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## Pre-Design Report

WSU Food Quality Building Creamery TI  
Equipment Upgrade - WSU File#: 815-G-018

Date: 2024.12.10

Prepared For:



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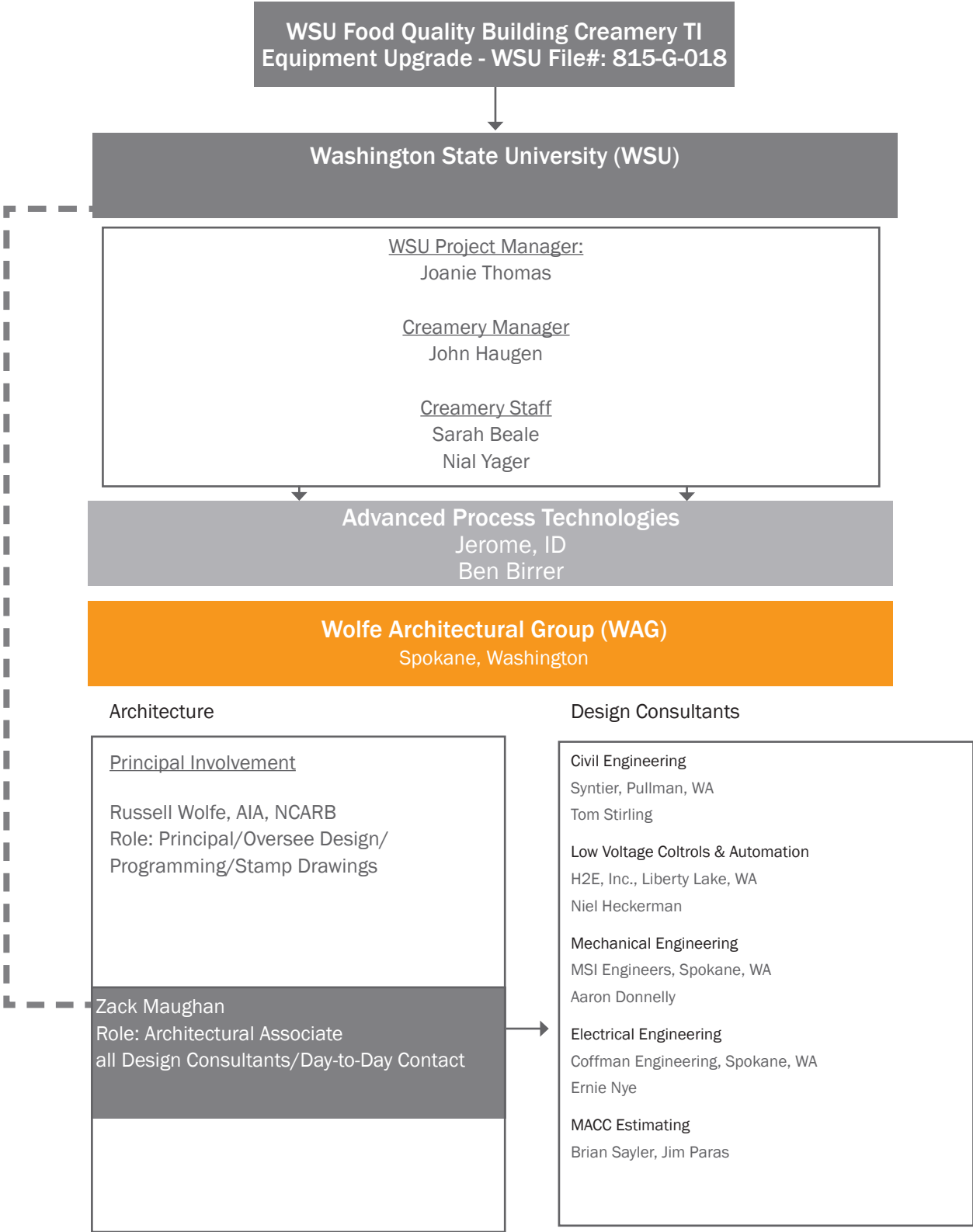
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WAG Drawings ..... See Attached

*Modernization and equipment upgrades to the existing creamery facility to enhance both creamery production and the student experience. Additional benefits include separation of “raw” milk and chemical treatment of waste prior to release into City of Pullman services.*

Project Team Structure





architecture planning & interiors

wagarch.com

Wolfe Architectural Group  
1015 North Calispel, Suite B  
Spokane, WA 99201  
t 509 455 6999

November 24<sup>th</sup>, 2024

Joanie Thomas, Assoc. DBIA, AUID  
Project Manager / Capital  
Facility Services - Washington State University  
2425 East Grimes Way  
Pullman, WA 99164-1150

**RE: Phase I – Pre Design Final Project Cost Summary - Food Quality Building:  
Creamery Interior Expansion and Equipment Upgrades  
WSU File Number: 815-G-018**

Mrs. Thomas,

Wolfe Architectural Group appreciates the opportunity to provide you this total project cost summary for the above referenced project. As you are aware, over the past nine months, there has been a robust Pre-Design Phase I discovery process between Creamery Operations and Ben Birrer with APT Inc. regarding the equipment needs to support Creamery Operations moving forward. During this time, WAG has been facilitating bi-monthly collaboration meetings and providing schematic design drawings to assist with final scoping and anticipated Project Cost.

Due to the proposed equipment upgrades, it is understood that other critical systems in the Creamery will also need to be upgraded. The current CIP system must be fully replaced and modernized to accommodate the added circuits and equipment. Additionally, the existing automation controls will require extensive modifications throughout the Creamery, including the Raw Milk, Whey Storage, and Receiving Bay.

In addition to the extensive modifications to the Creamery equipment, CIP, and controls, the University is taking this opportunity to address an ongoing issue with its caustic sewer discharge to the City of Pullman Sewer. Internal plumbing modifications are anticipated to capture the caustic waste and direct it to an external septic tank, which will pump the waste to a neutralization vessel on the east side of the facility. A pH monitor and citric acid dosing will pre-treat the solution to a level suitable for free discharge into the City's system.

The basis for the construction cost presented in this narrative has assumed that the University will be contracting directly with APT for their respective scope of work and selecting a General Contractor through a GCCM delivery due to the limited construction execution time frame, complexity of the equipment installation, and prepurchase requirements of long lead time items. We would anticipate that the pre orders for dairy/creamery equipment will occur six to eight months prior to the anticipated construction start date of May 1<sup>st</sup> 2026.

**Summary of Projected Project Costs**

**Item #1: Equipment and Construction**

Creamery Equipment Cost APT (10/16/2024)	\$6,286,000.00
Base Construction Cost	\$2,099,178.00
Alternate #1: New Quarry Tile/Grout Throughout Creamery	\$ 211,586.00
<u>Alternate #2: Update Lighting Throughout Creamery</u>	<u>\$ 81,313.00</u>
Sub Total w/o WSST	\$ 8,678,077.00

**Item #2: Soft Cost**

Phase I: Pre-Design Cost (WAG and Co complete 11/24/2024)	\$ 76,000.00
Final Equipment Design APT	\$ 114,000.00
Final WAG and Co Design Cost (DD through CA)	\$ 380,000.00
Design Contingency	\$ 38,000.00
<u>Sales Tax, Permits, Special Inspect, Etc. (15% of \$8,678,077.00)</u>	<u>\$1,301,711.55</u>
Sub Total	\$1,909,711.55

**Total Project Cost \$10,587,788.55**

*Note: this projected total project budget does not include any burden by the University to manage this project.*

Again, we thank you for this opportunity to assist on this challenging and complex project. Should you have any questions regarding this information please do not hesitate to call.

Respectfully submitted,



Russell J. Wolfe, AIA  
Principal

Attachment: Phase I Pre-design Schematics Architectural dated 11/24/2024  
MACC Construction Estimate, APT Proposal  
Consultant Pre-design Narratives



*“Our goal is to provide conceptual designs, engineered solutions, superior manufacturing, and complete installation for our customers in the food and dairy industries. APT will always strive to be the best at what we do. Our experienced team starts each project with our proven technology and completes each project earning our customer’s trust with continued support and service after project completion. We stand behind our tradition of: **Complete Systems. Complete Satisfaction.**” – President, Craig Campbell*

Quote #: 18850  
Re: WSU Pre-Engineering  
Date: 4/9/24

Customer: Wolfe Architectural Group  
Address: 1015 N Calispel Street Suite B  
City/State/Zip: Spokane, WA 99201

Attn: Russ Wolfe



Quote #: 18850  
Re: WSU Pre-Engineering  
Attn: Russ Wolfe  
Customer: WAG  
Address: Spokane, WA  
Date: 4/9/24

**We, Advanced Process Technologies, Inc. propose to quote the following for your consideration:**

**PROCESS ENGINEERING AND DESIGN**

- Process Flow Diagram
- Preliminary P&IDs including valving, instrumentation, flowverters, tanks, heat exchangers, etc.
- Preliminary 2D equipment layouts for major equipment
- Preliminary utility matrix for steam, water, glycol, MCC HP, and drains.
- (3) Coordination meetings (Teams, Zoom, etc.)
- (2) Site visits for site inspection and review with customer
- Project execution budget (final engineering, project management, installation, fittings, valves, pumps, etc.)

**CONTROLS AND AUTOMATION**

APT Automation is providing this pre-engineering proposal to evaluate current and future systems to supply a set of interconnect electrical drawings for quoting purposes only.

**This Automation package will include the following:**

- **Electrical Engineering & Documentation**
  - Pre-engineered electrical interconnects for the complete system for quoting purposes.

**AUTOMATION ONSITE EVALUATION TRIPS**

APT will provide an Automation Engineer as required for onsite analysis of the facility. On site time is estimated as follows:

**Anticipated Site Visits:**

- **Trip 1:**
  - (1) Engineer 2 Days Onsite:
- **Trip 2:**
  - (1) Engineer 2 Days Onsite:

**NET PRICE FOR THE ABOVE ..... \$113,165.00**



Quote #: 18850  
Re: WSU Pre-Engineering  
Attn: Russ Wolfe  
Customer: WAG  
Address: Spokane, WA  
Date: 4/9/24

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**NOTES:**

The above price is based on drawings as drawn. Any changes due to federal, state, or local governments may result in price changes.

Unless otherwise specified in writing, all written quotations expire sixty (60) days after the date thereof provided.

**TERMS:**

50% Down Payment  
50% after documentation delivery

The above price **does not** include:

- A. Any and All Taxes.
- B. 3D Equipment Drawings

It has been our pleasure to provide the above quote.  
If you have any questions, please do not hesitate to call.

Sincerely,

Ben Birrer  
Process Engineer  
Advanced Process Technologies, Inc.  
150 Swendra Blvd  
PO Box 939  
Cokato, MN 55321  
320-286-5060 ph.  
320-286-3055 fax

Enclosures:

- APT Terms and Conditions



Quote #: 18850  
Re: WSU Pre-Engineering  
Attn: Russ Wolfe  
Customer: WAG  
Address: Spokane, WA  
Date: 4/9/24

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## General Terms and Conditions of Sale

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The Following Terms and Conditions are a Part of this Quotation and/or any resulting purchase order for the sale of APT Equipment and/or Service:

1. **ACCEPTANCE** – The terms and conditions hereof must apply to and govern any contract between the parties: in case of any inconsistency between said terms and conditions and purchasers order, the terms and condition hereof shall prevail, and Purchaser is notified of Advanced Process Technologies, Inc (herein referred to as APT) objection to any such inconsistent terms or additional terms. This agreement between APT and the Purchaser is not binding unless accepted by APT in writing and shall be governed by and constructed in accordance with the laws of the State of Minnesota.
2. **CHANGES** – Any changes affecting equipment function, specification, destination, or otherwise affecting the scope of the work are not binding upon APT unless made in writing and accepted by APT at its office. These changes are subject to mutual agreement in writing and to price and/or schedule adjustment based on prevailing prices plus any costs incurred or to be incurred by APT as a result of these changes.
3. **CANCELLATION** – In the event of any cancellation of the order by either party, Purchaser shall pay to APT the costs and expenses (including engineering expenses and all commitments to its suppliers and sub-contractors) incurred by APT prior to receipt of notice of such cancellation from purchaser plus APT's usual rate of profit for the same similar work.
4. **DELIVERY** – Dates are approximate only. APT shall attempt to make shipment within time specified after the receipt of full data from Purchaser, including approved certified prints. Partial shipment may be made and invoiced upon completion of manufacture. In no event shall APT be liable for consequential damages, liquidated damages and/or penalties resulting from its delay or failure to deliver.
5. **EXCUSABLE DELAY** – APT shall not be liable for delays in delivery or in other performance due to causes beyond its reasonable control, including but without limiting the generality of the forgoing: acts of God: acts of civil or military authority, government priorities: fires, strikes or other labor disturbances: floods: war: riot: shortages of energy: delays in transportation: supplier, subcontractor, or Purchaser – caused delays. In the event of any such delay, the date of delivery or performance shall be extended for a period equal to the time lost by reason of the delay. As used herein, "performance" shall include fabrication, assembly, shipment, delivery, installation, testing and warranty repair or replacement as applicable.
6. **ERRORS** – APT reserves the right to correct stenographic or clerical errors that may be present in pricing or specifications in this quotation and/or order.
7. **INSTALLATION, COMMISSIONING, START-UP** – Purchaser shall be responsible for receiving (including removal from carrier at jobsite), storing, installing, commissioning, Start-up and maintaining the equipment. APT will, upon request, provide a quotation for services to assist Purchaser in these functions.
8. **PRICES** – Unless otherwise specified in writing, all written quotations expire sixty (60) days after date thereof provided APT is allowed to manufacture to normal production schedules and ship immediately upon completion. Quotations may be terminated earlier by notice and constitute only solicitations for offers to purchase. All prices are F.O.B. shipping point unless otherwise indicated.
9. **TERMS OF PAYMENT** – Terms are Net 30 except as otherwise applicable under the terms contained in established schedules. Cash advances received with order shall be credited to Purchaser upon acceptance by APT. If Purchaser's order is not accepted, APT shall promptly refund the cash advance. No order will be accepted, or production begins, until receipt of cash advance.
10. Payments not received within the time period specified are subject to service charge and carrying charge of one and one-half (1-1/2) percent per month on the outstanding balance, plus actual collection/attorneys' fees.
11. **RESCHEDULES** – If Purchaser requests deferment beyond the scheduled shipping date, APT reserves the right to adjust prices as they prevail at the time of the specified shipping date. APT further reserves the right to assess additional handling and storage charges resulting from such delays in shipment.

12. **SHIPMENT-PASSAGE OF TITLE** – Transportation expenses shall be paid by the purchaser, unless otherwise indicated. Delivery to carrier constitutes passage of title to Purchaser irrespective of arrangements for transportation or insurance charges. Risk of loss shall pass to purchaser concurrently with passage of title.
13. **TAXES** – APT’s prices do not include customs duties or sales, use, excise, retailer’s occupation and/or other similar taxes payable by reason of this transaction and Purchaser shall be responsible for the payment of such duties and taxes, which shall be assessed by APT unless Purchaser provides APT with a Tax Exemption Certificate acceptable to the Taxing Authorities. Purchaser shall reimburse APT for any such duties and taxes, including interest and penalties thereon, as may be paid by APT and shall also reimburse APT for any expenses connected therewith.
14. **WARRANTY** – APT warrants new equipment manufactured by us to be free from defects in material and workmanship under normal use and service for a period of one (1) year after shipment from factory. For breach of warranty of any kind, the measure of damages to be recoverable, from APT shall be limited to repair or replacement of the part or equipment which examination discloses to the satisfaction of APT to be defective, or the payment of the price of making such a repair or replacement, at the option of the APT. This warranty is expressly in lieu of all other warranties, expressed or implied, and all other obligations and liabilities on our part. Any warranty of merchantability is expressly excluded. We neither assume nor authorize any other persons to assume for us any liability in connection with the sale of our products and no other warranty will be honored unless in writing and signed by an officer of the corporation.
15. This warranty shall not apply to any product of our manufacture which has been repaired or altered outside our factory, or which in our opinion, has been subject to misuse, negligence, or accident. APT will not assume any charges for repairs made during warranty by anyone other than APT. Also, APT assumes no liability or responsibility for transportation, to and from repair point, nor any loss of time due to repair. This warranty does not cover components or other manufacturers beyond such warranty as is made by such manufacturer.
16. Any such action for breach of warranty shall be commenced within one (1) year of said breach or be forever barred.
17. All information including design details and dimensions contained herein are confidential and proprietary and must not be reproduced, disclosed to others, or used in the production of parts, unless authorized in writing by APT.
18. **LIMITATION OF LIABILITY** – APT’s liability on any claim based upon contract, warranty (except warranty of title), tort (including negligence), strict liability or otherwise for any loss or damage arising out of, connected with, or resulting from this contract, or from the performance or breach thereof, or from the design, manufacture, sale delivery, resale, installation, technical direction of installation, inspection, repair, operation or use of any equipment covered by or furnished under this contract shall in no case (except as provided in the paragraph entitled “Patents”) exceed the contract price and shall terminate one year after shipment of equipment. Purchaser shall institute any suit or claim within one (1) year of accrual of any cause of action or shall be barred there from. In no event shall APT be liable for incidental or consequential damages.
19. **INDEMNITY AND INSURANCE** – APT maintains blanket insurance policies covering Workman’s Compensation, general public liability, automobile liability and property damage to cover work on purchaser’s premises and will make available to purchaser at purchaser’s request such certificates of insurance coverage from sureties of APT’s choice. Purchaser agrees to indemnify and save APT harmless for all loss, cost or damage incurred by APT as a result of Purchaser’s negligence or misapplication of APT supplied products.
20. **LAWS AND REGULATIONS** – APT complies with all applicable executive orders and federal and state laws and regulations including, but not limited to, the Fair Labor Standards Act of 1933 (Federal Wage and Hour Law), the Equal opportunity Clauses per Executive Order No, 11246 and Occupational Safety and Health Act of 1970.
21. **COMPLETE AGREEMENT** – These terms and conditions together with the APT proposal shall constitute the complete and final agreement and understanding between Purchaser and APT, and shall not be modified in any way unless agreed in writing by a duly authorized representative of the purchaser and APT.



*“Our goal is to provide conceptual designs, engineered solutions, superior manufacturing, and complete installation for our customers in the food and dairy industries. APT will always strive to be the best at what we do. Our experienced team starts each project with our proven technology and completes each project earning our customer’s trust with continued support and service after project completion. We stand behind our tradition of: **Complete Systems. Complete Satisfaction.**” – President, Craig Campbell*

Quote #: 14209-3  
Re: Plant Expansion  
Date: 10/16/24

Customer: Washington State University Creamery  
Address: 2035 Ferdinand’s Lane  
City/State/Zip: Pullman, WA 99164

Attn: John Haugen

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**We, Advanced Process Technologies, Inc. propose to quote the following for your consideration:**

### **MISSION STATEMENT/OVERVIEW**

Expand the Washington State University creamery capacity to produce cheese by two fold. This will be accomplished by installing the new equipment below:

- 1,500 gallon raw milk storage tank
- Milk pasteurizer including a milk separator and milk bacterial removal separator
- 250 gallon sweet cream storage tank
- Starter culture injection equipment
- ACV30K Junior Advanced Cheese Vat
- Advancing Dosing System
- Finishing table and fines saver
- Whey storage silo
- Relocating of the ice cream tanks
- CIP system comprised of both raw and pasteurized circuits
- Waste water and neutralization system (by others)
- Modernized Automation and Controls system (FactoryTalk and ControlLogix)

### **RAW MILK STORAGE**

APT will provide and install a 1,500 gallon processor for the purpose of storing extra milk. This tank will be a cone bottom vessel with jacketed cooling such that all of the product can remain cold. APT will tie the product fill, product discharge, CIP supply, and CIP return into the existing lines serving the other milk silos.

### **CHEESE MILK HTST**

APT will install a cheesemilk HTST designed for 30,000 LBS/HR of raw milk. Raw milk will be pumped into a 250 Gallon Balance Tank. Raw milk will then be pumped into a 3 section plate and frame heat exchanger: a regenerator, a heater, and a reheater. A separator will be placed after the raw side of the regenerator such that the milk can be preheated to appropriate temperatures. This temperature will be controlled by bypassing milk around the pasteurized side of the regenerator. APT will also install a milk clarifier inline with the milk separator/HTST. Estimated reduction is Aerobic Spores of ~90% and Bacteria Removal between 70-90%. Regeneration will, however, leave the pasteurized milk too cool for feeding the cheese vat and will therefore need to be reheated. The HTST will be isolated from the rest of the plant via flowverters.

Chemicals will be manually added into the balance tanks for CIP.

**ANTICIPATED PLATE AND FRAME HEAT EXCHANGER DUTY:**

**Section 1: Regenerator**

Raw Milk	@ 30,000 LBS/HR	40° → 130°	ΔP = 12 PSI
Past. Milk	@ 30,000 LBS/HR	165° → 67°	ΔP = 12 PSI

**Section 2: Heater**

Raw Milk	@ 30,000 LBS/HR	130° → 165°	ΔP = 10 PSI
Hot Water	@ 135 GPM	168° → 152°	ΔP = 6 PSI

**Section 3: Reheater**

Past. Milk	@ 30,000 LBS/HR	67° → 90°*	ΔP = 16 PSI
Hot Water	@ 120 GPM	93° → 82°	ΔP = 19 PSI

\*: Temperature capable of reaching up to 94 degrees depending on cheesemake recipe.

**SWEET CREAM STORAGE**

Leftover sweet cream from the cheesemilk HTST/separator will be cooled and transferred into a small 250 gallon processor. This processor will be able to pump back into the cheesemilk HTST balance tank or into the ice cream vessels.

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**ADVANCED CHEESE VAT (ACV)**



The ACV is one of the most dependable cheese vats in the market today. We take pride in having the most innovative cheese vat with the utmost economical and mechanical advantages. With a single shaft agitator, the ACV has three blade panels that are counter balanced to help protect against pre-mature wear of the seal and gear box. The agitator shaft design is exclusive to the ACV and is patented under US Patent **#7,757,603**. In the counter clock-wise direction, the agitator blades are in the stir mode. In the clock-wise direction, the agitator blades are in the cut mode. The heavy duty blade assembly is design to withstand the operational challenges of all cheese make varieties.

The cook jacket on the ACV is design to use steam or hot water with no modifications to the jacket. The heating zones are positioned to get the most efficient heating of the product during the cook steps.

The milk inlet is located in the front of the vat. The milk enters in the top of the ACV and follows the curvature of the front to minimize foam. The ACV is sloped at ½” per foot towards the rear of the vat where the discharge outlet is in the back center for curds and whey discharge.

The ACV also has a back agitator shaft seal assembly. As part of the seal assembly design, the ACV has a Fluid Accessible CIP Chamber and is patented under US Patent **#7,780,340**. The shaft seal material is made of rubber compounds and was the first to receive 3A approval. The ACV has the only adjustable seal and is patented under US

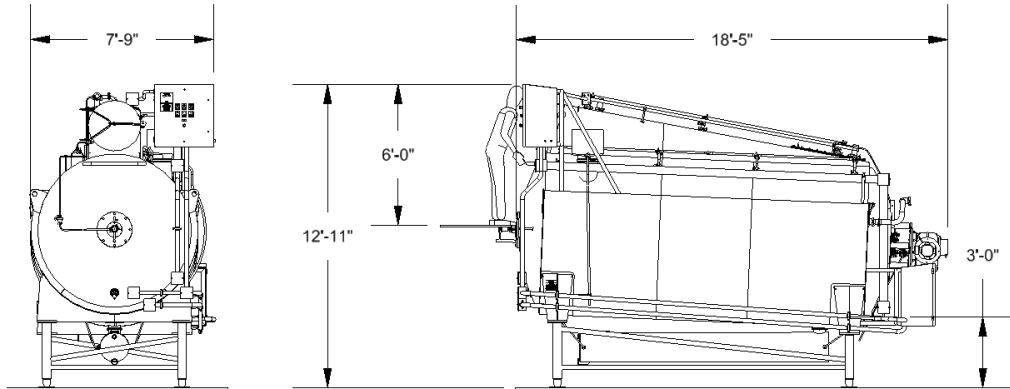
Patent **#8,109,208**. The adjustable seal promotes the longevity of the seal by several years.

The ACV is made of T304 Stainless Steel and is designed to meet all USDA guidelines and is listed under the USDA approved equipment list.

**SPECIFICATIONS FOR THE ACV-30K JUNIOR**

<b>Nominal Milk Capacity:</b>	30,000 pounds
<b>Milk Inlet:</b>	Sized to customer specs.
<b>Rennet/Calcium Injection:</b>	Four Inject Tubes on pipe manifold
<b>Predraw Outlet:</b>	4” Tri-Clamp connection
<b>Curds/Whey Discharge Outlet:</b>	4” Tri-Clamp connection
<b>Agitator:</b>	Standard heavy duty stir/cut agitator
<b>Agitator Drive:</b>	7.5 HP Eurodrive, 230/460 VAC 60 Hz severe duty, wash down
<b>Heating Zone:</b>	Lower two-thirds of cylindrical wall area with 2 sparge pipes
<b>Heating Media:</b>	Designed for steam or hot water
<b>Insulation Jacket:</b>	Three inches fiberglass to protect operator from accidental contact heat surface
<b>Temperature Sensor Well:</b>	Designed for surface mounted RTD
<b>Viewing Lights:</b>	Two with LED light source

**OVERALL DIMENSIONS FOR THE ACV-30K JUNIOR**



**Cleaning:**

**3** – Spray balls and agitator seal lines. Total flow rate of 135 GPM.

**Legs:**

**4** - Adjustable ball feet on pipe legs shipped loose for site installation

**Spare Parts included:**

- Gear motor removal assembly w/hoist for pulling drive and associated tools w/tool box.
- Gear motor Euro-drive 7.5 HP
- Drive end seal package includes face seal, shaft seal, and O-rings.
- Idler end bearing and seal package includes bearing and O-rings.

**ADVANCED DOSING SYSTEM (ADS)**



APT will provide an ingredient metering system for the addition of Rennet, Calcium, and Color called the Advanced Dosing System (ADS). Bulk ingredient is pumped into individual stainless steel day tanks. The Calcium day tank is Teflon coated to resist corrosion. When the system registers a need for a certain ingredient, the appropriate valves open, and the ingredient gravity feeds through a meter and into a water mix tank. Color will be metered into an injection pot rather than the mix tank to prevent staining. Immediately after the total amount of ingredient is in the water mix tank, additional water enters the tank to mix the ingredient. Once the water shuts off, the ACV ingredient-inject valves open, and the mix tank pump starts. After the tank is empty, the pump shuts off, water turns on for a set volume and the pump starts again making sure the ingredient completely enters the correct vat. The pump shuts off and the ACV valves close and the ingredient inject is complete. This system is designed to wash with the Predraw/Curd Line.

## **ACV PROCESS INSTALLATION**



APT will provide all process piping and valving for the ACV including milk fill, curd transfer line, process water flush line, and CIP lines. The vat will be tied into each line with manual swings and/or flowverters.

The milk fill line will be capable of sending product transitions to drain as well as product to the ACV.

APT will have a hot water cook system for the ACV.

The ACV will be equipped with predraw valves; the predraw valves will feed a positive displacement pump that is also used for curd transfer. Whey will be pumped to the table.

Curd will drain from the outlet port on the ACV into the previously mentioned positive displacement pump. The curd outlet will be equipped with a water flush line to evacuate the line of product.

The vat system will CIP as one circuit.

## **OPEN FINISHING TABLE**

APT will install the curd line to the table as well as sweet whey line away from the table. APT will also supply controls and automation for the finishing table. The ACV recipe program will be sent to the tables for each type of cheese. Programming of the finishing tables includes automation for time, agitator RPM, traverse speed, whey discharge, and cheese unload.

**Note:** The table is NOT CIPable, therefore no CIP has been included and the table will be cleaned manually.

### **FINES SAVER**

APT will install a fines saver belt. This belt will take whey off the cheese table and strain in through a moving belt/screen. Cheese fines will then be removed from the belt with a scraper bar and dropped into chute. This chute will drop fines into a bucket. This bucket may then be manually hand dumped back onto the cheese table for yield recovery or disposed of. The fines saver will wash with the whey line.

### **WHEY STORAGE SILO**

APT will provide a silo for the purposes of whey storage. Setting of the silo by others. The silo will be equipped with an 8 port flowverter to serve CIP supply, CIP return, product fill, and product discharge. APT will tie into the existing whey line for the purposes of a loadout line. The silo will be equipped with a pump capable of both product and CIP return duties.

### **CIP SYSTEM**

APT will install a CIP system for use on the raw and pasteurized sides of the plant. This system will be comprised of (5) 800 Gallon tanks; a rinse tank, a raw caustic tank, a raw acid tank, a pasteurized caustic tank, and a pasteurized acid tank. The system will be controlled on conductivity, flow, and temperature to increase safety and efficiency and reduce waste. The system will be designed to use city water. APT will pipe the discharge to a hub drain such that the waste can be transferred to the new sump.

Each CIP tank will be equipped with a ladder for access to the manway.

**Note:** Chemical addition by customer.

APT CIP Tank Functions:

- Individual Tank Wash (For all Tanks)
- All Tanks Wash (All tanks at the same time)
- Tank Pre-heat (Recirculate tank through shell and tube)
- Tank Chemical Charge (Recirculate tank while adding chemical)
- Tank Drain (Pump entire tank to drain)
- Tank Decant (Drain set % of tank)

APT will provide the following:

- 1,500 Gallon Raw Milk Storage Processor

- Cone Bottom with Agitator
- Jacketed for Cooling
- Cheesemilk HTST Pasteurizer
  - (1) AGC Plate and Frame Heat Exchanger
  - (1) 250 Gallon Balance Tank
  - (1) GEA MSI Pro+ Milk Separator
- 250 Gallon Sweet Cream Processor
- Cheese Vat Area
  - (1) Advanced Cheese Vat ACV-30K Junior
  - (1) Advanced Dosing System (Rennet, Calcium, Color)
  - (1) Hot Water Cook System
  - (1) ACV Access Deck
- Cheese Table Area
  - (1) Open Table
  - (1) Jacket Heating Water System
- Fines Saver Belt
- 4,000 Gallon Whey Storage Silo
- CIP System
  - (5) 800 Gallon Single Wall Vessels
  - (5) Access Ladders
  - (2) 4 Square Foot Strainer
- Lot Valves, Pumps, Heat Exchangers, Etc.
- Lot 304 Stainless Steel Tubing, Fittings, and Hanger Material
- Lot Process Engineering and Project Management
- Lot Install Labor for the above

### **CONTROLS AND AUTOMATION**

APT Automation has evaluated your request for a quotation, and we will provide complete automation engineering, design, programming, start-up, and commissioning for the system proposed. This Automation package will include the following:

#### **Scope Of Work:**

- Automate (1) Milk Receiving Bay
- Automate (2) Raw Milk Silos
- Automate and supply instrumentation for (1) Raw Milk Processor
- Automate and supply instrumentation for (1) Milk HTST with a bacteria removal and separator.
- Automate and supply instrumentation for (1) ACV with (1) 3 ingredient ADS
- Supply the automation to integrate CIP for the existing re-located ice cream tanks.
- Automate and supply instrumentation for (1) 5 tank CIP System
- Automate and supply instrumentation for (1) Waste Water System

- Automate and supply instrumentation for (1) Fines Saver System
- Automate and supply instrumentation for (1) Cream Tank
- Automate and supply instrumentation for (1) Whey Silo

**This Automation package will include the following:**

- **Electrical Engineering & Documentation**
  - Electrical design for the complete system
  - HMI & PLC programming for the complete system
  - AutoCAD drawings for all new control panels
- **APT will supply the following Panels and Instrumentation:**
  - All new electrical control panels required for the system
    - Legal HTST Panel/HMI
      - ControlLogix L83E Processor
      - ControlLogix IO
      - Hope Touchscreen and computer
        - Includes FactoryTalk View SE Stand Alone client license
      - SMC 3000 Series Ethernet Valve Banks
    - VAT Main Panel/HMI
      - ControlLogix IO
      - Hope Touchscreen and computer
        - Includes FactoryTalk View SE Stand Alone client license
      - SMC 3000 Series Ethernet Valve Banks
    - VAT IO Panel
      - Point IO
    - VAT Power Panel
      - PowerFlex 753 Agitator VFD
      - PowerFlex 525 Hot Water Pump VFD
    - CIP Panel
      - ControlLogix IO
      - Hope Touchscreen and computer
        - Includes FactoryTalk View SE Stand Alone client license
      - SMC 3000 Series Ethernet Valve Banks
      - ABB Chart Recorders
    - Silo Area IO Panel
      - ControlLogix IO
      - SMC 3000 Series Ethernet Valve Banks
  - Instrumentation for the systems supplied by APT

- Data Logging and trend screen setup

**Notes:**

- APT Execution of project
  - APT will use our standards unless otherwise noted within this document.
  - APT will prepare all code and screen changes offsite to be merged into the existing onsite system.
- APT anticipates the following will be supplied by WSU or other contractors
  - All MCC motor control equipment except for ACV agitator and Cook Pump.
  - All electrical Installation including but not limited to:
    - Conduit, Wiring, Labeling, and Terminations.
- Reporting: Reporting isn't included unless specially mentioned above and only reports mentioned are being provided. If reporting is a requirement, we will need a copy of the report you require, and the software you want the report created within. We will be able to provide you with an additional cost for these reports once we have received that information.
- Instrumentation Manufacturer – The following is a list of APT proven vendors for system instrumentation. APT recommends using these vendors for cost and reliability. If the plant desires a particular instrument, different from those shown, a cost addition may have to be added to the price below.
  - Point Level Detection – IFM
  - Process Temperature – IFM
  - Tank Level – IFM
  - Process Pressure - IFM
  - Optical Transmitter – Anderson
  - Legal Pressure and Temperature - Anderson
  - Flowmeters Mag and Mass – E&H
  - Silo Level Transmitter – E&H
  - Conductivity – E&H
  - Silo Temperature RTD – Pyromation
- The panels above will be UL listed and Per NEC 409.110 will be marked with a Short Circuit Current Rating (SCCR) of 5ka. Customer power feed is required to be below a SCCR of 5ka for this panel to be installed. If the plant requires a higher rating than 5ka the plant will be required to supply the feed SCCR information to APT. APT will investigate all changes that will be required to configure the panel to comply with that feed. Costs of panels may be increased if different or additional components are required to comply with the customers upstream feed SCCR rating. The customer will be responsible for verifying that the installation of the panel will comply with NEC and all local electrical codes.
- Local Internet Access – APT has anticipated that local internet access will be available to our computers during startup. If local internet access is unavailable,

additional time and expense incurred by APT establishing a local internet access point for commissioning will be at added cost.

- Remote Access – APT has anticipated that a remote support connection will be available during and after startup. If remote access is unavailable, additional time and expense incurred to complete the project commissioning 100% on site will be at added cost.

**AUTOMATION START-UP & COMMISSIONING**

APT will provide Automation Engineers and Technicians as required for site modifications, start-up, and commissioning. Start-up time is estimated as follows:

- Startup Trip 1:
  - (4) Engineers 9 Days:
    - HMI and PLC commissioning
    - IO checkout and testing
    - CIP system testing and cleaning
    - Passivation
    - Operator Training
- Startup Trip 2:
  - (4) Engineers 5 Days:
    - Complete startup items
    - Run system on product
    - Monitoring and Operator Training

**Notes:**

- Anticipated Startup – APT has included the field startup time listed above. Due to the unpredictable nature of a field startup, if time is extended due to production or delays not within APT control startup time, then price may need to be adjusted on a time and expense basis.
- Download – If a PLC download is required the PLC affected will not be able to perform ANY function associated with that PLC during the time when the download is occurring. This includes all network communications to that PLC, Ethernet, DeviceNet, ControlNet, etc.
- Downtime – When APT describes downtime or cutover time required, this indicates a period of time of no production or CIP for the affected area, however, all utilities, PLC’s, remote IO, Remote Networks, HMI’s, and network equipment are powered up and accessible to the automation engineers and technicians. Utilities include, but are not limited to, power (may include power for welding), plant air source, steam, cooling source, water, sewer, chemicals, and all items unique to the system mentioned above.

**BUDGETARY PRICE FOR THE ABOVE ..... \$6,400,000.00**

**NOTES:**

The above price is based on drawings as drawn. Any changes due to federal, state, or local governments may result in price changes.

Due to unstable stainless steel prices, the above prices will be reviewed at the time of order.

**TERMS:**

40% Down Payment

Progressive Billing upon Delivery/Completion

Final 10% 30 days after start-up

The above price includes:

- A. Process/CIP flow schematics showing new equipment supplied by APT, new equipment supplied by customer, new stainless-steel lines and flow rates supplied by APT and new lines and flow rates supplied by customer.
- B. Set of Electrical assembly drawings for the above supplied items.
- C. Running stainless steel conduit from solenoid boxes to stainless steel junction boxes located next to valves. Also includes poly tube from solenoids in panel to valves.
- D. Core drilling all holes in floors and walls.
- E. Hanging of all APT supplied panels.

The above price **does not** include:

- A. Freight. Freight to be billed at actual cost.
- B. Any and All Taxes.
- C. Silos and storage tanks not explicitly mentioned above.
- D. Electrical conduit, interconnecting wires between panels and all field devices.
- E. Unloading, moving, or setting of all capital equipment including separator.
- F. Installation of separator base, separator bowl, etc.
- G. Any crane work including setting silos and other large equipment.



Quote #: 14209-3  
Re: Plant Expansion  
Attn: John Haugen  
Customer: WSU Creamery  
Address: Pullman, WA  
Date: 10/16/24

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- H. Steam and condensate piping.
- I. Insulating of any lines.
- J. Isometric drawings.
- K. Temporary walls or necessary materials needed while installation is being done in process areas.
- L. Frequency drives, motor starters, and all associated equipment.
- M. Interconnecting wiring between control panels, field devices, MCC and MCC to motors.
- N. Flooring repair and/or tiling and/or grouting.

It has been our pleasure to provide the above quote.  
If you have any questions, please do not hesitate to call.

Sincerely,

Ben Birrer  
Process Engineer  
Advanced Process Technologies, Inc.  
150 Swendra Blvd  
PO Box 939  
Cokato, MN 55321  
320-286-5060 ph  
320-286-3055 fax

Enclosures:  
- APT Terms and Conditions

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## General Terms and Conditions of Sale

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The Following Terms and Conditions are a Part of this Quotation and/or any resulting purchase order for the sale of APT Equipment and/or Service:

1. **ACCEPTANCE** – The terms and conditions hereof must apply to and govern any contract between the parties: in case of any inconsistency between said terms and conditions and purchasers order, the terms and condition hereof shall prevail, and Purchaser is notified of Advanced Process Technologies, Inc (herein referred to as APT) objection to any such inconsistent terms or additional terms. This agreement between APT and the Purchaser is not binding unless accepted by APT in writing and shall be governed by and constructed in accordance with the laws of the State of Minnesota.
2. **CHANGES** – Any changes affecting equipment function, specification, destination, or otherwise affecting the scope of the work are not binding upon APT unless made in writing and accepted by APT at its office. These changes are subject to mutual agreement in writing and to price and/or schedule adjustment based on prevailing prices plus any costs incurred or to be incurred by APT as a result of these changes.
3. **CANCELLATION** – In the event of any cancellation of the order by either party, Purchaser shall pay to APT the costs and expenses (including engineering expenses and all commitments to its suppliers and sub-contractors) incurred by APT prior to receipt of notice of such cancellation from purchaser plus APT's usual rate of profit for the same similar work.
4. **DELIVERY** – Dates are approximate only. APT shall attempt to make shipment within time specified after the receipt of full data from Purchaser, including approved certified prints. Partial shipment may be made and invoiced upon completion of manufacture. In no event shall APT be liable for consequential damages, liquidated damages and/or penalties resulting from its delay or failure to deliver.
5. **EXCUSABLE DELAY** – APT shall not be liable for delays in delivery or in other performance due to causes beyond its reasonable control, including but without limiting the generality of the forgoing: acts of God: acts of civil or military authority, government priorities: fires, strikes or other labor disturbances: floods: war: riot: shortages of energy: delays in transportation: supplier, subcontractor, or Purchaser – caused delays. In the event of any such delay, the date of delivery or performance shall be extended for a period equal to the time lost by reason of the delay. As used herein, "performance" shall include fabrication, assembly, shipment, delivery, installation, testing and warranty repair or replacement as applicable.
6. **ERRORS** – APT reserves the right to correct stenographic or clerical errors that may be present in pricing or specifications in this quotation and/or order.
7. **INSTALLATION, COMMISSIONING, START-UP** – Purchaser shall be responsible for receiving (including removal from carrier at jobsite), storing, installing, commissioning, Start-up and maintaining the equipment. APT will, upon request, provide a quotation for services to assist Purchaser in these functions.
8. **PRICES** – Unless otherwise specified in writing, all written quotations expire sixty (60) days after date thereof provided APT is allowed to manufacture to normal production schedules and ship immediately upon completion. Quotations may be terminated earlier by notice and constitute only solicitations for offers to purchase. All prices are F.O.B. shipping point unless otherwise indicated.
9. **TERMS OF PAYMENT** – Terms are Net 30 except as otherwise applicable under the terms contained in established schedules. Cash advances received with order shall be credited to Purchaser upon acceptance by APT. If Purchaser's order is not accepted, APT shall promptly refund the cash advance. No order will be accepted, or production begins, until receipt of cash advance.
10. Payments not received within the time period specified are subject to service charge and carrying charge of one and one-half (1-1/2) percent per month on the outstanding balance, plus actual collection/attorneys fees.
11. **RESCHEDULES** – If Purchaser requests deferment beyond the scheduled shipping date, APT reserves the right to adjust prices as they prevail at the time of the specified shipping date. APT further reserves the right to assess additional handling and storage charges resulting from such delays in shipment.

12. **SHIPMENT-PASSAGE OF TITLE** – Transportation expenses shall be paid by the purchaser, unless otherwise indicated. Delivery to carrier constitutes passage of title to Purchaser irrespective of arrangements for transportation or insurance charges. Risk of loss shall pass to purchaser concurrently with passage of title.
13. **TAXES** – APT’s prices do not include customs duties or sales, use, excise, retailer’s occupation and/or other similar taxes payable by reason of this transaction and Purchaser shall be responsible for the payment of such duties and taxes, which shall be assessed by APT unless Purchaser provides APT with a Tax Exemption Certificate acceptable to the Taxing Authorities. Purchaser shall reimburse APT for any such duties and taxes, including interest and penalties thereon, as may be paid by APT and shall also reimburse APT for any expenses connected therewith.
14. **WARRANTY** – APT warrants new equipment manufactured by us to be free from defects in material and workmanship under normal use and service for a period of one (1) year after shipment from factory. For breach of warranty of any kind, the measure of damages to be recoverable, from APT shall be limited to repair or replacement of the part or equipment which examination discloses to the satisfaction of APT to be defective, or the payment of the price of making such a repair or replacement, at the option of the APT. This warranty is expressly in lieu of all other warranties, expressed or implied, and all other obligations and liabilities on our part. Any warranty of merchantability is expressly excluded. We neither assume nor authorize any other persons to assume for us any liability in connection with the sale of our products and no other warranty will be honored unless in writing and signed by an officer of the corporation.
15. This warranty shall not apply to any product of our manufacture which has been repaired or altered outside our factory, or which in our opinion, has been subject to misuse, negligence, or accident. APT will not assume any charges for repairs made during warranty by anyone other than APT. Also, APT assumes no liability or responsibility for transportation, to and from repair point, nor any loss of time due to repair. This warranty does not cover components or other manufacturers beyond such warranty as is made by such manufacturer.
16. Any such action for breach of warranty shall be commenced within one (1) year of said breach or be forever barred.
17. All information including design details and dimensions contained herein are confidential and proprietary and must not be reproduced, disclosed to others, or used in the production of parts, unless authorized in writing by APT.
18. **LIMITATION OF LIABILITY** – APT’s liability on any claim based upon contract, warranty (except warranty of title), tort (including negligence), strict liability or otherwise for any loss or damage arising out of, connected with, or resulting from this contract, or from the performance or breach thereof, or from the design, manufacture, sale delivery, resale, installation, technical direction of installation, inspection, repair, operation or use of any equipment covered by or furnished under this contract shall in no case (except as provided in the paragraph entitled “Patents”) exceed the contract price and shall terminate one year after shipment of equipment. Purchaser shall institute any suit or claim within one (1) year of accrual of any cause of action or shall be barred therefrom. In no event shall APT be liable for incidental or consequential damages.
19. **INDEMNITY AND INSURANCE** – APT maintains blanket insurance policies covering Workman’s Compensation, general public liability, automobile liability and property damage to cover work on purchasers premises and will make available to purchaser at purchaser’s request such certificates of insurance coverage from sureties of APT’s choice. Purchaser agrees to indemnify and save APT harmless for all loss, cost or damage incurred by APT as a result of Purchaser’s negligence or misapplication of APT supplied products.
20. **LAWS AND REGULATIONS** – APT complies with all applicable executive orders and federal and state laws and regulations including, but not limited to, the Fair Labor Standards Act of 1938 (Federal Wage and Hour Law), the Equal opportunity Clauses per Executive Order No. 11246 and Occupational Safety and Health Act of 1970.
21. **COMPLETE AGREEMENT** – These terms and conditions together with the APT proposal shall constitute the complete and final agreement and understanding between Purchaser and APT, and shall not be modified in any way unless agreed in writing by a duly authorized representative of the purchaser and APT.



405 SE Breilsford DR, Ste C  
Pullman, WA, 99163  
509-339-6187

The Civil Engineering for the WSU Food Quality Building Creamery TI Equipment Upgrade project will include the design of several different sanitary sewer lines and the pump design for the proposed 1,500-gallon septic tank. There will be four different sewer lines that will need to be taken into account. There will be a 4" non-pressure rated gravity line that will drain from the reinstalled COP tables within the building to the septic tank; there will be a 4" non-pressure rated gravity line that will drain from the CIP system to the septic tank; a 4" pressure line that will pump from the septic tank to the waste neutralization tank; and there will be a 6" non-pressure rated gravity line that drains from the waste neutralization tank to the existing sanitary sewer line located on the northeast side of the building. The pump design will consist of selecting dual 3" 3-phase submersible pumps that will operate within the septic tank to pump the waste into the waste neutralization tank and then it will enter the existing sewer system.



Date: 11/21/2024

To: Russ Wolfe  
WAG

From: Aaron Donnelly, PE  
MSI Engineers

Re: WSU Creamery Equipment Upgrade Study

CC:

#### Mechanical Narrative:

##### Project Scope

##### 1. HVAC Systems:

- a. Based on the schematic architectural design of the new processing area, field survey of the existing HVAC systems, and based on previous knowledge of the systems in those areas, we recommend the following HVAC revisions in the old receiving bay area:
  - Add a small air handler / fan coil (2000 cfm range) above the ceiling in Rm 103J to serve the space. The fan coil will have hot and chilled water for heating and cooling to maintain the space temperature through DDC controls.
  - The existing exhaust system serving that area will remain in place but will receive a new inline fan. This will provide the necessary exhaust and additional ventilation to this space by transferring air from the main processing area and continue to provide the exhaust needed in the CIP room.
  - The CIP room will continue to be served by the existing HVAC system as it was before.
  - No HVAC changes to the main processing room or Whey Processing Lab.
  - No HVAC changes to the Powder Mix Rm.
- b. Heating
  - Heating will be provided by hot water coils in the fan coil. The source of the hot water is existing supply and return pipes in room 103J. The heating coil will utilize a 2-way modulating valve.
- c. Cooling
  - Cooling will be provided by chilled water coils in the air handlers. The source of the chilled water will be existing 45-degree glycol-free campus chilled water piping in the existing 1<sup>st</sup> floor ceiling. Cooling coils will utilize a 'tertiary' pump configuration with a 2-way modulating valve and will be sized for a minimum of 12-degree rise in chilled water temperature to satisfy campus standards. Modulating air-side economizers will be provided on the air handlers to provide free cooling whenever available.
- d. Ventilation
  - Ventilation air for the process space (rm 103J) will be introduced through an exterior louver to the air handler at a rate that achieves 10-air changes per hour in accordance with recommended practices for dairy operations facilities.
- e. Humidification Control

- It is understood that dairy/cheese products will not be exposed to the environment in Rm 103J so active humidity control is not anticipated at this time.

f. Air Distribution:

- Supply air will be distributed through galvanized steel sheet metal ducts concealed in the ceiling space. Acoustical duct liner will be used for sound attenuation. For overhead supply air, adjustable ceiling diffusers will be utilized in areas with lay-in ceilings. Areas without lay-in ceilings will utilize sidewall supply grilles. Diffusers will be stainless steel or have a coating suitable for wash down.

g. Building Automation and HVAC Temperature Controls:

- All HVAC equipment and systems will be controlled by field installed Siemens Direct Digital Controls (DDC) which will control and monitor all HVAC equipment, space temperatures, and humidity. No factory equipment controls will be utilized. The DDC controls will be integrated with the existing Siemens control network which is located in the existing penthouse mechanical room. Upgrades to the existing control systems and any interface with the process controls are not anticipated.

2. Plumbing and Hydronic Systems:

- a. Based on the schematic architectural design of the new processing area, field survey of the existing plumbing and hydronic systems, and based on previous knowledge of the systems in those areas, we recommend the following project scope:

Processing Bay

- Disconnect / reconnect culinary steam & domestic cold water at the new Finishing Table
- Disconnect / reconnect culinary steam & ice water at Pasturizer being temporarily relocated.
- Disconnect / reconnect culinary steam & domestic cold water at the new cheese VAT
- Add sanitary drains at the relocated COP tables.
- Disconnect / Reconnect the hand sink on the north wall
- Disconnect / Reconnect the 3-compartment sink on the north wall
- Reconfigure and reconnect ice water at new CMU wall where it intersects with the existing north wall.

Old Receiving Bay / 103J

- Demo in ground oil separator and all below slab drain piping. Cap and finish with a floor cleanout so the remainder of the drainage systems may continue to be used.
- Demo hose reel and domestic hot/cold piping
- Re-Route rain leaders to either conceal or otherwise not interfere with the new layout.
- Reconfigure and reconnect trap primer header
- Add two floor drains
- Extend ice water for Milk Tank cooling.
- Extend ice water for the Cream Holding Tank
- Add a steam to hot water converter to support the HTST system's hot water requirements
- Extend ice water to the new Separator
- Extend heating and chilled water to the new air handler coils.

CIP Room

- Reconfigure & reconnect domestic water connections in CIP room. Install a new backflow preventer.
- Add hub drains as needed for the CIP equipment drains.
- Add a floor drain (SS Kusel Type)
- Install a new reduced pressure backflow preventer on the water supply.
- Reconfigure and reconnect culinary steam.
- Extend floor drainage to 5 ft outside the building for civil to continue.

Other

- Add a neutralization tank system (5000 gal poly tank with circulating / mixing pump). Monitoring and dosing systems to be provided by others.
- Route a pumped waste pipe from the site through the building to the neutralization tank.
- Hose bibbs and/or hose reels to be added where required.

- Compressed air piping for miscellaneous use to be added where requested.
- b. The following piping systems will be provided for process equipment in accordance with the process design requirements.
- Culinary steam (60-psig) and steam condensate piping
  - Domestic hot and domestic cold water
  - Ice Water supply and return
  - HVAC heating and chilled water supply and return
3. Design Codes and Standards:
- a. All mechanical systems, equipment and components will be designed, selected and installed in accordance with all applicable codes and standards including but not limited to:
- 2021 International Mechanical Code (IMC), Standards and Amendments.
  - 2021 Uniform Plumbing Code (UPC) Standards and Amendments.
  - American Society of Heating, Refrigeration and Air Conditioning Engineering (ASHRAE) standards.
  - 2021 Washington State Energy Code – Commercial Provisions.
  - Applicable State and local codes, laws and ordinances.
  - Washington State University Uniform Design and Construction Standards (Latest)
4. Mechanical Materials and Methods:
- a. Commercial quality methods and materials will be utilized throughout the construction of the new facility. Major mechanical system components are summarized below:
- Domestic, potable, industrial, and ice water piping will be Type L copper with solder-joint fittings.
  - Chilled water piping will be either:
    - Schedule 40 black steel with threaded fittings for 2 inch and smaller, and welded fittings for over 2 inch.
    - Type L copper with solder-joint fittings for 2 inch and smaller and brazed joints up to maximum 4 inch.
  - Steam and condensate for both process and heating will be Schedule 40 black steel with threaded fittings for 2 inch and smaller, and welded fittings for over 2 inch.
  - Storm drainage and sanitary waste and vent piping below grade will be ABS/PVC (plastic) and/or cast iron soil pipe with sanitary pattern fittings. Above ground storm drainage and sanitary waste and vent piping will be ductile cast iron with sanitary pattern fittings and minimum 4-band clamps at all joints. Plastic piping will not be used above grade.
  - Indirect waste piping will be Type M copper with solder-joint fittings.
  - Isolation valves will be provided at inlets and outlets of all mechanical equipment and plumbing fixtures.
  - Valves for domestic water systems will be butterfly or ball. Gate valves will not be used. Check valves will be swing type.
  - Valves for hydronic piping will be butterfly or ball type. Gate valves will not be used. Pump discharge check valves will be wafer (silent) style.
  - Unions will be provided downstream of all threaded valves and at all equipment connections. Dielectric unions will be provided at connections of dissimilar metals.
  - Access doors will be provided wherever required to service valves, dampers, fire dampers, or other concealed items requiring service.
  - Y-type strainers will be provided at pumps and control valves.
  - Water hammer arrestors will be provided at quick closing valves and plumbing fixtures.
  - Thermometers will be provided at inlets and outlets of heat exchangers, water heaters and mixing valves.
  - Pressure gauges will be provided at inlets and outlets of pumps.
  - Piping systems will be pressure tested according to service type.
  - Domestic, potable, and industrial water piping will be flushed and disinfected.
  - Ice water systems will be flushed, chemically cleaned, and treated with corrosion inhibitors and propylene glycol antifreeze.
  - Chilled water piping will be flushed and chemically cleaned. Glycol will not be used.
5. Mechanical Insulation:

- a. All mechanical systems, equipment and components will be insulated in accordance with the requirements of the Washington State Energy Code and the following:
- Water piping systems will be insulated with rigid, molded glass fiber pipe insulation with all service jacketing and vinyl fitting covers.
  - Steam and condensate piping systems will be insulated with rigid glass fiber pipe insulation with all service jacketing and removable glass cloth fitting and valve covers.
  - Ductwork will be insulated with either external flexible glass fiber blankets or internal acoustical glass fiber duct liner.
  - All insulation exposed to the process environment will be field covered with vinyl or metal jacket with all seams sealed water tight so it may be washed down and sanitized.

End of Memo

**PRE-DESIGN ELECTRICAL NARRATIVE**  
**WSU FOOD QUALITY BUILDING CREAMERY TI – EQUIPMENT UPGRADES**

November 2024

**ELECTRICAL SYSTEMS:**

1.1 Design:

It is the goal of the electrical design to provide functional, durable, low maintenance, energy efficient and flexible systems for power distribution, lighting and technology. Equipment selection and placement will strive to complement the building's architectural identity, allow for future expansion and maximize cost efficiency.

1.2 Site Utilities:

Existing WSU owned primary and service to building is adequate and will remain as is. Existing Verizon & Time Warner communication services to building are also adequate and shall remain.

1.3 Service and Distribution:

The existing building is served from two services both fed from a WSU owned Primary distribution system. There is an existing 1000A 480Y/120V, 3-phase service and a 2500A, 208Y/120V, 3-phase service that together serve the existing Food Quality Building. Both services have the capacity to feed the new loads associated with the equipment upgrades.

New 480V & 208V sub-panels will be installed with new feeders routed from the existing branch panels installed in the 2015 addition. These new sub-panels will serve the new process equipment and branch circuit loads.

Calculations will be provided throughout the distribution system based on the available fault current at the secondary lugs of the utility transformer and all distribution equipment will be braced accordingly.

1.4 Branch Circuit Wiring:

Branch circuits shall originate from new sub-panels located in the 2015 addition electrical room 151. The panelboards shall serve only circuits in the general area. The panel locations shall consider safety, accessibility and disruption to the facility operation during maintenance.

All concealed branch circuit wiring shall be installed in metallic conduit and all exposed branch circuit wiring shall be installed in stainless steel conduit to match existing conditions. Receptacle branch circuits shall be circuited conservatively to decrease the possibility of a nuisance trip and in such a manner that if a nuisance trip were to occur, it would only affect that area. All circuits shall be furnished with a full size dedicated neutral and equipment ground conductor.

Duplex receptacles will be installed as required throughout the remodeled spaces to meet convenience requirement as well as all owner required equipment needs.

1.5 Process Equipment Connections:

Power connections to all new process equipment will be provided based on equipment voltage to include disconnect or variable frequency drive (VFD) as coordinated with the Process Equipment provider. This equipment will be specified as required for the environment and will be located per NEC required working clearances and ease of maintenance.

#### 1.6 Mechanical Equipment:

Coordination will take place with the mechanical engineer to ensure all mechanical equipment connections are provided based on their equipment schedule.

Connections requirements shall include conduit and conductors, fused disconnect switches, fuses, starters and line voltage control wiring as required. Conduit & conductors include from panel to disconnect switch and from disconnect switch to equipment.

#### 1.7 Lighting and Control:

##### General:

Standards: All lighting will meet the pertinent IES recommendations. The lighting and lighting controls will meet the Washington State Non-Residential Energy Code (WSEC). All fixtures will have appropriate UL listing and will be supplied with all necessary accessories and hardware to provide a complete, sustainable, and maintainable lighting system.

Lighting will be designed utilizing highly efficient LED luminaires, or high efficiency fluorescent luminaires with optimized efficiency ballasts. All LED luminaires will meet all the IESNA requirements for LED systems listed in standards LM-79 and LM-80, referring to lighting performance, efficacy standards, efficiency standards, LED diode life cycle, and LED/Driver system testing.

Photometric calculations will be provided for all remodeled spaces that include new lighting.

##### Light Fixture Types:

Based on ceiling types & heights, specified light fixtures will be appropriate for the space regarding type, mounting and maintenance requirements while providing adequate light levels for the intended use.

##### Lighting Control:

All new lighting controls components will be compatible with the building's existing networked lighting control system. Local control of lighting shall utilize digital switches and other automatic input devices (i.e. occupancy sensors and photocells). The system will be comprised of lighting control modules (containing relays and dimming outputs), automatic input devices (occupancy sensors and photocells), and manual lighting control stations (digital switches).

Occupancy sensors will be programmed for manual-ON and automatic-OFF operation. Occupancy sensors will be dual-technology (Passive Infrared & ultra-sonic/micro-phonic). Photocells shall be closed loop. Multi-output programmable photocells will be considered in areas where appropriate (i.e. to achieve independent automatic control of both the primary and secondary daylight zones, as required by the WSEC).

#### 1.8 Surge Protection:

The new branch panelboards will be specified with integral surge protection devices (SPD's) to help suppress any voltage spikes whether generated external or internal to the building.

#### 1.9 Telecommunications Infrastructure:

Telecommunications Network: A Category 6 networked telecommunications cable system will provide the infrastructure for the Voice Over Internet Protocol (VOIP) communications system and data transmission network access throughout the remodeled areas.

Wireless access points will be provided throughout the remodeled spaces as coordinated with the owner.

All areas shall be provided with power and Cat 6 Ethernet outlets along walls or at equipment locations as required adequately serving the owner's requirements.

Category 6 network jacks will be six-pin RJ45, flush mounted, wired to TIA T568B specifications.

The telecommunications universal plant will be wired per TIA/EIA 568-B standards utilizing Category 6 copper cable to support gigabit-Ethernet from each jack to a corresponding rack mounted patch panel located in the existing telecommunications rack in electrical room 151.

All new cabling will be routed to the existing telecommunications rack not exceeding a maximum cable length of 250' from patch panel to outlet.

#### 1.10 Cable & Wire Management:

Each wall mounted voice/data outlet will consist of a 1" conduit stubbed up into nearest accessible ceiling space, cable tray or telecommunications rack. Cable rings and/or hooks shall be used to manage wiring between conduit stub-ups & nearest cable tray or telecommunications room.

#### 1.11 Fire Alarm System:

The existing Simplex 4002 fire alarm system will be extended as required to serve new devices located in the remodeled spaces. The system shall include an emergency battery backed power supply, control switch, manual stations, heat detectors, smoke detectors, ADA audible/visual alarm signals, addressable control relays, HVAC interface, zone modules and all other miscellaneous equipment required for a complete operable system that is compliant to all applicable codes and standards. All required programming & testing will be included.

Device locations will be coordinated with the local Authority Having Jurisdiction (AHJ) prior to issuing Construction Documents to ensure all required devices are included.

All mechanical equipment requiring shutdown per code shall be indicated to include all components and wiring as required.



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WSU FOOD QUALITY BUILDING CREAMERY T.I.  
EQUIPMENT UPGRADE

PULLMAN, WA

CONSTRUCTION COST ESTIMATE

Feasibility Study Phase

Report Version No. 1

November 22, 2024

Prepared for:



# SUMMARY

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<b>Estimated Costs</b>	<b>Cost</b>	<b>Cost/SqFt</b>
Base Bid	\$2,099,178	\$486.82
<b>Alternates</b>		
1. Remove and replace quarry tile flooring in Processing Area	\$211,586	\$65.79
2. Remove and replace Processing Area lighting with LED fixtures	\$81,313	\$25.28
<b>Total Estimated GC/CM Construction Cost</b>	<b>\$2,392,077</b>	

\* All values exclude WSST

# BASE BID - Equipment Upgrade

**WSU Food Quality Building Creamery T.I. Equipment Upgrade**

Site Area: 4,570 GSF

Gross Renovation Area: 4,312 GSF

**Construction Cost Estimate**

Design Phase: Feasibility Study

MACC = \$TBD

Element Description		Cost	Cost/SqFt	Percent
A10	Foundations	\$10,522	\$2.44	0.83%
A20	Basement Construction	\$0	\$0.00	0.00%
B10	Superstructure	\$9,800	\$2.27	0.77%
B20	Exterior Enclosure	\$31,462	\$7.30	2.48%
B30	Roofing	\$3,500	\$0.81	0.28%
C10	Interior Construction	\$243,496	\$56.47	19.21%
C20	Stairs	\$0	\$0.00	0.00%
C30	Interior Finishes	\$60,763	\$14.09	4.79%
D10	Conveying Systems	\$0	\$0.00	0.00%
D20	Plumbing	\$257,750	\$59.78	20.34%
D30	HVAC	\$85,625	\$19.86	6.76%
D40	Fire Protection	\$10,000	\$2.32	0.79%
D50	Electrical	\$268,925	\$62.37	21.22%
E10	Equipment	\$38,150	\$8.85	3.01%
E20	Furnishings	\$0	\$0.00	0.00%
F10	Special Construction	\$0	\$0.00	0.00%
F20	Selective Building Demolition	\$17,985	\$4.17	1.42%
Building Construction Cost		\$1,037,979	\$240.72	81.91%
G10	Site Preparation	\$19,415	\$4.50	1.53%
G20	Site Improvements	\$19,700	\$4.57	1.55%
G30	Site Mechanical Utilities	\$170,820	\$39.62	13.48%
G40	Site Electrical Utilities	\$600	\$0.14	0.05%
G90	Other Site Construction	\$0	\$0.00	0.00%
Sitework Cost		\$210,535	\$48.83	16.61%
Z10	Non-Specified General Conditions (1.50%)	\$18,728	\$4.34	1.48%
<b>Subtotal of Estimated Construction Cost</b>		<b>\$1,267,241</b>	<b>\$293.89</b>	<b>100.00%</b>
<b>CONTRACTOR FEES</b>				
Negotiated Support Services (4.00%)		\$50,690	\$11.76	4.00%
Specified General Conditions (17.0%)		\$215,431	\$49.96	17.00%
<b>Total Estimated Construction Cost</b>		<b>\$1,533,362</b>	<b>\$355.60</b>	<b>121.00%</b>
<b>FEASIBILITY STUDY PHASE ADJUSTMENTS</b>				
Contingency to 100% CD's (15.00%)		\$230,004	\$53.34	18.15%
Cost Index to Q3 '26 (5.83%)		\$89,395	\$20.73	7.05%
<b>Total Estimated Construction Cost</b>		<b>\$1,852,761</b>	<b>\$429.68</b>	<b>146.20%</b>
GC/CM Fee (10.0%)		\$185,276	\$42.97	14.62%
GCCM Risk (Construction Contingency) (3.00%)		\$61,141	\$14.18	4.82%
<b>Total Estimated GC/CM Amount</b>		<b>\$2,099,178</b>	<b>\$486.82</b>	<b>165.65%</b>

**WSU Food Quality Building Creamery TI - Equipment Upgrade**  
**Site Area: 4,570 SF**  
**Building Area: 4,312 SF**

**Construction Cost Estimate**  
**Design Phase: Feasibility Study**  
**MACC: TBD**

Code	Item Description	Quan	Unit	Unit Price	Total
<b>A10 Foundations</b>					
A1030	Sawcut Concrete Paving, 4"	186	lnft	8.00	1,488.00
A1030	Doweling at Slab Pourbacks	186	lnft	4.50	837.00
A1030	Slab on Grade, premium for difficulty of sloping floors	74	sqft	2.00	148.00
A1030	Slab on Grade Pourbacks, 4" thick, with #4 @ 18"OC EW reinforcement	808	sqft	7.50	6,063.60
A1030	Underslab Vapor Barrier, 15mil, taped seams	808	sqft	1.85	1,491.54
A1030	Subgrade Preparation under Slab on Grade, small qty.	125	sqft	1.35	168.75
A1030	Gravel Fill, compacted, under slab on grade, 6" deep, small qty.	125	sqft	1.00	125.00
A1030	Gravel Fill, compacted, under septic tank, 6" deep, small qty.	70	sqft	2.86	200.00
<b>Foundations Total</b>					<b>10,521.89</b>
<b>B10 Superstructure</b>					
B1020	Structural Modifications for Beam Hoist	1	lsum	5,000.00	5,000.00
B1020	Structural Crane Rail	25	lnft	192.00	4,800.00
<b>Superstructure Total</b>					<b>9,800.00</b>
<b>B20 Exterior Enclosure</b>					
B2010	Exterior CMU Walls and Infills, 8" astra glaze, small qty.	188	sqft	156.30	29,384.40
B2010	Joint Sealants, by sqft of renovation area	4,312	gsf	0.25	1,078.00
B2010	Exterior Painting Touchup at Removed Sectional Door	1	lsum	1,000.00	1,000.00
<b>Exterior Enclosure Total</b>					<b>31,462.40</b>
<b>B30 Roofing</b>					
B3010	Roof Patching	1	lsum	3,500.00	3,500.00
<b>Roofing Total</b>					<b>3,500.00</b>
<b>C10 Interior Construction</b>					
C1010	Interior CMU Walls and Infills, 8" astra glaze, small qty.	652	sqft	156.30	101,907.60
C1010	Interior CMU Walls, 8" astra glaze veneer, incl. epoxy mortar, small qty.	1,377	sqft	100.50	138,388.50
C1020	Reinstall Existing Doors, Frames & Hardware	2	each	600.00	1,200.00
C1030	Interior Signage Allowance	1	lsum	2,000.00	2,000.00
<b>Interior Construction Total</b>					<b>243,496.10</b>
<b>C30 Interior Finishes</b>					
C3020	Sealed Concrete Floors	933	sqft	2.63	2,449.13
C3020	Quarry Tile Flooring	1,230	sqft	25.00	30,745.20
C3020	Quarry Tile Base	225	lnft	46.00	10,350.75
C3030	Framing and Suspension Systems for Gypsum Board Ceilings, small qty.	74	sqft	25.00	1,850.00
C3030	Gypsum Board, on ceilings, 5/8" thick, taped and finished (level 4 finish), small qty.	74	sqft	42.75	3,163.50
C3030	Acoustical Panel Ceilings, 2'x4' vinyl coated, small qty.	664	sqft	17.60	11,686.56
C3030	Paint Gypsum Board Ceilings, small qty.	74	sqft	7.00	518.00
<b>Interior Finishes Total</b>					<b>60,763.13</b>
<b>D20 Plumbing</b>					
D2000	Plumbing Mobilization	1	lsum	6,250.00	6,250.00
D2000	Disconnect/Reconnect Steam & CW at Finishing Table - Processing Bay	1	each	3,125.00	3,125.00
D2000	Disconnect/Reconnect Steam & Ice Water at Pasturizer - Processing Bay	1	each	6,250.00	6,250.00
D2000	Disconnect/Reconnect Steam & Cold Water at Cheese VAT - Processing Bay	1	each	6,250.00	6,250.00
D2000	Add Drains at COP Tables - Processing Bay	2	each	3,125.00	6,250.00
D2000	Disconnect/Reconnect Hand Sink - Processing Bay	1	each	1,875.00	1,875.00
D2000	Disconnect/Reconnect 3-Compartment Sink - Processing Bay	1	each	1,875.00	1,875.00
D2000	Reconfigure & Reconnect Ice Water at New CMU Wall - Processing Bay	1	each	1,250.00	1,250.00
D2000	Demo Oil Separator and Drain Piping and Cap - Room 103J	1	each	6,250.00	6,250.00
D2000	Demo Hose Reel and Piping - Room 103J	1	each	1,250.00	1,250.00
D2000	Re-Route Rain Leaders - Room 103J	2	each	3,125.00	6,250.00
D2000	Reconfigure and Reconnect Trap Primer System - Room 103J	1	each	4,375.00	4,375.00
D2000	Floor Drain Waste Piping, 4" - Room 103J	50	lnft	56.25	2,812.50
D2000	Ice Water to Milk Tank - Room 103J	1	each	3,125.00	3,125.00
D2000	Ice Water to Cream Holding Tank - Room 103J	1	each	3,125.00	3,125.00
D2000	Hot Water Generator/Heat Exchanger - Room 103J	1	each	37,500.00	37,500.00
D2000	Steam to New Hot Water Generator - Room 103J	1	each	25,000.00	25,000.00
D2000	Hot Water Pump, incl. valves and accessories - Room 103J	1	each	12,500.00	12,500.00
D2000	Hot Water to HTST - Room 103J	1	each	6,250.00	6,250.00
D2000	Ice Water to the Separator - Room 103J	1	each	3,125.00	3,125.00
D2000	Fan Coil HW/CHW Piping, incl. valves and accessories - Room 103J	1	each	25,000.00	25,000.00
D2000	Reconfigure & Reconnect Water Connections in CIP Room	1	each	3,125.00	3,125.00
D2000	Hub Drains in CIP Room	2	each	625.00	1,250.00
D2000	Floor Drains in CIP Room, SS Kusel Type	1	each	3,750.00	3,750.00

**WSU Food Quality Building Creamery TI - Equipment Upgrade**  
**Site Area: 4,570 SF**  
**Building Area: 4,312 SF**

**Construction Cost Estimate**  
**Design Phase: Feasibility Study**  
**MACC: TBD**

Code	Item Description	Quan	Unit	Unit Price	Total
D2000	Reconfigure and Reconnect Cold Water in CIP Room	1	each	625.00	625.00
D2000	New Backflow Preventer in CIP Room	1	each	1,875.00	1,875.00
D2000	Reconfigure and Reconnect Steam in CIP Room	1	each	3,125.00	3,125.00
D2000	Neutralization Tank System, 5000 gallon poly, incl. pump	1	each	37,500.00	37,500.00
D2000	Pumped Waste Piping	150	lft	125.00	18,750.00
D2000	Hose Bibbs	4	each	625.00	2,500.00
D2000	Compressed Air Piping	1	lsum	7,125.00	7,125.00
D2000	Sanitary Vent Piping, 3"	50	lft	43.75	2,187.50
D2000	Plumbing Related Closeout	1	lsum	6,250.00	6,250.00
<b>Plumbing Total</b>					<b>257,750.00</b>
<b>D30 HVAC</b>					
D3000	HVAC Mobilization	1	lsum	6,250.00	6,250.00
D3000	Demolish Unit Heater and Heating Water Piping - 103J	1	each	1,250.00	1,250.00
D3000	Revise Exhaust Ductwork - 103J	1	each	1,875.00	1,875.00
D3000	Fan Coil (HW/CHW) - 103J	1	each	12,500.00	12,500.00
D3000	Supply, Return, OSA Ductwork, Insulation and Accessories - 103J	1	lsum	12,500.00	12,500.00
D3000	Air Outlets (Stainless) - 103J	10	each	625.00	6,250.00
D3000	Louver - 103J	10	sqft	125.00	1,250.00
D3000	Exhaust Fan - 103J	1	each	9,375.00	9,375.00
D3000	Temperature Controls (Siemens)	1	lsum	25,000.00	25,000.00
D3000	Testing, Adjusting and Balancing	1	lsum	3,125.00	3,125.00
D3000	HVAC Related Closeout	1	lsum	6,250.00	6,250.00
<b>HVAC Total</b>					<b>85,625.00</b>
<b>D40 Fire Protection</b>					
D4000	Fire Sprinkler Modifications	4,312	sqft	2.32	10,000.00
<b>Fire Protection Total</b>					<b>10,000.00</b>
<b>D50 Electrical</b>					
D5000	Electrical Demolition	4,312	gsf	3.83	16,500.00
D5000	Electrical Reroute for New Door Openings as well as Wall Demolition	4,312	gsf	2.23	9,600.00
D5000	Existing Equipment Relocation (Processing)	3	each	3,500.00	10,500.00
D5000	Panelboards and Feeders, incl. breakers	4,312	gsf	4.88	21,060.00
D5000	Lighting and Controls (Receiving & Cleaning Areas)	1,017	sqft	15.40	15,660.00
D5000	Power/Branch Circuiting	4,312	gsf	7.14	30,800.00
D5030	Mechanical Equipment Connections, 120V	3	each	3,000.00	9,000.00
D5030	Septic Duplex Pump and Alarm Connections	1	lsum	14,985.00	14,985.00
D5030	Process Equipment Connections, incl. VFD's	8	each	8,025.00	64,200.00
D5030	Process Equipment Control Conduit & Wire	1	lsum	39,700.00	39,700.00
D5030	CIP Panel Power & Remote Operator Panel Power	1	each	4,850.00	4,850.00
D5030	Telecom Drops & Wiring	6	each	2,600.00	15,600.00
D5030	Mobilization, Testing, Training & Closeout	1	lsum	16,470.00	16,470.00
<b>Electrical Total</b>					<b>268,925.00</b>
<b>E10 Equipment</b>					
E1010	Remove 50 Gallon Pasturizer	1	each	1,000.00	1,000.00
E1010	Remove 400 Gallon Pasturizer	2	each	1,375.00	2,750.00
E1010	Remove HTST Pasturizer	1	each	3,000.00	3,000.00
E1010	Remove & Relocate Parts Washer	2	each	975.00	1,950.00
E1010	Remove Separator	1	each	1,000.00	1,000.00
E1010	Remove 15,000 Gallon Cheese Vat	1	each	5,000.00	5,000.00
E1010	Remove CIP System Components	12	each	375.00	4,500.00
E1010	Electric Beam Hoist, 2000 lbs.	1	each	5,450.00	5,450.00
E1010	Remove End Door Finishing Vat Table	1	each	1,000.00	1,000.00
E1010	Citric Acid Barrel OFVI, 50 gallon	2	each		
E1010	Demolish Centrifuge System	1	each	1,250.00	1,250.00
E1010	Cheese Vat Equipment, OFCI	1	each	1,400.00	1,400.00
E1010	CIP System, OFCI	1	each	1,650.00	1,650.00
E1010	Waste Neutralization Tank, 30,000 lb., OFCI	1	each	3,250.00	3,250.00
E1010	Whey Holding Tank, OFCI	1	each	3,250.00	3,250.00
E1010	Ph Monitoring System, OFCI	1	each	1,700.00	1,700.00
<b>Equipment Total</b>					<b>38,150.00</b>
<b>F20 Selective Building Demolition</b>					
F2010	Select Demolition Disposal	1	lsum	5,000.00	5,000.00
F2010	Demolish and Remove Concrete	808	sqft	4.50	3,632.08
F2010	Sawcut Interior Concrete Masonry Unit Walls, 8"	34	lft	19.85	675.00
F2010	Demolish Interior Concrete Masonry Unit Walls, 8"	408	sqft	7.10	2,898.16

**WSU Food Quality Building Creamery TI - Equipment Upgrade**  
**Site Area: 4,570 SF**  
**Building Area: 4,312 SF**

**Construction Cost Estimate**  
**Design Phase: Feasibility Study**  
**MACC: TBD**

Code	Item Description	Quan	Unit	Unit Price	Total
F2010	Remove Doors, Frames & Hardware	4	each	170.00	680.00
F2010	Demolish Overhead Door	1	each	600.00	600.00
F2010	Demolish 800 Gallon Milk Storage Tank	2	each	2,250.00	4,500.00
<b>Selective Building Demolition Total</b>					<b>17,985.24</b>
<b>G10 Site Preparation</b>					
G1020	Sawcut Asphalt Paving, 4", min. call out	155	lnft	4.84	750.00
G1020	Sawcut Concrete Paving, 4", min. call out	29	lnft	8.62	250.00
G1020	Demolition of Concrete Walk, 4", including disposal off site	26	sqyd	15.00	390.00
G1020	Demolition of Concrete Curbing, including disposal off site	40	lnft	5.25	210.05
G1020	Demolition of Asphalt Paving, including disposal off site	50	sqyd	20.00	1,000.00
G1020	Demolish Bollards, incl. sawcutting	2	each	430.00	860.00
G1020	Demolition of Asphalt Paving in R.O.W., including disposal off site	36	sqyd	20.00	720.00
G1020	Remove Existing Landscaping, incl disposal	247	sqyd	3.50	864.50
G1030	Earthwork Mobilization	1	lsum	7,500.00	7,500.00
G1030	Earthwork Fine Grading, small qty.	42	cuyd	61.90	2,600.00
G1030	Septic Tank Excavation, incl. backfill, small qty.	35	cuyd	60.00	2,070.00
G1030	Export Spoils From Septic Tank Excavation, small qty.	14	cuyd	50.00	700.00
G1030	Erosion Control	1	lsum	1,500.00	1,500.00
<b>Site Preparation Total</b>					<b>19,414.55</b>
<b>G20 Site Improvements</b>					
G2010	Asphalt Patch in R.O.W.	36	sqyd	49.00	1,764.00
G2020	Asphalt Paving, 3" HMA over 6" Base	50	sqyd	41.00	2,050.00
G2020	Standard Curb, small qty.	29	lnft	43.75	1,268.75
G2020	Concrete Curb and Gutter, small qty.	11	lnft	52.50	577.50
G2030	Sidewalks, small qty.	226	sqft	15.00	3,390.00
G2040	Concrete Paving, 6" thick, with #4 @ 18"OC EW reinforcement, small qty.	125	sqft	18.00	2,250.00
G2050	Landscape and Irrigation Repair	2,100	sqft	4.00	8,400.00
<b>Site Improvements Total</b>					<b>19,700.25</b>
<b>G30 Site Mechanical Utilities</b>					
G3020	Precast Septic Tank, 1,500 gallon including dual pumps and controller with alarm	1,500	gal	80.00	120,000.00
G3020	6" PVC SDR35 Sanitary Sewer Line	80	lnft	114.00	9,120.00
G3020	Standard Sanitary Sewer Cleanout	6	each	1,300.00	7,800.00
G3020	4" PVC SDR35 Sanitary Sewer Line	250	lnft	110.00	27,500.00
G3020	Pressure Sanitary Sewer Cleanout	2	each	3,200.00	6,400.00
<b>Site Mechanical Utilities Total</b>					<b>170,820.00</b>
<b>G40 Site Electrical Utilities</b>					
G4000	Electrical Trenching	40	lnft	15.00	600.00
<b>Site Electrical Utilities Total</b>					<b>600.00</b>
<b>Grand Total</b>		<b>4,312</b>	<b>gsf</b>	<b>289.54</b>	<b>1,248,513.57</b>

# ALTERNATE 1 - Flooring Replacement - Processing Area

**WSU Food Quality Building Creamery T.I. - Replace Processing Flooring**

Site Area: 4,570 GSF

Gross Renovation Area: 3,216 GSF

**Construction Cost Estimate**

Design Phase: Feasibility Study

MACC = \$TBD

Element Description		Cost	Cost/SqFt	Percent
A10	Foundations	\$0	\$0.00	0.00%
A20	Basement Construction	\$0	\$0.00	0.00%
B10	Superstructure	\$0	\$0.00	0.00%
B20	Exterior Enclosure	\$0	\$0.00	0.00%
B30	Roofing	\$0	\$0.00	0.00%
C10	Interior Construction	\$0	\$0.00	0.00%
C20	Stairs	\$0	\$0.00	0.00%
C30	Interior Finishes	\$94,648	\$29.43	74.10%
D10	Conveying Systems	\$0	\$0.00	0.00%
D20	Plumbing <i>(See APT for Piping Disco/Reconnections)</i>	\$0	\$0.00	0.00%
D30	HVAC	\$0	\$0.00	0.00%
D40	Fire Protection	\$0	\$0.00	0.00%
D50	Electrical	\$20,500	\$6.37	16.05%
E10	Equipment	\$0	\$0.00	0.00%
E20	Furnishings	\$0	\$0.00	0.00%
F10	Special Construction	\$0	\$0.00	0.00%
F20	Selective Building Demolition	\$6,500	\$2.02	5.09%
Building Construction Cost		\$121,648	\$37.83	95.24%
G10	Site Preparation	\$0	\$0.00	0.00%
G20	Site Improvements	\$0	\$0.00	0.00%
G30	Site Mechanical Utilities	\$0	\$0.00	0.00%
G40	Site Electrical Utilities	\$0	\$0.00	0.00%
G90	Other Site Construction	\$0	\$0.00	0.00%
Sitework Cost		\$0	\$0.00	0.00%
Z10	Non-Specified General Conditions (5.00%)	\$6,082	\$1.89	4.76%
<b>Subtotal of Estimated Construction Cost</b>		<b>\$127,731</b>	<b>\$39.72</b>	<b>100.00%</b>
<b>CONTRACTOR FEES</b>				
Negotiated Support Services (4.00%)		\$5,109	\$1.59	4.00%
Specified General Conditions (17.0%)		\$21,714	\$6.75	17.00%
<b>Total Estimated Construction Cost</b>		<b>\$154,554</b>	<b>\$48.06</b>	<b>121.00%</b>
<b>FEASIBILITY STUDY PHASE ADJUSTMENTS</b>				
Contingency to 100% CD's (15.00%)		\$23,183	\$7.21	18.15%
Cost Index to Q3 '26 (5.83%)		\$9,011	\$2.80	7.05%
<b>Total Estimated Construction Cost</b>		<b>\$186,748</b>	<b>\$58.07</b>	<b>146.20%</b>
GC/CM Fee (10.0%)		\$18,675	\$5.81	14.62%
GCCM Risk (Construction Contingency) (3.00%)		\$6,163	\$1.92	4.82%
<b>Total Estimated GC/CM Amount</b>		<b>\$211,586</b>	<b>\$65.79</b>	<b>165.65%</b>

**WSU Food Quality Building Creamery TI - Flooring Replacement**  
**Site Area: 4,570 SF**  
**Building Area: 3,216 SF**

**Construction Cost Estimate**  
**Design Phase: Feasibility Study**  
**MACC: TBD**

Code	Item Description	Quan	Unit	Unit Price	Total
<b>C30 Interior Finishes</b>					
C3020	Quarry Tile Base	310	lnft	46.00	14,261.03
C3020	Quarry Tile Flooring	3,216	sqft	25.00	80,387.45
<b>Interior Finishes Total</b>					<b>94,648.48</b>
<b>D50 Electrical</b>					
D5000	Electrical Disconnect/Reconnect for Tile Replacement	3,216	sqft	6.37	20,500.00
<b>Electrical Total</b>					<b>20,500.00</b>
<b>F20 Selective Building Demolition</b>					
F2010	Select Demolition Disposal	1	lsum	1,500.00	1,500.00
F2010	Demolish Quarry Tile Flooring	3,216	sqft	1.55	5,000.00
<b>Selective Building Demolition Total</b>					<b>6,500.00</b>
<b>Grand Total</b>					<b>121,648.48</b>

# ALTERNATE 2 - Lighting Replacement - Processing Area

**WSU Food Quality Building Creamery T.I. - Replace Processing Area Lighting**

Site Area: 4,570 GSF

Gross Renovation Area: 3,216 GSF

**Construction Cost Estimate**

Design Phase: Feasibility Study

MACC = \$TBD

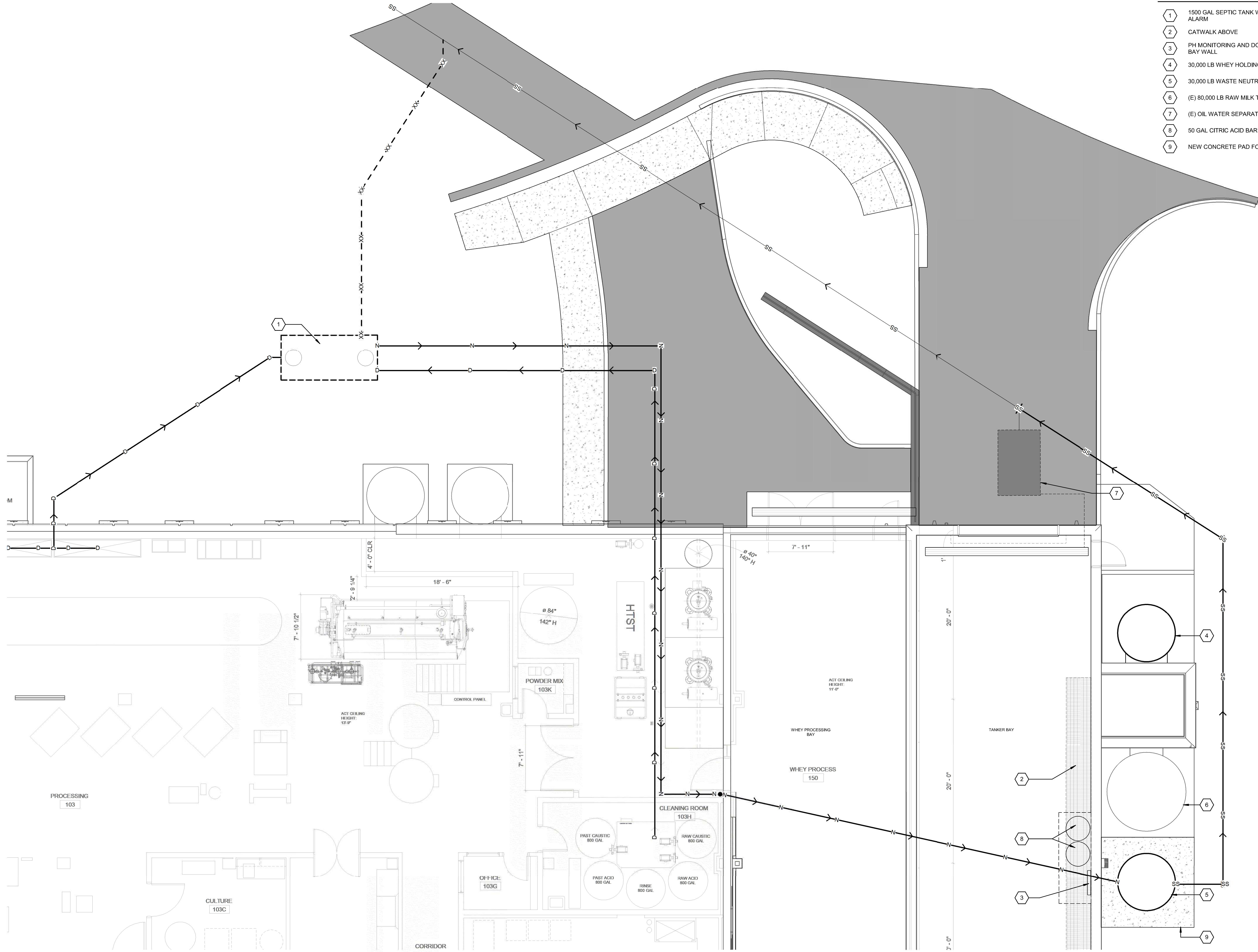
Element Description		Cost	Cost/SqFt	Percent
A10	Foundations	\$0	\$0.00	0.00%
A20	Basement Construction	\$0	\$0.00	0.00%
B10	Superstructure	\$0	\$0.00	0.00%
B20	Exterior Enclosure	\$0	\$0.00	0.00%
B30	Roofing	\$0	\$0.00	0.00%
C10	Interior Construction	\$0	\$0.00	0.00%
C20	Stairs	\$0	\$0.00	0.00%
C30	Interior Finishes	\$0	\$0.00	0.00%
D10	Conveying Systems	\$0	\$0.00	0.00%
D20	Plumbing <i>(See APT for Piping Disco/Reconnections)</i>	\$0	\$0.00	0.00%
D30	HVAC	\$0	\$0.00	0.00%
D40	Fire Protection	\$0	\$0.00	0.00%
D50	Electrical	\$46,750	\$14.54	95.24%
E10	Equipment	\$0	\$0.00	0.00%
E20	Furnishings	\$0	\$0.00	0.00%
F10	Special Construction	\$0	\$0.00	0.00%
F20	Selective Building Demolition	\$0	\$0.00	0.00%
<b>Building Construction Cost</b>		<b>\$46,750</b>	<b>\$14.54</b>	<b>95.24%</b>
G10	Site Preparation	\$0	\$0.00	0.00%
G20	Site Improvements	\$0	\$0.00	0.00%
G30	Site Mechanical Utilities	\$0	\$0.00	0.00%
G40	Site Electrical Utilities	\$0	\$0.00	0.00%
G90	Other Site Construction	\$0	\$0.00	0.00%
<b>Sitework Cost</b>		<b>\$0</b>	<b>\$0.00</b>	<b>0.00%</b>
Z10	Non-Specified General Conditions (5.00%)	\$2,338	\$0.73	4.76%
<b>Subtotal of Estimated Construction Cost</b>		<b>\$49,088</b>	<b>\$15.26</b>	<b>100.00%</b>
<b>CONTRACTOR FEES</b>				
Negotiated Support Services (4.00%)		\$1,964	\$0.61	4.00%
Specified General Conditions (17.0%)		\$8,345	\$2.59	17.00%
<b>Total Estimated Construction Cost</b>		<b>\$59,396</b>	<b>\$18.47</b>	<b>121.00%</b>
<b>FEASIBILITY STUDY PHASE ADJUSTMENTS</b>				
Contingency to 100% CD's (15.00%)		\$8,909	\$2.77	18.15%
Cost Index to Q3 '26 (5.83%)		\$3,463	\$1.08	7.05%
<b>Total Estimated Construction Cost</b>		<b>\$71,768</b>	<b>\$22.32</b>	<b>146.20%</b>
GC/CM Fee (10.0%)		\$7,177	\$2.23	14.62%
GCCM Risk (Construction Contingency) (3.00%)		\$2,368	\$0.74	4.82%
<b>Total Estimated GC/CM Amount</b>		<b>\$81,313</b>	<b>\$25.28</b>	<b>165.65%</b>

**WSU Food Quality Building Creamery TI - Lighting Replacement**  
**Site Area: 4,570 SF**  
**Building Area: 3,216 SF**

**Construction Cost Estimate**  
**Design Phase: Feasibility Study**  
**MACC: TBD**

Code	Item Description	Quan	Unit	Unit Price	Total
<b>D50 Electrical</b>					
D5000	LED Lighting Replacement				
		3,216	sqft	14.54	46,750.00
		<b>Electrical Total</b>			<b>46,750.00</b>
		<b>Grand Total</b>			<b>46,750.00</b>
		3,216	gsf	14.54	46,750.00





**KEYNOTES**

- ① 1500 GAL SEPTIC TANK W/ REDUNDANT PUMP PACKAGE AND ALARM
- ② CATWALK ABOVE
- ③ PH MONITORING AND DOSING SYSTEM MOUNTED TO TANKER BAY WALL
- ④ 30,000 LB WHEY HOLDING TANK
- ⑤ 30,000 LB WASTE NEUTRALIZATION TANK
- ⑥ (E) 80,000 LB RAW MILK TANK
- ⑦ (E) OIL WATER SEPARATOR
- ⑧ 50 GAL CITRIC ACID BARRELS
- ⑨ NEW CONCRETE PAD FOUNDATION

Revisions:


**NOT FOR CONSTRUCTION**

PARTIAL SITE - BUILDING PLAN

WSU FOOD QUALITY BUILDING CREAMERY T1  
EQUIPMENT UPGRADE - WSU FILE #: 815-G-018

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WSU Project No.:	815-G-018
WAG Project No.:	24,108
Date:	11.24.2024
Drawn By:	ZMM
Checked By:	RJW
Sheet No.:	

**A0.00**





**A SOUTH WHEY PROCESSING**

A1.13

REF A1.10



**B NORTH WHEY PROCESSING**

A1.13

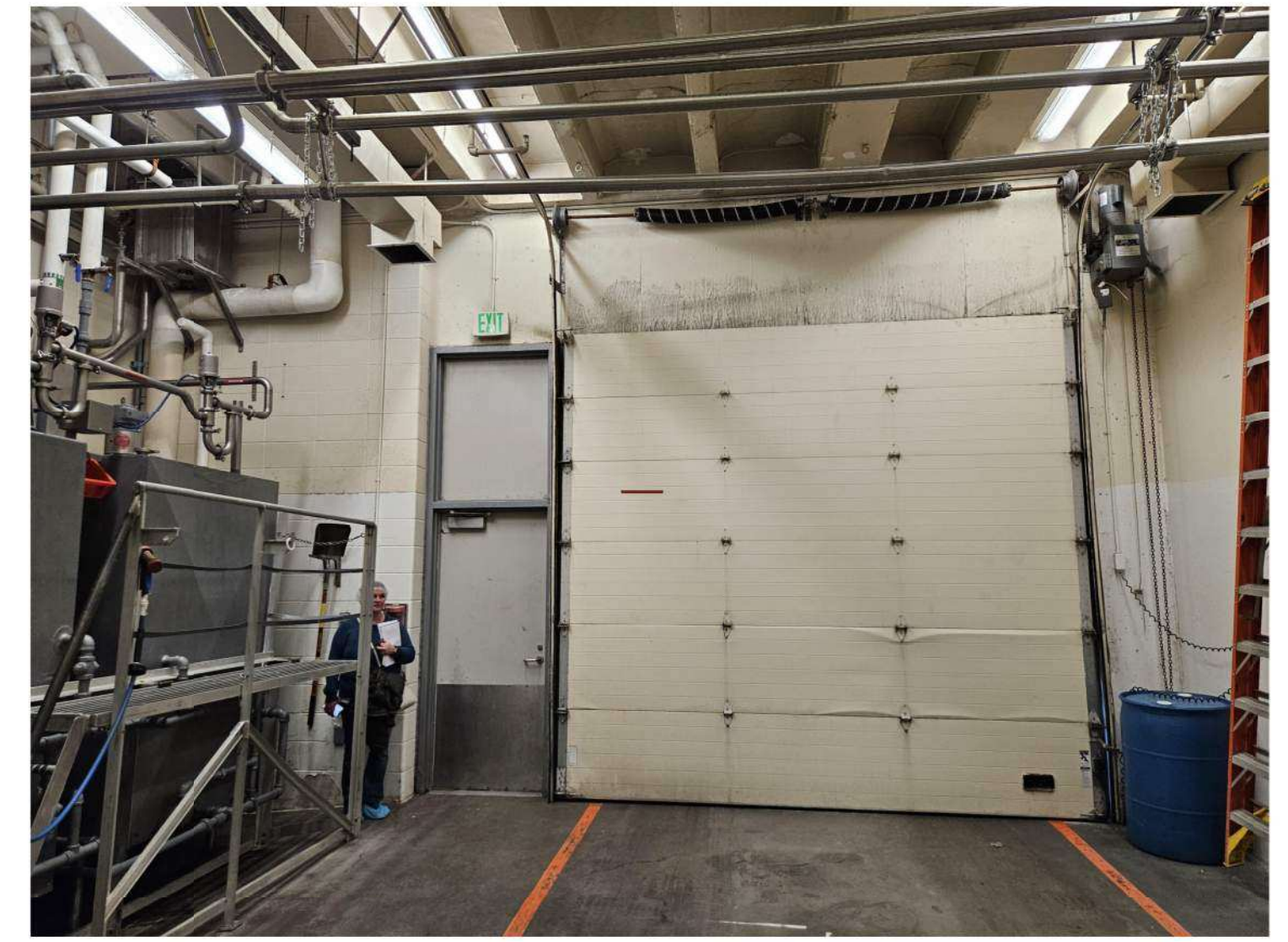
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**C WEST UPPER RECEIVING**

A1.13

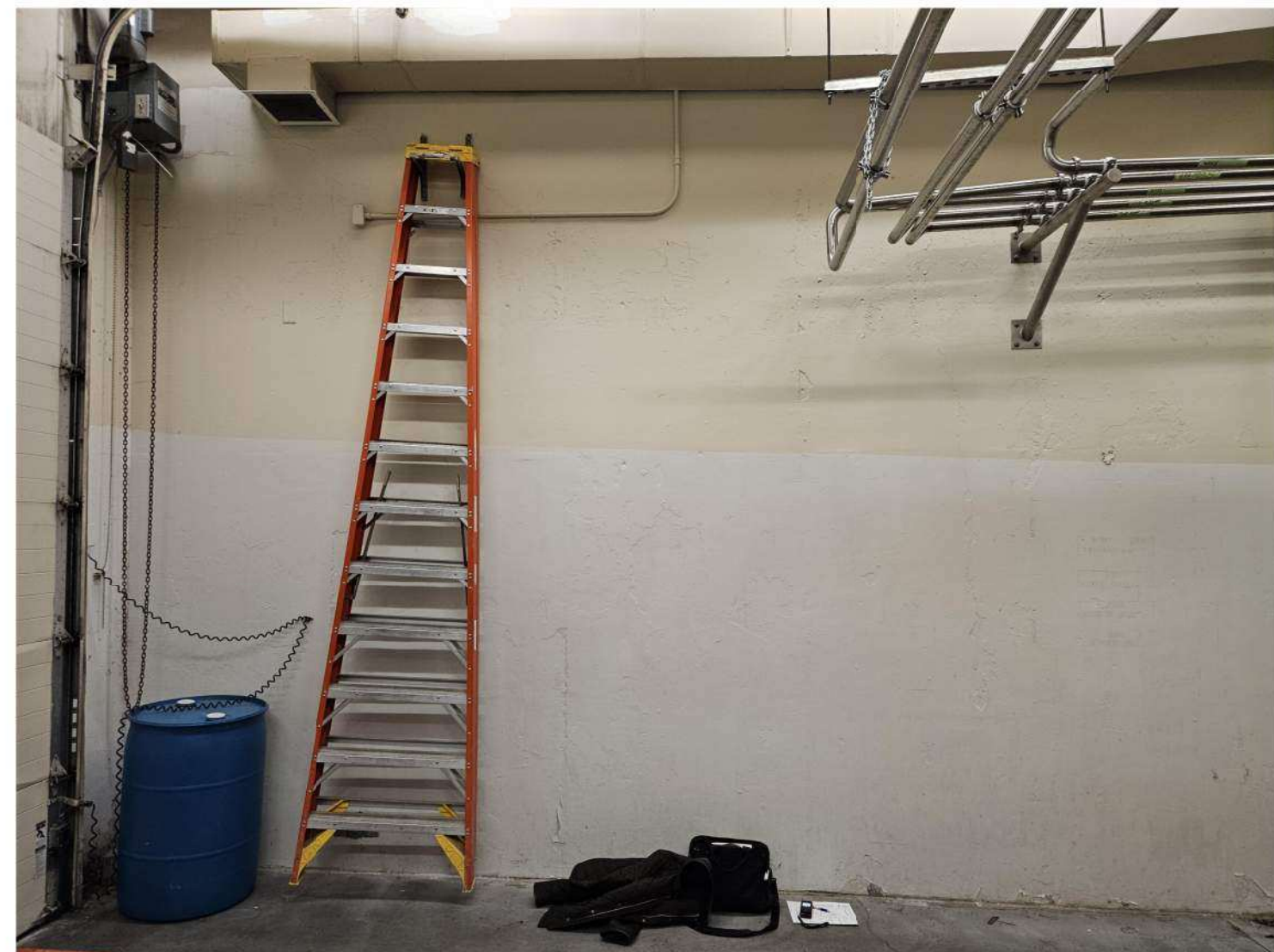
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**D NORTH RECEIVING**

A1.13

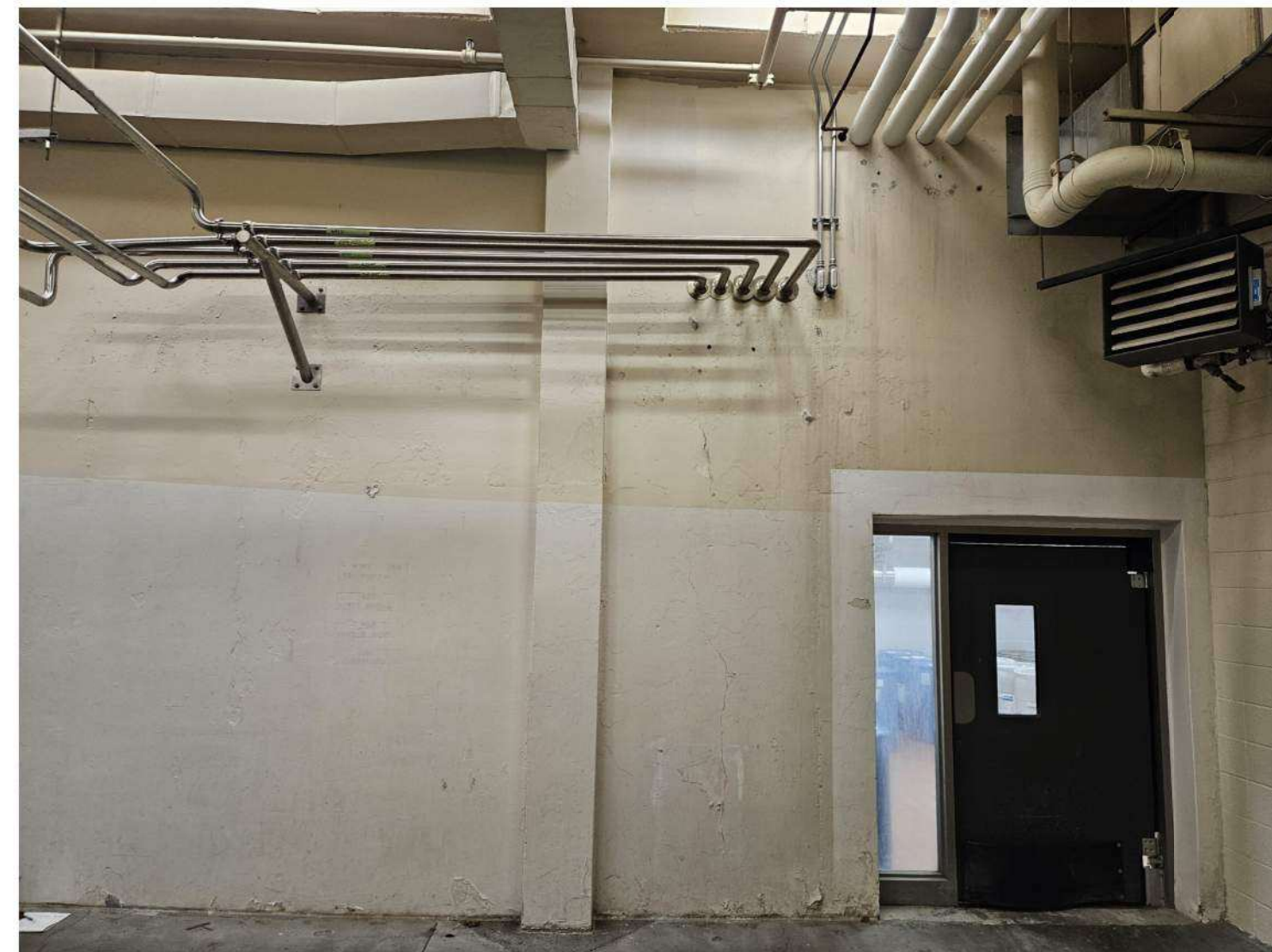
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**E EAST UPPER RECEIVING**

A1.13

REF A1.10



**F EAST LOWER RECEIVING**

A1.13

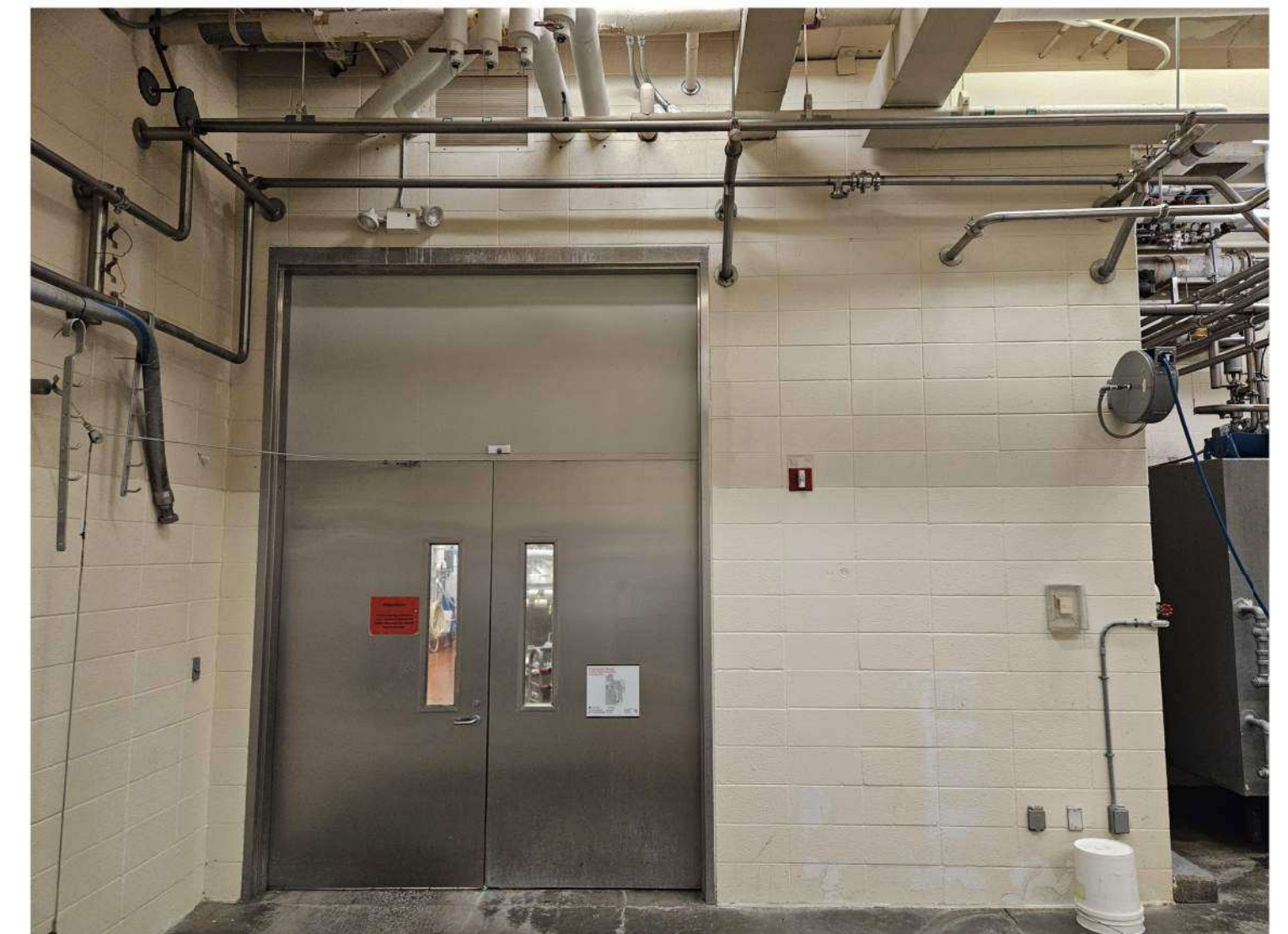
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**G SOUTH RECEIVING**

A1.13

REF A1.10



**H WEST LOWER RECEIVING**

A1.13

REF A1.10



**I SE CORNER**

A1.13

REF A1.10



**J NORTH PROCESSING CHEESE VAT**

A1.13

REF A1.10



**K SW PROCESSING VAT PASTURIZER**

A1.13

REF A1.10

Revisions:

NOT FOR CONSTRUCTION

DEMO PHOTOS

WSU FOOD QUALITY BUILDING CREAMERY T1  
EQUIPMENT UPGRADE - WSU FILE #: 815-G-018

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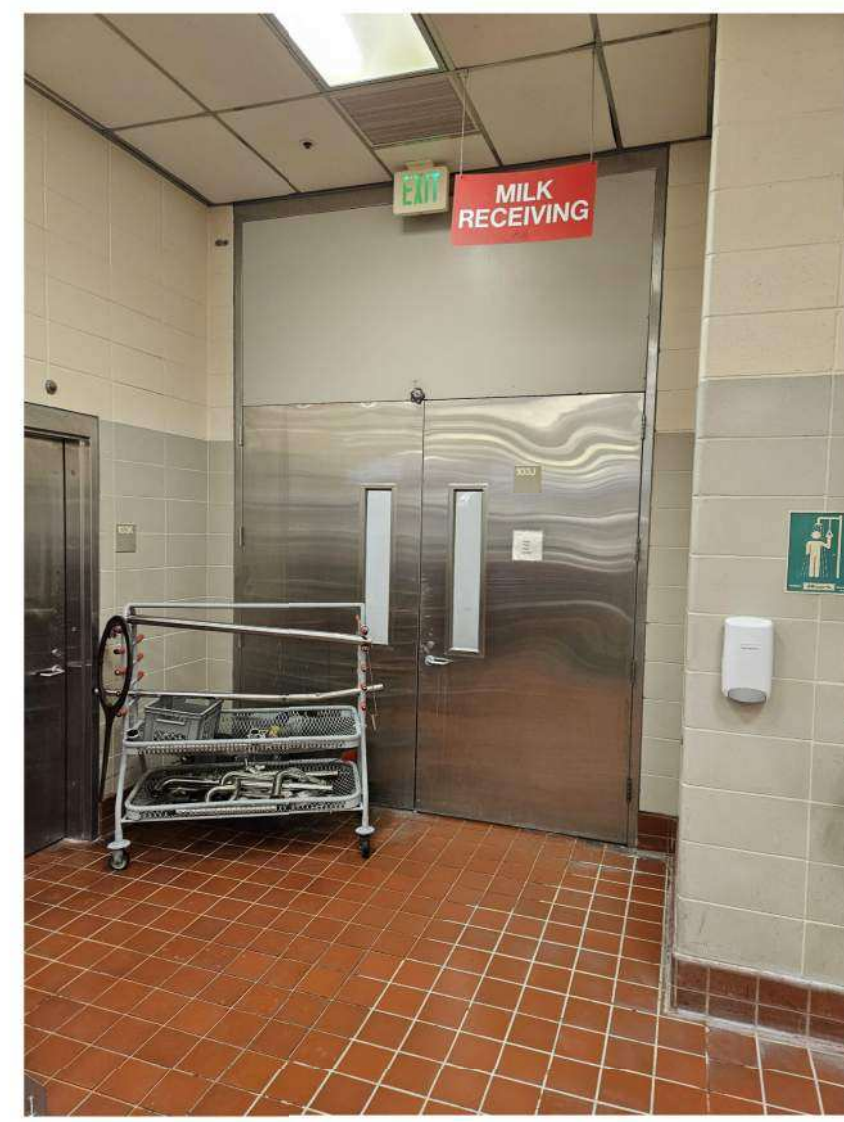
WSU Project No.: 815-G-018  
WAG Project No.: 24,108  
Date: 11.24.2024  
Drawn By: JN  
Checked By: RJW  
Sheet No.

**A0.02**



L VAT PASTURIZER

A1.14 REF A1.10



M SE ENTRANCE TO 103J

A1.14 REF A1.10



N SW VAT PASTURIZER

A1.14 REF A1.10



O EAST VAT PASTURIZER

A1.14 REF A1.10



P SW VAT PASTURIZER

A1.14 REF A1.10



Q NE HTST PASTURIZER

A1.14 REF A1.10



R EAST CHEESEMAKER

A1.14 REF A1.10



S NE CHEESEMAKER

A1.14 REF A1.10



T LOWER EAST PROCESSING

A1.14 REF A1.10



U NW HTST PASTURIZER

A1.14 REF A1.10



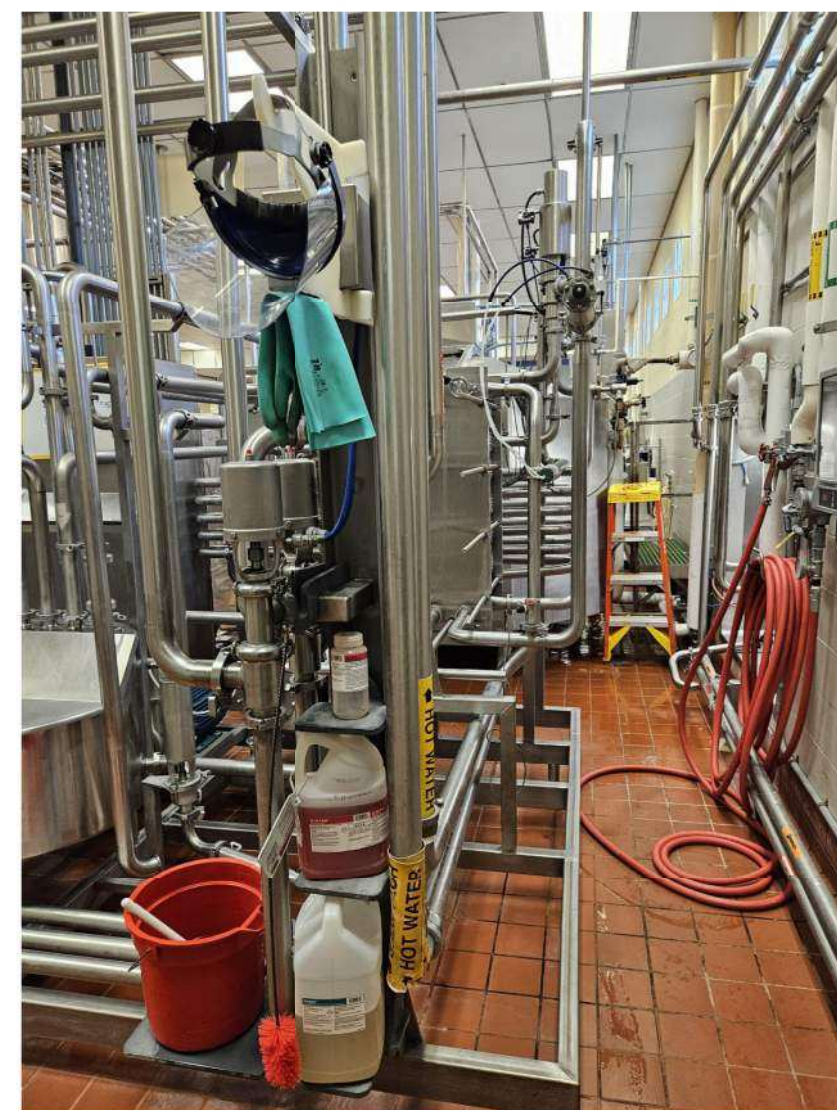
V UPPER EAST PROCESSING

A1.14 REF A1.10



W SW HTST PASTURIZER

A1.14 REF A1.10



X NW HTST PASTURIZER

A1.14 REF A1.10

Revisions:

NOT FOR CONSTRUCTION

DEMO PHOTOS

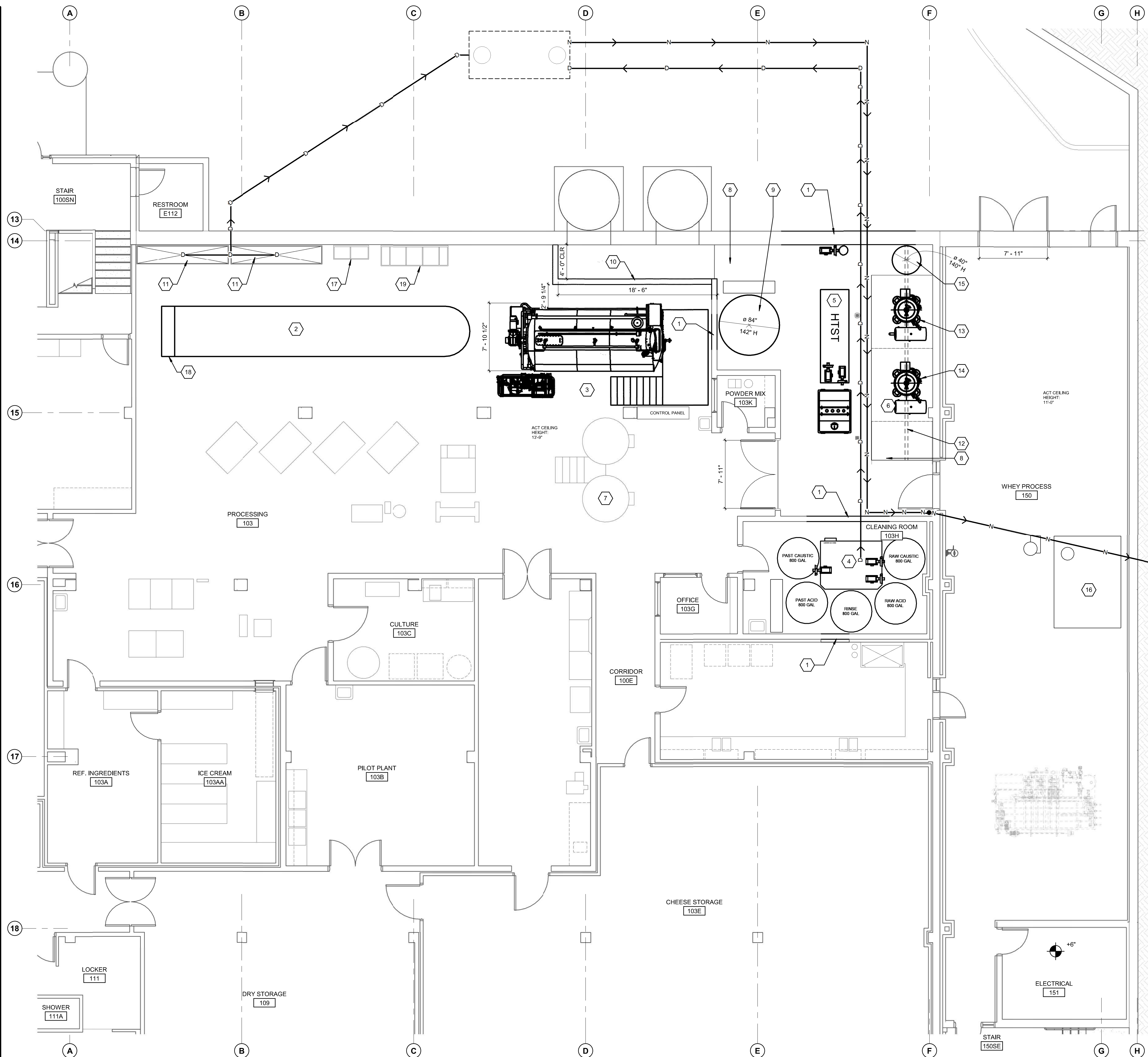
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Sheet No.

**A0.03**



**GENERAL NOTES**

- 1 ALL COMPONENTS DAMAGED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION WITHOUT COST TO THE OWNER
- 2 ALL DIMENSIONS FROM FACE OF STUD, U.O.N
- 3 U.O.N, ALL EXISTING TO REMAIN
- 4 THE GENERAL CONTRACTOR SHALL NOTIFY THE ARCHITECT OF ANY UN-AUTHORIZED STRUCTURAL ALTERATION
- 5 ALL EQUIPMENT LOCATIONS AND SIZES ARE ESTIMATES, AND TO BE VERIFIED IN THE FIELD. DRAWINGS TO BE USED FOR REFERENCE ONLY. SEE EQUIPMENT DRAWINGS FOR MORE INFORMATION

**KEYNOTES**

- 1 INFILL WALL, SEE PARTITION TYPES
- 2 INSTALL FINISHING TABLE, PROVIDE 3' 0" CLEAR
- 3 INSTALL CHEESE VAT EQUIPMENT
- 4 INSTALL CIP SYSTEM
- 5 INSTALL HTST SYSTEM
- 6 INSTALL CENTRIFUGE SYSTEM
- 7 RE-INSTALL (E) PASTURIZER
- 8 ROOM 103J TO RECEIVE NEW SLAB & FINISHES
- 9 NEW MILK TANK, 1,500 GAL
- 10 NEW CMU WALL, SEE PARTITION TYPES
- 11 REINSTALL COP TABLES
- 12 2,000 LB BEAM HOIST - CENTERED ABOVE SEPARATORS
- 13 MILK SEPARATOR CENTRIFUGE
- 14 MILK CLARIFIER CENTRIFUGE
- 15 INSTALL 2,000 LB/250 GAL - CREAM HOLDING TANK
- 16 RELOCATED (E) HTST & (E) SEPARATOR
- 17 (E) HANDWASH SINK - REINSTALL
- 18 PRODUCT ELEVATOR
- 19 (E) 3-COMPARTMENT SINK - REINSTALL

Revisions:


**NOT FOR CONSTRUCTION**

FLOOR PLAN

WSU FOOD QUALITY BUILDING CREAMERY TI  
 EQUIPMENT UPGRADE - WSU FILE #: 815-G-018  
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 Sheet No.

**A1.01**



ROOM FINISH SCHEDULE Copy 2																	
ROOM NAME	ROOM #	FLOOR		BASE		N		E		S		W		CEILING		NOTES	
		FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	HEIGHT			
01 - FLR																	
PROCESSING	103	FF	QT-1	FF	QT-3,4	FF	MVT1,2	FF	MVT1,2	FF	MVT1,2	FF	MVT1,2	FF	ACT-1	13' - 9"	
CLEANING ROOM	103H	FF	QT-2	FF	QT-3,4	FF	MVT1,2	FF	MVT1,2	FF	MVT1,2	FF	MVT1,2	FF	ACT-1	13' - 6"	
RECEIVING	103J	FF	QT-3	FF	QT-3,4	FF	MVT1,2	FF	MVT1,2	FF	MVT1,2	FF	MVT1,2	FF	ACT-1	13' - 6"	2
POWDER MIX	103K	FF	QT-1	FF	QT-3,4	FF	MVT1,2	FF	MVT1,2	FF	MVT1,2	FF	MVT1,2	FF	ACT-1	8' - 0"	

**FINISH ABBREVIATIONS**

- ACT - ACOUSTICAL CEILING TILE
- CPT - CARPET
- CT - CERAMIC TILE
- WOM - WALK OFF MAT
- GWB - GYPSUM WALL BOARD
- FF - FACTORY FINISH
- PNT - PAINT
- RB - RUBBER BASE
- SS - SOLID SURFACE
- E - EXISTING
- PLWD - PLYWOOD
- FRP - FIBER REINFORCED PANEL
- VCT - VINYL COMPOSITE FLOORING
- SLD - SEALED
- MVT - MASONRY VENEER TILE

**FINISH SCHEDULE GENERAL NOTES**

- A. ALL FLOORING TRANSITIONS TO OCCUR AT CENTER OF THRESHOLD U.O.N.
- B. ALL FINISHES TO TERMINATE ON INSIDE CORNER U.O.N.
- C. REFER TO REFLECTED CEILING PLAN FOR CEILING HEIGHTS.
- D. SEE FINISH FLOOR PLANS FOR FLOOR FINISH PATTERN.
- E. USE SCHLUETER TRANSITION PIECES AT FLOORING TRANSITIONS.

**FINISH SCHEDULE KEYED NOTES**

1. MVT-1 & MVT-2 TILES TO BE AT 10'-6" A.F.F. - SEE ELEVATION 7/A7.1
2. GWB SOFFIT AT CORRIDOR TO BE AT 8'-0" AFF
3. CUSTOM PAINT DESIGN - SEE ELEVATION 1/A7.2

**FINISH SCHEDULE**

- ACT-1 2' X 4' ARMSTRONG CIRRUS, FOOD GRADE CEILING TILE
- PNT-1 MATCH SHERWIN WILLIAMS, DOWNY SW 7002 (SATIN FINISH, TYP.)
- PNT-2 MATCH SHERWIN WILLIAMS, CITYSCAPE SW 7067 (SATIN FINISH, TYP.)
- PNT-3 MATCH SHERWIN WILLIAMS, COLLONADE GRAY SW 7641 (SATIN FINISH, TYP.)
- PNT-4 MATCH SHERWIN WILLIAMS, IRON ORE SW 7069 (SATIN FINISH, TYP.)
- PNT-5 MATCH SHERWIN WILLIAMS, SAFETY YELLOW SW 4084 (SATIN FINISH, TYP.)

**QUARRY TILE**

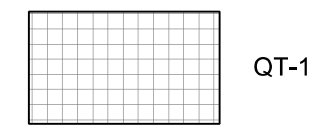
- QT-1 METROPOLITAN CERAMICS, QUARRY BASICS TILE 6"X6" COLOR: 310 MAYFLOWER RED
- QT-2 METROPOLITAN CERAMICS, QUARRY BASICS TILE 6"X6" COVE BASE Q3565 COLOR: 310 MAYFLOWER RED
- QT-3 METROPOLITAN CERAMICS, QUARRY BASICS TILE 6"X6" BULLNOSE Q1665 COLOR: 310 MAYFLOWER RED

GROUT: EPOXY GROUT, DRAK GRAY

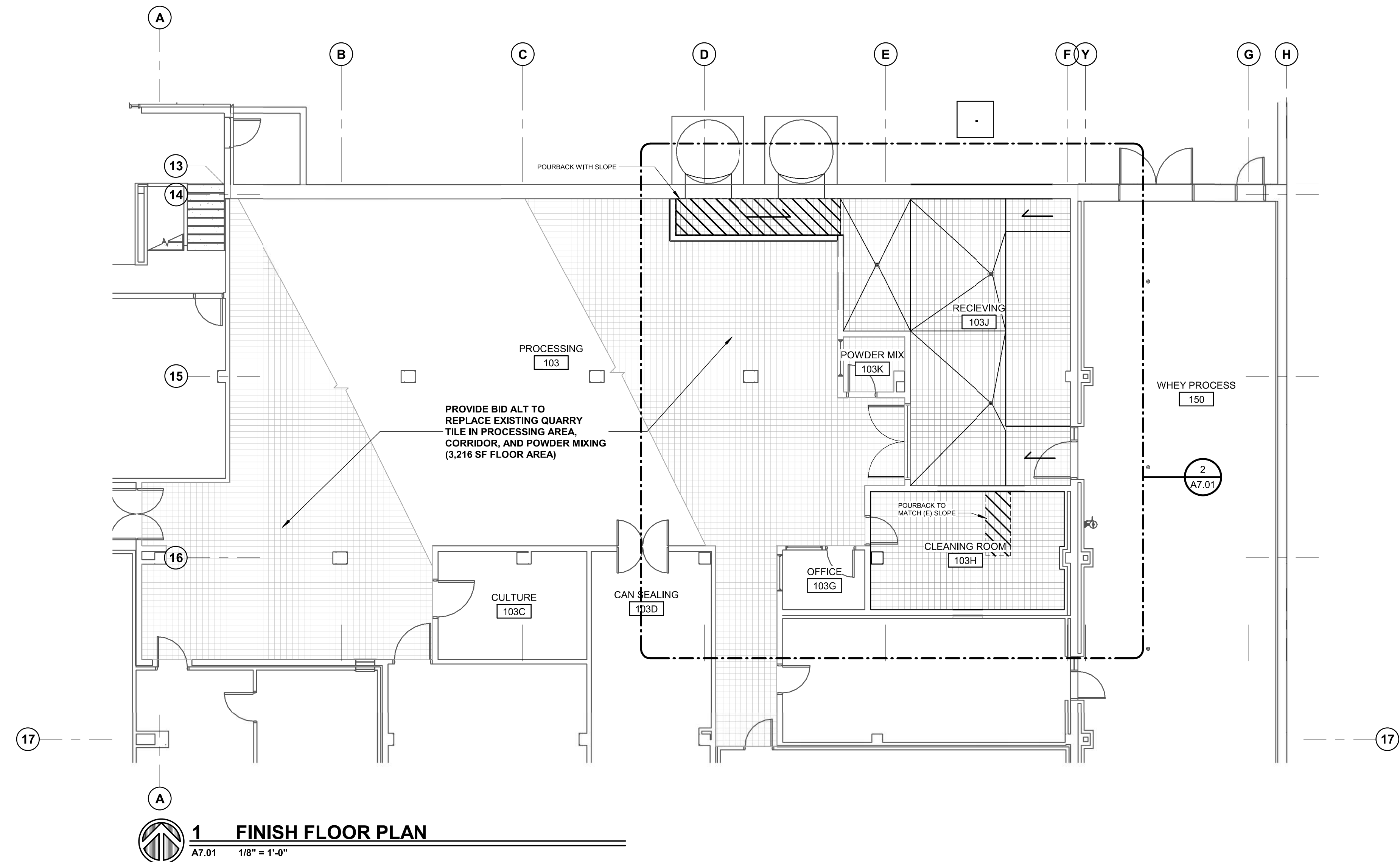
**MASONRY VENEER TILE**

- MVT-1 TRENWYTH INDUSTRIES, ASTRA-GLAZE-SW, COLOR: WHITMAN WHITE, SIZE: 4S, 4"D X 8"T X 16" W (WEST WHEY PROCESS)
  - MVT-2 TRENWYTH INDUSTRIES, ASTRA-GLAZE-SW, COLOR: SILVER GRAY, SIZE: 4S, 4"D X 8"T X 16" W (WEST WHEY PROCESS)
  - MVT-3 TRENWYTH INDUSTRIES, ASTRA-GLAZE-SW, COLOR: WHITMAN WHITE, SIZE: 2S, 2"D X 8"T X 16" W
  - MVT-4 TRENWYTH INDUSTRIES, ASTRA-GLAZE-SW, COLOR: SILVER GRAY, SIZE: 2S, 2"D X 8"T X 16" W
- GROUT: EPOXY GROUT, WHITE

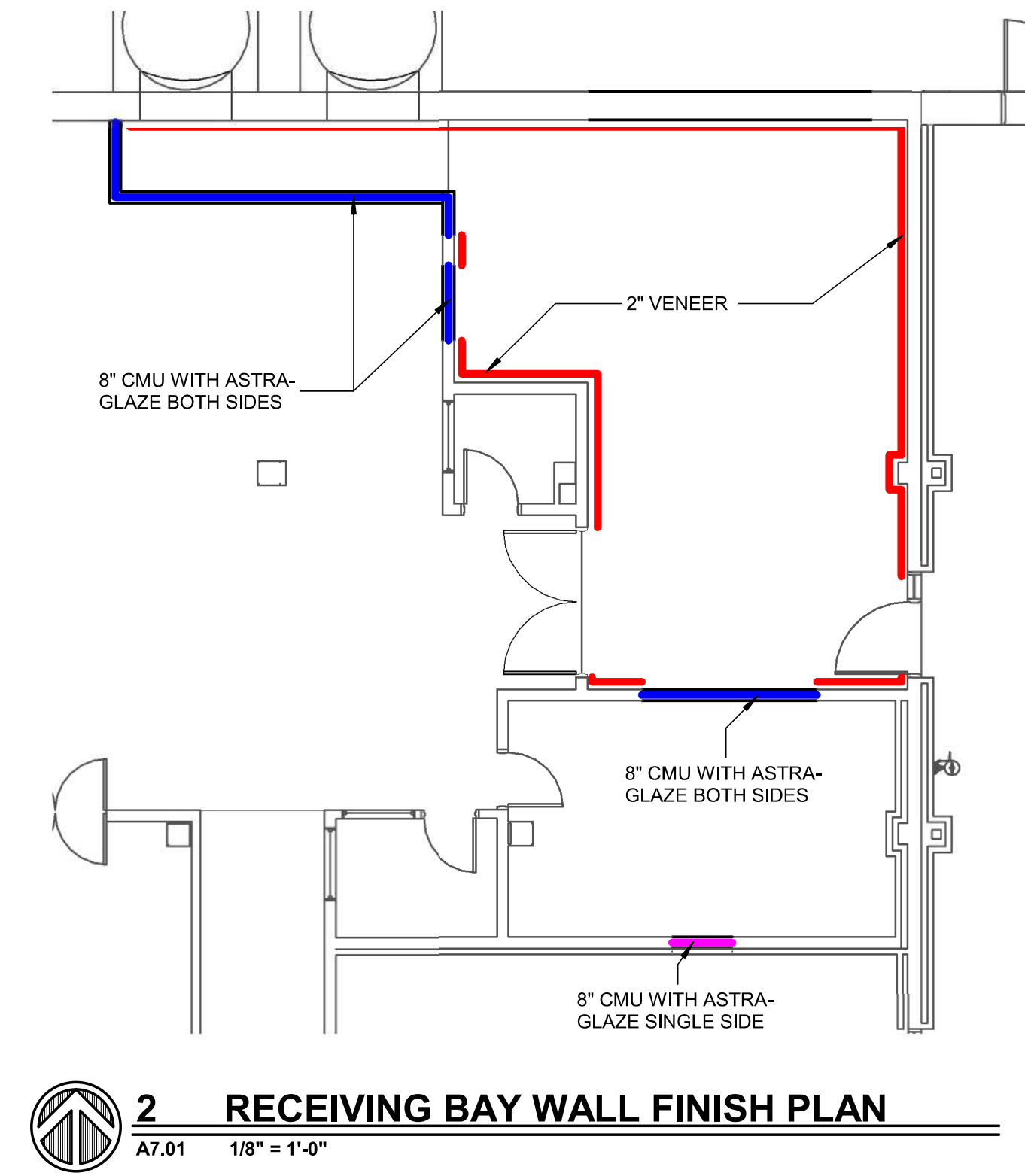
**FINISH FLOOR PLAN LEGEND**



QT-1



**1 FINISH FLOOR PLAN**  
A7.01 1/8" = 1'-0"



**2 RECEIVING BAY WALL FINISH PLAN**  
A7.01 1/8" = 1'-0"

Revisions:

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FINISH FLOOR PLAN

WSU FOOD QUALITY BUILDING CREAMERY TI  
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**A7.01**

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**KEYNOTES**

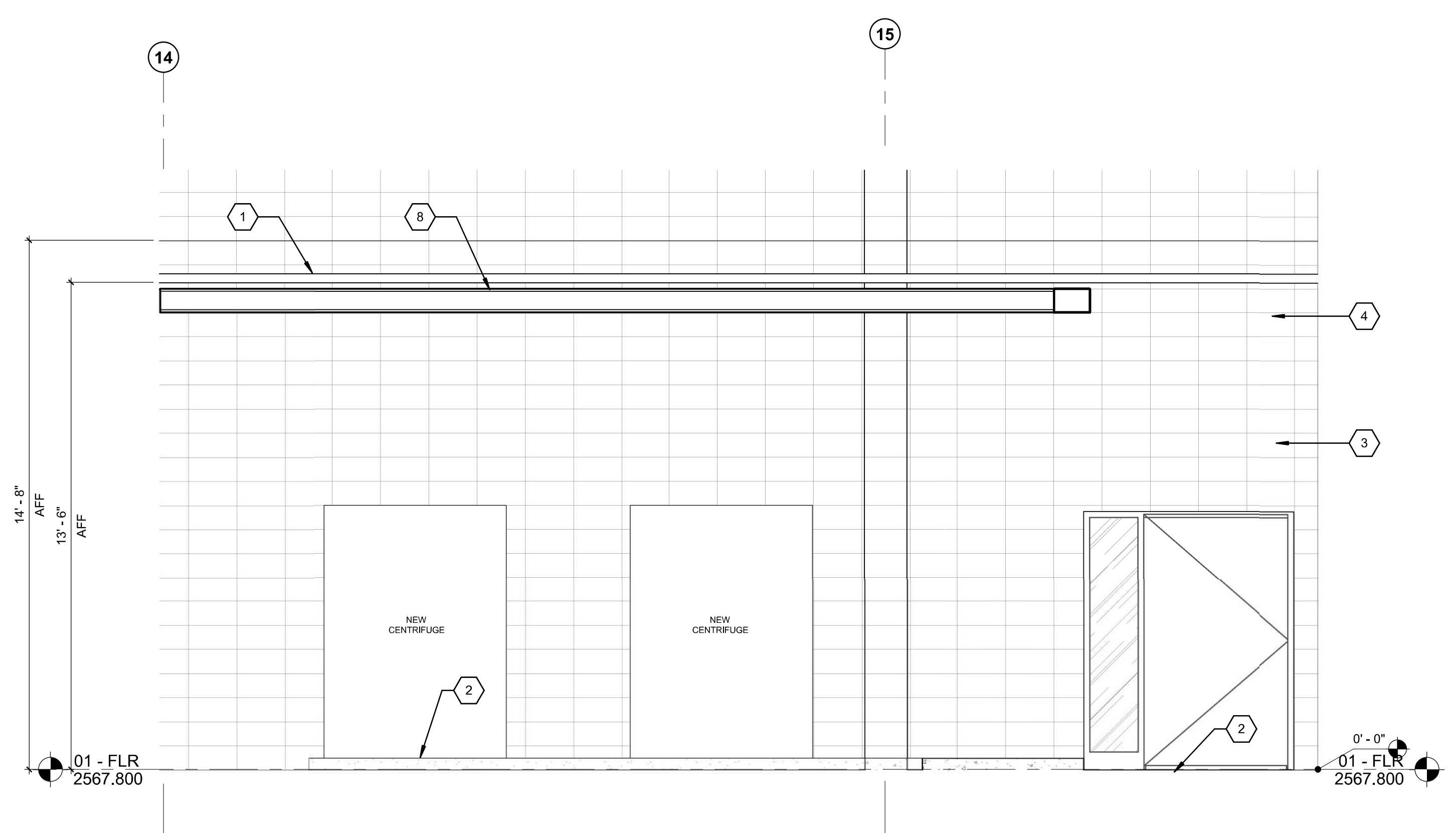
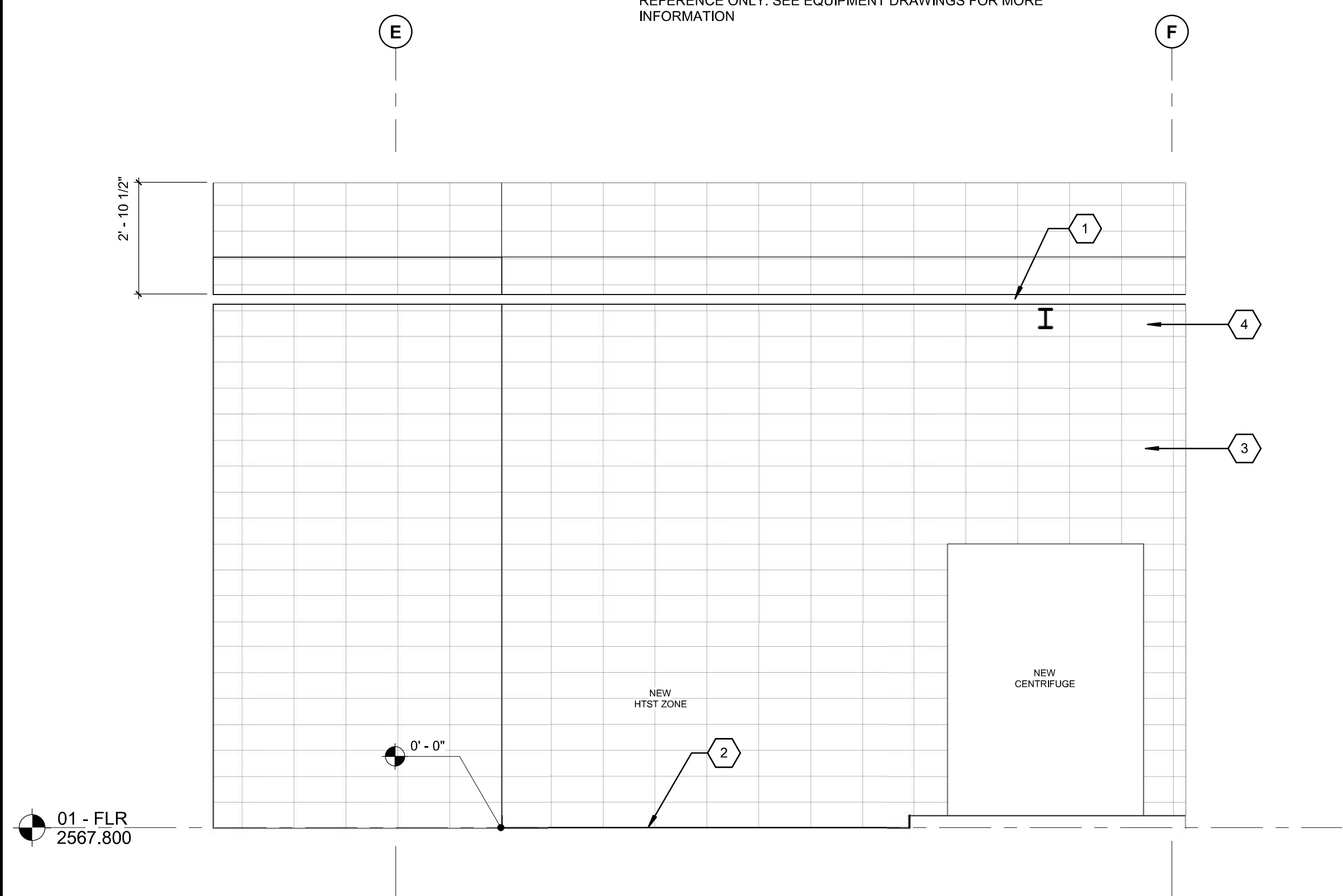
- |  |  |
|--|--|
| 1 INSTALL ACT-1 @ 13' 6" AFF                             | 5 NEW CENTRIFUGE FOOTING TO BE 4'-0", SEE EQUIPMENT FOR REQUIREMENTS |
| 2 INSTALL QT-1 ON NEW AND EXISTING SLABS                 | 6 SOFFIT ABOVE MILK SILO ACCESS CORRIDOR                             |
| 3 INSTALL MV-1 ON WALLS UP TO 10' -6" AFF                | 7 MILK SILO ACCESS CORRIDOR  |
| 4 INSTALL MV-2 ON ALL WALLS AT 10'-0" UP TO 6" ABOVE ACT | 8 CRANE RAIL   |

**FINISH KEY**

<b>ACOUSTICAL CEILING TILE</b>		<b>QUARRY TILE</b>
ACT-1	ARMSTRONG COMMERCIAL CEILINGS, ULTIMA HEALTH ZONE, 1938 SQUARE LAY-IN 24"x48", WHITE GRID: PRELUDE STAINLESS STEEL 15/16"	QT-1 METROPOLITAN CERAMICS, QUARRY BASICS TILE 6"x6" COLOR: 310 MAYFLOWER RED
<b>MASONRY VENEER TILE</b>		QT-3 METROPOLITAN CERAMICS, QUARRY BASICS TILE 6"x6" COVE BASE Q3565 COLOR: 310 MAYFLOWER RED
MVT-1	TRENWYTH INDUSTRIES, ASTRA-GLAZE-SW, COLOR: SILVER GRAY, SIZE: 4S, 4"D X 8" T X 16" W	QT-4 METROPOLITAN CERAMICS, QUARRY BASICS TILE 6"x6" BULLNOSE Q1665 COLOR: 310 MAYFLOWER RED
MVT-2	TRENWYTH INDUSTRIES, ASTRA-GLAZE-SW, COLOR: WHITMAN WHITE, SIZE: 4S, 4"D X 8" T X 16" W	GROUT: EPOXY GROUT, DRAK GRAY

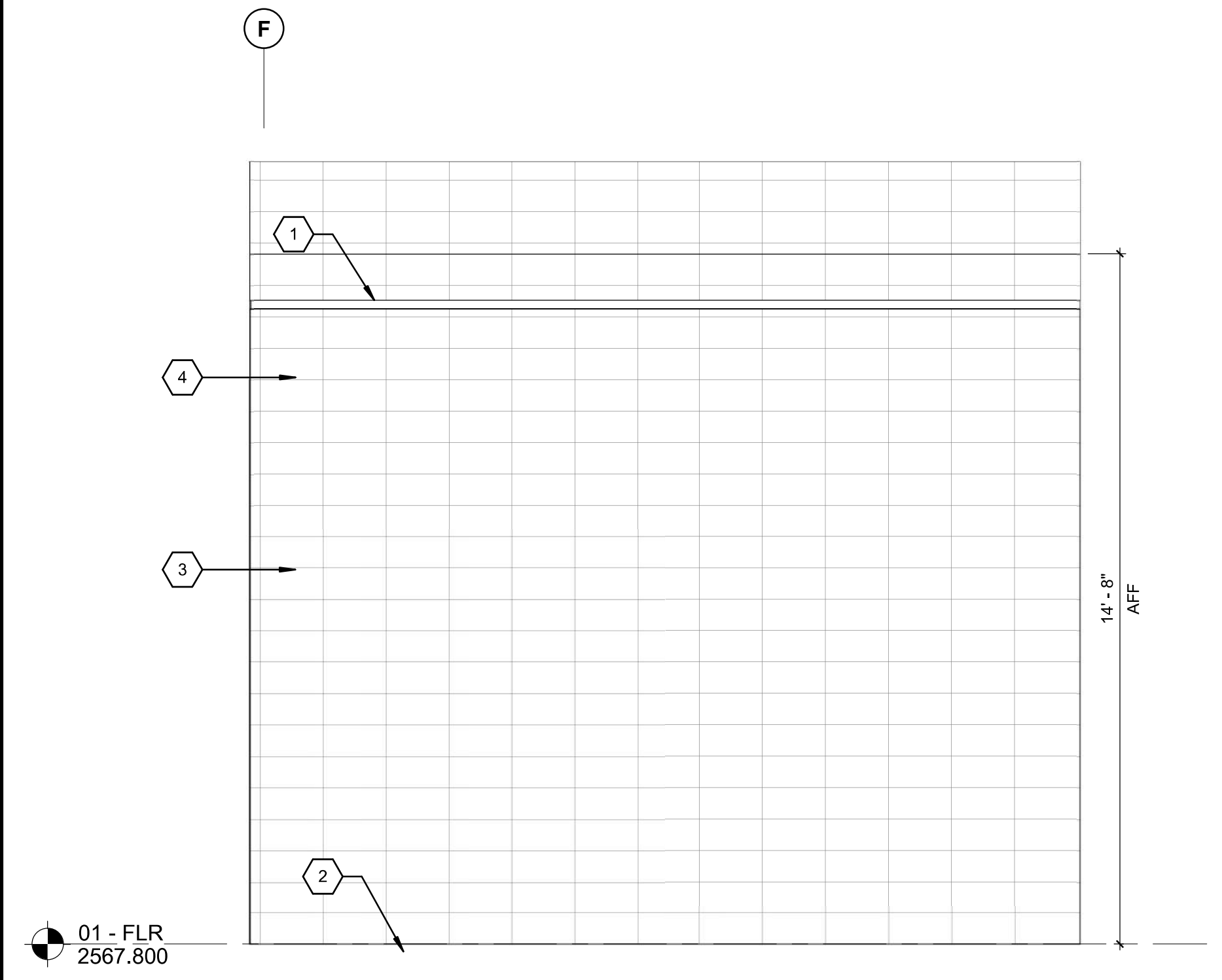
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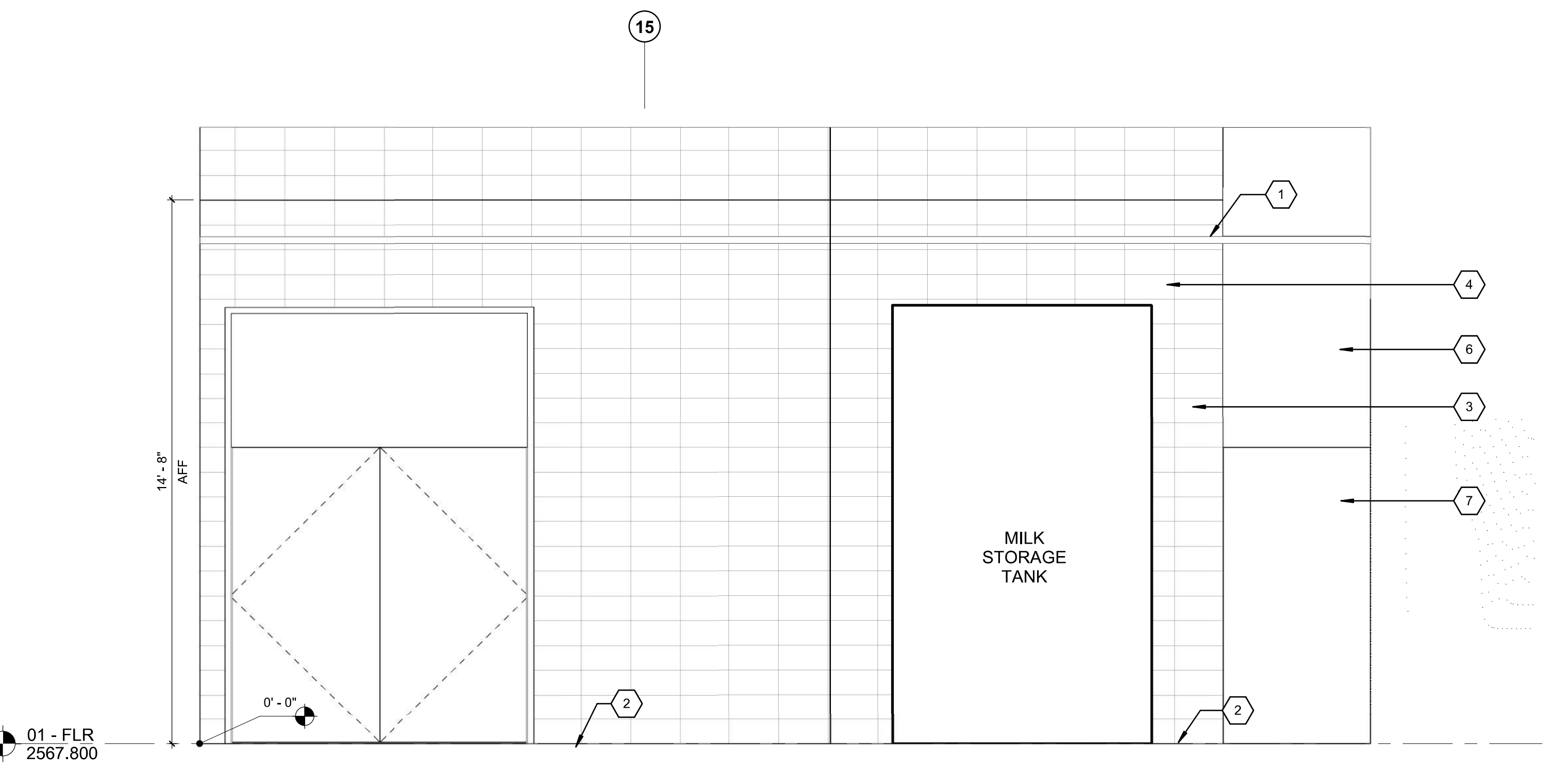
**1 NORTH RECEIVING**

A7.10 SCALE: 3/8" = 1'-0" REF: A1.21



**2 EAST RECEIVING**

A7.10 SCALE: 3/8" = 1'-0" REF: A1.21



**3 SOUTH RECEIVING**

A7.10 SCALE: 3/8" = 1'-0" REF: A1.21

**4 WEST RECEIVING**

A7.10 SCALE: 3/8" = 1'-0" REF: A1.21

INTERIOR ELEVATIONS

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**A7.10**