

DOCUMENT 00 91 13  
ADDENDUM NO. 1

Lincoln County  
Killian Creek WWTP Upgrade Phase 3  
WKD Project Number #20170294.00.CL

ADDENDUM NUMBER NO. 1

March 11, 2020

BID DATE: April 2, 2020 @ 2 p.m.

TO ALL BIDDERS:

This Addendum forms a part of the Contract Documents and modifies the Bidding Documents dated November 9, 2018 and all previous Addenda.

Acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to do so may disqualify the Bidder.

Below are changes, additions, and/or clarifications to the bid documents for this project.

**Specifications**

Item 1: Section 00 31 00 – Available Project Information

Article 1.2 – Subsurface Investigation Report to be REVISED as follows:

- A. A copy of a geotechnical report is included with this document, titled “Amended Report of Subsurface Exploration and Geotechnical Engineering Evaluation for Killian Creek WWTP Phase 3 Upgrade”, dated September 29, 2018, and prepared by Southern Engineering.
1. This report identifies properties of below grade conditions and offers recommendations for design of foundations, prepared primarily for use of Engineer.
  2. This report, by its nature, cannot reveal all conditions existing on the site. Should subsurface conditions be found to vary substantially from this report, changes in design and construction of foundations will be made, with resulting credits or expenditures to Contract Price/Sum accruing to Owner.

Item 2: EJCDC C-410 – Bid Form

DELETE section EJCDC C-410 – Bid Form and REPLACE with the attached EJCDC C-410 – Bid Form

Item 3: Section 03 30 00 - Cast-in-Place Concrete ACI

Article 3.13.C to be revised as follows:

- C. Areas exposed to view (including areas that will be under water inside a tank) shall have a formwork surface finish-3.0 as defined in ACI 301.
1. Patch all voids larger than  $\frac{3}{4}$ " wide or  $\frac{1}{2}$ " deep;
  2. Remove all projections larger than  $\frac{1}{8}$ ";
  3. Patch tie holes;
  4. Surface tolerance shall meet class A as defined in ACI 117;
    - a.  $\frac{1}{8}$  in;
    - b. Abrupt irregularities shall be measured within 1 in. of the irregularity; and,
    - c. Gradual surface irregularities shall be measured by determining the gap between concrete and near surface of a 5 ft straightedge, measured between contact points.
  5. Final finish shall be grout-cleaned rubbed finish as defined in ACI 301.
    - a. Apply grout comprised of 1-part cement and 1.5 part sand with water to a consistency of thick paint.
    - b. Scrub grout into voids and remove excess grout.
  6. Provide a mockup of the concrete surface for appearance and texture for exposed areas. This mockup will set the standard for acceptance for the project. If completed concrete does not meet the standard, it shall be rectified until it meets the standard; and,
  7. All formwork butt joints shall align in both horizontal and vertical directions.

Item 4: Section 01 20 00 – Price and Payment Procedures

Delete Article 1.18 – Cash Allowances in its entirety. There are none on this project.

Item 5: Section 06 41 13 – Wood Casework and Related Products

ADD Section 06 41 13 – Wood Casework and Related Products to the specifications

Item 6: Section 40 42 13 – Heat Tracing and Insulation

ADD Section 40 42 13 – Heat Tracing and Insulation to the specifications

Item 7: Section 10 28 13 – Toilet Accessories

Paragraph 3.3.

DELETE Item A.4 EHD, Electric Hand Dryer and REPLACE with PTD, Paper Towel Dispenser, semi-recessed framed medium capacity towel dispenser with 4.9-gallon waste basket.

ADD Item 7 WM, Wall Mirror, 24 x 36 stainless steel frame mirror.

Item 8: Section 44 46 10 – Sequencing Batch Reactor (SBR) and Aerobic Sludge Digestion System

ADD Paragraph 1.4.2 Pre-Qualified Suppliers. Evoqua Technologies, Inc and Parkson Corporation have previously submitted information are accepted at this date as pre-qualified suppliers for the equipment under this specification subject to compliance with the specifications.

## **Drawings**

Item 1: Drawing C.02 – Sheet Index

ADD Sheet Number 8.A-A.1 – Appendix B – Chemical Feed Building #8 to the Architectural drawing sheet index.

Item 2: Drawing S.0.1 – General Notes

DELETE Drawing S.0.1 in its entirety and REPLACE with the attached Drawing S.0.1., dated 2/12/20.

Item 3: Drawing 5.A-A.2 – Sludge Dewatering Building #5.A

Note 7. CHANGE reference of “Section 7” to “Sheet 10.A-A.1”.

Item 4: Drawing G.11 - Proposed Headworks Plan & Section

*ADD. A second 12” diameter influent force main has recently been added to the headworks flow splitter structure on the wall above the existing 20” force main and is not reflected on the drawings. Work in this area is to include:*

- *Removal of an existing 4’-10” x 12” x ¼” 304 SS weir plate on the outlet to the existing headworks and a 4’-10” x 5’-0” x ¼” 304 SS plate on the outlet to the proposed new headworks system to permit installation of the proposed new weir gates shown on Drawing G.11.*
- *Removal of the existing ¼” checkered plate over the receiving chamber directing flow to the new headworks system and replacement with grating to match 2” aluminum grating on active chamber.*
- *Removal and disposal of the sand medial fill within the receiving chamber directing flow to the new headworks system.*

## **Clarifications**

Item 1: Can a “Vectorized PDF” of Drawing C.4 – Site Grading & Drainage Plan be provided?

*Answer: Please see attached “Vectorized PDF” with stamp reflecting date signed/sealed for bidding purposes.*

Item 2: Is there a minority goal requirement for this project?

*Answer: Yes, per the MBE/WBE Instructions for SRF projects, there is a 10% MBE/WBE goal.*

Item 3: Can Machflow M09 VS Xlerator be considered an approved equal/sub request for the hand dryers, per Saniflow?

*Answer: Electronic hand dryers are not required for this project.*

**Item 4:** Would it be acceptable to submit the "8.01-G, Table-A" of the Bid Form within 24 hours after the Bid via email? This would allow us to be more accurate in determining maximum DBE participation.

*Answer: No, per the MBE/WBE Instructions, for SRF projects, all bidders must provide the Good Faith Efforts Form and Table A with their bid to be considered responsive, regardless of what percentage utilization is achieved.*

**Item 5:** Can "Waterman" be listed among approved manufacturer's for the subject project under Section 35 20 16-Sluice, Channel and Weir Gates. Waterman is a major supplier for all types of slide gates, sluice gates, roller and radial gates with over 100 years of experience and installation through the country. Link to the Waterman website, <https://watermanusa.com> (submitted by McWane India Pvt. Ltd.)

*Answer: To be considered as an "Or Equal", Waterman must follow requirements of "Instructions to Bidders", EJCDC C-200, Article 11 – Substitute and "Or Equal" Items and certify compliance with the American Iron and Steel (mandates only use iron and steel purchased in the US-percentage threshold or can apply for a waiver) and Iran Divestment.*

**Item 6:** We have completed a preliminary analysis of the construction work and sequencing required to meet substantial completion in 510 calendar days for Killian Creek and conclude that it cannot be done. Please consider extending the time for substantial completion to at least 24-26 months. Preferably 26 months. The existing schedule will preclude us from bidding the project.

*Answer: Presently under consideration.*

**Item 7:** Please consider naming acceptable manufacturers for the Process Equipment. The performance specification approach makes it impossible for General Contractors to determine during the bid process which vendor bids meet the specification and also encourages bids from unqualified respondents, which are difficult (impossible) to adequately analyze on bid day.

*Answer: All equipment manufactures even if listed as "acceptable" must comply with the specifications. If not listed as an "acceptable manufacturer", the manufacturer shall follow the "Instruction to Bidders", Article 11.*

**Item 8:** Specs call for pipe bollard tops to be formed by hand. [www.topgardcap.com](http://www.topgardcap.com) manufactures a precast concrete bollard cap that makes this process faster, less expensive and completely uniform.

*Answer: A precast concrete bollard top is considered as an acceptable alternative to hand formed concrete.*

**Item 9:** Planning on bidding on the peristaltic chemical feed system for the project. In the specs, you call out tubing sizes but no pressure requirements. Can we please have the process pressure requirements?



*Answer: Please refer to Specification 43 21 29 – Chemical Metering Pumps and Dilution Systems, Page 3-4, Tables 2.1 and/or Table 2.2. Tubing should be capable of withstanding a maximum pressure of 90 psi.*

Item 10: Regarding the SBR, post equalization, aerobic digester and sludge holding tank system. Are these items listed to have a protective coating or lining applied to the insides of the basins for waterproofing? Looked through the project specs and the drawings, and I did not see mention of such, but I wanted to confirm. If these items are planned to have a protective coating applied to them, could you assist me with which drawings I should be looking at?

*Answer: There are no protective coatings specified for the inside of these tanks.*

Item 11: Please confirm the structure at STA 1+34.95 in Sewer Line A is a 5' diameter manhole. This is detailed on drawing C.10.

*Answer: The manhole at STA 1+34.95 in Sewer Line A is a 4' diameter manhole.*

Item 12: Specification Section 00 31 00, Available Project Info states that the recommendations described in the soils report are not requirements of the Contract unless specifically reference in the Contract. Note #2 on drawing S0.0 states that all recommendations in the soils report are to be followed. Please confirm we are to follow the instructions of Spec 00 31 00.

*Answer: REVISE Article 1.2 in Section 00 31 00 as stated in the specification changes Item 1 above.*

Item 13: Will a unit bid item be added to the Bid Form for removing unsuitable soils and replacing with structural fill?

*Answer: A unit bid item will not be added to the bid form for removing unsuitable soils and replacing with structural fill. Unsuitable soils shall be removed and replaced with structural fill as required at no additional cost to the Owner. Bidders should review the geotechnical report provided in the contract documents.*

Item 14: There is a cross section for Detail 7 on sheet 10.A-A.2; Please identify when and where this cross section should be applied.

*Answer: This is a typical Section corresponding to Drawings 4.A-A.2 (Section 8), Drawing 5.A-A.2 (Section 8 & 7) and Drawing 9.A-A.2 (Section 6 & 8).*

Item 15: There are cabinets being detailed on sheet G.42 in the Sludge Dewatering Building. Is there a specification for these units?

*Answer: Specification section 06 41 13 has been added per this addendum.*

Item 16: On sheet 10.A-A.1 there is a window on the legend but no window can be found for the corresponding symbol. Is there only one window or an entire schedule?

*Answer: Window is located on Sheet 5.A-A.2, Section 9. Add legend G-2.*

Item 17: In the technical specifications there is a section on bentonite waterproofing. Where specifically should bentonite waterproofing be applied?

*Answer: Section 07 17 00 – Bentonite Waterproofing is noted on Drawing 4.A-A.2, Section 8 for waterproofing on the below ground walls of the Sludge Pump Station, Building 4.A. and on Drawing 7.A-A.2, Section 2 for waterproofing on the below ground walls of the Rotary Drum Thickener Building 7.*

Item 18: The Bid Form contains a bid line item for Excavation and Offsite Disposal of Rock Material. Per the recommendations on page 7 of the soils report, “the Contractor should provide unit rates for the removal of rock for both trench and mass excavations”. Are we to assume the 5,000 CY in the Bid Form is inclusive of both “mass and trench rock” or “mass rock” ONLY? If the 5,000 CY is for mass rock only, please consider adding a line item in the Bid Form for “trench rock” as the price difference in the two is significant.

*Answer: The bid form has been revised to include separate line items for mass and trench rock excavation and disposal.*

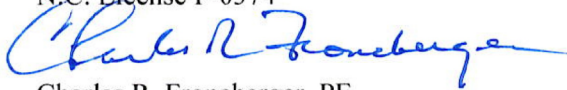
Item 19: Can the exiting 20” force main to the headworks influent box be shut down? If so, for how long?

*Answer: Flow to the plant headworks from the 12” and 20” force mains cannot be terminated and are subject to the cyclic operation of pumps. Temporary provisions must be made at the influent chamber of the influent flow splitter structure to provide access to the wall containing the weir gate additions. Flow diversion work shall be closely coordinated with plant operations and scheduled during dry weather conditions and at non-peak flow periods. See Drawings change, Item 4 above, for related information.*

Receipt of this addendum must be acknowledged on Page 1 of your Bid Form.

Sincerely,

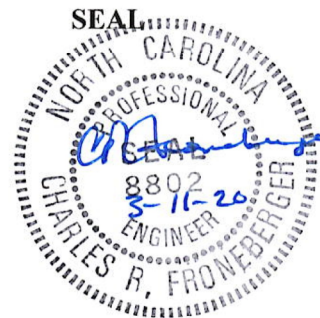
**W. K. Dickson & Co., Inc.**  
N.C. License F-0374



Charles R. Froneberger, PE  
Project Manager

RWH/ah

Enclosures: EJCDC C-410 – Bid Form  
Specification 06 41 13 – Wood Casework and Related Products  
Specification 40 42 13 – Insulation and Heat Tracing  
Revised Drawing Sheet - S.01  
Drawing Sheet - C.04 of 168 (vectorized pdf)



**BID FORM**

Lincoln County, North Carolina  
Killian Creek WWTP Phase 3 Upgrade  
WKD Project No. 20170294.00.CL

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**ARTICLE 1 – BID RECIPIENT**

1.01 This Bid is submitted to:

**Lincoln County  
John Henry, Purchasing Agent  
353 N. Generals Blvd.  
Executive Conference Room  
Lincolnton, NC 28092**

**The outer most packaging must be marked RFB 2020-0402 Killian Creek WWTP Phase 3 Upgrade.**

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

**ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS**

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 150 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

**ARTICLE 3 – BIDDER’S REPRESENTATIONS**

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

<u>Addendum No.</u>	<u>Addendum, Date</u>
_____	_____
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and

drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

- E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.
- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.
- J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

#### **ARTICLE 4 – BIDDER'S CERTIFICATION**

4.01 Bidder certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
  - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;
  - 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

**ARTICLE 5 – BASIS OF BID**

Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

5.01 Lump Sum Bid Price for Base Bid:

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_)  
 (Words) (Numbers)

5.02 Unit Cost Items:

Bidder is to include the following unit cost items.

Item No.	Item Description	Unit	Unit Quantity	Unit Price	Total Bid Price
1	Excavation and Offsite Disposal of Mass Rock Material	CY	5,000	\$ _____	\$ _____
2	Excavation and Offsite Disposal of Trench Rock Material	CY	500	\$ _____	\$ _____

5.03 Subtotal Base Bid (Lump Sum Bid Price and Unit Cost Items):

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_)  
 (Words) (Numbers)

5.04 Contingency Allowance:

All bidders shall include in the bid a General Construction Contingency Allowance per Section 01 20 00 in the amount of 5% of the Subtotal Base Bid.

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_ )  
(Words) (Numbers)

5.05 Total Base Bid (Lump Sum, Unit Cost Items and Contingency Allowance):

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_ )  
(Words) (Numbers)

5.06 In connection with the bid for Owner preferred major equipment and products as listed in Schedule A and to be furnished and installed at the Owner's option for the listed additional cost, the bidder expressly agrees to the provisions of Section 7C-200 2013 Instructions to Bidders and to the following:

- A. That Bidders will provide an additive or deductive price for the substitution of the listed "Base Bid" major equipment or products with "Alternative" Owner Preferred major equipment or products in the spaces provided if any.
- B. That all equipment prices stated in Schedule A include the preparation and submittal of detailed shop drawings showing all modifications, if any, to the Contract Drawings necessary to accommodate such equipment or products and furthermore that the installed costs stated include all items for a complete operating installation.
- C. That all proposed major equipment or products listed in Schedule A "Base Bid" are of equal quality and function to the identified Owner Preferred "Alternative" major equipment and products and will perform satisfactorily and continuously.
- D. That, if awarded a contract on this project, all equipment items or products are guaranteed by the Bidder and his Surety to meet the performance requirements of the Contract Documents.

**SCHEDULE A. TABULATION OF MAJOR EQUIPMENT ITEMS AND PRODUCTS**

Specification	Description	Base Bid Equipment or Products Mfg.	“Alternative” Owner Preferred Equip. or Product Mfg	Addition/ Deduct to Base Bid Price for “Alternative Owner Preferred Equip. or Product”
26 45 00	SCADA System Modifications		Dorsett Technologies	\$ _____
40 92 13.13	Electric Motor Actuators		EIM	\$ _____
43 12 19	Positive Displacement Blower Assemblies		Excelsior	\$ _____
43 21 13	Centrifugal Chemical Pumps		Finish Thompson, Inc	\$ _____
43 21 36	Rotary Lobe Pumps		Borger	\$ _____
43 21 39	Submersible Pumps in SBR, Digester, and Sludge Holding, Exclusive of Jet Aeration Pumps		Wilo	\$ _____
43 21 39	Submersible Pumps in Post Equalization Basin		Xylem, Flygt	\$ _____
43 32 63	Ultraviolet (UV) Disinfection Equipment		Xylem, Wedeco	\$ _____
44 42 39	Preliminary Treatment Equipment		Lakeside Equip Corp	\$ _____
44 46 10	SBR & Digester Equipment Including Jet Aeration Pumps		Evoqua	\$ _____



**SCHEDULE A. TABULATION OF MAJOR EQUIPMENT ITEMS AND PRODUCTS**

Specification	Description	Base Bid Equipment or Products Mfg.	“Alternative” Owner Preferred Equip. or Product Mfg	Addition/ Deduct to Base Bid Price for “Alternative Owner Preferred Equip. or Product”
44 46 16	Rotary Sludge Press Equipment & Conveyors		Fournier	\$ _____
46 33 33	Polymer Blending & Feed Equipment		Excell Feeders, Inc.	\$ _____
46 41 23	Submersible Mixers in Post Equalization Basin		Xylem, Flygt	\$ _____
46 61 46	Automatic Backwash Disc Filter Equipment		Kruger	\$ _____

**ARTICLE 6 – BASIS OF AWARD**

6.01 Award will be made to the lowest TOTAL BASE BID, Unit Price Items, and Contingency after consideration of the Owner preferred equipment listed within Schedule A, as selected by the OWNER based upon available funding and what is in the best interest of the OWNER.

**ARTICLE 7 – TIME OF COMPLETION**

7.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

7.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

**ARTICLE 8 – ATTACHMENTS TO THIS BID**

8.01 The following documents are submitted with and made a condition of this Bid:

- A. Affidavit of Compliance with E-Verify Requirements – Section 00 40 00;
- B. Schedule A – Tabulation of Major Equipment Items and Products
- C. List of Proposed Subcontractors by Trade;
- D. Required Bid Security;

- E. Qualifications Statement – EJCDC C-451;
- F. MBE/WBE (DBE) Good Faith Efforts Form (2 pages) (SRF Forms)
- G. MBE/WBE (DBE) Table A – Prime Contractor and List of Selected Subcontractors (SRF Form);

**ARTICLE 9 – DEFINED TERMS**

- 9.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

**ARTICLE 10 – BID SUBMITTAL**

BIDDER: *[Indicate correct name of bidding entity]*

By:

*[Signature]* \_\_\_\_\_

*[Printed name]* \_\_\_\_\_

*(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest:

*[Signature]* \_\_\_\_\_

*[Printed name]* \_\_\_\_\_

Title: \_\_\_\_\_

Submittal Date: \_\_\_\_\_

Address for giving notices:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Telephone Number: \_\_\_\_\_

Fax Number: \_\_\_\_\_

Contact Name and e-mail address: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Bidder's License No.: \_\_\_\_\_

*(where applicable)*

**List of Proposed Subcontractors by Trade:**

Note: Per NC [GS 143-128\(d\)](#), Single-prime contracts. – All bidders in a single-prime project shall identify on their bid the contractors they have selected for the subdivision or branches of work for:

Subdivision/Branch of Work to be Performed	Subcontractor Name	License No.	<a href="#">Classification</a> (H/S/PU)
HVAC, ventilating and air conditioning;			
Plumbing;			
Electrical; and			
General (work not listed in above categories):			

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**SECTION 06 41 14**  
**WOOD CASEWORK AND RELATED PRODUCTS**

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Wood laboratory casework and utility closures.
  - 2. Laboratory countertops.
  - 3. Laboratory sinks and troughs
  - 4. Accessories.
  - 5. Water.
  - 6. Installation.
  - 7. Elevation of casework attached.

1.2 DEFINITIONS

- A. Exposed Portions of Casework: Surfaces visible when doors and drawers are closed, and visible surfaces in open cabinets or behind glass doors.
- B. Semi-exposed Portions of Casework: Surfaces behind opaque doors, such as interiors of cabinets, shelves, dividers, interiors and sides of drawers, and interior faces of doors.
- C. Concealed portions of casework include sleepers, web frames, dust panels, and other surfaces not usually visible after installation.
- D. Service Fixtures: A device designed to control utilities such as electricity, water or gas. Some sources outside this specification refer to such devices as Service Fittings.
- E. Service Lines: Supply piping and conduit to Service Fixtures.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For wood laboratory casework. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Indicate locations of blocking and reinforcements required for installing laboratory

- casework.
  - 2. Indicate locations and types of service fixtures, together with associated service supply connection required.
  - 3. Include details of required utility spaces.
  - 4. Include details of required exposed service lines for service fixtures.
  - 5. Where required indicate locations of and clearances from adjacent walls, doors, windows, other building components, and other laboratory equipment.
  - 6. Include dimensions for all equipment provided under this specification.
  - 7. Include coordinated dimensions for laboratory equipment specified in other Sections where such equipment falls within or on casework.
- C. Samples: Base cabinet (not less than ½ size) demonstrating compliance with this specification. The sample unit will be retained at job site until completion of project for verification of compliance.
- 1. Base cabinet must be complete with hardware, doors, and drawers, but countertop is optional.
- D. Laboratory casework manufacturer qualifications requirements are as follows:
- 1. Proof that laboratory casework manufacturer has a minimum of five (5) years experience in the manufacture of wood laboratory casework and equipment.
  - 2. List of a minimum of five (5) completed project installations of equal or greater size and requirements that can be inspected prior to award of contract.
  - 3. AWI/QCP: Work in this Section shall be performed by a manufacturer certified by the Architectural Woodwork Institute (AWI) Quality Certification Program (QCP).
- E. Product Test Reports: Comprehensive tests performed by a qualified testing agency, indicating compliance with formaldehyde emission requirements, laboratory casework finishes and countertops with requirements specified for chemical and physical resistance.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations: Laboratory casework, including countertops, sinks, service fixtures, and accessories, from a single source.

- B. Product and Manufacturer

Designations: Manufacturer

Approval:

Kewaunee Scientific  
Company Leonard Peterson  
& Co., Inc. Fisher Hamilton,  
Inc.

C. Compliance with Specification:

1. Casework and countertops must have Architectural Woodwork Institute Quality Certification Program (AWI/QCP) labels applied according to AWI/QCP labeling guidelines.
2. Within thirty (30) days of installation the casework manufacturer must have AWI/QCP representatives conduct a project-specific compliance inspection of casework provided under this specification resulting in a written indication of compliance.

D. Product Performance & Design Criteria:

1. Comply with SEFA 8, "Laboratory Furniture—Casework, and Shelving Recommended Practices."
2. All casework shall be of lipped design. Flush overlap is not an acceptable cabinet design for this project. The use of 3MM edge banding is not permitted on this project.
3. Construction method shall be blind mortise and tenon with all joints screwed and glued together, to make each unit rigid and self-supporting. The use of face frame millwork type construction or the use of doveled joinery at any location within the cabinet will not be acceptable for this project.
4. All drawer fronts shall be solid oak. Plywood drawer fronts with or without additional veneer are not acceptable for this project.
5. All drawer cabinets shall be designed with a minimum of four-sided solid hardwood frame, supporting each drawer. Frames must utilize specified mortise and tenon construction method. Plywood drawer frames are not acceptable for this project.
6. At full extension, drawers shall be capable of supporting 300 pounds on drawer front member for an interval of one (1) minute without any degradation of cabinet, drawer or drawer function, or misalignment of drawer after removal of weight.
7. All exposed plywood ends on casework shall be banded with a minimum of ¾" wide x 1- 1/4" deep solid oak facer allowing exposed corners to utilize a 3/16" bevel radius, and allowing hinges to be anchored into solid hardwood. Plywood banded with 3MM edges is not acceptable on this project.
8. All shelves shall be adjustable (unless noted on drawings). Shelves shall be 1" thick with a minimum of 1"x1" solid oak facer. The use of 3MM edge banding is not



permitted on this project.

9. Comply with ADA requirements.
  10. Hinged doors shall be capable of opening 180 degrees, except inside corners where doors shall be capable of opening 90 degrees.
  11. All wall hanging and tall cases shall utilize a solid oak header. Oak header is to be 2-1/2" minimum. Construction requiring a fixed shelf for support is not acceptable on this project.
  12. Installed, to a maximum of 300 lbs., wall hung cases shall be capable of simultaneously supporting 50 lbs. per sq. ft. on shelf, case bottom and case top members without loss of anchoring, joint separation or impeding of door function.
  13. All knee spaces and table frame aprons shall be solid oak. Corresponding support framing shall be solid hardwood. Plywood aprons and corresponding frames are not acceptable on this project.
  14. All shelves within tall cases shall be adjustable. Designs that utilize a fixed center shelf for structural support are not permitted on this project.
  15. Emissions: Product must have independent testing showing compliance with HUD formaldehyde emission standard set forth in 24 CFR 3280.308 of the US Federal Register.
- E. Pre-installation Conference: Conduct conference at Project site to comply with coordination requirements.

#### 1.5 WARRANTY

- A. Casework manufacturer shall provide a 2-year warranty covering materials and workmanship.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces during handling and installation with protective covering of polyethylene film.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install wood laboratory casework until building is enclosed, wet work and utility roughing-in are complete, and HVAC system is continuously operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.8 COORDINATION

- A. Coordinate layout and installation of framing and reinforcements for support of wood laboratory casework.
- B. Coordinate installation of wood laboratory casework with installation of fume hoods and other laboratory equipment.

1.9 EXTRA MATERIALS

- A. Furnish complete touchup kit for each type and color of wood laboratory casework provided. Include scratch fillers, stains, finishes, and other materials necessary to perform permanent repairs to damaged laboratory casework finish.

PART 2 - PRODUCTS

2.1 CABINET

A. General:

- 1. Solid Wood: Hardwood, clean and free of defect.
- 2. Maximum Moisture Content for Solid Wood: 6 percent for hardwood.
- 3. Plywood: Hardwood veneer core plywood conforming to ANSI/HPVA HP-1-2004.
- 4. Medium-Density Fiberboard: ANSI A208.2, Grade MD.

B. Exposed Materials:

- 1. General: Provide materials that are selected and arranged for compatible grain and color. Do not use materials adjacent to one another that are noticeably dissimilar.
- 2. Wood Veneer Cut: Red oak, plain sliced, book matched.
- 3. Stain Colors and Finishes: As selected by Architect from manufactures full range of standard colors and finishes.
- 4. Doors: Red oak veneered, solid hardwood lumber edges. Pairs matched for grain.
- 5. Solid Wood: Red oak.
- 6. Plywood: Red oak, Grade A exposed faces, Grade J veneer core, and backs of same species as faces.

C. Semi-exposed Materials:

- 1. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects.
- 2. Plywood: Grade B faces, Grade J veneer core, and backs of same species as faces.

3. Hardboard: Tempered and smooth two sides.
- D. Concealed Materials:
1. Solid Wood: Any hardwood species, with no defects affecting strength or utility.
  2. Plywood: Grade C faces, Grade J veneer core, sound backs.
  3. Hardboard: Tempered, smooth on both faces.
- E. Acid Storage-Cabinet Lining: 1/4 inch (6.4 mm) thick removable lining on interior surfaces (cabinet ends, bottoms and doors) protected with pigmented acid resistant coating meeting SEFA 8 performance values for finish.
- F. Glass for Glazed Doors: Tempered float glass complying with ASTM C 1048, Kind FT, Type I, Class 1-Clear, not less than 1/8" (3 mm) thick.

## 2.2 CABINET DESIGN

- A. Style: Lipped overlay with radiused edges.
- B. Interiors: Flush. Cupboard bottoms and ends flush with facers. Surface-mounted bottoms and offsets caused by front face frames, which interfere with ease of cleaning, are not acceptable.
- C. Exposed Corners: Radiused minimum of 1/8 inch (3 mm).
- D. Grain Direction: Vertical on doors, horizontal on drawers.

## 2.3 CABINET

- A. Construction: Provide the following minimum construction:
1. Ends of Base and Wall Cabinets: Plywood with solid hardwood facer. 3/4inch (19mm) thick, with solid hardwood facers secured and sized to accept hinge screws into the solid wood. Concealed ends rebated 1/8" (3 mm) to facilitate installation and adjoining of cabinets without stressing cabinet joinery. Bored for shelf supports on 1-1/4" (32mm) centers.
  2. Bottoms of Cabinets, and Tops of Wall Cabinets and Tall Cabinets: Minimum 3/4inch (19mm) thick plywood capable of supporting 50 lbs. per sq. ft. without deflecting more than 1/4 inch (6.4 mm). Bottoms and tops of uniform thickness, minimum 3/4 inch (6.4 mm) thick and capable of supporting 50 lbs. per sq. ft. without deflecting more than 1/8 inch (3.2 mm) and without impeding door function; use exposed or semi-exposed header if necessary.
  3. Shelves: Minimum 1 inch (25mm) thick plywood with solid oak facers capable of supporting 50 lbs. per sq. ft. without deflecting more than 1/4 inch (6.4 mm).

4. Base Cabinet Top Frames: Full four-sided frame consisting of 1 inch (25 mm) by 1-3/4 inch (45 mm) solid oak front, and solid hardwood back and side members jointed together by tenon or doweling, connected to cabinet ends with mortise and tenon or dowels, glued and screwed.
  5. Base Cabinet Intermediate Frames, or Stretchers: Install frames or stretchers between all drawer and/or door combinations. Full four-sided frame consisting of 3/4 inch (19 mm) by 1-3/4 inch (45 mm) solid oak front, and solid hardwood back and side members jointed together by tenon or doweling, connected to cabinet ends with mortise and tenon or dowels, glued and screwed. Stretchers 3/4 by 2-1/2 inch (19 by 64 mm) solid oak member at front and solid hardwood member at back of cabinet, with mortise and tenon or doweled connections to cabinet ends, glued and screwed. Provide stretchers with grooved-in security dust panels regardless of locking requirements.
  6. Finished Backs: Plywood. 3/4 inch (19 mm) thick.
  7. Interior Backs: Tempered hardboard. 1/4 inch (6.4 mm) thick, secured on sides, bottoms, and tops.
  8. Drawers: Machine for and apply mechanical suspension system (see hardware Section) or solid hardwood framed carcass (web frame) suspension. Provide with positive stop.
  9. Drawer Fronts: Minimum of 3/4-inch (19 mm) solid hardwood.
  10. Drawer Sides and Backs: 1/2-inch (12.7 mm) thick solid wood or unidirectional plywood. Tenon or dovetail joinery, glued and pinned.
  11. Drawer Bottoms: 1/4inch- (6.4mm) thick tempered hardboard glued and dadoed into front, back, and sides of drawers.
  12. Solid Doors 48 Inches (1200 mm) or Less in Height: Minimum of 3/4 inch (19 mm) thick, solid core banded on 4 sides with 1-1/2 inch (38 mm) wide hardwood, and hardwood face veneers and crossbands. Paired doors must have matching grain.
- B. Utility Space Framing: Casework shall have accessible utility space provided where and how indicated per plans.
- C. Base Molding: ASTM F 1861, Type TV vinyl, black, 4 inches (100 mm) in height. Provide on fronts and exposed sides of floor-mounted laboratory casework. Provide stainless steel corner guards on all outside corners.
1. Style: Flat.
- D. Filler Strips, Knee Space and Utility Space Closure Panels: Provide as needed or shown to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as adjoining cabinet member. Machine for flush installation.

## 2.4 WOOD FINISH

- A. Preparation: Sand solid wood and plywood for laboratory casework construction before assembling. Sand edges of doors, drawer fronts, and molded shapes for smoothness. Sand casework after assembling for uniform smoothness.
- B. Staining: Remove fibers and dust and apply stain to exposed and semi-exposed surfaces as necessary to produce an appearance consistent with the approved sample.
- C. Chemical-Resistant Finish: Apply laboratory casework manufacturer's standard chemical-resistant, transparent finish consisting of sealer coating and catalyzed topcoat. Sand and wipe clean between coats. Topcoat(s) may be omitted on concealed surfaces.
  - 1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8.

## 2.5 CABINET HARDWARE

- A. General: Provide laboratory casework manufacturer's standard satin brushed-finish, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.
- B. Hinges: Stainless steel, 5-knuckle hinges with hospital tips. Provide 2 for doors 48 inches (1219 mm) or less in height; 3 for doors more than 48 inches (1219 mm) in height. Hinges capable of 180 degree opening.
- C. Pulls: Bar type. Solid aluminum, fastened from back with two screws. For sliding doors, provide stainless steel or chrome-plated recessed flush pulls. Provide 2 pulls for drawers more than 24 inches (600 mm) in width.
- D. Door Catches: Nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches (1200 mm) in height.
- E. Locks: Dead bold type, master keyed, 5-pin tumbler, brass with brushed chrome-plated finish. Provide and sequence as indicated by drawings. Provide two (2) keys per lock.
- F. Sliding-Door Hardware Sets: Laboratory casework manufacturer's standard, to suit type and size of sliding-door units.
- G. Adjustable Shelf Supports: Double-pin type made of nylon having anti-tipping seismic feature. Each support capable of supporting 400 lbs.

- H. Adjustable Wall Shelf Supports: Surface-type plated steel standards and steel shelf brackets, complying with BHMA A156.9, Types B04102 and B04112.

## 2.6 COUNTERTOPS, SINKS, TROUGHS

- A. Countertops, General: Provide units with smooth surfaces in uniform plane free of defects. Make exposed edges and corners straight and uniformly beveled. Provide front and end overhang of 1 inch.
- B. Countertops, Types. Reference drawings for Counter top type.
  - 1. Type 1 = Epoxy Countertops, Troughs and Sinks: Factory molded of modified epoxy- resin formulation with smooth, nonspecular finish. All Sinks and fixtures to be provided by the Casework Manufacturer.
    - a. Physical Properties:
      - 1) Flexural Strength: Not less than 10,000 psi (70 MPa).
      - 2) Modulus of Elasticity: Not less than 2,000,000 psi (1400 MPa).
      - 3) Hardness (Rockwell M): Not less than 100.
      - 4) Water Absorption (24 Hours): Not more than 0.02 percent.
      - 5) Heat Distortion Point: Not less than 260 deg F (127 deg C).
    - b. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, Test Procedure 3.4.5:
      - 1) No Effect: Acetic acid (98 percent), acetone, ammonium hydroxide (28 percent), benzene, carbon tetrachloride, dimethyl formamide, ethyl acetate, ethyl alcohol, ethyl ether, methyl alcohol, nitric acid (70 percent), phenol, sulfuric acid (60 percent), and toluene.
      - 2) Slight Effect: Chromic acid (40 percent) and sodium hydroxide (50 percent).
    - c. Color: Black.
    - d. Countertop Fabrication: Fabricate with factory cutouts for sinks and with butt joints assembled with epoxy adhesive. Machine drip groove on underside 1/2 inch (13 mm) of edges of countertop assemblies having sink.
    - e. Countertop Configuration: Flat, 1-inch (25 mm) thick, beveled edges and corners, with separate backsplash.
    - f. Sink Fabrication: Molded in 1 piece with smooth surfaces, 1/2-inch (13mm) minimum wall thickness, coved corners, and bottom sloped to NPT 1-1/2 inch outlet.
      - 1) Provide with NPT 1-1/2 inch polypropylene outlet with strainer.
      - 2) Provide sinks for drop-in installation with 1/4inch- (6mm) thick lip around perimeter of sink.

C. Sinks for epoxy resin tops only.

General: Provide sizes indicated or laboratory casework manufacturer's closest standard size of equal or greater volume, as approved by Architect.

1. Epoxy Sinks, and Cup Sinks: Provide sinks for drop-in installation with 1/4inch-(6mm) thick lip around perimeter of sink.
  - a. 1/2inch (13mm) minimum wall thickness. Molded in 1 piece with smooth surfaces, coved corners, and bottom sloped to NPT 1-1/2 inch outlet.
  - b. Provide with NPT 1-1/2 inch polypropylene strainers.

D. Troughs: Epoxy. Comply with requirements for materials and construction as specified for countertops and sinks. Pitch to drains not less than 1/8 inch/foot (10 mm/m).

1. Outlets: Except where troughs empty into sinks, provide NPT 1-1/2 inch (DN 40) outlets with strainers.

## 2.7 ACCESSORIES

- A. Reagent Shelves: Provide as indicated, fabricated from same material as adjacent countertop, unless otherwise indicated.
- B. Adjustable Wall Shelf Supports: Surface-type plated steel standards and steel shelf brackets, complying with BHMA A156.9, Types B04102 and B04112.
- C. Upright Rod Assembly and Metal Crossbar: Aluminum or stainless steel. Two vertical rods and 1 horizontal crossbar, 3/4 inch (19 mm) in diameter and 36 inches (900 mm) long, unless otherwise indicated; 2-rod socket receptacles and 2 crossbar clamps. Ends of vertical rods are tapered to fit receptacles; other rod ends are rounded. Provide where indicated on drawings.
- D. Burette Rods: Aluminum or stainless-steel rods, 1/2 inch (13 mm) in diameter and 18 inches (450 mm) long, threaded on 1 end to fit tapered plug adapter for flush socket receptacle. Provide with tapered plug adapter and receptacle. Provide where indicated on drawings.
- E. Greenlaw Arm Assembly: Aluminum or stainless steel vertical rod, tapered on one end to fit rod socket receptacle. Adjustable crossbar of hardwood with black, acid-resistant finish, secured to upright with adjustable clamp. Provide with receptacle. Provide where indicated on drawings.
- F. Pegboards: Stainless Steel pegboards with removable polypropylene pegs and stainless-steel drip troughs with drain outlet, as indicated on plans.
- G. Grommets: 3" diameter provided with removable covers made of high impact plastic, color: black.

## 2.8 WATER AND LABORATORY FIXTURES

- A. Service Fixtures: Provide units that comply with SEFA 7, "Laboratory and Hospital Fixtures-- Recommended Practices." Provide fixtures complete with washers, locknuts, nipples, and other installation accessories. Include wall and deck flanges, escutcheons, handle extension rods, and similar items.
- B. Materials: Fabricated from cast or forged red brass, unless otherwise indicated.
  - 1. Reagent-Grade Water Service Fixtures: Polypropylene, PVC, or PVDF for parts in contact with water.
- C. Finish: Chromium plated.
- D. Water Valves and Faucets: Provide units complying with ASME A112.18.1, with renewable seats, designed for working pressure up to 80 psig (550 kPa).
  - 1. Vacuum Breakers: Provide ASSE 1035 vacuum breakers on water fixtures with serrated outlets.
  - 2. Aerators: Provide aerators on water fixtures that do not have serrated outlets.
  - 3. Water faucets shall be designed to allow field change from fixed to swivel neck. Owner/Architect to indicate on submittal drawings how individual water faucets will be installed.
  - 4. D.I. Water Faucet Constructed of Heavy Weight Service Polypropylene or other inert material with counter flanges and trim for a complete and finished installation.
- E. Ground-Key Cocks: Tapered core and handle of one-piece forged brass, ground and lapped, and held in place under constant spring pressure. Provide units designed for working pressure up to 40 psig (280 kPa), with serrated outlets.
- F. Hand of Fixtures: Furnish right-hand fixtures unless fixture designation is followed by "L."
- G. Remote-Control Valves: Provide needle valves, straight-through or angle type as indicated for fume hoods and where indicated.
- H. Handles: Provide three- or four-arm handles for valves, unless otherwise indicated.
  - 1. Provide lever-type handles for ground-key cocks.
- I. Service-Outlet Identification: Provide color-coded plastic discs with embossed identification, secured to each service-fixture handle to be tamper resistant.



## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, building environment and other conditions affecting installation or performance of wood laboratory casework.
  - 1. Proceed with installation only after any unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION OF CABINETS

- A. Install level, plumb, and true; shim as required, using concealed shims. Securely anchor cabinets in compliance with manufacturer's recommendations and in compliance with Product Performance Section. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.
- B. Base Cabinets: Adjust top rails within 1/16 inch (1.5 mm) of a single plane. Fasten adjacent cabinets together with joints flush, tight, and uniform; without cracks or gaps. Align similar adjoining doors and drawers to a tolerance of 1/16 inch (1.5 mm).
  - 1. Where base cabinets are installed away from walls, fasten to floor at toe space at not more than 24 inches (600 mm) o.c. and at sides of cabinets with not less than 2 fasteners per side.
- C. Wall Cabinets: Adjust fronts and bottoms within 1/16 inch (1.5 mm) of a single plane. Fasten adjacent cabinets together with joints flush, tight, and uniform; without cracks or gaps. Align similar adjoining doors to a tolerance of 1/16 inch (1.5 mm).
- D. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.
- E. Adjust laboratory casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.
  - 1. Post-Installation Adjustment: Casework installer shall during the first year return after final inspection to make adjustments to drawers and/or doors due to building settling or other problems.

### 3.3 INSTALLATION OF COUNTERTOPS

- A. Abut top and edge surfaces in one true plane with flush joints and with internal supports placed to prevent deflection. Locate joints only where shown on Shop Drawings.
- B. Field Jointing: Where possible, make in the same manner as shop jointing using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop.

1. Use concealed clamping devices for field joints in plastic-laminate countertops. Locate clamping devices within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer's written instructions to exert a uniform heavy pressure at joints.
- C. Fastening:
1. Secure countertops, except for epoxy countertops, to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each cabinet front, end, and back.
  2. Secure epoxy countertops to cabinet assemblies with epoxy cement or construction adhesive, applied at each corner and along perimeter edges at not more than 48 inches (1200 mm) o.c.
  3. Secure epoxy countertops on mobile cabinets and movable tables with mechanical fasteners, using two or more fasteners at each cabinet front, end, and back.
  4. Where necessary to penetrate countertops with fasteners, countersink heads approximately 1/8 inch (3 mm) and plug hole flush with material equal to countertop in chemical resistance, hardness, and appearance.
- D. Provide required holes and cutouts for service fixtures.
- E. Seal unfinished edges and cutouts in plastic-laminate countertops with heavy coat of pigmented vinyl finish.
- F. Provide scribe moldings for closures at junctures of countertop, curb, and splash, with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent laboratory casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.
- G. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

#### 3.4 INSTALLATION OF SINKS

- A. Underside Installation of Epoxy Sinks: Use laboratory casework manufacturer's recommended adjustable support system for table- and cabinet-type installations. Set top edge of sink unit in sink and countertop manufacturers' recommended chemical-resistant sealing compound or adhesive and firmly secure to produce a tight and fully leak proof joint. Adjust sink and securely support to prevent movement. Remove excess sealant while still wet and finish joint for neat appearance.
- B. Semi flush Installation of Stainless-Steel Sinks: Before setting, apply sink and countertop manufacturers' recommended sealant under rim lip and along top. Remove excess sealant while still wet and finish joint for neat appearance.

- C. Drop-in Installation of Epoxy Sinks: Rout groove in countertop to receive sink rim if not prepared in shop. Set sink in adhesive and fill remainder of groove with sealant or adhesive. Use procedures and products recommended by sink and countertop manufacturers. Remove excess adhesive and sealant while still wet and finish joint for neat appearance.

### 3.5 INSTALLATION OF ACCESSORIES

- A. Install accessories according to Shop Drawings and manufacturer's written instructions.
- B. Securely fasten adjustable shelving supports, stainless-steel shelves, and pegboards to partition framing, wood blocking, or reinforcements in partitions.
- C. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight, closely fitted to other work where indicated.

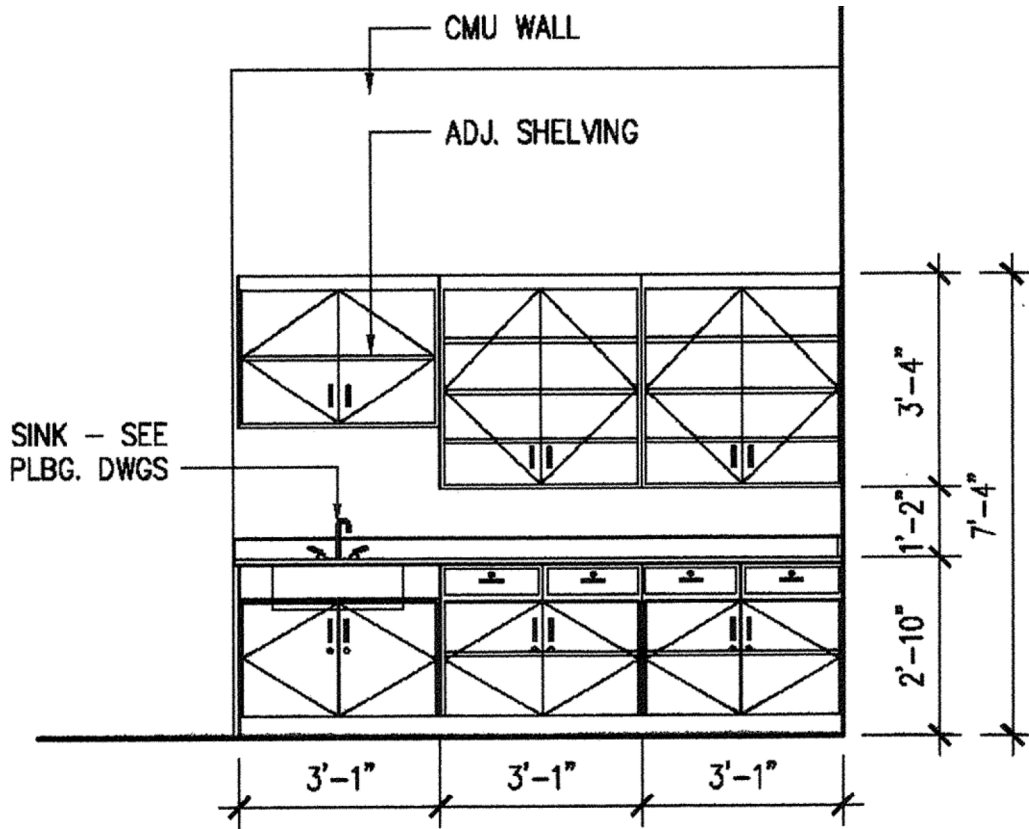
### 3.6 INSTALLATION OF SERVICE FIXTURES

- A. Ship fixtures assembled (except for nipples and lock-nuts, which are shipped loose), to be installed by other trades.

### 3.7 CLEANING AND PROTECTING

- A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.
- B. Protect countertop surfaces during construction with 6-mil (0.15mm) plastic or other suitable water-resistant covering. Tape to underside of countertop at minimum of 48 inches (1200 mm) o.c.

END OF SECTION



# 10 CABINET ELEVATION

1/4" = 1'-0"

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SECTION 40 42 13  
INSULATION AND HEAT TRACING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe insulation shall be provided as shown on the plans and as specified herein.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Catalog cuts and related data for all materials shall be submitted to the Engineer for review. Materials shall be delivered to the job site in their original unbroken factory packaging
1. Insulation for Exposed Piping shall consist of electrical heating tape covered with pipe insulation, unless otherwise specified or as shown on drawings.
  2. Heating Tape: UL approved, rated 115 volt and 7 watts per foot, and controlled by an ambient temperature thermostat.
  3. Pipe Insulation: Fiberglass or rigid urethane, 1-inch minimum thickness, with vapor barrier jacket unless otherwise specified or shown on drawings. Insulation for outdoor use shall have an additional weather-resistant finish.
- B. Insulation for Exposed Air Piping shall be rigid urethane or rigid phenolic designed for medium temperature service up to + 220 degrees F. Minimum thickness shall be 3/4 inch. Insulation shall be provided with vapor-barrier jacket. Insulation for outdoor use shall have an additional weather-resistant finish.

PART 3 - INSTALLATION

- 3.1 Heating tape and insulation shall not be installed until piping has been tested and accepted. Piping shall be clean and dry prior to installation. All materials shall be installed in strict accordance with the manufacturer's instructions. Insulation shall be applied to the pipe so that the longitudinal slit joint is tightly closed and adjoining sections of insulation are butted tightly together. Vapor-barrier jacket laps and butt joint strips shall be secured with staples, tape, adhesive or other suitable method. Fitting covers shall be job site fabricated or prefabricated; fitting cover thickness and finish shall be the same as pipe insulation.
- A. Insulation with Heating Tape: Heating tape shall be spiraled around the pipe a minimum of three turns per foot, without crossing or touching itself. After heating tape is installed, insulation shall be applied to all piping, including fittings and valves. Entire run shall be neatly done with only valve operators protruding from the insulation.

3.2 The following piping systems require heat tracing;

- A. Exposed piping and valves as indicated on plans at the following locations:
  - 1. Exposed water lines @ tanks and process equipment
  - 2. All exposed piping at tanks building, and process equipment
  - 3. All exposed Air Piping, insulation only
  
- B. The following temperatures shall be maintained:
  - 1. Water Piping 40° F min.
  - 2. Wastewater Piping 40° F min.
  
- C. Voltage requirements for all systems shall be 120 volts as shown on electrical drawings.

END OF SECTION

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### PRECAST CONCRETE STRUCTURES

1. ALL PRECAST CONCRETE SHALL CONFORM TO THE FOLLOWING PUBLICATIONS AND CODES/REFERENCES (LATEST EDITION):
  - A. ACI 308: REINFORCING BAR REQUIREMENTS FOR REINFORCED CONCRETE
  - B. ACI 318: SPECIFICATIONS FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS
  - C. ACI 309: SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS
  - D. ACI 308.5: CURING AND PROTECTION OF CONCRETE REINFORCEMENT
  - E. ACI DESIGN HANDBOOK - PRECAST AND PRESTRESSED CONCRETE
  - F. AWS D1.5: STRUCTURAL WELDING CODE - STEEL
  - G. AWS D1.6: STRUCTURAL WELDING CODE - REINFORCING STEEL
2. ALL PRECAST CONCRETE NOTED ON THE DRAWINGS SHALL BE OBSERVED AND DETAIL BY THE MATERIAL PROVIDER. FINAL SIZES, REINFORCING AND CONNECTIONS SHALL BE THE RESPONSIBILITY OF THE MATERIAL PROVIDER.
3. THE STRUCTURE SHALL BE DESIGNED FOR ALL LATERAL (WIND, SEISMIC, TEMPERATURE, HYDROSTATIC, ETC) AND GRAVITY (DEAD, LIVE, ETC) LOADS IN ACCORDANCE WITH THE PROVISIONS OF THE GOVERNING BUILDING CODE. ALL ANALYSIS SHALL BE PERFORMED USING GENERALLY ACCEPTED METHODS OF ENGINEERING ANALYSIS AND DESIGN. UNIQUE DESIGN METHODS ARE NOT ACCEPTED. THE CODE OFFICIAL HAS THE FINAL APPROVAL OF ALL UNIQUE DESIGN METHODS.
4. PRECAST SHALL BE DESIGNED FOR THE SUPERIMPOSED LIVE LOAD INDICATED IN THE DESIGN CRITERIA, 15 PSF FOR MEP ATTACHMENTS.
5. THE DESIGN AND DETAILING OF ALL PRECAST CONCRETE AND THEIR CONNECTIONS SHALL BE THE RESPONSIBILITY OF THE PRECAST FABRICATOR. THIS SHALL INCLUDE ALL JOISTS, PLATES, BRACKETS, REINFORCING, WELDED STEPS, AND ANY EMBEDDED ITEMS IN BOTH PRECAST AND STRUCTURAL FRAME FOR ALL CONNECTIONS BETWEEN THE PRECAST AND THE SUPPORT FRAME. ALL CONNECTIONS SHOWN ON THE DRAWINGS ARE CONCEPTUAL IN NATURE AND ARE FOR RECORD PURPOSES ONLY.
6. THE PRECAST FABRICATOR SHALL BE INFORMED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE STATE IN WHICH THE PROJECT IS LOCATED. THE DESIGN SHALL CONFORM TO THE GOVERNING BUILDING CODE, THE PRECAST MANUAL, AND JOIST L DESIGN CALCULATIONS. STAMPS BY THE REGISTERED ENGINEER, SHALL BE SUBMITTED FOR REVIEW BY THE ENGINEER OF RECORD. THE PRECAST FABRICATOR SHALL DESIGN A COMPLETE STRUCTURAL SYSTEM INCLUDING ALL GRAVITY AND LATERAL LOADS SHOWN ON THESE DRAWINGS AND REQUIRED BY THE GOVERNING BUILDING CODE. DESIGN SHALL INCLUDE ALL INTERCONNECTIONS BETWEEN PANELS, DOUBLE TIES, ROOF PLATES, DIAPHRAGM CHORDS AND COLLECTORS AND THE BASE OF ALL STEEL BEAMS WALLS.
7. DESIGN MODIFICATIONS MAY BE MADE ONLY AS NECESSARY TO MEET FIELD CONDITIONS AND TO ENSURE PROPER FITTING OF THE WORK, AND ONLY AS APPROPRIATE TO THE DESIGNER OF RECORD. MATERIALS GENERAL DESIGN CONCEPTS SHOWN WITHOUT NOTATIONS OR INCREASING SIZES OF MEMBERS OR ALTERING PROFILES AND ALIGNMENT SHOWN.
8. REFER TO ALL SPECIFIC DRAWINGS FOR LOCATION OF ALL OPENINGS, COLUMNS, AND POINT LOADS IN THE STRUCTURE. ALL OPENINGS, EITHER PLATE-CAST OR FIELD-CAST, MUST BE REVIEWED AND APPROVED BY THE PRECAST FABRICATORS ENGINEER. SUBMIT WALL ELEVATION SHOP DRAWINGS NOTING REQUIRED OPENINGS FOR REVIEW. RESPECTIVE TRADES SUBCONTRACTORS SHALL REVIEW AND APPROVE SHOP DRAWINGS PRIOR TO SUBMITTAL TO ENGINEER.
9. ROOF MEMBERS ARE ASSUMED TO ACT AS A DIAPHRAGM TO TRANSMIT ALL LATERAL FORCES TO THE VERTICAL LATERAL LOAD RESISTING SYSTEM.
10. THE ASSIGNED LATERAL LOAD RESISTING SYSTEM IS CONCRETE BEAM WALLS AND DEVIATION FROM THIS SYSTEM THAT RESULTS IN CHANGES TO THE FOUNDATIONS, CONNECTIONS OR OTHER STRUCTURAL MEMBERS NOT UNDER THE CONTROL OF THE PRECAST DESIGNER SHALL BE RESPONSIBLE BY THE DESIGNER OF RECORD AND ALL REVISIONS AND ASSOCIATED EXPENSES SHALL BE PAID FOR BY THE PRECAST MANUFACTURER.
11. ALL JOINTS SHALL BE NON-DRAINING.
12. JOINTS SHALL BE ASTM C825 TYPE 1 OR 2.
13. IF A JOINT SHALL BE ASTM C825 CLASS C OR F WITH A MAXIMUM AMOUNT OF 20 PERCENT OF CEMENTIOUS MATERIALS.
14. AGGREGATES SHALL COMPLY WITH ASTM C293 UNIFORMLY GRADED TO COMPLY WITH FINISH REQUIREMENTS.
15. AIR-ENTRAINING ADMIXTURES SHALL BE ASTM C491 TYPE 1 OR 1.5 (NON-FERROUS).
16. PRECAST CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS:

DOUBLE TIES	5,000 PSI, NOMINAL WEIGHT - NO AIR
WALLS	5,000 PSI, NOMINAL WEIGHT - NO AIR
17. ALL EXPOSED EDGES AND CORNERS OF PRECAST CONCRETE SHALL HAVE A 45 DEGREE BEVEL OR ONE INCH CHAMFERS UNLESS NOTED AND DETAILED OTHERWISE OR RADIUSDED EDGES IF DETAILED.
18. PRECAST PANELS AND COLUMNS ARE TO BE ATTACHED TO FOUNDATION USING NIB SPACE SLABS WITH THE TOLERANCES PRESCRIBED BY THE STEEL FABRICATOR MANUFACTURER.
19. ALL REINFORCING BARS SHALL BE ASTM A631 GRADE 60, DEFORMED, SUPPLEMENTED REINFORCEMENT FROM MILD. WITH BOLTS, CHAIRS, SPACERS OR OTHER DEVICE FOR SPACING ACCORDING TO PCA PLAN ETC.
20. INTERFERING STRANDS SHALL BE ASTM A414 GRADE 302 OR 201 UNCOATED, 7 WIRE OR ASTM A414 GRADE 370 UNCOATED, 7 WIRE, LOW RELAXATION STRANDS.
21. ALL WEDGE CONNECTIONS SHALL BE IN ACCORDANCE WITH LATEST AWS D1.5 SPECIFICATIONS. USING EPOXY ADHESIVES. ALL WEDGES SHALL BE PERFORMED BY A CERTIFIED WELDER.
22. EMBED PLATES SHALL COMPLY WITH ASTM A36 WITH WEDGED STUDS COMPLIING WITH ASTM A36.
23. DEFORMED BAR ANCHORS SHALL COMPLY WITH ASTM A63.
24. ALL REINFORCING STEEL, PLATES, ANCHORS, ACCESSORIES, CONNECTIONS MATERIAL, ETC. BETWEEN CAST-IN-PLACE CONCRETE AND PRECAST CONCRETE AND PRECAST TO PRECAST CONCRETE SHALL BE DESIGNED AND PROVIDED BY THE PRECAST CONCRETE MANUFACTURER.
25. POWDER ACTUATED FASTENERS IN STEPS MUST BE A MINIMUM OF 7 INCH FROM THE BOTTOM SURFACES AND LOCATED AT LEAST 18 INCH FROM THE EDGE WITH MAXIMUM SPACINGS OF 12 INCH. POWDER ACTUATED FASTENERS IN SLABS TO BE IN WEATHER EDGES OR EDGES WITH A MINIMUM.

### CONCRETE CONSTRUCTION JOINTS

1. CONTRACTOR SHALL PROVIDE NECESSARY CONSTRUCTION JOINTS IN UNREINFORCED CONCRETE SUCH THAT THE QUALITY OF JOINTS BEAT AND FINISH MEETS THE REQUIREMENTS OF PLANS AND SPECIFICATIONS. THE CONTRACTOR SHALL SUBMIT A PLAN SHOWING THE LOCATION OF ALL CONSTRUCTION JOINTS TO THE STRUCTURAL ENGINEER FOR APPROVAL.
2. THERE SHALL BE NO THROUGH CONSTRUCTION JOINTS IN CONCRETE FLOORS. ALL VERTICAL CONSTRUCTION JOINTS IN SLABS AND BEAMS SHALL BE MADE WITH BULKHEADS. ADDITIONAL REINFORCING AT CONSTRUCTION JOINTS SHALL BE AS SPECIFIED BY THE STRUCTURAL ENGINEER. SEE TYPICAL CONSTRUCTION JOINT DETAILS.

### ADHESIVE, ADHESIVE GROUT, AND MECHANICAL POST-INSTALLED ANCHORS

1. ANCHORS TO BE EMBEDDED INTO THE EXISTING ROOF SLAB SHALL BE FOR THE PRECAST STEEL TIEPS SHALL BE SET INTO HARDENED CONCRETE WITH ADHESIVE OR MECHANICAL POST-INSTALLED ANCHOR ONLY WHERE DETAILED ON THE DRAWINGS OR WHERE APPROVED BY THE ENGINEER.
2. MANUFACTURERS DATA FOR ALL ADHESIVE, ADHESIVE GROUT, AND MECHANICAL POST-INSTALLED ANCHOR SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION. SUBMITTALS FOR ADHESIVE AND PRODUCTS SHALL INCLUDE SCOPE REPORTS, STRICTLY FOLLOW THE MANUFACTURER'S SPECIFICATIONS AND INSTALLATION INSTRUCTIONS. ACCEPTABLE ADHESIVE PRODUCTS ARE:

FOR CONCRETE AND-OR-STEEL:	HILTI HIT 900 SAFE SET, HILTI HIT 900-50, SIMPSON STRONG-TIE SET-UP, SIMPSON STRONG-TIE AT-AP, REDWAD CS, POWERS AC 100+ OR APPROVED EQUAL.
FOR HOLLOW CELL ANCHORING:	SIMPSON STRONG-TIE SET, HILTI HIT 700, HILTI HIT 700-11, OR APPROVED EQUAL.
FOR CONCRETE AND-OR-STEEL:	HILTI KWIK BOLT 2, HILTI KWIK BOLT 3, HILTI KWIK BOLT 3, HILTI KWIK BOLT 3, HILTI KWIK BOLT 3, SIMPSON STRONG-BOLT, SIMPSON TITEN +D OR APPROVED EQUAL.
FOR HOLLOW CELL ANCHORING:	HILTI KWIK BOLT 3, SIMPSON TITEN HD, SIMPSON WEDGE-ALL, OR APPROVED EQUAL.
3. IN USING THE ABOVE PRODUCTS, FOLLOW STRICTLY THE MANUFACTURER'S SPECIFICATIONS AND DIRECTIONS FOR MIXING AND APPLICATION, KEEP ALL LAIN WASTING, VENTILATE ACCORDING WITH MANUFACTURER SAFETY DATA.
4. ALL HOLES SHALL BE DRILLED WITH A DIAMETER NO LARGER THAN 3/8" GREATER THAN THE DIAMETER OF THE STEEL MEMBER BEING INSTALLED.
5. ALL HOLES SHALL BE CLEANED WITH COMPRESSED AIR AND SHALL BE DRY PRIOR TO INSTALLATION OF ADHESIVE. HOLES SHALL BE FREE OF ALL DELIVERIOUS MATERIAL, SUCH AS LUBRICANTS, OIL, DIRT, AND OIL.
6. CONTRACTOR RESPONSIBLE FOR ADHESIVE WORK SHALL BE AN APPROVED CONTRACTOR BY THE MANUFACTURER FURNISHING THE ADHESIVE MATERIALS. HE SHALL HAVE NOT LESS THAN FIVE YEARS EXPERIENCE IN THE VARIOUS TYPES OF ADHESIVE RELATED WORK REQUIRED IN THIS PROJECT. A CERTIFICATION FROM THE MANUFACTURER ATTESTING TO THE TRAINING SHALL BE SUBMITTED TO THE ENGINEER/ARCHITECT ALONG WITH THE PROPOSAL AND THE BIDDING.

### REPRODUCTION

1. THE USE OF REPRODUCTIONS OF THESE CONTRACT DRAWINGS BY ANY CONTRACTOR, SUBCONTRACTOR, ENGINEER, ARCHITECT, OR MATERIAL SUPPLIER IN LIEU OF PREPARATION OF SHOP DRAWINGS SIGNIFICANT ACCEPTANCE OF ALL INFORMATION SHOWN HEREIN IS CORRECT, AND OBLIGATES HIMSELF TO ANY EXPENSE, REAL OR IMPLIED, ARISING DUE TO ANY ERRORS THAT MAY OCCUR HERE ON.

### GRANULAR BASE AND BACKFILL MATERIAL

1. GRANULAR BASE AND BACKFILL MATERIAL SHALL BE SAND, RAIN GRADE, OR SAND, OR PROCESSY STONE MEETING THE SPECIFICATION CRITERIA OF ASTM D 1557. ALL GRANULARS SHALL BE 100% OR SAND 100% OR SP, HAVING UNFINISHED SITE SHALL BE ASK 1/4" MIN. SIZE.
2. THE MATERIAL SHALL CONTAIN LESS THAN 15 PERCENT FINES PASSING THE NO. 200 SIEVE, AND SHALL HAVE A PARTICULUM PLASTICITY INDEX OF SIX.
3. GRANULAR MATERIAL FOUND ON THE SITE MAY BE USED FOR BACKFILL MATERIAL, SUBJECT TO THE APPROVAL OF THE GEOTECHNICAL ENGINEER.

### CONCRETE FORMWORK

1. THE DESIGN AND CONSTRUCTION OF ALL FORMWORK SHALL CONFORM TO THE LATEST EDITION OF ACI 308 CHAPTER 6 AND THE RECOMMENDED PRACTICE FOR CONCRETE FORMWORK ACI 308.1M.
2. CONCRETE FORMWORK SHALL BE DESIGNED AND STRUCTURES ARE OF SIZE, SHAPE, ALIGNMENT, ELEVATION, AND POSITION INDICATED WITHIN TOLERANCE LIMITS OF ACI 317.
3. FORMS FOR CONCRETE WORK SHALL BE FABRICATED FROM SMOOTH, UNPAINTED PLYWOOD, METAL OR MULTILAYER FIBERGLASS FORMS. FORMS SHALL BE OF ADEQUATE GAUGE OR THICKNESS TO SUPPORT THE WEIGHT OF WET CONCRETE AND PREPARED BACKS TO MINIMIZE DEFLECTION FOR THE REQUIRED PERFORMANCE OF THE FINISHED CONCRETE.
4. FORMWORK AND SUPPORTS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER IN THE FORMWORK DESIGN. ALL ELEVATED FORMWORK SHOP DRAWINGS SHALL BE REVIEWED AND APPROVED BY AN ENGINEER REGISTERED IN THE STATE OF THE PROJECT.
5. PARTING COMPOUND FOR FORMWORK SHALL BE WAX FREE, CHEMICALLY NEUTRAL AND NON-STAINING AND SHALL PREVENT FORMING TO CONCRETE. COMPACT SHALL BE EQUAL TO SHOP SUPPLY BY COLLINS-POPELCO, HOPKINS-POPELCO, AND SIMILAR SUPPLIERS (IF NOT PERMITTED).
6. FOR TIES FOR EXPOSED CONCRETE SHALL BE STAINLESS STEEL OR GALVANIZED. TYPED WITH ORIGINAL PULL CORP. SHAPED OR TYPED TIES SHALL NOT EXCEED ANY CLOSER THAN 1/4" FROM THE FINISH SURFACE OF THE CONCRETE.
7. INSTALL ALL PIPE CHAMBERS, CONDUITS, ELECTRICAL BOXES, CHUTES, SLOTS, SLEEVES, WATER STOPS, AND OTHER EMBEDDED PARTS AS REQUIRED.
8. EXPOSED CONCRETE SURFACES SHALL RECEIVE A SMOOTH FINISH SURFACE. ALL THE JOINTS, CORNER CONNECTIONS AND TROUGH AREAS TO BE FINISHED TO MATCH SUBSIDIARY SURFACES.
9. THE SIZES OF FOOTINGS MAY BE ENLARGED IF THE EXCAVATION CAN BE KEPT VERTICAL, CLEAN AND STABLE, OTHERWISE FORMS ARE REQUIRED.
10. ALL CORNERS AND EDGES SHALL BE CHAMFERED 1 INCH (ON THE SLICE) OR 3/4 INCH HORIZONTAL VERTICAL.
11. EXPOSED CONCRETE SURFACES SHALL BE FINISHED AS FOLLOWS:
  - A. AREAS NOT EXPOSED TO VIEW (SUCH AS IN CONTACT WITH EARTH OR COVERED WITH A FINISH) SHALL HAVE A FORMWORK SURFACE FINISH -2.0 AS SHOWN IN ACI 308.
  - B. REMOVE ALL Voids LARGER THAN 1 1/2" WIDE OR 1 1/2" DEEP.
  - C. REMOVE ALL PROJECTIONS LARGER THAN 1/2".
  - D. THE EDGES SHALL BE FINISHED.
12. AREAS EXPOSED TO VIEW (INCLUDING AREAS THAT WILL BE UNDER WATER INSIDE A TANK) SHALL HAVE A FORMWORK SURFACE FINISH -3.0 AS SHOWN IN ACI 308.
  - A. PATCH ALL HOLES.
  - B. REMOVE ALL PROJECTIONS LARGER THAN 1/2".
  - C. PATCH ALL THE HOLES.
  - D. SURFACE IRREGULARITIES SHALL MEET CLASS A AS DEFINED IN ACI 117.
  - E. FINISH IRREGULARITIES SHALL BE MEASURED WITHIN 1" OF THE IRREGULARITY AND SHALL NOT EXCEED 1/4".
  - F. CRACKS SURFACE IRREGULARITY SHALL BE MEASURED BY OBTAINING THE GAP BETWEEN CONCRETE SURFACES OF A 6" STRAIGHTEDGE AND SHALL NOT EXCEED 1/4".
  - G. FINISH FINISH SHALL BE COMPACTED WITH FINISH SAND OR FINISH SAND AS DEFINED IN ACI 308. ANY GROUP COMPRISED OF 3 PART CENTER AND 1.5 PART SAND WITH WATER TO A CONSISTENCY OF THICK PASTE. SOLID ABOUT INTO Voids AND REMOVE EXCESS GROUT.
13. PROVIDE A WOOD OR OTHER NON-POROUS SURFACE FOR FORMWORK AND LAYERS FOR EXPOSED AREAS. THIS WOOD OR FIBER SHALL BE THE STANDARD FOR ACCEPTANCE FOR THE PROJECT. IF COMPLETED CONCRETE DOES NOT MEET THE STANDARD, IT SHALL BE ACCEPTED UNTIL IT MEETS THE STANDARD.
14. ALL FORMWORK BUTT JOINTS SHALL ALSO IN BOTH HORIZONTAL AND VERTICAL DIRECTIONS.

### ISOLATION, CONTRACTION CONSTRUCTION AND EXPANSION JOINTS

1. PREPARED DOWEL FILLER SHALL BE 1/4" THICK ON ALL EXTERIOR WORK AND 1/2" THICK ON EXTERIOR WORK. JOINT FILLER SHALL CONFORM TO ASTM D2413 WITH A MINIMUM COMPRESSIVE STRENGTH OF 100 PSI. COMPRESS 50 PERCENT UNDER A 1,250 PSI OF PRESSURE AND BE EQUAL TO "SEALANT" FIBRE EXPANSION JOINT FILLER" BY W.L. HUDSON.
2. JOINT SEALANT FOR SLABS WHERE CALLED FOR ON THE DRAWINGS SHALL BE A TWO PART POLYURETHANE SEALANT CONFORMING TO FEDERAL SPEC T-305. THE FOR SEAL FILLING SEALANT BY TRENCO MANUFACTURES OR EQUAL.
3. JOINT SEALANT FOR WALLS WHERE CALLED FOR ON THE DRAWINGS SHALL BE SILICONE. HAND BY TRENCO OR EQUAL.
4. CONTRACTION JOINTS IN SLABS SHALL BE SAW CUT AT DETAILED USING A WET SAWING METHOD AS SOON AS THE CONCRETE WILL SUPPORT THE SAWING EQUIPMENT AND WILL NOT RAVELE DURING THE SAWING OPERATION. IN NO CASE SHALL THE SAWING BE LATER THAN 42 HOURS AFTER PLACING THE CONCRETE.



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STEWART

REGISTERED PROFESSIONAL ENGINEER  
MECHANICAL  
EXPIRES 02/12/2020

REVISION RECORD	
NO.	DATE

PROJECT NAME: KILLIAN CREEK WWTP PHASE 3 UPGRADE

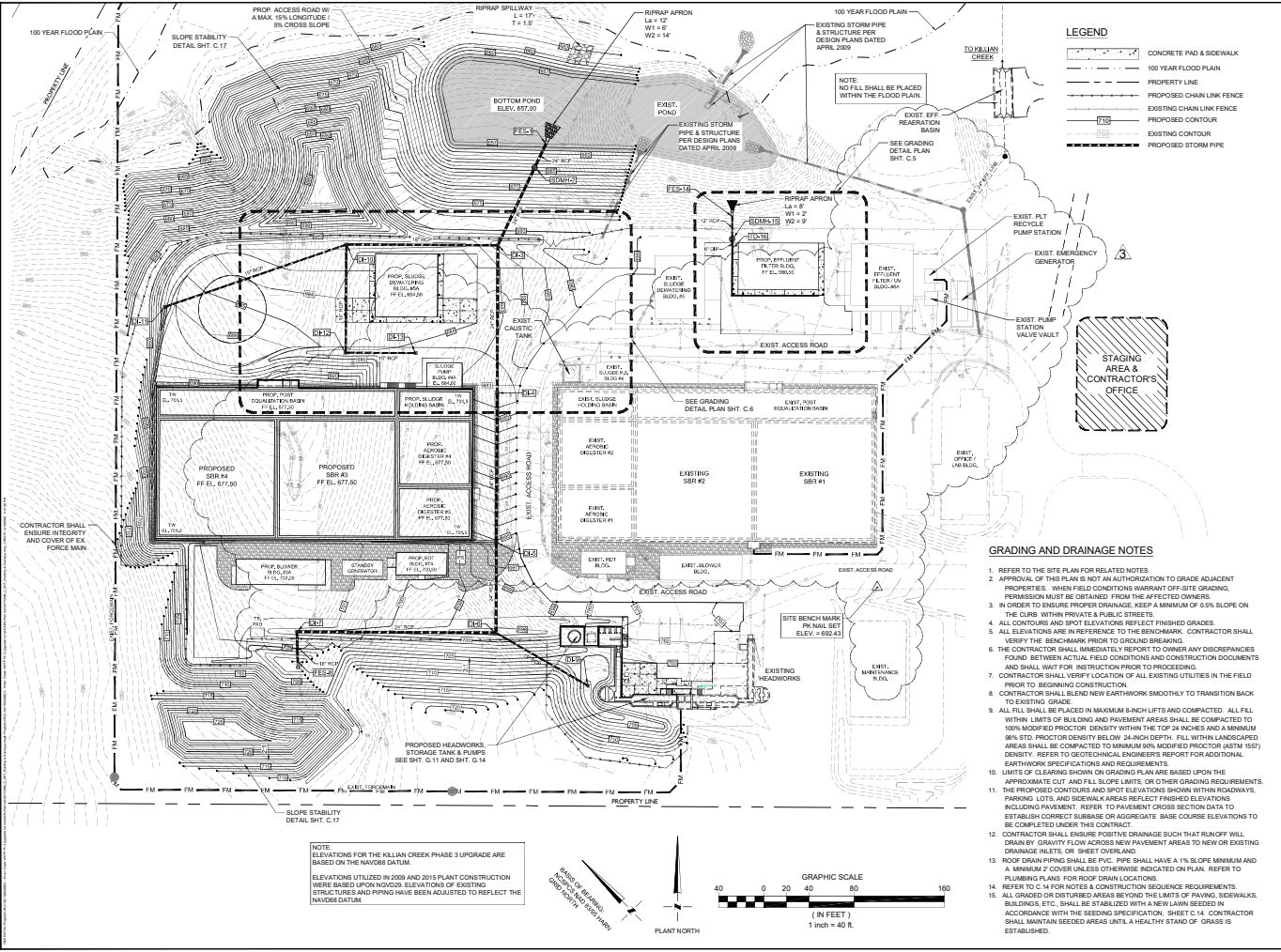
GENERAL NOTES

FINAL DESIGN - NOT RELEASED FOR CONSTRUCTION

PROJECT MGR.: MMG  
DESIGNER: DMM  
DRAWN BY: DMM  
PROJ. DATE: OCT. 09, 2018  
DRAWING NUMBER:

S.0.1  
WKD PROJ. NO.:  
20170294.00.CC





**LEGEND**

- CONCRETE PAD & SIDEWALK
- 100 YEAR FLOOD PLAN
- PROPERTY LINE
- PROPOSED CHAIN LINK FENCE
- EXISTING CHAIN LINK FENCE
- EXISTING CONTOUR
- PROPOSED STORM PIPE

- GRADING AND DRAINAGE NOTES**
- REFER TO THE SITE PLAN FOR RELATED NOTES.
  - APPROVAL OF THIS PLAN IS NOT AN AUTHORIZATION TO GRADE ADJACENT PROPERTIES. WHEN FIELD CONDITIONS WARRANT OFF-SITE GRADING, PERMISSION MUST BE OBTAINED FROM THE AFFECTED OWNERS.
  - IN ORDER TO ENSURE PROPER DRAINAGE, KEEP A MINIMUM OF 0.5% SLOPE ON THE CURB WITHIN PRIVATE & PUBLIC STREETS.
  - ALL CONTOURS AND SPOT ELEVATIONS REFLECT FINISHED GRADES.
  - ALL ELEVATIONS ARE IN REFERENCE TO THE BENCHMARK. CONTRACTOR SHALL VERIFY THE BENCHMARK PRIOR TO GROUND BREAKING.
  - THE CONTRACTOR SHALL IMMEDIATELY REPORT TO OWNER ANY DISCREPANCIES FOUND BETWEEN ACTUAL FIELD CONDITIONS AND CONSTRUCTION DOCUMENTS AND SHALL WAIT FOR INSTRUCTION PRIOR TO PROCEEDING.
  - CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES IN THE FIELD PRIOR TO BEGINNING CONSTRUCTION.
  - CONTRACTOR SHALL BLEND NEW EARTHWORK SMOOTHLY TO TRANSITION BACK TO EXISTING GRADE.
  - ALL FILL SHALL BE PLACED IN MAXIMUM 8-INCH LIFTS AND COMPACTED. ALL FILL WITHIN LIMITS OF BUILDING AND PAVEMENT AREAS SHALL BE COMPACTED TO 100% MODIFIED PROCTOR DENSITY WITHIN THE TOP 24 INCHES AND A MINIMUM 90% PROCTOR DENSITY BELOW 24-INCH DEPTH. FILL WITHIN LANDSCAPED AREAS SHALL BE COMPACTED TO MINIMUM 90% MODIFIED PROCTOR (ASTM 1557) DENSITY. REFER TO GEOTECHNICAL ENGINEERS REPORT FOR ADDITIONAL EARTHWORK SPECIFICATIONS AND REQUIREMENTS.
  - LIMITS OF CLEARING SHOWN ON GRADING PLAN ARE BASED UPON THE APPROXIMATE CUT AND FILL SLOPE LIMITS, OR OTHER GRADING REQUIREMENTS.
  - THE PROPOSED CONTOURS AND SPOT ELEVATIONS SHOWN WITHIN ROADWAYS, PARKING LOTS, AND SIDEWALK AREAS REFLECT FINISHED ELEVATIONS INCLUDING PAVEMENT. REFER TO PAVEMENT CROSS SECTION DATA TO ESTABLISH CORRECT SUBBASE OR AGGREGATE BASE COURSE ELEVATIONS TO BE COMPLETED UNDER THIS CONTRACT.
  - CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE SUCH THAT RUNOFF WILL DRAIN BY GRAVITY FLOW ACROSS NEW PAVEMENT AREAS TO NEW OR EXISTING DRAINAGE INLETS, OR SHEET OVERLAND.
  - ROOF DRAIN PIPING SHALL BE PVC. PIPE SHALL HAVE A 1% SLOPE MINIMUM AND A MINIMUM 2" COVER UNLESS OTHERWISE INDICATED ON PLAN. REFER TO PLUMBING PLANS FOR ROOF DRAIN LOCATIONS.
  - REFER TO C-14 FOR NOTES & CONSTRUCTION SEQUENCE REQUIREMENTS.
  - ALL GRADED OR DISTURBED AREAS BEYOND THE LIMITS OF PAVING, SIDEWALKS, BUILDINGS, ETC., SHALL BE STABILIZED WITH A NEW LAWN SEEDING IN ACCORDANCE WITH THE SEEDING SPECIFICATION, SHEET C-14. CONTRACTOR SHALL MAINTAIN SEEDED AREAS UNTIL A HEALTHY STAND OF GRASS IS ESTABLISHED.

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This document is original, sealed and sealed by Charles S. Dickson, PE, P.E. No. 3802, State of North Carolina. This means that the seal number is correct and certified.

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**PROJECT NAME:** KILLIAN CREEK WWTP PHASE 3 UPGRADE  
**DRAWING TITLE:** SITE GRADING & DRAINAGE PLAN

**SCALE:** C.4 OF 168  
**W/PD PROJ. NO.:** 20170294.00.CL

FINAL DRAWINGS - FOR REVIEW PURPOSES ONLY - NOT RELEASED FOR CONSTRUCTION