM) PIPE (RESERVED)
- 2.13 BURIED SERVICE LATERALS
- A. At locations shown on the Drawings and where manufactured fittings are available, use tee fittings as provided by applicable pipe manufacturer.
 - B. At locations shown on the Drawings and where manufactured fittings are not available, Inserta-Tee by Inserta Fittings Co. shall be used. Contractor shall confirm Inserta-Tee fittings are compatible with pipe to be installed.
- 2.14 TAPPING SLEEVES
- A. Tapping sleeves shall be ductile iron body with bituminous coating meeting NSF-61 or epoxy coated carbon steel. Tapping sleeves shall be MJ outlet.
 - B. Manufacturers:
 - 1. Smith-Blair MJ Outlet Tapping Sleeve
 - 2. Mueller H-615 MJ Tapping Sleeve
 - 3. American Series 2800-C Tapping Sleeve
- 2.15 TRACER WIRE
- A. Install copper tracer wire with high density polyethylene coating specifically made for directionally drilled applications and where shown on the drawings.
 - B. ASTM Standards:
 - 1. B1010/B1010M – Standard Specification for Copper-Clad Steel Electrical Conductor for Tracer Wire Applications
 - 2. B910/B910M – Standard Specification for Annealed Copper-Clad Steel Wire
 - 3. B227 – Standard Specification for Hard-Drawn Copper-Clad Steel Wire
 - 4. B170 – Standard Specification for Oxygen-Free Electrolytic Copper-Refinery Shapes

- 5. D1248 – Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
- C. Manufacturers:
 - 1. Copperhead Industries.
 - 2. Approved equal.
- D. Color: green.

PART 3 EXECUTION

3.01 GENERAL

- A. Proper and suitable tools and appliances for the safe and convenient handling and placing of the pipes shall be used. All pieces shall be carefully examined for defects and no piece shall be laid which is known to be defective. If any defective piece should be discovered after having been laid, it shall be removed and replaced with a sound piece, in a satisfactory manner, by the Contractor at his own expense.
- B. The pipes shall be thoroughly cleaned before they are placed, shall be kept clean until they are accepted in the completed work, and when laid shall conform accurately to the lines and elevations given by the Engineer, or as specified.

3.02 PIPE PREPARATION AND HANDLING

- A. Each pipe and fitting shall be carefully inspected before the buried pipe or fitting is lowered into the trench. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after laying.
- B. Use proper implements, tools, and facilities for the safe and proper protection of the pipe. Carefully handle pipe in such a manner as to avoid any physical damage to the pipe and coatings. Do not drop or dump pipe into trenches under any circumstances.
- C. Ream, clean, and remove burrs from piping before making up joints.
- D. Cut copper pipe square and remove burrs. Clean both inside of copper fittings and outside of pipe before sweating. Take care to prevent annealing of fittings and hard-drawn tubing when making connections.
- E. Bends in soft temper copper pipe shall be long sweep, wherever possible. Bends shall be shaped with bending tools and shall be made without appreciable flattening, buckling, or thinning of the tube wall at any point.

3.03 INSTALLATION OF BURIED PIPING

- A. General
 - 1. Buried piping shall be installed in accordance with “10-States Standards”, AWWA C600 and AWWA C605 except for requirements regarding measurement and payment and as modified herein.
 - 2. Assembly of buried pipe and fittings shall be in accordance with the manufacturer’s written instructions and recommendations.
 - 3. Field cut pipe shall be cut square, beveled, field-gauged, and rounded in accordance with manufacturers written instructions and recommendations.

4. D.I.P. solid sleeves shall be installed with buried piping where proposed piping connects to existing site piping. Provide a make-up pipe spacer to fill the gap between pipe ends covered by the sleeve. The pipe spacer shall be cut from the same pipe material as adjacent pipe and shall be cut to length such that all adjacent joints remain fully seated.
 5. All buried piping shall be uniformly sloped and installed to the line and grade indicated on the drawings. Minimum depth of cover shall be 4'-0" unless noted otherwise.
 6. If a grade conflict is determined, the Contractor shall notify the Engineer, who shall then determine what adjustments are required.
- B. Excavation - Refer to Section 02315 – Excavation and Fill of this Contract.
- C. Bedding and Backfilling - Refer to Section 02315 – Excavation and Fill and Section for pipelines greater than five (5) feet beyond the limits of any structure.
- D. Thrust block all crosses, tees, wyes, bends, plugs, fire hydrants and valves against undisturbed earth as detailed in the drawings. Backfill thrust blocks a minimum of 24 hours after placement. Thrust blocks or misplaced concrete shall not contact the bell face or fasteners of any pipe, fitting, or valve.
- E. Ductile-Iron Pipe (RESERVED)
- F. PVC & PP Pipe
1. Buried plastic pipe shall be installed in trench bottoms which are smooth and regular in either undisturbed soil or a layer of compacted backfill. The trench bottom should be smooth, free of rocks and debris, continuous, and provide uniform support. If ledge rock, hardpan or large boulders are encountered, the trench bottom should be padded with bedding of compacted granular material to a thickness of at least four inches.
 2. Plastic pipe subject to freezing should be installed below the frost level which is 3-feet 6-inches of cover. The minimum cover for lines not subject to freezing but subject to heavy overhead traffic is 24-inches.
 3. A smooth trench bottom is necessary to support the pipe over its entire length on firm stable material. Pipe must lie evenly on this surface throughout the entire length of its barrel. Blocking should not be used to change pipe grade or to intermittently support pipe over low sections in the trench.
 4. Buried plastic pipe shall be laid by snaking the pipe from one side of the trench to the other. Offset shall be as recommended by the manufacturer for the maximum temperature variation between time of solvent welding and during operation.
 5. Install plastic pipe in accordance with ASTM D 2321 "Underground Installation of Thermoplastic pipe for sewers and other gravity-flow applications."

3.04 TESTING

- A. Deflection Testing of Flexible Pipe.
1. If the deflection test is to be run using a rigid ball or mandrel, it shall have a diameter equal to 95% of the inside or base diameter of the pipe as

established in the ASTM standard to which the pipe is manufactured. The test shall be performed without mechanical pulling devices.

2. The individual lines to be tested shall be tested for final acceptance no sooner than 30 days after they have been installed.
3. Whenever possible and practical, the testing shall initiate at the downstream lines and proceed towards the upstream lines.
4. No pipe shall exceed a deflection of 5%.
5. If the deflection exceeds the 5% limit in 10% or more of the manhole intervals tested, the total sewer project shall be tested.

B. Sanitary Sewer Testing

1. The Contractor shall be required to test all the sanitary sewers and gravity drain lines installed on this project and all sections will be required to pass testing as outlined.
2. Leakage tests shall be performed after the lines have been cleaned and the trench backfilled.
3. All gravity sanitary sewers and gravity drain lines shall be tested by exfiltration of water or exfiltration of air. Along the section of sewer to be tested, the Contractor shall determine the groundwater level at each end manhole and at all intermediate manholes. The groundwater level outside each manhole shall be measured outside the manhole by excavating down to the sewer to be tested or shall be measured in the manhole by the use of clear tubing and piping which extends through the manhole wall at or below the top of the sewer pipe to be tested. The hole through the manhole shall be sealed following successful completion of all leakage testing.
 - a. Exfiltration of water:
Test shall be conducted on accordance with the Standard Specifications for Water and Sewer Construction in Indiana, latest edition. The Contractor shall furnish the water to be used during the test when the water exfiltration method of testing is used. If a public water system is used, all water shall be metered and the Contractor shall pay the utility according to their current rates. All sewers shall be required to meet allowable leakage criteria. If any section fails to meet the tests, the section shall be repaired or replaced at the Contractor's expense and retested until it meets the leakage limits. Pressure grout or concrete encasement will not be acceptable methods of repair of joints.
 - b. Exfiltration of air:
If used, the air test shall, as a minimum, conform to the test procedure described in Section 31-1.11B of the Standard Specifications for Water and Sewer Main Construction in Indiana. The specifications shall require that the time required for a pressure drop from 3.5 to 2.5 PSIG not be less than the time specified in the Air Test Table in Appendix C.

C. Pressure Tests – Pressure Pipe

1. All buried piping shall be subject to pressure tests as specified herein. After the pipe had been laid and backfilled, the pipe shall be subjected to hydrostatic pressure tests in accordance with AWWA Section C600. The

test pressure shall be a minimum of 1.5 times the maximum operating pressure of the pipe system but shall not exceed the maximum rated pressure of any of the parts making up the pipe system.

2. The duration of each pressure test shall be for a period of not less than two hours and not more than six hours. The basic provisions of AWWA C600 shall be applicable.
3. The acceptable pressure variance during the test is ± 5 psi per AWWA C600.
4. Each section of pipe to be tested shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump pipe connection and all necessary apparatus including gauges and meters shall be furnished by the Contractor. Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at points of highest elevation and afterwards tightly plugged. Any cracked or defective pipes, fittings, valves, or hydrants discovered in consequence of this pressure test shall be removed and replaced by the Contractor at the Contractor's expense with sound material and the test shall be repeated until satisfactory to the Engineer.

D. Leakage Tests

1. Concurrently with the pressure test, a leakage test shall be conducted to determine the quantity of water lost by leakage under the specified test pressure. Applicable provisions of AWWA C600 shall apply. Duration of each leakage test shall be a minimum of two hours. Allowable leakage is defined in AWWA C600.
2. Allowable leakage rate is defined as:

$$L = \frac{SD\sqrt{P}}{148,000}$$

- a. L = testing allowance (makeup water) in gallons per minute
- b. S = length of pipe tested in feet
- c. D = nominal diameter of the pipe
- d. P = hydrostatic test pressure in pounds per square inch

E. Joint Tests

1. On pipe sizes 48" and larger, joint testing may be performed in lieu of pressure tests and leakage tests.
2. The contractor shall follow all procedures outlined by the test equipment manufacturer and pipe manufacturer, including but not limited to:
 - a. Safety procedures
 - b. Min and Max test pressures
 - c. Duration of the test procedure
 - d. Allowable leakage rates

- F. Test Records: Records shall be made of each piping system installation during the test and recorded on a form. These records shall include but not be limited to the following:
1. Date of test.
 2. Description and identification of piping tested.
 3. Test fluid.
 4. Test pressure.
 5. Remarks, to include such items as:
 - a. Leaks (type, location).
 - b. Repairs made on leaks
 6. Certification by Contractor and signed acknowledgement by Engineer.

3.05 FINAL CLEANING

- A. Following assembly and testing and prior to final acceptance, all pipelines installed under this section, except plant process air lines and instrument air lines, shall be flushed with water and all accumulated construction debris and other foreign matter removed. Cone strainers shall be inserted in the connections to attached equipment and left there until cleaning has been accomplished to the satisfaction of the Engineer. Accumulated debris shall be removed through drains 2-inch and larger or by removing spools and valves.

END OF SECTION 02530

DIVISION 2 – SITEWORK
Section 02630 – Storm Drainage

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This section covers the work necessary to furnish, install and complete the storm sewers as shown in the plans.

1.02 REFERENCE TO STANDARDS

- A. ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
- B. Indiana Department of Transportation (INDOT): Standard Specifications for Road and Bridge Construction, Latest Edition.

1.04 SUBMITTALS

- A. Submittals shall be made in accordance with the Supplemental General Conditions, Article 8.07. In addition, the following specific information shall be provided by the Contractor.
 - 1. The pipe supplier shall provide certification that the pipe has been sampled, tested and inspected in accordance with the provisions of the ASTM standards. Each certification shall be signed by an authorized agent of the manufacturer.

PART 2 PRODUCTS

2.01 PIPE MANUFACTURERS

- A. The following manufacturers of ductile iron pipe and fittings products may be supplied and installed for the work specified herein.
 - 1. American Cast Iron Pipe Company
 - 2. Griffin Pipe Company
 - 3. U.S. Pipe & Foundry Company

2.02 PIPE MATERIALS

- A. Ductile iron pipe (D.I.P.) shall be:
 - 1. Centrifugally cast grade 60-42-10, iron, and pipe barrels in accordance with ANSI/AWWA C151/A21.51, standard class 250.
 - 2. **Protecto 401 corrosion lining** as manufactured by American Ductile Pipe Company or other pre-approved ceramic epoxy liner.
 - 3. Coated on all exterior surfaces with an asphaltic coating.
 - 4. Marked "gauged full length" by the manufacturer for pipe to be field-cut.
 - 5. Encased in polyethylene in accordance with ANSI/AWWA C105/A21.5, American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.

2.03 JOINTS

- A. Ductile Iron Pipe shall have push-on restrained joints in accordance with AWWA C151. Push-on joints shall be Fastite, as manufactured by American Ductile Iron Pipe, or pre-approved equal.
- B. Field adaptable restraints shall be "Fast-Grip" as manufactured by American Ductile Iron Pipe or other pre-approved and bolt-less, push-on restrained devices. Gasket material shall be standard styrene butadiene copolymer (SBR).
- C. Manufacturer shall furnish test results showing the restrained joints specified have been successfully tested to at least twice the specified pressure rating of the joint without leakage or failure.
- D. Gasket and joint lubricant furnished by the pipe manufacturer.

PART 3 EXECUTION

3.01 HANDLING

- A. Pipe shall be handled in accordance with the recommendations of the pipe manufacturer.
- B. The use of cables or chains for handling materials shall not be permitted; use nylon or canvas straps. During the transportation of materials, plastic caps shall cover open ends. The use of bracing is required when necessary to avoid excessive deflection in pipe and fittings.

3.02 EXCAVATION

- A. Excavation shall be in accordance with Section 02315 – Excavation and Fill.

3.03 BACKFILL

- A. Backfill and compaction shall be in accordance with Section 02315 – Excavation and Fill.

3.04 INSTALLATION

- A. Installation shall be in accordance with the INDOT Standard Specifications for Road and Bridge Construction in Indiana and shall also be in accordance with ASTM D2321 for ductile iron pipe, except for measurement and payment requirements.
- B. The Contractor shall utilize a laser to establish line and grade for the proposed line. The Engineer will have the authority to check the laser for proper set up and periodically check it for proper operation.

END OF SECTION 02630

DIVISION 2 – SITEWORK
Section 02730 – Aggregate Surface

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Construction of new access drive consisting of aggregate surface and base course at locations shown on the plans.
- B. Earthwork necessary to prepare the subbase for all proposed roadways.

1.02 RELATED SECTIONS

- A. Section 02315 – Excavation and Fill.
- B. Section 02390 – Planting.

1.03 REFERENCE TO STANDARDS

- A. Indiana Department of Transportation (INDOT) Standard Specifications for Road and Bridge Construction in Indiana, latest edition and applicable sections of the Supplemental Specifications and Recurring Special Provisions, latest edition, hereinafter referred to as the INDOT Standard Specifications.

1.04 SUBMITTALS

- A. Submit material certification under the provisions of Special Conditions - Section 01330.
- B. Shop Drawings: (Reserved)
- C. Product Data: Contractor shall submit letter of certification that material meets INDOT specifications for the material specified.
- D. Samples: Submit source and laboratory tests of all aggregate materials for laboratory testing.

1.05 QUALIFICATIONS

- A. The roadway work shall be performed by a Contractor who can produce a list of not less than five (5) projects on which he has worked with the specified materials, and one who can demonstrate that he will utilize the proper equipment necessary for the completion of the work within the specified requirements.

PART 2 PRODUCTS

2.01 AGGREGATE MATERIALS

- A. Aggregate Base and Surface Course
Crushed stone base course for roadways shall consist of the compacted thicknesses as shown on the plans of No. 53 aggregate, Class II quality or better, crushed limestone per Section 1004.04 of the INDOT Standard Specifications conforming to Section 301 of the INDOT Standard Specifications. See 3.05 - PROTECTION.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspection of surface course shall not commence until all construction activities are completed as directed by the Engineer.

3.02 PREPARATION

- A. Prepare subgrade to a condition which is satisfactory to the Engineer prior to roadway work in accordance with Section 301 of the INDOT Standard Specifications.
- B. The Contractor shall clear and remove the top 4" layer of turf and topsoil in the areas of the proposed aggregate surface.

3.03 SURFACE CONSTRUCTION

- A. Aggregate Base Course
Construction in accordance with Section 301 of INDOT Standard Specifications. Thickness shall be as shown on the plans after compaction. Work includes complete construction of base course as specified. Aggregate base course shall be compacted to 98 percent Standard Proctor.

3.04 FIELD QUALITY CONTROL

- A. The Contractor shall notify the Engineer 48 hours prior to commencement of surface construction to allow the Engineer to inspect the subgrade prior to placement of the aggregate base course. The Engineer may require the subgrade to be modified in accordance with Section 301; or compacted to prepare for backfilling.
- B. The Contractor shall monitor the in-place density of the surface materials to ensure adequate compaction occurs and provide documentation of density testing.

3.05 PROTECTION

- A. The Contractor shall restore existing roadways, which are damaged during the construction activities, at no expense to the Owner, such that no evidence of construction activities is apparent.

END OF SECTION 02730

DIVISION 02 – SITEWORK
Section 02740 – Asphalt Paving

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Cleaning and priming aggregate base courses for bituminous concrete binder course.
- B. Bituminous concrete binder and surface course paving at the locations indicated on drawings.
- C. Quality Control / Quality Assurance sampling and testing.
- D. Related Sections
 - 1. Section 01330 – Submittal Procedures
 - 2. Section 02315 – Excavation and Fill
 - 3. Section 02370 – Erosion Control & SWPPP
- E. Regulatory Requirements
 - 1. Conform to the current and applicable portions of Section 402-406 of the Indiana Department of Transportation (INDOT): Standard Specifications for Road and Bridge Construction, latest edition, including all Supplemental Specifications and Recurring Special Provisions.

1.03 SUBMITTALS

- A. Submit INDOT approved mix designs of each class of mix and INDOT approved material sources for review at least four weeks prior to beginning of work.

1.04 QUALITY ASSURANCE

- A. Mix designs shall be for bituminous concrete mixes approved and used by INDOT within the last year.
- B. Mixing Plant: Conform to INDOT's prequalification requirements for producing INDOT specified mix designs.
- C. Obtain materials from same source throughout paving operations.

1.05 JOB CONDITIONS

- A. Provide access to job for all contractors and subcontractors by using drives to fullest extent possible and, when specified, by constructing temporary roadways on portions of base course.

- B. Delay bituminous paving until after primary construction work is complete; unless concrete trucks, material delivery trucks, and other heavy construction vehicles can be detoured around roadway.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not place bituminous mixtures when ambient air or base temperature is less than 40 degrees F or surface is wet or frozen.

PART 2 PRODUCTS

2.01 BITUMINOUS CONCRETE BINDER AND SURFACE COURSE

- A. Materials: Conform to the Indiana Department of Transportation's Standard Specification. Mixes shall conform to the following:
 - 1. Bituminous Concrete Binder Course:
 - a. PG 64-22
 - b. Design Air Voids – 4.0% @ Ndesign = 70
 - c. Mixture Composition (Gradation Mixture) – IL-19.0
 - 2. Bituminous Concrete Surface Course:
 - a. PG 64-22
 - b. Design Air Voids - 4.0% @ Ndesign = 70
 - c. Mixture Composition (Gradation Mixture) – Mix C
- B. RAP Materials: Conform to the Indiana Department of Transportation's Special Provision, "Reclaimed Asphalt Pavement (RAP) and Reclaimed Asphalt Shingles (RAS)", latest edition, and as specified herein. Up to 15% RAP will be allowed in the binder course. Up to 10% RAP will be allowed in the surface course. RAS **will not** be allowed in either the surface course or the binder course.
- C. Prime Coat: Medium curing cut-back asphalt or asphalt emulsion penetrating prime coat consisting of either MC-30 or PEP.
- D. Tack Coat: Emulsified asphalt: SS-1, SS-1h, CSS-1, or CSS-1h, may be diluted with up to 1 part water to 1 part asphalt.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect areas and conditions where bituminous concrete paving is to be installed.
 - 1. Proof roll subgrade with loaded tandem vehicle to verify that subgrade is dry and compacted and ready to support paving operations.
 - 2. Notify Engineer of conditions detrimental to proper and timely completion of work.
 - 3. Request resolution of conditions.
- B. Protection:
 - 1. Provide protection for all adjacent work and areas.

3.02 PREPARATION – BITUMINOUS PRIME MATERIAL

- A. Apply bituminous prime coat to aggregate base course in accordance with INDOT Standard Specifications.
- B. Use clean sand to blot excess primer.

3.03 FRAME ADJUSTMENTS

- A. Set frames for manholes and other units, within areas to be paved, to final grade as part of this work.
 - 1. Include existing frames or new frames furnished in other sections of these specifications.
- B. Surround frames set to grade with ring of compacted bituminous base prior to paving.
 - 1. Place bituminous mixture up to 1 inch below top of frame, slope to grade and compact with hand tamp.
- C. Adjust frames to proper grade for paving.
 - 1. Provide temporary closures over openings until completion of rolling operations.
 - 2. Remove closures at completion of work.
 - 3. Set cover frames to grade, flush with surface of adjacent pavement.

3.04 BITUMINOUS CONCRETE BINDER AND SURFACE COURSE

- A. Construct in accordance with INDOT Standard Specifications.
 - 1. Apply bituminous Tack Coat to the binder course prior to placement of the surface course
 - 2. Apply bituminous prime to contact surfaces of curbs, gutters and pavement edges.
 - 3. Work includes complete construction of courses on prepared base course indicated on drawings, profiles and typical sections for proposed paved parking areas.

3.05 CONSTRUCTION TESTING

- A. Contractor shall complete all Quality Control / Quality Assurance testing in accordance with INDOT's Standard Specifications.
- B. Contractor shall provide and pay for an independent testing company to complete the Quality Assurance tests outlined to be completed in INDOT's Standard Specification.

END OF SECTION 02740

DIVISION 02 – SITEWORK
Section 02930 - Planting

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This section includes all material, labor and equipment for placement of topsoil on areas to receive seeding; the section also includes seedbed preparation, fertilizing, seeding, mulching, watering and mowing,
- B. Related Sections
 - 1. Section 01330 – Submittal Procedures
 - 2. Section 02315 – Excavation and Fill
 - 3. Section 02370 – Erosion Control
- C. Reference to Standards
 - 1. AASHTO T88
 - 2. AASHTO T194
 - 3. The pH shall be determined on that portion of the sample passing the No. 10 sieve in accordance with the ASTM Standard D-4972.

1.03 SUBMITTALS

- A. Samples: Representative samples of off-site material proposed for use as topsoil - including test results on clay, sand, organic contents and pH shall be submitted to the Engineer for review and/or testing prior to placement of the material.
- B. The following items shall be submitted and approved prior to operations:
 - 1. Schedule of seeding
 - 2. Source of seed
 - 3. Proposed seed mixes
 - 4. Fertilizer mixes and application rates
 - 5. Herbicides concentrations and application rates
- C. The following items shall be submitted during operations:
 - 1. Tags from seed bags certifying source, composition and quantity.
 - 2. Tags from fertilizer bags certifying composition.
 - 3. Load tickets from straw mulch and/or hydro-mulch deliveries.

1.04 PROTECTION

- A. Contractor is responsible to protect and avoid all existing underground utilities during construction operations. Repair of any utilities damaged by installation shall be the responsibility of the Contractor.

- B. Contractor is responsible to protect all existing conditions including buildings, fences, pavements, trees, and other plant material from damage during project installation and maintenance. Any damages occurring shall be the responsibility of the Contractor to replace, repair or compensate Owner for damages.

1.05 DELIVERY AND STORAGE

- A. Grass seed shall be delivered either individually or in premixed sacks, each bearing a tag with the following information clearly printed: date and location of packaging, seed mix, percentage of pure live seed, year of production and weight.
- B. Fertilizer may be delivered separately or premixed in sacks in which case each sack shall bear a tag with the following information clearly printed: name and address of manufacturer, brand, weight, chemical composition and guarantee of analysis.
- C. If the fertilizer, seed or mulch is stored on the site, it shall be raised above the ground and thoroughly covered with polyethylene to minimize moisture absorption.
- D. Seed which has become wet, moldy, musty or otherwise damaged during storage will not be acceptable and will be replaced at the Contractor's expense.

1.06 WARRANTY

- A. Contractor shall warranty turf for one complete growing season following the initial establishment. If seed does not germinate and develop into healthy turf, Contractor shall reseed following these seeding specifications, overseed or otherwise provide remedial work necessary for successful turf development as directed by the Owner's Representative.
- B. Contractor shall warranty the native plant mixes for one complete growing season following initial establishment. At the end of the first growing season forty (40) percent of the different species in the mixes shall be identified/present in the seeded areas. The native seed mixes shall not be dominated by non-native plant species. There shall be no areas larger than 100 square feet that do not have the seeded species present.

PART 2 PRODUCTS

2.01 TOPSOIL MATERIALS

- A. Topsoil shall be defined as follows:
 - 1. Topsoil shall be free from large roots, sticks, weeds, brush or stones larger than 1 inch in diameter or other litter and waste products. It shall be a loamy mixture having at least 90 percent passing the No. 10 sieve. It shall be free from extraneous materials, shall comply with the following requirements:
 - 2. Topsoil shall contain not less than 1 percent nor more than 10 percent organic matter as determined by the test for organic matter in accordance with AASHTO T 194.
 - 3. Topsoil shall contain not less than 12 percent nor more than 50 percent clay as determined in accordance with AASHTO T 88.
 - 4. The sand content shall not exceed 55 percent as determined in accordance with AASHTO T 88.

5. The pH of the sample shall not be lower than 5.0 nor higher than 8.0. The pH shall be determined with an acceptable pH meter, or that portion of the sample passing the No. 10 Sieve, in accordance with the ASTM Standard D-4972.
6. Topsoil shall be capable of sustaining vigorous plant growth.

2.02 SEEDING MATERIALS

- A. Starter Fertilizer nutrients shall be commercial nitrogen, phosphorus and potassium mixed in a 1:1:1 ratio of active ingredients and applied at a rate which will yield the number of actual nutrient pounds per acre as required.
- B. Maintenance Fertilizer nutrients shall be commercial slow-release nitrogen, phosphorus and potassium mixed in a 2:1:1 ratio of active ingredients and applied at a rate which will yield the number of actual nutrient pounds per acre as required.
- C. Seed Mixes shall be those shown on plans. Contractor may propose alternate varieties with equal or better qualities. Substitutions will be allowed only at the discretion of the Owner's Representative.
- D. Straw shall be fresh clean straw free from weed seeds and foreign material.
- E. Hydro-mulch shall be cellulose manufactured specifically for said purpose. Mulch shall be free from foreign material and sized appropriately to be applied at specified rates.
- F. Water for hydro-mulch shall be clean water, free from chemicals and materials which would adversely affect germination and growth of seeds.
- G. Seed Mixes
 1. Mowed turf areas: INDOT Seed Mix 1 Lawn Mixture
 2. Sloped turf areas: INDOT Seed Mix 3A Southern Illinois Slope Mixture
 3. Temporary Seeding: INDOT Seed Mix 7 Temporary Turf Cover Mixture

2.03 EROSION CONTROL BLANKET

- A. Erosion Control Blanket for general seeded areas shall be North American Green ERONET S75 Short-Term Photodegradable Straw Blanket or approved equal
- B. Erosion Control Blanket for slope installations (4:1 slopes or steeper) shall be North American Green ERONET S150 Short-term Photodegradable Double-Net Straw Blanket or approved equal
- C. Erosion Control Blanket for channel installations shall be North American Green ERONET C125 Long-Term Photodegradable Double-Net Coconut Blanket or approved equal

2.04 CONDITION OF SITE

- A. Site shall have a minimum 4" of topsoil placed over all areas to be seeded with permanent seed mix.
- B. Topsoil shall be finish graded to the lines and grades shown on plans or approved by the Owner's Representative and all areas shall drain.
- C. Areas with existing vegetation shall be mown to a height of no greater than three (3) inches. The mowed vegetation shall be cut and removed or mulched and dispersed.

Any remaining cut material shall not be at a thickness that will result in the death of the vegetation underneath it or inhibition of growth of seeds planted.

PART 3 EXECUTION

3.01 STRIPPING

- A. Stripping of any remaining or new vegetation and topsoil is required. Topsoil shall be removed from all building and pavement areas a minimum of 5 feet, in all directions, beyond the limits of construction. Any area used as a source of fill should also be stripped of topsoil. Stripping depth shall be a minimum of 6". Additional stripping depth may be required to adequately remove vegetation and heavily organic soils. The Contractor shall stockpile topsoil to be used when the site construction is complete. Contractor shall indicate to the Engineer the areas of topsoil stockpile(s) for approval prior to commencing work.

3.02 PREPARATION

- A. All foreign materials, plants, roots, stones, sticks and debris shall be removed. Foreign material shall not be buried.
- B. Under this item, grading will be necessary only at those areas where placement of topsoil will inhibit drainage. At those areas, sufficient material shall be removed to allow topsoil placement without inhibiting the drainage. Placement of the topsoil shall not begin until the Engineer approves the lines, grades and condition of the subgrade.

3.03 TOPSOIL PLACEMENT

- A. Spread topsoil to depth of four (4) inches over areas to be seeded or where directed by the Engineer. Place during dry weather and on dry, unfrozen subgrade.
- B. Topsoil shall be graded to the contours and spot elevations as shown on the Plans. Grades should be adjusted to ensure positive drainage away from buildings and other structures.
- C. The finished surface shall be free of clods, rocks and shall conform to the lines and grades shown on the plans.
- D. Topsoil intended for placement shall not be in a frozen or muddy condition, as determined by the Engineer.

3.04 TEMPORARY SEEDING

- A. Time of Operations
 - 1. Contractor shall commence operations only after giving a minimum 24 hours notice to the Owner's Representative.
- B. Seeding
 - 1. Seeding shall be done into freshly prepared seed bed. If the seed bed has been compacted, crusted-over or otherwise affected, seedbed shall be prepared again prior to seeding.
 - 2. Seed mixes shall be drilled, broadcasted, or hydraulically applied.

C. Mulch

1. Contractor may use either hydro mulch or straw over temporary seeded areas where topsoil is exposed with no existing vegetation present.
 - a. Hydromulching shall entail:
 - i. Area shall be hydro-mulched at the rate of 750 pounds of cellulose mulch per acre. Mulch shall be mixed with water and applied at the rate of 1000 gallons per acre.
 - ii. Seed may be mixed with the hydro-mulch at the Contractor's option.
 - iii. Buildings, streets, sidewalks and other surfaces shall be protected during hydromulching operations. Any hydromulch blown beyond the seeded area shall be thoroughly cleaned-up.
 - b. Straw mulching shall entail:
 - i. Area shall be uniformly covered with straw at the rate of 1-1/2 tons per acre.
 - ii. Straw shall be punched into the soil with an uncambered dull disk approximately 20 inches in diameter set at 3-inch intervals. Stabilizer weights shall provide for straw to be pushed into the ground at least 2 inches.
 - iii. In areas inaccessible to mechanical punching, water shall be applied to the spread straw at a rate and duration to bind the straw.
 - iv. Straw blown beyond the seeded areas shall be raked and removed from the site.

3.05 PERMANENT SEEDING

A. Time of Operations

1. Contractor shall commence operations only after giving a minimum 24 hours notice to Owner's Representative.
2. Seedbed preparation and seeding shall be done only when soil is relatively dry to avoid clodding and compaction of soil.
3. Seeding Dates: Spring seeding shall be from April 1 through June 15 and August 1 to November 1.

B. Seedbed Preparation

1. All areas designated for seeding shall be tilled to a minimum depth of 4 inches and rolled.
2. Surface shall be free of all construction debris, rocks, roots, vegetative debris and litter.
3. Soils particles shall be no larger than one inch in dimension.
4. Owner's Representative will approve seed bed prior to seeding. Seed beds will not be approved where weeds or vegetative growth remains.

C. Pre-seed Fertilizing

1. Within 24 hours of seedbed preparation, area shall be fertilized with 270 lb. of actual nutrient per acre using a fertilizer mix of 1-1-1.

- D. Seeding
1. Seeding shall be done into freshly prepared seed bed. If the seed bed has been compacted, crusted-over or otherwise affected, seedbed shall be prepared again prior to seeding.
 2. Turf seed mixes shall be drilled into the surface of the soil in two passes at right angles to each other. Seed shall be 1/2 inch below the surface or as recommended for specific seed mix.
- E. Mulch
1. Contractor may use either hydro mulch or straw over seeded areas where topsoil is exposed with no existing vegetation present.
 - a. Hydromulching shall entail:
 - i. Area shall be hydro-mulched at the rate of 750 pounds of cellulose mulch per acre. Mulch shall be mixed with water and applied at the rate of 1000 gallons per acre.
 - ii. Seed shall not be mixed with the hydro-mulch for permanent seeding applications.
 - iii. Building, streets, sidewalks and other surfaces shall be protected during hydromulching operations. Any hydromulch blown beyond the seeded area shall be thoroughly cleaned-up.
 - b. Straw mulching shall entail:
 - i. Area shall be uniformly covered with straw at the rate of 1-1/2 tons per acre.
 - ii. Straw shall be punched into the soil with an uncambered dull disk approximately 20 inches in diameter set at 3-inch intervals. Stabilizer weights shall provide for straw to be pushed into the ground at least 2 inches.
 - iii. In areas inaccessible to mechanical punching, water shall be applied to the spread straw at a rate and duration to bind the straw.
 - iv. Straw blown beyond the seeded areas shall be raked and removed from the site.
 - c. Erosion Control Blanket:
 - i. Blanket is required on all slopes 4:1 (H:V) or steeper.
 - ii. Blanket should be overlapped and stapled as shown on the plans and as per the manufacturer's recommendations
 - iii. Blanket shall be trenched-in along the top of the slope as shown on the plans.
- F. Post-seeding Fertilizing
1. Thirty (30) days following the first mowing, the area shall be re-fertilized at the rate of 200 lbs. per acre of actual nutrient using a fertilizer mix of 2-1-1.

3.06 ESTABLISHMENT – ALL SEEDED AREAS

- A. Contractor shall maintain all seeded areas until acceptance of project or successful establishment of turf, whichever is longer. In no case will the period of maintenance be less than 3 months.

- B. During the establishment period, Contractor shall provide the following:
1. Watering:
 - a. Contractor is not required to water seeded areas but may elect to do so to optimize germination and successful establishment of turf. Seeded areas generally shall be watered to achieve a rate of 5 gallons per square yard every 2 days until established. Rainfall may relieve the need for watering at certain times.
 - b. Watering shall be done in a manner to achieve infiltration of water and avoid run-off and soil erosion.
 - c. Contractor shall supply hoses, portable sprinkling devices and other needed equipment to provide supplemental watering when needed.
 2. Mowing:
 - a. Contractor shall mow the developing turf when it reaches a height of 8 inches. Growth shall be cut to a height of 4 inches. (If Contractor delays result in excess growth prior to mowing, Contractor may be required to rake and remove cuttings from the site.)
 - b. Contractor shall cut the turf with reel-type or rotary-type mowers, hand mowers, edgers, etc. with sharp blades set level. Mowing shall be done of the entire area, including turf around the driveways, sidewalks, mulched areas, etc. Finished areas shall smooth and uniform in height, with no gouges into soil or other irregularities indicating poorly-adjusted equipment or improper mowing techniques.
 - c. Mowing shall be done when the grass is relatively dry and ground is firm.
 3. Treatment of Insects, Disease, Fungus
 - a. Should problems with the turf develop such as insect infestation, disease or fungus, Contractor shall immediately notify the Owner's Representative and discuss remedies available.
 - b. Contractor shall proceed expeditiously with selected treatment of affected areas and continue treatment until the problem is resolved. Contractor shall have Illinois Applicators License for treatment products as needed.

3.07 CLEAN UP

- A. Any excess material shall be removed from the site. All improvements shall be cleaned as necessary to remove any effects of construction. Any damage to existing features shall be repaired to the satisfaction of the Owner's Representative.

END OF SECTION 02930

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CAMPGROUND IMPROVEMENTS – BASE BID AND ALTERNATES
FERDINAND STATE FOREST/DEPARTMENT OF NATURAL RESOURCES

DIVISION 03 – CONCRETE

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DIVISION 03 - CONCRETE
Section 03050 – Common Work Results for
Concrete

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Temporary shoring of existing structure and pipes.
 - 2. Protection and finishing of concrete surfaces and reinforcement steel associated with concrete removal.
 - 3. Removal and satisfactory disposal of damaged, spalled, and unsound concrete foundations, walls, slabs, and/or existing pipe at locations shown in the plans and designated by the Engineer.
 - 4. Replacement of the removed material with new concrete and/or modified concrete patching material, including cleaning exposed reinforcing steel, drilling and grouting dowels for supporting and fastening additional reinforcement if needed, applying a chemical bonding agent; constructing the necessary form work, placing, consolidating and finishing the replacement concrete, forming joints and curing the repaired areas.
- B. Related Sections:
 - 1. Section 01330 – Submittal Procedures
 - 2. Section 01450 – Quality Requirements
 - 3. Section 03100 – Concrete Accessories
 - 4. Section 03200 – Concrete Reinforcing
 - 5. Section 03300 – Structural Concrete
 - 6. Section 03390 – Concrete Curing
- C. References:
 - 1. ACI 301-16 – Specifications for Structural Concrete.
 - 2. ASTM C932 – Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering.
 - 3. ASTM C1059 – Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
 - 4. ASTM C1116 – Standard Specification for Fiber-Reinforced Concrete.

1.03 DEFINITIONS (RESERVED)

1.04 SUBMITTALS

- A. Submit under the provisions of Division 01 – Section 01330 – Submittal Procedures.
- B. Refer to Section 03300 for product data, material certifications, design mixtures, and concrete mix properties required for submittal.

- C. Product Data: Submit data on finishing materials

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301.
 - 1. Maintain one copy of document on site.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products in accordance with requirements set forth by the Engineer and product manufacturer.
- B. Deliver curing materials in manufacturer's packaging including application instructions.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. The equipment used shall be subject to approval of the Engineer.

2.02 CONCRETE MATERIALS

- A. Refer to Section 03300 for concrete materials.

2.03 ADMIXTURES

- A. Refer to Section 03300 for admixtures.

2.04 RELATED MATERIALS

- A. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.05 REPAIR MATERIALS

- A. Refer to Section 03300 for repair materials.

2.06 CONCRETE MIX

- A. Concrete mix for concrete repair shall be Mix Design A, as specified in Section 03300, with a maximum coarse aggregate size of 1/2 inch.
 - 1. Concrete mix for concrete repair shall include fiber reinforcement at a dosage rate of 1 Lb/C.Y., or as specified by manufacturer.
- B. Contractor may elect to use manufactured repair material for repair areas that are less than 15 square feet. Manufactured repair material shall be from BASF, SIKA, or Engineer approved equal. All manufactured patching materials that the Contractor intends to use must be applied as recommended by the material manufacturer and submitted to the Engineer under the provisions of Section 01330 of the Specifications for approval.

2.07 STEEL REINFORCEMENT

- A. Refer to Section 03200.

2.08 FIBER REINFORCEMENT

- A. Refer to Section 03200.

2.09 FINISHING MATERIALS

- A. Concrete Repair Mortar: Trowel-grade, microsilica and ASTM 1059 latex-modified, cement-based, non-sag repair mortar.

PART 3 EXECUTION

3.01 INSPECTION

- A. The Engineer will identify the areas of unsound concrete to be removed. The depth of removal shall be to sound concrete as determined by the Engineer. The perimeter of the removal shall be saw-cut to a depth of 2" or to top of the existing reinforcing steel, whichever is less. Removal outside the areas authorized by the Engineer will not be measured for payment. Existing concrete shall be removed by methods approved by the Engineer.

3.02 PREPARATION

- A. Concrete removal work shall not begin until prior construction sequences indicated on the drawings are completed.
- B. The Contractor shall furnish all equipment, material and labor required to temporarily support existing structure and pipes.
- C. Any temporary support systems necessary to complete the work shall be in place and accepted by the Engineer prior to excavation and concrete removal work.

3.03 PROTECTION

- A. The Contractor shall furnish all equipment, material and labor required to protect concrete surfaces and reinforcement steel.
- B. Concrete shall be removed in such a manner as to leave the remaining structure and all attached structures and equipment undamaged. Any damage to the remaining structure or attached structures or equipment shall be repaired by the Contractor as directed by the Engineer at the Contractor's expense.

3.04 REMOVAL

- A. The Contractor shall furnish all equipment and labor required to remove the concrete and reinforcement.
- B. Existing concrete shall be carefully removed to the limits indicated on the drawings unless otherwise directed by the Engineer. Prior to removal, a saw cut shall be made along the limits of removal.
- C. Where existing reinforcement bars are to extend from the remaining portions of the existing structure into new construction, care shall be exercised to prevent cutting,

stretching, or otherwise damaging any existing reinforcement. The concrete shall be removed so as to leave the projecting bars clean and undamaged. Reinforcing bars damaged by the Contractor's operations shall be supplemented by new bars spliced or doweled in place as directed by the Engineer. Such supplemental reinforcing bars shall be furnished and installed by the Contractor at the Contractor's expense.

- D. Where existing reinforcement bars are not to extend into new work, the bars shall be cut flush with the cut concrete surface. The ends of the bars shall then be flame-cut back 1/2 inch below the concrete surface.

3.05 REPAIR AND PATCHING

- A. After removal of all unsound concrete, the remaining surfaces shall be blown free of all dust and loose particles by means of compressed air. Provisions shall be made to prevent a film of oil being deposited from the compressor to the concrete surfaces.
- B. After the surfaces have been blown clean, each surface of the area shall be inspected to assure it is completely solid and that no unbounded particles remain trapped by or adhered to the reinforcing steel.
- C. Areas along partially exposed reinforcement bars and beneath fully exposed reinforcement bars should be given special attention during the final cleaning operation.
- D. Apply chemical bonding agent meeting the requirements of ASTM C 881.
- E. New concrete shall be placed in accordance with ACI 301. Repair areas shall be formed to match the profile of the existing concrete, including any bevels, chamfers, expansion joints, etc. that were present prior to removal of concrete. For repair areas where a prepackaged/bag mix patching material will be used, install per manufacturer's written recommendations and guidelines.
- F. New concrete / concrete patching materials shall be cured in accordance with Section 03390.

3.06 FINISH

- A. The Contractor shall furnish all equipment, material and labor required to finish concrete surfaces.
- B. All newly exposed concrete surfaces, which are to receive new concrete or finish, shall be blast-cleaned.
- C. Where concrete surfaces are not to receive new concrete, limits of concrete removal shall extend 1/2 inch beyond final dimensions. Surfaces shall then be built up with 1/2 inch concrete repair mortar to final dimensions.
- D. Apply finish to concrete surfaces in accordance with material manufacturer's preparation and application recommendations.

3.07 DISPOSAL

- A. The Contractor shall furnish all equipment and labor required to dispose of the removed concrete and reinforcement.

- B. All concrete and non-salvaged reinforcement bars removed by the Contractor shall be disposed of off-site by the Contractor at the Contractor's expense in accordance with the Project Specifications.
- C. Dispose of wastewater employed in cutting, washing, and rinsing of concrete surfaces in a manner such that the wastewater does not stain, discolor, or affect exposed surfaces of the structures, or damage the environment of the project area.

END OF SECTION 03050

DIVISION 03 - CONCRETE
Section 03100 - Concrete Accessories

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes concrete accessories as shown on the drawings and as herein specified, for the following:
 - 1. Footings.
 - 2. Foundation walls.
 - 3. Slabs-on-grade.
 - 4. Elevated slabs.
 - 5. Concrete toppings.
 - 6. Building frame members.
 - 7. Building walls.
 - 8. Concrete sidewalks.
 - 9. Entrance slabs.
 - 10. Miscellaneous concrete construction.
- B. Related Sections:
 - 1. Section 01330 – Submittal Procedures
 - 2. Section 03100 – Concrete Accessories
 - 3. Section 03200 – Concrete Reinforcement
 - 4. Section 03300 – Structural Concrete
- C. References:
 - 1. ACI 117-10 – Specification for Tolerances for Concrete Construction and Materials.
 - 2. ACI 301-16 – Specifications for Structural Concrete.
 - 3. AISC 303-10 – Code of Standard Practice for Steel Buildings and Bridges

1.03 DEFINITIONS (RESERVED)

1.04 SUBMITTALS

- A. Submit under the provisions of Division 01 - Section 01330 – Submittal Procedures.
- B. Product Data: For each type of product.
- C. Construction Joint Layout: Refer to Section 03100.
- D. Shop Drawings: Show fabrication of structural-steel components to be embedded in concrete.
 - 1. Include embedment drawings.
 - 2. Include type, size, and length of anchor rods.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's packaging with installation instructions.
- B. Store anchors and packaged materials to permit easy access for inspection and identification and protect from corrosion and deterioration.

1.06 COORDINATION

- A. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 PRODUCTS

2.01 JOINTS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, 1/2 inch thick (unless shown otherwise).
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.

2.02 ANCHORS

- A. Unheaded Anchor Rods: ASTM F 1554, Grade 55.
 - 1. Configuration: As indicated on drawings.
 - 2. Nuts: ASTM A 563 hex carbon steel.
 - 3. Plate Washers: ASTM A 36 carbon steel.
 - 4. Washers: ASTM F 436, Type 1, hardened carbon steel.
 - 5. Finish: Hot-dip zinc coating, ASTM A 153, Class C, unless noted otherwise.
- B. Headed Anchor Rods: ASTM F 1554, Grade 55 straight.
 - 1. Nuts: ASTM A 563 hex carbon steel.
 - 2. Plate Washers: ASTM A 36 carbon steel.
 - 3. Washers: ASTM F 436, Type 1, hardened carbon steel.
 - 4. Finish: Hot-dip zinc coating, ASTM A 153, Class C unless otherwise noted.

PART 3 EXECUTION

3.01 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form keyed joints as indicated. Embed keys at least 2 inches into concrete.
 - 3. Unless indicated differently on the Drawings, locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in

- girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Unless indicated differently on the Drawings, locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 5. Space vertical joints in walls such that the ratio of the dimensions of the pour does not exceed 2:1, or as indicated on the Drawings. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas with a ratio of plan dimensions not greater than 2:1, or as indicated on the Drawings. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.02 ANCHORS AND OTHER EMBEDDED ACCESSORIES

- A. Install accessories in accordance with manufacturer's instructions, level and plumb. Ensure items are not disturbed during concrete placement.
- B. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.
1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor rods, accurately located, to elevations required and complying with tolerances of AISC 303.
 3. Clean embedded items immediately prior to concrete placement.

END OF SECTION 03100

DIVISION 03 – CONCRETE
Section 03200 – Concrete Reinforcing

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes reinforcing steel bars, welded wire fabric and accessories for cast-in-place concrete.
- B. Related Sections
 - 1. Section 01330 – Submittal Procedures.
 - 2. Section 03300 – Structural Concrete.
- C. Reference to Standards
 - 1. ACI 117-10 – Specifications for Tolerances for Concrete Construction and Materials.
 - 2. ACI 301-16 – Specifications for Structural Concrete.
 - 3. ACI SP-066 – Detailing Manual.
 - 4. ANSI/ASTM A185 – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - 5. ASTM A615 – Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.
 - 6. ASTM A706 – Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.
 - 7. ASTM A775 – Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
 - 8. ASTM A884 – Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.
 - 9. ASTM A1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
 - 10. ASTM C1116 – Standard Specification for Fiber-Reinforced Concrete.
 - 11. ASTM D3963 – Standard Specification for Fabrication and Jobsite Handling of Epoxy Coated Steel Reinforcing Bars.
 - 12. AWS D1.4 – Structural Welding Code – Reinforcing Steel.
 - 13. CRSI - Concrete Reinforcing Steel Institute - Manual of Standard Practice

1.03 DEFINITIONS (RESERVED)

1.04 SUBMITTALS

- A. Submit under the provisions of Division 01 - Section 01330 – Submittal Procedures.
- B. Product Data: For the Following:
 - 1. Each type of steel reinforcement.
 - 2. Epoxy repair coating.
 - 3. Zinc repair material.

4. Bar supports.
 5. Mechanical splice couplers.
 6. Structural thermal break insulated connection system.
- C. Steel Reinforcement Shop Drawings:
1. Placing drawings that detail fabrication, bending, and placement.
 2. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Construction Joint Layout: Indicate proposed construction joints required to build the structure.
1. Location of construction joints is subject to approval of the Engineer.
- E. Qualification Data: For installer and manufacturer of reinforcement.
- F. Material Certificates: For each of the following, signed by manufacturers:
1. Steel reinforcement and accessories.
 2. Fiber reinforcement.
- G. Material Test Reports: For the following, from a qualified testing agency:
1. Steel Reinforcement:
 - a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706.
 2. Mechanical splice couplers.
- H. Welder's Certificates: Submit under provisions Division 01 – General Requirements, Manufacturer's Certificates, certifying welders employed on the Work, verifying AWS qualifications within the previous 12 months.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with CRSI Manual of Standard Practice, ACI 117, and ACI 301.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code - Reinforcing Steel."
- C. Maintain one copy of each document on site.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage and to avoid damaging coatings on steel reinforcement.

1.07 COORDINATION

- A. Coordinate work under provisions of Division 01 – General Requirements.
- B. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.01 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 60 percent.
- B. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- C. Low-Alloy Steel Reinforcing Bars: ASTM A706, deformed.
- D. Epoxy-Coated Reinforcing Bars:
 - 1. Steel Bars: ASTM A 615, Grade 60, deformed.
 - 2. Epoxy Coating: ASTM A 775 with less than 2 percent damaged coating in each 12-inch bar length.
- E. Plain-Steel Welded Wire Reinforcement: ASTM A1064, plain, fabricated from as-drawn steel wire into flat sheets.
- F. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884, Class A coated, Type 1, plain steel.

2.02 REINFORCEMENT ACCESSORIES

- A. Steel Tie Wire: ASTM A1064, annealed steel, Minimum 16 gage.
- B. Joint Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- C. Epoxy-Coated Joint Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, ASTM A 775 epoxy coated.
- D. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM D 3963 and ASTM A775.
- E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - a. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 - b. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

2.03 FABRICATION

- A. Fabricate concrete reinforcing in accordance with ACI 117.
- B. Locate reinforcing splices not indicated on drawings at point of minimum stress.

2.04 FIBER REINFORCEMENT

- A. Synthetic Micro-Fiber: Monofilament or fibrillated polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.

1. Products: Subject to compliance with requirements, provide one of the products specified.
 - a. Monofilament Micro-Fibers:
 - i. Axim Italcementi Group, Inc.; Fibrasol II P.
 - ii. Euclid Chemical Company (The), an RPM company; Fiberstrand 150.
 - iii. FORTA Corporation; FORTA Econo-Mono.
 - iv. Grace Construction Products, W. R. Grace & Co.; Grace MicroFiber.
 - v. Metalcrete Industries; Polystrand 1000.
 - vi. Nycon, Inc.; ProConM.
 - vii. Propex Concrete Systems Corp.; Fibermesh 150.
 - viii. Sika Corporation; Sika Fiber PPM.
 - ix. Or Engineer approved equal.
 - b. Fibrillated Micro-Fibers:
 - i. Axim Italcementi Group, Inc.; Fibrasol F.
 - ii. Euclid Chemical Company (The), an RPM company; Fiberstrand F.
 - iii. FORTA Corporation; FORTA Econo-Net.
 - iv. Grace Construction Products, W. R. Grace & Co.; Grace Fibers.
 - v. Nycon, Inc.; ProConF.
 - vi. Propex Concrete Systems Corp.; Fibermesh 300.
 - vii. Sika Corporation; Sika Fiber PPF.
 - viii. Or Engineer approved equal.
- B. Synthetic Macro-Fiber: Polyolefin macro-fibers engineered and designed for use in concrete, complying with ASTM C 1116, Type III, 1 to 2-1/4 inches long.
 1. Products: Subject to compliance with requirements, provide one of the products specified.
 - a. 3M; Scotchcast Polyolefin Fibers 1" or 2".
 - b. Euclid Chemical Company (The), an RPM company; Tuf-Strand SF.
 - c. FORTA Corporation; FORTA FERRO.
 - d. Grace Construction Products, W. R. Grace & Co.; Strux 90/40.
 - e. Nycon, Inc.; XL.
 - f. Propex Concrete Systems Corp.; Fibermesh 650.
 - g. Sika Corporation; Sika Fiber MS10.
 - h. Or Engineer approved equal.

PART 3 EXECUTION

3.01 PREPARATION

- A. Protection of In-Place Conditions:
 1. Do not cut or puncture vapor retarder.
 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.02 INSTALLATION OF STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement. Reinforcement shall be tied at a minimum of 50 percent of the bar intersections.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch, no less than one bar diameter, or not less than 1 1/3 times the size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with Drawings.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
- G. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.
- H. Accommodate placement of formed openings.
- I. Wall reinforcement shall not be placed in the work until one side of the wall forms has been erected, aligned and braced. As the wall reinforcement is placed, it shall be secured to the wall form with the proper clearance between the steel and forms.
- J. Slab reinforcement shall be supported by manufactured steel bolsters only. Concrete half-bricks may be permitted only in slab on grade or footing construction.
- K. Where walls or other items are shown as built integrally with other sections, but are placed as separate pours, keys and dowels shall be provided. Dowels shall be same size and at same spacing as reinforcing, unless noted otherwise.
- L. Provide 4 x 4 - W 4.0 x W 4.0 electrically welded wire fabric, ASTM A185 reinforcing in all concrete slabs on ground unless shown otherwise.
- M. Provide corner bars of same size and spacing as main reinforcement at all intersections and corners, unless noted otherwise.
- N. Where openings occur in walls or slabs, and unless otherwise noted on the plans, provide two (2) #5 bars at all sides and extending at least 2 feet beyond corners and two (2) #5 bars at least 4 feet long diagonally across each re-entrant corner.
- O. The Contractor shall give 24 hour notice to the Engineer for inspection of the reinforcing prior to the placement of the concrete.
- P. The reinforcing for the concrete placement shall be completed and inspected before ordering concrete.

3.03 INSTALLATION TOLERANCES

- A. Comply with ACI 117.

3.04 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Division 01 – General Requirements.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
 - 1. Steel-reinforcement placement.
 - 2. Steel-reinforcement mechanical splice couplers.
 - 3. Steel-reinforcement welding.

END OF SECTION 03200

DIVISION 03 - CONCRETE
Section 03300 – Structural Concrete

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
1. All cast-in-place concrete including, but not limited to floors, slabs on grade, foundation walls, supported slabs, beams and columns.
 2. Control, expansion and contraction joint devices associated with concrete work.
 3. Equipment pads and manhole slabs.
- B. Related Sections:
1. Section 01330 – Submittal Procedures
 2. Section 02315 – Excavation and Fill
 3. Section 03100 – Concrete Accessories
 4. Section 03200 – Concrete Reinforcing
 5. Section 03390 – Concrete Curing
 6. Section 16130 – Raceway and Boxes
- C. References:
1. ACI 117-10 – Specification for Tolerances for Concrete Construction and Materials
 2. ACI 301-16 – Specifications for Structural Concrete
 3. ACI 305.1-14 – Specification for Hot Weather Concreting
 4. ACI 306.1-90 – Standard Specification for Cold Weather Concreting
 5. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
 6. ASTM C33 – Standard Specification for Concrete Aggregates
 7. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
 8. ASTM C40 – Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
 9. ASTM C42 – Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
 10. ASTM C94 – Standard Specification for Ready-Mixed Concrete
 11. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete
 12. ASTM C150 – Standard Specification for Portland Cement
 13. ASTM C157 – Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
 14. ASTM C172 – Standard Practice of Sampling Freshly Mixed Concrete
 15. ASTM C219 – Standard Terminology Relating to Hydraulic Cement
 16. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

17. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete
18. ASTM C494 – Standard Specification for Chemical Admixtures for Concrete
19. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
20. ASTM C845 – Standard Specification for Expansive Hydraulic Cement
21. ASTM C881 – Standard Specification for Epoxy-Resin Base Bonding Systems for Concrete
22. ASTM C989 – Standard Specification for Slag Cement for Use in Concrete and Mortars
23. ASTM C1017 – Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
24. ASTM C1059 – Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete
25. ASTM C1064 – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
26. ASTM C1077 – Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
27. ASTM C1116 – Standard Specification for Fiber-Reinforced Concrete
28. ASTM C1240 – Standard Specification for Silica Fume Used in Cementitious Mixtures
29. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
30. ASTM D2240 – Standard Test Method for Rubber Property – Durometer Hardness
31. ASTM E329 – Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
32. ASTM E1155 – Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers

1.03 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.04 PREINSTALLATION MEETINGS

- A. Pre-placement Conference: Conduct conference a minimum of 15 days prior to placement of concrete at project site.
 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.

- c. Ready-mix concrete manufacturer.
 - d. Concrete subcontractor.
 - e. Special concrete finish subcontractor
- 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, methods for achieving specified floor and slab flatness and levelness, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.05 SUBMITTALS

- A. Submit under the provisions of Division 01 - Section 01330 – Submittal Procedures.
- B. Product Data: Submit data for each type of product including, but not limited to, joint devices, attachment accessories, admixtures, form release agents and bonding agent.
- C. Qualification Data: For Installer, Manufacturer, and Testing Agency.
- D. Material Certifications: For each item listed, submit information indicated.
 - 1. Coarse and Fine Aggregate
 - a. Producer Name.
 - b. Quarry Location.
 - c. Contact Person and Phone Number.
 - d. Material Test Reports: From a qualified testing agency, indicating compliance with requirements.
 - 2. Cement
 - a. Mill Test Report.
 - b. Producer Name and Location.
 - 3. Water
 - a. Specify Potable Water Source.
- E. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, use of additional admixtures, Project conditions, weather, test results, or other circumstances warrant adjustments. Design Mixtures shall be reviewed according to the provisions of ACI 301.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- F. Concrete Mix Properties:
 - 1. Mix Design
 - a. Cementitious Materials (Lbs./C.Y.)
 - b. Fine Aggregate (Lbs./C.Y.)
 - c. Coarse Aggregate (Lbs./C.Y.)
 - d. Water (Lbs./C.Y.)
 - e. Admixtures.
 - 2. Slump.
 - 3. Air Content.

- G. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- H. Minutes of pre-placement conference.

1.06 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301
 - 1. Maintain one copy of document on site.
- B. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
 - 2. Engineer reserves the right to reject Manufacturer at any time and to require Contractor to obtain different supplier.
- D. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.07 PROJECT RECORD DOCUMENTS

- A. Contractor shall accurately record actual locations of embedded utilities and components which are concealed from view.

1.08 COORDINATION

- A. Coordinate Work under provisions of Division 01 – General Requirements.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I. Supplement with the following:
 - a. Expansive Cement: ASTM C845, Type K for use in Mix B only.
 - b. Fly Ash: ASTM C 618, Class F.
 - c. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Silica Fume: ASTM C 1240, amorphous silica.

- C. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum size of coarse aggregate shall be in accordance with guidelines listed below:

Max. Aggregate Size	Type of Structure
1/2 inch	Concrete Toppings and Concrete Repair
3/4 inch	Mud Slabs, Stairs and Steps, Columns, Beams, Elevated Slabs, Flowable Fill
1 inch	Grade Beams, Equipment Pads, Slabs on Grade, Interior and Exterior Tank Walls, All Other Structures
1-1/2 inch	Caissons, Piles and Piers, Footings

- D. Fine Aggregate: ASTM C 33, Free of materials with deleterious reactivity to alkali in cement.

- E. Water: ASTM C 94 and potable.

2.02 ADMIXTURES

- A. When required or permitted, admixtures shall conform to requirements specified below. Use of one or more admixtures in concrete shall be approved by Engineer prior to its use at job site.
- B. Air-Entraining Admixture: ASTM C 260.
- C. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Water-Reducing Admixture: ASTM C 494, Type A.
 2. Retarding Admixture: ASTM C 494, Type B.
 3. Accelerating Admixture: ASTM C 494, Type C.
 4. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
 5. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
 6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
 7. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.
 8. Shrinkage Reducing Admixture: ASTM C 494, Type S; Maximum Length Change, tested in accordance with ASTM C 157, of 0.030%.
- D. Field Service: When requested, the Contractor shall arrange to have a qualified concrete technician employed by manufacturer be available to assist in proportioning concrete materials for optimum use, to advise on proper use of admixture and adjustment of concrete mix proportions to meet job site and climatic conditions.

2.03 FLOOR AND SLAB TREATMENTS

- A. (Reserved)

2.04 LIQUID FLOOR TREATMENTS

- A. (Reserved)

2.05 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, 1/2 inch thick (unless shown otherwise).
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.
- C. Latex Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Sealant and Primer: As specified in Section 07920 – Joint Sealants.

2.06 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than design f'_c (psi) of concrete substrate at 28 days when tested according to ASTM C 109.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than design f'_c (psi) of concrete substrate at 28 days when tested according to ASTM C 109.

2.07 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Fly Ash: 25 percent.
 2. Combined Fly Ash and Pozzolan: 25 percent.
 3. Ground Granulated Blast-Furnace Slag: 50 percent.
 4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
 5. Silica Fume: 10 percent.
 6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
 7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
 4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.08 CONCRETE MIXTURES FOR BUILDING AND TANK ELEMENTS

- A. Mix Design A: Proportion normal-weight concrete mixture for all parts of Work as follows:
1. Minimum Compressive Strength: 2500 psi at 7 days, 4500 psi at 28 days
 2. Maximum Water-Cementitious Materials Ratio: 0.42
 3. Cementitious material: Type II required, fly ash optional
 4. Slump: 4 inches; 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture
 5. Air Content:

Max. Aggregate Size	Air Content (percent)
1/2 inch	7 ± 1.5
3/4 inch	6 ± 1.5
1 inch	6 ± 1.5
1-1/2 inch	5.5 ± 1.5

 - a. Interior floor slabs located indoors not subjected to exposure conditions shall not contain entrained air.

2.09 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116 and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
2. In addition to batch ticket information required by ASTM C 94, the following shall be provided:
 - a. Concrete Design Strength.
 - b. Type and amount of cement.
 - c. Class and amount of coal fly ash, or raw or calcined natural pozzolans, if present.
 - d. Class and amount of ground granulated blast furnace slag, if present.
 - e. Type and amount of silica fume, if present.
 - f. Type and amount of admixtures.
 - g. Type and amount of fiber reinforcement, if present.
 - h. Maximum size of aggregate.
 - i. Amount of water added at job site shall be noted on ticket. No water is to be added at job site unless acceptable to Engineer.
3. One copy of delivery ticket shall be furnished to Engineer at time truck arrives at job site.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify site conditions under provisions of Division 01 - General Requirements.
- B. Verify requirements for concrete cover over reinforcement have been met.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed and positioned securely.
- D. Verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

3.02 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- B. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink or epoxy grout, unless noted otherwise.
- C. Contractor shall inform Engineer 24 hours in advance of any concrete pours, indicating location and size of pour by submitting completed pre-pour checklist.

3.03 CONCRETE PLACEMENT

- A. Concrete shall be conveyed and placed in conformance with ACI 301. Contractor shall instruct laborers on proper vibration techniques required for each situation.
- B. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

- C. Delivery of mixed concrete shall be regulated so there will not be an interruption of more than 20 minutes duration in placement of concrete. Engineer may waive these requirements if slump and temperature requirements are met without adding water.
- D. At beginning of concrete placement, a spare vibrator shall be on job site in addition to vibrators to be used during placement.
- E. If electrical power for equipment used in the concrete placement is provided by a portable electric generator, an additional back-up portable electric generator or an alternate reliable electrical source shall be available prior to and during the concrete placement.
- F. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints in accordance with Contract Documents. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints. Concrete placed in vertical forms shall be placed in lifts of not more than 2 feet which shall be kept practically level.
 - 2. Chutes shall extend as nearly as practicable to point of deposit. Concrete shall not be dropped more than 6 feet. For walls or column placements in excess of 6 feet vertical height, tremie shall be used in placing concrete. If reinforcing steel or formwork is such that tremie cannot be used, method of placement shall be approved by Engineer.
 - 3. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 4. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- G. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- H. Pumping Concrete: Comply with ACI 301 and as follows.
 - 1. Selection of pipe diameter for pumping shall be such that smallest inside diameter is no less than 4 inches or 3 times nominal maximum size coarse aggregate, whichever is greater.

2. Pumping lines shall be lubricated with minimum of 1 cubic yard of grout prior to pumping regular mix through lines.
 3. Contractor shall show sufficient evidence prior to use of pump that mix is pumpable. This shall be accomplished by submittal, in accordance with Specification Section 01330, of a certification from supplier that mix has performed satisfactorily on previous jobs of similar nature or by performing full scale field test for pumpability with line height and other variables being identical (or nearly so) to that of actual placing conditions.
- I. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- J. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.04 FINISHING FORMED SURFACES

- A. Defects in new concrete such as rock pockets and tie holes shall be repaired when forms are removed. Grout used for repair shall contain a bonding admixture conforming to ASTM C1059, Type II. Use admixture according to manufacturer's written instructions. This shall be done for all surface finishes of formed concrete surfaces.
1. Snap-off form ties shall be removed to a point 1" beneath surface of concrete and resulting depression shall be carefully pointed with grout.
 2. Removable form tie holes shall be plugged with X-Plug by Sika Greenstreak, or Engineer approved equal, and packed with grout.
- B. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched.
1. Apply to concrete surfaces to be covered by earth fill.
- C. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
1. Apply to exposed concrete surfaces and submerged surfaces.

- D. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete surfaces indicated on plans:
1. Wet down the entire area and fill all air pockets, voids and other depressions with grout to produce a smooth dense surface free from pits and other irregularities. Thoroughly scrub into the wetted surface a mortar mixture consisting of 1 part well graded sand passing the No. 30 sieve, 1 part portland cement and a sufficient quantity of a bonding admixture (described previously) to produce a workable mixture. Scrubbing shall be accomplished by use of a rubber or wood float following by finishing with a cork float or a light brush. The resulting surface shall be true and uniform, with no discernible thickness of mortar on the surface.
 2. Finish shall extend a minimum of one foot below final grade.
- E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.
- F. Edges and corners of structures, which are exposed in the completed structures, shall be chamfered 3/4 inch, unless noted otherwise.

3.05 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 301 recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.
1. Apply scratch finish to surfaces to be covered with fill material and surfaces to receive concrete toppings.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
1. Apply float finish to surfaces to receive trowel finish and to be covered with built-up or membrane roofing.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
1. Apply a trowel finish to surfaces exposed to view and to clarifier floor grout.
- E. Broom Finish: In lieu of final troweling, apply a broom finish to exterior concrete slabs, sidewalks, platforms, steps, ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

- F. Edges and corners of structures, which are exposed in the completed structures, shall be chamfered 3/4 inch, unless noted otherwise. Edges of walks and slabs on grade shall be finished with an edging tool.
- G. Walks and slabs on grade shall have contraction joints scored in the concrete to control cracking. The spacing of the scored joints shall be equal to the width of the walk or slab unless otherwise specified or noted on the plans.

3.06 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- C. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.07 JOINT FILLERS (RESERVED)

3.08 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when directed by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water and/or bonding agent for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.

- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least 14 days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 5. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.09 PLANT QUALITY CONTROL

- A. Sufficient testing shall be done by the supplier to assure the quality and consistency of the mix produced. The field tests are not to be used as a gauge of this quality.

3.10 FIELD QUALITY CONTROL

- A. Provide under provisions of Division 01 - General Requirements.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
1. Steel reinforcement placement.
 2. Steel reinforcement welding.
 3. Headed bolts and studs.
 4. Verification of use of required design mixture.
 5. Concrete placement, including conveying and depositing.

6. Curing procedures and maintenance of curing temperature.
 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C 143; one test at point of delivery for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31.
 - a. Cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
 - b. Where the Contractor intends to remove load supporting forms (when conditions permit), cast and field cure one set of four standard cylinder specimens for each composite sample. Field curing shall continue up to within four hours prior to laboratory testing. The Contractor shall be responsible for the safe field storage of the concrete cylinders during the field curing process.
 6. Compressive-Strength Tests: ASTM C 39; test one laboratory-cured specimen at 7 days and two specimens at 28 days. The fourth cylinder shall be held for testing as a check cylinder.
 - a. A 28 day compressive-strength test shall be the average compressive strength of two specimens obtained from same composite sample.
 7. Test results shall be submitted in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain:
 - a. Project identification name and number
 - b. Name of concrete testing and inspecting agency
 - c. Date of concrete placement
 - d. Date of compressive strength test
 - e. Location of concrete batch in Work
 - f. Design compressive strength at 28 days
 - g. Mix design designation
 - h. Slump of concrete
 - i. Temperature of concrete at placement

- j. Percent air entrained
 - k. Number of specimens tested
 - l. Compressive breaking strength
 - m. Type of break for both 7- and 28-day tests
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
9. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer.
- a. If compressive strength requirements are not met, steps shall be taken to increase average of subsequent strength test results. Engineer shall have right to order a change in proportions of mix for remaining work. Engineer shall also have right to require conditions of temperature and moisture necessary to secure required strength.
 - b. If any strength test of laboratory-cured cylinders falls below specified compressive strength by more than 500 psi or if tests of field-cured cylinders indicate deficiencies in protection or curing, steps shall be taken to assure that the load-carrying capacity of structure is not jeopardized.
 - c. If likelihood of low-strength concrete is confirmed and computations indicate that load-carrying capacity may have been significantly reduced, tests of cores drilled from area in question may be required in accordance with ASTM C 42. In such cases, three cores shall be taken for each strength test more than 500 psi below specified compressive strength. If concrete in structure will be dry under service condition, cores shall be air dried (temperature 60° to 80° F., relative humidity less than 60%) for 7 days before test and shall be tested dry. If concrete in structure will be more than superficially wet under service conditions, cores shall be immersed in water for at least 40 hours and be tested wet.
 - d. Concrete in an area represented by core tests shall be considered structurally adequate if average of three cores is equal to at least 85% of specified compressive strength and if no single core is less than 75% of specified compressive strength. To check testing accuracy, locations represented by erratic core strengths may be retested.
 - e. If criteria of paragraph (d) are not met, and if structural adequacy remains in doubt, the Engineer may order load tests as outlined in ACI 318 for questionable portion of structure or require other appropriate action.
 - f. All costs associated with performing analytical investigations, core testing and load testing shall be paid for by Contractor.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.

11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- E. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

END OF SECTION 03300

DIVISION 03 - CONCRETE
Section 03390 - Concrete Curing

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to work of this Section.

1.02 SUMMARY

- A. Section includes initial and final curing, sealing of vertical foundation wall surfaces and exterior concrete flat work and curing, sealing and dust proofing of interior concrete floor slab surfaces.
- B. Related Sections:
 - 1. Section 01330 – Submittal Procedures
 - 2. Section 03300 – Structural Concrete
- C. References:
 - 1. AASHTO M182 – Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats.
 - 2. ACI 301-16 – Specifications for Structural Concrete.
 - 3. ACI 305.1-14 – Specification for Hot Weather Concreting.
 - 4. ACI 306.1-90 – Standard Specification for Cold Weather Concreting.
 - 5. ACI 308.1-11 – Standard Specification for Curing Concrete.
 - 6. ASTM C171 – Standard Specification for Sheet Materials for Curing Concrete.
 - 7. ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - 8. ASTM C1315 – Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
 - 9. ASTM D2103 – Standard Specification for Polyethylene Film and Sheeting.

1.03 DEFINITIONS (RESERVED)

1.04 SUBMITTALS

- A. Submit under the provisions of Division 01 - Section 01330 – Submittal Procedures.
- B. Product Data: Provide data on curing compounds, including compatibilities and limitations.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301, ACI 305.1, ACI 306.1 and ACI 308.1.
 - 1. Maintain one copy of each document on site.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products under provisions of Division 01 - General Requirements.

- B. Deliver curing materials in manufacturer's packaging including application instructions.

PART 2 PRODUCTS

2.01 EVAPORATION RETARDER:

- A. Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Products: Subject to compliance with requirements, provide one of the products specified:
 - 1. Axim Italcementi Group, Inc.; CATExOL CimFilm.
 - 2. BASF Construction Chemicals - Building Systems; Confilm.
 - 3. ChemMasters; SprayFilm.
 - 4. Conspec by Dayton Superior; Aquafilm.
 - 5. Dayton Superior Corporation; Sure Film (J-74).
 - 6. Edoco by Dayton Superior; BurkeFilm.
 - 7. Euclid Chemical Company (The), an RPM company; Eucobar.
 - 8. Kaufman Products, Inc.; Vapor-Aid.
 - 9. Lambert Corporation; LAMBCO Skin.
 - 10. L&M Construction Chemicals, Inc.; E-CON.
 - 11. Meadows, W. R., Inc.; EVAPRE.
 - 12. Metalcrete Industries; Waterhold.
 - 13. Nox-Crete Products Group; MONOFILM.
 - 14. Sika Corporation; SikaFilm.
 - 15. SpecChem, LLC; Spec Film.
 - 16. Symons by Dayton Superior; Finishing Aid.
 - 17. TK Products, Division of Sierra Corporation; TK-2120 TRI-FILM.
 - 18. Unitex; PRO-FILM.
 - 19. Vexcon Chemicals, Inc.; Certi-Vex Envio Set.
 - 20. Or Engineer approved equal.

2.02 ABSORPTIVE COVER:

- A. AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

2.03 MOISTURE-RETAINING COVER:

- A. ASTM C171, polyethylene film or white burlap-polyethylene sheet.

2.04 WATER:

- A. ASTM C94 and potable.
- B. Engineer approved equal.

2.05 CLEAR, WATERBORNE, MEMBRANE-FORMING CURING COMPOUND

- A. ASTM C309, Type 1, Class B, dissipating
 - 1. Euclid Chemical Company – Kurez DR-100
 - 2. Dayton Superior – Clear Resin Cure J11W
 - 3. BASF – MasterKure 181

2.06 CLEAR, SOLVENT-BORNE, MEMBRANE-FORMING CURING AND SEALING COMPOUND:

- A. ASTM C1315, Type 1, Class A.
- B. Products: Subject to compliance with requirements, provide one of the products specified.
 - 1. BASF Construction Chemicals - Building Systems; Kure-N-Seal 25 LV.
 - 2. ChemMasters; Spray-Cure & Seal Plus.
 - 3. Conspec by Dayton Superior; Sealcure 1315.
 - 4. Dayton Superior Corporation; Day-Chem Cure and Seal (J-22UV).
 - 5. Edoco by Dayton Superior; Cureseal 1315.
 - 6. Euclid Chemical Company (The), an RPM company; Super Diamond Clear; LusterSeal 300.
 - 7. Kaufman Products, Inc.; Sure Cure 25.
 - 8. Lambert Corporation; UV Super Seal.
 - 9. L&M Construction Chemicals, Inc.; Lumiseal Plus.
 - 10. Meadows, W. R., Inc.; CS-309/30.
 - 11. Metalcrete Industries; Seal N Kure 30.
 - 12. Right Pointe; Right Sheen 30.
 - 13. Vexcon Chemicals, Inc.; Certi-Vex AC 1315.
 - 14. Or Engineer approved equal.
- C. COATING SCHEDULE
 - 1. Exterior & Interior Concrete Foundation Walls: One coat application
 - 2. Exterior Concrete Flatwork: One coat application
 - 3. Interior Concrete Floor Slabs: Two coat application

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify substrate conditions under provisions of Division 01 - General Requirements.
- B. Verify that substrate surfaces are ready to be cured.

3.02 CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305.1 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft./hour before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
 3. Curing and Sealing Compound: Apply uniformly to surfaces indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat where indicated. Maintain continuity of coating and repair damage during curing period.
- F. Cold Weather Concreting and Curing: Placing and protection of concrete shall be in conformance with ACI 306.1 and shall meet approval of Engineer prior to its use.
1. Contractor shall maintain temperature records of concrete. When concrete is placed, the time, date, weather conditions, outside air temperature and temperature of concrete shall be recorded. Temperatures shall be recorded at several locations (or as directed by Engineer) within enclosures and on concrete surfaces, edges and corners to obtain the range of temperatures. The maximum and minimum temperatures in each 24-hour period shall be recorded using measuring devices embedded in concrete surface or by placing thermometer against surface under temporary cover of thick insulation until a constant temperature is registered.
- G. Hot Weather Concreting and Curing: Placing and protection of concrete shall be in conformance with ACI 305.1 and shall meet approval of Engineer prior to its use.
1. Contractor shall conform to ACI 305.1 when following conditions exist:
 - a. Any combination of high air temperature, low relative humidity and high wind velocity.

- b. Any combination of rising air temperature and falling relative humidity.
- 2. Under hot weather conditions, Contractor shall be responsible for making arrangements for installation of windbreaks, shading, fog spraying, sprinkling, ponding or wet covering of light color. Arrangements shall be made in advance of placement and such protective measures shall be taken as quickly as concrete hardening and finishing operations will allow.

3.03 PROTECTION OF FINISHED WORK

- A. Protect finished work under provisions Division 01 - General Requirements.
- B. Do not permit traffic over unprotected floor surface.

3.04 FINAL ACCEPTANCE OF COMPLETE WORK

- A. The work shall be complete in every detail and the finished work approved by the Architect / Engineer and Owner before final acceptance.

END OF SECTION 03390

CDC2409631016
CAMPGROUND IMPROVEMENTS – BASE BID AND ALTERNATES
FERDINAND STATE FOREST/DEPARTMENT OF NATURAL RESOURCES

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

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DIVISION 7 – THERMAL AND MOISTURE
PROTECTION
Section 07920 – Joint Sealants

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes but is not limited to joint sealants for the following applications, including those specified by reference to this Section:
 - 1. Exterior joints in the following vertical surfaces and horizontal non-traffic surfaces:
 - a. Construction joints in cast-in-place concrete.
 - b. Control and expansion joints in Unit Masonry.
 - c. Perimeter joints between materials listed above and frames of doors, windows and louvers.
 - d. Other joints as indicated.
 - 2. Exterior joints in the following horizontal traffic surfaces where indicated:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Joints between different materials listed above.
 - 3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
 - a. Control and expansion joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints of exterior openings.
 - c. Vertical joints on exposed surfaces of interior unit masonry walls and partitions.
 - d. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
 - e. Other joints as indicated.

1.02 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.03 SUBMITTALS

- A. Product Data: For each joint-sealant product indicated herein.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view for approval by the Architect/Engineer.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's and General Contractor authorized Installer who is approved for installation of elastomeric sealants required for this project.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.05 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg. F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.02 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Single Component Mildew-Resistant Neutral-Curing Silicone Sealant:
 - 1. Available Products:
 - a. Pecora Corporation; 898.
 - b. Tremco; Tremsil 600 White.
 - 2. Type and Grade: S (single component) and NS (nonsag).
 - 3. Class: 25.
- C. Single component nonsag Urethane Sealant:
 - 1. Available Products:
 - a. Sonneborn, Division of ChemRex Inc.; NP 1.
 - b. Tremco; Vulkem 227.
 - c. Tremco; Dymonic.
 - 2. Type and Grade: S (single component) and NS (nonsag).
 - 3. Class: 25.

- D. Single component Pourable Urethane Sealant:
 - 1. Available Products:
 - a. Meadows, W. R., Inc.; POURTHANE.
 - b. Pecora Corporation; Urexpan NR-200.
 - c. Sonneborn, Division of ChemRex Inc.; SL 1.
 - d. Tremco; THC-900.
 - 2. Type and Grade: M (multicomponent) and P (pourable).
 - 3. Class: 25.

2.03 LATEX JOINT SEALANTS (Interior paintable surfaces)

- A. Latex Sealant: Comply with ASTM C 834, Type P, Grade NF.
- B. Available Products:
 - 1. Pecora Corporation; AC-20+.
 - 2. Sonneborn, Division of ChemRex Inc.; Sonolac.
 - 3. Tremco; Tremflex 834.
 - 4. Meadows, W. R., Inc

2.04 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type B (bicellular material with a surface skin) and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.05 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
- B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.
- D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints to satisfaction of the Architect / Engineer.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- H. Installation of Preformed Tapes: Install according to manufacturer's written instructions.
- I. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, producing seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires

acceleration to produce seal, apply heat to sealant in compliance with sealant manufacturer's written instructions.

3.04 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.05 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.06 JOINT-SEALANT SCHEDULE

- A. Exterior vertical and horizontal non-traffic construction joints in cast-in-place concrete.
 - 1. Joint Sealant Single component nonsag urethane sealant.
- B. Exterior horizontal nontraffic and traffic isolation and contraction joints in cast-in-place concrete slabs.
 - 1. Joint Sealant: Single component pourable urethane sealant.
- C. Miscellaneous exterior vertical joints.
 - 1. Joint Sealant: Single component nonsag urethane sealant.
- D. Exterior perimeter joints around frames of doors, windows and louvers.
 - 1. Joint Sealant: Single component nonsag urethane sealant.
- E. Control and expansion joints on exposed interior surfaces of exterior walls.
 - 1. Joint Sealant: Single component nonsag urethane sealant.
- F. Interior perimeter joints of exterior openings.
 - 1. Joint Sealant: Single component nonsag urethane sealant.
- G. Interior expansion, control, contraction, and isolation joints in horizontal traffic surfaces.
 - 1. Joint Sealant: Single component pourable urethane sealant.
- H. Vertical joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
 - 1. Joint Sealant: Single component nonsag urethane.
- I. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
 - 1. Joint Sealant: Latex sealant.

3.07 FINAL ACCEPTANCE OF COMPLETE WORK

- A. The work shall be complete in every detail and the finished work approved by the Engineer and Owner before final acceptance.

END OF SECTION 07920

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CAMPGROUND IMPROVEMENTS – BASE BID AND ALTERNATES
FERDINAND STATE FOREST/DEPARTMENT OF NATURAL RESOURCES

DIVISION 13 – SPECIAL CONSTRUCTION

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PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Construction and onsite placement of a prefabricated precast concrete family style restroom and shower building with three ladies toilets, two men's toilets and one urinal and four showers (one ADA in each area).
- B. Related Sections:
 - 1. Division 02 – Sitework.
 - 2. Division 03 – Concrete.

1.02 DESIGN

- A. Building will be manufactured using precast concrete including the roof. The building's structural and foundation design will be relevant to the region and properties associated with its final placement. Design will also meet ADA and building code requirements.

1.03 SUBMITTALS

- A. Product Data: For each type of building system component. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - 1. Framing system
 - 2. Roof and wall panels
 - 3. Insulation and vapor retarder facings
 - 4. Flashing and trim
 - 5. Accessories
- B. Shop Drawings: For the building system components. Include plans, elevations, sections, details, and attachments to other work.

1.04 COORDINATION

- A. Coordinate sizes and locations of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings. Concrete, reinforcement, and formwork requirements are specified in Division 03 Section 03300 "Structural Concrete."
- B. Coordinate precast concrete panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.05 WARRANTY

- A. Warranty Period: 20 years from date of Substantial Completion.
- B. Manufacturer will provide a written warranty providing 20 years structural, manufacturer's warranty on all hardware and components not produced at precast concrete manufacturer's plant, and 3 years against defects in paint, caulk, and grout.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Manufacturer shall be Huffcutt Concrete or a pre-approved equal.
- B. The manufacturer shall be an NPCA Certified Plant or equal with verifiable references demonstrating quality, design and service upon request.

2.02 BUILDING MATERIALS

- A. Doors and Frames
 - 1. Doors shall be 18ga galvanized metal, louvered with 16ga frames. Doors and frames shall include one coat of rust inhibitive primer and two finish coats of enamel paint.
- B. Door Hardware
 - 1. Aluminum drip cap. Reese or equal.
 - 2. Door closure with hold open. Cal-Royal or equal.
 - 3. Stainless hinges with non-removable pin. Cal-Royal or equal.
 - 4. Grade 1 lockset. Function and keying to be verified with owner.
 - 5. Brush style sweep. Reese or equal.
 - 6. ADA compliant threshold. Reese or equal.
- C. Windows
 - 1. Vinyl frame, obscure glass, non-operable. Parco or equal.
- D. Plumbing
 - 1. Stools
 - a. Kohler porcelain wall mounted, ADA compliant, elongated bowl.
 - b. Sloan flush valve, concealed, hydraulic actuator.
 - 2. Urinal
 - a. Kohler porcelain wall mounted, ADA compliant.
 - b. Sloan flush valve, concealed, hydraulic actuator.
 - 3. Lavatories
 - a. Kohler wall mounted sink, ADA compliant.
 - b. Moen single handle ADA metering faucet.
 - 4. Water Heater
 - a. Bradford white electric water heater. Size to be sufficient for number of showers and lavatories.
 - 5. Mixing Valve
 - a. Honeywell thermostatic mixing valve, adjustable.
 - 6. Shower
 - a. Acorn Penal-Ware Series, ADA compliant.
 - 7. Floor Drains
 - a. Sioux Chief on grade adjustable floor drain.
 - 8. Sediment Filter
 - a. Rusco sediment filter.
- E. Electrical
 - 1. Interior
 - a. RAB Vandalproof Tuff Dome motion sensor.
 - b. RAB VAN1 lights.

- c. GFI receptacles.
 - d. Murdock super secure.
 - 2. Exterior
 - a. RAB Tallpack lights.
 - 3. Chase
 - a. 100amp load center.
 - b. (2) 2 bulb florescent lamps. (1 per modular section)
 - c. Soler & Palau exhaust fan.
- F. Interior Hardware
 - 1. Stainless 3 roll toilet paper dispenser.
 - 2. ADA toilet stalls shall have (1) 18" stainless vertical grab bar, (1) 36" stainless horizontal grab bar, (1) 42" stainless horizontal grab bar.
 - 3. ADA showers shall have (1) 18" stainless vertical grab bar, (1) 30" stainless horizontal grab bar, (1) 42" stainless horizontal grab bar.
 - 4. Stainless frame 18" x 36" mirror.
 - 5. Bradley ADA compliant reversible phenolic shower seat.
 - 6. Two (2) coat hooks
- G. Sealers
 - 1. Floor shall be sealed using a deep penetrating, high alkali resistant, low volatility product. TK-290 or equal.
- H. Caulks and Grout
 - 1. All joints between precast panels shall be caulked using a durable, flexible polyurethane sealant. BASF Sonolastic NP-1 or equal.
 - 2. Weld plate panel connections shall be grouted flush with interior wall surface. Speed Crete Red Line or equal.

2.03 FINISHES

- A. Interior
 - 1. Smooth trowel finish.
- B. Exterior
 - 1. Exterior wall appearance to be approved by owner using an architectural form liner.
 - 2. Roof shall be cedar shake architectural form liner.
- C. Paint
 - 1. Interior
 - a. Wall panels shall be primed with a premium quality water based acrylic bonding primer moisture and alkali resistant. Finish coat shall be a high performance acrylic enamel.
 - 2. Exterior
 - a. Roof shall be covered with a quality 100% acrylic satin paint. Owner to determine color.
 - b. Walls shall be covered with a quality concrete stain. Owner to determine color.
 - c. Doors shall be covered using 2 coats of a high performance 100% acrylic satin enamel. Owner to determine color.

2.04 FOUNDATION FOR BUILDING

- A. The foundation design shown for the precast building was designed by the Engineer. Building manufacturer to coordinate with design engineer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Before building placement proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with erector present, for compliance with requirements and building system manufacturer's tolerances.
 - 1. Engage land surveyor to perform surveying.
- C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.02 PLACEMENT OF PRECAST BUILDING

- A. Building manufacturer shall construct, assemble, paint, install plumbing and electrical at their plant so that it may be transported to the jobsite in finished modules and placed using a crane.
- B. Building manufacturer shall provide mechanical rough in drawing showing where electrical, water supply line, waste line, and floor drains are to be located for hook up to building.
- C. Contractor will make final mechanical connections after the building is placed by manufacturer.
- D. Building manufacturer will caulk interior and exterior seams between modules. Manufacturer will also perform any shipping and handling repairs during installation.

3.04 ONSITE INSTALLATION

- A. Contractor shall provide adequate access and a level pad for the crane and semis to sit side by side under their own power. Working radius shall be 35' from center pin on crane.
- B. Contractor shall pour a foundation suitable for building to sit on as shown in the contract drawings. Foundation shall be level to within $\frac{1}{4}$ ".
- C. Contractor shall rough in mechanicals according to mechanical rough in drawing provided by building manufacturer. Mechanicals shall be terminated at top of foundation. Final mechanical connections shall be done by contractor including floor drains.

END OF SECTION 13022

DIVISION 13 – SPECIAL CONSTRUCTION
Section 13542 – Mound System for
Wastewater Treatment

PART 1 GENERAL

1.01 DESCRIPTION

- A. The work covered by this section consists of furnishing all labor, materials, accessories, tools, equipment, transportation services, and performing all operations required to install the mound system for wastewater treatment as specified herein and as shown on the drawings.

1.02 RELATED SECTIONS

- A. Division 01 – General Requirements.
- B. Division 02 – Sitework.

1.03 PRESBY ENVIRONMENTAL STANDARDS

- A. All Advanced Enviro-Septic® (AES) systems must be designed and installed in compliance with the procedures and specifications described in the Indiana Design & Installation Manual, latest edition and in the product's Indiana approval.
- B. Indiana Rules, the reference manual is to be used in conjunction with Rule 410 IAC 6-8.3 for residential systems effective 5-9-14 and with Rule 410 IAC 6-10.1 for commercial systems effective 5-17-14.
- C. Conflicts between Indiana Rules & Manual, in the event of contradictions between this Manual and Indiana State Department of Health (ISDH) regulations, the ISDH and Presby Environmental, Inc. (800-437-5298) must be contacted for technical assistance.
- D. Exceptions to Presby Requirements, to resolve any conflicts with or exceptions to any requirements in the reference Manual, the ISDH and Presby Environmental, Inc. must be contacted.
- E. Technical Support, Presby Environmental, Inc. provides technical support to all individuals using our products. For questions about our products or the information contained in this Manual, or to register for a Certification Course, please contact us at 1-800-473-5298.

1.04 MANUFACTURER QUALIFICATION REQUIREMENTS

- A. At the Engineer's request, the equipment manufacturer shall certify to not less than five (5) years of experience in the application, design, manufacture and operating experience of the mound system.

1.05 CERTIFICATION REQUIREMENTS

- A. Any designers and installers who have not previously attended a Presby Environmental, Inc. "Certification Course" are required to obtain Presby Certification. Certification is obtained by attending a Certification Course presented by Presby Environmental, Inc. or its sanctioned representative. Certification can also be obtained by viewing tutorial videos on our website (high speed connection required) and then successfully passing a short assessment test, which is also

available over the internet. All professionals involved in the inspection, review or certification of AES Systems must also become Presby Certified.

1.06 SUBMITTAL REQUIREMENTS

- A. Submittals shall meet the requirements of Section 01330 – Submittal Procedures.
- B. Complete shop drawings including drawings of the mound system pipe layout, adapters, couplings, raised connection, observation port, vent, system sand limits and details of each component, including materials of construction shall be provided for the Engineer's approval.

1.07 QUALITY ASSURANCE

- A. The equipment manufacturer shall certify manufacturing mound system equipment used in wastewater treatment.
- B. Component Supply and Compatibility:
 - 1. Obtain all equipment included in this Section regardless of the component manufacturer from a single mound system manufacturer.
 - 2. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall equipment assembly by the mound system manufacturer.
- C. Mound system manufacturer scope of supply:
 - 1. The mound system equipment installation will include the AES Pipe, offset adaptors, couplings, raised connection, observation port, vent and system sand as required to provide a complete and operational mound system for wastewater treatment as specified herein and shown on the drawings.

1.08 WARRANTY

- A. The Contractor shall provide a warranty for all the mound system equipment system components included within this specification for a period of one (1) year from the date of substantial completion as defined in the Bidding and Contract requirements. During that one (1) year, the Contractor shall, at no expense to the Owner, replace any part or parts which malfunction due to defective manufacture or installation.

1.09 OPERATION AND MAINTENANCE MANUALS

- A. Contractor shall provide operation and maintenance manuals for the mound system as supplied by the manufacturer for the mound system.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Manufacturer shall deliver mound system to jobsite and protect equipment until installation.

1.11 RECORD DOCUMENTS

- A. Contractor shall provide record documents in accordance with Section 01780.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. The manufacturer named below was used as the design basis as specified herein and shown on the drawings.
1. Presby Environmental, Inc, Advanced Enviro-Septic® (AES) Wastewater Treatment System
 2. No exceptions allowed.

2.02 DESIGN REQUIREMENTS

- A. Provide a complete and functional mound system. The treatment system shall process sanitary sewage to primary treatment levels including removing gross solids, grit, sand, silts, sediment and floatable debris. The equipment shall require no outside power source and shall have no moving parts.
- B. The mound system shall meet the following design requirements:

Design Flowrate (GPD)	Row Length and No. of Rows, Bends	System Sand Extensions (SSE)
1,900	80 feet, 12 rows, 45-degree bend	Level bed, 17 feet each SSE

2.03 AES SYSTEM COMPONENTS

- A. Advanced Enviro-Septic Pipe
1. Plastic pipe made with a significant percentage of recycled material
 2. 10 ft. sections (can be cut to any length)
 3. Ridged and perforated, with skimmer tabs on interior
 4. Supplied with Bio-Accelerator along bottom of the pipe (the sewn seam indicates "this side up").
 5. Surrounded by a mat of randomly oriented plastic fibers
 6. Wrapped in a non-woven geo-textile fabric stitched in place
 7. Exterior diameter of 12 in.
 8. Each 10 ft. section has a liquid holding capacity of approx. 58 gallons
 9. A 10 ft. length of pipe is flexible enough to bend up to 90°
- B. Offset Adapter
1. An offset adapter is a plastic fitting 12 in. in diameter with a 4 in. hole designed to accept a 4 in. inlet pipe, raised connection or vent pipe. The hole is to be in the 12 o'clock position, 7 in. above bottom of the AES pipe. When assembling pipes into rows, note that the geo-textile fabrics are placed over the edges of the Offset Adapter and Couplings.
- C. Coupling
1. A coupling is a plastic fitting used to create a connection between two pieces of pipe. Note that the couplings are wide enough to cover 1 or 2 pipe corrugations on each of the two pipe ends being joined. The couplings feature a snap-lock feature that requires no tools. When assembling pipes into rows, note that the geo-textile fabric does not go under couplings. Pull fabric back, install coupling, and then pull fabric over coupling. Also note,

during installation in cold weather, couplings are easier to work with if stored in a heated location before use; such as a truck cab.

D. Raised Connection

1. A raised connection is a PVC Sewer & Drain pipe configuration which is used to connect pipe rows. Raised connections extend 2 in. to 4 in. into pipe and are installed on an angle. All PVC joints should be glued.

E. Venting

1. Venting is required for all AES systems.
2. Adequate air supply is essential to the proper functioning of the system.
3. Vent openings must be located to ensure the unobstructed flow of air through the entire system.
4. The low vent inlet must be a minimum of 1 ft. above final grade.
5. One 4 in. vent is required for every 1,000 feet of AES pipe.
6. single 6 in. vent may be installed in place of up to three 4 in. vents.
7. If a vent manifold is used, it must be the same diameter as the vent(s).
8. Vent Locations for Gravity Systems:
 - a. A low vent through an offset adapter is installed at the end of the last row of each section or the end of the last row in a Basic Serial bed. A vent manifold may be used to connect the ends of multiple sections or rows.
 - b. The building (roof) vent functions as the high vent as long as there are no restrictions or other vents between the low vent and the building (roof) vent.
 - c. There must be a minimum of a 10 ft. vertical differential between the low and high vent openings.

F. Observation Port

1. All beds require at least one 4 in. diameter perforated Observation Port wrapped with geo-textile fabric and installed at the bottom of the infiltrative surface (bed bottom). For level beds, the port is to be located at the outermost edge of the tall portion of the System Sand extension. The port must extend to final grade for easy access and have a threaded cap.

G. System Sand Requirements

1. It is critical to the proper functioning of the system that the proper amount and type of System Sand be installed. System Sand must be clean, granular sand, free of organic matter and must adhere to Indiana DOT 23 sand requirements. Material passing the #200 sieve must be verified by washing the sample. The terms System Sand and Indiana DOT 23 sand are used interchangeably. The Presby Spec-Check® is a device created to help determine the suitability of material for use as System Sand without the need for an expensive lab test. Go to www.PresbyEnvironmental.com for more details.
2. The height of an AES system measures 21-inches minimum for In-Ground Systems (not including cover material):
 - a. 6-inches minimum of System Sand below the AES pipe for In-Ground Systems;
 - b. 12-inches diameter of the AES pipe; and
 - c. 3-inches minimum of System Sand above the AES pipe.

3. The System Sand Extension (SSE) area (any part of the System Sand bed that is more than 1 ft. away from the AES pipes) is required to be a minimum of 6 in. deep. The SSE should not be confused with the "cover material extension," which refers to the material used to cover the field.
- H. Topsoil
1. Suitable earth cover, similar to the naturally occurring soil at the site and capable of sustaining plant growth, is required as the uppermost layer over the entire system (including cover material extensions, side slope extensions and System Sand extensions). The topsoil layer should be a minimum of 9 inches deep and should be immediately seeded or mulched to prevent erosion.

PART 3 EXECUTION

3.01 GENERAL

- A. Inspect and verify that surfaces on which equipment will be installed have no defects which will adversely affect installation.
- B. Inspect all equipment prior to installation and provide a written report stating the findings from the inspection.
- C. Promptly report defects, which may affect the Work to the Engineer.

3.02 INSTALLATION

- A. Installation shall be in strict accordance with contract documents and requirements of the manufacturer's written instructions and shop drawings. It is the Contractor's responsibility to verify the accuracy of all necessary dimensions in the field to ensure compatibility with the specifications and equipment.
- B. The Contractor shall be responsible for coordinating the required manufacturer's staff during system startup and commissioning.

3.03 MANUFACTURER'S SERVICE

- A. The Manufacturer's field engineer shall inspect and check the installation after installation and be on site for initial start-up of the equipment. In addition to the start-up time, the Manufacturer's process design engineer shall provide process training and operational assistance during the first 60 days of operation of the new wastewater treatment system. The total time for all serviced listed above shall not be less than 2 trips and 4 days at the site.

END OF SECTION 13542

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CAMPGROUND IMPROVEMENTS – BASE BID AND ALTERNATES
FERDINAND STATE FOREST/DEPARTMENT OF NATURAL RESOURCES

DIVISION 16 – ELECTRICAL

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DIVISION 16 – ELECTRICAL
Section 16060 – Grounding and Bonding for
Electrical Systems

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

- 1.02 Work under this item includes the electrical grounding and bonding of the service entrance gear, electrical distribution equipment, metallic raceways, metallic enclosures, utilization equipment and other appurtenances for the work or equipment to be furnished under this project. In general, all work shall meet or exceed that defined in article 250 of the national electrical code NEC/NFPA 70.

- 1.03 This specifications section neither replaces any NEC requirements, nor are any NEC requirements not specifically identified considered deleted from the scope of work. Items listed in this section are furnished to either augment or exceed those established by NEC.

1.04 SUMMARY

- A. Equipment grounding conductors
- B. Grounding Electrodes
- C. Grounding Electrode Conductors
- D. Bonding
- E. Related Sections
 - 1. Section 16100 – Common Work Results for Electrical
 - 2. Section 16280 – Surge Protective Devices for Low Voltage Power Circuits
- F. Reference to Standards
 - 1. Article 250; ANSI/NFPA 70 - National Electrical Code (NEC)
 - 2. NFPA 780 – Standard for the Installation of Lightning Protection Systems

1.05 SUBMITTALS

- A. Submit under provisions of Division 01.
 - 1. Ground rods
 - 2. Exothermic welding components

1.06 QUALIFICATIONS (RESERVED)

1.07 QUALITY ASSURANCE (RESERVED)

1.08 DELIVERY, STORAGE AND HANDLING

- A. Ground rods shall be tie-wrapped together and stored away from contact with the earth.
- B. Exothermic welds and hardware items shall not be shipped loose but shall be in boxes, labeled with material and equipment enclosed. Boxes shall be stored away from contact with earth and shall be protected from weather.

1.09 REGULATORY REQUIREMENTS (RESERVED)

1.10 COORDINATION

- A. Installation of all Grounding and Bonding shall be coordinated with other trades and Sub-Contractors. Special attention is required for installation of Concrete-Encased Electrodes within structural footings.

1.11 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.12 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MANUFACTURERS (RESERVED)

2.02 EQUIPMENT SPECIFICATION

- A. Ground rods shall be UL listed, single-piece, 3/4" diameter by 10' long copper-clad steel with minimum 10 mil copper cladding.

All buried connections of grounding and bonding components shall be via exothermic weld only. Clamp or compression grounding connections below grade will be rejected and replaced at Contractor's expense.
- B. Exothermic Welding Equipment Manufacturers
 - 1. Erico – Cadweld
 - 2. Continental Industries – Therm-O-Weld
 - 3. Hagar – Ultraweld
- C. Grounding conductors shall be 600 volt, same insulation type as used for phase conductors, green in color unless otherwise noted.
- D. Grounding electrode conductors in contact to earth shall be bare, stranded, annealed copper. Grounding Electrode Conductors shall be the larger of that detailed on the project drawings, specified herein or as required by NEC.

PART 3 EXECUTION

3.01 EXAMINATION (RESERVED)

3.02 PREPARATION (RESERVED)

3.03 INSTALLATION

- A. A continuous grounding system shall be provided throughout the facility. The Contractor shall furnish and install all grounding and bonding as required per NEC and all Local Codes, whether or not specifically shown on the project drawings.
- B. Except for separately derived systems, a single-point ground system is intended throughout the facility. So-called "Multi-point", "independent", "clean" or "separate" grounding systems that are not inter-bonded to the single-point facility system do not comply with NEC, are unsafe, and will be rejected.
 - 1. On occasion, supplemental driven ground rods may be required on the project drawings. All such supplemental ground rods are to be bonded to the equipment grounding conductor and are NOT intended to indicate any separation of, or isolation from, the facility grounding system.
- C. Equipment ground conductors (green insulated) shall be used solely for grounding and bonding purposes and be kept entirely separate from grounded neutral conductors (white insulation), except where bonded at the Service Entrance equipment.
 - 1. The system Neutral and Ground conductors shall be bonded together through the Main Bonding Jumper in the Service Entrance Equipment only.
 - 2. Unless otherwise directed on the project drawings, Grounding Electrode Conductors shall terminate on the Neutral Bus within the Service Entrance equipment.
 - 3. The Main Bonding Jumper within the Service Entrance equipment shall be accessible for visual inspection.
- D. Bond the system Neutral and Ground within Utility-owned KWH metering or Current-Transformer (C.T.) Cabinets ONLY if specifically required by the serving Utility. Otherwise, bond the system neutral and the ground in Service Entrance Equipment as described below.
- E. Service Entrance Equipment Grounding and Bonding
 - 1. Furnish grounding bushings on all metallic service conduits entering Service Entrance Equipment. Bond each bushing to Neutral bus in the Service Entrance Equipment as required by NEC Article 250.92 and 250.102C.
 - 2. The System (Main) Bonding Jumper shall be installed within the Service Entrance Equipment and shall connect the Neutral Bus to the Ground Bus.
 - a. The Main Bonding Jumper shall consist of either a U.L. Listed bonding link furnished by the Service Equipment manufacturer or a copper bonding conductor sized to requirements in NEC Article 250.28D.

- b. Do not re-bond Neutral and Ground downstream unless required by special conditions, such as those described in NEC Article 250.32.

F. Grounding Electrode System

1. As a minimum, the Grounding Electrodes shall comply with NEC Articles 250.52 and 250.53. Where present at each new building or structure, all available Grounding Electrodes defined in NEC Article 250.52A1 thru A4 shall be interconnected to form the Grounding Electrode System.
2. Per NEC Article 250.68A, the Grounding Electrode System shall be installed in such a manner that each connection point may be visually inspected, unless encased by concrete or earth.
3. Per NEC Article 250.64, Grounding Electrode Conductors shall be installed without splice between Service Entrance Equipment Neutral bar and Grounding Electrodes. Where required due to distance or construction, splicing shall be permitted by means of exothermic welding only. Irreversible "H" and "C" type compression connectors shall NOT be utilized for Grounding Electrode Conductors.
 - a. Where exposed or visible, all Grounding Electrode Conductors (regardless of size) shall be protected from physical damage using non-metallic conduit, such as Schedule 40 PVC. Extend protective conduit as close as practical to the Grounding Electrode. Any metallic conduits installed by the Contractor for grounding electrodes must be bonded at both ends per NEC Article 250.64E.
 - b. Where a copper Grounding Electrode System Bus-Bar is indicated on the project drawings, it shall be sized as noted but no less than ¼" T x 2" W x 24" L. Size of the single copper Grounding Electrode Conductor between the Service Entrance Neutral Bus and the Grounding Electrode System Bus-Bar shall be the larger of that shown in NEC Table T250.66 or as noted on the project drawings. Connection of Grounding Electrode Conductors to a Grounding Electrode System Bus-Bar shall be through the use of listed compression-type lugs bolted to the Bus-Bar.
4. Grounding Electrode Conductors shall be individually installed from the Service Entrance Neutral Bus (or Grounding Electrode System Bus-Bar) to the respective Grounding Electrode. "Looping" of Grounding Electrode conductors (extending a suitably-sized single grounding electrode conductor from electrode-to-electrode) shall NOT be utilized without written approval from the Engineer.
5. Connection of Grounding Electrode Conductors to individual Grounding Electrodes shall comply with NEC Article 250.70.
 - a. Connection at all Grounding Electrodes shall be by use of exothermic welding. Clamp or compression connection connections shall NOT be utilized without written approval from the Engineer.
 - b. Below-grade ground rod and associated ground wire shall be clean and dry before performing the exothermic weld. Verify that the proper size and type of exothermic weld kit is used before beginning work
 - c. Exothermic welds shall be left exposed for inspection and approval before backfilling or otherwise concealing. Any unacceptable exothermic welds shall be redone, including any necessary

replacement material (ground rods, ground wires, etc.) as needed to provide an accepted exothermic weld.

6. Non-Metallic conduits containing grounding electrode conductors shall not be supported with metal clamps that completely encircle the conduit. Use nylon nuts, bolts, straps and/or reinforced fiberglass or premium grade plastic resin strut support with non-metallic hardware as manufactured by Aickinstrut, or equivalent.
7. All of the following shall be interconnected, where available:
 - a. Bond metallic underground water piping in direct contact with earth for no less than 10 feet per NEC Article 250.52A1. Size of the copper bonding jumper shall be the larger of that shown in NEC Table T250.66, or as noted on the project drawings. Installation shall comply with NEC Article 250.53. Connection shall be made at a point less than 5 feet from where the metallic water piping enters the facility. Furnish bonding around removable equipment (water meters, etc.) per NEC Article 250.68B.
 - i. Note that NEC Article 250.53D2 requires a Supplemental Grounding Electrode when a metallic underground water pipe is the sole Grounding Electrode. The Supplemental Grounding Electrode shall be one of those described in NEC Articles 250.52A2 through 250.52A7. See also paragraph 16060-3.03F8 below.
 - b. Metal frames of building or structure shall be bonded per NEC Article 250.52A2. Size of the copper bonding jumper shall be the larger of that shown in NEC Table T250.66, or as noted on the project drawings. Installation shall comply with NEC Article 250.53.
 - c. Furnish concrete-encased electrodes (commonly called "Ufer" ground) per NEC Article 250.52A3 and install per NEC Article 250.53.
 - i. The size of the copper conductor which is the sole connection to the concrete-encased electrode shall be the larger of that shown on the project drawings or #4 AWG.
 - ii. The Concrete-Encased Electrode (CEE) shall be no less than #4 rebar ($\frac{1}{2}$ " diameter) with a minimum length of 20 feet long placed in bottom of concrete footing encased by no less than 2" of concrete in direct contact with earth.
 - iii. Within the concrete encasement, connect the grounding electrode conductor to the re-bar by means of exothermic weld, Cadweld, or equivalent. Compression connections will not be accepted as an alternate termination method of connection within the concrete envelope.
 - iv. The Contractor shall provide all necessary coordination between the Sub-Contractors and trades for the implementation of this item before concrete is placed.
 - v. Do not use Insulated (plastic or epoxy coated) re-bar for concrete-encased electrodes. If the structural construction requires insulated or plastic-coated re-bar, add a minimum of 20 feet bare, non-coated re-bar to create the Grounding Electrode.

- vi. For installations that may structurally utilize re-bar smaller than #4, tie-wrap a minimum of 20' length of no smaller than #4 AWG bare copper Grounding Electrode to the re-bar in the bottom of the footing prior to installation of concrete.
 - d. Furnish a Grounding Electrode Ground-Ring only where specifically noted on the project drawings. Ground-Ring shall comply with NEC Article 250.52A4 requirements and be installed per NEC Article 250.53. Where utilized, all Ground-Rings must encircle the entire facility (form a closed-loop). Size of the copper Grounding Electrode Conductor which is the sole connection to the ground-loop shall be the larger of that shown on the project drawings or #2 AWG.
- 8. On projects where the only Grounding Electrode listed in NEC Article 250.52A through 250.52D is a metallic underground water pipe, it must be supplemented by another grounding electrode per NEC Article 250.53D2. Unless directed otherwise, the supplemental grounding electrode shall be a driven ground field.
 - a. Ground field shall consist of a triangle 10 feet on each side, with a driven ground rod at each vertex of the triangle. Size of the copper Grounding Electrode Conductor, and the bonding jumpers between all ground rods, shall be the larger of that shown on the project drawings or #6 AWG.
 - b. If required due to space constraints, furnish two (2) ground rods a minimum of 10 feet apart. Deviations from the triangular-shaped ground field shall require written approval by the Engineer prior to installation.
- G. All metallic raceways, boxes, enclosures, etc. shall include an insulated equipment ground conductor. Due to corrosion, metallic raceway and conduit connectors alone WILL NOT be considered as meeting this requirement. The Equipment Grounding Conductor shall positively bond all electrical components and utilization equipment to the facility ground system.
- H. All metallic boxes used for electrical equipment shall include listed grounding screws or lugs. No more than one grounding conductor shall be installed per lug location unless lug is listed for multiple conductors.
- I. The largest factory-scored concentric conduit knockouts shall be used to provide conduit bonding to NEMA 1 & 3R enclosures.
 - 1. If required, provide a conduit reducing hub for the specific conduit size terminated.
- J. Equipment Grounding Conductors shall be sizes as shown in NEC T250.122, but no less than #12 AWG.
- K. Isolated, exposed metal conduit segments (e.g. within manhole or handhole) shall be bonded with a bare copper conductor sized from NEC T250.122. Bonding jumper size shall be based upon the largest ampacity circuit contained within.
- L. Bonding of metallic components of manhole and handhole frames and lids as well as all exposed metal conduit sections of underground duct bank is covered under Specifications 16110 - Underground Electrical Construction.

- M. All other exposed metal piping (e.g. air, fire-protection, natural gas, metallic process piping etc.) and exposed structural steel not used as a Grounding Electrode shall be bonded to the Grounding Electrode System per NEC Article 250.104. Size of the copper bonding jumper shall be no smaller than that shown in NEC Table T250.66.

3.04 INTERFACE WITH OTHER SYSTEMS

(Where used on the project)

- A. Interface with Surge Protective Devices installed under section 16280.
- B. Lightning Protection Systems shall be bonded per NEC Article 250.106. All Lightning Protection Systems shall be bonded to facility Grounding Electrode system on facility exterior. Isolated grounding for Lightning Protection Systems will not be allowed.

3.05 MANUFACTURER'S FIELD SERVICES (RESERVED)

3.06 TESTING

- A. As described in Specifications Section 16080.
- B. All grounded metal cases and parts associated with electrical equipment shall be tested for continuity with ground system.
- C. If requested, testing shall be performed in the presence of the Owner's representative.
- D. Provide a copy of all testing reports to Engineer for record purposes.

END OF SECTION 16060

DIVISION 16 – ELECTRICAL
Section 16070 – Hangers and Supports for
Electrical Systems

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Strut-type framing for conduit and equipment supports
- B. Cable Rack saddle-type supports
- C. Anchors and Fasteners
- D. Related Sections
 - 1. Section 16100 – Common Work Results for Electrical
- E. Reference to Standards
 - 1. ANSI/NFPA 70 - National Electrical Code.
 - 2. NECA - National Electrical Contractors Association.
 - 3. ASTM No. A570 G33
 - 4. ASTM No. A-123
 - 5. ASTM No. A-525
 - 6. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.03 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Product Data: Provide manufacturer's catalog data for fastening systems and supports.
- C. Manufacturer's instructions: Include application conditions and limitations for use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination and installation of Product.

1.04 QUALIFICATIONS (RESERVED)

1.05 QUALITY ASSURANCE (RESERVED)

1.06 DELIVERY, STORAGE AND HANDLING

- A. Stored conduit and equipment supports shall not be in contact with earth, but shall be on pallets or other above-grade supports. Conduit and equipment supports shall be covered to minimize exposure to weather.

- B. Anchors and fasteners shall be stored in their original containers in a clean, dry place. They shall not be exposed to weather.

1.07 COORDINATION (RESERVED)

1.08 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.09 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MOUNTING STRUT

- A. Where utilized, strut-type metal framing shall be provided to mount and support electrical equipment and enclosures as indicated on the drawings.
- B. Strut-type supports shall be either aluminum or stainless-steel construction. Unless specifically identified for use on the drawings, painted or factory coated steel, galvanized steel or non-metallic strut are not acceptable alternates to this requirement. Use stainless steel on all project locations where strut is in direct physical contact with earth.
- C. Unless specifically noted to be Type 316 Stainless Steel only, Stainless Steel strut-type metal framing may be Type 304 or Type 316 Stainless Steel.
- D. Aluminum strut-type metal framing shall be Type 6063-T6 Aluminum.
- E. All mounting hardware shall be stainless steel.
- F. Manufacturers:
 - 1. Unistrut: P-1000 EA (Aluminum), P-1000 SS (Stainless Steel)
 - 2. B-Line: B22AL (Aluminum), B24SS (Stainless Steel)
 - 3. Equivalent meeting specifications

2.02 CABLE RACKS

- A. Cable racks within manholes, handholes and vaults shall be non-metallic saddle type construction as manufactured by Underground Devices, Inc.; Northbrook, IL, or equivalent. All mounting hardware shall be stainless steel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine all supports and fasteners for straightness, rust and corrosion. Do not use any equipment that is not straight or is rusted or corroded.

3.02 PREPARATION

- A. All equipment shall be clean at time of installation. Remove all burs.

3.03 INSTALLATION

- A. Install products in conformance with manufacturer's instructions and as detailed in drawings.
- B. Provide anchors, fasteners and supports in accordance with NECA Standard of Installation. Do not use spring steel clips or clamps except as noted in Section 16070-3.03H.
- C. Do not fasten supports to pipes (except where detailed on drawings), ducts, mechanical equipment (except where detailed on drawings), or conduit.
- D. Install surface mounted cabinets, enclosures and panelboards with a minimum of four anchors.
- E. Provide materials, sizes and types of anchors, fasteners, and supports necessary to carry loads of equipment and conduits. Consider weights of equipment and conduit when selecting products.
- F. Provide all necessary hardware, such as floor flanges, in order to install equipment as specified or as shown on the drawings.
- G. Include knee-braces and stiffeners as necessary to provide rigid support such that equipment does not bounce or sway.
- H. Use spring-lock washers under all nuts.

3.04 INTERFACE WITH OTHER PRODUCTS (RESERVED)

3.05 MANUFACTURER'S FIELD SERVICES (RESERVED)

END OF SECTION 16070

DIVISION 16 – ELECTRICAL
Section 16075 – Identification
for Electrical Systems

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This section includes field-installed nameplates, labeling and identification methods for electrical equipment, components and wiring.
- B. Related Sections
 - 1. Section 16100 – Common Work Results for Electrical
- C. Reference to Standards
 - 1. ANSI/NFPA 70 - National Electrical Code

1.03 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Product Data: Provide catalog data for nameplates, labels and markers.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.
- D. During course of construction, Contractor shall submit Wiring Identification Tables, listing wire marker identification schedules of all proposed wiring and terminations.

1.04 QUALIFICATIONS (RESERVED)

1.05 QUALITY ASSURANCE (RESERVED)

1.06 DELIVERY, STORAGE AND HANDLING

1.07 COORDINATION (RESERVED)

1.08 MAINTENANCE SERVICE (WARRANTY) (RESERVED)

1.09 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MANUFACTURERS (RESERVED)

2.02 EQUIPMENT SPECIFICATION

- A. Nameplates and legend plates shall be engraved three-layer laminated plastic, black letters on white background. Legends (wording) shall be as detailed on drawings or as directed by Owner's representative.
- B. Arc Flash labels shall be polyester type that are waterproof.
- C. All wire markers installed on electrical equipment above grade shall be weatherproof and water resistant. Wire identification labeling, whether factory applied or written in the field, shall utilize an adhesive that does not soften or weaken over time. Sleeve or tubing type labels may be utilized as an alternate. Paper adhesive-backed wire markers will be rejected and replaced at the Contractor's expense. Wire marker labels shall be as manufactured by Brady, or equivalent.
- D. All wire markers installed below grade in manholes, handholes or vaults shall be waterproof. Markers shall be non-corroding plastic clip-on sleeve type construction. Markers shall be permanently factory-printed such that label identification will not deteriorate due to time or contact with water. Wire markers used below grade shall be Brady Clip-Sleeve, or equivalent.
- E. Provide and install Safety Stripe Tapes on finished floors around electrical gear noting clearances required per NEC Article 110.26. Tape shall be minimum 2" in width with alternating black/yellow striping. Tape shall be Scotch/3M #5702 or equivalent.

PART 3 EXECUTION

3.01 EXAMINATION (RESERVED)

3.02 PREPARATION

- A. Degrease and clean surfaces to receive nameplates, legend plates and markers.

3.03 INSTALLATION

- A. Secure nameplates and legend plates to equipment using screws or adhesive.
- B. Nameplates or legend plates shall be provided for all disconnects, enclosed starters, control panels, transformers, level meters, flow meters and recorders.
- C. Per NEC 110.16: Arc Flash warning labels shall be included for all electrical equipment, such as switchboards, switchgear, panelboards, industrial control panels, meter socket enclosures and motor control centers, that are likely to require examination, adjustment, servicing, or maintenance while energized. Labels shall be field or factory marked to warn qualified persons of potential electric arc flash hazards. Label shall be permanently affixed, able to withstand the environment involved and shall not be hand written.

- D. Per NEC 408.4 (B) All switchboards, switchgear and panelboards supplied by a feeder shall be permanently marked to indicate which device or equipment where the power originates. Label shall be self-adhesive, polyester type waterproof and shall not be handwritten.
- E. Wiring Device identification labels shall be furnished and installed on all wiring device cover plates per Specifications Sections 16140-3.01O and 16140-3.01P.
- F. Contractor shall develop the Wiring Identification Tables to be used for ALL wiring terminations on this project, and shall submit Tables for review and comment by Owner's Representative prior to installation of any conductors or cables.
- G. Provide wire markers for ALL wires and terminations. By "all", this is intended to include, but not be limited to, all terminations at distribution panelboards, motors, valves, heaters, fan coils, heat pumps, fans, dampers, all MCC terminations, instrumentation & controls, terminal blocks and strips, etc. Wire identification shall be unique to wire that is marked or to terminal that wire lands upon. Identification of a run of wire from termination to termination shall be same throughout run.
- H. Provide wire markers in all manholes, handholes and vaults.
- I. Include markers labeled "SP" on all spare conductors.

3.04 INTERFACE WITH OTHER PRODUCTS (RESERVED)

3.05 MANUFACTURER'S FIELD SERVICES (RESERVED)

3.06 AS-BUILT WIRING IDENTIFICATION TABLE

- A. Upon completion of project, Contractor shall provide five copies of as-built Wiring Identification Table. This table shall list all circuits installed as part of this work and shall give identification of all wires and terminations as installed and marked.

Table shall include routing of all conductors installed in the project from end-to-end including each conduit, manhole, handhole and vault through which each conductor passes. Include and identify all spare conductors.

END OF SECTION 16075

DIVISION 16 – ELECTRICAL
Section 16080 – Testing Electrical Systems

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions on Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.
- B. Contractor shall note that this section shall be considered a Supplement to testing requirements outlined or described in other sections of these specifications.

1.02 WORK INCLUDES

- A. Extent of Work as required by the Drawings and these Specifications

1.03 RELATED WORK

- A. Specified elsewhere:
 - 1. Section 16060 - Grounding and Bonding for Electrical Systems
 - 2. Section 16100 – Common Work Results for Electrical
 - 3. Section 16120 – Low Voltage Conductors and Cables
 - 4. Section 16160 – Electrical Cabinets and Enclosures
 - 5. Section 16410 – Enclosed Switches and Circuit Breakers

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements
 - 1. Governing Codes:
 - a. NFPA 70 – National Electrical Code (most current issue)

1.05 SUBMITTALS

- A. Submit under provisions of Division 1.
 - 1. Test Reports:
 - a. Test of entire electrical system as noted herein. Submit to the Engineer in triplicate.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Furnish all equipment, tools, manpower, and labor to perform specified testing.

PART 3 EXECUTION

3.01 TESTING

- A. After wires and cables are in place and connected to devices and equipment, the system shall be tested for short circuits, improper grounds, and other faults. When fault condition is present, the trouble shall be rectified, then re-tested. Where cable is found defective or damaged, it shall be removed and replaced in entirety; do not field repair. Cost for correction shall be considered incidental to the project.
- B. All wiring devices and electrical apparatus furnished under this contract, when ground or shorted on any integral "live" part, shall be removed and the trouble rectified by replacing all defective parts and materials. Cost of correction is considered incidental to the project.
- C. All feeder cables and other power distribution apparatus shall have a Megger resistance test conducted to determine that insulation resistance is not less than that recommended by the manufacturer, or as noted below.

Unless otherwise recommended by the manufacturer, insulation resistance testing shall meet or exceed the following on 600 Volt equipment utilizing 500 Volt resistance test instrument:

Conductors.....	50 Meg-Ohms
Motors.....	5 Meg-Ohms
Switchboards, MCC's and Panelboards	25 Meg-Ohms
Power Transformers	5 Meg-Ohms

- D. Contractor shall furnish all tests and shall provide all test equipment, meters, instruments, cable connections or apparatus necessary for performing tests as specified herein. All costs for testing shall be considered incidental to this item and will not be paid for separately.
- E. Examine connections to equipment for proper phase relationships. Rotate phase conductors as necessary in order to correct.
- F. Testing of Ground System
 - 1. Each and all grounded cases and metal parts associated with electrical equipment shall be tested for continuity of connection with the ground bus system by the Contractor in the presence of the Engineer or his representative.
 - 2. All grounding electrode conductors brought in from the ground field shall be tested for satisfactory continuity and by resistance measurement between the electrical equipment ground bus and the ground field. The grounding path shall not exceed 0.010 ohms.
 - 3. Each Ground Field shall be tested for resistance to earth a "three-terminal" or "fall-of-potential" test as described in IEEE Standard #81. As an alternate, a specially designed clamp-on instrument such as AEMC Model 3710 (now superseded by Model 6416) or 3730 (now superseded by Model 6417) may be used if found acceptable to the engineer. Based upon measured field data, the Contractor shall calculate the ground field

resistance and furnish record copies to the Engineer and Owner for record. In no case shall the ground field resistance exceed 25 ohms. If the resistance is found to be higher than 25 ohms, one additional rod shall be driven with a minimum separation equal to the length of the ground rod used and connected in parallel with the rod under test.

4. Exterior ground field resistance testing shall not be measured during unusually wet weather and should be performed during normal weather and soil conditions. Any tests incorrectly performed or not performed to the satisfaction of the engineer will be repeated. Costs for all such re-testing shall be considered incidental to the project.
5. All specified maximums and minimums of this specifications must be met. Complete test records of all tests shall be made and shall show resistance values obtained and calculations of same, showing method of test and calculation.

3.02 CORRECTION OF DEFECTS

- A. When tests disclose any unsatisfactory workmanship or equipment furnished under this contract, correct defects and retest. Repeat tests until satisfactory results are obtained.
- B. When any wiring or equipment is damaged by tests, repair or replace such wiring or equipment. Test repaired items to ensure satisfactory operation.

END OF SECTION 16080

DIVISION 16 – ELECTRICAL
Section 16100 – Common Work Results for
Electrical

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is general in nature and applicable to electrical system work. Contractor is also directed to other sections of Division 16 - Electrical for additional related specifications for items described in this section.
- B. Work included in this section shall apply to installation and testing of all materials and equipment necessary to completely install electrical system as shown on drawings and as described herein in these specifications, or as may be necessary for a complete and operational electrical system.
- C. Unless otherwise noted, all electrical equipment shown on project drawings shall be furnished under Division 16.
- D. Drawings pertaining to this installation indicate general location of conduits, wiring, distribution and motor control centers, lighting and outlets, and other details necessary for installation of system.
- E. Electrical installation as shown on drawings and as specified herein is based upon best available information, with regard to characteristics of mechanical equipment specified. In the event changes are necessary in order to accommodate mechanical equipment furnished, necessary revisions will be made with approval of Owner's representative.
- F. Any minor changes in location of equipment, to include conduits, outlets, etc., from those shown on drawings, shall be made without extra charge if so directed by Owner's representative. These changes shall be any changes in location that, had new location been the bid-upon location, would not have resulted in an increase in contract construction cost over that actually bid.
- G. All electrical equipment shall be installed in conformance with applicable sections of NPFA 70 - National Electrical Code, respective equipment manufacturer's directions, as detailed on drawings and as specified herein. Any installations which void U.L. listing (or other third-party listing) and/or manufacturer's warranty of a device or equipment shall NOT be permitted.
- H. RELATED CONTRACT WORK DESCRIBED ELSEWHERE IN THESE SPECIFICATIONS:

Electrical Contractor shall note that it is not the intent of these Division 16 specifications herein to be all-inclusive of electrically related work to be performed as part of this contract.

Contractor shall also comply with electrical requirements in these sections of the specifications, including, but not limited to, wiring of motors, control panels furnished by others, HVAC equipment and all other electrically powered equipment furnished by others under this project.

1.02 LAWS AND ORDINANCES

- A. In installation of this work, Contractor shall comply in every respect with requirements of National Electrical Code (NEC), National Board of Fire Underwriters, and any state and local requirements, laws and ordinances as may be applicable.
- B. If, in opinion of the Contractor, there is anything in drawings or specifications that will not strictly comply with above laws, ordinances and rules, the matter shall be referred to the attention of the Owner's representative for a decision before proceeding with that part of the work. No changes on drawings or in specifications shall be made without the full consent of Owner's representative.
- C. Contractor shall obtain and pay for all licenses, permits and inspections required by above laws, ordinances and rules for entire electric wiring job called for in these specifications and accompanying drawings.

1.03 DRAWINGS

- A. Drawings for electrical work will be a part of electrical drawings to which will be added, during the period of construction, any other detail drawings as may be necessary in opinion of Owner's representative, to show proper installation of various appliances or equipment with relation to project.
- B. Drawings and specifications are intended to be descriptive only, and any error or omissions of detail in either shall not relieve Contractor from obligations thereunder to install in correct detail any and all materials necessary for complete and operating electrical systems to extent shown on drawings and described in this specification.
- C. Contractor shall, during progress of job, record any and all changes or deviations from original drawings, and, at completion of project, shall deliver to Owner's representative a single marked-up set of "as-built" drawings.

1.04 SHOP AND ERECTION DRAWINGS

- A. This Contractor shall prepare shop drawings for all parts of his work. Before commencing any work or providing any material, Contractor shall submit for approval of Owner's representative all drawings relating to construction, arrangement or disposition of equipment entering into contract, and show complete equipment with manufacturer's specifications of same.
- B. Shop drawings of all distribution and motor control centers, panels, power and lighting systems, fixtures, wire, cables, devices, etc. shall be submitted for approval, as well as complete details of all systems not shown in detail on drawings.
- C. Shop drawings shall be fully descriptive of all materials and equipment to be incorporated into this project. Contractor shall carefully check all submitted shop drawings, making sure they are complete in all details and cover specific items as hereinafter specified.
- D. Shop drawings shall be submitted in sufficient quantity as required by the General Conditions.
- E. No material or equipment shall be allowed at the site until shop drawings approved by the Engineer are received by the Resident Engineer at the site.

- F. The following information shall be clearly marked on each shop drawing, catalog cut, pamphlet, specifications sheet, etc. submitted:

PROJECT TITLE:

BRANCH OF WORK: ELECTRICAL

NAME OF BUILDING OR LOCATION:

PAGE OF DRAWINGS OR SPECS WITH WHICH EQUIPMENT COMPLIES:

DATE:

SUBMITTED BY:

PART 2 PRODUCTS

2.01 PRODUCTS SHALL BE AS SPECIFIED IN OTHER SECTION AND AS DETAILED ON THE DRAWINGS

PART 3 EXECUTION

3.01 EQUIPMENT STORAGE

- A. Except as indicated below, all electrical equipment considered to be a part of this contract shall be stored before installation in a warm, dry, indoor area so as to protect the equipment from physical damage, freezing, dirt and any other harmful effects.
- B. The following electrical equipment shall be permitted to be stored outdoors on pallets or without direct contact with the earth, under tarpaulins or plastic covers:
1. Conduit. Does not include boxed fittings, etc., which shall be stored indoors.
 2. Cable Tray. Does not include boxed hardware, which shall be stored indoors.
 3. Ground Rods.
 4. Wire and Cable.
 5. Rebar.
 6. Strut-type framing members. Does not include boxed hardware, which shall be stored indoors.
 7. Exterior pad mount transformers.
 8. Exterior Pad-Mounted Med. Voltage Switchgear.
 9. Other electrical equipment not listed herein, with written approval of the Owner's Authorized Representative.
- C. The following electrical equipment shall be permitted to be stored exposed outdoors on pallets or without direct contact with the earth:
1. Light Poles. Does not include light fixtures or boxed hardware, which shall be stored indoors.
 2. Other electrical equipment not listed herein, with written approval of the Owner's Authorized Representative.
- D. The installation of electrical equipment shall not begin until the structure, if required, within which the equipment is to be permanently housed, is complete

enough to provide protection from weather and vandalism (i.e. roof, windows and temporary padlockable or permanent doors installed).

- E. The Contractor will be responsible for ensuring conformance with these procedures.

3.02 EQUIPMENT MOUNTING

- A. All equipment and materials shall be installed and completed in a first-class workmanlike manner. The right is reserved to direct the removal and replacement of any item, which in the opinion of the Owner's Representative and/or Architect/Engineer does not present an orderly and reasonably neat or workmanlike appearance, provided such items can be properly installed in an orderly way by usual methods in such work.
- B. The approximate location of all equipment and devices is shown on the Drawings. The Owner's Representative and/or Architect/Engineer reserves the right to change the location of all equipment or devices 6 ft in any direction at no additional cost provided such changes are requested before final installation.
- C. Install all equipment with ample space allowed for removal and repair. Provide ready accessibility to removable parts of equipment and to all wiring without moving equipment which is installed or which is already in place. Provide access panels for all devices installed above non-accessible ceilings and/or within walls or partitions.
- D. Install electrical equipment with due consideration to ventilating ducts, HVAC equipment, mechanical piping, etc., adjusting locations as necessary.
- E. Electrical equipment shall be installed to maintain minimum clearances per Article 110 of NEC and ANSI C2 (National Electrical Safety Code.)
- F. Electrical Contractor shall be responsible for furnishing and setting all anchor bolts required to install Electrical Contractor's equipment.
- G. Where concrete mounting pads are required for electrical equipment mounting, Electrical Contractor shall furnish all concrete and form work necessary to complete the installation.
- H. Where electrical equipment is located on damp or wet walls or locations as directed, it shall be "stand-off" mounted a minimum of 1/2" from wall in a manner so that rear of equipment is freely exposed to surrounding air. Method of mounting shall be approved by Owner's representative before equipment is mounted.
- I. Unless otherwise noted, top of safety-switches, control panels, and similar equipment shall be 5'-0" above finish floor or finish grade.
- J. Enclosures for panelboards, switches or overcurrent devices shall not be used as junction boxes, auxiliary gutters or raceways for conductors feeding through or tapping-off to other switches or overcurrent devices, unless adequate space for this purpose is provided and the equipment is listed for this use.
- K. In order to maintain NEC ratings and classifications of cables, do not combine conduit contents or modify conduit materials of construction unless specifically directed or shown otherwise on project documents.

- L. Per NEC 300.11(A)(2), when independent electrical equipment support wires are installed within dropped-ceiling areas, they shall be distinguished by color, tagging, or other permanent effective means.

3.03 COORDINATION

- A. Provide day-to-day coordination with the work of other contractors engaged in this project. Execute the work in a manner not to interfere with other Contractors, and vice-versa.
- B. Coordinate with other contractors regarding the location and size of pipes, raceways, ducts, openings, devices, so that there may be no interferences between installation or of the progress of any contractor.
- C. Coordinate installation of equipment and wiring with the established construction schedule.
- D. Provide temporary platforms and handrails as required, to allow installation of electrical components and raceway systems.

3.04 PROTECTION OF WORK

- A. Protect work from injury by keeping all conduit and boxes capped and plugged or otherwise protected. This includes damage by freezing and/or stoppage from building materials, sand, dirt, or concrete.
- B. Protect all equipment and fixtures from damages during the project, provide all tarpaulins, drop cloths, barricades, temporary heaters or auxiliary equipment.
- C. All materials or equipment damaged during construction shall be repaired or replaced with new items to the satisfaction of the Architect/Engineer.

END OF SECTION 16100

DIVISION 16 – ELECTRICAL
Section 16110 - Underground Electrical
Construction

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Work included in this section is handholes, trenching and backfilling required for operation and maintenance of facility.
- B. This Specifications Section includes all exterior direct-buried conduit.
- C. Related Sections
 - 1. Section 16100 – Common Work Results for Electrical
 - 2. Section 16120 – Low-Voltage Conductors and Cables
 - 3. Section 16130 – Raceway and Boxes for Electrical Systems
- D. Reference to Standards
 - 1. Federal Specifications WW-C-581d
 - 2. ANSI C80.1
 - 3. ANSI/SCTE 77
 - 4. UL Standard #6
 - 5. NEMA RN1-1980
 - 6. NEC (Chapter 9 Tables 4, 5, 5A, 8 and Appendix C)
 - 7. NEMA TC-2
 - 8. NEMA TC-3
 - 9. UL-651
 - 10. A.A.S.H.T.O.
 - 11. ASTM A615

1.03 SUBMITTALS

- A. Submit under provisions of Division 01.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Reinforcing steel and conduit supports shall be stored on pallets, covered to protect them from weather.

1.05 MAINTENANCE SERVICE (WARRANTY)

- A. Material and workmanship shall be warranted to be free from defects in materials and workmanship for a period of one year from date of substantial completion established by Owner.

PART 2 PRODUCTS

2.01 POLYMER CONCRETE HANDHOLES (WHERE INDICATED ON THE DRAWINGS)

- A. Handholes shall be constructed of polymer concrete consisting of sand and aggregate bound together with a polymer resin. Internal reinforcement may be provided by means of steel, fiberglass, or a combination of the two.
- B. The use of chopped fiberglass strands, high density polyethylene or high density polystyrene is unacceptable. Plastic and/or fiberglass boxes will not be considered as acceptable alternates for polymer concrete handholes.
- C. Boxes and covers shall be concrete gray in color. All boxes and covers 30"W x 48"L and less shall be U.L. Listed and meet or exceed TIER 22 loading requirements of ANSI/SCTE 77-2007. U.L. Certification labels shall be attached to both box and lid. Shop Drawing submittals shall clearly note that the loading and U.L. listing requirements are met by the proposed equipment.
- D. All metal hardware shall be stainless steel.
- E. Logo "ELECTRIC" (Code #17) shall be factory molded into cover at time of production
- F. Handhole covers, and frames shall meet equivalent handhole requirements of NEC Article 314.30(D) including the bonding of all exposed metal components.
- G. All covers will have a minimum coefficient of friction of 0.5 in accordance with ASTM C1028 and be labeled to indicate the corresponding Tier level rating.
- H. Polymer concrete handholes shall open-bottom design and shall be Quazite/Hubbell #PG-xyyy-BA-zz with #PG-xyyy-HH-00-17 Cover, or equivalent where "xx" = width in inches, "yy" = length in inches, and "zz" = depth in inches. Handholes shall be 24"W x 36"L x 42" deep unless otherwise noted on project drawings.
- I. Where divided boxes are noted on project drawings or where physical cable isolation is required between compartments, furnish units similar to Quazite/Hubbell Model #PG-xyyy-BC-zz.
- J. Cable racks shall be provided per Section 16070 – Hangers and Supports for Electrical Systems.
- K. Furnish 6" thick minimum base of CA-6 below all handholes extending 6" beyond each exterior sidewall.

2.02 LINE MARKING TAPE

(To be provided only if specifically indicated on drawings)

- A. Electrical line marking tape shall be installed only if specifically noted on project drawings. Tape shall be minimum 5 mils thick constructed of aluminum foil encased in an impervious Mylar plastic coating. The minimum tensile strength determined in accordance with ASTM D882 is 15,000 PSI. The tape shall contain sufficient metal mass to provide detectability at depths up to 3 feet with a radio type metal locator. Tape shall be acid, alkali and corrosion resistant. Color shall be "RED", corresponding to the standard color for electrical lines, and shall additionally be printed with "WARNING-ELECTRICAL LINE BELOW" or similar text. Line marking tape shall be as manufactured by Pro-Line Safety Products of

West Chicago, Illinois or equivalent. Unless otherwise indicated on the drawings, burial depth of tape shall be approximately 18" below finish grade.

PART 3 EXECUTION

3.01 SEPARATION OF CABLES IN HANDHOLES (WHERE INSTALLED)

- A. Contractor shall maintain maximum separation possible of telephone cables and 4-20 mdc signal cables from 120V, 208V and 480V wiring in handholes to minimize electromagnetic affects from this wiring.

3.02 WIRE AND CABLE INSTALLATION

- A. All wire and cable passing thru manholes, handholes or vaults shall be supported on non-metallic racks or supports. No wire or cable will be permitted to lie directly on the floor of manholes, handholes or vaults.
- B. Install and support all cables passing thru manholes and handholes such that sump-pump depression in floor is not obstructed. Train and tie all cables to racks such that a portable sump pump may be dropped into sump depression without entering manholes and handholes.

END OF SECTION 16110

DIVISION 16 – ELECTRICAL
Section 16120 – Low-Voltage Electrical
Power Conductors and Cables

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Work included in this section is supply of wire and cable to provide a complete and operational electrical system.
- B. Any bid submitted to the Owner which contains cost adjustments for the current price of metals (copper and/or aluminum) will be rejected. Qualified bids in any form will not be considered.
- C. Unless otherwise specified or detailed on drawings, all wire and cable on this project shall be copper construction only.
- D. Related Sections
 - 1. Division 11 – Equipment
 - 2. Division 13 – Special Construction
 - 3. Division 15 – Mechanical
 - 4. Section 16060 – Grounding and Bonding for Electrical Systems
 - 5. Section 16100 – Common Work Results for Electrical
 - 6. Section 16130 – Raceway and Boxes for Electrical Systems
- E. Reference to Standards
 - 1. ANSI/NFPA 70 - National Electrical Code
 - 2. U.L Standard No. 44 - Thermoset-Insulated Wires and Cables.
 - 3. IPCEA Publication No. S-66-524.
 - 4. Federal Specification J-C-30B
 - 5. ASTM Specification B-8.

1.03 SUBMITTAL REQUIREMENTS

- A. Submit under provisions of Division 01.
- B. Contractor shall submit for all cable types and sizes used on this project.

1.04 QUALIFICATIONS

- A. Wire and cable shall be manufactured and supplied by a company regularly engaged in business of furnishing wire and cable. If required by Owner's representative, manufacturer shall submit a certification to a minimum experience of five years in manufacture of wire and cable.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Wire and cable shall be delivered on reels or coiled in boxes. Wire and cables shall be stored and handled to prevent damage to conductor and insulation.

1.06 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for period of one year from date of substantial completion established by the Owner.

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

A. RHW-2 / USE-2 WIRE

Unless otherwise noted on the drawings or specifications, all exterior cable shall be dual-rated type RHW-2/USE-2. Contractor should note that this applies to both direct buried cable and cable in conduit or duct.

Cable shall be 600 Volt rated, sized as indicated on the drawings. Cable shall comply with Underwriters Laboratories Standard U.L. 44 (for Type RHW-2) and U.L. 854 (for Type USE-2) and shall pass the IEEE 383, 70,000 BTU/hr and VW-1 Flame Tests. Cable insulation shall be abrasion, moisture, heat and sunlight resistant black cross-linked polyethylene (XLP). Cables shall be rated for use at 90°C in both wet and dry locations and be suitable for use in conduit, underground service entrance cable and direct burial applications.

B. THHN/THWN

Unless otherwise noted on the plans or specifications, all interior power wiring installed under this project shall be dual rated type THHN/THWN.

Cable shall be 600 Volt rated, sized as indicated on the drawings. Cable shall comply with Underwriters Laboratories Standard U.L. 83. Cables shall be rated 90°C in dry locations 75°C in wet locations. Conductors shall be annealed copper.

2.02 COLOR CODING

- A. Color code conductor insulation for #10 AWG or smaller conductors. Color code conductors #8 AWG or larger with colored tape or colored insulation. Standard colors:

	120/240V 1 Phase <u>3W</u>	240 V or 208/120V 3 Phase <u>3 or 4W</u>	480V 3 Phase <u>3 or 4W</u>	240/120V 3 Phase <u>4W,)</u>
Phase A	Black	Black	Brown	Black
Phase B	Red	Red	Orange	Orange (high leg)
Phase C	N/A	Blue	Yellow	Blue
Neutral	White	White	Gray	White
Ground	Green	Green	Green	Green

- B. Intrinsically safe wiring shall be light blue color insulation per ANSI/ISA RP12.6 and NEC 504 or per respective equipment manufacturer's recommendations.

- C. Control wiring insulation color shall be red.
- D. 120 VAC control wiring from a separate source (for example, 120 V control wiring from a control panel that supplies a remote located starter) shall be with yellow color insulation.
- E. 24 VDC wiring shall be Blue for Positive and White with Blue Stripe for Negative.

2.03 WIRE PULLING LUBRICANT

- A. Pulling lubricant shall be UL listed, water based, polymer solution. Lubricants containing waxes, soaps or combustible materials are not acceptable. Contractor shall verify the compatibility of the selected cable pulling lubricant and cable jacket materials proposed. Manufacturers/Lubricants shall be as follows, or equivalent:
 - 1. American Polywater - Polywater J
 - 2. Ideal Industries - ClearGlide
 - 3. American Colloid - Poly-X
 - 4. Buchanan - Quick Slip
 - 5. ARNCO – HydraLube

2.04 SPLICES AND JOINTS

- A. Splices and joints shall be as described below, or approved equivalent.
- B. Interior applications:
 - 1. #8 and smaller conductors:
 - a. Ideal “sing nut” type insulated connectors.
 - b. Scotchlok R, B, and Y type insulated connectors.
 - 2. #6 and larger conductors:
 - a. New construction: For straight line connections, use compression connector with rubber insulating cover or boot.
 - b. New construction: For “Tee” cable taps, use compression connector with rubber insulating cover or boot.
 - c. Existing construction: For taps in cabinets, gutters and other close locations, use O-Z/Gedney type XW & XWC, XTP & XTPC or, PMX & PMXC, or equivalent.
- C. Exterior applications
 Note that below grade splices in manholes, handholes and vaults will not be allowed on this project unless specifically shown on drawings. Conductors are to be pulled continuous end-to-end unless otherwise noted or directed by the Engineer in writing.
 - 1. #8 and smaller conductors:
 - a. Twist-on connectors pre-filled with silicone-based sealant to protect against moisture and corrosion. Units shall be UL 486D listed as weatherproof, waterproof and suitable for direct burial. Units shall be Ideal Industries “Underground” #64 or King Innovation “Dryconn King 6 Blue” Filled Waterproof Connectors, or equivalent.
 - 2. #6 and larger conductors:
 - a. NSI/Polaris ISRW Series “Blue”
 - b. Ilsco Series USPA, DBK, SSK or PDSS

2.05 LINE MARKING TAPE

- A. Where required or noted on the drawings, line marking tape shall be installed as specified in Section 16110 - Underground Electrical Construction

PART 3 EXECUTION

3.01 INSTALLATION (WIRE CONDUCTORS)

- A. Wire and cable shall be installed using accepted industry methods to prevent damage to conductors and insulation. Installation shall comply with all applicable sections of NEC regarding conduit fill.
- B. No splices shall be permitted in conduit bodies. All splices shall be made in junction boxes, control panels and cabinets provided for that purpose as detailed or required by need.
- C. Neatly train and lace wiring inside boxes, equipment and panelboards.
- D. Drawings are diagrammatic in showing circuitry routing between devices and equipment. Provide all phase conductors, neutrals, switched and unswitched legs, grounds, etc., as required for a complete and operational electrical system.
- E. All 120V circuits shall have individual neutral conductors. 120V circuits with "shared" neutral conductor shall not be permitted.
- F. Minimum wire size shall be #12 unless otherwise noted. Where protected by 15A fuses, control wiring may be #14 AWG.
- G. All conductors shall be continuous without splices except at locations approved for the purposes of splicing.
- H. All wire sizes shall be stranded except where specifically approved otherwise.
- I. All circuits shall be labeled in compliance with Section 16075— Identification for Electrical Systems.
- J. Pulling eyes on conductors or a basket weave grip shall be used for pulling cable. Woven wire cable grips shall be used to pull all single conductor cable where pulling eyes are not available. Preferred method for pulling conductors is factory-installed eyes attached to conductors. All sharp points and edges on the hardware attaching the pulling rope to the cable shall be taped to prevent snagging or damaging the raceway.
- K. When a cable grip or pulling eye is used for pulling, the area of the cable covered by the grip or seal plus 6 inches shall be cut off, and discarded when the pull is completed. When pulling loops are used, the entire loop shall be cut off and discarded when the pull is completed.
- L. A non-binding type of swivel, or swivel connection shall be inserted between the pulling rope and the cable pulling eye, grip or loop to prevent twisting under strain and allow for free rotation of the cable during pulling.
- M. The pulling tension of any cable shall not exceed the maximum tension recommended by the cable manufacturer. Pulling mechanisms of both the manual and power types shall have the rated capacity clearly marked on the equipment. Cable shall be installed using either hand-tension or by use of specially-designed

“cable-tuggers”. Any cable pulled through conduit using trucks, back-hoe’s, earthmoving equipment or similar apparatus will be rejected and will be replaced with new cable at the Contractor’s expense.

- N. Break-away shear-pins or other acceptable method of tension limitation shall be utilized on mechanical pulling equipment to prevent over-stressing cable during installation. To avoid insulation damage from excessive sidewall pressure at bends, the pulling tension, in pounds at a bend, shall not exceed 300 times the radius of the bend in feet.
- O. As soon as the cable is pulled into place, the pulling eyes, cable grips, or pulling loops shall be removed. On exterior pulls, the remaining cable ends shall be temporarily resealed with either a minimum of three (3) wraps of 2" Scotch #23 rubber splicing tape or heat-shrink caps. Exposed cable ends shall be wrapped in such a manner to prevent unintentional water entry. Cable ends or seals shall be installed prior to the end of the workday.
- P. Cable shall not be bent to a radius of less than 4 times the overall diameter, including installation apparatus.
- Q. Cable supports and securing devices shall be installed to provide adequate support without deformation of the cable jackets or insulation.
- R. Cables shall be routed within manholes and vaults such that adequate working space is provided within the structure for cable splicing and for the installation of future cables.
- S. All damaged or rejected cable shall be removed from the project site and replaced at no additional expense to the project.

3.02 CONNECTIONS AND TERMINATIONS (WIRE CONDUCTORS)

- A. Identify each conductor in panelboards, junction or pull boxes, or troughs with a permanent pressure sensitive label with suitable numbers or letters for easy recognition. Identify control wiring at each end and in junction boxes with numeric wire number corresponding to control wiring diagram.
- B. Thoroughly clean wire before installing lugs and connectors.
- C. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.
- D. Terminate spare conductors with electrical tape, identify as “spares” and roll up in box.

3.03 TESTING (WIRE CONDUCTORS)

- A. Inspect wiring for physical damage and proper connection.
- B. All wire and cable shall be tested for continuity and short circuits prior to energizing circuits. Verify proper phasing, adjust as required.
- C. Comply with all applicable items in Section 16080 and 16100.

END OF SECTION 16120

DIVISION 16 – ELECTRICAL
Section 16130 – Raceway and Boxes
for Electrical Systems

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Work included in this section is conduits, raceways and fittings required for operation and maintenance of facility.
- B. Related Sections
 - 1. Division 11 – Equipment
 - 2. Division 15 – Mechanical
 - 3. Section 16100 – Common Work Results for Electrical
 - 4. Section 16120 – Low Voltage Conductors and Cable
 - 5. Section 16070 – Hangers and Supports for Electrical Systems
- C. Reference to Standards
 - 1. Federal Specifications WW-C-581d
 - 2. Federal Specifications WW-C-540c
 - 3. Federal Specifications WC-1094-A
 - 4. ANSI C80.1
 - 5. ANSI C80.3
 - 6. ANSI C80.5
 - 7. ANSI/NEMA OS-1 – Sheet Steel Outlet Boxes, Device Boxes, Covers and Box Supports
 - 8. UL 50 – Enclosures for Electrical Equipment
 - 9. UL Standard UL-1 Standard for Flexible Metal Conduit
 - 10. UL Standard UL-6 Electrical Rigid Metal Conduit – Steel
 - 11. UL Standard UL-6A Electrical Rigid Metal Conduit – Aluminum, Red Brass and Stainless Steel
 - 12. UL Standard UL-651 Standard for Schedule 40, 80, Type EB and a Rigid PVC Conduit and Fittings.
 - 13. UL Standard UL-651A Schedule 40 and 80 High Density Polyethylene (HDPE) Conduit.
 - 14. UL Standard UL-797 Electrical Metallic Tubing - Steel
 - 15. UL Standard UL-1479 Standard for Fire Tests of Penetration Firestops.
 - 16. NEMA RN1
 - 17. NEMA RN2
 - 18. NFPA 70 (NEC)

- 19. NEMA TC-2
- 20. NEMA TC-3
- 21. NEMA TC-7
- 22. NEMA 250

1.03 SUBMITTALS (SUBMIT ONLY ON TYPES APPLICABLE FOR PROJECT)

- A. Submit under provisions of Division 01.
- B. Schedule 40 Galvanized Rigid Steel Conduit
- C. PVC Coated Galvanized Rigid Steel Conduit
- D. Schedule 40 Aluminum Rigid Conduit
- E. Electrical Metallic Tubing (EMT)
- F. Rigid PVC Conduit
- G. Flexible Metal Conduit
- H. Liquid Tight Flexible Metal Conduit
- I. Explosion-proof Flexible Metal Couplings
- J. High-Density Polyethylene Conduit (Unit Duct)
- K. Fittings and Conduit Bodies
- L. Expansion/Deflection Fittings
- M. Lay-In Wireway
- N. Conduit Seals
 - 1. Conduit Fire Stopping
 - 2. Conduit Water Seals
 - 3. Conduit Explosion Proof Seals

1.04 QUALIFICATIONS

- A. All materials shall be purchased new from suppliers/manufacturers regularly engaged in the business of electrical conduit, ducts and fittings.
- B. Junction and pull boxes shall be manufactured and supplied by a company regularly engaged in business of furnishing junction and pull boxes. If required by Owner's representative, manufacturer shall submit a certification to a minimum experience of five years in manufacture of junction and pull boxes. Junction and pull boxes shall be U.L. listed.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Conduits shall not be shipped loose, but shall be bundled by sizes. Threads of metal conduits shall be protected by plastic caps. Fittings shall be stored in boxes. All equipment shall be stored on pallets to prevent contact with earth and shall be covered with plastic sheeting to protect them from dirt and weather.
- B. Junction and pull boxes shall not be shipped loose, but shall be in boxes with labels indicating size and type. These boxes shall be stored away from contact with earth and protected from weather and abuse.

1.06 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by Owner.

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

Note that all types specified below may not be used on every project. Refer to project drawings for individual project requirements.

- A. Schedule 40 Rigid Aluminum Conduit

Conduit shall be of 6063 aluminum alloy, T-1 temper (Former designation T-42). Rigid aluminum conduit shall be third-party listed for use in classified (hazardous) locations. Conduit and installation shall comply with all requirements in NEC Article 344. Do not utilize steel or iron conduit fittings with aluminum conduit. Mounting hardware shall be corrosion resistant: stainless steel or aluminum.

- B. Rigid PVC Conduit:

Conduit shall be Schedule 40 or Schedule 80, as noted on the drawings, PVC, 90°C, UL rated or approved equivalent. Material shall comply to NEMA Specification TC-2 (Conduit), TC-3 (Fittings-UL-514), and UL-651 (Standard for rigid nonmetallic conduit). Conduit and fittings shall carry a UL label (on each 10 foot length of conduit and stamped or molded on every fitting). Conduit and fittings shall be identified for type and manufacturer and shall be traceable to location of plant and date manufactured. Markings shall be legible and permanent. Clean rework material, generated by manufacturer's own conduit production, may be used by same manufacturer, provided end products meet requirements of this specification. Conduit and fittings shall be homogeneous plastic material free from visible cracks, holes, or foreign inclusions. Conduit bore shall be smooth and free of blisters, nicks or other imperfections which could mar conductors or cables. Conduit, fittings and cement shall be compatible to assure system integrity and shall be as shown on project drawings, or equal. Conduit and installation shall comply with all requirements in NEC Article 352. Mounting hardware shall be corrosion resistant: nonmetallic support straps or PVC conduit clamps with stainless steel hardware, designed for the installation of PVC conduit, which allows the conduit to expand and contract freely over varying temperature changes.

- C. Fittings and Conduit Bodies:

Unless otherwise specified, all fittings and conduit bodies shall be manufactured from the same type of material as the conduit system (aluminum, galvanized steel, PVC, etc.)

Field Modifications to Existing Rigid Metal Conduit Systems ONLY: Where modifications to existing rigid conduit installations make threading of field cuts impossible, use Type HK series couplings by Thomas & Betts/Steel City, or equivalent.

- D. Expansion and Deflection Fittings

Where noted on project drawings, or required by the nature of construction

location, furnish conduit Expansion, Deflection or Expansion/Deflection Fittings. Expansion and deflection fittings shall be compatible with other conduit materials and be type AX (expansion), DX (deflection) or AXDX (expansion/deflection) as manufactured by O-Z/Gedney, or equivalent.

E. Lay-In Wireway:

Unless otherwise indicated on the drawings, lay-in wireway installed in dry (non-hosedown) interior areas shall be NEMA 1 hinge cover steel enclosed wiring trough. Lay-in wireway installed outdoors or in interior areas subject to hosedown or wet conditions shall be NEMA 3R, 4 or 4X as noted on the drawings. Wireway shall be sized as shown on drawings, as a minimum, or as required by NEC, and shall be as manufactured by Square D, Hoffman, or equivalent. Install all hinged wireways with hinges on bottom such that doors will not interfere with maintenance and installation when open.

F. Pull Cords

Each empty conduit shown or described on the drawings shall be furnished with a pull cord to facilitate future conductor installation. Cord shall consist of non-deteriorating, non-metallic, non-cotton construction such as polyester or nylon material. Minimum tensile strength of all pull strings shall be 200#. Leave minimum of 12 inches slack at each termination or end. Any references on project drawings to "pull wire" shall be interpreted as a pull cord as described herein.

2.02 SEALING

A. Fire Seal (Fire Stopping Material):

1. Fire stopping materials shall consist of commercially manufactured products capable of passing ASTM E-814 (UL 1479) Standard Method of Fire Test for Through Penetration Fire Stops.
2. Fire stopping materials shall maintain the rating of the wall, partition, ceiling or floor opening where penetration is made. Comply with NEC 300-21.
3. All fire-stopping materials shall be third-party classified.
4. Where sleeves are to be installed, the sleeve shall be heavy wall steel pipe sleeves, anchored to building construction and finished plumb with wall, ceiling, or floor lines.
5. Manufacturers:
 - a. Chase Technology – CTC, PR-855.
 - b. Dow Corning – Silicone RTV Foam 3-6548.
 - c. Nelson – Flameseal.
 - d. Thomas & Betts – Flame Safe.
 - e. 3M – Fire Barrier.
6. Where applicable for the respective wall and its fire rating, smoke and fire stop fittings may be used in lieu of sealant as manufactured by OZ/Gedney, Series CFS.

B. Thermal Seal:

1. Seal penetrations of thermally insulated equipment or rooms top prevent heat transfer.

C. Moisture Seal:

1. When electrical conduits are installed in sleeves, core-drilled holes or box outs, seal between conduit and penetration of perimeter walls, ceilings or floors to prevent entry of water.
2. Seal conduit penetrations of roof with flashings compatible with roof design and approved by Roofing System Manufacturer and Engineer.
3. Seal annular space between conductors and conduit wall of all conduit terminations where conduit enters a building from below grade in order to block moisture migration into electrical equipment. In addition seal conduits entering electrical equipment located either interior or exterior that once installed condensation is created in the electrical equipment due the electrical system being connected to areas with a different temperature. Conduit moisture barrier material shall not harden and be compatible with both wire insulation and conduit materials. Installed product shall be easily removed for maintenance or modifications, regardless of the length of time material has been installed. Conduit moisture seal material shall be:
 - a. "Hydroblock" by WaterGuard Technology Products
16023 East Freeway
Channelview, Texas 77530-4365
Phone: (281) 862-0300
Fax: (281) 862-0314
 - b. American Polywater Corporation
Polywater Duct Sealant FST-250 Series
P.O. Box 53
Stillwater, MN 55082
Phone: (651) 430-2270
Fax: (651) 430-3634
 - c. O-Z/Gedney
Type DUX Water Sealing Compound

2.03 BOXES

- A. Dimensions of all boxes shall meet or exceed NEC Article 370 requirements. Boxes larger than 12 inches in any dimension shall be hinged type.
- B. Flush mounted exterior boxes in floors, walkways and walls shall be NEMA 4, cast aluminum, Crouse Hinds, Killark, or equal. For supplemental corrosion protection, boxes encased in poured concrete shall have an asphalt paint coating applied to surfaces in contact with concrete prior to installation. Note that an asphalt paint coating is not required on boxes installed in masonry brick or block walls.
- C. Surface mounted interior junction and pull boxes used with Schedule 40 PVC conduit shall be nonmetallic and shall be as manufactured by Carlon, or equal.
- D. Surface mounted interior junction and pull boxes used with GRS or EMT conduit shall be NEMA OS-1, stamped galvanized steel.
- E. Flush mounted interior boxes in concrete floors and concrete walls shall be NEMA 4, cast aluminum, Crouse Hinds, Killark, or equal, and shall be supplied with asphalt paint applied to all surfaces in contact with concrete.
- F. Boxes used to support light fixtures shall be of metallic construction and capable of supporting installed fixtures.

- G. Exterior junction and pull boxes located in non-hazardous, non-classified areas shall be NEMA 4X stainless steel or aluminum. Provide waterproof conduit hubs, Meyers or equivalent, for all conduit terminations at enclosures. Gasketed lock-nuts will not meet this requirement.
- H. Acceptable manufacturers:
 - 1. Appleton Electric Co.
 - 2. Carlon
 - 3. Crouse-Hinds Co.
 - 4. Hammond
 - 5. Hennessy Outdoor Enclosures.
 - 6. Hoffman Co.
 - 7. Hubbell-Killark Electric Mfg. Co.
 - 8. O.Z./Gedney Co.
 - 9. Square D.
 - 10. Thomas & Betts

PART 3 EXECUTION

3.01 INSPECTION

- A. All conduits shall be inspected for proper fit and finish, for out-of-round and for proper thickness. All burrs and flashing shall be removed. Conduit and fittings shall be clean and free of obstructions.

3.02 INSTALLATION

- A. Unless otherwise shown on the project drawings, minimum conduit trade-size shall be 3/4". Larger sizes shall be installed where noted or where required by NEC.
- B. In general, no aluminum conduit shall be cast in concrete or in direct contact with earth. Where such contact is found necessary or where specifically noted on project drawings, either coat all aluminum contact surfaces with a protective bituminous coating (such as Carbolite Bitumastic 50 or 300M) or alternately substitute galvanized rigid steel conduit for the sections which are in contact with concrete or earth.
- C. Interior and Exterior Conduit Applications:
 - 1. Above Grade or Floor:
Rigid aluminum type unless otherwise noted on the project drawings. Where conduits exit to above grade transition to conduit type shall be no more than 6" from penetration.
 - 2. Below Grade or Floor:
Schedule 40 PVC. Where interior conduits exit from below floor or grade to above grade furnish conduit transition between types no more than 6" above finish floor.
- D. Moisture Seal of Below-Grade Conduits
 - 1. Seal annular space between conductors and conduit wall of all conduit terminations where conduit enters from below grade in order to block moisture migration into electrical equipment. Install product only after conductors have been installed, terminated and commissioned for service.

Install moisture seal products per all manufacturers instructions and requirements.

- E. Conduit Sealing For Fireproofing
 - 1. Sleeves:
 - a. Install rigid metallic sleeves where exposed raceways pass through floors, walls (except exterior walls below grade) and ceilings.
 - b. Sleeve Diameter: Size sleeves to accommodate their through penetrating items and allow a minimum of a one (1") inch void between the sleeve and the item of penetration.
 - 2. Seal openings in fire rated floors, ceilings and roofs:
 - a. Pack void with backing material and ends of the sleeve sealed with a minimum of one (1") inch of a listed fire-resistive silicone compound to a depth required to meet the fire rating of the structure penetrated.
 - b. Install firestopping to meet the requirements of ASTM E-814
 - c. Install product in accordance with the manufacturer's instructions.
- F. Conduit size and fill requirements shall comply with appropriate conduit fill tables in Annex C of NEC. It should be noted these are minimum requirements and larger conduit sizes or smaller fill requirements shall be used whenever specified or detailed on drawings.
- G. Flexible conduit shall be provided as a connection between each motor junction box (or any other piece of equipment subject to movement or vibration) and rigid conduit system. Liquid-tight and explosion-proof flexible conduit shall not exceed 3' in length.
- H. Ream conduits only after threads are cut. Cut joints square to butt solidly into couplings. Where necessary to join two pieces of conduit and it is impossible to use standard coupling, use three piece conduit coupling. Use of running thread is prohibited. This applies to all rigid conduit installations, underground or otherwise. In order to comply with NEC Article 300.6(A), all rigid steel conduit shall have field-cut threads re-coated using an electrically conductive, corrosion-resistant compound, Thomas & Betts/Shamrock "Kopr-Shield" (a product of Jet Lube, Inc.), or equivalent.
- I. Make all joints in underground conduit watertight with approved joint compound. Temporarily plug conduit openings to exclude water, concrete or any foreign materials during construction. Clean conduit runs before pulling in conductors.
- J. Hickey hand-bends will not be acceptable for conduits one inch (1") and larger. Use pre-manufactured factory elbows or bends fabricated with hydraulic bending machine. Field bending of all PVC conduit shall be accomplished with use of equipment approved by conduit manufacturer. Open flame bending equipment will not be acceptable.
- K. A run of conduit between outlet and outlet, between fitting and fitting or between outlet and fitting shall not contain more than the equivalent of four quarter turn bends (360°), including bends immediately at an outlet or fitting.
- L. At all conduit terminations furnish locknuts on both sides of enclosure plus an insulated bushing unless conduit termination is into a factory-threaded conduit opening or watertight (Myers-type) hub.

- M. All conduit terminations at NEMA 4 or 4X enclosures shall be made with watertight (Myers-type) hubs listed for the application.
- N. Do not run conduit below or adjacent to water piping, except where permitted by Owner's representative.
- O. Run exposed conduits parallel with walls and at right angles to building lines, not diagonally.
- P. Support exposed PVC conduit runs on walls or ceiling every three feet (3') and support exposed rigid metal conduit runs on walls or ceiling every five feet (5') with stainless steel or PVC coated galvanized cast one hole straps, clamp backs and anchors. Provide lead shield insert anchors, with stainless steel round head machine screws, for concrete and brick construction. In wood construction, use stainless steel round head wood screws. Where steel members occur, drill and tap and use stainless steel round head machine screws.
- Q. In brick construction, drill hole for insert near center of brick, not near edge or in mortar joint.
- R. Support two or more PVC exposed hanging parallel conduit runs every three feet (3') and support exposed rigid metal hanging parallel conduit runs every five feet (5') with trapeze hangers. Hanger assembly to consist of concrete inserts, threaded solid rod, washers, nuts and cross members nominally one and five-eighths inch (1-5/8") by one and five-eighths inch (1-5/8") non-metallic framing, as specified in Section 16070 – Hangers and Supports for Electrical Systems. Anchor each conduit individually to cross members of every other hanger with cast one hole straps, clamps backs and proper sized stainless steel or non-metallic machine bolts and nuts.
- S. Perforated metal strapping of any kind is prohibited.
- T. Provide expansion and deflection fittings in all conduits which pass through or over building expansion joints. All expansion and deflection fittings shall be designed for, and compatible with, the conduit types on which they are installed.
- U. Grounding Electrode Conductors shall be installed in non-metallic PVC conduit or bonded to both ends of metallic conduit to comply with NEC 250.64.

3.03 BOXES INSTALLATION

- A. Junction or pull boxes required by code or need which are not detailed on drawings shall be considered incidental to proposal price and will not be paid for separately.
- B. Any damage to equipment enclosures, pull or junction boxes shall be immediately repaired or replaced to satisfaction of Owner's representative.
- C. All pull or junction boxes surface mounted in any interior damp location shall be "standoff" mounted 1/2" from the wall in a manner to promote air circulation completely around the box.
- D. The contractor shall coordinate the installation of flush mounted junction boxes with the general and mechanical work as required at each structure.
- E. Flush mounted junction boxes to be installed in precast top slabs shall be furnished by the contractor for installation, and shall be furnished completely assembled, including conduit nipples and stub-outs with ends covered by protective caps.

- F. Provide knockout closures to cap unused knockout holes where blanks have been removed (for non-hazardous location boxes).
- G. All mounting hardware shall be corrosion resistant.
- H. All metal junction boxes shall be bonded to ground with a ground wire connection.

END OF SECTION 16130

DIVISION 16 – ELECTRICAL
Section 16140 – Wiring Devices

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Work in this section is supply and installation of receptacles and toggle switches.
- B. Work shall also include supply and installation of device boxes for receptacles and toggle switches.
- C. Related Sections
 - 1. Section 16075 – Identification for Electrical Systems
 - 2. Section 16100 – Common Work Results for Electrical
 - 3. Section 16120 – Low-Voltage Conductors and Cables
 - 4. Section 16130 – Raceway and Boxes for Electrical Systems
- D. REFERENCE TO STANDARDS
 - 1. UL Standard 943 Class A
 - 2. Federal Specification W-C-596F
 - 3. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 4. NEC Article 410-57
 - 5. NEMA WD-1
 - 6. NEMA WD-6
 - 7. ANSI/NEMA OS-1 - Sheet Steel Outlet boxes, Device Boxes, Covers and Box Supports
 - 8. U.L. 514A - Metallic Outlet Boxes
 - 9. U.L. 498

1.03 SUBMITTAL REQUIREMENTS

- A. Submit under provisions of Division 01.
 - 1. Receptacles
 - 2. Toggle switches
 - 3. Weatherproof covers and device boxes
 - 4. Remote control stations
 - 5. Multi-outlet raceway (if used)
- B. Where applicable, color of wiring devices to be identified during submittal review.

1.04 QUALIFICATIONS

- A. Wiring devices shall be manufactured and supplied by companies regularly engaged in business of furnishing wiring devices. If required by Owner's

representative, manufacturers shall submit certification to a minimum experience of five years in manufacture of respective wiring devices.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Supplied items shall not be shipped loose but shall be in boxes, labeled with material and equipment enclosed. Boxes shall be stored away from contact with earth and shall be protected from weather.

1.06 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

- A. Receptacles:
 - 1. Receptacles shall be installed under this item where shown on drawings.
 - 2. General Purpose Receptacles (Non-GFCI)
General purpose receptacles for all wall type convenience outlets in non-hazardous areas shall be of 20-amp, 125-volt, 3-wire grounding type, NEMA 5-20R, back and side wire compatible, heavy duty industrial specification grade.
 - a. Leviton 5362
 - b. Pass & Seymour 5362-A
 - c. Hubbell HBL5362
 - d. Equivalent
 - 3. Corrosion Resistant Receptacles (Non-GFCI)
Where indicated on the drawings, corrosion resistant receptacles in non-hazardous areas shall be of 20-amp, 125-volt, 3-wire grounding type, NEMA 5-20R, back and side wire compatible, heavy duty industrial specification grade. Color to be verified during shop drawing review.
 - a. Leviton 53CM62
 - b. Pass & Seymour CR6300
 - c. Hubbell HBL53CM62
 - d. Equivalent
 - 4. Self-Test Ground Fault Circuit Interrupting (GFCI) Duplex Receptacles
Duplex receptacles with ground fault circuit interrupters (GFCI) shall be provided and installed where noted on drawings. Receptacle shall be tamper resistant. Include indicator light that is lighted when device is tripped. Self-test feature to conduct an automatic test, ensuring ground protection. If ground fault protection is comprised, power to the receptacle must be discontinued. GFCI Receptacles shall be of the following types:
 - a. Interior GFCI Applications (Non-Hazardous)
 - i. Leviton "SmartLock Pro) GFNT2-X
 - ii. Pass & Seymour 2097
 - iii. Hubbell GFTRST20
 - iv. Equivalent, meeting requirements noted.

b. Weather-Resistant, Self-Test GFCI Receptacles.

Where indicated on the drawings, UL Weather-Resistant GFCI receptacles in non-hazardous areas shall be 20-amp, 125-volts, 3-wire grounding type, NEMA 5-20R, back and side wire compatible, specification grade. Include indicator light that is lighted when device is tripped. Self-test feature to conduct an automatic test every three seconds, ensuring ground protection. If ground fault protection is comprised, power to the receptacle must be discontinued.

- i. Leviton GFWT2
- ii. Pass & Seymour 2097WR
- iii. Hubbell GFWRST
- iv. Equivalent

5. Pin and Sleeve Receptacles

The plug and receptacles shall be of the non-load break design, screw type. Shells shall be high-strength impact extruded aluminum, hard coated with a high density anodic finish. The shells shall be lightweight, extremely strong, with high resistance to abrasion, corrosion and chemical attack. The insert assemblies shall consist of two rigid insulators with a silicone rubber wafer between to provide a cushioning action and effect a positive seal. Insulating materials shall be of high dielectric and mechanical strength with resistance to arc tracking. Termination shall be solder type. Connectors shall be polarized such that pieces cannot be mated incorrectly. Connectors shall have pin and socket contacts with integral grounding straps effectively bonding the shells to the grounding contacts. Grounding socket contacts shall be longer than current carrying parts to make first and break last. Back box shall be copper-free aluminum.

Plug and receptacle voltage, amperage, wiring, poles, and configurations shall be as detailed on the drawings.

The plug shall be Crouse-Hinds ARK-trol Series RPE, or equal with an additional stainless steel wire basket strain relief and reducer suitable for pump cable diameter.

The receptacle shall be Crouse-Hinds ARK-trol or equal with integral screw type dust cap and cast back box.

6. Special Purpose Receptacles (Where Required)

Special purpose receptacles shall have amperage, voltage, number of poles, number of wires as required or as shown on drawings. Contractor shall verify compatibility between proposed special purpose receptacles and plugs of proposed equipment prior to ordering. Contractor shall also provide labels for special purpose receptacles.

B. Toggle Switches

1. Toggle switches shall be installed under this item.
2. General Purpose Toggle Switches

Units for use in non-hazardous, toggle-type applications shall be 20A, 120/277 VAC rated, back and side wired type, industrial specification grade. Switches shall be duty rated for 1 HP at 120 VAC.

- a. Single Pole
Leviton 1221-2
Pass & Seymour CSB20AC1
Hubbell HBL1221
Equivalent
 - b. Two Pole
Leviton 1222-2
Pass & Seymour CBS20AC2
Hubbell HBL1222
Equivalent
 - c. Three-Way
Leviton 1223-2
Pass & Seymour CBS20AC3
Hubbell HBL1223
Equivalent
 - d. Four-Way
Leviton 1224-2
Pass & Seymour CBS20AC4
Hubbell HBL1224
Equivalent
- C. Weatherproof Receptacle Covers
 - 1. All receptacle covers noted as "weatherproof" with the letters "WP" or installed outdoors shall comply with NEC Article 406.9B1. Units shall remain raintight whether or not a plug and cord is inserted. Covers shall be extra-deep, padlock able, cast aluminum construction, listed and identified as "extra duty" as manufactured by Intermatic WP1010HMXD, Hubbell, WP26EH, Pass & Seymour CA26WV or equivalent, horizontal, for use with GFCI receptacles.
- D. Device Boxes
 - 1. Where PVC conduit is used, associated device boxes shall be of FS design, non-metallic PVC, as manufactured by Carlon, or equivalent.
 - 2. Where galvanized rigid metal conduit is used, associated device boxes shall be FS or FD design, metallic, as manufactured by Crouse-Hinds, or equivalent.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Unless otherwise specified on the drawings, use the following as a guide for mounting of device boxes and control operator (pushbutton) stations:

Device	Height above finished floor to bottom of box
1. Receptacles in offices and finished areas.	16 inches
2. Toggle wall switches	48 inches
3. Receptacles in all other or non-finished areas.	48 inches

4.	Receptacles on walkways	Attach to handrail crossbar
5.	Telephone Outlets	16 inches
6.	Data Outlets	16 inches
7.	CATV Outlets	16 inches
8.	Control Operator (P.B.) Stations	48 inches
- B. Unless otherwise noted on the drawings, boxes for wiring devices shall be flush mount construction such that device cover plates are flush with wall after installation.
- C. Legend plates shall be securely attached using weatherproof adhesives in accordance with Section 16075.
- D. All receptacles and toggles switches shall be grounded with a ground conductor connected to their respective grounding terminal or screw.
- E. Grounded conductors (neutrals) shall be continuous between outlets, boxes, devices, and so forth per NEC Article 300.13. Wiring device neutral connections shall not be utilized as splice points. Neutral path shall not be broken with wiring devices removed from boxes.
- F. Test all receptacles, toggle switches and control stations for proper operation, including GFCI operation where applicable.
- G. Modular devices are permitted for use. Modular connectors shall contain crimped and welded brass connections. Modular receptacles shall be listed to UL498, UL20, WC-596G, WC-896, Leviton Lev-Lok, Pass & Seymour PlugTail, or equal.
- H. Ground device enclosure or box with a ground conductor connected to the respective grounding lug or screw.
- I. Unless specifically shown otherwise on the drawings, all device boxes are to be flush mounted. This includes masonry construction.
- J. Where boxes are to be installed in finished masonry walls, adjust position of outlets to suit masonry course lines.
- K. Do not install boxes back-to-back in the same wall. Provide minimum 4 inches separation.
- L. Provide insulation behind boxes mounted in exterior walls.
- M. For boxes, outlets or multi-outlet raceway installed above counters or backsplashes, coordinate location and mounting height to agree with other trades and equipment.
- N. Unless otherwise specified, install wall switches with "OFF" position down.
- O. Unless otherwise specified, install duplex outlets with ground blade on the bottom if mounted vertically or to the right if mounted horizontally. Install GFCI receptacles in such that "Test" and "Reset" wording are oriented correctly.
- P. Each duplex outlet cover shall be furnished with a 3/8"-1/2" adhesive label strip identifying its respective source of supply (e.g. LP1-15 for Lighting Panelboard LP-1 circuit #15). All labels shall be affixed to the exterior (outside) of each respective cover plate. All duplex outlet labels shall be installed in the same general location on each cover plate throughout the project.

- Q. Each toggle wall switch shall be furnished with a 3/8"-1/2" adhesive label strip identifying its respective source of supply (e.g. LP1-16 for Lighting Panelboard LP-1 circuit #16). All toggle switch labels shall be affixed to the rear (inside) of the respective cover plate.
- R. Exterior receptacles shall be mounted horizontal.

END OF SECTION 16140

DIVISION 16 – ELECTRICAL
Section 16160 – Electrical Cabinets
and Enclosures

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Enclosures used to house electrical equipment.
- B. Related Sections
 - 1. Section 16100 – Common Work Results for Electrical
 - 2. Section 16060 – Grounding and Bonding for Electrical Systems
 - 3. Section 16070 – Hangers and Supports for Electrical Systems
 - 4. Section 16075 – Identification for Electrical Systems
- C. Reference to Standards
 - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 2. ANSI/NFPA 70 - National Electrical Code.
 - 3. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.03 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Product Data: Provide manufacturer's standard data for enclosures and cabinets.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.04 QUALIFICATIONS

- A. Cabinet and Enclosure manufacturer shall be regularly engaged in construction of Product and shall have at least five years' experience.

1.05 QUALITY ASSURANCE (RESERVED)

1.06 DELIVERY, STORAGE AND HANDLING

- A. Cabinets and enclosures shall be delivered to jobsite in original shipping containers and shall be stored in a clean, dry location until ready for installation.

1.07 COORDINATION (RESERVED)

1.08 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.09 EXTRA MATERIALS (SPARE PARTS)

- A. Provide individual containers of touch up paint for each painted cabinet and enclosure.
- B. For each cabinet and enclosure with a locking mechanism, provide two spare keys.

PART 2 PRODUCTS

2.01 MANUFACTURERS (RESERVED)

2.02 EQUIPMENT SPECIFICATION

A. NEMA 1

Enclosures shall be NEMA 1 rated, hinged, single or double door with slotted flush latch and white interior mounting panel, similar to Hoffman A-xxN Series (where xx is size subseries), or equivalent. Materials of construction shall be 14- or 16-gauge steel, depending on enclosure size, with polyester powder coating. Large enclosures shall have continuous hinge on door. Where noted, large enclosures shall include door operated light kits. Enclosure shall include grounding device kit or other means of positively grounding door to enclosure body.

B. NEMA 3R

Enclosures shall be NEMA 3R rated, hinged with stainless steel hinge pin, with drip shield, single door, white interior mounting panel and easily released door clamps. Materials of construction shall be 16- or 14-gauge steel, depending on enclosure size, with polyester powder coating. Furnish all exterior-mounted NEMA 3R enclosures with a NEMA 4X Drain-Vent (specified below) to remove interior moisture and condensation.

C. NEMA 4X

Enclosures shall be NEMA 4/ NEMA 4X/ NEMA 12 rated, hinged, gasketed, single or double door, with easily released fast-operating clamp assemblies or quarter turn slotted latch kits replacing conventional screw clamps, white interior mounting panel and stainless-steel hinge pin. Materials of construction shall be 16- or 14-gauge (depending on size) Type 304 stainless steel, Type 5052 H-32 aluminum, molded fiberglass polyester or corrosion resistant nonmetallic composite material. Interior mounting panel shall be steel, finish shall be white enamel. Where noted, enclosures shall include door operated light kits. Metallic enclosures shall include grounding device kit or other means of positively grounding door to enclosure body. Furnish all exterior-mounted NEMA 4X

enclosures with a NEMA 4X Drain-Vent (specified below) to remove interior moisture and condensation.

D. NEMA 7

Enclosures shall be NEMA 7 rated suitable for Class 1, Division 1, Group D hazardous locations. Materials of construction shall be copper-free aluminum and shall be either U.L. or F.M. listed and labeled for the application. Covers for small enclosures shall be threaded construction with minimum of 5 threads fully engaged after installation. Larger enclosures shall utilize bolted covers with all bolts torqued per manufacturer's requirements after installation.

E. NEMA 12

Enclosures shall be NEMA 12 rated, continuous hinge, gasketed, single or double door, with white interior mounting panel. Materials of construction shall be 16- or 14-gauge steel, depending on enclosure size, with polyester powder coating. Small enclosures shall be similar to Hoffman "CHQR" Series, or equivalent. Medium size enclosures shall include 1-point latch kits or quarter turn slotted latch kits replacing conventional external screw clamps. Large size enclosures shall include 3-point latch kits. Where noted, large enclosures shall include door operated light kits. Enclosure shall include grounding device kit or other means of positively grounding door to enclosure body.

F. Drain-Vents

Where noted or specified, enclosure Drain-Vents shall be furnished and installed in the bottom of enclosures in order to remove unwanted condensation and moisture from within enclosure. Units shall be NEMA 4X rated and shall maintain the NEMA 4X rating of enclosures when installed. Drain-Vents shall be as manufactured by Stahlin Enclosures Model DV4XKIT, or equivalent.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspect cabinets, enclosures and mounting panels for damage or rust. Inspect gasketing for proper sealing. Inspect hinges and clamps for proper operation.

3.02 PREPARATION

- A. Thoroughly clean interior and exterior of cabinets and enclosures. Sand and apply touch up paint where needed. Install mounting panels after equipment is mounted to it.

3.03 INSTALLATION

- A. Install cabinets and enclosures at locations shown on drawings and as directed by Owner's representative. Cabinets and enclosures shall be "stand off" mounted 1/2" from wall to provide free air flow behind cabinets and enclosures.
- B. To maintain NEMA 4X enclosure ratings, watertight hubs which are UL listed NEMA 4X shall be installed as necessary at conduit entrances to enclosure.

- C. At both interior and exterior locations, where enclosure or cabinet knockouts consist of tangential knockouts, the Contractor shall install weatherproof hubs sized for largest knockout, with a reducing bushing sized for the incoming conduit.

END OF SECTION 16160

DIVISION 16 – ELECTRICAL
Section 16280 – Surge Protective Devices
for Low Voltage Power Circuits

PART 1 GENERAL

1.01 WORK INCLUDES

- A. This specification describes the requirements for Surge Protective Devices. Surge Protective Device equipment shall be furnished for all locations where noted on project Drawings, referenced in other equipment specifications or as described herein.
- B. Unless noted otherwise on the drawings, new surge protection equipment shall be furnished with the following new equipment:
 - 1. Switchboards
 - 2. Motor Control Centers
 - 3. Other Service-Entrance Equipment
 - 4. Panelboards
 - 5. Fabricated Control Panels
 - 6. Other equipment where specifically noted on project drawings or specified herein.
- C. Additionally, where drawings note to add surge protection to existing equipment, provide equipment as specified herein or as noted on the project drawings.
- D. Provide supplemental Surge Suppressors on each end of all 4-20 mA dc signal lines which originate at, or terminate on, devices located on exterior of building. Typical equipment would include, but not be limited to, magmeters located in exterior meter pits and wet-well transmitters. Where 4-20 mA dc signals both originate and terminate within a single building, no supplemental surge protection is required.

1.02 RELATED SECTIONS

- A. Section 16060 – Grounding and Bonding for Electrical Systems
- B. Section 16100 – Common Work Results for Electrical
- C. Section 16305 – Service Entrance
- D. Section 16440 – Panelboards

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code (most current issue).
- B. U.L. 1449/ANSI “3rd Edition” - Surge Protective Devices
- C. U.L. 1283 – Electromagnetic Interference Filters.
- D. IEEE C62.41– Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits
- E. IEEE C62.45 – Guide on Surge Testing for Equipment Connected to Low-Voltage Power Circuits
- F. NEMA LS-1 – Low Voltage Surge Protection Devices

1.04 DELIVERY, STORAGE AND HANDLING

- A. Electrical surge protection equipment shall be stored in a clean dry place, away from construction.

1.05 SUBMITTALS

- A. Submit under the provisions of Division 01.
- B. Product Data: Provide catalog data for electrical surge protection equipment.
- C. Provide information to verify 3rd party testing certification on assembled equipment ratings. Ratings on individual components will not meet this requirement and will not be considered.
- D. Provide verification that the SPD complies with the required ANSI/UL 1449 3rd Edition listing by Intertek (ETL), Underwriters Laboratories (UL) or other Nationally Recognized Testing Laboratories (NRTL). Compliance may be in the form of a file number that can be verified on ETL's or UL's website or on any other NRTL's website, as long as the website contains the following information at a minimum: model number, SPD Type, system voltage, phases, modes of protection, Voltage Protection Rating (VPR), and Nominal Discharge Current (I_n). Language similar to "Manufactured in accordance with . . ." will not meet the intent of this specification requirement.
- E. Manufacturer's Instructions:
Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.06 QUALIFICATIONS

- A. Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.
- B. Third party tested for compliance.

1.07 QUALITY ASSURANCE (RESERVED)

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY)

- A. As a minimum, all equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.11 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 EQUIPMENT SPECIFICATION

- A. UL Category Code VZCA = UL 1449 3rd Edition Surge Protective Devices.
- B. All Electrical Surge Protection hardware shall be U.L. Listed and labeled as "Surge Protective Devices" under the latest edition of UL 1449 "3rd Edition".
- C. Visual indication that surge suppressors are functioning properly shall be furnished in the form of display, pilot light or LED for each device. If manufacturer utilizes LED's or pilot lights, one indicator shall be provided for each leg of a multi-phase device.
- D. Where Surge Protective hardware is not an integral part of a factory-assembled piece of equipment (such as factory installed in a switchboard or MCC), manufacturer or Contractor shall furnish all equipment, brackets and appurtenances necessary in order to properly install suppressors to manufacturer's requirements.
- E. Electrical Requirements – Power Distribution Equipment
 - 1. Unit operating voltage and configuration – Refer to Drawings
 - 2. SPD Types:
 - Type 1: Can be installed before service disconnect overcurrent device. (Old equivalent: Secondary surge arrestor, lightning arrester.) Nominal Discharge Current Rating - 10kA or 20kA.
 - Type 2: Can only be installed after service disconnect overcurrent device. (Old equivalent: TVSS) Nominal Discharge Current Rating - 3kA, 5kA, 10kA or 20kA.
 - Type 3: Point of Utilization SPD. Installed a minimum 10m (30ft) of conductor between service disconnect overcurrent device and surge protective device. (Old equivalent: Plug-In surge strips, surge receptacles).
 - Type 4: Component SPD. Does not have full enclosure; intended solely for installation in another listed device. Must pass all tests relevant to installation location (Type 1 or Type 2). (Old equivalent: UR recognized component.)
 - 3. The suppression system shall incorporate thermally protected metal oxide varistors (MOVs) as the core surge suppression component for the service entrance and all other distribution levels. The system shall not utilize silicon avalanche diodes, selenium cell, air gaps, etc.
 - 4. Maximum Continuous Operating Voltage (MCOV) – The MCOV shall be greater than 125% of the nominal system operating voltage.
 - 5. Protection Modes: The SPD must protect all modes of the electrical system being utilized. The required protection modes are indicated by bullets in the following table:
 - LN = Line to Neutral
 - LL = Line to Line
 - LG = Line to Ground

NG = Neutral to Ground

Wye System: LN-A Phase, LN-B Phase, LN-C Phase, LG-A Phase, LG-B Phase, LG-C Phase, NG

Delta System: LL-A Phase, LL-B Phase, LL-C Phase, LG-A Phase, LG-B Phase, LG-C Phase

Single Phase System: LN-A Phase, LN-B Phase, LG-A Phase, LG-B Phase, NG

High Leg Delta: LN-A Phase, LN-B Phase, LN-C Phase, LG-A Phase, LG-B Phase, LG-C Phase, NG

6. Voltage Protection Ratings (VPR) shall not exceed the following per UL-1449:

Modes	208Y/120	480Y/277
L-N; L-G; N-G	600 V	1000 V
L-L	900 V	1800 V

7. ANSI/IEEE Cat. C3 Let Through Voltage – The let through voltage based on IEEE C62.41 and C62.45 recommended procedures for Category C3 surges (20 kV, 10 kA) shall be less than:

Modes	208Y/120	480Y/277
L-L	1240V	2060V
L-G	1000V	1580V
L-N, N-G	890 V	1370 V

8. ANSI/IEEE Cat. B3/C1 Let Through Voltage – The let through voltage based on IEEE C62.41 and C62.45 recommended procedures for the ANSI/IEEE Cat. B3 ring wave (6000V, 3000A) shall be less than:

Modes	208Y/120	480Y/277
L-L	900V	1640V
L-G	550V	1050V
L-N, N-G	520 V	980 V

9. Each unit shall include an EMI/RFI filter. Filter shall comply with UL-1283.
10. Where practical, and to aid in keeping power lead/bus length short, Surge Protective Devices may be integrated into electrical distribution equipment enclosures.
11. In order to isolate the Surge Protective Devices under fault conditions, the assembly shall be U.L. rated for the same short circuit fault duty rating as the equipment to which it is connected. Provide supplemental fusing, if required, in order to meet this requirement. All overcurrent protection components shall be tested in compliance with UL 1449 – Limited Current Test and AIC Ratings.
12. Devices shall be provided with integral thermal protection to disconnect the suppression components during an overheated MOV condition.
13. Minimum Repetitive Surge Current Capability: The device shall be repetitive surge tested in every mode utilizing Category C3 waveshapes at minimum of one-minute intervals without suffering either performance degradation or more than 10% deviation of clamping voltage at a specified surge current. The minimum repetitive surge current capability as per ANSI/IEEE C62.41 and ANSI/IEEE C62.45 shall be:

- a. Service Entrance: 12,000 impulses per mode.
 - b. Branch Location (MCC's & Switchboards): 500 impulses per mode.
 - c. Branch Location Panelboard: 100 impulses per mode.
14. Voltage Protection Rating: The residual (limiting) voltage for a 6000V, 3000A, 8x20μs surge waveform that the Surge Protective Device is capable of withstanding shall be no less than that shown in the following table:

Minimum total Surge Current and Withstand Capability with Compliance to ANSI/IEEE C62.41 and NEMA LS-1			
Application	Per Phase	Per Mode	Surge Withstand Capabilities ANSI/IEEE C3 Wave (10kA)
<u>All Service Entrance Equipment</u> (Switchgear, Switchboards, MCC's, and other S.E. listed equipment)	240 kA	120kA	12,000 events
Branch Locations (Non-S.E. MCC's & Switchboards)	120 kA	60 kA	500 events
Branch Locations (Non-S.E. Panelboards)	40 kA	20 kA	100 events

15. Lighting and Distribution Panelboard Requirements. The following additional requirements shall apply when drawings indicate that the Surge Protective equipment is to be integral to the panelboard and mounted within the enclosure housing.
- a. The Surge Protection units shall be tested to demonstrate suitability for ANSI/IEEE C62.41 Category C1 environments.
 - b. The Surge Protective Device shall not limit the use of Through-feed lugs, Sub-feed lugs and Sub-feed breaker features, where applicable.
 - c. The Surge Protective Device shall be immediately installed on the load side of the main breaker.
 - d. The panelboard shall be capable of re-energizing upon removal of the Surge Protective Device.
 - e. A direct bus bar connection shall be used to mount the Surge Protective component to the panelboard bus bar to reduce the impedance of the shunt path.
 - f. The Surge Protected panelboard shall be constructed using a direct bus bar connection.
 - g. The surge Protective Device shall be included and mounted within the panelboard by the manufacturer of the panelboard.
 - h. The complete panelboard, including the Surge Protection Device shall be UL-67 listed.
16. Switchgear, Switchboard, MCC and other Service Entrance equipment:
- a. The Surge Protection Devices covered under this section shall be 3rd party tested and suitable for ANSI/IEEE C62.41 Category C3 environments.
 - b. Surge Protection Device Nominal Discharge Current Rating: 20kA.
 - c. Then Surge Protection Device shall be located on the load side of the main disconnect device, as close as possible to the phase conductors and ground/neutral bar.

- d. Provide a 30-amp disconnect (or manufacturers recommended size). The disconnect shall be directly integrated to the suppressor assembly.
 - e. Provide factory installed digital surge counter and form C dry-contact alarm that changes state if any of the three phases detect a faulted, open or other reduced protection condition.
 - f. All monitoring diagnostic features shall be visible from the front of the equipment.
- F. Control Panels (120 VAC Supply): All fabricated control panels utilizing 120 VAC power which house relays, timers or other electrical and electronic equipment shall be provided with Surge Protective Devices on the 120 VAC supply. This 120 VAC Surge Protective Device is in addition to any upstream three-phase Surge Protection units required elsewhere. Each 120 VAC Surge Protective Device unit shall include an isolated dry-contact "failure-alarm" for remote monitoring. Control Panel Surge Protective Devices units shall be Phoenix Contact Model PLT-SEC-T3-120-FM - 2905228, or equivalent. To permit remote monitoring, connect the "Alarm" dry-contact to a Programmable Logic Controller (PLC) Digital Input, if applicable on project.
- G. Instrumentation Signal Protection. All analog instrumentation 4-20 ma signal cables which originate or terminate on an instrument installed on building exterior shall be individually protected with surge suppression at both ends of cable.
 - 1. All Instrumentation Signal Surge Suppressors mounted within control panels shall be Transtector Model DRDC-24 (DIN Rail mount), or equivalent.
 - 2. All Instrumentation Signal Surge Suppressors mounted at field mounted equipment shall be ½" pipe nipple mount Transtector Model PDS-1 (dead-ended) or PDS-2 (thru-design), or equivalent.
- H. Surge Protection for DeviceNet Network:
On projects involving DeviceNet, or where shown on the drawings, provide UL-497B DeviceNet surge protection devices. Surge protection may be installed within DeviceNet equipment where practical. Where other enclosures are unavailable, provide suitably sized NEMA 4X Non-Metallic enclosure to house Surge Protection equipment. DeviceNet Surge Protection devices shall be Leviton Model #3863-DEV.
- I. Surge Protection for Ethernet Network:
On projects involving metallic-wire Ethernet which extends to building exterior, or where shown on the drawings, provide UL-497B Ethernet surge protection devices. Surge protection may be installed within other Ethernet equipment, Local Control Panels or PLC enclosures, whichever best suits particular project networking architecture and equipment. Where other enclosures are unavailable, provide suitably sized NEMA 4X Non-Metallic enclosure to house Surge Protection equipment. Ethernet Surge Protection devices shall be furnished with standard RJ-45 Input and Output jacks. Ethernet Surge Protection devices shall be Leviton Model #3861-ETH.

PART 3 EXECUTION

3.01 EXAMINATION (RESERVED)

3.02 PREPARATION (RESERVED)

3.03 INSTALLATION

- A. Control panel surge protection shall be installed per manufacturer's instructions by panel builder prior to shipment.
- B. Surge protection equipment for all other locations shall be installed per manufacturer's instructions and requirements.

END OF SECTION 16280

DIVISION 16 – ELECTRICAL
Section 16305 – Service Entrance

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Work included in this section is labor, equipment and materials necessary to provide a complete and operational service entrance as detailed on drawings and specified herein. All work shall be as shown on project drawings and coordinated with serving utility requirements.
- B. The work described in this Specification Section is for information only. The Contractor shall comply with all requirements of the Serving Utility effective at the time of the installation of the Service Entrance. This may result in different installation methods and different equipment supply and installation by the Contractor than shown on the plans or specified herein. All material, equipment and labor required to furnish and install a complete and operational Service Entrance in compliance with Serving Utility requirements shall be considered incidental to the contract work.
- C. Serving Utility shall furnish and install:
 - 1. Medium-Voltage primary cable, installation and terminations.
 - 2. Service transformer
 - 3. Concrete transformer pad
 - 4. All metering transformers (C.T.'s and P.T.'s as appropriate). (Note, Contractor shall furnish and install metering transformer cabinet if not furnished by serving Utility.)
 - 5. Termination of secondary conductors on secondary lugs of pad-mount transformer. Conductors to be provided and pulled by Contractor.
 - 6. KWH Meter instrument. (Note, Contractor shall furnish and install KWH Meter Base if not furnished by serving Utility.)
 - 7. Installation of secondary metering conductors between metering transformer enclosure and KWH meter equipment. Conduit and pull string meeting utility requirements is to be provided and installed by Contractor.
- D. Contractor shall furnish and install:
 - 1. Trenching between existing pad-mount service and proposed pad-mount transformer.
 - 2. Secondary service conductors and conduit between pad-mount transformer and Metering Transformer Cabinet.

3. Termination of service conductors at Metering Transformer Cabinet. Service conductors will be terminated at utility pad-mount transformer by serving utility.
4. If not furnished by serving Utility, KWH Meter Base meeting electric utility requirements
5. If not furnished by serving Utility, Metering Transformer Cabinet meeting electric utility requirements.
6. Conduit and pull-string meeting utility requirements between Metering Transformer Cabinet and KWH Meter base. Electric utility will furnish and install metering conductors.
7. Installation of conduit and service conductors between Metering Transformer Cabinet and Service Entrance Main Circuit Breaker.
8. Any additional work as required by serving utility but not specifically noted herein shall be considered incidental to this section.
9. Grounding and Bonding for Service Entrance is covered under Section 16060.

E. Related Sections

1. Section 16060 – Grounding and Bonding for Electrical Systems
2. Section 16080 – Testing Electrical Systems
3. Section 16100 – Common Work Results for Electrical
4. Section 16110 – Underground Electrical Construction
5. Section 16130 – Raceway and Boxes for Electrical Systems
6. Section 16280 – Surge Protective Devices for Low Voltage Power Circuits

F. Reference to Standards

1. ANSI/NFPA 70 - National Electrical Code

1.03 UTILITY NAME: Dubois REC, Inc.
 Contact Individual: Greg Dilger
 Street Address: 1400 Energy Drive
 City, State, Zip: Jasper, IN 47546
 Phone No.: 812-482-1188 office
 812-639-2325 cell
 Email: gdilger@duboisrec.com

1.04 CONTRACTOR SHALL NOTE THAT ALL “NEW SERVICE” OR “ONE TIME CHARGES” THAT MAY BE BILLED BY THE SERVING UTILITY SHALL BE PAID FOR BY THE CONTRACTOR AND INCLUDED WITH THE BASE BID PRICE UNDER THIS ITEM. THEY WILL NOT BE PAID FOR SEPARATELY.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Equipment shall be stored in original cartons, where applicable, and away from contact with earth and protected from weather and abuse.

1.06 SUBMITTALS (RESERVED)

1.07 QUALIFICATIONS (RESERVED)

1.08 QUALITY ASSURANCE (RESERVED)

1.09 REGULATORY REQUIREMENTS

- A. Contractor shall comply with all requirements of serving utility.

1.10 COORDINATION

- A. Contractor shall coordinate service installation with serving utility.

1.11 MAINTENANCE SERVICE (WARRANTY)

- A. Cable and appurtenances shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion.

1.12 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Contractor shall comply with all requirements of serving utility.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Pad-mounted transformer shall be installed on concrete pad as detailed in drawings and as required by serving utility. Concrete pad shall be level. Surrounding earth shall be thoroughly tamped, graded, fertilized and seeded. If erosion appears to be a problem, Contractor shall install rock to control erosion.
- B. Install service entrance conductors between the utility transformer and service entrance rated panelboard. Conductors shall conform to the requirements as noted in Section 16120 – Low-Voltage Conductors and Cables.
- C. Conduit shall be installed as specified in Section 16130 – Raceway and Boxes for Electrical Systems and Section 16110 – Underground Electrical Construction.
- D. Contractor shall furnish and install utility metering equipment as required by serving utility and shall coordinate the location of this metering with serving utility and owner's authorized representative.
- E. Power coordination during construction at an existing facility (if applicable)

In order to minimize down-time to the existing facility, an existing service shall remain in service as long as possible until new service or modifications are in place and ready for switch-over. Any shutdown or disruption of the existing facility power distribution shall be coordinated with the owner and engineer. A minimum of 72 hours written notice of any such shutdown shall be furnished by contractor before commencing with any such work. Before disconnection of any existing service entrance or power, new improvements shall be fully installed, checked out and

ready for commission. Any existing utility equipment to be de-commissioned or removed shall be done only after new improvements have been thoroughly tested and accepted for permanent operation.

3.02 TESTING

- A. Entire service entrance system shall be tested. Perform testing in accordance with serving utility's recommendations.
- B. Comply with all applicable items in Section 16080 – Testing Electrical Systems.

END OF SECTION 16305

DIVISION 16 – ELECTRICAL
Section 16410 – Enclosed Switches and
Circuit Breakers

PART 1 GENERAL

1.01 WORK INCLUDES

- A. This section includes enclosed safety switches for use as service disconnects, feeder and branch circuit switching and disconnect switches for motors and equipment.
- B. This section shall also include double-throw safety switches used as manual transfer switches.
- C. This section includes furnishing and installation of enclosed circuit breakers for use as service disconnects feeder or branch circuit switching.

1.02 RELATED SECTIONS

- A. Section 16100 – Common Work Results for Electrical
- B. Section 16120 – Low-Voltage Conductors and Cables
- C. Section 16060 – Grounding and Bonding for Electrical Systems
- D. Section 16070 – Hangers and Supports for Electrical Systems
- E. Section 16130 – Raceway and Boxes for Electrical Systems
- F. Section 16110 – Underground Electrical Construction
- G. Section 16075 – Identification for Electrical Systems
- H. Section 16305 – Service Entrance
- I. Section 16280 – Surge Protective Devices for Low Voltage Power Circuits

1.03 REFERENCE TO STANDARDS

- A. ANSI/NFPA 70 - National Electrical Code.
- B. NEMA KS 1 - Enclosed Switches.
- C. NECA - National Electrical Contractors Association.
- D. UL 489 - Molded Case Circuit Breakers
- E. UL 869A - Reference Standard for Service Equipment
- F. NEMA AB1 - Molded Case Circuit Breakers
- G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- H. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.04 DELIVERY, STORAGE AND HANDLING

- A. Single-Throw and Double-Throw Safety Switches shall be stored in original containers as delivered to jobsite. Safety switches shall be stored on pallets or other supports to prevent contact with earth. Safety switches shall be covered to protect them from weather.
- B. Enclosed circuit breakers shall be stored in a clean dry place, away from construction.

1.05 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Product Data: Provide catalog data for switch ratings and enclosure dimensions.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.
- D. Product Data: Provide information on the following:
 - 1. Voltage Rating
 - 2. Continuous Current
 - 3. Interrupting Ratings
 - 4. Cable Terminal Sizes
- E. Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.06 QUALIFICATIONS

- A. Enclosed circuit breakers shall be furnished by manufacturer regularly engaged in the construction of enclosed circuit breakers, with a minimum of five years' experience in furnishing equipment of this type.

1.07 QUALITY ASSURANCE

- A. Perform work in accordance with NECA Standard of Installation.

1.08 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc., as suitable for purpose specified and shown.

1.09 COORDINATION (RESERVED)

1.10 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

1.11 EXTRA MATERIALS (SPARE PARTS) (RESERVED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Square D
- B. Cutler-Hammer
- C. Siemens
- D. General Electric

2.02 EQUIPMENT SPECIFICATION – ENCLOSED SWITCHES

- A. Safety switches (disconnects) shall be rated for use at 480 Volts, 3 phase and shall be Heavy Duty, NEMA KS 1 load interrupter enclosed knife switch with externally operated handle interlocked to prevent opening front cover with switch in ON position. Disconnect handle shall be lockable in OFF position.
- B. Safety switch enclosures shall be NEMA 4X, unless otherwise indicated on drawings.
- C. Where noted on project drawings, disconnects shall be fusible-type and shall include high-interrupting capacity, U.L. Class “R” time-delay (slow-blow) fuses, Buss, or equivalent. Fuse ampacities shall be as noted on the project drawings. Three spare fuses of each ampacity used on the project drawings shall be provided with each fusible disconnect.
- D. Where noted, disconnects shall be U.L. Listed as suitable for use as Service Entrance Disconnect Equipment. Provide Ground Kit and Neutral Kit where required.

2.03 EQUIPMENT SPECIFICATION – ENCLOSED CIRCUIT BREAKERS

- A. Protective devices shall be molded case design and shall be operated by a toggle-type handle and shall have a quick-make, quick-break over-center switching mechanism that is mechanically trip-free. Automatic tripping of the breaker shall be clearly indicated by the handle position. Contacts shall be non-welding silver alloy and arc extinction shall be accomplished by means of arc chutes. A push-to-trip button on the front of the circuit breaker shall provide a local manual means to exercise the trip mechanism.
- B. Unless otherwise specified, enclosed circuit breakers shall have a minimum symmetrical interrupting capacity of 65,000 Amps at 480 Volts.

C. Where applicable, circuit breakers and associated enclosure shall be UL listed and labeled as suitable for use as service entrance equipment.

D. Unless otherwise specified, enclosed circuit breakers shall be U.L. Listed for 80% capacity. Circuit Breaker shall be furnished with line and load lugs suitable for use with number and size of cables as shown on project drawings. All line and load cables shall be applied at NEC 75°C ratings.

Where enclosed circuit breakers are specifically noted as 100% capacity rated, line and load cables shall be 90°C rated conductors applied at 75°C ampacity rating.

E. Circuit breaker enclosure shall be the same manufacturer as circuit breaker, furnished with circuit breaker and NEMA rated as shown on project drawings. With the exception of NEMA 1 enclosures, all conduit penetrations on circuit breaker enclosure shall be through the use of watertight conduit hubs, Meyers or equivalent.

F. Enclosed circuit breakers for use as service entrance equipment shall be furnished with both isolated neutral and ground lug.

PART 3 EXECUTION

3.01 EXAMINATION

A. Inspect safety switches for proper operation. Disconnect switch movement shall not bind at any point in its travel. Inspect enclosures for corrosion and water tightness.

3.02 PREPARATION (RESERVED)

3.03 INSTALLATION

A. Install safety switches (disconnects) where detailed on drawings. All switches shall be mounted to strut-type framing.

B. All safety switches shall be bonded to equipment grounding system.

C. Provide nameplate for each safety switch as detailed on drawings or as directed by Owner's representative.

D. Inspect all disconnects for proper operation, tight and secure connections, and correctness. Adjust as necessary to assure proper operation.

E. The Contractor shall install circuit breakers per the manufacturer's recommendations and the project drawings.

3.04 INTERFACE WITH OTHER PRODUCTS (RESERVED)

3.05 MANUFACTURER'S FIELD SERVICES (RESERVED)

3.06 TESTING

- A. Standard factory tests shall be performed on the equipment under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.
- B. Test all disconnects for proper operation and continuity on all poles when in the closed (ON) position.

3.07 FIELD SETTINGS

- A. The Contractor shall perform field adjustments of the circuit breakers as required to place the equipment in final operating condition. The settings shall be in accordance with data to be provided by the engineer during construction.

END OF SECTION 16410

DIVISION 16 – ELECTRICAL
Section 16440 – Panelboards

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Work included in this section is supply and installation of power and lighting panelboards to provide a complete and operational electrical system.

1.02 RELATED SECTIONS

- A. Section 16100 – Common Work Results for Electrical
- B. Section 16120 – Low-Voltage Conductors and Cables
- C. Section 16060 – Grounding and Bonding for Electrical Systems
- D. Section 16070 – Hangers and Supports for Electrical Systems
- E. Section 16130 – Raceway and Boxes for Electrical Systems
- F. Section 16075 – Identification for Electrical Systems
- G. Section 16280 – Surge Protective Devices for Low Voltage Power Circuits

1.03 QUALITY ASSURANCE

- A. Panelboards shall be manufactured and supplied by a company regularly engaged in business of furnishing panelboards. If required by Owner's representative, manufacturer shall submit a certification to a minimum experience of five years in manufacture of panelboards.

1.04 REFERENCE TO STANDARDS

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)
- B. U.L. Standard 489 - Molded Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures
- C. U.L. Standard 67 - Panelboards
- D. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less
- E. NFPA 70 - National Electrical Code
- F. NECA (National Electrical Contractors Association) "Standard of Installation"
- G. NEMA AB 1 - Molded Case Circuit Breakers
- H. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies
- I. NEMA KS 1 - Enclosed Switches
- J. NEMA PB 1 – Panelboards

1.05 SUBMITTALS

- A. Submit under provisions of Division 01.

- B. Submittals shall include outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker arrangement and sizes. Submittals shall also include manufacturer's installation instructions; indicating application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting the product.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Panelboards shall be stored indoors from time of delivery to jobsite, protected from weather and damage.

1.07 MAINTENANCE SERVICE (WARRANTY)

- A. All equipment shall be warranted to be free from defects in material and workmanship for a period of one year from date of substantial completion established by the Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Eaton/Cutler-Hammer
- B. Square D
- C. General Electric
- D. Siemens
- E. Equivalent

2.02 EQUIPMENT

- A. Panelboard shall be provided with bolt-on circuit breakers of size and rating as detailed in panel schedule on plans. Breakers shall be 1, 2 or 3-pole with an integral crossbar to assure simultaneous opening of all poles in multipole circuit breakers. Breakers shall have an overcenter, trip-free, toggle-type operating mechanism with quick-make, quick-break action and positive handle indication. Handles shall have "ON", "OFF" and "TRIPPED" positions. Circuit breakers shall be UL listed in accordance with UL Standard 489.
- B. Panelboards bus structure and main lugs or main circuit breakers shall have current ratings as shown on panelboard schedule. Bus material shall be copper with either silver or tin plating. Bus ratings shall be in accordance with UL Standard 67. Bus bar connections to branch circuit breakers shall be the "distributed phase" or phase sequence type.
- C. Panelboard bus assembly shall be enclosed in a cabinet rated NEMA 4X (unless otherwise noted on the drawings). Box front shall include a door and have a flush, cylinder tumbler-type lock and catch and spring-loaded stainless-steel door pull. Door shall have completely concealed hinges when closed and shall not be removable when locked. A circuit directory frame and card with a clear plastic cover shall be provided on door interior.
- D. Panelboards shall be nominal 20" in width unless otherwise noted.

- E. Panelboards rated 240 VAC or less shall have short-circuit ratings as shown on the drawings, or as herein scheduled, but not less than an integrated equipment rating of 10,000 amps RMS symmetrical. All units shall bear UL label.
- F. Panelboards rated 480 VAC shall have short-circuit ratings as shown on the drawings, or as herein scheduled, but not less than an integrated equipment rating of 65,000 amps RMS symmetrical. All units shall bear UL label.
- G. Except where noted otherwise on the drawings, all panelboards shall have neutral bar and ground bar bonded together. Where neutral bar and ground bar are noted to be isolated, the contractor shall verify during wiring installation that neutral and ground conductors are terminated on the correct bar.
- H. Where schedule on drawings indicates "SPARE", a complete circuit breaker of the ampacity and number of poles indicated is to be provided. Where schedule on drawings does not indicate a specific size circuit breaker provide a 20 AMP single pole circuit breaker for each of the remaining unused poles. Therefore, panelboard shall be filled with feeder circuit breakers.
- I. All circuit breakers feeding HVAC equipment shall be HACR rated.
- J. Multi-pole circuit breakers with removable tie-links are not acceptable.
- K. Tandem circuit breakers (two circuit breakers on single pole frame) are not acceptable.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install panelboards where shown on the plans, in accordance with manufacturer's directions and in accordance with NEMA PB1.1. Install panelboards plumb. Provide filler plates for unused spaces in panelboards. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes as required.
- B. Provide legend plates for all panelboards to identify panelboard as well as voltage, phase and number of wires (example" LP-1, 208Y/120 VAC, 3 PHASE, 4 WIRE"). Legend plates shall comply with Section 16075 – Identification for Electrical Systems.
- C. Panelboard Surge Protective Device shall be installed in compliance with Section 16280.

3.02 TESTING

- A. Panelboards and load centers shall be thoroughly tested after installation and connection to respective loads. Lighting panelboard phases shall be measured with all major items operating. Phase loads shall be within 20 percent of each other. Rearrange circuits if required maintaining proper phasing for multi-wire branch circuits.

- B. Test for shorts and high resistance grounds. Check for faulty operation of circuit breakers and correct as needed.

END OF SECTION 16440

DIVISION 16 – ELECTRICAL
Section 16500 – Interior Lighting

PART 1 GENERAL

1.01. WORK INCLUDES

- A. Base Bid:
 - 1. Electrical Contractor shall provide
 - a. Lighting fixtures and accessories complete as shown or implied on the Contract Documents

1.02 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Specified Elsewhere
 - 1. Section 16060 – Grounding and Bonding for Electrical Systems
 - 2. Section 16075 – Identification for Electrical Systems
 - 3. Section 16080 – Testing Electrical Systems
 - 4. Section 16100 – Common Work Results for Electrical
 - 5. Section 16120 – Low-Voltage Conductors and Cables
 - 6. Section 16130 – Raceways and Boxes for Electrical systems
 - 7. Section 16140 – Wiring Devices

1.03 REFERENCES

- A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the designation only:

1.04 SUBMITTALS

- A. Submit in accordance with Division 1, Submittals and Section 16100 Common Work Results for Electrical.
- B. Submit manufacturer's data on lighting fixtures, assembled by luminaire "type" the fixture schedule order, with the proposed fixture and accessories clearly labeled. Include photometric data. Ballast and lamp product data shall accompany fixture submittals.
- C. In addition to the printed copies of the submittal, a portable document format (pdf) of the submittal shall be transmitted via email to the Engineer.
- D. Project information: Not required for Engineer/Architect review.
- E. Contract closeout information: Not required for Engineer/Architect review.
 - 1. Operating and maintenance data.
 - 2. Owner instruction report.
 - 3. As Built Drawings
- F. Warranties: Provide one (1) year minimum material and labor warranty on all

components from date of substantial completion. Provide five (5) year manufacturer's warranty on all electronic ballasts. Provide three (3) year warranty on all led lamps and drivers.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70 2011
- B. Products: Listed by a Nationally Recognized Testing Laboratory and classified as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01. LIGHTING FIXTURES/MANUFACTURERS

- A. Lighting fixtures shall be as per plan or an equal meeting the specifications as well as lighting output and distribution.

2.02. LIGHT FIXTURES

- A. LIGHT EMITTING DIODE (LED) LIGHTING FIXTURES
 1. White LED fixtures for general illumination shall have been tested by the US Dept. of Energy's CALiPER program, IES LM-79 and LM-80.
 2. Color temperature: No greater than 5000K for indoor illumination. 3500 K strongly preferred.
 3. All LED luminaires shall have been designed around the LED source. LED lamps marketed as replacements for four foot fluorescent T8s shall never be used.
 4. LED systems shall be modular and allow for separate replacement of the LEDs and driver. "Throw-away" fixtures with non-replaceable components are not permitted.
 5. LED fixtures shall be equipped with wiring disconnect device to disconnect both line and neutral conductors to the LED driver.
 6. Warranty: Minimum 3-year manufacturer warranty on LED lamps and drivers.
- B. Other Lighting Fixtures:
 1. Incandescent ceiling recessed light fixtures shall be furnished complete with prewired junction box and trim rings; where not otherwise specified, trim rings shall be finished baked white enamel; such fixtures shall be listed and labeled as complying with thermal protection requirements of NEC.
 2. HID lighting fixtures shall be supplied complete with integral ballast, constant wattage secondary single-lamp type with minimum 90% power factor, 10% voltage/wattage regulation, outdoor units weatherproof and suitable for operation at -20°F; all HID fixtures shall have integral fuse protection.
 3. Where scheduled or required by fixture type, remote mounted HID ballast (long range igniter) wiring lengths shall not exceed the manufacturer's requirements. Wire size shall be per the manufacturer's requirements for

the remote distance, #12 AWG minimum, unless otherwise scheduled or specified. The ballast shall be provided in a rated enclosure for the environment in which installed.

4. Exit lights shall be end, back or canopy mounted as indicated or required, and shall be complete with directional arrows as required. For exit lights, the Electrical Contractor shall verify the lettering, lettering color, size, etc. of the specified units with local authorities and furnish lights, wiring and connections meeting the requirements of those authorities. Exit lights shall be equipped with self check feature.

- C. Generator Transfer Device (Relay) shall be installed at fixtures designated. Generator Transfer device shall be Bodine GTD

1. The device shall comply with UL 924 "Emergency Lighting and Power Equipment."
2. The device shall transfer selected lighting fixture(s) to an alternate power source in the event of an interruption of the primary lighting power source.
3. The device shall consist relay switching circuitry monitoring the primary power source and be capable of by-passing switch and powering lighting fixtures from the auxiliary source.
4. Switching Capacity 3 A max at 120 or 277 Volts.
5. Circuit burden of 280 ma. 1.6 watts during normal operation.

2.03 LAMPS

- A. LED Lamps

1. LED Lamps: self-contained replacement for 60 or 100 Watt A-19 incandescent lamps. for use in incandescent design fixtures

PART 3 EXECUTION

3.01. INSTALLATION

- A. Quantities and Locations:

1. Lighting fixture locations shown on Contract Documents are for estimating purposes; final locations shall be in accordance with Engineer/Architect's reflected ceiling plan.
2. Furnish and install fixtures indicated by Contract Documents complete with lamps; provide an outlet for each such fixture.
3. Fixtures in mechanical rooms shall be located to clear piping, ductwork, valves, and other equipment and to illuminate panels, gauges, valves, controls, etc. These fixtures may be chain or stem hung and shall be so hung when required to illuminate the equipment noted.
4. Where different wattages of the same type of fixture are installed in the same room, all of the fixtures shall be of the same manufacturer.

- B. Fixture Types:

1. Contractor shall verify ceiling construction with ceiling supplier prior to ordering fixtures and shall provide grid, flange, or surface mounted units where required.

- C. Generator Transfer Device installed on fixtures designated.
 - 1. Connect Transfer device to Alternate source.
 - 2. Wiring of transfer device per manufacturer's instructions.
 - 3. Connect to Center lamp ballast in three lamp fixtures.
 - 4. Connect to one ballast in two and four lamp fixtures.
- D. Mounting:
 - 1. Suspended fluorescent fixtures shall be mounted approximately 8'-0" to bottom above finished floor unless otherwise noted on Contract Documents.
 - 2. Install recessed fixture to permit removal from below.
 - 3. Install clips to secure recessed grid-supported fixtures in place.
 - 4. Bond fixtures and metal accessories to form a continuous path to ground.
 - 5. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions.
 - 6. Recessed fixtures installed in ceilings fire rated for one hour or more shall be provided with a one hour fire rated enclosure. Coordinate ceiling construction fire ratings with the Architectural plans and schedules.
- E. Adjusting: Aim and adjust fixtures per directions of Engineer/Architect.
- F. Cleaning:
 - 1. Clean electrical parts to remove dirt and debris.
 - 2. Clean photometric control surfaces.

END OF SECTION 16500

DIVISION 16 – ELECTRICAL
SECTION 16520 - EXTERIOR LIGHTING

PART 1 GENERAL

1.01 WORK INCLUDES

- A. Base Bid:
 - 1. Electrical Contractor shall provide
 - a. Lighting fixtures and accessories complete as shown or implied on the Contract Documents.

1.02 DESCRIPTION

This section specifies the furnishing, installation, and connection of exterior luminaires, poles, and supports. The term "Lighting Fixtures", "Fixture" and "Luminaire" are used interchangeably.

1.03 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Specified Elsewhere
 - 1. Section 03300 – Structural Concrete
 - 2. Section 16060 – Grounding and Bonding for Electrical Systems
 - 3. Section 16100 – Common Work Results for Electrical
 - 4. Section 16110 - Underground Electrical Construction
 - 5. Section 16120 - Low-Voltage Electrical Power Conductors and Cables
 - 6. Section 16130 – Raceway and Boxes for Electrical Systems

1.04 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed by a Nationally Recognized Testing Laboratory and classified as suitable for the purpose specified and indicated.

1.05 SUBMITTALS

- A. Submit in accordance with Division 1, submittals and Section 16100, and the following requirements.
- B. Shop Drawings:
 - 1. Clearly present sufficient information to determine compliance with drawings and specifications.
 - 2. Include electrical ratings, dimensions, mounting, details, materials, required clearances, terminations, wiring and connection diagrams, photometric data, ballasts, poles, luminaires, lamps, and accessories.
 - 3. In addition to the printed copies of the submittal, a portable document format (pdf) of the submittal shall be transmitted via email to the Engineer.
- C. Manuals: Two weeks prior to final inspection, submit four copies of operating and maintenance manuals to the Resident Engineer. Include technical data sheets,

wiring and connection diagrams, and information for ordering replacement lamps, ballasts, and parts.

- D. Certifications: Two weeks prior to final inspection, submit four copies of the following to the Architect/Engineer:
 - 1. Certification by the manufacturer that the materials are in accordance with the drawings and specifications.
 - 2. Certification by the contractor that the complete installation has been properly installed and tested.
- E. Contract closeout information: Not required for Engineer/Architect review.
 - 1. Operating and maintenance data.
 - 2. Owner instruction report.
 - 3. As-Built drawings
- F. Warranties: Provide one (1) year minimum material and labor warranty on all components from date of substantial completion.

1.06 APPLICABLE PUBLICATIONS

- A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.
- B. Aluminum Association Inc. (AA):
AAH35.1-06 Alloy and Temper Designation Systems for Aluminum
- C. American Association of State Highway and Transportation Officials (AASHTO):
LTS-5-09 Structural Supports for Highway Signs, Luminaires and Traffic Signals
- D. American Concrete Institute (ACI):
318-14 Building Code Requirements for Structural Concrete
- E. American National Standards Institute (ANSI):
H35.1/H35 1M-17 American National Standard Alloy and Temper Designation Systems for Aluminum.
- F. American Society for Testing and Materials (ASTM):
A123/A123M-17 Zinc (Hot-Dip Galvanized) Coatings on
Iron and Steel Products A153/A153M-16 Zinc Coating
(Hot-Dip) on Iron and Steel Hardware
B108/B108M-15 Aluminum-Alloy
Permanent Mold Casting C1089-13 Spun
Cast Prestressed Concrete Poles
- G. Illuminating Engineering Society of North America (IESNA) HB-9-00 Lighting Handbook
RP-8-14 Roadway Lighting
RP-20-98 Lighting for Parking Facilities
RP-33-99 Lighting for Exterior Environments
LM-5-96 Photometric Measurements of Area and
Sports Lighting Installations LM-50-99 Photometric
Measurements of Roadway Lighting Installations
LM-64-01 Photometric Measurements of
Parking Areas
LM-72-97 (R2010) Directional Positioning of Photometric Data

LM-79-08 Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products
LM-80-15 Approved Method for Measuring Lumen Maintenance of LED Light Sources
TM-15-11 Luminaire Classification System for Outdoor Luminaires

- H. National Electrical Manufacturers Association (NEMA):
 - C136.3-14 For Roadway and Area Lighting Equipment – Luminaire Attachments
 - ICS 2-00 (R2005) Controllers, Contactors and Overload Relays Rated 600 Volts
 - ICS 6-93 (R2006) Enclosures
- I. National Fire Protection Association (NFPA):
 - 70-20 National Electrical Code (NEC)
 - 101-18 Life Safety Code
- J. Underwriters Laboratories, Inc. (UL):
 - 496-17 Lampholders
 - 773-16 Plug-In, Locking Type Photocontrols for Use with Area Lighting
 - 773A-06 Nonindustrial Photoelectric Switches for Lighting Control
 - 1029-94 High-Intensity-Discharge Lamp Ballasts
 - 1598-08 Luminaires
 - 8750-15 Light Emitting Diode (LED) Light Sources for Use in Lighting Products

1.07 DELIVERY, STORAGE, AND HANDLING

Provide manufacturer's standard provisions for protecting pole finishes during transport, storage, and installation. Do not store poles on ground. Store poles so they are at least 12 in [305 mm] above ground level and growing vegetation. Do not remove factory-applied pole wrappings until just before installing pole.

PART 2 PRODUCTS

2.01 LIGHTING FIXTURES/MANUFACTURERS

- A. Lighting fixtures shall be as per plan or an equal meeting the specifications as well as lighting output and distribution.

2.01 POLES

- A. General:
 - 1. Poles shall be as shown on the drawings, and as specified. Finish shall be as specified on the drawings.
 - 2. The pole and arm assembly shall be designed for wind loading of 100 mph [161 km/hr], with an additional 30% gust factor, supporting luminaire(s) and accessories such as shields, banner arms, and banners that have the effective projected areas indicated. The effective projected area of the pole shall be applied at the height of the pole base, as shown on the drawings.
 - 3. Poles shall be anchor-bolt type designed for use with underground supply conductors. Poles shall have handhole having a minimum clear opening of 2.5 x 5 in [65 x 125 mm]. Handhole covers shall be secured by stainless steel captive screws.

4. Provide a steel-grounding stud opposite handhole openings, designed to prevent electrolysis when used with copper wire.
 5. Provide a base cover that matches the pole in material and color to conceal the mounting hardware pole-base and anchor bolts.
 6. Hardware and Accessories: All necessary hardware and specified accessories shall be the product of the pole manufacturer.
 7. Provide manufacturer's standard finish, as scheduled on the drawings. Where indicated on drawings,
- B. Types:
1. Aluminum: Provide aluminum poles manufactured of corrosion resistant AA AAH35.1 aluminum alloys conforming to AASHTO LTS-4 for Alloy 6063-T6 or Alloy 6005-T5 for wrought alloys, and Alloy 356-T4 (3,5) for ASTM B108-03 cast alloys. Poles shall be seamless extruded or spun seamless type. Provide a pole grounding connection designed to prevent electrolysis when used with copper ground wire. Base covers for aluminum poles shall be cast from 356-T6 aluminum alloy in accordance with ASTM B108-03.
 2. Steel: Provide (Round, Square) steel pole having a minimum 11-guage steel with minimum strength of 48,000 psi and (hot dipped galvanized, iron-oxide primed) factor finish.

2.02 FOUNDATIONS FOR POLES

- A. Foundations shall be cast-in-place concrete, having 3000 psi minimum 28-day compressive strength.
- B. Foundations shall support the effective projected area of the specified pole, arm(s), luminaire(s), and accessories, such as shields, banner arms, and banners, under wind conditions previously specified in this section.
- C. Place concrete in spirally-wrapped treated paper forms for round foundations, and construct forms for square foundations.
- D. Rub-finish and round all above-grade concrete edges to approximately 0.25 in [6 mm] radius.
- E. Anchor bolt assemblies and reinforcing of concrete foundations shall be as shown on the drawings. Anchor bolts shall be in a welded cage or properly positioned by the tie wire to stirrups. Anchor bolts shall be steel rod having a minimum yield strength of 50,000psi; the top 12 inches of the rod shall be galvanized in accordance with ASTM A 153/A 153M.
- F. Prior to concrete pour, install electrode per Section 16060, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

2.03 LUMINAIRES

- A. Luminaires shall be weatherproof, heavy duty, outdoor types designed for efficient light utilization, adequate dissipation of lamp and ballast heat, and safe cleaning and relamping.
- B. Light distribution pattern types shall be as shown on the drawings.
- C. Lenses shall be frame-mounted, heat-resistant, borosilicate glass, with prismatic refractors, unless otherwise shown on the drawings. Attach the frame to the

luminaire housing by hinges or chain. Use heat and aging-resistant, resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

- D. Pre-wire internal components to terminal strips at the factory.
- E. Bracket-mounted luminaires shall have leveling provisions and clamp-type adjustable slip-fitters with locking screws.
- F. Materials shall be rustproof. Latches and fittings shall be non-ferrous metal.
- G. Provide manufacturer's standard finish, as scheduled on the drawings. Where indicated on drawings, match finish process and color of pole or support materials. Where indicated on drawings,
- H. Luminaires shall carry factory labels, showing complete, specific lamp and ballast information.

2.04 LAMPS

- A. Install the proper lamps in every luminaire installed
- B. Lamps shall be general-service, outdoor lighting types.
- C. LED sources shall meet the following requirements:
 - 1. Operating temperature rating shall be between -40° F [-40° C] and 120° F [50° C].
 - 2. Correlated Color Temperature (CCT) 4000K unless indicated otherwise.
 - 3. Color Rendering Index (CRI) greater or equal than 85.
 - 4. The manufacturer shall have performed JEDEC (Joint Electron Devices Engineering Council) reliability tests on the LEDs as follows: High Temperature Operating Life (HTOL), Room Temperature Operating Life (RTOL), Low Temperature Operating Life (LTOL), Powered Temperature Cycle (PTMCL), Non-Operating Thermal Shock (TMSK), Mechanical Shock Variable Vibration Frequency, and Solder Heat Resistance (SHR).

2.05 LED DRIVERS

- A. LED Drivers shall meet the following requirements:
 - 1. Drivers shall have a minimum efficiency of 85%.
 - 2. Starting Temperature: -40 degrees C (-40 degrees F).
 - 3. Input Voltage: 120 to 480 (±10%) volt.
 - 4. Power Supplies: Class I or II output.
 - 5. Surge Protection: The system must survive 250 repetitive strikes of "C Low" (C Low: 6kV/1.2 x 50 µs, 10kA/8 x 20 µs) waveforms at 1-minute intervals with less than 10% degradation in clamping voltage. "C Low" waveforms are as defined in IEEE/ASNI C62.41.2-2002, Scenario 1 Location Category C.
 - 6. Power Factor (PF): ≥ 0.90.
 - 7. Total Harmonic Distortion (THD): ≤ 20%.
 - 8. Comply with FCC Title 47 CFR Part 18 Non-consumer RFI/EMI Standards.
 - 9. Drivers shall be reduction of hazardous substances (ROHS)-compliant.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install lighting in accordance with the NEC, as shown on the drawings, and in accordance with manufacturer's recommendations.
- B. Pole Foundations:
 - 1. Excavate only as necessary to provide sufficient working clearance for installation of forms and proper use of tamper to the full depth of the excavation. Prevent surface water from flowing into the excavation. Thoroughly compact backfill with compacting arranged to prevent pressure between conductor, jacket, or sheath, and the end of conduit.
 - 2. Set anchor bolts according to anchor-bolt templates furnished by the pole manufacturer.
 - 3. Install poles as necessary to provide a permanent vertical position with the bracket arm in proper position for luminaire location.
- C. Adjust luminaires that require field adjustment or aiming.

3.02 GROUNDING

Ground noncurrent-carrying parts of equipment, including metal poles, luminaires, mounting arms, brackets, and metallic enclosures, as specified in Section 16060, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS. Where copper grounding conductor is connected to a metal other than copper, provide specially-treated or tinned connectors suitable and listed for this purpose.

3.03 ACCEPTANCE CHECKS AND TESTS

Verify operation after installing luminaires and energizing circuits.

END OF SECTION 16520

Stakeout Data Points as of 2-20-25

Point No.	Easting	Westing	Elevation	Point Description
100	1096364.02	3041807.856	624.58	Campsite 1
101	1096359.808	3041794.165	624.70	Campsite 1
102	1096355.596	3041780.474	625.41	Campsite 1
103	1096347.173	3041753.093	625.46	Campsite 1
104	1096340.929	3041749.775	625.25	Campsite 1
105	1096334.236	3041751.822	624.97	Campsite 1
106	1096329.848	3041737.479	624.91	Campsite 1
107	1096325.46	3041723.136	624.90	Campsite 1
108	1096342.194	3041718.017	624.86	Campsite 1
109	1096358.927	3041712.898	624.26	Campsite 1
110	1096363.315	3041727.241	624.92	Campsite 1
111	1096367.703	3041741.584	625.54	Campsite 1
112	1096365.702	3041745.296	625.68	Campsite 1
113	1096370.614	3041761.355	626.01	Campsite 1
114	1096374.363	3041764.785	626.06	Campsite 1
115	1096379.178	3041763.163	626.01	Campsite 1
120	1096468.733	3041811.616	624.16	Campsite 2
121	1096459.894	3041807.669	624.32	Campsite 2
122	1096443.345	3041803.878	624.89	Campsite 2
123	1096426.796	3041800.088	625.24	Campsite 2
124	1096420.806	3041803.845	625.20	Campsite 2
125	1096419.243	3041810.668	625.00	Campsite 2
126	1096404.622	3041807.319	625.07	Campsite 2
127	1096390.002	3041803.97	625.14	Campsite 2
128	1096393.909	3041786.913	625.57	Campsite 2
129	1096397.816	3041769.855	625.57	Campsite 2
130	1096412.436	3041773.204	625.37	Campsite 2
131	1096427.057	3041776.553	624.94	Campsite 2
132	1096429.277	3041780.139	625.02	Campsite 2
133	1096442.765	3041783.229	624.73	Campsite 2
134	1096447.966	3041781.24	624.44	Campsite 2
140	1096497.366	3041856.651	623.29	Campsite 3
141	1096488.527	3041852.704	623.49	Campsite 3
142	1096476.045	3041849.845	623.95	Campsite 3
143	1096463.563	3041846.987	624.02	Campsite 3
144	1096457.573	3041850.744	624.03	Campsite 3
145	1096454.224	3041865.364	623.72	Campsite 3
146	1096437.865	3041861.617	623.91	Campsite 3
147	1096421.505	3041857.87	624.16	Campsite 3
148	1096424.854	3041843.25	624.40	Campsite 3
149	1096421.097	3041837.26	624.54	Campsite 3
150	1096407.15	3041834.065	624.42	Campsite 3
151	1096393.203	3041830.871	624.16	Campsite 3
152	1096388.002	3041832.861	624.03	Campsite 3
153	1096381.227	3041807.604	625.02	Campsite 3
154	1096397.313	3041819.502	624.73	Campsite 3

Stakeout Data Points as of 2-20-25

155	1096410.545	3041822.533	624.68	Campsite 3
156	1096423.776	3041825.563	624.67	Campsite 3
157	1096429.319	3041823.756	624.72	Campsite 3
158	1096444.051	3041827.13	624.62	Campsite 3
159	1096462.038	3041831.25	624.44	Campsite 3
160	1096466.242	3041835.29	624.30	Campsite 3
161	1096477.505	3041837.87	623.96	Campsite 3
162	1096482.706	3041835.88	623.73	Campsite 3
170	1096532.027	3041911.169	622.29	Campsite 4
171	1096523.189	3041907.222	622.39	Campsite 4
172	1096487.427	3041899.031	623.16	Campsite 4
173	1096481.438	3041902.789	623.11	Campsite 4
174	1096478.089	3041917.409	622.79	Campsite 4
175	1096461.73	3041913.662	622.99	Campsite 4
176	1096445.37	3041909.915	623.05	Campsite 4
177	1096448.719	3041895.295	623.49	Campsite 4
178	1096444.962	3041889.305	623.63	Campsite 4
179	1096427.865	3041885.389	623.58	Campsite 4
180	1096422.664	3041887.378	623.44	Campsite 4
181	1096408.004	3041866.607	623.63	Campsite 4
182	1096416.843	3041870.554	623.76	Campsite 4
183	1096432.242	3041874.081	623.78	Campsite 4
184	1096447.641	3041877.608	623.71	Campsite 4
185	1096453.184	3041875.8	623.65	Campsite 4
186	1096472.091	3041880.131	623.48	Campsite 4
187	1096485.903	3041883.294	623.42	Campsite 4
188	1096490.106	3041887.335	623.28	Campsite 4
189	1096512.167	3041892.388	622.67	Campsite 4
190	1096517.368	3041890.398	622.60	Campsite 4
200	1096566.886	3041965.69	620.93	Campsite 5
201	1096558.135	3041961.805	621.26	Campsite 5
202	1096540.381	3041957.739	621.75	Campsite 5
203	1096522.627	3041953.672	621.86	Campsite 5
204	1096516.637	3041957.429	621.88	Campsite 5
205	1096513.288	3041972.05	621.98	Campsite 5
206	1096496.929	3041968.303	621.91	Campsite 5
207	1096480.57	3041964.556	621.75	Campsite 5
208	1096483.918	3041949.935	622.64	Campsite 5
209	1096480.161	3041943.946	622.63	Campsite 5
210	1096462.526	3041939.906	622.38	Campsite 5
211	1096457.326	3041941.896	622.32	Campsite 5
212	1096442.666	3041921.125	622.71	Campsite 5
213	1096451.505	3041925.072	622.71	Campsite 5
214	1096467.172	3041928.66	622.61	Campsite 5
215	1096482.84	3041932.249	622.64	Campsite 5
216	1096488.383	3041930.441	622.59	Campsite 5
217	1096503.115	3041933.815	622.42	Campsite 5

Stakeout Data Points as of 2-20-25

218	1096521.102	3041937.935	622.12	Campsite 5
219	1096525.306	3041941.976	621.98	Campsite 5
220	1096546.829	3041946.905	621.69	Campsite 5
221	1096552.029	3041944.916	621.48	Campsite 5
230	1096602.323	3042020.386	620.66	Campsite 6
231	1096593.572	3042016.5	620.75	Campsite 6
232	1096575.699	3042012.407	621.16	Campsite 6
233	1096557.826	3042008.313	621.34	Campsite 6
234	1096551.836	3042012.07	621.42	Campsite 6
235	1096548.487	3042026.691	621.47	Campsite 6
236	1096532.128	3042022.944	621.35	Campsite 6
237	1096515.769	3042019.197	620.76	Campsite 6
238	1096519.117	3042004.576	621.35	Campsite 6
239	1096515.36	3041998.586	621.64	Campsite 6
240	1096497.241	3041994.436	621.32	Campsite 6
241	1096492.028	3041996.444	621.04	Campsite 6
242	1096477.328	3041975.643	621.39	Campsite 6
243	1096486.166	3041979.59	621.39	Campsite 6
244	1096502.103	3041983.24	621.96	Campsite 6
245	1096518.039	3041986.89	622.00	Campsite 6
246	1096523.583	3041985.082	621.93	Campsite 6
247	1096542.49	3041989.413	621.50	Campsite 6
248	1096556.301	3041992.576	621.28	Campsite 6
249	1096560.505	3041996.616	621.25	Campsite 6
250	1096582.077	3042001.557	620.87	Campsite 6
251	1096587.29	3041999.55	620.71	Campsite 6
260	1096644.004	3042084.718	619.89	Campsite 7
261	1096635.253	3042080.832	620.02	Campsite 7
262	1096613.246	3042075.792	620.29	Campsite 7
263	1096591.239	3042070.751	620.68	Campsite 7
264	1096585.249	3042074.509	620.70	Campsite 7
265	1096583.686	3042081.332	620.57	Campsite 7
266	1096569.066	3042077.983	620.90	Campsite 7
267	1096554.445	3042074.634	621.05	Campsite 7
268	1096556.008	3042067.811	621.05	Campsite 7
269	1096552.25	3042061.821	620.96	Campsite 7
270	1096538.922	3042058.768	620.77	Campsite 7
271	1096533.709	3042060.776	620.69	Campsite 7
272	1096533.61	3042066.361	620.70	Campsite 7
273	1096512.433	3042030.303	620.59	Campsite 7
274	1096521.183	3042034.189	620.83	Campsite 7
275	1096538.949	3042038.258	621.25	Campsite 7
276	1096556.715	3042042.327	621.23	Campsite 7
277	1096562.259	3042040.519	621.25	Campsite 7
278	1096576.99	3042043.893	621.07	Campsite 7
279	1096578.776	3042036.096	621.16	Campsite 7
280	1096583.65	3042037.212	621.06	Campsite 7

Stakeout Data Points as of 2-20-25

281	1096581.864	3042045.01	620.99	Campsite 7
282	1096591.5	3042047.217	620.71	Campsite 7
283	1096595.704	3042051.257	620.54	Campsite 7
284	1096617.514	3042056.253	620.40	Campsite 7
285	1096622.727	3042054.245	620.28	Campsite 7
290	1096630.574	3042121.695	619.34	Campsite 8
291	1096626.764	3042117.677	619.46	Campsite 8
292	1096619.604	3042116.037	619.66	Campsite 8
293	1096613.614	3042119.794	619.77	Campsite 8
294	1096610.265	3042134.415	619.55	Campsite 8
295	1096593.906	3042130.668	620.22	Campsite 8
296	1096577.546	3042126.921	620.72	Campsite 8
297	1096580.895	3042112.3	620.91	Campsite 8
298	1096577.138	3042106.31	620.76	Campsite 8
299	1096568.444	3042104.319	620.71	Campsite 8
300	1096563.231	3042106.326	620.69	Campsite 8
301	1096563.131	3042111.911	620.74	Campsite 8
302	1096548.187	3042085.488	620.95	Campsite 8
303	1096556.938	3042089.373	620.82	Campsite 8
304	1096568.377	3042091.993	620.59	Campsite 8
305	1096579.817	3042094.613	620.51	Campsite 8
306	1096604.267	3042097.136	620.37	Campsite 8
308	1096585.36	3042092.806	620.54	Campsite 8
309	1096618.079	3042100.3	620.02	Campsite 8
310	1096622.283	3042104.34	619.81	Campsite 8
311	1096640.228	3042108.451	619.51	Campsite 8
312	1096652.722	3042108.107	619.32	Campsite 8
313	1096656.34	3042103.309	619.38	Campsite 8
314	1096628.351	3042126.757	619.26	Campsite 8
320	1096570.648	3042170.193	619.84	Campsite 9
321	1096565.699	3042167.95	619.99	Campsite 9
322	1096559.244	3042168.919	619.99	Campsite 9
323	1096555.042	3042174.605	619.77	Campsite 9
324	1096556.081	3042181.527	619.45	Campsite 9
325	1096541.248	3042183.753	619.51	Campsite 9
326	1096526.414	3042185.979	619.51	Campsite 9
327	1096523.817	3042168.674	618.97	Campsite 9
328	1096521.22	3042151.368	618.16	Campsite 9
329	1096536.054	3042149.142	619.77	Campsite 9
330	1096550.887	3042146.916	620.17	Campsite 9
331	1096554.264	3042149.443	620.20	Campsite 9
332	1096564.694	3042147.878	620.34	Campsite 9
333	1096568.683	3042144.551	620.30	Campsite 9
340	1096634.971	3041857.515	621.07	Campsite 10
341	1096626.343	3041853.831	621.28	Campsite 10
342	1096601.861	3041848.49	621.81	Campsite 10
343	1096577.38	3041843.149	622.41	Campsite 10

Stakeout Data Points as of 2-20-25

344	1096571.856	3041845.014	622.36	Campsite 10
345	1096552.905	3041840.88	622.29	Campsite 10
346	1096539.061	3041837.86	622.53	Campsite 10
347	1096534.816	3041833.863	622.63	Campsite 10
348	1096522.822	3041831.247	622.97	Campsite 10
349	1096510.827	3041828.63	623.28	Campsite 10
350	1096505.662	3041830.652	623.39	Campsite 10
351	1096491.232	3041810.105	623.66	Campsite 10
352	1096500.217	3041814.034	623.44	Campsite 10
353	1096518.796	3041818.087	622.83	Campsite 10
354	1096537.374	3041822.14	622.30	Campsite 10
355	1096543.324	3041818.321	622.28	Campsite 10
356	1096546.521	3041803.666	622.08	Campsite 10
357	1096562.918	3041807.243	622.17	Campsite 10
358	1096579.316	3041810.82	622.47	Campsite 10
359	1096576.119	3041825.475	622.50	Campsite 10
360	1096579.938	3041831.425	622.49	Campsite 10
361	1096595.716	3041834.868	622.44	Campsite 10
362	1096611.494	3041838.31	621.94	Campsite 10
363	1096616.812	3041836.055	621.93	Campsite 10
364	1096616.455	3041830.29	622.09	Campsite 10
365	1096641.634	3041864.12	620.76	Campsite 10
370	1096671.064	3041912.821	618.78	Campsite 11
371	1096661.699	3041908.622	619.42	Campsite 11
372	1096637.072	3041903.249	619.90	Campsite 11
373	1096612.444	3041897.877	620.59	Campsite 11
374	1096606.92	3041899.742	620.61	Campsite 11
375	1096590.523	3041896.165	621.04	Campsite 11
376	1096574.125	3041892.588	621.60	Campsite 11
377	1096569.88	3041888.591	621.86	Campsite 11
378	1096557.73	3041885.94	622.05	Campsite 11
379	1096545.862	3041883.351	622.27	Campsite 11
380	1096540.414	3041885.312	622.34	Campsite 11
381	1096525.984	3041864.764	622.73	Campsite 11
382	1096534.969	3041868.693	622.50	Campsite 11
383	1096553.704	3041872.78	622.15	Campsite 11
384	1096572.438	3041876.867	622.01	Campsite 11
385	1096578.388	3041873.048	621.81	Campsite 11
386	1096581.585	3041858.394	622.05	Campsite 11
387	1096597.982	3041861.971	621.71	Campsite 11
388	1096614.38	3041865.548	621.42	Campsite 11
389	1096611.183	3041880.203	621.31	Campsite 11
390	1096615.002	3041886.153	620.99	Campsite 11
391	1096633.362	3041890.159	620.41	Campsite 11
392	1096651.723	3041894.164	619.94	Campsite 11
393	1096656.932	3041892.077	619.92	Campsite 11
394	1096656.921	3041886.465	620.05	Campsite 11

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400	1096702.64	3041967.428	613.89	Campsite 12
401	1096692.12	3041962.337	614.40	Campsite 12
402	1096669.814	3041957.471	615.19	Campsite 12
403	1096647.508	3041952.604	616.33	Campsite 12
404	1096641.984	3041954.47	616.47	Campsite 12
405	1096625.587	3041950.893	617.58	Campsite 12
406	1096609.189	3041947.315	618.56	Campsite 12
407	1096604.944	3041943.319	618.98	Campsite 12
408	1096592.649	3041940.636	619.58	Campsite 12
409	1096580.353	3041937.954	620.10	Campsite 12
410	1096575.176	3041939.994	620.28	Campsite 12
411	1096560.736	3041919.424	621.38	Campsite 12
412	1096569.721	3041923.353	621.06	Campsite 12
413	1096588.612	3041927.474	620.26	Campsite 12
414	1096607.502	3041931.595	619.70	Campsite 12
415	1096613.452	3041927.776	619.77	Campsite 12
416	1096616.649	3041913.121	620.04	Campsite 12
417	1096633.046	3041916.698	619.65	Campsite 12
418	1096649.444	3041920.276	619.21	Campsite 12
419	1096646.247	3041934.93	618.27	Campsite 12
420	1096650.066	3041940.881	617.61	Campsite 12
421	1096667.334	3041944.648	616.49	Campsite 12
422	1096684.602	3041948.415	615.58	Campsite 12
423	1096689.713	3041946.469	615.60	Campsite 12
430	1096716.497	3042019.613	617.13	Campsite 13
431	1096703.165	3042011.825	617.10	Campsite 13
432	1096689.177	3042008.773	617.45	Campsite 13
433	1096675.189	3042005.721	617.35	Campsite 13
434	1096669.665	3042007.587	617.80	Campsite 13
435	1096653.268	3042004.01	618.27	Campsite 13
436	1096636.871	3042000.432	618.99	Campsite 13
437	1096632.625	3041996.436	619.02	Campsite 13
438	1096615.876	3041992.782	619.55	Campsite 13
439	1096610.699	3041994.822	619.82	Campsite 13
440	1096595.902	3041974.216	620.04	Campsite 13
441	1096604.799	3041978.084	619.46	Campsite 13
442	1096619.991	3041981.398	619.00	Campsite 13
443	1096635.183	3041984.712	618.28	Campsite 13
444	1096641.133	3041980.893	617.46	Campsite 13
445	1096644.33	3041966.238	616.17	Campsite 13
446	1096660.727	3041969.815	615.13	Campsite 13
447	1096677.125	3041973.393	614.80	Campsite 13
448	1096673.928	3041988.047	616.10	Campsite 13
449	1096677.747	3041993.998	616.44	Campsite 13
450	1096694.071	3041997.559	616.44	Campsite 13
451	1096710.396	3042001.12	615.66	Campsite 13
452	1096715.117	3041999.647	615.14	Campsite 13

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460	1096628.378	3042024.43	620.15	Campsite 14
461	1096637.131	3042028.315	619.93	Campsite 14
462	1096658.024	3042033.098	619.52	Campsite 14
463	1096678.918	3042037.88	619.14	Campsite 14
464	1096684.907	3042034.122	618.87	Campsite 14
465	1096686.469	3042027.299	618.53	Campsite 14
466	1096701.09	3042030.646	618.28	Campsite 14
467	1096715.711	3042033.993	618.37	Campsite 14
468	1096711.806	3042051.051	619.14	Campsite 14
469	1096707.902	3042068.109	619.05	Campsite 14
470	1096693.281	3042064.762	619.27	Campsite 14
471	1096678.659	3042061.415	619.60	Campsite 14
472	1096676.439	3042057.829	619.60	Campsite 14
473	1096665.651	3042055.36	619.74	Campsite 14
474	1096654.864	3042052.891	619.91	Campsite 14
475	1096649.651	3042054.898	619.97	Campsite 14
480	1096558.932	3041779.622	621.64	Campsite 15
481	1096566.423	3041780.852	621.76	Campsite 15
482	1096573.938	3041779.777	621.71	Campsite 15
483	1096586.788	3041775.88	621.45	Campsite 15
484	1096599.638	3041771.982	621.45	Campsite 15
485	1096612.488	3041768.085	621.34	Campsite 15
486	1096625.338	3041764.188	621.08	Campsite 15
487	1096628.672	3041757.952	620.80	Campsite 15
488	1096626.64	3041751.254	620.54	Campsite 15
489	1096640.994	3041746.9	620.62	Campsite 15
490	1096655.347	3041742.547	620.70	Campsite 15
491	1096660.426	3041759.293	621.00	Campsite 15
492	1096665.505	3041776.039	620.61	Campsite 15
493	1096651.152	3041780.392	621.60	Campsite 15
494	1096636.798	3041784.745	621.98	Campsite 15
495	1096633.091	3041782.735	621.91	Campsite 15
496	1096618.915	3041787.034	622.43	Campsite 15
497	1096604.739	3041791.334	622.67	Campsite 15
498	1096601.256	3041795.313	622.89	Campsite 15
499	1096603.293	3041800.193	622.90	Campsite 15
500	1096609.213	3041804.675	622.80	Campsite 16
501	1096616.113	3041808.608	622.65	Campsite 16
502	1096623.898	3041810.179	622.31	Campsite 16
503	1096635.59	3041812.045	622.03	Campsite 16
504	1096646.515	3041816.608	621.59	Campsite 16
505	1096656.061	3041823.613	621.10	Campsite 16
506	1096663.693	3041832.665	620.53	Campsite 16
507	1096666.441	3041836.842	620.20	Campsite 16
508	1096673.365	3041838.272	619.58	Campsite 16
509	1096685.897	3041830.03	618.82	Campsite 16
510	1096695.119	3041844.052	618.02	Campsite 16

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511	1096704.341	3041858.074	617.22	Campsite 16
512	1096691.81	3041866.316	617.89	Campsite 16
513	1096690.38	3041873.241	618.17	Campsite 16
514	1096693.127	3041877.418	617.97	Campsite 16
515	1096698.005	3041886.907	617.74	Campsite 16
516	1096700.759	3041897.214	617.68	Campsite 16
517	1096701.264	3041907.87	617.62	Campsite 16
518	1096699.496	3041918.391	617.34	Campsite 16
519	1096698.772	3041928.329	616.72	Campsite 16
520	1096684.909	3041899.791	618.95	Campsite 16
521	1096687.681	3041893.746	618.62	Campsite 16
522	1096685.737	3041888.716	618.70	Campsite 16
523	1096683.101	3041884.012	618.87	Campsite 16
524	1096680.354	3041879.835	619.05	Campsite 16
525	1096675.101	3041877.306	619.45	Campsite 16
526	1096665.878	3041863.284	619.92	Campsite 16
527	1096656.656	3041849.262	620.55	Campsite 16
528	1096656.415	3041843.436	620.69	Campsite 16
529	1096648.889	3041833.371	621.21	Campsite 16
530	1096643.036	3041828.548	621.52	Campsite 16
531	1096636.635	3041829.259	621.76	Campsite 16
532	1096636.245	3041835.688	621.64	Campsite 16
533	1096750.313	3042054.637	618.12	Campsite 17
534	1096754.315	3042052.067	617.89	Campsite 17
535	1096760.783	3042040.342	617.50	Campsite 17
536	1096767.252	3042028.617	616.24	Campsite 17
537	1096765.289	3042021.824	615.50	Campsite 17
538	1096759.161	3042018.443	615.04	Campsite 17
539	1096766.406	3042005.31	613.61	Campsite 17
540	1096773.652	3041992.176	612.13	Campsite 17
541	1096788.974	3042000.63	612.96	Campsite 17
542	1096804.296	3042009.083	613.96	Campsite 17
543	1096797.05	3042022.216	615.23	Campsite 17
544	1096789.805	3042035.349	616.48	Campsite 17
545	1096785.746	3042036.495	616.54	Campsite 17
546	1096777.946	3042050.633	617.80	Campsite 17
547	1096773.51	3042058.675	618.33	Campsite 17
548	1096773.769	3042063.925	618.52	Campsite 17
550	1096806.776	3042056.22	617.76	Campsite 18
551	1096813.034	3042048.786	616.82	Campsite 18
552	1096819.754	3042036.605	616.28	Campsite 18
553	1096826.474	3042024.425	615.47	Campsite 18
554	1096824.511	3042017.632	614.93	Campsite 18
555	1096818.382	3042014.25	614.54	Campsite 18
556	1096825.628	3042001.117	613.52	Campsite 18
557	1096832.874	3041987.984	612.57	Campsite 18
558	1096848.196	3041996.437	613.61	Campsite 18

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559	1096863.518	3042004.89	615.35	Campsite 18
560	1096856.272	3042018.024	614.76	Campsite 18
561	1096849.027	3042031.157	616.18	Campsite 18
562	1096844.968	3042032.303	616.22	Campsite 18
563	1096841.14	3042039.242	616.22	Campsite 18
564	1096841.616	3042044.783	617.00	Campsite 18
565	1096846.92	3042046.456	618.26	Campsite 18
570	1096870.848	3042039.278	618.29	Campsite 19
571	1096879.352	3042034.786	617.49	Campsite 19
572	1096885.531	3042027.416	616.49	Campsite 19
573	1096893.464	3042013.035	616.85	Campsite 19
574	1096901.398	3041998.655	616.88	Campsite 19
575	1096899.435	3041991.862	616.58	Campsite 19
576	1096893.307	3041988.481	616.05	Campsite 19
577	1096900.552	3041975.348	615.81	Campsite 19
578	1096907.798	3041962.214	615.15	Campsite 19
579	1096923.12	3041970.668	616.30	Campsite 19
580	1096938.442	3041979.121	617.21	Campsite 19
581	1096931.196	3041992.254	617.25	Campsite 19
582	1096923.951	3042005.387	617.28	Campsite 19
583	1096919.892	3042006.534	617.24	Campsite 19
584	1096913.899	3042017.397	617.04	Campsite 19
585	1096914.38	3042022.946	617.38	Campsite 19
586	1096919.697	3042024.606	618.43	Campsite 19
590	1096992.962	3042002.802	618.94	Campsite 20
591	1097001.491	3041998.264	618.60	Campsite 20
592	1097007.662	3041990.831	618.44	Campsite 20
593	1097018.905	3041970.176	618.34	Campsite 20
594	1097030.148	3041949.521	618.21	Campsite 20
595	1097028.147	3041942.739	618.12	Campsite 20
596	1097022	3041939.392	618.14	Campsite 20
597	1097029.17	3041926.218	617.62	Campsite 20
598	1097036.341	3041913.044	616.69	Campsite 20
599	1097051.711	3041921.41	617.09	Campsite 20
600	1097067.081	3041929.776	616.98	Campsite 20
601	1097059.91	3041942.951	617.53	Campsite 20
602	1097052.739	3041956.125	617.85	Campsite 20
603	1097048.687	3041957.294	617.95	Campsite 20
604	1097035.878	3041980.827	618.07	Campsite 20
605	1097036.393	3041986.375	618.20	Campsite 20
606	1097041.723	3041988.001	618.83	Campsite 20
610	1097050.928	3041985.201	618.78	Campsite 21
611	1097059.356	3041980.658	618.28	Campsite 21
612	1097065.458	3041973.281	617.23	Campsite 21
613	1097076.891	3041952.278	617.41	Campsite 21
614	1097088.323	3041931.275	616.33	Campsite 21
615	1097086.322	3041924.493	616.10	Campsite 21

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616	1097080.174	3041921.147	616.19	Campsite 21
617	1097087.345	3041907.973	615.41	Campsite 21
618	1097094.516	3041894.799	613.65	Campsite 21
619	1097109.886	3041903.165	613.17	Campsite 21
620	1097125.256	3041911.531	613.58	Campsite 21
621	1097118.085	3041924.705	615.01	Campsite 21
622	1097110.914	3041937.879	615.89	Campsite 21
623	1097106.862	3041939.049	616.05	Campsite 21
624	1097094.028	3041962.626	616.73	Campsite 21
625	1097094.577	3041968.215	617.40	Campsite 21
626	1097099.974	3041969.769	618.03	Campsite 21
630	1097120.64	3041963.012	617.52	Campsite 22
631	1097128.864	3041958.464	616.90	Campsite 22
632	1097134.828	3041951.202	615.28	Campsite 22
633	1097142.988	3041936.211	614.81	Campsite 22
634	1097151.147	3041921.221	613.33	Campsite 22
635	1097149.146	3041914.439	612.96	Campsite 22
636	1097142.998	3041911.093	612.72	Campsite 22
637	1097150.169	3041897.919	610.68	Campsite 22
638	1097157.34	3041884.745	608.92	Campsite 22
639	1097172.71	3041893.111	610.31	Campsite 22
640	1097188.08	3041901.477	611.64	Campsite 22
641	1097180.909	3041914.651	612.57	Campsite 22
642	1097173.738	3041927.825	613.81	Campsite 22
643	1097169.686	3041928.995	613.91	Campsite 22
644	1097164.95	3041937.695	614.44	Campsite 22
645	1097165.618	3041943.422	614.93	Campsite 22
646	1097171.239	3041944.711	615.87	Campsite 22
650	1096827.029	3042068.938	618.54	Campsite 23
651	1096818.139	3042073.728	618.46	Campsite 23
652	1096811.87	3042081.645	618.12	Campsite 23
653	1096805.7	3042093.899	617.81	Campsite 23
654	1096799.531	3042106.153	617.77	Campsite 23
655	1096801.748	3042112.867	617.35	Campsite 23
656	1096808	3042116.015	616.98	Campsite 23
657	1096801.255	3042129.412	616.33	Campsite 23
658	1096794.51	3042142.809	614.98	Campsite 23
659	1096778.88	3042134.94	615.51	Campsite 23
660	1096763.25	3042127.071	615.75	Campsite 23
661	1096769.995	3042113.674	616.96	Campsite 23
662	1096776.74	3042100.277	618.07	Campsite 23
663	1096780.753	3042098.978	618.14	Campsite 23
664	1096784.726	3042091.087	618.42	Campsite 23
665	1096784.05	3042085.577	618.65	Campsite 23
666	1096778.704	3042084.086	618.78	Campsite 23
670	1096889.019	3042050.272	618.16	Campsite 24
671	1096880.167	3042055.065	617.98	Campsite 24

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672	1096873.923	3042062.96	617.47	Campsite 24
673	1096867.883	3042074.955	616.97	Campsite 24
674	1096861.844	3042086.95	617.06	Campsite 24
675	1096864.062	3042093.664	617.09	Campsite 24
676	1096870.314	3042096.812	616.62	Campsite 24
677	1096863.569	3042110.209	615.90	Campsite 24
678	1096856.823	3042123.606	614.42	Campsite 24
679	1096841.193	3042115.737	615.98	Campsite 24
680	1096825.564	3042107.867	616.92	Campsite 24
681	1096832.309	3042094.47	617.39	Campsite 24
682	1096839.054	3042081.073	617.34	Campsite 24
683	1096843.066	3042079.774	617.30	Campsite 24
684	1096847.066	3042071.829	616.92	Campsite 24
685	1096846.443	3042066.381	617.29	Campsite 24
686	1096841.197	3042064.782	618.38	Campsite 24
690	1096952.235	3042031.531	618.54	Campsite 25
691	1096943.506	3042036.134	618.23	Campsite 25
692	1096937.238	3042043.757	617.99	Campsite 25
693	1096930.481	3042056.44	617.78	Campsite 25
694	1096923.725	3042069.124	617.54	Campsite 25
695	1096925.787	3042075.887	617.27	Campsite 25
696	1096931.965	3042079.178	617.17	Campsite 25
697	1096924.913	3042092.416	616.60	Campsite 25
698	1096917.861	3042105.654	615.05	Campsite 25
699	1096902.416	3042097.427	616.07	Campsite 25
700	1096886.972	3042089.2	616.80	Campsite 25
701	1096894.024	3042075.961	617.27	Campsite 25
702	1096901.076	3042062.723	617.61	Campsite 25
703	1096905.117	3042061.517	617.65	Campsite 25
704	1096909.691	3042052.932	617.77	Campsite 25
705	1096909.142	3042047.408	617.95	Campsite 25
706	1096903.831	3042045.795	618.17	Campsite 25
710	1097010.249	3042014.274	618.49	Facilities
711	1097012.768	3042022.664	618.45	Facilities
712	1097014.498	3042028.427	618.43	Facilities
713	1097018.333	3042041.203	618.38	Facilities
714	1097011.149	3042043.359	618.41	Facilities
715	1097014.743	3042055.331	618.37	Facilities
716	1097018.336	3042067.302	618.28	Facilities
717	1096998.224	3042073.339	618.32	Facilities
718	1096978.111	3042079.376	618.07	Facilities
719	1096974.518	3042067.405	618.24	Facilities
720	1096970.924	3042055.433	618.38	Facilities
721	1096963.741	3042057.589	618.28	Facilities
722	1096959.681	3042044.061	617.90	Facilities
723	1096955.62	3042030.533	618.58	Facilities
724	1096970.718	3042086.576	617.85	CORNER SEPTIC TANK

Stakeout Data Points as of 2-20-25

725	1096964.607	3042097.766	617.38	CORNER SEPTIC TANK
726	1096959.078	3042094.747	617.33	CORNER SEPTIC TANK
727	1096965.188	3042083.556	617.84	CORNER SEPTIC TANK
730	1097124.447	3042027.908	615.33	Campsite 26
731	1097116.552	3042029.01	615.56	Campsite 26
732	1097103.459	3042033.041	615.94	Campsite 26
733	1097090.366	3042037.073	616.37	Campsite 26
734	1097087.059	3042043.323	616.17	Campsite 26
735	1097089.118	3042050.012	615.69	Campsite 26
736	1097074.783	3042054.426	616.25	Campsite 26
737	1097060.448	3042058.84	617.04	Campsite 26
738	1097055.299	3042042.116	617.60	Campsite 26
739	1097050.149	3042025.392	617.98	Campsite 26
740	1097064.484	3042020.978	617.75	Campsite 26
741	1097078.819	3042016.564	617.47	Campsite 26
742	1097082.535	3042018.558	617.25	Campsite 26
743	1097093.205	3042015.273	617.04	Campsite 26
744	1097096.608	3042011.608	617.10	Campsite 26
750	1097159.253	3041966.417	616.27	Campsite 27
751	1097156.091	3041971.212	615.92	Campsite 27
752	1097159.738	3041975.739	615.70	Campsite 27
753	1097165.362	3041974.2	615.50	Campsite 27
754	1097181.522	3041978.731	614.91	Campsite 27
755	1097197.682	3041983.261	614.33	Campsite 27
756	1097201.686	3041987.5	614.03	Campsite 27
757	1097218.215	3041992.134	613.24	Campsite 27
758	1097234.744	3041996.768	612.34	Campsite 27
759	1097243.789	3041997.59	612.08	Campsite 27
760	1097217.312	3042007.86	612.59	Campsite 27
761	1097213.669	3042003.321	612.96	Campsite 27
762	1097198.447	3041999.053	613.70	Campsite 27
763	1097192.283	3042002.518	613.81	Campsite 27
764	1097188.234	3042016.96	613.41	Campsite 27
765	1097172.074	3042012.43	614.45	Campsite 27
766	1097155.914	3042007.899	614.82	Campsite 27
767	1097159.963	3041993.457	615.63	Campsite 27
768	1097156.499	3041987.293	615.89	Campsite 27
769	1097146.606	3041984.519	616.10	Campsite 27
770	1097136.713	3041981.746	616.06	Campsite 27
771	1097129.509	3041982.446	616.21	Campsite 27
780	1097219.638	3041939.707	614.80	Campsite 28
781	1097217.061	3041944.658	614.21	Campsite 28
782	1097221.593	3041949.169	613.74	Campsite 28
783	1097227.217	3041947.63	613.68	Campsite 28
784	1097245.894	3041952.866	613.31	Campsite 28
785	1097259.537	3041956.691	612.93	Campsite 28
786	1097263.541	3041960.929	612.79	Campsite 28

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787	1097276.599	3041964.59	612.11	Campsite 28
788	1097289.657	3041968.251	611.58	Campsite 28
789	1097304.118	3041967.96	611.06	Campsite 28
790	1097275.708	3041980.14	611.95	Campsite 28
791	1097272.079	3041975.785	612.03	Campsite 28
792	1097260.302	3041972.483	612.55	Campsite 28
793	1097254.138	3041975.948	612.59	Campsite 28
794	1097250.089	3041990.39	612.21	Campsite 28
795	1097233.929	3041985.859	612.85	Campsite 28
796	1097217.769	3041981.329	613.72	Campsite 28
797	1097221.818	3041966.886	613.86	Campsite 28
798	1097218.354	3041960.723	614.07	Campsite 28
799	1097209.274	3041958.177	614.41	Campsite 28
800	1097200.195	3041955.631	614.10	Campsite 28
801	1097191.882	3041954.752	615.08	Campsite 28
802	1097183.745	3041956.662	615.79	Campsite 28
810	1097260.532	3041907.207	613.81	Campsite 29
811	1097259.498	3041912.021	613.59	Campsite 29
812	1097263.09	3041915.387	612.87	Campsite 29
813	1097268.635	3041916.734	612.37	Campsite 29
814	1097274.201	3041914.999	612.35	Campsite 29
815	1097288.888	3041918.564	611.93	Campsite 29
816	1097306.819	3041922.918	611.20	Campsite 29
817	1097310.97	3041927.013	610.95	Campsite 29
818	1097317.124	3041928.507	610.69	Campsite 29
819	1097325.649	3041926.663	610.25	Campsite 29
820	1097322.776	3041944.122	610.61	Campsite 29
821	1097319.444	3041941.418	610.74	Campsite 29
822	1097308.139	3041938.673	611.24	Campsite 29
823	1097302.101	3041942.352	611.44	Campsite 29
824	1097298.562	3041956.928	611.40	Campsite 29
825	1097282.253	3041952.969	612.12	Campsite 29
826	1097265.944	3041949.009	612.70	Campsite 29
827	1097269.483	3041934.433	612.59	Campsite 29
828	1097265.804	3041928.395	612.73	Campsite 29
829	1097255.726	3041925.948	612.71	Campsite 29
830	1097245.079	3041925.698	613.76	Campsite 29
831	1097235.294	3041929.901	614.35	Campsite 29
840	1097329.761	3041967.596	610.20	Campsite 30
841	1097335.392	3041973.898	609.74	Campsite 30
842	1097341.022	3041980.199	609.23	Campsite 30
843	1097348.082	3041980.597	608.65	Campsite 30
844	1097353.302	3041975.933	608.11	Campsite 30
845	1097363.295	3041987.118	607.68	Campsite 30
846	1097373.289	3041998.303	607.28	Campsite 30
847	1097360.239	3042009.962	608.20	Campsite 30
848	1097347.19	3042021.622	608.45	Campsite 30

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849	1097337.196	3042010.436	609.20	Campsite 30
850	1097327.203	3041999.251	609.71	Campsite 30
851	1097327.465	3041995.042	609.80	Campsite 30
852	1097325.582	3041992.934	609.89	Campsite 30
853	1097311.713	3041985.051	610.45	Campsite 30
860	1097378.958	3041850.021	607.29	Campsite 31
861	1097376.469	3041858.335	607.49	Campsite 31
862	1097374.582	3041874.463	607.67	Campsite 31
863	1097372.695	3041890.592	607.21	Campsite 31
864	1097377.08	3041896.139	607.00	Campsite 31
865	1097384.032	3041896.952	606.73	Campsite 31
866	1097382.289	3041911.85	605.32	Campsite 31
867	1097380.546	3041926.747	605.06	Campsite 31
868	1097363.165	3041924.714	607.38	Campsite 31
869	1097345.785	3041922.68	609.03	Campsite 31
870	1097347.528	3041907.783	608.90	Campsite 31
871	1097349.271	3041892.885	608.70	Campsite 31
872	1097352.595	3041890.289	608.46	Campsite 31
873	1097353.994	3041878.332	608.72	Campsite 31
874	1097350.947	3041873.134	609.21	Campsite 31
880	1097422.624	3041722.588	606.73	Campsite 32
881	1097427.855	3041729.134	606.56	Campsite 32
882	1097438.631	3041738.743	606.20	Campsite 32
883	1097449.407	3041748.353	605.80	Campsite 32
884	1097456.466	3041747.949	605.48	Campsite 32
885	1097461.124	3041742.725	605.46	Campsite 32
886	1097472.319	3041752.708	605.15	Campsite 32
887	1097483.514	3041762.69	604.53	Campsite 32
888	1097471.867	3041775.751	604.34	Campsite 32
889	1097460.22	3041788.811	604.22	Campsite 32
890	1097449.026	3041778.828	605.23	Campsite 32
891	1097437.831	3041768.846	606.13	Campsite 32
892	1097437.615	3041764.634	606.16	Campsite 32
893	1097430.056	3041757.893	606.42	Campsite 32
894	1097424.885	3041756.977	606.60	Campsite 32
900	1097415.537	3041682.999	606.45	Campsite 33
901	1097427.385	3041687.16	606.23	Campsite 33
902	1097438.975	3041688.134	606.07	Campsite 33
903	1097444.376	3041683.571	605.87	Campsite 33
904	1097444.963	3041676.596	605.61	Campsite 33
905	1097459.909	3041677.852	605.50	Campsite 33
906	1097474.856	3041679.109	605.16	Campsite 33
907	1097473.39	3041696.546	605.20	Campsite 33
908	1097471.924	3041713.984	605.31	Campsite 33
909	1097456.977	3041712.727	605.64	Campsite 33
910	1097442.031	3041711.471	606.20	Campsite 33
911	1097439.328	3041708.233	606.30	Campsite 33

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912	1097432.101	3041707.626	606.41	Campsite 33
913	1097424.874	3041707.018	606.48	Campsite 33
914	1097420.756	3041708.637	606.60	Campsite 33
920	1097378.353	3041635.966	605.57	Campsite 34
921	1097387.325	3041636.404	605.42	Campsite 34
922	1097401.227	3041634.56	605.22	Campsite 34
923	1097415.129	3041632.717	604.97	Campsite 34
924	1097419.428	3041627.103	604.63	Campsite 34
925	1097418.508	3041620.164	604.30	Campsite 34
926	1097433.377	3041618.192	603.99	Campsite 34
927	1097448.246	3041616.221	603.47	Campsite 34
928	1097450.546	3041633.568	604.01	Campsite 34
929	1097452.847	3041650.915	604.55	Campsite 34
930	1097437.978	3041652.887	605.09	Campsite 34
931	1097423.108	3041654.859	605.63	Campsite 34
932	1097419.776	3041652.275	605.70	Campsite 34
933	1097411.812	3041653.331	605.99	Campsite 34
934	1097403.849	3041654.387	606.10	Campsite 34
935	1097399.935	3041657.317	606.19	Campsite 34
940	1097322.262	3041652.947	606.17	Campsite 35
941	1097330.117	3041666.601	607.29	Campsite 35
942	1097346.743	3041679.083	607.62	Campsite 35
943	1097353.743	3041678.087	607.59	Campsite 35
944	1097362.748	3041666.091	606.81	Campsite 35
945	1097376.17	3041676.168	606.79	Campsite 35
946	1097389.591	3041686.244	606.91	Campsite 35
947	1097380.586	3041698.239	607.30	Campsite 35
948	1097381.582	3041705.239	607.48	Campsite 35
949	1097399.591	3041718.76	607.30	Campsite 35
950	1097405.234	3041719.007	607.18	Campsite 35
951	1097407.866	3041743.717	607.17	Campsite 35
952	1097400.179	3041734.206	607.39	Campsite 35
953	1097387.279	3041724.52	607.61	Campsite 35
954	1097374.378	3041714.835	607.75	Campsite 35
955	1097368.579	3041714.232	607.82	Campsite 35
956	1097356.492	3041705.159	607.89	Campsite 35
957	1097341.736	3041694.08	607.80	Campsite 35
958	1097339.539	3041688.679	607.77	Campsite 35
959	1097326.677	3041679.023	607.58	Campsite 35
960	1097313.816	3041669.367	607.07	Campsite 35
961	1097309.524	3041668.535	606.64	Campsite 35
962	1097306.22	3041671.391	607.06	Campsite 35
970	1097299.843	3041689.754	607.60	Campsite 36
971	1097300.345	3041704.394	607.31	Campsite 36
972	1097308.973	3041716.247	608.78	Campsite 36
973	1097320.83	3041725.148	608.86	Campsite 36
974	1097332.686	3041734.05	608.74	Campsite 36

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975	1097339.687	3041733.053	608.64	Campsite 36
976	1097348.692	3041721.058	608.24	Campsite 36
977	1097362.113	3041731.135	608.43	Campsite 36
978	1097375.535	3041741.211	607.95	Campsite 36
979	1097366.529	3041753.206	608.02	Campsite 36
980	1097367.526	3041760.206	607.98	Campsite 36
981	1097383.169	3041771.95	607.89	Campsite 36
982	1097398.812	3041783.694	606.93	Campsite 36
983	1097403.568	3041784.378	606.78	Campsite 36
984	1097394.812	3041802.804	607.04	Campsite 36
985	1097387.056	3041789.873	607.42	Campsite 36
986	1097373.689	3041779.837	608.19	Campsite 36
987	1097360.322	3041769.802	608.28	Campsite 36
988	1097354.522	3041769.199	608.44	Campsite 36
989	1097341.101	3041759.123	608.70	Campsite 36
990	1097327.679	3041749.047	608.92	Campsite 36
991	1097325.482	3041743.646	608.90	Campsite 36
992	1097314.312	3041735.26	609.01	Campsite 36
993	1097303.142	3041726.874	609.04	Campsite 36
994	1097297.846	3041726.43	608.21	Campsite 36
995	1097295.142	3041731.006	608.82	Campsite 36
1000	1097295.961	3041761.654	609.84	Campsite 37
1001	1097298.74	3041772.459	609.44	Campsite 37
1002	1097305.942	3041780.979	609.82	Campsite 37
1003	1097317.91	3041789.965	609.40	Campsite 37
1004	1097324.911	3041788.968	609.46	Campsite 37
1005	1097333.916	3041776.973	609.07	Campsite 37
1006	1097347.337	3041787.049	608.87	Campsite 37
1007	1097360.759	3041797.126	608.49	Campsite 37
1008	1097351.753	3041809.121	608.48	Campsite 37
1009	1097352.75	3041816.121	608.52	Campsite 37
1010	1097362.104	3041823.143	608.38	Campsite 37
1011	1097376.943	3041826.948	607.73	Campsite 37
1012	1097364.652	3041842.429	608.37	Campsite 37
1013	1097362.656	3041838.563	608.43	Campsite 37
1014	1097354.101	3041832.14	608.61	Campsite 37
1015	1097345.546	3041825.717	608.74	Campsite 37
1016	1097339.746	3041825.114	608.85	Campsite 37
1017	1097327.66	3041816.04	609.29	Campsite 37
1018	1097312.903	3041804.962	609.83	Campsite 37
1019	1097310.706	3041799.561	609.86	Campsite 37
1020	1097303.76	3041794.346	609.72	Campsite 37
1021	1097298.624	3041793.823	610.14	Campsite 37
1030	1097378.782	3041580.325	603.68	Campsite 38
1031	1097381.646	3041572.941	602.79	Campsite 38
1032	1097374.692	3041569.15	602.53	Campsite 38
1033	1097356.936	3041573.152	602.80	Campsite 38

Stakeout Data Points as of 2-20-25

1034	1097339.179	3041577.154	603.10	Campsite 38
1035	1097321.423	3041581.157	603.40	Campsite 38
1036	1097313.82	3041582.87	603.50	Campsite 38
1037	1097303.07	3041583.316	603.34	Campsite 38
1038	1097291.57	3041579.239	603.05	Campsite 38
1039	1097285.433	3041581.642	602.99	Campsite 38
1040	1097282.629	3041588.055	603.09	Campsite 38
1041	1097268.886	3041582.047	602.70	Campsite 38
1042	1097255.143	3041576.038	602.30	Campsite 38
1043	1097262.153	3041560.004	602.08	Campsite 38
1044	1097269.163	3041543.971	601.85	Campsite 38
1045	1097282.907	3041549.979	602.20	Campsite 38
1046	1097296.65	3041555.988	602.60	Campsite 38
1047	1097298.14	3041559.914	602.71	Campsite 38
1048	1097307.316	3041562.3	602.90	Campsite 38
1049	1097316.778	3041561.703	602.95	Campsite 38
1050	1097336.273	3041557.309	602.60	Campsite 38
1051	1097355.768	3041552.915	602.25	Campsite 38
1052	1097375.263	3041548.521	601.95	Campsite 38
1053	1097394.316	3041546.116	601.65	Campsite 38
1054	1097413.477	3041547.399	601.70	Campsite 38
1055	1097427.181	3041548.692	601.70	Campsite 38
1056	1097440.932	3041548.091	601.90	Campsite 38
1057	1097467.54	3041541.29	602.51	Campsite 38
1100	1096379.336	3041786.7	625.68	New Edge of Pavement
1101	1096376.139	3041800.944	625.22	New Edge of Pavement
1102	1096376.4	3041811.763	624.85	New Edge of Pavement
1103	1096378.983	3041822.272	624.28	New Edge of Pavement
1104	1096383.767	3041831.979	623.96	New Edge of Pavement
1105	1096387.867	3041838.427	623.94	New Edge of Pavement
1106	1096394.597	3041849.013	623.91	New Edge of Pavement
1107	1096401.327	3041859.598	623.64	New Edge of Pavement
1108	1096411.928	3041876.272	623.43	New Edge of Pavement
1109	1096422.529	3041892.945	623.21	New Edge of Pavement
1110	1096435.989	3041914.116	622.74	New Edge of Pavement
1111	1096446.59	3041930.79	622.35	New Edge of Pavement
1112	1096457.191	3041947.463	621.96	New Edge of Pavement
1113	1096470.651	3041968.634	621.29	New Edge of Pavement
1114	1096480.07	3041983.449	621.17	New Edge of Pavement
1115	1096489.49	3041998.264	620.88	New Edge of Pavement
1116	1096491.929	3042002.029	620.79	New Edge of Pavement
1117	1096505.784	3042023.413	620.44	New Edge of Pavement
1118	1096516.575	3042040.069	620.60	New Edge of Pavement
1119	1096527.366	3042056.724	620.60	New Edge of Pavement
1120	1096541.538	3042078.598	620.89	New Edge of Pavement
1121	1096555.451	3042100.072	620.45	New Edge of Pavement
1122	1096569.364	3042121.546	620.74	New Edge of Pavement

Stakeout Data Points as of 2-20-25

1123	1096572.746	3042126.765	620.70	New Edge of Pavement
1124	1096579.668	3042134.259	620.43	New Edge of Pavement
1125	1096588.701	3042139	620.04	New Edge of Pavement
1126	1096598.801	3042140.44	619.73	New Edge of Pavement
1127	1096608.799	3042138.412	619.46	New Edge of Pavement
1128	1096614.429	3042135.504	619.38	New Edge of Pavement
1140	1096367.707	3041783.052	625.62	New Edge of Pavement
1141	1096364.181	3041799.934	624.88	New Edge of Pavement
1142	1096364.505	3041813.349	624.38	New Edge of Pavement
1143	1096367.709	3041826.38	623.81	New Edge of Pavement
1144	1096373.641	3041838.417	623.30	New Edge of Pavement
1145	1096377.74	3041844.866	623.13	New Edge of Pavement
1146	1096384.471	3041855.451	622.89	New Edge of Pavement
1147	1096391.201	3041866.037	622.67	New Edge of Pavement
1148	1096401.802	3041882.71	622.46	New Edge of Pavement
1149	1096412.402	3041899.384	622.21	New Edge of Pavement
1150	1096425.863	3041920.555	621.78	New Edge of Pavement
1151	1096436.463	3041937.228	621.37	New Edge of Pavement
1152	1096447.064	3041953.901	620.91	New Edge of Pavement
1153	1096460.524	3041975.072	620.05	New Edge of Pavement
1154	1096469.944	3041989.887	619.84	New Edge of Pavement
1155	1096479.391	3042004.746	619.56	New Edge of Pavement
1156	1096495.713	3042029.938	619.06	New Edge of Pavement
1157	1096506.504	3042046.594	619.50	New Edge of Pavement
1158	1096517.295	3042063.249	619.65	New Edge of Pavement
1159	1096531.467	3042085.123	619.79	New Edge of Pavement
1160	1096545.38	3042106.597	620.17	New Edge of Pavement
1161	1096559.293	3042128.071	620.54	New Edge of Pavement
1162	1096562.675	3042133.29	620.53	New Edge of Pavement
1163	1096567.566	3042139.478	620.50	New Edge of Pavement
1164	1096574.285	3042148.265	620.06	New Edge of Pavement
1165	1096576.506	3042156.05	619.94	New Edge of Pavement
1166	1096576.007	3042164.66	619.90	New Edge of Pavement
1167	1096572.611	3042172.588	619.72	New Edge of Pavement
1168	1096570.629	3042175.627	619.80	New Edge of Pavement
1169	1096566.05	3042182.645	620.02	New Edge of Pavement
1200	1096440.685	3041764.008	624.30	New Edge of Pavement
1201	1096448.101	3041775.673	624.31	New Edge of Pavement
1202	1096461.755	3041797.149	624.29	New Edge of Pavement
1203	1096475.409	3041818.625	624.07	New Edge of Pavement
1204	1096482.841	3041830.313	623.84	New Edge of Pavement
1205	1096493.442	3041846.987	623.49	New Edge of Pavement
1206	1096504.042	3041863.66	623.14	New Edge of Pavement
1207	1096510.772	3041874.246	622.93	New Edge of Pavement
1208	1096517.503	3041884.831	622.71	New Edge of Pavement
1209	1096528.103	3041901.504	622.42	New Edge of Pavement
1210	1096538.704	3041918.178	622.12	New Edge of Pavement

Stakeout Data Points as of 2-20-25

1211	1096545.434	3041928.763	621.79	New Edge of Pavement
1212	1096552.164	3041939.349	621.49	New Edge of Pavement
1213	1096560.603	3041952.621	621.09	New Edge of Pavement
1214	1096573.534	3041972.58	620.77	New Edge of Pavement
1215	1096580.462	3041983.273	620.63	New Edge of Pavement
1216	1096587.389	3041993.965	620.62	New Edge of Pavement
1217	1096598.181	3042010.62	620.60	New Edge of Pavement
1218	1096608.972	3042027.276	620.61	New Edge of Pavement
1219	1096615.899	3042037.968	620.37	New Edge of Pavement
1220	1096622.827	3042048.66	620.24	New Edge of Pavement
1221	1096633.618	3042065.316	620.16	New Edge of Pavement
1222	1096644.409	3042081.971	619.92	New Edge of Pavement
1223	1096655.974	3042099.822	619.53	New Edge of Pavement
1230	1096482.315	3041799.666	623.78	New Edge of Pavement
1231	1096494.996	3041819.61	623.76	New Edge of Pavement
1232	1096505.542	3041836.198	623.35	New Edge of Pavement
1233	1096512.372	3041846.939	623.10	New Edge of Pavement
1234	1096519.201	3041857.681	622.91	New Edge of Pavement
1235	1096529.748	3041874.269	622.64	New Edge of Pavement
1236	1096540.294	3041890.857	622.28	New Edge of Pavement
1237	1096547.124	3041901.599	621.98	New Edge of Pavement
1238	1096553.953	3041912.341	621.65	New Edge of Pavement
1239	1096564.522	3041928.95	621.17	New Edge of Pavement
1240	1096575.091	3041945.558	620.37	New Edge of Pavement
1241	1096582.119	3041956.405	620.22	New Edge of Pavement
1242	1096589.147	3041967.252	620.18	New Edge of Pavement
1243	1096599.881	3041983.819	619.85	New Edge of Pavement
1244	1096610.614	3042000.386	620.03	New Edge of Pavement
1245	1096621.728	3042017.539	620.25	New Edge of Pavement
1246	1096628.701	3042028.33	620.36	New Edge of Pavement
1247	1096635.674	3042039.121	620.20	New Edge of Pavement
1248	1096642.613	3042049.802	619.98	New Edge of Pavement
1249	1096649.552	3042060.483	619.96	New Edge of Pavement
1250	1096660.356	3042077.16	619.71	New Edge of Pavement
1251	1096668.552	3042089.81	619.36	New Edge of Pavement
1252	1096671.161	3042093.836	619.31	New Edge of Pavement
1300	1096662.549	3041894.086	619.74	New Edge of Pavement
1301	1096677.79	3041920.155	618.12	New Edge of Pavement
1302	1096689.984	3041941.006	616.01	New Edge of Pavement
1303	1096701.755	3041961.138	614.30	New Edge of Pavement
1304	1096709.114	3041975.429	613.72	New Edge of Pavement
1305	1096714.901	3041990.425	614.35	New Edge of Pavement
1306	1096719.05	3042005.954	615.48	New Edge of Pavement
1307	1096721.513	3042021.838	617.11	New Edge of Pavement
1308	1096723.281	3042039.417	618.55	New Edge of Pavement
1309	1096725.05	3042056.996	618.90	New Edge of Pavement
1310	1096724.274	3042068.604	618.90	New Edge of Pavement

Stakeout Data Points as of 2-20-25

1311	1096719.737	3042079.317	618.91	New Edge of Pavement
1312	1096711.939	3042087.95	618.90	New Edge of Pavement
1313	1096701.741	3042093.551	618.93	New Edge of Pavement
1314	1096672.908	3041888.029	619.54	New Edge of Pavement
1315	1096678.581	3041897.73	619.29	New Edge of Pavement
1316	1096684.254	3041907.432	618.82	New Edge of Pavement
1317	1096695.599	3041926.835	617.04	New Edge of Pavement
1318	1096701.271	3041936.537	615.95	New Edge of Pavement
1319	1096706.944	3041946.238	615.06	New Edge of Pavement
1320	1096718.289	3041965.641	613.45	New Edge of Pavement
1321	1096722.16	3041972.688	612.92	New Edge of Pavement
1322	1096725.647	3041979.932	613.10	New Edge of Pavement
1323	1096728.742	3041987.352	613.48	New Edge of Pavement
1324	1096731.434	3041994.928	613.92	New Edge of Pavement
1325	1096733.717	3042002.637	614.56	New Edge of Pavement
1326	1096735.583	3042010.457	615.14	New Edge of Pavement
1327	1096737.028	3042018.366	615.72	New Edge of Pavement
1328	1096738.047	3042026.341	616.53	New Edge of Pavement
1329	1096738.906	3042034.883	617.31	New Edge of Pavement
1330	1096739.724	3042039.662	617.68	New Edge of Pavement
1331	1096743.291	3042048.656	617.98	New Edge of Pavement
1332	1096745.971	3042052.697	618.12	New Edge of Pavement
1333	1096749.757	3042056.881	618.25	New Edge of Pavement
1334	1096757.461	3042062.369	618.32	New Edge of Pavement
1335	1096764.594	3042065.166	618.39	New Edge of Pavement
1336	1096773.461	3042066.379	618.59	New Edge of Pavement
1337	1096778.58	3042066.042	618.58	New Edge of Pavement
1338	1096783.547	3042064.975	618.48	New Edge of Pavement
1339	1096793.882	3042061.955	618.34	New Edge of Pavement
1340	1096799.049	3042060.445	618.37	New Edge of Pavement
1400	1097139.239	3041973.67	616.73	New Edge of Pavement
1401	1097060.893	3041998.871	618.28	New Edge of Pavement
1402	1097079.08	3041998.238	617.36	New Edge of Pavement
1403	1097095.011	3042006.714	617.37	New Edge of Pavement
1404	1097112.491	3042019.939	616.19	New Edge of Pavement
1405	1097132.287	3042029.348	614.96	New Edge of Pavement
1406	1097150.234	3042034.035	614.09	New Edge of Pavement
1407	1097168.719	3042035.571	612.93	New Edge of Pavement
1408	1097187.194	3042033.91	611.99	New Edge of Pavement
1409	1097205.109	3042029.102	611.51	New Edge of Pavement
1410	1097219.589	3042023.533	611.35	New Edge of Pavement
1411	1097233.851	3042017.426	611.27	New Edge of Pavement
1412	1097254.11	3042007.724	611.31	New Edge of Pavement
1413	1097267.582	3042001.095	611.30	New Edge of Pavement
1414	1097281.051	3041994.467	611.15	New Edge of Pavement
1415	1097295.897	3041987.162	610.99	New Edge of Pavement
1416	1097307.995	3041981.208	610.65	New Edge of Pavement

Stakeout Data Points as of 2-20-25

1417	1097319.231	3041973.674	610.62	New Edge of Pavement
1418	1097328.084	3041963.446	610.41	New Edge of Pavement
1419	1097332.26	3041956.313	610.05	New Edge of Pavement
1420	1097335.696	3041948.795	609.78	New Edge of Pavement
1421	1097338.356	3041940.969	609.60	New Edge of Pavement
1422	1097340.215	3041932.914	609.53	New Edge of Pavement
1423	1097341.252	3041924.714	609.43	New Edge of Pavement
1424	1097341.457	3041916.451	609.40	New Edge of Pavement
1425	1097340.829	3041908.209	609.37	New Edge of Pavement
1426	1097339.373	3041900.072	609.71	New Edge of Pavement
1427	1097338.73	3041890.509	609.71	New Edge of Pavement
1428	1097130.381	3041979.128	616.14	New Edge of Pavement
1429	1097124.665	3041987.824	616.64	New Edge of Pavement
1430	1097123.104	3041996.736	616.76	New Edge of Pavement
1431	1097124.393	3042004.113	616.61	New Edge of Pavement
1432	1097127.893	3042010.734	616.19	New Edge of Pavement
1433	1097133.263	3042015.954	615.69	New Edge of Pavement
1434	1097139.98	3042019.265	615.17	New Edge of Pavement
1435	1097155.123	3042022.651	614.14	New Edge of Pavement
1436	1097170.614	3042023.545	613.83	New Edge of Pavement
1437	1097186.046	3042021.921	613.14	New Edge of Pavement
1438	1097201.012	3042017.823	612.66	New Edge of Pavement
1439	1097214.19	3042012.773	612.40	New Edge of Pavement
1440	1097227.867	3042006.959	612.19	New Edge of Pavement
1441	1097241.32	3042000.644	612.02	New Edge of Pavement
1442	1097252.531	3041995.127	611.97	New Edge of Pavement
1443	1097262.734	3041990.106	611.93	New Edge of Pavement
1444	1097272.937	3041985.086	611.89	New Edge of Pavement
1445	1097287.817	3041977.763	611.57	New Edge of Pavement
1446	1097302.697	3041970.441	611.11	New Edge of Pavement
1447	1097311.282	3041964.684	610.85	New Edge of Pavement
1448	1097318.047	3041956.869	610.66	New Edge of Pavement
1449	1097322.785	3041948.413	610.61	New Edge of Pavement
1450	1097325.666	3041941.337	610.43	New Edge of Pavement
1451	1097327.758	3041933.989	610.23	New Edge of Pavement
1452	1097329.036	3041926.456	610.08	New Edge of Pavement
1453	1097329.484	3041918.829	610.00	New Edge of Pavement
1454	1097328.845	3041909.118	610.15	New Edge of Pavement
1455	1097326.864	3041899.589	610.36	New Edge of Pavement
1456	1097323.421	3041891.813	610.41	New Edge of Pavement
1457	1097317.933	3041885.316	610.54	New Edge of Pavement
1458	1097310.843	3041880.619	610.81	New Edge of Pavement
1459	1097302.72	3041878.101	611.18	New Edge of Pavement
1460	1097294.219	3041877.963	611.46	New Edge of Pavement
1461	1097286.02	3041880.216	611.95	New Edge of Pavement
1462	1097274.804	3041888.38	613.28	New Edge of Pavement
1500	1097293.032	3041831.925	611.85	New Edge of Pavement

Stakeout Data Points as of 2-20-25

1501	1097295.119	3041846.913	611.81	New Edge of Pavement
1502	1097301.411	3041856.423	611.35	New Edge of Pavement
1503	1097310.798	3041862.898	610.85	New Edge of Pavement
1504	1097321.923	3041865.402	610.22	New Edge of Pavement
1505	1097333.179	3041863.573	609.52	New Edge of Pavement
1506	1097342.471	3041859.614	609.24	New Edge of Pavement
1507	1097351.317	3041854.737	608.99	New Edge of Pavement
1508	1097359.625	3041848.993	608.62	New Edge of Pavement
1509	1097367.312	3041842.44	608.27	New Edge of Pavement
1510	1097380.077	3041830.393	607.38	New Edge of Pavement
1511	1097388.33	3041821.447	607.11	New Edge of Pavement
1512	1097395.27	3041811.448	607.02	New Edge of Pavement
1513	1097400.763	3041800.586	606.71	New Edge of Pavement
1514	1097404.706	3041789.071	606.71	New Edge of Pavement
1515	1097406.704	3041780.739	606.89	New Edge of Pavement
1516	1097409.343	3041764.594	607.07	New Edge of Pavement
1517	1097410.122	3041755.736	607.09	New Edge of Pavement
1518	1097410.352	3041739.702	607.09	New Edge of Pavement
1519	1097407.709	3041714.931	607.03	New Edge of Pavement
1520	1097401.473	3041690.812	606.69	New Edge of Pavement
1521	1097390.267	3041668.643	606.53	New Edge of Pavement
1522	1097373.313	3041650.488	606.10	New Edge of Pavement
1523	1097354.447	3041635.297	605.83	New Edge of Pavement
1524	1097347.586	3041631.698	605.88	New Edge of Pavement
1525	1097339.871	3041630.977	604.62	New Edge of Pavement
1526	1097327.547	3041636.862	606.18	New Edge of Pavement
1527	1097346.346	3041873.186	609.49	New Edge of Pavement
1528	1097353.827	3041867.194	609.11	New Edge of Pavement
1529	1097365.172	3041859.837	608.27	New Edge of Pavement
1530	1097375.548	3041851.167	607.53	New Edge of Pavement
1531	1097388.313	3041839.121	606.75	New Edge of Pavement
1532	1097397.692	3041828.955	606.39	New Edge of Pavement
1533	1097405.578	3041817.592	606.40	New Edge of Pavement
1534	1097411.82	3041805.249	606.47	New Edge of Pavement
1535	1097416.3	3041792.163	606.53	New Edge of Pavement
1536	1097421.266	3041765.958	606.66	New Edge of Pavement
1537	1097422.345	3041739.308	606.72	New Edge of Pavement
1538	1097419.535	3041712.891	606.72	New Edge of Pavement
1539	1097412.84	3041686.964	606.44	New Edge of Pavement
1540	1097407.207	3041673.604	606.49	New Edge of Pavement
1541	1097400.12	3041661.744	606.27	New Edge of Pavement
1542	1097380.839	3041641.142	605.76	New Edge of Pavement
1543	1097371.573	3041633.68	605.59	New Edge of Pavement
1544	1097366.732	3041627.99	605.43	New Edge of Pavement
1545	1097364.316	3041620.92	605.16	New Edge of Pavement
1546	1097364.664	3041613.458	603.72	New Edge of Pavement
1547	1097367.725	3041606.643	603.89	New Edge of Pavement

Stakeout Data Points as of 2-20-25

1548	1097371.792	3041602.352	604.06	New Edge of Pavement
1549	1097341.137	3041881.231	609.46	New Edge of Pavement
2000	1096366.339	3041826.88	623.69	Grading - Daylight
2001	1096371.022	3041840.082	623.14	Grading - Daylight
2002	1096374.682	3041846.81	622.91	Grading - Daylight
2003	1096380.279	3041858.116	622.52	Grading - Daylight
2004	1096386.101	3041869.279	622.13	Grading - Daylight
2005	1096396.993	3041885.768	621.99	Grading - Daylight
2006	1096407.829	3041902.291	621.83	Grading - Daylight
2007	1096421.256	3041923.484	621.34	Grading - Daylight
2008	1096431.896	3041940.132	620.97	Grading - Daylight
2009	1096441.719	3041956.395	620.51	Grading - Daylight
2010	1096452.644	3041980.082	619.28	Grading - Daylight
2011	1096462.673	3041994.51	619.08	Grading - Daylight
2012	1096471.97	3042009.464	618.74	Grading - Daylight
2013	1096488.901	3042034.183	618.50	Grading - Daylight
2014	1096501.102	3042050.094	618.66	Grading - Daylight
2015	1096512.445	3042066.392	618.79	Grading - Daylight
2016	1096528.591	3042086.986	619.41	Grading - Daylight
2017	1096520.576	3042147.071	617.95	Grading - Daylight
2018	1096516.115	3042148.888	617.49	Grading - Daylight
2019	1096515.699	3042152.197	617.54	Grading - Daylight
2020	1096521.623	3042168.833	618.74	Grading - Daylight
2021	1096697.268	3041842.639	617.94	Grading - Daylight
2022	1096700.863	3041847.092	617.66	Grading - Daylight
2023	1096710.206	3041854.217	616.16	Grading - Daylight
2024	1096711.74	3041857.045	616.01	Grading - Daylight
2025	1096710.741	3041859.321	616.33	Grading - Daylight
2026	1096706.805	3041861.819	617.01	Grading - Daylight
2027	1096694.689	3041868.138	617.74	Grading - Daylight
2028	1096693.339	3041872.828	617.86	Grading - Daylight
2029	1096697.331	3041879.53	617.70	Grading - Daylight
2030	1096700.027	3041886.127	617.63	Grading - Daylight
2031	1096705.24	3041936.91	615.67	Grading - Daylight
2032	1096710.513	3041944.151	615.01	Grading - Daylight
2033	1096725.69	3041964.97	613.15	Grading - Daylight
2034	1096733.994	3041969.736	611.21	Grading - Daylight
2035	1096732.741	3041975.606	612.29	Grading - Daylight
2036	1096733.999	3041985.324	613.05	Grading - Daylight
2037	1096734.855	3041995.628	613.83	Grading - Daylight
2038	1096736.613	3042005.422	614.80	Grading - Daylight
2039	1096745.014	3042008.822	614.80	Grading - Daylight
2040	1096756.585	3042020.328	615.20	Grading - Daylight
2041	1096760.374	3042001.982	613.10	Grading - Daylight
2042	1096764.449	3041987.099	611.70	Grading - Daylight
2043	1096768.275	3041981.215	611.14	Grading - Daylight
2044	1096775.398	3041979.209	610.84	Grading - Daylight

Stakeout Data Points as of 2-20-25

2045	1096779.595	3041981.323	611.08	Grading - Daylight
2046	1096794.596	3041992.049	612.19	Grading - Daylight
2047	1096806.791	3042002.871	613.39	Grading - Daylight
2048	1096813.485	3042004.351	613.60	Grading - Daylight
2049	1096816.351	3041995.999	612.92	Grading - Daylight
2050	1096820.757	3041981.299	611.59	Grading - Daylight
2051	1096825.545	3041976.042	611.53	Grading - Daylight
2052	1096832.182	3041974.859	611.82	Grading - Daylight
2053	1096838.516	3041977.757	612.31	Grading - Daylight
2054	1096852.579	3041988.491	613.53	Grading - Daylight
2055	1096863.367	3041998.191	614.90	Grading - Daylight
2056	1096879.468	3041991.074	615.31	Grading - Daylight
2057	1096891.47	3041986.507	615.83	Grading - Daylight
2058	1096898.332	3041974.123	615.60	Grading - Daylight
2059	1096901.616	3041967.259	615.38	Grading - Daylight
2060	1096903.665	3041959.934	614.73	Grading - Daylight
2061	1096907.233	3041957.29	614.64	Grading - Daylight
2062	1096909.891	3041958.42	614.86	Grading - Daylight
2063	1096923.838	3041969.367	616.25	Grading - Daylight
2064	1096940.893	3041989.813	617.37	Grading - Daylight
2065	1096957.866	3041985.541	617.58	Grading - Daylight
2066	1096976.198	3041980.926	618.07	Grading - Daylight
2067	1096993.267	3041976.63	618.50	Grading - Daylight
2068	1097007.857	3041972.957	618.59	Grading - Daylight
2069	1097014.928	3041956.175	618.48	Grading - Daylight
2070	1097065.309	3041927.418	616.95	Grading - Daylight
2071	1097070.192	3041927.726	616.84	Grading - Daylight
2072	1097070.288	3041915.766	616.33	Grading - Daylight
2073	1097082.881	3041902.572	615.38	Grading - Daylight
2074	1097090.77	3041901.68	614.61	Grading - Daylight
2075	1097092.707	3041893.814	613.71	Grading - Daylight
2076	1097093.944	3041891.88	613.43	Grading - Daylight
2077	1097096.228	3041891.653	613.21	Grading - Daylight
2078	1097109.57	3041896.05	612.45	Grading - Daylight
2079	1097122.779	3041904.596	612.93	Grading - Daylight
2080	1097126.528	3041906.468	612.91	Grading - Daylight
2081	1097138.595	3041902.823	611.66	Grading - Daylight
2082	1097140.413	3041892.608	610.30	Grading - Daylight
2083	1097143.522	3041877.223	608.36	Grading - Daylight
2084	1097150.676	3041866.364	607.08	Grading - Daylight
2085	1097165.439	3041866.949	607.08	Grading - Daylight
2086	1097179.148	3041881.282	609.21	Grading - Daylight
2087	1097192.058	3041894.168	611.08	Grading - Daylight
2088	1097199.722	3041911.374	612.85	Grading - Daylight
2089	1097207.386	3041928.58	614.42	Grading - Daylight
2090	1097366.369	3041583.86	603.20	Grading - Daylight
2091	1097349.322	3041591.768	603.40	Grading - Daylight

Stakeout Data Points as of 2-20-25

2092	1097326.187	3041606.522	604.73	Grading - Daylight
2093	1097304.004	3041629.893	605.51	Grading - Daylight
2094	1097282.751	3041645.809	605.07	Grading - Daylight
2095	1097290.527	3041607.846	604.27	Grading - Daylight
2096	1097316.494	3041559.134	602.09	Grading - Daylight
2097	1097335.55	3041554.1	601.50	Grading - Daylight
2098	1097354.917	3041549.136	600.96	Grading - Daylight
2099	1097373.904	3041542.487	599.89	Grading - Daylight
2100	1097383.73	3041539.183	599.22	Grading - Daylight
2101	1097394.12	3041539.448	599.43	Grading - Daylight
2102	1097404.681	3041541.563	600.08	Grading - Daylight
2103	1097413.815	3041545.345	601.01	Grading - Daylight
2104	1097416.789	3041585.838	602.40	Grading - Daylight
2105	1097392.018	3041602.472	603.82	Grading - Daylight
2106	1097402.089	3041625.484	604.80	Grading - Daylight
2107	1097441.47	3041664.741	605.35	Grading - Daylight
2108	1097459.051	3041727.726	605.64	Grading - Daylight
2109	1097474.327	3041777.219	604.20	Grading - Daylight
2110	1097463.627	3041791.85	603.88	Grading - Daylight
2111	1097460.386	3041792.906	604.03	Grading - Daylight
2112	1097457.76	3041790.945	604.33	Grading - Daylight
2113	1097448.074	3041779.896	605.27	Grading - Daylight
2114	1097431.287	3041789.022	606.20	Grading - Daylight
2115	1097424.031	3041799.479	606.23	Grading - Daylight
2116	1097416.774	3041809.935	606.27	Grading - Daylight
2117	1097407.887	3041819.428	606.29	Grading - Daylight
2118	1097376.273	3041888.811	607.06	Grading - Daylight
2119	1097384.735	3041892.769	606.69	Grading - Daylight
2120	1097387.288	3041894.413	606.62	Grading - Daylight
2121	1097388.12	3041898.096	606.61	Grading - Daylight
2122	1097394.787	3041909.033	604.15	Grading - Daylight
2123	1097396.269	3041913.486	603.56	Grading - Daylight
2124	1097395.902	3041919.764	603.48	Grading - Daylight
2125	1097394.941	3041928.432	603.52	Grading - Daylight
2126	1097392.58	3041933.68	603.72	Grading - Daylight
2127	1097387.888	3041937.012	604.18	Grading - Daylight
2128	1097382.154	3041937.51	604.75	Grading - Daylight
2129	1097377.563	3041935.999	605.23	Grading - Daylight
2130	1097362.638	3041929.218	607.34	Grading - Daylight
2131	1097353.749	3041925.848	608.35	Grading - Daylight
2132	1097346.158	3041929.495	609.01	Grading - Daylight
2133	1097345.235	3041933.809	609.10	Grading - Daylight
2134	1097343.588	3041942.457	608.99	Grading - Daylight
2135	1097339.953	3041950.486	609.27	Grading - Daylight
2136	1097335.198	3041957.839	609.70	Grading - Daylight
2137	1097330.987	3041962.827	610.10	Grading - Daylight
2138	1097331.026	3041966.466	610.13	Grading - Daylight

Stakeout Data Points as of 2-20-25

2139	1097336.892	3041971.492	609.57	Grading - Daylight
2140	1097353.784	3041969.097	607.73	Grading - Daylight
2141	1097358.872	3041970.956	607.51	Grading - Daylight
2142	1097368.376	3041982.579	607.28	Grading - Daylight
2143	1097379.968	3041992.335	606.16	Grading - Daylight
2144	1097382.703	3041996.992	605.93	Grading - Daylight
2145	1097380.953	3042001.806	606.35	Grading - Daylight
2146	1097375.262	3042004.172	607.27	Grading - Daylight
2147	1097362.592	3042012.596	608.07	Grading - Daylight
2148	1097353.152	3042019.477	608.49	Grading - Daylight
2149	1097349.198	3042023.869	608.30	Grading - Daylight
2150	1097347.596	3042024.902	608.20	Grading - Daylight
2151	1097344.875	3042023.69	608.27	Grading - Daylight
2152	1097335.768	3042011.713	609.11	Grading - Daylight
2153	1097254.977	3042009.509	611.01	Grading - Daylight
2154	1097235.35	3042020.535	610.75	Grading - Daylight
2155	1097221.146	3042027.367	610.72	Grading - Daylight
2156	1097206.744	3042033.604	610.80	Grading - Daylight
2157	1097187.878	3042037.757	611.50	Grading - Daylight
2158	1097168.726	3042037.51	612.71	Grading - Daylight
2159	1097117.068	3042030.685	615.45	Grading - Daylight
2160	1097103.527	3042036.571	615.74	Grading - Daylight
2161	1097097.205	3042053.813	615.06	Grading - Daylight
2162	1097095.225	3042057.025	614.98	Grading - Daylight
2163	1097091.697	3042058.386	615.10	Grading - Daylight
2164	1097076.452	3042059.844	615.97	Grading - Daylight
2165	1097066.838	3042062.647	616.45	Grading - Daylight
2166	1097069.268	3042079.457	615.74	Grading - Daylight
2167	1097059.179	3042081.126	616.67	Grading - Daylight
2168	1097046.413	3042075.705	617.31	Grading - Daylight
2169	1097037.269	3042067.34	617.80	Grading - Daylight
2170	1096954.542	3042067.727	618.00	Grading - Daylight
2171	1096921.509	3042107.598	615.02	Grading - Daylight
2172	1096918.364	3042111.05	614.59	Grading - Daylight
2173	1096914.015	3042110.164	614.50	Grading - Daylight
2174	1096897.087	3042097.029	616.13	Grading - Daylight
2175	1096886.945	3042090.552	616.69	Grading - Daylight
2176	1096880.872	3042093.577	616.52	Grading - Daylight
2177	1096870.949	3042097.544	616.54	Grading - Daylight
2178	1096865.4	3042111.982	615.72	Grading - Daylight
2179	1096864.179	3042125.416	613.82	Grading - Daylight
2180	1096859.739	3042130.753	613.38	Grading - Daylight
2181	1096853.749	3042129.712	613.97	Grading - Daylight
2182	1096846.086	3042121.547	615.49	Grading - Daylight
2183	1096818.907	3042111.599	616.89	Grading - Daylight
2184	1096807.513	3042118.618	616.85	Grading - Daylight
2185	1096801.313	3042133.786	616.07	Grading - Daylight

Stakeout Data Points as of 2-20-25

2186	1096799.234	3042145.188	614.74	Grading - Daylight
2187	1096796.343	3042148.628	614.46	Grading - Daylight
2188	1096791.786	3042148.219	614.48	Grading - Daylight
2189	1096779.653	3042141.955	614.82	Grading - Daylight
2190	1096761.21	3042131.121	615.74	Grading - Daylight
2191	1096757.549	3042123.407	616.04	Grading - Daylight
2192	1096766.64	3042107.602	617.35	Grading - Daylight
2193	1096772.207	3042093.141	618.35	Grading - Daylight
2194	1096752.25	3042097.307	617.80	Grading - Daylight
2195	1096741.801	3042100.271	617.82	Grading - Daylight
2196	1096730.992	3042103.762	617.75	Grading - Daylight
2197	1096722.529	3042107.567	617.62	Grading - Daylight
2198	1096714.065	3042111.371	617.49	Grading - Daylight
2199	1096936.069	3042074.714	617.40	Grading - Daylight
2200	1096708.888	3042107.835	618.77	New Edge of Pavement
2201	1096720.848	3042103.327	618.83	New Edge of Pavement
2202	1096735.352	3042098.333	618.80	New Edge of Pavement
2203	1096749.855	3042093.339	618.78	New Edge of Pavement
2204	1096761.999	3042089.46	618.77	New Edge of Pavement
2205	1096774.143	3042085.58	618.77	New Edge of Pavement
2206	1096783.914	3042082.38	618.80	New Edge of Pavement
2207	1096793.685	3042079.18	618.84	New Edge of Pavement
2208	1096807.199	3042074.875	618.88	New Edge of Pavement
2209	1096810.534	3042066.414	618.72	Grading - Interior
2210	1096795.502	3042071.011	618.84	Grading - Interior
2211	1096780.471	3042075.607	618.95	Grading - Interior
2212	1096765.815	3042080.395	618.99	Grading - Interior
2213	1096751.159	3042085.183	619.02	Grading - Interior
2214	1096736.502	3042089.97	619.06	Grading - Interior
2215	1096721.846	3042094.758	619.10	Grading - Interior
2216	1096706.051	3042100.612	619.05	Grading - Interior
2217	1096714.848	3042088.984	618.88	Grading - Interior
2218	1096726.363	3042084.867	618.83	Grading - Interior
2219	1096734.967	3042081.896	618.78	Grading - Interior
2220	1096743.571	3042078.924	618.73	Grading - Interior
2221	1096752.175	3042075.953	618.68	Grading - Interior
2222	1096760.779	3042072.981	618.63	Grading - Interior
2223	1096769.304	3042069.976	618.62	Grading - Interior
2224	1096683.62	3042079.473	619.25	Grading - Interior
2225	1096500.343	3041796.516	622.81	Grading - Interior
2226	1096744.588	3042027.223	616.45	Grading - Interior
2227	1096747.388	3042045.213	617.70	Grading - Interior
2228	1096798.85	3042043.619	616.79	Grading - Interior
2229	1096871.245	3042022.096	616.45	Grading - Interior
2230	1097384.117	3041618.103	604.66	Grading - Interior
2231	1097342.124	3041650.607	606.61	Grading - Interior
2232	1097395.395	3041755.872	607.54	Grading - Interior

Stakeout Data Points as of 2-20-25

2233	1097323.753	3041702.086	608.20	Grading - Interior
2234	1097316.111	3041762.612	609.37	Grading - Interior
2235	1097378.764	3041808.344	607.94	Grading - Interior
2236	1097324.131	3041844.313	609.71	Grading - Interior
2237	1097302.639	3041834.188	610.37	Grading - Interior
2238	1097316.374	3041910.1	610.56	Grading - Interior
2239	1097301.397	3041899.806	611.60	Grading - Interior
2240	1097285.853	3041898.004	612.06	Grading - Interior
2241	1097250.81	3041939.407	613.25	Grading - Interior
2242	1097187.318	3041966.189	614.96	Grading - Interior
2243	1097140.821	3041999.039	615.89	Grading - Interior
2244	1097055.5	3042069.276	617.00	Grading - Interior
2245	1097044.091	3042053.151	617.76	Grading - Interior
2246	1097035.372	3042033.009	618.29	Grading - Interior
2247	1097031.552	3042015.887	618.32	Grading - Interior
2248	1097019.531	3042047.012	618.36	Grading - Interior
2249	1096991.037	3042049.396	618.39	Grading - Interior
2250	1096696.404	3042051.115	619.20	Grading - Interior
2251	1096656.998	3041986.912	616.65	Grading - Interior
2252	1096629.317	3041933.795	618.85	Grading - Interior
2253	1096594.253	3041879.068	621.58	Grading - Interior
2254	1096559.189	3041824.34	622.25	Grading - Interior
2255	1096523.432	3041800.091	622.17	Grading - Interior
2256	1096546.382	3041855.32	622.39	Grading - Interior
2257	1096581.368	3041910.031	620.77	Grading - Interior
2258	1096614.59	3041964.357	618.59	Grading - Interior
2259	1096647.447	3042016.765	619.45	Grading - Interior
2260	1096605.915	3042083.249	620.39	Grading - Interior
2261	1096567.757	3042026.183	621.32	Grading - Interior
2262	1096532.558	3041971.542	621.76	Grading - Interior
2263	1096506.367	3041920.503	622.58	Grading - Interior
2264	1096483.076	3041868.59	623.63	Grading - Interior
2265	1096454.793	3041819.584	624.63	Grading - Interior
2266	1096408.529	3041790.262	625.46	Grading - Interior
2267	1096441.772	3041844.56	624.29	Grading - Interior
2268	1096466.156	3041891.387	623.46	Grading - Interior
2269	1096500.836	3041951.246	622.34	Grading - Interior
2270	1096536.035	3042005.886	621.35	Grading - Interior
2271	1096571.234	3042060.527	620.96	Grading - Interior
2272	1096596.074	3042113.212	620.60	Grading - Interior
2273	1096949.918	3042037.777	617.98	Grading - Interior
2274	1096942.993	3042056.246	617.92	Grading - Interior
2275	1097273.686	3041601.084	603.56	Campsite 38
2276	1097267.864	3041586.353	602.94	Campsite 38
2277	1097265.742	3041580.984	602.71	Campsite 38
2278	1097257.238	3041578.141	602.01	Campsite 38
2279	1097253.521	3041577.713	601.53	Campsite 38

Stakeout Data Points as of 2-20-25

2280	1097252.262	3041576.547	601.36	Campsite 38
2281	1097252.225	3041574.762	601.24	Campsite 38
2282	1097259.414	3041561.934	601.53	Campsite 38
2283	1097262.84	3041548.601	600.62	Campsite 38
2284	1097264.891	3041540.052	600.02	Campsite 38
2285	1097267.899	3041537.914	599.95	Campsite 38
2286	1097271.534	3041538.55	599.88	Campsite 38
2287	1097279.619	3041543.044	600.39	Campsite 38
2288	1097284.508	3041546.317	600.87	Campsite 38
2289	1097288.986	3041549.236	601.30	Campsite 38
2290	1097298.069	3041553.589	601.67	Campsite 38
2291	1097307.671	3041560.424	602.29	Campsite 38
2292	1097303.537	3041606.604	604.43	Campsite 38



SOIL EVALUATION FOR ONSITE SEWAGE SYSTEMS

State Form 48100 (R / 10-08)
INDIANA STATE DEPARTMENT OF HEALTH

Type of system:	☐ Residential	☒ Commercial	County	Dubois	Date of survey (month, day, year)	October 1, 2024
Name of owner DNR - Ferdinand State Forest Campground						
Address (number and street, city, state and ZIP code) 6583 East State Road 264, Ferdinand, Indiana 47532						
Home telephone number			Work telephone number (812) 827-2857	Cellular number	E-mail address Dillingworth@dnr.IN	
Name of person requesting assistance Amanda Withers PE, Crawford, Murphy & Tilly						
Address (number and street, city, state and ZIP code) 915 Main Street, Suite 408, Evansville, IN 47708						
Home telephone number			Work telephone number (812) 647-6195	Cellular number	E-mail address awithers@cmtengr.com	
LOCATION OF PROPERTY						
Address of property (number and street, city, state and ZIP code) 6583 East State Road 264, Ferdinand, Indiana 47532						
Name of township Ferdinand	Name of subdivision		Lot number			
Legal description NE Quarter	Section 18	Township 3	Range 3			
Global Positioning Satellite (GPS) Latitude						
USE OR TYPE OF FACILITY						
Stage of Development: ☒ New (Planning) ☐ New (Under construction) ☐ Existing ☐ System failure ☐ Change of use						
Water supply: ☒ Public ☐ Private ☐ Existing ☐ Proposed	Weather Conditions: 75 °F ☐ Clear ☒ Overcast ☐ Rain ☐ Snow					
If Commercial, name of business Ferdinand State Forest Campground						
Number of bedrooms None	Design flow considerations 38 camp sites x 50 gpd = 1,900 gpd Most of the campsites will not have individual sewer connection.					
Name of person(s) present during evaluation Amanda Withers (CMT), Dean Illingworth (DRN)						
Availability of perimeter drain (show on site plan) A good outlet is available for the perimeter drain on the lower slope in the woods to the east.						
Brief description of site and comments: The east shoulder on the nose of the ridge in the existing campground was evaluated for a Presby bed. Eight soil samples were evaluated within the Presby bed. The sampling sites in the north half of the bed do have a fragipan, whereas the sampling sites in the south half of the bed do not have a fragipan. Most of the sampling sites have redox features due to water moving downslope in the subsoil.						
Signature of soil scientist conducting survey David S. Ralston				Name of soil scientist conducting survey David S. Ralston, PhD, RPSS, CPSS		IRSS registration number 38

Soil
Tech
Inc.

5144 W. Timberwood Drive
Newburgh, IN. 47630-3010

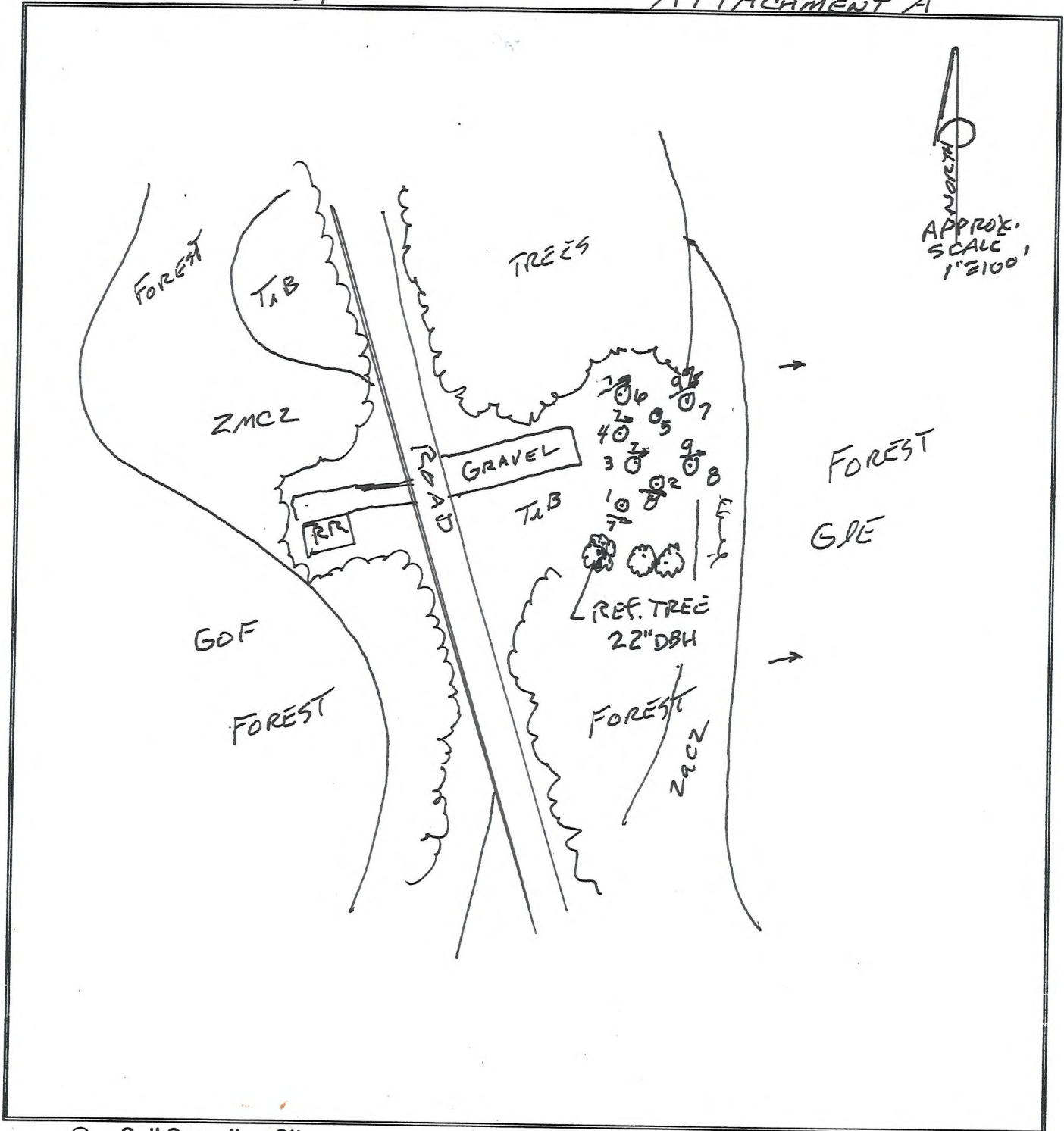
Phone: 812-858-7003
email: ralston@soiltech.com

Project FERDINAND STATE FOREST CAMPGROUND Date 10-1-2024

6583 EAST SR 264

SITE SKETCH

ATTACHMENT A



- Soil Sampling Site
- Utility Pole
- Site Slope Orientation

T1B - ZANESVILLE 2-6%
ZACZ - ZANESVILLE 6-12%
GLE - GILPIN 18-25%
GOF - GILPIN 20-50%

INDIVIDUAL SOIL PROFILE DESCRIPTION

County Dubois	Name Ferdinand State Forest Campground	Date (month, day, year) October 1, 2024
Equipment used Bucket auger - 3" diameter	Slope (%) 6 - 10	Depth in inches to Bedrock None
Soil atlas number and date Dubois Co. Soil Survey - Sheet 59 - Feb 1980	Slope aspect SE - NE	None
Map unit name TiB - Zanesville 2-6% and ZaC2 - Zanesville 6-12%	Surface cut or fill? None	Fragic characteristics Site 6 = 39"
Family classification Fine silty mixed mesic Typic Fragiudults	Fill depth (inches) None	Gravel, coarse sand None
Present land use DNR State Forest campground - recreation	Wellness characteristics	Dense glacial till None
Present vegetation Grass at edge of the woods	Depth to seasonal high water table (inches) 27"	Artificial compaction None
Landform Loess hills	Depth to free water, if present (inches) None	BC Horizon None
Landform component Upland	Seeps or springs? None	Massive-firm structure None
Modifier Shoulder	Ponds water None	High shrink / swell None
Shape of slope Convex		Pressure faces / slickensides None

Coordinates (decimal degrees or NAD83, Zone 16) **38.2599 N, -86.77216 W**

Site number and location **Site 6 - NW corner of the Presby bed - Approx 18' east and 97' north of the reference Tulip Poplar - 7% NE**

DEPTH (inches)	HORIZON DESIGNATION	SOIL COLORS			TEXTURE	CLAY (%)	STRUCTURE		CONS- ISTENCY	CO. FR. (%)	ROOTS (# / size)	EFFER- VESENCE	PARENT MATERIAL
		MATRIX	MOTTLES	COATINGS			GRADE	SHAPE					
0 - 7	Ap	10YR4/3			Silt Loam	17	1 - GR - F		FR	None	C/F	None	Loess
7 - 27	Bt1	10YR4/6		10YR6/3	Silt Loam	21	2 - SBK - F		FR	None	F/F	None	Loess
27 - 39	2Bt2	10YR5/6	10YR5/2	10YR7/3	Silty Clay Loam	28	2 - SBK - Med		FI	2	None	None	Residuum
39 - 60	2Bx	10YR5/6	10YR6/2	10YR8/1	Silty Clay Loam	31	3 - PR - C		FI	4	None	None	Residuum
Site	Ref. Poplar		Mottles	2Bx				Slope					
Site 4	16' E - 65' N	Same	29"	40"	Same as Site 6 w/Bx at 40"			7% E					
Site 5	31' E - 68' N	Same	33"	43"	Same as Site 6 w/Bx at 43"			8% E					
Site 7	42' E - 89' N	Same	35"	44"	Same as Site 6 w/Bx at 44"x			9% E					

Identify extent of areas of soil disturbance (cut / fill) on site map.

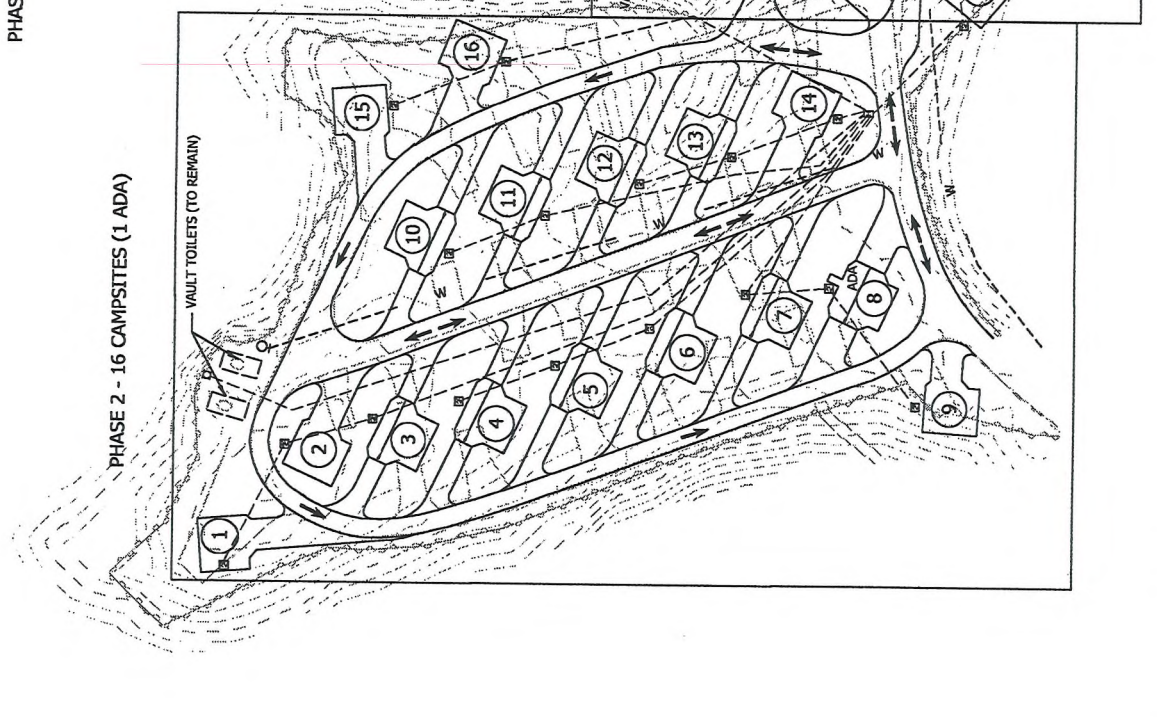
Soil Moisture: ☐ Dry ☒ Moist ☐ Near saturation ☐ Frozen

Comments:

The Presby bed was flagged on the east shoulder of the ridge's summit. The north sampling sites (4,5,6, and 7) do have a fragipan that is deeper than is typical for Zanesville series. Site 6 is the key soil profile for the bed design. The other sampling sites in the bed have redox features due to water moving downslope in the soil profile, but the south sampling sites do not have a developed fragipan. A good outlet is available on the steep slope to the east for the perimeter drain outlet.

INDIVIDUAL SOIL PROFILE DESCRIPTION													
County Dubois		Name Ferdinand State Forest Campground		Date (month, day, year) October 1, 2024									
Equipment used		Bucket auger - 3" diameter		Slope (%)		6 - 10							
Soil atlas number and date		Dubois Co. Soil Survey - Sheet 59 - Feb 1980		Slope aspect		SE - NE							
Map unit name		TiB - Zanesville 2-6% and ZaC2 - Zanesville 6-12%		Surface cut or fill?		None							
Family classification		Fine silty mixed mesic Typic Fragiuults		Fill depth (inches)		None							
Present land use		DNR State Forest campground - recreation		Wetness characteristics		None							
Present vegetation		Grass at edge of the woods		Depth to seasonal high water table (inches)		27"							
Landform		Loess hills		Depth to free water, if present (inches)		None							
Landform component		Upland		Seeps or springs?		None							
Modifier		Shoulder		Ponds water		None							
Shape of slope		Convex		Pressure faces / slickensides		None							
Coordinates (decimal degrees or NAD83, Zone 16) 38.25962 N, -86.77209 W													
Site number and location Site 1 - SW corner of the Presby bed - Approx 15' east and 17' north of the reference Tulip Poplar													
DEPTH (inches)	HORIZON DESIGNATION	SOIL COLORS			TEXTURE	CLAY (%)	STRUCTURE		CONS- ISTENCY	CO. FR. (%)	ROOTS (# / size)	EFFER- VESENCE	PARENT MATERIAL
		MATRIX	MOTTLES	COATINGS			GRADE	SHAPE					
0 - 7	Ap	10YR4/3			Silt Loam	17	1 - GR - F		FR	None	C/F	None	Loess
7 - 21	Bt1	10YR4/6			Silt Loam	21	2 - SBK - F		FR	None	F/F	None	Loess
21 - 37	2Bt2	10YR5/6		10YR6/3	Silty Clay Loam	28	2 - SBK - Med		FI	2	None	None	Residuuum
37 - 60	2Bx	10YR5/6		10YR7/3	Silty Clay Loam	31"	1 - SBK - C		FI	4	None	None	Residuuum
Site	Ref. Poplar		Mottles	2Bx			Slope						
Site 2	30' E - 27' N	Same	None	None	Same as Site 1 w/ no Bx		8%SE						
Site 3	23' E - 65' 47N	Same	34"	None	Same as Site 1 w/ no Bx		7% SE						
Site 8	42' E - 46' N	Same	37"	None	Same as Site 1 w/ no Bx		9% E						
Identify extent of areas of soil disturbance (cut / fill) on site map.													
Soil Moisture: ☐ Dry ☒ Moist ☐ Near saturation ☐ Frozen													
Comments: The Presby bed was flagged on the east shoulder of the summit of the ridge. The south sampling sites (1,2,3, and 8) do not have a fragipan since the sites are in transtion with Gilpin soils on the steep slope to the east. Site 6 is the key soil profile for the bed design. The other sampling sites in the south half of the bed do have redox features due to water moving downslope in the soil profile, but they do not have a developed fragipan. A good outlet is available on the steep slope to the east for the perimeter drain..													

PHASE 3 - 8 CAMPSITES TO NORTH (1 ADA) WITH ELECTRIC AND WATER, WATER TO 2 HYDRANTS AND ASPHALT PAVEMENT



PHASE 3 - 8 CAMPSITES (1 ADA) AND ASPHALT PAVEMENT

PHASE 1

- BASE BID - COMFORT STATION, MOUND SYSTEM, WATER, ELECTRIC AND 6 CAMPSITES (1 ADA, 1 VIP)
- ALTERNATE #1 - 6 CAMPSITES
- ALTERNATE #2 - CAMPSITES 29 AND 30
- ALTERNATE #3 - ADD WATER SERVICE LINES

ELECTRIC AND WATER UTILITIES NEAR THE CCC SHELTER AT D OF THE CAMPGROUND.



NOT FOR CONSTRUCTION

INDIANA DEPARTMENT OF NATURAL RESOURCES	
DESIGNED: LNB	DATE: _____
CHECKED: AW	DRAWN: BTS
CHECKED: LNB	OVERALL: LNB
PROPOSED OVERALL SITE PLAN	

HYDRANT

Ferdinand State Forest Campground

6583 East SR 264, Ferdinand, Indiana 47532

Legend

GID2

TIB

GIE

GID3

GoF

Google Earth



400 ft



Fig. 1—Looking north (top) and south (bottom) toward the soil sampling sites





Fig. 2—Looking East (top) and West (bottom) toward the soil sampling sites





Fig. 3—Looking north toward the Tulip Poplar reference tree (Left)



DRAWING NOTES

THESE DRAWINGS WERE DEVELOPED FROM THE INFORMATION CONTAINED IN THE FOLLOWING CONSTRUCTION DOCUMENTS:

- ARCHITECTURAL PLAN SET: _____
- STRUCTURAL PLAN SET: _____
- ADDENDUM: _____

JOB SITE ACCESS NOTES

SELLERS TRUCKS REQUIRE 90'-0" ALL WEATHER ACCESS AROUND EXTERIOR/INTERIOR OF THE BUILDING.

ACCESS AREAS SHALL BE ADEQUATE FOR UNRESTRICTED OPERATION OF SELLERS TRUCKS.

ACCESS/HAUL ROADS BY OTHERS (NOT BY HUFFCUTT). SELLERS TRUCKS TO OPERATE UNDER THEIR OWN POWER.

OBSTRUCTIONS, INCLUDING POWER LINES, WIRES & OBJECTS WHICH ARE HAZARDOUS TO SELLERS TRUCKS & PERSONNEL SHALL BE REMOVED BY BUYER.

DAMAGE TO EXISTING LANDSCAPING, DRIVES, SIDEWALKS, CURBS, FOUNDATIONS, SLABS, UNDERGROUND UTILITIES AND OTHER INSTALLATIONS TO FACILITATE

INSTALLATION WILL NOT BE THE RESPONSIBILITY OF HUFFCUTT CONCRETE.

ERECTION NOTES

WALL BRACING TYPE, USE, COORDINATION, AND DESIGN FOR USE DURING ERECTION IS TO BE PROVIDED BY THE PRECAST ERECTOR.

PRECAST ERECTOR TO VERIFY ALL FIELD CONDITIONS, DIMENSIONS, DETAILS, ELEVATIONS, MECHANICAL OPENINGS, AND STEEL & CONCRETE BEARING ELEVATIONS PRIOR TO START OF WORK. ANY FIELD OR PLAN DISCREPANCIES SHOULD BE REPORTED TO PRECAST ENGINEER PRIOR TO START OF WORK.

REVIEWER NOTES

THESE DRAWINGS AND SCHEDULES REPRESENT OUR INTERPRETATION OF THE ARCHITECTURAL AND STRUCTURAL DRAWINGS RECEIVED TO DATE.

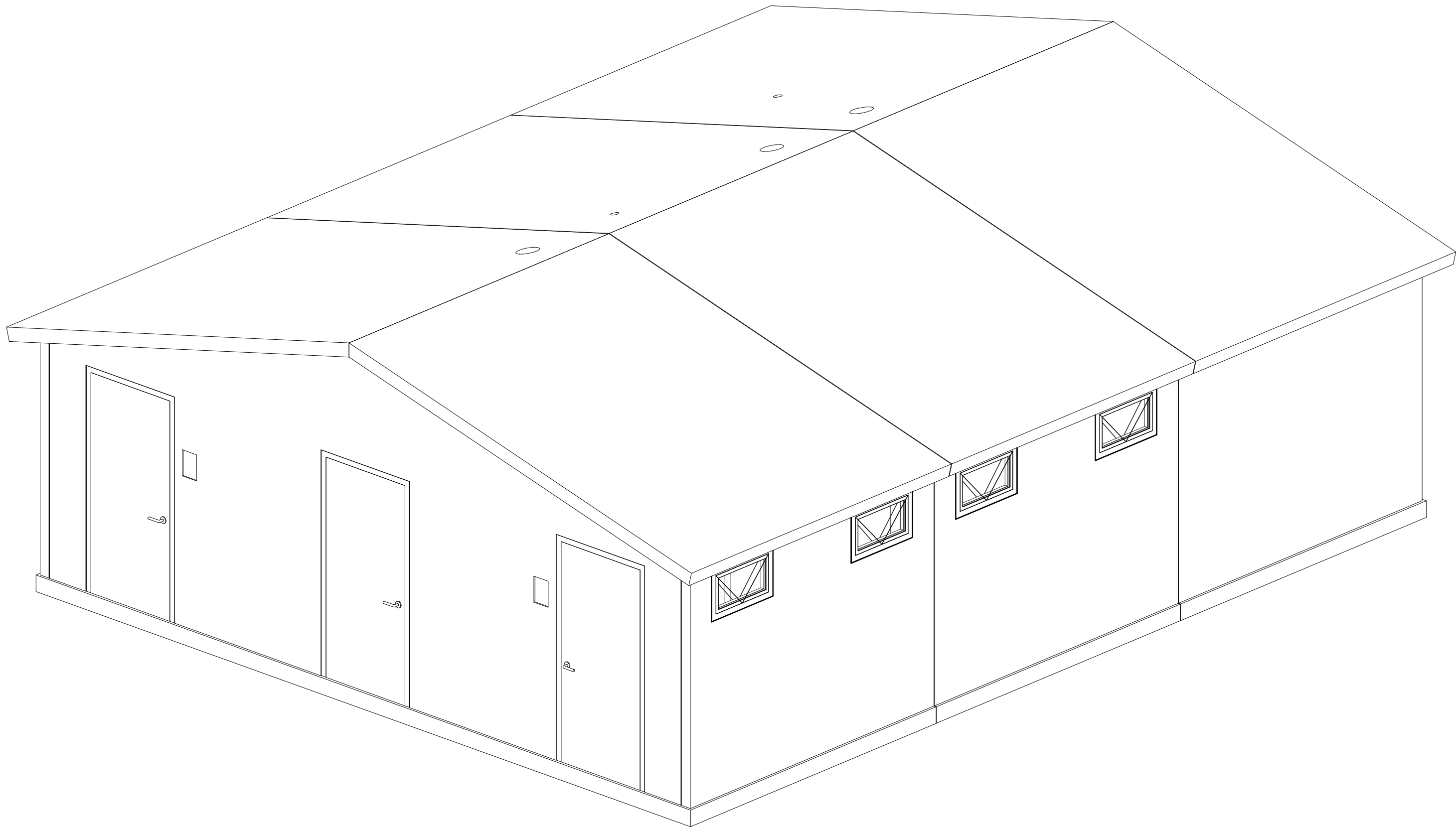
FINAL PRODUCT DESIGN, FABRICATION, AND SCHEDULING WILL BE DONE DIRECTLY FROM THESE DRAWINGS. AS SUCH, THESE DOCUMENTS SHOULD BE CAREFULLY AND COMPLETELY CHECKED BEFORE APPROVAL IS GIVEN. ANY CHANGES OR ADDITIONS OCCURRING AFTER FINAL APPROVAL MAY RESULT IN INCREASED COSTS AND SCHEDULE DELAYS. UNVERIFIED ITEMS WILL BE CONSIDERED APPROVED AS DRAWN UNLESS NOTED OTHERWISE AND FABRICATED AS SUCH.

PLEASE VERIFY ALL DIMENSIONS, OPENINGS AND DETAILS, TOP OF FOUNDATION, EXTERIOR ELEVATIONS, BEARING ELEVATIONS, MECHANICAL OPENINGS, STEEL OR CONCRETE BEARING ELEVATIONS AND REVEAL LOCATIONS AND FINISHES.

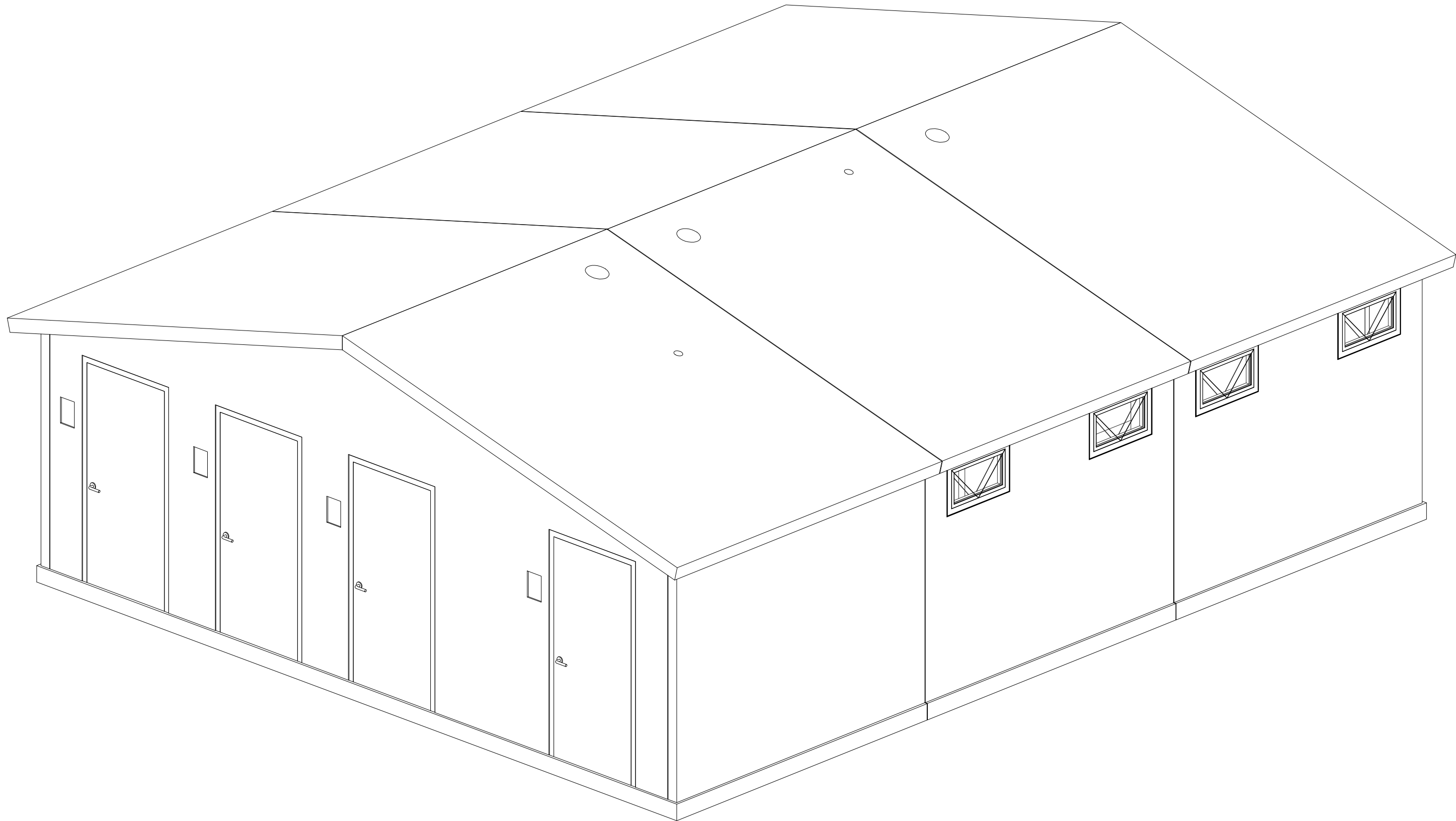
VERIFY ALL CLOUDED ITEMS PRIOR TO RETURN OF SUBMITTAL.

SHEET INDEX

Sheet #	Sheet Name	Revision	Description	Rev. Date
0.00	COVERSHEET	1	FOR SUBMITTAL	XX-XX-2023
0.01	SCHEDULES	1	FOR SUBMITTAL	XX-XX-2023
0.02	DETAILS	1	FOR SUBMITTAL	XX-XX-2023
1.00	FLOOR PLAN & OPENINGS DETAILS	1	FOR SUBMITTAL	XX-XX-2023
2.00	WALL & FLOOR PANEL LAYOUT	1	FOR SUBMITTAL	XX-XX-2023
4.00	EXTERIOR ELEVATIONS - WEST & SOUTH	1	FOR SUBMITTAL	XX-XX-2023



NORTHEAST ISOMETRIC VIEW



SOUTHWEST ISOMETRIC VIEW

ABBREVIATIONS

@	-	AT	NTS	-	NOT TO SCALE
Ø	-	DIAMETER	O/C	-	ON CENTER
A.B.	-	ANCHOR BOLT	OPNG	-	OPENING
ARCH	-	ARCHITECTURAL	OPP	-	OPPOSITE
BBE	-	BRICK BEARING ELEV.	PBE	-	PLANK BEARING ELEV.
BCE	-	BOT. OF COLUMN ELEV.	PROJ	-	PROJECTION
BM	-	BEAM	ROF	-	RANDOM ORIENTATED FIBER
BOS	-	BOT. OF STEEL	REQD	-	REQUIRED
(B)	-	BOTTOM	RVL	-	REVEAL
BOT	-	BOTTOM	SSE	-	SLAB ON GRADE ELEV.
BPE	-	BOT. OF POCKET ELEV.	SHE	-	SOUTH HAUNCH ELEVATION
BRG	-	BEARING	SIL	-	SUPERIMPOSED LOAD
BSE	-	BOT. OF SPANDREL ELEV.	SIM	-	SIMILAR
BWE	-	BOT. OF WALL ELEV.	SPA	-	SPACES
CL	-	CENTERLINE	SS	-	STAINLESS STEEL
CIP	-	CAST IN PLACE CONCRETE	SSE	-	SOUTH STEP ELEVATION
CANT	-	CANTILEVER	SSBE	-	SOLID SLAB BRG ELEV.
CDR	-	COTTON DUCK REINFORCED	(T)	-	TOP
CONC	-	CONCRETE	TATE	-	TOP OF ARCH TRIM ELEV.
CONN	-	CONNECTION	TBRE	-	TOP OF BEAM RISER ELEV.
CONT	-	CONTINUOUS	TCE	-	TOP OF COLUMN ELEV.
DBE	-	DECK BEARING ELEV.	TCWE	-	TOP OF CIP WALL ELEV.
DIA	-	DIAMETER	TCWP	-	TOP OF COLUMN W.P. (AT GRID)
DTBE	-	DOUBLE TEE BEARING ELEV.	TECE	-	TOP OF EXISTING COLUMN ELEV.
EA	-	EACH	TETE	-	TOP OF EXISTING DBL TEE ELEV.
EHE	-	EAST HAUNCH ELEVATION	TFE	-	TOP OF FOOTING ELEV.
ELEV	-	ELEVATION	TGBE	-	TOP OF GRADE BEAM ELEV.
EP	-	ELECTRO- PLATED	TFWE	-	TOP OF FOUNDATION WALL ELEV.
ESE	-	EAST STEP ELEVATION	THE	-	TOP OF HAUNCH ELEV.
EXT	-	EXTERIOR	THWP	-	TOP OF HAUNCH W.P. (AT GRID)
FON	-	FOUNDATION	TLE	-	TOP OF LEDGE ELEV.
FEE	-	FINISH FLOOR ELEV.	TLWP	-	TOP OF LEDGE W.P. (AT GRID)
FTG	-	FOOTING	TOD	-	TOP OF DECK
FTTE	-	FUTURE TOP DBL TEE ELEV.	TOS	-	TOP OF STEEL
GALV	-	HOT DIP GALVANIZE	TPCE	-	TOP OF PRECAST ELEV.
GC	-	GENERAL CONTRACTOR	TPE	-	TOP OF PIER ELEV.
INS	-	INSERT	TRE	-	TOP OF RISER ELEV.
INSUL	-	INSULATION	TTE	-	TOP OF DBL TEE ELEV. (AT GRID)
INT	-	INTERIOR	TSE	-	TOP OF SPANDREL ELEV.
JBE	-	JOIST BEARING ELEV.	TWE	-	TOP OF WALL ELEV.
JST	-	JOIST	TYP	-	TYPICAL
JT	-	JOINT	UNO	-	UNLESS NOTED OTHERWISE
LLH	-	LONG LEG HORIZONTAL	W	-	WITH
LLV	-	LONG LEG VERTICAL	WHE	-	WEST HAUNCH ELEVATION
MAX	-	MAXIMUM	WP	-	WORKING POINT
MIN	-	MINIMUM	WSE	-	WEST STEP ELEVATION
MISC	-	MISCELLANEOUS	WWF	-	WELDED WIRE FABRIC
NHE	-	NORTH HAUNCH ELEVATION	ZRC	-	PAINTED W/ ZINC RICH COMPOUND
NSE	-	NORTH STEP ELEVATION			



HUFFCUTT

CONCRETE, INC

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Chippewa Falls, WI 54729

PH: (715)723-7446

www.Huffcutt.com

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PRECAST BIM MODEL MANAGER
JASON SWART (715)231-2292

PROJECT GENERAL CONTRACTOR

PROJECT ARCHITECT

PROJECT ENGINEER OF RECORD

STATUS:

REVISION HISTORY

1		
2		
3		
4		
5		

HUFFCUTT PROJECT No.:

PROJECT:

SHEET TITLE

COVERSHEET

SHEET NUMBER

0.00

FINISH SCHEDULE				
CALL OUT	FINISH/FORM LINER	PAINT/SEALER TYPE	COLOR	COMMENTS
INTERIOR WALLS & CEILING	SMOOTH TROWEL	SATIN ACRYLIC	NP1 TAN	.
LOWER EXTERIOR	TBD	SATIN ACRYLIC	TBD	.
LOWER EXTERIOR COLUM CORNER	TBD	SATIN ACRYLIC	TBD	.
UPPER EXTERIOR	TBD	SATIN ACRYLIC	TBD	.
UPPER EXTERIOR COLUM CORNER	TBD	SATIN ACRYLIC	TBD	.
ROOF	CEDAR SHAKE	SATIN ACRYLIC	TBD	.
FLOOR	FORM FINISH	TK-290		.

DOOR SCHEDULE										
CALL OUT /MARK	SWING	SIZE		DOOR		FRAME			COLOR	HARDWARE GROUP
		WIDTH	HEIGHT	MAT.	LOUV.	MAT.	CORE	THICK.		
D1	RHR	3'-0"	6'-8"	STEEL	YES	STEEL	LEVER	3 3/4"	TBD	GROUP 2
D2	LHR	3'-0"	6'-8"	STEEL	YES	STEEL	LEVER	3 3/4"	TBD	GROUP 3
D3	LHR	3'-0"	6'-8"	STEEL	YES	STEEL	LEVER	3 3/4"	TBD	GROUP 2
D4	RHR	3'-0"	6'-8"	STEEL	YES	STEEL	LEVER	3 3/4"	TBD	GROUP 1
D5	RHR	3'-0"	6'-8"	STEEL	YES	STEEL	LEVER	3 3/4"	TBD	GROUP 1
D6	RHR	3'-0"	6'-8"	STEEL	YES	STEEL	LEVER	3 3/4"	TBD	GROUP 1
D7	RHR	3'-0"	6'-8"	STEEL	YES	STEEL	LEVER	3 3/4"	TBD	GROUP 1

HARDWARE GROUP 1
SCHLAGE LEVER CORRIDOR LOCK MODEL ND73PD RHODES 626
REESE ENTERPRISES SADDLE THRESHOLD MODEL S204A ALUMINUM
REESE ENTERPRISES NYLON BRUSH DOOR SWEEP MODEL 962C ALUMINUM
REESE ENTERPRISES RAIN DRIP MODEL R201A ALUMINUM
IVES FULL MORTISE HINGES (5BB1HD), NON-REMOVABLE PINS (NRP), STAINLESS STEEL (A5112)
FALCON SC70A DOOR CLOSER WITH HOLD OPEN SPRING STOP

HARDWARE GROUP 2
FALCON, GRADE 1 CYLINDRICAL LEVER LOCK MODEL T961 CLASSROOM
REESE ENTERPRISES SADDLE THRESHOLD MODEL S204A ALUMINUM
REESE ENTERPRISES NYLON BRUSH DOOR SWEEP MODEL 962C ALUMINUM
REESE ENTERPRISES RAIN DRIP MODEL R201A ALUMINUM
IVES FULL MORTISE HINGES (5BB1HD), NON-REMOVABLE PINS (NRP), STAINLESS STEEL (A5112)
FALCON SC70A DOOR CLOSER WITH HOLD OPEN SPRING STOP

HARDWARE GROUP 3
FALCON, GRADE 1 CYLINDRICAL LEVER LOCK MODEL T381 STOREROOM
REESE ENTERPRISES SADDLE THRESHOLD MODEL S204A ALUMINUM
REESE ENTERPRISES NYLON BRUSH DOOR SWEEP MODEL 962C ALUMINUM
REESE ENTERPRISES RAIN DRIP MODEL R201A ALUMINUM
IVES FULL MORTISE HINGES (5BB1HD), NON-REMOVABLE PINS (NRP), STAINLESS STEEL (A5112)
FALCON SC70A DOOR CLOSER WITH HOLD OPEN SPRING STOP

INTERIOR HARDWARE SCHEDULE			
DESCRIPTION	COMPANY	SIZE/MODEL	QUANTITY
GRAB BAR	BRADLEY	18" (001-18)	3
GRAB BAR	BRADLEY	36" (001-36)	2
GRAB BAR	BRADLEY	42" (001-42)	2
GRAB BAR	BRADLEY	66" (001-66)	1
ADA SHOWER SEAT	BRADLEY	9569	1
RESTROOM SEAT	BRADLEY	9591	1
TOILET PAPER HOLDER	ROYCE ROLLS	TP-3 (3 ROLL)	5
MIRROR	BRADLEY	18" x 36" (781-1836)	4
BABY CHANGING STATION	KOALA KARE	KB200-00	2
COAT HOOKS	JACKNOB	4020	8

ELECTRICAL SCHEDULE			
DESCRIPTION	COMPANY	MODEL	QUANTITY
LOAD CENTER	CH	32 POLE, 200 AMP	1
HAND DRYER	MURDOCK SUPER SECURE	1118 SERIES	2
INT. EXHAUST VENT	SOLER & PALAU	TD-200	3
MOTION SENSOR	ACUTY CONTROLS	CRM 9	2
HIGH MOISTURE MOTION SENSOR	RAB	SB500W	4
INTERIOR LIGHTS	RAB	VAN1FS13	12
EXTERIOR LIGHTS	RAB	WPTS 70	4
4' MECHANICAL LIGHTS	LITHONIA	4' FLORESCENT	4
CONDUIT	EMT	N/A	N/A
OUTLETS & SWITCHES	LEGRAND	N/A	N/A

PLUMBING SCHEDULE			
DESCRIPTION	COMPANY	MODEL	QUANTITY
SEDIMENT FILTER	RUSCO	2-100-F	1
SINK WATER HEATER	BRADFORD WHITE	RE12OU6 (6 GAL.)	1
SHOWER WATER HEATER	BRADFORD WHITE	RE350T6 (50 GAL.)	2
MIXING VALVE	WATTS	LFMMV-US-M1	3
CIRCULATION PUMP	GRUNDFOS	E1-BCSVNN1W-06	1
SINK	KOHLER	K1722	4
FAUCET	MOEN	M8884	4
SINK DRAIN	PROFLO	PFGD100	4
P TRAP	PROFLO	PF200WH	4
URINAL	KOHLER	K4991-ER	1
URINAL FLUSH VALVE	SLOAN	S3915513	1
TOILET SEAT	BEMIS	1955CT	5
TOILET	KOHLER	K4323	5
TOILET CARRIER	ZURN	ZZ1201-N (L/R)	5
TOILET FLUSH VALVE	SLOAN	S3914817	5
ADA SHOWER	ACORN	1741ADA-03-M	1
ADA SHOWER SLEEVE	ACORN	SP-ASW (8x42)	1
SHOWER	ACORN	1741-04-M-RD	3
SHOWER SLEEVE	ACORN	SP-ASW (8x20)	3
INTERIOR HOSE BIB	WOLVERINE BRASS	50259	2
EXTERIOR HOSE BIB	WOODFORD	MODEL 65	1
FLOOR DRAIN	PROFLO	PF42950	10
MOP SINK	PROFLO	PFMB2424	1
MOP SINK FAUCET	CHICAGO FAUCETS	835CP	1

VENT SCHEDULE						
CALL OUT /MARK	SIZE		MATERIAL	SCREEN OR LOUVERS	QTY.	COMMENTS
	WIDTH	HEIGHT				
1	18"	18"	18 GA. CRS	INVERTED SPLIT "Y"	2	DOOR AIR LOUVERS
2	16"	16"	TBD	SCREEN & LOUVERS	2	WALL AIR LOUVERS



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2		
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4		
5		

HUFFCUTT PROJECT No.:

PROJECT:

SHEET TITLE

SCHEDULES

SHEET NUMBER

0.01

ADA NOTES:
GENERAL NOTES

- (1) ALL DOORS TO BE 32" MIN. CLEAR WIDTH, AND 1/2" MAXIMUM THRESHOLD.
(2) ALL DOORS TO HAVE LEVER HANDLES @ 34" TO 48" ABOVE FINISHED FLOOR.
(3) PROVIDE 18" MINIMUM CLEARANCE TO LATCH PULL SIDE OF ENTRANCE DOORS.
(4) PROVIDE 12" MINIMUM CLEARANCE TO LATCH PUSH SIDE OF ENTRANCE DOORS.
(5) ALL SWITCHES, RECEPTACLES, OUTLETS, AND CONTROLS TO BE 15" TO 44" HIGH AND SHOULD BE OPERABLE WITH ONE HAND.
(6) INSTALL PROTECTIVE COVERING ON ALL EXPOSED PIPES.
(7) ALL SIGNAGE TO BE 6" x 9", WHITE ON BLACK LETTERING WITH BRAILLE.

RESTROOM NOTES:

- (1) MINIMUM 30" x 48" CLEAR SPACE IN FRONT OF ALL BATH FIXTURES.
(2) CONTROLLED DELIVERY TOILET TISSUE DISPENSERS & NON-CONTINUOUS FLOW DISPENSERS SHALL NOT BE USED.
(3) FLUSH CONTROLS SHALL BE HAND OPERATED OR AUTOMATIC & SHALL BE MOUNTED ON WIDE SIDE OF TOILET AREA NO MORE THAN 44" ABOVE FINISHED FLOOR.

GRAB BAR NOTES:

- (1) ALL GRAB BARS SHALL BE 1 1/4" TO 1 1/2" DIAMETER STAINLESS STEEL.
(2) SPACE BETWEEN GRAB BAR AND ADJACENT WALL, OR PARTITIONS, SHALL BE 1 1/2".
(3) FASTENERS AND MOUNTING SUPPORTS SHALL WITHSTAND 250 LB MINIMUM POINT LOAD.
(4) GRAB BARS SHALL NOT ROTATE WITHIN THEIR FITTINGS.

LAVATORY NOTES:

- (1) THERE SHALL BE NO SHARP CORNERS OR ABRASIVE SURFACES UNDER LAVATORIES.

WATER CLOSET NOTES:

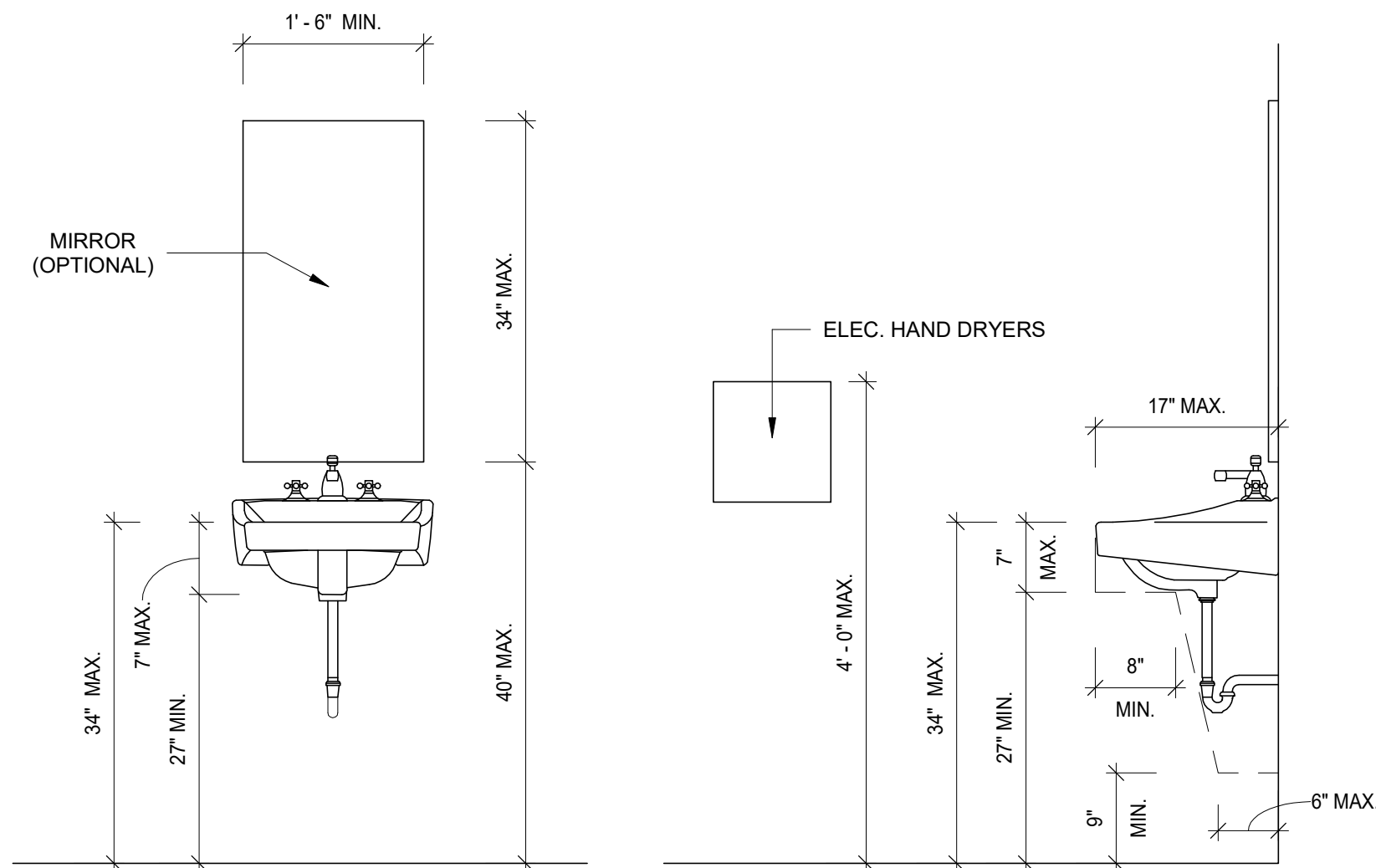
- (1) THE WATER CLOSET SHALL BE POSITIONED WITH A WALL OR PARTITION TO THE REAR AND TO ONE SIDE.
(2) THE CENTERLINE OF THE WHEELCHAIR ACCESSIBLE WATER CLOSETS SHALL BE 16" MIN. TO 18" MAX. FROM THE SIDE WALL OR PARTITION.
(3) THE CENTERLINE OF THE AMBULATORY ACCESSIBLE WATER CLOSETS SHALL BE 17" MIN. TO 19" MAX. FROM THE SIDE WALL OR PARTITION.
(4) CLEARANCE AROUND A WATER CLOSET SHALL BE 60 INCHES MINIMUM MEASURED PERPENDICULAR FROM THE SIDE WALL AND 56 INCHES MINIMUM MEASURED PERPENDICULAR FROM THE REAR WALL.

URINAL NOTES:

- (1) URINAL RIM TO BE 17" MAXIMUM ABOVE FINISHED FLOOR.
(2) URINAL TO BE 13 1/2" MINIMUM FROM OUTER FACE OF URINAL TO BACK OF FIXTURE.

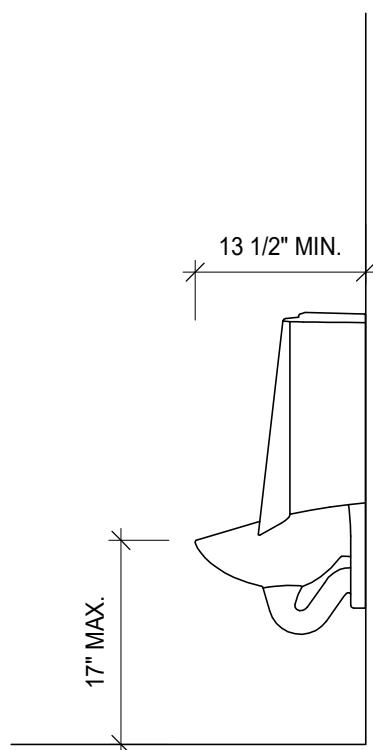
SHOWER NOTES:

- (1) SHOWER ENCLOSURES SHALL NOT OBSTRUCT CONTROLS OR TRANSFER FROM WHEELCHAIRS ONTO SHOWER SEATS.
(2) SHOWER CURB(S) TO NOT EXCEED 1/2"



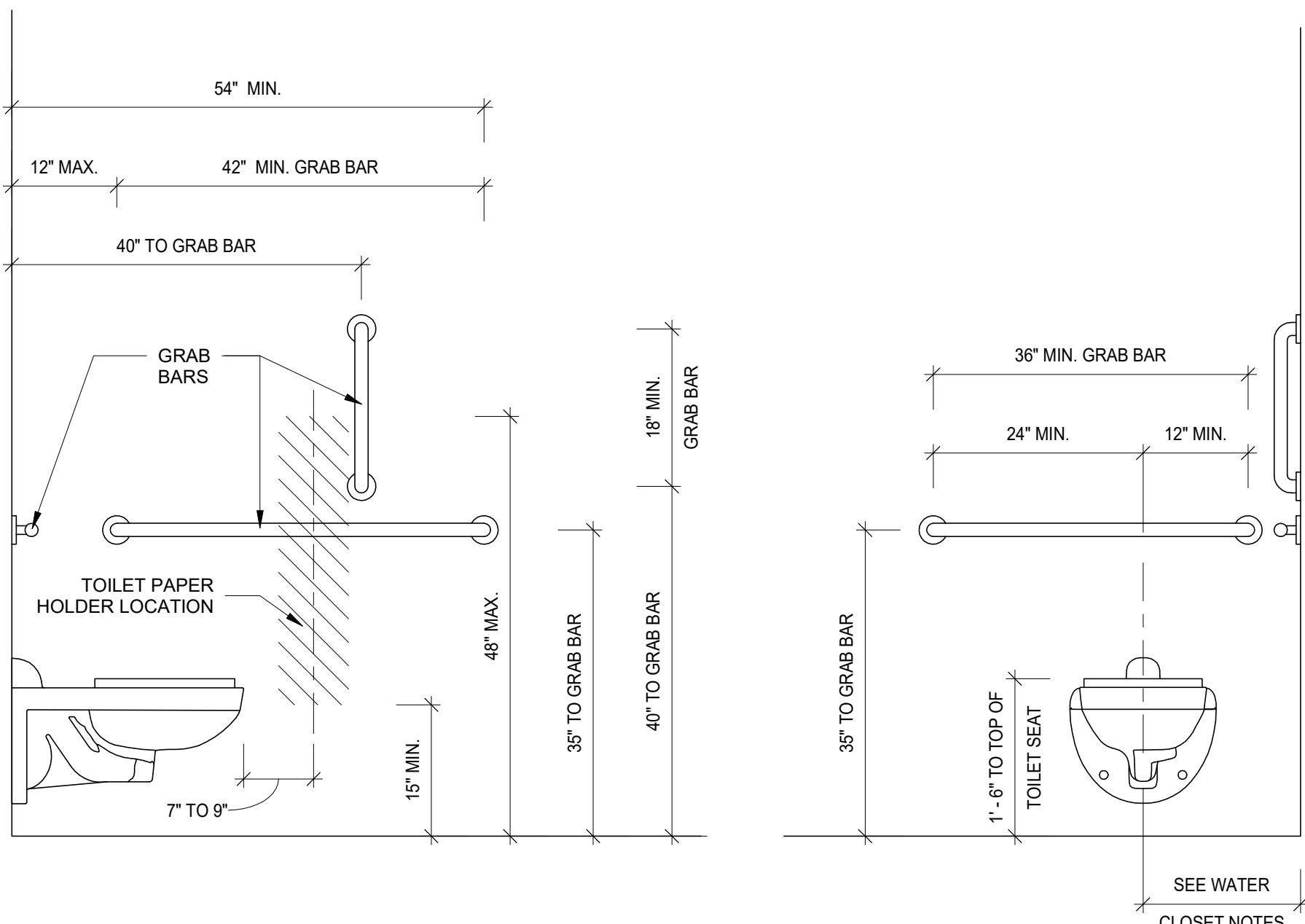
HUFFCUTT - ADA SINK DETAIL

3/4\" = 1'-0"



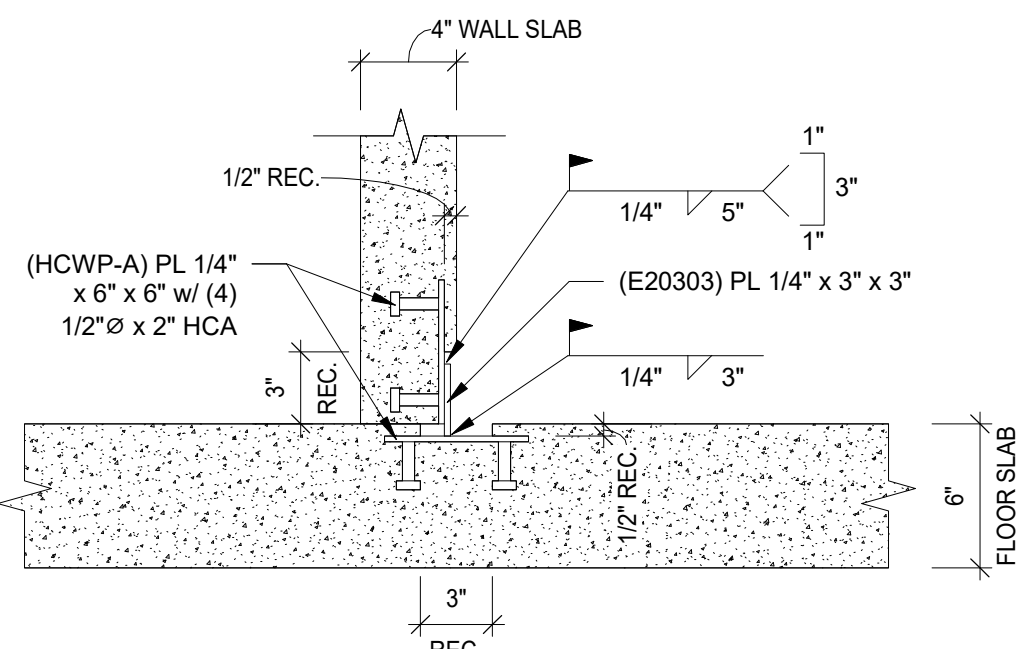
HUFFCUTT - ADA URINAL DETAIL

3/4\" = 1'-0"



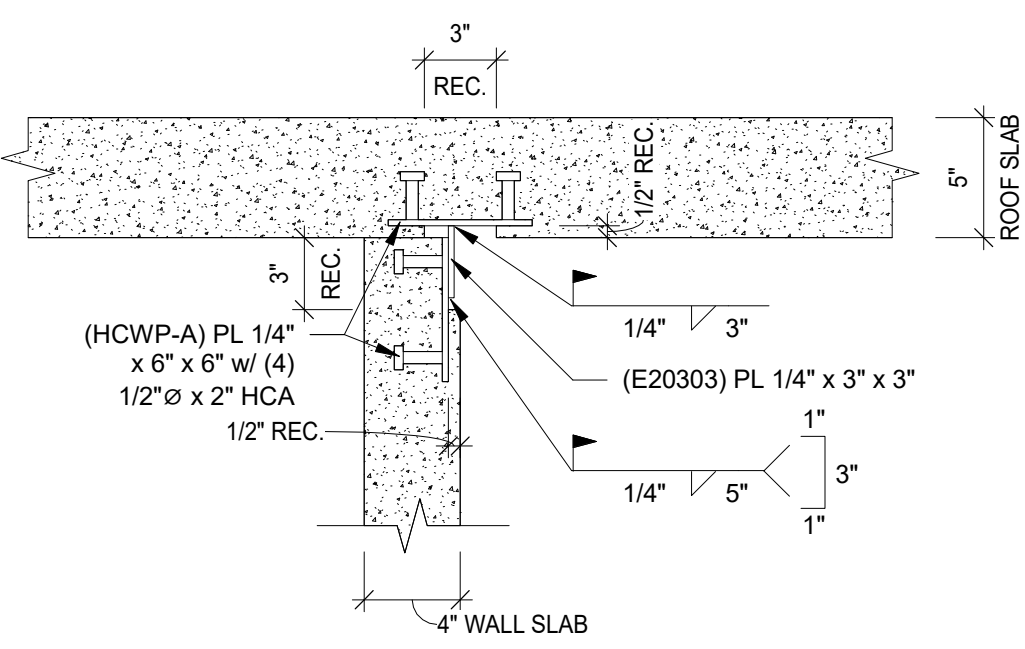
HUFFCUTT - ADA TOILET DETAIL

3/4\" = 1'-0"



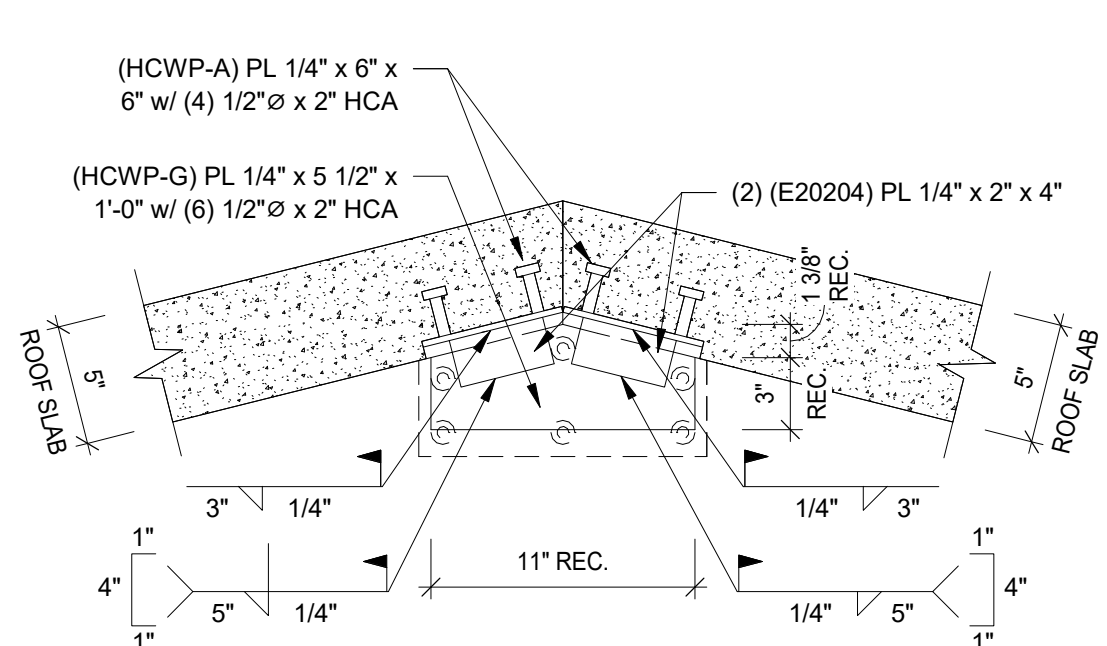
1 CONNECTION DETAIL - FLOOR TO WALL

0.02 1 1/2\" = 1'-0"



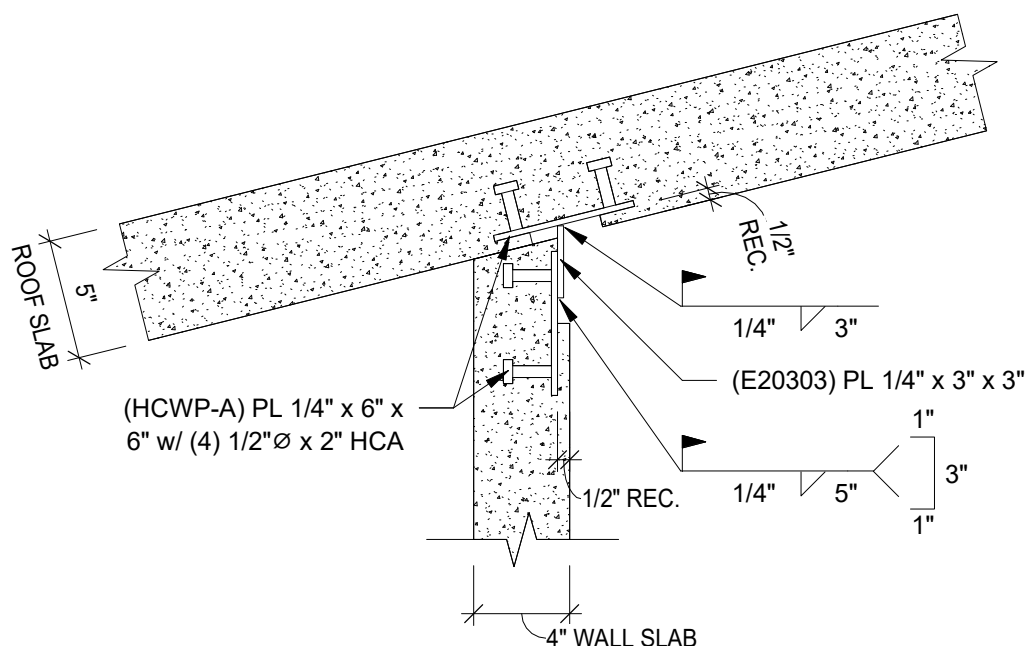
2 CONNECTION DETAIL - WALL TO ROOF

0.02 1 1/2\" = 1'-0"



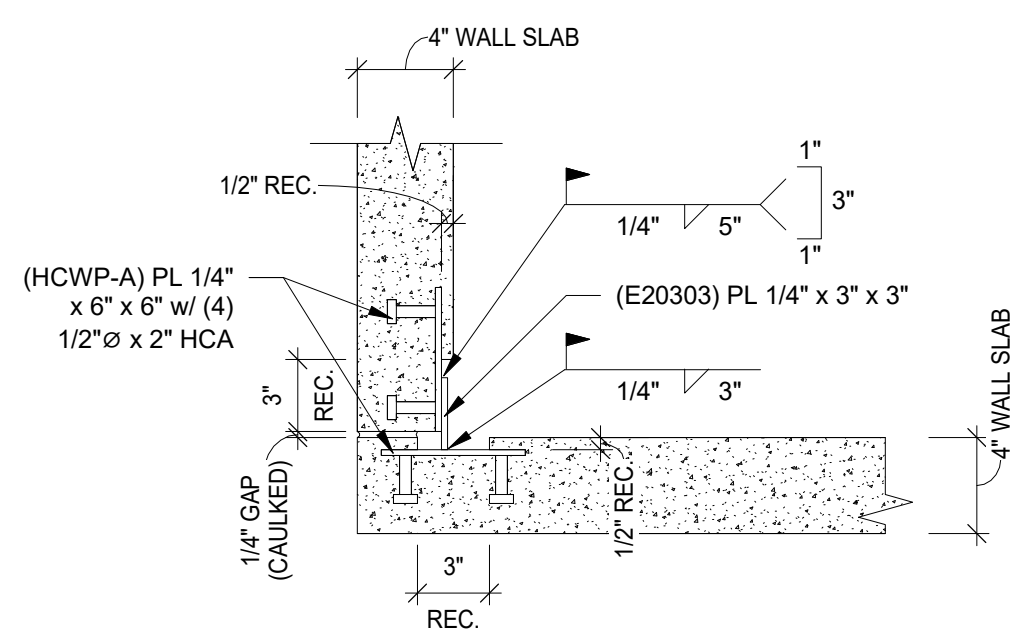
3 CONNECTION DETAIL - WALL TO ROOF PEAK

0.02 1 1/2\" = 1'-0"



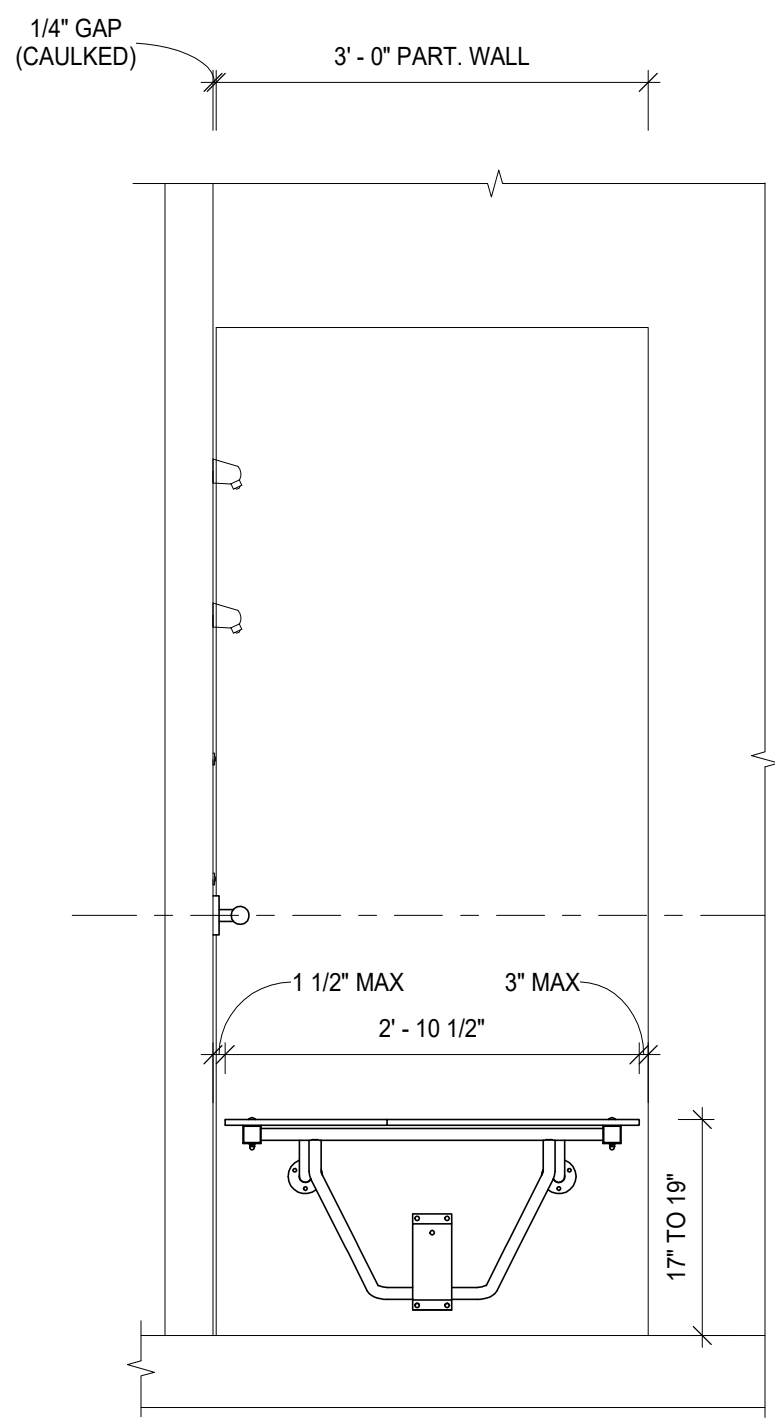
4 CONNECTION DETAIL - WALL TO ROOF SLOPE

0.02 1 1/2\" = 1'-0"

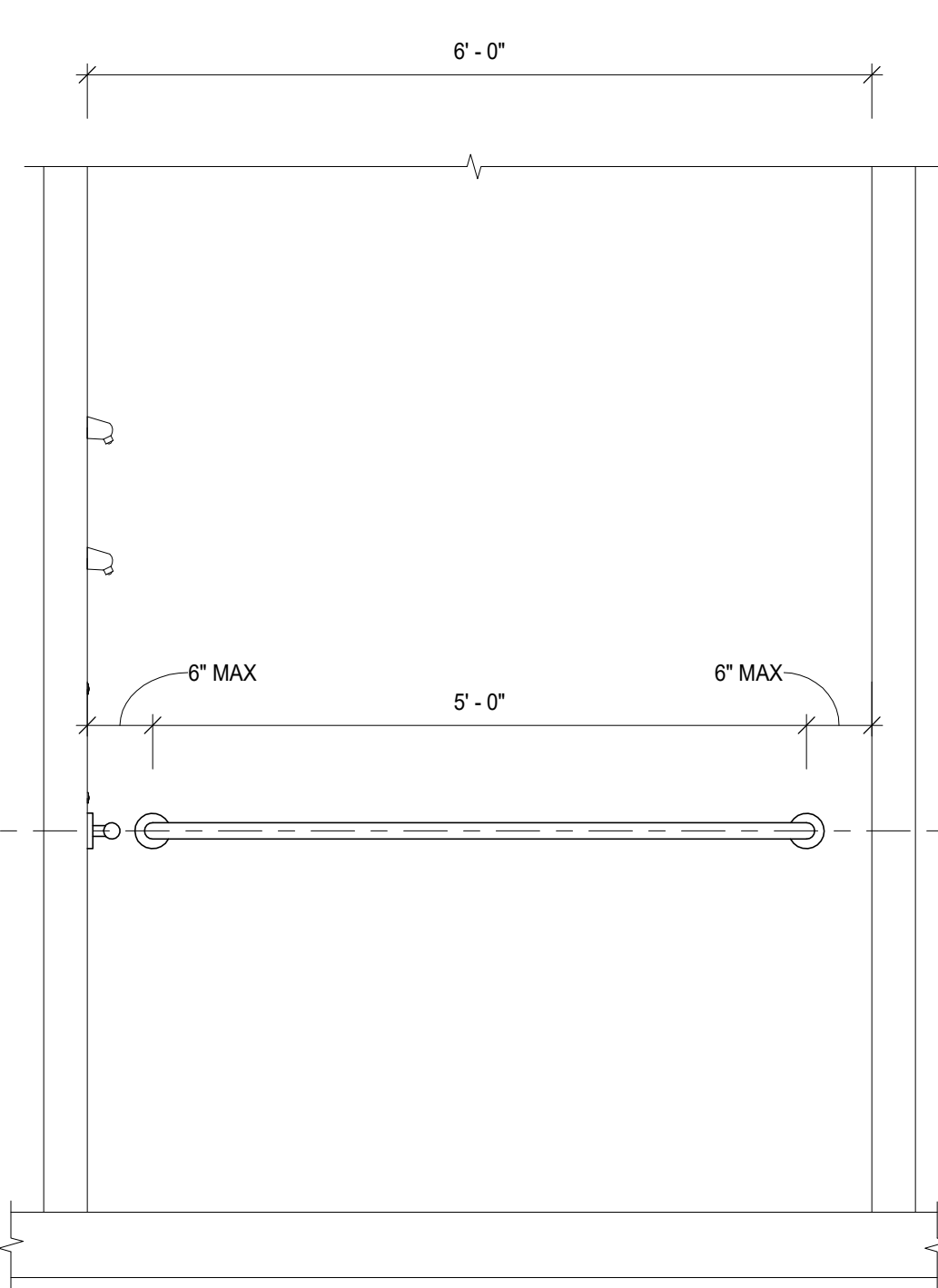


5 CONNECTION DETAIL - WALL TO WALL PLAN VIEW

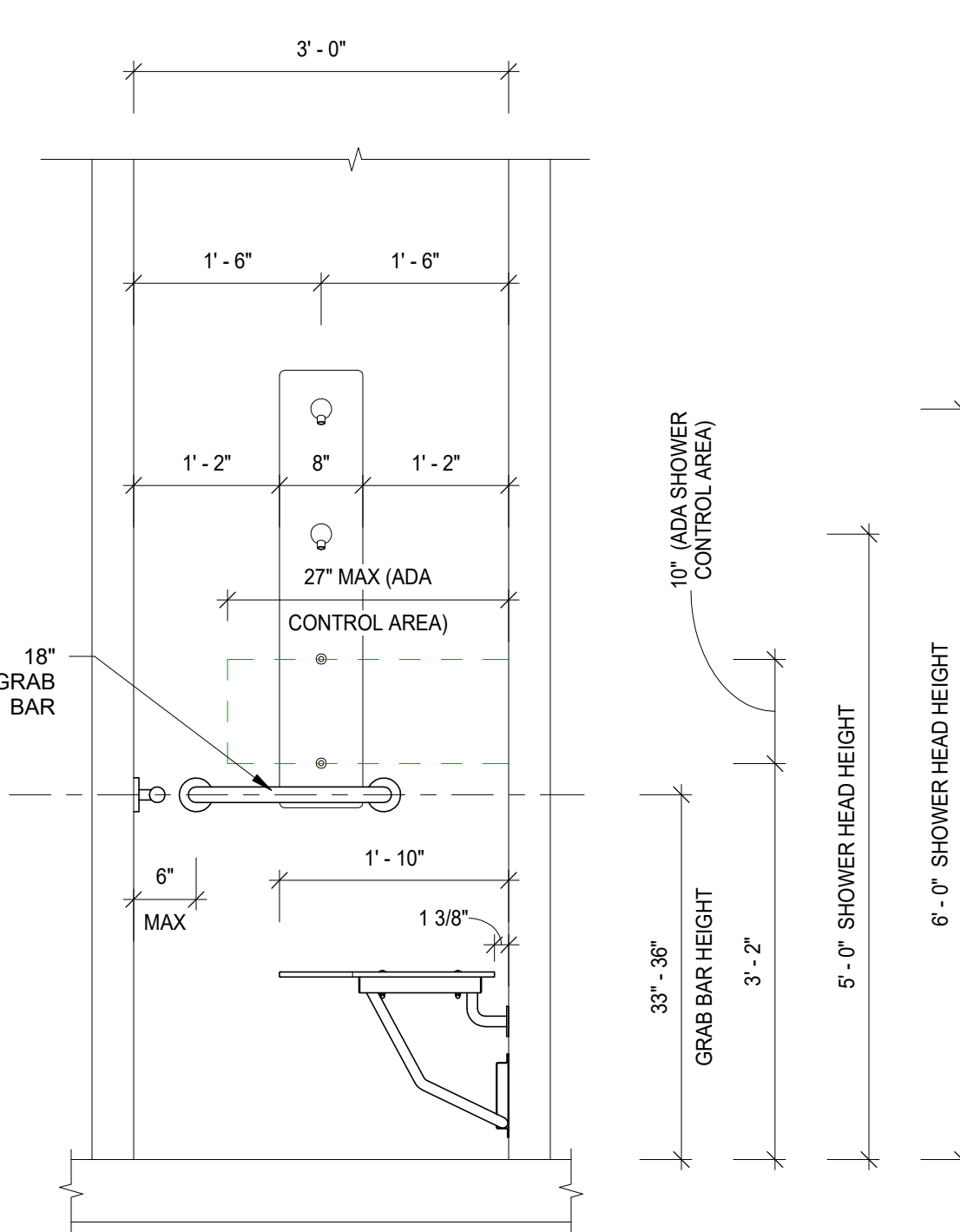
0.02 1 1/2\" = 1'-0"



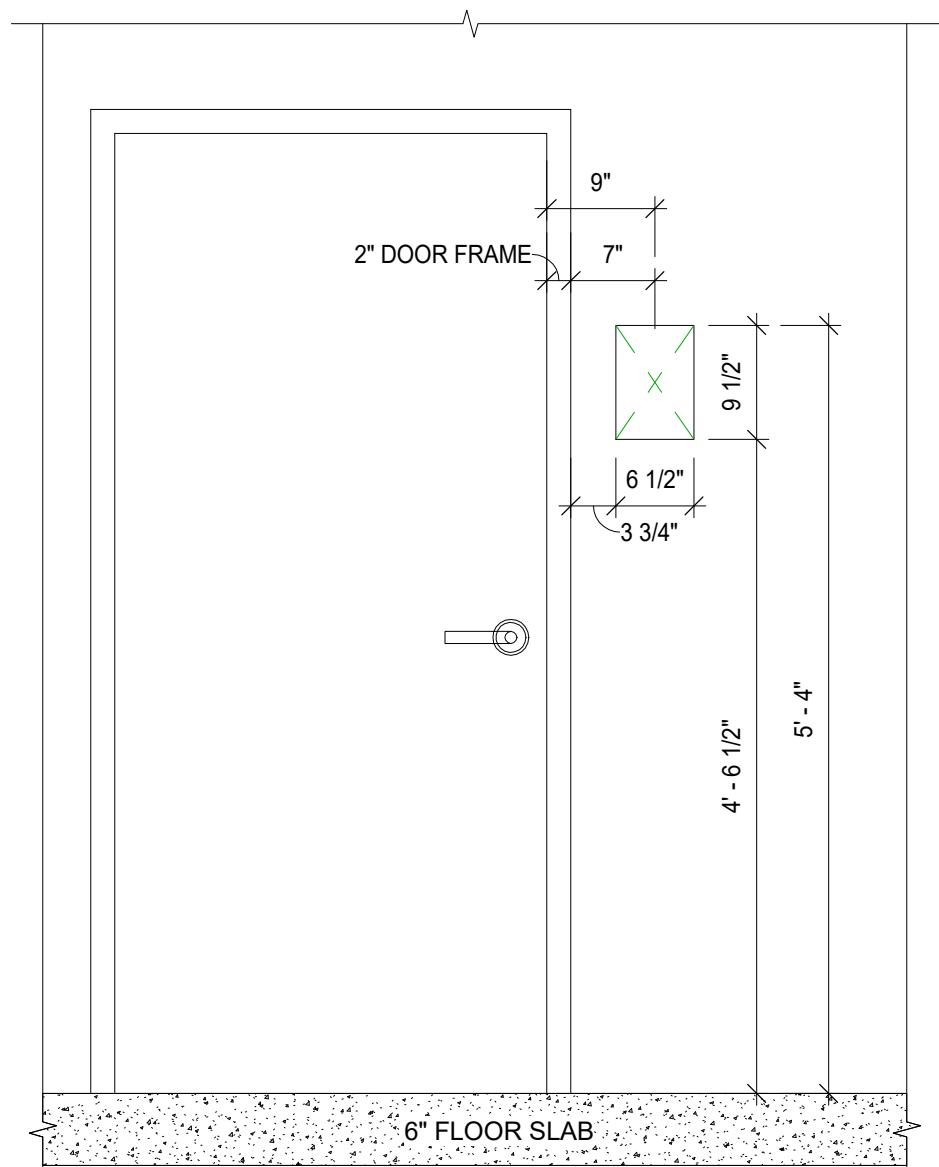
PARTITION WALL VIEW



SIDE WALL VIEW



FIXTURE WALL VIEW



6 RESTROOM SIGN FLAT SPOT DETAIL

0.02 3/4\" = 1'-0"

PROJECT CONTACTS:
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JASON SWART (715)231-2292
PROJECT GENERAL CONTRACTOR

PROJECT ARCHITECT
PROJECT ENGINEER OF RECORD

STATUS:

REVISION HISTORY		
1		
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HUFFCUTT PROJECT No.:

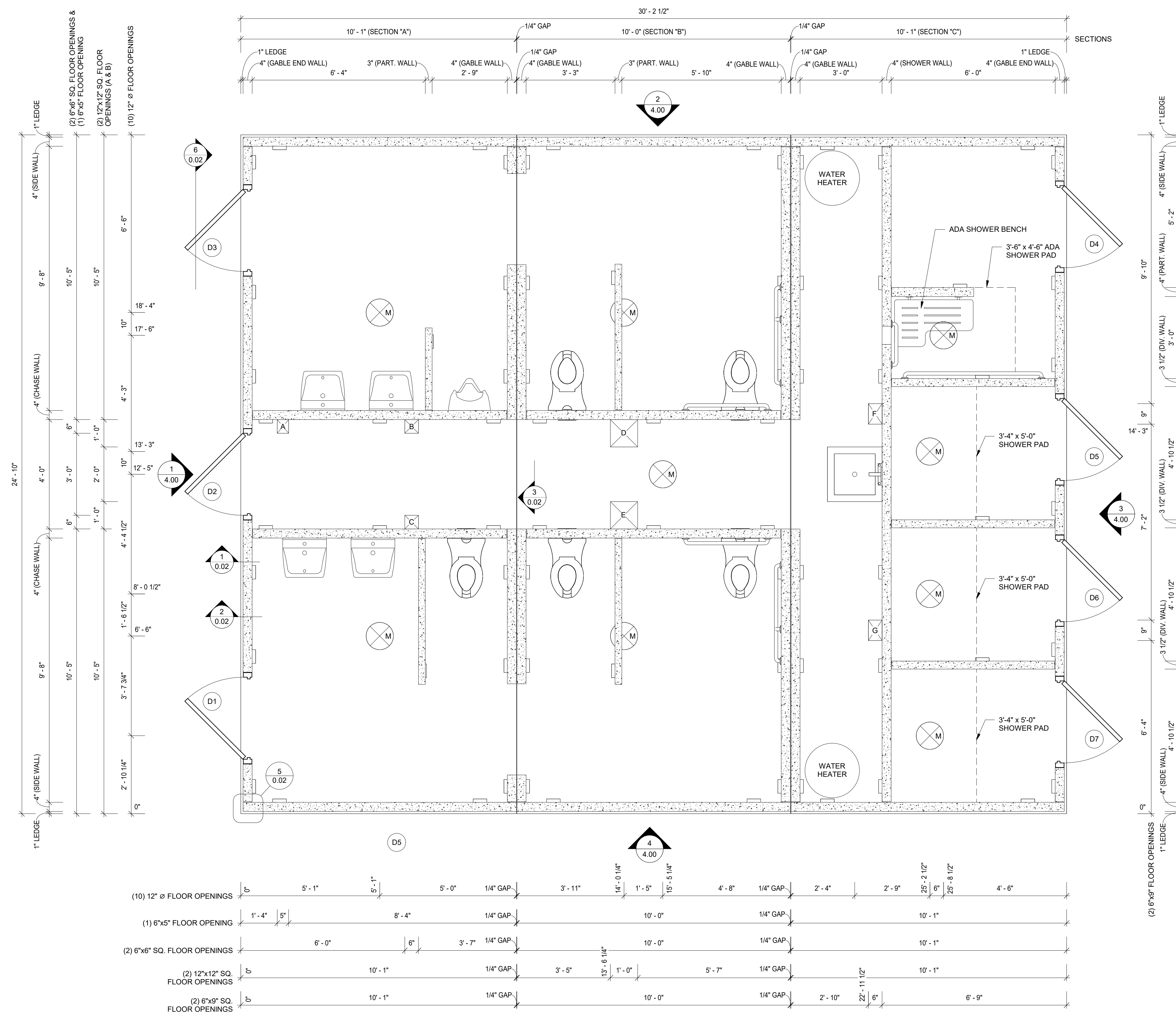
PROJECT:

SHEET TITLE

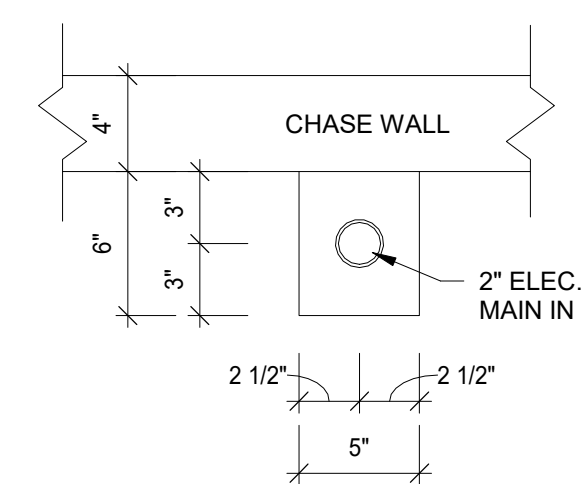
DETAILS

SHEET NUMBER

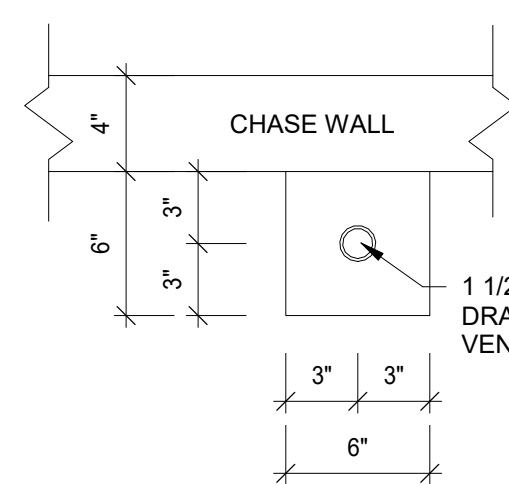
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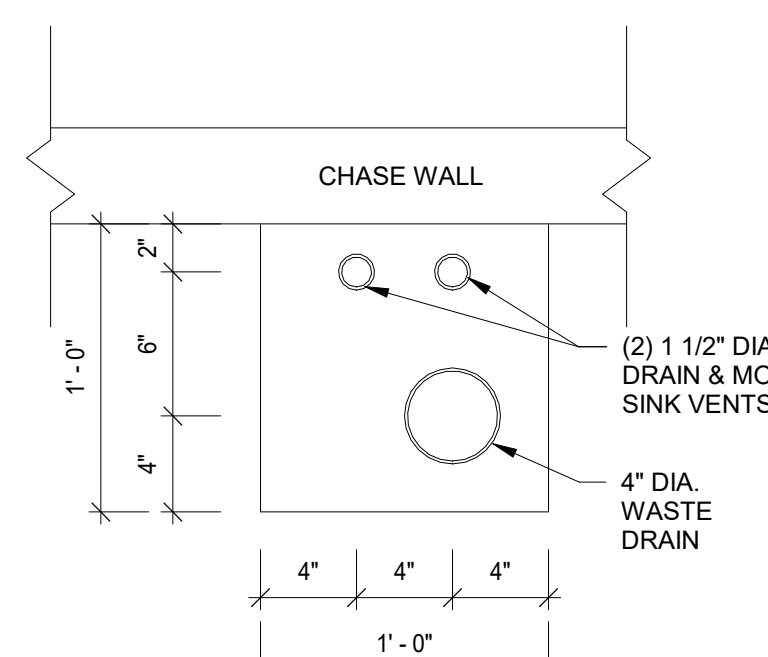
FLOOR PLAN & FLOOR SLAB OPENINGS
1/2" = 1'-0"



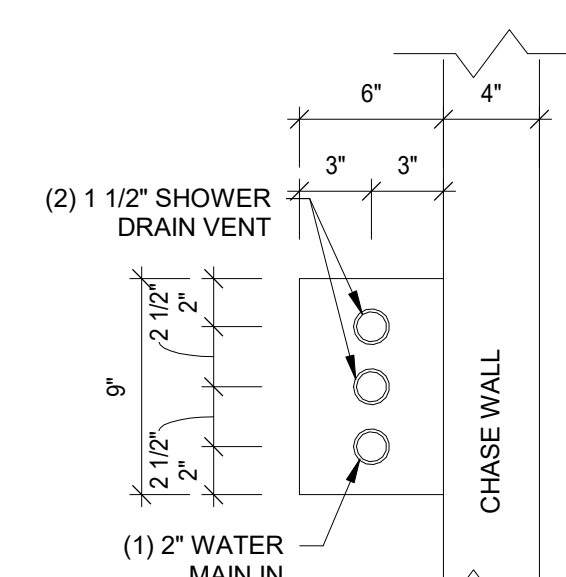
A OPENING DETAIL
SCALE: 1 1/2"=1'-0"



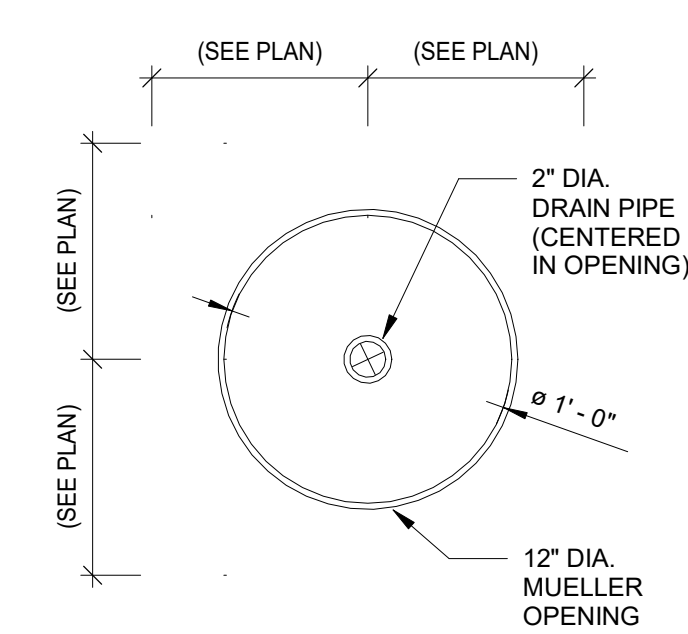
B OPENING DETAIL
SCALE: 1 1/2"=1'-0"



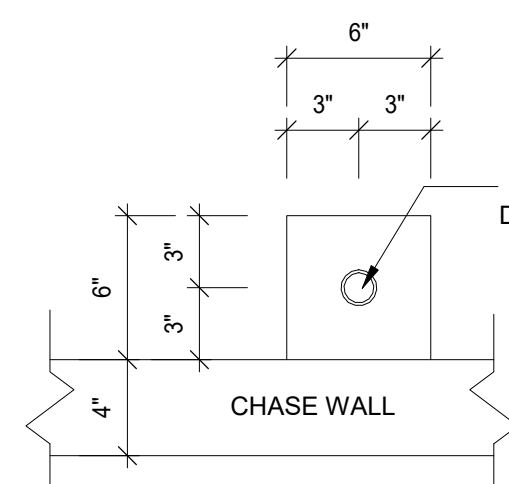
D OPENING DETAIL
SCALE: 1 1/2"=1'-0"



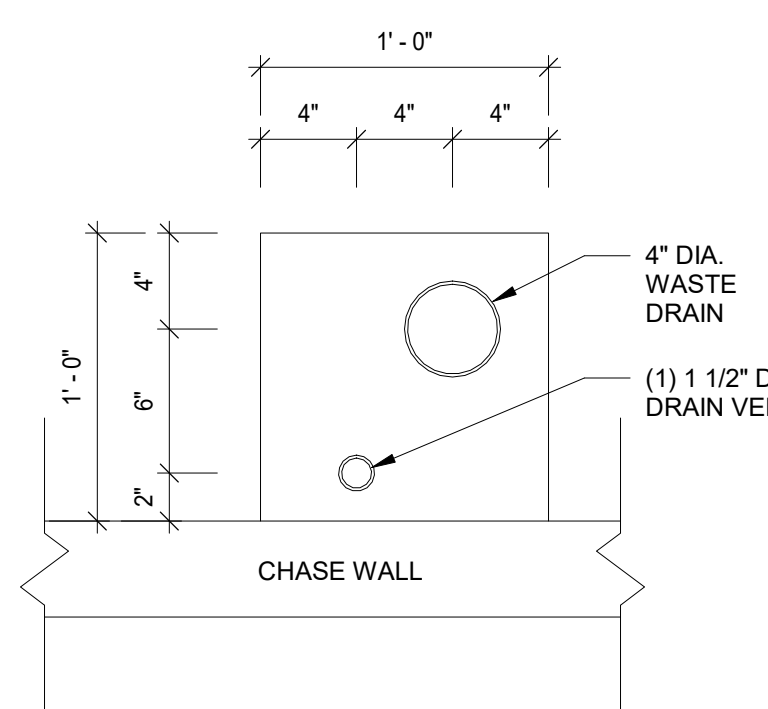
F OPENING DETAIL
SCALE: 1 1/2"=1'-0"



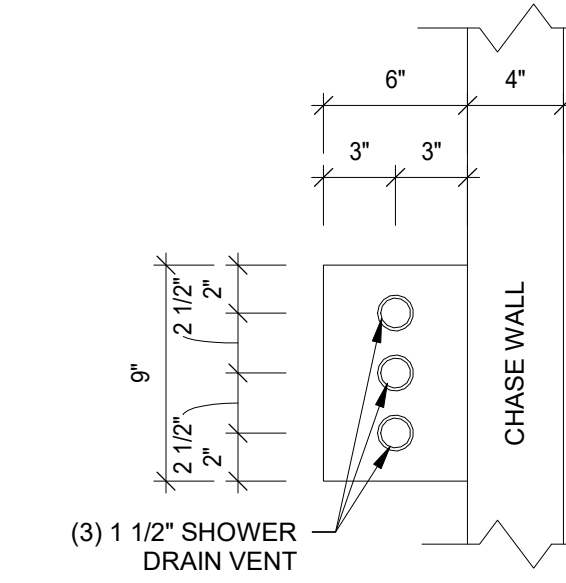
M **OPENING DETAIL**
SCALE: 1 1/2"=1'-0"



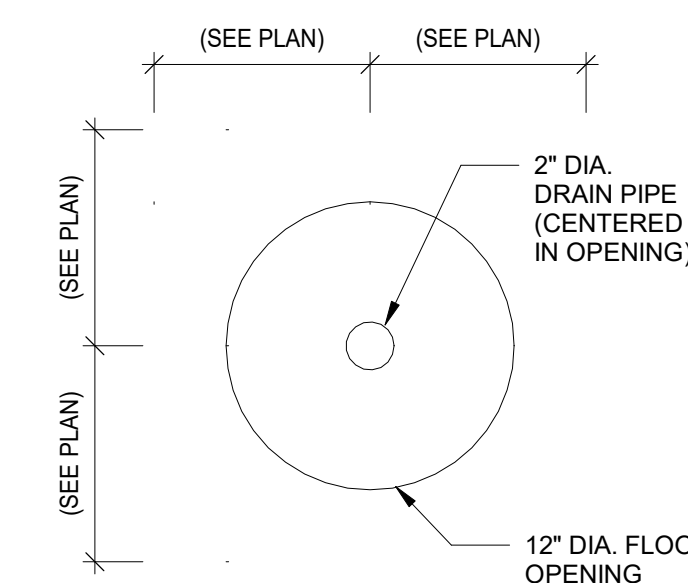
C OPENING DETAIL
SCALE: 1 1/2"=1'-0"



E OPENING DETAIL
SCALE: 1 1/2"=1'-0"



G OPENING DETAIL



N OPENING DETAIL

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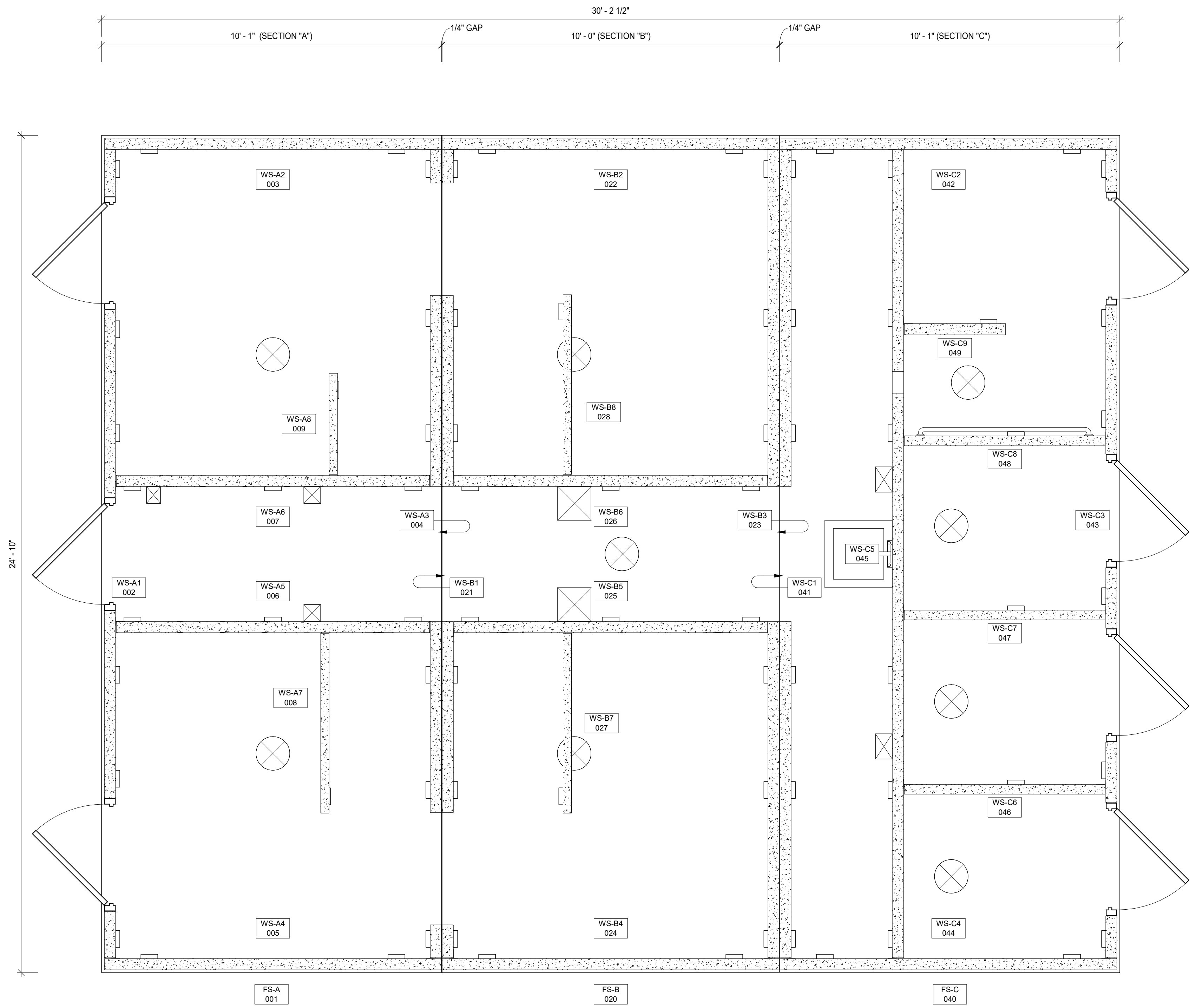
PROJECT:

SHEET TITLE

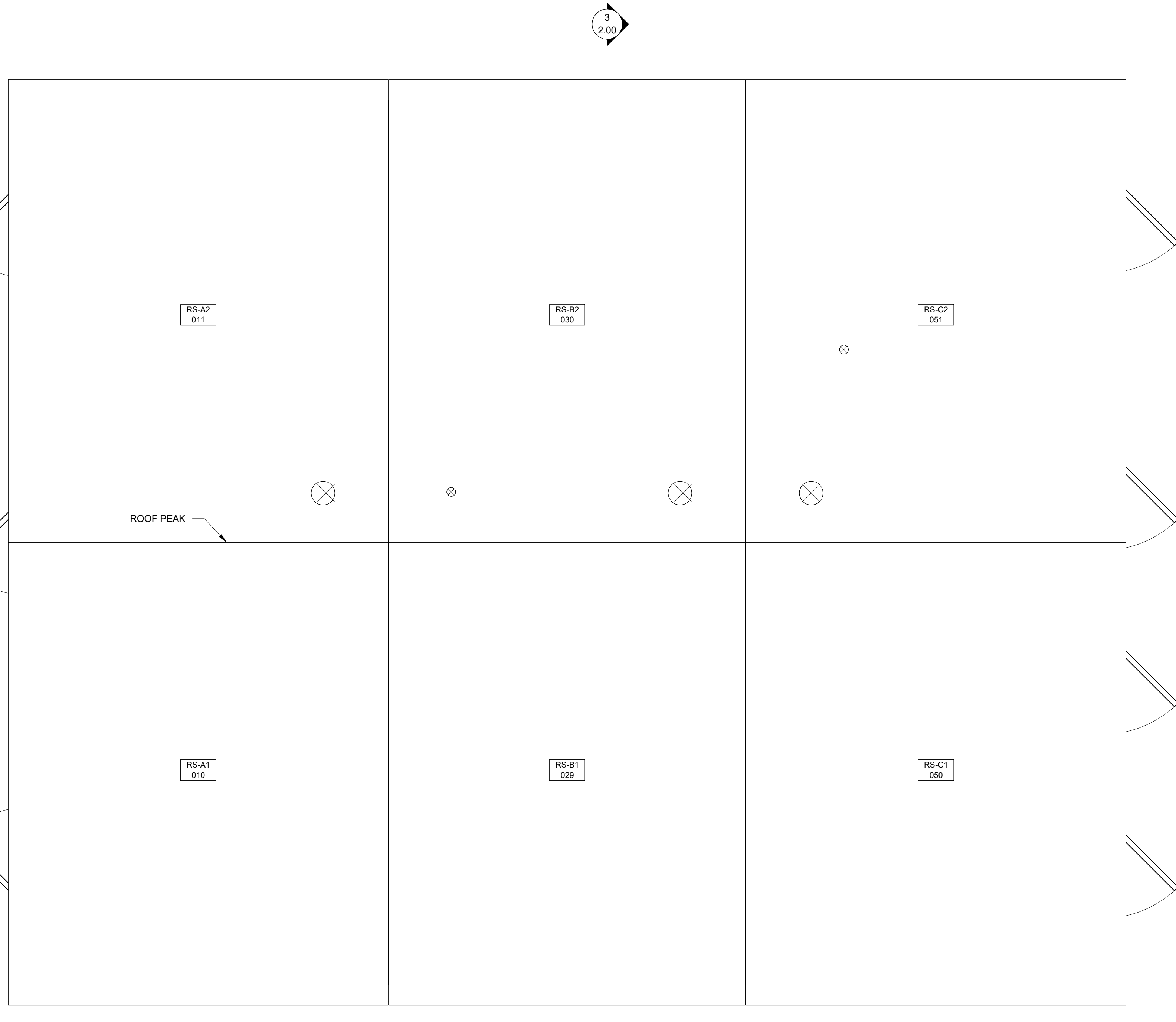
FLOOR PLAN & OPENINGS DETAILS

SHEET NUMBER

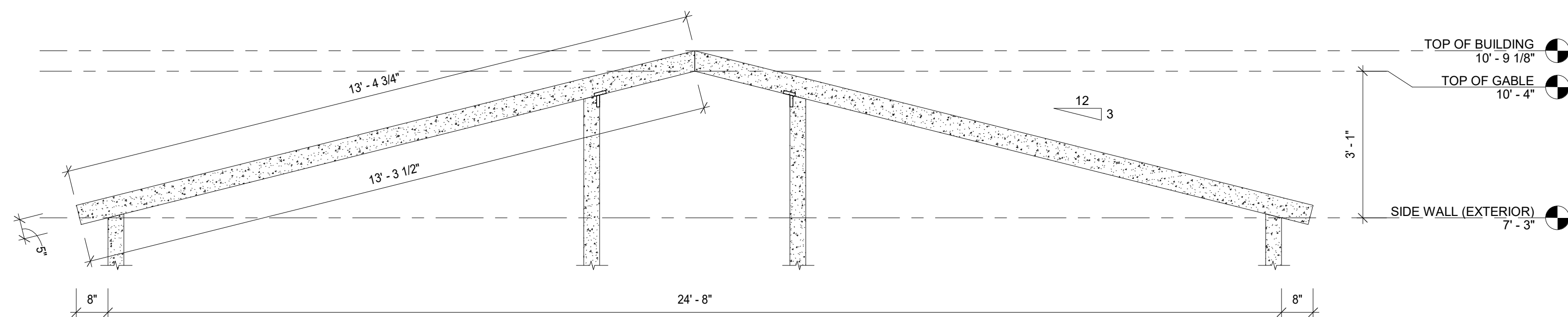
1.00



1 WALL PANEL LAYOUT
2.00 1/2" = 1'-0"



2 ROOF PANEL LAYOUT
2.00 1/2" = 1'-0"



3 ROOF PANEL SECTION
2.00 1/2" = 1'-0"

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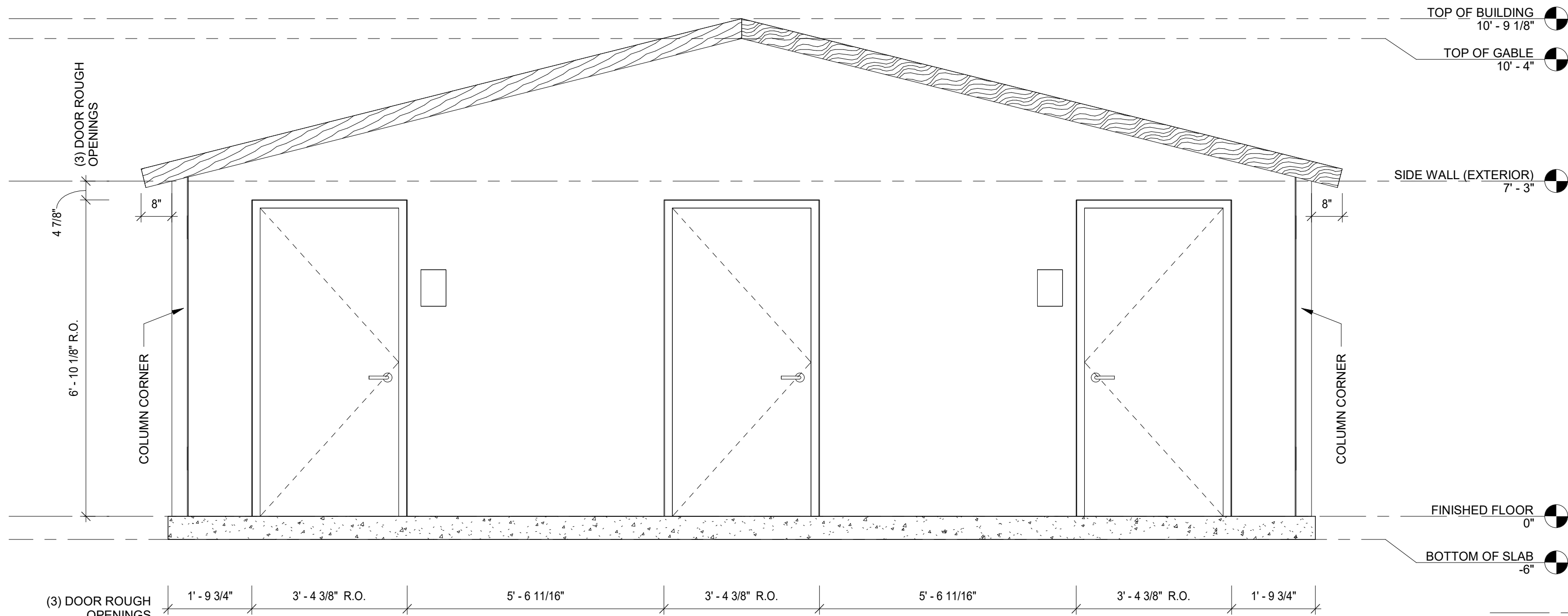
REVISION HISTORY		
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HUFFCUTT PROJECT No.:

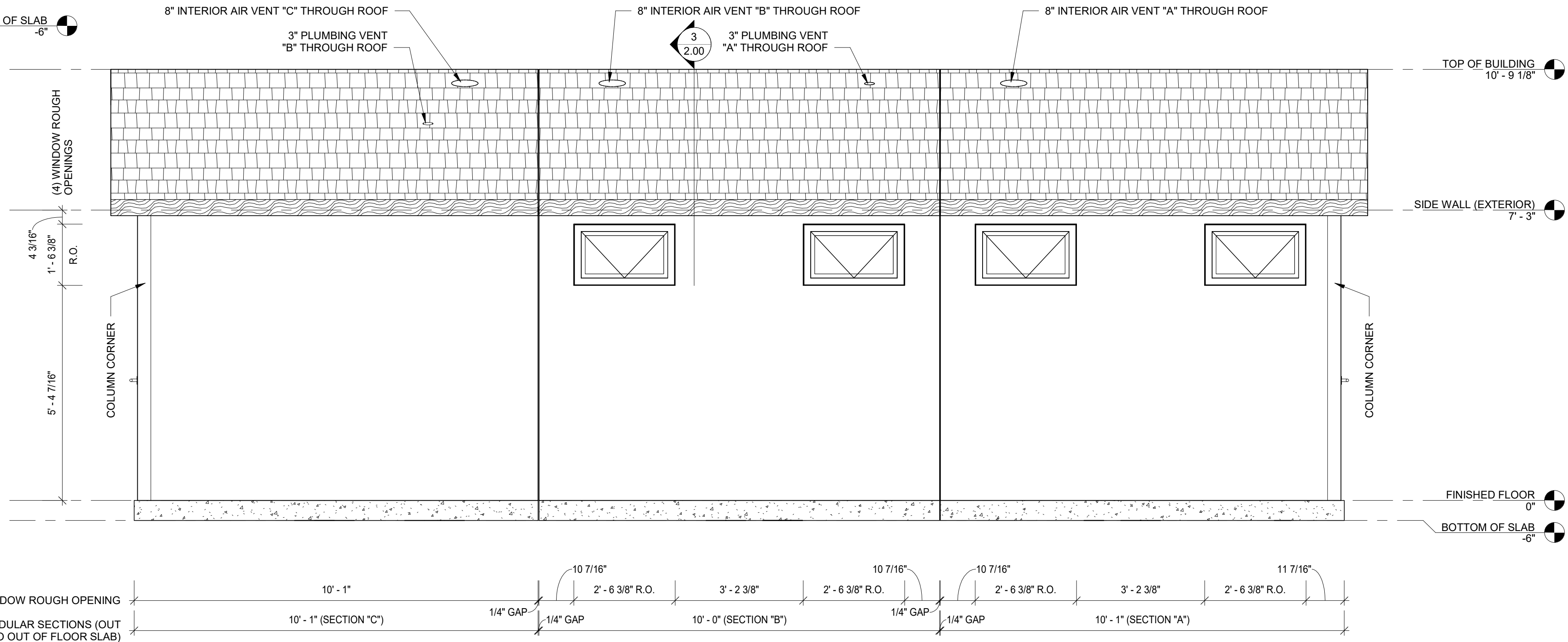
PROJECT:

SHEET TITLE
WALL & FLOOR
PANEL LAYOUT

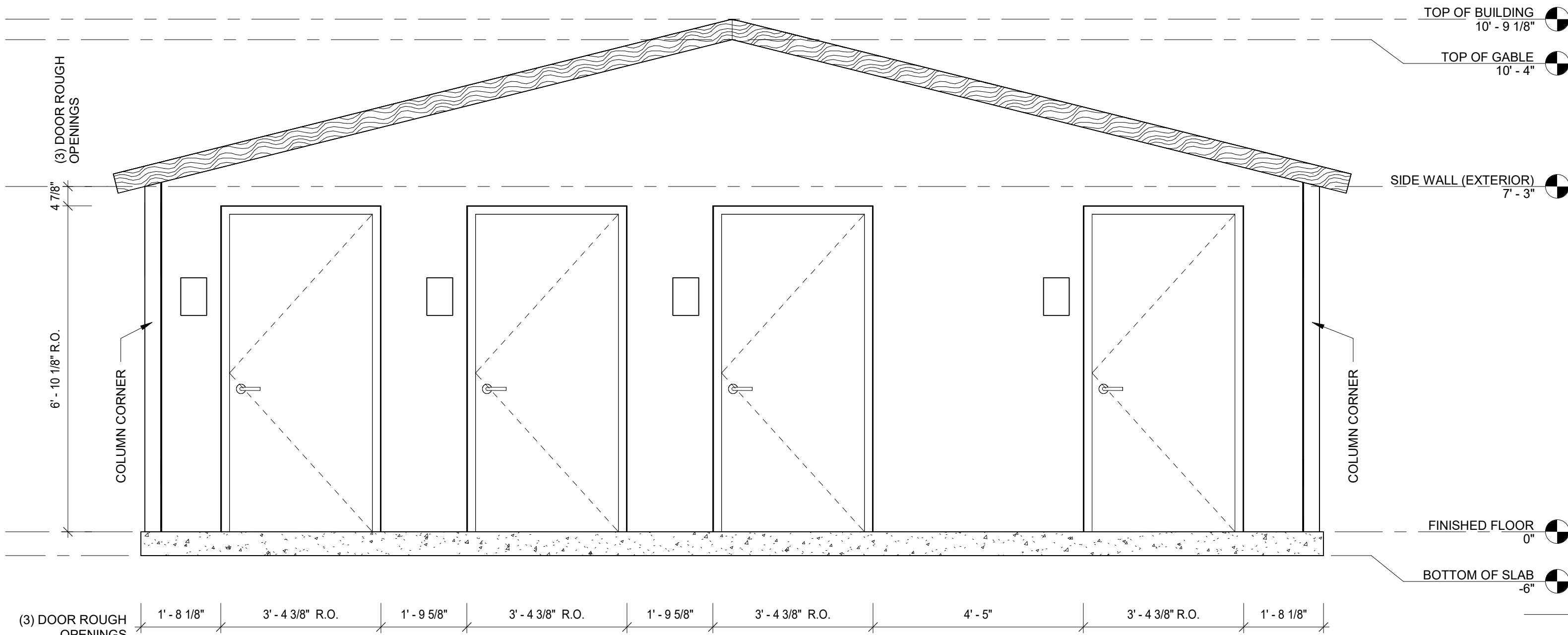
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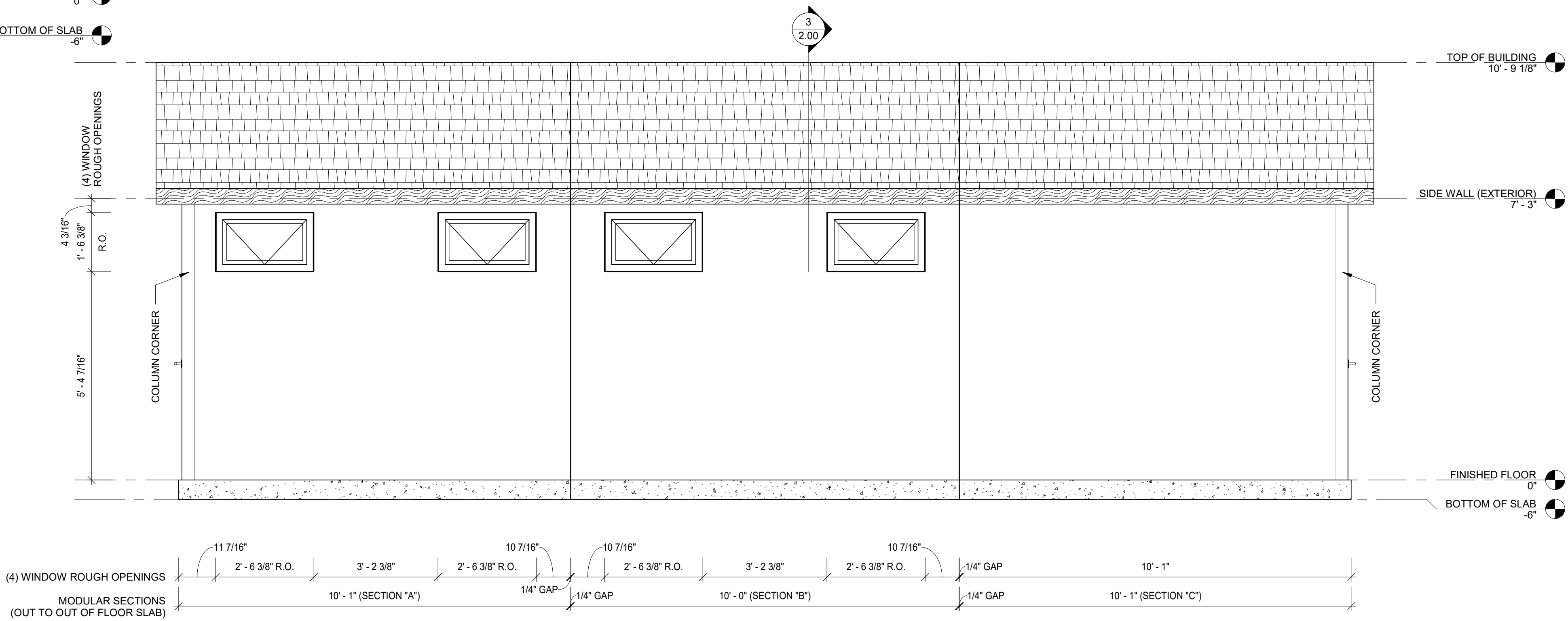
1 WEST EXTERIOR ELEVATION
4.00 1/2" = 1'-0"



2 NORTH EXTERIOR ELEVATION
4.00 1/2" = 1'-0"



3 EAST EXTERIOR ELEVATION
4.00 1/2" = 1'-0"



4 SOUTH EXTERIOR ELEVATION
4.00 1/2" = 1'-0"

FINISH KEY	
	CEDAR SHAKE
	WOOD GRAIN
	6" VERTICAL WOODGRAIN
	SHALLOW FIELDSTONE
	SANDBLAST-MEDIUM
ALL REVEALS TO BE SAND BLAST FINISH	

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HUFFCUTT PROJECT No.:

PROJECT:

SHEET TITLE

EXTERIOR
ELEVATIONS - WEST
& SOUTH

SHEET NUMBER

4.00