

CONTRACT DOCUMENTS

FOR

PROJECT 17-RD-01: Progress Business Park Phase 4

**Department of Engineering
City of Greenfield**

**Chuck Fewell.....Mayor
Jason Koch, PE.....City Engineer**

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NOTICE TO BIDDERS
City of Greenfield

Department: **Department of Engineering**
10 S. State Street
Greenfield, Indiana 46140

Project/Work: **17-RD-01: Progress Business Park Phase 4**

Notice is hereby given that the City of Greenfield will receive sealed bids for the above described "Project/Work" at Clerk-Treasurer's Office, 10 S. State Street, Greenfield, Indiana, until 9:30 a.m. prevailing local time, 10 S. State Street, on **Tuesday, October 22, 2019** and commencing as soon as practicable thereafter on the same date such bids will be publicly opened. No late Bids will be accepted.

A Bid Bond or certified check in an amount not less than five percent (5%) of the amount bid must be submitted with each Bid. A one hundred percent (100%) Performance and Payment Bond will also be required of the successful Bidder.

The Work consists of, but is not necessarily limited to the following:

Drainage improvements, sanitary sewer construction and new road construction of Progress Park

Contract Documents for the Project/Work have been assembled into one or more bound Project Manuals which, together with Drawings, may be examined the Clerk-Treasurer's Office or the Department of Engineering at 10 S. State Street, Greenfield, Indiana 46140.

Copies of such Drawings and Project Manuals will be available for purchase and pick-up at the Clerk-Treasurer's Office. Payment may be made by check, credit card, or cash. NO DEPOSITS ACCEPTED. Make checks payable to City of Greenfield. All payments and costs of Contract Documents and related supplemental materials are non-refundable. BID PACKAGES WILL NOT BE AVAILABLE FOR SALE IN THE DEPARTMENT OF ENGINEERING. Electronic copies of the Drawings and Project Manuals will be available on the City of Greenfield website at <https://www.greenfieldin.org/government/engineering>. Bidders will be responsible to contact the Clerk-Treasurers office to be added to the plan-holders list if downloading electronic contract documents.

Bidders shall assure that they have obtained complete sets of drawings and Contract Documents and shall assume the risk of any errors or omissions in Bids prepared in reliance on incomplete sets of drawings and Contract Documents.

A pre-bid conference for discussion of the Work, the bidding requirements, and other important matters will be held on **Monday, October 14, 2019 at 3:00pm local time in the Larry Breese Conference Room located at 10 S. State Street, Greenfield, Indiana 46140**. All prospective Bidders are strongly urged to attend the pre-bid conference to learn about the project.

For accommodations needed by persons with disabilities to attend the public bid opening meeting, please call (317) 477-4320.

The City of Greenfield reserves the right to reject any or all bids or to waive any informalities and to accept the bid which it deems most favorable to the interests of the City after all bids have been examined and canvassed.

INSTRUCTIONS TO BIDDERS

City of Greenfield

Department (“Owner”): **Department of Engineering
10 S. State Street
Greenfield, Indiana 46140**

Project/Work: **17-RD-01: Progress Business Park Phase 4**

Owner’s Representative: **Jason Koch**

Engineer: **GAI Consultants, Inc.**

1. GENERAL

- 1.1 Submission of a Bid shall constitute an unconditional agreement and acknowledgment by the Bidder to be bound by all terms and conditions set forth herein and in any of the documents assembled or referred to in the bound Project Manual of which these Instructions to Bidders are a part.
- 1.2 Sample forms are included in the Project Manual to acquaint Bidders with the form and provisions of various Bid Documents and other documentation required by the Contract Documents to be executed, completed and submitted by some or all Bidders, either as part of a Bid Submission or after the Bid Date. Such sample forms are not to be detached from the Project Manual, or filled out or executed. Separate copies of such forms and any other required documentation prescribed by the Contract Documents have been or will be furnished separately by the Owner and must be obtained directly from the City.
- 1.3 Instructions and requirements printed on any sample form included in the Project Manual or any form not so included but required to be completed, signed or furnished by a Bidder as part of a Bid Submission or after receipt and opening of Bids shall be deemed requirements established by these Instructions to Bidders to the same extent as if fully restated herein.
- 1.4 By submitting bid the Bidder agrees the bid proposal and price(s) contained herein shall be valid for ninety (90) days from bid opening.

2. DEFINITIONS

The following definitions shall apply to these Instructions to Bidders (ITB):

- 2.1 Bidder - Any person or entity who submits a Bid.
- 2.2 Bid - A written proposal submitted by a Bidder as part of the form prescribed herein offering to perform and complete the Work and to fulfill all other requirements of the Contract Documents for one or more specified prices.
- 2.3 Bid Documents - All documents and completed forms required to be submitted by a Bidder with and as integral parts of a Bid Submission, whether or not included as sample forms assembled in the Project Manual of which these Instructions to Bidders are a part. Such Bid Documents are listed and more fully described in ITB Section 5.3 hereof.

- 2.4 Bid Date - The date when Bids are to be received, opened and publicly read aloud as established by the Notice to Bidders as may be modified by Addenda.
- 2.5 Bid Submission - All documents presented by a Bidder for receipt and opening on the Bid Date.
- 2.6 Contract Documents - The Agreement and any exhibits thereto, Addenda (which pertain to the Contract Documents), Instructions to Bidders, Advertisement, Notice to Bidders, Bidder's Bid (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award), Notice to Proceed, the Bonds, the General Conditions, the Additional Requirements Section, any supplemental or special conditions, the Specifications and the Drawings, as the same are more specifically identified in the Agreement.
- 2.7 E-Verify Program - An electronic verification of work authorization program of the Illegal Immigration Reform and Immigration Responsibility Act of 1996 (P.L. 104-208), Division C, Title IV, s.403(a), as amended, operated by the United States Department of Homeland Security or successor work authorization program designated by the United States Department of Homeland Security or other federal agency authorized to verify the work authorization status of newly hired employees under the Immigration Reform and control Act of 1986 (P.L. 99-603).
- 2.8 Owner - The City of Greenfield acting by and through the Department or other agency designated above.
- 2.9 Project Manual - The bound set of documents, sample forms, and Contract Documents (excluding plans and Addenda) approved by the Owner for the Work and/or Project described in the Notice to Bidders and of which these Instructions to Bidders are a part.

In all other respects, terms used herein shall have the meanings as stated in the General Conditions or other Contract Documents.

3. EXAMINATION OF SITE AND DOCUMENTS

- 3.1 Before the Bid Date, all Bidders shall carefully and thoroughly examine and inspect the entire site of the proposed Work and adjacent premises and the various means of approach and access thereto by means of a site inspection visit, and make all necessary investigations to inform themselves thoroughly as to the facilities necessary for delivering, placing and operating the necessary construction equipment, and for delivering and handling materials at the site, and shall inform themselves thoroughly as to any and all actual or potential difficulties, hindrances, delays and constraints involved in the commencement, prosecution and completion of the proposed Work in accordance with the requirements of the Contract Documents.
- 3.2 It shall be the sole responsibility of Bidders to make borings, test pits and to conduct such other investigations at or near the site of the proposed Work as they deem necessary to determine the character, location, and amount of materials to be encountered or other subsurface conditions which could affect the manner, cost or time required to perform the Work.
- 3.3 Bidders shall carefully and thoroughly examine the plans, specifications and other Contract and/or Project Manual Documents and shall assume the full risk of their own judgments as to the nature, quality and amount of the whole of the Work to be done, and for the price bid must assume all risk of any and all variances or errors in any computation or statement of amounts or quantities necessary to complete the Work in strict compliance with the Contract Documents.

- 3.4 Elevations of the existing ground surface or structures at the site of the Work as shown on the plans are believed to be reasonably correct, but are not guaranteed to be absolutely so and are presented only as an approximation. Bidders shall satisfy themselves as to the correctness of all elevations.
- 3.5 Information stated or depicted on plans concerning the location, dimensions, depth and other characteristics of underground structures and utilities is given only as general information and shall not be construed or relied upon by Bidders as a representation or assurance that such structures or utilities will be found or encountered as plotted, or that such information is complete or accurate. Bidders, therefore, shall satisfy themselves by such means as they may deem proper as to the location of all structures and utilities that may be encountered in construction of the Work and shall bear the risk of the number, type, location, dimensions and depth of all structures and utilities thus encountered.
- 3.6 The City of Greenfield Standard General Conditions for Construction Contracts, August 2018, is incorporated by reference as part of this bid. Copy of General Conditions are available at <https://www.greenfieldin.org/government/engineering>.

4. CLARIFICATIONS AND ADDENDA

- 4.1 If a Bidder finds conflicts, errors, discrepancies or ambiguities in the Contract Documents or any sample form, or if the Bidder is in doubt as to the intended meaning of any portion or provision therein, the Bidder shall at once give written notice thereof to the Owner's Representative, at least seven (7) consecutive calendar days prior to the Bid Date. No Bidder shall be allowed any extra compensation or time extension by reason of any conflict, error, discrepancy or ambiguity of which the Bidder had actual knowledge or reasonably should have known and which he/she failed to report within the period and in the manner required by these Instructions to Bidders.
- 4.2 No material changes, clarifications or interpretations of the Contract Documents will be issued except by written or graphic Addenda mailed or delivered to record holders of Contract Documents not less than three (3) days prior to the Bid Date. All such Addenda must be acknowledged by the Bidder and will become a part of the Contract Documents. The Owner will not be responsible for or bound by any oral or written interpretations or clarifications of the Contract Documents which anyone presumes to make on its behalf, except by an Addendum issued in accordance with this Section.

5. BID SUBMISSION

- 5.1 All Bid Documents shall be placed within a sealed envelope which shall be plainly labeled on the outside with the name and address of the Bidder, Project name and number (if applicable) and Due Date. If forwarded by mail, the sealed envelope must be enclosed in another envelope addressed to: City of Greenfield, Clerk-Treasurer, 10 S. State Street, Greenfield, Indiana 46140.
- 5.2 All Bid Documents as herein prescribed must be submitted with and as integral parts of each Bid Submission and shall be subject to all requirements of the Contract Documents, including drawings and these Instructions to Bidders. Bid Documents must be properly filled in and completed in every material respect and without interlineations, excisions, special conditions, qualifications or exceptions. Each Bid Document requiring a signature shall be signed by an individual duly authorized to execute such document on Bidder's behalf. A bid executed by a corporation, joint venture, or other entity with an assumed name shall have the legal and correct

name thereof followed by the word “by” and the signature and title of the officer or other person authorized to sign for it.

5.3 The Bid Documents to be thus submitted by each Bidder shall consist of all of the following (5.3.1, 5.3.2, 5.3.3):

.1 Bidder’s Itemized Proposal and Declarations. A sample of this form is included in the Project Manual and must be utilized by all Bidders. Such document includes and consists of the following constituent “Parts”:

“Part 1 - Bidder Information”

“Part 2 - Proposal (Bid)”

“Part 3 - Contract Items and Unit Prices”

“Part 4 - Contract Documents and Addenda”

“Part 5 - Exceptions”

“Part 6 - Nepotism Disclosure Form”

“Part 7 - Additional Declarations, including certification required by IC 5-22-16.5”

“Part 8 - Drug Testing”

“Part 9 - Non-Collusion Affidavit”

“Part 10 - E-Verify Affidavit”

“Part 11 - Signatures”

.2 Bid Security in the form of a Bid Bond or Certified Check in an amount not less than five percent (5%) of the bid price. Such Bid Security shall serve as security to insure the execution of the Agreement and the furnishing of other required documents by the successful Bidder, including Performance and Payment Bonds. A sample Bid Bond form is included in the Project Manual and such form, or such other form as may be approved in advance by Owner, shall be utilized if such a bond is furnished as Bid Security. A Bid Bond shall be executed by a surety company licensed to transact such business in the State of Indiana and qualified as a surety under the underwriting limitations on the current list of “Surety Companies Acceptable on Federal Bonds” as published in the U.S. Treasury Department Circular No. 570; the Bidder shall also furnish as part of the Bid Submission a signed power of attorney establishing the authority of the person executing such Bid Bond on behalf of the surety. Bid Security shall be held until the Contract is executed with the successful Bidder. In the event that all bids are rejected, the Bid Security of all Bidders will be returned upon request. No “Annual” bid bonds, cash deposits or cashiers’ checks will be accepted.

.3 Contractor’s Bid for Public Work (State Form 96). Such form is included in this Project Manual on pages BID-10 to BID-15 and shall be used in consideration of a Bidder’s ability to perform its obligations under the terms of the contract Documents and in determining other material factors bearing upon a Bidder’s responsibility. If Bid is under \$150,000 either of these forms may be submitted as a Post-Bid submittal under Section 6, Post Bid Requirements.

5.4 Bids may be withdrawn in person by a Bidder during normal hours of business prior to the time fixed for opening of Bids. In the event of a valid withdrawal of a Bid, the Bid Security of the withdrawing Bidder will be returned promptly. No Bid may be withdrawn after opening of Bids has commenced except after expiration of such period following the Bid Date as specifically provided by law, plus any extension thereof as provided elsewhere in these Instructions to

Bidders. Bidder's failure to provide all completed documentation as required in ITB Section 5.3 may result in Bid being deemed non-responsive.

6. POST-BID REQUIREMENTS

Within five (5) business days of notification by Owner, the apparent lowest responsive Bidder will be required to submit additional documents and satisfy additional requirements as conditions to such Bidder being found by the Owner to be a responsible Bidder, as follows:

- 6.1 Proof of Insurability. The Bidder shall furnish: (1) proof of insurance showing existing coverage in accordance with the terms and amounts stated in the General Conditions, or (2) a letter or statement certifying that, in the event that the bid is awarded by the Owner, an insurance company will provide the required coverage to the Bidder submitting the bid. Such proof of insurance or the letter/statement shall be issued by a financially responsible insurance company authorized to do business in the State of Indiana.
- 6.2 Surety Letter of Intent. The Bidder shall furnish a written statement or letter from a Surety company licensed to transact such business in the State of Indiana and qualified as a surety under the underwriting limitations on the current list of "Surety Companies Acceptable on Federal Bonds" as published in U.S. Treasury Department Circular No. 570, which assures the Owner that, in the event the Bid is accepted and a contract is awarded by Owner, said Surety will execute and deliver both a Performance Bond and Payment Bond as required by the Contract Documents.
- 6.3 Joint Venture Agreement. If the Bidder is a joint venture, partnership or other combination of two or more persons or entities, the Bidder shall submit a copy of the joint venture or other agreement by which such joint venture, partnership or other association has been formed, executed by all such participating persons or entities. If the Bid is signed by less than all parties that comprise the Bidder, suitable written evidence of the authority of such signing party to bind all such parties must also be furnished.
- 6.4 Subcontractor/Supplier List. The Bidder shall submit all subcontractors and suppliers that will be used on the project, as required (POST-BID-1).
- 6.5 Manufacturers List. The Bidder shall submit a complete list of all equipment and supplies that are listed in the Manufacturer's List (POST-BID-2).
- 6.6 E-Verify Documentation. - The Bidder shall submit verification that it is enrolled in and participating in the E-Verify program (POST-BID-3).

7. BID EVALUATION AND AWARD

- 7.1 **Award of the Contract will be made to the lowest, responsive and responsible Bidder, where the Bid is reasonable and does not exceed the funds available for the project.** The Owner reserves the right to reject all Bids and may waive or allow a Bidder to correct errors, omissions or other irregularities in Bid Documents that are found not to have afforded the Bidder a substantial competitive advantage over other Bidders.

- 7.2 The Owner shall have the right to reject any Bid if investigation of the Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations and complete the Work. Any or all Bids will be rejected if there is reason to believe that collusion exists among Bidders.
- 7.3 For unit price Contract Items, estimated quantities and unit prices will serve as the basis for determining the proposed price of each Bid. Patent math errors in statements of Bid prices or totals may be corrected by the Owner or Engineer, in which case the corrected amounts will be used for the purpose of Bid evaluation, comparison and other award considerations. However, neither the Owner nor the Engineer shall be required to discover or correct any error or omission in a Bid and the Bidder shall assume the risk of and be bound to the consequences of any such error or omission.
- 7.4 The Owner may, at its sole option, award the Contract to a Bidder on a conditional basis to afford the Bidder additional time and opportunity to submit required documents or to fulfill other requirements. In such case, the Owner will furnish to the Bidder a notice of conditional award which will establish (i) the additional conditions to be fulfilled for the award to become effective, and (ii) the time limit within which such conditions shall be satisfied. If the Bidder fails to satisfy the conditions in the manner and within the time specified in such notice, the Owner may declare such Bidder to be non-responsible and award the Contract, conditionally or unconditionally, to another Bidder. Time limitations governing the Owner's award of the Contract shall be extended for such additional period as may be required to effectuate the conditional award procedure set forth in this sub-section, and no Bid may be withdrawn during such period of extension.

8. CONTRACT EXECUTION; SUBMITTALS

- 8.1 Within five (5) business days after the award notice, the successful Bidder shall sign and deliver at least three (3) counterparts of the Agreement, utilizing the form thereof included in the Project Manual and make delivery thereof to the Owner, along with other documents as prescribed by the Contract Documents. After execution and delivery of the Agreement and other required documents, and acceptance thereof by the Owner, the Bid Security furnished by each Bidder will be returned to the respective Bidders upon request.
- 8.2 If the Bidder fails or neglects to execute and deliver the Agreement and other required documents as prescribed by the preceding sub-section, the Bidder shall be deemed to have repudiated the Contract and thereupon the award shall be null and void; and the Bid Security provided by the Bidder shall be forfeited to and retained by the Owner as liquidated damages for such failure of the Bidder to execute the Contract, it being understood and agreed that the character and amount of actual damages sustained by the Owner cannot reliably be ascertained and measured and that the amount of the Bid Security is intended as a reasonable prospective estimate of such actual damages.
- 8.3 Concurrently with the execution and delivery of the Agreement to the Owner, or within such other period as the Owner may prescribe, the successful Bidder (Contractor) shall submit the following as conditions to the Bidder's right to proceed with and receive payment for any Work:
- .1 Proof of all required insurance coverage, a one hundred percent (100%) Performance Bond and a one hundred percent (100%) Payment Bond as prescribed by the General Conditions or other Contract Documents. Such bonds shall be executed utilizing the sample forms included in the Project Manual or alternative forms approved in advance by the Owner. Indemnification clauses between successful Bidder and the Surety shall not be binding upon the Owner;

- .2 The preliminary schedules required by Paragraph 2.7 of the General Conditions;
- .3 Other Post-Bid submittals required by the Contract Documents.

9. LIQUIDATED DAMAGES

- 9.1 The Contract Documents provide for the payment of liquidated damages in the event of unexcused failure by the Contractor to complete the Work within the time required by the Contract Documents. **Such liquidated damages are to be assessed and recovered at the rate of \$500.00 per day for delay in achieving the Substantial Completion date of June 1, 2020 and at the rate of \$100.00 per day for delay in achieving the Final Completion date of July 1, 2020.**
- 9.2 The per diem rate(s) of liquidated damages established by the preceding sub-section have been determined and are intended as reasonable prospective estimate(s) of the type and amount of actual damages which the Owner may sustain in the event of such delay(s). Submission of a Bid shall constitute an unconditional acknowledgment and agreement by the Bidder that such liquidated damages are fair and reasonable and do not and will not constitute a penalty, and that such liquidated damages may be assessed and recovered by the Owner as against the successful Bidder/Contractor and its Surety in lieu of actual damages for delayed completion.

10. CHANGE ORDERS

- 10.1 During the course of the Work, should the Owner or Bidder determine that additional work which was foreseeable is required, such work shall not be automatically awarded through change orders. However, the Owner reserves the right to award additional work which was foreseeable to the original Bidder where doing so is in the best interest of the Owner. All such awards are and will remain subject to necessary approvals.

END OF INSTRUCTIONS TO BIDDERS

PART 1
BIDDER'S ITEMIZED PROPOSAL
AND DECLARATIONS
City of Greenfield

Instructions to Bidders:

This form shall be utilized by all Bidders. Except as otherwise specifically provided, all Parts shall be fully and accurately filled in and completed and notarized.

Project: **17-RD-01: Progress Business Park Phase 4**

Proposal For Construction of: **Drainage improvements, sanitary sewer construction and new road construction of Progress Park**

Date: _____

To: **City of Greenfield, Department of Engineering
10 S. State Street, Greenfield, Indiana 46140**

PART 1
BIDDER INFORMATION
(Print)

1.1 Bidder Name: _____

1.2 Bidder Address: Street Address: _____
City: _____ State: _____ Zip: _____
Phone #: () _____ Fax #: () _____

1.3 Former Business names of Bidder: _____

1.4 Bidder is a/an [mark one]:
 Individual Partnership Indiana Corporation
 Foreign (Out of State) Corporation
 Joint Venture
Other: _____

PART 2
PROPOSAL (BID)

- 2.1 The undersigned Bidder proposes to furnish all necessary labor, machinery, tools, apparatus, materials, equipment, service and other necessary supplies, and to perform and fulfill all obligations incident thereto in strict accordance with and within the time(s) provided by the terms and conditions of the Contract Documents for the above described Work and Project, including any and all addenda thereto, for the total lump sum of _____ Dollars (\$_____).
- 2.2 By submitting bid the Bidder agrees the bid proposal and price(s) contained herein shall be valid for ninety (90) days from bid opening.

PART 3
CONTRACT ITEMS AND UNIT PRICES

Contract Item No.	Item Description	Item Unit	Estimated Quantity	Prices in Figures	
				Unit Price	Total Price for Item
1	CONSTRUCTION ENGINEERING	LS	1		
2	MOBILIZATION AND DEMOBILIZATION	LS	1		
3	CLEARING RIGHT OF WAY	LS	1		
4	EXCAVATION, COMMON	CYS	29		
5	EXCAVATION, UNCLASSIFIED	CYS	1,500		
6	BORROW	CYS	15,152		
7	TEMPORARY INLET PROTECTION	EACH	25		
8	TEMPORARY MULCHING	TON	2		
9	TEMPORARY SILT FENCE	LFT	2,605		
10	SUBGRADE TREATMENT, TYPE II	SYS	1,773		
11	SUBGRADE TREATMENT, TYPE IB	SYS	5,324		
12	STRUCTURAL BACKFILL, TYPE 1	CYS	2,114		
13	COMPACTED AGGREGATE, NO. 53, BASE	TON	4,858		
14	PCCP, 8 IN.	SYS	4,202		
15	D-1 CONTRACTION JOINT	LFT	3,142		
16	HMA FOR SIDEWALK	TON	185		
17	CURB, INTEGRAL CONCRETE	LFT	90		
18	CURB, CONCRETE	LFT	143		
19	CURB AND GUTTER, CONCRETE	LFT	2,430		
20	HMA FOR APPROACHES, TYPE B	TON	282		
21	RIPRAP, REVETMENT	TON	677		
22	GEOTEXTILE FOR RIPRAP TYPE 1B	SYS	1,011		
23	MOBILIZATION AND DEMOBILIZATION FOR SEEDING	EACH	1		
24	FERTILIZER	TON	8		
25	SEED MIXTURE, T (Temporary Seeding)	LBS	520		
26	MULCHED SEEDING, U	SYS	4,100		
27	SODDING	SYS	560		
28	FIELD OFFICE, B	MOS	8		
29	STRUCTURE, REINFORCED CONCRETE, BOX SECTIONS, 5 FT X 1 FT	LFT	76		
30	PIPE, TYPE 2, CIRCULAR 36 IN	LFT	1,230		
31	PIPE, TYPE 2, CIRCULAR 12 IN	LFT	590		
32	PIPE, TYPE 2, CIRCULAR 18 IN	LFT	52		
33	PIPE, SANITARY SEWER, 10 IN.	LFT	1,167		
34	SANITARY DROP MANHOLE	EACH	5		
35	INLET, J-10	EACH	10		
36	MANHOLE, D4	EACH	7		
37	INLET, C15	EACH	4		
38	MAINTAINING TRAFFIC	LSUM	1		

PART 4
CONTRACT DOCUMENTS AND ADDENDA

4.1 The Bidder agrees to be bound by the terms and provisions of all Contract Documents as defined in the General Conditions and incorporates such Contract Documents herein by reference

4.2 The Bidder acknowledges receipt of the following addenda:

<u>Addendum Number</u>	<u>Date</u>
_____	_____
_____	_____
_____	_____
_____	_____

PART 5
EXCEPTIONS

Instructions to Bidders:

- 5.1 *The Bidder shall fully state each exception taken to the Specifications or other Contract Documents in Section 5.3 of this Part.*
- 5.2 *Bidder is cautioned that any exception taken by Bidder and deemed by Owner to be a material qualification or variance from the terms of the Contract Documents may result in this Bid being rejected as non-responsive.*

5.3 *Exceptions:*

PART 6
NEPOTISM DISCLOSURE

Contractor: _____

Project: _____

For purposes of compliance with Indiana Code Chap. 36-1-21, please specify below whether Contractor (individual), or a person who wholly or partially owns Contractor (business), is a relative, as that term is defined by Indiana Code § 36-1-21-3, of either the Mayor of Greenfield, Indiana, or a member of the City Council of Greenfield, Indiana.

Contractor (individual) or Contractor (business) does NOT have a relative who is either the Mayor of Greenfield, Indiana or a member of the City of Greenfield, Indiana.

Contractor (individual) or Contractor (business) DOES have a relative who is either the Mayor of Greenfield, Indiana or member of the City Council of Greenfield, Indiana (must specify all relatives below):

Mayor Chuck Fewell

City Councilor [please specify name of Councilor(s)]

Name of Authorized Representative (Printed)

Signature of Authorized Representative:

Date: _____

PART 7
ADDITIONAL DECLARATIONS

- 7.1 Bidder certifies for itself and all its subcontractors compliance with existing laws of the City of Greenfield, the State of Indiana and the United States regarding (a) prohibition of discrimination in employment practices on the basis of race, sex, disability, religion, national origin, disabled veteran status and Vietnam-era veteran status.
- 7.2 Bidder certifies that it has thoroughly examined the site of the Work and informed itself fully regarding all conditions under which it will be obligated to operate and that in any way affect the Work, and knows, understands and accepts the existing conditions. Bidder further certifies that it has thoroughly reviewed the Contract Documents, including all Addenda, and has had the opportunity to ask questions and obtain interpretations or clarifications concerning Contract Documents.
- 7.3 Hiring Practices. The Bidder shall, upon request of the Owner, make available its policies, practices and standards for the hiring of applicants, except as prohibited under Indiana Code section 22-2-17-3, to the extent such information is related to the provision of services under this Bid.
- 7.4 Bidder Qualifications. Bidder certifies to Owner the following:
- .1 That Bidder is eligible to work in the State of Indiana;
 - .2 That Bidder's labor force participates in apprenticeship or training programs approved by and registered with the United States Department of Labor's Office of Apprenticeship, or its successor organization;
 - .3 That Bidder has implemented an employee drug testing plan that meets, or exceeds, the requirements set forth in IC 36-1-12-24;
 - .4 That Bidder will utilize project managers and superintendents with sufficient relevant management experience to complete bidder's scope of work;
 - .5 That Bidder and its management personnel possess any and all professional trade licenses required by law for any trade or specialty area in which Bidder is seeking a contract award, and said licensures have not been suspended or revoked within the previous five (5) years;
 - .6 That Bidder is utilizing a surety company which is on the United States Department of Treasury's listing of approved sureties; and
 - .7 For contracts estimated to be over \$300,000.00, that Bidder and sub-contractors expected to be awarded at least \$300,000 for the project are qualified under IC 4-13.6-4 or IC 8-23-10.

Violation of this certification shall constitute a material breach of the contract to result from this Bid, and upon such a violation Owner may terminate the contract. In addition, upon a violation of this certification, Owner shall report such violation to the City Legal Department who may, at its discretion, debar the Bidder from eligibility for future city purchasing, bids, contracts, quotes and/or projects.

PART 8
DRUG PROGRAM

- 8.1 Pursuant to IC 4-13-18-5, the Bidder must submit with the Bid a written plan for a program to test the Bidder's employees for drugs. A contractor that is subject to a collective bargaining agreement that establishes an employee drug testing program shall only submit a copy of the relevant part of the collective bargaining agreement establishing the program. Failure to submit a written plan for an employee drug testing program, or relevant parts of a collective bargaining agreement establishing an employee drug testing program shall result in the Bid being rejected as non-responsive.

- 8.2 Attach a copy of your drug testing program or the relevant parts of your collective bargaining agreement establishing a drug testing program to this page.

PART 9
NON-COLLUSION AFFIDAVIT

The individual person(s) executing this Proposal, being first duly sworn, depose(s) and state(s) that the Bidder has not directly or indirectly entered into a combination, collusion, undertaking or agreement with any other bidder or person (i) relative to the price(s) proposed herein or to be bid by another person, or (ii) to prevent any person from bidding, or (iii) to induce a person to refrain from bidding; and furthermore, this Bid Proposal is made and submitted without reference to any other bids and without agreement, understanding or combination, either directly or indirectly, with any persons with reference to such bidding in any way or manner whatsoever.

PART 10
E-VERIFY PROGRAM

Pursuant to Indiana Code 22-5-1.7-11.1, the contractor awarded the Bid is required to enroll in and verify the work eligibility status of all its newly hired employees through the E-Verify program. The contractor who is awarded the Bid is not required to verify the work eligibility status of all its newly hired employees through the E-Verify program if the E-Verify program no longer exists.

The individual person(s) executing this Proposal, being first duly sworn, depose(s) and state(s) that the Bidder does not knowingly employ an unauthorized alien. The undersigned further affirms that, prior to entering into an agreement for this Bid, the undersigned business entity will enroll in and agrees to verify the work eligibility status of all its newly hired employees through the E-Verify program.

PART 11
SIGNATURES

[Signature by or on behalf of the Bidder in the spaces provided below shall constitute execution of each and every Part of this Itemized Proposal and Declarations document. SIGNATURE MUST BE PROPERLY NOTARIZED.]

Written Signature: _____

Printed Name: _____

Title: _____

Important - Notary Signature and Seal Required in the Space Below

STATE OF _____

SS:

COUNTY OF _____

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____ (Signed) _____

Residing in _____ County, State of _____



CONTRACTOR'S BID FOR PUBLIC WORK – FORM 96

State Form 52414 (R2 / 2-13) / Form 96 (Revised 2013)
Prescribed by State Board of Accounts

PART I

(To be completed for all bids. Please type or print)

Date (month, day, year): _____

1. Governmental Unit (Owner): City of Greenfield, Indiana
2. County: Hancock
3. Bidder (Firm): _____
Address: _____
City/State/ZIPcode: _____
4. Telephone Number: _____
5. Agent of Bidder (if applicable): _____

Pursuant to notices given, the undersigned offers to furnish labor and/or material necessary to complete the public works project of _____
(Governmental Unit) in accordance with plans and specifications prepared by _____
_____ and dated _____ for the sum of
_____ \$ _____

The undersigned further agrees to furnish a bond or certified check with this bid for an amount specified in the notice of the letting. If alternative bids apply, the undersigned submits a proposal for each in accordance with the notice. Any addendums attached will be specifically referenced at the applicable page.

If additional units of material included in the contract are needed, the cost of units must be the same as that shown in the original contract if accepted by the governmental unit. If the bid is to be awarded on a unit basis, the itemization of the units shall be shown on a separate attachment.

The contractor and his subcontractors, if any, shall not discriminate against or intimidate any employee, or applicant for employment, to be employed in the performance of this contract, with respect to any matter directly or indirectly related to employment because of race, religion, color, sex, national origin or ancestry. Breach of this covenant may be regarded as a material breach of the contract.

CERTIFICATION OF USE OF UNITED STATES STEEL PRODUCTS (If applicable)

I, the undersigned bidder or agent as a contractor on a public works project, understand my statutory obligation to use steel products made in the United States (I.C. 5-16-8-2). I hereby certify that I and all subcontractors employed by me for this project will use U.S. steel products on this project if awarded. I understand that violations hereunder may result in forfeiture of contractual payments.

ACCEPTANCE

The above bid is accepted this _____ day of _____, 20____, subject to the following conditions: _____

Contracting Authority Members:

PART II
(For projects of \$150,000 or more - IC 36-1-12-4)

Governmental Unit: **City of Greenfield, Indiana**

Bidder (Firm): _____

Date (month, day, year): _____

These statements to be submitted under oath by each bidder with and as a part of his bid. Attach additional pages for each section as needed.

SECTION I EXPERIENCE QUESTIONNAIRE

1. What public works projects has your organization completed for the period of one (1) year prior to the date of the current bid?

Contract Amount	Class of Work	Completion Date	Name and Address of Owner

2. What public works projects are now in process of construction by your organization?

Contract Amount	Class of Work	Expected Completion Date	Name and Address of Owner

3. Have you ever failed to complete any work awarded to you? _____ If so, where and why?

4. List references from private firms for which you have performed work.

SECTION II PLAN AND EQUIPMENT QUESTIONNAIRE

1. Explain your plan or layout for performing proposed work. *(Examples could include a narrative of when you could begin work, complete the project, number of workers, etc. and any other information which you believe would enable the governmental unit to consider your bid.)*

2. Please list the names and addresses of all subcontractors *(i.e. persons or firms outside your own firm who have performed part of the work)* that you have used on public works projects during the past five (5) years along with a brief description of the work done by each subcontractor.

3. If you intend to sublet any portion of the work, state the name and address of each subcontractor, equipment to be used by the subcontractor, and whether you will require a bond. However, if you are unable to currently provide a listing, please understand a listing must be provided prior to contract approval. Until the completion of the proposed project, you are under a continuing obligation to immediately notify the governmental unit in the event that you subsequently determine that you will use a subcontractor on the proposed project.

4. What equipment do you have available to use for the proposed project? Any equipment to be used by subcontractors may also be required to be listed by the governmental unit.

5. Have you entered into contracts or received offers for all materials which substantiate the prices used in preparing your proposal? If not, please explain the rationale used which would corroborate the prices listed.

SECTION III CONTRACTOR'S FINANCIAL STATEMENT

Attachment of bidder's financial statement is mandatory. Any bid submitted without said financial statement as required by statute shall thereby be rendered invalid. The financial statement provided hereunder to the governing body awarding the contract must be specific enough in detail so that said governing body can make a proper determination of the bidder's capability for completing the project if awarded.

BID OF

(Contractor)

(Address)

**FOR
PUBLIC WORKS PROJECTS
OF**

Filed _____

Action taken _____

POST-BID SUBMITTAL
SUBCONTRACTOR/SUPPLIER PARTICIPATION

A. SUBCONTRACTORS AND SUPPLIERS LIST

Instructions to Bidders: The Bidder shall submit a completed Subcontractor/Supplier list (see below) as required in ITB 6.4.

*The Bidder shall enter the names, the type of work to be done, and the price, in the Subcontractors/Suppliers List for each subcontractor/supplier that the Bidder proposes to use for any part of the Work for the Project at an agreed price of **\$10,000** or greater, as part of the total amount bid as stated above in Part 2.*

Only one subcontractor/supplier shall be listed for each line. Upon award of a contract, the named subcontractors/suppliers shall be employed to perform the work, unless changes are specifically authorized by the Owner. Failure to furnish all information requested may render the bid non-responsive if it is determined that such omission materially affords the Bidder a substantial advantage over other Bidders.

Except as otherwise specifically stated by the Bidder in this Part, omission of any names of subcontractors/suppliers herein shall constitute an affirmative representation and statement that the Bidder proposes to use its own work force for that portion of the Work

Bidder's attention is directed to paragraphs 6.8, 6.9, and 6.11 of the City of Greenfield Standard General Conditions for Construction Contracts as they relate to use of subcontractors/suppliers.

Subcontractor Name	Work	Price
		\$
		\$
		\$
		\$
		\$
		\$
		\$
Supplier Name	Work	Price
		\$
		\$
		\$
		\$
		\$
		\$

(please duplicate and use this form, if additional sheets are necessary)

POST-BID SUBMITTAL
MANUFACTURERS LIST

Instructions to Bidders:

The Bidder shall enter, in the spaces provided below, the name of the manufacturer for ALL material and equipment listed below, to be incorporated into the Work.

Failure to furnish all information for each listed material or equipment item(s) may render the bid non-responsive.

Preliminary acceptance of equipment listed by the manufacturer's name shall not in any way constitute a waiver of the Drawing and Specification requirements covering such equipment. Acceptance will be based on full conformity with the Drawings and Specifications covering the equipment.

The information submitted on this Post-Bid-2 page does not alleviate the Bidder from submitting the required Subcontractor/Supplier Information on the Post-Bid-1 page.

<u>Material/Equipment Item</u>	<u>Manufacturer</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

POST BID SUBMITTAL
E-VERIFY DOCUMENTATION
SEE ITB SECTION 6.6

Pursuant to Indiana Code 22-5-1.7-11.1 the Contractor shall provide documentation that it has enrolled and is participating in the E-Verify program. Contractor is required to submit proof from the E-Verify Program that it is currently enrolled in the Program. An example of confirmation is the confirmation e-mail received from E-Verify that the Contractor has successfully enrolled in E-Verify.

BID BOND
City of Greenfield

Instructions to Bidders

Bidders may use this form or other form containing the same material conditions and provisions as approved in advance by Owner/Obligee.

Bidder/Surety must attach a signed, certified and effective dated copy of the Power of Attorney or Attorney-In-Fact establishing the authority of the person(s) signing this Bid Bond on behalf of the Surety.

Surety company executing this bond shall appear on the most current list of "Surety Companies Acceptable on Federal Bonds" as specified in the U.S. Treasury Department Circular 570, as amended, and be authorized to transact business in the State of Indiana.

KNOW ALL MEN BY THESE PRESENTS, that the undersigned

"Bidder": _____
and

"Surety": [Name] _____
[Address] _____

a corporation chartered and existing under the laws of the State of _____, and authorized to do business in the State of Indiana,

are held and firmly bound unto the City of Greenfield, Indiana ("Owner/Obligee") in the full and just sum equal to five percent (5%) of the price stated in the Bid Proposal described below, including accepted alternates, if any, to be paid upon demand of the Owner/Obligee, together with interest at the maximum legal rate from date of demand and any attorney fees and court costs incurred by Owner/Obligee to enforce this instrument, to which payment well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally and firmly by these presents.

WHEREAS, the Owner/Obligee has solicited bids for certain Work for or in furtherance of construction of public improvements described generally as

17-RD-01: Progress Business Park Phase 4

pursuant to plans, specifications and other "Contract Documents" included as parts of and designated by such solicitation; and

WHEREAS, the Bidder has submitted to the Owner/Obligee a Bid Proposal to perform such Work.

NOW THEREFORE: The conditions of this obligation are such that if the Bid Proposal be accepted, with or without conditions, the Bidder shall within such time thereafter as prescribed by the Contract Documents (i) fulfill all conditions of such award that remain to be fulfilled, (ii) execute a Contract in accordance with the Bid Proposal and in the form and manner required by the Contract Documents, and (iii) thereafter provide all bonds, and other documentation required by the Contract Documents to be delivered to Owner/Obligee prior to commencing Work, including without limitation a sufficient and satisfactory Performance Bond and Payment Bond payable to Owner/Obligee, each in an amount of one hundred percent (100%) of the total Contract price as awarded and in form and with surety satisfactory to said Owner/Obligee, then this obligation to be void; otherwise to be and remain in full force and virtue in law, and the Surety shall, upon failure of the Bidder to comply with any or all of the foregoing requirements within the time specified above and as prescribed by the Contract Documents, immediate pay to the Owner/Obligee, upon demand, the amount hereof, in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

IN TESTIMONY THEREOF, the Bidder and Surety have caused this instrument to be duly signed and sealed this ____ day of _____, 20____.

This Bid Bond shall bind the undersigned Surety whether or not also signed by the Bidder.

“Bidder”

“Surety”

By: _____

By: _____

Printed: _____

Printed: _____

NOW, THEREFORE, Contractor warrants the workmanship and all materials used in the construction, installation and completion of said Work, including all improvements and installations thereof, to be of good quality and constructed and completed in a workmanlike manner in accordance with the Agreement and Contract Documents and all local, state and federal laws, ordinances, rules, standards and regulations applicable to said Work;

FURTHERMORE, the conditions of the Surety's obligation hereunder are such that if Contractor at his own expense, for a period of 3 years, commencing on the date of Substantial Completion, shall make all repairs or replacements thereto which may become necessary by reason of improper or defective workmanship or materials, or any failure thereof to conform to the provisions of the Agreement or Contract Documents, then Surety's obligation is to be null and void; otherwise such obligation shall remain in full force and effect. Any repairs or replacements made under this Bond shall in like manner be subject to the terms and conditions hereof.

Contractor and Surety covenant that all action required by law to be taken by them to authorize the execution and delivery of this bond have been previously been taken, that the officers whose signatures appear below have been fully empowered to execute and deliver this instrument and that once executed and delivered, it shall represent the lawful and binding obligation of the parties.

IN WITNESS WHEREOF, this instrument is executed in _____ (number) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20____.

CONTRACTOR: _____
[name]

By: _____
[signature] [printed name]

ATTEST: _____, Secretary
[signature]

SURETY: _____
[name]

By: _____, Attorney-in-Fact
[signature]

[printed name] [address]

PROVIDED, FURTHER, that the said Surety, for value received, hereby stipulates and agrees:

1. that no defect or irregularity in the contract or in the proceedings preliminary to the letting of the contract will operate to release or discharge Surety.
2. that no change, omission, extension of time, alteration or addition to the terms of the Agreement, Contract Documents or to any Work to be furnished thereunder, and no delay by the Owner/Obligee in enforcement of the Agreement or this Bond shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Agreement, Contract Documents or to the Work.
3. that no final settlement between the Owner/Obligee and the Contractor shall abridge any right of the Owner/Obligee hereunder as to any claim that may remain unsatisfied.
4. that this Payment Bond and Surety shall not be released until one (1) year after the Owner/Obligee's final settlement with the Contractor.

IN WITNESS WHEREOF, this instrument is executed in _____ (number) counterparts, each one of which shall be deemed an original, this the ____ day of _____, 20____.

CONTRACTOR: _____
[name]

By: _____
[signature] [printed name]

ATTEST: _____, Secretary
[signature]

SURETY: _____
[name]

By: _____, Attorney-in-Fact
[signature]

[printed name] [address]

PERFORMANCE BOND

City of Greenfield

Instructions:

Successful Bidder must use this form or other form containing the same material conditions and provisions as approved in advance by Owner.

Date of Bond must not be prior to date of Contract. If Contractor is a Partnership, all partners should execute bond.

Surety company executing this bond shall appear on the most current list of "Surety Companies Acceptable on Federal Bonds" as specified in the U.S. Treasury Department Circular 570, as amended, and be authorized to transact business in the State of Indiana.

KNOW ALL MEN BY THESE PRESENTS: that

“Contractor”: _____

and

“Surety”: [name] _____
[Address] _____

a corporation chartered and existing under the laws of the State of _____, and authorized to do business in the State of Indiana,

are held and firmly bound unto the City of Greenfield, Indiana hereinafter called Owner/Obligee, in the penal sum of _____ Dollars, (\$ _____) in lawful money of the United States, for the payment of which sum well and truly to be made, together with interest at the maximum legal rate from date of demand and any attorney fees and court costs incurred by Owner/Obligee to enforce this instrument, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Contractor has entered into a certain Agreement with the Owner/Obligee, dated as of the _____ day of _____, 20 _____, by which Contractor has agreed to perform and furnish certain Work for or in furtherance of construction of public improvements described generally as

17-RD-01: Progress Business Park Phase 4

which Agreement, and the “Contract Documents” as referred to therein, are hereby incorporated herein by reference;

NOW, THEREFORE, the conditions of this obligation are such that if the Contractor shall well, truly and faithfully perform his duties, all the undertakings, covenants, terms and conditions of said Agreement whether during the original term thereof, and any extensions thereof which may be granted by the Owner/Obligee, with or without notice to the Surety and during any period of guaranty or warranty provided therein or arising thereunder, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the Owner/Obligee from all costs and damages which he may suffer by reason of failure to do so, and shall reimburse and repay the

AGREEMENT
City of Greenfield

THIS AGREEMENT is made and entered into as of the _____ day of _____, 20_____.

by and between

“OWNER”: City of Greenfield, Indiana, by and through its Board of Public Works
10 S. State Street, Greenfield, Indiana 46140

and

“CONTRACTOR”:

concerning the following:

“PROJECT”: **17-RD-01: Progress Business Park Phase 4**

“WORK”: **Drainage improvements, sanitary sewer construction and new road construction of Progress Park**

“ENGINEER”: **GAI Consultants, Inc.**

RECITALS:

- A. The OWNER has heretofore caused to be prepared certain plans, specifications and other “Contract Documents” as hereinafter listed pertaining to the above described Project and Work, and the CONTRACTOR has filed Proposal to furnish said labor, tools, material, equipment, services, and perform said Work upon the terms and for the price(s) therein fully stated and set forth;
- B. The said Contract Documents accurately and fully describe the terms and conditions upon which the CONTRACTOR is willing to furnish the labor, tools, material, equipment, services, and perform the Work called for by the Contract Documents and in the manner and time and for the price(s) set forth herein.

THE OWNER AND CONTRACTOR AGREE AS FOLLOWS:

1. Contract Documents

1.1 This Agreement consists of the following Contract Documents all of which are as fully a part of this Agreement as if set out verbatim herein or attached hereto and the same do in all particulars become the Agreement between the parties hereto in all matters and things set forth herein and described:

- .1 This Agreement;
- .2 All Addenda issued prior to receipt of Bids, whether or not receipt thereof has been acknowledged by CONTRACTOR in its Bid;
- .3 Special Conditions;
- .4 General Conditions;
- .5 CONTRACTOR's Itemized Proposal and Declarations;
- .6 Technical Specifications;
- .7 Plans;
- .8 City Standards and Specifications;
- .9 INDOT Standard Drawings;
- .10 INDOT Supplemental Specifications Section 200 Series through Section 900 Series;
- .11 INDOT Standard Specifications Sections 200 Series through Sections 900 Series;
- .12 Additional Requirements Section of the Bid Documents (change order forms, Indiana Code 5-16-13, etc.);
- .13 Instructions to Bidders;
- .14 Advertisement or Notice to Bidders; and
- .15 Performance, Payment and Warranty Bonds.

1.2 In resolving conflicts, errors, discrepancies and disputes concerning the nature, character, scope or extent of Work to be performed or furnished by the CONTRACTOR, or other rights and obligations of the OWNER and CONTRACTOR, arising from or prescribed by one or more of the Contract Documents, the following rules shall govern:

- .1 A requirement occurring in one Contract Document is as binding as though occurring in all Contract Documents;
- .2 Calculated dimensions shall govern over scaled dimensions;

- .3. The Contract Documents shall be given precedence in the order listed in Paragraph 1.1 above; and
- .4. In documents of equal priority, if any such conflict, error, discrepancy or dispute cannot be resolved or reconciled by application of the rules stated in Subparagraphs 1.2.1 through 1.2.3, then the provision expressing the greater quantity, quality, or scope of work, or imposing the greater obligation upon the CONTRACTOR or affording the greater right or remedy to the OWNER shall govern, without regard to the party who drafted such provision.

2. Contract Price

- 2.1 The CONTRACTOR shall, in strict conformity with the Contract Documents, furnish all labor, tools, materials, equipment, services, assume and fulfill all obligations and perform all Work required to construct, complete, and make ready for use by the OWNER for the lump sum of _____ Dollars (\$_____).

- 2.2 The above stated Contract Sum will be paid to the CONTRACTOR in the manner and at such times as set forth in the Contract Documents.

3. Contract Time

- 3.1 It is hereby understood and mutually agreed, by and between the CONTRACTOR and OWNER, that the date of commencement and the time for completion of the Work as specified in the Contract Documents are ESSENTIAL CONDITIONS of this Agreement.
- 3.2 The CONTRACTOR agrees that the Work shall be commenced no later than the date indicated in the Notice to Proceed and that the Work shall be prosecuted regularly, diligently and uninterruptedly at such a rate of progress as will insure **Substantial Completion on or before June 1, 2020, and Final Completion on or before July 1, 2020.**
- 3.3 The CONTRACTOR and OWNER acknowledge and agree that the time allotted by this Agreement for the performance and completion of the Work is reasonable and takes into account any and all risks and adverse conditions assumed by CONTRACTOR hereunder.

4. Liquidated Damages

The CONTRACTOR and OWNER recognize and contemplate that unexcused failure by the CONTRACTOR to complete the Work within the Contract Time will cause the OWNER and the Public to suffer financial losses or inconvenience the full and exact extent and character of which cannot be measured as a basis for recovery by the OWNER of actual damages, and that liquidated damages as prescribed in the Contract Documents represent a fair, reasonable and appropriate estimate thereof. Accordingly, the CONTRACTOR agrees that such liquidated damages may be assessed and recovered by the OWNER, as against CONTRACTOR and its Surety, in the event of delayed completion and without the OWNER being required to present any evidence of the amount or character of actual damages sustained by reason thereof. **Such liquidated damages shall be assessed and recovered at the rate of \$500.00 per day for delay in achieving Substantial Completion and at the rate of \$100.00 per day in achieving Final Completion of the Work.**

5. Effective Date

This Agreement shall be deemed effective as of the date and year first above written notwithstanding the date on which this Agreement has been executed by the respective parties or their representatives as stated below.

[REST OF PAGE INTENTIONALLY LEFT BLANK]

“CONTRACTOR” SIGNATURE:

IN TESTIMONY THEREOF, the CONTRACTOR has hereunder set his hand this _____ day of _____, 20____.

Firm Name _____

Address _____

Telephone No. _____ Fax No. _____

By: _____
Signature

Printed: _____

Title: _____

“OWNER” SIGNATURES:

IN WITNESS WHEREOF, the OWNER does hereby accept the foregoing Agreement, and has herewith set his/her hand this _____ day of _____, 20____.

For and on behalf of the City of Greenfield by its Board of Public Works.

Chuck Fewell, Mayor,

Kelly McClarnon, Member

Larry J. Breese, Member

Katherine N. Locke, Member

Glenna Shelby, Member

ATTEST:

Lori Elmore, Clerk Treasurer

Date: _____

ADDITIONAL REQUIREMENTS

TABLE OF CONTENTS

City of Greenfield Sample Change Order Forms	AR-2
Additional Indiana Code (IC) Requirements	AR-7
IC 5-16-13	AR-7
IC 4-13-18	AR-9

Following are specimen forms proposed to be used for the issuance of change orders, field orders, and work directive changes. Procedure for the development, submittal and processing of these forms will be discussed during the preconstruction conference.

CITY OF GREENFIELD

OWNER: CITY OF GREENFIELD

FIELD ORDER NUMBER: _____

DATE: _____

PROJECT NAME: _____

PROJECT NO: _____

You are hereby directed to execute promptly this Field Order which interprets the Contract Documents or orders minor changes in the Work without change in Contract Sum or Contract Time.

If you consider that a change in Contract Sum or Contract Time is required, please submit your itemized proposal to the Engineer immediately and before proceeding with this Work. If your proposal is found to be satisfactory and in proper order, this Field Order will in that event be superseded by a Change Order.

Description:

Attachments:

PROJECT MANAGER:

By: _____

Date: _____

CITY OF GREENFIELD

TO:

WORK DIRECTIVE CHANGE NO. _____

DATE: _____

PROJECT NAME: _____

PROJECT NO.: _____

Specification Reference: _____

Drawing Reference: _____

DESCRIPTION OF WORK COVERED BY THIS DIRECTIVE CHANGE:

REASON FOR THIS ORDER:

AUTHORIZATION:

THIS WORK DIRECTIVE CHANGE AUTHORIZES THE WORK TO BE COMPLETED AS OUTLINED. A Contract Change Order in the amount of \$_____ will be issued to you in the near future to cover this Work Directive Change.

PROJECT COMPLETION DATE: ADD/DEDUCT/UNCHANGED _____ DAYS.

By: _____
Project Manager

By: _____
City Engineer

CITY OF GREENFIELD

TO: REQUEST FOR PROPOSAL NO.: _____
DATE: _____
PROJECT NAME: _____
PROJECT NO.: _____

Specification Reference: _____

Drawing Reference: _____ Drawing Date: _____

Identification of Attachments: _____

Please submit within fifteen calendar days of this request date a proposal showing increase, decrease or no change in contract price and/or contract time. Proposal shall be accompanied by four (4) copies of breakdown showing quantities, cost of material, equipment, labor, overhead, profit and basis for the additional time if any.

DESCRIPTION OF PROPOSED CHANGE COVERED BY THIS REQUEST:

REASON FOR CHANGE:

SPECIAL INSTRUCTIONS:

THIS REQUEST DOES NOT AUTHORIZE YOU TO PROCEED WITH THE ABOVE WORK NOR STOP PREVIOUSLY SCHEDULED WORK. Upon approval a Contract Change Order and a Notice to Proceed will be issued.

Please state in your proposal the effect the acceptance of this REQUEST will have on the project completion, if accepted within ___ days of proposal due date.

YOUR PROPOSAL DUE DATE: _____

By: _____ Date: _____
Project Manager

CITY OF GREENFIELD

TO: CONTRACT CHANGE REQUEST NO.: _____
DATE: _____
PROJECT NAME: _____

FROM: _____

IT IS REQUESTED THAT A CONTRACT CHANGE BE MADE TO THE ABOVE REFERENCED CONTRACT.

1. SCOPE OF WORK (USE ADDITIONAL PAGES IF REQUIRED. ALSO LIST OTHER CONTRACTS INVOLVED.)

2. REASON FOR CHANGE:

3. APPROXIMATE COST CHANGE TO CONTRACT PRICE: _____

4. WILL THE CONTRACT NEED ADDITIONAL CONTRACT TIME TO COMPLETE THE CHANGE IN WORK SCOPE? ____ -YES ____ -NO ____ -(CALENDAR DAYS)

5. WILL THE CONTRACTOR NEED ADDITIONAL PERSONNEL TO COMPLETE THE CHANGE IN WORK SCOPE? ____ -YES ____ -NO

IF NO, TRADE(S): _____

NO. OF PERSONNEL: _____

DURATION: _____

6. IDENTIFICATION OF ATTACHMENTS:

DATE: _____ DATE: _____

PREPARED BY: _____ REVIEWED BY: _____
Project Manager

Comments and Recommendation:

CITY OF GREENFIELD

TO: CONTRACT CHANGE ORDER NO.: _____
DATE: _____
PROJECT NAME: _____
ORIGINAL CITY P.O. NO.: _____

I. You are directed to make the following changes in this contract:

<u>ITEM</u>	<u>AMOUNT</u>	<u>SCHEDULED ADJUSTMENT (+) OR (-) DAYS</u>
-------------	---------------	---

II. The following referenced documents further describe the changes outlined in Paragraph I, and are to be considered a part of this Change Order:

R.F.P.: _____ W.D.C.: _____

The changes result in the following adjustment of Contract Price and Contract Time:

Contract Sum prior to this Change Order	\$ _____
Contract Sum will be increased/decreased by this Change Order	\$ _____
New Contract Sum including this Change Order	\$ _____
Contract Time Prior to this Change Order _____	Substantial Completion Date
	Final Completion Date
Net increased/decreased resulting from this Change Order _____ Days	
Current Contract Time including this Change Order _____	Substantial Completion Date
	Final Completion Date

This Change Order is for full and final settlement of all direct, indirect, impact costs and time extension incurred at any time resulting from the performance of the changed work.

The Above Changes Are Recommended:

The Above Changes Are Accepted:

Approved:

Engineer

Contractor

Owner

Address

Address

Address

City/State/Zip

City/State/Zip

City/State/Zip

By _____

By _____

By _____

Phone _____

Phone _____

Phone _____

Date _____

Date _____

Date _____

INDIANA CODE (IC) ADDITIONAL REQUIREMENTS

I. IC 5-16-13

1. The definitions in IC 5-16-3 are incorporated by reference into this Section.
2. In accordance with IC 5-16-13-9, the Bidder, as a “Tier 1 contractor” (as defined in IC 5-16-3-4), if awarded a contract for the Work contemplated by this Bid must contribute:
 - (a) Work performed by the tier 1 contractor’s employees;
 - (b) Materials supplied directly by the tier 1 contractor;
 - (c) Services supplied directly by the tier 1 contractor’s employees; or
 - (d) Any combination of subdivisions (a) through (d);at least fifteen percent (15%) of the tier 1 contractor’s total contract price as determined at the time the contract is awarded.

NOTE: In accordance with Subsection 6.8.1 of the City of Greenfield Standard General Conditions for Construction Contracts (August 2018), the successful Bidder is required to perform with its own organization Work amounting to **not less than thirty percent (30%)** of the original or revised contract amount, whichever is less.

3. In accordance with IC 5-16-13-10, if awarded a contract for the Work contemplated by this Bid, the Bidder, as a “Tier 1 contractor”, and each “Tier 2 contractor” and “Tier 3 contractor” (as defined in IC 5-16-3-4 (i.e., subcontractors and sub-subcontractors)) employed to perform Work on the Project must maintain general liability insurance in at least the following amounts:
 - (a) For the each occurrence limit, one million dollars (\$1,000,000).
 - (b) For the general aggregate limit, two million dollars (\$2,000,000).

NOTE: The successful Bidder, its subcontractors and sub-subcontractors, are required to maintain all insurance coverage as provided for in Article 5 of the City of Greenfield Standard General Conditions for Construction Contracts (August 2018).

4. In accordance with IC 5-16-13-11, if awarded a contract for the Work contemplated by this Bid, the Bidder as a “Tier 1 contractor” and each “Tier 2 contractor” and “Tier 3 contractor” employed to perform Work on the Project:
 - (a) 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 Project.
 - (b) May not pay cash to any individual employed by the contractor for Work done by the individual on the Project.
 - (c) Must be in compliance with the federal Fair Labor Standards Act of 1938, as amended (29 U.S.C. 201-209) and IC 22-2-2-1 through IC 22-2-2-8.
 - (d) Must be in compliance with IC 22-3-5-1 and IC 22-3-7-34.
 - (e) Must be in compliance with IC 22-4-1 through IC 22-4-39.5.
 - (f) Must be in compliance with IC 4-13-18-1 through IC 4-13-18-7.
 - (g) Must comply with IC 5-16-13-12, if applicable.

5. In accordance with IC 5-16-13-12, if awarded a contract for the Work contemplated by this Bid, the Bidder as a “Tier 1 contractor” and each “Tier 2 contractor” employed to perform Work on the Project, if they employ fifty (50) or more journeymen:

- (a) Must provide access to a training program applicable to the tasks to be performed in the normal course of the employee's employment with the contractor.
 - (b) Shall participate in an apprenticeship training program that meets the standards established by the United States Department of Labor, Bureau of Apprenticeship and Training.
 - (c) May comply with this section through any of the following:
 - (1) An apprenticeship program.
 - (2) A program offered by Ivy Tech Community College of Indiana.
 - (3) A program offered by Vincennes University.
 - (4) A program established by or for the contractor.
 - (5) A program offered by an entity sponsored by the United States Department of Labor, Bureau of Apprenticeship and Training.
 - (6) A program that results in the award of an industry recognized portable certification.
6. In accordance with IC 5-16-13-13, if awarded a contract for the Work contemplated by this Bid, the payroll and related records of the Bidder as a "Tier 1 contractor" and each "Tier 2 contractor" and "Tier 3 contractor" employed to perform Work on the Project, must be:
- (a) Preserved by the contractor for a period of three (3) years after completion of the Project Work; and
 - (b) Open to inspection by the Indiana Department of Workforce Development (DWD).

In accordance with IC 5-16-13-14, if the City of Greenfield suspects a misclassification of one (1) or more workers by a contractor in any contractor tier working on the Project may request in writing that DWD investigate the suspected worker misclassification, and in so doing shall provide to DWD any information or records that the City has concerning the misclassification. DWD may investigate such a request, and if it finds information or records that support a finding that worker misclassification has occurred, DWD may refer the matter to the appropriate agency or official for further action.

7. In accordance with IC 5-16-13-15, if the City of Greenfield reasonably suspects the Bidder awarded a contract for the Work contemplated by this Bid or any "Tier 2 contractor" and "Tier 3 contractor" employed to perform Work on the Project has violated a provision of IC 5-16-13, the City is required to do one (1) of the following:
- (a) If the suspected violation concerns or is related to any of the following provisions, the City shall refer the matter to the appropriate agency as follows:
 - (1) For a suspected violation of IC 5-16-13-11(1) (E-Verify), the Indiana Department of Labor.
 - (2) For a suspected violation of IC 5-16-13-11(3) (the federal FLSA or state minimum wage law), the Indiana Department of Labor.
 - (3) For a suspected violation of IC 5-16-13-11(4) (worker's compensation or occupational diseases), the Worker's Compensation Board of Indiana.
 - (4) For a suspected violation of IC 5-16-13-11(5) (unemployment insurance), the Department of Workforce Development.
 - (b) If the suspected violation concerns a provision of IC 5-16-13 other than a provision listed in subdivision (a), the City shall require the contractor to remedy the violation not later than thirty (30) days after the City notifies the contractor of the violation in accordance with IC 5-16-13-15(b)(2). During the thirty (30) day period, the contractor may continue to work on the Project; however, if the contractor fails to remedy the violation within the thirty (30) day period, the City shall find the contractor not responsible and shall determine the length of time the contractor is considered not responsible by the City based on the severity of the violation. The period during which a contractor is considered not responsible:
 - (1) May not exceed forty-eight (48) months; and

(2) Begins on the date of substantial completion of the Project.

A finding by the City that a contractor is not responsible under this section may not be used by another public agency in making a determination as to whether the contractor is responsible for purposes of that public agency's award of a public works contract to that contractor.

II. IC 4-13-18 (A response to "Part 11—Drug Testing" of the "Bidder's Itemized Proposal and Declarations" fulfills this requirement)

1. IC 4-13-18 applies if the Bid is one hundred fifty thousand dollars (\$150,000) or more.
2. The definitions in IC 4-13-18 are incorporated by reference into this Section.
3. In accordance with IC 4-13-18-5, the Bidder must submit with the Bid a written plan for a program to test the Bidder's employees for drugs. A contractor that is subject to a collective bargaining agreement that establishes an employee drug testing program shall only submit a copy of the relevant part of the collective bargaining agreement establishing the program. Failure to submit a written plan for an employee drug testing program, or relevant parts of a collective bargaining agreement establishing an employee drug testing program shall result in the Bid being rejected as non-responsive.
4. The Bidder's employee drug testing program must satisfy all of the following requirements:
 - (a) In accordance with IC 4-13-18-4, if the Bidder's employee drug testing program is established by a collective bargaining agreement it shall include the following:
 - (1) Provides for the random testing of the contractor's employees.
 - (2) Contains a five (5) drug panel that tests for the following substances:
 - (A) amphetamines;
 - (B) cocaine;
 - (C) opiates (2000 ng/ml);
 - (D) PCP;
 - (E) THC
 - (3) Imposes disciplinary measures on an employee who fails a drug test which includes at a minimum all of 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) 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; and
 - (D) the employee successfully completes a rehabilitation program recommended by a substance abuse professional if the employee fails more than one (1) drug test.
 - (b) In accordance with IC 4-13-18-5, if the Bidder has its own employee drug testing program (which is not included as part of a collective bargaining unit), the Bidder's program shall include the following:
 - (1) Subject each of the contractor's employees to a drug test at least one (1) time each year.
 - (2) Provide for random employee testing, with at least two percent (2%) of the contractor's employees randomly selected each month for testing.
 - (3) Contain at least a five (5) drug panel that tests for:
 - (A) amphetamines;
 - (B) cocaine;
 - (C) opiates (2000 ng/ml);
 - (D) PCP;
 - (E) THC.

- (4) Impose progressive discipline on an employee who fails a drug test with at least the following progression:
- (A) after the first positive test, an employee must be:
 - (i) suspended from work for 30 days;
 - (ii) directed to a program of treatment or rehabilitation; and
 - (iii) subject to unannounced drug testing for one (1) year from the day the employee returns to work.
 - (B) after a second positive test, an employee must be:
 - (i) suspended from work for 90 days;
 - (ii) directed to a program of treatment or rehabilitation; and
 - (iii) subject to unannounced drug testing for one (1) year from 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 from 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 described above. An employer complies with the requirement to direct an employee to a program of treatment or rehabilitation if the employer either advised the employee of any such program covered by employer-provided insurance, or, if the employer's insurance does not provide insurance coverage, the employer advises the employee of agencies that provide such programs.

5. In accordance with IC 4-13-18-7, if awarded a contract for the Project, the Bidder must implement the employee drug testing program as described in the plan or collective bargaining agreement. The City of Greenfield shall cancel the contract with the successful Bidder if it:
- (a) Fails to implement its employee drug testing program during the term of the contract;
 - (b) Fails to provide information regarding implementation of the employee drug testing program at the request of the City; or
 - (c) Provides the City with false information regarding the contractor's employee drug testing program.

III. IC 8-23-10 or IC 4-13.6-4

1. The requirements of this Section III are effective for Bids awarded by the City of Greenfield **after December 31, 2016**.
2. The definitions in IC 5-16-3 are incorporated by reference into this Section.
3. In accordance with IC 8-23-10-0.5, if the total amount of the contract awarded under this Bid is **three hundred thousand dollars (\$300,000) or more** and the Project is for the construction, improvement, alteration, repair, or maintenance of a road (as defined by IC 8-23-1-23), highway, street, or alley, then the Bidder, as a "Tier 1 contractor" (as defined in IC 5-16-3-4), and each "Tier 2 contractor" and "Tier 3 contractor" (as defined in IC 5-16-3-4 (i.e., subcontractors and sub-subcontractors)) employed to perform Work on the Project must be qualified by the Indiana Department of Transportation under IC 8-23-10 before performing any Work on the Project.
4. In accordance with IC 4-13.6-4-2.5, if the total amount of the contract awarded under this Bid is **three hundred thousand dollars (\$300,000) or more** and the Project is for any work other than for the construction, improvement, alteration, repair, or maintenance of a road (as defined by IC

8-23-1-23), highway, street, or alley, then the Bidder, as a “Tier 1 contractor” (as defined in IC 5-16-3-4), and each “Tier 2 contractor” and “Tier 3 contractor” (as defined in IC 5-16-3-4 (i.e., subcontractors and sub-subcontractors)) employed to perform Work on the Project must be qualified under IC 4-13.6-4 by the Indiana Certification Board established by IC 4-13.6-3-3 before performing any Work on the Project.

SECTION 01 11 00
SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

- A. All work and materials shall be in accordance with applicable agencies' standards. Reference to any other documents contained in the specifications shall contain the latest editions and include in its entirety any specific sections as referenced to therein. Except as specifically modified in these specifications, all work and materials will comply with the applicable sections of the Indiana Department of Transportation Standard Specifications, latest revision.

1.02 CONTRACT DESCRIPTION

- A. Work Included: The project includes installation of approximately 1,170 feet of 10-inch gravity main.

1.03 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Confine operations at site to areas permitted by:
 - 1. Site limits shown on the Drawing.
 - 2. Owner's written permission for all other locations.
- B. Do not unreasonably encumber site with materials or equipment.
- C. Assume responsibility for protection and safekeeping of products stored on premises.
- D. Move any stored products which interfere with operations of Owner.
- E. Obtain and pay for use of additional storage or work areas needed for operations at no additional cost to the Owner.
- F. Use of site: exclusive, for execution of work, except:
 - 1. Where Contractor's activity may interfere with work of other contractors.
 - 2. As designated by the Owner.

1.04 CONTRACTOR'S USE OF UTILITIES

- A. The Contractor shall make all necessary applications and arrangements and pay all fees and charges for water usage and electrical energy for power and light required for construction of this contract during its entire progress.
- B. Contractor shall coordinate the intent for payment of these usages with Owner prior to any construction, or Owner shall deduct all costs from the Contractor's final payment application.

1.05 PERMITS

- A. Owner has applied for the following permits/approvals:
 - 1. Sanitary Sewer Construction
 - 2. 401 IDEM Water Quality Certification
 - 3. 404 USACE Regional General Permit
 - 4. Construction Stormwater Runoff Permit (Rule 5)
- B. The Contractor shall comply with all provisions of such permits regarding workmanship, schedules, notification of starting construction and other conditions under which the permit is issued.

- C. The Contractor shall obtain and pay for all other permits, licenses and other authorizations required for the prosecution of the work, including the cost of all work performed in compliance with the terms and conditions of such permits, licenses and authorizations, whether by himself or others.

1.06 SECURITY

- A. The Contractor is responsible for the security of his equipment and work.

1.07 OWNER OCCUPANCY

- A. Owner and/or the Engineer will occupy all areas for the purposes of observation and testing.
- B. Contractor shall provide:
 - 1. Access for Owner's personnel.
 - 2. Access for the Engineer.
 - 3. Access for all local, State and Federal agency employees while performing Work in their capacity as representatives of cognizant authority.
 - 4. Access for other contractors, if required.

1.08 PEST CONTROL

- A. The Contractor is responsible for the pest control that is required for him to prosecute his work.

1.09 CONSTRUCTION SITE ACCESS

- A. The Contractor shall be responsible for maintaining access along all public right-of-way. All pavement, whether on-site or off-site, that is damaged by construction traffic shall be removed and replaced in a manner that is acceptable to the Engineer. The cost of this work shall be included in the bid items.

1.10 SUBSTANTIAL AND FINAL COMPLETION

- A. Substantial Completion for the gravity sewer portion of the work shall consist of installation of all gravity main sewer components and completion of all necessary testing.

PART 2 PRODUCTS - NOT USED.

PART 3 EXECUTION - NOT USED.

END OF SECTION

SECTION 01 11 01
BORROW PIT COORDINATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Progress meetings.

1.02 BORROW PIT COORDINATION

Contractor to coordinate the removal and hauling of borrow located at Stonehurst Pointe via email with stonehurstpointe@att.net. A copy of the contractors insurance will be required to be provided to the owner of the site, along with the stipulations that the gravel path to the borrow pit will be the only access to the site, and regrading and reseeding the borrow pit after the use of the approximately 15,000 CYS is removed from the borrow pit.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 03 00 05
CONCRETE

PART 1 GENERAL

1.01 SUMMARY

- A. This Section sets forth the requirements for concrete, grout and related work required to furnish and install cast-in-place reinforced and unreinforced concrete.
- B. General:
 - 1. Reinforced concrete shall be steel reinforced and includes:
 - a. Precast manholes and wet wells.
 - b. Other reinforced concrete structures.
 - c. Encasements, etc.
 - 2. Steel Reinforcement: Includes bars, ties and supports.

1.02 QUALITY ASSURANCE

- A. SOURCE QUALITY CONTROL:
 - 1. Concrete Testing Service:
 - a. Contractor shall employ acceptable testing laboratory to perform materials evaluation, testing and design of concrete mixes.
 - b. Contractor's laboratory shall also evaluate concrete delivered to and placed at the site.
 - 2. Certificates, signed by concrete producer and Contractor may be submitted in lieu of material testing when acceptable to Owner and/or Engineer of Record.
 - 3. Quality Control: Perform sampling and testing during concrete placement as follows:
 - a. Sampling: ASTM C 172.
 - b. Slump: ASTM C 143, one test for each load at point of discharge Air Content: ASTM C 31, one for each set of compressive strength specimens.
 - c. Compressive Strength: ASTM C 39, one set for each 50 cubic yards or fraction thereof of concrete; 1 specimen tested at 7 days, 1 specimens tested at 28 days.
 - d. Report test results in writing to Owner and/or Engineer of Record on same day tests are made.
- B. REFERENCE STANDARDS: Comply with the applicable provisions and recommendations of the following, except as otherwise shown or specified:
 - 1. ACI 301, Specifications for Structural Concrete for Building (includes ASTM Standards referred to herein except for ASTM A 36).
 - 2. ACI 304, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
 - 3. ACI 305, Hot Weather concreting.
 - 4. ACI 306, Cold Weather Concreting.
 - 5. ACI 315, Manual of Engineering and Placing Drawing for Reinforced Concrete Structures.
 - 6. ACI 318, Building Code Requirements for Reinforced Concrete.

7. ACI 347, Guide to Formwork for Concrete.
8. ACI 350, Environmental Engineering Concrete Structures.
9. ASTM A 36, Specification for Structural Steel.
10. Concrete Reinforcing Steel Institute Manual of Standard Practice, include ASTM Standards referred to herein.

1.03 SUBMITTALS

- A. Samples: Submit samples of materials as specified and may be requested by Owner and/or Engineer of Record, including names, sources and descriptions.
- B. Shop Drawings: Submit for approval the following:
 1. Copies of manufacturer's specifications with application and installation instructions for proprietary materials and items, including admixtures and bonding agents.
 2. Drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315, Chapters 1 thru 7. Show bar schedules, stirrup spacing, diagrams of bent bars, arrangements and assemblies, as required for the fabrication and placement of concrete reinforcement.
 3. List of concrete materials and concrete mix designs proposed for use. Include the results of all tests performed to qualify the materials and to establish the mix designs in accordance with ACI 301, 3.9. Submit written report to Owner and/or Engineer of Record for each proposed concrete mix at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed and are acceptable to Owner and/or Engineer of Record. Mix designs may be adjusted when material characteristics, job conditions, weather, test results or other circumstances warrant. Do not use revised concrete mixes until submitted to and accepted by Owner and/or Engineer of Record.
- C. Laboratory Test Reports: Submit copies of laboratory test reports for concrete cylinders, materials and mix design tests. Owner and/or Engineer of Record review will be for general information only. Production of concrete to comply with specified requirements is the responsibility of CONTRACTOR.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery concrete reinforcement materials to the site bundled, tagged and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.
- B. All materials used for concrete must be kept clean and free from all foreign matter during transportation and handling and kept separate until measured and placed in the mixer. Bins or platforms having hard clean surfaces shall be provided for storage. Suitable means shall be taken during hauling, piling and handling to insure that segregation of the coarse and fine aggregate particles does not occur and the grading is not affected.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type II.
- B. Aggregates: ASTM C 33.
 1. Fine Aggregate: Clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances. Dune sand, bank run sand and manufactured sand are not acceptable.

2. Coarse Aggregate: Clean, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter, as follows:
 - a. Crushed stone, processed from natural rock or stone.
 - b. Washed gravel, either natural or crushed. Use of slag and pit or bank run gravel is not permitted
- C. Coarse Aggregate Size: Size to be ASTM C 33, Nos. 57 or 67, unless permitted otherwise by Owner and/or Engineer of Record.
- D. Water: Clean, drinkable.
- E. Air-Entraining Admixture: ASTM C 260.
- F. Water-Reducing High Range Admixture: ASTM C 494, Type F/G. Only use admixtures which have been tested and accepted in mix designs
- G. Slump Limits:
 1. Proportion and design mixes to result in concrete slump:
 - a. Not more than 4 inches prior to adding high range water-reducer.
 - b. Not more than 8 inches at point of placement after adding high range water-reducer.

2.02 FORM MATERIALS

- A. Provide form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.
- B. Exposed Concrete Surfaces: Acceptable panel-type to provide continuous, straight, smooth, as-cast surfaces. Use largest practical sizes to minimize form joints.
- C. Unexposed Concrete Surfaces: Suitable material to suit project conditions.

2.03 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60.
- B. Steel Wire: ASTM A 82.
- C. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcement in place.
 1. Use wire bar type supports complying with CRSI recommendations, except as specified below. Do not use wood, brick, or other unacceptable materials.
 2. For slabs on grade, use supports with sand plates or horizontal runners where base materials will not support chair legs.
 3. For all concrete surfaces, where legs of supports are in contact with forms, provide supports (Either hot-dip galvanized, plastic protected or stainless steel legs) complying with CRSI, Manual of Standard.
 4. Over waterproof membranes, use precast concrete chairs.

2.04 RELATED MATERIALS

- A. Waterstops:
 1. Flat dumbbell or center bulb type, size to suit joints, uniform minimum thickness of 3/8-inch by 9 inches minimum width of Polyvinyl Chloride.
 - a. Manufacturer: Provide waterstops of one of the following:

- 1) W.R. Meadows, Incorporated.
 - 2) A.C. Horn, Incorporated.
 - 3) Or equal.
- B. Membrane-Forming Curing Compound: ASTM C 309, Type I.
- C. Epoxy Bonding Agent:
1. Two-component epoxy resin bonding agent.
 - a. Product and Manufacturer: Provide one of the following:
 - 1) Sikadur Hi-Mod, as manufactured by Sika Chemical Corporation.
 - 2) Epoxite Binder (Code No. 2390), as manufactured by A.C. Horn, Incorporated.
 - 3) Or Equal.

2.05 GROUT

- A. Non-shrink, Nonmetallic Grout:
1. Prepackaged nonstaining cementitious grout requiring only the addition of water at the job site.
 2. Product and Manufacturer: Provide one of the following:
 - a. Euco N-S, as manufactured by the Euclid Chemical Company.
 - b. Masterflo 713, as manufactured by Masters Buildings Company.
 - c. Or equal.
- B. Non-shrink, Nonmetallic 100% Solids, High Strength Epoxy Grout:
1. Use prepackaged solvent-free, moisture-insensitive, 3- component epoxy grouting system.
 2. Product or Manufacturer: Provide one of the following:
 - a. Euco High Strength Grout, as manufactured by the Euclid Chemical Company, Cleveland, Ohio.
 - b. Sikadur 42, Grout-Pak, as manufactured by the Sika Chemical Company, Lyndhurst, NJ
 - c. Or equal.
- C. Ordinary Cement-Sand Grout:
1. Except where otherwise specified use 1 part cement to 3 parts sand complying with the following:
 - a. Cement: ASTM C 150, Type II.
 - b. Sand: ASTM C 33.

PART 3 EXECUTION

3.01 INSPECTION

- A. CONTRACTOR and his installer shall examine the foundation for and the conditions under which work is to be performed and notify Owner of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Owner and/or Engineer of Record.

3.02 FORMWORK

- A. Formwork: Construction so that concrete members and structures are correct size, shape alignment, elevation, and position, complying with ACI 347.
- B. Provide openings in form work to accommodate work of other trades. Accurately place and securely support items built into forms.
- C. Clean and adjust forms prior to concrete placement. Apply form release agents or wet forms, as required. Retighten forms during and after concrete placement if required to eliminate mortar leaks.

3.03 REINFORCEMENT, JOINTS, AND EMBEDDED ITEMS

- A. Comply with the applicable recommendations of specified codes and standards and CRSI. Manual of Standard Practice, for details and methods of reinforcement placement and supports.
- B. Clean reinforcement to bright metal surface unless otherwise directed by Owner. Remove loose rust and mill scale, earth, and other materials which reduce or destroy bond with concrete.
- C. Position, support, and secure reinforcement against displacement during formwork construction or concrete placement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.
 - 1. Place reinforcement to obtain the minimum concrete coverage as shown and as specified in ACI 18. Arrange, space, and securely tie bars and bar supports together with 16 gage wire to hold reinforcement accurately in position during concrete placement operations. Set with ties so that twisted ends are directed away from exposed concrete surfaces.
 - 2. Reinforcing steel shall not be secured to forms with wire, nails or other ferrous metal. Metal supports subject to corrosion shall not touch formed or exposed concrete surfaces.
- D. Provide sufficient numbers of supports of strength required to carry reinforcement. Do not place reinforcing bars more than 2 inches beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.
- E. Splices:
 - 1. Provide standard reinforcement splices by lapping ends, placing bars in contact, and tying tightly with wire. Comply with requirements shown for minimum lap of spliced bars.
- F. Concrete shall not be placed until the reinforcing steel is inspected and permission for placing concrete is granted by Owner/Engineer. All concrete placed in violation of this provision will be rejected.
- G. Joints: Provide construction, isolation, and control joints as indicated or required. Locate construction joints so as to not impair the strength and appearance of the structure. Place isolation and control joints in slabs on ground to stabilize differential settlement and random cracking.
 - 1. In mats and slabs on grade locate joints at a spacing of approximately 40 feet. Place concrete in a strip pattern.
- H. Installation of Embedded Items: Set and build into the work anchorage devices and embedded items required for other work that is attached to, or supported by cast-in-place concrete. Use setting diagrams, templates and instructions provided under other Sections for locating and setting.

3.04 Concrete and placement

- A. Proportioning and Design of Mix:
 - 1. Minimum compressive strength at 28 days: 3000 psi.

2. Maximum water cement ration by weight: 0.45.
 3. Minimum cement content: 564 pounds per cubic yard.
 4. Normal weight: 145 pounds per cubic foot.
 5. Use air-entraining admixture in all concrete: provide not less than 4 percent or more than 8 percent entrained air for concrete.
 6. Calcium Chloride: Do not use calcium chloride in concrete, unless otherwise authorized in writing by Owner and/or Engineer of Record. Do not use water or admixtures containing calcium chloride.
- B. Job-Site Mixing: Use drum type batch machine mixer, mixing not less than 1 ½ minutes for one cubic yard or smaller capacity. Increase mixing time at least 15 seconds for each additional cubic yard or fraction thereof.
- C. Ready-Mixed Concrete: ASTM C 94.
- D. Concrete Placement: Comply with ACI 304, placing concrete in a continuous operation within planned joints or sections. Do not begin placement until work of other trades affecting concrete is completed.
- E. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping, so that concrete is worked around reinforcement and other embedded items and into all parts of forms.
- F. Protect concrete from physical damage or reduce strength due to weather extremes during mixing, placement and curing.
1. In cold weather comply with ACI 306.
 2. In hot weather comply with ACI 305.

3.05 QUALITY OF CONCRETE WORK

- A. Make all concrete solid, compact and smooth, and free of laitance, cracks and cold joints.
- B. All concrete for liquid retaining structures, and all concrete in contact with earth, water, or exposed directly to the elements shall be watertight.
- C. Cut out and properly replace to the extent ordered by Owner, or repair to the satisfaction of Owner, surfaces which contain cracks or voids, are unduly rough, or are in any way defective. Patches or plastering will not be acceptable.
- D. Repair, removal, and replacement of defective concrete as ordered by Owner shall be at no additional cost to Owner.

3.06 CURING

- A. Curing: Begin initial curing as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 72 hours. Continue curing use of moisture- retaining cover or membrane-forming curing compound. Cure formed surfaces by moist curing until forms are removed. Provide protection as required to prevent damage to exposed concrete surfaces.

3.07 FINISHES

- A. Finish:
1. After placing concrete slabs, do not work the surface further until ready for floating. Begin floating when the surface water has disappeared or when the concrete has stiffened sufficiently. Use a wood float only. Check and level the surface plane to a tolerance not exceeding ¼ inch in 10 feet when tested with a 10 foot straightedge placed on the surface at not less than 2 different angles. Cut down high spots and fill all low spots. Uniformly

slope surfaces to drains. Immediately after leveling, refloat the surface to a uniform, smooth granular texture.

2. Apply a non-slip broom finish of neat appearance to exterior concrete slabs. Use fiber-bristle broom unless otherwise directed. Coordinate the required final finish with Owner/Engineer before application.

3.08 GROUT PLACEMENT

A. General:

1. Place grout as shown and in accordance with manufacturer's instructions. If manufacturer's instructions conflict with the Specifications do not proceed until Owner provides clarification.
2. Drypacking will not be permitted.
3. Proprietary product manufacturers shall make the services of qualified, full-time employees available upon 72 hours notification to assure that the product is properly used.
4. Placing grout shall conform to the temperature and weather limitations described in Article 3.04 above.

END OF SECTION

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SECTION 03 35 00
CONCRETE FINISHES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required to finish cast in place concrete surfaces as shown on the Contract Drawings and as specified herein.
- B. All interior concrete floor slabs are to receive concrete sealer unless otherwise noted on the Contract Drawings. Exterior slabs and wet wells or basins do not require a sealer, unless noted otherwise on the Contract Drawings.

1.02 QUALITY ASSURANCE

- A. Standards: Design, manufacturing and assembly of elements of the products herein specified shall be in accordance with, but not limited to, published standards of the following, as applicable:
 - 1. American Society for testing and materials (ASTM)
 - a. ASTM C33 - Standard specification for concrete aggregates
 - 2. Building Codes
 - b. Indiana Building Code
 - c. Local codes and regulations
 - 3. Where reference is made to standards of one of the above, or other organizations, the version of the standard in effect at the time of bid opening shall apply.
- B. Finishes:
 - 1. For concrete which will receive additional applied finishes or materials, the surface finish specified is required for the proper application of the specified manufacturer's products. Where alternate products are approved for use, determine if changes in finishes are required and provide the proper finishes to receive these products.
 - 2. Changes in finishes made to accommodate products different from those specified shall be performed at no additional cost to the Owner. Submit the proposed new finishes and their construction methods to the Engineer for approval.
- C. Services of manufacturer's representative: The Contractor shall make available at no extra cost to the Owner, upon 72 hours notification, the services of a qualified field representative of the manufacturer of concrete sealer to instruct the user on the proper application of the product under prevailing job conditions.

1.03 SUBMITTALS

- A. Submit shop drawings and product data, in accordance with Division 01 - General Requirements and 01 01 33 23 - Shop Drawings, Product Data & Samples, showing materials of construction and details of installation for: Concrete sealer. Conformation that the sealer is compatible with additional applied coating shall also be submitted.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Concrete sealer shall be a silicate based sealer and shall be "Eucosil" by Euclid Chemical Company; "MasterKure HD 100WB" by BASF Construction Chemicals; or equal as approved by the Engineer.

PART 3 EXECUTION

3.01 FORMED SURFACES

- A. Forms shall not be removed before the requirements of Section 03 00 05 - Concrete, have been satisfied.
- B. Exercise care to prevent damaging edges or obliterating the lined of chamfers, rustications or corners when removing the forms or performing any other work adjacent thereto.
- C. Prepare the exposed surface as specified in Section 03 00 05 - Concrete.
- D. As-Cast finish: No additional finishing is required.
- E. Rubbed Finish
 - 1. While the wall is still damp apply a thin coat of medium consistency neat cement slurry by means of bristle brushes to provide a bonding coat within all pits, air holes, or blemishes in the parent concrete. Avoid coating large areas with the slurry at one time.
 - 2. Before the slurry has dried or changed color, apply a dry (almost crumbly) grout proportioned by volume and consisting of one part cement to one and one-half parts of clean masonry sand having a fineness modulus of approximately 2.3 and complying with the gradation requirements of ASTM C33 for such a material. Grout shall be uniformly applied by means of damp pads of coarse burlap approximately 6-square inches, used as a float. Scrub grout into the pits and air holes to provide a dense mortar in all imperfections.
 - 3. Allow the mortar to partially harden for 1 to 2 hours depending upon the weather. If the air is hot and dry, keep the wall damp during the period using a fine, fog spray. When the grout has hardened sufficiently so it can be scrapped from the surface with the edge of steel trowel without damaging the grout in the small pits or holes, cut off all that can be removed with a trowel. (Note: Grout allowed to remain on the wall too long will harden and will be difficult to remove.)
 - 4. Allow the surface to dry thoroughly and rub it vigorously with clean dry burlap to completely remove any dried grout. No visible film of grout shall remain after this rubbing. The entire cleaning operation for any area must be completed the day it is started. Do not leave grout on surfaces overnight. Allow sufficient time for grout to dry after it has been cutoff with the trowel so it can be wiped off clean with the burlap.
 - 5. On the day following the repair of pits, air holes and blemishes the walls shall again be wiped off clean with dry, used pieces of burlap containing old hardened mortar which will act as a mild abrasive. After this treatment, there shall be no built-up film remaining on the parent surface. If, however, such a film is present, a film is present; a fine abrasive stone shall be used to remove all such materials without changing the texture of the concrete.
 - 6. A thorough wash down with stiff bristles shall follow the final bagging or stoning operation. No extraneous materials shall remain on the surface of the wall. The wall shall be sprayed with a fine fog spray periodically to maintain a continually damp condition for at least 3 days after the application of the repair grout.

3.02 FLOOR AND SLABS

- A. Floated Finish:
 - 1. Machine Floating
 - a. Screed floors and slabs with straightedges to the established grades as shown on the Contract Drawings or specified elsewhere in the Project Specifications. Immediately after final screeding, a dry cement/sand shake in the proportion of two (2) sacks of Portland cement to 350-lbs of coarse natural concrete sand shall be sprinkled evenly over the surface at the rate of approximately 500-lbs per 1,000-SF of floor. Do not sprinkle neat, dry cement on the surface.

- b. The application of cement/sand may be eliminated at the discretion of the Engineer if the base slab concrete exhibits adequate fattiness and homogeneity, and the needs not indicated. When the concrete has hardened sufficiently to support the weight of a power float without digging into or disrupting the level surface, thoroughly float the shake into the surface with a heavy revolving disc type power compacting machine capable of providing a 200-lb compacting force distributed over a 24-inch diameter disc.
 - c. Start floating along the walls and around columns and then move systematically across the surface leaving a matte finish.
 - d. The compacting machine shall be the power float with compaction control. Troweling machines equipped with float (shoe) blades that are slipped over the trowel blades may be used for floating. Floating with a troweling machine equipped with normal trowel blades shall not be permitted. The use of any floating or troweling machine which has a water attachment for wetting the concrete surface during finishing shall not be permitted.
2. Hand Floating
- a. In lieu of power floating, small areas may be compacted by hand floating. The dry cement/sand shale previously specified shall be used unless specifically eliminated by the Engineer. Screed the floors and slabs with straightedges to the established grades shown on the Contract Drawings or as specified elsewhere in the Project Specifications. While the concrete is still green, but sufficiently hardened to support a finisher and kneeboards with no more than ¼-inch indentation, wood float to a true, even plane with no coarse aggregate visible. Use sufficient pressure on the wood floats to bring moisture to the surface.
3. Troweling
- a. All floor slabs shall receive a light trowel finish, unless otherwise specified.
4. Finishing tolerances
- a. Level floors and slabs to a tolerance of plus or minus ½-inch when checked with a 10-foot straightedge placed anywhere on the slab in any direction. Where drains occur, pitch floors to drains such that there are no low spots left un-drained. Failure to meet either of the above requirements shall be cause for removal, grinding, or other correction as directed by the Engineer at Contractor's expense.
- B. Broom Finish: Screed slabs with straightedges to the established grades indicated on the Contract Drawings or as specified elsewhere in the Project Specifications. When the concrete has stiffened sufficiently to maintain small surface indentations, draw a stiff bristle broom lightly across the surface in the direction of drainage, or, in the case of walk and stairs, perpendicular to the direction of traffic to provide a non-slip surface.
- C. Steel Trowel Finish: Finish concrete as specified in paragraph 3.02A. Power trowel surface and then hand steel trowel to a perfectly smooth hard even finish free from high or low spots, trowel marks, or other defects.
- D. Concrete Sealer
1. Prepare and seal surfaces indicated on the room finish schedule to receive a sealer as follows:
 - a. Finish concrete as specified in paragraph 3.02A.
 - b. Newly placed concrete: Surface must be sound and properly finished. Surface is application-ready when it is damp but not wet and can no longer be marred by walking workman.

- c. Newly-Cured bare concrete: Level any spots gouged out by trades. Remove all dirt, dust, droppage, oil, grease, asphalt, and foreign matter. Cleanse with caustics and detergents as required. Rinse thoroughly and allow to dry so that surface is no more than damp, and not wet.
- d. Aged concrete: Restore surface soundness by patching, grouting, filling cracks, and holes, etc. Surface must also be free of any dirt, dust, and other foreign matter. Use power tools and/or strippers to remove any incompatible sealers or coatings. Cleanse as required, following the procedure indicated under cured concrete.
- e. Methods: Apply sealer so as to form a continuous, uniform film by spray, soft-bristle push broom, long-nap roller, or lambs wool applicator. Ordinary garden-type sprayers using neoprene hose, are recommended for best results.
- f. Applications: Apply first coat evenly and uniformly as soon as possible after final finishing. Apply second coat when all trades are completed and structure is ready for occupancy.
- g. To seal and dustproof, two coats are required. For sealing new concrete, both coats shall be applied full-strength. On aged concrete, when renovating, dust proofing and sealing, the first coat should be thinned per manufacturer's directions.

3.03 APPROVAL OF FINISHES

- A. All concrete surfaces, when finished, will be inspected by the Engineer.
- B. Surfaces which, in the opinion of the Engineer, are unsatisfactory shall be refinished or reworked.
- C. After finishing horizontal surfaces, regardless of the finishing procedure specified, the concrete shall be cured in compliance with Section 03 00 05 - Concrete, unless otherwise directed by the Engineer.

3.04 SCHEDULE OF FINISHES

- A. Concrete shall be finished as specified either to remain as natural concrete to receive an additional applied finish or material under another Section.
- B. Concrete for the following conditions shall be finished as noted on the Drawings and as further specified herein:
 1. Concrete to receive damproofing: As-cast finish See paragraph 3.01, D.
 2. Concrete not exposed to view and not scheduled to receive an additional applied finish or material: As-cast finish See paragraph 3.01, D.
 3. Exterior vertical concrete above grade exposed to view: Rubbed finish. See paragraph 3.01, E.
 4. Interior vertical concrete exposed to view except in water containment areas: Rubbed finish. See paragraph 3.01, E.
 5. Vertical concrete in Water containment areas: Rubbed finish on exposed surfaces and extending at 2-feet below normal operating water level: As-cast finish on remainder of submerged areas. See paragraph 3.01E and 3.01, D.
 6. Interior and exterior underside concrete exposed to view: Rubbed Finish. See paragraph 3.01, E.
 7. Concrete to be painted: Rubbed finish. See paragraph 3.01, E.
 8. Concrete to receive heavy duty or extra heavy-duty concrete topping: Light broomed finish.
 9. Concrete to receive floor sealer: See paragraph 3.02, D.

10. Concrete slabs noted to receive steel trowel finish: See paragraph 3.02, C.
11. Concrete for exterior walks, interior and exterior stairs: Broomed finish perpendicular to direction of traffic. See paragraph 3.02, B.
12. Interior and exterior horizontal concrete not required or steel trowel finish: Floated finish. See paragraph 3.02, A.
13. Concrete surfaces to be covered with grout. See Section 03 60 00 - Grout
14. Concrete to receive ceramic tile: Steel trowel

END OF SECTION

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SECTION 03 41 00
PRECAST, PRESTRESSED CONCRETE

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work included: These specifications cover precast and precast- prestressed structural concrete construction, including product design not shown on contract drawings, manufacture, transportation, erection and other related items such as anchorage, bearing pads, storage and protection of precast concrete.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, Cast-in-Place Concrete, Metal Work, Waterproofing, Sealants and Caulking, Testing, and sections in Division I of these Specifications.

1.02 QUALITY ASSURANCE

- A. Manufacturer qualifications: The precast concrete manufacturing plant shall be certified by the Prestressed Concrete Institute, Plant Certification Program, prior to the start of production.
- B. Erector qualifications: Regularly engaged for at least five (5) years in the erection of precast structural concrete similar to the requirements of this project.
- C. Welder qualifications: In accordance with AWS D1.1.
- D. Testing: In general compliance with testing provisions in MNL-116, Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products.
- E. Requirements of Regulatory Agencies: All local codes plus the following specifications, standards and codes are a part of these specifications:
 - 1. ACI 318 - Building Code Requirements for Reinforced Concrete.
 - 2. ACI D1.1 - Structural Welding Code - Steel
 - 3. AWS D1.4 - Structural Welding Code - Reinforcing Steel
 - 4. ASTM Specifications - As referred to in Part 2- Products, of this Specification.

1.03 SUBMITTALS

- A. Shop Drawings:
 - 1. Erection Drawings:
 - a. Plans and/or elevations locating and defining all material furnished by manufacturer.
 - b. Sections and details showing connections, cast-in items and their relation to the structure.
 - c. Description of all loose, cast-in and field hardware.
 - d. Field installed anchor location drawings.
 - e. Erection sequences and handling requirements.
 - f. All dead, live and other applicable loads used in the design.
 - 2. Production Drawings:
 - a. Elevation view of each member.

- b. Sections and details to indicate quantities and position of reinforcing steel, anchors, inserts, etc.
 - c. Lifting and erection inserts.
 - d. Dimensions and finishes.
 - e. Prestress for strand and concrete strengths.
 - g. Estimated cambers.
 - h. Method of transportation.
- B. Product Design Criteria:
- 1. Loadings for design:
 - a. Initial handling and erection stresses.
 - b. All dead and live loads as specified on the contract drawings.
 - c. All other loads specified for member, where applicable.
 - 3. Design calculations of products not completed on the contract drawings shall be performed by a Registered Engineer experienced in precast, prestressed concrete design and submitted for approval upon request.
 - 4. Design shall be in accordance with applicable codes, ACI 318.
- C. Permissible Design Deviations:
- 1. Design deviations will be permitted only after the Engineer's written approval of the manufacturer's proposed design supported by complete design calculations and drawings.
 - 2. Design deviations shall provide an installation equivalent to the basic intent without incurring additional cost to the Owner.
- D. Test Reports: Reports of tests on concrete and other materials upon request.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Portland Cements:
- 1. ASTM C150 - Type I or III.
- B. Admixtures:
- 1. Air-entraining admixtures: ASTM C260.
 - 2. Water reducing, retarding, accelerating, high range water reducing admixtures: ASTM C494.
- C. Aggregates:
- 1. ASTM C33 or C330.
- E. Water:
- 1. Potable or free from foreign materials in amounts harmful to concrete and embedded steel.
- F. Reinforcing Steel:
- 1. Bars:
 - Deformed billet-steel: ASTM A615

- Deformed rail-steel: ASTM A616
- Deformed axle-steel: ASTM A617
- Deformed low-alloy steel: ASTM A706
- 2. Wire: Cold-drawn steel: ASTM A82
- 3. Wire Fabric: Welded steel: ASTM A185
 - Welded deformed steel: ASTM A497
- G. Strand:
 - 1. Uncoated, 7-wire, stress-relieved strand: ASTM A416 (including supplement) - Grade 250K or 270K.
- H. Anchors and Inserts:
 - 1. Materials:
 - a. Structural Steel: ASTM A36
 - b. Stainless Steel: ASTM A666
 - 2. Finish
 - a. Hot Dipped Galvanized: ASTM A153
 - b. Zinc-Rich Coating: MIL-P-2135, self curing, one component, sacrificial.
 - c. Cadmium coating
- B. Grout:
 - 1. See Cast-In-Place Concrete, Section 03300.
- C. Welded Studs:
 - 1. AWS D1.1

2.02 CONCRETE MIXES

- A. Twenty-eight (28) day compressive strength: Minimum of 5,000 psi for prestressed members and minimum of 4,500 psi for precast members that are not prestressed.
- B. Release Strength: Minimum of 4,000 psi.
- C. Use of calcium chloride, chloride ions or other salts is not permitted.

2.03 MANUFACTURE

- A. Manufacturing procedures shall be in general compliance with PCI MNL-116.
- B. Manufacturing tolerances shall comply with PCI MNL-116.
- C. Finishes:
 - 1. Standard Underside: Resulting from casting against approved forms using good industry practice in cleaning of forms, design of concrete mix, placing and curing. Small surface holes caused by air bubbles, normal color variations, normal form joint marks, and minor chips and spalls shall be tolerated, but no major or unsightly imperfections, honeycomb or other defects shall be permitted.
 - 3. Standard Top: Result of vibrating screed and additional hand finishing at projections. Normal color variations, minor indentations, minor chips and spalls shall be permitted. No

major imperfections, honeycomb or defects shall be permitted.

4. Exposed Vertical Ends: Strands shall be recessed and the ends of the member shall receive sacked finish.

D. Openings:

1. Primarily on thin sections, the manufacturer shall provide for those openings 10 inches round or square or larger as shown on the structural drawings. Other openings shall be located and field drilled or cut by the trade requiring them after the precast, prestressed products have been erected. Openings shall be approved by Engineer before drilling or cutting.

E. Patching:

Shall be acceptable providing the structural adequacy of the product and the appearance are not impaired.

F. Fasteners:

Manufacturer shall cast in structural inserts, bolts and plates as detailed or required by the contract drawings.

PART 3 EXECUTION

3.01 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery and Handling:

1. Precast concrete members shall be lifted and supported during manufacturing, stockpiling, transporting and erection operations only at the lifting or supporting point, or both, as shown on the shop drawings, with approved lifting devices. Lifting inserts shall have a minimum safety factor of 4. Exterior lifting hardware shall have a minimum safety factor of 5.
2. Transportation, site handling and erection shall be performed with acceptable equipment and methods and by qualified personnel.

B. Storage:

1. Store all units off ground.
2. Place stored units so that identification marks are discernible.
3. Separate stacked members by battens across full width of each bearing point.
4. Stack so that lifting devices are accessible and undamaged.
5. Do not use upper member of stacked tier as storage area for shorter member of heavy equipment.

3.02 ERECTION

A. Site Access: General Contractor shall be responsible for providing suitable access to the building, proper drainage and firm, level bearing for the hauling and erection equipment to operate under their own power.

B. Preparation: General Contractor shall be responsible for:

1. Providing true, level bearing surfaces on all field placed bearing walls and other field placed supporting members.
2. Placement and accurate alignment of anchor bolts, plates or dowels in column footings, grade beams and other field placed supporting members.

3. All shoring required for composite beams and slabs. Shoring shall have a minimum load factor of 1.5 x (dead load plus construction loads).
- D. Installation: Installation of precast, prestressed concrete shall be performed by the manufacturer or a competent erector. Members shall be lifted by means of suitable lifting devices at points provided by the manufacturer. Temporary shoring and bracing, if necessary, shall comply with manufacturer's recommendations.
- E. Alignment: Members shall be properly aligned and leveled as required by the approved shop drawings. Variations between adjacent members shall be reasonably leveled out by jacking, loading or any other feasible method as recommended by the manufacturer and acceptable to the Engineer.

3.03 FIELD WELDING

- A. Field welding is to be done by qualified welders using equipment and materials compatible with the base material.

3.04 ATTACHMENTS

- A. Subject to approval of the Engineer, precast, prestressed products may be drilled or "shot" provided no contact is made with the prestressing steel. Should spalling occur, it shall be repaired by the trade doing the drilling or the shooting.

3.05 INSPECTION AND ACCEPTANCE

- A. Final inspection and acceptance of erected precast, prestressed concrete shall be made by the Engineer.

END OF SECTION

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SECTION 03 60 00

GROUT

PART 1 GENERAL

1.01 DESCRIPTION

- A. Scope of Work: The work included in this Section consists of grouting the various items as shown on the Contract Drawings, as specified elsewhere in the Project Specifications, or as specified herein.

1.02 QUALITY ASSURANCE

- A. Standards:
1. American Society for Testing and Materials (ASTM):
 - a. ASTM C33 - Specification for Concrete Aggregates
 - b. ASTM C150 - Specification for Portland Cement
 - c. ASTM C531 - Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical Resistant Mortars, Grouts and Monolithic Surfacing and Polymer Concretes
 - d. ASTM C579 - Standard Test Method for Compressive Strength of Chemical Resistant Mortars, Grouts and Monolithic Surfacing and Polymer Concretes
 - e. ASTM C827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens from Cementitious Mixtures
 - f. ASTM C1107 -Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
 - g. ASTM D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics.
 2. U.S. Army Corps of Engineers Standard (CRD): CRD C-621 - Corps of Engineers Specification for Nonshrink Grout
 3. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.
- B. Qualifications: Grout manufacturer shall have a minimum of 10 years experience in the production and use of the type of grout proposed for the work.
- C. Services of Manufacturer's Representative: A qualified field technician of the nonshrink grout manufacturer, specifically trained in the installation of the products, shall attend the pre-installation conference and shall be present for the initial installation of each type of nonshrink grout. Additional services shall also be provided, as required, to correct installation problems.
- D. Field Testing:
1. All field testing and inspection services required shall be provided by the Owner. The Contractor shall assist in the sampling of materials and shall provide any ladders, platforms, etc, for access to the work. The methods of testing shall comply in detail with the applicable ASTM Standards.
 2. The field testing of Concrete Grout shall be as specified for concrete in Section 03 00 05 - Concrete.

1.03 SUBMITTALS

- A. Submit to the Engineer, in accordance with Section 01 33 23 - Shop Drawings, Product Data & Samples showing materials of construction and details of installation for:
 - 1. Commercially manufactured nonshrink cementitious grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards and Material Safety Data Sheet.
 - 2. Commercially manufactured nonshrink epoxy grout. The submittal shall include catalog cuts, technical data, storage requirements, product life, working time after mixing, temperature considerations, conformity to required ASTM standards and Material Safety Data Sheet.
 - 3. Cement grout: The submittal shall include the type and brand of the cement, the gradation of the fine aggregate, product data on any proposed admixtures and the proposed mix of the grout.
 - 4. Concrete grout: The submittal shall include data as required for concrete as delineated in Section 03 00 05 - Concrete. This includes the mix design, constituent quantities per cubic yard and the water/cement ratio.
- B. Laboratory Test Reports: Submit laboratory test data as required under Section 03 00 05 - Concrete for concrete to be used as concrete grout.
- C. Certifications: Certify that commercially manufactured grout products and concrete grout admixtures are suitable for use in contact with potable water after 30 days curing.
- D. Qualifications: Grout manufacturers shall submit documentation that they have at least 10 years experience in the production and use of the proposed grouts which they will supply.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the jobsite in original, unopened packages, clearly labeled with the manufacturer's name, product identification, batch numbers and printed instructions.
- B. Store materials in full compliance with the manufacturer's recommendations. Total storage time from date of manufacture to date of installation shall be limited to 6 months or the manufacturer's recommended storage time, whichever is less.
- C. Material which becomes damp or otherwise unacceptable shall be immediately removed from the site and replaced with acceptable material at no additional expense to the Owner.
- D. Nonshrink cement-based grouts shall be delivered as preblended, prepackaged mixes requiring only the addition of water.
- E. Nonshrink epoxy grouts shall be delivered as premeasured, prepackaged, three component systems requiring only blending as directed by the manufacturer.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Nonshrink Cementitious Grout
 - 1. Nonshrink cementitious grouts shall meet or exceed the requirements of ASTM C1107, Grades B or C and CRD C-621. Grouts shall be Portland Cement based, contain a pre-proportioned blend of selected aggregates and shrinkage compensating agents and shall require only the addition of water. Nonshrink cementitious grouts shall not contain expansive cement or metallic particles. The grouts shall exhibit no shrinkage when tested in conformity with ASTM C827.

- a. General purpose nonshrink cementitious grout shall conform to the standards stated above and shall be SikaGrout 212 by Sika Corp.; MasterFlow100 by BASF Construction Chemicals; Euco NS by The Euclid Chemical Co.; or equivalent.
 - b. Flowable (Precision) nonshrink cementitious grout shall conform to the standards stated above and shall be Masterflow 928 by BASF Construction Chemicals; Hi-Flow Grout by the Euclid Chemical Co.; SikaGrout 328 by Sika Corp.; or equivalent.
- B. Nonshrink Epoxy Grout: Nonshrink epoxy-based grout shall be a pre-proportioned, three (3) component, 100 percent (100%) solids system consisting of epoxy resin, hardener, and blended aggregate. It shall have a compressive strength of 14,000-psi in 7 days when tested in conformity with ASTM D695 and have a maximum thermal expansion of 30×10^{-6} when tested in conformity with ASTM C531. The grout shall be Masterflow 640 by BASF Construction Chemicals; Sikadur 42 Grout-Pak by Sika Corp.; High Strength Epoxy Grout by the Euclid Chemical Co. or equal as approved by Engineer.
- C. Cement Grout: Cement grouts shall be a mixture of one part Portland Cement conforming to ASTM C150, Types I, II, or III and 1 to 2 parts sand conforming to ASTM C33 with sufficient water to place the grout. The water content shall be sufficient to impart workability to the grout but not to the degree that it will allow the grout to flow.
- D. Concrete Grout:
1. Concrete grout shall conform to the requirements of Section 03 00 05 - Concrete except as specified herein. It shall be proportioned with cement, Pozzolan, coarse and fine aggregates, water, water reducer and air entraining agent to produce a mix having an average strength of 2,900-psi at 28 days, or 2,500-psi nominal strength. Coarse aggregate size shall be $\frac{3}{8}$ -inch maximum. Slump should not exceed 5-inches and should be as low as practical yet still retain sufficient workability.
- E. Water: Potable water, free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

PART 3 EXECUTION

3.01 PREPARATION

- A. Grout shall be placed over cured concrete which has attained its full design strength unless otherwise approved by the Engineer.
- B. Concrete surfaces to receive grout shall be clean and sound; free of ice, frost, dirt, grease, oil, curing compounds, laitance, and paints and free of all loose material or foreign matter which may effect the bond or performance of the grout.
- C. Roughen concrete surfaces by chipping, sandblasting, or other mechanical means to ensure bond of the grout to the concrete. Remove loose or broken concrete. Irregular voids or projecting coarse aggregate need not be removed if they are sound, free of laitance and firmly embedded into the parent concrete.
 1. Air compressors used to clean surfaces in contact with grout shall be the oilless type or equipped with an oil trap in the air line to prevent oil from being blown onto the surface.
- D. Remove all loose rust, oil or other deleterious substances from metal embedments or bottom of baseplates prior to the installation of the grout.
- E. Concrete surfaces shall be washed clean and then kept moist for at least 24 hours prior to the placement of cementitious or cement grout. Saturation may be achieved by covering the concrete with saturated burlap bags, use of a soaker hose, flooding the surface, or other method acceptable to the Engineer. Upon completion of the 24 hour period, visible water shall be removed from the surface prior to grouting. The use of an adhesive bonding agent in lieu of surface saturation shall only be used when approved by the Engineer for each specific location of grout installation.

- F. Epoxy-based grouts do not require the saturation of the concrete substrate. Surfaces in contact with epoxy grout shall be completely dry before grouting.
- G. Construct grout forms or other leakproof containment as required. Forms shall be lined or coated with release agents recommended by the grout manufacturer. Forms shall be of adequate strength, securely anchored in place and shored to resist the forces imposed by the grout and its placement.
 - 1. Forms for epoxy grout shall be designed to allow the formation of a hydraulic head and shall have chamfer strips built into forms.
- H. Level and align the structural or equipment bearing plates in accordance with the structural requirements and the recommendations of the equipment manufacturer.
- I. Equipment shall be supported during alignment and installation of grout by shims, wedges, blocks or other approved means. The shims, wedges and blocking devices shall be prevented from bonding to the grout by appropriate bond breaking coatings and removed after grouting unless otherwise approved by the Engineer.

3.02 INSTALLATION - GENERAL

- A. Mix, apply and cure products in strict compliance with the manufacturer's recommendations and this Section.
- B. Have sufficient manpower and equipment available for rapid and continuous mixing and placing. Keep all necessary tools and materials ready and close at hand.
- C. Maintain temperatures of the foundation plate, supporting concrete, and grout between 50 and 90°F during grouting and for at least 24 hours thereafter or as recommended by the grout manufacturer, whichever is longer. Take precautions to minimize differential heating or cooling of baseplates and grout during the curing period.
- D. Take special precautions for hot weather or cold weather grouting as recommended by the manufacturer when ambient temperatures and/or the temperature of the materials in contact with the grout are outside of the 50 and 90°F range.
- E. Install grout in a manner which will preserve the isolation between the elements on either side of the joint where grout is placed in the vicinity of an expansion or control joint.
- F. Reflect all existing underlying expansion, control and construction joints through the grout.

3.03 INSTALLATION - CEMENT GROUTS AND NONSHRINK CEMENTITIOUS GROUTS

- A. Mix in accordance with manufacturer's recommendations. Do not add cement, sand, pea gravel or admixtures without prior approval by the Engineer.
- B. Avoid mixing by hand. Mixing in a mortar mixer (with moving blades) is recommended. Pre-wet the mixer and empty excess water. Add premeasured amount of water for mixing, followed by the grout. Begin with the minimum amount of water recommended by the manufacturer and then add the minimum additional water required to obtain workability. Do not exceed the manufacturer's maximum recommended water content.
- C. Placements greater than 3-inch in depth shall include the addition of clean, washed pea gravel to the grout mix when approved by the manufacturer. Comply with the manufacturer's recommendations for the size and amount of aggregate to be added.
- D. Place grout into the designated areas in a manner which will avoid segregation or entrapment of air. Do not vibrate grout to release air or to consolidate the material. Placement should proceed in a manner which will ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.

- E. Place grout rapidly and continuously to avoid cold joints. Do not place cement grouts in layers. Do not add additional water to the mix (retemper) after initial stiffening.
- F. Just before the grout reaches its final set, cut back the grout to the substrate at a 45 degree angle from the lower edge of bearing plate unless otherwise approved by the Engineer. Finish this surface with a wood float (brush) finish.
- G. Begin curing immediately after form removal, cutback, and finishing. Keep grout moist and within its recommended placement temperature range for at least 24 hours after placement or longer if recommended by the manufacturer. Saturate the grout surface by use of wet burlap, soaker hoses, ponding or other approved means. Provide sunshades as necessary. If drying winds inhibit the ability of a given curing method to keep grout moist, erect wind breaks until wind is no longer a problem or curing is finished.

3.04 INSTALLATION - NONSHRINK EPOXY GROUTS

- A. Mix in accordance with the procedures recommended by the manufacturer. Do not vary the ratio of components or add solvent to change the consistency of the grout mix. Do not overmix. Mix full batches only to maintain proper proportions of resin, hardener and aggregate.
- B. Monitor ambient weather conditions and contact the grout manufacturer for special placement procedures to be used for temperatures below 60 or above 90°F.
- C. Place grout into the designated areas in a manner which will avoid trapping air. Placement methods shall ensure the filling of all spaces and provide full contact between the grout and adjoining surfaces. Provide grout holes as necessary.
- D. Minimize "shoulder" length (extension of grout horizontally beyond base plate). In no case shall the shoulder length of the grout be greater than the grout thickness.
- E. Finish grout by puddling to cover all aggregate and provide a smooth finish. Break bubbles and smooth the top surface of the grout in conformity with the manufacturer's recommendations.
- F. Epoxy grouts are self curing and do not require the application of water. Maintain the formed grout within its recommended placement temperature range for at least 24 hours after placing, or longer if recommended by the manufacturer.

3.05 INSTALLATION - CONCRETE GROUT

- A. Screed underlying concrete to the grade shown on the Contract Drawings. Provide the surface with a broomed finish, aligned to drain. Protect and keep the surface clean until placement of concrete grout.
- B. Remove the debris and clean the surface by sweeping and vacuuming of all dirt and other foreign materials. Wash the tank slab using a strong jet of water. Flushing of debris into tank drain lines will not be permitted.
- C. Saturate the concrete surface for at least 24 hours prior to placement of the concrete grout. Saturation may be maintained by ponding, by the use of soaker hoses, or by other methods acceptable to the Engineer. Remove excess water just prior to placement of the concrete grout. Place a cement slurry immediately ahead of the concrete grout so that the slurry is moist when the grout is placed. Work the slurry over the surface with a broom until it is coated with approximately 1/16 to 1/8-in thick cement paste. A bonding grout composed of one part Portland cement, one and one-half parts fine sand, an approved bonding admixture and water, mixed to achieve the consistency of thick paint, may be substituted for the cement slurry.
- D. Place concrete grout to final grade using the scraper mechanism as a guide for surface elevation and to ensure high and low spots are eliminated. Unless specifically approved by the equipment manufacturer, mechanical scraper mechanisms shall not be used as a finishing machine or screed.

- E. Provide grout control joints as indicated on the Contract Drawings.
- F. Finish and cure the concrete grout as specified for cast-in-place concrete.

3.06 SCHEDULE

- A. The following list indicates where the particular types of grout are to be used:
 1. General purpose nonshrink cementitious grout: Use at all locations where non shrink grout is called for on the plans except for base plates greater in area than 3-feet wide by 3-feet long and except for the setting of anchor rods, anchor bolts or reinforcing steel in concrete.
 2. Flowable nonshrink cementitious grout: Use under all base plates greater in area than 3-feet by 3-feet. Use at all locations indicated to receive flowable nonshrink grout by the Contract Drawings. The Contractor, at their option and convenience, may also substitute flowable nonshrink grout for general purpose nonshrink cementitious grout.
 3. Nonshrink epoxy grout: Use for the setting of anchor rods, anchor bolts and reinforcing steel in concrete and for all locations specifically indicated to receive epoxy grout.
 4. Cement grout: Cement grout may be used for grouting of incidental base plates for structural and miscellaneous steel such as post base plates for platforms, base plates for beams, etc. It shall not be used when nonshrink grout is specifically called for on the Contract Drawings or specified in the Project Specifications for grouting of primary structural steel members such as columns and girders.
 5. Concrete grout: Use for overlaying the base concrete under scraper mechanisms of clarifiers and other similar equipment to allow more control in placing the surface grade.

END OF SECTION

SECTION 33 31 13**SANITARY UTILITY SEWERAGE PIPING AND PRECAST MANHOLES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Pipe for gravity sewer
- B. Manholes for gravity sewer

1.02 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. ASTM International.
 - 1. ASTM C478 – Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
 - 2. ASTM C923 – Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
 - 3. ASTM C990 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants ASTM C1244 – Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill
 - 4. ASTM D1784 - Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
 - 5. ASTM D2241 Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rate Pipe (SDR Series)
 - 6. ASTM D2122 – Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
 - 7. ASTM D2321 - Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
 - 8. ASTM D2774 - Underground Installation of Thermoplastic Pressure Piping
 - 9. ASTM D3034 - Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
 - 10. ASTM D3212 - Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
 - 11. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe
 - 12. ASTM F1417 - Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air
 - 13. ASTM F1668 - Construction Procedures for Buried Plastic Pipe
- C. American Water Works Association (AWWA):
 - 1. C605 - Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
 - 2. M23 - PVC Pipe - Design and Installation
- D. Indiana Administrative Code, Title 327 Water Pollution Control Board
 - 1. Indiana Administrative Code-327 IAC 3-6-12.

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1.03 SUBMITTALS FOR REVIEW

- A. Product Data: Provide data on pipe materials, manholes, and accessories.

1.04 SUBMITTALS FOR CLOSEOUT

- A. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 SUBMITTALS AT PROJECT CLOSEOUT

- A. Record actual locations of piping mains, connections, and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with municipality.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Store plastic piping protected from direct sunlight and support to prevent sagging and bending. Protect stored piping from moisture and dirt by elevating above grade.

1.08 WARRANTY

- A. The Contractor shall remedy any defect due to faulty material or workmanship and pay for any damage to other work resulting therefrom within a period of one year from final acceptance. Further, the Contractor will provide all manufacturers' and supplier's written guarantees and warranties covering materials and equipment furnished under this Contract.

PART 2 PRODUCTS**2.01 POLYVINYL CHLORIDE (PVC) PIPE**

- A. PVC gravity sanitary pipe shall be green SDR 21 (200 psi minimum) ASTM D2241. Pipe material shall be installed as designated on the plans. Pipe shall be integral wall bell and spigot type with elastomeric seal joints.
- B. The joints for gravity sewer pipe and fittings shall be a rubber gasketed compression type designed to prevent infiltration. Joint lubrication shall be as furnished by the manufacturer.
- C. PVC sewer fittings shall conform to the requirements of ASTM D3034 specifications. Wall thickness must meet established standard.
- D. Installed conduits shall have a smooth internal wall surface and be clean and free of sand and other debris that will interfere with their intended use.

2.02 MANHOLES

- A. Standard precast concrete manholes shall be constructed of precast reinforced sections.
 1. Precast Concrete Manholes: Material shall be as per ASTM C478, precast, reinforced concrete, of depth indicated, with sealed joints.
 2. Concrete Base: Concrete for base of manhole shall have a minimum compressive strength of 5000 psi (35 MPa at 28 days. Thickness to be 8 inches, minimum.
 3. Riser Section: 4 inch minimum thickness, of lengths to provide the total depth of manhole.
 4. Top Section: Eccentric-cone type unless otherwise indicated. Top section to match adjustment ring configurations.
 5. Joint Sealant: ASTM C990.
 6. Resilient Pipe Connectors: ASTM C923.

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7. Steps: As indicated on plans.

8. Adjusting Rings: Reinforced-concrete rings; 4 to 12 inch total thickness, with diameter matching manhole frame and cover, and with height as required to adjust manhole frame and cover to indicated elevation and slope.

B. Manhole Base Channels: Manhole channels shall be main line pipe material. Lay main pipe through manhole and cut top of pipe out to be three-fourths of pipe diameter. Slope through manhole to match run slopes of the main pipe.

PART 3 EXECUTION

3.01 PIPING INSTALLATION

- A. Drawing plans and details indicate the general location and arrangement of underground sanitary sewer piping. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at the low point, true to grades and alignment indicated on the drawings, with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for using lubricants, cements, and other installation requirements. In areas with a watermain crossing, place the joints equidistance from the watermain.
- C. Do not lay pipe on unstable material, in wet trench or when trench and weather conditions are unsuitable for the work.
- D. Support pipe on compacted bedding material. Excavate bell holes only large enough to properly make the joint.
- E. Inspect pipes and fittings for defects before installation. Defective materials shall be plainly marked and removed from the site. Cut pipe shall have smooth regular ends at right angles to axis of pipe.
- F. Lower pipe into trench carefully and bring to proper line, grade, and joint. After jointing, interior of each pipe shall be thoroughly wiped or swabbed to remove any dirt, trash or excess jointing materials.
- G. Do not walk on pipe in trenches until covered by layers of bedding or backfill material to a depth of 12 inches (300 mm) over the crown of the pipe.
- H. Warning tape shall be continuously placed 12 inches above sewer pipe
- I. Install manholes for changes in direction unless fittings are indicated.
- J. Install gravity-flow piping according to the following:
 - 1. Install piping pitched down in direction of flow, at slope indicated on plans.
 - 2. Install piping with minimum cover as shown on Drawings.
 - 3. Install PVC gravity sewer according to ASTM D2321 and ASTM F1668.
- K. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.02 PIPE JOINT CONSTRUCTION

- A. Join gravity-flow, non-pressure, drainage piping according to the following:
 - 1. Join PVC piping according to ASTM D2321.

3.03 MANHOLE INSTALLATION

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- A. Install manholes complete with appurtenances and accessories indicated.
- B. Precast reinforced concrete rings shall be installed true and plumb. The joints between rings and between rings and the base and top, shall be sealed as per manufacturer's recommendations. Adjust the length of the rings so that the top section will be at the required elevation. Cutting the top section is not acceptable.
- C. Concrete manhole risers and tops: Install as specified.

3.04 CONNECTIONS

- A. Make connections to existing piping and underground manholes by coring and installing the pipe at the design invert with an elastomeric gasket as shown in the plans.
- B. Connection to an existing manhole: The bench of the manhole shall be cleaned and reshaped to provide a smooth flowline for all new pipes connected to the manhole.
- C. Protect existing piping and manholes to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.05 PIPE SEPARATION

- A. Water Mains and Sewers:
 - 1. All gravity sewer is being constructed of SDR-21 PVC pipe. The pipe shall be installed to maximize the separation between the existing water main and sanitary sewer while maintain the required slope for the sanitary sewer.

3.06 IDENTIFICATION

- A. Install green warning tape directly over piping and at outside edges of underground manholes.

3.07 INSPECTION AND TESTING

- A. Testing Gravity Sewer Piping:
 - 1. Hydrostatic Testing of Buried Piping:
 - a. Where any section of the piping contains concrete thrust blocks or encasement, do not make the pressure test until at least 10 days after the concrete has been poured. When testing mortar-lined piping, fill the pipe to be tested with water and allow it to soak for at least 48 hours to absorb water before conducting the pressure test.
 - b. Test Pressure: 50 percent (50%) above the normal working pressure, but not less than 150-psi, unless otherwise noted on the Contract Drawings.
 - c. Apply and maintain the test pressure by means of a hydraulic force pump. Maintain the test pressure for a minimum duration of 2 hours. After the test pressure is reached, use a meter to measure the additional water added to maintain the pressure during the 2 hours. This amount of water is the loss due to leakage in the piping system. The allowable leakage rate is defined by the formula.

$$L = \frac{SD(P)^{1/2}T}{133,200}$$

in which:

L = Allowable Leakage During the Test Period (gallons)

S = Length of Pipe Tested (feet)

D = Diameter of the Pipe (inches)

P = Specified Test Pressure (psig)

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T = Specified Time (hours)

- d. Visible Leakage: All leaks evident at the surface shall be repaired and leakage eliminated regardless of the measured total leakage.
 - e. Leakage Measurement: The amount of water required to maintain the test pressure is the leakage.
 - f. Repair and retest any pipes showing leakage rates greater than that allowed.
 - g. Leakage Repair: Repairs to leaks shall be completed in strict accordance with the pipe manufacturer's written recommendations.
2. Deflection Testing of Plastic Sewer Pipe:
- a. Perform vertical ring deflection test on PVC sewer piping, after backfilling has been in place for at least 30 days but not longer than 12 months.
 - b. Allowable maximum deflection for installed plastic sewer pipe limited to 5 percent of original vertical internal diameter.
 - c. Perform deflection testing using properly sized rigid ball or 'Go, No-Go' mandrel.
 - d. Furnish rigid ball mandrel with diameter not less 95 percent of base or average inside diameter of pipe as determined by ASTM standard to which pipe is manufactured. Measure pipe in compliance with ASTM D2122.
 - e. Perform test without mechanical pulling devices.
3. Testing Manholes:
- a. General: Test using air whenever possible prior to backfilling to assist in locating leaks. Make joint repairs on both outside and inside of joint to ensure permanent seal. Test manholes with manhole frame set in place.
 - b. Vacuum test in accordance to ASTM C1244 and as follows:
 - (1) Plug pipe openings; securely brace plugs and pipe.
 - (2) Inflate compression band to effect seal between vacuum base and structure connect vacuum pump to outlet port with valve open; draw vacuum to 10 inches of Hg; close valve; start test.
 - (3) Test:
 - i Determine test duration for manhole from the following table:

Manhole Diameter	Test Period
4 feet	60 seconds
 - ii Record vacuum drop during test period; when vacuum drop is greater than 1 inch of Hg during test period, repair and retest manhole; when vacuum drop of 1 inch of Hg does not occur during test period, discontinue test and accept manhole.
 - iii When vacuum test fails to meet 1 inch of Hg drop in specified time after repair, repair and retest manhole.

3.08 FIELD QUALITY CONTROL

- A. All systems shall be inspected and obtain the Resident Engineer's approval. Prior to final acceptance, provide a video record of all piping from the building to the municipal connection to show the lines are free from obstructions, properly sloped and joined.

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- B. To inspect, thoroughly flush out the lines and manholes before inspection. Lamp test between structures and show full bore indicating sewer is true to line and grade. Lips at joints on the inside of gravity sewer lines are not acceptable.
 - 1. Submit separate report for each system inspection.
 - 2. Defects requiring correction include the following:
 - h. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - i. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - j. Damage: Crushed, broken, cracked, or otherwise damaged piping.
 - k. Infiltration: Water leakage into piping.
 - l. Exfiltration: Water leakage from or around piping.
 - 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 4. Re-inspect and repeat procedure until results are satisfactory.

3.09 CLEANING

- A. Clean dirt and superfluous material from interior of piping.

END OF SECTION