DOCUMENT NUMBER 00900

ADDENDUM NO. 4

Date of Issue: February 26, 2024

To all prospective bidders of record on the Work titled: **Biosolids Handling Facilities and Odor Control Improvements**

The Drawings and Project Manual including Specifications are modified as follows. This Addendum is part of the Contract Documents and modifies the original documents dated January 2024.

Acknowledge receipt of this Addendum in the space provided in the BID FORM. Failure to do so may subject the Bidder to disqualification.

Note: The following are attached:

1. Section 00300 – Bid Form
2. Section 02900 – Landscaping
3. Section 09250 – Gypsum Wallboard
4. Section 11575 – Odor Control Carbon Scrubber
5. Section 13122 – Pre-Engineered Metal Canopy Systems
6. Sheet I-071 – Equipment Building - Instrumentation Plan
7. Sheet I-700 – WAS PUMPS – P&ID

This Addendum consists of 6 pages.

2/26/2024

KENNEDY/JENKS CONSULTANTS, INC.
Michael Lubovich, P.E.

CHANGES TO SPECIFICATIONS

Item AD4-1 Section 00300: BID FORM

Replace Section 00300 Bid Form in its entirety with the revised Section 00300 Bid form attached to this addendum. Changes have been made to Article 5.

Item AD4-2 Section 01010: SUMMARY OF WORK

Delete paragraph 1.02.A and replace with "NOT USED."

Item AD4-3 Section 01200: PRICE AND PAYMENT PROCEDURES

In paragraph 1.03.M.2, replace the following sentence "It is estimated that 21 dry tons will need to be removed from Lagoon 1" with "It is estimated that 281 dry tons will need to be removed from Lagoon 1."

Item AD4-4 Section 01200: PRICE AND PAYMENT PROCEDURES

In paragraph 1.03.N.2, replace the following sentence "It is estimated that a total of 538 dry tons will need to be removed from Lagoons 1, 2 and 3" with "It is estimated that a total of 1,943 dry tons will need to be removed from Lagoons 1, 2 and 3."

Item AD4-5 Section 01500: CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

Delete paragraph 1.01.B.3 and replace with:

"Internet: Provide temporary internet service for the Contractor's and Engineer's use. Pay periodic charges for the internet services to the Engineer's office."

Item AD4-6 Section 01500: CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

Delete paragraph 1.05.B.

Item AD4-7 Section 01500: CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

Under paragraph 1.08.B.1.c, delete “and a toilet room”.

Item AD4-8 Section 01500: CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

Delete paragraph 1.08.B.1.g.

Item AD4-9 Section 01650: FACILITY COMMISSIONING, TESTING, AND STARTUP

In paragraph 1.01.D, delete “Owner’s PLC/SCADA Programmer (Owner’s Programmer)” and replace with “Owner and Engineer”.

Item AD4-10 Section 01650: FACILITY COMMISSIONING, TESTING, AND STARTUP

In paragraph 1.02.A, delete “and the Owner’s Programmer”.

Item AD4-11 Section 01650: FACILITY COMMISSIONING, TESTING, AND STARTUP

In paragraph 1.03.B.8, delete “Then allow time in the construction schedule for the Owner’s Programmer to debug and test the PLC control logic and HMI interface.”

Item AD4-12 Section 02150: LAGOON DECOMMISSIONING

In Paragraph 3.02, insert the following subparagraph I: “Removed liner material shall be placed on top of Lagoon 1 liner material that is to remain in place. Grade placed materials to within 1-inch of a level (0%) slope.”

Item AD4-13 Section 02150: LAGOON DECOMMISSIONING

In Paragraph 3.03, insert the following subparagraph F: “Do not place removed liner material within Lagoons 2, 3, or 4. Removed liner material shall be placed on top of Lagoon 1 liner material that is to remain in place. Grade placed materials to within 1-inch of a level (0%) slope.”

Item AD4-14 Section 02900: LANDSCAPING

Replace Section 02900 Landscaping in its entirety with the revised Section 02900 Landscaping attached to this addendum.

Item AD4-15 Section 09250: GYPSUM WALLBOARD

Add Section 09250 Gypsum Wallboard to the project manual for drywall.

Item AD4-16 Section 09960: PROTECTIVE COATINGS

In the Finish Schedule under paragraph 2.02.C.1, Coating System No. 7, replace "Buried exterior of walls of aeration basin feed and primary effluent pump stations" with "Buried exterior of walls of Aerobic Digesters and Biological Selector."

Item AD4-17 Section 11575: ODOR CONTROL CARBON SCRUBBER

Replace Section 11575 Odor Control Carbon Scrubber in its entirety with the revised Section 11575 Odor Control Carbon Scrubber attached to this addendum.

Item AD4-18 Section 13122: PRE-ENGINEERED METAL CANOPY SYSTEMS

Add Section 13122 Pre-Engineered Metal Canopy Systems to the project manual for the Biosolids Storage Canopy.

Item AD4-19 Section 16720: FIRE DETECTION AND ALARM

Delete paragraph 2.01(A)(5) from Section 16720 Fire Detection and Alarm.

“5. Voice Notification: Provide emergency voice/alarm communications with multichannel capability; digital.”

CHANGES TO DRAWINGS

Item AD4-20 Sheet M-101 AEROBIC DIGESTERS DECK PLAN

On Drawing M-101, at gridline B.4, delete the callout for "T7S." Pipe support type is to be determined by the Contractor.

Item AD4-21 Sheet M-103 AEROBIC DIGESTERS SECTIONS

On Drawing M-103, at gridline B.1, delete the callout for "T7S". Pipe support type is to be determined by the Contractor.

Item AD4-22 Sheet M-202 BIOSOLIDS HANDLING BUILDING PLAN – II

On Drawing M-202, add the following to the GENERAL SHEET NOTES:

"3. PIPES AND CONDUITS 2" DIAMETER OR SMALLER CAN BE MOUNTED DIRECTLY TO THE FURRING STUDS OF THE WALL. SUPPORTS FOR ANYTHING LARGER THAN 2" DIAMETER WILL REQUIRE DIRECT ANCHORAGE TO THE CMU WALL BEHIND THE FURRING WALL. THIS WILL REQUIRE A FINISHED BLOCK-OUT AROUND THE SUPPORT AND ITS ANCHORAGE. BLOCK-OUT DIMENSION TO BE NO GREATER THAN 1" BEYOND THE MOUNTING PLATES OF THE SUPPORT IN ANY DIRECTION."

Item AD4-23 Sheet M-204 BIOSOLIDS HANDLING BUILDING SECTIONS – II

On Drawing M-204, add the following to the GENERAL SHEET NOTES:

"3. PIPES AND CONDUITS 2" DIAMETER OR SMALLER CAN BE MOUNTED DIRECTLY TO THE FURRING STUDS OF THE WALL. SUPPORTS FOR ANYTHING LARGER THAN 2" DIAMETER WILL REQUIRE DIRECT ANCHORAGE TO THE CMU WALL BEHIND THE FURRING WALL. THIS WILL REQUIRE A FINISHED BLOCK-OUT AROUND THE SUPPORT AND ITS ANCHORAGE. BLOCK-OUT DIMENSION TO BE NO GREATER THAN 1" BEYOND THE MOUNTING PLATES OF THE SUPPORT IN ANY DIRECTION."

Item AD4-24 Sheet M-205 BIOSOLIDS HANDLING BUILDING SECTIONS – III

On Drawing M-205, add the following to the GENERAL SHEET NOTES:

"3. PIPES AND CONDUITS 2" DIAMETER OR SMALLER CAN BE MOUNTED DIRECTLY TO THE FURRING STUDS OF THE WALL. SUPPORTS FOR ANYTHING LARGER THAN 2" DIAMETER WILL REQUIRE DIRECT ANCHORAGE TO THE CMU WALL BEHIND THE FURRING WALL. THIS WILL REQUIRE A FINISHED BLOCK-OUT AROUND THE SUPPORT AND ITS ANCHORAGE. BLOCK-OUT DIMENSION TO BE NO GREATER THAN 1" BEYOND THE MOUNTING PLATES OF THE SUPPORT IN ANY DIRECTION."

Item AD4-25 Sheet I-071 EQUIPMENT BUILDING – INSTRUMENTATION PLAN

Replace Sheet I-071 EQUIPMENT BUILDING – INSTRUMENTATION PLAN in its entirety with the revised Sheet I-071 EQUIPMENT BUILDING – INSTRUMENTATION PLAN attached to this addendum. Changes are noted on the drawing.

Item AD4-26 Sheet I-700 WAS PUMPS – P&ID

Replace Sheet I-700 WAS PUMPS – P&ID in its entirety with the revised Sheet I-700 WAS PUMPS – P&ID attached to this addendum. Changes are noted on the drawing.

END OF ADDENDUM NO. 4

SECTION 00300

BID FORM

Project Identification: Washougal Biosolids Handling Facilities and Odor Control Improvements

Contract Identification and Number:_____

This Bid is Submitted to: City of Washougal
City Hall
1701 C Street
Washougal, Washington 98671

The Design Engineer is: Kennedy/Jenks Consultants, Inc.
32001 32nd Avenue South, Suite 300
Federal Way, Washington 98001
Telephone Number 253-835-6400

The Engineer is: Michael Lubovich
32001 32nd Avenue South, Suite 300
Federal Way, Washington 98001
Telephone Number 253-835-6459

Article 1

The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with Owner in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.

Potential bidders can download all bid documents and addendums at Washougal's e-procurement website (https://procurement.opengov.com/portal/cityofwashougal). For any potential Bidder not signed up through the e-procurement portal, further instructions are located on the City's bid opportunities website (https://www.cityofwashougal.us/748/Bid-Opportunities).

Article 2

Bidder accepts all of the terms and conditions of the Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid Security. This Bid will remain subject to acceptance for thirty (30) days after the day of Bid opening. Bidder will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within ten (10) days after the date of the Owner's Notice of Award.

Article 3

In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that:

(a) Bidder has examined copies of all the Bidding Documents.

(b) Bidder has examined copies of the following Addenda (receipt of which is hereby acknowledged):

Date	Number
_____	_____
_____	_____
_____	_____
_____	_____

(c) Bidder has familiarized itself with the nature and extent of the Contract Documents, Work, site locality, and all local conditions and laws and regulations that in any manner may affect cost, progress, performance, or furnishing of the Work.

(d) Bidder has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions which are identified in Section 00200, Information Available to Bidders.

Bidder has read and accepts the provisions in General Conditions paragraphs 3.3 through 3.5 which limit the extent to which the Contractor may rely on information provided by the Owner or the Design Engineer with regard to: a) subsurface soil conditions, b) existing concealed or underground utilities and underground facilities, and c) existing structures and facilities.

(e) Bidder has read and accepts the provisions in General Conditions paragraphs 3.6 and 3.8 identifying the Contractor's responsibility: a) for using care in making excavations and in doing demolition, b) for damage to existing utilities and underground facilities and for loss of use thereof, and c) for the protection of workers and others from known and unknown or concealed hazards.

(f) Bidder has read and accepts the provisions in General Conditions paragraph 3.7 which identifies the limited conditions under which the Contractor may be entitled to a change in Contract Time or Price due to differing or unknown conditions.

(g) Bidder has visited the site and has reviewed the Bidding Documents and the Information Available to Bidders and it has made any other investigations, explorations, or tests and has obtained any other data it considers necessary for preparation of its Bid.

(h) Bidder has correlated the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the Contract Documents and Bidder has read and understands provisions in the General Conditions relevant to differing and unknown conditions.

(i) Bidder has given Engineer written notice of all conflicts, errors, or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by Engineer is acceptable to Bidder.

(j) Bidder has read, studied, and understands the entire set of Bidding Documents including the Construction Drawings, Specifications, and General Conditions and finds them fit and sufficient for the purpose of preparing its Bid and constructing the Work required.

(k) Bidder represents that its Bid is based on providing all of the material, labor, equipment, and services necessary to complete the Work in full compliance with the Contract Documents without exception.

(l) Attached is a Bid Bond duly completed by a guaranty company authorized to carry on business in the State of Washington, in the amount of no less than five percent (5%) of the total amount of our proposal, or alternatively, there is attached a certified or cashier's check payable to the City of Washougal in the amount of no less than five percent (5%) of the total amount of our proposal.

(m) We further agree, if our Bid is accepted and a Contract for performance of Work is entered into with the City of Washougal, to so plan the Work and to prosecute it with such diligence that all the Work shall be completed within the time period stated in the Contract. We understand that the City of Washougal reserves the right to reject any or all bids and to determine which proposal is, in the judgment of the City of Washougal, the lowest responsible bid, and which proposal, if any, should be accepted in the best interests of the City of Washougal and that the City of Washougal also reserves the right to waive any informalities in any proposal or bid.

(n) We further state that we have not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such contract.

Article 4

Requirements for State of Washington Public Works Contracts.

(a) **DECLARATION OF LICENSE STATUS**. In accordance with Title 18.27 of the Revised Code of Washington, the Bidder declares that it possesses a valid State of Washington General Contractor's license at the time of submitting this Bid. Bidder shall state its license number and expiration date on its Bid Form.

(b) **EXCAVATION, TRENCHING, AND SHORING**. The Bidder's attention is directed to Part N - EXCAVATION, TRENCHING, AND SHORING, Chapter 296-155 of the Washington Administrative Code. These regulations relate to all excavation and contain specific requirements to provide for the protection of all employees during all excavation work in connection with all construction work relating thereto, such as trenches, underpinning, shoring and bracing, and in connection with the construction of footings, foundations, retaining walls, and other construction work below ground level.

The Bid schedule includes an item for Excavation Safety. The Bidder shall include its costs to provide the required worker protection as required by Washington State Law.

(c) **PREVAILING WAGE RATES**. The undersigned agrees that, if awarded the Contract, the undersigned and all of its subcontractors shall pay all laborers, workers, and mechanics employed in the performance of such Contract, or any subcontract thereunder, not less than the general prevailing rate of per diem wages and rates for overtime and legal holidays in the locality in which the Work is to be performed, as ascertained and determined, by the statutes, regulations, and Section 00800 applicable thereto.

(d) **WASHINGTON STATE AND LOCAL SALES TAXES**. The Owner will pay monthly to the Contractor, Washington State and local sales taxes at the current prevailing rates based on the progress payment amount. The Contractor shall then pay these State and local sales tax amounts to the Washington State Department of Revenue. The Contractor's obligations regarding RCW Title 82, Excise Taxes, are explained in a comprehensive manual entitled, Contractor's Tax Manual, available from the Research & Information Division of the Washington State Department of Revenue. In addition, the Washington Administrative Code Sections 458-20-102, 145, 170, 171, 172, 173, and 235 contain specific provisions relating to sales/use taxes.

(e) The Bidder must provide a written declaration that they meet the Bidder responsibility criteria in accordance with RCW 39.04.350. Under RCW 39.04.350, the evaluation of bids for public work projects must include verification that the Bidder meets mandatory Bidder responsibility criteria and any supplemental Bidder responsibility criteria, and a written declaration from the Bidder verifying under penalty of perjury the Bidder is in compliance with the responsible Bidder criteria requirements for wage and labor standards in Chapters 49.46, 49.48, and 49.52 RCW

Article 5

Bidder will complete the Work for the following price(s):

Bid Schedule

Item No.	Item	Quantity	Unit	Unit Price ($)	Total Estimated Price ($)
1.	Mobilization, Demobilization, Site Preparation & Clean up	1	LS		
2.	General Site Improvements and Yard Piping	1	LS		
3.	Aerobic Digester	1	LS		
4.	Biosolids Handling Building	1	LS		
5.	Biosolids Storage Canopy	1	LS		
6.	Facility Odor Control Systems	1	LS		
7.	Anoxic Selector Material	1	LS		
8.	Anoxic Selector Labor	1	LS		
9.	Existing Headworks Odor Improvements	1	LS		
10.	WAS Pump Replacement	1	LS		

Item No.	Item	Quantity	Unit	Unit Price ($)	Total Estimated Price ($)
11.	Utility Water System Replacement	1	LS		
12.	Berm Renovations	1	LS		
13.	Sludge Removal from Lagoon 1	281	DRY TONS		
14.	Sludge Removal from Lagoons 2, 3, and 4	1,943	DRY TONS		
15.	Liner Removal from Lagoons 1, 2, 3, and 4	1	LS		
16.	Excavation Safety	1	LS		

TOTAL ESTIMATED PRICES (excluding tax)

_____($_____)
(use words) (figures)

WASHINGTON STATE AND LOCAL SALES TAX

_____($_____)
(use words) figures

Sum of TOTAL ESTIMATED PRICES and WASHINGTON STATE AND LOCAL SALES TAX

_____($_____)
(use words) (figures)

Quantities are not guaranteed. Final payment will be based on actual quantities.

Article 6

(a) Bidder agrees that the Work will be finally complete and ready for acceptance and final payment in accordance with Article 13 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

(b) Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work on time.

Article 7

The following documents are attached to and made a condition of this Bid:

(a) Required Bid Security in the form of physical copy
(b) Declaration of Option for Management of Statutory Retained Percentage
(c) Noncollusion Affidavit
(d) Wage Compliance
(e) Bidder's References
(f) Bidder's Qualifications
(g) Subcontractor List
(h) Copy of Contractor's license
(i) Supplementary Conditions

Article 8

Communications concerning this Bid shall be addressed to:

Scott Collins, PE at Scott.Collins@cityofwashougal.us

Telephone Number: 360-835-8501 ext. 230

Article 9

The terms used in this Bid which are defined in the General Conditions of the Construction Contract included as part of the Contract Documents have the meanings assigned to them in the General Conditions.

Bidder declares that it does possess a contractor's license of the required classification, valid in the appropriate jurisdiction at the time of submitting this bid.

Contractor's license number: _____

License classification: _____

License expiration date: _____

SUBMITTED on _____, 20____.

If Bidder is:

An Individual

By: _____ (SEAL)
Individual's Name

_____
(Signature)

Doing business as: _____

Business Address: _____

Telephone Number:

A Partnership

By: (SEAL)
(Firm Name)

(General Partner Name)

(Signature)

(Title)

Business Address:

Telephone No.:

A Corporation

By:
(Corporation's Name)

(State of Incorporation)

By:
(Name of Person Authorized to Sign)

(Signature)

(Title)

Attest
(Secretary)

Business Address:

Telephone No.:

Home Office Address (if different from above):

A Joint Venture

By:_____
(Name)

_____
(Signature)

Address:_____

_____

Telephone Number:_____

By:_____
(Name)

_____
(Signature)

Address:_____

_____

Telephone No.:_____

Each joint venturer must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture shall be in the manner indicated above.

END OF BID FORM

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SECTION 02900

LANDSCAPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
   1. Stormwater Plants: Various Washington native plants.
   2. Maintenance.

B. Definitions:
   1. Plants: Living plants specified in this section.
   2. Weeds: Include dandelion, jimsonweed, quack grass, horsetail, morning glory, rush grass, mustard, lambs quarter, chickweed, cress, crabgrass, Canadian thistle, nutgrass, poison oak, blackberry, tansy ragwort, Bermuda Grass, Johnson Grass, poison ivy, nut sedge, nimblewill, bindweed, bent grass, wild garlic, perennial sorrel, and brome grass.

1.02 SUBMITTALS

A. Submit in accordance with Section 01300.

B. Submit landscape installer qualifications thirty (30) days before start. This shall include 3 to 5 projects with descriptions, photos and contacts similar in material, design, and extent to that indicated for this Project. Installer shall identify the Field Supervisor and provide a record of this individual's successful landscape installations.

C. Submit landscaping installation schedule thirty (30) days before start, showing scheduled dates for all landscaping work. Update as needed to indicate changes in the schedule. Work done at an unscheduled time may be rejected by the Engineer. Schedule changes must be delivered to the Engineer 48 hours before the start of the indicated work.

D. Submit names and location of preapproved nurseries and proof of deposit or other method of reserving all plant material required for this project within thirty (30) days following the Notice to Proceed. Proof of non-availability and requests for plant material substitutions must be submitted in accordance with Section 01300.

E. Record Drawings: Upon completion of the project, submit a revised contract drawing on a reproducible plan, showing location, quantities, names and sizes of all plant materials, planting beds, and lawn areas.

1.03 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful landscape establishment.
   1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site while landscaping is in progress.

B. Provide plantings from a preapproved nursery in accordance with sound horticultural practice. To add a nursery to the preapproved list, provide nursery

name, address, phone number and contact person along with proof of availability of proposed plant material to Engineer for approval.

1. Potentially suitable nurseries include the following:
   a. Watershed Garden Works
      2039 44th Avenue
      Longview, Washington 98632
      Phone: 360.423.6456
   b. Sound Native Plants, Inc.
      PO Box 7505
      Olympia, Washington 9850
      Phone: 360.352.4122
   c. Fourth Corner Nurseries
      5652 Sand Road
      Bellingham, Washington 98226
      Phone: 360.592.2250
   d. Provitro Biosciences LLC
      17618 Dunbar Road
      Mount Vernon, Washington 98273
      Phone: 360.848.0305
2. Provide healthy, vigorous stock grown under climatic conditions similar to conditions in the locality of the project and free of disease, insects, eggs, larvae, weeds in root balls, and defects, such as knots, sunscald, injuries, abrasions, and disfigurement.

C. Work shall be performed by persons familiar with and experienced in doing similar projects. Work shall be done under the supervision of a qualified supervisor.

1.04 DELIVERY STORAGE

A. Do not prune before delivery, except as approved by Engineer. Protect root systems from sunscald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie in such a manner as to destroy natural shape. Provide protective covering during delivery. Do not drop plants during delivery.

B. Protect and maintain plant life until it is planted. Do not remove container-grown-stock from containers before time of planting.

C. Deliver plant life materials immediately before placement. Water as often as necessary to maintain root systems in a moist condition. No plants shall be planted without approval of Engineer.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Do not install plants when ambient temperatures may drop below 35 degrees or rise above 90°F.

1.06 WARRANTY

A. Warranty: Contractor shall warrant living planting materials for a period of one (1) year after date of Substantial Completion against defects, including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Owner, abnormal weather conditions unusual for warranty period, or incidents that are beyond Contractor's control.

B. Replace plant materials that are more than 25 percent dead or in unhealthy condition at the end of the warranty period.

1.07 MAINTENANCE SERVICES

A. Maintain plant life immediately after placement and until date of Final Completion.

B. Maintenance to include:
   1. Cultivating and weeding all plant beds.
   2. Irrigate by use of water truck, or temporary irrigation system, during dry months until plants are established. Saturate root systems periodically to promote deep roots and drought tolerance. Irrigate for at least 3 years or until plants are established.
   3. Disease control.

PART 2 - PRODUCTS

2.01 PLANT TYPE

A. Stormwater Vegetation:
   1. Provide plantings comprised of the following:
      a. Slough sedge (carex obnupta) (80% of total planting)
      b. Other Washington native water tolerant vegetation commonly used with stormwater treatment (20% of total planting)
   2. Name and Variety: Provide plant materials true to name and variety established by the American Joint Committee on Horticultural Nomenclature's "Standardized Plant Names."
   3. Quality: Provide plantings and all other plant material complying with the recommendations and requirements of ANSI Z60.1 "Standard for Nursery Stock" and as further specified.

PART 3 - EXECUTION

3.01 STORMWATER VEGETATION AREA SOIL PREPARATION

A. Remove existing lagoon liner within the Stormwater Vegetation Area, as indicated on the Drawings.

B. Place landscape fill within the Stormwater Vegetation Area to bring elevations up to the finished grades indicated on the Drawings.

C. Integrated Pest Management (IPM) shall be implemented. Herbicides, fungicides, pesticides, and insecticides within vegetated area shall not be used.

3.02 STORMWATER VEGETATION AREA PLANTING

A. Prepare the planting bed by roughening the soil.

B. Plant stormwater vegetation to achieve a one plant per square foot density.

C. Preliminary Inspection: Notify the Engineer 48 hours in advance of all planting inspection and favorable review of the completed work shall begin the plant establishment period.

D. Plant Establishment Maintenance:
   1. General plant maintenance shall immediately follow planting and continue until planted areas are covered with acceptable stands of plantings.

2. Protect areas against all damage, including erosion and trespass, and provide proper safeguards. Maintain and keep in good repair all temporary barriers erected to prevent trespass. Check all barriers and temporary fencing daily, and make immediate repairs or replacements.
3. Repair all damage to planted areas.
4. Irrigate if necessary to maintain minimum moisture depth in soil of 6 inches to insure vigorous growth.
5. Continue maintenance for at least 45 days or until plantings are established.

E. Final Inspection and Acceptance: Final inspection will be conducted upon completion of maintenance replacements, and corrective work. Five (5) days' notice shall be given. If project improvements, corrective work, and maintenance have not been performed as specified and to the satisfaction of the State, maintenance shall continue at the Contractor's expense until such time as work has been successfully completed.

F. Guarantee and Replacement:
1. Guarantee all planting to be in a healthy, thriving condition until the end of the maintenance period or beyond that time until active growth is evident and for one (1) year from date of acceptance.
2. Replace all planted areas not in vigorous condition as soon as directed by the Engineer. Repair any erosion in areas where plantings do not become established. Replacement plantings must be of the same kind and quantity as specified in this section.

3.03 CLEANUP AND PROTECTION

A. During landscape work and any Maintenance Period, store materials and equipment where directed. Keep pavements clean and landscape area in an orderly condition.

B. Protect landscape work and materials from damage due to landscape operations, operations by other contractors, tradesmen, and trespassers. Maintain protection during installation and maintenance periods. Treat, clean up, repair, or replace landscape work as directed.

3.04 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus landscaping soil and waste material, including excess bioretention soil, trash, and debris, and legally dispose of it off the Owner property.

END OF SECTION

SECTION 09250

GYPSUM WALLBOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide gypsum board partitions, furred walls, and similar construction. Provide taping and finishing of gypsum board ready for paint or other finish coatings.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C475 Taping Joint Compounds and Joint Tape for Finishing Gypsum Wallboard.
2. ASTM C834 Standard Specification for Latex Sealants
3. ASTM C840 Application and Finishing of Gypsum Wallboard.
4. ASTM C1047 Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
5. ASTM C1396 Standard Specification for Gypsum Board.
6. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

B. Gypsum Association (GA):

1. GA-214-2015 Recommended Specification for Levels of Gypsum Board Finish

C. International Code Council (ICC):

1. ESR-1338 Gypsum Wall and Ceiling Assemblies and Gypsum Board Interior and Exterior Applications

D. Washington State Building Code Council

1. State Building Code adoption and amendment of the 2018 Edition of the International Building Code (IBC), Chapter 51-54A WAC, adopted.

1.3 SUBMITTALS

A. Submit Product Data giving manufacturer's technical data for all materials and systems proposed for use.

1.4 QUALITY ASSURANCE

A. Comply with the more restrictive or conservative of the following.

B. Comply with the following Regulatory requirements:

1. 2018 International Building Code, especially Chapter 25.

C. Comply with Gypsum Association GA-216-2016 "Application and Finishing of Gypsum Panel Products" 2016 Edition

D. Comply with ASTM C840 for the methods of application and finishing of gypsum board including related accessories.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages, containers or bundles bearing brand and manufacturer's name.

B. Store all materials in protected dry storage areas. Neatly stack in flat position on spacers to prevent sagging and contact with concrete slabs.

PART 2 - PRODUCTS

2.1 DRYWALL MATERIALS

A. Gypsum Board (Where indicated on Drawings): 5/8-inch, Type X, tapered edges, 4 feet wide by longest lengths available to keep end joints to a minimum ASTM C1396. United States Gypsum (USG) sheetrock Firecode "C"; National Gypsum (NG) Gold Bond XP Fire-shield; or equal.

B. Moisture Resistant Gypsum Board "MR" (Green Board) (Where indicated on Drawings): 5/8 inch-thick, Type C, tapered edges, ASTM C1396, complying with ASTM D3273 for mold resistance. 4 feet wide by longest lengths available to keep end joints to a minimum, USG Sheetrock "Brand Mold Tough" Firecode; National Gypsum (NG) Gold Bond "XP" Gypsum Board; or equal.

2.2 ACCESSORIES

A. Corner Bead: Complying with ASTM C1047. At all exterior corners, galvanized steel, 1 1/2 x 1 1/2 Beadex; United States Gypsum; National Gypsum; or equal.

B. Edge Trim: Use metal trim in exposed locations at intersection of drywall with other materials, and as shown, U.S. Gypsum "J" B9J or "L" B4; National Gypsum; or equal.

2.3 FASTENERS

A. Gypsum Board to Wood Supports. Cooler or wallboard nails shall comply with 2018 IBC Table 2508.5.

1. 6d wallboard nails at 16" o.c. 0.0915 inch shank diameter, 1 7/8 inch-long, 19/64 inch head diameter, concave head, phosphate etched diamond point.

2. 6d cooler nails at 16" o.c 0.092 inch shank diameter, 1 7/8 long, 1/4 inch head diameter, cement coated, flathead diamond point.

2.4 JOINT TREATMENT AND FINISHING

A. Reinforcing Tape: USG Imperial Tape; NG Gold Bond; or equal.
B. Taping Compound: USG Ready-to-use joint compound-tapping; NG Gold Bond; or equal.

C. Topping Compound: USG Ready-to-use joint compound-topping; NG Gold Bond; or equal.

PART 3 - EXECUTION

3.1 GYPSUM BOARD INSTALLATION

A. Edge and ends of gypsum board shall be in moderate contact. Attach gypsum boards to wood member. For non-rated assemblies, space screws at 8 inches on center on edges of gypsum board for vertical surfaces and at 7 inches on center for horizontal surfaces. Space screws at 12 inches on center at intermediate members. Space nails at edges of gypsum board same as screws; space nails at intermediate members same as for edges. Space fasteners at least 3/8-inch from panel edges or ends. Stagger fasteners in adjacent edges at joints. Drive fasteners until their heads are slightly below the surface of the gypsum board, but without breaking the cover. After all fasteners have been installed hammer on walls to detect loose fasteners and push on gypsum board adjacent to fasteners to detect movements. Drive loose fasteners tight or replace them with other fasteners approximately 1 1/2 inches away and remove loose fasteners.

B. Install corner bead at all outside corners with fasteners 9 inches on center. Install edge trim at exposed edges, where gypsum board abuts or joins other materials and where shown. Attach edge trim with fasteners 9 inches on center.

C. Cut openings for outlet boxes, pipes and similar items with a saw, router, or other device that produces a clean, tight fitting hole without tearing the paper face or back and without fracturing the gypsum core. Outlet boxes in opposite faces of acoustical or fire-rated partitions shall be at least 24 inches apart.

D. Stagger vertical and horizontal joints on opposite sides of partition 2 feet or as required for fire-rated assemblies.

E. Where a second layer of gypsum board is required, apply over first layer. Screws in first layer to be 16 inches on center at edges and in field. Apply second layer with joints staggered and attach with screws at 12 inches on center at edges and in the field or if nails are used, reduce spacing to 7 inches.

F. Install control or expansion joints as required and/or recommended by manufacturer.

G. Set bottom edge of gypsum board 1/4 inch above the floor. Where fire or sound rated partitions are required, fill the gap between gypsum board and floor with fire-rated sealant for fire-rated construction or with acoustical sealant for sound rated partitions.

H. Install access panels furnished under other sections.

3.2 FINISHING AND JOINT TREATMENT

A. Mix and size joint compound in accordance with manufacturer's instructions. Spread a thin layer of compound over joint and embed tape in compound leaving sufficient compound under tape to provide proper bond. Spot nail heads. Reinforce interior angles with perforated tape neatly folded to form straight, true corner. Reinforce exterior corners with specified corner bead. Backer board shall be taped and screwheads spotted prior to installing face layer.

B. Allow compound to dry overnight. Sand lightly. Cover tape with topping cement spread evenly and slightly beyond tapered edge of wallboard. Apply second coat to screwheads. Feather all edges of topping compound.

C. Allow compound to dry and then sand lightly. Apply a final skim coat of topping cement. Feather edges 8 inches to 10 inches each side of joint. Feather out final coat at screwheads to 10 inch diameter.

D. Apply a skim coat of topping cement to cover the entire surface of all water-resistant gypsum board.

E. Sand to true even surface with very fine paper. Avoid heavy pressure that might scuff paper face of wallboard. Leave ready for painting or other wall finish.

3.3 LEVELS OF GYPSUM BOARD FINISH

A. All exposed gypsum board intended to receive a painted finish shall have a Level 5 finish unless a lower level of finish is indicated on the Finish Schedule.

B. All "MR" moisture resistant gypsum board shall receive a skim coat of topping cement to cover the entire surface regardless of the level of finish specified.

C. Description of Levels of Finish (From GA-214-2015):

1. Level 1: All joints and interior angles shall have tape embedded in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.

2. Level 2: All joints and interior angles shall have tape embedded in joint compound and one separate coat of joint compound applied over all joints, angles, fastener heads, and accessories. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Apply a skim coat of topping cement to the entire surface of all "MR" moisture resistant gypsum board.

3. Level 3: All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges. Note: It is recommended that the prepared surface be coated with a primer/sealer prior to the application of final finishes. See painting/wallcovering specification in this regard.

4. Level 4: All joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. All joint compound shall be smooth and free of tool marks and ridges. Note: It is

recommended that the prepared surface be coated with a primer/sealer prior the application of final finishes. See painting/wallcovering specification in this regard.

5. Level 5: All joints and interior angles shall have tape embedded in joint compound and three separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges. Note: It is recommended that the prepared surface be coated with a primer/sealer prior to the application of finish paint. See painting specification in this regard.

END OF SECTION

SECTION 11575

ODOR CONTROL CARBON SCRUBBER

PART 1 - GENERAL

1.01 QUALITY ASSURANCE AND EXPERIENCE

A. The system supplier shall have process design experience in carbon adsorption systems for wastewater, demonstrating at least 10 years' experience. At least five systems shall have been in operation for over 5 years. Experience should be specific to process design and not component (FRP Vessel) fabrication.

B. Fabricator's QA Supervisor: Minimum of 10 years' experience in fabrication of fiberglass structures.

C. Vendor shall have a local service center with 100 miles of the system location.

1.02 SUMMARY

A. Section Includes: Two Complete, tested and operating packaged odor reduction systems. One unit complete with two (2) media layers, a blower and accessories as shown on the Drawings and as specified herein (Biosolids) and one unit with complete one up-flow activated carbon odor control system as shown on the Drawings and specified herein (Headworks).

B. Work included in this Section:
   1. Odor Reduction System and all appurtenances described within this section are to be provided and installed by the General Contractor

C. Related Sections:
   1. Section 01040: Coordination and Project Requirements
   2. Section 01190: Structural Component and Equipment Performance Requirements
   3. Section 01300: Submittals
   4. Section 09960: High Performance Coatings
   5. Section 11001: General Equipment and Mechanical Requirements
   6. Section 11002: Electric Motor Drives

1.03 REFERENCES

A. Air Movement and Control Association (AMCA):
   1. AMCA 210 Test Code and Certified Ratings Program

B. ASTM International (ASTM):
   1. ASTM D4167 Fiber-Reinforced Plastic Fans and Blowers
   2. ASTM D2563 Standard Practice for Classifying Visual Defects in Glass Reinforced Plastic Laminate Parts
   3. ASTM D2584 Standard Test Method for Ignition Loss of Cured Reinforced Resins
   4. ASTM D2854 Standard Test Method for Apparent Density of Activated Carbon
   5. ASTM D2867 Standard Test Methods for Moisture in Activated Carbon
   6. ASTM D3299 Standard Specifications for Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks

7. ASTM D3467 Standard Test Method for Carbon Tetrachloride Activity of Activated Carbon
8. ASTM D3802 Standard Test Method for Ball-Pan Hardness for Activated Carbon
9. ASTM D4097 Standard Specification for Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks
10. ASTM D3982 Flanges

C. FRP fabrications shall be in accordance with the National Bureau of Standard Voluntary Products Standards PS-15-69.

1.04 SYSTEM DESCRIPTION

A. Design Requirements:
1. Foul, odorous air within the biosolids handling building is to be treated prior to discharging to atmosphere. The odor reduction system shall include two media layers, a blower, and all appurtenances necessary for a complete and operable system.
2. Foul, odorous air within the headworks is to be treated prior to discharging to atmosphere. The odor reduction system shall include a media layer, a blower, and all appurtenances necessary for a complete and operable system.

1.05 PERFORMANCE AND DESIGN REQUIREMENTS

A. The Biosolids Odor Reduction System shall be designed to operate at 99% gas removal efficiencies, contain an enclosed blower assembly for outdoor operation, fit within the spatial constraints shown on the Contract Drawings, and conform to the following operational requirements:

1.	Air flow	1400 cfm
2.	H2S maximum concentration	50 ppm
3.	H2S average concentration	10 ppm
4.	Percent H2S Removal	99%
5.	Number of Beds	2

B. Odor Reduction System Blower

1.	Capacity	1400 cfm
2.	Blower Speed	Single Speed
3.	Maximum horsepower	5 HP
4.	Shall include sound enclosure	

C. The Headworks Odor Reduction System shall be designed to operate at 99% gas removal efficiencies, contain an enclosed blower assembly for outdoor operation, fit within the spatial constraints shown on the Contract Drawings, and conform to the following operational requirements:

1.	Air flow	300 cfm
2.	H2S maximum concentration	50 ppm
3.	H2S average concentration	10 ppm
4.	Percent H2S Removal	99%
5.	Number of Beds	1

D. Odor Reduction System Blower

1.	Capacity	300 cfm
2.	Blower Speed	Single Speed, Top Mounted
3.	Maximum horsepower	1.5 HP

1.06 SUBMITTALS

A. Shop Drawings and Product Data: Submit the following as a single complete initial submittal in accordance with Section 01300:
   1. Product data fully describing all items proposed for use to demonstrate that the equipment conforms to the Specifications, including drawings, specifications, installation and design details, catalogue cut sheets. Include a list of materials of construction for all components.
   2. Motor data.
   3. Odor Reduction System layouts and dimensions and operating Data Sheets including odor reduction efficiency, air residence time through the media bed shall, blower motor performance, and other operational data conforming to the requirements herein.
   4. Fan performance curve and sizing based upon supplied inlet duct losses.
   5. Shop Drawings: Submit signed and sealed structural calculations by a Professional Engineer registered in the State of Oregon and detailed drawings for the attachments and anchorage to the structure of the equipment and appurtenances in this section: Calculations shall conform to the requirements of Section 01190 and Section 01040.
   6. Submit certification from the manufacturer that the equipment is capable of resisting seismic loads. Loading shall be as described in Section 01190 and Section 01040.

B. Performance Testing: Submit certified non-witnessed factory performance test results. Receive favorable review of test results prior to shipping the equipment.

C. Manuals: Furnish manufacturer's installation, lubrication, operation and maintenance manuals, bulletins, and spare parts lists.

D. Affidavits: Submit affidavit from the manufacturer stating that the equipment has been properly installed, adjusted, and tested and is ready for full time operation.

1.07 QUALITY ASSURANCE

A. Equipment furnished under this Section shall be supplied by a single manufacturer who has been regularly engaged in the design and manufacture of the equipment for at least 5 years. Demonstrate to the satisfaction of the Engineer that the quality is equal to equipment made by those manufacturers named herein.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The odor reduction system shall be:
   1. Biosolids: ECS 60-Series, or approved equal.
   2. Headworks: ECS 60-Series, or approved equal.

2.02 EQUIPMENT

A. Odor Reduction System:
   1. Housing materials shall be weatherproof and suitable for outdoor operation.
   2. A stainless steel nameplate shall be provided, permanently attached to the unit. The nameplate shall be engraved with the scrubber type, order number and serial number.

2.03 MEDIA BED

A. Carbon Media (Biosolids):

1. The activated carbon media supplied for the carbon filter unit specified for shall be layered with two different medias. The bottom layer shall be pelletized carbon made from select grades of high-quality bituminous coal, activated under rigid process control conditions to yield a strong, dense, very active product designed for the removal of hydrogen sulfide and other sewage gasses. The top layer (polishing layer) shall be a potassium permanganate impregnated oxidizing agent. Media shall be a spherical alumina ball with 8% by weight KMON4 content. The carbon media shall be supplied by the manufacturer of the carbon filter unit who will be responsible for the quality of the carbon media.
2. Bottom layer (First Stage): The bottom layer shall consist of 2 feet of virgin pelletized activated carbon made from a coconut shell or bituminous coal base. Wood or lignite-based carbon is not acceptable. The activated carbon shall be suitable for the vapor phase adsorption of sewage treatment odors. The activated carbon shall have the following specifications:
   a. Iodine Number 1200 mg/g min
   b. Moisture, weight % as packed 5% max
   c. Hardness No. 99 min
   d. Apparent Density, g/ml 0.45 min
   e. Screen Size by Weight, US Sieve Series 5% on 4 mesh
   f. H2S Breakthrough Capacity, g H2S removed/cc Carbon[1] 0.04 min
   g. CTC by Weight 60% min
   h. Acceptable products include ECS-LC/G.04C from ECS or engineered approved equal.
   i. Bottom layer allocation to be 2/3 of the total amount of carbon in vessel.

   Note 1 The determination of H2S breakthrough capacity will be made by passing a moist (85% R.H.) air stream containing 1% H2S at a rate of 1,450 cc/min. through a 1 inch diameter by 9 inch deep bed of uniformly packed activated carbon and monitored to 50 ppm breakthrough. Results are expressed in grams H2S removed per cc of carbon. Test shall be performed per ASTM Test method D6646, without modification or addition.

3. Top Layer (Polishing Stage): The top layer shall consist of 1 foot of an oxidizing media. Product should consist of an alumina ball containing 8% by weight potassium permanganate. The activated carbon shall be suitable for the vapor phase adsorption of sewage treatment odors. The activated carbon shall have the following specifications:
   a. Hardness No. 80 min
   b. Apparent Density, g/ml 0.44 min
   c. Mean Particle Diameter, mm 4 min
   d. Potassium Permanganate Content, % 8% min
   e. Acceptable products include CC-PP8 from ECS or engineered approved equal.
   f. Top layer allocation to be 1/3 of the total amount of carbon in vessel.

B. Carbon Media (Headworks)

1. Type: Product shall be ECS-- SULFASORB- HC/4P.3C type carbon, or equal.
2. Sufficient activated carbon shall be provided to fill the reactor vessel to the height of the vessel. The activated carbon shall be virgin granular activated carbon. The activated carbon shall be suitable for the vapor phase adsorption

of sewage treatment odors. No chemical impregnation of the activated carbon is permitted. The activated carbon shall have the following specifications:

a.	Iodine No., mg/g	800 min
b.	Butane Activity, weight %	31.4 min
c.	Moisture, weight % as packed	5% max
d.	Hardness No.	95 min
e.	Apparent Density, g/ml	0.45 min
f.	Mean Particle Diameter, mm	4 min
g.	H2S Breakthrough Capacity, g H2S removed/cc Carbon[1]	0.30 min

Note 1 The determination of H2S breakthrough capacity will be made by passing a moist (85% R.H.) air stream containing 1% H2S at a rate of 1,450 cc/min. through a 1 inch diameter by 9 inch deep bed of uniformly packed activated carbon and monitored to 50 ppm breakthrough. Results are expressed in grams H2S removed per cc of carbon. Test shall be performed per ASTM Test method D6646, without modification or addition.

2.04 FAN (BIOSOLIDS)

A. The fan shall be a centrifugal industrial FRP fan that meets AMCA requirements. All parts of the fan that are exposed to the airstream shall be encapsulated in FRP with graphite impregnation to insure corrosion resistance and spark proof operation.

B. All fans shall be equipped with the following features and accessories:
   1. Flanged inlet/outlet
   2. PVC coupling drain
   3. Teflon shaft seal
   4. Shaft and belt guards
   5. Constant-speed V-belt drive

C. Fan shall be manufactured by New York Blower, KCH or equal.

D. The fan shall be rated for 1400 cfm @ 10 inch w.c.

E. The fan shall be equipped with a unified base with neoprene vibrations isolators.

F. The motor shall be TEFC heavy duty, with a 1.15 SF, 5 hp, 3-60-230/480 volt.

G. Fan shall be manufactured in the United States of America.

H. Sound Attenuation, weather enclosure, stack and outlet silencer.

I. A FRP fan enclosure shall be provided by the system supplier. Construction and performance shall be as follows:
   1. Walls shall be vacuum-formed construction with two layers of FRP over a honey-comb core.
   2. Resin, liner, color and exterior coating system shall be the same as specified for the adsorber vessel.
   3. Enclosure shall have four ventilation louvers installed.
   4. Enclosure shall be manufactured so that it can be easily removed for maintenance.
   5. Enclosure shall be single-piece construction. No seams or joints are allowed. Bolt-together kit enclosures are not acceptable.
   6. Enclosure shall have 2 inches of Sound-adsorb lining all internal surfaces.
   7. Enclosure shall reduce fan noise contribution to 3 db at a distance of 5 feet.

8. Enclosure system shall have been tested in an NVLAP certified laboratory within the prior 12 months.

2.05 INSTRUMENTATION (BIOSOLIDS)

A. Pressure differential instruments shall be provided and include Magnehelic style pressure gauges allowing determination of the pressure loss in inches of water column across the carbon. The range shall be 0 to 10 inches of water. Tubing shall be bonded to a solid acrylic plastic block that contains safety traps. Magnehelic shall be Dwyer or equal.

B. Sampling Ports: Each adsorption unit shall have three 2-inch diameter sample ports which extend into the carbon bed 1 foot minimum, suitable for extracting carbon samples. Provide one grain thief that is capable of extracting a core sample of the in-place carbon through the sample ports. Ports shall be adequate to provide suitable extraction of air samples from the carbon bed and be nonbinding. Each port nozzle shall extend outside the vessel wall and be blocked off with a 2-inch ball valve. One additional air sampling port shall be provided above the carbon bed.

C. A visual H2S breakthrough indicator should be supplied on the outlet of the fan. Indicator shall change color when trace amounts of sulfide being breaking through the carbon and provide at least 3-months warning prior to detectable breakthrough. Indicator system shall not require calibration or have any complex electronic components.

2.06 CONTROLS (BIOSOLIDS)

A. Control Panel / Motor Starter – The system shall be furnished with a Local Control Panel. The panel shall be housed in a NEMA 4X enclosure. The Local Control Panel shall control the exhaust fan and be mounted 3 feet away from the system.
   1. NEMA 4X SST enclosure with:
      a. 480v main circuit breaker
      b. Control transformer – 120v
      c. Controls/Contacts/Alarms
         1) HOA switch for fan
         2) Main power disconnect
         3) Red “On” pilot light’
         4) Motor starter for exhaust fan
         5) Dry contacts for:
            a) Exhaust Fan Run
            b) Fan Fail

2.07 FAN (HEADWORKS)

A. The fan shall be a centrifugal industrial fan of aluminum and epoxy coated construction. Wheel shall be aluminum forward curved electrically and dynamically balanced. All parts of the fan that are exposed to the airstream shall be encapsulated in FRP with graphite impregnation to insure corrosion resistance and spark proof operation.

B. All fans shall be equipped with the following features and accessories:
   1. Arrangement 4HM
   2. Fan mounted on vessel lid
   3. Fan outlet damper

C. Fan shall be manufactured by ECH, New York Blower, Hartzell or Verantis without exception

D. The fan shall be rated for 300 cfm @ 8 inch w.c.

E. The motor shall be Class 1 Division 2 heavy duty, with a 1.15 SF, 1.5 hp, 3-60-230/480 volt.

2.08 SOUND ATTENUATION PACKAGE (HEADWORKS)

A. A FRP sound enclosure shall be provided by the system supplier. Construction and performance shall be as follows:
   1. Walls shall be vacuum-formed construction with two layers of FRP over a honey-comb core.
   2. Resin, liner, color, and exterior coating system shall be the same as specified for the adsorber vessel.
   3. Enclosure shall have four ventilation louvers installed.
   4. Enclosure shall be manufactured so that it can be easily removed for maintenance.
   5. Enclosure shall be single-piece construction. No seams or joints are allowed. Bolt-together kit enclosures are not acceptable.
   6. Enclosure shall have 2 inches of Sound-adsorb lining all internal surfaces.
   7. Performance of the enclosure design should produce a 20 Db insertion loss at 3 feet.

2.09 INSTRUMENTATION (HEADWORKS)

A. Pressure differential instruments shall be provided and include Magnehelic style pressure gauges allowing determination of the pressure loss in inches of water column across the carbon. The range shall be 0 to 10 inches of water. Tubing shall be bonded to a solid acrylic plastic block that contains safety traps. Magnehelic shall be Dwyer or equal.

B. Sampling Ports: Each adsorption unit shall have three 2-inch diameter sample ports which extend into the carbon bed 1 foot minimum, suitable for extracting carbon samples. Provide one grain thief that is capable of extracting a core sample of the in-place carbon through the sample ports. Ports shall be adequate to provide suitable extraction of air samples from the carbon bed and be nonbinding. Each port nozzle shall extend outside the vessel wall and be blocked off with a 2-inch ball valve. One additional air sampling port shall be provided above the carbon bed.

2.10 CONTROLS (HEADWORKS)

A. Control Panel / Motor Starter – The system shall be furnished with a Local Control Panel. The panel shall be housed in a NEMA 4X enclosure. The Local Control Panel shall control the exhaust fan and be mounted 3’ away from the system.
   1. NEMA 4X SST enclosure with:
      a. 480v main circuit breaker
      b. Control transformer – 120v
      c. Controls/Contacts/Alarms
         1) HOA switch for fan
         2) Main power disconnect
         3) Red “On” pilot light’
         4) Motor starter for exhaust fan

5) Dry contacts for:
   a) Exhaust Fan Run
   b) Fan Fail

2.11 PRE-FILTER

A. Prefilter shall be provided to collect airflow, remove moisture / particulate and direct it into a fan.

B. Housing: Housing shall be manufactured using fiberglass reinforced plastic. Stainless or alternate plastic materials are not acceptable. Manufacture shall have a minimum of 10 years' experience in the design and supply of similar equipment. Manufacturer shall retain the services of an independent inspector who is responsible to confirm the prefilter has been manufactured in accordance with this specification and all FRP work meets or exceeds ASME RTP-1 level 2 visual inspection criteria.
   1. Resin system shall be a corrosion resistant vinyl ester with a Class 1 flame spread rating. Acceptable products are AOC K022-AC or Dow Derakane 510-B series. Resin system shall not require any additives such as nyacol or antimony to achieve the Class 1 flame spread rating. Finished laminate including liner and structure shall be translucent.
   2. All internal surfaces shall have a 100-mil corrosion liner made up of a single nexus veil followed by two layers of 1.5 oz chopped strand matt.
   3. All exterior surfaces shall have gelcoat applied. This coating shall contain UV inhibitors, color to be selected by the Owner.
   4. Housing shall have machined UMHW guides to prevent stainless frame on filter pad from scratching or damaging the corrosion liner.
   5. Filter housing shall be designed for 12-inch positive and negative pressure with a maximum of 1/8-inch deflection.
   6. Housing shall have an access door for pad removal complete with EPDM gasket and Type 316 stainless hinges / quick latches. For filter housings larger than 3 feet across, two access doors shall be provided. Access doors shall have stainless toggle clamps for easy pad access. Bolt-on access doors are not acceptable.
   7. Housing shall be provided with a 2-inch drain connection at the base, and come from the manufacturer complete with ball valve.
   8. Housing shall be provided with a 2-inch drain connection at the base, and come from the manufacturer complete with ball valve.
   9. For installation, housing shall have (2) 8-inch diameter FRP legs. Length of legs shall be coordinated with the Contactor. Housing shall be supported by these legs independent of the connecting ductwork, anchored with stainless steel HILTI bolts.
   10. Housing shall have a differential gauge bracket and be supplied with a Dwyer Magnehelic pressure gauge and connections for gauge on either side of filter pad. Unit shall come complete from the factory with all DP equipment pre-assembled and installed.

C. Filter Pad:
   1. Pad shall have 2 inches of stainless mesh followed by 4 inches of poly mesh. Mesh shall be held together by a stainless-steel frame. Total pad width including pads and frame shall be 8 inches.
   2. Maximum pad segment width of pads is 24 inches. Pads larger than 24 inches wide must be segmented to allow easy removal by the Owner. Segment width should not exceed 24 inches.

D. Dimensions / Design:
   1. End connections shall be sized for a maximum air velocity of 2500 f/m. Flange dimensions shall match the connecting ductwork. Flange thickness shall not be less than that listed in ASTM D3982.
   2. Inlet cone shall be designed so that the airstream can spread evenly over the pad surface. Cone angle shall be no less than 60 degrees.
   3. Housing shall be sized so that air velocity through the filter pad is 400 f/m.
   4. Particle removal efficiency shall be 99% of particles 10 microns or larger.

2.12 FINISHES

A. Painting: Apply manufacturer’s standard factory paint finish.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install the odor reduction system in strict conformance with manufacturer's installation instructions. The skid shall rest on a level, even base of concrete. Check fan and motor alignment after complete system has been installed at the site.

3.02 FIELD PAINTING

A. Apply a final color coat of paint to the system in accordance with Section 09960.

3.03 FIELD TESTING

A. Field test the system to guarantee compliance with these specifications.

3.04 FIELD SERVICE AND TRAINING

A. The equipment manufacturer shall supply a competent field service engineer to thoroughly check and inspect the equipment after installation, place the equipment in operation, make necessary adjustments, calibrate instruments, and conduct field tests, and perform operator training.

END OF SECTION

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SECTION 13122

PRE-ENGINEERED METAL CANOPY SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes a complete rigid frame, pre-engineered metal canopy that shall be designed, detailed, fabricated, and installed as a deferred submittal including, but not limited to:
   1. Rigid frame, prefabricated, including primary and secondary structural framing capable of resisting the applied loads as determined by applicable codes and the Drawings.
   2. The connection of primary and secondary framing members to complete a vertical and lateral load resisting system, including any diaphragms, connection of bolts, braces, cables, plates, ties, rods, and anchorage to the foundation.
   3. Factory finished roof and wall panels, rigid insulation, flashing, fasteners, closures, sealants, field/touch-up painting.
   4. Gutters and downspouts and splash blocks as shown on Drawings.

1.02 REFERENCES

A. American Concrete Institute (ACI):
   1. ACI 318 Building Code Requirements for Structural Concrete and Commentary, 2019.

B. American Institute of Steel Construction (AISC):
   1. AISC 207 Standard for Certification Programs (Governing Requirements for Certification Programs)
   2. AISC 341 Seismic Provisions for Structural Steel Buildings, 2016
   3. ASIC 358 Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications, Including Supplement No. 1, 2016
   4. AISC 360 Specification for Structural Steel Buildings, 2016

C. American Iron and Steel Institute (AISI):
   1. AISI S202 Code of Standard Practice for Cold-Formed Steel Framing, 2020

D. American National Standards Institute (ANSI):
   1. ANSI/ASME B18.6 Machine Screws, Tapping Screws, and Metallic Drive Screws (Inch Series)
   2. ANSI/ASME B18.2.2 Square and Hex Nuts
   3. ANSI/ASME B18.2.6 Fasteners for Use in Structural Applications
   4. ANSI/ASME B18.22.1 Plain Washers

E. American Society of Civil Engineers (ASCE/SEI):
   1. ASCE 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures, including Supplement No. 3, 2016
   2. ASCE 19 Structural Applications of Steel Cables for Buildings, 2016

3. ASCE 55 Tensile Membrane Structures, 2016

F. American Society for Testing and Materials (ASTM), Standard Specification for:
1. ASTM A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
2. ASTM A36 Carbon Structural Steel
3. ASTM A653 Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
4. ASTM C167 Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations
5. ASTM C665 Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
6. ASTM C1107 Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
7. ASTM E96 Test Method for Water Vapor Transmission of Materials (Perm Rating)
8. ASTM E136 Test Method for Behavior of Materials for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C
9. ASTM F436 Hardened Steel Washers
10. ASTM F1554 Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
11. ASTM F3125 High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions

G. American Welding Society (AWS):
1. AWS A5.1 Specification for Carbon Steel Electrodes for Shielded Metal Arch Welding
2. AWS D1.1 Structural Welding Code – Steel
3. AWS D1.3 Structural Welding Code – Sheet Steel
4. AWS D1.8 Structural Welding Code – Seismic Supplement

H. Metal Building Manufacturers Association (MBMA):
1. Metal Building Systems Manual, 2018
2. Seismic Design Guide for Metal Building Systems

I. Washington State Building Code:
1. WSBC Washington State Building Code, 2018

1.03 SUBMITTALS

A. Product Data:
1. Structural Primary and Secondary Members: cross-sectional properties (area, dimensions thickness, section modulus, plastic section modulus, moment of inertia), yield strength, tensile strength, vertical and lateral strength capacities.
2. Structural Components: (plates, base plates, attachments, braces, cables, and rods) member cross-sectional properties (area, dimensions, thickness), yield strength and tensile strength.
3. Bolts (Fasteners):
   a. Diameter of bolts, material grade designation, hardness, coatings, minimum yield strength and minimum tensile strength.
   b. Overall length of bolts.

c. Material grade, thickness, and dimensional data for nuts and washers.

4. Anchor Bolts:
   a. Diameter(s),
   b. Material grade designation, hardness, coatings, minimum yield strength, and minimum tensile strength.
   c. Overall length, including extension length.
   d. Embedment length consistent with the Contract Documents and/or favorably reviewed submittals.
   e. Stand-offs and/or leveling nut types, dimensional properties, material properties, grade, and location.
   f. Material grade, thickness, and dimensional data for nuts and washers.
5. Roof panels.
6. Wall panels.

B. Metal Building Systems manufacturer's fully described product literature.

C. Samples:
   1. Provide samples of manufacturer's full line of standard colors at the same time as the shop drawings and calculations.
   2. Provide physical samples on metal of selected colors only, prior to ordering and favorably reviewed shop drawings.

D. Reference Documents:
   1. Reference drawing shall be included to demonstrate coordination of the canopy components has been completed. Reference drawings shall include plans, sections, and details. Reference drawings shall be drawing to scale and shall include dimensions and gridlines consistent with the Drawings.
   2. Reference drawings shall include all nonstructural components (conduits, lights, etc) and structure mounted equipment weights, sizes, and locations consistent with the development of the loads applied on the structure.

E. Shop Drawings:
   1. Complete shop drawings shall be submitted as part of a deferred submittal and comply with the WSBC, and the Structural Drawings. The shop drawings shall be prepared, stamped, signed, and furnished by a Professional Civil or Structural Engineer licensed to practice in, and as required by the State where the project is being constructed.
   2. Shop drawings shall fully describe the proposed product including plans, sections, elevations and sufficient details for assembly and installation.
   3. Submit drawings at the same time as the calculations.
   4. Submittal shall be favorably reviewed prior to any work on the foundations, so that the anchorage and foundation loads may be coordinated with Engineer of Record's design of the foundation.

Contractor shall coordinate the canopy anchorage with the foundation design provided in the Contract Documents.

F. Minimum Calculations Requirements:
   1. Complete calculations shall be submitted as part of a deferred submittal and comply with the WSBC, and the Structural Drawings. The calculations shall be prepared, stamped, signed, and furnished by a Professional Civil or Structural Engineer licensed to practice in, and as required by the State where the project is being constructed.

2. Calculations shall be comprehensible and complete. When evaluating the structural strengths, indicate stress for comparing with strengths or show the demand versus capacity ratio in the structural elements. Evaluating the results by stating “Okay by Inspection” is not acceptable.
3. Complete calculations for the canopy structures meeting the requirements of the applicable building codes and demonstrating that the design criteria used are in general conformance with the Contract Documents.
4. Clearly indicate the lateral force procedure and lateral parameters used to develop the structures resistance to wind and seismic forces, including applicable code references.
5. Derivation of forces used, including at least one complete sample calculation, showing the process used so that Engineer of Record may determine general conformance. Printouts of spreadsheets without explanation of calculations used to determine values are not acceptable.
6. The calculations and details shall demonstrate a complete vertical and lateral load path and shall clearly indicate all forces imposed on the supporting structure. Include all load combinations used in the design shall be referenced and include a clear indication whether service level or strength level was used in the design.
7. Reaction loads at each column for the Engineer of Record to review, indicating the load combinations used to derive the loads.
8. Verification of components and cladding to withstand the corresponding wind pressures regarding the tributary area of the canopy structure components exposed to the wind pressures.
9. Resulting deflection of structural members including global sidesway (drift) of the canopy structure. Demonstrate deflection of structural members and global drift of the structure is within drift limits of applicable codes.

G. Anchorage Calculations and Details:
1. Anchorage calculations and details shall be provided for all nonstructural components and nonbuilding structures required as part of the deferred submittal items. Anchorage calculations and details shall be sealed and signed by a Professional Civil or Structural Engineer licensed to practice in, and as required by the State where the project is being constructed.
2. Submittals without sealed and signed anchorage details will be rejected.
3. Submit anchorage calculations for nonstructural components and nonbuilding structures to resist dynamic operational, wind, and seismic forces in both concrete and steel as required for the point of attachment relative to the Contract Documents.
4. Reduction factors associated with edge distance, embedment length, grout and base plate thickness, and bolt spacing shall be considered in the design and clearly indicated on the submittal drawings.
5. Anchorage details shall include the required concrete strength or steel strength consistent with the Contract Documents, anchor bolt diameter, embed, spacing, and edge distances consistent with the calculations.
6. Include anchoring methods and leveling criteria for equipment consistent with manufacturer’s recommendations.
7. Final dimensions of equipment pads based on equipment size and edge distance required for anchorage. The Contractor shall coordinate the final dimensions of equipment pads, including any revisions required to meet the

requirements of the favorably reviewed submittal by at no additional cost to the Owner.

H. Quality Assurance Submittals:
   1. Qualifications.
   2. Mill certificates of all steel materials used.
   3. ASIC certification.
   4. MBMA member documentation.
   5. Certificate stating that the surface preparation of steel elements conforms with the shop painting system and that shop applied coatings are compatible with field applied coating systems.
   6. Evaluation Reports: Submit the current and relative ICC-ESR or IAPMO-UES reports used in the design of anchorage and other structural elements.
   7. Warranty information.

1.04 QUALITY ASSURANCE

A. The Pre-Engineered Canopy designer, manufacturer, and installer shall have minimum 10 years' experience on similar pre-engineered canopy projects. Installers (erector) shall be trained and certified by manufacturer to install the canopy frame systems.

B. Pre-Engineered Metal Canopy Manufacturer Qualifications:
   1. AISC Certified for design and fabrication per AISC 207.
   2. Member of the Metal Building Manufacturers Association (MBMA).

C. Regulatory Requirements:
   1. The design and constriction shall conform to the WSBC, adopted edition and all applicable State, local codes, and amendments.

D. Welding procedures shall comply with AWS.

   Welders:
   1. Use only welders and welding operators that are certified as qualified welders for this type of work in accordance with the AWS Code.
   2. Comply with AWS qualification procedures for all welds identified with the installation of structural steel. Including PQR for arc spot welds.
   3. Welding Procedure Qualification Record for the welders performing the work.
   4. All welding operators are subject to examination for requalification at any time during the progress of the work. All welding operators performing the work shall be qualified in accordance with this Section.
   5. Welds found to be defective shall be replaced as part of this work.

E. No insulation, roofing materials, or other permanent coverings shall be placed over structural members until the Engineer of Record has observed or the Special

Inspector has inspected the structural system, connections, welds, and accessories.

F. Erector Qualifications: An erector with a minimum of five years of experienced who has specialized in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

G. Professional Engineer Qualifications: A professional engineer who is licensed to practice in the jurisdiction where Project is located.

H. Manufacturer Qualifications: A minimum of twenty-five years of experienced in manufacturing overhead canopy systems similar to those indicated for this Project and with a record of successful in-service performance.

I. Regulatory Requirements. Design and construction shall conform to the following:
   1. California Building Code (CBC) adopted edition and all applicable local codes and amendments.

J. Welding: Use only welders and welding operators that are certified as qualified welders for this type of work in accordance with the AWS Code.
   1. Steel shop connections shall be welded, and field connections shall be bolted, unless otherwise noted in the submittal drawings. Shop welds may be changed to field welds with the approval of the Engineer at no additional cost to the project.
   2. Slag shall be cleaned from welds and prime painted with rust-inhibitive primer.

K. Source Limitations: Obtain Pre-Engineered Metal Canopy through one source from a single manufacturer who shall manufacture and install the canopy.

1.05 WARRANTY

A. Canopy system manufacturer shall provide a written standard full system warranty for a maximum of 20 years against leaks in standing roof panels, arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions.
   1. Warranty shall be signed by both the metal roof system manufacturer and the metal roof system installer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle and erect prefabricated components, sheets, panels, and other manufactured items in a manner that will not cause scratching, damage or deformation of exposed or concealed items or surfaces. Stack site stored materials and components on platforms or pallets and cover with tarpaulins or other suitable weathertight covering. Inspect all panels upon arrival at jobsite. Remove moisture, if any, and restack and protect materials and components until used.

B. Deliver insulation materials to the job in original packages with manufacturer's "R" Values and any required UL flame spread ratings clearly shown.

Damaged, cut, torn, or bent structural members, framing, plates, and components of the structure shall not be installed and shall be rejected.

1.07 SYSTEM DESCRIPTION

A. General

1. The Contractor is responsible for the design, detailing, fabrication, and installation of the entire canopy system, including canopy components that may be shown on the Drawings or specified in other sections to complete the canopy system.
2. Provide the design, materials, and erection of metal canopy structures on concrete foundations as specified herein and on the Drawings.
3. Dimensional modifications to the foundations as may be required for the specific canopy provided. All modifications are subject to the acceptance of the Engineer of Record. All modifications shall be coordinated by the Contractor.

B. Structural Frame: Design and size frames for the canopy dimensions and criteria to resist applied loads as specified and required by codes, standards, and this Section.

C. Secondary and Lateral Bracing: Design and size purlins, girts, struts, and bracing, including attachments, to resist vertical and horizontal loads not resisted by main frame action.

D. Columns and Base Plates:
1. Design and size base plates for the canopy frame columns to resist shear, uplift, moment, and bearing loads.
2. Use steel base plates of adequate size and thickness and provide space for foundation bolts of adequate diameter to provide proper anchorage of the column base to the structure foundation.
3. Design welds at base plates the columns with continuous welds to develop the full strength of the column.
4. Provide anchor bolts and related anchorage designed to resist the column reactions resulting from the specified loads applied in the specified loading combinations.

1.08 performance and design criteria

A. Performance, Design Basis and Coordination:
1. The Pre-Engineered Metal Canopy Manufacturer shall note that the layout of the structure shown on the Drawings have been developed based on the limits in the Contract Documents.
2. Coordinate all attachments and related work and shall provide connections as noted in the favorably reviewed shop drawings.
3. If the edge distance desired by the submitted anchorage calculations deviate from that provided in the Contract Documents, the Pre-Engineered Canopy Manufacturer shall note the deviation in the submittal for review and shall modify the base plate within the footprint of the foundation no additional cost to the Owner.
4. The design shall resist dynamic operational, live loads, snow loads, rain loads, wind, and seismic forces in accordance with the Contract Documents.
5. Coordinate the layout so that adequate space is provided between items for relative motion. Provide additional supports and restraints between items of different systems when necessary to prevent lateral impacts or interaction.
6. Do not locate horizontal or vertical braces in an area which block openings. Contact the Engineer of Record for conflicts with openings prior to any fabrication.

7. Framing arrangements shall be as shown in the Shop Drawings, including lateral bracing types and locations. If revisions to what is presented in the Drawings are required based on the standards of the canopy supplier, submit proposed deviations to the Engineer of Record for review prior to fabrication.
8. Canopy frames systems shall be designed to consider connections of columns to the foundation without fixity (pinned). Moment transfer at foundation is not acceptable.
9. Load Combinations: Load combinations and load factors considered in the design of the structure and components shall comply with the referenced building codes and relative standards.

B. Structural Design Criteria:
   1. General: The development of loads for Pre-Engineered Metal Canopy Systems shall comply with Chapter 16 of the WSBC, including local amendments, ASCE 7, ASCE 19, SCE 55, and the Contract Documents.
   2. Dead Loads:
      a. The weight of all materials of construction incorporated into the canopy including, but not limited to, roofs, finishes, wall cladding, and other similar incorporated architectural and structural items and fixed service equipment (cable trays, conduits, HVAC, piping, etc, including material handling systems.
      b. The canopy system dead load shall be determined by the Pre-Engineered Metal Canopy Manufacturer.
      c. Conveyor and Conveyor Supports as shown on the Drawings.
      d. Collateral (hanging) loads due to piping, HVAC, and/or electrical components load allowance occurring over the entire underside of the roof surface: 10 PSF.
   3. Roof Live Loads:
      a. Reference the Structural Drawings.
      b. Roof and other similar surfaces shall be designed to support the uniform distributed live load or the concentrated live load as shown on the Structural Drawings, whichever produces the greater load effects on the supported element or frame.
      c. Unbalanced or Skip Loading: The full intensity of the appropriately reduced live load applied only to a portion of a structure or member shall be accounted for if it produced a more unfavorable load effect than the same intensity applied over the full structure or member.
      d. Conveyor material conveyance live load.
   4. Roof Snow Load:
      a. Reference the Structural Drawings.
      b. Unless otherwise specified, the roof snow load shall be developed based on the ground snow load as shown on the Drawings.
      c. Balanced and unbalanced snow loads shall be analyzed separately. Winds from all directions shall be accounted for when establishing unbalanced snow loads.
      d. Snow Drift on Roofs: Roof shall be designed to sustain localized loads from snowdrift that form wind shadow of higher portions of the same structure and adjacent structure terrain features. Snow drift on lower roofs shall comply with ASCE 7, CBC, IBC, OSSC, WSBC, including local amendments and references.
   5. Rain-on-Snow Surcharge:

a. Reference the Structural Drawings.

6. Wind Design Criteria:
   a. Reference the Structural Drawings.
7. Seismic Design Criteria:
   a. Reference the Structural Drawings.
   b. The development of seismic forces shall be in accordance with Chapter 12 of ASCE 7 and Chapter 16 of the WSBC, including local amendments and references.
   c. The seismic analysis and design of the canopy structures and their members shall comply with ASCE 7, WSBC, including local amendments and references. The canopy structure shall include complete lateral and vertical force-resisting systems capable of providing adequate strength and stiffness to withstand the design ground motions as shown on the Structural Drawings.
   d. A continuous load path with adequate strength and stiffness shall be provided to transfer all forces from the point of application to the final point of resistance.
   e. A positive connection for all horizontal or vertical forces acting parallel to the member shall be provided for each beam, column, girder, truss, or framing element, directly to its supporting elements designed for lateral resistance.
   f. The total operating weight of the equipment for nonstructural components and nonbuilding structures attached to the canopy structure shall be considered in the development of the seismic design forces.
   g. Pre-Engineered Metal Canopy shall be designed for a concurrent vertical acceleration force. Where required by ASCE 7, the effects of vertical ground motions for nonbuilding structures shall be used in lieu of the vertical acceleration force.
   h. Orthogonal Effects: Pre-Engineered Metal Canopy structures shall be designed for orthogonal effects as required by ASCE 7 and the WSBC.
   i. A redundancy factor shall be assigned to the seismic force-resisting system in each of the two orthogonal directions for all structures in accordance ASCE 7.

C. Deflection Limits:
   1. Maximum permissible member deflections shall be in accordance with Table 1604.3 of the WSBC, unless otherwise specified in this Section and the following table:

Member Type	**Deflection Limit**
Primary Framing:	
Dead Loads + Live Loads	L/180
Roof Live, or Snow, or Wind Loads	L/240
Secondary Framing:	
Dead Loads + Live Loads	L/180
Roof Live, or Snow, or Wind Loads	L/240

Roof Panels:	
Dead Loads + Live Loads	L/180
Roof Live, or Snow, or Wind Loads	L/180

2. L is defined as the length of the member between supports.
3. For cantilevered members, the unsupported length shall be taken as twice the length of the cantilever.

D. Drift Limits:
1. Maximum permissible canopy structure global allowable story drift limits due to wind or seismic shall be in accordance with ASCE 7, WSBC, and this Section. Drift limits shall not be less than the following:
a. Global Structure Sidesway for Wind or Seismic: H/120.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Canopy Systems
1. TFC Canopy.
2. Shelters Direct.
3. Panel Built Industries.
4. or equal.

2.02 STRUCTURE FRAMING AND COMPONENTS

A. Rigid Frames:
1. Built-Up or Extruded Shapes: ASTM A36
2. W Shapes: ASTM A992.
3. Hot-dip galvanized in accordance with ASTM A123.

B. Standard Structural Steel Shapes, Bars and Plates: ASTM A36 or ASTM A572.

C. Steel Tubing: ASTM A500, Grade C

D. Steel Pipe (Seamless): ASTM A53, Type E or S, Grade B.

E. Secondary Structural Framing:
1. Purlins, Joists, and Girts: AISI S202 and ASTM A653, Grade B, G90
2. Minimum thickness shall not be less than 16-ga.

F. Rigid and Primary Framing Members: Identify with an easily visible mark, stamped, stenciled, or painted.

G. Welded Connections:
1. AWS A5.1, AWS D1.1, AWS D1.3, and AWS D1.8
2. AISC 360 and AISC 341.
3. Welded connections shall be shop welded. Field welding is not permitted unless approved by the Engineer of Record at no additional cost to the Owner.

H. Bolted Connections (Fasteners):
1. All bolts shall be manufactured in accordance with the dimensional requirements of ASME B18.2.6.

2. All bolts, nuts, and washers shall be clearly marked per AISC and RSCS. Bolts, nuts, and washers not marked or incorrectly marked shall not be used and shall be removed from site.
3. Bolts and nuts shall be purchased from the same supplier. Do not submit bolts and nuts provided by separate suppliers.
4. All bolts for structural steel connections shall conform to the following, unless specified elsewhere in the Contract Documents or favorably reviewed submittal:
    a. ASTM F3125, Grade A325, Type 3, galvanized.
    b. ASTM F3125, Grade A490, Type 3, galvanized.
5. Nuts and Washers for Bolted Connections:
    a. Provide the correct size of nuts and washers to accommodate galvanizing and bolt threads where required.
    b. Do not oversize nuts or washers.
    c. Nuts shall be hex or heavy hex style and shall meet the dimensional requirements of ASME B18.2.6 or ASME B18.2.2, unless otherwise specified.
    d. Standard washers shall be hard, flat, circular (round) and meet the dimensional requirements of ASTM F436, unless otherwise specified. The Type of washers shall be the same Type as the bolts.
6. Bolting components required to be galvanized shall be hot-dip galvanized or mechanically galvanized provided the requirements of AISC are met.

I. Anchorage to Concrete (Anchor Bolts):
1. Reference Section 05090.

J. Non-shrink Grout:
1. Grout Type: ASTM C1107.
2. Provide grout under the column bases and other structural members required to bear on the concrete slab. Furnish a pre-mixed, non-metallic dimensionally stable material.

K. Touch-up Material: Provide extra primer for field touch-up.

L. Primers: As selected by manufacturer for resistance to normal atmospheric corrosion, compatibility with finish paint systems, capability to provide a sound foundation for field-applied topcoats as follows:
1. Primer: Manufacturer's standard, lead-and chromate-free, non-photochemically reactive, rust-inhibiting primer.

2.03 PANELS

A. Roof Panels:
1. Material: Form from 24-gauge, hot dip, galvanized steel sheet conforming to AISI S202 and ASTM A653 G-90 Specifications. Minimum zinc coating: 1.25 ounces per square foot.
2. Panel Design: interlocking ribbed panels with 2-inch-high minimum locked standing seams with concealed clips.

B. Wall Panels:
1. Material: Form from 24-gauge, hot dip, galvanized steel sheet conforming to AISI S202 and ASTM A653 G-90 Specifications. Minimum zinc coating: 1.25 ounces per square foot.

C. Panel Design: interlocking ribbed wall panels as shown on Drawings. Provide concealed clips for anchorage to metal stud framing behind.

D. Panel Finishes:
   1. Provide panels that have a high-performance finish specially formulated to resist highly corrosive atmospheres and having a minimum 20-year life expectancy.
      a. Heat cured fluoropolymer coating factory-applied to both sides: Kynar 500, Hylar 5000 or equal.
      b. Use only full strength 70% fluorpolymer formulation.
      c. Or equal.

E. Panel Colors: Selected from manufacturer's standard line of colors. Minimum (4) four different colors will be selected. Reverse side shall have a white finish.

2.04 ACCESSORIES

A. Eave Gutters, Rainleaders, Fascias, Trim, and Closures: Roll formed from 24-gauge hot dipped galvanized steel. Galvanized coating shall be 1.25 ounces minimum per square foot of surface.

B. Finish: All accessories shall have a coating system as specified above for roof panels.

C. Touch-up Material: Provide extra enamel for field touch-up to match factory finish.

2.05 SEALANTS

A. Manufacturer's standard gray pressure sensitive tape which consists of a blend of butyl and EPDM rubbers that are non-asphaltic, non-shrinking, non-drying and non-toxic.

2.06 FASTENERS

A. Fasteners: Self-tapping sheet metal screws conforming to ANSI Standard B18.6 and having Type "A" threads. Use screws and washers made from carbon steel and plated with 0.0003-inch-thick cadmium.

B. Treat all exposed fasteners and washers with zinc phosphate and apply one prime coat and apply finish coats of baked silicone polyester. Apply a finish coat that matches the color of the roof panels.

2.07 FIELD TOUCH PAINTING

A. Latex Universal Rust Inhibiting Primer:
   1. Primer for galvanized metal, shop primed steel, etc. Maximum allowable VOC limit 350. Glidden Professional Acrylic Enamel Devflex 4020PF, Pro Industrial Pro-Cryl Universal Primer B50WZ1Sherwin-Williams, or equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Weather Limitations: Proceed with installation only when weather conditions permit roof and fascia panel installation to be performed according to manufacturer's written instructions and warranty requirements.

B. Verify locations and elevations of footings relative to finish grade prior to fabrication of columns and other canopy components. Verify the foundation, floor slab, mechanical and electrical utilities have been placed and anchors are in the correct position, and properly squared and plumb.

C. Established Dimensions: Contractor is responsible to coordinate footer locations and elevations with any interferences with or attachments to abutting structures.

D. Anchor bolts must be installed per erection drawings. Footings need to be free of debris and anchor bolt threads undamaged.

E. Use templates for accurate setting of anchor bolts in the foundation. When required, level bearing plate area with steel wedges, shims, or grout. Verify all previously placed anchors in the foundation.

3.02 STRUCTURAL FRAMING

A. Do not construct foundations until metal canopy shop drawings and calculations have been favorably reviewed by the Engineer of Record.

B. Erect framing in accordance with MBMA Metal Building Systems Manual, Seismic Design Guide for Metal Building Systems and OSHA requirements. Erect canopy frame true and level, with vertical members plumb and bracing properly installed. Maintain the structural stability of the frame system during erection so it does not overstress or impose large loads on the foundation.

C. The erector shall furnish temporary guys and bracing where needed for square, plumbing, and securing structural framing against, temporary loads such as wind and seismic, and the erection operation. Bracing furnished by the manufacturer for the canopy structure shall not be assumed to be adequate during erection and shall not be used to pull frames into a secure, set, and plumb condition. Temporary bracing and falsework used for erection shall be removed immediately upon completion of erection.

D. Provide wind, or seismic bracing in roof during erection. Provide double roof purlins, interconnected by diaphragms between the rigid frames at all points of attachment of diagonal roof bracing.

E. Laterally brace the inside (compression) flange of all rigid frames so that the allowable compressive stress is adequate to resist any combination of vertical and lateral loading.

F. Bolt all field connections as required by the favorably reviewed submittal.

G. Columns:
   1. Secure column bases in accordance with OSHA requirements and MBMA Metal Building Systems Manual.
   2. Fixed base corner columns or other suitably designed rigid frame bracing may be used in lieu of diagonal bracing.

3. Coordinate column anchorage requirements with favorably reviewed metal canopy shop drawings. Column anchor rods shall be cast into the foundation concrete and temporarily supported with the use of templates to prevent accidental movement during construction activities.

H. Finish: Clean all structural steel to remove all rust, dirt, and grease. Touch paint, as required, any damaged areas of shop prime coat. Use penetrating primer suitable for use with applied shop prime coat; verify with metal canopy manufacturer prior to application.

3.03 ROOF AND WALL PANELS

A. Provide roof panels that are continuous from ridge to eave with no end splices.

B. Secure roof panels with concealed clips attached to roof purlins with self-drilling fasteners. Rigidly fasten eave end of roof panels and allow ridge end free movement due to thermal expansion and contraction.

C. Seal all standing seams of roof panels with a continuous strip of sealant tape before field crimping.

D. Secure wall panels to all bearing points with self-drilling fasteners at a maximum spacing of 12 inches on centers.

E. Where required for weathertightness, equip screws with metal and neoprene washers.

3.04 FLASHING, CLOSURES, AND TRIM

A. Install flashing and/or trim at the rake and corners, where shown and where necessary to provide weathertightness and a finished appearance.

B. Install preformed neoprene panel rib closures at the ridge, eave, base and where shown and where required for weathertightness.

3.05 ACCESSORIES

A. General: Install accessories according to manufacturer's written instructions, with positive anchorage and weathertight mounting. Coordinate installation with flashings and other components.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions. Provide for thermal expansion of metal units; conceal fasteners where possible, set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates resulting in waterproof and weather-resistant performance.
2. Separate metal from incompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.

C. Provide eave, gutters and rainleaders where shown and the following:
   1. Extend the gutter apron under the roof panels and seal with neoprene closures. Securely fasten and seal joints between adjacent sections and seal end closures and downspouts.
   2. Secure rain leaders to columns with 20-gauge straps spaced 6 feet on centers. Provide two self-tapping fasteners and washers at each anchor strap.

3.06 SEALANTS

A. Seal sidelaps, endlaps and flashings with gray pressure sensitive tape that will adhere to metals, plastics and painted surfaces from -10°F to +140°F.

B. Apply sealants required to achieve watertightness.

3.07 PAINTING, ADJUSTMENTS AND TOUCH-UP

A. Field Painting: Canopy structure components not factory finished to be field primed and painted as per Section 09900.

B. Factory Primed Items: Touch up with rust inhibitive primer all surfaces on which the factory applied primer has been marred or damaged.

C. Factory Finished Items: Exercise care in handling factory finished panels, sheets, and accessories. Touch up scratches and small blemishes with compatible paint system. Replace items that have been dented, creased, bent, or rusted with new identical items.

D. Galvanizing: See section 05100.

END OF SECTION

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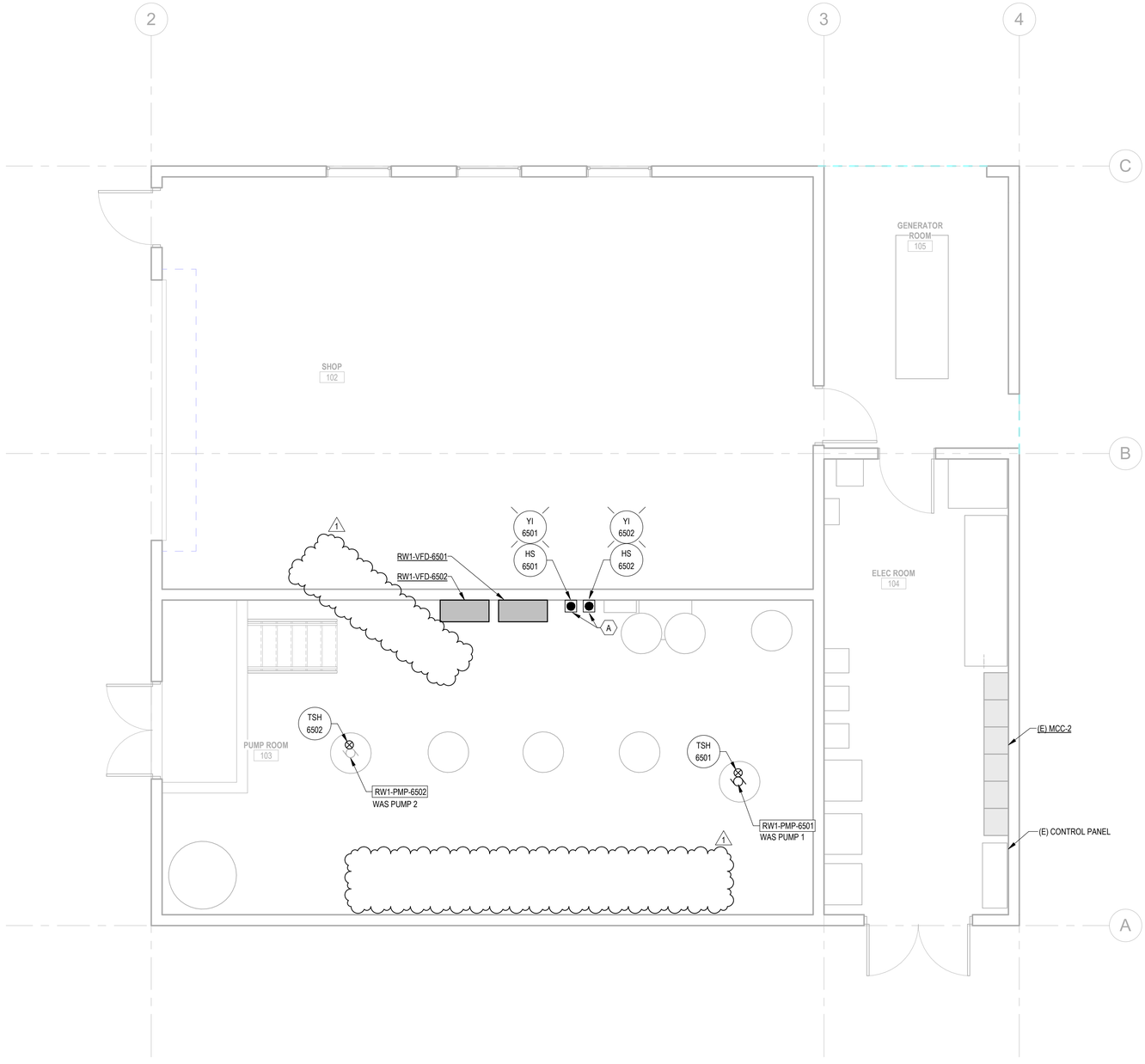

1 EQUIPMENT BUILDING - INSTRUMENTATION PLAN
SCALE: 1/4" = 1'-0"

GENERAL SHEET NOTES

1. CONDUIT ROUTING SHOWN IS DIAGRAMATIC TO SHOW COORDINATION INTENT. NOT ALL CONDUITS ARE SHOWN BETWEEN MCC'S, CONTROL PANELS, JUNCTION BOXES AND FIELD INSTRUMENTS. SEE CABLE AND CONDUIT SCHEDULE.
2. EXPOSED CONDUIT SHALL BE ROUTED ALONG STRUCTURAL BUILDING LINES UNLESS NOTED OTHERWISE. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. SEE PROCESS MECHANICAL PLANS AND SECTIONS FOR FURTHER DETAIL AND EXACT LOCATIONS OF PROCESS EQUIPMENT.

KEYNOTES

A LOCAL CONTROL STATION. REFER TO 1/I-803 FOR INSTALLATION DETAILS.

CONTROL CONDUIT AND CABLE SCHEDULE - I-071

CONDUIT TAG	TO	FROM	CONDUIT SIZE	CONDUCTOR	NOTES
C-YI-6502	YI-6502	RW1-VFD-6502	3/4"	2#14,#14G	LOCAL CONTROL STATION, SEE MOTOR CONTROL DIAGRAM.
C-TSH-6502	TSH-6502	RW1-VFD-6502	3/4"	2#14	
C-HS-6502	HS-6502	RW1-VFD-6502	3/4"	2#14,#14G	LOCAL CONTROL STATION, SEE MOTOR CONTROL DIAGRAM.
C-HS-6501	HS-6501	RW1-VFD-6501	3/4"	2#14,#14G	LOCAL CONTROL STATION, SEE MOTOR CONTROL DIAGRAM.
C-TSH-6501	TSH-6501	RW1-VFD-6501	3/4"	2#14	
C-YI-6501	YI-6501	RW1-VFD-6501	3/4"	2#14,#14G	LOCAL CONTROL STATION, SEE MOTOR CONTROL DIAGRAM.
C-RW1-VFD-6501	RW1-VFD-6501	(E) PLC CONTROL PANEL	3/4"	14#14	
S-RW1-VFD-6502	RW1-VFD-6502	(E) PLC CONTROL PANEL	3/4"	2#16 TSP	
S-RW1-VFD-6501	RW1-VFD-6501	(E) PLC CONTROL PANEL	3/4"	2#16 TSP	
C-RW1-VFD-6502	RW1-VFD-6502	(E) PLC CONTROL PANEL	3/4"	14#14	

ISSUED FOR BID

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NO	REVISION	DATE	BY
1	ADDENDUM NO. 4	02/23/24	JRB

SCALES
0 1"
0 25mm
IF THIS BAR IS NOT DIMENSION SHOWN, ADJUST SCALES ACCORDINGLY.

DESIGNED BM
DRAWN JRB
CHECKED TJH

CITY OF WASHOUGAL
WASHOUGAL, WASHINGTON

BIOSOLIDS HANDLING FACILITIES

Kennedy Jenks WINDSOR ENGINEERS

EQUIPMENT BUILDING - INSTRUMENTATION PLAN

SCALE 1/4" = 1'-0"
JOB NO 20056
DATE DECEMBER 2023
SHEET OF ---
I-071

SCADA

(E) PLC IN EQUIPMENT BUILDING CONTROL PANEL

START HS 6502 D | STOP HS 6502 E | RUN YI 6502 A | AUTO YI 6502 B | ENABLED YI 6502 C | FAIL YA 6502 | SPEED SI 6502 | CMD SC 6502

HS-6502D | HS-6502E | YI-6502A | YI-6502B | YI-6502 | YA-6502 | SI-6502 | SC-6502

START HS 6501 D | STOP HS 6501 E | RUN YI 6501 A | AUTO YI 6501 B | ENABLED YI 6501 C | FAIL YA 6501 | SPEED SI 6501 | CMD SC 6501

HS-6501D | HS-6501E | YI-6501A | YI-6501B | YI-6501 | YA-6501 | SI-6501 | SC-6501

FLOW FI 6511

FIT-6511

1

480/3 RW1-VFD-6502

HOA HS 6502 A | START HS 6502 D | STOP HS 6502 E | RUN YI 6502 A

SC 6502 | FAIL YA 6502 | RST HS 6502 B | TAH 6502

ETM KQI

480/3 RW1-VFD-6501

HOA HS 6501 A | START HS 6501 D | STOP HS 6501 E | RUN YI 6501 A

SC 6501 | FAIL YA 6501 | RST HS 6501 B | TAH 6501

ETM KQI 6501

DISABLE/STOP HS 6501 C

DISABLED YI 6501 C

TSH 6501

M

FIT 6511

M

FROM SECONDARY CLARIFIER 1

6" WAS

4" WAS

6" X 4"

6" X 4"

WAS PUMP 1

RW1-PMP-6501

TO ROTARY DRUM THICKENERS

DISABLE/STOP HS 6502 C

DISABLED YI 6502 C

TSH 6502

M

FROM SECONDARY CLARIFIER 1

6" WAS

4" WAS

6" X 4"

6" X 4"

WAS PUMP 2

RW1-PMP-6502

NOTES:

1. REFERENCE SHEET I-071 FOR EQUIPMENT LOCATION AND ADDITIONAL DETAILS.
2. FLOW METER IS EXISTING TO REMAIN.

ISSUED FOR BID

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DRAWN JRB

CHECKED TJH

CITY OF WASHOUGAL
WASHOUGAL, WASHINGTON

BIOSOLIDS HANDLING FACILITIES

Kennedy Jenks | WINDSOR ENGINEERS

WAS PUMPS - P&ID

SCALE

JOB NO 20056

DATE DECEMBER 2023

SHEET OF ---

I-700