



Members: Councilmembers Clerget, Elfers, Reinke, Alt. Brown

Staff: Michael Kosa, Alisa O’Haver-Ayala, Ryan Johnstone, Andrew Leach, Robert Wright, Andria Hannegan, Courtney Littrell, Drew McCarty, Gursimran Singh, Thi Le, Kelsey White

The city is conducting this public meeting using a hybrid model. The public is welcome to attend tonight’s meeting in-person at City Hall (First Floor Conference Room), or virtually by using the meeting access link below:

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CALL TO ORDER

COMMITTEE BUSINESS

1. White River Restoration Project Phase 1 - Construction Contract Award
2. Rivergrove Pedestrian Bridge - Consultant Supplement for Design
3. Fryar Ave Trail - Consultant Contract Award
4. Biosolids Dryer Procurement - Contract Award
5. Elm Street Sidewalks - Construction Contract Award
6. Cemetery Maintenance Facility - PSE Easement
7. Water Rights Appraisal - Regional Water and Sonoco

REPORTS

1. Project Management Report

ADJOURNMENT

SUBJECT: White River Restoration Project Phase 1 - Construction Contract Award

CATEGORY: Consent

BUDGET IMPACT:

Expenditure Required: \$3,365,097.18

Within Budget Allocation: Yes

ATTACHMENTS:

1. Bid Tab
-

STAFF CONTACT: Robert Wright, Engineering Specialist

SUMMARY BACKGROUND:

Five (5) bids were received on May 29, 2024 for this project. The lowest responsive bid was submitted by Goodfellow Bro's, Inc., with a bid amount of \$3,059,179.25. With 10% contingency, the total budgeted value is \$3,365,097.18. The engineer's estimate was \$4,500,000. The contractor will have 57 working days after issuance of the Notice to Proceed to complete the project.

COUNCIL COMMITTEE/STUDY SESSION: Public Works Committee

MEETING/STUDY SESSION DATE: 6/4/2024
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COMMITTEE RECOMMENDATION: Do Pass

STAFF RECOMMENDATIONS/MOTION:

A motion authorizing the Mayor and City Administrator to execute all necessary contract documents with Goodfellow Bro's, Inc., in an amount not-to-exceed \$3,365,097.18 for the White River Restoration Project Phase 1 (CIP14-10), substantially in a form approved by the City Attorney.

Bid Tabulation

		Project Name:	White River Restoration Project - Phase 1 Excavation											
		CIP No.:	14-10											
		Bid Opening Date:	May 29, 2024											
		Notes:			Bidder #1		Bidder #2		Bidder #3		Bidder #4		Bidder #5	
		Indicates error corrected by PW dept	\$X,XXX.XX		Active Construction, Inc.		Rodarte Construction, Inc.		Johansen Construction Compar		Pivetta Brothers Construction, I		Goodfellow Bros., LLC	
		Indicates Bidder modified Proposal	\$X,XXX.XX		5110 River Rd E		17 East Valley Hwy E		P.O. Box 674		1812 Pease Ave		22035 SE Wax Rd #14	
		Indicates Revision Due to Duplication	*		Tacoma WA 98443		Auburn, WA 98092		Buckley, WA 98321		Sumner, WA 98390		Maple Valley, WA 98038	
					Total	\$5,174,174.00		\$3,238,320.15		\$7,742,803.86		\$3,875,284.39		\$3,059,179.25
Bid Item	Spec	Bid Item Description	Unit	Quant	Unit Price	Amount	Unit Price	Amount	Unit Price	Amount	Unit Price	Amount	Unit Price	Amount
1	1-09	Mobilization	LS	1	\$470,000.00	\$470,000.00	\$234,000.00	\$234,000.00	\$705,000.00	\$705,000.00	\$89,325.00	\$89,325.00	\$270,000.00	\$270,000.00
2	2-02	Removal of Structures and Obstructions	LS	1	\$280,236.56	\$280,236.56	\$63,500.00	\$63,500.00	\$12,000.00	\$12,000.00	\$74,555.00	\$74,555.00	\$315,000.00	\$315,000.00
3	2-03.3	Common Excavation, Incl. Haul - Area A to CAT 1, 2, 3 Stockpiles	CY	35,000	\$7.00	\$245,000.00	\$12.00	\$420,000.00	\$16.85	\$589,750.00	\$26.50	\$927,500.00	\$7.00	\$245,000.00
4	2-03.3	Common Excavation, Incl. Haul - Area B/C to CAT 1, 2, 3 Stockpiles	CY	100,000	\$12.25	\$1,225,000.00	\$8.00	\$800,000.00	\$30.70	\$3,070,000.00	\$13.00	\$1,300,000.00	\$8.00	\$800,000.00
5	2-03.3	Common Excavation, Incl. Haul - Area B/C to CAT 1, 2, 3 Stockpiles	CY	40,000	\$12.00	\$480,000.00	\$9.50	\$380,000.00	\$20.80	\$832,000.00	\$14.00	\$560,000.00	\$8.00	\$320,000.00
6	2-03.3	Common Excavation, Incl. Haul - Area A/B/C to CAT 4 Stockpile	CY	95,000	\$5.50	\$522,500.00	\$6.50	\$617,500.00	\$16.05	\$1,524,750.00	\$2.25	\$213,750.00	\$6.00	\$570,000.00
7	8-01	Erosion Control and Water Pollution Prevention Dry Season	LS	1	\$60,000.00	\$60,000.00	\$130,000.00	\$130,000.00	\$36,500.00	\$36,500.00	\$85,000.00	\$85,000.00	\$15,000.00	\$15,000.00
8	8-01	Erosion Control and Water Pollution Prevention Wet Season	LS	1	\$1,000,000.00	\$1,000,000.00	\$48,000.00	\$48,000.00	\$29,500.00	\$29,500.00	\$52,170.00	\$52,170.00	\$50,000.00	\$50,000.00
9	8-01.3(1)A	Stormwater Pollution Prevention Plan	LS	1	\$154.00	\$154.00	\$500.00	\$500.00	\$5,000.00	\$5,000.00	\$4,550.00	\$4,550.00	\$5,000.00	\$5,000.00
10	8-01.3(7)	Silt Fence at Area A & B Stockpiles	LF	1045	\$8.50	\$8,882.50	\$6.00	\$6,270.00	\$6.75	\$7,053.75	\$10.50	\$10,972.50	\$6.00	\$6,270.00
11	8-01.3(1)C	Flood Fighting	FA	1	\$57,500.00	\$57,500.00	\$57,500.00	\$57,500.00	\$57,500.00	\$57,500.00	\$57,500.00	\$57,500.00	\$57,500.00	\$57,500.00
12	8-02.3	WRRP Temporary Seeding	AC	50	\$7,500.00	\$375,000.00	\$4,000.00	\$200,000.00	\$3,550.00	\$177,500.00	\$3,255.00	\$162,750.00	\$2,800.00	\$140,000.00
13	2-09	OPTIONAL Shoring or Extra Excavation Class B	LS	1	\$1,000.00	\$1,000.00	\$100.00	\$100.00	\$24,500.00	\$24,500.00	\$1,000.00	\$1,000.00	\$1.00	\$1.00
					Tax	\$448,900.94	Tax	\$280,950.15	Tax	\$671,750.11	Tax	\$336,211.89	Tax	\$265,408.25
					Total	\$5,174,174.00	Total	\$3,238,320.15	Total	\$7,742,803.86	Total	\$3,875,284.39	Total	\$3,059,179.25
		Prepared By:	Robert Wright											
		Date:	May 29, 2023											

SUBJECT: Rivergrove Pedestrian Bridge - Consultant Supplement for Design

CATEGORY: Consent

BUDGET IMPACT:

Expenditure Required: \$831,646.00

Within Budget Allocation: Yes

ATTACHMENTS:

1. Consultant Scope & Fee Phase 2

STAFF CONTACT: Andrew Leach, Associate Engineer

SUMMARY BACKGROUND:

The project involves designing a shared use pedestrian/bicycle bridge over SR 410 that connects the Rivergrove neighborhood to the rest of Sumner. This bridge will provide residents a safe route to the City and two local schools without having to walk along SR 162 to cross SR 410. The City has been awarded funding from Sound Transit to complete the design of this project.

This supplement adds funding to complete the design of the project. The project will be able to move from 30% design to a final bid package. The original contract amount was \$168,925 and the supplement adds \$831,646 for a total contract cost of \$1,000,571. This supplement is fully funded by grant funding from Sound Transit, PSRC CMAQ and STBG, and State Legislative grants.

COUNCIL COMMITTEE/STUDY SESSION: Public Works Committee

MEETING/STUDY SESSION DATE: 6/4/2024

COMMITTEE RECOMMENDATION: Do Pass

STAFF RECOMMENDATIONS/MOTION:

A motion approving a supplement to V+M Structural Design's Consultant Services Contract for the Rivergrove Community Pedestrian Bridge (CIP 20-07), increasing the contract amount by \$831,646.00 to a total authorized amount not-to-exceed \$1,000,571.00, and authorizing the Mayor and City Administrator to execute any and all documents necessary to effectuate the amendment, substantially in a form as approved by the City Attorney.

EXHIBIT A

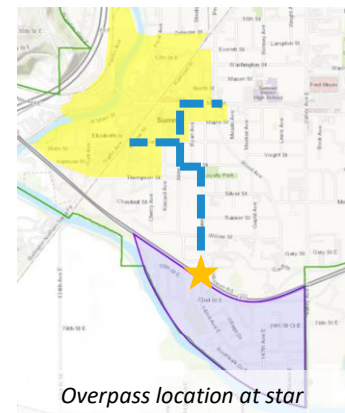
SCOPE OF WORK

City of Sumner

Rivergrove Community Pedestrian Bridge over SR 410

During the term of this Agreement, the consultant team (Consultant), including the prime and subconsultants, shall perform professional services for the City of Sumner (City) on the Rivergrove Community Pedestrian Bridge (Project). The complete scope of work for the Project includes:

- Conducting a land survey and preparing a base map.
- Carrying out geotechnical investigation and preparing a geotechnical report with recommendations.
- Evaluating environmental impacts created by the new structure.
- Assessing floodplain impacts.
- Carrying out a Type, Size and Location study to identify a preferred crossing location and span arrangement for the new bridge.
- Assisting the City with permitting requirements to facilitate construction of the new bridge.
- Developing the detailed design of the preferred option and preparing bid documents by 2025.



This phase of the Project is described below.

PHASE 2 of the Project includes:

- Final survey
- Land acquisition/easement assistance to the City
- Final geotechnical investigation
- Preparation of geotechnical report
- Final environmental work and permitting support
- Final floodplain impact assessment
- Final design of the Preferred Alternative, including structural, civil and landscape
- Potential support of public outreach and grant applications
- Preparation of Bid Documents and supporting bid period

Phase 1 work has been completed, with a preferred alignment selected using the WSDOT ROW to reach Alder St and continue north. An amendment to the contract will be executed to start Phase 2 work.

Construction Management is not included in the above phases of work and is expected to form a separate scope of work as Phase 3 upon completion of Phase 2.

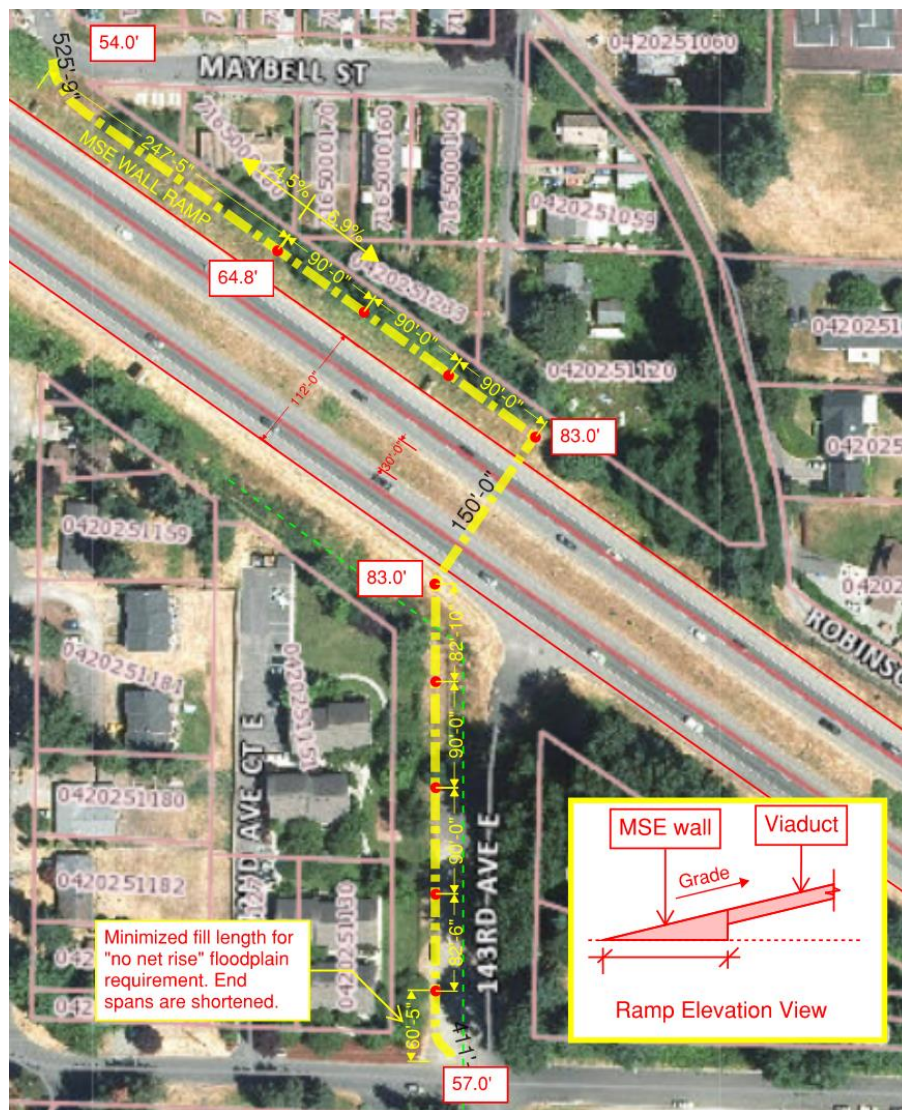
Project tasks and subtasks of Phase 2 are described in the Scope of Work below.

Project Description

The goal of the proposed pedestrian and cycling bridge crossing over SR 410 is to provide a safe, convenient connection between the Rivergrove neighborhood to the historic downtown core, the Sumner Sounder Station, and nearby schools. Enhancing multimodal connections in the City will enhance livability for residents in this neighborhood and provide stronger community ties over the long-term. The City has secured grant funding for the detailed design of overpass and connections at each end of the bridge into the existing street infrastructure.

Project Extents

The extents of the project extend to the at-grade tie-ins at either end of the bridge. The preferred alignment for the new overpass is illustrated below. Phase 2 will include the final design of the structure and bid document preparation for tender.



Proposed Project Alignment



Project Schedule

The anticipated project schedule activities are listed below. Review periods by the City and others are assumed to be three (3) weeks. The project schedule may be subject to adjustment by mutual agreement, whether initiated by the City or Consultant.

PHASE 2:

- July 2024: NTP on Phase 2
- January 2025: 60% design submission
- May 2025: 90% design submission
- August 2025: 100% design submission
- September 2025: Negotiate Phase 3 (Construction Management)
- October 2025: Bid Package

Intellectual Property

The documents listed as “**Deliverables**” in the Detailed Task Description of this scope of work and other exhibits or presentations for the work covered by this AGREEMENT and associated supplements will be furnished by the Consultant to the City upon completion of the various tasks of work. Whether the documents are submitted in electronic media or in tangible format, any use of the materials on another project or on extensions of this project beyond the use for which they were intended, or any modification of the materials or conversion of the materials to an alternate system or format will be without liability or legal exposure to Consultant. The City will assume all risks associated with such use, modifications, or conversions. The Consultant may remove from the electronic materials delivered to the City, all references to the Consultant involvement and will retain a tangible copy of the materials delivered to the City which will govern the interpretation of the materials and the information recorded.



DETAILED TASK DESCRIPTION

General Assumptions:

1. *The level of effort for each task and subtask is limited to the amount of labor and expenses indicated in Level of Effort provided in Exhibit B. It is assumed that budget may be transferred between tasks, provided the total contracted amount is not exceeded.*
2. *Additional services beyond the described services herein will be considered Extra Work.*
3. *Phase 2 activities will be substantially complete by October 2025.*
4. *Unused budget from Phase 1 is assumed to be transferrable to Phase 2 tasks.*
5. *Annual escalation is assumed to occur at the start of the new calendar year.*
6. *The Consultant is responsible for meeting deadlines for their tasks only; Consultant has no control over those portions of the schedule related to the tasks performed by the City or any third party.*
7. *The Project will use U.S. Customary units.*
8. *The City has the authority to approve the Proposed Scope of Work and schedule changes.*
9. *All meetings are assumed to take place via videoconference.*
10. *No property acquisition is required for the project.*
11. *Submittal reviews account for one round of revisions to take the draft submittal to the final submittal stage.*

Task 100 – Project Management

This task includes services necessary to plan, perform and control the various elements of the Project to meet the needs and expectations of the City and other stakeholders.

Work under this task will be performed by V+M.

Task 120 – Phase 2 Project Management

Phase 2 tasks will be a continuation of Phase 1, with ongoing coordination and site investigations carried out for the project through to the tender process.

Subtask 121 – Coordination

Under this subtask, the Consultant Project Manager will provide overall direction and coordination of activities with the City and amongst the Consultant team.

Project Management tasks will include:

- **Project Meetings** – Consistent communication with the City's PM and meetings with key City staff and outside stakeholders.
- **Interdisciplinary Communication** – Regular communication between discipline leads, conveying information and decisions between survey, geotechnical, environmental, hydraulics, permitting, civil, landscaping, and structural.
- **Project Budget** – Establish anticipated spending rates and monitor progress, correcting budget deviations early.
- **Schedule** – Establish a baseline schedule at project commencement. Make and hold decisions on key considerations consistent with the baseline schedule.



- **Drawing Standards** – Comply with the City’s standards for the titleblock and will use APWA standard layers for AutoCAD drawings.
- **Review/Comment Periods** – It is assumed that there will be three formal Review/Comment periods during Phase 2 (for the 60%, 90%, and 100%), along with over-the-shoulder reviews periodically through the project.

Subtask 122 – Administration

This subtask will include preparation of meeting minutes and monthly invoices, complete with progress reports.

Assumptions:

- *The Consultant’s Project Manager will meet with the City’s PM on a regular basis throughout the project – 20 count @ 0.5 hours each.*
- *Stakeholder meetings are assumed to include:*
 - a. *City Staff – 2 meetings @ 1 hour each*
 - b. *WSDOT – 4 meetings @ 1 hour each*
 - c. *Other stakeholders – 1 meeting @ 1 hour each*
- *Internal project team coordination meetings will be held on an as-needed basis during project duration (assumed 6 count at 1 hour each). These meetings will be in addition to the coordination meetings held with the City, but budgeted as part of this task.*
- *All meetings are assumed to take place via video conference for Phase 2.*

Deliverables:

- *Meeting minutes and/or notes, as appropriate.*
- *Monthly Invoices and Progress Report in pdf format (1 copy)*



Task 200 – Survey

This task includes services to provide survey services conducted by 1Alliance Geomatics Surveying and Mapping (1Alliance).

Task 220 – Phase 2 Survey

This task includes services to provide a survey base map sufficient for engineering design of the preferred alternative/alignment in Phase 2.

Survey will be conducted by 1Alliance.

This task is expected to be completed in Phase 2. Subtasks include:

Subtask 221 – Management

This subtask is for communicating with Consultant PM and for coordination of activities associated with this task. Administration and accounting services for the subconsultant are also included in this subtask.

Subtask 222 – SR-410 Right-of-Way Resolution and Easement Assistance

This subtask includes resolving of the WSDOT Right-of-Way for SR-410 within the project area.

This subtask also includes developing land descriptions and exhibits for up to two permanent and two temporary easements for the project. One round of addressing comments is included in this subtask.

Subtask 223 – South Side Boundary Resolution (Optional)

This subtask includes resolving the Westerly Right-of-Way margin, and Westerly parcel lines, along 143rd Ave SE between SR-410 and 72nd St E. If this optional task is requested, up to 2 title reports will be needed which will be provided by the City.

Subtask 224 – Topographic Survey

This Phase 2 survey will include supplemental topographic survey along the WSDOT ROW on the north side based on the preferred alignment. Rights-of-entries (ROEs) will be obtained by 1Alliance for entering WSDOT ROW to complete the detailed topographic survey in Phase 2.

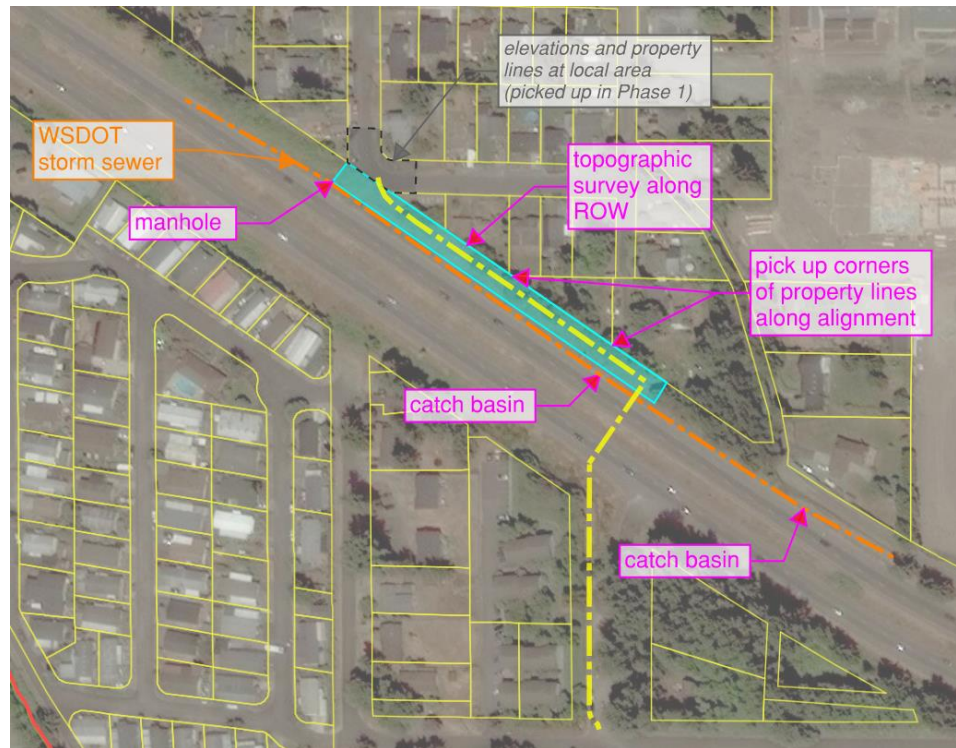


Figure – Phase 2 Survey Extents

The following will be carried out under this subtask:

- Provision of necessary field surveying and mapping to meet the objective of providing a topographical base map sufficient for engineering design, including capturing physical features based on the shaded areas in the above figure, such as:
 - a. Edge of pavement and driveways
 - b. Location of existing drainage
 - c. Type, size, and location of any utilities/culverts, including WSDOT storm sewer along north side of SR 410. Survey may require picking up surface features such as manholes and catch basins to ascertain alignment of storm sewer.
 - d. Fences
 - e. Walls
 - f. Slopes with break lines indicating top and toe of slope
 - g. Significant trees
 - h. Locate additional geotechnical borings (assume 9 count)

This subtask also involves updating the basemap prepared in Phase 1 with supplemental information obtained in Phase 2.

Assumptions:

- *The City will provide any existing data or basemaps from previous efforts, as available.*



- *The City will assist Consultant in obtaining information from regulatory and resource agencies, utility providers, and other City departments.*
- *The City will provide any previous reports and documents pertaining to the Project.*
- *The City will provide access through the ROW fence for the field crew.*
- *Traffic control will only be necessary for one day of fieldwork.*
- *Horizontal datum will be NAD83/11 based on the Washington State Plane Coordinate System South Zone.*
- *Vertical datum will be NAVD88.*
- *It is assumed that right-of-way plans, TCE's, and property acquisition are not required.*
- *Requirements for an air space/trail lease with WSDOT is not included in this scope, as additional discussion with WSDOT is needed to understand specific requirements.*

Deliverables:

- *AutoCAD Civil3D 2018 Topographic Survey and ROW 2D Basemap (electronic copy)*
- *AutoCAD Civil 3D 2018 Surfaces (DTM Files) (electronic copy)*
- *Copy of field survey books (PDF copy)*



Task 300 – Geotechnical

This task includes services to provide geotechnical engineering design services conducted by GeoEngineers, Inc. (GEO).

Task 320 – Phase 2 Geotechnical

Phase 2 of the geotechnical work includes subsurface investigation for the preferred alignment resulting from the TS&L study. This task is expected to be completed in Phase 2 and will be conducted by GEO.

Subtasks include:

Subtask 321 – Management

This subtask includes effort for supplemental coordination during Phase 2. This includes the following meetings:

- Regular coordination calls (10 count @ ½ hour each).
- Team meetings to discuss findings, foundation types, and construction considerations (assumed a total of 3 to 4 meetings).

Subtask 322 – Data Gathering

During Phase 2, supplemental subsurface exploration will be carried out for final design. Specific scope of geotechnical engineering services will include:

- Prepare the exploration work plan including proposed boring locations, drilling set-up, and traffic control plans for accessing WSDOT right-of-way. This information will be submitted to the City for review and approval prior to commencing work.
- Complete the right-of-entry permits for drilling within WSDOT right-of-way including, including a description of the work, drill rig size and set-up, traffic control plans and access coordination from SR410, and proposed restoration at the boring sites.
- Check for underground utilities at the exploration locations by contacting the Washington State One Call Utility Locate Service and hiring a private utility locating company to clear the borings.

Subtask 323 – Subsurface Investigation

Specific scope of geotechnical subsurface explorations will include:

- Borehole exploration of the subsurface ground conditions including soil characteristics and groundwater conditions. Borings will be required at each pier location for the proposed structure. A total of 4 new borings are proposed on the south side to supplement the one boring completed during the preliminary evaluation, and 5 new borings will be drilled on the north side of SR410 (4 at pier locations and one at the west end of the north ramp. The boring for the north ramp will also be utilized to monitor long-term groundwater for a potential bioretention facility. Exploration depths are anticipated to extend up to 130 feet below existing ground surface to sufficiently extend below the liquefiable soil layers.

One additional monitoring well will be installed adjacent to one of the borings on the north side. A monitoring well was previously installed adjacent to the Phase 1 boring on the south side.

Provide traffic control plans and a work plan description for access to the borings from SR410. We plan to submit a permit application to close the shoulders of SR410 for drill rig access to the boring sites.

- Soil samples will be obtained using standard penetration test (SPT) methods (American Society for Testing and Materials [ASTM D] 1586 test method) at 5-foot depth intervals.
- Complete three follow-up site visits to measure groundwater levels in the monitoring wells.

Phase 2 drilling plan:

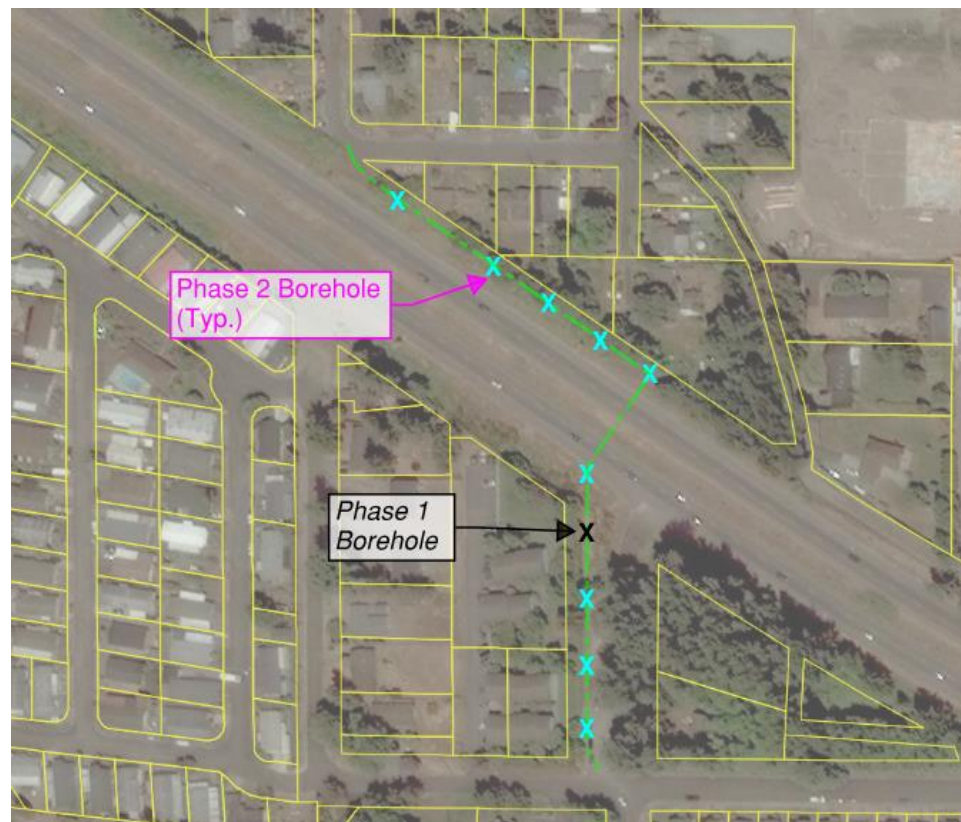


Figure – Phase 2 Borehole Location

- Evaluation of pertinent physical and engineering characteristics of the soils based on geotechnical laboratory tests conducted on samples from the borings. The laboratory tests may include moisture content, percent fines (particles passing the No. 200 sieve), grain size analyses including hydrometers, and Atterberg limits (plasticity) tests, as appropriate.
- Complete two small-scale Pilot Infiltration tests (PITs) to support the design of potential shallow infiltration facilities. This will include the following subtasks:



- a. Collaborate with the design team regarding PIT locations and design considerations. We have included the cost for a water truck and permits for use of a fire hydrant. Based on preliminary locations, we will access the areas from the adjacent roadways, in lieu of SR410. The locations and PITS will be included in the WSDOT permit.
- b. Submit a permit application to WSDOT for accessing the right-of-way for PIT testing.
- c. Visit the site to mark the PIT locations and complete the utility check.
- d. Excavate the PITs to the planned infiltration elevation and complete one or two small scale infiltration tests in accordance with the 2019 Washington State Department of Ecology Stormwater Management Manual for Western Washington (SMMWW) adopted by the City of Sumner, or the WSDOT Highway Runoff Manual. We will install a datalogger in the test pit to monitor water fluctuations. The tests will likely require two days including a soaking period.
- e. Following completion of the test, excavate to a depth of 4 to 5 feet below the test location to record subsurface conditions.
- f. Perform one cation exchange capacity (CEC) test and one grain-size distribution test from soil samples obtained from the base of each PIT test pit.
- g. Based on the results of the PIT(s), assess the suitability of the site for stormwater infiltration and provide design infiltration rates, as appropriate.

Subtask 324 – Geotechnical Report

A final design geotechnical engineering report will be prepared to include final engineering analyses incorporating the findings of the supplemental borings and recommendations for the preferred alternative. This will include the following:

- Develop considerations for site preparation and earthwork, including timing relative to prevailing weather conditions, potential excavation of unsuitable soils for at-grade improvements, temporary and permanent slopes, and structural fill requirements for earth embankments.
- Considerations for pathways, and retaining walls including mechanically stabilized earth (MSE) walls, conventional concrete walls, and other wall types, if appropriate.
- Evaluation of settlement of ramp fills (static and seismic) and recommended mitigation measures.
- Recommendations and design parameters for support of bridge piers, abutments and retaining walls.
- Recommendations and design parameters for deep foundations, including appropriate pile and drilled shaft types and sizes, approximate lengths or tip elevations, allowable



capacity for compression, uplift and lateral loading, estimated pile settlement, and installation considerations.

- Seismic design criteria based on the WSDOT Geotechnical Design Manual (GDM) and the AASHTO Guide Specifications for LRFD Seismic Bridge Design. Evaluate the potential for liquefaction and lateral spreading of the site soils and provide estimates of liquefaction-induced settlements.
- Recommendations for trail pavement design and construction including subgrade preparation, base course thickness and wearing course thickness, using applicable standards.
- Site drainage recommendations including design infiltration rates for proposed facilities, if appropriate.
- Comment on construction considerations for the project, including access for foundation drilling equipment and installation of the deep drilled shafts.
- Provide recommendations for underground utility installation, including backfilling and compaction criteria.
- Draft and final geotechnical technical report presenting findings, conclusions and recommendations.

Subtask 325 – Construction Specifications

Support from the geotechnical effort includes development of construction specifications, providing input to the engineer's estimate.

Subtask 326 – Bid Documents and Bid Support

Support with preparing geotechnical related items for bid and support the City during the bidding period with any questions that arise related to geotechnical aspects.

Assumptions:

- *GeoEngineers will mark proposed boring locations in the field using white paint. The Land Surveyor will pick up these marks. The survey will be provided to GeoEngineers to incorporate into figures/exhibits accompanying environmental documentation produced.*
- *Soil cutting generated from the boring(s) will be hauled off site. The driller will attempt to limit disturbance of the ground at the boring locations, although some ground disturbance should be anticipated.*
- *Removal of vegetation (brush and small trees) and possibly minor grading may be required to access Phase 2 borings as needed along WSDOT ROW.*
- *It is assumed that a truck-mounted attenuator will not be required for drilling.*
- *It is assumed that the geotechnical PIT tests will be completed in the winter/wet season.*

Deliverables:

- *Borehole Data drawing*
- *Drilling Exploration Plan for Phase 2 borings*



- *Draft and Final Geotechnical Report*
- *Input to construction specifications and engineer's estimate*



Task 400 – Environmental and Permitting

This task includes services to provide environmental and permitting services conducted by GEO.

Task 420 – Phase 2 Environmental and Permitting

This task covers environmental and permitting support for Phase 2 and includes the scope of services outlined below.

Subtask 421 – Management

This subtask is for communicating with Consultant PM and for coordination of activities associated with this task. Attend project team meetings to review environmental and permitting objectives for the Project.

The scope of services under this subtask includes:

- Communication with the project design team, permit agencies, and other stakeholders.
- Attend project team meetings to review baseline environmental conditions, regulatory jurisdiction, and environmental mitigation options that impact selection of type of crossing. Assumed meetings specific to this task include:
 - a. *The City (1 count) @ 1 hours*
 - b. *NEPA Kick-off Meeting with WSDOT (1 count) @ 2 hours*
 - c. *Regular coordination calls (4 count @ ½ hour each)*
- Provide design support with regard to environmental constraints, including but not necessarily limited to:
 - a. *Permit-related design constraints,*
 - b. *Environmental impacts and mitigation measures, and*
 - c. *Developing proposed design/construction Best Management Practices and Minimization Measures.*

Subtask 422 – Environmental Documentation

This subtask supplements the Phase 1 work and includes the preparation of documentation that can be submitted to regulatory agencies in support of applications for environmental permits in Phase 2 of the Project.

Based on experience with similar projects and the results of our Phase 1 site and permitting review, it is assumed that the Project may require the following environmental permit authorizations:

- State Environmental Policy Act (SEPA) determination from the City.
- NEPA review by WSDOT, including Endangered Species Act (ESA) review, National Historic Preservation Act (NHPA) approval, and other NEPA topics as identified in the assumptions listed below.

The purpose of this task is to provide permit-related support during Phase 2. This includes:



- Prepare a State Environmental Policy Act (SEPA) Checklist using available project information and the results of our Phase 1 baseline assessment.
- Prepare a WSDOT NEPA Categorical Exclusion (CE) Form for submittal to WSDOT in support of NEPA approval.
- Prepare a No Effect Biological Evaluation and Floodplain Habitat Assessment to comply with Section 7 of the Endangered Species Act. This report will be submitted to the City of Sumner in support of the Floodplain Development permit and to WSDOT in support of NEPA.
- Prepare an Area of Potential Effects (APE) Request and submit to WSDOT prior to completing a pedestrian survey. Upon approval of the APE, complete a pedestrian survey and Cultural Resources Survey (CRS) Report for submission with the NEPA documentation in compliance with Section 106 of the National Historic Preservation Act (NHPA). The APE Request letter and CRS Report will be prepared and submitted by a subconsultant of GEO that specializes in this type of work.

Subtask 423 – Construction Specifications & Bid Support

This subtask includes providing support to the development of the construction specifications. The scope of services under this subtask includes:

- Assist with specifications related to site restoration, mitigation and other landscape requirements.
- Support the City during the bidding period with any questions that arise related to environmental and permitting aspects.

Assumptions:

- *A Determination of Non-Significance (DNS) or Mitigated Determination of Non-Significance (MDNS) is the appropriate SEPA Determination, and a SEPA Environmental Impact Statement will not be required.*
- *City of Sumner will be the SEPA lead and will take the lead on all City permit processes using information provided by the consultant team.*
- *During Phase 1, it was determined through coordination with City of Sumner that the floodplain development ordinance requirements would be fulfilled using a cut/fill balance approach as documented in the civil engineering design plans. No further floodplain development support is included in GEO's scope other than addressing ESA requirements.*
- *A Categorical Exclusion (CE) or Documented Categorical Exclusion (DCE) is the appropriate NEPA classification, and a NEPA Environmental Impact Statement or Environmental Assessment will not be required. The WSDOT CE Form will be used to document NEPA compliance.*
- *The following NEPA DCE topics are assumed to require minimal review and documentation on the WSDOT NEPA CE Form: Air Quality; Critical and Sensitive Areas; Floodplains and Floodways; Hazardous and Problem Waste; Noise; Section 4(f)/6(f) Resources; Agricultural Lands; Rivers,*



Streams or Tidal Waters; Tribal Lands; Water Quality/Stormwater; Previous Environmental Commitments; and Environmental Justice. Studies provided by the consultant team will be referenced as appropriate in support of these topics, including documentation prepared during Phase 1 of the project (e.g., Critical Areas Review and Hazardous Materials Database Review); additional supporting documentation related to these topics is not included in this task.

- *The following NEPA DCE topics may require additional supporting documentation: Historic and Cultural Resources; Endangered Species Act. Additional supporting documentation related to these topics will be prepared as outlined in the scope above.*

Deliverables:

- *Meeting minutes and/or notes, as appropriate*
- *SEPA Checklist will be provided for City of Sumner use.*
- *Preliminary, Draft and Final NEPA CE Form will be provided for submission to WSDOT.*
- *Draft and Final No Effect Biological Evaluation/Floodplain Habitat Assessment will be provided in support of NEPA review process.*
- *APE Request will be provided for WSDOT review and approval.*
- *Draft and Final Cultural Resources Survey Report will be provided in support of NEPA review process.*



Task 500 – Hydraulic/Floodplain Assessment

Hydraulic modelling is not anticipated for this project. Based on discussions with the City, floodplain compliance will be achieved with a cut / fill balance. Documentation of compliance will be shown on the civil plans, covered under Task 600.



Task 600 – Civil, Utilities, Drainage, and Landscaping

This task includes civil engineering, utility review/coordination, stormwater management, and sidewalk improvements.

Services will be conducted by MIG.

Task 620 – Phase 2 Civil, Utilities, Drainage, and Landscape Restoration

This task covers activities for Phase 2 to complete final design of the Project.

Subtask 621 – Management

This subtask includes managing the work and communication with the project design team during final design. Meetings assumed within this task to be attended by the task lead for each phase include:

- Regular coordination calls (3 count @ ½ hour each)
- Meetings with City (1 count @ 1 hour each)
- Meetings with WSDOT (4 Count @ 1 hour each)

Subtask 622 – 60% Design

The civil and landscape plans will be brought to a 60% design level. The following activities will be completed during this subtask:

- Determination of necessary volume and depth of compensation between new bridge fill and cut areas to satisfy “no net rise” in the floodplain on the south approach based on preferred alignment. This information will feed into the grading model developed by V+M for detailing in the final design.
- Development of flow control facilities (detention, bio retention) and required sizing of facilities.
- Stormwater drainage plan from the base of the structure into existing collection systems and new detention facilities as required. Drainage inlets, collection system and piping on structure completed by structural engineer.
- Stormwater will be collected from bridge deck and conveyed to ground.
- Design of sidewalk improvements, including:
 - Installation of new drainage inlet and curb bulb at southwest corner of 143rd Ave E and 72nd St E intersection – tree remains.
 - Installation of truncated domes on existing ramp at southeast corner of 143rd Ave E and 72nd St E intersection. We will conceptually analyze a conceptual curb bulb, associated improvements and a ramp with order of magnitude costs.
- The City of Sumner has issued a bid package for some ADA improvements in the area of Alder. This project will coordinate with that work.
- Signage and Striping on City of Sumner Streets will be indicated on Paving plans.
- Stormwater Report including modelling



- Landscape Restoration Narrative
- Design of three beam roadside barrier along north ramp
- Update WSDOT Clear Zone memorandum
- Incorporate maintenance access negotiated with WSDOT and City of Sumner
- Prepare design documents including plans, specifications, and inputs to engineer's estimate, related to stormwater, sidewalk improvements and landscape restoration.

Subtask 623 – 90% Design

The civil and landscape restoration plans will be brought to a 90% design level for the activities identified in subtask 622.

Subtask 624 – 100% Design

The civil and landscape restoration plans will be brought to a 100% design level for the activities identified in subtask 622.

Subtask 625 – Bid Documents and Bid Support

Prepare civil and landscape restoration plans, specifications, and estimate (PS&E) for bid and support the City during the bidding period with any questions that arise related to the civil/landscape scope.

Subtask 626 – Construction Phasing and Access Plans

The civil engineer will coordinate with the structural engineer in developing plans indicating site access and work zones for review and comment by WSDOT.

- Prepare three (3) submittal packages for client and WSDOT review for construction access. Discussions with WSDOT will include expectations for SR 410 closure and detour during bridge span hoisting. Other lane reductions are possible for other phases.
- Submittal packages will include narrative, plan and detail sheets
- Meetings with WSDOT (2 @ 1 hr each)
- Development of special specification for bid package

Assumptions:

- *The City will coordinate and schedule the meetings with utility owners within the Project limits.*
- *Stormwater will be piped from bridge deck to stormwater facility and then piped into existing WSDOT storm system. Existing WSDOT storm system will not require relocation.*
- *Existing City of Sumner utilities will not require relocations or extensions.*
- *Fences will remain in their current general alignments and configurations. City and V+M will coordinate and detail replacement of existing defunct access gate to SR 410.*
- *V+M will develop and detail grading under the approaches with input from MIG's volume and depth compensation analysis in the floodplain and stormwater calculations.*



- *It is assumed that the increased impervious area will trigger Washington Department of Ecology flow control requirements for the north and south ramps. It is assumed that flow control can be addressed utilizing the linear detention structure and a surface retention pond for the north and south ramps, respectively, as shown in the 30% plans. It is assumed the main span over WSDOT will drain back into the WSDOT conveyance system.*
- *It is assumed that irrigation will include gator bags for any new trees and sod with supplemental truck watering until establishment on both sides. There will not be permanent irrigation for this project.*
- *Civil and landscape available for public outreach support as an additional service.*
- *No WSDOT or FHWA deviation process or documentation is required or included.*
- *Lighting design, specification and electrical service relocations not included in civil and landscape scope.*
- *Detail of trail on MSE ramp by V+M.*
- *Landscape restoration will primarily be a restoration seed mix with potential of accent planting in certain areas.*
- *It is assumed that truncated domes are sufficient to address ADA requirements on the existing ramp at southeast corner of 143rd Ave E and 72nd St E intersection. If the City desires a curb bulb and new ramps, this can be provided as an additional service.*
- *It is assumed that a road safety audit will not be required if we keep the structure outside of the clear zone.*
- *It is assumed that the roadside barrier will be comprised of a three beam solution and that this will be acceptable to WSDOT. MIG has budgeted four (4) hours for input to the barrier solution and three (3) hours for coordination with WSDOT.*
- *It is assumed that the new guardrails installed by WSDOT on the north side will be sufficient for protection of the approach structure behind them. Additional effort is not included to analyze the guardrail requirements on the north side.*
- *The construction will remove and store the guardrail that has been installed along the north side of SR 410, and we assume that the guardrail can be re-used by reinstalling it in-kind at the end of construction.*
- *The main pier on the south side of SR 410 will require clear zone analysis for guardrail requirements.*
- *It is assumed that WSDOT will allow the traffic camera on the north side to be temporarily removed and reinstalled after superstructure is completed. Relocation of the utility cabinet and camera pole foundation are not anticipated.*
- *It is assumed the north ramp terminus shown in the 30% plans will be at the corner of Alder and Maybelle. The narrow sidewalk access along Alder will be extended behind the existing power pole with modifications needed to the guy wires (by utility company). It is assumed that the power pole will stay in place.*



- *At north connection, it is assumed that sidewalks and ramps are not required. The trail will have an access point with a removable bollard at the SW corner of the intersection as shown in the 30% plans.*
- *It is assumed electrical services for lighting and the stormwater retention pipe will be considered a part of the bridge system and not a “utility”. Based on this assumption, surety for WSDOT is assumed not to be required.*
- *Scope for future maintenance requirements is not included in this phase.*
- *WSDOT will confirm clear zone/control zone requirements during the design process. If there are challenges working from roadside face of the barrier for future bridge maintenance, then additional maintenance protocols that take place from the approach ramp trail will need to be considered. It is assumed that the linear stormwater retention pipe can be shifted to the north to accommodate future maintenance access.*

Deliverables:

- *Design documents at 60%, 90%, 100%, and Bid:*
 - *Stormwater Report (Technical Information Report).*
 - *Drawings for civil, stormwater management and landscape restoration.*
 - *Construction specifications.*
 - *Input to engineer’s estimate assuming unit price bid package.*
- *Construction Phasing and Access Plans.*



Task 700 – Structural

Bridge structural design work will be performed by V+M.

Task 720 – Phase 2 Structural

The scope under this task involves development of preferred alternative through final design and to prepare the bid/tender package.

Subtask 721 – Data Gathering

Additional information during Phase 2 obtained will be reviewed and considered as inputs to final design of the preferred alternative.

Subtask 722 – 60% Design Development

The preferred alternative will be taken to the 60% design development level.

Draft specifications and a Class 3 (Scoping – 10%-30% Design) OPC will be prepared.

Subtask 723 – 90% Design Development

Comments received from the 60% design will be incorporated into the 90% design, which will include drawings and calculations.

Updated specifications and a Class 2 (Design – 30% to 90%) OPC will be prepared.

Subtask 724 – 100% Design

Comments from the 90% drawings will be incorporated into the 100% design submission.

Construction specifications and a Class 1 (PS&E – 90% to 100%) OPC will be prepared.

Subtask 725 – Bid Package and Bid Support

Prepare bid package documents (PS&E) and support the City during the bidding period with any questions that arise related to the structural aspects.

Assumptions:

- *Drawings will be produced using AutoCAD 2018 following APWA standards.*
- *It is assumed that approximately 30 drawings will be produced for the final design package.*
- *Any potential use agreements/easements within WSDOT ROW will be coordinated by the City.*
- *Reinforcing bar tables will not be required for the drawing submissions.*
- *A public art allowance has been included for engaging an artist to develop a design for the north trail node.*

Deliverables:

- *Meeting minutes and/or notes, as appropriate.*
- *Updated Basis of Design Report, if necessary*
- *60% Design, including drawings and updated OPC*
 - a. *60% Design drawings:*
 - i. *Cover Sheet*



- ii. *Drawing List*
- iii. *General Notes*
- iv. *Site Plan*
- v. *Alignment and Profile*
- vi. *General Arrangement*
- vii. *Suggested Construction Sequence (2 count)*
- viii. *Retaining Walls – Layout and Sections*
- ix. *Foundation Plan*
- x. *Foundation Layout and Reinforcement*
- xi. *South Abutment*
- xii. *South Abutment Reinforcement*
- xiii. *North Abutment*
- xiv. *North Abutment Reinforcement*
- xv. *Pier Outlines*
- xvi. *Pier Reinforcement*
- xvii. *Approach Ramp Span Details*
- xviii. *Approach Ramp Reinforcement*
- xix. *Main Span Layout Details (4 count)*
- xx. *Deck Layout (2 count)*
- xxi. *Railing*
- xxii. *Bridge Bearings*
- xxiii. *Drains and Expansion Joints*
- *90% Design, including drawings, specifications, and updated OPC*
 - a. *Drawings will refine information shown on 60% drawing set and include additional design details developed in 90%.*
- *100% Design and Bid package documents, include drawings, specifications, and engineer's estimate.*



Task 800 – Public Outreach

Our team will provide support to the City on public outreach efforts by preparing and delivering a PowerPoint presentation to City Council, graphics, and display board pdf for potential use on the City website.

Work under this task will be performed by V+M.

Subtask 821 – Graphics/Presentation Materials & Grant Applications

Preparation of graphics for project website to update the community. Potentially assisting with grant application is also included in this task.

Some potential graphics for these materials include:

- Schematic level 3D computer models will be used to illustrate the alignments, grades and high-level structural concepts and massing for the alternatives.
- Graphics from existing information and master plans may be used to highlight how the new crossing integrates with the site.
- Basic plan and elevation graphics to show the proposed alignments of the structure and support locations. The project limits of the option will be shown in plan view.
- Simple renderings will showcase the bridge form for the preferred structural system.

Assumptions:

- *It is assumed that there will be only one round of comments on and revisions to the presentation materials.*
- *The City will manage all online project information and electronic documents, including any online surveys. Our team can supply images and pdfs for use online.*
- *The City will be responsible for distribution of mailers and other related materials.*

Deliverables:

- *Preparation of materials for project website*
- *Visualizations of the preferred option (3 count)*
- *Support with grant application materials*



Task 900 – Lighting and Electrical

Bridge lighting and electrical design work will be performed by DMD & Associates.

Task 920 – Phase 2 Lighting and Electrical Design

The scope under this task involves development of preferred alternative through final design and to prepare the bid package. Work would include preparation of electrical design drawings defining:

- Pedestrian scale lighting along the at-grade pathway and walls.
- Linear LED system along the bridge structure (ramps and main span).
- Power supply locations and electrical.
- Under-bridge lighting for the north and south ramps to limit camping beneath the spans.

Subtask 921 – 60% Design Development

Lighting design for preferred bridge alternative will be taken to the 60% design development level.

Draft specifications and a Class 3 (Scoping – 10% to 30% Design) OPC will be prepared.

Subtask 922 – 90% Design Development

Comments received from the 60% design will be incorporated into the 90% design.

Updated specifications and a Class 2 (Design – 30% to 90%) OPC will be prepared.

Subtask 923 – 100% Design and Bid Package

Comments from the 90% drawings will be incorporated into the 100% design submission.

Final specifications and a Class 1 (PS&E – 90% to 100%) OPC will be prepared.

Prepare 100% design package documents, including specs, drawings, engineer's estimate.

Subtask 924 – Bid Documents and Bid Support

Support with preparing lighting/electrical related items for bid and support the City during the bidding period with any questions that arise related to lighting/electrical aspects.

Assumptions:

- *Drawings will be produced using AutoCAD 2018 following APWA standards.*
- *Attendance at one (1) meeting with City.*
- *Electrical service reconfigurations for WSDOT reader board and electric gate will be by others.*

Deliverables:

- *Inputs to meeting minutes and/or notes, as appropriate.*
- *60% Design, including drawings and updated OPC.*
- *90% Design, including drawings, supplemental specifications, and updated OPC.*
- *100% Design, including drawings, supplemental specifications, and engineer's estimate.*
- *Bid-ready documents for bid phase.*



Task 1000 – Management Reserve

The management reserve is to provide the City with flexibility to authorize additional funds, beyond those estimated for the tasks of the scope of work, for allowable unforeseen costs, or for reimbursing the Consultant for additional work requested by the City toward completing the project.

Payment from the management reserve fund must be authorized in writing before the Consultant performs the additional work. Such written authorization will include a description of the work to be performed and shall specify the amount of the payment.



EXHIBIT B

LEVEL OF EFFORT

City of Sumner

Rivergrove Community Pedestrian Bridge over SR 410

SUMMARY OF PROJECT COSTS

Project: Rivergrove Community Pedestrian Bridge
Owner: City of Sumner
Prime: V+M Structural Design, Inc.
Scope: Preliminary and Final Design Development
Phase: Phase 2

WORK TASKS		FEES BY COMPANY					COST
		V+M	1Alliance	GeoEngineers	MIG	DMD	
120	Project Management - Phase 2						\$37,431
121	Coordination	\$21,002					\$21,002
122	Administration	\$16,429					\$16,429
220	Survey - Phase 2						\$30,464
221	Management		\$3,850				\$3,850
222	ROW Resolution/Easement Assistance		\$8,191				\$8,191
223	South Side Boundary Resolution (Optional)		\$5,251				\$5,251
224	Topographic Survey		\$13,172				\$13,172
320	Phase 2 Geotechnical						\$128,946
321	Management			\$14,639			\$14,639
322	Data Gathering			\$22,106			\$22,106
323	Subsurface Investigation			\$41,110			\$41,110
324	Geotechnical Report			\$41,530			\$41,530
325	Construction Specifications			\$6,639			\$6,639
326	Bid Documents and Bid Support			\$2,921			\$2,921
420	Phase 2 Environmental and Permitting						\$32,065
421	Management			\$6,722			\$6,722
422	Environmental Documentation			\$18,181			\$18,181
423	Construction Specifications and Bid Support			\$7,162			\$7,162
620	Civil, Utilities, and Drainage - Phase 2						\$112,296
621	Management				\$11,527		\$11,527
622	60% Design				\$34,860		\$34,860
623	90% Design				\$26,018		\$26,018
624	100% Design				\$9,483		\$9,483
625	Bid Package				\$9,057		\$9,057
626	Construction Phasing and Access Plans				\$21,351		\$21,351
720	Phase 2 Structural						\$247,967
721	Data Gathering	\$3,187					\$3,187
722	60% Design Development	\$80,547					\$80,547
723	90% Design Development	\$95,893					\$95,893
724	100% Design	\$49,428					\$49,428
725	Bid Package and Bid Support	\$18,912					\$18,912
820	Phase 2 Public Outreach						\$19,651
821	Graphics/Presentation Materials & Grant Application	\$19,651					\$19,651
920	Phase 2 - Electrical/Lighting						\$31,270
921	60% Design					\$7,884	\$7,884
922	90% Design					\$7,730	\$7,730
923	100% Design					\$7,395	\$7,395
924	Bid Documents and Bid Support					\$8,261	\$8,261
TOTAL NHR COST (SUM OF TASKS 100 THROUGH 900)		\$305,049	\$30,464	\$161,011	\$112,296	\$31,270	\$640,089
1000	Management Reserve						\$30,000
Other Direct Costs - Phase 2		\$473	\$4,170	\$156,346	\$67	\$500	\$161,556
Grand Total		\$305,522	\$34,634	\$317,357	\$112,363	\$31,770	\$831,646

LABOR DETAIL / ESTIMATE - PRIME
PROJECT: Rivergrove Community Pedestrian Bridge
OWNER: City of Sumner
PRIME: V+M Structural Design, Inc.

WORK ELEMENT		LABOR HOURS										TOTAL LABOR HOURS	NHR COST	
		CLASS	Principal / PM	Sr Struct Engr 6	Bridge Engr 5	Bridge Engr 3	Bridge Engr 1	Drafting Tech 3	Drafting Tech 2	Sr Planner	Contract Specialist			
		STAFF NAME	S. Valdovinos											
		NHR	\$253.45	\$228.38	\$175.00	\$141.77	\$107.08	\$128.75	\$93.75	\$147.92	\$187.50			
WBS	Scope:Preliminary and Final Design Development													
120	Project Management - Phase 2	82	10	0	60	0	0	0	32	6		190	\$37,431.23	
121	Coordination	50	10		40					2		102	\$21,002.08	
122	Administration	32			20				32	4		88	\$16,429.15	
720	Phase 2 Structural	172	238	8	404	52	436	252	28	10	0	1600	\$247,967.07	
721	Data Gathering	2	4		8		2	4				20	\$3,187.07	
722	60% Design Development	58	72		148	16	140	80	8			522	\$80,546.85	
723	90% Design Development	66	90		160	24	180	96	8			624	\$95,893.12	
724	100% Design	26	48		76	12	90	56	10	8		326	\$49,427.95	
725	Bid Package and Bid Support	20	24	8	12		24	16	2	2		108	\$18,912.08	
820	Phase 2 Public Outreach	10	0	0	20	0	36	24	50	0	0	140	\$19,650.75	
821	Graphics/Presentation Materials & Grant Applications	10			20		36	24	50			140	\$19,650.75	
TOTAL LABOR HOURS AND COST		264	248	8	484	52	472	276	110	16	0	1930	\$305,049.05	

OTHER DIRECT COSTS (ODCs) - Phase 2:

Mileage	160	miles @	\$0.670	per mile	\$107.20
Tolls	4	each @	\$4.00	per each	\$16.00
Parking	0	each @	\$15.00	per each	\$0.00
Postage, Shipping & Delivery	2	each @	\$25.00	per each	\$50.00
Reproduction - B&W	10	each @	\$10.00	per each	\$100.00
Reproduction - Color	4	each @	\$50.00	per each	\$200.00
SUBTOTAL - ODCs					\$473.20

Classification	Labor Hours	
Principal / PM	264	
Sr Struct Engr 6	248	
Bridge Engr 5	8	
Bridge Engr 3	484	
Drafting Tech 3	472	
Drafting Tech 2	276	
Sr Planner	110	
Total =		1862

NHR Cost	\$305,049
Other Direct Costs	<u>\$473</u>
GRAND TOTAL =	<u><u>\$305,522</u></u>

SUMMARY OF ESTIMATE - PRIME**Rivergrove Community Pedestrian Bridge****City of Sumner****V+M Structural Design, Inc****Scope: Preliminary and Final Design Development****NEGOTIATED HOURLY RATES (NHRs)**

Classification	Direct Rate (DR)	+	DR x ICR 120.00%	+	DR x FF 30%	=	NHR
Principal / PM	\$101.38		\$121.66		\$30.41		\$253.45
Sr Struct Engr 6	\$91.35		\$109.62		\$27.41		\$228.38
Sr Struct Engr 5	\$79.58		\$95.50		\$23.88		\$198.96
Bridge Engr 5	\$70.00		\$84.00		\$21.00		\$175.00
Bridge Engr 3	\$56.71		\$68.05		\$17.01		\$141.77
Bridge Engr 1	\$42.83		\$51.40		\$12.85		\$107.08
Drafting Tech 3	\$51.50		\$61.80		\$15.45		\$128.75
Drafting Tech 2	\$37.50		\$45.00		\$11.25		\$93.75
Sr Planner	\$59.17		\$71.00		\$17.75		\$147.92
Contract Specialist	\$75.00		\$90.00		\$22.50		\$187.50

COST ESTIMATE (Labor Hours x NHR):

Classification	Labor Hours	x	NHR	=	Labor Cost
Principal / PM	264		\$253.45		\$66,910.80
Sr Struct Engr 6	248		\$228.38		\$56,637.00
Sr Struct Engr 5	0		\$198.96		\$0.00
Bridge Engr 5	8		\$175.00		\$1,400.00
Bridge Engr 3	484		\$141.77		\$68,617.08
Bridge Engr 1	52		\$107.08		\$5,568.33
Drafting Tech 3	472		\$128.75		\$60,770.00
Drafting Tech 2	276		\$93.75		\$25,875.00
Sr Planner	110		\$147.92		\$16,270.83
Contract Specialist	16		\$187.50		\$3,000.00
SUBTOTAL - Labor Hours x NHR	1,930				\$305,049

SUBTOTAL	\$305,049
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OTHER DIRECT COSTS (ODCs):	\$473
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TOTAL NHR COST (SUM OF TASKS 1 THROUGH 9)

TOTAL - Phase 2	\$305,522
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LABOR DETAIL / ESTIMATE - Subconsultant
PROJECT Rivergrove Community Pedestrian Bridge
OWNER: City of Sumner
PRIME: V+M Structural Design, Inc.
SUB: 1Alliance Geomatics

WORK ELEMENT		LABOR HOURS										TOTAL LABOR HOURS	NHR COST	
		CLASS	Principal	Sr. Project Manager	Project Surveyor	CADD 5	CADD 4	TECH 5	TECH 3	Admin 5	Admin 3			
		STAFF NAME												
		NHR	\$268.94	\$162.78	\$147.01	\$103.71	\$0.00	\$118.39	\$95.29	\$103.71	\$99.23			
WBS	Scope:Preliminary and Final Design Development													
220	Survey - Phase 2	12	28	56	16	0	56	56	6	2	0	232	\$30,463.70	
221	Management	4	12						6	2		24	\$3,849.81	
222	ROW Resolution/Easement Assistance	2	4	36			8	8				58	\$8,190.81	
223	South Side Boundary Resolution (Optional)	2	4	16			8	8				38	\$5,250.58	
224	Topographic Survey	4	8	4	16		40	40				112	\$13,172.50	
TOTAL LABOR HOURS AND COST		12	28	56	16	0	56	56	6	2	0	232	\$30,463.70	

OTHER DIRECT COSTS (ODCs) - Phase 2:

Mileage	1,000	miles @	\$0.670	per day	\$670.00
Traffic Control with TCP Allowance	1	@	\$3,500.00	each	\$3,500.00
SUBTOTAL - ODCs for Phase 2					\$4,170.00

Classification	Labor Hours
Principal	12
Sr. Project Manager	28
Project Surveyor	56
CADD 5	16
CADD 4	0
TECH 5	56
TECH 3	56
Admin 5	6
Admin 3	2

Total = 232

NHR Cost	\$30,464
Other Direct Costs	\$4,170
GRAND TOTAL =	\$34,634

SUMMARY OF ESTIMATE - Subconsultant
Rivergrove Community Pedestrian Bridge
City of Sumner
Subconsultant: 1Alliance Geomatics

NEGOTIATED HOURLY RATES (NHRs)

Classification	Direct Rate (DR)	+	DR x ICR 120.14%	+	DR x FF 10%	=	NHR
Principal	\$111.06		\$133.43		\$24.45		\$268.94
Sr. Project Manager	\$67.22		\$80.76		\$14.80		\$162.78
Project Surveyor	\$60.71		\$72.94		\$13.36		\$147.01
CADD 5	\$42.83		\$51.46		\$9.43		\$103.71
CADD 4							
TECH 5	\$48.89		\$58.74		\$10.76		\$118.39
TECH 3	\$39.35		\$47.28		\$8.66		\$95.29
Admin 5	\$42.83		\$51.46		\$9.43		\$103.71
Admin 3	\$40.98		\$49.23		\$9.02		\$99.23

COST ESTIMATE (Labor Hours x NHR):

Classification	Labor Hours	x	NHR	=	Labor Cost
Principal	12		\$268.94		\$3,227.23
Sr. Project Manager	28		\$162.78		\$4,557.73
Project Surveyor	56		\$147.01		\$8,232.65
CADD 5	16		\$103.71		\$1,659.43
CADD 4	0		\$0.00		\$0.00
TECH 5	56		\$118.39		\$6,629.79
TECH 3	56		\$95.29		\$5,336.11
Admin 5	6		\$103.71		\$622.29
Admin 3	2		\$99.23		\$198.47
SUBTOTAL - Labor Hours x NHR	232				\$30,464

SUBTOTAL **\$30,464**

OTHER DIRECT COSTS (ODCs):

TOTAL NHR COST (SUM OF TASKS 1 THROUGH 9)

\$4,170

TOTAL - Phase 2

\$34,634

LABOR DETAIL / ESTIMATE - Subconsultant
PROJECT: Rivergrove Community Pedestrian Bridge
OWNER: City of Sumner
PRIME: V+M Structural Design, Inc.
SUB: GeoEngineers, Inc.

WORK ELEMENT		LABOR HOURS											TOTAL LABOR HOURS	NHR COST	
		CLASS	Principal	Associate	Senior Engineer/ Scientist 2	Senior Engineer/ Scientist 1	Project Engineer/ Scientist 1	Staff Engineer/ Scientist 3	Staff Engineer/ Scientist 2	GIS Analyst 2	CAD Designer	Admin 3			Admin 2
		STAFF NAME													
		NHR	\$287.22	\$265.93	\$232.22	\$190.73	\$172.60	\$149.18	\$137.29	\$152.47	\$151.08	\$128.33			\$112.88
WBS	Scope:Preliminary and Final Design Development														
320	Phase 2 Geotechnical	6	108	183	8	16	171	140	6	10	25	12	685	\$128,945.90	
321	Management		28	24			10				1	0	63	\$14,639.38	
322	Data Gathering	0	15	44	0	0	48	0	0	0	4	2	113	\$22,106.10	
322.1	Exploration Plan and WSDOT ROE Permit Coordination		12	24			20						56		
322.2	Coordinate exploration locations, traffic control plan, pier survey		2	8			12				2		24		
322.3	Utility locates			4			8					2	14		
322.4	Additional Coordination for PITs		1	8			8				2		19		
323	Subsurface Investigation	0	18	40	8	0	38	130	0	0	12	4	250	\$41,109.72	
323.1	Complete additional explorations - borings		2	20				120			4		146		
323.2	Sample Review, Laboratory Testing, Data Reduction		10	20							8	2	40		
323.3	Field Labor for PITs		2		8		28	10				2	50		
323.4	Read Wells and Document Levels		4				10						14		
324	Geotechnical Report	6	33	55	0	16	67	10	6	10	8	6	217	\$41,529.91	
324.1	Erosion Control, Site Preparation and Earthwork, Static Settlement		1	2			1						4		
324.2	Retaining Wall Design Parameters for MSE Walls		2	4									6		
324.3	Shallow Foundation Design			2			2						4		
324.4	Drilled Shaft Foundation Design		6	4			16	6					32		
324.5	Seismic Design per AASHTO LRFD and WSDOT GDM, Liquefaction		4	6			8	4					22		
324.6	Pavement Design Recommendations, Utility Support, and Backfill Criteria			2			1						3		
324.7	Construction Considerations		4	2									6		
324.8	PIT analysis	4	4	8		16	24				2		58		
324.9	Prepare Draft and Final Report Including PIT Testing	2	12	25			15		6	10	6	6	82		
325	Construction Specifications		10	12			8						30	\$6,639.33	
326	Bid Documents and Bid Support		4	8									12	\$2,921.47	
420	Phase 2 Environmental and Permitting	23	0	72	0	0	0	44	7	4	8	0	158	\$32,064.86	
421	Management	4		24									28	\$6,722.10	
422	Environmental Documentation	7	0	32	0	0	0	44	7	4	8	0	102	\$18,180.67	
422.1	SEPA Checklist	1		4				12			2		19		
422.2	WSDOT NEPA CE Form	3		16				8			3		30		
422.3	No Effect BE/Floodplain Habitat Assessment	3		8				24	5	2	3		45		
422.4	APE Request and CRS Form			4					2	2			8		
423	Construction Specifications and Bid Support	12	0	16	0	0	0	0	0	0	0	0	28	\$7,162.09	
423.1	Construction Specifications	8		8									16		
423.2	Bid Support	4		8									12		
TOTAL LABOR HOURS AND COST		29	108	255	8	16	171	184	13	14	33	12	843	\$161,010.76	

LABOR DETAIL / ESTIMATE - Subconsultant
PROJECT: Rivergrove Community Pedestrian Bridge
OWNER: City of Sumner
PRIME: V+M Structural Design, Inc.
SUB: GeoEngineers, Inc.

WORK ELEMENT		LABOR HOURS											TOTAL LABOR HOURS	NHR COST	
		CLASS	Principal	Associate	Senior Engineer/ Scientist 2	Senior Engineer/ Scientist 1	Project Engineer/ Scientist 1	Staff Engineer/ Scientist 3	Staff Engineer/ Scientist 2	GIS Analyst 2	CAD Designer	Admin 3			Admin 2
		STAFF NAME													
		NHR	\$287.22	\$265.93	\$232.22	\$190.73	\$172.60	\$149.18	\$137.29	\$152.47	\$151.08	\$128.33			\$112.88
WBS	Scope:Preliminary and Final Design Development														

OTHER DIRECT COSTS (ODCs) - Phase 2:

Mileage	689	miles @	\$0.670	per mile	\$461.63
Field Supplies	1	each @	\$50.00	per each	\$50.00
EDR	1	each @	\$100.00	per each	\$100.00
Electric Tape	2	per day @	\$50.00	per each	\$100.00
Subcontracted Drilling Allowance	1	each @	\$77,820.00	per each	\$77,820.00
Subcontracted PIT testing (water truck, excavator) Allowance	2	each @	\$11,000.00	per each	\$22,000.00
Subcontracted Traffic Control Plan for Shoulder Closure During Drilling	1	each @	\$2,500.00	per each	\$2,500.00
Subcontracted Traffic Control Allowance (with TMA)	12	each @	\$1,900.00	per each	\$22,800.00
Lab Tests (includes hydrometer testing for stormwater design)	1	each @	\$4,026.00	per each	\$4,026.00
Subcontracted CEC test	2	each @	\$150.00	per each	\$300.00
Cultural Resources Subconsultant	1	each @	\$26,188.30	per each	\$26,188.30
SUBTOTAL - ODCs					\$156,346

Classification	Labor Hours
Principal	29
Associate	108
Senior Engineer/ Scientist 2	255
Senior Engineer/ Scientist 1	8
Project Engineer/ Scientist 1	16
Staff Engineer/ Scientist 3	171
Staff Engineer/ Scientist 2	184
GIS Analyst 2	13
CAD Designer	14
Admin 3	33
Admin 2	12

Total = 843

NHR Cost	\$161,011
Other Direct Costs	\$156,346
GRAND TOTAL =	\$317,357

SUMMARY OF ESTIMATE - Subconsultant
Rivergrove Community Pedestrian Bridge
City of Sumner
Subconsultant: GeoEngineers

NEGOTIATED HOURLY RATES (NHRs)

Classification	Direct Rate (DR)	+	DR x ICR 209.50%	+	DR x FF 30%	=	NHR
Principal	\$84.60		\$177.24		\$25.38		\$287.22
Associate	\$78.33		\$164.10		\$23.50		\$265.93
Senior Engineer/ Scientist 2	\$68.40		\$143.30		\$20.52		\$232.22
Senior Engineer/ Scientist 1	\$56.18		\$117.70		\$16.85		\$190.73
Project Engineer/ Scientist 1	\$50.84		\$106.51		\$15.25		\$172.60
Staff Engineer/ Scientist 3	\$43.94		\$92.05		\$13.18		\$149.18
Staff Engineer/ Scientist 2	\$40.44		\$84.72		\$12.13		\$137.29
GIS Analyst 2	\$44.91		\$94.09		\$13.47		\$152.47
CAD Designer	\$44.50		\$93.23		\$13.35		\$151.08
Admin 3	\$37.80		\$79.19		\$11.34		\$128.33
Admin 2	\$33.25		\$69.66		\$9.98		\$112.88

COST ESTIMATE (Labor Hours x NHR):

Classification	Labor Hours	x	NHR	=	Labor Cost
Principal	29		\$287.22		\$8,329.29
Associate	108		\$265.93		\$28,720.48
Senior Engineer/ Scientist 2	255		\$232.22		\$59,215.59
Senior Engineer/ Scientist 1	8		\$190.73		\$1,525.85
Project Engineer/ Scientist 1	16		\$172.60		\$2,761.63
Staff Engineer/ Scientist 3	171		\$149.18		\$25,509.15
Staff Engineer/ Scientist 2	184		\$137.29		\$25,262.06
GIS Analyst 2	13		\$152.47		\$1,982.10
CAD Designer	14		\$151.08		\$2,115.09
Admin 3	33		\$128.33		\$4,234.92
Admin 2	12		\$112.88		\$1,354.61
SUBTOTAL - Labor Hours x NHR	843				\$161,011

SUBTOTAL	\$161,011
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OTHER DIRECT COSTS (ODCs):	\$156,346
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TOTAL NHR COST (SUM OF TASKS 1 THROUGH 9)

TOTAL - Phase 2	\$317,357
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LABOR DETAIL / ESTIMATE - Subconsultant
PROJECT Rivergrove Community Pedestrian Bridge
OWNER: City of Sumner
PRIME: V+M Structural Design, Inc.
SUB: MIG, Inc.

WORK ELEMENT		LABOR HOURS												TOTAL LABOR HOURS	NHR COST	
		CLASS	Principal II	Sr. Engineer VII	Eng V / LA V / Planner	Engineer IV	LA IV	Sr CAD Technician, Sr Proj. Asst.	CAD Technician	EIT, LA., Landscape Designer II	Project Assistant	Civil Designer I, Landscape Designer II	Landscape Designer, Graphics			
		STAFF NAME														
		NHR	\$265.88	\$229.06	\$200.08	\$160.89	\$163.61	\$146.56	\$132.24	\$115.91	\$106.35	\$109.75	\$100.90			\$0.00
WBS	Scope:Preliminary and Final Design Development															
620	Civil, Utilities, and Drainage - Phase 2	54.5	84	158	135	29	97	9	0	25	0	24	0	616	\$112,295.86	
621	Management	15	20	10						9				54	\$11,527.35	
622	60% Design	12	22	25	56	16	50	8	0	0	0	16	0	205	\$34,859.91	
622.1	Cut/Fill Analysis for "No Net Rise" assessment	3	4				2							9		
622.2	Demo/Erosion, Grading, Paving and Drainage Plans and Details	1	6	1	32		24							64		
622.3	Landscape Restoration	1		6		12		8				8		35		
622.4	Stormwater Report	1	4	4	16		8							33		
622.5	List of Special Specifications/Bid items/Cost Estimate Input	2	2	2	8	4						8		26		
622.6	60% Design of Sidewalk Improvements	4	6	12			16							38		
623	90% Design	14.5	22	29	29	0	39	1	0	0	0	8	0	142.5	\$26,018.10	
623.1	Cut/Fill Analysis for "No Net Rise" assessment	2.5	1					1						4.5		
623.2	Landscape Restoration	1		8	8		2					8		27		
623.3	Stormwater Report Update	1	4	4	8		8							25		
623.4	List of Special Specifications/Bid items/Cost Estimate Input	2	4	4			8							18		
623.5	90% Design of Sidewalk Improvements	4	4		12		8							28		
623.6	Response to comments	3	1	1			1							6		
623.7	Demo/Erosion, Grading, Paving and Drainage Plans and Details	1	8	12	1		12							34		
624	100% Design	3	8	8	16	4	8	0	0	8	0	0	0	55	\$9,482.70	
624.1	100% Design Package - Civil/Landscape	3	8	8	16	4	8			8				55		
625	Bid Package	2	12	6	14	9	0	0	0	8	0	0	0	51	\$9,056.68	
625.1	Bid Document Preparation	1	8	4	12	7				8				40		
625.2	Bid Support	1	4	2	2	2								11		
626	Construction Phasing and Access Plans	8		80	20									108	\$21,351.11	
TOTAL LABOR HOURS AND COST		54.5	84	158	135	29	97	9	0	25	0	24	0	615.5	\$112,295.86	

OTHER DIRECT COSTS (ODCs) - Phase 2:

Mileage	100	miles @	\$0.670	per mile	\$67.00
SUBTOTAL - ODCs					\$67

Classification	Labor Hours
Principal II	54.5
Sr. Engineer VII	84
Eng V / LA V / Planner	158
Engineer IV	135
LA IV	29
Sr CAD Technician, Sr Proj.	97
CAD Technician	9
EIT, LA., Landscape Designr	0
Project Assistant	25
Civil Designer I, Landscape I	0
Landscape Designer, Graphi	24
0	0

Total = 615.5

NHR Cost	\$112,296
Other Direct Costs	\$67
GRAND TOTAL =	<u><u>\$112,363</u></u>

SUMMARY OF ESTIMATE - Subconsultant
Rivergrove Community Pedestrian Bridge
City of Sumner
Subconsultant: MIG, Inc.

NEGOTIATED HOURLY RATES (NHRs)

Classification	Direct Rate (DR)	+	DR x ICR 153.60%	+	DR x FF 30%	=	NHR
Principal II	\$93.75		\$144.00		\$28.13		\$265.88
Sr. Engineer VII	\$80.77		\$124.06		\$24.23		\$229.06
Eng V / LA V / Planner	\$70.55		\$108.36		\$21.17		\$200.08
Engineer IV	\$56.73		\$87.14		\$17.02		\$160.89
LA IV	\$57.69		\$88.61		\$17.31		\$163.61
Sr CAD Technician, Sr Proj. Asst.	\$51.68		\$79.38		\$15.50		\$146.56
CAD Technician	\$46.63		\$71.62		\$13.99		\$132.24
EIT, LA., Landscape Designer II	\$40.87		\$62.78		\$12.26		\$115.91
Project Assistant	\$37.50		\$57.60		\$11.25		\$106.35
Civil Designer I, Landscape Designer II	\$38.70		\$59.44		\$11.61		\$109.75
Landscape Designer, Graphics	\$35.58		\$54.65		\$10.67		\$100.90
			\$0.00		\$0.00		\$0.00

COST ESTIMATE (Labor Hours x NHR):

Classification	Labor Hours	x	NHR	=	Labor Cost
Principal II	54.5		\$265.88		\$14,490.19
Sr. Engineer VII	84		\$229.06		\$19,241.35
Eng V / LA V / Planner	158		\$200.08		\$31,612.61
Engineer IV	135		\$160.89		\$21,719.65
LA IV	29		\$163.61		\$4,744.66
Sr CAD Technician, Sr Proj. Asst.	97		\$146.56		\$14,216.75
CAD Technician	9		\$132.24		\$1,190.18
EIT, LA., Landscape Designer II	0		\$115.91		\$0.00
Project Assistant	25		\$106.35		\$2,658.75
Civil Designer I, Landscape Designer II	0		\$109.75		\$0.00
Landscape Designer, Graphics	24		\$100.90		\$2,421.72
0	0		\$0.00		\$0.00
SUBTOTAL - Labor Hours x NHR	615.5				\$112,296

SUBTOTAL **\$112,296**

OTHER DIRECT COSTS (ODCs):

TOTAL NHR COST (SUM OF TASKS 1 THROUGH 9)

TOTAL - Phase 2

\$134

\$112,430

LABOR DETAIL / ESTIMATE - Subconsultant
PROJECT Rivergrove Community Pedestrian Bridge
OWNER: City of Sumner
PRIME: V+M Structural Design, Inc.
SUB: DMD Consulting Engineers Ltd.

WORK ELEMENT		LABOR HOURS												TOTAL LABOR HOURS	NHR COST
		CLASS	Principal/Senior Engineer	Principal/Projec t Lead	Technical Specialist	CAD Technician									
		STAFF NAME	D. Wong	D. McLean											
		NHR	\$196.32	\$196.32	\$107.07	\$87.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00		
WBS	Scope:Preliminary and Final Design Development														
920	Phase 2 - Electrical/Lighting	29	97	27	43	0	0	0	0	0	0	0	0	196	\$31,270.08
921	60% Design	5	28	5	10	0	0	0	0	0	0	0	0	48	\$7,883.92
922.1	60% Design Package - lighting/electrical	5	28	5	10									48	
922	90% Design	7.5	22.5	5	15	0	0	0	0	0	0	0	0	50	\$7,729.96
923.1	90% Design Package - lighting/electrical	7.5	22.5	5	15									50	
923	100% Design	9	18	9	13	0	0	0	0	0	0	0	0	49	\$7,395.28
923.1	100% Design Package - lighting/electrical	9	18	9	13									49	
924	Bid Documents and Bid Support	8	28	8	5	0	0	0	0	0	0	0	0	49	\$8,260.93
924.1	Bid Documents/Support - lighting/electrical	8	28.0	8	5									49	
TOTAL LABOR HOURS AND COST		29	97	27	43	0	0	0	0	0	0	0	0	196	\$31,270.08

OTHER DIRECT COSTS (ODCs) - Phase 2:

Disbursements	1	each @	\$500.00	each	\$500.00
SUBTOTAL - ODCs					\$500

Classification	Labor Hours
Principal/Senior Engineer	29
Principal/Project Lead	97
Technical Specialist	27
CAD Technician	43
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
Total = 196	

NHR Cost	\$31,270
Other Direct Costs	\$500
GRAND TOTAL =	\$31,770

SUMMARY OF ESTIMATE - Subconsultant
Rivergrove Community Pedestrian Bridge
City of Sumner
Subconsultant: DMD Consulting Engineers Ltd.

NEGOTIATED HOURLY RATES (NHRs)

Classification	Direct Rate (DR)	+	DR x ICR 110.00%	+	DR x FF 30%	=	NHR
Principal/Senior Engineer	\$81.80		\$89.98		\$24.54		\$196.32
Principal/Project Lead	\$81.80		\$89.98		\$24.54		\$196.32
Technical Specialist	\$44.61		\$49.07		\$13.38		\$107.07
CAD Technician	\$36.25		\$39.88		\$10.88		\$87.00
			\$0.00		\$0.00		\$0.00
			\$0.00		\$0.00		\$0.00
			\$0.00		\$0.00		\$0.00
			\$0.00		\$0.00		\$0.00
			\$0.00		\$0.00		\$0.00
			\$0.00		\$0.00		\$0.00
			\$0.00		\$0.00		\$0.00
			\$0.00		\$0.00		\$0.00

COST ESTIMATE (Labor Hours x NHR):

Classification	Labor Hours	x	NHR	=	Labor Cost
Principal/Senior Engineer	29		\$196.32		\$5,693.28
Principal/Project Lead	97		\$196.32		\$18,944.88
Technical Specialist	27		\$107.07		\$2,890.92
CAD Technician	43		\$87.00		\$3,741.00
0	0		\$0.00		\$0.00
0	0		\$0.00		\$0.00
0	0		\$0.00		\$0.00
0	0		\$0.00		\$0.00
0	0		\$0.00		\$0.00
0	0		\$0.00		\$0.00
0	0		\$0.00		\$0.00
0	0		\$0.00		\$0.00
SUBTOTAL - Labor Hours x NHR	196				\$31,270

SUBTOTAL **\$31,270**

OTHER DIRECT COSTS (ODCs): **\$500**

TOTAL NHR COST (SUM OF TASKS 1 THROUGH 9)

TOTAL - Phase 2 **\$31,770**

SUBJECT: Fryar Ave Trail - Consultant Contract Award

CATEGORY: Consent

BUDGET IMPACT:

Expenditure Required: \$240,115.85

Within Budget Allocation: Yes

ATTACHMENTS:

1. Consultant Scope & Fee

STAFF CONTACT: Andrew Leach, Associate Engineer

SUMMARY BACKGROUND:

This project will construct approximately 3,300 linear feet of shared use path that parallels Fryar Avenue from West Main Street to Puyallup Street. The City has been awarded state funding through the WSDOT Pedestrian and Bicycle Program, as well as PSRC CMAQ grant funding for the right of way phase of the project.

After a public Request for Qualifications solicitation to perform this service, qualifications from four (4) firms were received. City Staff reviewed the qualifications and found Commonstreet Consulting to be qualified to perform this work. A negotiated scope and budget have been prepared with a total contract amount of \$240,115.85. This contract will be fully funded by the WSDOT Pedestrian and Bicycle Program grant.

COUNCIL COMMITTEE/STUDY SESSION: Public Works Committee

MEETING/STUDY SESSION DATE: 6/4/2024

COMMITTEE RECOMMENDATION: Do Pass

STAFF RECOMMENDATIONS/MOTION:

A motion authorizing the Mayor and City Administrator to execute all necessary contract documents with Commonstreet Consulting, in an amount not-to-exceed \$240,115.85 for the Fryar Avenue Shared Use Trail (CIP14-01), substantially in a form approved by the City Attorney.



COMMONSTREET

CONSULTING

92 Lenora St, PMB 125
Seattle, WA 98121
(206)920-4017



info@csrow.com
www.csrow.com



May 30, 2024

Mr Andrew Leach

Associate City Engineer
City of Sumner-Public Works
1104 Maple Street, Suite 260
Sumner, WA 98390

Re: Scope and Fee Proposal – City of Sumner: CIP 14-01 Fryar Avenue Shared Use Trail

Dear Mr Leach: Thank you for the opportunity to provide right of way services for this important trail project for the City of Sumner. It is our understanding that Commonstreet is providing turn-key right of way services for the Fryar Avenue Shared Use Trail project. This work will include pre-acquisition support services, valuations, development of legal descriptions, title review, property owner negotiations and acquisition documentation, escrow coordination to close acquisitions, Washington State Department of Transportation (WSDOT) certification support, and file close out. The scope and fee proposal provided herein is in response to request for a scope and fee for a project with Federal Highway Administration (FHWA) funding in the Right of Way and Construction phases and is based on ICR/FAR rates in effect July 1, 2024. Prior to that date, rates invoiced will be based on current ICR/FAR.

Scope Summary and Project Understanding

This proposed scope and fee is based upon the RFP, the approved ROW Plan, and the approved ROWFE. The fee proposal provided herein are based upon an assumption of potential ROW impacts assuming up to twenty (20) R/W acquisitions (Fee), five (5) temporary easements (TE), nine (9) permanent easements (PE), and four (4) driveway reconstruction permits (DRPO). It is understood that any change in scope will require an amendment in scope and fee. All right of way activities will comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act (URA), WSDOT LAG manual, and the City's WSDOT Approved ROW Procedures. This is a total amount not to exceed (NTE) budget and allocation between subtasks is for reference only and does not constitute separate budgets for each subtask.

Assumptions

- The Right of Way and Construction phases of the project have federal funding and WSDOT ROW Certification will be required.
- The City requires no more than thirty eight (38) partial acquisitions from fourteen (14) property owners consisting of up to 20 Fee, 5 TEs, 9 PEs, and 4 DRPs .
- There are no full acquisitions.
- No design changes will occur after the initial valuation assignment is authorized.
- Legal descriptions suitable for recording and meeting all WSDOT requirements will be provided by a licensed survey company subconsultant to Commonstreet.

- No occupants or personal property will be displaced requiring relocation services and no relocation services will be required.
- The City will provide ROW document templates or Commonstreet will utilize WSDOT templates and provide to the City for review and approval.
- No more than 9 appraisals and appraisal reviews will be required.
- Administrative Offer Summaries (AOS) will be utilized wherever eligible, and it is anticipated that an AOS can be used to value at least 8 parcels.
- If impacts on properties make an AOS ineligible for more than 9 parcels, an appraisal and appraisal review will be completed. Providing more than 9 required appraisals and appraisal reviews will require additional scope and fee.
- Title reports will be ordered by Commonstreet and paid for by the City.
- The City will pay directly to the title company all expenses for title commitments, recording fees, escrow services, and title insurance.
- If the Notice to Proceed (NTP) is received after 120 days from this proposal, fees and billing rates may require revision to reflect cost of living increases and current business conditions.

Best regards,



Theodore R. Parry, JD
Senior Project Manager

Scope of Services

Task 1.0 – ROW Project Management

- Prepare for and attend early design development meetings as requested by the City or the project team;
- Provide pre-acquisition services as requested by the City or project team to support early design development;
- Respond to inquiries and needs identified by your team, the City and/or Project Stakeholders;
- Oversight of preliminary ROW activities to comply with WSDOT requirements;
- Provide written and oral status updates on right of way activities;
- Provide oversight to all aspects of the right of way program;
- Review City's approved Right of Way Procedures;
- Develop and execute the Right of Way program in compliance with state law, Uniform Act and WSDOT requirements;
- Provide oversight of ROW activities to comply with WSDOT certification requirements;
- Maintain quality control/quality assurance protocols in the execution of the right of way tasks;
- Coordinate title reviews.

Task 2.0 – Title Review and Conveyance Documents Drafts

- Create state and federal compliant project files for each parcel;
- Request the City order new and/or updates to existing title commitments;
- Review title reports for each parcel and identify each exception;

- Once a parcel's title interest has been reviewed, identify methods of clearance per City direction.
- Coordinate the development of offer package templates per City direction.
- Prepare, deliver and present offer packages to pass WSDOT LAC spot check review.

Task 3.0 – Legal Descriptions

- Coordinate delivery of legal descriptions by a subconsultants licensed survey company necessary to draft Fee, PE, TE, and DRP conveyance documents.
- Provide all documentation required to complete legal descriptions and integrate findings into offer packages.
- Commonstreet will manage Right of Way Team survey sub-consultants to prepare no more than thirty eight (38) partial acquisitions from fourteen (14) property owners consisting of up to 20 Fee, 5 TEs, 9 PEs, and 4 DRPs.
- Coordinate the development of legal descriptions approved by the Agency.

Task 4.0 – Appraisal and Appraisal Review Coordination

- Coordinate valuation task and any subconsultants;
- Provide all documentation required to complete valuations supporting City's Determinations of Value and integrate findings into offer packages.
- Commonstreet will manage Right of Way Team appraisal sub-consultants to prepare the up to 9 appraisals, 9 appraisal reviews, and 8 Administrative Offer Summaries.
- Coordinate the development of DV/Just Compensation approved by the Agency.

Task 5.0 - Negotiations, Administrative Settlements, QA/QC

- Project file set-up;
- Review of all valuation and compensation data;
- QA/QC of all documents, tasks, and processes before, during, and after acquisition process;
- Prepare, deliver and present approved offer packages to property owners;
- Negotiate settlements, and draft justification memos when necessary;
- Clear encroachments to comply with federal and state requirements;
- Additionally, includes support preparing condemnation ordinance(s) when required.

Task 6.0 - Project Close Out and Certification

- Collaborate with City during certification process;
- Set up client escrow account or facilitate execution of all conveyance documents, payment vouchers, proof of payment and closing data along with recorded conveyance documents and closing of files;
- Compile completed/closed files to provide to WSDOT LAC;
- Address any items brought forth by Local Programs;
- Prepare parcel files (electronic and/or hard copy) in a format requested by the City and provide to City for retention.

Scope and Fee Table Summary				
CIP 14-01 Sumner: Fryar Shared Use Trail				
Attachment A				
			Indirect Cost Rate	119.58%
			Fixed Fee %	30%
Tasks	Job Classifications	Fully Burdened NTE Rate	Qty.	Total
1.0	Principal / Senior Advisor / Program Manager	\$301.99	10	\$3,019.92
	Senior Project Manager / Senior Field Manager	\$234.61	75	\$17,595.39
	Senior Project Control Specialist / Senior Right of Way Technician	\$159.73	12	\$1,916.77
			0	\$0.00
2.0	Senior Project Control Specialist / Senior Right of Way Technician	\$159.73	58	\$9,264.41
			0	\$0.00
			0	\$0.00
			0	\$0.00
3.0	Project Control Specialist / Right of Way Technician	\$119.80	38	\$4,552.34
			0	\$0.00
			0	\$0.00
			0	\$0.00
4.0	Senior Project Manager / Senior Field Manager	\$234.61	8	\$1,876.84
	Senior Project Control Specialist / Senior Right of Way Technician	\$159.73	0	\$0.00
			0	\$0.00
			0	\$0.00
5.0	Senior Right of Way Agent / Senior Property Management Specialist / Senior Outreach and Right of Way Agent / Property Management Specialist / Outreach and Engagement Specialist	\$192.18	180	\$34,591.79
		\$117.30	400	\$46,921.04
			0	\$0.00
			0	\$0.00
6.0	Senior Project Control Specialist / Senior Right of Way Technician	\$159.73	25	\$3,993.28
	Right of Way Agent / Property Management Specialist / Outreach and Engagement Specialist	\$117.30	25	\$2,932.57
			0	\$0.00
			0	\$0.00
7.0			0	\$0.00
			0	\$0.00
			0	\$0.00
			0	\$0.00
Hourly Subtotal			781	\$126,664.35
Expenses	Type	Rate	Qty.	Total
Other Direct Costs (ODC's)	Appraisal	\$ 4,800.00	9	\$43,200.00
	Appraisal Review	\$ 1,500.00	9	\$13,500.00
	Administrative Offer Summaries	\$ 1,000.00	8	\$8,000.00
	Legal Descriptions	\$ 1,275.00	38	\$48,450.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
				\$0.00
	Mileage at current federal rate	0.67	450	\$301.50
Expense Total				\$113,451.50
Contract Total				\$240,115.85

SUBJECT: Biosolids Dryer Procurement - Contract Award

CATEGORY: Motion

BUDGET IMPACT:

Expenditure Required: \$75,000

Within Budget Allocation: Yes

ATTACHMENTS:

1. Biosolids Dryer Procurement Contract
 2. Komline-Sanderson Bid Proposal
 3. Biosolids Modernization Project Biosolids Drying Equipment Procurement - Revised Specs
-

STAFF CONTACT: Ryan Johnstone, Public Works Deputy Director - Operations

SUMMARY BACKGROUND:

The Biosolids Equipment Modernization Project is replacing major components involved in the processing of wastewater sludge at the Wastewater Treatment Facility to a Class A Biosolids product. One of the pieces of equipment to be replaced is the biosolids dryer. Due to the long lead time necessary to manufacture the dryer and in order to not delay the project once in construction, the decision was made to procure the dryer in advance of the construction phase of the project. The procurement advertisement began March 13, 2024 and bids were opened on April 16, 2024. Two bids were received with Komline-Sanderson Corporation being the lowest responsive bidder with a bid of \$4,905,600.00.

COUNCIL COMMITTEE/STUDY SESSION: Public Works Committee

MEETING/STUDY SESSION DATE: 6/4/2024

COMMITTEE RECOMMENDATION: Do Pass

STAFF RECOMMENDATIONS/MOTION:

A motion authorizing the Mayor and City Administrator to execute all necessary contract documents with Komline-Sanderson Corporation, in an amount not-to-exceed \$4,905,600.00 for the Biosolids Equipment Modernization Project (CIP21-17), substantially in a form approved by the City Attorney.

PUBLIC WORKS CONTRACT

between City of Sumner and

Komline-Sanderson Corporation

THIS AGREEMENT, made and entered into this 17th day of June, 2024, between the City of Sumner under and by virtue of Title 35 RCW (Cities and towns) as amended and Komline-Sanderson Corporation, hereinafter called the Contractor.

WITNESSETH:

That in consideration of the terms and conditions contained herein and attached and made a part of this agreement, the parties hereto covenant and agree as follows:

I. The Contractor shall do all work and furnish all tools, materials and equipment for

Providing pre-construction services, furnishing biosolids drying equipment, delivery of this equipment to the project location, post-construction inspection and start-up services, and all other services as required to provide a complete and workable biosolids drying system.

in accordance with and as described in the (a) attached plans and specifications, (b) the standard specifications of the Washington State Department of Transportation, and (c) all other documents, specifications as amended by mutual agreement of the parties, provisions and required regulations contained in the Bid Document package provided at bid opening, all of which are considered the "Contract Documents" and are incorporated herein by this reference and made part hereof as if fully set forth in this contract, and, shall perform any changes in the work in accord with the Contract Documents.

The Contractor shall provide and bear the expense of all equipment, work and labor, of any sort whatsoever that may be required for the transfer of materials and for constructing and completing the work provided for in these Contract Documents except those items mentioned therein to be furnished by the City of Sumner.

II. The City of Sumner hereby promises and agrees with the Contractor to employ, and does employ the Contractor to provide the materials and to do and cause to be done the above described work and to complete and finish the same in accord with the attached plans and specifications and the terms and conditions herein contained and hereby contracts to pay for the same according to the attached specifications and the schedule of unit or itemized prices at the time and in the manner upon the conditions provided for in this contract. The Contractor for

himself/herself, and for his/her heirs, executors, administrators, successors, and kin, does hereby agree to the full performance of all the covenants herein contained upon the part of the Contractor.

III. Contractor's Employees – Employment Eligibility Requirements (E-Verify).

The Contractor and any subcontractors shall comply with E-Verify as set forth in Sumner Municipal Code Chapter 3.30. E-Verify is an Internet-based system operated by United States Citizenship and Immigration Services in partnership with the Social Security Administration. E-Verify is free to employers and is available in all 50 states. E-Verify provides an automated link to federal databases to help employers determine employment eligibility of new hires and the validity of their Social Security numbers. The Contractor shall enroll in, participate in and document use of E-Verify as a condition of the award of this contract. The Contractor shall continue participation in E-Verify throughout the course of the Contractor's contractual relationship with the City. If the Contractor uses or employs any subcontractor in the performance of work under this contract, or any subsequent renewals, modifications or extension of this contract, the subcontractor shall register in and participate in E-Verify and certify such participation to the Contractor. Upon execution of this Contract, the Contractor shall provide proof of compliance with this section by filling out and signing the attached Certification of Compliance with Sumner's Municipal Code 3.30 "E-Verify" attached hereto as Exhibit B.

IV. It is further provided that no liability shall attach to the City of Sumner by reason of entering into this contract except as provided herein.

V. Debarment. The Contractor must certify that it, and its subcontractors, have not been and are not currently on the Federal or the Washington State Debarment List and if the Contractor or its subcontractors become listed on the Federal or State Debarment List, the City will be notified immediately.

VI. Application of Uniform Guidance. If this contract involves the use, in whole or in part, of federal award(s), provisions (A)-(J) in Appendix II to Part 200 of the Uniform Guidance (2 CFR Ch. 11 (1-1-14 edition)) are hereby incorporated, as applicable, as if fully set forth herein. See attached Exhibit C.

IN WITNESS WHEREOF, the Contractor has executed this instrument, on the day and year first below written and the Local Agency Approving Authority has caused this instrument to be executed by and in the name of said City of Sumner the day and year first above written.

CONTRACTOR:	CITY OF SUMNER:
By: _____ (signature)	By: _____ (signature)
Print Name: _____	Print Name: <u>Kathy Hayden</u>
Its _____ (Title)	Its <u>Mayor</u> (Title)
DATE: _____	DATE: _____
	By: _____ (signature)

EXHIBIT B

CITY OF SUMNER

**CERTIFICATION OF COMPLIANCE WITH SUMNER MUNICIPAL CODE CHAPTER 3.30
“E-VERIFY“**

As the person duly authorized to enter into such commitment for

_____,

I hereby certify that the Company or Organization named herein will

(check one box below)

☐ Be in compliance with all of the requirements of City of Sumner Municipal Code Chapter 3.30 for the duration of the contract entered into between the City of Sumner and the Company or Organization.

OR

☐ Hire no employees for the term of the contract between the City and the Company or Organization.

NAME

TITLE

DATE

EXHIBIT C

APPENDIX II TO PART 200---CONTRACT PROVISIONS FOR NON-FEDERAL ENTITY CONTRACTS UNDER FEDERAL AWARDS

In addition to other provisions required by the Federal agency or non-Federal entity, all contracts made by the City of Sumner under federal award(s) are subject to the following provisions, as applicable.

(A) Contracts for more than the simplified acquisition threshold currently set at \$150,000, which is the inflation adjusted amount determined by the Civilian Agency Acquisition Council and the Defense Acquisition Regulations Council (Councils) as authorized by 41 U.S.C. 1908, must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as appropriate.

(B) All contracts in excess of \$10,000 must address termination for cause and for convenience by the non-Federal entity including the manner by which it will be effected and the basis for settlement.

(C) Equal Employment Opportunity. Except as otherwise provided under 41 CFR Part 60, all contracts that meet the definition of "federally assisted construction contract" in 41 CFR Part 60-1.3 must include the equal opportunity clause provided under 41 CFR 60-1.4(b), in accordance with Executive Order 11246, "Equal Employment Opportunity" (30 FR 12319, 12935, 3 CFR Part, 1964- 1965 Comp., p. 339), as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and implementing at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

(D) Davis-Bacon Act, as amended (40 U.S.C. 3141-3148). When required by Federal program legislation, all prime construction contracts in excess of \$2,000 awarded by non-Federal entities must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148) as supplemented by Department of Labor regulations (29 CFR Part 5, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction"). In accordance with the statute, the following language is hereby incorporated into the contract as if fully set forth therein:

Application of Uniform Guidance. If this contract involves the use, in whole or in part, of federal award(s), the following provisions (29 CFR, Subtitle A Part 5, Subpart A, § 5.5, subsections (a)(1) – (a)(10)) shall apply:

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)

(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The City of Sumner shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii) (A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the City if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the City. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying

number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the City if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit them to the applicant, sponsor, or owner, as the case may be, for transmission to the City, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, sponsor, or owner).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5

(a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5

(a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph

(a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the City or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the City may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7.. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

(E) Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708). Where applicable, all contracts awarded by the non-Federal entity in excess of \$100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

(F) Rights to Inventions Made Under a Contract or Agreement. If the Federal award meets the definition of "funding agreement" under 37 CFR §401.2 (a) and the recipient or sub recipient wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that "funding agreement," the recipient or sub recipient must comply with the requirements of 37 CFR Part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any implementing regulations issued by the awarding agency.

(G) Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended- Contracts and sub grants of amounts in excess of \$150,000 must contain a provision that requires the non-Federal award to agree to

comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

(H) Mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. 6201).

(I) Debarment and Suspension (Executive Orders 12549 and 12689)-A contract award (see 2 CFR 180.220) must not be made to parties listed on the government wide Excluded Parties List System in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR Part 1986 Comp., p. 189) and 12689 (3 CFR Part 1989 Comp., p. 235), "Debarment and Suspension." The Excluded Parties List System in SAM contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

(J) Byrd Anti-Lobbying Amendment (31 U.S.C. 1352)-Contractors that apply or bid for an award of \$100,000 or more must file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the non-Federal award.



Komline-Sanderson

12 Holland Ave.
Peapack, NJ 07977-0257

www.komline.com
(908) 234-1000

Komline-Sanderson Biosolids Drying System Proposal



**Gray & Osborne, Inc
City of Sumner**

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**BIOSOLIDS MODERNIZATION PROJECT
BIOSOLIDS DRYING EQUIPMENT PROCUREMENT**

PROPOSAL

City of Sumner
1104 Maple Street
Sumner, Washington 98390

The undersigned has examined the Work site(s), local conditions, the Contract, and all applicable laws and regulations covering the Work. The following unit and lump sum prices are tendered as an offer to perform the Work in accordance with all of the requirements set forth in the Contract and all applicable laws and regulations.

As required by the Contract, a certified check, bank draft, cashier's check or Proposal bond made payable to the Owner is attached hereto. If this Proposal is accepted and the undersigned fail(s) or refuse(s) to enter into a contract and furnish the required performance bond, labor and material payment bond, special guarantee bonds (if required), required insurance and all other required documentation, the undersigned will forfeit to the Owner an amount equal to five percent of the amount bid.

After the date and hour set for submitting the Proposals, no bidder may withdraw its Proposal, unless the Award of the contract is delayed for a period exceeding 60 consecutive calendar days.

The undersigned agrees that the Owner reserves the right to reject any or all Proposals and to waive any minor irregularities and informalities in any Proposal. **The undersigned agrees that the Owner reserves the right to Award the Contract to the lowest responsible, responsive bidder whose Proposal is in the best interest of the Owner.**

PROPOSAL - Continued

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1.	Preconstruction Services	1 LS	\$ <u>75,000.00</u>	\$ <u>75,000.00</u>
2.	Biosolids Drying System: Equipment Supply, Construction Services, and Post Construction Services	1 LS	\$ <u>4,405,000.00</u>	\$ <u>4,405,000.00</u>

Subtotal:..... \$ 4,480,000.00

Washington State Sales Tax (9.5%):..... \$ 425,600.00

TOTAL CONSTRUCTION COST: \$ 4,905,600.00

Note: A bid must be received on all items.

PROPOSAL - Continued

SELECTION PROCESS

Bidders shall complete the provided proposal form, including bid cost, and the Proposal shall also include the required supporting documentation.

SUPPORTING DOCUMENTATION

Proposals shall be complete in all respects and shall be suitable for the Owner to evaluate the proposed design and equipment. Bidders shall provide the supporting documentation listed herein with the Proposal. Bidders are also advised to include as much detail as possible to facilitate the evaluation process. Missing, incomplete, or inaccurate information and details may disqualify the bidder.

The following supporting documentation shall be submitted with the Proposal:

1. A list of any deviations from the Proposal, Contract, or Specifications. The list shall be organized by page and specification section. The list shall contain a detailed description of the requested deviation and a detailed written explanation of the reasons for requesting the deviation. The Owner shall be the final authority for determining acceptability of the requested deviations.
2. Technical data sheet(s) on the proposed equipment.
3. A scope of supply list. The list shall include a detailed list of all mechanical and electrical equipment items, including motors, instrumentation, programmable logic controllers (PLCs), operator interfaces, and gauges that are included in the Supplier's proposal. For each item of ancillary electrical equipment, include the connected load as well as the power load at 480V and 120V with the number of phases, ampacity, and horsepower ratings.
4. All additional documentation as required in Attachments A-D.

PROPOSAL - Continued

STATEMENT OF BIDDER'S QUALIFICATIONS

Name of Firm: Komline-Sanderson Corporation

Address: 12 Holland Avenue, Peapack, NJ 07977

Telephone No. +1-908-234-1000 Fax No. +1-908-234-9487

Contact Person for this Project: John Balla

E-mail: JBalla@komline.com

Number of years the Contractor has been engaged in the construction business under the present firm name, as indicated above:

Komline-sanderson has been in the machinery manufacturing business for 78 years, it is not a construction company

Have you ever been a party to a lawsuit or an arbitration proceeding in any way relating to a construction project? NO

PROPOSAL - Continued

ADDENDA RECEIVED

Addendum No.	Date Received	Name of Recipient
1	03/25/2024	John Balla

NOTE: Bidder shall acknowledge receipt of all addenda. Bidder is responsible for verifying the actual number of addenda issued prior to submitting a Proposal.

Subject to any extensions of the Contract Time granted under the Contract, the undersigned agrees to complete the preconstruction services required under this Contract within 150 calendar days from the date of the Notice to Proceed with preconstruction services.

Furthermore, subject to any extensions of the Contract Time granted under the Contract, the undersigned agrees to deliver the equipment required under this Contract within 400 calendar days from the date of the Notice to Proceed with equipment fabrication.

The undersigned has reviewed and fully understands the provisions in the Contract regarding liquidated damages and agrees that liquidated damages shall be \$500.00 per calendar day for each and every calendar day beyond the Contract Time allowed for preconstruction services from the date of the Notice to Proceed with preconstruction services.

Furthermore, the undersigned has reviewed and fully understands the provisions in the Contract regarding liquidated damages and agrees that liquidated damages shall be \$2,000.00 per calendar day for each and every calendar day beyond the Contract Time allowed for delivery of the equipment from the date of the Notice to Proceed with equipment fabrication. **Aggregate liquidated damages for pre-construction services and equipment fabrication shall not exceed a maximum of 2.5% of the contract price.** *BTK*

The undersigned is, and will remain in, full compliance with all Washington State administrative agency requirements including, but not limited to registration requirements of Washington State Department of Labor & Industries for contractors, including but not limited to requirements for bond, proof of insurance and annual registration fee. The undersigned's Washington State:

Dept. of L&I Workman's Compensation Account No. is (if applicable) _____;
Dept. of Licensing Contractor's Registration No. is (if applicable) _____;
Unified Business Identifier Number is (if applicable) _____;
Excise Tax Registration Number is (if applicable) _____; and
Employment Security Account Number is (if applicable) _____.

The undersigned has reviewed all insurance requirements contained in the Contract and has verified the availability of and the undersigned's eligibility for all required insurance. The undersigned verifies that the cost for all required insurance, has been included in this Proposal.

In relation to claims related in whole or in part to workplace injuries to employees, the undersigned waives any immunity granted under the State Industrial Insurance Law,

PROPOSAL - Continued

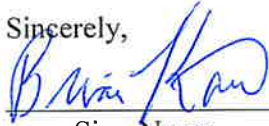
RCW Title 51. This waiver has been specially negotiated by the parties, which is acknowledged by the undersigned in signing this Proposal.

By signing the proposal, the undersigned declares, under penalty of perjury under the laws of the United States and the State of Washington, that the following statements are true and correct:

1. That the undersigned person(s) or entity(ies) has(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 the project for which this Bid is submitted.
2. The bidder hereby certifies that, within the three-year period immediately preceding the bid solicitation date March 13, 2024, that the bidder is not a "willful" violator, as defined in RCW 49.48.082, of any provision of chapters 49.46, 49.48, or 49.52 RCW, as determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction.

The undersigned agrees that the Owner is authorized to obtain information from all references included herein.

Sincerely,



Sign Name

4/12/2024

Date

By: Brian T. Komline

Print Name, Title

Peapack, NJ

Location Executed (City, State)

Komline-Sanderson Corporation

Print Company Name

Amount of Proposal deposit: \$ N/A Check No. N/A

or Proposal bond in the amount of \$ 224,000.00 (5% of the price)

, issued through Great Midwest Insurance Company
Name of Bank/Bonding Company

located at 800 Gessner Road Suite 600, Houston TX 77024, USA
Mailing Address

+1-800-829-8165
Telephone Number of Bank/Bonding Company

Attachment A

Operational Parameters

PARAMETER	DECLARED PERFORMANCE
Specific Heat Energy Consumption of the Biosolids Drying System (BTU/lb): The heat required to evaporate one pound of water at steady state conditions from the solids. The Specific Heat Energy shall be based on the lower heating value (LHV) of natural gas, excluding electric energy consumed by the drying system at steady state and shall be calculated as the system gas energy input (BTU) divided by the amount of water evaporated from the biosolids (lb).	1,450 BTU/Lb of evaporated water
The maximum ratio of digester gas to natural gas, which the proposed system can operate at and meet the requirements of Section 11650-1.6.	Assuming a mixture of 60%/40% ratio of digester gas to natural gas, the maximum deviation is 5% or 65%/35%. Gas mixture is by others.
Non-Potable Water (NPW) Usage (gpm): The flow rate of NPW required for the design requirements of Sections 11650-1.6 at steady state.	110 gpm of NPW is required.
Potable Water Usage (gpm): The flow rate of potable water required for the design requirements of Sections 11650-1.6 at steady state.	0 gpm of Potable water is needed.
Natural Gas Usage (cfh): The natural gas usage rate when burned simultaneously with digester gas at 2 psig at 60 percent digester gas and 40 percent natural gas and when burning only natural gas at the design requirements of Section 11650-1.6 at steady state.	Specific Heat Energy Consumption is 1,450 BTU/lb of evaporation with a design rate of 1,640 lb/h evap. Thus 2,378,000 BTU/h of Energy is required. The LHV of 60%/40% DG/NG is estimated to be 760 BTU/ft ³ , therefore 3,130 cft/h of mixed gas is required. Of which, 40% is Natural Gas or 1,252 cft/h.
Maximum Electrical Power Demand (kW): The maximum electrical power demand for the design requirements of Sections 11650-1.6at steady state.	90 kW
Exhaust Air Flow Rate (SCFM), Temperature (°F), and Relative Humidity (%) for the design requirements of Sections 11650-1.6at steady state.	300 SCFM at 110 °F and 100% RH

PARAMETER	DECLARED PERFORMANCE
The maximum evaporation rate for the proposed system (lb/h)	The limiting factor in the drying system is believed to be the thermal fluid heater which can deliver 2.5 MMTBU/h. At that rate, the dryer will evaporate approximately 2,100 lb/h of water.
The minimum evaporation rate for the proposed system (lb/h)	Again, the limiting factor is the thermal fluid heater which has a 4 to 1 turn down before cycling on /off. This would reduce the evaporation rate to about 400 lb/h
Time required for complete start-up of the system including required pre-start safety checks (hr).	1.5 hours
Time required for complete shutdown of the system, including cleaning and shutdown maintenance (hr).	Including Cooling Down Approximately 5 hours
Percentage of final product, by weight, within size range 0.5 mm–6.0 mm and average dryness of 92percent DS.	Based on samples taken during the pilot test, 3% of the product was below 0.5 mm and another 3% of the product was above 4 mm. The majority of this material would be sent back to the dryer for reprocessing. K-S expects >99% of the product exiting the dryer system to be within 0.5 and 6 mm.

System Design Parameters

The Komline-Sanderson Thermal Drying System offered in this proposal is designed to dry anaerobically digested municipal sludge from an initial solids range of 19% to 20% to produce Class A Biosolids that will be suitable for land application.

Per Section 11650B, §1.6 the design requirements of the Drying System are as follows:

Sludge Type	Anaerobically Digested Sludge
Dewatered Cake Solids	19% - 20% DS
Volatile Solids	68% to 74%
Feed Temperature	> 60°F
Dry Solids Rate	410 dry lb/h
Wet Solids Feed Rate	2,050 wet lb/h @20% DS
Product Solids*	90% DS is needed to meet Class A requirements. 92% DS is required per Specification. ~94% will be targeted to ensure 92% DSs are obtained.
Product Rate	436 lb/h (at 94% DS)
Evaporative Rate**	1,640 lb/h
Heat Consumption†	1,370 BTU/lb of water evaporated.

*Per the CFR 40 503 rule, biosolids > 90% are considered Class A. Controlling the product moisture to discharge 90% - 91% DS all of time is difficult to do and leaves very little margin for error. As a result, K-S designs the biosolids drying systems to obtain a slightly dryer product, 92% DS, to ensure that a Class A Product is always met. However, because the specification is written that biosolids must be >92% solids or be subjected to liquidated damages, K-S will need to produce even drier product solids in the ~94% ±2% DS range.

*Note: Per the specifications, a dry solids feed rate of 410 lb/h at 20% DS which equals a wet feed rate of 2,050 wet lb/h. This wet cake contains 1,640 lb/h of water. Performing the specified evaporation rate of 1,640 lb/h will result in a product with zero moisture which is undesirable. As a result, the attached PFD assumes the 410 lb/h of dry solids will be at 19.75% solids. This provides sufficient water in the wet feed to satisfy the evaporative requirement of 1,640 lb/h and producing 94% DS.

†The heat consumption rate shown is based on a heat consumption of 1,165 BTU per lb/ evaporative at the dryer (refer to the heat load calculation in Attachment D) with a thermal fluid heater having an 85% burner efficiency. This is the estimated gas consumption rate. It is **not** Komline-Sanderson's guaranteed gas consumption rate which includes additional safety factors for unforeseeable heat losses that may or may not be present. Refer to the Proposal Bid Form for guaranteed gas and electrical consumption.

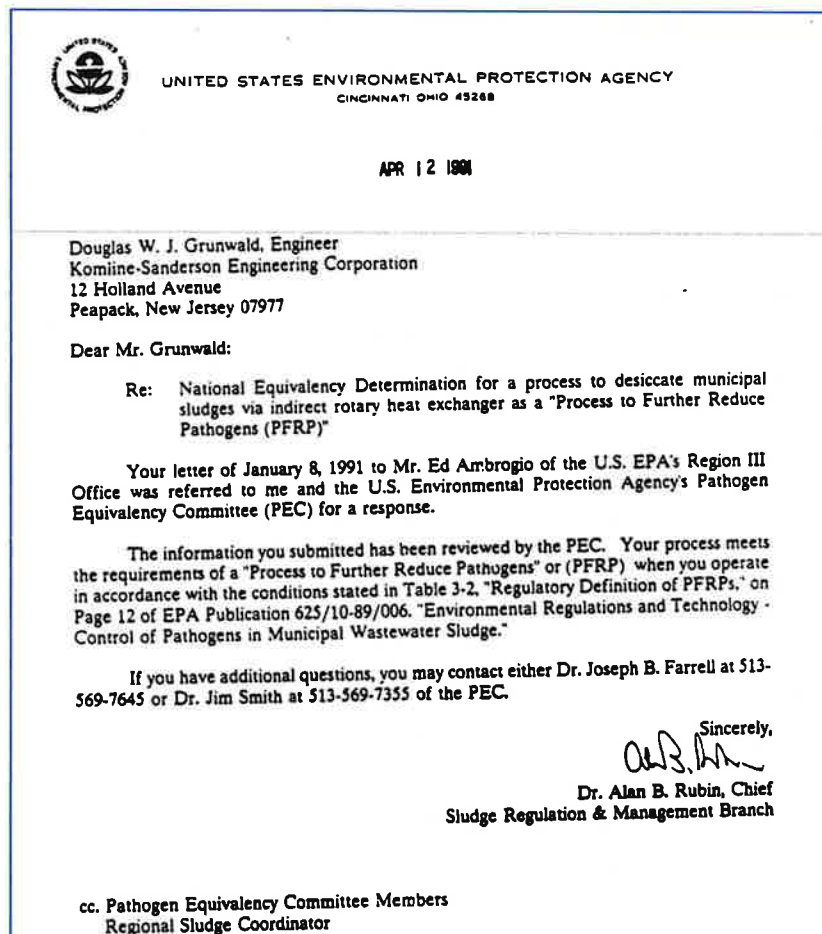
General Description of Thermal Drying Technology

A general description of Komline-Sanderson's Drying System is provided below. Additional information on Process Controls and Operations is provided in Attachment D.

The K-S Paddle Dryer Model 8W-580 is designed to dry digested municipal sludge cake and generate a Class A material suitable for beneficial reuse.

As shown in the Process Flow Diagram attached, an existing 50 cubic yard bin receives dewatered cake from the dewatering device. The wet cake bin then discharges a portion of wet cake to a small 20 ft² hopper located below the bin with a wet cake pump mounted at the bottom of the hopper. The hopper includes a radar level transmitter to monitor the level in the hopper and controls the amount of wet cake transferred to the hopper. A high-level switch is included to insure the level in the hopper does not become too high.

The wet cake is then metered to the dryer by a progressive cavity pump. A VFD is used to adjust the pump speed. In this way, the wet feed rate to the dryer can be increased or decreased as needed. Feed rate control is critical to obtaining consistent product quality.



Letter from EPA recognizing Komline-Sanderson Paddle Dryer as a PFRP

The Part 503 rule lists six alternatives for treating biosolids so they can be classified as Class A biosolids. Under Alternative 5, Biosolids Treated in a PFRP (Process to Further Reduce Pathogens), the K-S Paddle Dryer has been recognized as a PFRP since April 1991. Specifically, the K-S Dryer falls under Method 2, Heat Drying, to produce a >90% solids product that is typically in the 240 °F to 250 °F temperature range. Using this Method not only satisfies the Pathogen Reduction Requirements, but also the Vector Attraction Requirements that are listed under Option 8 in the Part 503 rules.

The K-S Paddle Dryer provides the mixing action needed to ensure uniform drying. This mixing action generates heat transfer film coefficients that can be two to three times higher than a screw-conveyor type dryer which provides little agitation due to their slow speeds. In addition, the K-S Paddle Dryer moves material forward by displacement, as a result, the residence time is controlled by the feed rate and the bed level in the dryer and not the speed of the screws.

The temperature in the dryer is measured and recorded at several places to monitor the drying process. During continuous operation, the product exit temperature is used to determine the product solids. Product discharging the dryer at >90% DS are typically above 225°F while 235 °F to 245 °F product is in the 92% solids range. To insure the product reaches 92%, K-S will need to dry the product further to about 250 °F to 260 °F.

The dried product leaves the dryer by overflowing an adjustable side weir that is used to maintain the bed level and control the product solids. K-S once used a bottom discharge conveyor to control the bed level about 20 years ago, however, there were frequent operational problems in the field as operators would inadvertently run the conveyors and empty the dryer. With no level in the dryer, obtaining accurate product temperatures was difficult and re-establishing a proper bed level became problematic. Some manufacturers still try to use this antiquated method.

By using a side overflow weir, monitoring the temperature of the product is never an issue and adjusting the level in the dryer bed is easy. The K-S patented weir control displays the exact height of the overflow weir on the OIT and permits operators to manually adjust and control the weir height within a tenth of an inch. Should the product become drier and hotter in temperature, the side overflow weir is lowered, and the product will discharge from the dryer faster. Should the product become cooler and wetter, the weir is raised, reducing the product discharge rate, and providing additional residence time to dry the product. As a result, the residence time of the product inside the dryer can be adjusted to control the product quality.

Product overflowing the weir falls through a rotary valve and into a discharge conveyor. The rotary valve provides isolation between the product handling system and the dryer in the unlikely event there is a deflagration in the dryer. From the discharge conveyor, the product is fed into a product cooling conveyor.

The cooling conveyors use non-contact water to cool the product. The heat load required to cool the biosolids is small and the cooling water temperature will only rise a few degrees. To save plant water, the cooling water after the conveyor is then used in the off-gas spray duct to keep the duct clean and start the condensing of the dryer off gas.

The dried product falls through a vibrating screen to segregate fines and large particulate. Fines and overs discharge into a common return conveyor which sends the material back to the feed inlet of the dryer. A second rotary valve is located at the dryer to isolate the dryer.

In addition, K-S has provided a screen by-pass line. Unlike many of our competitors, K-S has been providing these types of drying systems for over twenty years, and from our experience we know that over time, screens, and vibrating motors will fail. When this occurs, the by-pass line can be opened, and the dryer can continue to operate sans screening system until repairs are complete and the screener is back on-line.

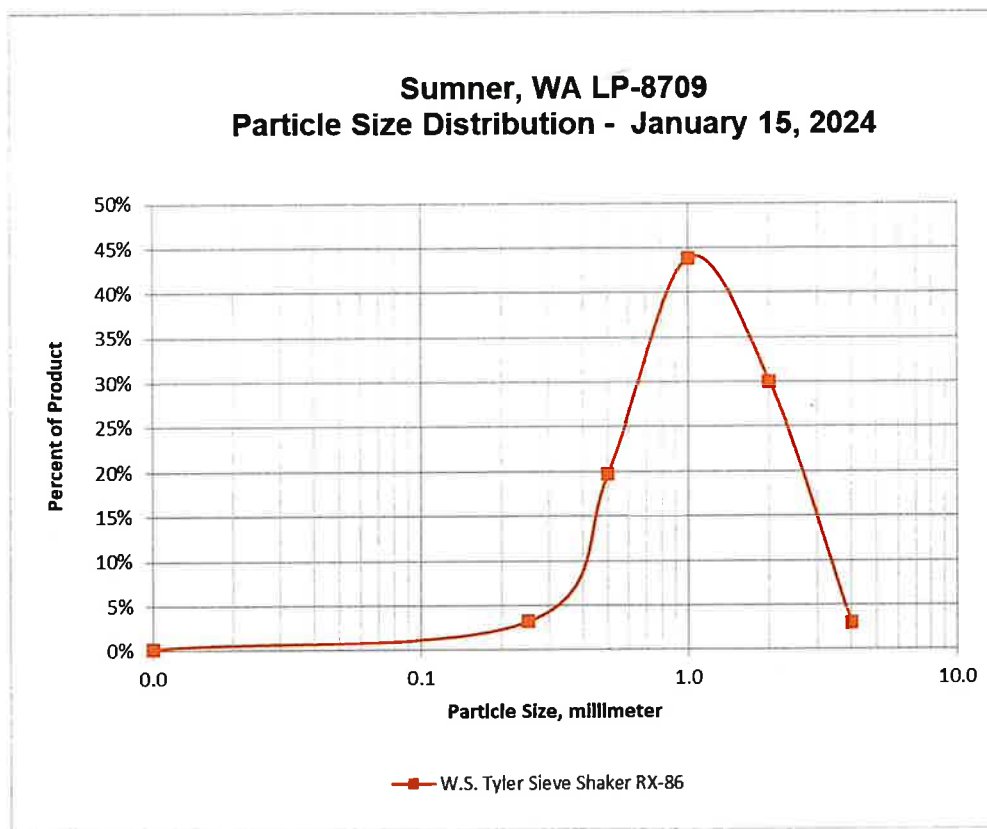
The screened product is discharged into the customer's product handling system which is provided by others.

Based on pilot tests conducted at Komline-Sanderson laboratory, the dried product should be an irregular granular material with an average bulk density of 45 to 50 lb/ft³. A photo of dried product from Sumner is provided below.



Dried Product from Pilot Testing Sumner, WA Biosolids - K-S Lab Test TPG-8907

A sample taken from the dryer was screened and a particle size distribution was measured. About 3% of the product was measured to be below 0.5 mm and another 3% of the product was measured to be above 4 mm. As noted above, both fines and overs discharge into a return conveyor which are sent to the feed inlet of the dryer.



The hot saturated off-gases from the K-S Paddle Dryer are first sent through a spray duct which uses the water from the cooling conveyor to start the scrubbing process and to keep the duct flushed with water. This prevents the buildup of solids in the off-gas duct and keeps it clean. The exhaust gases then enter a spray tower condenser which condenses and cools the evaporated water. This greatly reduces the volume off-gas stream. Next, a venturi scrubber is used to further cool the off-gases and remove large particulates. Finally, the exhaust gases pass through a demisting pad to remove fine water droplets before leaving the drying system through an exhaust fan. From the exhaust fan the exhaust gases are sent to an existing biofilter owned by the waste treatment facility. The K-S Paddle Dryer System produces a very low amount of non-condensable off-gas.

Effluent water from the spray duct, condenser, venturi scrubber, and demister all drain into a common hot well which is below the condenser and scrubber. The hot well has an overflow line to permit the effluent to gravity drain back to the head of the plant. A bottom drain valve is provided to periodically clean out the hot well.

The K-S Paddle Dryer is indirectly heated with circulating thermal fluid which is distributed to the agitators and trough jacket by a distribution manifold. A thermal fluid heater is supplied to heat the thermal fluid using either digester gas or natural gas. The digester gas supplied can be 100% digester gas or mixture of digester gas and natural gas to burn the two fuels simultaneously. Cleaning and drying of the digester gas, and the pre-mixing of the digester gas with natural gas is by others, The mixture of DG and NG must be such to provide a constant caloric value.

K-S has selected the dryer size to meet the process requirements using thermal fluid operating below its flash point of 415°F. As a result, the thermal fluid remains a Class III Liquid and is exempt from some of the more stringent requirements of NFPA 30. This is inherently safer than using a smaller dryer operating with higher thermal fluid temperatures.

Preliminary Process Flow Diagram

A preliminary Process Flow Diagram is provided in the Appendix A – Drawings.

Utilities Required

Electrical

Plant power is to be 3 Ph, 60 Hz, 460 Volts with 24 VDC, 110 VAC control voltage. All motors are to be TEFC motors. Motors shall be provided to be in conformance with NFPA 820, Table 6.2(b) Rows 1 and 2. Power requirements are estimated to be 197 hp connected for the equipment listed herein. Operating power is estimated to be 82 kW. Please note, this is not the guaranteed rate. Refer to the Formal Proposal Form for Guaranteed Rates.

Preliminary Motor List

Line #	Tag Number	Equipment Description	CONNECTED MOTOR - hp	VFD MS	ESTIMATED DEMAND			
					hp	kw	kva	amps
01	PMP-01	Wet Cake Pump	10	VFD	8	6.4	7.5	9.5
02	PMP-01	Wet Cake Pump (Shelf Spare)	10	VFD	0	0.0	0.0	0.0
03	DRY-01	Dryer Drive	60	VFD	36	28.9	34.0	42.6
04	DRY-02	Discharge Weir Gate	Servo					
05	RV-01	Discharge Rotary Valve	1.5	VFD	1.2	1.0	1.1	1.4
06	DCV-01	Discharge Conveyor	3	VFD	2.4	1.9	2.3	2.8
07	CCV-01	Product Cooling Conveyor	7.5	VFD	6	4.8	5.7	7.1
08	SCR-01	Screener (Optional)	0.75	MS	0.6	0.5	0.6	0.7
09	FCV-01	Fines Return Conveyor	3	VFD	2.4	1.9	2.3	2.8
10	RV-02	Return Rotary Valve	1	VFD	0.8	0.6	0.8	0.9
11	FAN-01	Off Gas Exhaust Fan	5	VFD	4	3.2	3.8	4.7
12	TOP-01	Thermal Fluid Pump #1	40	MS	34	27.3	32.1	40.3
13	TOP-02	Thermal Fluid Pump #2 (Piped Spare)	40	MS	0	0.0	0.0	0.0
14	TOF-01	Thermal Fluid Combustion Fan	5	MS	4.25	3.4	4.0	5.0
15	AC-01	Air Compressor #1	5	MS	3	2.4	2.8	3.6
16	AC-02	Air Compressor #2	5	MS	0.0	0.0	0.0	0.0
TOTALS			197		103	82	97	122

Heat Transfer Medium

The dryer will be heated using thermal fluid at a temperature of 380 °F. The thermal fluid flow rate will be 400 gal/min.

Non-Potable Water

110 gal/min is required for the off-gas handling system. Water should have a pH between 6 and 7 with no particulates greater than 800 µm. Particulate matter should not be greater than 500 ppm. Process water strainers to remove particulates and water treatment systems to address hardness and fouling are not included in our offer and if required must be provided by the client.

Instrument Air

16 ft³/min at 2 psig is required to purge the four dryer seals. Pneumatic valves are open and close and require 80 psig compressed air only when operated.

Natural Gas

The natural gas consumption is expected to be approximately 2,300 cfh - LHV (1,000 Btu/ft³). This is the expected gas consumption and not the guaranteed energy consumption. Please see the warranty section for the guaranteed fuel consumption rate.

Dryer Heat and Material Balance

		KOMLINE-SANDERSON PADDLE DRYER SIZING CALCULATIONS HEATING WITH THERMAL FLUID		Komline-Sanderson 12 Holland Ave Peapack, NJ 07977 TEL: (908) 234-1000 FAX: (908) 234-9487	
COMPANY: Sumner, WA		K-S PROJECT NO.: TPG-8907		DATE:	
LOCATION:				REV.: 0	
1	Input Parameter				
2		410.0	Dry lb/h		
3					
4	Feed Rate	410	Dry lb/h of	Type of material	
5	% Solids in Feed	19.75%	Feed Solids		
6	% Solids in Product	94%	Product Solids		
7	Solids Specific Heat	0.3	Btu/(lb·°F)		
8	Liquid Specific Heat	1.0	Btu/(lb·°F)		
9	Heat of Vaporization	970.3	Btu/lb		
10	Liquid Boiling Point	212	°F		
11	Initial Temperature	70	°F		
12	Product Temperature	240	°F		
13	Thermal Fluid Temp In	380	°F	Fluid Density @ Temp	6.311 lb/gal
14	Thermal Fluid Flow Req.	400	gal/min	Fluid Cp @ Temp	0.649 Btu/(lb·°F)
15	Thermal Fluid Temp Out	361	°F		
16					
17	Material Balance				
18					
19		Feed	Product	Off-Gas	
20	Solids lb/h	410	410	-	
21	Water lb/h	1,666	26	1,640	
22	Total lb/h	2,076	436	1,640	
23					
24	Heat Load				
25					
26	Sensible Heat (Initial)	254,062	Btu/h	13.7%	of Heat Load
27	Latent Heat	1,591,292	Btu/h	86.0%	of Heat Load
28	Sensible Heat (Final)	4,177	Btu/h	0.2%	of Heat Load
29	Total Heat Load	1,849,531	Btu/h		
30					
31	Dryer Efficiency	97.0%		Heater Efficiency	84%
32	Total Heat to Dryer	1,906,733	Btu/h	Energy Required	2,269,920 BTU/h

Attachment B: Qualifications of Design, Testing, and Service Teams

Key Project Members

Primary project members to Komline Sanderson's Engineering and Support Team are listed below.

VP of Sales – Brian Komline

Mr. Komline is part of the third generation of the Komline family since the company's founding in 1946 by Mr. Tom Komline Sr., his grandfather. Brian serves as the Vice President of Sales at Komline-Sanderson and for the past 14 years he has been leading the Municipal Wastewater and Industrial Process global sales teams. Brian earned a Bachelor of Arts degree in Communications from Fairleigh Dickinson University.

Primary Sales Contact – John Balla

Mr. Balla joined Komline-Sanderson in 2023 as the Business Development Manager, Municipal Market, focusing on pre contract activities associated with the drying of municipal biosolids. Mr. Balla has an MBA in Industrial Management from Fairleigh Dickinson University and a BS in Mechanical Engineering from Virginia Tech. Prior to joining Komline-Sanderson, Mr. Balla served as Vice President (2015 – 2023) and Rental Division Manager (2003-2015) at Ground/Water Treatment & Technology, LLC; Project Manager at Hamon Cooling Towers, Wet Energy Division (2001-2003); and as a Sales & Applications Engineer at Layne Christensen Company, Water Treatment Division (1990-2001).

Chief Mechanical Engineer – Cumali Semetay

Cumali Semetay joined Komline-Sanderson in 2019. Currently he is the VP of Engineering, in charge of project, mechanical and electrical engineering groups. He oversees design and engineering efforts for Komline-Sanderson products such as dryers, belt filter presses, pumps, vacuum filters and more, ensuring design and shop releases are compliant with customer and internal specifications, safety requirements and good engineering practices. He holds a PhD from Lehigh University ME department and he is also a licensed professional engineer. Prior to Komline, he worked for Mitsubishi-Hitachi Power Systems as a Senior Mechanical Engineer and later managed an engineering team in the Plant Design & Performance department.

Project Manager – Steve Capan

Steve Capan has a BSME from the University of Pittsburg and a Master of Engineering from Stevens Institute of Technology. Between 2009 and 2021 he was a project engineer at SPG Dry Cooling where his duties included the creation of Piping & Instrumentation Drawing (P&ID); sizing process piping and equipment (gear reducers, large fans (36 ft. dia), pumps, condensate storage tanks, vacuum systems: liquid ring vacuum pumps and eductors, instrumentation, valves); installation and commissioning assistance. In 2021, Steve left SPG and joined Komline-Sanderson where he is a project manager/engineer for paddle dryers and is involved with the dryer feed system (feed bins, feed pumps, piping design), dryer off-gas system design (ducting, spray tower, pumps, exhaust fan/liquid ring vacuum pump, etc.), thermal fluid heating systems, product handling (rotary valves, screw conveyors, product loading system, baghouse for dust collection); process line sizing; P&ID generation; Hazop meeting participation; installation and commissioning assistance.

Dave Boncher - Product Engineer

Dave has been the Product Engineer for the Paddle Dryer at Komline since 2001. Duties include mechanical design, shaft stress analysis, ASME Code Calculations, generating equipment and sub-vendor specifications for the dryer components such as bearings, reducers, etc., as well as generating, reviewing, and approving customer and production drawings. Previously, he was employed at The Bethlehem Corporation as Engineering Manager for the Porcupine Dryer which was a similar rotary indirect type dryer.

Project Manager – Colin Dray

Mr. Dray started working for Komline-Sanderson in 1998 as a mechanical designer / engineer for the paddle dryers. With his past experience with hydraulics systems and other equipment, he became one of our Project Engineers and in 2011 and in 2018 became the Project Engineering Manager. His duties included engineering support for projects by assisting with design, development, and release of project documentation. Communicate with clients and vendors on project details and schedule as well as providing technical support to other departments during project development and execution. Design and specify system components for dryers, dewatering systems, filter presses, and process filtration equipment with an emphasis on engineering and problem solving. Although Colin retired in 2023, he still works three days a week, part time, to bring his experience and knowledge to current in-house projects.

Process Engineering Director – Douglas Grunwald

Mr. Grunwald graduated from Georgia Institute of Technology in 1988 and has been involved with the drying of municipal biosolids since 1989 when he conducted his first drying test while with the Bethlehem Corporation. At the end of 1990, he left Bethlehem to start work at Komline-Sanderson as an Engineer for the Paddle Dryer product line. For several years he worked both on the mechanical design of the dryer as well as its process applications. Around 1995, his duties were changed to working full time as a Process Engineer. Currently, he is the Process Engineering Director and his duties include, but are not limited to, managing the pilot plant testing facility and corporate R&D, auxiliary equipment sizing and selection, generating process flow diagrams and PIDs, preparing equipment specifications, preparing bids, providing technical information and support for the sales team, project management, equipment start-up, commissioning, training, and operational assistance for customer service.

Jeffrey Fletcher Jr. – Tech Center Laboratory Manager/Safety Manager

Jeff graduated from Lehigh University in 1997 with a B.S. in Chemical Engineering. He began working in the filtering/dewatering wet laboratory at Komline-Sanderson in 2000. In 2008, he became the laboratory/tech center manager for all dewatering and drying tests. His duties include running dewatering/filtering/drying bench and pilot scale tests for customers, writing reports, scheduling the tests, preparing the rental pilot units to be shipped to customers. He also provides technical support for the sales team. In addition to this, Jeff also serves as the Safety and Environmental manager for the site. His duties for this include training, recordkeeping, conducting safety meetings, conducting monthly environmental inspections and reports, maintaining the company's safety policies, and incident investigations. He also serves as a backup for the company's ISO 9001-2015 certification. Jeff works with the ISO manager to make sure the company is following the required procedures defined in our ISO program. This includes conducting training, internal ISO audits, and taking part in an annual external ISO audit.

Electrical Engineering – Tim Riley

Mr. Riley has been with Komline-Sanderson since 1999. His duties include, but are not limited to, responding to requests for quotations, providing technical information and support for the sales team, electrical control panel design, motor control system design, instrument selection, electrical system testing, PLC and HMI programming, VFD programming and commissioning, equipment start-up support, and field service support.

Customer Service Manager – Wayne Gasper

Mr. Gasper has an Environmental Technology Degree and has been employed by Komline-Sanderson since 1981. He has been involved with Paddle Dryers for over 20 years in the installation and commissioning phases of the projects. Mr. Gasper has been involved with all of the K-S products in various capacities since hire. Currently, he is the Service Manager for all products and his duties have included, but are not limited to, managing the field service team, scheduling of site visits, providing field service support, and reporting and on call to address any operation and maintenance questions.

Plant Layout Designer – Tommy Perret

Mr. Perret studied Engineering Graphics at Delgado College in New Orleans from 1976 to 1979. Starting in October of 1979, he was a Structural Marine Designer producing fabrication drawings for shipyards and design firms for just under ten years. He then moved into the piping design discipline for 15 years, first in marine field and then in the petro-chem and gas industries working for several engineering firms in Louisiana and New Jersey. After he was successfully self-employed separately from the engineering field for 3 years, K-S hired him in 2006 as Plant Layout Designer. His duties include, but are not limited to, production of fabrication drawings for K-S dryer, rotary drum, and belt filter press equipment; lay out biosolids drying systems including wet cake feed system, dry product convey system, off-gas system, thermal fluid heating system, piping, and access platforms. He also ensures K-S vendors manufacturing auxiliary equipment conform to the system layout. Depending on job requirements, all work is achieved using AutoCAD (2D) or Inventor (3D). He handles all dryer system layout proposals and sales drawings.

Service Personnel

A list of current Komline-Sanderson Service technicians for the dryers, their “area of expertise” and their years of service with Komline is presented below:

Jeff Henderson	(Process / Mechanical)	35 years
Ali Baragoush*	(Process / Mechanical)	25 years
Fred Jackson	(Electrical)	23 years
Marc Butz	(Mechanical)	13 years
Anthony Rodrigez	(Mechanical)	3 years
Jeff Winker	(Training)	1 year

*Ali Baragoush is semi-retired and works as an independent contract out of his home in Wilmington, NC.

Besides our standard customer service personnel, we also have shop assemblers, welders, QC inspectors, as well as Mechanical, Electrical, and Process Engineers who have all travelled to supply customer service. In addition, Komline-Sanderson has a pilot test facility to test the application should there be changes to your process over the years.

All servicemen (except for Ali Baragoush) are full-time employees stationed out of our office in Peapack, NJ and K-S is currently looking to hire additional service personnel.

Finally, additional service personnel are available through our subsidiary holding companies:

- Komline-Haselden in Charleston, SC
- Komline-Henry in Bowling Green, OH
- Komline-Barnes in Rockford, IL, and
- Komline-Fluid-Quip out of Springfield, OH.

Manufacturing Capabilities

Komline maintains eight integrated manufacturing facilities in the United States with over 350,000 square feet of manufacturing space, housing a wide array of machinery and automated equipment for metal preparation, forming, machining, fabrication (ASME and PED code certified for welding pressure vessels), finishing, and mechanical assembly. The facility also houses an UL508A Certified electrical shop for the manufacture and assembly of instrumentation panels and motor control centers. The company's Filter Fabrics operation is located in Sparta, NJ. In addition to its own manufacturing facilities, Komline-Sanderson utilizes company-certified fabricators to manufacture K-S components and equipment worldwide.

Komline-Sanderson is an ISO-9001 Certified company.



Attachment C: Installation List

References

Below is a list of References who own a Komline-Sanderson Drying System

Client Location	K-S Job Number	Year Started	Contact Phone #	Type of Biosolids	Percent Feed Solids	Percent Product Solids	Wet Ton per Day	Plant Description
Lititz WWTP 50 Lititz Run Road Lititz, PA (Severn Trent Services)	D0391	2010	Michael Wolgemuth (717) 626-2172	Aerobically Digested Sludge	20%	>92 %	14	Thermal fluid Dryer Exhaust to aeration basin. Dry product for agric
Orangeburg WWTP 369 Gulbrandsen Dr. Orangeburg, SC 29116	D0616	2021	Rachel Cooper rcooper@orbgdpu.com 803-535-8975	Digested Sludge	18%	92%	58	Thermal fluid heated Exhaust to aeration basin.
Mason WWTP Plant 3200 Mason-Morrow- Milgrove Rd. Mason, OH 45040	D0298	2006	Shawn Hollon, Director (513) 229-8570	Aerobically Digested Sludge	20%	90%	95	Thermal Fluid Dryer Dense Phase to Product Silo Exhaust to Aeration Basin
Joint Municipal Authority of Wyomissing Valley 701 Old Wyomissing Road Reading, PA 19611	D0366	2009	David Wisser (610) 376-1756	Anaerobically Digested Sludge	22%	90%	9	Dryer uses 165 psig Zero Flash System Product Dedusting Fluid Exhaust to Aeration Basin
City of Lebanon Authority WWTP Lebanon, PA 17042 2311 Ridgeview Road	D0408	2014	Frank DiScullo (717) 272-2841	Anaerobically Digested Sludge	16-22 %	90%	57	Dryer uses thermal fluid. Solids discharge to dense phase system and silo. Exhaust to Bio Reactor
McHenry WWTF McHenry, IL 60050 333 S. Green Street	D0499	2018	Russell Ruzicka Superintendent (815) 578-1303	Waste Activated Sludge	16%	90%	27	Dryer uses thermal fluid. Solids discharge to covered roll off bin. Off gas to Aeration Basin.
Harrisonburg- Rockingham Regional Sewer Authority Mount Crawford, VA 22841	D0571	2019	Sharon Foley (540)-434-1053 Executive Director	Anaerobically Digested Sludge	15%	90%	58	Thermal fluid heated dryer, using Biogas Exhaust to Aeration Basin
Lancaster Area Sewer Authority Washington Borough, PA 17582	D0500	2019	Brian Wilcox (717)-344-5812 Plant Operations Director	Anaerobically Digested Sludge	18%	90+ %	120	Thermal Fluid heated with biogas and heat recovery. Dry product discharged to cooler. Off gases to aeration basin.

Detailed Dryer References

Mason WWTP

Owner and Project Name: Mason WWTP	
Project Reference Name and Position: 3200 Mason-Morrow-Milgrove Rd. Mason, OH 45040 KS Job D0298	
Current Contact Information: Keith Collins, Superintendent, Bob Byer, Head Operator (513) 229-8570	
Date of Completion: 2006	Evaporative Capacity: 6,222 lbs/hr
Model Number: 13W-2000	Type of Sludge Dried: Aerobically Digested
Project Description: The thermal drying system is complete with sliding frame feed bin, feed pumps, product cooler, product screener with fines return, dense phase transport system, and 6,000+ cft dry product storage silo. Off gases are sent to the aeration basin. Instrumentation and controls provided by Komline.	

Lancaster Area Sewer Authority

Owner and Project Name: Lancaster Area Sewer Authority	
Project Reference Name and Position: 160 Blue Rock Rd. Washington Borough, PA 17582 K-S Job D-0500	
Current Contact Information: Brian Wilcox (717) 344-5812	
Date of Completion: 6-7-2017	Evaporative Capacity: 7,333 lbs/hr
Model Number: 14W-2200	Type of Sludge Dried: Anaerobically Digested
Project Description: Wet cake is fed to a 45 yd³ live bottom hopper. Progressive cavity pumps feed the dryer 10,000 wet pounds per hour of 24% DS cake. Digester Gas is used to heat the thermal fluid to dry the solids. Product exiting the dryer overflows an automatic weir into a rotary valve that isolates the dryer from the product handling system. The product is cooled and then sent to a vibrating screener where the fines are returned to the dryer. The remaining solids are then conveyed to a truck loading area. Off-gases from the dryer go into a heat recovery system that partial condenses the dryer off-gases generating hot water which can be used to heat the digesters. The remaining off-gas is sent to a secondary condenser and then a liquid ring compressor. The non-condensed gases are then sent to a coarse bubble diffuser in the aeration basin.	

City of Lebanon Authority WWTP

Owner and Project Name: City of Lebanon Authority WWTP	
Project Reference Name and Position: 2311 Ridgeview Road Lebanon, PA 17042 KS Job D0408	
Current Contact Information: Frank DiScullo (717) 272-2841	
Date of Completion: May, 2014	Evaporative Capacity: 4,000 lbs/hr
Model Number: 11W-1200	Type of Sludge Dried: Anaerobically Digested
Project Description: Project consisted of Live Bottom hopper, duplex feed pumps, cooling conveyors, product screener with fines return, dense phase transport system to 6,000 cft storage silo, off gas condenser with non-condensable vapors sent to the aeration basin, thermal fluid heater, instrumentation and controls.	

Recent Dryer Sales

The following is a list of municipal drying systems that have been purchased in the last five years.

Job #	Customer	Dryer Size	Design Capacity
D0724	Fond Du Lac	11W-1200	Recently Awarded
D0711	City of Monro	9W-850	Being Designed
D0703	Hong Kong, China	9W-710	3,080 wet lb/h each
D0664	Altoona, PA	13W-2000	7,650 wet lb/h
D0652	Athens, GA	12W-1500	5,513 wet lb/h
D0616	Orangeburg, SC	11W-1200	4,840 wet lb/h
D0603	Rensselaer, NY	9W-850	3,000 wet lb/h
D0597	Inland Bays, DE	13W-2000	7,220 wet/lb/h

Attachment D: Bid Proposal Submittal

General Exceptions

K-S has reviewed the Specification Documents that were provided. No reference drawings were included with the Request for Proposal.

Below is a list of exceptions and comments to the specifications, listed by Section and Paragraph. For those paragraphs which Komline-Sanderson has taken exception to, Komline-Sanderson has marked the paragraph with an "E" and the reason for the exception has been given. For some paragraphs, Komline-Sanderson believes the paragraph could have multiple interpretations depending on how one reads the paragraph. For these cases, Komline-Sanderson has marked the Paragraph with a "C" and an explanatory Comment has been provided with Komline's understanding of the paragraph and its context.

Finally, Komline-Sanderson takes exceptions to all Project Specifications that are referenced in the Specifications but were not supplied and unavailable to be reviewed. For example, Section 16920 – HMI Hardware and Software.

Commercial Exceptions

Document	Exception / Comment
Agreement Article 3 – Liquidated damages	Add at the end of Paragraph "...Aggregate liquidated damages for preconstruction services and equipment fabrication shall not exceed a maximum of 2.5% of the contract price."
Procurement General Conditions 3.03.5(1.1)	Revise 1 st Paragraph to: "Warrant and guarantee the equipment will be free of defects in workmanship and material for a period of two years after the City's receipt and acceptance of the equipment not to exceed 30 months from delivery. The supplier is required to correct all defects in workmanship and materials occurring within two years from the date of the City's receipt and acceptance of the equipment at the supplier's expense. The Supplier shall begin to correct any defects within twenty (20) calendar days of notice from the Owner of the defect."
3.05.3	Remove 3 rd Paragraph Revise to "For the convenience of the parties to the Contract it is mutually agreed by the parties that any claims or causes of action which the Supplier has against the Owner arising from the Contract shall be brought within one-hundred eighty (180) calendar days from the end of the warranty period ; and it is further agreed that any such claims or causes of action

shall be brought only in the Superior Court of the county where the Owner headquarters is located, provided that where an action is asserted against a county, RCW 36.01.05 shall control venue and jurisdiction. The parties understand and agree that the Supplier's failure to bring suit within the time period provided, shall be a complete bar to any such claims or causes of action. It is further mutually agreed by the parties that when any claims or causes of action which the Supplier asserts against the Owner arising from the Contract are filed with the Owner or initiated in court, the Supplier shall permit the Owner to have timely access to any records deemed necessary by the Owner to assist in evaluating the claims or action."

Section 01200

1.3B

Revise payment Terms for Bid Item 2 to:

10% - with Purchase Order

15% - upon approval of initial submittals (including GA drawings, P&ID, PFD, Preliminary Specification, Lay out Drawing)

15% - Upon receipt of major materials (Billed Monthly)

50% - Upon delivery

5% - upon Successful start up

5% - upon substantial completion of the dryer project

11650B

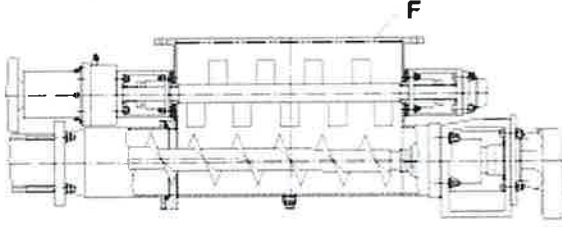
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Replace the first sentence with "Warrant and guarantee the equipment will be free of defects in workmanship and material for a period of two years after the City's receipt and acceptance of the equipment not to exceed 30 months from delivery."

Technical Exceptions and Comments

Item No.	Specification	E/C*	Description
01	01200 §1.3 B	C	The Cost for Preconstruction Services is greater than \$75,000. Should the OWNER Delete Item 2 from the contract, K-S requests compensation for the Engineering Services provided be considered.
02	01300 §2.3	E-C	K-S must take exception to the scope of supply of the Precontract Service listed in the specification as much of auxiliary equipment information, such as detailed fabrication drawings, etc. comes for our sub-vendors and will not be available until after a purchase order for equipment has been provided. K-S has assembled a Preliminary Document Submittal Schedule of information that will be provided under Precontractual Services. Please Refer to Preconstruction Documentation listed Attachment D
03	01300 §3.4	C	The documentation required for the Preliminary Product Submittals and 60% Submittals are not listed in the Specifications. K-S has assembled a Preliminary Document Submittal Schedule. Please refer to Attachment D
04	01800 §1.3 F2	C	If the performance test is conducted on biogas, the caloric value of both the digester gas and natural gas will either need to be tested separately as the biogas is specified as being 60%/40% of DG and NG or tested as the 60%/40% mix. In order to Meet Class A requirements per the CFR, Part 503 rule, biosolids need to be dried to >90% solids. Once above 90%, there is no additional advantage to drying the product. In fact, additional drying will reduce product quality and generate additional fines and nuisance dust.
05	01800 §1.3 F6 11650B §1.6 B5	C	The ability to produce a product just over 90% solids is difficult, and it is very easy to undershoot this limit, producing solids less than 90%. This is not acceptable as it would generate material that does not meet Class A requirements. As a result, K-S designs the drying system to generate 92% solids (as per the specification) with the understanding that should the process undershoot the target and produce wetter material, even in the 90% - 91% solids range, the product <u>IS STILL</u> Class A. The specification however demands that the product be 92% DS <u>or less</u>, with penalties for Liquidated Damages should the product be even 91.95% solids. First, what losses or damages have been caused to justify liquidated damages? The product is still a Class A solid and the City has lost no money.

05 (Cont)	01800	\$1.3 F6	C	Second, by mandating the product to be 92% DS, KS will now need to over dry the product (to 94%) to insure the product meets the 92% requirements. As noted above, this will reduce the product quality of the product and generate a large fines fraction.
	11650B	\$1.6 B5		K-S is fine with 10% liquidated damages for a product that does not achieve 90% solids per the specification. However, KS would like Gray & Osborne to rethink the consequences of requiring the product to be over dried and eliminate the liquidated damages for producing Class A product.
06	11000	\$1.5 D	E	Factory testing the wet cake pump on sludge is not practical, and performing a pump test using water provides no useful data as the difference of viscosities between sludge and water are of a sufficient magnitude to affect the measured rate.
07	11650B	\$1.5 C	E	K-S can provide information concerning the interconnecting requirements between the instruments, equipment, motors, MCC, and the PLC. However, Komline-Sanderson must take exception to this paragraph as Komline is an equipment supplier and does not have the capability to provide detailed Electrical Building Design Information such as conduit runs, raceways, cable trays, etc. to an Installing Contractor.
08	11650B	\$1.5 D	C	Komline found the scope of supply as written in the reference paragraph confusing. Please refer to our Piping Section in ITEM 15 Piping in Attachment D concerning the scope of our offering.
09	11650B	\$1.6 B9	E	The gas consumption rate will theoretically be 1,370 BTU per lb/h evaporation. This is based on a heat consumption of 1,165 BTU per lb/evaporative <u>at the dryer</u> with a thermal fluid heater having an 85% burner efficiency. This is the estimated gas consumption rate. It is not Komline-Sanderson's guaranteed gas consumption rate which includes additional safety factors for unforeseeable heat losses that may or may not be present. Refer to the Proposal Bid Form for guaranteed gas and electrical consumption.
10	11650B	\$2.2 D	E	The weight of exhaust stack from the thermal fluid heater will be supported from the floor. However, the building and/or roof will be required to support horizontal loads due to wind loadings, etc.
11	11650B	\$2.3 B	E	Seepex takes exception to this paragraph, "The drive train shall be firmly supported by heavy duty bearings integral to the pump". Seepex' s design uses the gearbox bearings to support the drive train. Supplying a third bearing along the drive train shaft IS NOT recommended.
12	11650B	\$2.3 I	C	Some of the motors listed have been sold and are now branded under new names. Baldor Motors for example is now known as ABB Motors. K-S assumes the motors under the new names are acceptable.
13	11650B	\$2.3 J	E	Seepex has taken exception to this paragraph. Their hoppers are a high manganese carbon steel and they do not have an option for galvanized steel for their open hopper pumps. If high manganese carbon steel is not acceptable, stainless-steel hoppers can be supplied for a cost adder.

13 (Cont)	11650B	\$2.3 M	E	The pump manufacturer has taken exception to this paragraph. SEEPEX will supply their BTVE range which does not utilize bridge breakers. SEEPEX does not recommend bridge breakers for this application, as the spec requires a level above the hopper for storage prior to transfer. SEEPEX BTVE range will be better suited for the application and is recommended by SEEPEX in lieu of the bridge breaker design citing that the BTI pump with bridge breaker should not be used in conjunction with the 20 ft³ feed hopper. Per Seepex, the "Fill Level" on the BTI pump "should not be above the top flange of the pump as shown." 2.1.3 Range BTI, TINS 
				K-S and the thermal fluid heating vendors understand this paragraph to mean that the 'biogas' stream provided at the heater will be 100% biogas that has first been dried and cleaned, and then mix with natural gas in a ratio of 60% DG and 40% NG BY OTHERS. The thermal fluid heater provided does not control the NG and DG mixture. K-S assumes the gas being supplied will have a consistent caloric value.
14	11650B	\$2.4 C	C	With regard to mixing digester gas and biogas at the heater, all of the vendors that K-S contacted have taken exception to this requirement, including the vendor referred by Gray & Osborne whose response is provided below. Fulton Thermal Corp. 972 Centerville Road Pulaski, NY 13142 Call: (315) 298-5121 Fax: (315) 298-5312  Fulton Thermal Corporation FUEL: Heater will have the ability to fire on straight natural or biogas gas. BTU content of the biogas cannot change more than 5%. Switching from digester gas to natural gas is automatic Switching from Natural gas to digester gas is manual. Instead of straight biogas, customer can supply a blend of natural gas and biogas at a fixed BTU rate, assuming heater is correctly tuned with this fuel mixture. Our heater does not have the ability to blend the two.
15	11650B	\$2.4 C	C	Digester Gas must have less than 99 ppm of H₂S, be at 4 psig minimum, free of chlorides, and have a caloric content greater than 550 BTU/ft³
16	11650B	\$2.4 F	E	X-Ray of the coil welds is not required by ASME Section 1 requirements and is not included.
17	11650B	\$2.4 H	C	The thermal heater proposed has a horizontal coil which is easier to access and clean than vertical coil heaters. As a result, ladders and railing are not required.
18	11650B	\$2.12 C	E	The cooling conveyor will be a 12"-inch auger. With only 410 lb/h of dry product, a 12"-inch conveyor is still excessive.

19	11650B	\$2.12 G	C	Structural support calculations by a licensed PE in the State of Washington will be supplied in our submittal package after Notice to Proceed has been given to purchase the equipment.
20	11650B	\$2.13 D	C	The fines return conveyor is a tubular conveyor. There is no cover.
21	11650B	\$2.20 A	E	Most of Komline-Sanderson's equipment vendors have taken exception to the paint specification listed in this section and will provide their manufacturer's standard. As a result, K-S must also take exception to this paragraph as well.
22	15066	\$2.1	C	This Paragraph states the Supplier to provide and install pipe and conduit support system. These are not included in K-S scope of supply as per previous parts of the specification. For Example, Section 11650B §2.2.B states "The Contractor shall provide piping and supports to the interface point from utility connections and from the dryer equipment." This implies the Contractor is responsible for the piping to the drying equipment and interconnecting the drying equipment. Section 11650B §2.2A states "The Contractor shall provide conduits, raceways, wire and other appurtenances not provided by the Supplier between skid mounted equipment, the dryer equipment and other free-standing equipment"

* E = Exception to the Specification.

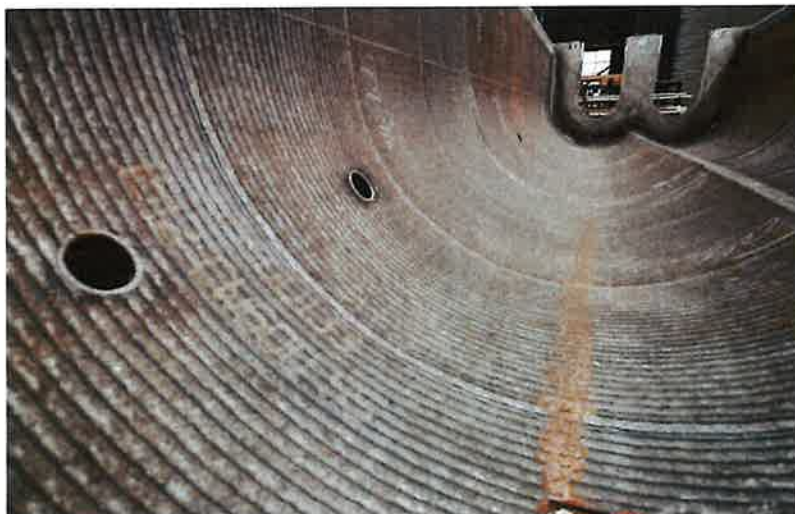
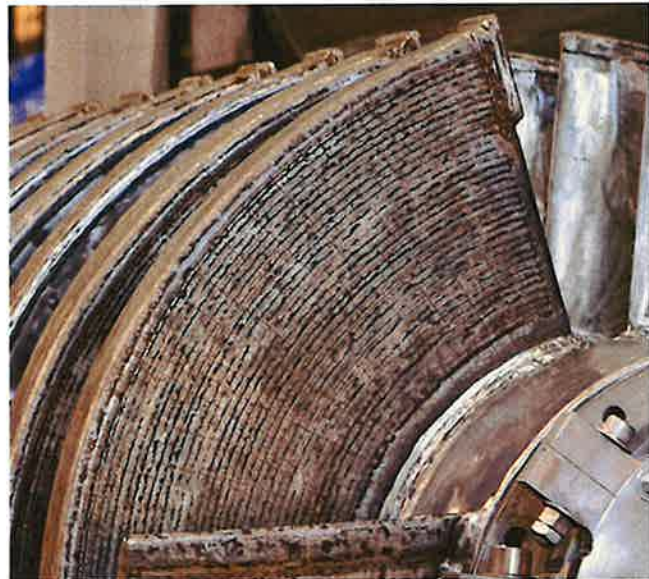
C = Clarification or Explanatory Comment to the Specification.

Materials of Construction

Komline-Sanderson has been providing paddle dryers to the municipal market for over 30 years. Some of our first sludge dryers were fabricated from carbon steel. However, severe corrosion was experienced on one of our first dryers. Within two years, both the carbon steel trough and agitator had to be replaced. Volatile organic sulfur components were identified as the main source of the corrosion. K-S replaced the agitators fabricated with stainless steel wet parts and the unit is still in service today. Since then, Komline-Sanderson has manufactured all of our agitator shafts with 316L stainless steel paddles and 304 stainless steel troughs.

Besides corrosion attack, grit in the sludge has shown to be an issue over the years, although not at every installation. One of our earliest sludge dryers at Mason, OH was put into operation in 2006 with minimal hard surfacing protection and is still in operation. However, not all municipalities are as fortunate and have good grit removal systems. Some installations from the 2000 to 2010 era experienced various levels of wear.

Based on field data, both the type and amount of hard surfacing applied to our dryers has slowly evolved based upon field observation and experience. For the last 12 years, we have been using a weld applied chromium carbide alloy. The hard facing is applied to the rims and leading edges of all paddles. The last 2/3 of the paddles have hard surfacing applied to the sides of the paddles within 1" of the shaft. Hard surfacing is also added to the last several feet of the agitator shaft. Lastly, the trough is also protected by applying hard surfacing to the entire bottom of the trough and partially up the vertical side walls.



Weld thickness is $3/16" \pm 1/16"$ due to the shape of the weld bead. The hard surfacing material has a hardness of HRC 56 - 64. It should be noted that hardness and abrasion resistance are not necessarily the same thing and that two materials of equal hardness may exhibit different wear resistance. ASTM G65-04 is the standard method used for measuring abrasion.

Previously, K-S has used a combination of weld applied and HVOF applied abrasion resistant coating. Several types of spray coated materials were used on the surface of the paddle where it was believed the wear would be less onerous. The crown or top of paddle had a weld on hard surfacing to protect areas where the abrasion would be higher.

The main issue with the HVOF applied coatings was that they are relatively thin and lack fusion with the parent metal. As shown in the adjacent photo, over time, the material chips, and the dried sludge would undercut the coating resulting in the material flaking off. The weld on coating applied to the outer crown however remained in excellent condition.



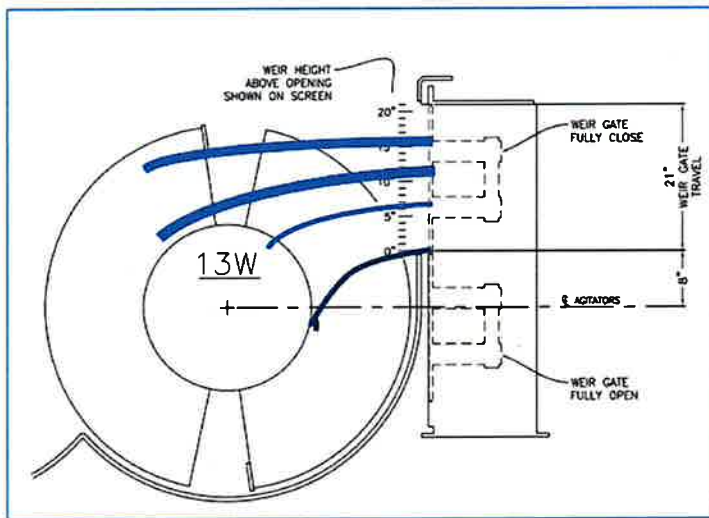
Process Control Narratives

A general narrative describing the K-S drying description is provided in Attachment A. Process Controls and Operations are provided below.

Product Solids Control

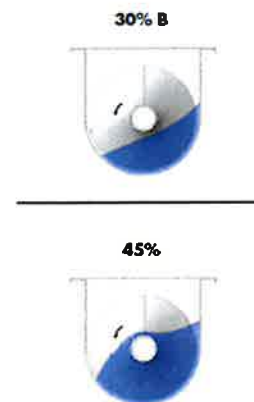
Biosolids fed into the K-S dryers are agitated with heated paddles that are in the range of 350° to 390°F. The intimate contact with the heated paddles heats the biosolids to the boiling point of water (212 °F) It takes several hours for the wet cake to dry to 90% solids as it slowly travels down the length of the dryer. At some point, typically around 85% solids, the temperature of the biosolids starts to rise above 212 °F. By the time 90% solids are achieved, product temperatures are in the 230°F to 245°F range. The relationship between product solids and product temperature is crude, but it is relatively consistent with each installation and provides a means of measuring the solids content of the product in the dryer within a few percent.

The product discharges from the dryer over a side weir. The height of the side weir affects the level in the dryer and the dryer's volumetric capacity. This in turn affects both the residence time of the biosolids in the dryer as well as the amount of heated surface area that the solids are contacting. Lower residence times and less contact with heated areas create a wetter product. Conversely, higher residence times with more contact with heated areas creates drier product. Consequently, by raising and lowering the weir, a wetter or dryer product can be produced.



Komline-Sanderson

Bed height is like
a screw conveyor



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Combining the two paragraphs above, a means to control the product solids is achieved. The dryer bed temperature is monitored, and the discharge weir height is slowly adjusted up or down to maintain the product in a defined temperature range and indirect control of the product solids.

The main attributes of this control scheme is that it only affects the dried product that is being discharged. The wet cake that is being fed into the dryer and the material in the middle of the dryer are

still experiencing the same drying rate and drying conditions as before. And when that material comes to the discharge end of the dryer, fine-tuned adjustments are being made to account for the minor changing characteristics of the sludge, and not the ever-present operational changes of the dryer. In many dryers, if the product is considered too dry, the thermal fluid or steam pressure would be reduced to reduce the drying rate of the sludge. While this may decrease the product solids by a few points to avoid a product that is too dry, it also reduced the drying rate of the sludge in the rest of the dryer at the same time, including wet cake that is just being fed. The inevitable result is in three to four hours that feed material will have traveled down the length of the dryer after experiencing a lower drying rate and is now too wet because of the reduced temperature in the dryer. The solution is to turn up the temperature and the cycle begins.

Other folks who use screw conveyors for their “paddles” can say they increase the speed of the conveyor to get material out. But it also means that product that is in the middle of the dryer and at the feed end of the dryer will also be conveyed faster down the dryer. This will reduce the residence time of that sludge and when it eventually shows up at the discharge end, the paddles have need to be slowed down.

In both cases, changing the heating media temperature and /or adjusting the speed of a screw conveyor, have the unavoidable consequence of effect the drying rate of the material being fed to the dryer which can easily become unstable and escalated out of control over time.

Dryer Turn Down

As the wet feed rate to the dryer is reduced, the dryer can be turned down by

- a) reducing the temperature of the thermal fluid to dryer and,
- b) by lowering the discharge weir height.

Lowering the thermal fluid temperature reduces the thermal driving force the rate at which heat is transferred to the dryer and is similar to lowering the heat to a teapot on the stove. Reducing the discharge height on the weir reduces the residence time in the dryer as well as the amount of heat transfer surface area with which the material comes into contact. Both of these acts can reduce the dryer capacity significantly. Although the dryer turndown ratio is very high, the turn down ratio of the dryer system is not limited by the dryer, but by the wet cake feed pump which is driven by a VFD.

This leads to the question, what is the design speed verses the operating speed? K-S recommends that the cake pumps be designed to operate in the 30 to 40 hz range. This way, when the wet cake pumps begin to experience wear and higher slippage rates, the speed of the pumps can be increased to compensate. This provides a longer service life for the pumps and saves considerable money on spare parts. However, designing the pumps this way will mean there is less turndown as most VFD's are limited to continuous operation in the 10 hz range. This means the drying system turndown is in the 3:1 to 4:1 range.

Power Loss

If the emergency shutdown is caused by a general area power outage, then the K-S paddle dryer shafts should be restarted as quickly as possible once power is restored.

Sludge is a thermoplastic material in that as it cools, the viscosity increases greatly. If the dryer is down for a significant period, it may not restart once the power is back on. If so the first stage to restart the dryer is to heat the sludge.

Turn the thermal fluid heater on and begin heating the dryer with 190°F thermal fluid. Monitor the temperatures in the dryer bed. When the first and second temperature zone are greater than 170°F, the sludge should have softened enough to restart the dryer.

If the dryer does not restart, open the dryer access doors, and inspect the dryer bed. Note where the material is exceptionally pasty. Add water in the first third of the dryer (feed end) by manually opening the water deluge valve (SV-3011/FV-3011) for 1 minute. If the sludge is pasty in the middle of the dryer as well as the feed end, water may need to be added in the middle zone of the dryer by opening SV-3010/FV-3010. DO NOT ADD WATER where the product is a free-flowing granule.

Let the water seep into the sludge for at least 10 minutes and try to start the dryer. If the dryer still does not turn over. Repeat the process as needed.

After an attempt or two to start the dryer, the shafts and paddles should have rotated a little, creating void spaces and openings where additional water can be added. Allow the dryer bed to sit to let the sludge soak in the water. DO NOT try to start the dryer more than once every 30 minutes.

With added water, eventually the sludge will soften, and the dryer will restart.

Once the dryer starts, it is best to dry out the dryer if any significant amount of water was added during the restart process.

Safety

Dry biosolids present a moderate risk of dust explosion hazard. Because data on the solids produced at Sumner are not available, we have used the following explosion severity (ASTM E 1226-10) values in our design based on previous tests conducted on municipal biosolids:

- Deflagration Index, $K_{st} = 125 \text{ (bar}\cdot\text{m)}/\text{s}$
- Pressure maximum, $P_{max} = 7.67 \text{ bar(g)}$

Although the dryer is designed to operate in a safe manner, mechanical problems and upset process conditions might occur. The combination of some of these variables can generate potentially hazardous conditions. K-S has several features to address safe dryer operation.

K-S has selected the dryer size to meet the process requirements using thermal fluid at a temperature around 390 °F which is well below flash point of the thermal fluid. This is inherently safer than using a smaller dryer operating with higher thermal fluid temperatures.

Temperature sensors are provided to monitor the product and vapor temperature. In the event of a temperature excursion, a high temperature alarm will sound to alert the operators to take action. Should no action be taken, a high-high temperature alarm will sound, and plant water will automatically be sprayed into the dryer bed. Not only will this help to cool the product, but it also produces steam

which provides an inert atmosphere if one isn't present already. The water spray nozzles are programmed to open for a fixed period before closing again. Should the high temperature condition persist, additional water is sent to the dryer.

To address deflagrations (Per NFPA 68), Q-Boxes are supplied in the dryer cover. Besides the benefits of personnel protection, this feature can also save the equipment from requiring major repairs and prevent costly downtime should an incident occur.

A rotary valve is provided at the discharge of the dryer for isolation. A second rotary valve is provided to isolate the product return conveyor.

The product temperature is monitored in several places. Should a temperature excursion be seen, a water deluge nozzle is provided for each conveyor to apply water where it is needed.

DHA STUDY

Per NFPA 652, Chapter 7, a Dust Hazard Analysis (DHA) is to be performed by the Authority that has Jurisdiction (AHJ) to assess the risk of fire and deflagration. When conducting a DHA, it is the AHJ who will assess what is and what is not an acceptable risk. Komline-Sanderson is not the AHJ. The DHA must be done in conjunction with the Owner and Engineer.

Risk assessment is subjective. Komline-Sanderson has included in its scope of supply our standard safety features as described above. These features in conjunction with our standard operating conditions have been accepted in the past by several Engineering Firms and Wastewater Treatment plants and deemed to be in accordance with NFPA requirements and sufficient for the safe operation of the dryer. If however, additional safety features and equipment are deemed necessary beyond our offering, Komline-Sanderson will provide a cost adder to add them to our scope of supply.

Ease of Start-up and Shut Down

The Komline-Sanderson Drying System includes an Automatic Start-Up and Shut-Down Sequence button in the operating screen.

When the Automatic Start-Up Sequence, the PLC will automatically:

- start the off-gas system,
- open water valves for the condenser and product coolers,
- start the product handling system (in reverse order),
- start the thermal fluid heater and slowly raise the thermal fluid temperature as required,
- open the valves to provide air to the dryer shaft seals,
- start the dryer rotating,
- and when the system is up to temperature, start the wet cake feed pump.

Likewise, Automatic Shut-Down will shut the dryer down automatically without the need of operator attendance.

Operator Input During Operation – Unmanned Operation

The K-S drying system does not require a dedicated operator. At many installations, the same operator in charge of the dewatering device is also responsible for the drying system. This is mostly because there

are few changes in the drying system and a long time must pass before many changes occur. Many of the process alarms in the drying system are simply warnings that the dryer operation has slowly drifted outside of its prescribed operating parameters. The most common of these alarms is the high and low product temperature alarms.

As the product enters the final stages of drying, the product temperature begins to rise above its boiling point of 212 °F. Temperature sensors in the discharge end of the dryer, monitor the product temperature and control an overflow weir which is used to set the product level in the discharge end of the dryer. Should the product temperature be too low (an indication the product is still wet), the overflow weir will automatically rise to provide additional residence time in the dryer to dry. Should the product temperature be too high, the overflow weir is lowered, and the product is discharged. In this way, the final product's moisture is controlled.

Alarms such as high or low product temperature are setup to act as an alert with the dryer continuing to operate until the drying operation eventually drifts back to where it's supposed to be due to actions taken by the PLC, or an operator comes and makes a minor adjustment. However, if neither of these events occur and the dryer operation continues to drift off course, a second high-high (or low-low) alarm is provided as a warning that the operator intervention is required within a certain time frame (often around 15 minutes) or else the system will go into automatic shutdown.

Other alarms such as low speed on the conveyors, high level alarms in the overflow weir, are typically an indication of mechanical problems that require immediate attention. Under these circumstances, feed to the dryer is stopped and the drying system begins an automatic shutdown sequence. This shut down sequence involves drying out the dryer and takes several hours to complete. Very often, operators can address the alarm issues before the dryer shut down sequence is finished, and the drying operation can be restarted.

In the evening, the drying system can be remotely monitored by plant personnel via the plant's SCADA system from the plant's main control room. From this position, the major process parameters can be watched, alarms acknowledged, and minor corrections to the dryer operation made. Should an alarm condition be serious and require maintenance, the dryer can be put into a shutdown mode using the automatic shutdown sequence.

If required, the system can operate unmanned as well. As always, the automatic weir will make minor adjustments as required to produce a Class A product. However, should a mechanical alarm activate, the system will put the dryer into automatic shutdown mode and the operators will need to address the alarm condition before restarting the dryer in the morning.

Preconstruction and Engineering Services

Below is a list of Engineering Submittals and the estimated schedule of submittals that will be provided.

In general, the process flow diagram and piping, instrumentation diagrams are always submitted first and are considered the foundation documents. As shown in the submittal schedule, these documents will be submitted within 30 or 90 days. When two submittal dates are indicated, this generally means that the earlier date (30 days) is too aggressive, but the latter date is too liberal. In reality, the submittal will be in the 40-to-60-day range.

Submittal Description	After PreEnginee	
	30 Days	90 Days
01 PID / PFD		
Dryer Heat Balance	X	
Process Flow Diagram	X	
PID - Legend	X	X
PID - Wet Feed Pump	X	X
PID - Paddle Dryer	X	X
PID - Dry Product Handling System	X	X

A significant amount of information is provided with approval drawings from our sub-vendors. However, most of our sub-vendors require a PO for equipment in order to provide engineering documents. As a result, this information cannot be provided until after Notice to Proceed is given for Equipment Purchase.

K-S has engineered enough of these systems to provide Preliminary documentation. This documentation would be from previous jobs and would represent our best guess until NTP has been given for Equipment Purchase. This is shown as a "P" on the engineering submittals below. This information may or may not be similar to the approval documentation provided by the equipment supplier later on.

Submittal Description	After Pre-Engineer NTP			After Equip. NTP	
	30 Days	90 Days	150 Days	90 Days	150 Days
01 PID / PFD					
Dryer Heat Balance	X				
Process Flow Diagram	X				
PID - Legend	X	X			
PID - Wet Feed Pump	X	X			
PID - Paddle Dryer	X	X			
PID - Dry Product Handling System	X	X			
PID - Dryer Exhaust System	X	X			
PID - Thermal Fluid Heating System	X	X			
PID - Utilities	X	X			
K-S Dewatered Sludge Feed Piping Specification	X				
K-S Thermal Fluid Piping Specification	X				
K-S Piping Insulation Specification	X				
K-S Compressed Air Piping Specification	X				
K-S Low Temperature NPW Piping Specification	X				
K-S High Temperature NPW Piping Specification	X				

Submittal Description	After Pre-Engineer NTP			After Equip. NTP	
	30 Days	90 Days	150 Days	90 Days	150 Days
02 System Layout					
System Plan Drawings		P		X	
System Elevation Drawings		P		X	
System Instrument Location Drawing			P	X	
System Valve Location Drawings			P	X	
03 Model 8W-580 Paddle Dryer					
K-S Dryer Equipment Specification	X				
General Arrangement Drawing (2D)	X				
Side Discharge Weir Drawing		X			
Model 8W-580 Paddle Dryer - stp file		X			
ASME Code Calcs		X			
Dryer Anchor Bolt Calculations				X	
Dryer Lifting Arrangement Drawing			X		
K-S Standard Paint Specs	X				
Dryer Sub-Vendor Data					
Motor Data Sheet				X	
Reducer				X	
Bearing Drawings		P		X	
Bearing Grease		X			
Rotary Joint Drawing		P		X	
Dryer Weir Actuator		P		X	
Agitator Timing Gear Locking Assy		P		X	
Dryer Instrument Cut Sheets		X			
Dryer Lubrication List		P	X		
Operational Manual					X
04 Deflagration Duct					
Pmax - Kst Tet Results			X		
Dryer Deflagration Vent Calculations			X		
Dryer Deflagration Duct Drawings			X		
05 Auxiliary Equipment Submittal *					
Un-priced Purchase order requisition			X	X	X
General Arrangement Drawing		P		X	X
Performance Curve		P		X	X
Equipment Specifications		P		X	X
Operation Manual					X
Motor Data Sheets					X
Sub-Vendor Data Sheets (i.e. bearings)				X	X
Instrument Cut Sheets			P		X
Seismic and Anchor Bolt Calculations					X

Submittal Description	After Pre-Engineer NTP			After Equip. NTP	
	30 Days	90 Days	150 Days	90 Days	150 Days
06 Piping					
Wet Cake Piping Layout		P	X		
Wet Cake Piping Calculations					X
Thermal Fluid Piping Layout			P	X	
Thermal Fluid Piping Calc					X
NP Water Piping Layout/Routing per Item 18			X		
Compressed Air Locations			X		
07 Off-Gas Handling System					
Off-Gas Duct GA Drawing		X	X		
Off-Gas Duct Support		X	X		
Off-Gas Duct Support Calculation					X
Off-Gas Duct Anchor Bolt Sizing Calculation					X
Spray Tower Condenser GA Drawing		X	X		
Sparry Nozzle Assy Drawings		X	X		
Separator Tank Ga Drawing		X	X		
Venturi GA Drawing		X	X		
Demister Pad Drawing		X	X		
Separator Tank Support Calculations					X
Separator Tank Anchor Bolt Calculations					X
Off-Gas Spray Nozzle Cut Sheets			X		
08 Instrumentation and Controls					
Instrument List			P	X	
instrument Cut Sheets			P	X	
Control Valve List		X			
Control Valve Cut Sheets			P	X	
Dryer Control Panel Layout			X		
PLC Programing			P	X	
PLC Screens			P	X	

*Auxiliary Equipment Includes: Wet Cake Pump, Rotary Valves, Conveyors, Screeners, Thermal Fluid Heater and Pump, Thermal Fluid Cooler, Exhaust Stack, Platforms, Air Compressor

It is Komline-Sanderson intent to provide Purchase Order Documentation for the Auxiliary Equipment so that when the Notice to Proceed for Equipment is given, the Auxiliary Equipment can be purchased relatively quickly, and approval drawings obtained expediently.

Equipment Scope of Supply

Item 1 Wet Cake Pump

Two (2) progressive cavity pumps (one as shelf spare) will be provided to transport dewatered cake from the current wet storage hopper to the dryer. The pump will be fabricated with ductile iron and elastomers and include an open throat, Buna (or equal) stator, and tool steel rotor with hard surfacing. The pump will be a Seepex Model BTVE 17-4, or equal, and will pump the wet cake at the design rate at a pump speed below 90 rpm.

The pump will be mounted under an existing 50 yd³ live bottom hopper which feeds the wet cake pump. K-S assumes that wet cake will be fed at a controlled rate from the hopper into an inlet hopper mounted on the pump that has a total capacity of 20 ft³. The hopper shall be provided with radar level sensor for level measurement and to control the live bottom hopper speed.

The feed pump will have an open hopper which incorporates two rectangular inspection ports, 180° apart, to permit access to the suction housing interior without disconnecting the piping or feed chute. An auger assembly shall be provided to force feed the pump elements. The auger shall be integrally mounted to the pump drive shaft in an eccentric motion and connected to the rotor and drive shaft by two universal joints. The universal joints shall have a continuous torque rating equivalent to the maximum torque rating of the pump. The conveying capacity of auger assembly shall be 400 percent greater than pump element design.

The pump shall be driven by a 10 hp, 1,750 rpm direct coupled, 460V electric motor, connected for operation on a 480 Volt, 3 phase, 60 Hz service. Motors shall be constructed with Class F insulated windings, continuous duty at 40 degrees C ambient air temperature with a 1.15 service factor. A VFD, supplied by the Contractor, is used to control the pumping rate to the dryer.

The rotor shall be tool steel ground, polished and coated with a chrome steel coating approximately 0.01" (250-micron) thick for abrasion resistance. The stator shall be a synthetic rubber with a minimum Shore A hardness of 67-73.

The pump discharge flange shall be rated for 300 psi per ANSI B16.5, tapped and plugged.

The stuffing box shall be equipped with a split packing gland and split Teflon® lantern ring to permit repacking of the pump without removing the bearings or drive shaft components. Fittings will be provided for (grease) (water) lubrication of the packing.

Over-pressure protection is provided through a sealed flange and bladder type, glycol-filled, pressure ring having the same internal diameter as the discharge piping and isolated from the pumped product by the elastomer insert. A pressure transmitter is provided to send a signal to the dryer PLC to monitor pump performance and signal alarm conditions.

A TSE thermal sensor assembly is embedded in the stator tube to prevent dry operation.

Wet cake piping is supplied by Komline-Sanderson. Refer to Item 18.

Instruments provided by K-S for the wet cake pump include:

- Two (2) motor temperature switches, one in each pump motor.
- One (1) TSH to monitor the rotor and stator temperature. Each pump will have a connection for the TSH.
- One (1) bladder diaphragm type pressure ring with pressure transmitter after the pump in the wet cake piping.

Item 2 Thermal Fluid Heater

One (1) thermal fluid heater, designed for 2.5 million Btu/h output will be provided heat 400 gpm of thermal fluid up to 410 °F. The heater will be designed and stamped in accordance with ASME Section I for 750 °F at 225 psig with 300 lb flanges on the inlet and outlet and with a relief valve included.

The thermal fluid heater will be a Vapor Power Hi-R-Temp Thermal Fluid Heater, Model No. OG-5937-SHK-25 (or equal) with combination Biogas / Natural Gas fired, fully modulating burner with 4:1 turndown on Biogas and 8:1 turndown on Natural Gas. Natural gas will also be used for the pilot.

K-S interprets 'biogas' to be a composition of 60/40 mix of biogas and natural gas that was premixed by others to provide a constant caloric value +/- 5%, for example 55/45. The thermal fluid heater provided does not control the NG and DG mixture. Digester gas and natural gas blending is by others. The provided burner will have dual gas trains. One gas train will be for natural gas only. And the second gas train will be for 60% digester gas and 40% natural gas that is delivered to the heater in a pre-blended condition by others.

The thermal fluid heater includes a pre-piped and wired NFPA natural gas train including main and pilot gas pressure regulators for 10 psi maximum supply pressure. A second pre-piped and flanged gas train for premixed mixed biogas and natural gas is supplied with stainless steel pipe and fittings with NFPA components including the main digester gas pressure regulator (10 psi max inlet), high and low gas pressure switches, two SSOVs for biogas service, stainless steel vent valve, butterfly gas control valve, stainless steel ball cock.

The burner is designed to have sufficient fluid velocities to ensure that the maximum permissible film temperature of the fluid is not exceeded. The burner includes:

- 3,450 r/min, 5 hp TEFC blower motor,
- Full modulation burner control with pilot,
- Ignition transformer,
- UV flame detection scanner,
- Combustion air pressure switch,
- IRI insured gas train,
- Components are in NEMA 4 enclosures,
- NEMA 4X control panel
- Stainless steel heater jacket with 2" mineral wool insulation.

A NEMA 4X 304 stainless control panel is included. The UL 508A approved panel is complete with all required safety controls, E-stop, remote Start/Stop, Remote/Local switches, and remote cycling contacts

to allow for remote temperature set point and control. Expected voltage is 480/3/60. A Siemens LMV51 flame safeguard and linkageless burner control system with AZL52 display module is provided.

The fluid is controlled by an indicating modulating controller for regulating the desired fluid temperature. It will also have a manual/auto mode, low fire hold for cold start-up, and an on/off mode for low heat demand.

A fluid safety high temperature-indicating controller will shut down the burner, and it will not start again until the reset button is pressed.

A stack safety high temperature-indicating controller will shut down the burner should an unsafe firing condition exist. The burner will not start again until the reset button is pressed.

A differential pressure switch is provided to ensure proper flow through the heater. Should the differential pressure fall below the set value, the burner will shut down and will not start again until the reset button is pressed.

The thermal fluid heater is complete with 3,000 liters of Paratherm HE or equal heat transfer fluid. Approximately 2,300 liters of fluid is required to fill the system.

A thermal fluid expansion tank designed and fabricated (not stamped) to ASME Section VIII for 450 °F at 50 psig with nitrogen blanketing equipment is provided. The tank will be mounted to the rear of the heater frame with support legs and is equipped with a nitrogen pressure and backpressure regulator to prevent air from coming in contact with the hot fluid. Also included is a low fluid level switch, steel vent valve, relief valve, fill connection, level gage, and flanged outlet/inlet connections.

Note:

- Nitrogen supply (bottled) to inert expansion tank is by others.
- Interconnecting piping between the thermal fluid heater skid and the K-S Paddle Dryer is by the Contractor. Vents at high points and drains at low points are required.
- All insulation of the thermal fluid piping including that for the K-S supplied thermal fluid distribution manifold is by Contractor.
- The expansion tank and supports are shipped loose for field assembly.
- Carbon steel components will be painted per manufacturer factory standards.

Item 3 Thermal Fluid Cooler

One (1) water-cooled heat exchanger (shipped loose) will be provided to cool the thermal fluid system and thermal dryer during shut-down. The fluid cooler is to be piped by others in parallel with the dryer and is to be isolated with automatic valves supplied by K-S.

During a system shut-down cycle, the thermal dryer is permitted to operate until the drying system is ready for cool down. At that time, the thermal fluid system is shut down and a pneumatically actuated ball valve is opened, permitting the flow of thermal fluid to the cooler. A second pneumatically actuated valve is opened that detours the cooling water from the spray tower condenser to the thermal fluid cooler. After the cooler, the water is sent back to the spray tower condenser to continue to provide off-gas scrubbing for the dryer exhaust.

The fluid cooler will be designed to cool the thermal drying system to ≤ 200 °F before shut-down. The fluid cooler shall be fabricated from carbon steel with stainless steel tubes and designed, manufactured, inspected, tested, and stamped in accordance with the latest revision of the ASME Code for Unfired Pressure Vessels, Section VIII, Division 1, for a maximum working pressure of 100 psig and a design temperature of 450 °F.

The cooling water temperature is monitored by a common temperature transmitter. The inlet thermal fluid is the same as the dryer supply temperature and is already being monitored as well. Two (2) temperature gages (local) are provided to monitor the cooling water and thermal fluid return temperatures.

Carbon steel components will be painted per manufacturer factory standards.

Item 4 Thermal Fluid Recirculating Pump

Two (2) thermal oil recirculation pumps (one duty and one standby) shall be furnished to provide recirculation of thermal oil from the thermal oil heater to the dryer. The pumps shall be manufactured by Dean or equal. The thermal oil pumps shall be configured such that any one (of the two) thermal oil recirculation pumps can serve the operating thermal dryer while the remaining pump is either not in service, or removed from service for maintenance.

The thermal oil recirculation pump shall be a low-pressure centrifugal pump designed for an operating flow rate of 400 gpm. The pump will be air cooled with a 40 hp 3,600 r/min TEFC motor, spacer coupling and guard, and seal and is used to circulate the thermal fluid through the heater and system.

The thermal oil recirculation pump shall be supplied with mechanical seals designed for thermal oil fluid use to assure long-life and maintenance free operation of the pumping equipment.

The thermal oil recirculation pump shall be furnished with a pump discharge pressure gauge (0 to 160 psig operating range); pump suction combination pressure/vacuum gauge (-30-inches Hg to 30 psig operating range); and 2-gauge air bleed valves.

Carbon steel components will be painted per manufacturer factory standards.

Item 5 Air Compressor

One (1) Champion Model HR5D 5 hp duplex air compressor (or equal) will be provided. The two reciprocating compressors will be mounted on a common 80-gallon horizontal ASME Receiver Tank. The combined capacity of the two compressors is 34 cfm at a maximum pressure of 175 psi.

The air compressor system contains an air cooled after cooler and filter.

Item 6 Komline-Sanderson Paddle Dryer Model 8W-580

One (1) Komline-Sanderson Paddle Dryer Model 8W-580 using circulated thermal fluid as the heating medium will be provided. The K-S Paddle Dryer utilizes two (2) intermeshing, counter-rotating agitators with heated, hollow, wedge-shaped paddles. Thermal fluid enters and exits each agitator through a

rotary joint located at the discharge end of the dryer. K-S provides flexible hoses for the rotary joints. The agitators are mounted in a heated (jacketed) trough that is provided with a bolted, vaulted top cover.

The agitators are driven by a 1,750 r/min TEFC motor connected to a shaft mounted gear reducer manufactured by SEW-Eurodrive or equal. Timing gears maintain shaft synchronization. The agitators are supported by pillow block bearings and provided with shaft seals. A heavy-duty, painted, carbon steel base supports the trough and agitator bearings.

Model:	8W-580
Heat transfer area (nominal):	580 ft ²
Working volume:	146 ft ³
Motor rated power:	60 hp
Shaft seal:	Mechanical face seal with air purge
Access ports:	Two (2) 20 inch
View ports:	One (1) with wiper and water rinse connection
Clean out ports:	Two (2)

The agitators and trough jacket will be designed, manufactured, inspected, tested, and stamped in accordance with the latest revision of the ASME Code for Unfired Pressure Vessels, Section VIII, Division 1, for a maximum working pressure of 125 psig and a design temperature of 550 °F.

The agitators will be manufactured with process contact surfaces of 316/316L stainless steel. An abrasion resistant coating will be weld-applied on 75% of the paddles to within a 1 inch radius of the shaft OD. In addition, the shaft will have an abrasion resistant coating weld applied directly onto the non-cladded portion of the carbon steel shaft around the last five paddles on the discharge end of the dryer.

The trough and trough jacket will be manufactured with process contact surfaces of 304/304L stainless steel. The interior surface of the trough bottom will have a weld applied abrasion resistant coating that extends up the side walls to a height equal to one-half the paddle radius above the agitator centerline. The dryer will also include a side overflow that has an adjustable weir making it possible to adjust the overflow level (bed level) while the dryer is in operation.

Shafts seals will consist of a mechanical face seal with air purge. Each shaft seal will require approximately 3 to 4 cfm of compressed air at 2 psig. An air purge manifold will be provided: one at the feed end and one at the discharge end of the dryer to service the two agitator shafts. The air purge manifold consists of a pressure regulator, rotameter, and seal pressure gauge for each shaft seal. A common maintenance isolation valve is provided for each manifold.

An unheated, vaulted cover fabricated from 304/304L stainless steel will be bolted to the dryer trough. This cover will include burst (relief) panel(s) for the venting of any potential deflagrations. The cover will also include access manways, which include padlocks to prevent unauthorized opening, and a view port

with wiper and water rinse connection. The cover will also include water spray nozzles, an off-gas outlet connection, and instrument connections.

Instruments provided by K-S for the Paddle Dryer:

- Four (4) Thermocouples with hardened thermowells and transmitters in the dryer bed.
- One (1) Thermocouple with transmitter in the overflow chute.
- One (1) High level switch in the product overflow chute.
- One (1) Pressure transmitter for the dryer hood.
- Four (4) Shaft seal purge gas manifolds consisting of a pressure regulator, rotameter and two pressure gages.
- One (1) Dryer motor thermostat

Structural steel (other than the dryer base) or concrete foundations are not in Komline-Sanderson's scope of supply. Instruments are shipped loose for field mounting by others.

Dryer Thermal Fluid Manifold

The K-S Paddle Dryer will be supplied with a thermal fluid manifold to distribute the fluid to the agitators and trough jacket. A return manifold is also provided. These manifolds allow for one (1) supply and one (1) return connection to the piping supplied by others. The required vents and drains for this piping are included. Instruments provided by K-S for the thermal fluid manifold:

- Three (3) Temperature gages with thermowells.
- Two (2) Pressure Gages with isolation valves.

Note: Dryer manifold piping is removed for shipment and is to be reassembled on site by others.

Thermal Dryer Insulation

Except for the end heads, the Paddle Dryer will be insulated. The trough will be insulated using a 4-inch-thick closed cell glass insulation covered with 24 gauge (0.024 inch) thick stainless-steel sheathing. The dryer cover will be insulated with 1-1/2-inch-thick fiberglass insulation with a fabric cover.

Deflagration Venting System

One (1) deflagration venting system will be provided in the unlikely a deflagration occurs inside the dryer. Deflagration panels will be provided on the top of the dryer hood to safely vent the pressure excursion from the dryer into the room. A deflagration duct is provided by Komline-Sanderson to extend from the dryer to the outside. The deflagration duct is free standing and will not need to be supported by the building. The deflagration duct will be installed by the Contractor who will also provide flashing around the duct.

The deflagration duct is designed in accordance with NFPA 68 and per the following explosion severity (ASTM E 1226-10) values:

- Deflagration Index, $K_{st} = 125$ (bar·m)/s

- Maximum Pressure, $P_{\max} = 111.2 \text{ psi(g)} (7.67 \text{ bar(g)})$

Item 7 Dryer Discharge Rotary Valve

One (1) rotary type airlock valve will be provided to safely isolate the drying process. The rotary air lock will be an ACS Model CI 12 or equal. The 8-vane open end rotor assembly will be fabricated from 304 stainless steel and have adjustable / replaceable 304 stainless steel beveled rotor tips. Rotor housing will be carbon steel with a hard chrome interior to provide corrosion protection. A rotor pocket purge is provided but plugged.

The valve will be driven by a 1.5 hp 1.5 direct drive assembly including TEXP enclosure, 460volt, 3 phase, 60 cycle, c-face WEG motor Class I, Div I, Group C & D, Class 2 Group F&G, SEW reducer, inverter duty rated, 20:1 turndown, completely factory assembled. A zero-speed switch is mounted on the non-drive end of the valve to monitor valve operation.

Carbon steel components will be painted per manufacturer factory standards.

Item 8 Dryer Discharge Conveyor

One (1) discharge conveyor will be provided to convey product discharging from the dryer to the first cooling conveyor. The conveyor will have a 12- inch diameter screw and will be approximately 12 feet long. The trough will be a U-shaped trough with a bolted top cover and gaskets.

The dryer discharge screw conveyor shall contain two inlet connections. The primary discharge connection is from the side overflow weir / rotary valve. The second connection is at the bottom of the dryer where manual slide gates are provided. These gates are normally kept close and are only open for maintenance purposes should the dryer need to be fully emptied and washed out.

The wetted parts of the conveyor, screw and trough, will be 304L stainless steel. The top cover shall be 316L stainless steel.

The conveyor will be driven by a 3 hp TEFC inverter duty motor connected to a shaft mounted gear reducer. A zero-speed switch is mounted on the non-drive end of the conveyor to monitor conveyor operation. A VFD is used to control the conveyor speed.

Per 2.10 L, conveyor supports are supplied by K-S and installed by the Contractor. Painting supports will be per §2.20 A.1, standard coating for 250 °F maximum temperature.

Instruments provided by K-S for the dryer discharge conveyor:

- One (1) Zero speed switch
- One (1) Safety pull switch
- One (1) Motor temperature switch

Item 9 Dryer Off-gas System

One (1) off-gas handling system fabricated with wetted parts from 304 stainless steel will be provided to condense and cool the exhaust vapors from the dryer and remove particulate. The off-gas system will consist of the following components:

Off-gas Spray Duct

One (1) stainless steel duct to convey off-gases from the Paddle Dryer to the condenser. The off-gas duct contains several spray nozzles to start the condensing process as well as to flush the duct and prevent buildup of solids over time. Spray water from the duct flows into the separator tank under the condenser. The spray duct includes one (1) inspection (cleanout) port.

Spray Tower Condenser

One (1) stainless steel spray tower condenser will be provided to condense the water vapor and cool the non-condensable gases. Vapors entering the condenser flow upwards, counter-current to water sprays. The spray tower condenser includes multiple spray headers which are removable from the outside of the vessel in order to maintain the nozzles. The condenser is mounted on top of the separator tank. Water sprayed into the condenser falls into the separator tank below.

Venturi Scrubber

One (1) stainless steel constant throat venturi scrubber is provided in which water and off-gases are turbulently mixed and particulate is entrained in water droplets. The venturi will be sized for 5 in w.c. pressure drop at the design condition. The venturi scrubber is mounted on top of the separator tank. A stainless-steel baffle is used to separate the condenser from the venturi scrubber and prevent short circuiting between the two. Water from the venturi scrubber falls into the separator tank below.

Demister

Off-gases from the venturi scrubber are sent through a stainless-steel demister pad mounted on top of the separator tank. The demister pad has an access panel so the pad can be easily cleaned and or replaced if needed.

Exhaust Fan

One (1) radial blade industrial fan with wetted parts fabricated from stainless steel will be provided to induce dryer off-gases through the system. From the fan discharge, the cleaned, condensed, and cooled gases will flow under pressure to the odor control device which is provided by others. The fan will be driven by a 3 hp TEFC motor. The fan will be as manufactured by Cincinnati Fan or equal. The exhaust fan will discharge approximately 300 ft³/min (actual) at a discharge pressure of +2 in w.c. A damper to control the flow of off-gases through the drying system; the damper will be manually operated.

Separator Tank

A stainless-steel separator tank to collect the particulate laden water droplets from the condenser and venturi is provided. The water drains by gravity from the tank.

Instruments provided by K-S for the off-gas handling system:

- One (1) Thermocouple with transmitter for the Dryer Exhaust
- One (1) Level switch, high inside the separator tank.

- One (1) Flow switch (water supply)
- One (1) Temperature gage for the dryer exhaust after the fan.
- One (1) Temperature gage (local only) for the separator effluent.
- Six (6) Pressure gages (local only) for water and air pressure.

Note:

- All ductwork after the exhaust fan is to be provided by others.
- Non-potable water supply and discharge (purge) piping is provided by others.
- Drain water may contain offensive odors and should be piped in a closed line that includes a trap.
- Instruments are shipped loose for field installation.
- The off-gas handling system will require some assembly and welding in the field.

Item 10 Cooling Conveyor

One (1) 12" cooling conveyor will be provided to cool the dried product. The conveyor will receive the dried product from the discharge conveyor and begin cooling the product using water at a maximum temperature of 85°F.

The conveyor will have a 12-inch diameter screw and will be approximately 35 feet long. The trough of the cooling conveyor will have circulated non-potable water used as the indirect cooling media. There will be no contamination of the cooling water. The cooling water will enter and exit via flanged connections on the jacket. Connections between jacket segments are by K-S.

The wetted parts of the conveyor, including the bolted top cover, screw, and trough, will be stainless steel. Each conveyor will include an inspection port and a trough cleanout port. Jacket segment drains will be provided.

The conveyor will be driven by a 7.5 hp TEFC inverter duty motor connected to a shaft mounted gear reducer. A zero-speed switch is mounted on the non-drive end of the conveyor to monitor conveyor operation. A VFD is used to control the conveyor speed.

Per 2.10 L, conveyor supports are supplied by K-S and installed by the Contractor. Painting supports will be per §2.20 A.1, standard coating for 250 °F maximum temperature.

Instruments provided by K-S for the dryer discharge conveyor:

- One (1) Zero speed switch
- One (1) Safety pull switch
- One (1) Motor temperature switch

Item 11 Fines Separator and Return System.

One (1) fines separator and return system shall be provided to segregate the fines and large particles and return them to the front of the dryer. The fines return system will consist of the following components.

Vibrating Screen

One (1) vibratory type product screener will be supplied to screen fines and oversized material from the product. The product screener is a 40-inch diameter, two deck screen with the first deck classifying all particles larger than 6.3 mm using a 1/4 inch screen and discharging them to either the "off-spec" return conveyor or into a roll-off container provided by the owner. Two (2) outlets are provided on the top screen. Manual diverter gates are included on each outlet of the top screen.

The second deck classifies all particles smaller than 0.5 mm using a 35-mesh screen. Product between 0.5 mm and 6 mm will be discharged into a product conveyor provided by others.

The product screener will be fabricated from 304 stainless steel screens with all necessary clamp rings, gaskets, dust cover assembly, and hardware mounted on vibration isolation springs mounted to a fixed carbon steel base. The screener will be powered by an integrally mounted TENV motor.

Fines Return Conveyor

One (1) inclined screw conveyor is provided to return the "off-spec" material from the product screener back to the feed end of the dryer. The conveyor will have a 9-inch diameter auger and be approximately 17 feet long. The trough will be a solid tubular trough. The conveyor is inclined as required to convey the rejects from the discharge of the screener to the feed end of the dryer.

The wetted parts of the conveyor, including the screw and trough, will be 304 stainless steel. The conveyor will be driven by a 3 hp TEFC duty motor connected to a shaft mounted gear reducer. A zero-speed switch is mounted on the non-drive end of the conveyor to monitor conveyor operation.

Rotary Valve

One (1) rotary type airlock valve will be provided to safely isolate the fines return system from drying process. The rotor will be constructed of 304 stainless steel. The housing and endplates will be cast iron with chrome plating.

The valve will be driven by a 0.5 hp TEFC inverter duty motor. A zero-speed switch is mounted on the non-drive end of the valve to monitor valve operation.

Instruments provided by K-S for the product screener:

- One (1) Proximity Switch to monitor the Screeners Base Access Door
- One (1) Zero speed switch for the Off Spec Conveyor
- One (1) Zero speed switch for Rotary Valve

Item 12 Thermal Fluid Heater Exhaust Stack

A thermal fluid heater stack is included. The stack will be located next to the boiler and bolted into the concrete and extend upwards through the roof. The exhaust stack shall be constructed of corrosion resistant series 316L stainless steel and shall have a minimum thickness of 1/8 inch. For purposes of estimating, it is assumed the stack will be <40 feet.

The weight of the stack will be fully supported on the ground, however, lateral forces due to seismic and wind loadings, will need to be transmitted to the building structure through supporting guide wires.

Stack shall include two sampling ports on diameter 90 degrees apart. The centerline of these ports shall be at least 2.5 feet from the stack exit or other flow disturbances and at least 10 feet downstream of any bends, inlets, constrictions, abatements equipment, straightening vanes, or other flow disturbances. The stack port locations and construction shall comply with the requirements of 40 CFR, Part 60 Appendix A.

Sampling ports shall be a minimum 4-inch nominal diameter, standard industrial flanged pipe. Ports shall be installed flush with interior stack wall and shall extend outward from exterior stack wall no less than three inches and no more than eight inches.

Item 13 Instrumentation and Controls

Instruments to monitor the drying process are provided as shown in the attached Preliminary PID's. Pneumatically operated control valves are also included in K-S scope of supply. Manual valves, fitting and items noted as NKS on the PID's are to be supplied and installed by the Contractor.

One (1) NEMA 4X Dryer Main Control Panels will be provided to consolidate all instrumentation and control functions for the drying process. An Allen-Bradley ControlLogix Programmable Logic Controller (PLC) will be incorporated into the panel to monitor and control system operation, provide safety interlocks, and alarm anomalies. A desktop PC, with Wonderware Intouch installed and 27" display, will be provided to allow operators to interface with the PLC. From the desktop PC, operators will be able to start or stop equipment, monitor selected system temperatures and pressures, and silence and reset system alarms. In addition, extra I/O modules will be supplied to integrate related dryer system auxiliary components not supplied by K-S into the control design (Per K-S P&IDs).

Item 14 Dryer and Screener Platform

K-S will include 38 a dryer platform with stairs for access to the 9W-840 Paddle Dryer as shown on the layout drawing. A second maintenance platform is provided to service the vibrating screen.

Platforming will be fabricated for aluminum and assembled in the field by the Contractor.

Item 15 Piping

Wet Cake Piping

Per Section 11650B, §1.5 D, K-S will design and supply the wet cake piping between the wet cake pump and the thermal dryer. All piping is to be 10" seamless carbon steel pipe, ASTM A53 TP S Gr B, Standard Wall Thickness. Per Section 11650B, §2.3 D, the overall pipe length between the cake pump discharge and the dryer inlet will be 50 feet. It is assumed that the wet cake piping will include a maximum of three 5R 90-degree bends and one 5R 45 degree bend.

The wet cake pipe will be provided in 40' lengths. All pipe cutting, weld prepping, and welding, including flange welding, shall be performed by the installing contractor.

The wet cake piping supports will be design by K-S. Per Section 01110 §1.3 B2 process and utility piping, supports, hangers, are supplied by the Contractor.

Thermal Fluid Piping

Per Section 11650B, §2.4 D, Komline-Sanderson shall design the interconnecting piping, and provide specifications for the thermal fluid valves, and insulation (hot oil supply and return) between the thermal oil heater, cooler, and the drying equipment. The Contractor shall be responsible for the supply and installation of the hot oil piping systems, including piping supports, manual isolation valves, expansion joints (if required) and insulation.

The wet cake piping supports will be design by K-S. Per Section 01110 §1.3 B2 process and utility piping, supports, hangers, are supplied by the Contractor.

Dryer Off-Gas Exhaust Piping

Komline-Sanderson will supply the Dryer Exhaust Piping between the dryer up to the dryer exhaust fan as listed in Item 9. The design, supply, and support of the off-gas duct after the exhaust fan is by the Installing Contractor.

K-S will provide recommended off-gas piping specifications.

Non-potable Water Piping

K-S will provide a recommended pipe layout for water piping 2" and larger. Detailed design including pipe layout, pipe supports, and pipe supply is for the Installing Contractor.

Compressed Air Piping

K-S will provide a general pipe layout for the compressed air piping that highlights the location of all pneumatic valves and equipment that requires compressed air. Detailed design including pipe layout, pipe supports, and pipe supply is for the Installing Contractor.

Item 16 Anchor Bolts and PE Services.

Komline-Sanderson is an equipment manufacturer and not a Civil Engineering Company. As a result, Komline-Sanderson will hire a local, independent, Professional Engineer in the State of Washington for the following Services:

- Provide Sizing Calculations for Anchor Bolts for equipment provided.
- Provide Seismic Calculations for equipment provided.
- Provide Calculations for Wet Cake and Thermal Fluid Piping and their supports.

Platform and Screw Conveyor Supports Calculations are provided by the respected vendors.

Item 17 Site Services

Komline-Sanderson shall furnish the services of a technician for a period of sixty (60) days to be covered in twelve trip(s) to the job site to check the installation, supervise the start-up, supervise performance testing if required by the specifications, and provide operator instruction for the items included in our scope of supply. Additional service is available at our portal to portal per diem rate in effect at the time of service delivery. The current per diem supervision rate is One Thousand, Nine Hundred, Ninety-Five dollars (\$1,995.00) which include living and travel expenses.

Exclusions

The following equipment, materials, and services are excluded from the Komline-Sanderson scope of supply:

- Wet cake transfers to our hopper above the pump at a controlled rate.
- Dry product handling after our screener.
- Any odor control equipment.
- Design and supply of vent duct(s) from K-S exhaust fan to the odor control device.
- Supply and hookup of all utilities.
- Process water strainers to remove particulates and water treatment systems to address hardness and fouling are not included in our offer and if required must be provided by the client.
- Motor control center (MCC), motor starters (MS), and variable frequency drives (VFDs).
- Building and associated heating, cooling, ventilation, and power.
- Any building modifications required.
- Any and all permits.
- Insurance certificates.
- Taxes, duties, and fees of any kind.
- Storage of all equipment after scheduled delivery.
- Receipt and off-loading of all equipment supplied.
- Installation, reassembly, and field alignment of any equipment when required.
- Design, supply, and installation of interconnecting piping, ducting, exhaust stacks, expansion joints, pipe supports, fittings, gaskets, fasteners, and all valves except as noted.
- Testing and cleaning of piping.
- Design, supply, and installation of interconnecting wiring, cables, conduit tubing, etc.
- 3D Piping or piping isometric and installation drawings (P&IDs are supplied).
- Design, supply, and installation of insulation except as noted. (K-S will insulate the dryer. Customer will install the K-S supplied dryer cover blanket.)
- Design, supply, and installation of concrete or steel foundations and anchor bolts except as noted.
- All civil work including overhead cranes, lifting equipment, drains, building, building structure and seismic calculations.
- Design, supply, and installation of equipment support steel not referenced.
- Biogas cleaning, compressing, drying and mixing with natural gas to a consistent caloric value.
- Nitrogen supply to inert expansion tank (bottled nitrogen).
- Any and all field painting, including touch up paint.
- Logic diagrams.
- Local disconnects and HOA stations, if required.
- Spare parts other than those specifically itemized in the specification.
- Any other equipment, material, or service not specifically identified within this proposal/quotation.

Maintenance Information

A list of common maintenance tasks is provided below.

Daily, Weekly, Monthly and Quarterly Maintenance Tasks

Equipment Item	Frequency	Item Component	Item Sub Component	Required Maintenance	Estimated Time for task	Downtime
Paddle Dryer	Daily when operating	Agitator Bearings		Add Grease	<20 minutes for walk around inspection	None
		Shaft Seals		Check air purge rate		
Off Gas Handling		Spray Duct	Spray Nozzles	Check flow and pressure		
		Spray Tower Condenser	Spray Nozzles	Check flow and pressure		
Thermal Fluid		Rotary Joints and Piping	Thermal Fluid System	Check for leaks		
Thermal Fluid Heater		Exhaust Damper		Check operation		
Paddle Dryer	Weekly when operating	Shaft Seals		Inspect and adjust if needed	10 to 15 min for inspection. Seal adjustment if required takes 30 min per seal while the unit is offline.	None
General Housekeeping				Clean dust		
		Burner peephole glass		Clean		
Thermal Fluid Heater		Thermal Fluid Heater		Inspect seals, packing, and piping for leakage		
Paddle Dryer	Monthly	Gear Reducer		Check oil level	5 min	None
		Sight Glasses		Clean	5 min	
		Timing Gears		Check oil level	5 min	
Conveyors - Task and times shown are per conveyor		Hanger Bearing		Grease	5 - 10 min per conveyor	
Thermal Fluid Heater		Damper	Bearings	Lubricate	5 min	
Paddle Dryer	Quarterly	Cover bolts		Check for tightness	90 to 120 min	1 to 2 days
		Flex hoses		Check for leakage	5 - 10 min	
		Thermowells		Check for wear	120 min	
		Timing Gears		Sample and analyze oil	5 min to sample	
		Control Relays and Starters		Inspect contacts	10 min	
Thermal Fluid Heater		Drive Motors	Bearings	Lubricate	5 min	
		Flame scanner lens		Clean	5 min	
		Ignition Spark Plug	Electrodes	Inspect	30 min	

Semi-Annually Maintenance Tasks

Equipment Item	Frequency	Item Component	Item Sub Component	Required Maintenance	Estimated Time for task	Downtime
Paddle Dryer	Semi-annually	Agitator Bearings		Cleanout and pack with new grease	6 hours with two people	2 to 3 days Assumes more than 1 service person is available
		Motor		Grease	5 min	
		Gear Reducer Planetary		Sample and analyze oil	5 min to sample	
		Gear Reducer Helical		Sample and analyze oil	5 min to sample	
		Timing Gears		Check alignment and wear	120 min with two people	
		V-Belts		Inspect and retension	60 min	
Off Gas Handling		Spray Duct	Duct	Inspect	20 min	
		Spray Duct	Spray Nozzles	Inspect	90 min	
		Spray Tower Condenser	Spray Nozzles	Inspect	90 min	
Conveyors - Task and times shown are per conveyor		Bearings		Grease	5 min	
		Drive Belts		Check for wear and proper tension	30 min if drive belts are used	
		Gear Reducer		Check oil level	5 min	
		Rotary Joint		Check joint seals and replace if needed	60 minutes per joint if replacing	
		Motor	Bearings	Grease	5 min	
		Stuffing Box		Inspect	10 min inspection, 45 minutes to replace packing if needed per seal	
		Thermal Fluid Heater	Combustion Blower	Wheel	Check for dirt accumulation	

Annual Maintenance Tasks

Equipment Item	Frequency	Item Component	Item Sub Component	Required Maintenance	Estimated Time for task	Downtime
Paddle Dryer	Annually	Gear Reducer		Change oil	120 min	3 to 4 days Assumes more than 1 service person is available
		Timing Gears		Change oil	45 min	
Off-Gas Fan		Compressor	Bearings	Lubricate	5 min	
		Compressor	Drive Coupling	Inspect	5 min	
		Compressor Motor	Bearings	Lubricate	5 min	
Conveyors - Task and times shown are per conveyor		Gear Reducer		Change oil	30 min per conveyor	
Thermal Fluid		Heat Transfer Fluid	Thermal Fluid System	Analyze properties	5 min and ship	
Thermal Fluid Heater		Burner		Check combustion at low, mid, and high fire	4 hours	
		Heater Coils		Check exterior surfaces for soot deposits.	4 hour	
		Operating Controls		Check operation through complete range and tolerances	4 hours	
Thermal Fluid Heater	Every 5 years	Expansion Tank Level Control	Head Mechanism	Replace	2 hours	

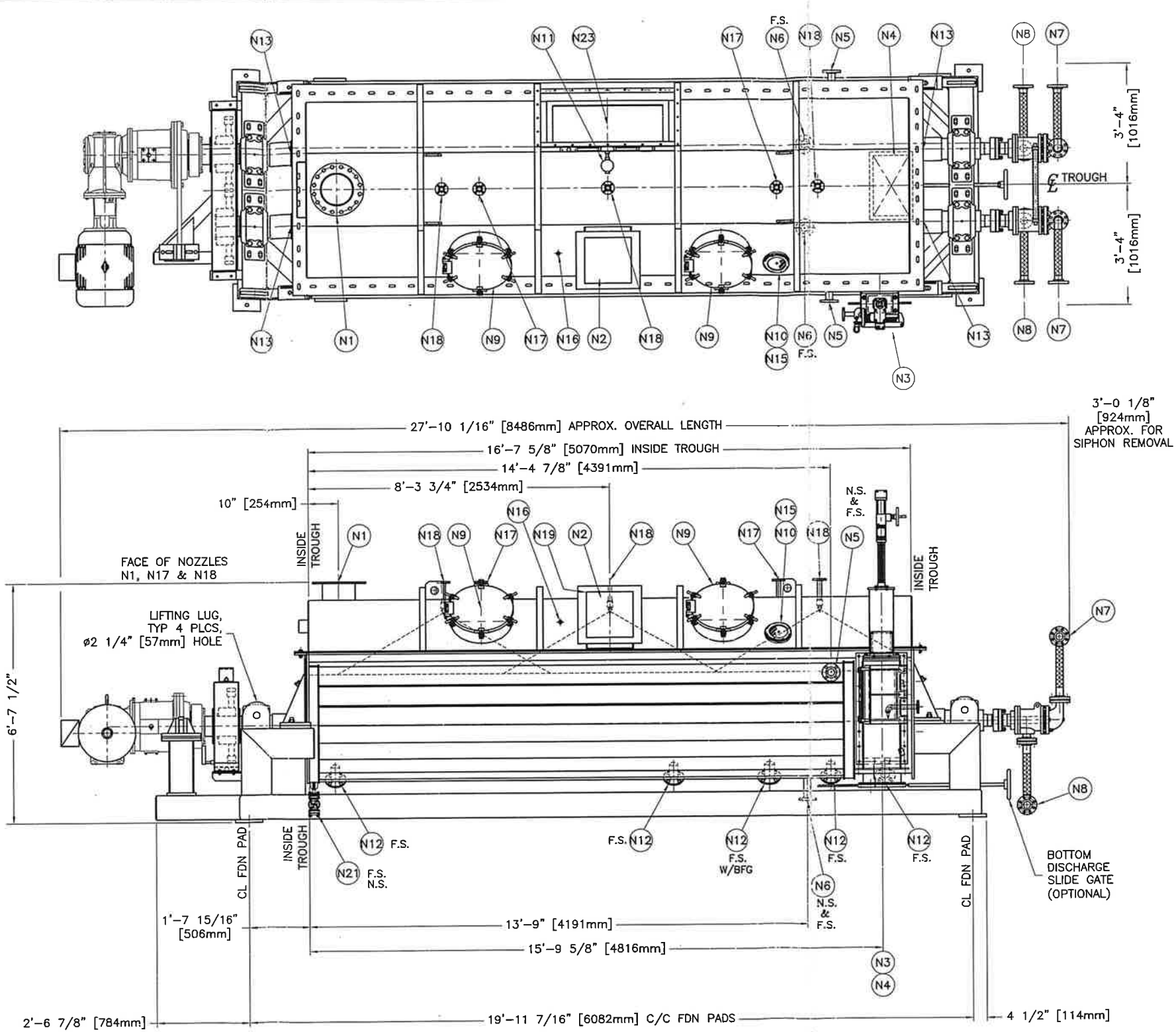
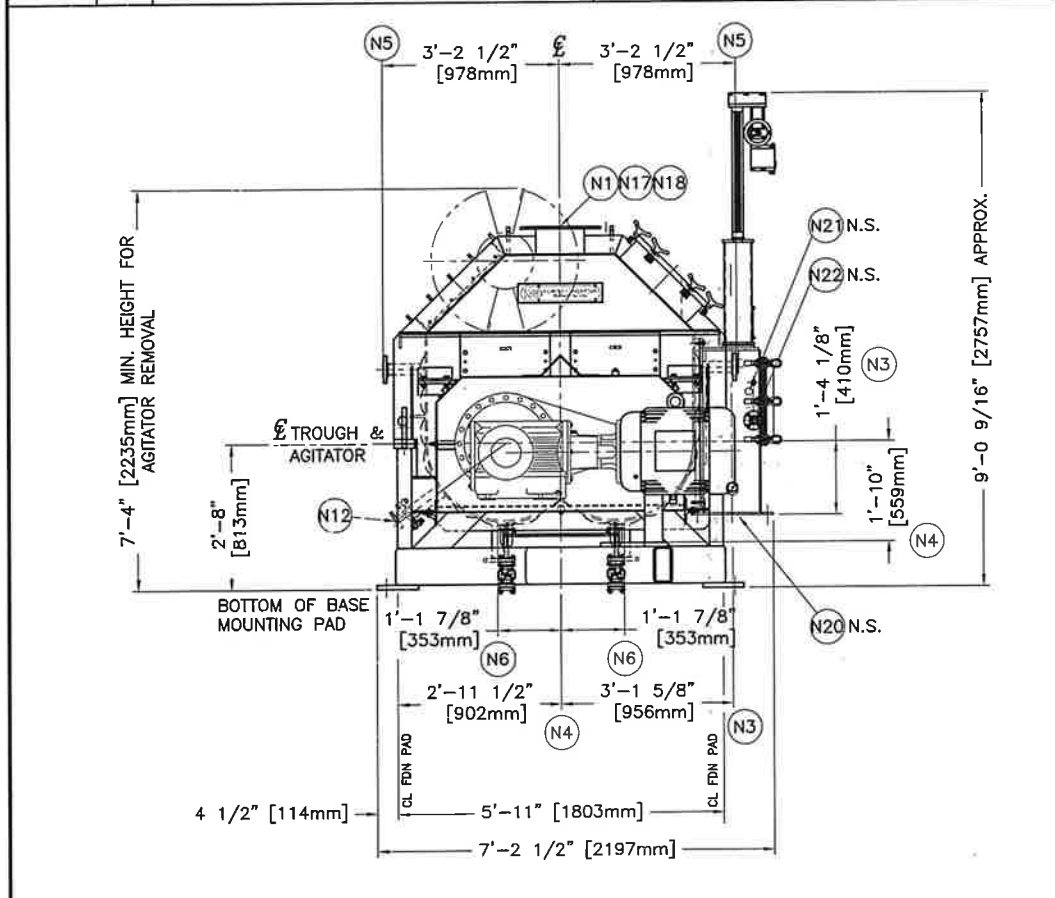
Maintenance Service Package

A K-S maintenance service contract is also available to our customers. During the design stage a job specific maintenance list is generated itemizing all the daily, weekly, monthly, semi-annual and annual maintenance tasks. Once all these tasks have been itemized, a K-S service representative can be scheduled to supervise and assist with some of these tasks.

Typically, the K-S service representative is contracted to assist with specialized tasks such as maintenance of the dryer's shaft seals, cleaning the dryer bearings and inspecting for wear and other similar tasks that may be unfamiliar to the plant's maintenance personnel. Tasks such as daily lubrication, replacing oil in the reducers, adjusting drive belts and similar tasks are assigned to the plant's maintenance department. The service contract covers living and travel expenses plus labor. Materials, parts and lubricants are to be provided by the plant as well as common tools such as ladders, lifts, etc.

APPENDIX A DRAWINGS

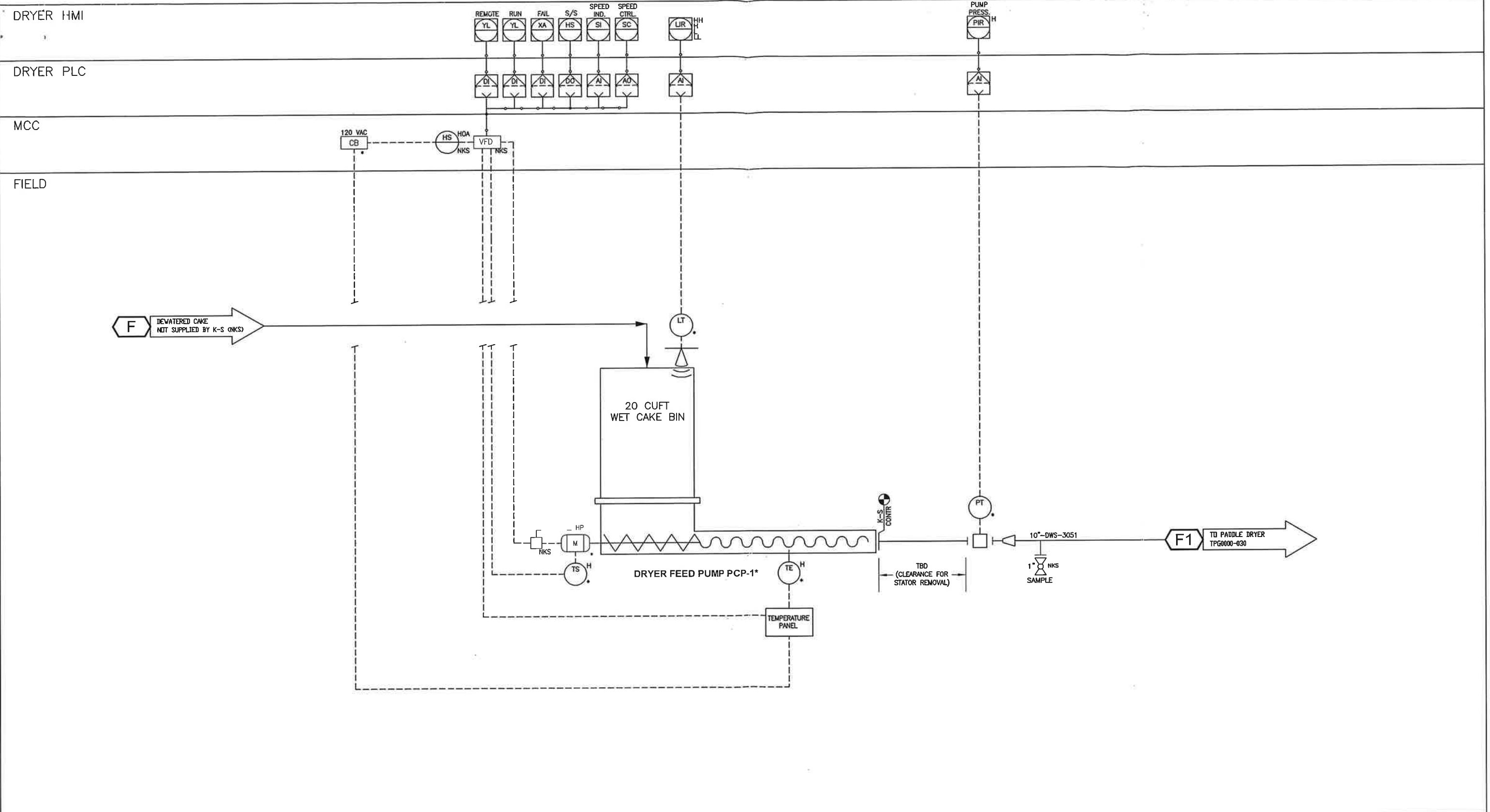
NOZZLE	QTY	SIZE/RATING/MAT'L	SERVICE
N1	1	TO BE DETERMINED PER SYSTEM REQUIREMENTS	FEED INLET
N2	1	TO BE DETERMINED PER SYSTEM REQUIREMENTS	VAPOR OUTLET
N3	1	12" x 12"	SIDE DISCHARGE (TO ROTARY VALVE)
N4	1	12" x 24"	BOTTOM DISCHARGE W/SLIDE GATE (SEE NOTE 6)
N5	2	2" 300# RF ANSI FLG	TROUGH JACKET STEAM INLET/LIQUID OUTLET
N6	2	2" 300# RF ANSI FLG	TROUGH JACKET CONDENSATE OUTLET/LIQUID INLET
N7	2	TO BE DETERMINED	AGITATOR STEAM INLET/LIQUID OUTLET
N8	2	TO BE DETERMINED	AGITATOR CONDENSATE OUTLET/LIQUID INLET
N9	2	20" DIA. / NR	ACCESS OPENING W/ SAFETY LOCK
N10	1	6" DIA. / NR	VIEW PORT
N11	1	1/2" NPT	EXPL. PANEL LIMIT SWITCH JUCTION BOX
N12	5	1"-150# RF ANSI FLG	THERMOWELL CONNECTIONS (1) W/BLIND FLANGE
N13	4	3/8" FNPT	SEAL PURGE CONNECTION
N15	1	1/4" NPT	VIEW PORT RINSE CONNECTION
N16	1	1/2" NPT	PRESSURE TRANSMITTER PROCESS CONNECTION
N17	2	1"-150# RF ANSI FLG	SPARE W/BLIND FLANGE
N18	3	1"-150# RF ANSI FLG	WATER SPRAY
N19	1	1 1/2" NPT	LEVEL SWITCH
N20	1	1/2" FNPT	THERMOCOUPLE CONNECTION
N21	2	1/2"-300# GATE VALVE W/BLIND FLANGE	JACKET OIL DRAIN (THERMAL FLUID DESIGNS ONLY)
N22	1	1"-150# RF ANSI FLG	WATER SPRAY (SIDE DISCHARGE)
N23	1	TO BE DETERMINED	EXPLOSION VENT DUCT CONNECTION



- NOTES:
- THIS IS A PRELIMINARY DRAWING. FOR PROJECT SPECIFIC DRAWING CONTACT KOMLINE-SANDERSON.
 - REFER TO KOMLINE-SANDERSON ENGINEERING CORPORATION PRELIMINARY SPECIFICATIONS FOR ADDITIONAL INFORMATION SUCH AS DRIVE DESCRIPTION, PRESSURE AND TEMPERATURE RATINGS, MATERIALS OF CONSTRUCTION, ETC.
 - TOTAL EMPTY WEIGHT 39,000 LBS
AGITATOR SHAFT WEIGHT 8,500 LBS EACH
PROCESS VOLUME 148 CU FT

- CONNECTIONS ARE NOT DESIGNED TO ACCEPT EXTERNAL LOADS. CONNECTED PIPING AND DUCTS MUST BE INDEPENDENTLY SUPPORTED AND ARRANGED TO ALLOW FOR THERMAL EXPANSION (HORIZONTAL MOVEMENT: 3/4" [19mm]; VERTICAL MOVEMENT: 1/4" [6mm]).
- LIFTING LUGS ARE DESIGNED FOR VERTICAL LIFT ONLY. SPREADER BARS ARE NOT PROVIDED BY KOMLINE-SANDERSON.
- ALTERNATE BOTTOM DISCHARGE DESIGN IS USED IF SLIDE GATE IS NOT PROVIDED.

REV	DATE	APPROVED	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY	REFERENCE: -	SHT	OF	REV
2017-09-11	1=20	LCT	VC	VC	VC	VC	KOMLINE-SANDERSON CORPORATION PEAPACK, NJ 07977 USA	B-8W580-SideWeir-180219		



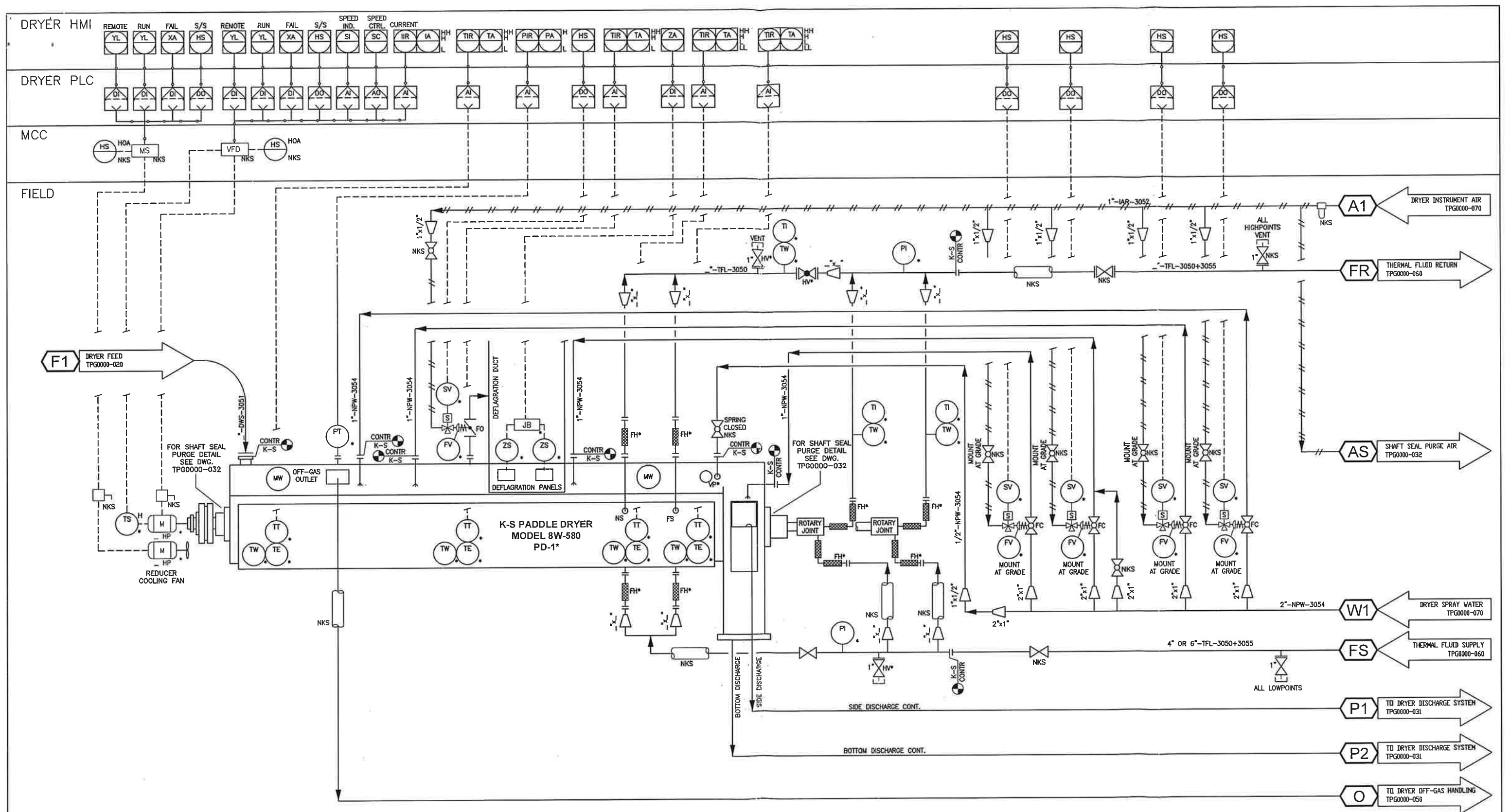
PRELIMINARY

NOT FOR CONSTRUCTION. The information in this drawing is intended to relay conceptual information and is to be used for general discussion and planning. This drawing is preliminary and is subject to change without notification as new information is made available during the design stage.

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 - 4. FOR MORE INFORMATION REFER TO P&ID LEGEND TPG0000-019.

THIS DRAWING IS THE PROPRIETARY PROPERTY OF KOMLINE-SANDERSON CORPORATION. IT IS LOANED IN CONFIDENCE AND MUST BE RETURNED ON DEMAND. ANY USE DETRIMENTAL TO THE INTERESTS OF KOMLINE-SANDERSON CORPORATION IS PROHIBITED. IT MUST NOT BE LOANED, COPIED OR REPRODUCED WITHOUT PERMISSION.									
P & I DIAGRAM DEWATERED CAKE FEED SYSTEM					TPG-8907 CITY OF SUMNER WASHINGTON				
REV	DRN	CHG	DATE	APPR	SCALE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
2024-MAR-19					1=1	DWG	JEC		
KOMLINE-SANDERSON CORPORATION PEAPACK, NJ 07977 USA					REFERENCE: DRAWING NO. TPG0000-PID-020				

PRINT MAY BE REDUCED SIZE, DO NOT SCALE. = ONE INCH(1")



PRELIMINARY

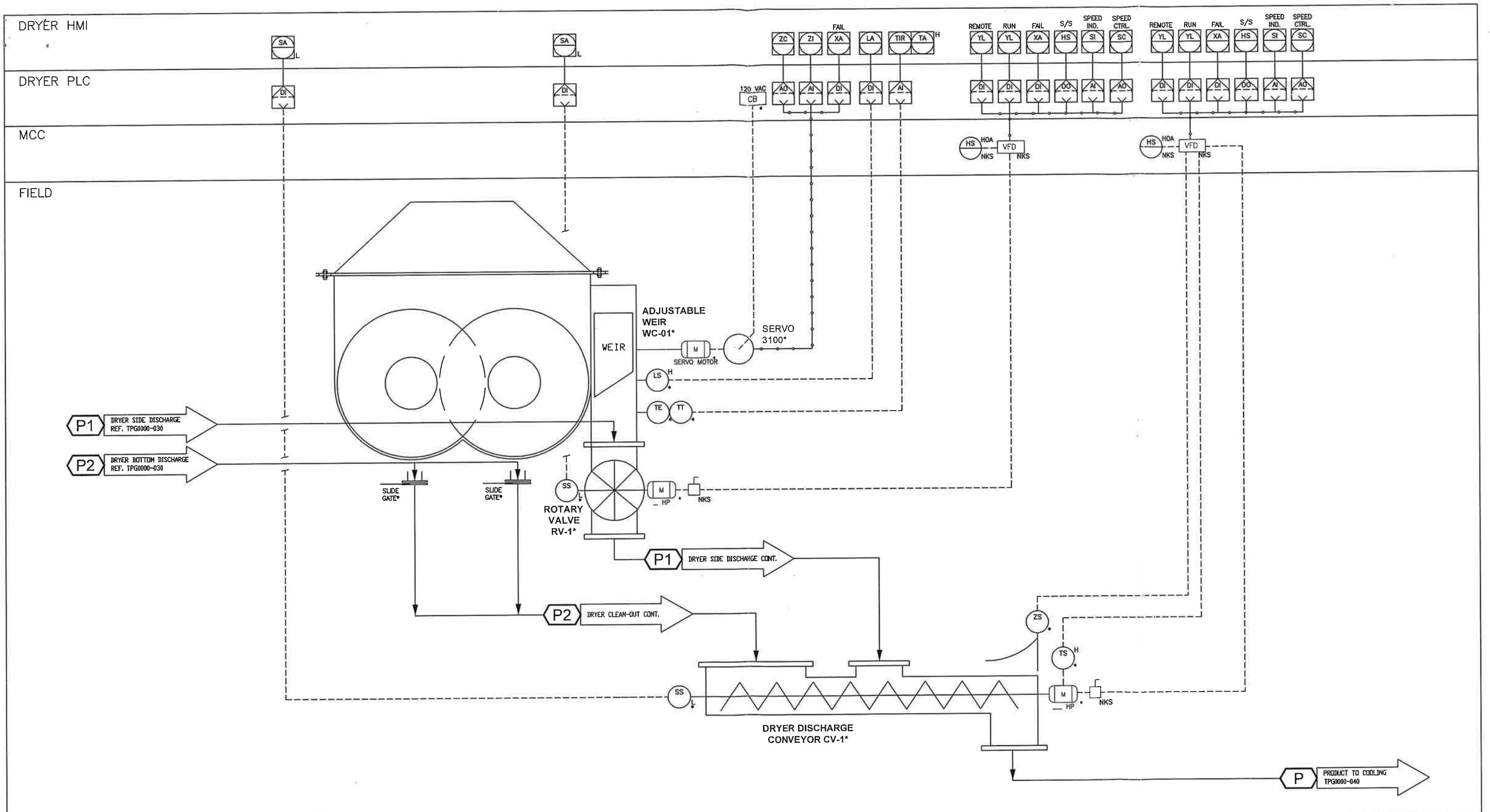
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4. ALL INTERCONNECTING WIRING SUPPLIED BY OTHERS.
5. WIRING BETWEEN SYMBOLS TYPICALLY REQUIRES MULTIPLE CONDUCTORS. SEE SCHEMATICS AND INTERCONNECTION DIAGRAMS FOR WIRING DETAILS.
6. FOR MORE INFORMATION ON UTILITIES REFER TO TPG0000-070.
7. FOR MORE INFORMATION REFER TO P&ID LEGEND TPG0000-019.
8. ALL TAG NUMBERS SHOWN WITH AN (X) SUFFIX MUST HAVE THE (X) SUBSTITUTED BY THE APPROPRIATE DRYER NUMBER 1, 2, 3 OR 4 RESPECTIVELY.
9. REDUCER MAY HAVE COOLING FEATURES AND MAY HAVE A REDUCER OIL TEMPERATURE ELEMENT.

THIS DRAWING IS THE PROPRIETARY PROPERTY OF KOMLINE-SANDERSON CORPORATION. IT IS LOANED IN CONFIDENCE AND MUST BE RETURNED ON DEMAND. ANY USE DETRIMENTAL TO THE INTERESTS OF KOMLINE-SANDERSON CORPORATION IS PROHIBITED. IT MUST NOT BE LOANED, COPIED OR REPRODUCED WITHOUT PERMISSION.									
P & I DIAGRAM PADDLE DRYER w/ MANIFOLD THERMAL FLUID HEATED					TPG-8907 CITY OF SUMNER WASHINGTON				
2024-MAR-19	SCALE 1=1	DESIGNED BY DWG	DRAWN BY JEC	CHECKED BY -	APPROVED BY -	REFERENCE: DRAWING NO. TPG0000-PID-030			
KOMLINE-SANDERSON CORPORATION PEAPACK, NJ 07977 USA						REV -			

PRINT MAY BE REDUCED SIZE, DO NOT SCALE. [] = ONE INCH(1")



PRELIMINARY

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3. ITEMS SHOWN WITH NEITHER (NKS) OR AN (*) SHOULD BE ASSUMED TO BE NOT SUPPLIED BY KOMLINE-SANDERSON.
4. ALL INTERCONNECTING WIRING SUPPLIED BY OTHERS.
5. WIRING BETWEEN SYMBOLS TYPICALLY REQUIRES MULTIPLE CONDUCTORS. SEE SCHEMATICS AND INTERCONNECTION DIAGRAMS FOR WIRING DETAILS.
6. FOR MORE INFORMATION ON UTILITIES REFER TO TPG0000-070.
7. FOR MORE INFORMATION REFER TO P&ID LEGEND TPG0000-019.
8. All TAG NUMBERS SHOWN WITH AN (X) SUFFIX MUST HAVE THE (X) SUBSTITUTED BY THE APPROPRIATE DRYER NUMBER 1, 2, 3 OR 4 RESPECTIVELY.

REV	DRN	CHD	DATE	APPR.	THIS DRAWING IS THE PROPRIETARY PROPERTY OF KOMLINE-SANDERSON CORPORATION. IT IS LOANED IN CONFIDENCE AND MUST BE RETURNED ON DEMAND. ANY USE DETRIMENTAL TO THE INTERESTS OF KOMLINE-SANDERSON CORPORATION IS PROHIBITED. IT MUST NOT BE LOANED, COPIED OR REPRODUCED WITHOUT PERMISSION.			
					P & I DIAGRAM PADDLE DRYER DISCHARGE SYSTEM			
					TPG-8907 CITY OF SUMNER			
					WASHINGTON			
2024-MAR-19	SCALE	DESIGNED BY	DWG	CPO	CHECKED BY	APPROVED BY		
KOMLINE-SANDERSON CORPORATION PEAPACK, NJ 07977 USA							REFERENCE: DRAWING NO. TPG0000-PID-031	
							SHT 1 OF 1	

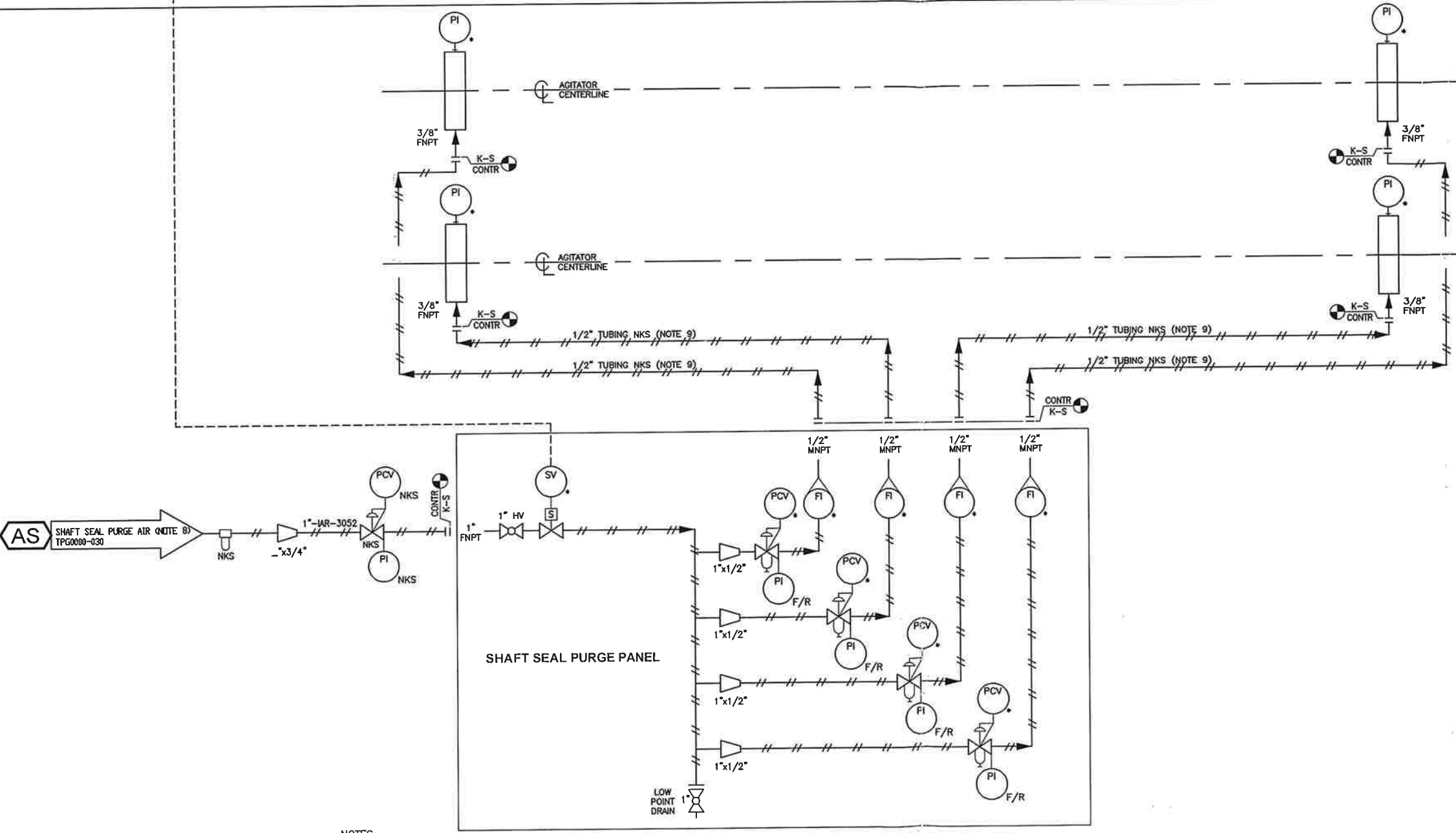
PRINT MAY BE REDUCED SIZE, DO NOT SCALE. [] = ONE INCH(1")

DRYER HMI

DRYER PLC

MCC

FIELD



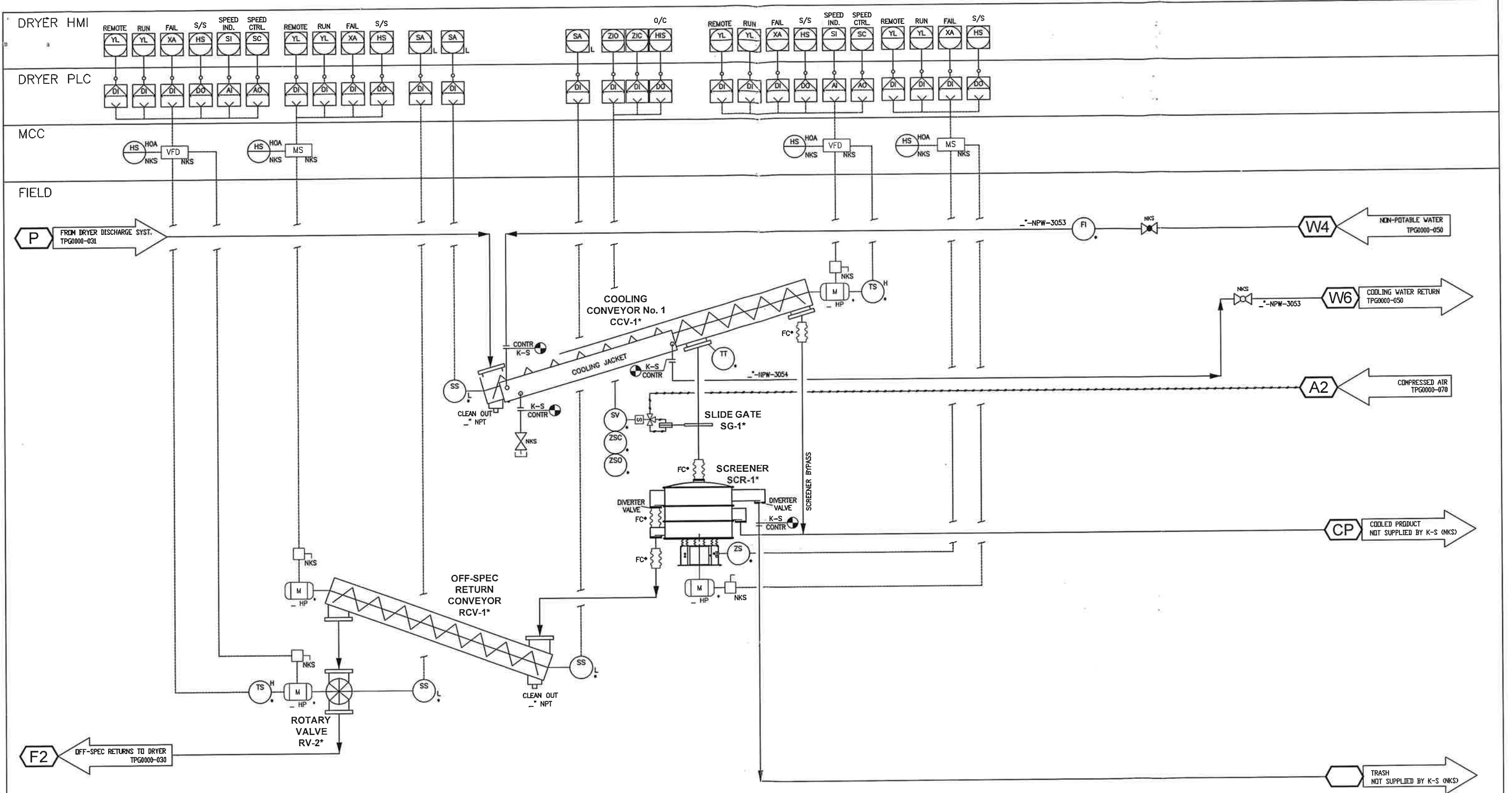
- NOTES:
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 - 4. ALL INTERCONNECTING WIRING SUPPLIED BY OTHERS.
 - 5. WIRING BETWEEN SYMBOLS TYPICALLY REQUIRES MULTIPLE CONDUCTORS. SEE SCHEMATICS AND INTERCONNECTION DIAGRAMS FOR WIRING DETAILS.
 - 6. FOR MORE INFORMATION ON UTILITIES REFER TO TPG0000-070.
 - 7. FOR MORE INFORMATION REFER TO P&ID LEGEND TPG0000-019.
 - 8. PURGE AIR SUPPLY TO BE DRY INSTRUMENT AIR QUALITY AT A MAX./MIN. PRESSURE OF 150/20 PSIG. EXPECTED SEAL PURGE FLOW WILL BE BETWEEN 0-8 SCFM COMBINED FOR ALL FOUR SEALS. SEAL PRESSURE IS TYPICALLY SET AT 5 PSIG ABOVE PROCESS PRESSURE.
 - 9. TUBING BETWEEN AGITATOR SEAL PURGE PANEL AND SHAFT SEALS IS RECOMMENDED AS 1/2" O.D. X 0.049" WALL SEAMLESS TUBING 304/304L SS OR 316/316L SS WITH STAINLESS STEEL SWAGELOCK GAGEABLE TUBE FITTINGS.

PRELIMINARY

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REV	DATE	CHG	APP	THIS DRAWING IS THE PROPRIETARY PROPERTY OF KOMLINE-SANDERSON CORPORATION. IT IS LOANED IN CONFIDENCE AND MUST BE RETURNED ON DEMAND. ANY USE DETRIMENTAL TO THE INTERESTS OF KOMLINE-SANDERSON CORPORATION IS PROHIBITED. IT MUST NOT BE LOANED, COPIED OR REPRODUCED WITHOUT PERMISSION.				
1	2024-MAR-21			SCALE	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
				1:1	DWG	CPO	-	-
KOMLINE-SANDERSON CORPORATION PEAPACK, NJ 07977 USA				REFERENCE: DRAWING NO. TPG0000-00W0000-PID-032				SHT 1 OF 1 REV

PRINT MAY BE REDUCED SIZE, DO NOT SCALE. [] = ONE INCH(1")



PRELIMINARY

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 - ITEMS SHOWN WITH NEITHER (NKS) OR AN (*) SHOULD BE ASSUMED TO BE NOT SUPPLIED BY KOMLINE-SANDERSON.
 - ALL INTERCONNECTING WIRING SUPPLIED BY OTHERS.
 - WIRING BETWEEN SYMBOLS TYPICALLY REQUIRES MULTIPLE CONDUCTORS. SEE SCHEMATICS AND INTERCONNECTION DIAGRAMS FOR WIRING DETAILS.
 - FOR MORE INFORMATION ON UTILITIES REFER TO TPG0000-070.
 - FOR MORE INFORMATION REFER TO P&ID LEGEND TPG0000-019.
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P & I DIAGRAM PRODUCT HANDLING SYSTEM					TPG-8907 CITY OF SUMNER WASHINGTON				
2024-MAR-21	SCALE 1=1	DESIGNED BY DWG	DRAWN BY CPO	CHECKED BY ---	APPROVED BY ---	REFERENCE: DRAWING NO. TPG0000-00W0000-PID-040			
KOMLINE-SANDERSON CORPORATION PEAPACK, NJ 07977 USA						SHEET 1 OF 1 REV -			

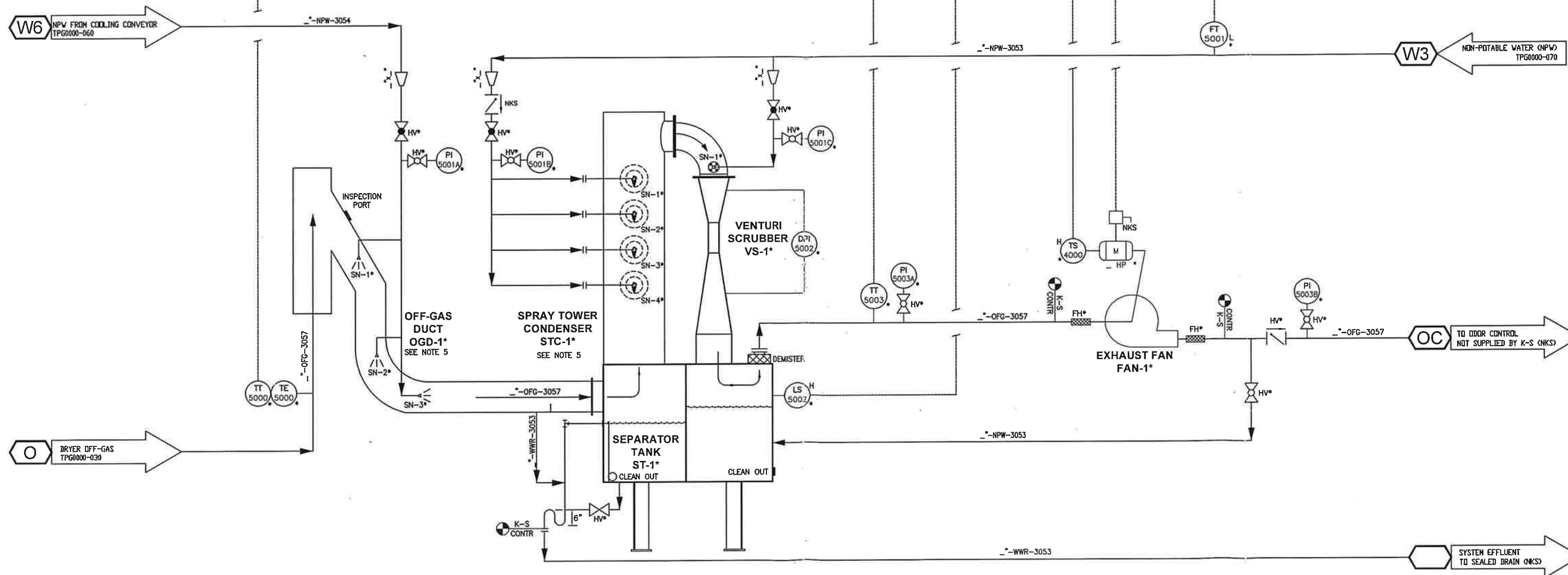
PRINT MAY BE REDUCED SIZE, DO NOT SCALE. [] = ONE INCH(1")

DRYER HMI

DRYER PLC

MCC

FIELD



NOTES:

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2. ALL ITEMS SHOWN WITH (NKS) ARE NOT SUPPLIED BY K-S.
3. ALL INTERCONNECTING WIRING SUPPLIED BY OTHERS.
4. WIRING BETWEEN SYMBOLS TYPICALLY REQUIRES MULTIPLE CONDUCTORS. SEE SCHEMATICS AND INTERCONNECTION DIAGRAMS FOR WIRING DETAILS.
5. SECTIONS OF OGD-1 AND STC-1 ARE TO BE INSULATED AS NECESSARY FOR PERSONAL PROTECTION. (BY CONTRACTOR)
6. FOR MORE INFORMATION ON UTILITIES REFER TO TPG0000-070.
7. FOR MORE INFORMATION REFER TO P&ID LEGEND TPG0000-019.

PRELIMINARY

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					P & I DIAGRAM OFFGAS HANDLING SYSTEM					TPG-8907 CITY OF SUMNER				
2024-MAR-21					SCALE 1=1	DESIGNED BY DWG	DRAWN BY CPO	CHECKED BY ---	APPROVED BY ---	WASHINGTON				
KOMLINE-SANDERSON CORPORATION PEAPACK, NJ 07977 USA										REFERENCE: DRAWING NO. TPG0000-00W0000-PID-050				

PRINT MAY BE REDUCED SIZE, DO NOT SCALE. [] = ONE INCH(1")

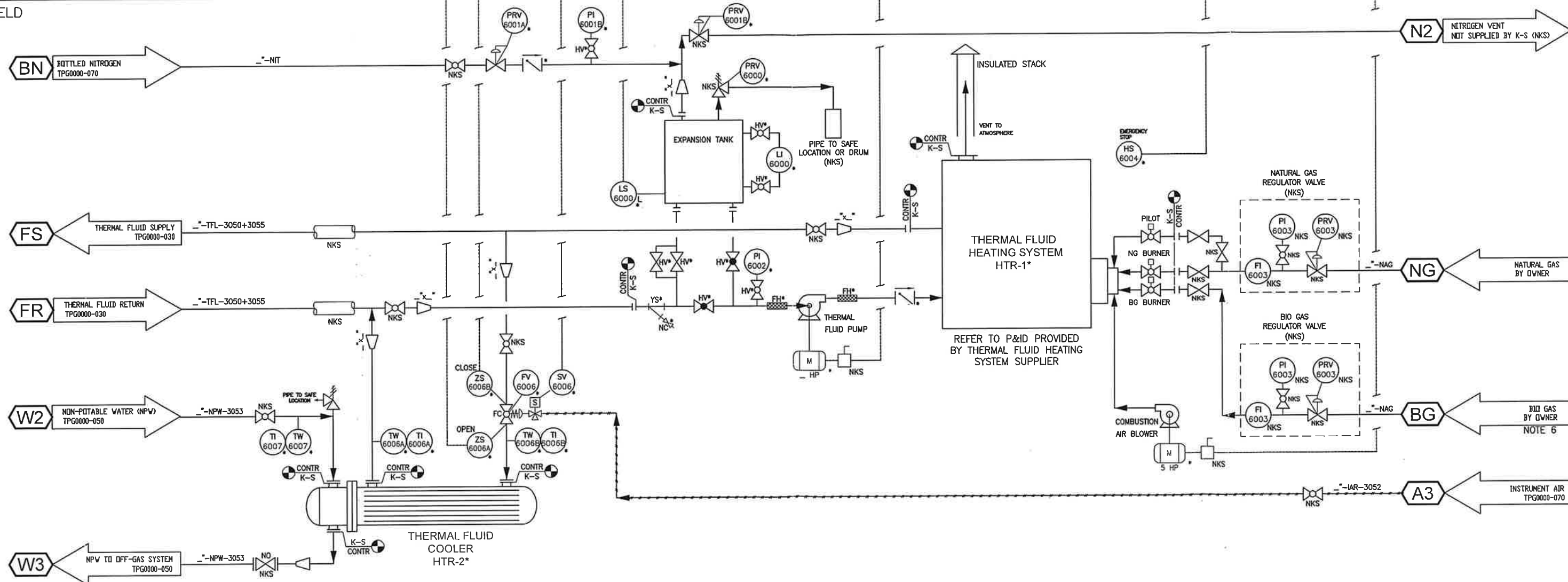
DRYER HMI

DRYER PLC

THERMAL FLUID HEATER LCP

MCC

FIELD



PRELIMINARY

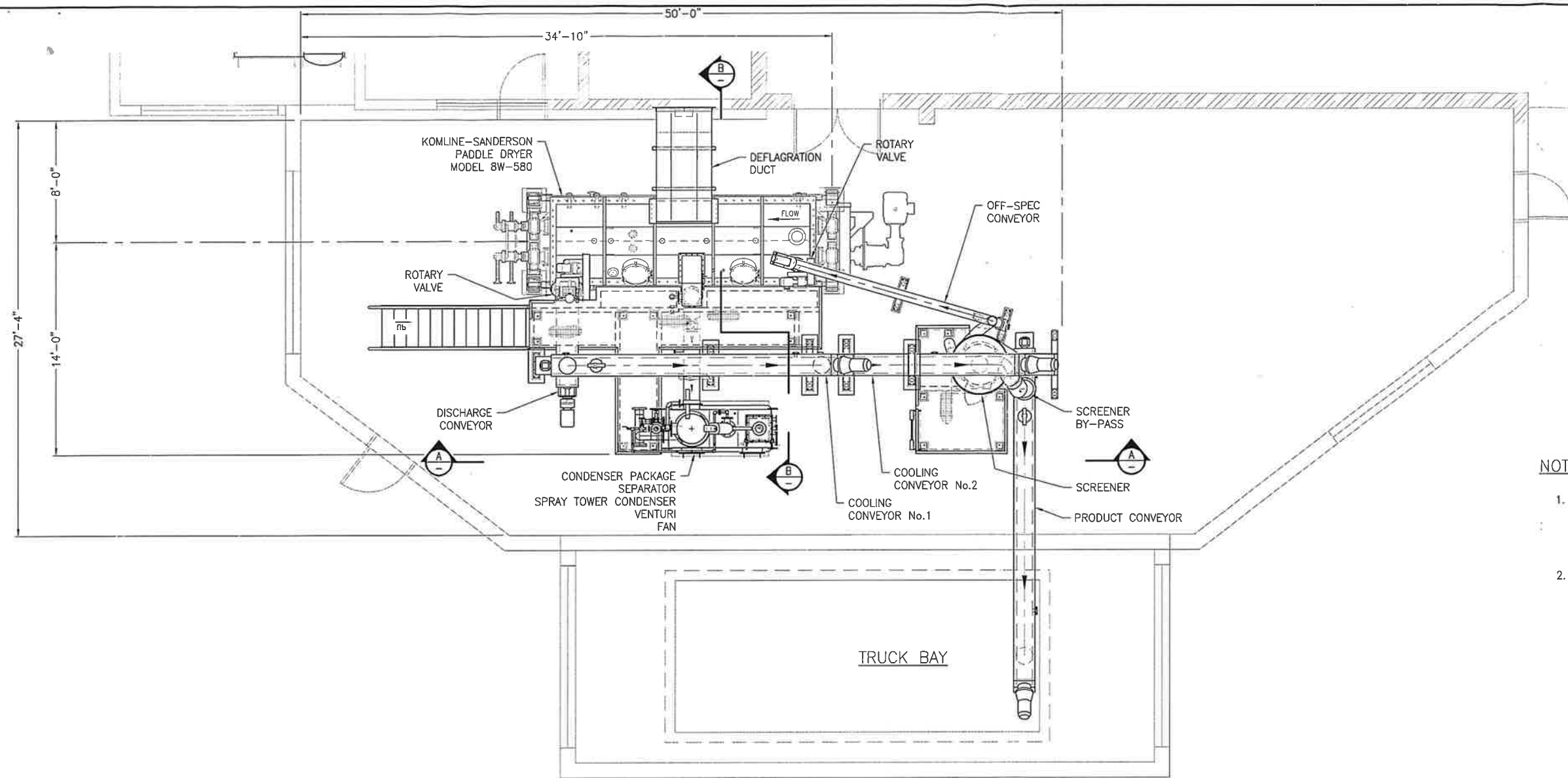
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5. FOR MORE INFORMATION REFER TO P&ID LEGEND TPG0000-019.
6. BIOGAS TO BE A MIXTURE OF 60% DIGESTER GAS AND 40% NATURAL GAS WITH A MAXIMUM VARIANCE OF 5%. DIGESTER GAS AND NATURAL GAS TO BE PRE-MIXED BY OTHERS.

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2024-MAR-21	1=1	DWG	DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
KOMLINE-SANDERSON CORPORATION PEAPACK, NJ 07977 USA			TPG-8907 CITY OF SUMNER WASHINGTON			
REFERENCE: DRAWING NO. TPG0000-00W0000-PID-060			SHEET 1 OF 1 REV			

PRINT MAY BE REDUCED SIZE, DO NOT SCALE. [] = ONE INCH(1")



PLAN VIEW

NOTES:

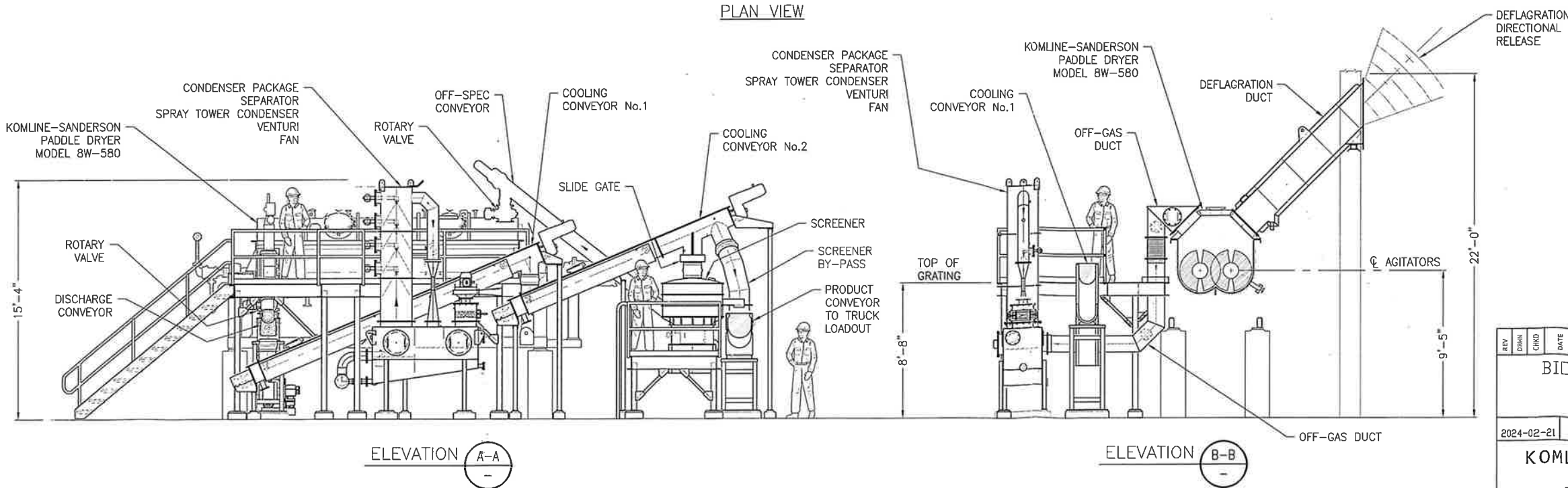
1. NOT FOR CONSTRUCTION. THE INFORMATION IN THIS DRAWING IS INTENDED TO RELAY CONCEPTUAL INFORMATION AND IS TO BE USED FOR GENERAL DISCUSSION AND PLANNING. THIS DRAWING IS PRELIMINARY AND IS SUBJECT TO CHANGE WITHOUT NOTIFICATION AS NEW INFORMATION IS MADE AVAILABLE DURING THE DESIGN STAGE.
2. PIPING NOT SHOWN.

PRELIMINARY

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CONFIDENTIAL

THIS DRAWING IS NOT TO BE DISTRIBUTED WITHOUT WRITTEN PERMISSION OF KOMLINE-SANDERSON ENGINEERING CORPORATION



ELEVATION A-A

ELEVATION B-B

REV	DATE	CHKD	APPR.	THIS DRAWING IS THE PROPRIETARY PROPERTY OF KOMLINE-SANDERSON CORPORATION. IT IS LOANED IN CONFIDENCE AND MUST BE RETURNED ON DEMAND. ANY USE DETRIMENTAL TO THE INTERESTS OF KOMLINE-SANDERSON CORPORATION IS PROHIBITED. IT MUST NOT BE LOANED, COPIED OR REPRODUCED WITHOUT PERMISSION.			
BIOSOLIDS DRYING SYSTEM K-S PADDLE DRYER MODEL 8W-580				TPG-8907 SUMNER WA BIOSOLIDS DRYER			
2024-02-21		SCALE 1=48	DESIGNED BY TPG	DRAWN BY TGP	CHECKED BY -	APPROVED BY -	SUMNER, WASHINGTON
KOMLINE-SANDERSON CORPORATION PEAPACK, NJ 07977 USA					REFERENCE:-		
					DRAWING NO.		SHT 1 OF 1
TPG8907-8W580-SYS-100							

PRINT MAY BE REDUCED SIZE, DO NOT SCALE. = ONE INCH(1")

PROPOSAL BOND

KNOW ALL MEN BY THESE PRESENTS, That we, Komline-Sanderson Corp.
Of Peapack, NJ as principal, and the Great Midwest Insurance Company
a corporation duly organized under the laws of the state of Texas, and
authorized to do business in the State of Washington, as surety, are held and firmly bound unto
the City of Sumner in the full and penal sum of five (5) percent of the total amount of the bid
proposal of said principal for the work hereinafter described, for the payment of which, well and
truly to be made, we bind our heirs, executors, administrators and assigns, and successors and
assigns, firmly by these presents.

The condition of this bond is such, that whereas the principal herein is herewith submitting his or
its sealed proposal for the following construction project, to wit:

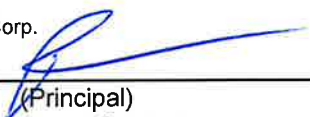
BIOSOLIDS MODERNIZATION PROJECT
BIOSOLIDS DRYING EQUIPMENT PROCUREMENT

said bid and proposal, by reference thereto, being made a part hereof.

NOW, THEREFORE, if the said proposal bid by said principal be accepted, and the contract be
awarded to said principal, and if said principal shall duly make and enter into and execute said
contract and shall furnish bond as required by the City of Sumner within a period of twenty (20)
days from and after said award, exclusive of the day of such award, then this obligation shall be
null and void, otherwise it shall remain and be in full force and effect.

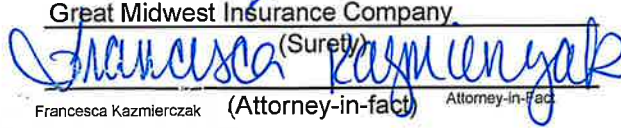
IN TESTIMONY WHEREOF, the principal and surety have caused these presents to be signed
and sealed this 25th day of March, 2024.

Komline-Sanderson Corp.


(Principal)

Great Midwest Insurance Company

(Surety)


Francesca Kazmierczak

(Attorney-in-fact)

Attorney-in-fact

POWER OF ATTORNEY

Great Midwest Insurance Company

KNOW ALL MEN BY THESE PRESENTS, that **GREAT MIDWEST INSURANCE COMPANY**, a Texas Corporation, with its principal office in Houston, TX, does hereby constitute and appoint:

Samantha Russell, Elizabeth K. Sterling, Jennifer L. Jakaitis, Frances Rodriguez, Sara Owens, Rosa E. Rivas, Tracy Aston, Meghan Hanes, Sandra M. Winsted, Mary Y. Volmar, Nicholas Kertesz, Derek J. Elston, Bartlomiej Siepierski, Francesca Kazmierczak, Anne Potter, Vanessa Fong

its true and lawful Attorney(s)-In-Fact to make, execute, seal and deliver for, and on its behalf as surety, any and all bonds, undertakings or other writings obligatory in nature of a bond.

This authority is made under and by the authority of a resolution which was passed by the Board of Directors of **GREAT MIDWEST INSURANCE COMPANY**, on the 1st day of October, 2018 as follows:

Resolved, that the President, or any officer, be and hereby is, authorized to appoint and empower any representative of the Company or other person or persons as Attorney-In-Fact to execute on behalf of the Company any bonds, undertakings, policies, contracts of indemnity or other writings obligatory in nature of a bond not to exceed Twenty-Five Million dollars (\$25,000,000.00), which the Company might execute through its duly elected officers, and affix the seal of the Company thereto. Any said execution of such documents by an Attorney-In-Fact shall be as binding upon the Company as if they had been duly executed and acknowledged by the regularly elected officers of the Company. Any Attorney-In-Fact, so appointed, may be removed in the Company's sole discretion and the authority so granted may be revoked as specified in the Power of Attorney.

Resolved, that the signature of the President and the seal of the Company may be affixed by facsimile on any power of attorney granted, and the signature of the Secretary, and the seal of the Company may be affixed by facsimile to any certificate of any such power and any such power or certificate bearing such facsimile signature and seal shall be valid and binding on the Company. Any such power so executed and sealed and certificate so executed and sealed shall, with respect to any bond of undertaking to which it is attached, continue to be valid and binding on the Company.

IN WITNESS THEREOF, **GREAT MIDWEST INSURANCE COMPANY**, has caused this instrument to be signed by its President, and its Corporate Seal to be affixed this 11th day of February, 2021.



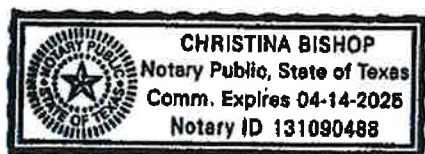
GREAT MIDWEST INSURANCE COMPANY

BY

Mark W. Haushill
President

ACKNOWLEDGEMENT

On this 11th day of February, 2021, before me, personally came Mark W. Haushill to me known, who being duly sworn, did depose and say that he is the President of **GREAT MIDWEST INSURANCE COMPANY**, the corporation described in and which executed the above instrument; that he executed said instrument on behalf of the corporation by authority of his office under the By-laws of said corporation.



BY

Christina Bishop
Notary Public

CERTIFICATE

I, the undersigned, Secretary of **GREAT MIDWEST INSURANCE COMPANY**, A Texas Insurance Company, DO HEREBY CERTIFY that the original Power of Attorney of which the foregoing is a true and correct copy, is in full force and effect and has not been revoked and the resolutions as set forth are now in force.

Signed and Sealed at Houston, TX this 25th Day of March, 2024.



BY

Leslie K. Shaunty
Secretary

"WARNING: Any person who knowingly and with intent to defraud any insurance company or other person, files and application for insurance of claim containing any materially false information, or conceals for the purpose of misleading, information concerning any fact material thereto, commits a fraudulent insurance act, which is a crime and subjects such person to criminal and civil penalties.

CERTIFICATE AS TO ENTITY PRINCIPAL

I, Robert J. Vander Meulen, certify that I am
the CFO of the Entity named as
Supplier in the agreement attached hereto, that
Brian T. Komline, who signed said agreement on
behalf of the Supplier, was the Vice President of said entity; that said
agreement was duly signed on and in behalf of said entity by authority of its governing body, and
is within the scope of its powers.

By: _____
Title: CFO

State of New Jersey)
County of Somerset) ss.

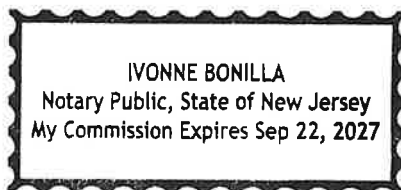
Robert J. Vander Meulen being duly sworn deposes and says that he/she is

CFO of Komline-Sanderson Corp.
(Title) (Name of Organization)



Subscribed and sworn to before me this 10th day of
April, 2024.

Ivonne C Bonilla
Notary Public
My commission expires Sep 22, 2027
Bond No. N/A



CITY OF SUMNER

PIERCE COUNTY

WASHINGTON



CONTRACT PROVISIONS

for

BIOSOLIDS MODERNIZATION PROJECT BIOSOLIDS DRYING EQUIPMENT PROCUREMENT

G&O #22446
MARCH 2024



Gray & Osborne, Inc.
CONSULTING ENGINEERS

CERTIFICATION

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.



3/11/2024

Doug Welch, P.E.

Approved By

CITY OF SUMNER

Approved for Construction
City of Sumner Public Works Department



By: 
Signature

3/11/2024
Date

Ryan Johnstone, P.E. – Public Works Director – Operations
Printed Name

**CALL FOR BIDS
CITY OF SUMNER
BIOSOLIDS MODERNIZATION PROJECT
BIOSOLIDS DRYING EQUIPMENT PROCUREMENT
(CIP 21-17)**

The City of Sumner will accept Sealed Bids at the Permit Center counter located on the second floor of Sumner City Hall, 1104 Maple Street, Sumner, WA 98390, until **2:00 p.m. Tuesday, April 2, 2024 (Bid Opening Date)** as displayed at <https://www.time.gov/>. If a Bidder chooses to submit a sealed bid before the Bid Opening Date, the Bidder shall call to schedule an appointment to deliver their bid. A staff member will be present at the Permit Center counter on the Bid Opening Date to receive sealed bids between 8:00 a.m. and 10:00 a.m. Just after 10:00 a.m. on the Bid Opening Date, bids will be formally opened and publicly read aloud in the City Council Chambers, located on the first floor of Sumner City Hall. Bids received after the Bid Opening Date will be deemed non-responsive.

The City of Sumner reserves the right to waive informalities in the bidding, accept a bid proposal of the lowest responsible and responsive bidder (Successful Bidder), reject any or all Bids, republish the Call for Bids, revise or cancel the scope of work, or require the work to be done in another way if doing so is in the best interest of the City.

All submitted bids shall be accompanied by a bid proposal deposit (certified or cashier's check or approved bond) payable to the City of Sumner in an amount not less than five percent (5%) of the amount of the proposal price. Should the Successful Bidder fail to enter into a contract with the City and furnish a satisfactory performance bond within the time stated in the specifications, the bid proposal deposit shall be forfeited to the City of Sumner.

The City of Sumner, as an Affirmative Action/Equal Opportunity employer, and in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C. 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally Assisted Programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises as defined at 49 CFR Part 26 will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin, or sex in consideration for an award.

Plans, Specifications, and addenda for this project may be viewed online at the MRSC Roster Bonfire electronic bidding portal at:
<https://mrscrosters.bonfirehub.com/portal/?tab=openOpportunities>.

Free vendor registration is required to use this platform. It is the Bidder's responsibility to check for addenda and other new documents online.

The public work for which bids are being accepted is described as follows:

The Work includes pre-construction design services, furnishing biosolids drying equipment, delivery of this equipment to the project location, post-construction inspection and startup services, and all other services as required to provide a complete and workable biosolids drying system.

The Engineer's estimate range for this project is between \$3,000,000 - \$3,500,000. For technical questions, please reach out to DOUG WELCH, P.E. Gray & Osborne, Inc., at 206-284-0860, dwelch@g-o.com.

Dated this 13 day of March 2024.

By: _____
RYAN JOHNSTONE, P.E. – DEPUTY PUBLIC WORKS
DIRECTOR – OPERATIONS

Dates of publication in the Courier Herald: March 13 and March 20, 2024

Dates of publication in the Seattle Daily Journal of Commerce: March 13 and March 20, 2024

CONTRACT PROVISIONS

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PART 1

BID DOCUMENTS

BIDDER'S CHECKLIST

1. REQUIRED FORMS

The Bidder shall submit the following forms, which must be executed in full and submitted with the Proposal.

- a. Proposal (including Statement of Bidder's Qualifications) (Pages P-1 - P-6)
- b. Bid Deposit or Proposal Bond (PB-1)

2. AGREEMENT FORMS

The following forms (a., b., and c.) are to be executed and the Certificates of Insurance (d. and e.) are to be provided after the Contract is awarded and prior to Contract execution.

- a. Agreement (Pages A-1 - A-3)
- b. Performance Bond (Page B-1)
- c. Public Works Payment Bond (Page B-2)
- d. Certificate of Insurance
- e. Certificate of Builders Risk Insurance

**BIOSOLIDS MODERNIZATION PROJECT
BIOSOLIDS DRYING EQUIPMENT PROCUREMENT**

PROPOSAL

City of Sumner
1104 Maple Street
Sumner, Washington 98390

The undersigned has examined the Work site(s), local conditions, the Contract, and all applicable laws and regulations covering the Work. The following unit and lump sum prices are tendered as an offer to perform the Work in accordance with all of the requirements set forth in the Contract and all applicable laws and regulations.

As required by the Contract, a certified check, bank draft, cashier's check or Proposal bond made payable to the Owner is attached hereto. If this Proposal is accepted and the undersigned fail(s) or refuse(s) to enter into a contract and furnish the required performance bond, labor and material payment bond, special guarantee bonds (if required), required insurance and all other required documentation, the undersigned will forfeit to the Owner an amount equal to five percent of the amount bid.

After the date and hour set for submitting the Proposals, no bidder may withdraw its Proposal, unless the Award of the contract is delayed for a period exceeding 60 consecutive calendar days.

The undersigned agrees that the Owner reserves the right to reject any or all Proposals and to waive any minor irregularities and informalities in any Proposal. **The undersigned agrees that the Owner reserves the right to Award the Contract to the lowest responsible, responsive bidder whose Proposal is in the best interest of the Owner.**

PROPOSAL - Continued

<u>NO.</u>	<u>ITEM</u>	<u>QUANTITY</u>	<u>UNIT PRICE</u>	<u>AMOUNT</u>
1.	Preconstruction Services	1 LS	\$ _____	\$ _____
2.	Biosolids Drying System: Equipment Supply, Construction Services, and Post Construction Services	1 LS	\$ _____	\$ _____
Subtotal:.....			\$ _____	
Washington State Sales Tax (9.5%):.....			\$ _____	
TOTAL CONSTRUCTION COST:			\$ _____	

Note: A bid must be received on all items.

PROPOSAL - Continued

SELECTION PROCESS

Bidders shall complete the provided proposal form, including bid cost, and the Proposal shall also include the required supporting documentation.

SUPPORTING DOCUMENTATION

Proposals shall be complete in all respects and shall be suitable for the Owner to evaluate the proposed design and equipment. Bidders shall provide the supporting documentation listed herein with the Proposal. Bidders are also advised to include as much detail as possible to facilitate the evaluation process. Missing, incomplete, or inaccurate information and details may disqualify the bidder.

The following supporting documentation shall be submitted with the Proposal:

1. A list of any deviations from the Proposal, Contract, or Specifications. The list shall be organized by page and specification section. The list shall contain a detailed description of the requested deviation and a detailed written explanation of the reasons for requesting the deviation. The Owner shall be the final authority for determining acceptability of the requested deviations.
2. Technical data sheet(s) on the proposed equipment.
3. A scope of supply list. The list shall include a detailed list of all mechanical and electrical equipment items, including motors, instrumentation, programmable logic controllers (PLCs), operator interfaces, and gauges that are included in the Supplier's proposal. For each item of ancillary electrical equipment, include the connected load as well as the power load at 480V and 120V with the number of phases, ampacity, and horsepower ratings.
4. All additional documentation as required in Attachments A-D.

PROPOSAL - Continued

STATEMENT OF BIDDER'S QUALIFICATIONS

Name of Firm: _____

Address: _____

Telephone No. _____ Fax No. _____

Contact Person for this Project: _____

E-mail: _____

Number of years the Contractor has been engaged in the construction business under the present firm name, as indicated above:

Have you ever been a party to a lawsuit or an arbitration proceeding in any way relating to a construction project? _____

PROPOSAL - Continued

ADDENDA RECEIVED

Addendum No.	Date Received	Name of Recipient

NOTE: Bidder shall acknowledge receipt of all addenda. Bidder is responsible for verifying the actual number of addenda issued prior to submitting a Proposal.

Subject to any extensions of the Contract Time granted under the Contract, the undersigned agrees to complete the preconstruction services required under this Contract within 150 calendar days from the date of the Notice to Proceed with preconstruction services.

Furthermore, subject to any extensions of the Contract Time granted under the Contract, the undersigned agrees to deliver the equipment required under this Contract within 400 calendar days from the date of the Notice to Proceed with equipment fabrication.

The undersigned has reviewed and fully understands the provisions in the Contract regarding liquidated damages and agrees that liquidated damages shall be \$500.00 per calendar day for each and every calendar day beyond the Contract Time allowed for preconstruction services from the date of the Notice to Proceed with preconstruction services.

Furthermore, the undersigned has reviewed and fully understands the provisions in the Contract regarding liquidated damages and agrees that liquidated damages shall be \$2,000.00 per calendar day for each and every calendar day beyond the Contract Time allowed for delivery of the equipment from the date of the Notice to Proceed with equipment fabrication.

The undersigned is, and will remain in, full compliance with all Washington State administrative agency requirements including, but not limited to registration requirements of Washington State Department of Labor & Industries for contractors, including but not limited to requirements for bond, proof of insurance and annual registration fee. The undersigned's Washington State:

Dept. of L&I Workman's Compensation Account No. is (if applicable) _____;
Dept. of Licensing Contractor's Registration No. is (if applicable) _____;
Unified Business Identifier Number is (if applicable) _____;
Excise Tax Registration Number is (if applicable) _____; and
Employment Security Account Number is (if applicable) _____.

The undersigned has reviewed all insurance requirements contained in the Contract and has verified the availability of and the undersigned's eligibility for all required insurance. The undersigned verifies that the cost for all required insurance, has been included in this Proposal.

In relation to claims related in whole or in part to workplace injuries to employees, the undersigned waives any immunity granted under the State Industrial Insurance Law,

PROPOSAL - Continued

RCW Title 51. This waiver has been specially negotiated by the parties, which is acknowledged by the undersigned in signing this Proposal.

By signing the proposal, the undersigned declares, under penalty of perjury under the laws of the United States and the State of Washington, that the following statements are true and correct:

1. That the undersigned person(s) or entity(ies) has(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 the project for which this Bid is submitted.
2. The bidder hereby certifies that, within the three-year period immediately preceding the bid solicitation date March 13, 2024, that the bidder is not a “willful” violator, as defined in RCW 49.48.082, of any provision of chapters 49.46, 49.48, or 49.52 RCW, as determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction.

The undersigned agrees that the Owner is authorized to obtain information from all references included herein.

Sincerely,

_____ Sign Name	_____ Date
--------------------	---------------

By: _____ Print Name, Title	_____ Location Executed (City, State)
--------------------------------	--

Print Company Name

Amount of Proposal deposit: \$ _____ Check No. _____,

or Proposal bond in the amount of \$ _____

_____, issued through _____
Name of Bank/Bonding Company

located at _____
Mailing Address

Telephone Number of Bank/Bonding Company

**BID PROPOSAL
ATTACHMENT A**

OPERATIONAL PARAMETERS

Parameter	Declared Performance
Specific Heat Energy Consumption of the Biosolids Drying System (BTU/lb): The heat required to evaporate one pound of water at steady state conditions from the solids. The Specific Heat Energy shall be based on the lower heating value (LHV) of natural gas, excluding electric energy consumed by the drying system at steady state and shall be calculated as the system gas energy input (BTU) divided by the amount of water evaporated from the biosolids (lb).	
The maximum ratio of digester gas to natural gas, which the proposed system can operate at and meet the requirements of Section 11650-1.6.	
Non-Potable Water (NPW) Usage (gpm): The flow rate of NPW required for the design requirements of Sections 11650-1.6 at steady state.	
Potable Water Usage (gpm): The flow rate of potable water required for the design requirements of Sections 11650-1.6 at steady state.	
Natural Gas Usage (cfh): The natural gas usage rate when burned simultaneously with digester gas at 2 psig at 60 percent digester gas and 40 percent natural gas and when burning only natural gas at the design requirements of Section 11650-1.6 at steady state.	
Maximum Electrical Power Demand (kW): The maximum electrical power demand for the design requirements of Sections 11650-1.6 at steady state.	
Exhaust Air Flow Rate (SCFM), Temperature (°F), and Relative Humidity (%) for the design requirements of Sections 11650-1.6 at steady state.	

BID PROPOSAL ATTACHMENTS – Continued

Parameter	Declared Performance
The maximum evaporation rate for the proposed system (lb/hr)	
The minimum evaporation rate for the proposed system (lb/hr)	
Time required for complete start-up of the system including required pre-start safety checks (hr).	
Time required for complete shutdown of the system, including cleaning and shutdown maintenance (hr).	
Percentage of final product, by weight, within size range 0.5 mm – 6.0 mm and average dryness of 92 percent DS.	

BID PROPOSAL ATTACHMENTS – Continued

BID PROPOSAL ATTACHMENT B

QUALIFICATIONS OF DESIGN, TESTING, AND SERVICE TEAMS

Attach the following information:

DESIGN TEAM

Attach the resumes and home office locations for the following Design Team Members:

1. Project Manager
2. Project Engineer
3. System Integrator/Electrical Engineer

TESTING AND COMMISSIONING TEAM

Attach the resumes and home office locations for two representatives that will be responsible for testing and commissioning.

SERVICE TEAM

Attach the resumes and home office locations for the following service team representatives:

1. Designated warranty service contact.
2. Representative designated to conduct troubleshooting and optimization via remote telephone modem.
3. Two representatives designated to perform warranty field service.

BID PROPOSAL ATTACHMENTS – Continued

**BID PROPOSAL
ATTACHMENT C**

INSTALLATION LIST

Attach an installation list of five similar projects containing technical data and reference contacts including telephone numbers.

BID PROPOSAL ATTACHMENTS – Continued

**BID PROPOSAL
ATTACHMENT D**

BID PROPOSAL SUBMITTAL

Attach a bid proposal submittal as specified in Section 01110-1.2, Bid Proposal Requirements.

PROPOSAL BOND

KNOW ALL MEN BY THESE PRESENTS, That we, _____
Of _____ as principal, and the _____
a corporation duly organized under the laws of the state of _____, and
authorized to do business in the State of Washington, as surety, are held and firmly bound unto
the City of Sumner in the full and penal sum of five (5) percent of the total amount of the bid
proposal of said principal for the work hereinafter described, for the payment of which, well and
truly to be made, we bind our heirs, executors, administrators and assigns, and successors and
assigns, firmly by these presents.

The condition of this bond is such, that whereas the principal herein is herewith submitting his or
its sealed proposal for the following construction project, to wit:

BIOSOLIDS MODERNIZATION PROJECT
BIOSOLIDS DRYING EQUIPMENT PROCUREMENT

said bid and proposal, by reference thereto, being made a part hereof.

NOW, THEREFORE, if the said proposal bid by said principal be accepted, and the contract be
awarded to said principal, and if said principal shall duly make and enter into and execute said
contract and shall furnish bond as required by the City of Sumner within a period of twenty (20)
days from and after said award, exclusive of the day of such award, then this obligation shall be
null and void, otherwise it shall remain and be in full force and effect.

IN TESTIMONY WHEREOF, the principal and surety have caused these presents to be signed
and sealed this _____ day of _____, _____.

(Principal)

(Surety)

(Attorney-in-fact)

CERTIFICATE AS TO ENTITY PRINCIPAL

I, _____, certify that I am the _____ of the Entity named as Supplier in the agreement attached hereto, that _____, who signed said agreement on behalf of the Supplier, was the _____ of said entity; that said agreement was duly signed on and in behalf of said entity by authority of its governing body, and is within the scope of its powers.

By: _____
Title: _____

State of _____)
County of _____) ss.

_____ being duly sworn deposes and says that he/she is

_____ of _____.
(Title) (Name of Organization)

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

Notary Public
My commission expires _____, 20____
Bond No. _____

PART 2

AGREEMENT AND BONDS

AGREEMENT

THIS AGREEMENT is entered into by and between the **CITY OF SUMNER** (hereinafter called the Owner) and _____ (hereinafter called the Supplier).

The Owner and the Supplier agree as follows:

ARTICLE 1. WORK.

The Work includes preconstruction design services, furnishing biosolids drying equipment, delivery of this equipment to the project location within Sumner, Washington, post-construction inspection and startup services, and all other services as required to provide a complete and workable biosolids drying system.

ARTICLE 2. CONTRACT TIME.

The Supplier must provide design submittals in accordance with the Schedule in the Contract (Specification 01300-3.4)

The Supplier shall deliver the equipment by the Contract within 400 calendar days from the notice to proceed with fabrication.

ARTICLE 3. LIQUIDATED DAMAGES.

The Owner and the Supplier recognize that time is of the essence and that the Owner will suffer financial loss if the equipment is not delivered within the time, plus any extensions thereof, allowed in accordance with the Contract. They also recognize the inconvenience, expense, and difficulties involved in a legal proceeding to prove the actual loss suffered by the Owner if the equipment is not delivered within the time allowed in the Contract. Accordingly, the Owner and the Supplier agree that as liquidated damages for delay, and not as a penalty, the Supplier shall pay the Owner \$2,000.00 per day for each calendar day beyond the Contract Time allowed for delivery of the equipment. Additionally, liquidated damages in the amount of \$500.00 per day shall be charged to the Supplier for each calendar day of unexcused delay that occurs after the contract time specified in Specification Section 01300-3.4, for each design submittal delivery work. Aggregate liquidate damages for preconstruction services and equipment fabrication shall not exceed a maximum of 2.5 percent of the contract price.

ARTICLE 4. CONTRACT PRICE.

The Owner shall pay the Supplier the amount(s) set forth in the Proposal (\$USD) for completion of the Work in accordance with the Contract.

ARTICLE 5. CONTRACT.

The Contract, which comprises the entire agreement between the Owner and the Supplier concerning the Work, consists of the following:

- This Agreement;
- The Supplier's Proposal including the bid, bid schedule(s), information required of bidder, Proposal bond, and all required certificates and affidavits;
- The Performance and Public Works Payment Bond;
- The Contract Provisions;
- Addenda numbers _____, inclusive; and
- Change Orders issued after the effective date of this Agreement.

There are no Contract Documents other than those listed in this Article 5. The Contract may be amended only in writing by Change Order as provided in the Contract.

ARTICLE 6. MISCELLANEOUS.

For purpose of defending any work place injury claims by employees of the Supplier and Subcontractors, the Supplier waives any immunity granted under the State Industrial Insurance Law, RCW Title 51. This waiver has been specifically negotiated between the parties and is hereby acknowledged by the Supplier.
_____(Supplier's initials)

The Supplier shall not assign any rights under or interests in the Contract, including but not limited to rights to payment, without the prior written consent of the Owner. Unless specifically stated in a written consent to an assignment, no assignment will release or discharge the Supplier-assignor from any duty or responsibility under the Contract.

The Contract is binding upon the Owner and the Supplier, and their respective partners, successors, assigns and legal representatives.

AGREEMENT – Continued

IN WITNESS WHEREOF, Owner and Supplier have caused this Agreement to be executed the day and year indicated below.

CITY OF SUMNER

SUPPLIER

By _____

License No. _____

By _____

Date _____

Title _____

Attest _____

Name and Address for giving notices (print)



PAYMENT AND PERFORMANCE BOND TO CITY OF SUMNER

KNOW ALL MEN BY THESE PRESENTS:

That we, the undersigned, _____
as Principal, and _____
a Corporation organized and existing under the laws of the State of Washington, as a
Surety Corporation, and qualified under the laws of the State of Washington to
become Surety upon bonds of Contractors with Municipal Corporations, as Surety, are
jointly and severally held and firmly bound to the CITY OF SUMNER in the penal sum
of \$ _____ **(which includes WA State Sales Tax)**
together with any adjustments, up or down, in the total contract price because of
changes in the contract work, for the payment of which sum on demand we bind
ourselves and our successors, heirs, administrators or personal representatives, as the
case may be.

This obligation is entered into in pursuance of the statutes of the State of
Washington, and the Codes and Ordinances of the CITY OF SUMNER.

Nevertheless, the conditions of the above obligation are such that:

WHEREAS, under and pursuant to a motion, duly made, seconded and passed
by the City Council of the City of Sumner, Pierce County, Washington, the Mayor of
the City of Sumner has let or is about to let to the above bounden Principal, a certain
contract, the said contract providing for construction of **CIP 21-17 Biosolids
Modernization Project Biosolids Drying Equipment Procurement** (which
contract is referred to herein and is made a part hereof as though attached hereto),
and

WHEREAS, the Principal has accepted, or is about to accept, the contract, and
undertake to perform the work therein provided for in the manner and within the time
set forth:

NOW, THEREFORE, if the Principal shall faithfully perform all the provisions of
said contract in the manner and within the time herein set forth, or within such
extensions of time as may be granted under the said contract, and shall pay all
laborers, mechanics, subcontractors and material men, and all persons who shall
supply the Principal or subcontractors with provisions and supplies for the carrying on
of said work and shall indemnify and hold the CITY OF SUMNER harmless from any
damage or expense by reason of failure of performance as specified in said contract or
from defects appearing or developing in the material or workmanship provided or

performed under said contract, then and in that event this obligation shall be void; but otherwise it shall be and remain in full force and effect.

WARRANTY, Upon acceptance of the contract work, Supplier must provide the City a two-year warranty bond in the amount of 20% of the contract value specified above and in a form acceptable to the City. The Supplier shall correct all defects in workmanship and materials within two (2) years from the date of the city's receipt and acceptance of the Equipment. In the event any parts are repaired or replaced, only original replacement parts shall be used, rebuilt or used parts will not be acceptable. When defects are corrected, the warranty for that portion of the Equipment shall extend for an additional two (2) years from the date such correction is complete and accepted by the City. The Supplier shall begin to correct any defects within ten (10) calendar days of its receipt of notice from the City of the defect. If the Supplier does not complete the corrections within thirty (30) calendar days of such notice, the City may complete the corrections and the Supplier shall pay all costs incurred by the City in order to accomplish the correction.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their separate seals. The name and corporate seal (if required by law) of each corporate party is hereto affixed and duly signed by its undersigned representatives pursuant to authority of its governing body.

TWO WITNESSES:

DATE: _____

PRINT NAME

DATE: _____

CORPORATE SEAL:

PRINCIPAL (enter principal's name above)

BY: _____

TITLE: _____

DATE: _____

CORPORATE SEAL:

SURETY

BY: _____

DATE: _____

TITLE: _____

ADDRESS: _____

CERTIFICATE AS TO CORPORATE SEAL

I hereby certify that I am the (Assistant) Secretary of the Corporation named as Principal in the within Bond; that _____
Who signed the said bond on behalf of the Principal _____
Of the said Corporation; that I know his signature thereto is genuine, and that said Bond was duly signed, sealed, and attested for and in behalf of said Corporation by authority of its governing body.

SECRETARY OR ASSISTANT SECRETARY

PART 3

**SUPPLEMENTARY GENERAL CONDITIONS
AND GENERAL CONDITIONS**

SUPPLEMENTARY GENERAL CONDITIONS

The General Conditions shall be supplemented as follows:

3.04.10 MEASUREMENT AND PAYMENT

Delete this Section in its entirety and replace with the following.

3.04.10 MEASUREMENT AND PAYMENT

3.04.10(1) General

The Contract price for the Work, whether lump sum or unit prices, shall constitute full compensation for furnishing all facilities, labor, materials, appurtenances, and incidentals and performing all operations necessary to construct and complete all items of the Work in accordance with the Contract, notwithstanding that minor or incidental features of the Work may not be shown on the Contract Plans or Contract Provisions.

3.04.10(2) Measurement

Measurement for all items shall be as specified in the Contract for unit price and lump sum price items.

3.04.10(3) Payment

Payment for all of the Work will be made at the lump sum or unit Contract price as set forth in the Contract. Payment of the Contract price shall constitute full compensation for the complete performance of all of the Work.

3.04.10(4) Access to Books and Records

The Supplier shall, whenever so requested, give the Owner and/or the Engineer access to all invoices, bills of lading and other documents relating to the Work. The Supplier shall, without charge, provide personnel and measures and scales with adequate capacity for measuring or weighing any materials or other items paid for on a unit price basis.

3.04.10(5) Payment for Materials on Hand

The Owner may reimburse the Contractor for 90 percent of the invoice amount of materials and equipment purchased before their incorporation into the Work if properly stored at the Manufacturers facility. Invoices for equipment and materials will be verified and approved by the Engineer. Each invoice shall be sufficiently detailed to enable the Engineer to determine actual costs.

Payment for materials on hand shall not exceed the total Contract cost of the Contract item. Payment will not be made for granular materials, forming materials, consumables, nails, tie wire, etc. Payment will not be made for materials for any invoice that is less than \$2,000.00 or for freight bills and similar items. Payment for equipment or materials on hand shall not constitute acceptance of the equipment or materials. Equipment and materials will be rejected if found to be faulty, even if payment for it has been made.

3.04.10(6) Payments Withheld

The Engineer may decide not to recommend approval of all or a portion of a progress estimate, and/or the Owner may decide to withhold from a progress estimate an amount sufficient to protect the Owner from loss because of:

- a. Defective Work not remedied;
- b. Third-party claims or reasonable evidence indicating the probability that a third-party claim will be asserted;
- c. Failure of the Supplier to make timely and proper payments to Subcontractors or for labor, materials or equipment;
- d. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract price;
- e. Damage to the Owner or another contractor;
- f. Reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance of the Contract price will not be adequate to cover actual or liquidated damages for the anticipated delay;
- g. Repeated failure by the Supplier to comply with the directions of the Owner or the Engineer or to carry out the Work in accordance with the Contract;
- h. Other appropriate reasons necessary to protect the Owner.

3.04.10(7) Payment Upon Correction of Deficiencies

When the reason or reasons for withholding payment are resolved, payment will be made for amounts previously withheld.

3.04.10(8) Final Payment

After final inspection (Section 3.04.13) of the Work and a determination by the Engineer that the requirements of the Contract have been achieved, the balance of the remaining Contract price due to the Supplier will be paid based upon the final estimate by the Engineer and presentation of a Final Contract Voucher Certification signed by the Supplier. The Final Contract Voucher Certification shall be deemed to be a release of all claims of the Supplier unless a claim is filed in accordance with the requirements of Section 3.05 and is expressly excepted from release in the Supplier's Final Contract Voucher Certification. The date the Owner signs the Final Contract Voucher Certification constitutes the Contract Completion Date in accordance with Section 3.04.13.

If the Supplier fails, refuses, or is unable to sign and return the Final Contract Voucher Certification or any other documentation required in order to achieve the Contract Completion Date, the Owner reserves the right to establish a completion date (for the purpose of meeting the requirements of RCW 39.08 and RCW 60.28) and unilaterally accept the Work. Unilateral final acceptance will occur only after the Supplier has been provided the opportunity, by written request from the Engineer, to voluntarily submit such documents. If voluntary compliance is not achieved, formal notification of the impending establishment of a completion date and unilateral final acceptance will be provided by certified letter from the Owner to the Supplier, which will provide thirty (30) calendar days for the Supplier to submit the necessary documents. This period will begin on the date the certified letter is received by the Supplier. The date on which the Owner unilaterally signs the Final Contract Voucher Certification shall constitute the Contract Completion Date under Section 3.04.13. The Owner shall have the right to unilaterally establish a Contract Completion Date when either (1) the Work has been achieved in accordance with Section 3.04.13, or (2) the Owner terminates the Contract in accordance with Section 3.07. Unilateral establishment of the Contract Completion Date by the Owner shall not in any way relieve the Supplier of any liability for failing to comply with the Contract or from responsibility for compliance with all federal, state, tribal, or local laws, ordinances, and regulations that affect the Work.

Payment to the Supplier of partial or final payment estimates and retained percentages shall be subject to applicable laws.

PROCUREMENT GENERAL CONDITIONS

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PROCUREMENT GENERAL CONDITIONS

SECTION 1 - GENERAL INFORMATION APPLICABLE TO PROPOSAL AND CONTRACT

1.01 DEFINITIONS AND TERMINOLOGY

The following terms are abbreviated and defined as they are used in the Contract. When used in the Proposal form to denote items of Work and units of measurements, abbreviations mean the full expression of the abbreviated term.

1.02 ABBREVIATIONS AND TERMINOLOGY

1.02.1 REFERENCED STANDARDS AND CODES

The following is a partial list of specifications and codes that may be referenced in sections of the Contract. The Supplier shall be responsible for conducting its Work and carrying out its operations and furnishing equipment in accordance with the latest edition or versions, in effect at the time of bid opening, of any applicable specified portions of the referenced standards and codes.

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute, Inc.
APWA	American Public Works Association
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASME	American Society Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ASTM	American Society for Testing and Material
AWS	American Welding Society
AWWA	American Water Works Association
CFR	Code of Federal Regulations
CSA	Canadian Standards Associations
CSI	Construction Specifications Institute
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
HUD	United State Department of Housing and Urban Development
IBC	International Building Code
IEEE	Institute of Electrical and Electronic Engineers
IPC	International Plumbing Code
ISA	Instrumentation Society of America
LID	Local Improvement District
MUTCD	Manual on Uniform Traffic Control Devices

NCMA	National Concrete Manufacturer's Association
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
OMWBE	Office of Minority and Women's Business Enterprises
OSHA	Occupational Safety and Health Administration
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SSPC	Steel Structures Painting Council
UL	Underwriters' Laboratory
ULID	Utility Local Improvement District
WABO	Washington Association of Building Officials
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety and Health Administration
WSDL&I	Washington State Department of Labor and Industries
WSDOE	Washington State Department of Ecology
WSDOT	Washington State Department of Transportation

1.02.2 TERMINOLOGY

The use of pronouns of any gender in these General Conditions shall include pronouns of all genders, as applicable.

The terms "supply", "provide," and "furnish" are used interchangeably in the Contract and mean that the Supplier shall provide, and furnish the item(s) described unless specifically noted otherwise.

The terms "Plans" and "Drawings" are used interchangeably in the Contract and shall mean the Contract Plans, which show location, character, and dimensions of prescribed Work, including layouts, profiles, cross-sections, and other details.

1.02.3 ABBREVIATIONS

Cfm	Cubic Feet per Minute
Cfs	Cubic Feet per Second
Cl.	Class
CMP	Corrugated Metal Pipe
CPEP	Corrugated Polyethylene Pipe
Cy or Cu. Yd.	Cubic Yard(s)
Dia.	Diameter
DI	Ductile Iron
EA	Each
Ft.	Foot or Feet
GALV	Galvanized
Gph	Gallon(s) per Hour
Gpm	Gallon(s) per Minute

HDPE	High Density Polyethylene
HMA	Hot Mix Asphalt
Hund.	Hundred
In.	Inch(es)
L	Liter
Lb.	Pound(s)
LF or Lin. Ft.	Linear Foot (Feet)
LS	Lump Sum
PSI	Pounds per Square Inch
PSF	Pounds per Square Foot
PVC	Polyvinyl Chloride
QTY	Quantity
SF	Square Foot (Feet)
Stl.	Steel
SST	Stainless Steel
Sy or Sq. Yd.	Square Yard(s)
TN	Ton
TYP	Typical

1.03 DEFINITIONS

ACCEPTANCE

The formal action by Owner or Owner's governing body as provided in RCW 39.08 and RCW 60.28, as existing or amended.

ADDENDUM

A written or graphic document issued to all Bidders prior to bid opening and identified as an addendum, which clarifies, modifies or supplements the bid documents and becomes part of the Contract.

ADDITIVE

A supplemental unit of work or group of bid items, identified separately in the Proposal, which may, at the discretion of the Owner, be awarded in addition to the base bid.

ALTERNATE

One of two or more units of work or groups of bid items, identified separately in the Proposal, from which the Owner may make a choice between different methods or material of construction for performing the same work.

AWARD

The formal decision of the Owner awarding the Contract to the lowest or most favorable responsible and responsive Bidder for the Work.

BID DOCUMENTS

The component parts of the proposed Contract which may include, but not limited to, the Proposal form, the proposed Contract Provisions, the proposed Contract Plans, Addenda, and Subsurface Boring Logs (if any).

BIDDER

A natural person or legal entity (e.g., partnership, corporation, limited liability company, firm, or joint venture) submitting a proposal or bid.

BUSINESS DAY

A business day is any day from Monday through Friday, except holidays, as listed in Section 3.04.11.

CLERK

The duly elected or appointed Clerk of the Commission, Council, or Board of Directors of the Owner or authorized designee.

COMMISSION, COUNCIL, OR BOARD OF DIRECTORS

The duly elected or appointed Council, Commission, or Board of Directors of the Owner.

CONTRACT

The written agreement between the Owner and the Supplier. It describes, among other things:

1. What work will be done, and by when;
2. Who will provide labor and materials; and
3. How Supplier will be paid.

The Contract includes: the agreement form, Bidder's completed Proposal form, all required certificates and affidavits, Performance and Public Works Payment Bond, Contract Provisions, Contract Plans, and all Addenda and Change Orders executed pursuant to the provisions of the Contract.

CONTRACT BOND

The approved form of security furnished by the Supplier and the Supplier's Surety as required by the Contract, that guarantees performance of all the Work required by the Contract and payment to anyone who provides supplies or labor for the performance of the Work.

CONTRACT DOCUMENTS

See definition for "Contract."

CONTRACT PLANS (DRAWINGS)

The Contract Plans (or drawings) are those plans, drawings or other illustrations and all addenda and revisions, whether issued before or after the award of the Contract to Supplier, which show location, character, and dimensions of the Work, including layouts, profiles, cross-sections and other details.

CONTRACT PROVISIONS

A publication addressing the Work required for an individual project. At the time of the call for Bids, the Contract Provisions may include, for a specific individual project, general conditions, supplemental general conditions, specifications, a listing of the applicable WSDOT standard plans, the prevailing minimum hourly wage rates, and an informational Proposal form with the listing of Bid items. The proposed Contract Provisions may also include, for a specific individual project, various required certifications or declarations. At the time of the Contract execution date, the Contract Provisions include the proposed Contract Provisions and include any Addenda, a copy of the agreement form, and a copy of the Proposal form with the Contract prices and extensions.

CONTRACT TIME

The period of time established by the terms and conditions of the Contract within which the Work shall be complete.

CONTRACTOR (or GENERAL CONTRACTOR, or INSTALLATION CONTRACTOR)

The natural person(s) or legal entity (e.g., partnership, corporation, limited liability company, firm, joint venture) that will install the equipment provided under this Contract. The Contractor will contract directly with the Owner and may or may not have this supply Contract assigned to them.

DATES

Delivery Date is the day that the Owner has received, inspected, and accepted the equipment described in the Contract. Delivery shall occur to the project address or another designated appropriate storage location, and must include all components except minor incidental equipment.

Final Acceptance Date is the date on which the Owner accepts the Work as complete.

NOTICE TO PROCEED

The written notice from the Owner or Engineer to the Supplier authorizing and directing the Supplier to proceed with the Work and establishing the date on which the Contract Time begins.

OWNER

The government entity or agency that awards the Contract to the Supplier and is responsible for the execution and administration of the Contract.

PROJECT ENGINEER/ENGINEER

The Owner's representative who administers the construction program for the Owner.

PROPOSAL (or BID)

A Bidder's offer, on a properly completed Proposal form, to perform the Work required by the Contract. The terms Proposal and Bid may be used interchangeably.

SPECIFICATIONS

Written provisions describing the Work and requirements thereof.

SUBCONTRACTOR

A natural person, or entity (e.g., partnership, corporation, limited liability company, firm or joint venture) to which the Supplier sublets a portion of the Work.

SUPPLEMENTARY GENERAL CONDITIONS

That part of the Contract amends or supplements these General Conditions.

SUPPLIER

The natural person(s) or legal entity (e.g., partnership, corporation, limited liability company, firm, joint venture) awarded the Contract to furnish and deliver the Equipment pursuant to the Contract Documents.

WORK

The provision of all labor, materials, tools, equipment, supervision and other things needed to supply the equipment and complete the project in full accordance with the Contract Documents.

WORKING DRAWINGS

Shop drawings, shop plans, erection plans, falsework plans, framework plans, cofferdam, cribbing and shoring plans, bending diagrams for reinforcing steel, or any other supplementary plans or similar data, including a schedule of submittal dates for working drawings where specified, that the Supplier shall submit to the Engineer for approval.

SECTION 2 - INSTRUCTIONS FOR PREPARATION OF PROPOSAL (OR BID)

2.01 BID PROCEDURES AND CONDITIONS

2.01.1 QUALIFICATIONS OF BIDDERS

Where applicable and required, Bidders shall provide all requested information relating to experience, financing, equipment, and organization relating to their ability to properly perform the Work. The Owner reserves the right to take whatever action it deems necessary to ascertain the responsibility of the Bidder and the ability of the Bidder to perform the Work satisfactorily.

2.01.2 CONTRACT PROVISIONS AND CONTRACT PLANS

Contract Provisions and Contract Plans are on file in the offices of the Owner and the Engineer, Gray & Osborne, Inc. After award of the Contract, up to five sets of Contracts will be issued without charge to the Supplier. Additional sets of Contracts may be purchased from the Owner by the Supplier.

2.01.3 ESTIMATED QUANTITIES

The quantities shown in the Proposal form are estimates and are stated only for bid comparison purposes. The Owner does not warrant, expressly or by implication that the actual quantities will correspond with those estimates. Payment will be made on the basis of the actual quantities of each item of Work satisfactorily completed in accordance with the requirements of the Contract.

2.01.4 EXAMINATION OF CONTRACT AND SITE

2.01.4(1) General

Bidders shall satisfy themselves by personal examination of Contract Provisions, Contract Plans, and site of the proposed improvements, and by any other examination and investigation which they may desire to make as to the accuracy of the estimate of quantities, the nature of the Work and the difficulties to be encountered. Bidders shall review the entire Contract to ensure that the completeness of their Proposal includes all items of Work regardless of where shown in the Contract. Bidders are cautioned that alternate sources of information (copies of the Contract obtained from third parties) are not necessarily an accurate or complete representation of the Contract. Bidders shall use such information at their own risk.

Bidders shall be familiar and comply with all applicable federal, state, and local laws, ordinances, and regulations in any way applicable to the performance the Work. Bidders are responsible for familiarizing themselves with all current state and federal wage rates applicable to the Work and its duration before submitting a Proposal based on the Contract Provisions and Contract Plans. Any wage determination contained in the Contract is for the Bidder's general information only and is not warranted to be complete or accurate. The Owner will not consider any plea of misunderstanding or ignorance of such requirements. Bid prices shall reflect what the Bidder has determined to be the total cost of completing the Work, including but not limited to: construction methods, materials, labor, administrative costs, any and all applicable taxes, and equipment.

Except as the Contract may provide, the Bidder to which the Contract is awarded shall receive no payment for any costs that exceed those set forth in the Proposal.

2.01.4(2) Interpretation of the Contract Provisions and Contract Plans

If any Bidder desires interpretation or clarification of the Contract Provisions and Contract Plans, the Bidder shall make a written request to the Engineer for such clarification or interpretation prior to the submission of a Proposal. If the Engineer determines that the Contract Provisions and/or Contract Plans do not require interpretation or clarification, the Engineer will so notify the Bidder making the request. All interpretations and clarifications made by the Engineer will be by written addendum to all planholders of record, and a copy of the addendum will be filed in the office of the Owner. Neither the Owner nor the Engineer will be responsible for any interpretation, clarification or explanation of the Contract Provisions and Contract Plans that is not set forth in a written addendum to all planholders of record, and Bidders shall not under any circumstances rely on any other interpretation, clarification or explanation.

2.01.4(3) Subsurface Information

If the Owner has made a subsurface investigation of the site of the proposed Work, the boring log data and soil sample test data accumulated by the Owner will be made available for inspection by the Bidders. However, the Owner makes no representation or warranty, express or implied, that:

- a. The Bidders' interpretations from the boring logs may be correct;
- b. Moisture conditions and indicated water tables will not vary from those found at the time the borings were made;
- c. The ground at the location of the borings has not been physically disturbed or altered after the boring was made; and
- d. Conditions below the surface of the ground are consistent throughout the site with the information made available hereunder, or that conditions to be encountered on the site are uniform or consistent with geological conditions usually encountered in the area.

The Owner makes no representations, guarantees, or warranties as to the condition, materials, or proportions of the materials between the specific borings, regardless of any subsurface information the Owner may make available to the prospective Bidders. Bidders are solely responsible for making the necessary investigations to support and/or verify any conclusions or assumptions used in preparation of their Proposals.

Any subsurface investigations and analysis were carried out for design purposes only. Supplier may not rely upon or make any claim against Owner, Engineer, or any of their subconsultants, with respect to:

1. The completeness of such reports for Supplier's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and

procedures of construction to be employed by Supplier, and safety precautions and programs incident thereto; or

2. Other conclusions, interpretations, opinions, representations, and information contained in such reports; or
3. Any Supplier interpretation of or conclusion drawn from any “technical data” or any such other data, conclusions, interpretations, opinions or information.

2.01.4(4) Availability of Specified Items

Prior to submitting a Proposal, all Bidders shall verify that all items necessary to complete the Work will be available in time to allow the Work to be completed within the Contract Time. In the event that one or more items may not be available to allow the Work to be completed within the Contract Time, the Bidder shall notify the Engineer in writing prior to submitting a Proposal. Responsibility for delays and related costs because of non-availability of items necessary to complete the Work shall be borne by the Supplier.

2.01.5 PROPOSAL DEPOSIT

A deposit of at least 5 percent of the total Proposal amount shall accompany each Proposal (Proposal Deposit). The Proposal Deposit may be in the form of a Proposal bond (surety bond), certified check, cashier’s check, or postal money order made payable to the Owner. All Proposal bonds shall be on the form included within the Contract Provisions and shall be signed by the Bidder and the surety. The surety shall: (1) be registered with the Washington State Commissioner, and (2) appear on the current Authorized Insurance List in the State of Washington published by the Office of the Insurance Commissioner. The Proposal bond shall not be conditioned in any way to modify the minimum 5 percent required. The Proposal Deposit will be held as a guaranty that the successful Bidder will, within 10 working days from the date of notification of Award, enter into a Contract and furnish approved Performance and Public Works Payment Bonds, on forms attached, in amounts equal to 100 percent of the amount of the Contract, including state sales tax. The failure to furnish a Proposal Deposit of a minimum of 5 percent with the Proposal shall make the Proposal non responsive and shall cause the Proposal to be rejected by the Owner.

2.01.6 PROPOSAL

- (1) Proposals shall be submitted on the Proposal form included in the Contract Provisions. All Proposals shall be completed, signed by an authorized person and dated. To be considered by the Owner as a responsive Proposal, the Bidder shall bid on all Additive or Alternate items set forth in the Proposal form, unless otherwise specified in the Contract Documents.
- (2) To be responsive, a Proposal shall state that it will remain valid for a period of sixty (60) days following the date of Proposal opening. In the event that a conflict in this

duration appears elsewhere in the Contract Provisions, the longest duration shall apply.

- (3) All prices set forth on the Proposal form shall be legible and either be written in ink or typed. In the space provided on the Proposal form, Bidders shall identify all Addenda that have been received. The Proposal, Proposal Deposit, and all other certificates, forms or other documents required by the Contract Provisions to be executed and delivered with the Proposal shall be submitted in a sealed package, addressed to the Owner, and plainly marked "Proposal for _____ (insert name of project as shown on the Proposal) to be opened on the _____ day of _____, 20____," (insert the day, month and year shown in the published bid notice). The Owner will not consider any Proposal received after the time established for opening Proposals.
- (4) Where noted in the Proposal, the Bidder shall furnish information concerning its experience with work of a similar nature, equipment to be used on this project, and general background information. Information that is incomplete, evasive, or of a general nature only, may be considered as grounds for rejection of the Proposal.
- (5) After opening and reading Proposals, the Owner will check them for correctness of extensions of the prices per unit and the total price. If a discrepancy exists between the price per unit and the extended amount of any bid item, the price per unit, converted to the actual extension, will control. The total extensions, corrected where necessary, will be used by the Owner for comparison and award purposes and to establish the amount of the Supplier's Performance and Public Works Payment Bond.

2.01.7 WITHDRAWING OR REVISING PROPOSAL

After submitting a physical Proposal to the Owner, the Bidder may withdraw, or revise it if:

1. The Bidder submits a written request to withdraw or revise its Proposal signed by an authorized person and physically delivers it to the place designated for receipt of Proposals, and
2. The Owner receives the request before the time set for receipt of Proposals, and
3. The revised or supplemented Proposal (if any) is received by the Owner before the time set for receipt of Proposals.

If the Bidder's request to withdraw or revise its Proposal is received before the time set for receipt of Proposals, the Owner will return the unopened Proposal package to the Bidder. The Bidder must then submit the revised package in its entirety. If the Bidder does not submit a revised package, then its bid shall be considered withdrawn.

Late revised Proposals or late withdrawal requests will be date recorded by the Owner and returned unopened. Mailed, emailed, or faxed requests to withdraw or revise a Bid Proposal are not acceptable.

2.01.8 DISQUALIFICATION OF BIDDERS

1. A Proposal will be considered irregular and will be rejected if:
 - a. The Bidder is not prequalified when so required;
 - b. The authorized proposal form furnished by the Owner is not used or is altered;
 - c. The completed proposal form contains any unauthorized additions, deletions, alternate Bids, or conditions;
 - d. The Bidder adds provisions reserving the right to reject or accept the award, or enter into the Contract;
 - e. A price per unit cannot be determined from the Bid Proposal;
 - f. The Proposal form is not properly executed;
 - g. The Bidder fails to submit or properly complete a Subcontractor list, if applicable;
 - h. The Bidder fails to submit or properly complete a Disadvantaged, Minority or Women's Business Enterprise Certification, if applicable;
 - i. The Bid Proposal does not constitute a definite and unqualified offer to meet the material terms of the Bid invitation; or
 - j. More than one proposal is submitted for the same project from a Bidder under the same or different names.
2. A Proposal may be considered irregular and may be rejected if:
 - a. The Proposal does not include a unit price for every Bid item;
 - b. Any of the unit prices are excessively unbalanced (either above or below the amount of a reasonable Bid) to the potential detriment of the Owner;
 - c. Receipt of Addenda is not acknowledged;
 - d. A member of a joint venture or partnership and the joint venture or partnership submit Proposals for the same project (in such an instance, both Bids may be rejected); or
 - e. If Proposal form entries are not made in ink.
3. A Bidder will be deemed not responsible if the Bidder does not meet the mandatory bidder responsibility criteria in RCW 39.04.350(1), as amended; or does not meet Supplemental Criteria 1 through 8 in this Section:

The Owner will verify that the Bidder meets the mandatory bidder responsibility criteria in RCW 39.04.350(1), and Supplemental Criteria 1. Evidence that the Bidder meets Supplemental Criteria 2 through 8 shall be provided by the Bidder as stated later in this Section.

- a. **Criteria 1 – Federal Debarment**

1. Criterion: The Bidder shall not currently be debarred or suspended by the Federal government.
2. Documentation: The Bidder shall not be listed as having an “active exclusion” on the U.S. government’s “System for Award Management” database (www.sam.gov).

b. **Criteria 2 – Delinquent State Taxes**

1. Criterion: The Bidder shall not owe delinquent taxes to the Washington State Department of Revenue without a payment plan approved by the Department of Revenue.
2. Documentation: The Bidder shall, if and when required as detailed below, sign a statement (on a form to be provided by the Owner) that the Bidder does not owe delinquent taxes to the Department of Revenue. If the Bidder owes delinquent taxes, they must submit a written payment plan approved by the Department of Revenue, to the Owner by the deadline listed below.

c. **Criteria 3 – Claims Against Retainage and Bonds**

1. Criterion: The Bidder shall not have a record of excessive claims filed against the retainage or payment bonds for public works projects in the 3 years prior to the bid submittal date, that demonstrate a lack of effective management by the Bidder of making timely and appropriate payments to its Subcontractors, suppliers, and workers, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Owner.
2. Documentation: The Bidder shall, if and when required as detailed below, sign a statement (on a form to be provided by the Owner) that the Bidder has not had claims against claims against retainage and bonds in the 3 years prior to the bid submittal date. If the Bidder has had claims against retainage and bonds in the 3 years prior to the bid submittal date, they shall submit a list of the public works projects completed in the 3 years prior to the bid submittal date that have had claims against retainage and bonds and include for each project the following information:
 - Name of project
 - The owner and contact information for the owner;
 - A list of claims filed against the retainage and/or payment bond for any of the projects listed;
 - A written explanation of the circumstances surrounding each claim and the ultimate resolution of the claim.

d. **Criteria 4 – Public Bidding Crime**

1. **Criterion:** The Bidder and/or its owners shall not have been convicted of a crime involving bidding on a public works contract in the 5 years prior to the bid submittal date.
2. **Documentation:** The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Owner) that the Bidder and/or its owners have not been convicted of a crime involving bidding on a public works contract.

e. **Criteria 5 – Termination for Cause/Termination for Default**

1. **Criterion:** The Bidder shall not have had any public works contract terminated for cause or terminated for default by a government agency in the 5 years prior to the bid submittal date, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Owner.
2. **Documentation:** The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Owner) that the Bidder has not had any public works contract terminated for cause or terminated for default by a government agency in the 5 years prior to the bid submittal date; or if Bidder was terminated, describe the circumstances.

f. **Criteria 6 – Lawsuits**

1. **Criterion:** The Bidder shall not have lawsuits with judgments entered against the Bidder in the 5 years prior to the bid submittal date that demonstrate a pattern of failing to meet the terms of contracts, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Owner.
2. **Documentation:** The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Owner) that the Bidder has not had any lawsuits with judgments entered against the Bidder in the 5 years prior to the bid submittal date that demonstrate a pattern of failing to meet the terms of contracts, or shall submit a list of all lawsuits with judgments entered against the Bidder in the 5 years prior to the bid submittal date, along with a written explanation of the circumstances surrounding each such lawsuit. The Owner shall evaluate these explanations to determine whether the lawsuits demonstrate a pattern of failing to meet of terms of construction related contracts.

g. **Criteria 7 – Contract Time (Liquidated Damages)**

1. Criterion: The Bidder shall not have had liquidated damages assessed on any projects it has completed 5 years prior to the bid submittal date that demonstrate a pattern of failing to meet Contract Time, unless there are extenuating circumstances and such circumstances are deemed acceptable to the Owner.
2. Documentation: The Bidder, if and when required as detailed below, shall sign a statement (on a form to be provided by the Owner) that the Bidder has not had liquidated damages assessed on any projects it has completed within the 5 years prior to the bid submittal date, or shall submit a list of projects with assessed liquidated damages along with Owner contact information, and number of days assessed liquidated damages.

h. **Criteria 8 – Experience and Capacity**

1. Criterion: The Bidder shall have sufficient current capacity and experience to meet the requirements of this project. The Bidder shall have successfully completed at least three projects, of a similar size and scope, during the 7-year period immediately preceding the bid submittal deadline for this project. Similar size is defined as a minimum of 60 percent of the bid amount submitted by the Bidder.
2. Documentation: The Bidder shall, if and when required as detailed below, on a form to be provided by the Owner, provide the number of years the Supplier has been in business, and three project references of similar size and scope during the 7-year period immediately preceding the bid submittal deadline for this project. The Owner may check owner references for the previous projects and may evaluate the owner's assessment of the Bidder performance.

As evidence that the Bidder meets Supplemental Responsibility Criteria 2 through 8 stated above, the apparent two lowest Bidders must submit to the Owner by 12:00 p.m. (noon) of the second business day following the bid submittal deadline, a written statement verifying that the Bidder meets Supplemental Criteria 2 through 8 together with supporting documentation (sufficient in the sole judgment of the Owner) demonstrating compliance with Supplemental Responsibility Criteria 2 through 8. The Owner reserves the right to request further documentation as needed from the low bidder and documentation from other Bidders as well to assess Bidder responsibility and compliance with all bidder responsibility criteria. The Owner also reserves the right to obtain information from third-parties and independent sources of information concerning a Bidder's compliance with the mandatory and Supplemental Criteria, and to use that information in their evaluation. The Owner may consider mitigating factors in determining whether the Bidder complies with

the requirements of the Supplemental Criteria.

The basis for evaluation of Bidder compliance with these mandatory and Supplemental Criteria shall include any documents or facts obtained by Owner (whether from the Bidder or third parties) including but not limited to: (i) financial, historical, or operational data from the Bidder; (ii) information obtained directly by the Owner from others for whom the Bidder has worked, or other public agencies or private enterprises; and (iii) any additional information obtained by the Owner which is believed to be relevant to the matter.

If the Owner determines the Bidder does not meet the bidder responsibility criteria above and is therefore not a responsible Bidder, the Owner shall notify the Bidder in writing, with the reasons for its determination. If the Bidder disagrees with this determination, it may appeal the determination within two (2) business days of the Owner's determination by presenting its appeal and any additional information to the Owner. The Owner will consider the appeal and any additional information before issuing its final determination. If the final determination affirms that the Bidder is not responsible, the Owner will not execute a contract with any other Bidder until at least two (2) business days after the Bidder determined to be not responsible has received the Owner's final determination.

Bidders with concerns about the relevancy or restrictiveness of the Supplemental Bidder Responsibility Criteria may make or submit requests to the Owner to modify the criteria. Such requests shall be in writing, describe the nature of the concerns, and propose specific modifications to the criteria. Bidders shall submit such requests to the Owner no later than five (5) business days prior to the bid submittal deadline and address the request to the Project Engineer or such other person designated by the Owner in the Bid Documents.

2.01.9 PROPOSAL ERRORS

If a Bidder discovers an error in the Bidder's Proposal after the Proposals have been opened and tabulated and desires to withdraw the erroneous Proposal, the Bidder shall submit a notarized affidavit signed by the Bidder, accompanied by original certified worksheets used in the preparation of the Proposal, requesting relief from the Award. The affidavit shall describe the specific error(s) and certify that the worksheets are the originals used in the preparation of the Proposal.

The affidavit and the certified worksheets shall be received by the Engineer before 5:00 p.m. local time on the next business day following the day of the Proposal opening or the claim of error will not be considered. The Engineer will review the certified worksheets to determine the validity of the claimed error, and make its recommendation to the Owner. If the Owner and Engineer concur that the claim of error is allowable under applicable law, the Bidder will be relieved of responsibility for the Proposal, and the Proposal Deposit will be returned to the Bidder. Thereafter, at the discretion of the Owner, all Proposals may be rejected or an Award made to the next lowest responsive, responsible Bidder.

2.02 AWARD AND EXECUTION OF CONTRACT

2.02.1 AWARD OF CONTRACT

A Contract will not be awarded until the Owner is satisfied that the successful Bidder is responsible, reasonably familiar with the Work to be performed and has the necessary capital, tools, personnel and equipment to satisfactorily perform the Work.

The Owner reserves the right to waive informalities in the bidding, accept a Proposal of the lowest responsive, responsible Bidder, reject any or all Proposals, republish the call for Proposals, or revise or cancel the project.

After the date and hour set for the opening of the Proposals, no Bidder may withdraw its Proposal unless the Award of the Contract is delayed for a period exceeding 60 calendar days following Proposal opening. In the event that a conflicting duration appears elsewhere in the Invitation for Proposals or Contract Provisions or advertisement, the longer period shall govern.

2.02.2 EXECUTION OF CONTRACT

Within ten (10) calendar days after notification by the Owner of the Award, the successful Bidder shall return to the Engineer the signed Owner-prepared Contract, all insurance certificates and endorsements required by the Contract Provisions, all other certificates, information, and forms required by the Contract Provisions, and Performance and Public Works Payment Bond required by the Contract Provisions. If the Contract is signed by an officer, agent, or other authorized representative of the Supplier, the officer, agent, or other representative shall furnish satisfactory evidence of authority to sign as the legal representative of the Supplier, if required by the Owner. An authorized partner of a joint venture may sign the Contract, subject to the approval of the Owner, which may, at its discretion, require each and every member of the joint venture to sign the Contract.

Until the Owner executes the Contract, no Proposal shall bind the Owner, and the Supplier shall not commence any Work. The Supplier shall bear all risks for any Work begun before the Contract is executed by the Owner.

2.02.3 FAILURE TO EXECUTE CONTRACT

If the Supplier fails to submit the insurance certificates, bonds, and all other certificates, forms, information and documents as required by the Contract Provisions, with the executed Contract within the time required by the Contract Provisions, the Owner may then award the Contract to the next lowest responsive, responsible Bidder or reject any or all Proposals.

2.02.4 RETURN OF PROPOSAL DEPOSIT

When Proposals have been examined and corrected as necessary, Proposal Deposits accompanying Proposals ineligible for further consideration will be returned. All other Proposal Deposits will be held until the Contract is awarded and fully executed, after which the Proposal Deposits, except those subject to forfeiture, will be returned.

2.02.5 NOTICE TO PROCEED

A written Notice to Proceed will be issued to the Supplier by the Owner or Engineer after the Contract has been executed by the Supplier and the Owner, and the Performance and Public Works Payment Bonds and required insurance and other certificates and documents are approved by the Owner and, when applicable, by State or Federal agencies responsible for funding any portion of the project. The Supplier shall not commence Work until the Notice to Proceed has been issued.

SECTION 3 - GENERAL REQUIREMENTS OF THE CONTRACT

3.01 SCOPE OF THE WORK

3.01.1 INTENT OF THE CONTRACT

The intent of the Contract is to describe a functionally complete system to be provided in accordance with the Contract. The Supplier shall provide all labor, supervision, materials, tools, equipment, transportation, supplies, and other things required expressly by, or reasonably implied from, the Contract, to complete all Work. Omissions from the Contract of details of Work which are necessary to carry out the intent of the Contract, or which are customarily performed, shall not relieve the Supplier from performing the complete Work called for by the Contract; such Work shall be performed as if fully set forth and described in the Contract. The unit or other bid prices shall be full payment for everything required to complete the Work, including but not limited to labor, supervision, materials, equipment, jobsite and home office overhead and profit.

3.01.2 COORDINATION OF CONTRACT

The Contract Plans and the Contract Provisions for the Work shall be considered as a whole, and anything shown or called for in one and omitted in any other is as binding as if called for or shown on both. Figure dimensions shall, in all cases, be used in preference to scale dimensions. Any inconsistency in the Contract Documents shall be resolved by the following order of precedence (e.g., 1 presiding over 2 through 4, 2 presiding over 3 through 4, etc.):

1. Addenda;
2. The Agreement and Proposal Form;
3. Specifications;
 - 3a. Supplementary General Conditions (including conditions supplied by federal or state agencies on projects funded, in whole or part, by such agencies. In the event of a conflict in various forms of General Conditions, those conditions affording the greatest benefit or protection to the Owner shall govern.);
 - 3b. General Conditions;
 - 3c. Technical Specifications;
4. Contract Plans.

3.01.3 ASSIGNMENT OF CONTRACT

The Supplier shall not assign the Contract or any part of the Contract or of the funds to be received under the Contract unless such assignment is approved by the Owner and the Supplier's Performance and Public Works Payment Bonds surety prior to the execution or effectiveness of the assignment. In case such consent to sublet any part of this Contract is granted by the Owner,

it shall in no way release the Supplier from any responsibility under this Contract, and the Supplier shall be held in all respects accountable as if no consent has been given.

This Contract may be assigned by the Owner to the installation Contractor at the discretion of the Owner. If the Contract is assigned, the Contractor will take on all rights and responsibilities of the Owner as it relates to the Contract.

3.02 CONTROL OF WORK

3.02.1 AUTHORITY AND ROLE OF THE ENGINEER

- (1) The Engineer is the authorized representative of the Owner, and is employed to act as advisor and consultant to the Owner in engineering matters relating to the Contract. Among other things, the Engineer may determine the quantity of material installed or Work completed, evaluate whether materials and equipment comply with the Specifications, and assist the Owner with answering questions relating to the meaning and intent of the Contract. The Owner, with the advice of the Engineer, will make the final determination relating to quality, acceptability and conformity of labor and materials to the requirements of the Contract.
- (2) The Engineer nor any of its assistants or agents does not purport to be a safety expert, and is not engaged in that capacity under the Contract or the Engineer's contract with the Owner. The Engineer does not have either the authority or the responsibility to enforce construction safety laws, rules, regulations or procedures, or to order the stoppage of Work for claimed violations thereof. From time to time, the Engineer may inform the Supplier of conditions that may constitute safety issues or violations. Such information will be provided solely to cooperate with and assist the Supplier and shall not make the Field Representative or the Engineer responsible for the enforcement of safety laws, rules, regulations or procedures. After receiving information relating to safety issues from the Engineer, the Supplier shall make its own examination and analysis of the situation reported and take such action, if any, that the Supplier determines to be appropriate. The Engineer's performance of project representation and observation services shall not make the Engineer responsible for the enforcement of safety laws, rules, regulations or procedures; nor shall it make the Engineer responsible for construction means, methods, techniques, sequences, or procedures, or for the Supplier's failure to properly perform the Work, all of which are entirely the responsibility of the Supplier.
- (3) The Engineer shall have no liability whatsoever to, or contractual relationship with, the Supplier in any way relating to the Contract. The Owner and the Supplier shall look solely to each other for the enforcement with respect to any rights, obligations, claims or liabilities arising under or in any way relating to the Contract. Neither the authority given to the Engineer herein, nor any action or service provided by the Engineer or its subconsultants with regard to the Work, shall create any duty owed by the Engineer or its subconsultants to the Supplier or a cause of action against the Engineer or its subconsultants by Supplier.

- (4) Neither the Engineer nor any of its assistants or agents shall have any power to waive any obligation of the Contract. The Engineer's failure to reject Work that is defective or otherwise does not comply with the requirements of the Contract shall not constitute approval or acceptance of the Work or relieve the Supplier of its obligations under the Contract, even if such Work has been estimated for payment or if payments have been made for that Work. Neither shall such failure to reject Work, nor any acceptance by the Engineer or by the Owner of any part or of the whole of the Work bar a claim by the Owner at any subsequent time for recovery of damages for the cost of removal and replacement of any portions of the Work that do not comply with the Contract.
- (5) No order, measurement, determination or certificate by the Engineer or Owner for payment of money or payment for or acceptance of the whole or of any part of the Work by the Engineer or the Owner or extension of time or possession taken by the Owner shall constitute a waiver of any portion of the Contract, nor shall any waiver of any breach of the Contract constitute a waiver of any other or subsequent breach thereof.

3.02.2 EMERGENCY CONTACT LIST

The Supplier shall submit an emergency contact list to the Engineer no later than five (5) calendar days prior to delivery of equipment. The list shall include, at a minimum, the Supplier's project manager and on-site representative. The list shall identify a representative with delegated authority to act as the emergency contact on behalf of the Supplier and include one or more alternates. The emergency contact shall be available upon the Engineer's request at other than normal working hours. The emergency contact list shall include 24-hour telephone numbers for all individuals identified as emergency contacts or alternates.

3.02.3 ORAL AGREEMENTS

No oral agreement or conversation with any officer, agent, or employee of the Owner, either before or after execution of the Contract, shall affect or modify any of the terms or obligations contained in any of the documents comprising the Contract. Such oral agreement or conversation shall be considered as unofficial information and in no way binding upon the Owner, unless subsequently put in writing and signed by the Owner.

3.03 LEGAL RELATIONS AND RESPONSIBILITIES

3.03.1 APPLICABLE LAWS AND REGULATIONS

3.03.1(1) General

The Supplier shall comply with all laws, ordinances, rules and regulations of any authority having jurisdiction in any way relating to the project, including, but not limited to, regulations governing site maintenance, clean-up, air pollution control, noise control, water quality control, surface water

control and runoff, tree and vegetation protection, cultural resources and oil and hazardous substance control.

3.03.1(2) State Taxes

The Washington State Department of Revenue has issued special rules on the State sales tax. These sections are meant to clarify those rules. The Supplier should contact the Washington State Department of Revenue for answers to questions in this area. The Owner will not adjust its payment if the Supplier bases a bid on a misunderstood tax liability.

The Supplier shall include all Supplier-paid taxes in the unit bid prices or other Contract amounts. In some cases, however, state retail sales tax will not be included. The Owner shall be responsible for paying Washington State Sales Tax on the Contract amount at a rate that is current when and where the unit is purchased. Sales Tax collected by the Supplier will be subject to WAC 458-20-145, Rule 1

The Owner will pay the retained percentage only if the Supplier has obtained from the Washington State Department of Revenue a certificate showing that all Contract-related taxes have been paid (RCW 60.28.051). The Owner may deduct from its payments to the Supplier any amount the Supplier may owe the Washington State Department of Revenue, whether the amount owed relates to the Contract or not. Any amount so deducted will be paid into the proper State fund.

3.03.1(3) Equal Employment Responsibilities

The Supplier shall, at its sole cost and expense, comply with all applicable laws, policies and regulations pertaining to nondiscrimination and equal employment opportunities. The absence of specific provisions or other requirements mandated by state, municipal or federal laws, policies or regulations from these General Conditions shall not excuse the Supplier from compliance with such laws, regulations or policies.

3.03.2 SAFETY MEASURES

All Work under the Contract shall be performed in a safe manner. The Supplier and all Subcontractors shall comply with all applicable rules, regulations, and safety standards of the Washington State Department of Labor and Industries and all other federal, state, local and other governmental entities having jurisdiction over the project.

The Engineer's review of the Supplier's work plan, safety plan, construction sequences, schedule or performance does not and is not intended to include review or approval of the adequacy of the Supplier's safety measures. The Engineer does not purport to be a safety expert, and is not engaged in that capacity under the Contract. The Engineer has neither the authority nor the responsibility to enforce construction safety laws, rules, regulations, or procedures, or to order the stoppage of Work for claimed violations thereof.

The Supplier shall exercise all required and appropriate precautions to protect all persons and property from injury and damage.

3.03.3 HAZARDOUS MATERIAL

The Supplier shall take precautions and perform any necessary Work to provide and maintain a safe and healthful Work site in accordance with all applicable laws. The cost for all Work necessary to provide and maintain a safe Work site shall be included in the Supplier's Proposal, unless the Contract includes provisions to the contrary.

3.03.4 PAYMENT OF WAGES AND RELATED REQUIREMENTS

3.03.4(1) Minimum Prevailing Wage Requirements

- a. The Contract is subject to the minimum prevailing wage and hour requirements of RCW 39.12 and RCW 49.28 (as amended or supplemented). On projects having federal funding, federal wage laws and rules may also apply. The Contract may list minimum hourly rates for wages for trades or occupations in the locality within the state where such labor is performed as determined by the Industrial Statistician for the Department of Labor and Industries or under the federal Davis-Bacon Act. These rates are for general reference purposes only and may not be current or complete. The Supplier, any Subcontractor, or other person doing any Work under the Contract shall not pay any worker less than the applicable current minimum hourly wage rates required by applicable law. Higher wages and benefits may be paid.
- b. The Supplier, any Subcontractor, and all individuals or firms required by RCW 39.12, WAC 296-127, or the Federal Davis-Bacon and Related Acts (DBRA) to pay minimum prevailing wages, shall not pay any worker less than the minimum hourly wage rates and fringe benefits required by RCW 39.12 or the DBRA. Higher wages and benefits may be paid.
- c. In accordance with WAC 296-127, the applicable prevailing wage rates that are in effect on the date when Proposals are due shall remain in effect for the duration of the Contract. By incorporating prevailing wage rates into the Contract, the Owner does not warrant or imply that the Supplier will find labor available at those rates. The Supplier shall calculate in its Proposal any amounts above the minimums that it will actually have to pay. Further, rates for wages and/or fringe benefits may change while the Contract is in force. If they do, the Supplier shall bear the cost of paying rates above those in effect at time of bid.
- d. If employing labor in a class not listed in the Contract Provisions on State funded projects, the Supplier shall request the Industrial Statistician, Department of Labor and Industries to determine the correct wage and benefits rate.
- e. If employing labor in a class not listed in the Contract Provisions on a federally funded project, the Supplier shall request the U.S. Secretary of Labor to determine the correct wage and benefits rate.

- f. The Supplier shall ensure that any firm (Supplier, Manufacturer, or Fabricator) that falls under the provisions of RCW 39.12 because of the definition “Contractor” in WAC 296-127-010, complies with all the requirements of RCW 39.12.
- g. The Supplier shall be responsible for compliance with the requirements of the DBRA and RCW 39.12 by all firms (Subcontractors, lower tier Subcontractors, Suppliers, Manufacturers, or Fabricators) engaged in any part of the Work necessary to complete the Contract. Therefore, should a violation of this Subsection occur by any firm that is providing Work or materials for completion of the Contract whether directly or indirectly responsible to the Supplier, the Owner will take action against the Supplier, as provided by the provisions of the Contract, to achieve compliance, including, but not limited to, withholding payment on the Contract until compliance is achieved.

3.03.4(2) Posting Notice Requirements

Notice of intent to pay prevailing wages and prevailing wage rates for the project shall be posted for the benefit of workers. The Supplier shall post the following, together with anything else necessary to comply with all applicable laws and regulations:

- a. One copy of the approved “Statement of Intent to Pay Prevailing Wages” for the Supplier, each Subcontractor, and any other firm (Supplier, Manufacturer, of Fabricator) that falls under the provisions of RCW 39.12 because of the definition of “Contractor” in WAC 296-127-010;
- b. One copy of the prevailing wage rates for the project;
- c. The address and telephone number of the Industrial Statistician for the Department of Labor and Industries, along with a statement that complaints and questions about wage rates may be directed there; and
- d. FHWA 1495/1495A “Wage Rate Information” poster if the project is funded with federal aid.

Notice shall be posted at a location readily visible to workers at the job site, or where no field office is established, at a local office. The Supplier shall supply a copy of the Notice to any employee upon request.

3.03.4(3) Apprentices

If employing apprentices, the Supplier shall submit to the Owner written evidence showing:

- a. That each apprentice is enrolled in a program approved by the Washington State Apprenticeship and Training Council;
- b. The progression schedule for each apprentice; and

- c. The established apprentice-journeyman ratios and wage rates in the project locality upon which the Supplier shall base such ratios and rates under the Contract. Any worker for whom an apprenticeship agreement has not been registered and approved by the Washington State Apprenticeship and Training Council shall be paid the prevailing hourly rate for journeymen provided in RCW 39.12.021.

3.03.5 BONDS, INSURANCE AND INDEMNITY OBLIGATIONS

3.03.5(1) Contract Bonds

Within ten (10) business days after notification by the Owner of acceptance of the bid proposal, the successful Bidder shall provide an executed Performance and Public Works Payment Bond for the full Contract amount (including sales tax). The Contract Bonds shall:

1. Be on Owner-furnished forms;
2. Be signed by an approved Surety (or Sureties) that:
 - a. Is registered with the Washington State Insurance Commissioner; and
 - b. Appears on the current Authorized Insurance List in the State of Washington published by the Office of the Insurance Commissioner.
3. Be conditioned upon the faithful performance of the Contract by the Supplier within the prescribed time; and
4. Be conditioned upon the payment of taxes, increases, and penalties incurred on the project under titles 50, 51, and 82 RCW; and
5. Guarantee that the Surety shall indemnify, defend, and protect the Owner against any claim of direct or indirect loss resulting from the failure:
 - a. Of the Supplier (or any of the employees, Subcontractors, or lower tier Subcontractors of the Supplier) to faithfully perform the Contract; or
 - b. Of the Supplier (or the Subcontractors or lower tier Subcontractors of the Supplier) to pay all laborers, mechanics, Subcontractors, lower tier Subcontractors, material person, or any other person who provides supplies or provisions for carrying out the Work.
6. Be accompanied by a power of attorney for the Surety's officer empowered to sign the bond; and
7. Be signed by an officer of the Supplier empowered to sign official statements (sole proprietor or partner). If the Supplier is a corporation, the bond must be signed by the president or vice-president, unless accompanied by written proof of the authority of the individual signing the bond to bind the corporation (i.e., corporate

resolution, power of attorney or a letter to such effect by the president or vice-president).

The Owner may require Sureties or Surety companies on the Bond to appear and qualify themselves. Whenever the Owner deems the Surety or Sureties to be inadequate, it may, upon written demand, require the Supplier to furnish additional Surety to cover any remaining Work. Until the added Surety is furnished, payments on the Contract will stop.

The parties agree that no liability shall attach to the Owner by reason of entering into this Contract except as expressly provided herein.

3.03.5(1.1) Two-Year Guarantee Period

The Supplier warrants and guarantees that the equipment provided under this Contract will be manufactured in accordance with the specifications set forth in the attachments to this Contract. The Supplier shall provide express warranties consistent with the requirements in the Specifications. In addition to all Supplier supplied warranties, the Supplier shall warrant and guarantee the Equipment will be free of defects in workmanship and material for a period of two (2) years after the Owner's receipt and acceptance of the Equipment, not to exceed thirty (30) months from delivery. The supplier is required to correct all defects in workmanship and materials occurring within two (2) years from the date of the Owner's receipt and acceptance of the Equipment at the Supplier's expense. The Supplier shall begin to correct any defects within twenty (20) calendar days of notice from the Owner of the defect. If the Supplier fails to perform the corrective work within thirty (30) calendar days of such notice, the Owner may complete the correction and the Supplier shall pay all costs incurred by the owner to perform the correction.

The implied warranties of merchantability and fitness for a particular purpose, as set forth in sections 62A.2-314 and -315 of the Revised Code of Washington, shall apply to the Equipment. These implied warranties shall apply even though they may be disclaimed in an attachment to this Agreement or other documents supplied by the Supplier, such that this section shall prevail over such disclaimer, and such disclaimer shall not apply. The inspection of or failure to inspect the Equipment shall not constitute a waiver or cancellation of the implied warranties.

Supplier shall provide all paperwork relating to warranty coverage of the Equipment or their components to the Owner upon delivery. In the event of any discrepancy or inconsistency between the paperwork and this Contract, the provisions providing the greatest warranty protection to the Owner shall control.

The warranty periods set forth in this Contract shall not begin to run until the Equipment is delivered to the project location and accepted by the Owner. The Owner will promptly notify the Supplier of the date the Equipment is delivered and accepted. The warranty period set forth in this Contract shall not run during any period in which the Equipment is not functional due to a defect in the Equipment so long as the Owner places the Supplier on written notice of the defect.

In the event a component manufacturer requires that the purchaser register its purchase with the manufacturer to make effective a component manufacturer's warranty, the Supplier shall take all steps necessary to register such purchase with the component manufacturer. In the event the

Supplier fails to properly register the Owner's purchase with the component manufacturer, then the Supplier shall assume the status of warrantor of such component as if such registration had occurred. The Owner's failure to discover any defect during any inspection or at any other time shall not constitute a waiver of the warranty applicable to such defect.

3.03.5(2) Worker's Benefits

- a. The Supplier shall make all payments required for unemployment compensation under RCW Title 50 and for industrial insurance and medical aid required under RCW Title 51. If any payment required by Title 50 or Title 51 is not made when due, the Supplier shall indemnify the Owner with respect to all costs and damages, including attorneys' fees and expenses, associated with such nonpayment. The Owner may retain payments due under Title 50 or Title 51 from any money due to the Supplier and make payment to the appropriate fund.
- b. The Supplier shall include in the various items in its bid Proposal all costs for payment of unemployment compensation and for providing the required insurance coverage(s). The Supplier will not be entitled to any additional payment for: (1) failure to include such costs in the Proposal, or (2) post-Award determinations made by the U.S. Department of Labor, the Washington State Department of Labor and Industries, or any other agency or entity regarding insurance coverage requirements.

3.03.5(3) Public Liability & Property Damage Insurance

3.03.5(3.1) General Requirements

- A. The Supplier shall procure and maintain insurance described in all subsections in this Section, from insurers with a current A.M. Best rating not less than A – VII and licensed to do business in the state of Washington. The Owner reserves the right to approve or reject the insurance provided, based on the insurer (including financial condition), terms and coverage, the Certificate of Insurance, and/or endorsements.
- B. The Supplier shall keep this insurance in force during the term of the Contract and for thirty (30) days after final acceptance of the Work, unless otherwise indicated.
- C. All insurance coverage required by this section shall be written and provided by "occurrence-based" policy forms rather than by "claims made" forms.
- D. The insurance policies shall contain a "cross liability" provision.
- E. The Supplier's and all Subcontractors' insurance coverage shall be primary and non-contributory insurance as respects the Owner's insurance, self-insurance, or insurance pool coverage. Any insurance, self-insurance or self-insured pool coverage maintained by the Owner shall be excess of the Supplier's insurance and shall not contribute with it.

- F. The Supplier shall provide the Owner and all Additional Insured with written notice of any policy cancellation and the date of effective cancellation within two (2) business days of receipt.
- G. The Supplier shall not begin Work under the Contract until the required insurance has been obtained and approved by the Owner.
- H. Failure on the part of the Supplier to maintain the insurance as required shall constitute a material breach of Contract, upon which the Owner may, after giving five (5) business days notice to the Supplier to correct the breach, immediately terminate the Contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith, with any sums so expended to be repaid to the Owner on demand, or at the sole discretion of the Owner, offset against funds due the Supplier from the Owner.
- I. All costs for insurance shall be incidental to and included in the unit or lump sum prices of the Contract and no additional payment will be made.

3.03.5(3.2) Additional Insured

All insurance policies, with the exception of Workers Compensation, shall name the following listed entities as additional insured(s) using the forms or endorsements required herein:

- The Owner and its officers, elected/appointed officials, employees, agents, and volunteers;
- Gray & Osborne, Inc.;

The above-listed entities shall be additional insured(s) for the full available limits of liability maintained by the Supplier, irrespective of whether such limits maintained by the Supplier are greater than those required by the Contract, and irrespective of whether the Certificate of Insurance provided by the Supplier pursuant to 3.03.4(3.5) describes limits lower than those maintained by the Supplier.

3.03.5(3.3) Subcontractors

Supplier shall ensure that each Subcontractor of every tier obtains and maintains at a minimum the insurance coverages listed in 3.03.5(3.5)A and 3.03.5(3.5)B. Upon request of the Owner, the Supplier shall provide evidence of such insurance.

3.03.5(3.4) Verification of Coverage

The Supplier shall deliver to the Owner a Certificate(s) of Insurance and endorsements for each policy of insurance meeting the requirements set forth herein when the Supplier delivers the signed Contract for the Work. The certificate and endorsements shall conform to the following requirements:

1. An ACORD certificate or a form determined by the Owner to be equivalent. The certificate or an endorsement form shall indicate the Supplier's insurance is primary and non-contributory.
2. The Supplier shall obtain endorsement forms CG 2010 10 01, CG 2032 07 04 and CG 2037 10 01 or the equivalent of each, naming the Owner and all other entities listed in 3-03.4(3.2) as Additional Insured(s) and showing the policy number. If the Supplier is unsuccessful in securing these endorsements after exerting commercially reasonable efforts, the Supplier shall obtain other endorsements providing equivalent protection to the Additional Insured. Commercially reasonable efforts shall be evidenced by a signed statement by the Supplier's insurance broker indicating that endorsement forms CG 2010 10 01, CG 2032 07 04 and CG 2037 10 01 are not available and the endorsements submitted provide equivalent protection to the Additional Insured.
3. Any other amendatory endorsements to show the coverage required herein.
4. A notification of coverage enhancements on the Certification of Insurance shall not satisfy these requirements; actual endorsement must be submitted.

Upon request, the Supplier shall forward to the Owner a full and certified copy of the insurance policy(s). If Builders Risk Insurance is required on this project, a full and certified copy of that policy is required when the Supplier delivers the signed Contract for the Work.

3.03.5(3.5) Coverages and Limits

The insurance shall provide the minimum coverages and limits set forth below. Providing coverage in these stated minimum limits shall not be construed to relieve the Supplier from liability in excess of such limits. All deductibles and self-insured retentions shall be disclosed and are subject to approval by the Owner. The cost of any claim payments falling within the deductible shall be the responsibility of the Supplier.

3.03.5(3.5)A Commercial General Liability

Commercial General Liability insurance shall be written on coverage forms at least as broad as ISO occurrence form CG 00 01, including but not limited to liability arising from premises, operations, stop gap liability, independent contractors, products-completed operations, personal and advertising injury, and liability assumed under an insured contract. There shall be no exclusion for liability arising from explosion, collapse or underground property damage.

The Commercial General Liability insurance shall be endorsed to provide a per project general aggregate limit, using ISO form CG 25 03 05 09 or an equivalent endorsement.

Supplier shall maintain Commercial General Liability Insurance arising out of the Supplier's completed operations for at least 3 years following Substantial Completion of the Work.

Such policy must provide the following minimum limits:

\$1,000,000	Each Occurrence
\$2,000,000	General Aggregate
\$2,000,000	Products & Completed Operations Aggregate
\$1,000,000	Personal & Advertising Injury, each offence
\$1,000,000	Stop Gap/Employers' Liability

3.03.5(3.5)B Automobile Liability

Automobile Liability for owned, non-owned, hired, and leased vehicles, with an MCS 90 endorsement and a CA 9948 endorsement attached if "pollutants" are to be transported. Such policy(ies) shall provide a minimum combined single limit for bodily injury and property damage of \$1,000,000.00 per accident.

3.03.5(3.5)C Workers' Compensation

The Supplier shall comply with Workers' Compensation coverage as required by the Industrial Insurance laws of the state of Washington.

3.03.5(3.5)D Excess or Umbrella Liability

The Supplier shall provide Excess or Umbrella Liability coverage at limits of \$2 million per occurrence and annual aggregate. This excess or umbrella liability coverage shall apply, at a minimum, to both the Commercial General and Auto insurance policy coverage and employers liability.

This requirement may be satisfied instead through the Supplier's primary Commercial General and Automobile Liability coverage, or any combination thereof.

3.03.5(4) Indemnity and Hold Harmless

- a. To the fullest extent permitted by law and subject to the limitations of RCW 4.24.115, the Supplier shall defend, indemnify and hold harmless the Owner and the Engineer and their appointed and elected officers, agents and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees and expenses arising out of or resulting from the negligent performance of the Work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and (2) is caused by any negligent act or omission of the

Supplier, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. Provided, however, that when any such claim, damage, loss or expense arises from the concurrent negligence of (1) the Owner, or anyone for whose acts it may be liable, and (2) the Supplier, or anyone for whose acts it may be liable, it is expressly agreed that the Supplier's obligations of defense and indemnity under this section shall be effective only to the extent of the Supplier's negligence and those for whose negligence the Supplier is responsible. This obligation of indemnity shall not extend to claims, losses or expenses arising from the sole negligence of the Owner, its appointed or elected officials, agents or employees.

- b. In any and all claims against the Owner or the Engineer or any of their agents or employees by any employee of the Supplier, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this section shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Supplier or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefit acts, it being the expressed intent of the parties that Supplier herein specifically waives any immunity granted under the State Industrial Insurance Law, RCW Title 51. **THIS WAIVER HAS BEEN SPECIALLY NEGOTIATED BY THE PARTIES, WHO HAVE ACKNOWLEDGED SAME BY AFFIXING THEIR SIGNATURES TO THE PROPOSAL FORM.**

3.03.5(5) Patent Royalties & Process Fees

The Supplier shall be responsible for all costs arising from the use of patented devices, materials, or processes used in or incorporated in the Work. The Supplier agrees to indemnify, defend, and save harmless the Owner from all claims and damages, in any way relating to the use of patented devices, materials, or processes used in or incorporated in the Work.

3.03.6 METHOD OF SERVING NOTICE

All correspondence from the Supplier constituting any notification, notice of protest, notice of dispute, or other correspondence constituting notification required to be furnished under the Contract, shall be in paper format, hand delivered or sent via mail delivery service to the Owner. Electronic formats such as emails or electronically delivered copies of correspondence will not constitute such notice and will not comply with the requirements of the Contract.

3.04 PROSECUTION AND PROGRESS OF THE WORK

3.04.1 QUALITY OF WORK

3.04.1(1) Workmanship

- a. The Supplier represents that it is fully experienced and possesses all the necessary capital, facilities and expertise to perform all of the Work, and hereby guarantees

that all of the Work performed by it under the Contract will be of the highest quality and done in a workmanlike fashion in strict accordance with the requirements of the Contract.

- b. The Supplier shall at all times employ skilled workers and use skilled Subcontractors in the performance of the Work. When required in writing by the Owner or the Engineer, the Supplier or its Subcontractors shall remove from the Work any person or Subcontractor who is, in the opinion of the Owner or the Engineer, not competent, not qualified, disorderly, or otherwise unsatisfactory and shall not again employ such discharged person or Subcontractor on the Work, except with the prior written consent of the Owner. Discharge of any person or Subcontractor shall not be the basis of any claim for compensation or damages against the Owner or the Engineer.
- c. All Work performed under the Contract shall be of first quality workmanship throughout, with the Work complete and in full working order upon completion.
- d. Except when otherwise expressly specified in the Contract, the Supplier shall design, and be responsible for all methods, materials and equipment used in performing the Work.
- e. If, at any time, the Supplier's workforce (including Subcontractors), in the opinion of the Owner and/or the Engineer, shall be inadequate for maintaining the necessary progress required to complete the Work within the Contract Time, the Supplier shall at its sole cost, if so required by the Owner and/or the Engineer, increase the workforce or equipment to such an extent as to give reasonable assurance of compliance with the Work schedule. The failure of the Owner and/or the Engineer to make such demand shall not relieve the Supplier of its obligation to perform the Work in accordance with the requirements of the Contract. The Supplier alone shall be responsible for the safety, efficiency and adequacy of its activities, construction methods and the rate of progress required by the Contract.

3.04.2 MATERIALS AND EQUIPMENT

- (1) Materials and equipment furnished and installed shall be manufactured, fabricated or constructed to meet all applicable safety requirements. All material and equipment supplied by the Supplier and incorporated in the Work shall be of new manufacture, free from defects and in strict compliance with the requirements of the Contract. When required by the Owner, a certificate from the manufacturer or other responsible supplier shall be supplied attesting to this fact.
- (2) All tools and equipment used for construction operations shall be of the size and type suitable for the Work and shall be kept in safe and good working condition at all times.
- (3) The Supplier shall, whenever required during the progress of the Work and after completion of the Work, furnish proof acceptable to the Owner that all items of

equipment and all materials installed equal or exceed all requirements specified in the Contract.

3.04.3 SPECIFICATION OF PARTICULAR MATERIALS AND EQUIPMENT

- (1) Within the Contract, certain items are specified by brand, style, trade name, or manufacturer in order to set forth a standard of quality, and/or preference by the Owner. Unless specifically noted otherwise, it is not the intent of the Contract to exclude other processes or materials of a type and quality equal to those designated.
- (2) The term “or equal” as used in the Contract does not mean that the Supplier’s substitution of material or equipment will necessarily be approved as equal by the Engineer. If the Supplier desires to substitute material or equipment on the basis that it is equal to that specified, the Supplier shall submit a written request to the Engineer to substitute the material or equipment. The Supplier shall not use or incorporate such material or equipment into the Work until the Supplier has received written approval from the Engineer.
- (3) If the Supplier proposes substitutions, the Engineer will record all time used to evaluate each proposed substitution. If an approved substitution requires revisions to the Contract Documents, the Engineer will record all time to accomplish the revisions. Whether or not the Engineer approves a proposed substitution all direct and indirect cost to evaluate the proposed substitution shall be deducted from amounts due or to become due to the Supplier.
- (4) No additional compensation or extension of time will be allowed the Supplier for any changes required to incorporate substituted materials or equipment.

3.04.4 DEFECTIVE MATERIALS, EQUIPMENT AND WORKMANSHIP

- (1) The Owner reserves the right to inspect the Equipment for any defects, irregularities, non-conformities, and defects in workmanship and appearance, and to reject non-conforming or defective equipment. Materials, equipment, or workmanship which, in the opinion of the Owner or the Engineer, does not conform to the Contract or are in any other way unsatisfactory or unsuited to the purpose for which they are intended may be rejected. If rejected, the Owner shall notify the Supplier in writing within two (2) business days within discovery of the defect or decision to reject the Equipment. The Supplier shall have thirty (30) calendar days to cure the defect; provided that the Supplier provides the Owner written notice of the Supplier’s intent to cure the defect and assures the Owner that it is capable of curing such defect. The cure shall be at the sole expense of the Supplier, and the Supplier shall cover all costs of such cure. If the Supplier gives no instructions within ten (10) business days after notification of the rejection, the Owner will store the Equipment at the Supplier’s expense and such expense shall become a security interest in favor of the Owner. The parties understand that in the case of rejection, the Owner is not required to store the Equipment in an enclosed area. The Owner will hold the Equipment in its possession with reasonable care at the Supplier’s

disposition for a time sufficient to permit the Supplier to remove or cure the Equipment.

The Supplier shall have one opportunity to cure each defect for which it has been placed on notice or which the Supplier discovers. Any agreement to cure defects of the Equipment shall not constitute a settlement of claims brought pursuant to the terms of this Contract. The Supplier shall remove from the Work site without delay, all rejected materials, equipment and work, and shall promptly replace the same in strict conformity with the requirements of the Contract. Unsatisfactory materials, equipment and workmanship may be rejected at any time, notwithstanding any previous testing, inspection or acceptance of such materials, equipment or workmanship, or inclusion thereof in any previously issued progress estimates.

If, at any time, the Supplier discovers a defect in the Equipment, the Supplier shall, within two (2) business days of discovery, notify the Owner of such defects in writing and shall promptly cure such defect, if Supplier so chooses, pursuant to this section.

- (2) If the Supplier fails to correct defective Work, equipment or materials, the Owner shall have the right to exercise any of the following options or any combination thereof:
 - a. The Owner may replace the defective Work, materials or equipment by purchase from or contract with any other parties at the expense of the Supplier, and in this event, the Owner shall be entitled without compensation to the Supplier, to the use of the defective Work or equipment for such reasonable time as is necessary to enable Owner to replace such defective Work, materials or equipment.
 - b. The Owner may elect to accept the defective Work, materials or equipment and issue a Change Order reflecting a credit against the Contract price, computed under the terms of the Contract in an amount to be determined by the Engineer, which amount shall reflect the actual value to the Owner of the accepted Work.
 - c. Upon receipt of notice from the Owner of any defects in material, equipment or workmanship which appear within a two-year period following Delivery, or within any other warranty or guarantee period required by the Contract or provided by a manufacturer or supplier, the Supplier shall promptly and with the least possible delay and inconvenience to the Owner, repair or replace such defective workmanship, material or equipment without expense to the Owner.
 - d. The Supplier shall be responsible for the full cost of correcting defective Work and complying with warranties and guarantees as required by the Contract. Direct or indirect costs, including administrative and engineering, incurred by the Owner attributable to correcting and remedying defective or

unauthorized work, or Work the Supplier failed or refused to perform, shall be paid by the Supplier. Payment will be deducted by the Owner from monies due, or to become due, the Supplier. Such direct and indirect costs shall include in particular, but without limitation, compensation for additional professional services required, and costs for repair and replacement of Work of others destroyed or damaged by correction, removal, or replacement of the Supplier's unauthorized work.

- e. All warranties, guarantees, and other obligations to correct Work that does not comply with the Contract are material requirements of the Contract. The performance of all warranties, guarantees and other obligations shall be secured by the Performance Bond and the Public Works Payment Bond submitted by the Supplier at the time the Contract is signed.

3.04.5 CHANGES IN THE WORK

- (1) The Owner or the Engineer may, at any time, without notice to the Performance and Public Works Payment Bond sureties, by written order designated or indicated to be a Change Order or Change Directive, make any change, including modifications to, additions to or deletions from the Work including, but not limited to, changes:
 - a. To the Contract Provisions and Contract Plans;
 - b. To quantities or performance of the Work;
 - c. To Owner-furnished facilities, equipment, materials, services or the Work site; or
 - d. To the schedule for the Work or the Contract Time.
- (2) A Change Order is an amendment to the Contract, which signifies changes in the scope of the Work, the Contract Time, and/or the Contract price. A Change Order shall be the complete expression of the agreement between the Owner and the Supplier. No claims or entitlement to an equitable adjustment or changes to the Contract Time and/or Contract price will be allowed for alleged verbal or oral agreements or directives.
- (3) The Engineer will issue a written change order for any change. If the Engineer determines that the change increased or decreased the Supplier's costs or time to do any of the Work, the Engineer will make an equitable adjustment to the Contract. The equitable adjustment will be by agreement with the Supplier. However, if the parties are unable to agree, the Engineer will determine the amount of the equitable adjustment in accordance with Section 3.04.5(7) and adjust the time as the Engineer deems appropriate. Extensions of time will be evaluated in accordance with Section 3.04.12.

The Supplier shall proceed with the Work upon receiving:

1. A written change order approved by the Owner; or
2. An oral order from the Engineer before actually receiving the written change order.

Within fourteen (14) calendar days of delivery of the change order the Supplier shall endorse and return the change order, request an extension of time for endorsement or respond in accordance with Section 3.04.11. The Owner may unilaterally process the change order if the Supplier fails to comply with these requirements. These changes shall be made at the unit prices that apply. The Supplier shall respond immediately to changes shown on field stakes without waiting for further notice.

The Supplier shall obtain written consent of the Surety or Sureties if the Engineer requests such consent.

- (4) All Change Orders will be prepared by the Owner or Engineer and executed in triplicate with one copy to the Owner, one to the Supplier, and one retained by the Engineer.
- (5) If the Supplier encounters any circumstances during the performance of the Work that the Supplier contends creates any entitlement to a change in the Contract Time, the Contract price, or both, the Supplier shall immediately provide written notice to the Engineer. Within ten (10) calendar days after providing written notice, the Supplier shall provide a written request to the Engineer for a change to the Contract Time and/or Contract price and provide detailed information supporting the request, including cost and schedule information.
- (6) No claim by the Supplier shall be allowed if the terms of this Section 3.04.5 are not strictly followed. In the event of any non-compliance, the Supplier shall be conclusively determined to have waived any claim or entitlement to an adjustment of the Contract Time or the Contract price.
- (7) The cost to be included in an adjustment for any changes to the Work, adjustment of the Contract Time or Contract price and any equitable adjustment or entitlement related to the Work or the Contract shall meet the claim notice provisions of Section 3.04.6, and will be determined strictly by one or a combination of the following methods:
 - a. Contract unit bid prices previously agreed upon; or
 - b. An agreed lump sum
- (8) Payment to the Supplier will be made only for the actual quantities of Work performed and accepted in conformance with the Contract. When the accepted

quantity of Work performed under a unit item varies from the original bid quantity, payment will be at the unit Contract price for all Work unless the total accepted quantity of any Contract item, adjusted to exclude added or deleted amounts included in change orders accepted by both parties, increases or decreases by more than 25 percent from the original bid quantity, and that bid item represents 10 percent or more of the total original Contract price. In that case, payment for Contract Work may be adjusted as described herein.

The adjusted final quantity shall be determined by starting with the final accepted quantity measured after all Work under an item has been completed. From this amount, subtract any quantities included in additive change orders accepted by both parties. Then, to the resulting amount, add any quantities included in deductive change orders accepted by both parties. The final result of this calculation shall become the adjusted final quantity and the basis for comparison to the original Proposal quantity.

- a. **Increased Quantities.** Either party to the Contract will be entitled to renegotiate the price for that portion of the adjusted final quantity in excess of 1.25 times the original Proposal quantity, if 10 percent or more of the original Contract price. The price for excessive increased quantities will be determined by agreement of the parties, or, where the parties cannot agree, the price will be determined by the Engineer based upon the actual costs to perform the Work, including reasonable markup for overhead and profit. The final price will be determined by the Engineer.
- b. **Decreased Quantities.** Either party to the Contract will be entitled to an equitable adjustment if the adjusted final quantity of Work performed is less than 75 percent of the original Bid quantity, if 10 percent or more of the original Contract price. The Supplier shall submit the documentation to support the equitable adjustment to the Engineer. The equitable adjustment shall be based upon and limited to three factors:
 1. Any increase or decrease in unit costs of labor, materials or equipment, utilized for Work actually performed, resulting solely from the reduction in quantity;
 2. Changes in production rates or methods of performing Work actually done to the extent that the nature of the Work actually performed differs from the nature of the Work included in the original plan; and
 3. An adjustment for the anticipated contribution to unavoidable fixed cost and overhead from the units representing the difference between the adjusted final quantity and 75 percent of the original plan quantity.

The following limitations shall apply to renegotiated prices for increases and/or equitable adjustments for decreases:

1. The equipment rates shall be actual cost but shall not exceed the rates set forth in the AGC/WSDOT Equipment Rental Agreement.
2. No payment will be made for extended or unabsorbed home office overhead and field overhead expenses to the extent that there is an unbalanced allocation of such expenses among the Contract Bid items.
3. No payment for consequential damages or loss of anticipated profits will be allowed because of any variance in quantities from those originally shown in the Proposal form, Contract Provisions, and Contract Plans.
4. The total payment (including the adjustment amount and unit prices for Work performed) for any item that experiences an equitable adjustment for decreased quantity shall not exceed 75 percent of the amount originally Bid for the item.

If the adjusted final quantity of any item does not vary from the quantity shown in the Proposal by more than 25 percent, then the Supplier and the Owner agree that all Work under that item will be performed at the original Contract unit price.

When ordered by the Engineer, the Supplier shall proceed with the Work pending determination of the cost or time adjustment for the variation in quantities.

The Supplier and the Owner agree that there will be no cost adjustment for decreases if the Owner has entered the amount for the item in the Proposal form only to provide a common Proposal for Bidders.

- (9) The Contract may only be amended or modified by the mutual written agreement of all parties. All amendments or modifications shall be signed by both parties and shall be attached to this Contract.

3.04.6 PROTEST BY THE SUPPLIER

If the Supplier disagrees with anything in a Change Order or a written directive, or with any interpretation or determination by the Engineer, the Supplier shall:

- a. Immediately submit a signed written notice of protest to the Engineer before doing the Work;

- b. Supplement the written protest within 14 calendar days with a written statement and supporting documents providing the following:
 1. The date and nature of the protested order, direction, instruction, interpretation or determination;
 2. A full discussion of the circumstances which caused the protest, including names of persons involved, time, duration, and nature of the Work involved and a review of the Plans and Contract Provisions referenced to support the protest;
 3. The estimated dollar cost, if any, of the protested Work and a detailed breakdown showing how that estimate was determined; and
 4. An analysis of the progress schedule showing the schedule change or disruption if the Supplier is asserting a schedule change or disruption; and
 5. If the protest is continuing, the information required above shall be supplemented upon request by the Engineer until the protest is resolved.

The Supplier shall keep detailed and complete records of extra costs and schedule impacts to Contract Time that in any way relate to a protest. The Supplier shall allow the Engineer to have access to all documents and records needed for evaluating the protest.

The Engineer will evaluate all protests that comply with this Section. If the Engineer determines that a protest is valid, the Engineer will adjust the Contract price and/or the Contract Time by an adjustment in accordance with Section 3.04.5 and 3.04.12

During the time when any protest is pending, the Supplier shall proceed promptly with the Work, as the Engineer orders in writing.

The Supplier's failure to submit a protest in strict accordance with the requirements of this Section shall constitute a waiver of any claim for an adjustment to the Contract Time, the Contract price, or other relief.

3.04.7 SUBCONTRACTORS AND SUBCONTRACTS

3.04.7(1) Supplier Responsibility

Nothing contained in the Contract shall create any contractual or other relationship between the Owner and/or the Engineer and any Subcontractor or lower tier Subcontractor, and no performance undertaken by any such Subcontractor or lower tier Subcontractor shall, under any circumstances, relieve the Supplier of its obligations and responsibilities under the Contract.

Prior to subcontracting any Work, the Supplier shall verify that every first tier Subcontractor meets the responsibility criteria stated below at the time of subcontract execution. The Supplier shall include these responsibility criteria in every subcontract, and require every Subcontractor to:

1. Possess any electrical contractor license required by 19.28 RCW or elevator contractor license required by 70.87 RCW, if applicable;
2. Have a certificate of registration in compliance with Chapter 18.27 RCW;
3. Have a current State unified business identifier number;
4. If applicable, have:
 - a. Industrial insurance coverage for the Subcontractor's employees working in Washington (Title 51 RCW);
 - b. An employment security department number (Title 50 RCW), if applicable;
 - c. A state excise tax registration number (Title 82 RCW), if applicable.
5. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or RCW 39.12.065(3);
6. Verify these responsibility criteria for every lower tier Subcontractor at the time of subcontract execution; and
7. Include these responsibility criteria in every lower tier subcontract.

3.04.7(2) Approval of Subcontractors

The Supplier shall not subcontract Work unless the Engineer approves in writing. Each request to subcontract shall be on the form the Engineer provides. If the Engineer requests, the Supplier shall provide proof that the Subcontractor has the experience, ability, and equipment the work requires. The Supplier shall require each Subcontractor to comply with Section 3.03.5 and to furnish all certificates and statements required by the Contract. Approval of a Subcontractor by the Owner shall not relieve the Supplier or Subcontractor of any obligations or responsibilities under the Contract. Any delays or other impacts caused by the failure of the Supplier to provide required information and obtain approval of any Subcontractor in a timely manner will not be considered as justification for additional compensation or an extension of the Contract Time.

3.04.7(3) Subcontracts

Upon approval of Subcontractors by the Engineer, the Supplier shall, if requested, provide the Owner with complete copies of all subcontracts entered into between the Supplier and any Subcontractor. Providing requested subcontracts to the Owner shall be a condition precedent to the Owner's obligation to make any progress payment to the Supplier.

3.04.7(4) Incorporation of Contract

Every subcontract entered into by the Supplier shall expressly bind each Subcontractor to all of the terms and conditions of the Contract, which the Supplier shall incorporate into each subcontract by reference. The Contractor shall provide a copy of the Contract to all Subcontractors and obtain written confirmation from Subcontractors that the Subcontractor received a copy of the Contract. All Subcontractor shall provide a copy of the Contract to all lower tier Subcontractors and obtain written confirmation from lower tier Subcontractors that the lower tier Subcontractor received a copy of the Contract.

3.04.7(5) Replacement of Subcontractors

Subject to the requirements of state and/or federal agencies having jurisdiction over MBE/WBE/DBE requirements applicable to the Work, should it become impossible for a Subcontractor to perform the Subcontractor's intended Work, the Supplier shall submit the information required above for an alternate Subcontractor at least ten (10) days prior to the time that the Subcontractor is scheduled to begin the Work. The failure of any Subcontractor to perform its portion of the Work in a timely or workmanlike fashion is the sole responsibility of the Supplier.

3.04.8 MUTUAL RESPONSIBILITY OF SUPPLIERS

The Owner reserves the right to perform other work on or near the Work site using its own forces and/or other contractors. The Supplier shall take all reasonable steps to coordinate its performance of the Work with the Owner and/or such other contractors and Subcontractors. If, through acts of commission or omission on the part of the Supplier, any other contractor or any Subcontractor shall suffer loss or damage with respect to the other work being performed by the Owner, the Supplier agrees to promptly settle with such other contractor or Subcontractor by agreement or other dispute resolution process. The Supplier agrees to indemnify and hold harmless the Owner and the Engineer from all claims asserted against and liability incurred by the Owner or the Engineer resulting from disputes between the Supplier and any other contractor or any Subcontractor or material supplier. The indemnification rights of the Owner and the Engineer include expenses such as, but not limited to, salaries/wages of employees and all other expenses relating to any mediation, litigation, or arbitration, including costs, consulting fees and attorneys' fees. If such other contractor or Subcontractor shall assert any claim against the Owner on account of any damage alleged to have been sustained by an act or omission of the Supplier or anyone for whose acts it may be liable, the Owner or the Engineer shall notify the Supplier, which shall defend, indemnify and save harmless the Owner and the Engineer against such claim.

The coordination of the Work with other work by the Owner shall be taken into account by the Supplier as part of its site investigation obligations under Section 2.01.4, and all costs thereof shall be borne by the Supplier as part of the Contract price for the Work.

3.04.9 RISK OF LOSS

The Supplier shall have all risk of loss for all equipment in any way relating to the Work through theft, fire, other casualty, act of God, or any other cause until the acceptance of delivery of the equipment by the Owner.

3.04.10 MEASUREMENT AND PAYMENT

3.04.10(1) General

The Contract price for the Work, whether lump sum or unit prices, shall constitute full compensation for furnishing all facilities, labor, materials, appurtenances, and incidentals and performing all operations necessary to construct and complete all items of the Work in accordance with the Contract, notwithstanding that minor or incidental features of the Work may not be shown on the Contract Plans or Contract Provisions.

3.04.10(2) Measurement

Measurement for all items shall be as specified in the Contract for unit price and lump sum price items.

3.04.10(3) Payment

Payment for all of the Work will be made at the lump sum or unit Contract price as set forth in the Contract. Payment of the Contract price shall constitute full compensation for the complete performance of all of the Work.

3.04.10(4) Access to Books and Records

The Supplier shall, whenever so requested, give the Owner and/or the Engineer access to all invoices, bills of lading and other documents relating to the Work. The Supplier shall, without charge, provide personnel and measures and scales with adequate capacity for measuring or weighing any materials or other items paid for on a unit price basis.

3.04.10(5) Payments Withheld

The Engineer may decide not to recommend approval of all or a portion of a progress estimate, and/or the Owner may decide to withhold from a progress estimate an amount sufficient to protect the Owner from loss because of:

- a. Defective Work not remedied;
- b. Third-party claims or reasonable evidence indicating the probability that a third-party claim will be asserted;
- c. Failure of the Supplier to make timely and proper payments to Subcontractors or for labor, materials or equipment;

- d. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract price;
- e. Damage to the Owner or another contractor;
- f. Reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance of the Contract price will not be adequate to cover actual or liquidated damages for the anticipated delay;
- g. Repeated failure by the Supplier to comply with the directions of the Owner or the Engineer or to carry out the Work in accordance with the Contract;
- h. Other appropriate reasons necessary to protect the Owner.

3.04.10(6) Payment Upon Correction of Deficiencies

When the reason or reasons for withholding payment are resolved, payment will be made for amounts previously withheld.

3.04.10(7) Final Payment

After final inspection (Section 3.04.13) of the Work and a determination by the Engineer that the requirements of the Contract have been achieved, the balance of the remaining Contract price due to the Supplier will be paid based upon the final estimate by the Engineer and presentation of a Final Contract Voucher Certification signed by the Supplier. The Final Contract Voucher Certification shall be deemed to be a release of all claims of the Supplier unless a claim is filed in accordance with the requirements of Section 3.05 and is expressly excepted from release in the Supplier's Final Contract Voucher Certification. The date the Owner signs the Final Contract Voucher Certification constitutes the Contract Completion Date in accordance with Section 3.04.13.

If the Supplier fails, refuses, or is unable to sign and return the Final Contract Voucher Certification or any other documentation required in order to achieve the Contract Completion Date, the Owner reserves the right to establish a completion date (for the purpose of meeting the requirements of RCW 39.08 and RCW 60.28) and unilaterally accept the Work. Unilateral final acceptance will occur only after the Supplier has been provided the opportunity, by written request from the Engineer, to voluntarily submit such documents. If voluntary compliance is not achieved, formal notification of the impending establishment of a completion date and unilateral final acceptance will be provided by certified letter from the Owner to the Supplier, which will provide thirty (30) calendar days for the Supplier to submit the necessary documents. This period will begin on the date the certified letter is received by the Supplier. The date on which the Owner unilaterally signs the Final Contract Voucher Certification shall constitute the Contract Completion Date under Section 3.04.13. The Owner shall have the right to unilaterally establish a Contract Completion Date when either (1) the Work has been achieved in accordance with Section 3.04.13, or (2) the Owner terminates the Contract in accordance with Section 3.07. Unilateral establishment of the Contract Completion Date by the Owner shall not in any way relieve the Supplier of any liability

for failing to comply with the Contract or from responsibility for compliance with all federal, state, tribal, or local laws, ordinances, and regulations that affect the Work.

Payment to the Supplier of partial or final payment estimates and retained percentages shall be subject to applicable laws.

3.04.11 CONTRACT TIME

The Contract Time shall begin on the first working day following the 10th calendar day after the issuance of the written Notice to Proceed. Time is of the essence of the Contract. All of the Work shall be completed within the time limits set forth in the Contract, and the Supplier's unexcused failure to do so shall result in the assessment of liquidated damages as provided in the Contract.

The Supplier shall complete all of the physical Work within the number of working days that are specified as the Contract Time.

3.04.12 CONSTRUCTION SCHEDULE

3.04.12(1) Progress Schedule

- a. Within 5 working days after the date the Contract is executed, the Supplier shall submit to the Engineer four copies of a preliminary progress schedule covering the first 90 days of the Work. Within 30 days after the Contract is executed, the Supplier shall submit to the Engineer four copies of a comprehensive critical path method progress schedule and analysis for the entire Work. The preliminary progress schedule may consist of a bar graph or arrow diagram and shall show the time the Supplier intends to start and complete various Work activities. No progress payments will be made until the required progress schedules have been submitted in a form acceptable to the Engineer.

3.04.12(2) Extensions of the Contract Time

- a. The Supplier specifically waives claims for damages for any hindrance or delay, excepting unreasonable delays caused by the Owner. In lieu thereof, the Supplier will be granted equitable extensions of the Contract Time for which liquidated damages will not otherwise be claimed by the Owner under the following circumstances:
 - i. A delay caused by any suit or other legal action against the Owner will entitle the Supplier to an equivalent extension of time, unless the period of such delay exceeds 90 calendar days. When such period is exceeded, the Owner will, upon written request of the Supplier, either negotiate a termination of the Contract or grant a further extension of the Contract Time, whichever is in the best interests of the Owner.
 - ii. If the volume of specified unit price work is increased over the estimated volume utilized in the Proposal at the time of the Award for reasons beyond

the control of the Supplier, and the increased volume delays the Supplier's performance of the Work, the Supplier will be granted an equivalent extension of the Contract Time as determined by the Engineer. As a condition precedent to entitlement to an adjustment of the Contract Time, Supplier must meet the claim notice provisions herein. Failure to provide timely notice of claim shall be deemed a complete waiver of entitlement to an extension of time.

- iii. Should any other unforeseen condition occur that is beyond the reasonable control of Supplier, requires more time for the Supplier to complete the performance of the Work by the Substantial Completion Date, the Supplier shall notify the Owner and the Engineer in writing prior to the performance of such Work, and in any event within ten (10) calendar days after the occurrence of the unforeseen condition. The notice shall set forth in detail the Supplier's estimate of the required time extension. The Owner will allow such equitable extension of the Contract Time that the Engineer determines to be appropriate. Failure to complete with the claim notice provisions required by the Contract shall be deemed a complete waiver of any entitlement to adjustment of the Contract Time.

3.04.12(3) Liquidated Damages

- a. The Supplier acknowledges that the Owner will suffer monetary damages in the event of an unexcused delay in delivery of the equipment. If the Supplier fails, without excuse under the Contract, to complete the Work within the Contract Time, or any proper extension thereof granted by the Owner, the Supplier agrees to pay to the Owner the amount specified in the Proposal form, not as a penalty, but as liquidated damages for such breach of the Contract, for each day that the Supplier shall be in default after the time stipulated for delivery of the equipment..
- b. The amount of liquidated damages is fixed and agreed upon by and between the Supplier and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount is specifically agreed to be a reasonable approximation of damages that the Owner would sustain as a result of an unexcused delay in the delivery of the equipment; said amount may be retained from time to time by the Owner from current progress payments.

3.04.13 COMPLETION AND ACCEPTANCE OF THE WORK

3.04.13(1) Delivery Date

- a. When the Supplier has confirmed that the Equipment has been delivered and is ready for inspection, the Supplier shall notify the Engineer in writing. The Engineer shall then have seven (7) calendar days to inspect the Equipment to ensure it meets the conditions of the Contract Documents. At the conclusion of the inspection, the

Engineer shall then notify the Supplier in writing of the outcome, and further actions shall be as stipulated herein.

3.04.13(2) Contract Completion Date (Acceptance of the Work)

- a. When all of the Supplier's obligations under the Contract have been performed satisfactorily, the Owner will provide the Supplier with written notice of the Contract Completion Date. The following events shall occur in order for the Supplier to achieve the Contract Completion Date:
 1. The Supplier shall have achieved Delivery of the Equipment; and
 2. The Supplier shall furnish all documentation required by the Contract and required by law. The documents shall include, but are not limited to, the following:
 - i. Complete and legally effective releases and/or waivers of liens or bond or retainage claims in a form acceptable to the Owner. Subject to prior approval of the Owner, the Supplier may, if approved by the Owner, submit in lieu of the lien or claims releases and waivers: (1) receipts showing payment of all accounts in full; (2) an affidavit that the release and receipts cover all labor, services, materials, and equipment for which a lien or other claim could be filed and that all payrolls, material, and equipment bills and other indebtedness connected with the Work for which the Owner or the Owner's property might in any way be responsible, have been paid; and (3) the consent of the surety, if any, to final payment. If any Subcontractor or supplier fails to furnish a release waiver or receipt in a form satisfactory to the Owner, the Supplier may be permitted by the Owner to furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any lien or similar claim;
 - ii. Certified Payrolls if applicable (Federal Aid projects or if requested);
 - iii. Final Contract Voucher Certification.
 - iv. Affidavits of Wages Paid for the Supplier and all Subcontractors must be submitted to the Owner.
- b. The Supplier agrees that neither completion nor final acceptance shall relieve the Supplier of the responsibility to indemnify, defend, and protect the Owner against any claim or loss resulting from the failure of the Supplier (or the Subcontractors or lower tier Subcontractors) to pay all laborers, mechanics, Subcontractors, materialpersons, or any other person who provides labor, supplies, or provisions for carrying out the work or for any payments required for unemployment

compensation under Title 50 RCW or for industrial insurance and medical aid required under Title 51 RCW.

Final acceptance shall not constitute acceptance of any unauthorized or defective work or material. The Owner shall not be barred from requiring the Supplier to remove, replace, repair, or dispose of any unauthorized or defective work or material or from recovering damages for any such work or material.

3.04.13(3) Waiver of Claims by Supplier

The Supplier's acceptance of the final payment from the Owner constitutes an irrevocable and complete waiver of any and all claims against the Owner under the Contract or otherwise arising from the Work, except for those claims that have been properly identified in writing in advance of final payment, and for which timely and sufficient prior written notice has been given, all in accordance with the Contract.

3.04.14 CORRECTION OF FAULTY WORK AFTER FINAL PAYMENT

The Owner's final payment to the Supplier shall not relieve the Supplier of responsibility for faulty materials, equipment or workmanship. The Supplier shall promptly repair or replace any such defects discovered within the warranty or other applicable limitations period.

3.05 DISPUTES AND CLAIMS

3.05.1 DISPUTES

When disputes occur, the Supplier shall pursue resolution through the Engineer. The Supplier shall follow the notice and protest procedures outlined in Section 3.04. If negotiation using the procedures outlined in Section 3.04 fails to provide satisfactory resolution, the Supplier shall pursue the more formalized method set forth in Section 3.05.2 for submitting claims.

3.05.2 CLAIMS

If the Supplier contends that additional payment is due, has provided timely notices and protests as required by Section 3.04, and the Supplier has pursued and exhausted all of the means provided in that section to resolve the dispute, the Supplier may submit a claim as provided in this Section. Any claim for an increase in the Contract price or for an extension of the Contract Time by the Supplier is waived if the written notifications and protests required in Section 3-04 have been not provided, or if the Engineer is not afforded reasonable access to the Supplier's complete records relating to the claim, as required by Section 3-04, or if a claim is not submitted in accordance with the requirements of this Section. The fact that the Supplier has provided proper notification, properly submitted a claim, or provided the Engineer with access to records, shall not in any way be construed as proving or substantiating the validity of the claim. If, after consideration by the Owner, the claim is found to have merit, the Owner will make an equitable adjustment to either the Contract price, the Contract Time, or both. If the Owner finds the claim to be without merit, no adjustment will be made.

All claims submitted by the Supplier shall be in writing and in sufficient detail to enable the Engineer to ascertain the basis for and amount of the claim. The following information shall accompany each claim submitted:

1. A detailed factual statement of the basis for the claim for additional compensation and/or extension of time, including all relevant dates, locations, and items of work relating to the claim.
2. The date on which the events occurred that give rise to the claim.
3. The name of each person involved in or having knowledge about the claim.
4. The specific provisions of the Contract which support the claim and a statement of the reasons why such provisions support the claim.
5. If the claim relates to a decision of the Engineer that the Contract leaves to the Engineer's discretion or as to which the Contract provides that the Engineer's decision is final, the Supplier shall set out in detail all facts supporting its position relating to the decision of the Engineer.
6. The identification of any documents and the substance of any oral communications that support the claim.
7. Copies of any identified documents, other than Owner documents and documents previously furnished to the Owner by the Supplier, that support the claim (manuals which are standard to the industry may be included by reference).
8. If an extension of the Contract Time is sought:
 - a. The specific days and dates for which the extension is sought;
 - b. The specific reasons why the Supplier believes a time extension should be granted;
 - c. The specific provisions of Section 3-04.12 under which the time extension is sought; and
 - d. An analysis of the Supplier's progress schedule, demonstrating the reasons why a time extension should be granted.
9. If additional compensation is sought, the exact amount sought and a breakdown of that amount into the following categories:
 - a. Labor;
 - b. Materials;
 - c. Direct equipment. The actual cost for each piece of equipment for which a claim is made, or, in the absence of actual cost, the rates established by the AGC/WSDOT Equipment Rental Agreement which was in effect when the Work was performed. The amounts claimed for any piece of equipment shall not exceed the rates established by the Equipment Rental Agreement,

even if the actual cost for such equipment is higher. The Owner may audit the Supplier's cost records, as provided in Section 3.06, to determine actual equipment costs. The following information shall be provided for each piece of equipment:

- i. Detailed description (e.g., make, model, year, diesel or gas, size of bucket);
 - ii. The hours of use or standby; and
 - iii. The specific day and dates of use or standby.
- d. Subcontractor claims (in the same level of detail as specified herein); and
 - e. Other information as requested by the Engineer or the Owner.

10. A notarized statement containing the following language:

Under the penalty of law for perjury or falsification, the undersigned,

_____, _____
(name) (title)

of _____
(company)

hereby certifies that the claim for extra compensation and time, if any, made herein for work on this Contract is a true statement of the actual costs incurred and time sought, and is fully documented and supported under the Contract between the parties.

If the claim for extra time and/or compensation involves any work of a Subcontractor or lower tier Subcontractor, the undersigned duly authorized agent of the Contractor hereby swears that Contractor has investigated the basis for the Subcontractor's or lower tier Subcontractor's claims and has determined that all such claims are justified as to entitlement and amount of money and/or time requested, has reviewed and verified the adequacy of all back-up documentation and has no reason to believe and does not believe that the factual basis for the Subcontractor's or lower tier Subcontractor's claim is falsely represented.

Dated _____/s/ _____

Subscribed and sworn before me this _____ day of _____

Notary Public

My Commission Expires: _____

It will be the responsibility of the Supplier to keep full and complete records of the

costs and additional time incurred with respect to any claim. The Supplier shall permit the Engineer to have access to those records and any other records and documents as may be required by the Engineer to determine the facts or contentions involved in the claim. The Supplier shall retain all records and documents in any way relating to the Work for a period of not less than three years after the Contract Completion Date.

The Supplier shall in good faith attempt to reach a negotiated resolution of all claims with the Engineer or its designee.

The Supplier's failure to submit with the Final Contract Voucher Certification a list of all claims, together with the information and details required by this Section shall operate as a waiver of the claims by the Supplier.

If the Supplier submits a claim in full compliance with all the requirements of this Section, the Owner will respond in writing to the claim as follows:

1. Within forty-five (45) calendar days from the date the claim is received by the Owner, if the claim amount is less than \$100,000;
2. Within ninety (90) calendar days from the date the claim is received by the Owner, if the claim amount is equal to or greater than \$100,000; or
3. If these time periods are unreasonable due to the complexity of the claim, the Supplier will be notified within fifteen (15) calendar days from the date the claim is received by the Owner of the amount of time which will be necessary for the Owner to evaluate the claim and issue a response.

Full compliance by the Supplier with the provisions of this Section is a condition precedent to the Supplier's right to commence a lawsuit or pursue other legal remedies.

3.05.3 TIMELINE AND JURISDICTION

For the convenience of the parties to the Contract it is mutually agreed by the parties that any claims or causes of action which the Supplier has against the Owner arising from the Contract shall be brought within one-hundred eighty (180) calendar days from the end of the warranty period; and it is further agreed that any such claims or causes of action shall be brought only in the Superior Court of the county where the Owner headquarters is located, provided that where an action is asserted against a county, RCW 36.01.05 shall control venue and jurisdiction. The parties understand and agree that the Supplier's failure to bring suit within the time period provided, shall be a complete bar to any such claims or causes of action. It is further mutually agreed by the parties that when any claims or causes of action which the Supplier asserts against the Owner arising from the Contract are filed with the Owner or initiated in court, the Supplier shall permit the Owner to have timely access to any records deemed necessary by the Owner to assist in evaluating the claims or action.

3.05.4 CONTINUATION OF WORK PENDING RESOLUTION OF DISPUTES

The Supplier shall expeditiously carry on the Work, adhere to the progress schedule, and comply with all written directives of the Owner or the Engineer regardless of any dispute or claim that may exist between the Owner and the Supplier. No Work shall be delayed or postponed pending resolution of any dispute or claim. Failure or refusal of the Supplier to comply with the written directives of the Owner or the Engineer shall constitute a material breach of the Contract and immediately constitute grounds for the Owner to withhold payments to the Supplier, suspend the Work or terminate the Contract. Notice under this Section shall be in accordance with other provisions of the Contract.

3.06 AUDITS

If the Supplier requests an equitable adjustment to either the Contract price or the Contract Time, the Owner shall have the right to audit the Supplier's books, records, other documents, and accounting practices and procedures, and to inspect the Supplier's plant, equipment and facilities to examine all facts and verify all direct and indirect costs of whatever nature claimed to have been incurred or are anticipated to be incurred. The right to audit encompasses all subcontracts and is binding upon Subcontractors. All subcontracts that the Supplier enters into shall contain a clause allowing the Owner to audit all Subcontractor books, records, other documents, and accounting practices and procedures, and to inspect the Subcontractor's plant, equipment and facilities. All audits shall be performed by auditors of the Owner during normal working hours at the Supplier's or Subcontractor's office or any other location mutually agreed upon. The Supplier, Subcontractor, and all lower tier Subcontractors shall cooperate fully with the auditor and shall make available all required information. Failure to cooperate or provide requested information shall be grounds for denial of the claim.

3.07 SUSPENSION OF WORK AND TERMINATION OF CONTRACT

3.07.1 SUSPENSION OF WORK

1. The Owner or the Engineer may order suspension of all or any part of the Work if:
 - a. Unsuitable or other conditions that are beyond the reasonable control of the Supplier exist or arise that prevent satisfactory and timely performance of the Work; or
 - b. The Supplier fails to comply with written directives by the Owner or the Engineer to correct deficiencies in its performance of the Work; or
 - c. It is in the public interest.
2. If the Supplier believes that suspension of performance of all or any part of the Work is occasioned by any wrongful act or omission of the Owner, the Supplier shall notify the Engineer in writing within ten (10) calendar days following the beginning of the suspension of the Supplier's intent to seek an equitable adjustment in the Contract Time or the Contract price.

3. If the Supplier believes that the suspension of performance of all or part of the Work has continued for an unreasonable period of time, the Supplier shall give written notice to the Engineer of its intention to seek an equitable adjustment in the Contract Time or the Contract price. In the event that an equitable adjustment is allowed, no adjustment shall be allowed for any time lost or costs incurred more than ten (10) calendar days before delivery of the written notice to the Engineer.

3.07.2 TERMINATION FOR DEFAULT

1. The Owner may terminate the Contract for default, effective seven (7) calendar days following delivery of written notice of default to the Supplier, if the Supplier:
 - a. Refuses or fails to supply enough properly skilled laborers or conforming materials to complete the Work in a timely manner;
 - b. Refuses or fails to prosecute the Work with such diligence as will ensure its physical completion by the required date of Delivery;
 - c. Performs work which deviates from the requirements of the Contract and refuses or fails to correct the non-conforming work;
 - d. Fails to make prompt payment to Subcontractors and/or suppliers for labor or materials;
 - e. Fails to comply with laws, ordinances, rules, regulations or orders of a public authority having jurisdiction; or
 - f. Otherwise fails to follow written directives of the Owner or the Engineer or is in default of a material provision of the Contract.
2. If the Supplier abandons the Work for any cause other than failure of the Owner to make monthly progress payments for Work properly performed, or if the Supplier refuses to comply with requirements of the Contract, the Owner has the additional right to notify the Supplier's performance bond surety and require the surety to complete the Work in accordance with the Contract.

3.07.3 TERMINATION FOR CONVENIENCE OF THE OWNER

The Owner may by written notice terminate the Contract at any time in whole or in part, without cause, and except where termination is due to the Supplier's default, the Owner shall pay the Supplier that portion of the Contract price corresponding to the acceptable Work completed to the Owner's satisfaction, together with reasonable costs, as determined in the sole discretion of the Owner, necessarily incurred by the Supplier in terminating the remaining portion of Work, less any payments made before termination. In no event shall the Owner be required to pay the Supplier any amount in excess of the completed portion Contract price. The Owner shall not be required to pay the Supplier any amount for consequential damages including but not by means of limitation

lost or anticipated profits on Work that is not performed as a result of termination.

The Owner and Supplier may terminate the Contract by mutual written agreement. The Contract to terminate shall include conditions of termination, the effective date, and in the case of termination in part, the portion to be terminated. After the effective date of termination of the Contract, no charges incurred under this Contract, or terminated portions thereof, are allowable.

3.07.4 RESPONSIBILITY OF THE SUPPLIER AND SURETY

Termination of the Contract shall not relieve the Supplier of any responsibilities under the Contract for Work performed. Nor shall termination of the Contract relieve the sureties of their obligations under the bonds required or permitted by the Contract or applicable law.

PART 4

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

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DIVISION 1

GENERAL TECHNICAL REQUIREMENTS

SECTION 01110

SUMMARY OF WORK AND BID PROPOSAL REQUIREMENTS

PART 1 GENERAL

1.1 SCOPE OF WORK

A. GENERAL

This Contract Document covers work necessary to provide a Biosolids Drying System for the Sumner Wastewater Treatment Facility (WWTF) as described herein.

The work to be provided by the Biosolids Drying System Supplier (Supplier) is described herein and includes, but is not limited to, the following:

1. Preconstruction Services
2. Equipment Supply, Construction Services, and Post Construction Services

The Supplier shall be the manufacturer of the Biosolids Dryer. However, the Supplier is not required to be the manufacturer of all components for the Biosolids Drying System. The equipment to be provided by the Supplier is specified in Section 11650A and 11650B.

The Owner expressly reserves the right to reject any or all Proposals and to waive minor irregularities or informalities in any Proposal, and to award the Project to the lowest responsive responsible bidder as it best serves the interest of the Owner. The Owner will assign parts of the Biosolids Drying System Contract to the Construction Contractor (the Contractor) who is awarded the Contract to construct the WWTF Biosolids Equipment Modernization. The Supplier will owe contract obligations to the Owner and the Contractor. By submitting its proposal in response to this call for bids, the Supplier agrees to the following:

1. As to items set forth in this section and/or specified terms within the Contract with the Owner, the Owner selected Contractor is an intended third-party beneficiary, and the Supplier's contractual obligations are both to the Owner and the Owner's selected Contractor.
2. The total amount of the Bidder's pricing for services and equipment to be provided during construction (Bid Item 2), as

finalized in the Agreement with the Owner, will be listed as the Lump Sum price in the Owners bid documents for a General Contractor. The total amount listed for the Biosolids Drying System will be the price bid for Bid Item 2.

The Owner expressly reserves the right to cancel the remainder of the contract after the submittal phase has been completed and prior to issuing the Notice to Proceed with fabrication. This would include deletion of all work associated with Bid Item 2, which includes the manufacture, delivery and startup of the dryer system. Deletion of this work shall be at no additional cost to the Owner.

B. PRECONSTRUCTION SERVICES

1. Submission of Product and Design Submittals as specified in Section 01300 and other descriptive information.
2. Pilot testing of the wet cake produced at the Sumner WWTP shall be performed by the drying system Supplier. Costs for the pilot test and shipping the material are to be borne by the bidder. Plant staff shall assist by filling two 55-gallon drums of wet cake and loading them on a truck provided by the Supplier, for use in conducting the required pilot testing.
3. Design assistance and review of Construction Drawings.
4. Design and layout of the equipment.
5. The System Supplier shall attend two design meetings via online teleconference and participate in two design status conference calls per month for a duration of 5 months. The System Supplier shall assume that each meeting shall require 1 full day and each conference call shall last 2 hours. The meetings and conference calls shall, as a minimum, be attended by the System Supplier's project manager, the electrical engineer responsible for programming, and the lead design engineer. The resumes of the System Supplier's project manager, the electrical engineer responsible for programming, and the lead design engineer shall be included with the Proposal on Attachment B.

C. EQUIPMENT SUPPLY

1. Fabrication and delivery of equipment to the Contractor.
2. Factory testing.

3. Programmable Logic Controllers (PLCs)/computer control system hardware design and software programming.

D. CONSTRUCTION SERVICES

1. Installation assistance to the Contractor.
2. Equipment startup and calibration.
3. Testing, Commissioning, and Training as Specified in Section 01800.
4. Submission of Factory and Field Test Reports, PLC and OI Programming Submittals, Equipment O&M Manuals, and Manufacturers' Affidavits as specified in Section 01300.
5. Initial Performance Testing.
6. Training of the WWTF staff.

E. POST CONSTRUCTION SERVICES

1. Warranties.
2. On-call performance optimization services.

1.2 BID PROPOSAL REQUIREMENTS

Bidders shall submit the Required Bid Forms and as specified in the Bidder's Checklist. Of the Required Forms, the Proposal shall include the following items:

A. BID PROPOSAL

Provide the completed bid proposal, including bid cost with the following completed attachments.

B. BID PROPOSAL ATTACHMENT A – OPERATIONAL PARAMETERS

Provide the declared performance for the operational parameters listed on Attachment A of the Bid Proposal as specified in Section 11650-1.6.

C. BID PROPOSAL ATTACHMENT B – QUALIFICATIONS OF DESIGN, TESTING, AND SERVICE TEAMS

Provide the required information for the design, testing, and service teams as Specified in Section 11650-1.8.

D. BID PROPOSAL ATTACHMENT C – INSTALLATION LIST

Attach an installation list of five similar projects to this Project, including technical data and reference contacts with telephone numbers.

E. BID PROPOSAL ATTACHMENT D – BID SUBMITTAL

Bid submittals shall be complete in all respects and shall be suitable for the Owner to evaluate the proposed design and equipment. Bidders shall provide all submittals listed herein with the bid package. The cost for preparation of the bid submittals shall not be included in the bid price, nor will the bidders be compensated for the bid submittals at a later date. Drawings submitted by the Bidder or System Supplier shall clearly delineate the supplied equipment. All drawings shall clearly indicate all required external connection points to the provided equipment. Partial, incomplete, or illegible submissions may disqualify the bidder.

The following information shall be submitted with the bid submittal:

1. A list of requested deviations from the specifications. The list shall be organized by specification section and referenced by its specific subsection and page. The requested specification deviation list shall contain a detailed description of the requested deviation from the specifications and a detailed written explanation of the reasons for requesting the deviation. The Owner shall be the final authority for determining acceptability of requested deviations.
2. Simplified process and instrumentation diagrams (P&IDs). The simplified P&IDs shall include all flows, conveyance rates, pipe sizes, pressures, and temperatures. P&IDs shall clearly identify equipment, pipes, conduit, conductors, electrical components, and instrumentation. The P&IDs shall show all equipment required for a complete and operational system and shall clearly indicate which equipment items, piping, conduit, conductors, and electrical connections are not included in the Supplier's bid price.
3. A scope of supply list. The scope of supply list shall include a detailed list of all mechanical and electrical equipment items,

including all pumps, conveyors, fans, blowers, compressors, motors, instrumentation, programmable logic controller, operator interface, and gauges that are included in the Supplier's bid. The scope of supply list shall include the equipment manufactures name and model, electrical requirements and connected loads, motor size and type, and features and accessories.

4. Process control narratives, including, but not limited to, start-up and shut-down procedures, and recommended maintenance procedures.
5. A heat and material balance for the proposed system operating at an evaporation rate of 2,050 lb/hr, its maximum design evaporation rate and the minimum turndown evaporation rate for the dewatered cake solids concentration range specified in Section 11650A and 11650B.
6. Maintenance Information
 - a. Provide the following maintenance information based on operational experience at similar installations and provide backup data to support the information provided, including the facility name, actual costs, maintenance hours, conversion factors used, facility name, location, and names and telephone numbers of facility staff familiar with the numbers presented.
 1. Maintenance labor requirements:
 - (i) Provide a list of required maintenance labor tasks for each startup and shutdown and during operation.
 - (ii) Provide the labor time in hours required for each startup and shutdown.
 - (iii) Provide the maintenance labor hours, including labor required for parts replacement, required for every 1,000 hours of operation.
 2. Provide a list of dryer parts, and component replacement items with their delivered replacement cost and the number of hours of operation that each item can be expected to be replaced. Provide an average total replacement item cost (in 2023 US dollars) per every 1,000 hours of operation,

including the delivered cost for the dryer parts, and components for a 20-year life cycle cost.

3. Provide the name and usage rates for any chemicals required and the chemical cost per every 1,000 hours of operation and the assumed chemical cost per unit volume used.

7. Mechanical Information

- a. Plans and sections of the equipment in its proposed location within the existing sludge storage building.
- b. Plan view of each major component and/or skid.
- c. All four section views of each major component and/or skid.
- d. Manufacturer's data, including catalog cut, materials of construction, identifying trade name and model designation, and equipment weight.
- e. Information on codes to which the equipment conforms.

8. Electrical Information

- a. List of preferred variable frequency drives (VFDs), which will be supplied and installed by the Contractor, and an indication if the following manufacturers are acceptable: Allen-Bradley Co, Square-D, Eaton Electrical (Cutler-Hammer).
- b. Motor data shall be supplied as specified for the scope of supply list.
- c. Equipment list of power loads at 480V and 120V with the number of phases, ampacity, and hp ratings shall be included on scope of supply list.

9. Process equipment drawings shall include, but not be limited to:

- a. Materials and equipment specifications.
- b. Equipment dimensions and dimensions between equipment and existing walls, floor, and ceiling.

- c. Piping, air ducts, and electrical conduit sizes, materials, and connection locations, clearly identified and delineated to show the Suppliers scope of supply.
- d. Walkway and platform dimensions.
- e. Location and weight of all pumps, motors, and equipment weighing over 100 pounds, which will require hoisting equipment to be supplied by the Contractor, for removal and maintenance.
- f. Location and approximate footprint of electrical system control panels.
- g. General location, material, and type of support for major equipment items, walkways, and platforms.
- h. Motor size and type.

1.3 WORK BY OTHERS

The following items will be supplied by others, as indicated, and will include:

A. STRUCTURAL (BY CONTRACTOR)

- 1. Building modifications for installation of the Biosolids Drying System.
- 2. Concrete equipment pads.
- 3. Supply of equipment anchor bolts, which shall be sized by the Supplier.
- 4. Installation of equipment accesses platforms, walkways, ladders, and stairs as supplied by the Supplier.

B. MECHANICAL (BY CONTRACTOR)

- 1. Installation of the Biosolids Drying System equipment as supplied by the Supplier.
- 2. Process and utilities piping, pipe supports, and hangers including all interconnecting piping between the supplier's dryer and associated equipment.

3. Air duct from the off-gas systems to the existing biofilter shall be supplied and installed by the Contractor. All other interconnecting air ducts required for the biosolids drying system shall be supplied by the supplier for installation by the Contractor.

C. ELECTRICAL (BY CONTRACTOR)

1. Electrical wiring interconnections (including wiring, conduit and other appurtenances required to provide power connections as needed) from the electrical power source to the Dryer System control panel.
2. Electrical wiring interconnections (including wiring, conduit, specialty cabling, and other appurtenances required to provide power connections as needed) from the plant power distribution and motor control equipment to the Dryer System electrical loads
3. Instrumentation wiring, conduit, and other appurtenances, specialty cabling, required to provide connections as needed between the Dryer System components and the Dryer System control panel.
4. Motor control centers, variable speed drives, panel boards, transformers, and other equipment necessary to provide power distribution and control for all equipment.
5. Communications wiring, conduit and appurtenances required for communications connection to the Owner's Plant Control System.

D. OTHER

1. Receiving, unloading, and safe storage of equipment at site or a storage facility until ready for installation (by Contractor).
2. Equipment installation (by Contractor).
3. Raw materials, chemicals, and utilities during equipment startup and operation including lubricants (by Owner and Contractor).
4. The Contractor shall be required to assist with testing, commissioning and training.
5. Any on-site painting or touchup painting of equipment supplied (by Contractor).

1.4 PROJECT BACKGROUND

The City of Sumner currently owns and operates a conventional activated sludge WWTF consisting of headworks with 1/4-inch fine screens, primary clarifiers, aeration basins with anoxic selectors and oxic/anoxic zones for nitrogen removal, secondary clarifiers, and UV disinfection. The existing solids treatment facilities include grit removal, primary and secondary sludge thickening, anaerobic digestion, digested sludge dewatering via centrifuge, and a gas-fired biosolids drying system. Dewatered digested sludge is currently conveyed via screw conveyor from the centrifuge discharge to the biosolids dryer system. Dried biosolids are then made available as a Class A biosolid for land application and public give-away.

The City of Sumner will solicit bids for construction of WWTF Biosolids Modernization Project in January 2025 with an anticipated notice to proceed to the Construction Contractor in March 2025. The WWTF Biosolids Modernization Project work will include the work required to install the Biosolids Drying System, which shall be supplied as specified herein. The WWTF Biosolids Modernization Project design criteria will be annual average, maximum month, and peak hour influent flows of 4.14 mgd, 6.40 mgd, and 17.50 mgd, respectively, and maximum month influent BOD₅, TSS, and TKN loadings of 11,840 lb/d, 12,660 lb/d, and 2,640 lb/d, respectively.

1.5 PROJECT INFORMATION

The Equipment shall be furnished by the System Supplier and delivered to the Contractor at the WWTF for installation by the Contractor. All workmanship, equipment, and materials incorporated in the work covered under this Contract Document shall be new and of the best available grade or quality.

The System Supplier is directed to become familiar with this Contract Document and the actual and potential difficulties to be encountered for the furnishing of the Drying System. The submission of a proposal indicates the System Supplier has done so.

It is the intent and purpose of this Contract Document to furnish the Biosolids Drying System in good working order for the least practical cost to the Owner.

No change in the bid price will be considered unless the Notice to Proceed with equipment fabrication is more than 240 days following the Notice to Proceed with preconstruction services.

After approval of the design submittals, the Owner may issue the "Notice to Proceed" with equipment fabrication to the System Supplier.

The system supplier shall not commence with any work related to equipment fabrication and delivery prior to receiving the Notice to Proceed with equipment fabrication from the City.

The Notice to Proceed with equipment fabrication is defined as the written notice from the Owner or Engineer to the Supplier authorizing the Supplier to proceed with the fabrication of the equipment and establishing the date on which the Contract time for delivery of the equipment begins.

1.6 DELIVERY AND SCHEDULE

- A. The System Supplier shall provide design submittals according to the schedule in Section 01300-3.4.
- B. After approval of the design submittals, the Owner may issue a Notice to Proceed with equipment fabrication to the Supplier.
- C. The Owner anticipates selecting a Construction Contractor for construction of the Biosolids Modernization Project and issuing a Notice to Proceed for the Construction Contractor in February 2025.
- D. Assuming the Owner issues a Notice to Proceed with fabrication by October 2024. The Supplier shall deliver the Biosolids Drying System no later than November 2025.
- E. It is expected that the Contractor will be required to achieve Substantial Completion of Biosolids Drying System by May 31, 2026, and therefore, the warranty period for the Supplier shall be expected to begin no later than May 31, 2026, and shall be for the time period specified in Section 11000-1.6. Final acceptance shall be expected to be obtained 3 to 4 months after substantial completion and is therefore expected to be achieved by September 30, 2026.

***** END OF SECTION *****

SECTION 01190

REFERENCE STANDARDS

PART 1 GENERAL

1.1 REFERENCED SPECIFICATIONS AND CODES

The following is a list of organizations and codes that are referenced in sections of these Contract Documents. The Supplier shall be responsible for conducting his work and operations and furnishing equipment in accordance with the current, applicable portions of these Specifications and codes referenced in these Contract Documents.

American Concrete Institute (ACI)
American Gear Manufacturing Association (AGMA)
American Institute of Steel Construction (AISC)
American National Standards Institute, Inc. (ANSI)
American Plywood Association (APA)
American Public Works Association (APWA)
American Society for Testing and Material (ASTM)
American Water Works Association (AWWA)
Anti-friction Bearing Manufacturing Association (AFBMA)
Concrete Reinforcing Steel Institute (CRSI)
Electrical Testing Laboratories (ETL)
Institute of Electrical and Electronic Engineers (IEEE)
Instrumentation Society of America (ISA)
Joint Industry Conference (JIC) Electrical Standards for Industrial Equipment
Manufacturer's Standardization Society of the Valve and Fitting Industry (MSS)
National Concrete Manufacturer's Association
National Fire Protection Association (NFPA)
National Electrical Code (NEC)
National Electrical Manufacturer's Association (NEMA)
National Plumbing Code (NPC)
Occupational Safety and Health Administration (OSHA)
Specifications and Illuminating Engineering Society (SIES)
Steel Structures Painting Council (SSPC)
Underwriters Laboratory (UL)
International Building Code (International Code Council) (IBC)
Washington Association of Building Officials (WABO)
Washington State Department of Labor and Industries (WSDL&I)
Washington State Department of Transportation, Standard Specifications for Road, Bridge and Municipal Construction (APWA/WSDOT)
Western Wood Products Association (WWPA)

Equipment with electrical connections is to be approved and labeled for the purpose for which it is to be used by a nationally recognized electrical testing laboratory (NRTL) or other organization acceptable to the State of Washington Department of Labor and Industries.

***** END OF SECTION *****

SECTION 01200

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the contract price for each item, and constitutes full compensation for furnishing all equipment, labor, materials, appurtenances, and incidentals and performing all operations necessary to complete the various bid items in accordance with these Specifications. Payment for each item shall be considered as full compensation, notwithstanding that minor features may not be mentioned herein. The Owner reserves the right to make changes should unforeseen conditions necessitate such changes.

1.2 MEASUREMENT

Measurement for all items shall be as indicated in these Specifications for lump sum price items, and are outlined in detail in this Section of the Specifications, and further are designated in the proposal.

1.3 PAYMENT

Payment for all work will be made at the contract lump sum price as indicated in the Proposal, payment of which shall constitute full compensation, for a complete installation.

A. INDIVIDUAL BID ITEMS

1. Preconstruction Services

- a. Measurement: Shall be measured by lump sum.
- b. Payment: The lump sum contract price shall include costs for the labor, materials, and equipment required to provide the Preconstruction Services in accordance with the Drawings and Specifications. For bidding purposes, the line item amount for PRECONSTRUCTION SERVICES shall not exceed \$75,000.

2. Biosolids Drying System: Equipment Supply, Construction Services, and Post Construction Services
 - a. Measurement: Shall be measured by lump sum.
 - b. Payment: The lump sum contract price shall include all costs for the labor, materials, and equipment required to provide a complete and operable Biosolids Drying System and shall also include all costs for the labor, materials, and equipment required to provide the Construction Services and Post Construction services in accordance with the Drawings and Specifications.

B. PAYMENT SCHEDULE

The Owner will pay the Supplier for Bid Item 1 in full upon receipt of the approved 100 percent design submittal.

Upon approval of the submittals, the Owner reserves the right to delete Bid Item 2 from the contract by change order. Deletion of this work shall be at no additional cost to the Owner.

Unless otherwise entitled to withhold payment, the Owner will pay the Construction Contractor, who is assigned the Contract, for Bid Item 2 according to the following schedule:

<u>Activity</u>	<u>Payment Percentage</u>
Approval of Initial Submittals	20%
Receipt of Major Materials (Billed Monthly)	15%
Equipment Delivery	50%
Successful Completion of Initial Performance Test	10%
Project Acceptance	5%

1.4 PROJECT MATERIALS ON HAND

See General Conditions Section 3.04.10(5).

1.5 PROPERTY DAMAGE CLAIM WITHHOLDING

The Owner may, by its sole discretion, withhold amounts sufficient to pay any property damage claim against the supplier for which the Owner may have knowledge. Regardless of the informalities of the notice of such a claim arising out of the performance of this contract, the term “property damage claim” shall not include any claim for personal injuries or any claim by persons furnishing supplies or materials or performing labor for the Supplier. The amount withheld

will not be paid to the claimant by the Owner, but will be held until either the Supplier secures a written release from the claimant, obtains a court decision that such claim is without merit, or satisfies any judgment in favor of the claimant on such claim. The Owner reserves the right to make payment to the Supplier out of such amounts withheld if the Owner is of the opinion that the claim or claims are without merit.

***** END OF SECTION *****

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes requirements that shall apply to all equipment and materials supplied on the Project. The Supplier shall be responsible for the accuracy and completeness of the information contained in each submittal, and shall ensure that the material, equipment, or method of work shall be as described in the submittal. The Supplier shall verify that all features of all products conform to the requirements of the Specifications. Submittal documents shall be clearly edited to indicate only those items, models, or series of equipment that are being submitted for review. All extraneous materials shall be crossed out or otherwise obliterated. The Supplier shall ensure that there is no conflict with other submittals and notify the Engineer in each case where his submittal may affect the work of another contractor or the Owner. Where approved substitutions of specified equipment affect other materials or equipment, mechanical, structural, or electrical work, the Supplier shall ensure that there are no conflicts with the other submittals.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01110	Summary of Work
11000	Equipment General Provisions
11010	Vibration and Critical Speed Limitations
11650	Biosolids Drying System
Division 13	Special Construction
Division 15	Mechanical
Division 16	Electrical

1.3 WORK INCLUDED

Submittals required for this work shall include any or all of the following as required by the particular Specification section:

- A. Bid Submittal: As Specified in Section 01110.
- B. Design Submittals (60- and 100-percent submittals).
- C. Factory and Field Test Reports.

- D. PLC and OI Programming Submittal.
- E. Equipment O&M Manual Submittal (Drafts and Final).
- F. Manufacturer's Affidavits: As Specified in Section 11000.

1.4 SUBMITTAL INFORMATION

Shop, catalog, and other appropriate drawings and information shall be submitted to the Engineer for review prior to fabrication or ordering of all equipment and materials specified. The number of copies of submittal information to be submitted shall be as indicated below.

All submittal information shall be sent by the Supplier to the Engineer. The Supplier shall assign a separate submittal number to each item or group of items that relate to each Specification section. Submittal numbers shall be assigned in consecutive ascending order, with the first project submittal assigned the number "1." Resubmittals shall be numbered using the same number followed by an alphabetical suffix. All submittals shall bear the Supplier's certification that he has reviewed, checked, and approved the submittal information prior to transmitting to the Engineer. The submittal number and related specification section shall be marked on each submittal.

Submittals shall be comprehensive and complete enough to enable review of all details of system design. Submittals shall be complete in all respects, incorporating all information and data listed herein and all additional information required for evaluation of the proposed equipment and evaluation of compliance with the Contract. Where applicable, submittals shall include information on standards of construction and/or manufacturing and codes to which the individual component conforms.

1.5 PAYMENT

Refer to the payment schedule in Specification Section 01200.

PART 2 PRODUCTS

2.1 SUBMITTAL REQUIREMENTS

Product submittals shall contain the detailed information described in Section 11000 and in the representative technical sections for each material and type of equipment.

The Supplier may submit one copy of submittals electronically in lieu of submitting hard copies for all submittals except Equipment Manuals. Hard copies of Equipment Manuals must be submitted. If submittals are provided electronically, only one reviewed copy will be returned to the Contractor. Electronic submittal drawings shall be formatted in pdf and AutoCAD format, and hard copy submittals shall be to scale and 11" x 17" format.

See Part 3.4 of this Section for the schedule of submittals and submittal review.

The Engineer shall review the submittal and return all but one copy of the marked-up submittal. The reproducible original will be retained by the Engineer. The returned submittal shall indicate one of the following actions:

- A. If the review indicates that the material, equipment, or work method complies with the project Specifications, submittal copies will be marked "NO EXCEPTIONS TAKEN." In this event, the Supplier may begin to implement the work method or fabricate or purchase the material or equipment covered by the submittal.
- B. If the review indicates limited corrections are required, copies will be marked "MAKE CORRECTIONS NOTED." The Supplier may begin implementing the work method or fabricating or purchasing the material and equipment covered by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in O&M data, a corrected copy shall be provided.
- C. If the review reveals that the submittal is insufficient or contains incorrect data, copies will be marked "AMEND AND RESUBMIT." Except at his own risk, the Supplier shall not undertake work covered by this submittal until it has been revised, resubmitted, and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."
- D. If the review indicates that the material, equipment, or work method does not comply with the project Specifications, copies of the submittal will be marked "REJECTED - SEE REMARKS." Submittals with deviations that have not been identified clearly may be rejected. Except at his own risk, the Supplier shall not undertake the work covered by such submittals until

a new submittal is made and returned marked either “NO EXCEPTIONS TAKEN” or “MAKE CORRECTIONS NOTED.”

2.2 DESIGN SUBMITTALS

A. TYPES OF SUBMITTAL CONTENTS

1. MANUFACTURER’S LITERATURE

Where the contents of submitted literature includes data not pertinent to the submittal, the portion(s) of the contents being submitted for the Engineer’s review shall be clearly indicated.

2. SHOP DRAWINGS

Shop drawings shall be submitted in the form of blue-line or black-line prints of each sheet. Blueprint submittals will not be acceptable.

All shop drawings shall be accurately drawn to a scale sufficiently large enough to show pertinent features and method of connection or joining. On all shop drawings, figure dimensions shall be used as opposed to scaled dimensions.

3. COLOR AND MATERIAL SAMPLES

All material samples shall be of the exact article proposed to be furnished for the work and shall be submitted in the quantity required. Samples shall be returned to the Supplier, with one retained by the Engineer.

Unless the precise color is specifically described in the Specifications, accurate color charts shall be submitted to the Engineer for his review and selection whenever a choice of color or pattern is available for a specified product.

4. DESIGN CALCULATIONS

Where required in the Specifications, a minimum of five copies of design calculations shall be submitted to the Engineer. Design calculations shall be complete, concise, and in an easy-to-read format. Sizing calculations based on site specific pilot test results shall be included with design calculations. If required in the particular section to which the design calculations pertain, test data and calculations from previous full-scale pilot or treatment plant

testing shall be submitted with the design calculations. All design calculations shall be stamped by a Professional Engineer.

2.3 DESIGN SUBMITTALS

Design submittals shall be submitted as specified in Section 11000 and as specified herein. Submittals shall be comprehensive and complete enough to enable review of all details of the system design. Bidders shall note that although some items listed herein are redundant to the bid submittals requirements, they shall be required to be submitted with the 60 percent submittal. Items which are identified as “NO EXCEPTIONS TAKEN” in the Engineers review of the 60-percent submittal do not need to be submitted with the 100 percent submittal if there have been no changes made to the design associated with that item. The following information shall be submitted with the design submittal:

- A. Detailed process and instrumentation diagrams (P&IDs). The detailed P&IDs shall include all flows, conveyance rates, pipe sizes, pressures, temperatures and other measurement ranges. The detailed P&IDs shall also include all signal information, component ratings and ranges, and shall have functional descriptions of each item. P&IDs shall clearly identify equipment, pipes, electrical components, and instrumentation. The P&IDs shall show all equipment required for a complete and operational system and shall clearly indicate which equipment items, piping, and electrical connections are not included in the Suppliers bid price.
- B. A scope of supply list. The scope of supply list shall include a detailed list of all mechanical and electrical equipment items, including all instrumentation, programmable logic controller, operator interface, and gauges that are included in the Suppliers bid. The scope of supply list shall include the equipment manufactures name and model, electrical requirements and connected loads, motor size and type, and features and accessories.
- C. Process control narratives, including, but not limited to, start-up and shut-down procedures, and recommended maintenance procedures.
- D. A pilot test report shall be submitted along with videos demonstrating the dryer performance as part of the dryer bid package. The report shall include drying curves, the observed heat transfer rate, initial and final %DS, %VS, and density.
- E. A heat and material balance for the proposed system operating at both its maximum design evaporation rate and the minimum turndown evaporation

rate for the dewatered cake solids concentration range specified in Section 11650.

F. Mechanical Information

1. Plans and sections of the equipment in its proposed location within the existing sludge storage building.
2. Plan view of each component and/or skid showing all process connection and tie-in points and location and size of all utility connection points.
3. All four section views of each component and/or skid showing all process connection and tie-in points and location and size of all utility connection points.
4. Details of equipment and components.
5. Weights of each skid, including dry weight and operating weight. Weights of the heaviest removable pieces of equipment from each skid, weight of individual auxiliary pieces of equipment including but not limited to pumps, conveyors and storage tanks. Drawings showing the locations and loads associated with each bearing point.
6. Connection and interconnection diagrams and drawings showing connection points and piping required between component parts of equipment and/or between equipment and outside facilities.
7. Fabrication details for any field fabricated items.
8. Manufacturer's data, including catalog cut, materials of construction, identifying trade name and model designation, and equipment weight.
9. Information on codes to which the equipment conforms.

G. Electrical Information

1. Approximate footprint of expected individual control system enclosures.
2. Electrical drawings, including power/wiring plans and details, one line diagrams, cable/conduit schedule, physical location of each

motor with clear indication of motor horsepower and electrical load.

3. Quantities and sizes of variable speed drives required and motor starters required to be supplied and installed by others.
4. Instrumentation and control drawings, including instrument plans, wiring diagrams, elementary diagrams, loop diagrams, control system network diagrams, electrical motor control schematics.
5. Electrical panel schematics, panel fabrication drawings, and arrangement drawings.
6. Manufacturer's data including all manufactured equipment supplied by the Supplier showing dimensions, weights, and physical and electrical requirements.
7. Control strategy narrative.
8. Equipment list of power loads at 480V and 120V with the number of phases, ampacity, kVA, kW, and hp ratings shall be included on scope of supply list.

2.4 FACTORY AND FIELD TEST REPORTS

Factory and field testing shall be completed as required in Sections 01800, 11000, and in the respective technical sections of the specifications. Where testing is required, a minimum of five copies of all test reports shall be submitted to the Engineer.

2.5 PLC AND OI PROGRAMMING SUBMITTAL

Provide to the Engineer subsequent to the acceptance of the product submittal but no less than 3 months prior to the control systems test.

For each PLC, include the project files created by the PLC programming software. The PLC code shall include provisions for communications with the plant SCADA system as described below and in Division 16. These project files shall be sufficient to reload the operating code to the PLC using the PLC programming software. The project files shall include annotation and commenting (in the English language) sufficient to allow a reviewer to follow the PLC logic.

For each PLC, include PLC tagnames exported to a tab or comma delimited text file. This text file shall include all tagnames accessible from a remote PLC, OI, or

HMI. For each tagname, the text file shall include the name, description, and any additional information required to retrieve the data remotely.

For each PLC, include a PDF of the PLC code. Create the PDF using the PLC programming software and a software based PDF creator. (For this item, a PDF created from scanned documents is not acceptable.) The PDF shall include the PLC configuration, a complete tagname crossreference, and all of the PLC code.

For each OI, include the project files created by the OI programming software. These project files shall be sufficient to reload the operating configuration to the OI using the OI programming software.

For each OI, include OI tagnames exported to a tab or comma delimited text file. These text files shall include all tagnames for information from remote PLCs. For each tagname, the text files shall include the name, description, source of the information, data type, and scaling information.

The files included in submittal shall be provided as both pdf and “native programming” formats.

Electronic submittals shall be via email or cloud-based file share service.

2.6 EQUIPMENT O&M MANUALS

Five manufacturer’s equipment O&M manuals shall be submitted to the Engineer for review. All manuals except one return copy with comments will be retained by the Engineer.

The following information shall be furnished for all items of equipment installed on the project requiring operational and/or maintenance procedures, and for any additional items indicated by the Engineer.

A. LUBRICATION INFORMATION

This shall consist of the manufacturer’s recommendations regarding the lubricants to be used and the lubrication schedule to be followed.

B. CONTROL DIAGRAMS

Diagrams shall show internal and connection wiring.

C. STARTUP PROCEDURES

These instructions consist of equipment manufacturer’s recommendations for installation, adjustment, calibration, and troubleshooting.

D. OPERATING PROCEDURES

These instructions consist of the equipment manufacturer's recommended step-by-step procedures for starting, operating, and stopping the equipment under specified modes of operation.

E. PREVENTIVE MAINTENANCE PROCEDURES

These instructions consist of the equipment manufacturer's recommended steps and schedules for maintaining the equipment.

F. OVERHAUL INSTRUCTIONS

These instructions consist of the manufacturer's directions for the disassembly, repair, and reassembly of the equipment and any safety precautions that must be observed while performing the work.

G. PARTS LIST

This list consists of the generic title and identification number of each component part of the equipment.

H. SPARE PARTS LIST

This list consists of the manufacturer's recommendations of number of parts, which should be stored by the Owner and any special storage precautions, which may be required.

I. EXPLODED VIEW

Exploded or cut views of equipment shall be provided if available as a standard item of the manufacturer's information. When exploded or cut views are not available, plan and section views shall be provided with detailed callouts.

J. SPECIFIC INFORMATION

Where items of information not included in the above list are required, they will be provided as described in the specifications for the equipment.

In addition, the following items of equipment shall be provided with Maintenance Information Summaries in each appropriate section of the equipment manuals, prepared according to the format specified herein:

- Dryer equipment
- pumps
- compressors and fans
- conveyors
- Instrumentation, including flow meters
- Valves (larger than 1-inch in size)
- Control equipment, including PLC and operator interface
- Electrical equipment, including control panels

Maintenance information summaries shall be prepared on 8-1/2-inch x 11-inch paper only and shall contain the following information compiled from manufacturer's recommendations in the order shown.

- A. Description or name of item of equipment.
- B. Manufacturer.
- C. Name, address, and telephone number of local manufacturer's representative.
- D. Serial number (where applicable).
- E. Equipment nameplate data including model number.
- F. Recommended maintenance procedures:
 - 1. Description of procedures.
 - 2. Maintenance frequency required.
 - 3. Lubricant(s) or other materials required (where applicable), including type of lubricant, lubricant manufacturer, and specific compound.
 - 4. Additional information as required for proper maintenance.
- G. Recommended spare parts (where applicable).

The maintenance information summaries shall be placed at the beginning of the manual.

All operation and maintenance information shall be comprehensive and detailed, and shall contain information adequately covering all normal operation and maintenance procedures.

For ease of identification, each manufacturer's brochure and manual shall be appropriately labeled with the equipment name and equipment specification number as it appears in the project Specifications. The information shall be organized in three-ring binders with a maximum 3-inch width per volume. The binders shall be provided with a table of contents and tab sheets to permit easy location of desired information.

All information shall be specifically for items of equipment installed as part of the Project. Material not directly applicable shall be removed or omitted from catalogs or other printed information. If manufacturer's standard brochures and manuals are used to describe operating and maintenance procedures, such brochures, and manuals shall be modified to reflect only the model or series of equipment used on this project. Extraneous material shall be crossed out neatly or otherwise annotated or eliminated.

Lubricants shall be described in detail, including type, recommended manufacturer, and manufacturer's specific compound to be used.

It shall be the responsibility of the Supplier to ensure that all operation and maintenance materials are obtained. Material submitted must meet the approval of the Engineer prior to project acceptance.

All costs of furnishing operation and maintenance materials, as herein specified, shall be merged into the prices bid for applicable items of equipment in the Proposal.

Only equipment and materials properly installed and operating in good order with approved Operational and Maintenance information will be recommended for acceptance in the final work.

The Contractor shall also supply three CD-Rom or USB copies of the final equipment manuals in a tabbed, searchable, .pdf format, with a table of contents bookmarked to provide a navigation link to each section of the manual. The O&M Manual shall include a copy of the information from "PLC and OI Programming Submittal" incorporating any revisions through the successful completion of the performance test.

PART 3 EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

A. GENERAL

Each submittal shall be accompanied by a letter of transmittal showing the date of transmittal, specification section to which the submittal pertains, submittal number, and a brief description of the material submitted.

B. RESUBMITTALS

When material is resubmitted for any reason, it shall be submitted under a new letter of transmittal and referenced to the previous submittal.

3.2 REVIEW OF SUBMITTALS

The Engineer shall review all submittals for general conformance with the design and other requirements of the Contract Documents. Markings or comments shall not be construed as relieving the Supplier from compliance with the Contract Documents. Submittals may be rejected based on inadequate information and/or not meeting the requirements of the Specifications. Rejection of submittals requires action on the part of the Supplier to correct the reason for the rejection. The Supplier remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes and for techniques of assembly and installation.

3.3 COORDINATION OF PRODUCT SUBMITTALS

A. GENERAL

Prior to submittal for review by the Engineer, all data shall be fully coordinated with the Contractor, including the following:

1. All field dimensions and conditions.
2. All trades and public agencies involved, including necessary approvals.
3. All deviations from the Contract Documents.

B. GROUPING OF SUBMITTALS

1. All submittals shall be grouped with associated items, unless otherwise specifically permitted by the Engineer.

2. The Engineer may reject the submittals in their entirety or any part thereof, if not in accordance with the Contract Documents.

C. CERTIFICATION

Submittals shall be accompanied with a signed cover letter certifying that the Supplier has reviewed, checked, and approved the shop drawings prior to forwarding them to the Engineer.

3.4 TIMING OF PRODUCT SUBMITTALS

Design submittals, as part of preconstruction services, shall be received by the Engineer according to the following schedule, in calendar days:

- A. Preliminary product Submittals – 30 days following notice to proceed (NTP).
- B. Receipt of Engineer's Review Comments – 45 Days following NTP.
- C. 60-percent product submittals – 90 days following Notice to Proceed (NTP).
- D. Receipt of Engineer's review comments – 105 days following NTP.
- E. 100-percent product submittals – 135 days following NTP or 30 days following receipt of engineer's review comments on 60 percent product submittal.
- F. Receipt of Engineer's review comments – 150 days following NTP or 15 days following receipt of the 100 percent product submittal.

The following submittals shall be submitted by the Supplier as part of the equipment supply, construction services, and post construction services:

- A. Factory and Field Test Reports.
- B. PLC and OI Programming Submittal.
- C. Equipment O&M Manual Submittal (Drafts and Final).
- D. Manufacturer's Affidavits: As Specified in Section 11000.

No additional or separate payment will be made for costs of delays occasioned by tardiness of submittals on the part of the Supplier or the Engineer's requirement to amend submittals.

3.5 QUALIFICATION AND SUBSTITUTIONS

A. GENERAL

In order to establish a basis of quality, certain processes, types of machinery and equipment or kinds of material may be specified herein by designating a manufacturer by name and referring to his brand or product designation. It is not the intent of these Specifications to exclude other processes or materials of a type and quality equal to those designated.

Whenever a manufacturer's name, brand, or item designation is given, it shall be understood that the words "or equal" follow such name or designation whether in fact they do so or not, except for the equipment specified in Divisions 11, 13, and 14 and Section 16910, for which the sentence or phrase "No other manufacturers shall be accepted" follows the list of approved manufacturers. For these pieces of equipment, only the named manufacturers in the specifications shall be supplied.

It shall not be assumed that the phrase "or equal" means that material, equipment, or methods will be approved as equal by the Engineer unless the item has been specifically approved in writing for this work by the Engineer.

No extra costs will be allowed the Supplier for any changes required to adopt substitute equipment; therefore, the Supplier's proposal, including any approved substitutions, shall include all costs for any modifications to the work, additional piping or changes in piping, electrical changes, or any other modifications which may be necessary for approval and adoption of the proposed alternative equipment.

B. ALTERNATE BIDS

The equipment of manufacturers who have not been named as approved suppliers in the Specifications may, at the option of the bidder, be bid as alternate major equipment items in the spaces provided on the bid proposal. If the Owner wishes to select any of the alternate major equipment item bids offered by the bidder in lieu of the bid for the preapproved equipment for that item, notification will be made after submittal of the Proposal.

C. AVAILABILITY OF SPECIFIED ITEMS

1. Verify prior to bidding that all specified items will be available in time for delivery during orderly and timely progress of the work.
2. In the event the specified item or items will not be available, notify the Engineer prior to submittal of bid.
3. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Supplier, will be backcharged as necessary and shall not be borne by the Owner.

3.6 EQUIPMENT O&M MANUALS

All final manufacturer's equipment manuals submitted will be retained by the Engineer. Provide four copies of the final manuals. Prior to submittal, the Supplier shall check the manuals for accuracy and completeness in accordance with Part 2.4 of this Section. The Supplier shall verify the serial number(s) of the equipment actually installed with that described in the manual. The manual shall be bound in post binders, indexed to the Specifications, and be consistent with the final O&M manuals provided by the Construction Contractor.

Prior to the 95 percent payment for project work, the final equipment manuals shall have been submitted to and approved by the Engineer. Supplier shall maintain equipment manual files until final approval copies have been approved by the Engineer prior to 95 percent payment.

***** END OF SECTION *****

SECTION 01800

TESTING, COMMISSIONING, AND TRAINING

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section is the testing, commissioning, and training performed by the Biosolids Drying System Supplier (the Supplier) for all mechanical, electrical, and instrumentation systems included with the Biosolids Drying System, functioning as completed facilities and as the completed project. The Supplier must coordinate with the Owner and the Contractor to perform the testing, commissioning and training.

See Sections 11000 and 11650 for additional testing requirements. See also Section 16050 for additional electrical and instrumentation system testing requirements.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
11000	Equipment General Provisions
11650	Biosolids Drying System
Division 11	Equipment
Division 15	Mechanical
Division 16	Electrical

1.3 TESTING

A. GENERAL REQUIREMENTS

All equipment and partially complete or fully completed portions of the work included in this Contract shall be tested and inspected to prove compliance with the Contract requirements. Unless otherwise specified, all costs of testing, including temporary facilities and connections, shall be borne by the Supplier. For the purpose of this Section, equipment shall mean any mechanical, electrical, instrumentation, or other device with one or more moving parts or devices requiring an electrical, pneumatic, or hydraulic connection.

No tests specified herein shall be applied until the item to be tested has been inspected and approval given by the Engineer for the application of such test.

Tests and inspection shall include:

1. The delivery acceptance test and inspections.
2. The Mechanical Tests (see Section 11650-2.4).
3. The Control Systems Test (see Section 11650-2.5).
4. The Integrated System Test (see Section 11650-2.6).
5. The Process Performance Test (see Section 01800-1.3.F).
6. The commissioning of the completed Biosolids Drying Equipment System by District personnel.

Tests and inspections, unless otherwise specified or accepted, shall be in accordance with the recognized standards of the industry. The Supplier shall see that scheduling and performance of all tests are coordinated with the Owner, the Contractor, involved subcontractors, and suppliers. The Supplier shall allow for up to two additional setpoint changes per adjustable system variable during testing. No extra costs or time allowances shall be provided as long as this setpoint allowance is not exceeded.

The form of evidence of satisfactory fulfillment of delivery acceptance test and inspection requirements shall be at the discretion of the Engineer, either by tests and inspections carried out in his presence or by certificates or reports of tests and inspections carried out by approved persons or organizations. The Supplier shall provide and use forms that include all test information, including specified operational parameters. The content of the forms used shall be acceptable to the Engineer.

A master test log book shall be maintained by the Supplier, which shall cover all tests including piping, equipment, electrical, and instrumentation. The master test log book shall be provided with loose-leaf pages that shall be copied weekly after updating for transmittal to the Engineer. The master test log book shall be transmitted to the Engineer upon completion of the Project.

B. DELIVERY ACCEPTANCE TESTS AND INSPECTIONS

The factory tests and delivery acceptance tests and inspections shall be at the Supplier's expense for any equipment specified herein and shall include the following:

The delivery acceptance tests and inspections shall be at the Supplier's expense for any equipment specified herein and shall include the following:

1. Test of items at the place of manufacture during and/or on completion of manufacture, comprising hydraulic pressure tests, electric and instrumentation subsystems tests, performance and operating tests and inspections in accordance with the relevant standards of the industry and more particularly as detailed in individual clauses of these Specifications to satisfy the Engineer that the items tested and inspected comply with the requirements of this Contract.
2. Notify the Engineer of testing dates 3 weeks prior to testing. Certified test results shall be submitted to the Engineer by the Supplier.
3. Inspection of all items delivered at the site so that the Engineer may be satisfied that such items are of the specified quality and workmanship and are in good order and condition at the time of delivery. The Contractor shall be prepared to remove all coverings, containers, or crates to permit the Engineer to conduct his inspection. Should the Engineer find, in his opinion, indication of damage or deficient quality of workmanship, the Supplier shall provide the necessary documentation or conduct such tests deemed necessary by the Engineer to demonstrate compliance. Compensation for tests and work related thereto arising out of this requirement shall be in accordance with the provisions of Section 3 of General Conditions.

C. COMPONENT AND SYSTEM TESTS

1. General

All equipment shall be calibrated and tested by the Supplier to the satisfaction of the Engineer before any facility is put into operation. Once written certification of proper installation by the Contractor has been issued, the Supplier shall field calibrate all instruments where possible, with the exception of instruments that have been factory calibrated. Instruments that cannot be field calibrated will be checked for accuracy in the field.

The Component and System Tests shall be as specified in the respective technical specifications, and shall be made to determine whether the equipment has been properly assembled, aligned,

adjusted and connected. The purpose of the Component and System Tests shall be to demonstrate the proper operation of the System components and features. The Supplier shall operate all valves, controls, and other devices to ensure they are functional and ready for performance testing.

2. Procedures

At least 30 days before the scheduled date of any component test, the test procedure to be followed shall be submitted to the Engineer for review and shall include details of the installed tests and inspection procedures the Contractor, with assistance from the Supplier, proposes to adopt for testing and start-up of all equipment to be operated singly and together, except when such procedures have been covered in the technical specifications. Component testing shall not start until the Engineer has reviewed the test procedures. The Engineer must approve subsequent modifications. The Engineer reserves the right to modify the test procedures as conditions warrant. All testing shall be performed to the Engineer's satisfaction.

The Contractor shall conduct, under supervision of Supplier, a mechanical component test of each installed piece of equipment. The mechanical tests shall demonstrate that each unit:

- a. Has not been damaged by transportation or installation.
- b. Has been properly installed.
- c. Has no mechanical defect.
- d. Is free of overheating of any parts.
- e. Is free of all objectionable vibration.
- f. Is free of overloading of any parts.
- g. Is free of excessive noise.
- h. Has all interlocks operating correctly.

No handling or processing of either dewatered sludge cake or recycle material by any equipment and/or system shall take place during the mechanical test.

Supplier shall mechanically test all major pieces of equipment and systems.

It shall be the responsibility of the Contractor to communicate with the Owner and the Supplier to arrange the times for testing and startup activities.

The Supplier shall report to the Owner any changes, adjustments, or replacements required for the Biosolids Drying System to operate as specified. The Supplier must remedy any problems due to equipment manufacture, as determined by the Owner. The Contractor must remedy any problems due to improper equipment installation, as determined by the Owner.

D. CONTROL SYSTEM TESTS

The complete control system shall be tested to confirm that the system meets or exceeds the specified requirements. Tests shall cover the full operational range or capability of the system and shall include, but not be limited to:

1. Signal verification (check or correct voltages, current polarity, contact “sensor,” etc.).
2. Database verification (check for correct range, alarm limits, engineering units, message repairs, etc.).
3. Operator input to the controls system.
4. Verification of application software.
5. Alarm log and display generation.
6. Human-machine interface.

All field instrumentation and controls that are an integral part of the equipment being testing shall also be tested.

Any defects in the equipment or operating controls or failure to meet the requirements of the specification shall be promptly corrected at no additional cost to the Owner.

E. INTEGRATED SYSTEM TESTS

Upon successful completion of the Component and Control System Tests, an integrated system test using as much field equipment as possible shall be performed.

The integrated systems test shall demonstrate successful functioning of the Biosolids Drying System and all its elements and software capabilities through planned test cases with actual system on-line operating conditions.

All process and control functions shall be tested, as well as designated combinations and logical sequence.

Operation of I/O peripherals shall be checked out.

During the integrated system test, the Biosolids Drying System shall process dewatered sludge and demonstrate that the System can function continuously and reliably and produce a product as specified. The Owner shall be responsible for supplying dewatered sludge required for initial startup, in accordance to the specified minimum properties and utilities as described in section 11650-1.6 A through J.

The Supplier shall notify the Owner at least 96 hours prior to the integrated systems test so that the Owner can arrange for supplying dewatered sludge to the system during the test period.

All completed tests, malfunctions, corrective measures and downtime shall be chronologically logged.

The integrated system test shall be completed before the Supplier conducts the Process Performance Test as specified herein.

During the integrated system test, the Supplier shall provide all personnel to operate the system to perform the test, and analyze samples.

The Integrated System Test shall consist of at least three consecutive, 8-hour days of system operation.

F. PROCESS PERFORMANCE TEST

1. General

The performance test shall be conducted to demonstrate that the Biosolids Drying System is operating properly and capable of meeting the performance criteria specified.

The supplier shall submit a detailed protocol to be followed for the PT at least 60 days in advance of initiating the PT. This protocol requires written approval by the Owner before initiating the tests. The protocol shall specifically detail the operational mode of the system, sampling program, method and schedule, equipment and system monitoring data to be collected with each sampling, the daily (manual) log format, all sampling and analytical procedures, and calculations required to document compliance with the performance criteria outlined herein. Upon acceptance of the protocol by the Owner, the Supplier shall commence the performance test. The Supplier shall collect and process samples at the locations and frequency outlined in the approved PT protocol for the test period.

During the PT, the Owner shall have the option of collecting samples for independent analyses to confirm measurements and analyses conducted by the Supplier and the Contractor. The Engineer and the Owner shall have the option of witnessing all testing performed by the Supplier and the Contractor. The Supplier shall notify the Engineer a minimum of 2 weeks in advance of testing.

The Performance Test shall be conducted after successful completion of field mechanical tests, control system tests, and the integrated system test to ensure that all equipment is in operating condition.

2. Performance Test Conditions

The performance test and guarantees set forth in the Sections below are made expressly subject to each of the following preconditions (the "Performance Conditions") having been satisfied.

The Performance Test must begin within the first 30 days after the Initial Continuous Operation Date. The "Initial Continuous Operation Date" means the first date on which the sludge dryer

system has completed five days of continuous operation. Continuous operation shall be defined as operation eight or more hours at design capacity during a 24-hour period.

If the sludge drying system does not demonstrate satisfactory Performance Tests in which all of the Performance Conditions have been met, then System Supplier shall have up to 180-days (calendar days) from the beginning of the first Performance Test to satisfactorily conduct a Performance Test. This time period (the "Test Limitation Period") shall be extended for a period of time equal to the time lost by reason of any delay resulting from the actions of the Owner, third parties, acts of force majeure, delays caused by equipment outside the supply of System Supplier and other causes outside of System Supplier's reasonable control. Claims for extension of the test limitation period shall be made within 7 days (calendar days) of the start of the period for which a claim for extension shall start.

- a. The Paddle Drying System is to be operated and maintained the Suppliers instructions and according to the procedures set forth in the O&M Manual issued by the Supplier. All testing shall be performed while the Drying System is operating at steady state condition.
- b. The System Supplier shall submit a detailed scope of work and testing plan ("Performance Test Protocol") for the conduct of the Performance Test at least 60-days (calendar days) prior to the initiation of the Performance Test.
- c. The Performance Test shall be conducted after successful completion of field mechanical tests, control system tests, and the integrated system test to ensure that all equipment is in operating condition.
- d. The Owner and System Supplier shall jointly plan the conduct and execution of the Performance Test and the System Supplier's representative shall direct all operations during the Performance Test.
- e. The Owner shall provide adequate quantity and quality of power, manpower, cooling water, natural gas/digester gas, a mutually agreed upon emulsion polymer, consumables and other utilities as required to operate the equipment and as reasonably specified by the System Supplier prior to commencing the performance test.

- f. If the performance test is conducted using digester gas, the owner will have the gas tested to determine the LHV of the digester gas. If natural gas is used during the performance test, the LHV as certified by the natural gas supplier will be used.
- g. The Owner shall provide biosolids (dewatered sludge) in sufficient quantity and quality as described in Section 11650-1.6(A.1) and 1.6(A.2).
- h. The Owner shall supply operators in training to participate in assistance with sample collection.
- i. For the Performance Test to be deemed satisfactory each of the performance guarantee criteria must be simultaneously achieved, or exceeded.
- j. If the sludge drying system achieves a satisfactory performance test; then the System Supplier shall have no further obligations with respect to demonstrating the performance guarantee.
- k. The exclusive means for determining whether a satisfactory Performance Test has been conducted and the performance guarantee criteria demonstrated shall be by the test of the sludge dryer system in accordance with procedures set forth in this Section.

3. Guarantee

Subject to the Performance Conditions being satisfied, Supplier guarantees that the Biosolids Drying System as described in Section 11650 will perform as specified herein and as declared in Attachment A of the Bid Proposal.

Evaporation Rate: The Biosolids Drying System will evaporate a minimum of 1,640 pounds per hour (lb/hr) of water and will operate at the maximum evaporate as declared in Attachment A of the Bid Proposal.

Final Product: Product quality shall be determined by moisture content analysis and sieve analysis performed on samples of the product material. Product samples shall be taken from the point where the material drops into the screening unit. Of the granules

classified as final product, 95 percent by weight as determined by sieve analysis, shall be between 0.5 and 6 mm at an average dryness of 92 percent DS as declared in Attachment A of the Bid Proposal.

Specific Heat Energy Consumption: The heat energy consumption of the Biosolids Drying System shall not exceed the value declared on in Attachment A of the Bid Proposal with units of BTU/lb of water evaporated based on the lower heating value (LHV) of natural gas, at the evaporation rate as defined herein.

4. Performance Tests

Two test runs consisting of a total duration of 48 hours will constitute the Performance Test. The ability of the Drying System to achieve the Performance Guarantees shall be judged by the results obtained during the “Performance Test” as they apply to the Performance Guarantees set forth in Section 1.3.F(3) with the following assumptions:

- a. Shutdowns caused by parties other than the System Supplier, its subcontractors, vendors or agents, or equipment not delivered by the Supplier or not installed or commissioned under the Suppliers’ supervision will not count against test downtime requirements.
- b. Shutdowns or poor test results caused by biosolids not in accordance with the parameters described in 11650-1.6(A) will not count against test downtime or performance results.
- c. The Owner will obtain all required operating permits, including the air permit.
- d. The System Supplier will be responsible for the costs of all required testing and the 3rd party air emission testing. The System Supplier shall prepare reports of performance test results.
- e. The owner will be responsible for handling and disposal of all biosolids.
- f. The Performance Test results will be evaluated by a review team composed of the Owner and the System Supplier’s qualified personnel.

- g. The Owner and Supplier will mutually agree upon a Performance Test Protocol, including Test planning, procedures and schedule. The Supplier representatives shall be responsible for directing all operations during the Performance Test.
- h. At the commencement of any Performance Test, the Owner will demonstrate to the System Supplier's reasonable satisfaction that each of the Performance Conditions has been met.

5. Test Procedures

- a. Evaporation Rate: Composite dewatered sludge samples shall be taken once per hour to determine average cake dryness of the feed to the dryer. The evaporation rate will be calculated based on the procedures outlined in the PT protocol.
- b. Product Quality: Average final product dryness and size classification to be determined by samples taken once every 4 hours. Average of all samples to be used for assessment, excluding the worst and best sample(s).
- c. Heat Consumption: Gas flow will be measured continuously via in-line meter and averaged over the test period. The usage shall be converted to BTU by using the guaranteed heat content of the gas as specified by the utility supplying the gas. The daily fuel consumption divided by the evaporation shall be computed each day of the performance test. The average of these two values shall not exceed the value in BTU (LHV)/pound of water evaporated as declared in Attachment A of the Bid Proposal. Specific energy consumption will be calculated using the results of the tests specified herein.

6. Remedies

If the Biosolids Drying System does not meet the Performance Guarantee as determined by a Performance Test, then Supplier shall, at its discretion, repair, replace or modify the Biosolids Drying System in order to meet the Performance Guarantee, prior to the expiration of the Test Limitation Period.

Supplier shall not be liable for lost production or the Contractor/Owner's lost profit or for any other indirect, special, or consequential damages due to the inability of the Biosolids Drying System to meet the Performance Guarantee. Liquidated damages associated with the performance guarantee apply to the evaporation rate, product quality (size and moisture content), and heat energy consumption as described below.

If upon expiration of the Test Limitation Period the Biosolids Drying System has failed to pass a Performance Test, then Supplier shall pay Owner, as liquidated damages and not as a penalty, an amount (calculated as a percentage of the Total Cost of the Contract for the Biosolids Drying System) based on the percentage of Performance Guarantee parameters achieved in the Performance Test as set forth below.

Evaporation Rate - The performance guaranteed evaporation rate is 1,640 pounds water evaporated per hour of operation. The percentage guaranteed evaporation rate shall be calculated as the performance test evaporation rate divided by 1,640 pounds water evaporated per hour. The liquidated damages, expressed as a percentage of the Contract Price, for not meeting the performance guaranteed evaporation rate are listed below:

Percent of Guaranteed Evaporation Rate Achieved	Liquidated Damages (Percent of Contract Price)
≥99% and < 100%	1%
≥98% and < 99%	2%
≥97% and < 98%	3%
≥96% and < 97%	4%
≥95% and < 96%	5%
≥94% and < 95%	6%
≥93% and < 94%	7%
≥92% and < 93%	8%
≥91% and < 92%	9%
≥90% and < 91%	10%

The maximum liquidated damages assessed for the evaporation rate shall be 10 percent of the Contract Price.

Product Quality - The product quality guaranteed performance is that at least 95 percent of the final product material shall be within the 0.5-mm to 6-mm size range and product dryness is at least 92 percent (< 8 percent moisture content) following drying. The

liquidated damages, expressed as a percentage of the Contract Price, for not meeting the performance guaranteed size and moisture content are listed below:

Percent of Product Outside of Guaranteed Performance Size Range	Liquidated Damages (Percent of Contract Price)
>5% and ≤10%	1%
>10% and ≤15%	2%
>15% and ≤20%	3%
>20% and ≤25%	4%
>25%	5%

The maximum liquidated damages assessed for the product size shall be 5 percent of the Contract Price.

Product Dryness Achieved	Liquidated Damages (Percent of Contract Price)
<90%	10%

The maximum liquidated damages assessed for the product moisture content shall be 10 percent of the Contract Price.

Heat Energy Consumption - The heat energy consumption performance criteria is that heating energy consumption shall be as declared in Attachment A of the Bid Proposal in units of BTU (LHV) per pound of water evaporated. The liquidated damages, expressed as a percentage of the Contract Price, for not meeting the performance guaranteed heat energy consumption are listed below:

Percent of Guaranteed Heat Energy Consumption Achieved	Liquidated Damages (Percent of Contract Price)
>100% and ≤ 101%	1%
>101% and ≤ 102%	2%
>102% and ≤ 103%	3%
>103% and ≤ 104%	4%
>104% and ≤ 105%	5%
>105% and ≤ 106%	6%
>106% and ≤ 107%	7%
>107% and ≤ 108%	8%
>108% and ≤ 109%	9%
>109% and ≤ 110%	10%

The maximum liquidated damages assessed for the heat energy consumption shall be 10 percent of the Contract Price.

The remedies and obligations set forth herein are the Owner's exclusive remedies and Suppliers exclusive obligations in the event of failure of the Biosolids Drying System to meet the Performance Guarantee. The maximum amount to be paid in the aggregate of any and all liquidated damages for performance per this section is 35 percent of the contract value.

7. Measurement of Performance Criteria

Capacity: Weigh empty containers into which the product will be loaded on a certified truck scale. Obtain a sample from the container each hour and perform moisture content and sieve analysis. As each container is filled, weigh the full container; compute the product by weight by subtracting the empty container weight from the full container weight. Compute the average moisture content of product samples obtained from that container. The Owner will provide the empty container, truck, and scale for this procedure.

Product Quality: Perform moisture content and sieve analysis of hourly product sample in accordance with the latest issue of Standard Methods. Average the hourly samples for each day of the 2-day performance test. Compute the average of the two daily average values for moisture content and percent by weight of material between 0.5 and 6 millimeters in size. The Supplier shall be responsible for selecting an independent laboratory, which is acceptable to the Owner, for the sieve analysis and moisture content analysis. Costs for the independent laboratory analyses shall be paid by the Supplier.

8. Performance Test Report

Within 10 business days after completion of the performance tests and upon receipt of lab testing data from the analytical laboratory, three copies of a report shall be submitted with the following information:

- a. The date and time of the performance test for the dryer system.
- b. A description of all sample collection and measurement techniques.

- c. Raw data collected from the SCADA system or field during the conduct of the performance tests. Field data sheets bound in the reports shall be copies of the original data sheets collected during the test. Original data sheets shall be provided in a separate bound volume and shall contain original dated signatures (on each sheet) of the System Suppliers and Owners Representatives attesting to their accuracy and original nature.
 - d. Copies of all laboratory reports for all parameters analyzed during the conduct of the performance test including chain of custody forms. Original lab data sheets shall be provided in a separate bound volume and shall contain original dated signatures (on each sheet) of the attesting to their accuracy and original nature.
 - e. Engineering calculations which clearly show the performance of the thermal drying system with respect to the performance guarantee Criteria.
 - f. Descriptions of operations problems, unusual conditions, equipment failures or malfunctions, and other factors adversely affecting performance of the sludge drying system.
9. Acceptance
- a. Within 30 days of submittal of Performance Test Report, the Engineer shall formally notify the System supplier of acceptance or non-acceptance of the Sludge Drying System.
 - b. The System shall comply with the minimum capacity, product quality (moisture content and product sizing), and fuel consumption requirements, as set forth in Section 1.3.F(3) of this specification, to pass the Performance Test. The System supplier shall be allowed three attempts to pass the Performance Test. If the System fails the Performance Test, the System supplier shall make whatever adjustments are determined to be necessary at no cost to the owner and run the Performance Tests again or pay the liquidated damages.

- c. In addition to the performance criteria specified in Paragraph 1.3.F(3), the Engineer shall review the additional measurement and record keeping to ensure that the System as provided by the System Supplier complies with the Specifications. If the data suggests that certain sub-systems are not in compliance with specific sections of the Specifications, the System Supplier will be notified and shall make such adjustments as necessary to achieve compliance prior to acceptance of the System by the Owner.

1.4 COMMISSIONING

After completion of the Process Performance Testing, the commissioning period on the Biosolids Drying System may begin. The commissioning period shall begin and end at Owner's discretion, no later than 120 days after completion of the Process Performance Testing. The commissioning period shall be 30 days.

The Supplier shall remove all temporary piping that may have been in use during the Process Performance Test and shall assist the Owner and the Contractor with the placement of the equipment into its fully operational mode. The Owner's operations and maintenance personnel will be responsible for operation of the equipment during this period of time.

The Supplier shall be available at all times during commissioning period to provide assistance in case of failure of any portion of the system being tested. The Supplier shall be responsible for all costs in excess of the Owner's normal expected costs of Biosolids Drying System operations during the commissioning period.

A representative of the Supplier is not required to be onsite during the entire 30-day commissioning period, but shall be available to answer questions by telephone during normal business hours, US Pacific Time, and provide services consistent with warranty services during this time period.

1.5 TRAINING AND MANUFACTURER'S SERVICES

During the phase of the Component and System Tests, the Supplier shall make available experienced factory-trained representatives of the manufacturers of all the various pieces of equipment, to train the Owner's personnel in the operation and maintenance thereof. The time required for this training shall be as covered in the specifications for the specific piece of equipment. The Supplier shall notify the Engineer and the Contractor of the time of the training at least ten days prior to the start time of the training. The Supplier shall submit a detailed outline of training activities to be performed by each manufacturer's representative ten days

prior to the start time of the training. This outline shall indicate how the manufacturer's representative is going to allocate the required specified number of training hours to fulfill these contractual obligations.

Wherever specification sections herein require the services of a factory-trained representative of the supplied equipment, it shall be acceptable for a representative of the Supplier to provide these services, in lieu of a factory-trained representative of the equipment, if the representative of the Supplier is qualified to perform the services for the supplied equipment. If the representative of the Supplier cannot perform the required services satisfactorily, the Supplier shall provide a factory-trained representative of the supplied equipment to provide these services.

PART 2 PRODUCTS

2.1 TESTING

A. RECORDS

The Supplier shall provide sign-off forms for all installed and operational testing to be accomplished under this Contract. Sign-off forms shall be provided for the dryer system mechanical, electrical and instrumentation equipment provided or installed under this Contract and shall contain provisions for recording relevant performance data for original testing and not less than three retests. Separate sections shall be provided to record values for the preoperation checkout, as well as signatures of representatives of the equipment manufacturers, the Supplier, the Contractor, and the Engineer.

PART 3 EXECUTION

3.1 TESTING

Testing shall proceed on a step-by-step basis in accordance with the Supplier's written testing procedures. The Supplier's testing work shall be accomplished by a skilled team of specialists under the direction of a coordinator whose sole responsibility shall be the orderly, systematic testing of all equipment, systems, structures, and the complete facility as a unit. Each individual step in the procedures shall be witnessed by a representative of the Engineer.

During the Initial Performance Test, all equipment and systems in operation shall be operated to the greatest extent practicable, at conditions that represent the full range of operating parameters as defined by this Contract Document.

3.2 TRAINING

Training of the Owner's personnel shall be done by experienced technical manufacturers' representatives. These representatives shall follow the outline presented below. See also the training requirements in Section 11000.

The Contractor shall video record all training sessions and also provide the Owner with any audio-visual training materials the manufacturer utilizes (i.e., Digital Video Files, DVDs, Power Point presentations, etc.). Cost of instruction and audio-visual training materials shall be included in the bid price for the equipment.

GENERAL OUTLINE FOR MANUFACTURER PRESENTATIONS

A. FAMILIARIZATION

1. Overview explaining theory of operation.
2. Show catalog, parts lists, drawings, etc., in the plant files and O&M manuals.
3. Check out the installation of the specific equipment items.
4. Demonstrate the unit and show that all parts of the Specifications are met.
5. Answer questions.

B. SAFETY

1. Point out safety references.
2. Discuss proper precautions around equipment.

C. OPERATION

1. Point out reference literature.
2. Explain all modes of operation (including emergency).
3. Check out Owner's personnel on proper use of the equipment. (Let them do it).

D. PREVENTIVE MAINTENANCE (PM)

1. Pass out PM list including:
 - a. Reference material.
 - b. Daily, weekly, monthly, quarterly, semi-annual, and annual jobs.
2. Show how to perform PM jobs.
3. Show Owner's personnel what to look for as indicators of equipment problems.
4. Demonstrate use of any special tools required for maintenance.

E. CORRECTIVE MAINTENANCE

1. List possible problems.
2. Discuss repairs - point out special problems.
3. Open up equipment and demonstrate procedures, where practical.

F. PARTS

1. Show how to use parts list and order parts.
2. Check over spare parts on hand. Make recommendations on additional spare parts and tools.

G. LOCAL REPRESENTATIVES

1. Indicate where to order parts. Provide name, address, telephone, fax and email address for spare parts supplier.
2. Service problems:
 - a. Indicate who to call.
 - b. Indicate how to get emergency help.

***** END OF SECTION *****

DIVISION 11
EQUIPMENT

SECTION 11000

EQUIPMENT GENERAL PROVISIONS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section shall apply to all Sections of Divisions 11, 13, and 15, and portions of Division 16 unless specifically revised therein.

The Supplier shall direct the attention of all subcontractors and suppliers of equipment and related appurtenances for the work to the applicable provisions in the Contract Documents wherever they may occur.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01300	Submittals
11010	Vibration and Critical Speed Limitations
Division 11	Equipment
Division 13	Special Construction
Division 16	Electrical

1.3 STANDARDS FOR THE WORK

For the items within the scope of the Suppliers supply, pipe, fittings, wiring, and supports shall be provided to produce complete, operable systems with all elements properly interconnected as shown in schematic diagrams or to provide specified operations.

Equipment and material shall be new and without imperfections. Equipment shall be located, as shown on the final shop drawings so that connecting and disconnecting piping and accessories can be readily done and so that all parts are easily accessible for inspection, operation, maintenance, and repair. Oil and lubrication fittings shall be located clear of and away from guards, base, and equipment and within reach from the operating floor. Indicating devices such as gauges, flow meter readouts, sight gauges, or glasses, and similar type devices shall be oriented to be easily read from the floor, slab, or ground surface at normal operating or maintenance locations without climbing, bending or crossing over piping or equipment. Remote located readouts shall be provided if required.

All equipment shall be designed for the service intended, of rugged construction, of ample strength for all stresses which may occur during fabrication, transportation, erection and during continuous or intermittent operation, and shall

be shown as adequately stayed, braced and anchored on the final shop drawings. Appearance and safety, as well as utility, shall be given consideration in the design of details. Materials of construction shall be cathodically compatible.

1.4 MANUFACTURER'S INSTRUCTIONS

The recommendations and instructions of the manufacturers of products used in the work are hereby made part of these Specifications, except as they may be superseded by other requirements of these Specifications.

1.5 SUBMITTALS

Submittals shall be provided according to the procedures in Section 01300, including the Schedule in Part 3.4. Submittals shall also include specified information required in the respective technical sections for that type of equipment.

A. PRODUCT SUBMITTALS

Product submittals shall be submitted showing sizes and arrangement of equipment, foundations, and anchor bolts required, performance characteristics, fan curves and pump curves, control diagrams, wiring diagrams, motor data sheets, methods of assembly, ductwork details, and connections to other work. Submittals shall be dated and signed as certified for use in construction of this Project. However, the manufacturer's drawings shall not deviate from the Specifications as to location, size, type, and design of equipment.

The following minimum requirements shall accompany all equipment submittals:

1. Overall dimensions.
2. Mounting arrangement and dimensions.
3. Description of materials.
4. Connection sizes and orientation.
5. Capacity and location of lifting eyes.
6. Motor arrangement showing location of electrical connections.
7. Rating data - Mechanical and Electrical as applicable.

8. Detailed electrical wiring diagrams, showing component designation and rating, and the connection points, associated terminals and cable identification for connection to the power supply and process control system. Diagrams shall include dimensioned elevation views of electrical control panels and enclosures, and shall clearly show conduit entry/exit locations. Diagrams shall clearly differentiate factory wiring from field wiring, and shall indicate minimum wire sizes and type of conductors required for field wiring circuits.
9. Motor Data, including bearing and enclosure information.
10. List of any special tools and/or spare parts required and being furnished, if any.
11. Exceptions taken to the Specifications and a detailed explanation as to why exception is being taken.

Each piece of equipment, for which certified witnessed or non-witnessed performance tests are required, shall be accompanied by a completed form which will contain at least the following information:

1. Owner's name and location of project.
2. Supplier's name and subcontractor (if applicable).
3. Name of item being submitted.
4. Specification reference by section, paragraph, and page number.
5. Data on item (manufacturer, general descriptive data, dimensions, size of connections, speeds, performance curves, and serial number).
6. Motor data, type, voltage, frequency, phase, full load amperes, starter type, frame size, enclosure, insulation type, NEMA Code letter, dimensions, service factor, serial number.
7. Date and signature of person certifying performance.

B. FACTORY TEST RESULTS

Factory tests shall be performed for each piece of equipment where specifically called for in the Specification Section specifying that equipment. Note that factory tests are inherent in many reference

standards. The requirement for a factory test in a referenced standard shall make that requirement a part of these Specifications. Conduct factory tests at the same speeds at which the equipment will operate in the field, except as noted.

Where specifically noted, performance test may be witnessed by the Owner or its representative. The Supplier shall inform the Engineer in sufficient time to allow arrangements to be made for witness of such tests. When non-witnessed tests are performed, certified test results shall be supplied by the Supplier to the Engineer.

Factory testing of pumps shall be done in accordance with the requirements and standards of the Hydraulic Institute. Provide certified pump curves for all pumps. Tests of other equipment shall conform to the requirements set forth in these Specifications.

C. EQUIPMENT O&M MANUALS

Prepare and submit operation and maintenance manuals to include all information required and in the format specified in Section 01300.

D. DESIGN CALCULATIONS

Seismic design calculations shall be submitted for equipment and for supports and anchorage for equipment.

Special seismic certification shall be submitted for all active mechanical and electrical equipment that must remain operable following an earthquake in compliance with ASCE 7-10 Minimum Design Loads for Buildings and Other Structures, Chapter 13 Seismic Design for Nonstructural Components.

E. MANUFACTURER'S AFFIDAVITS

Equipment manufacturers, or their authorized representatives, shall each submit a notarized written report with respect to operational startup of his equipment certifying that:

1. The equipment has been properly installed and lubricated;
2. The equipment is in accurate alignment;
3. The manufacturer was present when the equipment was placed into operation;

4. The manufacturer has checked, inspected, and adjusted the equipment as necessary;
5. The equipment is free from any undue stress imposed by connecting piping or anchor bolts;
6. The equipment is not imposing any undue stress on any connecting members;
7. The equipment has been operated satisfactorily under full load conditions;
8. The manufacturer has inspected his equipment during the operational demonstrations and system validation tests to the extent specified; and
9. The equipment is fully covered under the terms of the guarantee.

Equipment for which Affidavits shall be provided include the following:

1. Biosolids Drying System Equipment (11650)
2. Instrumentation (Division 13)

F. SPARE AND LOOSE PARTS

1. Spare and Loose Parts Supplied

Provide an inventory of spare and loose parts required to be supplied under the project. Turn over inventory and parts to the Owner. The Owner's written acknowledgment of receipt is required for project completion. Loose parts are defined as items such as special tools, keys, safety equipment, and portable equipment.

2. Recommended Spare Parts

Besides the specified spare parts, furnish a complete list of additional recommended spare parts and supplies, for each piece of equipment furnished with current prices and a source of supply. Include this information in the equipment O&M Manuals.

PART 2 PRODUCTS

2.1 STANDARD REQUIREMENTS

A. MATERIALS

Design, fabricate, and assemble equipment and systems with new materials and in accordance with acceptable engineering and shop practices. Manufacture individual parts to standard sizes and gauges so repair parts can be installed in the field. Make like parts of duplicate units interchangeable. Do not place equipment in service at any time prior to delivery except as required for factory or shop tests.

B. UNIFORMITY

Unless otherwise specified, equipment or material of the same type or classification used for the same purpose shall be the product of the same manufacturer and shall be the same model.

C. STANDARDS

Provide equipment and materials suitable for service conditions and meeting standard requirements of ANSI, ASME, AWWA, ASTM, NEMA, NEC, IBC, NPC, UL, and OSHA.

2.2 LUBRICATION

The Supplier shall provide lubricants of types recommended by equipment manufacturers, in quantities sufficient for a minimum of 1-year consumption, prior to completion of the Component and System Test for the respective piece of equipment.

2.3 ANCHORS AND FASTENERS

All anchor bolts, nuts, and washers shall be sized by the Supplier, based on weight and arrangement information, and furnished and installed by the Contractor.

2.4 SAFETY GUARDS

For belt or chain drives, fan blades, couplings, exposed shafts and other moving or rotating parts provide safety guards on all sides conforming to all Federal, State, and local codes and regulations pertaining; conform to the most restrictive requirement. Guards shall be designed for easy installation and removal, complete with necessary supports, accessories, and fasteners, and shall be hot-dip

galvanized or painted. Guards in outdoor locations shall be designed to prevent entrance of rain and dripping water. Provide tachometer test opening in line with ends of shafts. Typically, guards shall be expanded metal on a structural steel frame except that outdoor guards may be of solid material. Provide spring loaded hinged doors with latch for service and lubrication access.

All pipes, manifolds, heaters, and other surfaces which have a surface temperature sufficient to burn human tissue shall be covered with a thermal insulating material or otherwise guarded against contact.

Guards shall comply with the requirements of these Specifications, WISHA Standards, and “The Principles and Techniques of Mechanical Guarding” (OSHA 2057), whichever is more stringent.

2.5 LIFTING EYES

All equipment weighing over 100 pounds shall be supplied with lifting eyes. Parts of equipment assemblies which are normally serviced separately, such as motors, shall have lifting eyes of their own.

2.6 NAMEPLATES/IDENTIFICATION

Each piece of equipment and its driver shall be furnished with a corrosion-resistant metal nameplate fastened to the item in an accessible position. This nameplate shall contain the manufacturer’s name, equipment rating, capacity, size, model, serial number, and speed. Data for motors shall be NEMA standard. All information written or printed shall be in English. Each item of equipment shall bear a different serial number. Measurement units shall be given for ratings and capacity.

Nameplates for tanks and pressure vessels shall give working pressure, test pressure, vessel plate thickness, and ASME Code data.

Each piece of rotating equipment shall have a direction of rotation arrow.

Each piece of equipment shall be labeled using a plastic laminate label with the functional name and number of the equipment submitted by the Supplier and approved by the Engineer. Equipment number shall have the following format: 15 xxx xx, where 15 refers to the Site Area (11 Solids Handling Building), xxx is a two or three letter abbreviation for the equipment type, and xx is the serial number assigned to the specific piece of equipment. Name and number shall correspond to those used on Motor Control Centers and Panels.

Labels shall be fastened to the equipment base or other acceptable location. The letters shall be at least 1/2-inch high with a border trim on all sides not less than

1/4 inch. Color shall be black background with white letters. Fasteners shall be brass or stainless steel screwed into inserts, anchor shields, or tapped holes in equipment or base.

Units of measure shall be shown on the indicating and totalizing dials of all meters, gauges and other measuring devices.

2.7 PROTECTION AGAINST ELECTROLYSIS

Where dissimilar metals are used in conjunction with each other, suitable insulation shall be provided between adjacent surfaces so as to eliminate direct contact and any resultant electrolysis. The insulation shall be bituminous impregnated felt, heavy bituminous coatings, non-metallic separators or washers or other approved materials. Connections of dissimilar piping materials shall utilize dielectric unions, flanges, couplings, or bushings.

2.8 NOISE

Mechanical and electrical equipment shall not create sound levels in excess of that permitted by WISHA for 8 hours per day worker exposure unless otherwise noted for the specific piece of equipment involved.

2.9 PRESSURE GAUGE CONNECTIONS

For each pump, and other equipment required in the Specifications, provide tapped and plugged suction and discharge gauge connections on the nozzles or flanges. Where this is not possible, provide gauge connections on the piping immediately adjacent to the equipment. Pressure gauges shall be provided in accordance with Section 13417.

PART 3 EXECUTION

3.1 STORAGE OF EQUIPMENT

Prior to final delivery to the Contractor, storage of all equipment that includes electrical panels, controls, switches, contacts, motors, etc. shall be inside a heated and air-conditioned enclosure to prevent condensation and moisture damage. This requirement includes all electrically actuated valve and gate operators and instrumentation items.

3.2 INSPECTION

Inspect each item of equipment for damage, defects, completeness, and correct operation at the point of delivery.

3.3 INSTALLATION SUPPORT

A. EQUIPMENT STARTUP AND ADJUSTMENT

The Supplier shall arrange for authorized factory-trained representatives of the companies supplying the various items of equipment to check the installation, adjust, and test the equipment furnished before the acceptance of the work by the Owner. Said representatives shall be experienced and knowledgeable of the equipment being tested. Furthermore, they shall assist and instruct the Owner's operating staff in adjusting and operating the equipment during the initial start-up period.

All equipment shall be tested and demonstrated to the Engineer that proper operation and capacity has been achieved. For the wet cake feed pumps, voltage, amperage draw on each phase of power, flow capacity, discharge pressure and other significant parameters shall be recorded. For pumps, this shall include measurement of suction and discharge pressure all other at the pump and measurement of pumping rate by volumetric means, or through a suitably calibrated meter for two points on the performance curve. Current draw on the motor shall be measured for each pumping rate measurement. For two speed pumps, such tests shall be conducted at both speeds. The Supplier shall furnish any test equipment or measuring device (including portable flow meters) required which is not part of the permanent installation. Tests for variable speed pumps, fans and other equipment shall be performed at 60 Hz and at the initial anticipated flow or capacity levels.

If problems are found, the manufacturer's representative shall repeat the inspection and check and adjust until all troubles or defects are corrected, and the equipment installation and operation are acceptable.

In addition, the entire facility shall be demonstrated to be in full operating order prior to the acceptance of the work. Should any equipment or part thereof fail to operate as intended, it shall be immediately removed and replaced, all at the Supplier's expense.

Equipment startup and adjustment shall take place before instruction of Owner personnel is performed.

All startup and adjustment work shall be coordinated with the Construction Contractor.

B. SOUND LEVEL TESTING

The Construction Contractor will measure the sound level developed by all mechanical and electrical equipment provided by the Supplier under the Contract Documents. The Construction Contractor will use OSHA approved instrument and record the highest sound level developed when measured according to OSHA standards in each room and space, and deliver a certified copy of records to the Engineer. The Supplier shall remedy any problems due to supplied equipment, as determined by the Engineer.

C. INSTRUCTION OF OWNER'S PERSONNEL

Conduct an instruction program for up to six operations personnel designated by the Owner. Furnish the services of qualified instructors from the various equipment manufacturers for the duration specified in each specific Section. Include instruction covering basic system operation theory, routine maintenance and repair, and "hands on" operation of equipment. Equipment startup and adjustment shall be complete and the equipment shall be fully operational when instruction takes place.

Provide the instruction program at the Owner's convenience before contract closeout. The Supplier shall video tape all training sessions and also provide the Owner with any audio-visual training materials the manufacturer utilizes (i.e., Digital Video Files, DVDs, PowerPoint presentations, etc.). Cost of instruction and audio-visual training materials shall be included in the bid price for the equipment.

***** END OF SECTION *****

SECTION 11010

VIBRATION AND CRITICAL SPEED LIMITATIONS

PART 1 GENERAL

1.1 SCOPE

This Section specifies vibration and critical speed limitations for rotating mechanical equipment. Individual equipment specification sections may specify more stringent requirements, which shall then govern. Field-testing and vibration measurements shall be taken on all rotating mechanical equipment.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01300	Submittals
11000	Equipment General Provisions

1.3 SUBMITTALS

Manufacturer's certified calculations and data showing location of critical speeds in relation to operating speeds shall be provided in accordance with Section 01300, when specified in the individual equipment specification sections.

1.4 VIBRATION LIMITATIONS

Vibration frequencies shall span the range from 5.0 to 5,000 Hz. Where specified, measurements shall be obtained while the installed equipment is operating within the specified speed range. These measurements shall be recorded and provided to the Engineer along with the Manufacturer's Affidavits.

A. CENTRIFUGAL

1. Machines with Sleeve Bearings: Unless otherwise specified, centrifugal machines with sleeve bearing shafts shall not exhibit unfiltered RMS readings for vibration displacement in excess of the following:

<u>Shaft speed range, rpm</u>	<u>Displacement, peak to peak, mils</u>
Up to 900	3.5
901 – 1,800	3.0
1,801 – 3,000	2.5
3,001 – 4,500	2.0
Above 4,500	1.6

Displacement measurements shall be taken radially on the shaft at two points at each bearing. Measuring points shall be 90 degrees apart.

2. Machines with Antifriction Bearings: Unless otherwise specified, centrifugal machines with antifriction bearing shafts shall not exhibit unfiltered RMS readings for vibration velocity in excess of 0.12 inches per second. Velocity measurements shall be taken on one point of each bearing housing.

B. POSITIVE DISPLACEMENT MACHINES

Unless otherwise specified, positive displacement machines of the rotary, reciprocating and controlled volume types shall operate without any lateral or torsional vibration characteristics that may accelerate wear of the equipment. The Supplier shall provide manufacturer's certification that the manufacturer has inspected the machine under operating conditions and found it to comply with the requirements of this paragraph.

1.5 CRITICAL SPEED REQUIREMENTS

Unless otherwise specified, rotating mechanical equipment shall not exhibit critical speeds within the specified range of operating speeds. Critical speeds for equipment with rigid rotor systems shall be at least 20 percent greater than maximum operating speed or impeller blade pass frequency, whichever is greater. Critical speeds for equipment with flexible shaft-rotor systems shall be at least 15 percent below minimum operating speed and 20 percent above maximum operating speed or impeller blade pass frequency, whichever is greater.

1.6 SUBMITTALS

The manufacturer's certified calculations and data showing location of critical speeds in relation to operating speeds shall be provided in accordance with Section 01300, Submittals, when specified in the individual equipment specification sections.

Where equipment is driven with a motor powered with a variable-frequency drive, the Supplier shall provide information on the limits and ranges of the vibration, torsion, mechanical, thermal, and similar characteristics of the driven equipment, where such limits or ranges impact the speed, time, or ramp settings of the variable-frequency drive. These points and ranges shall be included as part of the submittal information for the driven item of equipment. The purpose of this requirement is to allow coordination of the variable-frequency drive configuration with the limitations of the driven equipment.

***** END OF SECTION *****

SECTION 11650A

BIOSOLIDS DRYING SYSTEM

PART 1 GENERAL

1.1 DEFINITIONS

- A. **SYSTEM** – The complete drying system, which shall include all equipment, controls, instrumentation, and all appurtenances required such that a full functional thermal drying system is realized.
- B. **SYSTEM SUPPLIER** - The person, partnership, corporation, association, or affiliation with whom the OWNER executes an agreement for the supply of the system, and related components and services, as described within this specification.
- C. **OWNER** – The entity contracting for the work to be completed under this specification for system supply and installation.
- D. **CONTRACTOR** – The person, partnership, corporation, association, or affiliation with whom the OWNER executes an agreement for the installation of the system, and related components and services, furnished by the SYSTEM SUPPLIER.
- E. **ENGINEER** – The private engineering firm contracted by the OWNER to design and manage the installation of the SYSTEM and carry out the intent of the project. The ENGINEER shall act as the OWNER's representative to the extent that such authority has been granted them by their contract with the OWNER.

1.2 SCOPE

- A. The work to be provided by the Biosolids Drying Supplier (the Supplier) under this specification section shall include the design, supply of materials and equipment, fabrication, testing, and delivery for assembly and installation of one Biosolids Drying System with accessories as required for a complete and operable unit for the rate as herein specified. Also included are installation supervision assistance, commissioning services and performance testing. The Owner intends to assign that portion of the Contract for the equipment supply, construction services, and post construction services, as defined in Section 01110, to the Construction Contractor (the Contractor) who is awarded the Contract to construct the Biosolids Modernization Project.

- B. The Biosolids Drying System shall be of a fully automated design capable of operating unattended and capable of automatic shutdown when required.
- C. The dryer shall be manufactured by the Supplier.
- D. The Supplier shall guarantee performance of the complete system.
- E. The Supplier shall deliver the Biosolids Drying System to the General Contractor within the timeframe specified herein.
- F. Supplier shall minimize fugitive odor and dust emissions by proper design and ventilation of the equipment to meet the indoor air quality requirements of Chapter 296-841 WAC.
- G. The Supplier shall design and supply a system complete, including but not limited to instrumentation, fasteners, and interconnecting equipment, including all interconnecting air ductwork and chutes, whether or not called for in the Contract Specifications. Any omission of required equipment from this Specification shall not relieve the Supplier of his responsibility for the satisfactory operation of the Biosolids Drying System specified. Consequently, the Supplier shall be responsible for the various details and any special construction which may not be specifically detailed or called for, but is necessary to properly install and place into successful and continuous operation the Biosolids Drying System specified herein.
- H. The Supplier shall furnish a complete Instrumentation and Control system for the Biosolids Drying System. The system shall include all materials and documentation required to install, test and place in operation a complete and operable instrumentation and control system as specified. The system shall include all measuring elements, control devices, signal converters, transmitters, local control panels, digital hardware and software, operation workstations, and communication networks to provide the functions indicated.
- I. The Contractor shall provide power, control and interconnecting wiring between the equipment and control panels. The contractor shall field mount all field instrumentation supplied by the Supplier at defined locations.

- J. Items to be supplied with the system are defined in detail in Part 2 of these Specifications and shall include, but not be limited to the following:
1. A thermal oil system suitable for operation with natural gas, as well as, a natural gas and digester gas burned simultaneously. A thermal fluid cooler will also be included to cool the system during shutdown. Control equipment shall be included with the system.
 2. Indirect thermal oil heated Paddle Dryer to produce Class A dried biosolids.
 3. Explosion and fire prevention systems, in accordance with NFPA 69, provided for all System components.
 4. An off-gas handling system to condense and cool the off-gas from the dryer and to facilitate odor control. Off-gas from the dryer shall be shall be ventilated through the existing biofilter odor control system.
 5. Fines screening and product recycle system.
 6. One Cake feed pump and one uninstalled spare pump for use with the existing 50 cubic foot wet cake feed hopper with live bottom, to be used for the new paddle dryer system.
 7. Product cooling conveyor.
 8. Valves and dampers (motorized, pneumatic and manual) required for process control and isolation.
 9. All electrical, instrumentation, and control equipment as specified herein and including the following:
 - a. Electrical system components including motors, conduit and wiring to junction boxes (single point connections) on skid mounted equipment.
 - b. Instrumentation and controls including control panels, PLCs, field instruments, conduit and wiring to junction boxes (single point connections) on skid mounted equipment.
 10. Access provisions including platforms, catwalks, ladders, handrails and stairways.

11. Equipment not appearing herein, but necessary for the complete system are not eliminated by reason of such omission and shall be provided by the Supplier unless specifically noted as being supplied by others.
12. SUPPLIER SCOPE EXCLUDES motor control centers, electrical power panels and variable frequency drives associated with the dryer system.

1.3 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01110	Summary of Work
01190	Reference Standards
01300	Submittals
01800	Testing, Commissioning, and Training
11000	General Requirements for Equipment
11010	Vibration and Critical Speed Limitations
Division 13	Special Construction
Division 15	Mechanical
Division 16	Electrical

1.4 SUBMITTALS

The Supplier shall provide submittals as specified herein and in accordance with Sections 01110, 01300, and 11000 of these Specifications.

1.5 WORK BY OTHERS AND COORDINATION WITH OTHERS

- A. The Biosolids Drying System, specified herein, shall be installed by the Contractor. The Supplier shall supervise the installation of the biosolids drying equipment.

The Supplier is not required to be on site during the entire construction process, but shall be available by telephone to provide installation support and answer questions during normal business hours (U.S. Pacific Time).

- B. The equipment shall be unloaded at the plant site by the Contractor.
- C. The Supplier shall design and furnish to the Contractor all components necessary for installation of the electrical systems that are an integral part of the Biosolids Drying System. The Supplier shall coordinate with the Contractor size, location, and routing of all power conduits, raceways, cable trays, and other necessary items. Conduits, raceways, wire ways, and other appurtenances on skid mounted equipment and on the dryer

equipment, instruments and motors shall be provided by the Supplier connected to junction boxes and shall be routed in neat, organized groupings next to structural components, such that no field wiring will be required between the junction box and its associated component on the dryer equipment or other skid mounted equipment. The Contractor shall provide conduits, raceways, wire and other appurtenances not provided by the Supplier between skid mounted equipment, the dryer equipment and other free-standing equipment. The Contractor shall provide grounding and bonding of all equipment and electronic controls. The Contractor shall supply all power distribution equipment including motor control centers for all motors which are not integral to valve operators or other final control elements, with starters and variable frequency drives and the conduit and wiring to junction boxes on skid mounted equipment and the dryer equipment, and directly to free standing equipment. The Contractor shall furnish the types of motor controllers (size and type) needed for the dryer system using the approved Suppliers submittal details (motor list and single line diagrams).

- D. The Supplier shall design piping systems that are an integral part of the Biosolids Drying System. Piping on skid mounted equipment and the dryer equipment, shall be installed by the supplier routed in neat, organized groupings next to structural components. Interface for utility connections shall be located on skid mounted equipment, the dryer equipment, or at other free-standing equipment and shall be clearly indicated on all drawings submitted. The Supplier shall provide piping and supports from the interface point to the Biosolids Drying System components. The Contractor shall provide piping and supports to the interface point from utility connections and from the dryer equipment and other skid mounted or free-standing equipment interface points. Piping systems designs by Supplier are limited to those required for the Biosolids Drying System. Supplier will be responsible for cake pump discharge piping design and supply.
- E. The Biosolids Drying System digital control system shall interface with the WWTP control system over a Modbus/TCP local area network data link. The two control systems shall exchange data such as equipment status, flow rates, alarms, etc. The Biosolids Drying System; however, shall only be controlled from the Biosolids Drying System digital control system.

1.6 PERFORMANCE AND DESIGN REQUIREMENTS

- A. The Biosolids Drying System shall be designed for continuous operation to produce a Class A biosolids product, as defined by 40 CFR 503, from a feed biosolids with the following characteristics and the performance and design requirements herein:
1. Type of WWTP: Municipal
 2. Type of Sludge: Anaerobically Digested Sludge (Primary and Waste Activated Sludge)
 3. Sludge pH: 6.0 to 8.0
 4. Dewatered Cake Solids: 19-20% DS
 5. Temperature: 60 degrees F to 95 degrees F
- B. The Biosolids Drying System shall be designed to produce a Class A biosolids product, as defined by 40 CFR 503, under the following conditions:
1. Dry Solids Feed Rate: 410 dry lb/hr
 2. Wet Solids Feed Rate: 2,050 Wet lb/hr
 3. Cake Dryness: 20% T.S.
 4. Cake % Volatile Solids: Historically varies from 68-74% with an average of 71% VS
 5. Final Dryness: 92% T.S. Minimum
 6. Final Product Rate: 446 lb(dried)/hr
 7. Fuel Source: Natural gas (LHV of 1000 BTU/CF), Digester Gas (LHV of 600 BTU/CF)
 8. Design Evaporation Rate: 1,640 lbs/hr
 9. Heat Consumption: up to 1,350 ($\leq$ LHV) BTU per hr/lb of water evaporation based on LHV

10. Operation: 24 hours/day, Monday morning start-up through Friday afternoon shutdown.
- C. The maximum evaporation rate and the minimum turndown evaporation rate for the proposed system shall be declared in Attachment A of the Bid Proposal.
- D. Fuel for the dryer shall be natural gas and/or a blend of digester gas and natural gas. The maximum ratio of digester gas to natural gas, which the proposed system can operate at to meet these specifications, shall be declared in Attachment A of the Bid Proposal.
- E. The Biosolids Drying System area NEC classification shall be as follows:
1. Biosolids Drying Room (beyond a 10-foot envelope around the main dryer): Unclassified (NFPA 820-2020, Table 6.2(b), Row 1d)
 2. Biosolids Drying Room (inside a 10-foot envelope around the main dryer and ancillary equipment handling dry product): Class II, Division 2, Group G (NFPA 820-2020, Table 6.2(b), Row 1c)
 3. Within equipment processing combustible particulate solids (e.g., dried product conveyance/recycle, dried product storage): NEC Classification Class II, Division 1, Group G (NFPA 820-2020, Table 6.2(b), Row 1b)
- F. The Biosolids Drying System shall be designed to meet the requirements of the latest edition of the following NFPA Standards:
1. NFPA 30, *Flammable and Combustible Liquid*
 2. NFPA 69, *Standard on Explosion Prevention System*
 3. NFPA 652, *Standard on the Fundamentals of Combustible Dust*
 4. NFPA 654, *Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids*
 5. NFPA 820, *Standard for Fire Protection in Wastewater Treatment and Collection Facilities*
- G. Perform seismic design in accordance with the Washington Building Code. Supports and anchorage of equipment(s) shall comply with the

requirements of the 2021 International Building Code (IBC) Section 1613 and ASCE 7-10 Minimum Design Loads for Buildings and Other Structures, Chapter 13 Seismic Design for Nonstructural Components, as referenced and amended by the IBC. For the following design parameters:

- Risk Category III
- Site Class D
- The component Importance Factor: $I_p = 1.25$
- Design spectral response coefficients:

SDS = 0.832g

SD1 = 0.484g

- Seismic Design Category D

H. Design all access provision items, such as access platforms, catwalks, ladders, handrails, and stairways in accordance with the WAC 51-52-0306 and applicable OSHA standards.

I. The following utilities shall be available to the biosolids drying facility:

1. Non-Potable Filtered Plant Effluent Water (NPW), from plant NPW pumping system
 - a. Temperature: 70 degrees F (maximum)
 - b. Pressure at Interface Point: 65 psig (minimum)
2. Natural Gas (NG)
 - a. Nominal Heat Value: 1,000 BTU/standard cubic foot
 - b. Pressure at Interface Point: 2 psig (min)
3. Digester Gas (DG)
 - a. Nominal Heat Value: 600 BTU/standard cubic foot
 - b. Pressure at Interface Point: 5 psig
4. Electric Power (EP)
 - a. Service Conditions: 480/240VAC, 60 Hz, 3-phase, 3-wire, 115 VAC, 24 VDC instruments

- 5. Communications
 - a. Service Conditions: Wired internet connection, service by Owner

- J. The following utility requirements and exhaust air parameters of the biosolids drying facility shall be declared in Attachment A of the Bid Proposal for the evaporation rate of 1,640 lb/hr, the maximum evaporation rate, and the minimum turndown evaporation rates declared:
 - 1. NPW (gpm)
 - 2. Potable Water (gpm)
 - 3. Natural Gas at 2 psig (cubic ft/hr when burned)
 - 4. Electric Power (Amps, or kVA)
 - 5. Exhaust (SCFM, temp, relative humidity)
 - 6. Process Discharge Water (flow rate (gpm), TSS concentration (mg/L))

- K. Specific Heat Energy Consumption of the Biosolids Drying System, as determined by the heat required to evaporate one pound of water at steady state conditions from the solids, shall be declared in Attachment A of the Bid Proposal and shall be guaranteed as specified herein. The specific heat energy consumption shall be based on the lower heating value (LHV) of natural gas, excluding electric energy consumed by the drying system and shall be calculated as the system gas energy input (BTU) divided by the amount of water evaporated from the solids (pounds).

- L. Final product from the thermal drying system, prior to conveyance to the dried product loading area, shall have not less than ninety five percent (95 percent) of the material classified as being between 0.5-mm and 6.0-mm size gradation on a weight basis. Classification shall be determined based on a sieve analysis to determine final product size gradation. Material retained on a 6.0-mm sieve or passing a 0.5-mm sieve shall be considered “off-specification”.

- M. Oversize product, dried material removed from the thermal drying system but not routed to the dried product loading area, shall not exceed 2.0 percent of the total product produced from the thermal drying system. The total product produced shall be determined as the sum of the weight

of the oversize product and the final product routed to the dried product.

- N. Maximum temperature of final product after cooling shall be 120°F at 70°F ambient.
- O. Time required for complete startup of the Biosolids Drying System, including the pre-start safety checks per the procedures in the O&M manual shall be declared in Attachment A of the Bid Proposal.
- P. Time required for complete shutdown of the Biosolids Drying System shall be declared in Attachment A of the Bid Proposal.

1.7 CODES AND STANDARDS

- A. AISC – Manual of Steel Construction.
- B. AGMA – American Gear Manufacturers Association
- C. ANSI – American National Standards Institute
- D. ASME – Standards of American Society of Mechanical Engineers
- E. ASTM – American Society of Testing and Materials
- F. AWS – American Welding Society
- G. CEMA – Conveyor Equipment Manufacturers Association
- H. FM – Factory Mutual
- I. IBC – International Building Code
- J. IEEE – Institute of Electrical and Electronics Engineers
- K. IFC – International Fire Code
- L. IRI – Industrial Risk Insurers
- M. ISA – Instrument Society of America
- N. NEC – National Electrical Code
- O. NEMA – Standards of National Electric Manufacturers Association
- P. NFPA – National Fire Protection Association

- Q. OSHA – Occupational Safety and Health Act
- R. UL – Underwriters Laboratory
- S. WAC – Washington Administrative Code
- T. Local Laws and Ordinances

1.8 QUALITY ASSURANCE

A. QUALIFICATIONS OF SUPPLIER DESIGN TEAM

1. Supplier to provide resumes of the following key project personnel in Attachment B of the Bid Proposal:
 - a. Project Manager.
 - b. Project Engineer.
 - c. System Integrator/Electrical Engineer.

B. QUALIFICATIONS OF SUPPLIER STARTUP, OPERATIONS, AND SUPPORT STAFF

1. Supplier to provide the following information in Attachment B of the Bid Proposal:
 - a. Name and resume of the person or persons, directly employed and trained by the Supplier who will provide on-site construction services and post construction services.
 - b. Name and resume and home office location of the person or persons, directly employed and trained by the Supplier who will provide on-site warranty service and maintenance.
 - c. Name and resume and home office location of the person or persons, directly employed and trained by the Supplier who will provide system troubleshooting via telephone modem connection.

C. EQUIPMENT STANDARD OF QUALITY

1. Products that are specified by manufacturer, trade name or catalog number establish a standard of quality.

2. The completed work shall include all necessary permanent devices, such as machinery guards and similar items required by OSHA and other federal, state, and local health and safety regulations.
3. Welding shall comply with AWS standards and shall be accomplished using the metal-arc or gas-shielded arc method described in the American Welding Society's Welding Handbook. As supplemented by other AWS standards Qualification of welders, all welding shall comply with AWS and ASME standards. The pressure parts of the dryer will be manufactured and stamped in accordance with ASME Section VIII.
4. It is the intent of these Specifications to secure high quality materials and equipment in order to facilitate operations and maintenance of the biosolids drying facility. All equipment and materials shall be new and the products of reputable recognized suppliers having adequate experience in the manufacturing of these particular items. For uniformity, only one manufacturer will be accepted for each type of product. All equipment shall be designed for the service intended and shall be of rugged construction, of ample strength for all stresses which may occur during fabrication, transportation, erection and during continuous or intermittent operation, all equipment shall be adequately stayed, braced and anchored. Appearance and safety, as well as utility, shall be given consideration in the design of details.

1.9 WARRANTY

The System Supplier shall warrant in writing the equipment furnished under this specification against defects in workmanship and material for a period of 24 months from substantial completion and subsequent acceptance for beneficial operational use by the Owner. The product shall also be warranted for a period of 60 months against any defects in workmanship and material for any spray on or weld on hard surfacing, such that the hard surfacing is no longer protecting the parent metal. Any repairs to such abrasion resistant hard surfacing shall be completed within 30 days of the Supplier being notified of the defects. If discovered from inspection, damage or increased abrasion deemed to be caused due to foreign objects entering the dryer system shall not be considered a warranty claim. All costs for labor and replacement parts required to repair the unit, due to equipment malfunction, during the guarantee period shall be considered to have been included in the quoted price for this equipment. An inspection of the hard surfacing at 60 months after system acceptance by the system supplier will be included to ensure that the terms of this warranty have

been fulfilled. The expected schedule of the warranty period is presented in Section 01110-1.6.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

The Biosolids Drying System shall be as manufactured by Andritz Separation Inc., as specified herein, or Komline-Sanderson Corp., as specified in 11650B. No other manufacturers shall be accepted.

In order to assure uniform quality, product functionality, and ease of maintenance; all of the equipment specified in this Section shall be supplied by one manufacturer.

2.2 GENERAL

- A. The Biosolids Drying System shall be complete with all required and necessary supports, equipment, access provisions, safety guards, soundproofing, thermal insulation, controls and instrumentation, control panels, sensors, interconnecting piping and ducting, and valves required for an operable system as specified herein.
- B. Materials and details of constructions shall be Supplier's standard for service conditions and performance requirements specified unless noted otherwise in this specification.
- C. Sampling ports, permanently mounted, shall be provided as required for sampling solid and air streams within the process units. The sampling ports shall be arranged in a manner that allows safe sample collection and minimizes material leakage or spillage during sampling.
- D. No component of the Biosolids Drying System shall be supported from the building roof or walls with the exception of piping supports. The loads from the Biosolids Drying System shall be transferred to the floor slab only.
- E. Access ports shall be provided at convenient locations to allow removal of solid objects trapped within the process units and for any required cleaning, maintenance, sampling, or inspection. The ports shall be adequately sized and shall be equipped with removable bolted and gasketed doors.
- F. The System Supplier shall supply all motors and drive components for this equipment. Motors shall be suitable for continuous operation and shall be

of sufficient horsepower, exclusive of the service factor, to operate the equipment over its full operating range, including startup loads, without overloading. Motor lubrication may be either grease or oil type.

- G. Unless otherwise specified, all bearings shall be designed with an AFBMA L-10 life of at least 100,000 hours.
- H. All manual valve shall be operable without the need of ladders or climbing on equipment in an unsafe manner.
- I. All parts of the equipment furnished shall, be designed and constructed for the maximum stresses occurring during fabrication, transportation, installation, testing, and all conditions of operation. All materials shall be new, and both workmanship and materials shall be entirely suitable for the service to which the units are to be subjected and shall conform to all applicable sections of these Specifications.
- J. The indirectly heated thermal dryer will be of the dual counter-rotating shaft design in which thermal fluid circulates within hollow wedge shaped paddles to provide indirect heating of the dewatered cake.
- K. Multiple temperature sensors shall be provided to monitor the temperature of the sludge at various locations along the dryer bed. A temperature sensor shall also be required to monitor the feed inlet conditions. Residence time of the sludge in the dryer shall be adjustable by changing the height of a product discharge weir.
- L. To withstand the abrasive nature of drying municipal biosolids, the dryer paddles and trough shall have an applied hard surfacing as described herein.
- M. All manufactured items provided under this Section shall be new, of current manufacture, and shall be the products of reputable manufacturers specializing in the manufacture of such products.

2.3 WET CAKE FEED PUMP

- A. Two progressive cavity feed pumps (One installed, one as spare) shall be provided to transfer dewatered sludge from the storage hopper to the dryer. The pump shall be manufactured by Seepex, Moyno, Netzsch, or equal.
- B. The pumps shall be of the heavy duty, positive displacement, progressing cavity type with a gear joint or pin joint drive train. The drive train shall be firmly supported by heavy duty bearings integral to the pump. The

pump shall have a minimum of four stages on the rotor and stator and designed for a maximum discharge pressure of 275 psig.

- C. The supplier shall be responsible for the design and sizing of the pump, assuming discharge piping that will have an overall length of 50 feet between the cake pump discharge and the dryer inlet. The supplier shall also assume that the discharge piping will include three 5R 90 degree bends and one 5R 45 degree bend.
- D. The feed pump shall be designed to handle 130 percent of the design feed rate to the dryer. At the design feed rate to the dryer, the pump will shall have an operating speed less than 90 rpm.
- E. The pump shall be driven by a minimum 10 hp, 1,750 rpm direct coupled, 460V electric motor, connected for operation on a 480 Volt, 3 phase, 60 Hz service. Motors shall be constructed with Class F insulated windings, continuous duty at 40 degrees C ambient air temperature with a 1.15 service factor.
- F. The Pump motors shall be rated “Inverter Duty” suitable for operation with a PWM variable frequency drive, with output to the motor conditioned by a reactor or filter. These motors shall comply with NEMA MG-1 Parts 30 and 31. Motor insulation shall be rated for high dV/dt (2,000 volts minimum) for VFD operation. The turndown ratio for the motors shall be as required for the rated throughput range recommended by the Supplier. The motors shall be capable of meeting the design conditions specified herein at a maximum operating frequency of 60 Hz.
- G. Motors shall meet the electrical requirements of WAC 296-46B-430, “Motors, motor circuits and controllers, 007 Markings on motors and multi-motor equipment”. Motors shall meet the efficiency requirements of the Washington State Energy Code (Washington Administrative Code, Title 51, Chapter 51-11C) Table C405.8(1), regardless of whether or not a particular motor is exempted from meeting this efficiency by the Washington State Energy Code.
- H. If any motor fails during the warranty period, the Supplier shall replace the motor with a new motor. Rewinding a failed motor shall not be acceptable.
- I. Motors shall be by SEW, Baldor, US Motors, Reliance, General Electric or Toshiba/Houston. No other manufacturers shall be accepted.
- J. The suction housing shall be made from fabricated galvanized steel with quality welds, cleaned and deburred. The suction housing shall incorporate

two inspection ports, 180 degrees apart, to permit easy access to the suction housing interior without disconnecting the piping or feed chute. The bearing housing of the pump shall be thick-walled cast iron. All cast parts shall be free of sand holes, blow holes, and other defects.

- K. Provide a TSE thermal sensor assembly embedded in the stator tube to alert in the event of dry operation. The rotor and stator shall be monitored by a controller with predetermined temperature settings, automatic shutdown, and manual reset.
- L. The cake pump shall be provided with an enlarged inlet hopper that has a total capacity of 20 ft³. The hopper shall be provided with radar level sensor for level measurement in accordance with specification Section 13425.
- M. A bridge breaker shall be an integral part of the suction housing. It shall consist of two counter-rotating shafts, each with a series of wide paddles, and positioned in close proximity to the pump's conveyor assembly. The bridge breaker shafts shall be sealed from the pumped material by adjustable packing.

The bridge breaker shafts shall be supported at each end by heavy duty bearing blocks and ball bearings. The shafts shall be driven off a separate right angle gearmotor drive, which will allow the bridge breaker to operate at different speeds than the pump. The single drive shall turn both shafts in a counter rotating direction through a set of grease lubricated timing gears. The bearing blocks, ball bearings, and timing gears shall be protected from contamination by pumped material through a wide atmospheric break between the drive components and sealing arrangement.

For ease of pump maintenance, the bridge breaker paddles shall be designed for easy access to the pump's drive components without disturbing the bridge breaker drive assembly and timing gears. Each shaft shall be a three-piece design with two end shafts and a paddle shaft. The end shafts shall be made of stainless steel and the paddle shaft shall be made of alloy steel. The paddle shaft shall be fully removable from the top of the suction housing without disturbing the bridge breaker bearings, timing gears, gearmotor, packing, and end shafts.

- N. Provide over-pressure protection utilizing a flow through annular diaphragm pressure sensor ring assembly with a discharge pressure transmitter. Pump pressure shall be displayed and trended in the dryer control screens.

O. SPARE PARTS

The System Supplier shall provide the manufacturer's recommended spare parts and special tools. All parts and tools shall be suitably identified and effectively protected from moisture and corrosion with appropriate wrappings or coatings or a combination thereof. All parts and tools shall be furnished in sturdy labeled boxes. At a minimum these shall include all special tools and appliances necessary to service, repair, and adjust the equipment, and the following spare parts items:

Rotor	1 per pump
Stator	1 per pump
Spare mechanical seal	1 per pump
Pump bearings.....	1 set per pump
Gear joint kit	1 per pump
Joint seal kit	1 per pump
Casing gasket	1 per pump
Plug-in shaft.....	1 per pump
Shaft seal	1 per pump
Required seals and gaskets.....	1 complete set per pump

2.4 THERMAL OIL HEATING SYSTEM

- A. A thermal oil system heating shall be furnished to produce a sufficient thermal energy to meet the evaporative demands of the thermal drying system. The thermal oil heaters shall be located in a separate room from the thermal drying processing equipment and provided with secondary containment.
- B. The thermal oil heater shall be rated for a minimum output capacity of 2.5MM BTU/hour and shall provide thermal oil with a maximum thermal oil temperature of 446°F and a design oil output temperature of 410°F.
- C. The thermal oil heater shall be designed to operate on natural gas as well as natural gas and digester gas burned simultaneously as a fuel source at a rate sufficient to meet 100 percent of the heating requirement. The thermal oil heater burner shall be equipped with two gas rings to allow digester gas and natural gas to be utilized as fuel sources. In the event that digester gas is not available, the system shall automatically transfer to burn natural gas alone and then back to both when digester gas is again available. The system controls shall also automatically modulate gas flows as required to meet varying load requirements. The digester gas and natural gas supply pressure at the thermal oil heater shall be 5 psig and 2 psig, respectively, minimum regulated pressure.

- D. The System Supplier shall be responsible for the design, and specification of the interconnecting piping, valves, and insulation (hot oil supply and return) between the thermal oil heater and the drying equipment. The Contractor shall be responsible for the supply and installation of the hot oil supply and return piping systems including insulation. For purposes of estimating the interconnecting piping requirements, the System Supplier shall estimate for a total of not more than 100 linear feet between the interface of the thermal oil heater and the dryer.
- E. A thermal oil expansion tank with a nitrogen (inert gas) blanket shall be provided for the thermal oil heater unit and thermal oil heating loop. The thermal oil expansion tank shall be provided complete with all connections and valves required for a functional system.
- F. The heater shall be of a forced circulation design. The coil shall be designed and stamped according to the specifications of the ASME Section I - Pressure Vessel Code for 650°F at 225 psig. The coils shall be hydro-tested at 375 psig. A minimum of 100 percent of the inner coil welds and 10 percent of the outer coil welds shall be x-ray inspected. The heater inlet and outlet connections shall be ANSI 300 pound flanged and shall be fitted with thermowells to monitor the heater inlet and outlet temperatures. Each individual coil outlet into the common supply heater shall contain a thermowell for monitoring of the individual coil temperature.
- G. The thermal oil heater shell shall be externally insulated with a minimum of 2 inches of mineral wool insulation, quilted on expanded metal and covered with an embossed aluminum outer cover to prevent heat loss radiation, accidental injuries due to high surface temperature, and overheating of the working environment. Surface temperature shall be less than 125°F when the system is operating at design conditions.
- H. The thermal oil heater shall be furnished with an approved OSHA ladder and handrail system for personnel access for operations, inspection, and maintenance. The thermal oil heating system shall be furnished in accordance with OSHA, and other applicable safety codes, requirements.
- I. The thermal oil heater shall be furnished with a pressure relief valve connected to a 00# flanged valve sized and furnished in accordance with the requirements of ASME Section VII for the thermal oil liquid utilized.
- J. The System Supplier shall furnish heat loss calculations through the proposed insulation in order to quantify heat losses during thermal oil heater operation in order that adequate ventilation rates can be furnished within the thermal oil heater room. The System Supplier shall also furnish

combustion air requirements for the thermal oil heaters in order that adequate combustion air can be provided in the thermal oil heater room.

- K. The thermal oil heater burner shall be of the forced draft type design designed to operate on the fuel sources previously described (i.e., natural gas and natural gas and anaerobic digester gas burned simultaneously).
- L. The thermal oil heater burner, fan, motor and fuel train furnished shall comply with the applicable requirements of the nationally recognized testing laboratories (e.g., NFPA, IRI, FM and UL).
- M. The thermal oil heater burner shall be furnished with a flame safety system utilizing a self-checking UV flame detector.
- N. The thermal oil system shall be furnished with a local control panel (LCP) that shall be labeled as meeting the requirements of a nationally recognized testing laboratory. The LCP shall provide for the local control of the thermal oil system and monitoring of the thermal oil heating system and shall contain, as a minimum, the following fault and failure indication:
 - 1. High Thermal Fluid Temperature
 - 2. High Flue Gas Temperature
 - 3. Low Thermal Fluid Temperature
 - 4. Low Thermal Fluid Flow
 - 5. Low Thermal Fluid Level in Expansion Tank
 - 6. Burner Flame Failure
- O. The thermal oil system shall contain, as a minimum, the following control devices:
 - 1. Temperature Switch(es) – High Thermal Oil Temperature (Each coil to be independently monitored)
 - 2. Temperature Switch(es) – High flue gas temperature
 - 3. Temperature Sensors – Hot Oil Supply
 - 4. Temperature Sensors – Hot Oil Return
 - 5. Pressure Relief Valve (ASME Section VIII Rated)

6. Fluid Level Switch – Expansion Tank Level
 7. Low Fluid Level Switch (in Expansion Tank)
 8. Flame Safeguard Control
- P. The thermal oil burner control system components and local control panel shall be furnished in NEMA 4 stainless steel enclosures.
- Q. The System Supplier shall specify the type and quality of thermal oil. The Contractor shall furnish the first fill thermal oil to fully charge the system.

2.5 THERMAL OIL COOLER

- A. A thermal oil cooler shall be provided for the thermal oil heater system. The Thermal oil cooler shall be a water-cooled heat exchanger and shall be provided to cool the thermal oil and the thermal dryer during system shutdown.
- B. The thermal oil cooler shall be designed with sufficient heat transfer capacity to cool the thermal drying system from its working temperature to less than 200°F in approximately 90 minutes with an inlet feed water temperature of not greater than 85°F. The system supplier shall clearly indicate cooling water requirements for the thermal oil cooler system in the submittal package.
- C. The thermal oil cooler shall be fabricated from stainless steel and designed, manufactured, inspected, tested and stamped in accordance with the ASME Code for Unfired Pressure Vessels, Section VII, Division 1 (latest revision) for a design condition of not less than 100 psig working pressure at a design temperature of 450°F.
- D. Connections to the thermal oil cooler shall be 300# flanged connections. Temperature gauges shall be provided on the thermal oil cooler inlet and outlet to monitor temperature conditions across the thermal oil cooler.

2.6 THERMAL OIL RECIRCULATION PUMP

- A. Two thermal oil recirculation pumps (one duty and one standby) shall be furnished to provide recirculation of thermal oil from the thermal oil heater to the dryer. The thermal oil pumps shall be configured such that the any one (of the two) thermal oil recirculation pumps can serve the operating thermal dryer while the remaining pump is either not in service, or removed from service for maintenance.

- B. The thermal oil recirculation pump shall be a low-pressure centrifugal pump specifically designed for pumping thermal oil fluids under the service conditions required for the thermal drying system and suitable for operation with thermal oil temperatures up to 450°F.
- C. The thermal oil recirculation pump shall be supplied with mechanical seals designed for thermal oil fluid use to assure long-life and maintenance free operation of the pumping equipment.
- D. The thermal oil recirculation pump shall be mounted on a common base plate complete with coupling, coupling guard, and TEFC motor.
- E. The thermal oil recirculation pump shall be designed to operate under the flow and pressure requirements sufficient to circulate the required minimum quantity of thermal oil required to meet the thermal dryer evaporation requirements.
- F. The thermal oil recirculation pump shall be furnished with a pump discharge pressure gauge (0 to 160 psig operating range); pump suction combination pressure/vacuum gauge (-30-inches Hg to 60 psig operating range); and 2-gauge air bleed valves.
- G. The thermal oil pumps, where not insulated to protect operating personnel, shall be provided with appropriately designed safety cages and/or guards to protect operating personnel from hot surfaces.

2.7 PADDLE DRYER

- A. The dryer shall consist of a jacketed trough and cover mounted to a common base. The trough shall be equipped with two rotating agitator assemblies comprised of hollow agitator shafts with multiple hollow paddles mounted on each agitator shaft. The hollow agitator shaft and paddles shall be utilized for heat transfer surface area in conjunction with heat transfer surface area associated with the jacketed dryer trough.
- B. The paddle dryer shall have a minimum total heat transfer surface area of 563 square feet (51.37 square meters) and a minimum effective volume of 142 cubic feet. The paddle dryer shall be designed for use with thermal oil as the heat transfer medium. The medium side of all heated surfaces shall be designed to ensure a turbulent oil flow for optimum heat transfer.
- C. The trough shall have a “W”, omega shaped configuration.

- D. Trough shall be designed and stamped in accordance with ASME Code Section VIII, Division I, with max. design temperature and pressure of 550 degrees F at 125 psig.
- E. The cover shall be heat traced to reduce internal condensation during operation.
- F. The vaulted cover shall provide sufficient space to allow for the removal of vapors which are generated during the drying process. Average vapor velocities shall not to exceed 2 fps to minimize dust entrainment.
- G. The dryer cover and trough shall be equipped with the following:
 - 1. Trough, trough jacket, and vaulted bolted cover shall be 304/304L stainless steel for all process wetted parts.
 - 2. One round flanged inlet in cover for sludge feed located at the drive end.
 - 3. One round flanged recycle inlet in cover for sludge feed located at the drive end.
 - 4. Two maintenance man ways and inspection ports along one side of cover.
 - 5. One flanged outlet port for vapor removal located in the top cover.
 - 6. One rectangular bottom center discharge flange.
 - 7. Flanged connections for temperature, safety, and level sensors.
 - 8. A water injection manifold in the event of upset or emergency conditions and automatic valve actuation.
 - 9. Five thermowells for field installation of Supplier furnished temperature sensors.
- H. A deflagration prevention system consisting of chemical suppression for the protection of the dryer system and personnel shall be supplied and conform to NFPA 69, 652, and 654. The specific elements, sensors, controls and locations of the system will be confirmed by the Supplier upon confirmation of the Dryer System design. In general, the system will contain the following elements:

1. Mount one 2-zone CONEX controller to operate the Interceptor®-HRD™ system. The CONEX controller feature independent zones, programmable relays, data recording, and a 24 hour battery backup.
 2. Mount one Dual-headed DetEx Pressure Detector on the dryer.
 3. Mount four 50L Interceptor®-HRD™ suppression bottles on the dryer.
 4. Mount one 5L Interceptor®-HRD™ isolation bottles on the extraction line from each dryer.
 5. Mount one 5L Interceptor®-HRD™ isolation bottles on the discharge screw conveyor.
 6. Each suppression bottle is equipped with an OSHA compliant lockout/tagout, stainless steel mounting flange. The suppressant material for each bottle will be sodium bicarbonate.
- I. The assembly shall be a closed system to minimize air leakage throughout the system. The trough end heads shall be designed to permit vertical removal of agitator shafts.
- J. The paddle dryer cover and trough shall be insulated, except at the ends, to minimize heat loss to the operating area, maximize heat transfer to the product being dried, and to protect operating personnel from hot surfaces. At a minimum, the trough shall be provided with a 4-inch thickness of closed cell glass insulation and shall be banded to the trough. The trough insulation system shall be covered with a 0.024-inch thickness (minimum) Type 304 stainless steel sheathing. The cover insulation system shall consist of a fiberglass fabric covered blanket, 1.5-inch minimum thickness, which attaches to the cover with tabs for ease of removal of the cover insulation system for maintenance. Sufficient insulation shall be provided to control surface temperatures to less than 125°F when the thermal drying system is in operation.
- K. The dryer shall be equipped with two counter-rotating agitator assemblies. Each agitator assembly shall have numerous discontinuous wedge-shaped paddles fabricated from 316/316L stainless steel. Paddles shall be hollow to permit flow of heating medium throughout. These paddles shall be mounted on a central hollow pipe which acts as the primary structural member of the agitator shaft.

- L. The agitator assemblies shall be designed, manufactured, inspected, tested, and stamped in accordance with ASME Code for Unfired Pressure Vessels, Section VIII, Division I, for 550°C at 125 psig.
- M. All paddles shall have HVOF applied tungsten carbide on crowns (top rim), leading edge, and back mixing tabs. The last 70 percent of the agitator paddles shall be 100 percent coated with HVOF applied tungsten carbide for abrasion protection.
- N. The interior of the trough shall be protected against abrasion with Hardox 450 plates, extending up the trough side walls to a height equal to 1/2 of the paddle radius above the agitator centerline. The Hardox 450 plates shall have a minimum thickness of 5 mm.
- O. The product level inside the machine shall be controlled by a manually adjustable overflow weir to maintain product level inside. The product outlet overflow weir is equipped with manually operated emptying valves in the discharge chute allowing for removal of product before a production stop. The product outlet chute at the bottom of the trough has a rectangular flange to connect to the downstream conveying equipment.
- P. The main shaft seals shall be equipped with spring loaded stuffing boxes to maintain a constant pressure. The shafts shall be equipped with wear sleeves at the sealing area to protect the shaft from abrasion. The stuffing boxes shall be equipped with a lantern ring for a gas purge.
- Q. The agitator shafts shall be supported by roller type bearings. The bearings are oil lubricated roller type supplied with a forced oil lubrication system including oil tank, filter, pump, etc. The oil lubrication system is also supplied with temperature and flow monitoring to ensure proper lubrication is being achieved. Control of the oil lubrication system including alarms shall be integrated and included as part of the dryer system controls.
- R. Rotary Joints – Thermal Oil. The heat transfer medium is introduced into, and removed from the dryer agitator shaft, via the same rotary on one end of the shaft.
- S. The paddle agitator shafts shall be driven by an electric gearmotor drive assembly. The drive shall include a motor and a planetary gear reducer. The agitator shafts shall be connected by spur gears to ensure the same rotational speed is achieved.

Between the shafts are spur gears which ensure identical rotational speed. Speed is fixed and does not require variation.

Motors will be 460 VAC/3 ph/60 Hz, UL listed, NEMA MG-1 for:

1. Paddle dryer drive
2. Lubrication pumps (2) for lube oil to main bearings

Inverter rated motors are furnished for:

1. Discharge conveyor drive
2. Cooling conveyor drive

- T. The dryer frame shall be constructed from a steel painted construction by elongations of the end plates of the trough. A single mounting base shall be provided which is constructed of carbon steel for the dryer. The base shall include support for the jacketed trough, pedestals for the agitator pillow blocks, and a base for the drive assembly components.
- U. The dryer system shall be equipped with a stainless-steel duct to connect the exhaust gas discharge from the dryer hood to the condenser wet scrubber. The duct shall be heat traced and insulated by the Contractor as specified by the System Supplier.

2.8 DRYER DISCHARGE CONVEYOR

- A. A covered dryer discharge screw conveyor shall be provided for the thermal dryer to transport dried product from the paddle dryer to downstream conveyance and handling equipment in the thermal drying system. The dryer discharge screw conveyor will consist of a single shafted auger designed for the mass and volumetric flow rates required based on the thermal dryer loading conditions.
- B. The dryer discharge screw conveyor shall have two inlet connections. The first connection shall be to the dryer discharge rotary valve. The second connection is to the bottom of the dryer and includes a manual slide gate.
- C. The dryer discharge screw conveyor shall be fabricated of Type 304L stainless steel for all product contact surfaces. The conveyor auger shall be fabricated with solid flights with a minimum material thickness of 0.375 inches that are continuously welded on one side to the conveyor shaft.
- D. The dryer discharge screw conveyor drive shall consist of a 5 hp inverter duty 480VAC, 3PH, 60HZ TEFC electric motor rated for Class II,

Division II, Group G, hazardous area. The dryer discharge screw conveyor shall be designed for operation under variable speed conditions utilizing a variable frequency drive (VFD) to be furnished with the motor control center equipment for the thermal dryer system

- E. A speed reduction gear shall be provided with the drive assembly which shall be designed to produce an output speed in the conveyor sufficient for the volumetric transport requirements when operating under design conditions at appropriate bed loading conditions and design safety factors. The gear reduction assembly shall be suitable for AGMA Class II operation, by Falk or Dodge Corporation Type JSC, or approved equal.
- F. The dryer discharge screw conveyor shall be enclosed to avoid being an odor or dust source. Covers shall be fabricated from 1/8-inch (minimum) thickness. Covers shall be bolted to the conveyor troughs with silicone rubber gasketing.
- G. The dryer discharge screw conveyor shall be equipped with external lubrication points. The lubrication points shall be readily accessible from either the operating floor level, or walkway platform if elevated.
- H. The dryer discharge screw conveyor shall be provided with a zero speed switch for monitoring movement of the conveyor auger screw. The zero speed switch shall detect if the auger has stopped rotating while the motor remains in operation.
- I. The dryer discharge screw conveyor shall be furnished with OSHA required safety guards and other required safety equipment.
- J. The dryer discharge conveyor shall be furnished with an emergency trip cord and safety switch. The cord shall run the full length of each conveyor on each side. The cable shall be plastic coated safety cable mounted through stainless steel eyebolts on 10 feet maximum centers. The trip switch shall immediately stop all conveyors when the switch is actuated. The switch shall have a NEMA 4X enclosure and switch.
- K. Dried material exiting the dryer discharge screw conveyor shall gravity discharge into inclined cooling screw conveyor.
- L. Carbon steel structural supports for the conveyor shall be provided by the system supplier.

2.9 OFF GAS HANDLING SYSTEM

- A. An off gas handling system, consisting of an off-gas spray duct and a condenser/wet scrubber, shall be provided to cool the process off gasses and condense the moisture evaporated in the process.
- B. Condenser/scrubber shall be a vertical flow unit where the gas stream enters at the bottom of the unit and exits from the top and designed for the maximum vacuum pressure which the process gas fan will be able to produce. The vapors and remaining fines coming from the dryer will be treated in a direct condenser/cooler.
- C. The scrubbing system shall utilize recycled plant pressurized non-potable water, which is fed to the spray-nozzles. The amount of spray water is controlled by temperature measurement in the bottom of the condenser.
- D. The discharge water should be sent back to the wastewater treatment plant by gravity drainage. The non-condensables and some remaining vapors leave the scrubber on the top, where a demister package minimizes droplets from being carried out.
- E. From the wet scrubber, a connection shall be provided for ducting that will feed into the WWTP's existing biofilter odor control system. The existing off exhaust and odor control system should provide sufficient vacuum pressure to the system to preclude the need for additional exhaust fans.
- F. **CONDENSER/WET SCRUBBER**
 - 1. Cylindrical construction manufactured of 304L SS housing, top, bottom, flanges and lugs.
 - 2. Flanged instrument connections.
 - 3. Flanged drain and water connections ASTM 304 SS, 150 lb rated.
 - 4. All nozzles of 304 SS shall be accessible from outside of condenser.

2.10 COOLING SCREW CONVEYOR

- A. A covered inclined cooling screw conveyor shall be provided for the thermal dryer to transport dried product from the dryer discharge conveyor to the vibrating screen and fines separation system. The inclined cooling screw conveyor will consist of a single shafted auger designed for the

mass and volumetric flow rates required based on the thermal dryer loading conditions.

- B. Dried material exiting the dryer discharge screw conveyor shall gravity discharge into a cooling screw conveyor. The cooling conveyors shall be capable of receiving the dried bio-solids at a maximum temperature of 260°F (normal 240°F) and cooled to a temperature of less than 120°F. The cooling conveyor shall be jacketed cooled with a minimum cooling water flow of 30 gpm of non-potable water at 75°F or less.
- C. The cooling conveyors shall consist of a single shafted 14-inch auger. The conveyors shall be fabricated of Type 304L stainless steel for all product contact surfaces. The conveyor auger shall be fabricated with solid flights with a minimum material thickness of 0.375 inches that are continuously welded on one side to the conveyor shaft.
- D. The inclined cooling screw conveyor shall be designed for operation under variable speed conditions utilizing a variable frequency drive (VFD) to be furnished with the motor control center equipment for the thermal dryer system.
- E. The inclined cooling screw conveyor shall be enclosed to avoid being an odor or dust source. Covers shall be fabricated from 1/8-inch (minimum) thickness Type 316 stainless steel. Covers shall be bolted to the conveyor troughs.
- F. The inclined cooling screw conveyor shall be furnished with OSHA required safety guards and other required safety equipment.
- G. Structural supports shall be provided for the conveyance equipment and shall be designed by a currently licensed Professional Engineer in the State of Washington. Design calculations for the conveyor structural support shall be included in the submittal package.

2.11 FINES SEPARATION AND RETURN SYSTEM

- A. The thermal drying system shall be supplied with a fines separation and return system to classify dried product prior to final product conveyance to product handling area, with reject materials returned via screw conveyors via a rotary valve air lock at the inlet of the Paddle Dryer for recycling into the dryer. The fines separation and return system shall consist of a vibrating screen, a fines return conveyor, a rotary valve, and related accessory equipment required for this processing step.

- B. A vibrating screen shall be provided with at least two screening decks to classify dried product into at least three classifications: (1) Oversize; (2) Midsize product; and (3) Undersize. Product larger than 6.0-mm shall be classified by the vibrating screen as Oversize. Product smaller than 0.5 mm shall be classified by the vibrating screen as Undersize. Product between 0.5 mm and 6.0 mm shall be classified as Midsize Product and shall be discharged to the inclined cooling screw conveyor. Screened undersized and oversized product is returned to dryer inlet via screw conveyors.
- C. Undersize product (< 0.5 mm) and oversize product (>6 mm) shall be returned to the paddle dryer via an inclined tubular screw conveyor system. The fines return conveyor shall include full size flanged inlet and outlet connections in the cover and trough to receive material from the vibrating screen and discharge material to the paddle dryer inlet.
- D. The fines return conveyor shall be enclosed to avoid being an odor or dust source. Covers shall be fabricated from 1/8-inch (minimum) thickness Type 316 stainless steel. Covers shall be bolted to the conveyor troughs.
- E. Structural supports shall be provided for the conveyance equipment and shall be designed by a currently licensed Professional Engineer in the State of Washington. Design calculations for the conveyor structural support shall be included in the submittal package.

2.12 THERMAL OIL HEATING SYSTEM EXHAUST STACK

- A. An exhaust stack shall be provided to collect exhaust gases and provide a single point of discharge from the thermal oil heating system. The thermal oil heating system exhaust stack shall extend to a height as required to meet the air permit requirements, but not less than 10-feet above the dryer building roof. For purposes of estimating exhaust stack costs a stack height of not less than 40-feet shall be utilized.
- B. The exhaust stack shall be constructed of corrosion resistant series 316L stainless steel and shall have a minimum thickness of 1/8 inch. The stack design shall account for thermal expansion, wind, snow and earthquake loads present at the site.
- C. Stack shall include two sampling ports on diameter 90 degrees apart. Location of the centerline of these ports shall be at least 2.5 feet from the stack exit or other flow disturbances and at least 10 feet downstream of any bends, inlets, constrictions, abatements equipment, straightening vanes, or other flow disturbances. The stack port locations and

construction shall comply with the requirements of 40 CFR, Part 60, Appendix A.

- D. Sampling ports shall be a minimum 4-inch nominal diameter, standard industrial flanged pipe. Ports shall be installed flush with interior stack wall and shall extend outward from exterior stack wall no less than three inches and no more than eight inches.

2.13 INSTRUMENTATION AND CONTROLS

- A. The Supplier shall furnish instrumentation and associated equipment as specified herein and as required for proper operation, control, safety, monitoring, and alarming functions related to the Biosolids Drying System. All mounting hardware, cable, and supports for the instruments including 316 stainless steel fasteners shall be provided by the Supplier. All instrumentation components shall be rated for the environment in which they will be located, with minimum NEMA 4 rated enclosures.
- B. All elements of the Instrumentation and Control System shall be tested to demonstrate that the total system satisfies all of the requirements of this Specification.
- C. Like items of equipment provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts, and service. All components, assemblies, and wiring shall conform to the requirements of the National Electric Code. Panels shall be listed and labeled in a manner acceptable to the Washington State Department of Labor and Industries.
- D. Control of the Drying System equipment shall be by a local control panel, equipped with an Allen Bradley ControlLogix Programmable Automation Controller (PAC). PLC shall be configured with Allen Bradley Modbus TCP server instruction blocks. All SCADA data (setpoints and status information) shall be presented in contiguous DINT arrays made accessible via the Modbus TCP instruction blocks. Analog values shall be scaled to hundredths of Engineering Units (e.g., 125.78 degrees would be represented as an integer value of 12578).
- E. All controls and instruments shall fail into a safe condition. The controls shall be designed such that the biosolids drying system cannot operate unless the controls are energized, nor can they operate with any defective controls. Upon PLC failure, the biosolids drying system components shall shut down in a safe manner and generate an alarm to the plant SCADA system.

- F. The system supplier shall provide instrumentation and controls for the system equipment, with signals from the thermal fluid heater control panel to be sent to the main dryer panel for remote operation and control. The thermal fluid heater shall have local instrumentation panels for independent control. All wiring and electrical connections must be protected from moisture and dust to prevent shorts or failure.
- G. The dryer panel shall consolidate all instrumentation and control functions for the drying process incorporating the following features:
1. An Allen Bradley ControlLogix Series PLC provided to control system control.
- H. Dryer system visualization shall be provided by manufacturer in Aveva InTouch format, version 2023 . Manufacturer shall provide fully functional InTouch HMI application for startup of dryer system from manufacturer laptop. When system is fully functional, a copy of the HMI application shall be provided to the Owner for incorporation into the plant's existing HMI application.
1. HMI application shall include a tabbed menu across the top of the screen. The menu shall have a resolution of 39 pixels tall by 1878 pixels wide and be located at (11,80).
 2. HMI application shall include any necessary process visualization windows, configured as "Replace", accessible via the tabbed menu. Process screens shall have a resolution of 1058 pixels tall by 1878 pixels wide, and a location of (11,119).
 3. Setpoint windows may be the same size as process windows and configured as "Replace" or may be implemented as smaller "Pop-Up" windows.
 4. The startup HMI application shall configure all analog status, analog setpoint, discrete command, and discrete status tags for local historical logging.
 5. The startup HMI application shall configure alarming on all tags associated with PLC generated or IO derived alarms.
 6. Alarms for analog values, for example a high temperature alarm, shall be determined in the PLC and presented as a discrete alarm tag to the HMI and plant SCADA system. Setpoints for all alarms shall be operator adjustable from the HMI and plant SCADA system.

7. All HMI tagnames shall be prefixed with the string “SHB_Dryer_”. (For example, a general system alarm would be “SHB_Dryer_GenAlarm”).
8. The HMI interface shall display of the following minimum functions:
 - a. All motor conditions (Auto, Run, Stop, Local).
 - b. All equipment alarm conditions.
 - c. Dewatered cake bin level. (Trended)
 - d. Dewatered cake pump speed, amps, and discharge pressure (Trended)
 - e. Dryer drive motor amps. (Trended)
 - f. Dryer bed and off gas temperatures. (Trended)
 - g. Thermal fluid supply and return temperatures. (Trended)
 - h. Thermal fluid temperature drop across dryer. (Trended)
 - i. Natural Gas consumption (Trended)
- I. The system supplier shall provide the PLC with Ethernet capabilities to communicate with the plant’s SCADA system. Programming of the plants SCADA system and interconnecting field wiring between the PLC and the plant SCADA system is to be furnished and installed by Contractor.
- J. The system supplier shall provide online biosolids indirectly heated thermal dryer system monitors, which shall continuously automatically track the feed pump speed and temperature in the dryer.
- K. HMI application shall incorporate a display screen for visual trend analysis up to a 24-hour basis on the dryer operational parameters.
- L. The system supplier shall provide alarms to indicate a condition in which the indirectly heated thermal dryer system performance may be jeopardized, as follows:
 1. High and low bed discharge temperature from dryer.

2. High dryer vapor temperature.
3. High condenser water level.
4. High product cooler discharge temperature.
5. All motor overloads.
6. High/low level on dryer feed hopper.
7. Zero speed on conveyor(s).
8. High condenser outlet temperatures.
9. High dryer amps.

2.14 MOTORS

- A. All motors furnished shall be a standard horizontal, squirrel caged, TEFC electric induction motor meeting NEMA MG-1 and other applicable NEMA, ANSI, and IEEE standards and shall be suitable for use in a corrosive environment. Motor shall be constructed with Class F insulated windings, B 30,000 anti-friction bearings, cast iron frame and end bells. The motors shall be suitable for 460 volts AC, 3 phase, 60 Hertz, or 120 volt AC, single phase power supply. The motor service factor shall not be used in determining a non-overload condition. The motor torque shall be adequate for all operating conditions.
- B. The motor windings shall be provided with thermal detection switches (normally closed) embedded in each phase of the motor windings, Detectors shall be suitable for operation with 120 volt AC and 24 volt DC control circuits, Klaxon or equal. These sensors shall have insulated conductor leads brought to the motor terminal box and shall be suitable for wiring as a permissive in the motor starting circuit.
- C. Motors shall be recognized or labeled and listed by a recognized electrical testing laboratory approved by the Washington State Department of Labor and Industries, or the motor shall be specifically approved by the Washington State Department of Labor and Industries for installation on the project.
- D. Motors shall meet the efficiency requirements of the Washington State Energy Code (Washington Administrative Code, Title 51, Chapter 51-11) Table C405.8(1), regardless of whether or not a particular motor is

exempted from meeting this efficiency by the Washington State Energy Code.

- E. All motors to be operated via VFD's shall be rated "Invertor Duty" suitable for operation with the variable frequency drives specified in Division 16, Electrical, and shall be coordinated with the thermal, electrical, and mechanical characteristics of the drives actually supplied. These motors shall comply with NEMA MG-1 Parts 30 and 31. Motor insulation shall be rated for high dV/dt (2,000 volts minimum) for VFD operation.
- F. The motors shall be painted as specified herein. Do not paint nameplates, drain holes, vent openings, or lubrication fittings.
- G. If any motor fails during the warranty period, the Supplier shall replace the motor with a new motor. Rewinding a failed motor shall not be acceptable.

2.15 ACCESS PLATFORMS, WALKS AND STAIRWAYS

- A. The Supplier shall design and furnish access provisions consisting of access platforms, catwalks, ladders, handrails, stairways, and other necessary items as required to conform to OSHA and other applicable codes and regulations. All access provisions shall be provided as required to allow convenient and unobstructed access to all areas of equipment requiring routine maintenance. This shall include as a minimum access to items such as equipment drives, bearings, instrumentation nozzles, hatches, lubrication points, sampling points, inspection and access doors.
- B. Access to major equipment platforms shall be by stairs or ladders.
- C. Structural steel members shall be free standing and shall be supported from the floor slab only. Anchoring structural supports to the building walls, columns, beams, or ceilings shall not be allowed.
- D. Provide handrails around all areas requiring personnel access. All handrails shall be three rail type, extruded aluminum, minimum tensile strength of 38,000 psi and minimum yield strength 35,000 psi. Rails and posts nominal 1-1/2-inch diameter. Post spacing maximum 5-feet.
- E. All metal grating provided shall be aluminum bar type grating, designed for foot traffic, 100 pounds per square foot minimum uniform service load, maximum deflection 1/4 inch. Bearing bars shall be spaced at 1-3/16-inch center-to-center, banding 3/16-inch minimum.

- F. Ladders shall be aluminum or galvanized steel sized for concentrated load of 250 pounds plus 30 percent impact on the rungs. Maximum rung deflection shall be L/360. Rungs shall be non-slip grip surface.
- G. Structural steel members shall be fabricated in accordance with AISC specifications. Rolled plates, shapes, and bars shall be ASTM A36 or ASTM A992. Structural steel pipe shall be ASTM A501 or ASTM A53, Type E or S, Grade B. Structural tubing shall be ASTM A500, Grade B. Welding materials shall be AWS D1.1.

2.16 PIPING

Piping shall conform to the requirements of Section 15050.

2.17 ANCHOR BOLTS

- A. Supplier shall size all anchor bolts required for anchoring equipment components, accessories, and structural steel members to their concrete supports and foundation.
- B. Anchor bolts shall be of 316 stainless steel and shall be furnished and installed by the Contractor.
- C. Anchor bolts shall be properly sized to match loads associated with anchored equipment.
- D. Supplier shall provide Contractor drawings showing arrangement and location of anchor bolts in concrete supports and foundations.
- E. Supplier shall coordinate installation of anchor bolts with Contractor to match the equipment installed.

2.18 PAINTING

- A. Unless specified otherwise, factory surface prepare, prime, and finish exposed exterior ferrous metal surfaces for all equipment and accessories of the Biosolids Drying System.
 - 1. Standard Coating – For equipment and motors with surface temperatures below 250 degrees F a standard coating system shall be provided. Prepare surface to receive coating by abrasive blasting or centrifugal wheel blast. Prime with one coat of 2.5 to 3.5-mils minimum DFT Tnemec Omnithane Series 1 or equal. Finish with two coats each of 4 to 6-mils minimum DFT Hi-Build Epoxoline Tnemec Series N69 or equal polyurethane enamel.

2. Thermal Coating #1 – For equipment with surface temperatures between 250 degrees F and 450 degrees F a thermal coating system shall be provided. Prepare surface to receive coating by abrasive blasting or centrifugal wheel blast. Prime with one coat of 2.5 minimum DFT inorganic silicon primer. Finish with two coats of 2.0 minimum DFT silicone acrylic.
 3. Thermal Coating #2 – For equipment with surface temperatures between 450 degrees F and 700 degrees F a thermal coating system shall be provided. Prepare surface to receive coating by abrasive blasting or centrifugal wheel blast. Prime with one coat of 2.5 minimum DFT inorganic zinc primer. Finish with one coat of 2.0 minimum DFT silicone.
- B. Surfaces not requiring painting include non-ferrous and corrosion-resistant alloys, such as copper, bronze, Monel, aluminum, chromium plate, and stainless steel.

2.19 THERMAL INSULATION

- A. The exterior surface of all hot system components, except for the dryer endheads, unless otherwise specified, shall be insulated as required to ensure that skin temperature of any part shall not exceed 125 degrees F. The insulation shall be covered with a jacket or cladding as specified herein.
- B. The insulation shall be chemically and thermally stable fiberglass with a maximum K factor of 0.90 at 600°F.

2.20 MISCELLANEOUS

- A. All equipment, vessels, piping and ductwork in drying system handling dry material shall be bonded and grounded per NFPA. Metal to metal bolted connections will be considered bonded. Contractor shall install bonding jumpers.
- B. Minimum service factor of 1.5 for 24-hour continuous service based on motor horsepower shall be used for sizing gear drives.

PART 3 EXECUTION

3.1 GENERAL

- A. The Supplier shall review the existing building design and layout to ensure equipment may be installed as proposed. The Supplier shall also perform testing as specified herein.
- B. All fuel and water utilities required for the testing specified in this Part shall be supplied by the Owner at the rate and in the quantities designated within this Specification.
- C. The Supplier shall retain the services of an Owner approved independent certified third-party laboratory to provide analytical services for the field and performance testing. Reports from the Supplier that rely on data generated by the third-party laboratory shall be due at the specified interval after the laboratory results are provided to the Supplier.

3.2 INSTALLATION

- A. The Contractor in accordance with approved System Supplier's drawings, approved Engineer's drawings and instructions shall erect the equipment. System Supplier shall furnish necessary oil and grease for initial operation and making final adjustments to place the equipment in operable condition.
- B. Equipment shall be rigidly and accurately anchored into position and carefully coordinated with all connecting pieces of equipment. The System Supplier shall supply all necessary anchor bolts, nuts, washers and plates for installation of equipment provided under this Section. Shims, as required for leveling, shall be furnished by the Contractor.

3.3 FIELD TESTING – GENERAL

- A. Field tests shall consist of Mechanical Tests, Control System Tests, Integrated Systems Tests, and Performance Tests of the entire System as described in Section 3.
- B. The Contractor shall have available to the System Supplier, sufficient personnel of relative trades to assist with the mechanical tests and integrated systems test as well as perform punch list items.
- C. The System Supplier shall provide sufficient staff of skilled operators to supervise and conduct the field, mechanical, control system, integrated system, and process performance tests. Competent and experienced

personnel shall be furnished to supervise the system startup and provide operator instruction for the items included in the scope of supply. These services shall include two trips to site with a total of 30 days on site service.

- D. The System Supplier shall provide access for a reasonable complement of the Owner's staff to accompany and observe the System Supplier's staff throughout these tests. The System Supplier shall document the results of all tests (field, mechanical, control system, integrated system, and process performance) and equipment servicing (pre-warranty and warranty period) of suitable form and content to the Engineer and the Owner.
- E. The drying systems shall be given mechanical field tests to assure compliance with specifications. If the test indicates that adjustments are necessary to ensure conformance, such adjustments shall be made by the contractor. Mechanical testing shall demonstrate that the equipment has been properly installed, with no defects, and is free of overheating, excessive vibration, overloading, and excessive noise. Testing shall also confirm correct operation with control stations and interlocks. No biosolids shall be processed for these tests.
- F. Grounding resistance tests shall be conducted on all equipment, vessels, piping, and ductwork in the drying system. Grounding, and its testing, will be the responsibility of the contractor.
- G. The complete control system as specified herein shall be tested to confirm that the system operates correctly in accordance with the specified requirements. Field instruments shall be tested prior to testing the control system as a whole.
- H. Upon successful completion of the above tests and services, an integrated drying system test shall be performed to demonstrate that the system as a whole is complete and operational. The test shall process dewatered cake as required to test the operation of the system. The integrated drying system test shall be 5 days. The system supplier shall submit data that shows the operation parameters for the test and typical record keeping required to properly monitor the drying system.
- I. The system supplier shall provide training in the proper operation and maintenance of the equipment. Manufacturer's representatives who will provide training shall be factory trained, articulate, and knowledgeable in the installation, operation, and maintenance (including the information in the operations and maintenance manuals) of the drying system. Three days will be provided for training of plant personnel.

3.4 MECHANICAL TESTS

- A. Conduct a mechanical test of each installed piece of equipment. The mechanical tests shall demonstrate that each unit:
 - 1. has not been damaged by transportation or installation.
 - 2. has been properly installed.
 - 3. has no mechanical defect.
 - 4. is free of overheating of any parts.
 - 5. is free of objectionable vibration.
 - 6. is free of overloading of any parts.
 - 7. is free of excessive noise.
 - 8. has all interlocks operating correctly.
- B. No handling or processing of either dewatered sludge cake or recycle material by any equipment and/or system shall take place during the mechanical test.
- C. System supplier shall mechanically test all major pieces of equipment and systems with the assistance of the Contractor.

3.5 CONTROL SYSTEMS TESTS

- A. The complete control system, as specified herein, shall be tested to confirm that the system meets or exceeds the specified requirements. Tests shall cover the full operational range or capability of the system and shall include, but not be limited to:
 - 1. Signal verification (check or correct voltages, current polarity, contact “sensor”, etc.).
 - 2. Database verification (check for correct range, alarm limits, engineering units, message repairs, etc.).
 - 3. Operator input to the controls system.
 - 4. Verification of application software.

- 5. Alarm log and display generation.
- 6. Man-machine interface.
- B. All field instrumentation and controls that are an integral part of the System equipment being tested shall also be tested.
- C. Any defects in the equipment or operating controls or failure to meet the requirements of the specification shall be promptly corrected at no additional cost to the OWNER.

3.6 INTEGRATED SYSTEM TESTS

- A. Upon successful completion of the Mechanical and Control System Tests, an integrated system test using as much field equipment as possible shall be performed.
- B. The integrated systems test shall demonstrate successful functioning of the System and all its elements and software capabilities through planned test cases with actual system on-line operating conditions.
- C. All process and control functions shall be tested, as well as designated combinations and logical sequence.
- D. Operation of I/O peripherals shall be checked out.
- E. During the integrated system test, the System shall process dewatered sludge and demonstrate that the System can function continuously and reliably and produce a granular dried product. The Owner shall be responsible for supplying dewatered sludge required for initial startup.
- F. The System Supplier shall notify the Owner at least 96 hours prior to the integrated systems test so that the Owner can arrange for supplying dewatered sludge to the system during the test period.
- G. All completed tests, malfunctions, corrective measures and downtime shall be chronologically logged.
- H. The integrated system test shall be completed before the System Supplier conducts the Process Performance Test as specified in Article 3.07 of this Section.
- I. During the integrated system test, the System Supplier shall provide all personnel to operate the system to perform the test and analyze samples.

- J. The Integrated System Test shall consist of at least 3 consecutive, 8-hour days of system operation.

3.7 PROCESS PERFORMANCE TEST AND GUARANTEES

Performance test and guarantees shall be as described in section 01800-1.5(F).

***** END OF SECTION *****

SECTION 11650B

BIOSOLIDS DRYING SYSTEM

PART 1 GENERAL

1.1 DEFINITIONS

- A. **SYSTEM** – The complete drying system, which shall include all equipment, controls, instrumentation, and all appurtenances required such that a full functional thermal drying system is realized.
- B. **SYSTEM SUPPLIER** - The person, partnership, corporation, association, or affiliation with whom the OWNER executes an agreement for the supply of the system, and related components and services, as described within this specification.
- C. **OWNER** – The entity contracting for the work to be completed under this specification for system supply and installation.
- D. **CONTRACTOR** – The person, partnership, corporation, association, or affiliation with whom the OWNER executes an agreement for the installation of the system, and related components and services, furnished by the SYSTEM SUPPLIER.
- E. **ENGINEER** – The private engineering firm contracted by the OWNER to design and manage the installation of the SYSTEM and carry out the intent of the project. The ENGINEER shall act as the OWNER's representative to the extent that such authority has been granted them by their contract with the OWNER.

1.2 SCOPE

- A. The work to be provided by the Biosolids Drying Supplier (the Supplier) under this specification section shall include the design, supply of materials and equipment, fabrication, testing, and delivery for assembly and installation of one Biosolids Drying System with accessories as required for a complete and operable unit for the rate as herein specified. Also included are installation supervision assistance, commissioning services and performance testing. The Owner intends to assign that portion of the Contract for the equipment supply, construction services, and post construction services, as defined in Section 01110, to the Construction Contractor (the Contractor) who is awarded the Contract to construct the Biosolids Modernization Project.

- B. The Biosolids Drying System shall be of a fully automated design capable of operating unattended and capable of automatic shutdown when required.
- C. The dryer shall be manufactured by the Supplier.
- D. The Supplier shall guarantee performance of the complete system.
- E. The Supplier shall deliver the Biosolids Drying System to the General Contractor within the timeframe specified herein.
- F. Supplier shall minimize fugitive odor and dust emissions by proper design and ventilation of the equipment to meet the indoor air quality requirements of Chapter 296-841 WAC.
- G. The Supplier shall design and supply a system complete, including but not limited to instrumentation, fasteners, and interconnecting equipment, including all interconnecting air ductwork and chutes, whether or not called for in the Contract Specifications. Any omission of required equipment from this Specification shall not relieve the Supplier of his responsibility for the satisfactory operation of the Biosolids Drying System specified. Consequently, the Supplier shall be responsible for the various details and any special construction which may not be specifically detailed or called for, but is necessary to properly install and place into successful and continuous operation the Biosolids Drying System specified herein.
- H. The Supplier shall furnish a complete Instrumentation and Control system for the Biosolids Drying System. The system shall include all materials and documentation required to install, test and place in operation a complete and operable instrumentation and control system as specified. The system shall include all measuring elements, control devices, signal converters, transmitters, local control panels, digital hardware and software, operation workstations, and communication networks to provide the functions indicated.
- I. The Contractor shall provide power, control and interconnecting wiring between the equipment and control panels. The contractor shall field mount all field instrumentation supplied by the Supplier at defined locations.

- J. Items to be supplied with the system are defined in detail in Part 2 of these Specifications and shall include, but not be limited to the following:
1. A thermal oil system suitable for operation with natural gas, as well as, a natural gas and digester gas burned simultaneously. A thermal fluid cooler will also be included to cool the system during shutdown. Control equipment shall be included with the system.
 2. Indirect thermal oil heated Paddle Dryer to produce Class A dried biosolids.
 3. Explosion protection and fire prevention systems, in accordance with NFPA 68, provided for all System components.
 4. An off-gas handling system to condense and cool the off-gas from the dryer and to facilitate odor control. Off-gas from the dryer shall be shall be ventilated through the existing biofilter odor control system.
 5. Fines screening and product recycle system.
 6. One (1) Cake feed pump and one (1) uninstalled spare pump for use with the existing 50 cubic foot wet cake feed hopper with live bottom, to be used for the new paddle dryer system.
 7. Product cooling conveyor.
 8. Valves and dampers (motorized, pneumatic and manual) required for process control and isolation.
 9. All electrical, instrumentation, and control equipment as specified herein and including the following:
 - a. Electrical system components including motors, conduit and wiring to junction boxes (single point connections) on skid mounted equipment.
 - b. Instrumentation and controls including control panels, PLCs, field instruments, conduit and wiring to junction boxes (single point connections) on skid mounted equipment.
 10. Access provisions including platforms, catwalks, ladders, handrails and stairways.

11. Equipment not appearing herein, but necessary for the complete system are not eliminated by reason of such omission and shall be provided by the Supplier unless specifically noted as being supplied by others.
12. SUPPLIER SCOPE EXCLUDES motor control centers, electrical power panels and variable frequency drives associated with the dryer system.

1.3 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01110	Summary of Work
01190	Reference Standards
01300	Submittals
01800	Testing, Commissioning, and Training
11000	General Requirements for Equipment
11010	Vibration and Critical Speed Limitations
Division 13	Special Construction
Division 15	Mechanical
Division 16	Electrical

1.4 SUBMITTALS

The Supplier shall provide submittals as specified herein and in accordance with Sections 01110, 01300, and 11000 of these Specifications.

1.5 WORK BY OTHERS AND COORDINATION WITH OTHERS

- A. The Biosolids Drying System, specified herein, shall be installed by the Contractor. The Supplier shall supervise the installation of the biosolids drying equipment.

The Supplier is not required to be on site during the entire construction process, but shall be available by telephone to provide installation support and answer questions during normal business hours (U.S. Pacific Time).

- B. The equipment shall be unloaded at the plant site by the Contractor.
- C. The Supplier shall design and furnish to the Contractor all components necessary for installation of the electrical systems that are an integral part of the Biosolids Drying System. The Supplier shall coordinate with the Contractor size, location, and routing of all power conduits, raceways, cable trays, and other necessary items. Conduits, raceways, wire ways, and other appurtenances on skid mounted equipment and on the dryer

equipment, instruments and motors shall be provided by the Supplier connected to junction boxes and shall be routed in neat, organized groupings next to structural components, such that no field wiring will be required between the junction box and its associated component on the dryer equipment or other skid mounted equipment. The Contractor shall provide conduits, raceways, wire and other appurtenances not provided by the Supplier between skid mounted equipment, the dryer equipment and other free-standing equipment. The Contractor shall provide grounding and bonding of all equipment and electronic controls. The Contractor shall supply all power distribution equipment including motor control centers for all motors which are not integral to valve operators or other final control elements, with starters and variable frequency drives and the conduit and wiring to junction boxes on skid mounted equipment and the dryer equipment, and directly to free standing equipment. The Contractor shall furnish the types of motor controllers (size and type) needed for the dryer system using the approved Suppliers submittal details (motor list and single line diagrams).

- D. The Supplier shall design piping systems that are an integral part of the Biosolids Drying System. Piping on skid mounted equipment and the dryer equipment, shall be installed by the supplier routed in neat, organized groupings next to structural components. Interface for utility connections shall be located on skid mounted equipment, the dryer equipment, or at other free-standing equipment and shall be clearly indicated on all drawings submitted. The Supplier shall provide piping and supports from the interface point to the Biosolids Drying System components. The Contractor shall provide piping and supports to the interface point from utility connections and from the dryer equipment and other skid mounted or free-standing equipment interface points. Supplier will be responsible for cake pump discharge piping design and supply.
- E. The Biosolids Drying System digital control system shall interface with the WWTP control system over a Modbus/TCP local area network data link. The two control systems shall exchange data such as equipment status, flow rates, alarms, etc. The Biosolids Drying System; however, shall only be controlled from the Biosolids Drying System digital control system.

1.6 PERFORMANCE AND DESIGN REQUIREMENTS

- A. The Biosolids Drying System shall be designed for continuous operation to produce a Class A biosolids product, as defined by 40 CFR 503, from a feed biosolids with the following characteristics and the performance and design requirements herein:
1. Type of WWTP: Municipal
 2. Type of Sludge: Anaerobically Digested Sludge (Primary and Waste Activated Sludge)
 3. Sludge pH: 6.0 to 8.0
 4. Dewatered Cake Solids: 19-20% DS
 5. Temperature: 60 degrees F to 95 degrees F
- B. The Biosolids Drying System shall be designed to produce a Class A biosolids product, as defined by 40 CFR 503, under the following conditions:
1. Dry Solids Feed Rate: 410 dry lb/hr
 2. Wet Solids Feed Rate: 2,050 Wet lb/hr
 3. Cake Dryness: 20% T.S.
 4. Cake % Volatile Solids: Historically varies from 68-74% with an average of 71% VS
 5. Final Dryness: 90% T.S. Minimum
 6. Final Product Rate: 446 lb(dried)/hr
 7. Fuel Source: Natural gas (LHV of 1000 BTU/CF), Digester Gas (LHV of 600 BTU/CF)
 8. Design Evaporation Rate: 1,640 lbs/hr
 9. Heat Consumption: up to 1,350 ($\leq$ LHV) BTU per hr/lb of water evaporation based on LHV

10. Operation: 24 hours/day, Monday morning start-up through Friday afternoon shutdown.
- C. The maximum evaporation rate and the minimum turndown evaporation rate for the proposed system shall be declared in Attachment A of the Bid Proposal.
- D. Fuel for the dryer shall be natural gas and/or a blend of digester gas and natural gas burned simultaneously. The maximum ratio of digester gas to natural gas, which the proposed system can operate at to meet these specifications, shall be declared in Attachment A of the Bid Proposal.
- E. The Biosolids Drying System area NEC classification shall be as follows:
1. Biosolids Drying Room (beyond a 10-foot envelope around the main dryer): Unclassified (NFPA 820-2020, Table 6.2(b), Row 1d)
 2. Biosolids Drying Room (inside a 10-foot envelope around the main dryer and ancillary equipment handling dry product): Class II, Division 2, Group G (NFPA 820-2020, Table 6.2(b), Row 1c)
 3. Within equipment processing combustible particulate solids (e.g., dried product conveyance/recycle, dried product storage): NEC Classification Class II, Division 1, Group G (NFPA 820-2020, Table 6.2(b), Row 1b)
- F. The Biosolids Drying System shall be designed to meet the requirements of the latest edition of the following NFPA Standards:
1. NFPA 30, *Flammable and Combustible Liquid*
 2. NFPA 68, *Standard on Explosion Protection by Deflagration Venting*
 3. NFPA 652, *Standard on the Fundamentals of Combustible Dust*
 4. NFPA 654, *Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids*
 5. NFPA 820, *Standard for Fire Protection in Wastewater Treatment and Collection Facilities*

G. Perform seismic design in accordance with the Washington Building Code. Supports and anchorage of equipment(s) shall comply with the requirements of the 2021 International Building Code (IBC) Section 1613 and ASCE 7-10 Minimum Design Loads for Buildings and Other Structures, Chapter 13 Seismic Design for Nonstructural Components, as referenced and amended by the IBC. For the following design parameters:

- Risk Category III
- Site Class D
- The component Importance Factor: $I_p = 1.25$
- Design spectral response coefficients:

$$SDS = 0.832g$$

$$SD1 = 0.484g$$

- Seismic Design Category D

H. Design all access provision items, such as access platforms, catwalks, ladders, handrails, and stairways in accordance with the WAC 51-52-0306 and applicable OSHA standards.

I. The following utilities shall be available to the biosolids drying facility:

1. Non-Potable Filtered Plant Effluent Water (NPW), from plant NPW pumping system

a. Temperature: 70 degrees F (maximum)

b. Pressure at Interface Point: 65 psig (minimum)

2. Natural Gas (NG)

a. Nominal Heat Value: 1,000 BTU/standard cubic foot

b. Pressure at Interface Point: 2 psig (min)

3. Digester Gas (DG)

a. Nominal Heat Value: 600 BTU/standard cubic foot

b. Pressure at Interface Point: 5 psig

4. Electric Power (EP)
 - a. Service Conditions: 480/240VAC, 60 Hz, 3-phase, 3-wire, 115 VAC, 24 VDC instruments
 5. Communications
 - a. Service Conditions: Wired internet connection, service by Owner
- J. The following utility requirements and exhaust air parameters of the biosolids drying facility shall be declared in Attachment A of the Bid Proposal for the evaporation rate of 1,640 lb/hr, the maximum evaporation rate, and the minimum turndown evaporation rates declared:
1. NPW (gpm)
 2. Potable Water (gpm)
 3. Natural Gas at 2 psig (cubic ft/hr)
 4. Electric Power (Amps, or kVA)
 5. Exhaust (SCFM, temp, relative humidity)
 6. Process Discharge Water (flow rate (gpm), TSS concentration (mg/L))
- K. Specific Heat Energy Consumption of the Biosolids Drying System, as determined by the heat required to evaporate one pound of water at steady state conditions from the solids, shall be declared in Attachment A of the Bid Proposal and shall be guaranteed as specified herein. The specific heat energy consumption shall be based on the lower heating value (LHV) of natural gas, excluding electric energy consumed by the drying system and shall be calculated as the system gas energy input (BTU) divided by the amount of water evaporated from the solids (pounds).
- L. Final product from the thermal drying system, prior to conveyance to the dried product loading area, shall have not less than ninety five percent (95 percent) of the material classified as being between 0.5-mm and 6.0-mm size gradation on a weight basis. Classification shall be determined based on a sieve analysis to determine final product size gradation. Material retained on a 6.0-mm sieve or passing a 0.5-mm sieve shall be considered “off-specification”.

- M. Oversize product, dried material removed from the thermal drying system but not routed to the dried product loading area, shall not exceed 2.0 percent of the total product produced from the thermal drying system. The total product produced shall be determined as the sum of the weight of the oversize product and the final product routed to the dried product
- N. Maximum temperature of final product after cooling shall be 120°F at 70°F ambient.
- O. Time required for complete start-up of the Biosolids Drying System, including the pre-start safety checks per the procedures in the O&M manual shall be declared in Attachment A of the Bid Proposal.
- P. Time required for complete shutdown of the Biosolids Drying System shall be declared in Attachment A of the Bid Proposal.

1.7 CODES AND STANDARDS

- A. AISC – Manual of Steel Construction
- B. AGMA – American Gear Manufacturers Association
- C. ANSI – American National Standards Institute
- D. ASME – Standards of American Society of Mechanical Engineers
- E. ASTM – American Society of Testing and Materials
- F. AWS – American Welding Society
- G. CEMA – Conveyor Equipment Manufacturers Association
- H. FM – Factory Mutual
- I. IBC – International Building Code
- J. IEEE – Institute of Electrical and Electronics Engineers
- K. IFC – International Fire Code
- L. IRI – Industrial Risk Insurers
- M. ISA – Instrument Society of America
- N. NEC – National Electrical Code

- O. NEMA – Standards of National Electric Manufacturers Association
- P. NFPA – National Fire Protection Association
- Q. OSHA – Occupational Safety and Health Act
- R. UL – Underwriters Laboratory
- S. WAC – Washington Administrative Code
- T. Local Laws and Ordinances

1.8 QUALITY ASSURANCE

A. QUALIFICATIONS OF SUPPLIER DESIGN TEAM

- 1. Supplier to provide resumes of the following key project personnel in Attachment B of the Bid Proposal:
 - a. Project Manager.
 - b. Project Engineer.
 - c. System Integrator/Electrical Engineer.

B. QUALIFICATIONS OF SUPPLIER STARTUP, OPERATIONS, AND SUPPORT STAFF

- 1. Supplier to provide the following information in Attachment B of the Bid Proposal:
 - a. Name and resume of the person or persons, directly employed and trained by the Supplier who will provide on-site construction services and post construction services.
 - b. Name and resume and home office location of the person or persons, directly employed and trained by the Supplier who will provide on-site warranty service and maintenance.
 - c. Name and resume and home office location of the person or persons, directly employed and trained by the Supplier who will provide system troubleshooting via telephone modem connection.

C. EQUIPMENT STANDARD OF QUALITY

1. Products that are specified by manufacturer, trade name or catalog number establish a standard of quality.
2. The completed work shall include all necessary permanent devices, such as machinery guards and similar items required by OSHA and other federal, state, and local health and safety regulations.
3. Welding shall comply with AWS standards and shall be accomplished using the metal-arc or gas-shielded arc method described in the American Welding Society's Welding Handbook. As supplemented by other AWS standards Qualification of welders, all welding shall comply with AWS and ASME standards. The pressure parts of the dryer will be manufactured and stamped in accordance with ASME Section VIII.
4. It is the intent of these Specifications to secure high quality materials and equipment in order to facilitate operations and maintenance of the biosolids drying facility. All equipment and materials shall be new and the products of reputable recognized suppliers having adequate experience in the manufacturing of these particular items. For uniformity, only one manufacturer will be accepted for each type of product. All equipment shall be designed for the service intended and shall be of rugged construction, of ample strength for all stresses which may occur during fabrication, transportation, erection and during continuous or intermittent operation, all equipment shall be adequately stayed, braced and anchored. Appearance and safety, as well as utility, shall be given consideration in the design of details.

1.9 WARRANTY

The System Supplier shall warrant and guarantee the equipment will be free of defects in workmanship and material for a period of 2 years after the Owner's receipt and acceptance of the equipment, not to exceed 30 months from delivery. The product shall also be warranted for a period of 60 months against any defects in workmanship and material for any spray on or weld on hard surfacing, such that the hard surfacing is no longer protecting the parent metal. Any repairs to such abrasion resistant hard surfacing shall be completed within 30 days of the Supplier being notified of the defects. If discovered from inspection, damage or increased abrasion deemed to be caused due to foreign objects entering the dryer system shall not be considered a warranty claim. All costs for labor and replacement parts required to repair the unit, due to equipment malfunction, during the guarantee period shall be considered to have been included in the

quoted price for this equipment. An inspection of the hard surfacing at 60 months after system acceptance by the system supplier will be included to ensure that the terms of this warranty have been fulfilled. The expected schedule of the warranty period is presented in Section 01110-1.6.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

The Biosolids Drying System shall be as manufactured by Komline-Sanderson Corp., as specified herein, or Andritz Separation Inc., as specified in 11650A. No other manufacturers shall be accepted.

In order to assure uniform quality, product functionality, and ease of maintenance; all of the equipment specified in this Section shall be supplied by one manufacturer.

2.2 GENERAL

- A. The Biosolids Drying System shall be complete with all required and necessary supports, equipment, access provisions, safety guards, soundproofing, thermal insulation, controls and instrumentation, control panels, sensors, interconnecting piping and ducting, and valves required for an operable system as specified herein.
- B. Materials and details of constructions shall be Supplier's standard for service conditions and performance requirements specified unless noted otherwise in this specification.
- C. Sampling ports, permanently mounted, shall be provided as required for sampling solid and air streams within the process units. The sampling ports shall be arranged in a manner that allows safe sample collection and minimizes material leakage or spillage during sampling.
- D. No component of the Biosolids Drying System shall be supported from the building roof or walls with the exception of piping supports. The loads from the Biosolids Drying System shall be transferred to the floor slab only.
- E. Access ports shall be provided at convenient locations to allow removal of solid objects trapped within the process units and for any required cleaning, maintenance, sampling, or inspection. The ports shall be adequately sized and shall be equipped with removable bolted and gasketed doors.

- F. The System Supplier shall supply all motors and drive components for this equipment. Motors shall be suitable for continuous operation and shall be of sufficient horsepower, exclusive of the service factor, to operate the equipment over its full operating range, including startup loads, without overloading. Motor lubrication may be either grease or oil type.
- G. Unless otherwise specified, all bearings shall be designed with an AFBMA L-10 life of at least 100,000 hours.
- H. All manual valve shall be operable without the need of ladders or climbing on equipment in an unsafe manner.
- I. All parts of the equipment furnished shall, be designed and constructed for the maximum stresses occurring during fabrication, transportation, installation, testing, and all conditions of operation. All materials shall be new, and both workmanship and materials shall be entirely suitable for the service to which the units are to be subjected and shall conform to all applicable sections of these Specifications.
- J. The indirectly heated thermal dryer will be of the dual counter-rotating shaft design in which thermal fluid circulates within hollow wedge shaped paddles to provide indirect heating of the dewatered cake.
- K. Multiple temperature sensors shall be provided to monitor the temperature of the sludge at various locations along the dryer bed. A temperature sensor shall also be required to monitor the feed inlet conditions. Residence time of the sludge in the dryer shall be adjustable by changing the height of a product discharge weir.
- L. To withstand the abrasive nature of drying municipal biosolids, the dryer paddles and trough shall have an applied hard surfacing as described herein.
- M. All manufactured items provided under this Section shall be new, of current manufacture, and shall be the products of reputable manufacturers specializing in the manufacture of such products.

2.3 WET CAKE FEED PUMP

- A. Two progressive cavity feed pumps (One installed, one as spare) shall be provided to transfer dewatered sludge from the storage hopper to the dryer. The pump shall be manufactured by Seepex, Moyno, Netzsch, or equal.

- B. The pumps shall be of the heavy duty, positive displacement, progressing cavity type with a gear joint or pin joint drive train. The drive train shall be firmly supported by heavy duty bearings integral to the pump. The pump shall have a minimum of four stages on the rotor and stator and designed for a maximum discharge pressure of 275 psig.
- C. The supplier shall be responsible for the design and sizing of the pump, assuming discharge piping that will have an overall length of 50 feet between the cake pump discharge and the dryer inlet. The supplier shall also assume that the discharge piping will include three 5R 90 degree bends and one 5R 45 degree bend.
- D. The feed pump shall be designed to handle 130 percent of the design feed rate to the dryer. At the design feed rate to the dryer, the pump will shall have an operating speed less than 90 rpm.
- E. The pump shall be driven by a minimum 10 hp, 1,750 rpm direct coupled, 460V electric motor, connected for operation on a 480 Volt, 3 phase, 60 Hz service. Motors shall be constructed with Class F insulated windings, continuous duty at 40 degrees C ambient air temperature with a 1.15 service factor.
- F. The Pump motors shall be rated “Inverter Duty” suitable for operation with a PWM variable frequency drive, with output to the motor conditioned by a reactor or filter. These motors shall comply with NEMA MG-1 Parts 30 and 31. Motor insulation shall be rated for high dV/dt (2,000 volts minimum) for VFD operation. The turndown ratio for the motors shall be as required for the rated throughput range recommended by the Supplier. The motors shall be capable of meeting the design conditions specified herein at a maximum operating frequency of 60 Hz.
- G. Motors shall meet the electrical requirements of WAC 296-46B-430, “Motors, motor circuits and controllers, 007 Markings on motors and multi-motor equipment”. Motors shall meet the efficiency requirements of the Washington State Energy Code (Washington Administrative Code, Title 51, Chapter 51-11C) Table C405.8(1), regardless of whether or not a particular motor is exempted from meeting this efficiency by the Washington State Energy Code.
- H. If any motor fails during the warranty period, the Supplier shall replace the motor with a new motor. Rewinding a failed motor shall not be acceptable.

- I. Motors shall be by SEW, Baldor, US Motors, Reliance, General Electric or Toshiba/Houston. No other manufacturers shall be accepted.
- J. The suction housing shall be made from fabricated galvanized steel with quality welds, cleaned and deburred. The suction housing shall incorporate two inspection ports, 180 degrees apart, to permit easy access to the suction housing interior without disconnecting the piping or feed chute. The bearing housing of the pump shall be thick-walled cast iron. All cast parts shall be free of sand holes, blow holes, and other defects.
- K. Provide a TSE thermal sensor assembly embedded in the stator tube to alert in the event of dry operation. The rotor and stator shall be monitored by a controller with predetermined temperature settings, automatic shutdown, and manual reset.
- L. The cake pump shall be provided with an enlarged inlet hopper that has a total capacity of 20 ft³. The hopper shall be provided with radar level sensor for level measurement in accordance with specification Section 13425.
- M. A bridge breaker shall be an integral part of the suction housing. It shall consist of two counter-rotating shafts, each with a series of wide paddles, and positioned in close proximity to the pump's conveyor assembly. The bridge breaker shafts shall be sealed from the pumped material by adjustable packing.

The bridge breaker shafts shall be supported at each end by heavy duty bearing blocks and ball bearings. The shafts shall be driven off a separate right angle gearmotor drive, which will allow the bridge breaker to operate at different speeds than the pump. The single drive shall turn both shafts in a counter rotating direction through a set of grease lubricated timing gears. The bearing blocks, ball bearings, and timing gears shall be protected from contamination by pumped material through a wide atmospheric break between the drive components and sealing arrangement.

For ease of pump maintenance, the bridge breaker paddles shall be designed for easy access to the pump's drive components without disturbing the bridge breaker drive assembly and timing gears. Each shaft shall be a three-piece design with two end shafts and a paddle shaft. The end shafts shall be made of stainless steel and the paddle shaft shall be made of alloy steel. The paddle shaft shall be fully removable from the top of the suction housing without disturbing the bridge breaker bearings, timing gears, gearmotor, packing, and end shafts.

N. Provide over-pressure protection utilizing a flow through annular diaphragm pressure sensor ring assembly with a discharge pressure transmitter. Pump pressure shall be displayed and trended in the dryer control screens.

O. Spare Parts

The System Supplier shall provide the manufacturer's recommended spare parts and special tools. All parts and tools shall be suitably identified and effectively protected from moisture and corrosion with appropriate wrappings or coatings or a combination thereof. All parts and tools shall be furnished in sturdy labeled boxes. At a minimum these shall include all special tools and appliances necessary to service, repair, and adjust the equipment, and the following spare parts items:

Rotor	1 per pump
Stator	1 per pump
Spare mechanical seal	1 per pump
Pump bearings.....	1 set per pump
Gear joint kit	1 per pump
Joint seal kit	1 per pump
Casing gasket	1 per pump
Plug-in shaft.....	1 per pump
Shaft seal	1 per pump
Required seals and gaskets.....	1 complete set per pump

2.4 THERMAL OIL HEATING SYSTEM

- A. A thermal oil system heating shall be furnished to produce a sufficient thermal energy to meet the evaporative demands of the thermal drying system. The thermal oil heaters shall be located in a separate room from the thermal drying processing equipment and provided with secondary containment.
- B. The thermal oil heater shall be rated for a minimum output capacity of 2.5MM BTU/hour and shall provide thermal oil with a maximum thermal oil temperature of 446 F and a design oil output temperature of 410°F.
- C. The thermal oil heater shall be designed to operate on natural gas as well as a natural gas and digester gas burned simultaneously as a fuel source at a rate sufficient to meet 100 percent of the heating requirement. The thermal oil heater burner shall be equipped with two gas rings to allow digester gas and natural gas to be utilized as fuel sources. In the event that digester gas is not available, the system shall automatically transfer to burn natural gas alone and then back to both when digester gas is again

available. The system controls shall also automatically modulate gas flows as required to meet varying load requirements. The digester gas and natural gas supply pressure at the thermal oil heater shall be 5 psig and 2 psig, respectively, minimum regulated pressure.

- D. The System Supplier shall be responsible for the design, and specification of the interconnecting piping, valves, and insulation (hot oil supply and return) between the thermal oil heater and the drying equipment. The Contractor shall be responsible for the supply and installation of the hot oil supply and return piping systems including insulation. For purposes of estimating the interconnecting piping requirements, the System Supplier shall estimate for a total of not more than 100 linear feet between the interface of the thermal oil heater and the dryer.
- E. A thermal oil expansion tank with a nitrogen (inert gas) blanket shall be provided for the thermal oil heater unit and thermal oil heating loop. The thermal oil expansion tank shall be provided complete with all connections and valves required for a functional system.
- F. The heater shall be of a forced circulation design. The coil shall be designed and stamped according to the specifications of the ASME Section I - Pressure Vessel Code for 650°F at 225 psig. The coils shall be hydro-tested at 375 psig. A minimum of 100 percent of the inner coil welds and 10 percent of the outer coil welds shall be x-ray inspected. The heater inlet and outlet connections shall be ANSI 300 pound flanged and shall be fitted with thermowells to monitor the heater inlet and outlet temperatures. Each individual coil outlet into the common supply heater shall contain a thermowell for monitoring of the individual coil temperature.
- G. The thermal oil heater shell shall be externally insulated with a minimum of 2 inches of mineral wool insulation, quilted on expanded metal and covered with an embossed aluminum outer cover to prevent heat loss radiation, accidental injuries due to high surface temperature, and overheating of the working environment. Surface temperature shall be less than 125°F when the system is operating at design conditions.
- H. The thermal oil heater shall be furnished with an approved OSHA ladder and handrail system for personnel access for operations, inspection, and maintenance. The thermal oil heating system shall be furnished in accordance with OSHA, and other applicable safety codes, requirements.
- I. The thermal oil heater shall be furnished with a pressure relief valve connected to a 00# flanged valve sized and furnished in accordance with the requirements of ASME Section VII for the thermal oil liquid utilized.

- J. The System Supplier shall furnish heat loss calculations through the proposed insulation in order to quantify heat losses during thermal oil heater operation in order that adequate ventilation rates can be furnished within the thermal oil heater room. The System Supplier shall also furnish combustion air requirements for the thermal oil heaters in order that adequate combustion air can be provided in the thermal oil heater room.
- K. The thermal oil heater burner shall be of the forced draft type design designed to operate on the fuel sources previously described (i.e., natural gas and natural gas and anaerobic digester gas burned simultaneously).
- L. The thermal oil heater burner, fan, motor and fuel train furnished shall comply with the applicable requirements of the nationally recognized testing laboratories (e.g., NFPA, IRI, FM and UL).
- M. The thermal oil heater burner shall be furnished with a flame safety system utilizing a self-checking UV flame detector.
- N. The thermal oil system shall be furnished with a local control panel (LCP) that shall be labeled as meeting the requirements of a nationally recognized testing laboratory. The LCP shall provide for the local control of the thermal oil system and monitoring of the thermal oil heating system and shall contain, as a minimum, the following fault and failure indication:
 - 1. High Thermal Fluid Temperature
 - 2. High Flue Gas Temperature
 - 3. Low Thermal Fluid Temperature
 - 4. Low Thermal Fluid Flow
 - 5. Low Thermal Fluid Level in Expansion Tank
 - 6. Burner Flame Failure
- O. The thermal oil system shall contain, as a minimum, the following control devices:
 - 1. Temperature Switch(es) – High Thermal Oil Temperature (Each coil to be independently monitored)
 - 2. Temperature Switch(es) – High flue gas temperature

3. Temperature Sensors – Hot Oil Supply
 4. Temperature Sensors – Hot Oil Return
 5. Pressure Relief Valve (ASME Section VIII Rated)
 6. Fluid Level Switch – Expansion Tank Level
 7. Low Fluid Level Switch (in Expansion Tank).
 8. Flame Safeguard Control.
- P. The thermal oil burner control system components and local control panel shall be furnished in NEMA 4 stainless steel enclosures.
- Q. The System Supplier shall specify the type and quality of thermal oil. The Contractor shall furnish the first fill thermal oil to fully charge the system.

2.5 THERMAL OIL COOLER

- A. A thermal oil cooler shall be provided for the thermal oil heater system. The Thermal oil cooler shall be a water-cooled heat exchanger and shall be provided to cool the thermal oil and the thermal dryer during system shutdown.
- B. The thermal oil cooler shall be designed with sufficient heat transfer capacity to cool the thermal drying system from its working temperature to less than 200°F in approximately 90 minutes with an inlet feed water temperature of not greater than 85°F. The system supplier shall clearly indicate cooling water requirements for the thermal oil cooler system in the submittal package.
- C. The thermal oil cooler shall be fabricated from stainless steel and designed, manufactured, inspected, tested and stamped in accordance with the ASME Code for Unfired Pressure Vessels, Section VII, Division 1 (latest revision) for a design condition of not less than 100 psig working pressure at a design temperature of 450°F.
- D. Connections to the thermal oil cooler shall be 300# flanged connections. Temperature gauges shall be provided on the thermal oil cooler inlet and outlet to monitor temperature conditions across the thermal oil cooler.

2.6 THERMAL OIL RECIRCULATION PUMP

- A. Two thermal oil recirculation pumps (one duty and one standby) shall be furnished to provide recirculation of thermal oil from the thermal oil heater to the dryer. The thermal oil pumps shall be configured such that the any one (of the two) thermal oil recirculation pumps can serve the operating thermal dryer while the remaining pump is either not in service, or removed from service for maintenance.
- B. The thermal oil recirculation pump shall be a low-pressure centrifugal pump specifically designed for pumping thermal oil fluids under the service conditions required for the thermal drying system and suitable for operation with thermal oil temperatures up to 450°F.
- C. The thermal oil recirculation pump shall be supplied with mechanical seals designed for thermal oil fluid use to assure long-life and maintenance free operation of the pumping equipment.
- D. The thermal oil recirculation pump shall be mounted on a common base plate complete with coupling, coupling guard, and TEFC motor.
- E. The thermal oil recirculation pump shall be designed to operate under the flow and pressure requirements sufficient to circulate the required minimum quantity of thermal oil required to the meet the thermal dryer evaporation requirements.
- F. The thermal oil recirculation pump shall be furnished with a pump discharge pressure gauge (0 to 160 psig operating range); pump suction combination pressure/vacuum gauge (-30-inches Hg to 60 psig operating range); and 2-gauge air bleed valves.
- G. The thermal oil pumps, where not insulated to protect operating personnel, shall be provided with appropriately designed safety cages and/or guards to protect operating personnel from hot surfaces.

2.7 AIR COMPRESSOR

- A. Two thermal oil recirculation pumps (one duty and one standby) shall be furnished to provide recirculation of thermal oil from the thermal oil heater to the dryer. The thermal oil pumps shall be configured such that the any one (of the two) thermal oil recirculation pumps can serve the operating thermal dryer while the remaining pump is either not in service, or removed from service for maintenance.

2.8 PADDLE DRYER

- A. The dryer shall consist of a jacketed trough and cover mounted to a common base. The trough shall be equipped with two rotating agitator assemblies comprised of hollow agitator shafts with multiple hollow paddles mounted on each agitator shaft. The hollow agitator shaft and paddles shall be utilized for heat transfer surface area in conjunction with heat transfer surface area associated with the jacketed dryer trough.
- B. The paddle dryer shall have a minimum total heat transfer surface area of 563 square feet (51.37 square meters) and a minimum effective volume of 142 cubic feet. The paddle dryer shall be designed for use with thermal oil as the heat transfer medium. The medium side of all heated surfaces shall be designed to ensure a turbulent oil flow for optimum heat transfer.
- C. The trough shall have a “W”, omega shaped configuration.
- D. Trough shall be designed and stamped in accordance with ASME Code Section VIII, Division I, with max. design temperature and pressure of 550 degrees F at 125 psig.
- E. The vaulted cover shall provide sufficient space to allow for the removal of vapors which are generated during the drying process. Average vapor velocities shall not to exceed 2 fps to minimize dust entrainment.
- F. The dryer cover and trough shall be equipped with the following:
 - 1. Trough, trough jacket, and vaulted bolted cover shall be 304/304L stainless steel for all process wetted parts.
 - 2. One round flanged inlet in cover for sludge feed located at the drive end.
 - 3. Two 20-inch diameter manways with bolted covers and locks.
 - 4. One 6-inch view port with wiper and spray connection along one side of cover.
 - 5. One flange for the dryer exhaust.
 - 6. Three 1-inch, 150 lb flanged spray water connections each with pneumatically actuated valve and spray nozzle in the event of upset or emergency conditions.

7. One connection for dryer hood pressure transmitter. Hood pressure shall be trended in the dryer control screens.
 8. One connection for dryer vapor relief complete with a 10-inch pneumatically actuated butterfly valve for emergency exhaust.
- G. The cover shall include explosion panels to vent dryer gasses. The panels shall be rated for 1.45 psig (0.1 barg). Explosion panels shall be designed in accordance with NFPA 68 guidelines and shall be ducted to outside the building.
- H. Deflagration protection for the dryer and personnel is to be provided by a relief panel and ducting to outside the building. The sizing of the panel and duct will be in accordance with NFPA 68 and ASTM-E 1226-10. Deflagration panels shall have an integral proximity switch in case of activation or failure.
- I. The assembly shall be a closed system to minimize air leakage throughout the system. The trough end heads shall be designed to permit vertical removal of agitator shafts.
- J. The paddle dryer cover and trough shall be insulated, except at the ends, to minimize heat loss to the operating area, maximize heat transfer to the product being dried, and to protect operating personnel from hot surfaces. At a minimum, the trough shall be provided with a 4-inch thickness of closed cell glass insulation and shall be banded to the trough. The trough insulation system shall be covered with a 0.024-inch thickness (minimum) Type 304 stainless steel sheathing. The cover insulation system shall consist of a fiberglass fabric covered blanket, 1.5-inch minimum thickness, which attaches to the cover with tabs for ease of removal of the cover insulation system for maintenance. Sufficient insulation shall be provided to control surface temperatures to less than 125°F when the thermal drying system is in operation.
- K. The dryer shall be equipped with two counter-rotating agitator assemblies. Each agitator assembly shall have numerous discontinuous wedge-shaped paddles fabricated from 316/316L stainless steel. Paddles shall be hollow to permit flow of heating medium throughout. These paddles shall be mounted on a central hollow pipe which acts as the primary structural member of the agitator shaft.
- L. The agitator assemblies shall be designed, manufactured, inspected, tested, and stamped in accordance with ASME Code for Unfired Pressure Vessels, Section VIII, Division I, for 550°C at 125 psig.

- M. All paddles shall have chromium carbide hard facing alloy weld applied on crowns (top rim), leading edge, and back mixing tabs. The paddles on the last 67 percent of the agitator will also have chromium carbide hard facing alloy weld applied on its sides to within 1 inch of the radius of the shaft.
- N. The interior of the trough shall be protected against abrasion with a nominal 1/8-inch thickness weld applied, chromium carbide alloy, extending up the trough side walls to a height equal to 1/2 of the paddle radius above the agitator centerline.
- O. The Non-drive end trunnion ends shall be arranged to allow for circulation of thermal fluid into and out of the agitator through a rotary joint. Shaft trunnions shall be provided with replaceable wear sleeves in the area where the shaft seals are located.
- P. Shafts seals shall consist of a mechanical face seal with air purge. Each shaft seal will require approximately 2 to 3 cfm of compressed air. A purge manifold shall be provided consisting of a pressure regulator, rotameter, and seal pressure gauge for each shaft seal. A pneumatically operated ball valve shall be supplied to provide compressed air to the shaft seals prior to the dryer operation. In addition, a common maintenance isolation valve shall be provided for each manifold.
- Q. Each agitator shaft shall be supported at its trunnion ends by self-aligning double row spherical roller bearings, minimum B-10 life of 100,000 hours, and mounted in split case pillow blocks. Housings to be of cast iron with grease fitting for lubrication using high temperature grease.
- R. Agitator shafts shall be driven using a 60 TEFC High Efficiency motor mounted to a shaft-mounted reducer. The reducer shall be direct coupled to the drive agitator and shall transmit rotation and torque to the driven agitator through a set of spur gears rotating in an oil bath gear case. The motor shall be suitable for Class II, Division II, Group G, hazardous area.
- S. The product level inside the machine shall be controlled by a motorized adjustable overflow weir to maintain product level inside. Product shall discharge from the dryer over the motorized weir mounted on the side of the dryer. The weir height shall be capable of being manual adjusted while the dryer is in operation or put into an automatic mode to rise and lower based on the product temperature in the dryer. Controls shall be provided to indicate the weir height at the dryer control panel. Weir position is trended in the dryer control screen.

- T. Product overflowing the side discharge weir will fall into a side discharge chute which shall be equipped with a hinged top inspection opening, a bolted front access panel, high level switch, thermocouple, and emergency deluge valve. The temperature in the side overflow weir shall be trended in the dryer control screens.
- U. The dryer frame shall be constructed from a steel painted construction by elongations of the end plates of the trough. A single mounting base shall be provided which is constructed of carbon steel for the dryer. The base shall include support for the jacketed trough, pedestals for the agitator pillow blocks, and a base for the drive assembly components.
- V. The dryer shall be equipped with a horizontal discharge screw conveyor direct mounted underneath the rectangular outlet flange of the discharge chute, to remove the product from the trough. The screw conveyor shall have a flanged connection to the dryer. The spiral screw conveyor is equipped with two discharge outlets. The dry product can be transported to either one of these product outlets. One of the product outlets is connected to the cooling conveyor for post-processing of the dried sludge. The other outlet is an emergency outlet for off-spec product or in case of plant problems downstream of the dryer. Included with the discharge screw conveyor are two level switches to control the product level and air lock in the overflow section of the dryer.
- W. The dryer system shall be equipped with a stainless-steel duct to connect the exhaust gas discharge from the dryer hood to the condenser wet scrubber. The duct shall be heat traced and insulated by the Contractor as specified by the System Supplier.

2.9 DISCHARGE ROTARY VALVE

- A. Supplier shall provide a rotary airlock valve below the dryer side discharge chute to isolate the dryer from the product handling system. The rotary valve shall be designed in accordance with NFPA 69 for close clearance rotary valves.
- B. The open end rotor shall be constructed of 304 stainless steel and have adjustable/replaceable stainless steel beveled rotor tips. The housing of the rotary valve shall be cast iron with a hard chrome interior bore and end plates.
- C. The 8-vane rotary valve shall be driven by a 1 hp (approximate horsepower) TEFC inverter duty motor rated for Class II, Division II, Group G, hazardous area. The valve speed will be controlled by a variable frequency drive, supplied separately.

- D. A zero-speed switch shall be provided to monitor the valve operation.
- E. The rotary valve shall have the ability to be gas purged if required.

2.10 DRYER DISCHARGE CONVEYOR

- A. A covered dryer discharge screw conveyor shall be provided for the thermal dryer to transport dried product from the paddle dryer to downstream conveyance and handling equipment in the thermal drying system. The dryer discharge screw conveyor will consist of a single shafted auger designed for the mass and volumetric flow rates required based on the thermal dryer loading conditions.
- B. The dryer discharge screw conveyor shall have two inlet connections. The first connection shall be to the dryer discharge rotary valve. The second connection is to the bottom of the dryer and includes a manual slide gate.
- C. The dryer discharge screw conveyor shall be fabricated of Type 304L stainless steel for all product contact surfaces. The conveyor auger shall be fabricated with solid flights with a minimum material thickness of 0.375 inches that are continuously welded on one side to the conveyor shaft.
- D. The dryer discharge screw conveyor drive shall consist of a 5 hp inverter duty 480VAC, 3PH, 60HZ TEFC electric motor rated for Class II, Division II, Group G, hazardous area. The dryer discharge screw conveyor shall be designed for operation under variable speed conditions utilizing a variable frequency drive (VFD) to be furnished with the motor control center equipment for the thermal dryer system
- E. A speed reduction gear shall be provided with the drive assembly which shall be designed to produce an output speed in the conveyor sufficient for the volumetric transport requirements when operating under design conditions at appropriate bed loading conditions and design safety factors. The gear reduction assembly shall be suitable for AGMA Class II operation, by Falk or Dodge Corporation Type JSC, or approved equal.
- F. The dryer discharge screw conveyor shall be enclosed to avoid being an odor or dust source. Covers shall be fabricated from 1/8-inch (minimum) thickness. Covers shall be bolted to the conveyor troughs with silicone rubber gasketing.

- G. The dryer discharge screw conveyor shall be equipped with external lubrication points. The lubrication points shall be readily accessible from either the operating floor level, or walkway platform if elevated.
- H. The dryer discharge screw conveyor shall be provided with a zero speed switch for monitoring movement of the conveyor auger screw. The zero speed switch shall detect if the auger has stopped rotating while the motor remains in operation.
- I. The dryer discharge screw conveyor shall be furnished with OSHA required safety guards and other required safety equipment.
- J. The dryer discharge conveyor shall be furnished with an emergency trip cord and safety switch. The cord shall run the full length of each conveyor on each side. The cable shall be plastic coated safety cable mounted through stainless steel eyebolts on 10 feet maximum centers. The trip switch shall immediately stop all conveyors when the switch is actuated. The switch shall have a NEMA 4X enclosure and switch.
- K. Dried material exiting the dryer discharge screw conveyor shall gravity discharge into inclined cooling screw conveyor.
- L. Carbon steel structural supports for the conveyor shall be provided by the system supplier.

2.11 OFF GAS HANDLING SYSTEM

- A. An off-gas handling system shall be provided to condense and cool the exhaust vapors from the dryer and remove particulate. The off-gas handling system shall consist of a dryer spray duct and spray tower condenser. Off-gas will be sent to the plant's odor control biofilter system via ducting.
- B. OFF-GAS SPRAY DUCT
 - 1. A 304 stainless steel sluiced spray duct shall be provided to connect the dryer to the spray tower condenser. The spray duct shall have a minimum of three non-clogging type spray nozzles to continuously flush the duct. Cooling water from the cooling conveyor shall be used to flush the duct.
 - 2. All nozzles shall be easily maintainable and replaceable from the exterior of the duct.

3. The spray duct shall be sloped away from the dryer to wash the solid particulates into the condenser and to prevent water from flowing back into the dryer.
4. The spray duct shall have a bolted removable access panel for cleaning.

C. SPRAY TOWER CONDENSER

1. A single-stage condenser/cooler shall be provided to cool and condense the dryer off-gases.
2. The spray tower condenser shall be fabricated from 304 stainless steel.
3. The condenser shall have an inlet flanged connection, flanged nozzle connections that are easily maintainable and replaceable from the exterior of the vessel, flanged instrument connections, and it shall be free standing and supported to grade with stainless steel supports.
4. All flanges above 2 inch will be non-rated flanges with a bolt hole pattern to match a standard 150 pound flange.
5. Drain water may contain offensive odors and should be piped in a closed line. Piping for the drain water will include a barometric seal and shall be provided by others.

- D.** The System Supplier shall provide a connection to route off gas system exhaust to the WWTP's existing odor control biofilter system. The existing off exhaust and odor control system should provide sufficient vacuum pressure to the system to preclude the need for additional exhaust fans.

2.12 COOLING SCREW CONVEYOR

- A.** A covered inclined cooling screw conveyor shall be provided for the thermal dryer to transport dried product from the dryer discharge conveyor to the vibrating screen and fines separation system. The inclined cooling screw conveyor will consist of a single shafted auger designed for the mass and volumetric flow rates required based on the thermal dryer loading conditions.
- B.** Dried material exiting the dryer discharge screw conveyor shall gravity discharge into a cooling screw conveyor. The cooling conveyors shall be

capable of receiving the dried bio-solids at a maximum temperature of 260°F (normal 240°F) and cooled to a temperature of less than 120°F. The cooling conveyor shall be jacketed cooled with a minimum cooling water flow of 30 gpm of non-potable water at 75°F or less.

- C. The cooling conveyors shall consist of a single shafted 14-inch auger. The conveyors shall be fabricated of Type 304L stainless steel for all product contact surfaces. The conveyor auger shall be fabricated with solid flights with a minimum material thickness of 0.375 inches that are continuously welded on one side to the conveyor shaft.
- D. The inclined cooling screw conveyor shall be designed for operation under variable speed conditions utilizing a variable frequency drive (VFD) to be furnished with the motor control center equipment for the thermal dryer system.
- E. The inclined cooling screw conveyor shall be enclosed to avoid being an odor or dust source. Covers shall be fabricated from 1/8-inch (minimum) thickness Type 316 stainless steel. Covers shall be bolted to the conveyor troughs.
- F. The inclined cooling screw conveyor shall be furnished with OSHA required safety guards and other required safety equipment.
- G. Structural supports shall be provided for the conveyance equipment and shall be designed by a currently licensed Professional Engineer in the State of Washington. Design calculations for the conveyor structural support shall be included in the submittal package.

2.13 FINES SEPARATION AND RETURN SYSTEM

- A. The thermal drying system shall be supplied with a fines separation and return system to classify dried product prior to final product conveyance to product handling area, with reject materials returned via screw conveyors via a rotary valve air lock at the inlet of the Paddle Dryer for recycling into the dryer. The fines separation and return system shall consist of a vibrating screen, a fines return conveyor, a rotary valve, and related accessory equipment required for this processing step.
- B. A vibrating screen shall be provided with at least two screening decks to classify dried product into at least three classifications: (1) Oversize; (2) Midsize product; and (3) Undersize. Product larger than 6.0-mm shall be classified by the vibrating screen as Oversize. Product smaller than 0.5 mm shall be classified by the vibrating screen as Undersize. Product between 0.5-mm and 6.0 mm shall be classified as Midsize Product and

shall be discharged to the inclined cooling screw conveyor. Screened undersized and oversized product is returned to dryer inlet via screw conveyors.

- C. Undersize product (< 0.5 mm) and oversize product (> 6 mm) shall be returned to the paddle dryer via an inclined tubular screw conveyor system. The fines return conveyor shall include full size flanged inlet and outlet connections in the cover and trough to receive material from the vibrating screen and discharge material to the paddle dryer inlet.
- D. The fines return conveyor shall be enclosed to avoid being an odor or dust source. Covers shall be fabricated from 1/8-inch (minimum) thickness Type 316 stainless steel. Covers shall be bolted to the conveyor troughs.
- E. Structural supports shall be provided for the conveyance equipment and shall be designed by a currently licensed Professional Engineer in the State of Washington. Design calculations for the conveyor structural support shall be included in the submittal package.

2.14 THERMAL OIL HEATING SYSTEM EXHAUST STACK

- A. An exhaust stack shall be provided to collect exhaust gases and provide a single point of discharge from the thermal oil heating system. The thermal oil heating system exhaust stack shall extend to a height as required to meet the air permit requirements, but not less than 10-feet above the dryer building roof. For purposes of estimating exhaust stack costs a stack height of not less than 40-feet shall be utilized.
- B. The exhaust stack shall be constructed of corrosion resistant series 316L stainless steel and shall have a minimum thickness of 1/8 inch. The stack design shall account for thermal expansion, wind, snow and earthquake loads present at the site.
- C. Stack shall include two sampling ports on diameter 90 degrees apart. Location of the centerline of these ports shall be at least 2.5 feet from the stack exit or other flow disturbances and at least 10 feet downstream of any bends, inlets, constrictions, abatements equipment, straightening vanes, or other flow disturbances. The stack port locations and construction shall comply with the requirements of 40 CFR, Part 60, Appendix A.
- D. Sampling ports shall be a minimum 4-inch nominal diameter, standard industrial flanged pipe. Ports shall be installed flush with interior stack wall and shall extend outward from exterior stack wall no less than three inches and no more than eight inches.

2.15 INSTRUMENTATION AND CONTROLS

- A. The Supplier shall furnish instrumentation and associated equipment as specified herein and as required for proper operation, control, safety, monitoring, and alarming functions related to the Biosolids Drying System. All mounting hardware, cable, and supports for the instruments including 316 stainless steel fasteners shall be provided by the Supplier. All instrumentation components shall be rated for the environment in which they will be located, with minimum NEMA 4 rated enclosures.
- B. All elements of the Instrumentation and Control System shall be tested to demonstrate that the total system satisfies all of the requirements of this Specification.
- C. Like items of equipment provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts, and service. All components, assemblies, and wiring shall conform to the requirements of the National Electric Code. Panels shall be listed and labeled in a manner acceptable to the Washington State Department of Labor and Industries.
- D. Control of the Drying System equipment shall be by a local control panel, equipped with an Allen Bradley ControlLogix Programmable Automation Controller (PAC). PLC shall be configured with Allen Bradley Modbus TCP server instruction blocks. All SCADA data (setpoints and status information) shall be presented in contiguous DINT arrays made accessible via the Modbus TCP instruction blocks. Analog values shall be scaled to hundredths of Engineering Units (e.g., 125.78 degrees would be represented as an integer value of 12578).
- E. All controls and instruments shall fail into a safe condition. The controls shall be designed such that the biosolids drying system cannot operate unless the controls are energized, nor can they operate with any defective controls. Upon PLC failure, the biosolids drying system components shall shut down in a safe manner and generate an alarm to the plant SCADA system.
- F. The system supplier shall provide instrumentation and controls for the system equipment, with signals from the thermal fluid heater control panel to be sent to the main dryer panel for remote operation and control. The thermal fluid heater shall have local instrumentation panels for independent control. All wiring and electrical connections must be protected from moisture and dust to prevent shorts or failure.

- G. The dryer panel shall consolidate all instrumentation and control functions for the drying process incorporating the following features:
1. An Allen Bradley ControlLogix Series PLC provided to control system control.
- H. Dryer system visualization shall be provided by manufacturer in Aveva InTouch format, version 2023. Manufacturer shall provide fully functional InTouch HMI application for startup of dryer system from manufacturer laptop. When system is fully functional, a copy of the HMI application shall be provided to the Owner for incorporation into the plant's existing HMI application.
1. HMI application shall include a tabbed menu across the top of the screen. The menu shall have a resolution of 39 pixels tall by 1878 pixels wide and be located at (11,80).
 2. HMI application shall include any necessary process visualization windows, configured as "Replace", accessible via the tabbed menu. Process screens shall have a resolution of 1058 pixels tall by 1878 pixels wide, and a location of (11,119).
 3. Setpoint windows may be the same size as process windows and configured as "Replace" or may be implemented as smaller "Pop-Up" windows.
 4. The startup HMI application shall configure all analog status, analog setpoint, discrete command, and discrete status tags for local historical logging.
 5. The startup HMI application shall configure alarming on all tags associated with PLC generated or IO derived alarms.
 6. Alarms for analog values, for example a high temperature alarm, shall be determined in the PLC and presented as a discrete alarm tag to the HMI and plant SCADA system. Setpoints for all alarms shall be operator adjustable from the HMI and plant SCADA system.
 7. All HMI tagnames shall be prefixed with the string "SHB_Dryer_". (For example, a general system alarm would be "SHB_Dryer_GenAlarm").

8. The HMI interface shall display of the following minimum functions:
 - a. All motor conditions (Auto, Run, Stop, Local).
 - b. All equipment alarm conditions.
 - c. Dewatered cake bin level. (Trended)
 - d. Dewatered cake pump speed, amps, and discharge pressure (Trended)
 - e. Dryer drive motor amps. (Trended)
 - f. Dryer bed and off gas temperatures. (Trended)
 - g. Thermal fluid supply and return temperatures. (Trended)
 - h. Thermal fluid temperature drop across dryer. (Trended)
 - i. Natural Gas consumption (Trended)
- I. The system supplier shall provide the PLC with Ethernet capabilities to communicate with the plant's SCADA system. Programming of the plants SCADA system and interconnecting field wiring between the PLC and the plant SCADA system is to be furnished and installed by Contractor.
- J. The system supplier shall provide online biosolids indirectly heated thermal dryer system monitors, which shall continuously automatically track the feed pump speed and temperature in the dryer.
- K. HMI application shall incorporate a display screen for visual trend analysis up to a 24-hour basis on the dryer operational parameters.
- L. The system supplier shall provide alarms to indicate a condition in which the indirectly heated thermal dryer system performance may be jeopardized, as follows:
 1. High and low bed discharge temperature from dryer.
 2. High dryer vapor temperature.
 3. High condenser water level.
 4. High product cooler discharge temperature.

5. All motor overloads.
6. High/low level on dryer feed hopper.
7. Zero speed on conveyor(s).
8. High condenser outlet temperatures.
9. High dryer amps.

2.16 MOTORS

- A. All motors furnished shall be a standard horizontal, squirrel caged, TEFC electric induction motor meeting NEMA MG-1 and other applicable NEMA, ANSI, and IEEE standards and shall be suitable for use in a corrosive environment. Motor shall be constructed with Class F insulated windings, B 30,000 anti-friction bearings, cast iron frame and end bells. The motors shall be suitable for 460 volts AC, 3 phase, 60 Hertz, or 120 volt AC, single phase power supply. The motor service factor shall not be used in determining a non-overload condition. The motor torque shall be adequate for all operating conditions.
- B. The motor windings shall be provided with thermal detection switches (normally closed) embedded in each phase of the motor windings, Detectors shall be suitable for operation with 120 volt AC and 24 volt DC control circuits, Klaxon or equal. These sensors shall have insulated conductor leads brought to the motor terminal box and shall be suitable for wiring as a permissive in the motor starting circuit.
- C. Motors shall be recognized or labeled and listed by a recognized electrical testing laboratory approved by the Washington State Department of Labor and Industries, or the motor shall be specifically approved by the Washington State Department of Labor and Industries for installation on the project.
- D. Motors shall meet the efficiency requirements of the Washington State Energy Code (Washington Administrative Code, Title 51, Chapter 51-11) Table C405.8(1), regardless of whether or not a particular motor is exempted from meeting this efficiency by the Washington State Energy Code.
- E. All motors to be operated via VFD's shall be rated "Invertor Duty" suitable for operation with the variable frequency drives specified in Division 16, Electrical, and shall be coordinated with the thermal,

electrical, and mechanical characteristics of the drives actually supplied. These motors shall comply with NEMA MG-1 Parts 30 and 31. Motor insulation shall be rated for high dV/dt (2,000 volts minimum) for VFD operation.

- F. The motors shall be painted as specified herein. Do not paint nameplates, drain holes, vent openings, or lubrication fittings.
- G. If any motor fails during the warranty period, the Supplier shall replace the motor with a new motor. Rewinding a failed motor shall not be acceptable.

2.17 ACCESS PLATFORMS, WALKS AND STAIRWAYS

- A. The Supplier shall design and furnish access provisions consisting of access platforms, catwalks, ladders, handrails, stairways, and other necessary items as required to conform to OSHA and the NCBC and other applicable codes and regulations. All access provisions shall be provided as required to allow convenient and unobstructed access to all areas of equipment requiring routine maintenance. This shall include as a minimum access to items such as equipment drives, bearings, instrumentation nozzles, hatches, lubrication points, sampling points, inspection and access doors.
- B. Access to major equipment platforms shall be by stairs or ladders.
- C. Structural steel members shall be free standing and shall be supported from the floor slab only. Anchoring structural supports to the building walls, columns, beams, or ceilings shall not be allowed.
- D. Provide handrails around all areas requiring personnel access. All handrails shall be three rail type, extruded aluminum, minimum tensile strength of 38,000 psi and minimum yield strength 35,000 psi. Rails and posts nominal 1-1/2-inch diameter. Post spacing maximum 5-feet.
- E. All metal grating provided shall be aluminum bar type grating, designed for foot traffic, 100 pounds per square foot minimum uniform service load, maximum deflection 1/4 inch. Bearing bars shall be spaced at 1-3/16-inch center-to-center, banding 3/16-inch minimum.
- F. Ladders shall be aluminum or galvanized steel sized for concentrated load of 250 pounds plus 30 percent impact on the rungs. Maximum rung deflection shall be L/360. Rungs shall be non-slip grip surface.

- G. Structural steel members shall be fabricated in accordance with AISC specifications. Rolled plates, shapes, and bars shall be ASTM A36 or ASTM A992. Structural steel pipe shall be ASTM A501 or ASTM A53, Type E or S, Grade B. Structural tubing shall be ASTM A500, Grade B. Welding materials shall be AWS D1.1.

2.18 PIPING

Piping shall conform to the requirements of Section 15050.

2.19 ANCHOR BOLTS

- A. Supplier shall size all anchor bolts required for anchoring equipment components, accessories, and structural steel members to their concrete supports and foundation.
- B. Anchor bolts shall be of 316 stainless steel and shall be furnished and installed by the Contractor.
- C. Anchor bolts shall be properly sized to match loads associated with anchored equipment.
- D. Supplier shall provide Contractor drawings showing arrangement and location of anchor bolts in concrete supports and foundations.
- E. Supplier shall coordinate installation of anchor bolts with Contractor to match the equipment installed.

2.20 PAINTING

- A. Unless specified otherwise, factory surface prepare, prime, and finish exposed exterior ferrous metal surfaces for all equipment and accessories of the Biosolids Drying System.
 - 1. Standard Coating – For equipment and motors with surface temperatures below 250 degrees F a standard coating system shall be provided. Prepare surface to receive coating by abrasive blasting or centrifugal wheel blast. Prime with one coat of 2.5 to 3.5-mils minimum DFT Tnemec Omnithane Series 1 or equal. Finish with two coats each of 4 to 6-mils minimum DFT Hi-Build Epoxoline Tnemec Series N69 or equal polyurethane enamel.
 - 2. Thermal Coating #1 – For equipment with surface temperatures between 250 degrees F and 450 degrees F a thermal coating system shall be provided. Prepare surface to receive coating by abrasive

blasting or centrifugal wheel blast. Prime with one coat of 2.5 minimum DFT inorganic silicon primer. Finish with two coats of 2.0 minimum DFT silicone acrylic.

3. Thermal Coating #2 - For equipment with surface temperatures between 450 degrees F and 700 degrees F a thermal coating system shall be provided. Prepare surface to receive coating by abrasive blasting or centrifugal wheel blast. Prime with one coat of 2.5 minimum DFT inorganic zinc primer. Finish with one coat of 2.0 minimum DFT silicone.
- B. Surfaces not requiring painting include non-ferrous and corrosion-resistant alloys, such as copper, bronze, Monel, aluminum, chromium plate, and stainless steel.

2.21 THERMAL INSULATION

- A. The exterior surface of all hot system components except for the dryer endheads, unless otherwise specified, shall be insulated as required to ensure that skin temperature of any part shall not exceed 125 degrees F. The insulation shall be covered with a jacket or cladding as specified herein.
- B. The insulation shall be chemically and thermally stable fiberglass with a maximum K factor of 0.90 at 600°F.

2.22 MISCELLANEOUS

- A. All equipment, vessels, piping and ductwork in drying system handling dry material shall be bonded and grounded per NFPA. Metal to metal bolted connections will be considered bonded. Contractor shall install bonding jumpers.
- B. Minimum service factor of 1.5 for 24-hour continuous service based on motor horsepower shall be used for sizing gear drives.

PART 3 EXECUTION

3.1 GENERAL

- A. The Supplier shall review the existing building design and layout to ensure equipment may be installed as proposed. The Supplier shall also perform testing as specified herein.

- B. All fuel and water utilities required for the testing specified in this Part shall be supplied by the Owner at the rate and in the quantities designated within this Specification.
- C. The Supplier shall retain the services of an Owner approved independent certified third-party laboratory to provide analytical services for the field and performance testing. Reports from the Supplier that rely on data generated by the third-party laboratory shall be due at the specified interval after the laboratory results are provided to the Supplier.

3.2 INSTALLATION

- A. The Contractor in accordance with approved System Supplier's drawings, approved Engineer's drawings and instructions shall erect the equipment. System Supplier shall furnish necessary oil and grease for initial operation and making final adjustments to place the equipment in operable condition.
- B. Equipment shall be rigidly and accurately anchored into position and carefully coordinated with all connecting pieces of equipment. The System Supplier shall supply all necessary anchor bolts, nuts, washers and plates for installation of equipment provided under this Section. Shims, as required for leveling, shall be furnished by the Contractor.

3.3 FIELD TESTING – GENERAL

- A. Field tests shall consist of Mechanical Tests, Control System Tests, Integrated Systems Tests, and Performance Tests of the entire System as described in Section 3.
- B. The Contractor shall have available to the System Supplier, sufficient personnel of relative trades to assist with the mechanical tests and integrated systems test as well as perform punch list items.
- C. The System Supplier shall provide sufficient staff of skilled operators to supervise and conduct the field, mechanical, control system, integrated system, and process performance tests. Competent and experienced personnel shall be furnished to supervise the system startup and provide operator instruction for the items included in the scope of supply. These services shall include two trips to site with a total of 30 days on site service.
- D. The System Supplier shall provide access for a reasonable complement of the Owner's staff to accompany and observe the System Supplier's staff throughout these tests. The System Supplier shall document the results of

all tests (field, mechanical, control system, integrated system, and process performance) and equipment servicing (pre-warranty and warranty period) of suitable form and content to the Engineer and the Owner.

- E. The drying systems shall be given mechanical field tests to assure compliance with specifications. If the test indicates that adjustments are necessary to ensure conformance, such adjustments shall be made by the contractor. Mechanical testing shall demonstrate that the equipment has been properly installed, with no defects, and is free of overheating, excessive vibration, overloading, and excessive noise. Testing shall also confirm correct operation with control stations and interlocks. No biosolids shall be processed for these tests.
- F. Grounding resistance tests shall be conducted on all equipment, vessels, piping, and ductwork in the drying system. Grounding, and its testing, will be the responsibility of the contractor.
- G. The complete control system as specified herein shall be tested to confirm that the system operates correctly in accordance with the specified requirements. Field instruments shall be tested prior to testing the control system as a whole.
- H. Upon successful completion of the above tests and services, an integrated drying system test shall be performed to demonstrate that the system as a whole is complete and operational. The test shall process dewatered cake as required to test the operation of the system. The integrated drying system test shall be 5 days. The system supplier shall submit data that shows the operation parameters for the test and typical record keeping required to properly monitor the drying system.
- I. The system supplier shall provide training in the proper operation and maintenance of the equipment. Manufacturer's representatives who will provide training shall be factory trained, articulate, and knowledgeable in the installation, operation, and maintenance (including the information in the operations and maintenance manuals) of the drying system. Three days will be provided for training of plant personnel.

3.4 MECHANICAL TESTS

- A. Conduct a mechanical test of each installed piece of equipment. The mechanical tests shall demonstrate that each unit:
 - 1. has not been damaged by transportation or installation.
 - 2. has been properly installed.

3. has no mechanical defect.
 4. is free of overheating of any parts.
 5. is free of objectionable vibration.
 6. is free of overloading of any parts.
 7. is free of excessive noise.
 8. has all interlocks operating correctly.
- B. No handling or processing of either dewatered sludge cake or recycle material by any equipment and/or system shall take place during the mechanical test.
- C. System supplier shall mechanically test all major pieces of equipment and systems with the assistance of the Contractor.

3.5 CONTROL SYSTEMS TESTS

- A. The complete control system, as specified herein, shall be tested to confirm that the system meets or exceeds the specified requirements. Tests shall cover the full operational range or capability of the system and shall include, but not be limited to:
1. Signal verification (check or correct voltages, current polarity, contact “sensor”, etc.).
 2. Database verification (check for correct range, alarm limits, engineering units, message repairs, etc.).
 3. Operator input to the controls system.
 4. Verification of application software.
 5. Alarm log and display generation.
 6. Man-machine interface.
- B. All field instrumentation and controls that are an integral part of the System equipment being tested shall also be tested.

- C. Any defects in the equipment or operating controls or failure to meet the requirements of the specification shall be promptly corrected at no additional cost to the OWNER.

3.6 INTEGRATED SYSTEM TESTS

- A. Upon successful completion of the Mechanical and Control System Tests, an integrated system test using as much field equipment as possible shall be performed.
- B. The integrated systems test shall demonstrate successful functioning of the System and all its elements and software capabilities through planned test cases with actual system on-line operating conditions.
- C. All process and control functions shall be tested, as well as designated combinations and logical sequence.
- D. Operation of I/O peripherals shall be checked out.
- E. During the integrated system test, the System shall process dewatered sludge and demonstrate that the System can function continuously and reliably and produce a granular dried product. The Owner shall be responsible for supplying dewatered sludge required for initial startup.
- F. The System Supplier shall notify the Owner at least 96 hours prior to the integrated systems test so that the Owner can arrange for supplying dewatered sludge to the system during the test period.
- G. All completed tests, malfunctions, corrective measures and downtime shall be chronologically logged.
- H. The integrated system test shall be completed before the System Supplier conducts the Process Performance Test as specified in Article 3.07 of this Section.
- I. During the integrated system test, the System Supplier shall provide all personnel to operate the system to perform the test and analyze samples.
- J. The Integrated System Test shall consist of at least 3 consecutive, 8-hour days of system operation.

3.7 PROCESS PERFORMANCE TEST AND GUARANTEES

Performance test and guarantees shall be as described in section 01800-1.5(F).

***** END OF SECTION *****

DIVISION 13
SPECIAL CONSTRUCTION

SECTION 13417

PRESSURE GAUGES

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes furnishing and installing new suction and discharge pressure gauges, as shown on the Plans and specified herein. Discharge pressure gauges shall include all necessary connectors and hardware on all process piping for pumps, blowers, fans, and compressors and at the various locations for a complete and workable installation.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01200	Measurement and Payment
01300	Submittals
11000	Equipment General Provisions

1.3 PERFORMANCE REQUIREMENTS

Unless otherwise indicated, the discharge pressure gauge scales shall be selected so that the normal operating pressure falls between 50 and 80 percent of full scale. The suction pressure gauges on pumps, blowers, and compressors shall be equivalent to the discharge pressure gauges with a lower range of 30-inch Hg.

1.4 DELIVERY, STORAGE AND HANDLING

All equipment shall be completely factory assembled, skid mounted, crated and delivered to protect against damage during shipment.

All equipment delivered to the site shall be stored as specified in accordance with the manufacturer's instructions.

1.5 WARRANTY

In addition to the warranty required in the General Conditions, the equipment manufacturer shall provide an extended warranty covering defects in material and workmanship for 2 years following the date of substantial completion. The warranty shall be in printed form, shall apply to all similar units, and shall include parts and labor.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

The pressure gauges shall be Ashcroft Duragage 1279, or approved equal.

The diaphragm seals shall be Ashcroft Type 101, or approved equal.

2.2 GENERAL

The pressure gauges shall be glycerin filled type and shall have all internal parts immersed. Pressure gauges shall be minimum 4 1/2-inch dial size, with non-metallic case, stainless steel bourdon tube with plastic bushings and pinion, and stainless steel selector. Gauges shall be ANSI grade A or better with an accuracy of ± 0.5 percent.

Gauges measuring liquids shall be supplied with bronze pressure snubber and diaphragm seal. Diaphragm seals shall have silicone DC200 fluid fill and shall have a Type 316 stainless steel body, with 1/4-inch flushing connection and 1/2-inch process connection.

2.3 SPARE PARTS

The Contractor shall provide the manufacturer's recommended spare parts and special tools. All parts and tools shall be suitably identified and effectively protected from moisture and corrosion with appropriate wrappings or coatings or a combination thereof. All parts and tools shall be furnished in sturdy labeled boxes. At a minimum these shall include all special tools and appliances necessary to service, repair, and adjust the equipment.

2.4 FACTORY TESTING

The equipment shall be fully tested at the manufacturer's plant before shipment. Tests shall insure that the equipment will operate as desired under anticipated field conditions. Certified copies of test report(s) shall be submitted to the Engineer prior to shipment.

PART 3 EXECUTION

3.1 INSTALLATION

The pressure gauges and accessories shall be installed as shown on the Plans and as specified herein and in accordance with the manufacturer's instructions.

3.3 FIELD TESTING

The Contractor shall perform the field testing described in Sections 011000.

The field test shall insure that the equipment will operate as desired under field conditions. The manufacturer shall provide a formal test procedure and report forms for recording data. The Contractor shall submit the report forms to the Engineer prior to operational testing.

Any defects in the equipment or failure to meet requirements of the Specification shall be promptly corrected by the Contractor.

3.4 MANUFACTURER'S SERVICES

The services of a factory-trained representative of the pressure gauge manufacturer shall be provided. Services shall include a minimum of 1 day onsite. Services shall include inspection of the installation, initial configuration, programming, startup, and adjustments and instruction of the Owner's personnel in operation and maintenance. Instruction and training of the Owner's personnel shall not take place until startup is completed and the pressure gauges are fully operational and shall be at a time and location agreed to by the Owner. The cost of these services shall be included in the bid price.

***** END OF SECTION *****

SECTION 13425

RADAR LEVEL SENSORS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes furnishing a radar level sensor and for the Wet Cake Feed Pump Hopper and as specified herein. The radar level sensor shall include all necessary accessories and hardware for a complete and workable installation.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01200	Measurement and Payment
01300	Submittals
01800	Testing, Commissioning, and Training
11000	Equipment General Provisions
Division 16	Electrical

1.3 PERFORMANCE REQUIREMENTS

The radar transmitter signal shall indicate to ± 0.08 inch or ± 0.1 percent resolution of tank height. These units shall each be supplied with a separate field display unit to be installed by the Contractor.

1.4 DELIVERY, STORAGE AND HANDLING

All equipment shall be completely factory assembled, crated and delivered to protect against damage during shipment.

All equipment delivered to the site shall be stored as specified in accordance with the manufacturer's instructions.

1.5 WARRANTY

In addition to the warranty required in the General Conditions, the equipment manufacturer shall provide an extended warranty covering defects in material and workmanship for 2 years following the date of substantial completion. The warranty shall be in printed form, shall apply to all similar units, and shall include parts and labor.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

The radar level sensors shall be VEGAPULS 6X by Vega.

2.2 RADAR LEVEL SENSOR AND TRANSMITTER

The pulsed time of flight radar transmitter shall operate at 26 GHz using 2-wire technology for level measurement and/or open channel flow measurement.

The radar level sensor accuracy shall be $\pm 0.08''$, maximum measurement distance shall be 0 - 66 ft., process temperature range shall be -40 to 176 degrees F and pressure range shall be from -14.5 to 43 psi.

The unit provides diagnosis information according to NAMUR NE107 with clear text messages to remedy.

It must be possible to view a graphical representation of the actual signal and envelope curve on the display.

The process connection shall be 4" ANSI flange with swivel mount connection by application.

The radar output signal shall be 4-20 mA dc loop powered.

The radar device shall have Bluetooth wireless technology interface and can be operated and configured via this interface "adjustment app." The range under reference conditions is 33ft. The Bluetooth shall have both encrypted communication and password encryption for security purposes. The Bluetooth wireless technology interface can be deactivated.

The radar shall have a linearization function with up to 32 value pairs entered allowing conversion of the measured value into any unit of length, weight, flow or volume.

The radar unit shall be rated for IP66/68 or NEMA4X/6P.

The radar sensor body material shall be made of PVDF. Wetted parts shall be 316 stainless steel.

The radar sensor must have hermetically sealed wiring and fully potted electronics eliminating water ingress.

The radar level sensors shall be listed and labeled by an electrical testing laboratory recognized by the Washington State Department of Labor and Industries or be acceptable to the Washington State Department of Labor and Industries for installation on this project.

2.3 ACCESSORIES

Display units supplied with the sensors listed in Section 1.4 shall be loop powered, 4-20 mA process display units with a 5-digit LCD display of 4-20 mA input and shall be rated IP66.

2.4 SOURCE QUALITY CONTROL AND CALIBRATION

Provide ISA data sheet ISA-TR20.00.01. Use the latest revision of form 20F2321. Complete the form with all known data, and dash out the inapplicable fields. Incomplete data sheets submitted will be result in a rejected submittal. Provide complete documentation covering the calibration during manufacturing.

2.5 SAFETY

All electrical equipment shall meet the requirements of ANSI/NFPA 70, NATIONAL ELECTRIC CODE, latest addition.

All devices shall be suitable for use as non-incentive devices when used with appropriate non-incentive associated equipment. Devices with intrinsically safe ratings will normally be acceptable with vendor's approval.

Transmitter housing shall conform to NEMA 4x classification.

Non-intrinsically safe electrical equipment shall be approved by a Nationally Recognized Testing Laboratory (NRTL) such as FM, UL, ETL, CSA, etc. for the specified electrical area classification.

Electrical equipment specified as intrinsically safe shall qualify as "simple apparatus" or NTRL approved intrinsically safe equipment per ANSI/ISA-RP12.6 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations," latest edition.

2.6 FACTORY TESTING

The equipment shall be fully tested at the manufacturer's plant before shipment. Tests shall insure that the equipment will operate as desired under anticipated field conditions. Certified copies of test report(s) shall be submitted to the Engineer prior to shipment.

PART 3 EXECUTION

3.1 INSTALLATION

The radar level sensors shall be installed as shown on the Plans and in strict accordance with Manufacturer's recommendations and written instructions.

Specific attention should be given to verifying the nozzle height, dimension, and location where the transmitter has been installed.

All mounting hardware and supports shall be provided by the Contractor.

3.2 FIELD TESTING

The Contractor shall perform the field testing described in Sections 01800 and 11000.

The field test shall insure that the equipment will operate as desired under field conditions. The manufacturer shall provide a formal test procedure and report forms for recording data. The Contractor shall submit the report forms to the Engineer prior to operational testing.

Any defects in the equipment or failure to meet requirements of the Specification shall be promptly corrected by the Contractor.

3.3 MANUFACTURER'S SERVICES

The services of a factory-trained representative of the radar level sensor manufacturer shall be provided. Services shall include a minimum of 1 day onsite. Services shall include inspection of the installation, initial configuration, programming, startup. This visit shall include adjustments to the equipment as well as instruction of the Owner's personnel in operation and maintenance for each radar sensor (or group of sensors). Instruction and training of the Owner's personnel shall not take place until startup is completed and the radar sensors are fully operational and shall be at a time and location agreed to by the Owner.

***** END OF SECTION *****

DIVISION 15
MECHANICAL

SECTION 15050

PROCESS PIPING SYSTEMS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section describes all process piping including pipe, fittings, hoses, supports and accessories for the skid mounted Biosolids Drying equipment.

The Supplier shall design piping systems that are an integral part of the Biosolids Drying System. Piping on skid mounted equipment and the dehydration chamber shall be routed in neat, organized groupings next to structural components. The Supplier shall also design piping necessary for connection to other utilities; such as, potable water, non-potable water, natural gas, and drains. Interface for utility connections shall be clearly indicated on the drawings submitted. The Supplier shall provide piping and supports from the interface point to the Biosolids Drying System components. The Contractor shall provide piping and supports to the interface point from utility connections and from the dehydration chamber and other skid mounted or free standing equipment interface points. Piping systems designs by Supplier are limited to those required for the Biosolids Drying System.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01300	Submittals
01800	Testing, Commissioning and Training
Division 11	Equipment
Division 15	Mechanical
Division 16	Electrical

1.3 STANDARDS FOR THE WORK

Pipe and fittings shall be provided to produce complete, operable systems with all elements properly interconnected as shown in submittal schematic diagrams or to provide specified operations. All piping shall be in accordance with the current Uniform Plumbing Code. If the approved submittal drawings do not detail all items such as complete venting, etc., it is understood that this work shall be included as a part of this section and all costs included in the lump sum bid. Piping systems and materials shall be new and without imperfections.

1.4 PIPE MATERIALS

The materials to be utilized for the various pipe sizes and applications on the project shall be as follows, unless otherwise noted on the Drawings or herein:

<u>Process</u>	<u>Abbr.</u>	<u>Inside (Above Ground)</u>	<u>Outdoor Exposed</u>
Drain (<3")	D	Solvent Welded PVC	Solvent Welded PVC
Drain (≥3")	D	Ductile Iron, FL	Ductile Iron, FL
Natural Gas	NG	Steel, threaded	-----
Non-Pot Water	NPW	Solvent Welded PVC	Galvanized Steel

1.5 SUBMITTALS

Submittal data shall be supplied in accordance with Section 01300 of these Specifications.

Detailed installation drawings of all piping and connected equipment shall be submitted. The drawings shall include all piping, valves, fittings, pipe support locations and types, seismic bracing, and appurtenances.

Submit data to show that the following items conform to the Specification requirements:

- A. Pipe, fittings and accessories.
- B. Valves.
- C. Couplings and couplers.
- D. Pipe supports and seismic braces as required herein.

Submit certified test reports as required herein and by the referenced standards.

PART 2 PRODUCTS

2.1 GENERAL

Pipe sizes are nominal inside diameter unless otherwise noted.

All materials delivered to the job site shall be new, free from defects, and marked to identify the material, class and other appropriate data such as thickness for piping.

Acceptance of materials shall be subject to strength and quality testing in addition to inspection of the complete product. Acceptance of installed piping systems

shall be based on inspection and leakage tests as specified in Part 3.12 of this Section.

2.2 DUCTILE IRON PIPE AND FITTINGS

A. GENERAL

Ductile iron pipe shall be centrifugal cast pipe conforming to ANSI A21.51, AWWA C151, Class 52, unless otherwise noted, bituminous coated and cement mortar lined in accordance with ANSI A21.4/AWWA C104, unless otherwise noted. All flanged spools shall be Class 53, as shall all piping where grooved couplings are used. Approved grooved couplings may be used instead of flanged spools and fittings.

Pipe joints shall be flanged or grooved unless otherwise specified or indicated. Mechanical joints shall comply with ANSI A21.11.

Flanges shall comply with ANSI B16.1, Class 125. Flange gaskets shall be full face. Grooved couplings shall be Victaulic Style 31, Certainteed GB or equal and shall comply with AWWA C606.

Fittings shall be cast iron or ductile iron and shall comply with ANSI A21.10, AWWA C110 or AWWA C153, bituminous-coated exterior and cement mortar lined, 250-psi minimum pressure. Fittings and type of joints shall be the same as adjacent pipe joints.

2.3 PVC PIPE AND FITTINGS

All PVC pipe 3 inch and smaller shall be Schedule 80. Pipe shall be constructed of material that meets or exceeds ASTM D2241-65T and D-1784-68T and Commercial Standard CS 256-63. Joints shall be solvent weld with press fit. Fittings shall conform to ASTM D2466 and D2467 for socket type and ASTM D2464 for threaded pipe.

All PVC pipe 4-inch and larger shall be PVC, Cast Iron pipe equivalent O.D., Class 150, D.R. 18, conforming to the requirements of ANSI/AWWA C900. Pipe joints shall be gasketed. Solvent-cement joints will not be acceptable. Fittings for PVC pipe 4 inch and larger shall be ductile iron, as specified in Part 2.2 of this Section.

Provisions for pipe expansion shall be as recommended by the pipe manufacturer.

Bolts for PVC pipe, where required, shall be 316 stainless steel, ASTM A193, Grade B8M, hex head with ASTM A194, Grade 8M hex nuts. Washers of the same material shall be supplied.

2.4 STEEL PIPE AND GALVANIZED STEEL PIPE AND FITTINGS

Steel pipe shall be general service, carbon steel pipe conforming to ASTM A53, Grade A, Type E. Pipe shall be Schedule 40 with threaded and coupled fittings. Galvanized pipe and fittings shall be hot-dip galvanized.

2.5 STAINLESS STEEL PIPE AND FITTINGS

All stainless steel pipe larger than 2 inches in diameter shall be Schedule 10S and be manufactured from ASTM A240 annealed and pickled sheets and plates, Type 316L, in accordance with ASTM A778. Pipe shall be manufactured to nominal pipe sizes and wall thicknesses as listed in ANSI B36.19, Table 2. All stainless steel pipe two inches and smaller in diameter shall be fabricated from 316L stainless steel pipe conforming to ASTM A312, and shall be Schedule 40S. Non-welded parts and pieces such as nuts, bolts, washers, supports, follower flanges and anchor bolts shall be made from 316 stainless steel.

Stainless steel fittings shall be Type 316L and conform to ASTM A403. All gaskets shall be 45 to 55 durometer (Shore A) neoprene.

After fabrication, all stainless steel piping shall be passivated by immersion in a pickling solution of nitric and hydrofluoric acid. Parts shall be free of iron particles or other foreign materials. A final neutralizing rinse will complete the cleaning.

All stainless steel pipe shall be butt-welded in accordance with the applicable standards. In addition to the locations shown on the Drawings, expansion couplings shall be installed at a maximum spacing of 40 feet on all stainless steel pipe. Approved grooved couplings, such as Victaulic IPS stainless steel grooved fittings may be used instead of butt-welding.

The locations of the expansion couplings shall be determined by the Contractor prior to pipe fabrication and shall be subject to review and approval by the Engineer.

2.6 MISCELLANEOUS FITTINGS

A. FLEXIBLE COUPLINGS

Flexible couplings shall be as follows:

Steel to Steel:	Rockwell (Smith-Blair) Type 411, Dresser Style 38, or equal. Middle ring and follower shall have fusion bonded epoxy coating.
Steel to Cast Iron or Ductile Iron:	Rockwell (Smith-Blair) Type 433, Dresser Style 62 or 162, or equal.
Cast Iron to Cast Iron or Ductile Iron to	Rockwell (Smith-Blair) Type 431, Dresser Style 53, or equal.
PVC to PVC:	General Rubber Corp. Spool-type expansion joint with straight through tube, single arch and flanged ends, or equal.

Harness lugs and tie bolts for harnessed joints shall comply with AWWA M-11, Third Edition and as shown on the Drawings.

B. FLANGED COUPLING ADAPTERS

Flanged coupling adapters shall be Rockwell (Smith-Blair) Type 912 Dresser Style 127 or equal.

C. ADAPTER FLANGES

Adapter flanges for ductile iron pipe shall be manufactured of high strength ductile iron, ASTM A536, Grade 65-45-12. Flange dimensions shall be in accordance with ANSI B16.1, 125-lb. pattern. Gasket shall be Buna-N. Set screws shall be AISI 4140, high strength, low alloy steel. The adapter flanges shall be Uni-Flange Series 400, or equal.

D. GROOVED PIPE COUPLERS

The couplers for steel pipe shall be Victaulic Style 44 for Type C collared end design.

The coupler for ductile iron pipe shall be Victaulic Style 31.

The gaskets shall be suitable for use in wastewater.

E. CALDER-TYPE FLEXIBLE COUPLINGS

Flexible couplings shall be Calder-type where specifically indicated on the Drawings. Calder-type flexible couplings shall consist of all elastomeric PVC sleeve secured to the pipes with stainless steel clamping bands. Adapter couplings shall be furnished for transitions between piping of different outside diameters as necessary.

Calder-type flexible couplings shall be as manufactured by Calder Co., Fernco, or approved equal.

F. FLEXIBLE CONNECTORS AND EXPANSION JOINTS

Flexible connectors and expansion joints shall be provided where shown on the drawings. The flexible connectors and expansion joints shall be provided with 125-pound ASA flanges and be single arch-type multiple ply rubber or synthetic elastomers, complete with steel retaining rings, as manufactured by the Red Valve Company, Inc., the Metraflex Company, or equal.

G. DIELECTRIC INSULATED UNIONS

Dielectric insulated unions shall be used to connect dissimilar metals. They shall separate the metals so that the passage of more than 1 percent of the galvanic current, which would exist with metal to metal contact, is prevented. Unions shall be of the same material as the pipe to which attached, and pressure and temperature ratings shall be no lower than that of the piping system in which it is installed.

PART 3 EXECUTION

3.1 HANDLING AND DELIVERY

Pipe and accessories shall be handled in such a manner as to insure delivery on site in sound, undamaged condition. Particular care shall be taken not to injure pipe coating. No other pipe or material of any kind shall be placed inside of lined pipe or fitting after lining has been applied.

Pipe and accessories shall be delivered to the Owner within the delivery window, as specified in Section 01110.

3.2 INSTALLATION

The Supplier shall furnish complete shop drawings, installation instructions, and manufacturer's recommendations to the Owner and the Contractor. The Contractor will install the piping systems between interface points.

Manufacturer's written installation instructions shall be included with the delivered materials.

1.1 FIELD TESTING

Pipe testing will be performed by the Contractor immediately following pipe installation. The Contractor will submit a test report to the Owner and the Supplier, detailing any test failures due to defective material. The Supplier must deliver new material as needed to remedy any identified pipe failures due to defective material or design, to be installed and retested by the Contractor.

***** END OF SECTION *****

SECTION 15066

PIPE AND CONDUIT SUPPORT SYSTEM

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

This Section specifies pipe and conduit hangers, brackets, and supports on the dehydration chamber and skid mounted equipment. Pipe and conduit support systems shall be furnished complete with all necessary inserts, bolts, nuts, rods, washers, structural attachments, and other accessories as specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01300	Submittals
01600	Materials and Equipment
01800	Testing, Commissioning, and Training
11000	Equipment General Conditions
11650	Biosolids Drying System
15050	Piping Systems
15100	Valves
16050	Basic Electrical Materials and Methods
16130	Raceways and Boxes

1.3 REFERENCES

All pipe and conduit support materials and methods shall conform to the latest, applicable requirements of documents listed hereafter. In case of conflict between this section and the listed documents, the requirements of this Section shall prevail.

ANSI A13.1	Piping and Piping System
ANSI B31.1	Power Piping
ASME	Boiler and Pressure Vessel Code
ANSI/MSS SP-58	Pipe Hangers and Supports C Materials, Design and Manufacture
ANSI/MSS SP-69	Pipe Hangers and Supports C Selection and Application
SMACNA	Seismic Restraint Manual C Guidelines for Mechanical Systems
UPC	Uniform Plumbing Code

1.4 SUBMITTALS

In accordance with the requirements of Section 01300, submit the following project data prepared by a licensed Professional Engineer:

- A. Manufacturer's technical data for all hangers, brackets, supports and documentation of conformance with appropriate standards and these specifications.
- B. Location of pipe and conduit support, including type of structural and pipe attachments, shown on detail drawings and/or specified under paragraph 1.5 of Section 15050.

PART 2 PRODUCTS

2.1 GENERAL

The Supplier shall design, provide, and install pipe and conduit support systems, which include hangers, brackets, supports, anchors, expansion joints, and structural attachments. The support system shall be pipe rack, trapeze pipe hangers or individual pipe clamps, hangers, supports and structural attachments as specified herein. The support system shall be designed in conjunction with the pipe and conduit to be supported. Seismic restraints shall be provided in accordance with SMACNA Manual as referenced in paragraph 1.3.

It shall be the Supplier's responsibility to provide a complete system of pipe and conduit supports for the piping and conduit supplied with the dehydration chamber and skid mounted equipment. Pipe support schedule under paragraph 2.6 sets forth minimum requirements for pipe supports.

2.2 PIPE RACKS AND TRAPEZE HANGERS

Pipe and conduit racks and trapeze hangers shall be constructed of galvanized steel channels, rods, posts, post base, clamps, brackets, fittings, and accessories for supporting pipes in equipment and pump rooms. All components for pipe and conduit rack and trapeze shall be Unistrut or equal.

2.3 PIPE CLAMPS AND HANGERS

In areas where pipe racks and trapezes are not used, pipe shall be supported with clamp hangers and stanchion saddle support system. The clamps and hangers shall be fastened to threaded rods hanging from structural attachments. Pipe supports shall be selected for the size and type of pipe to which they are applied. Strap hangers will not be acceptable. Threaded rods shall have sufficient threading to permit the maximum adjustment available in the support item.

All pipe clamps and hangers, including all accessories, shall be galvanized steel for indoor use and 316 stainless steel for outdoor use and submerged application.

Pipe and conduit clamps and hangers shall be as manufactured by ITT Grinnell or equal and shall be as follows:

Type	Pipe Size (In.)	Pipe Material	Grinnell Figure
Split Ring	3/4 to 6	All type	104
Split Clamp	1/2 to 3	All type	138R
Adjustable Ring	1/2 to 6	All type	97
Adjustable Ring	1/2 to 4	Copper	CT-269
Adjustable Clevis	4 to 30	All type	260
Pipe Clamp	4 to 18	All type	216
Socket Clamp	4 to 24	Cast Iron	590
Stanchion Saddle	4 to 12	All type	259
Adjustable Saddle Support	3 to 24	All type	264
Riser Clamp	2 to 8	All type	40
Adjustable Pipe Roll	6 to 12	Stainless Steel	174

2.4 STRUCTURAL ATTACHMENTS

Structural attachments shall be concrete insert channels or individual inserts for new concrete, surface-mounted channel or individual inserts for existing concrete or where applicable, steel, roof plate supported attachments, complete with all accessories required. All structural attachments including all accessories shall be galvanized steel for indoor use and stainless steel for outdoor use, and shall be provided by a single manufacturer. Structural attachments shall be as measured by Unistrut Corporation or equal.

2.5 PROTECTION SADDLES

Protection saddles shall be used for protecting pipe insulation against damage at pipe supports or as shown on the Drawings. The nominal thickness of covering shall be the same as that of pipe insulation. The protection saddles shall be curved carbon steel plate and shall be ITT Grinnell Figure 160 through Figure 162 or equal.

2.6 SPACING

Maximum support spacing shall conform to the following table:

Pipe Size Inches	Pipe Material	Maximum Spacing Feet
1" & Smaller	Iron or Steel Copper Plastic Tubing	6 4-1/2 continuous continuous
1-1/4 to 2"	Iron or Steel Copper or Plastic	8 5
2-1/2 to 4"	Iron or Steel Copper or Plastic	10 6
6 to 8"	Iron or Steel Plastic	12 8

PART 3 EXECUTION

3.1 DESIGN

Pipe and conduit support systems shall be designed in accordance with applicable reference standards specified in paragraph 1.3. Pipe and conduit supports shall be designed and selected to withstand seismic loads specified in Section 11000 and shall adhere to the following:

- A. Weight balance calculations shall be made to determine the required supporting force at each pipe support location and the pipe weight at each equipment location. Design loads for inserts, clamps, and other support items shall not exceed the manufacturer's recommended loads.
- B. Pipe supports shall be able to support the pipe in all conditions of operation. They shall allow free expansion and contraction of the piping, and prevent excessive stress resulting from transferred weight being induced into the pipe or connected equipment. Allow clearances for pipe expansion and contraction.
- C. Wherever possible, pipe attachments for horizontal piping shall be pipe clamps, or as shown on the pipe support detail sheet. Horizontal or vertical pipes should be supported preferably at locations of least vertical movement.
- D. All pipe supports shall provide a means or vertical adjustment after erection.

- E. Where practical, riser pipe shall be supported independently of the connected horizontal piping. Pipe support attachments to the riser piping shall be riser clamps.

3.2 INSTALLATION

Pipe support system shall be installed strictly in accordance with standards and codes referenced in paragraph 1.3 and piping support system manufacturer and piping manufacturer's recommendations.

In addition, all piping shall be rigidly support and anchored so that there is no movement or visible sagging between supports.

Contact between dissimilar metals, including contact between stainless steel and carbon steel, shall be prevented. Supports for brass or copper pipe or tubing shall be copper-plated. Those portions of pipe supports, which contact other dissimilar metals, shall be rubber or vinyl coated.

Anchorage shall be provided to resist thrust due to temperature changes, changes in diameter or direction, or dead-ending. Anchors shall be located as required to force expansion and contract movement to occur at expansion joints, loops, or elbows, and as required to prevent excessive bending stresses and opening of mechanical couplings. Anchorage for temperature changes shall be centered between elbows and mechanical joints used as expansion joints. Anchorage for bellows type expansion joints may be located adjacent to the joint.

*****END OF SECTION *****

DIVISION 16
ELECTRICAL

SECTION 16010

BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section shall consist of the Supplier providing electrical work as specified herein and as required for proper operation and/or monitoring/alarming functions related to the Dryer Equipment System.

1.2 RELATED DOCUMENTS

<u>Section</u>	<u>Item</u>
01300	Submittals
01800	Testing, Commissioning, and Training
Division 11	Equipment
Division 13	Special Construction

1.3 SUMMARY

- A. Section Includes:
 - 1. General requirements for electrical work.
 - a. Systems Descriptions
 - b. Submittals
 - c. Records
 - d. Coordination
- B. Related Sections include but are not necessarily limited to:
 - 1. General Conditions.
 - 2. Division 11 - Equipment.
 - 3. Division 13 - Special Construction.
- C. Installation of systems and equipment is subject to clarification as indicated in reviewed shop drawings and field coordination drawings.

1.4 SYSTEMS DESCRIPTIONS

- A. Provide the labor, materials, and equipment necessary to furnish, test, and place into operation the instrumentation, control, alarm, and associated electrical systems of the Dryer Equipment System.
- B. Installation of the Dryer Equipment System, including electrical, control, alarm, and instrumentation systems, will be by others. The Supplier will be responsible for oversight of the installation, testing of the installed equipment and system, startup and training.
- C. Furnish complete process control systems including programmable automation controllers (PACs), individual controllers, monitoring and/or metering equipment, instrumentation equipment, and associated raceways, wiring, control panels, enclosures, and similar items.
- D. Test, adjust and calibrate equipment and start-up all electrical equipment, instrumentation equipment, and its associated mechanical attachments as necessary to place the Dryer Equipment into operation.
- E. Mark and identify circuits, equipment, and enclosures with wire numbers, nameplates, and warning signs.

1.5 DEFINITIONS

- A. SHOP FABRICATED
 - 1. Manufactured or assembled equipment for which a NRTL test procedure has not been established.
- B. NRTL: Nationally Recognized Testing Laboratory.
- C. NEC: National Electrical Code

1.6 QUALITY ASSURANCE

- A. When a specific code or standard has not been cited, the applicable codes and standards of the following code-making authorities and standards organizations apply:
 - 1. American Association of State Highway and Transportation Officials (AASHTO).
 - 2. American Iron and Steel Institute (AISI).

3. American National Standard Institute (ANSI).
 4. American Society for Testing and Materials (ASTM).
 5. ETL Testing Laboratories, Inc (ETL).
 6. Insulated Cable Engineers Association (ICEA).
 7. Institute of Electrical and Electronic Engineers (IEEE).
 8. Instrument Society of America (ISA).
 9. Joint Industrial Council (JIC).
 10. National Electrical Manufacturers Association (NEMA).
 11. National Fire Protection Association (NFPA).
 12. Occupational, Health and Safety Administration (OSHA).
 13. Underwriters Laboratories, Inc. (UL).
- B. In case of conflict or disagreement between codes, standards, laws, ordinances, rules, regulations, drawings and specifications, or within either document itself, the more stringent condition governs.

1.7 SUBMITTALS

- A. See Section 01300.
- B. Make submittals as soon as practicable after the date of notice to proceed, but prior to purchase, fabrication, or installation of materials or equipment. Make submittals as a single package, with proposed products and materials grouped according to the sections specified in Division 16.
- C. **PRODUCT DATA**
1. Provide manufacturer's product technical data, including, but not limited to:
 - a. Identification of the manufacturer.
 - b. Manufacturer's product descriptive bulletin.

- c. Current, voltage, nameplate, load, impedance, and other electrical data pertinent to the Project and necessary to assure compliance with the Specifications and Drawings.
- d. Equipment dimensions.

D. SHOP DRAWINGS

Submit Shop Drawings containing detailed drawings, diagrams and instructions for installing, operating and maintaining the material and equipment proposed for installation in the electrical work.

1. See individual Division 16 sections for specific requirements.
2. Provide technical drawings as follows:
 - a. Provide diagrams and drawings similar to the Contract Drawings and named in a similar fashion for all technical drawings submittals.
 - b. Use diagrams and symbols for shop drawings that conform to Joint Industry Conference (JIC) Electrical Standards for Industrial Equipment and/or NEMA, Industrial Control Systems, ANSI and IEEE standards, latest revisions. Prepare drawings on size A, B or D sheets in a format similar to the Contract Documents or other nationally recognized drawing standard.
 - c. Provide electrical elementary wiring diagrams for the electrical control systems showing the wiring of electrical control items, such as starters, control systems, interlocks, switches, programmable controllers, microprocessor controllers, and relays.
 - d. Provide scaled and dimensioned panel or enclosure face layout drawing; panel/subpanel material of construction, dimensions, and weight; conduit and wiring access locations; and material wiring and terminal block drawings for each control panel.
 - e. Provide schematic interconnection diagrams and/or Process Instrumentation Drawings (PID) diagrams for each separate control system or control panel. Each control diagram shall show a schematic representation of process equipment and locations of switches, meters, automatic valves, and

indicators, controllers and recorders. Correct operating settings and ranges for each control instrument shall be marked on these diagrams.

- E. Clearly indicate on submittals that equipment or material is NRTL listed or is constructed utilizing listed or recognized components. Where a NRTL standard has not been established clearly identify that no NRTL standard exists for that equipment.
- F. OPERATION AND MAINTENANCE MANUALS
 - 1. See specific sections for information specific to each type of equipment which is to be included in O&M manuals.
 - 2. Provide preliminary manuals to the Engineer for review in the quantities indicated in Division 1 no later than when the electrical equipment is shipped to the job site. Drawings and Bill of Materials included in preliminary manuals shall show “as shipped” wiring and components. Provide final manuals with Record Drawings of the work upon completion of the work, folded and punched for insertion into the manual after they are reviewed by the Engineer.
 - 3. Manuals for the electrical system consist of 3-post, expandable metal hinge binders labeled with the job name and the Contractor’s name with tab dividers for each major type of equipment.
 - a. Provide manufacturer’s installation, operation, maintenance, and service information for each item of equipment furnished under Division 16.
 - b. Assemble and index each section listing the contents individually on the tab divider for that section.
 - c. Compile a spare parts list and a suppliers index for each section and assemble in the section provided.
 - d. Assemble records of tests, measurements, and calibration settings made for each device. Provide Record (“As-Built”) Drawings of the work upon completion of the work. Fold, punch, and insert these records into the manual after they are reviewed by the Engineer.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Refer to individual Division 16 sections.
 - 1. Provide equipment, which is of a similar type, made by one manufacturer throughout the project unless otherwise noted in the Specifications.
- B. Submit requests for substitution in accordance with Specification Section 01300.

2.2 APPROVALS AND LABELING

- A. Provide material or equipment approved and labeled for the purpose for which it is to be used by a nationally recognized electrical testing laboratory (NRTL) or other organization acceptable to the State of Washington Department of Labor and Industries.
 - 1. Where NRTL test procedures have been established for the product type, provide electrical equipment approved under that procedure and bearing the NRTL label.

2.3 MATERIALS

- A. Except as otherwise indicated, provide new materials and equipment which are standard products of manufacturers regularly engaged in production of such equipment. Provide similar items of equipment of the same manufacturer and quality. Where systems are specified, provide components of the system from one manufacturer.
- B. Where voltage, current, power, temperature or other ratings are specified that do not correspond to standard ratings of the manufacturer selected by the Contractor, furnish the next rating level which increases the capacity of the device or material in question.
- C. Furnish materials, devices, equipment or supplies of materials that are inherently non-corrosive or are coated or covered in a manner, acceptable to the Engineer, which renders them non-corrosive. Material that may cause rusting or streaking on a building surface shall not be used.
- D. Provide materials and equipment which do not contain polychlorinated biphenyls, asbestos or other hazardous or detrimental materials.

- E. When equipment is shop fabricated for the Project, use electrical devices and enclosures which are NRTL listed and labeled or recognized.
- F. SHOP OR FACTORY FINISHES
 - 1. Interiors of painted equipment shall be either white or light gray.

PART 3 EXECUTION

3.1 INSTALLATION

- A. The Supplier shall furnish complete installation instructions and recommendations to the Contractor. The Contractor will install the Biosolids Drying System and associated devices furnished by the Supplier.
- B. The Supplier shall check and approve the installation of the Biosolids Drying System in accordance with Section 11000.
- C. The Supplier shall test and adjust the Biosolids Drying System after approval of the installation in accordance with Section 01800.
- D. The Supplier shall startup the Biosolids Drying System in accordance with Section 01800.
- E. The Supplier shall provide training to the Owner for the Biosolids Drying System. Training shall meet the requirements of Section 01800.

***** END OF SECTION *****

SECTION 16050

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section shall consist of the Supplier providing electrical basic materials and work as specified herein and as required for proper operation and/or monitoring/alarming functions related to the Biosolids Drying System.

1.2 RELATED DOCUMENTS

<u>Section</u>	<u>Item</u>
01300	Submittals
01800	Testing, Commissioning, and Training
Division 11	Equipment
Division 13	Special Construction

1.3 SUMMARY

- A. This Section includes the following:
1. Supporting devices for electrical components.
 2. Electrical identification.
 3. Cleaning and finish touchup painting.
 4. Testing.

1.4 SUBMITTALS

A. GENERAL

Submit each item below according to the Conditions of the Contract and Division 1 Specification Sections.

B. Test reports.

1.5 QUALITY ASSURANCE

- A. Comply with NEC for components and installation.

B. LISTING AND LABELING

Provide products specified in this Section that are listed and labeled.

1. The Terms “Listed and Labeled:” As defined in the NEC, Article 100.
2. Listing and Labeling Agency Qualifications: A “Nationally Recognized Testing Laboratory” (NRTL) as defined in OSHA Regulation 1910.7.

PART 2 PRODUCTS

2.1 SUPPORTING DEVICES ON SKID MOUNTED UNITS

- A. Provide channel and angle support systems, hangers, anchors, sleeves, brackets, fabricated items, and fasteners for secure support of electrical components.

1. Material
 - a. Outdoors, Wet and Damp locations: Hot-dip galvanized steel, or stainless steel.
 - b. Other locations: Steel, protected from corrosion with zinc coating, cadmium plating, or with treatment of equivalent corrosion resistance using approved alternative finish or inherent material characteristics.

B. FASTENERS

Cadmium plated or galvanized steel in dry areas; stainless steel or hot dipped galvanized steel in damp or wet areas; 316 stainless steel in hazardous or corrosive areas.

C. CONDUIT CLAMPS

One hole or beam clamps.

1. Rigid Steel Conduit: cast iron clamps with cast iron “foot.”
2. EMT: stamped steel clamps

D. ANCHORS

Cadmium plated or galvanized steel in dry areas; stainless steel or hot dipped galvanized steel in damp or wet areas.

1. clamps or U-bolts for structural steel.
2. hanger rods: 1/4-inch diameter or larger threaded steel

2.2 ELECTRICAL ENCLOSURES

A. ENCLOSURES FOR USE WITH ELECTRICAL EQUIPMENT

1. Standards:
 - a. NEMA ICS-6, Enclosures for Industrial Controls and Systems.
 - b. UL 508, Industrial Control Equipment.
2. Provide NEMA enclosure types as follows:
 - a. NEMA 12: Use in unclassified indoor locations which are neither wet nor damp.
 - b. NEMA 4:
 - i. Use in wet indoor locations.
 - ii. Use in outdoor locations.
 - c. NEMA 4X: Use in all corrosive locations.

B. SHOP OR FACTORY FINISHES

1. Exteriors of painted enclosures shall be ANSI gray.
2. Interiors of painted enclosures shall be white.

2.3 ELECTRICAL IDENTIFICATION

A. MANUFACTURER’S STANDARD PRODUCTS

Where more than one type is listed for a specified application, selection is Supplier’s option, but provide single type for each application category. Use colors prescribed by ANSI A13.1, NEC and these Specifications.

B. COLORED ADHESIVE MARKING TAPE FOR RACEWAYS, WIRES, AND CABLES

Self-adhesive vinyl tape not less than 3 mils thick by 1 inch wide.

C. TAPE MARKERS

Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

D. COLOR-CODING CABLE TIES

Type 6/6 nylon, self-locking type. Colors to suit coding scheme.

E. ENGRAVED, PLASTIC-LAMINATED LABELS, SIGNS, AND INSTRUCTION PLATES

Engraving stock, melamine plastic laminate punched for mechanical fasteners 1/16-inch minimum thick for signs up to 20 sq. in., 1/8-inch thick for larger sizes. Engraved legend in white letters on black face.

F. FASTENERS FOR PLASTIC-LAMINATED AND METAL SIGNS

Self-tapping stainless-steel screws or stainless-steel No. 10/32 machine screws with nuts and flat and lock washers.

G. WIRE MARKERS

Machine printed, black ink, alpha-numerical identifiers on white or yellow polyolefin shrink tubing. Kroy K4350 Shrink Tube, or approved equal.

2.4 TOUCHUP PAINT

A. FOR EQUIPMENT

Provided by equipment manufacturer and selected to match equipment finish.

B. FOR NON-EQUIPMENT SURFACES

Matching type and color of undamaged, existing adjacent finish.

C. FOR GALVANIZED SURFACES

Zinc-rich paint recommended by item manufacturer.

PART 3 EXECUTION

3.1 INSTALLATION

- A. The Supplier shall furnish complete installation instructions and recommendations to the Contractor. The Contractor will install the Biosolids Drying System and associated devices furnished by the Supplier.
- B. The Supplier shall check and approve the installation of the Biosolids Drying System in accordance with Section 11000.
- C. The Supplier shall test and adjust the Biosolids Drying System after approval of the installation in accordance with Section 01800.
- D. The Supplier shall startup the Biosolids Drying System in accordance with Section 01800.
- E. The Supplier shall provide training to the Owner for the Biosolids Drying System. Training shall meet the requirements of Section 01800.

***** END OF SECTION *****

SECTION 16120

CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section shall consist of the Supplier providing electrical work as specified herein and as required for proper operation and/or monitoring/alarming functions related to the Biosolids Drying System.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
16130	Raceways and Boxes

1.3 QUALITY ASSURANCE

A. LISTING AND LABELING

Provide wires and cables specified in this Section that are listed and labeled.

1. The Terms “Listed” and “Labeled:” As defined in NEC, Article 100.
2. Listing and Labeling Agency Qualifications: A “Nationally Recognized Testing Laboratory” as defined in OSHA Regulation 1910.7.

B. Comply with NEC.

PART 2 PRODUCTS

2.1 BUILDING WIRES AND CABLES

- A. UL-listed building wires and cables with conductor material, insulation type, cable construction, and rating as specified in Part 3 “Wire and Insulation Applications” Article.

B. THERMOPLASTIC INSULATION MATERIAL

Comply with NEMA WC 5.

C. CROSS-LINKED POLYETHYLENE INSULATION MATERIAL

Comply with NEMA WC 7.

D. ETHYLENE PROPYLENE RUBBER INSULATION MATERIAL

Comply with NEMA WC 8.

E. CONDUCTOR MATERIAL

Copper.

F. STRANDING

1. Class B for power applications.
2. Class C for control applications.

G. SIZE AND TYPE

1. Solid or stranded conductor for No. 10 AWG and smaller gauge 120 Vac branch power circuits;
2. Stranded conductor for 277 or 480 Vac power circuits, and for any power circuit larger than No. 10 AWG.
3. Stranded conductors for control circuits.
4. Grounding conductors: solid conductor in sizes No. 6 AWG and smaller gauge; stranded in No. 4 AWG and larger gauge.

H. CORDS

Type SO, size #14 or larger.

2.2 INSTRUMENTATION AND SPECIALTY WIRES AND CABLES

A. LOW VOLTAGE INSTRUMENT WIRE

600 volt rated, multi-conductor cable with overall neoprene or PVC jacket. Individual conductors PVC or polyethylene insulated, with or without nylon overcoat.

1. Unshielded instrument cable Beldon 9486 (18 gauge), 9488 (14 gauge) or equal, Alpha or NEC.

2. Shielded single pair instrument wire (2/C#18) Belden 9341 or equal, Alpha or NEC.
3. Shielded three conductor instrument wire (3/C#18) Belden 1121A or equal, Alpha or NEC.
4. Shielded multi-pair (#18 gauge) instrument wire equal to Belden 1048 (2 pair), 1049 (4 pair), 1050 (8 pair), 1051 (12 pair) or equal, Alpha or NEC.

B. SPECIALTY WIRE

As specified in the section describing the system it serves.

2.3 CONNECTORS AND SPLICES

- A.** Provide UL-listed, factory-fabricated wiring connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

B. CONDUCTOR TAPS

1. Solid Conductors size 18 through 10 AWG: Twist on insulated spring connectors.
2. Stranded Conductors size 18 through 6 AWG: insulated, solid barrel, crimp type plated copper alloy connectors.
3. Conductors size 4 AWG and larger: plated copper alloy compression splicing sleeves installed by high pressure compression tools and insulated with heat shrink Raychem sleeves.

C. TERMINATIONS

Suitable for 75 degree Celsius rated copper conductor.

1. Feeder circuits: compression indent barrel connectors with one or two hole spade lug ends.
2. Conductor size 18 through 10 AWG: insulated, solid copper barrel, crimp type, plated copper alloy spade tongue terminal, made for the wire size and terminal on which they are installed and crimped with an approved pliers or tool for the connector.

3. Conductor size 8 AWG and larger: compression, indent, solid copper barrel, one or two hole lugs.

D. MOTOR CONNECTIONS

Insulated, solid barrel, crimp type, ring tongue plated copper alloy.

2.4 INSULATING MATERIALS

A. FILLERS

Scotchfill, or equal.

B. TAPE

7 mil vinyl plastic tape, Scotch 33+, or equal.

PART 3 EXECUTION

3.1 WIRE AND INSULATION APPLICATIONS

A. FEEDERS

Type USE/RHW/RHH insulated, stranded conductors, in raceway.

B. BRANCH CIRCUITS

Type USE/RHW/RHH insulated, stranded conductors, in raceway.

C. EQUIPMENT GROUNDING CONDUCTORS

Same type insulation and conductor as the circuit conductors supplying the equipment to be grounded.

D. CLASS 1 AND 2 CONTROL CIRCUITS

Type MTW/THWN, size #14 AWG or larger, in raceway.

E. INSTRUMENTATION CIRCUITS

Shielded or unshielded instrument cable, as required for the connected equipment/device.

3.2 INSTALLATION

- A. Install wires and cables in raceway system.
- B. Provide individual neutral conductors for each circuit. Common neutral conductors for multi branch circuits are not permitted unless specifically shown on the Drawings.
- C. Install feeder and motor circuits continuously without splices from equipment terminal to equipment terminal or motor lead. 120 volt single phase branch circuits may be spliced at taps. Do not splice circuits at other locations.
- D. Install instrumentation and control circuits continuously except for termination on terminal strips in control panels or terminal cabinets.
- E. Color code conductors as follows:
 - 1. Grounding conductors: Green.
 - 2. 480/277 volt, three phase systems:
 - a. Phase A - brown
 - b. Phase B - orange
 - c. Phase C - yellow
 - d. Neutral – gray
 - 3. 208Y/120 or 240/120 volt delta, three phase systems:
 - a. Phase A - black
 - b. Phase B - red (208 volt), orange (240 volt, high leg)
 - c. Phase C - blue
 - d. Neutral – white
 - 4. 240/120 volt, single phase systems:
 - a. Phase A - black
 - b. Phase B - red
 - c. Neutral – white
 - 5. Use wire with insulation of required color for conductors of #8 AWG and smaller. For wire larger than No. 8 AWG which is not available in specified colors, use self-adhesive, wrap-around cloth type markers of solid colors to code the conductors. When conductors are marked in this manner, mark each conductor at all

accessible locations such as junction boxes, pullboxes, auxiliary gutters, outlets, switches, and control centers.

6. Do not use white or green color for any power, lighting, or control conductor not intended for neutral or grounding purposes.
 - a. low voltage control circuits, or 18 AWG or smaller control conductors, may use green or white singly or as part of a trace color in addition to the base color.
 7. Use control wiring of colors different than power wiring or supplied with a trace of color in addition to the basic color of the insulation. Use the same color scheme throughout a given system for any control or signal wires performing the same function.
 8. Connect circuit conductors of the same color to the same phase throughout the installation. Viewing all equipment from the front, make connections so phase color sequence is in the same throughout the project.
- F. Install wires neatly in enclosures. Bend or form wires in neat runs from conduits to terminals. Arrange wires so that they may be grouped by conduit or function in the enclosure. Install cable ties and straps to support and bundle wires in enclosures. Arrange wires to allow wire tags and numbers to be easily read without bending or flexing wiring.
- G. Install grounding conductors in non-metallic raceways, and in flexible conduit connecting to mechanical equipment.
- H. Identify wires and cables according to Section 16050 “Basic Electrical Materials and Methods.”
1. At each connection, except at motors, tag for phase rotation.
 2. At each motor tag for winding lead numbers. Make all phase rotation changes for motor direction changes at the motor to maintain correct color phase sequence in equipment.

3.3 CONNECTIONS

- A. Use the proper high pressure compression tool for terminating indent type compression connectors or terminations on conductors of size #8 AWG or larger gauge. Use an approved pliers or tool for crimping connectors for conductors of size #10 AWG or smaller gauge.

- B. Make splices or bolted connections with filler, and tape that possess equivalent or better mechanical strength and insulation ratings than conductors being spliced. Insulate to same thickness as connectors being spliced or connected.
- C. Connect components to wiring and to ground as instructed by manufacturer, and in compliance with other Sections of Division 16.
- D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

***** END OF SECTION *****

SECTION 16130

RACEWAYS AND BOXES

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section shall consist of the Supplier providing electrical work as specified herein and as required for proper operation and/or monitoring/alarming functions related to the Biosolids Drying System.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
16050	Basic Electrical Materials and Methods
16120	Conductors and Cables

1.3 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
 - 1. Raceways include the following:
 - a. RMC.
 - b. PVC externally coated, rigid steel conduits.
 - c. LFMC.
 - 2. Boxes, enclosures, and cabinets include the following:
 - a. Device boxes.
 - b. Pull and junction boxes.
 - c. Cabinets and hinged-cover enclosures.

1.4 DEFINITIONS

- A. RMC
Rigid metallic conduit.
- B. LFMC
Liquidtight flexible metal conduit.

1.5 QUALITY ASSURANCE

A. LISTING AND LABELING

Provide raceways and boxes specified in this Section that are listed and labeled.

1. The Terms “Listed” and “Labeled:” As defined in NEC, Article 100.
2. Listing and Labeling Agency Qualifications: A “Nationally Recognized Testing Laboratory” as defined in OSHA Regulation 1910.7.

B. Comply with NECA’s “Standard of Installation.”

C. Comply with NEC.

1.6 COORDINATION

- ### **A. Coordinate layout and installation of raceways and boxes to ensure adequate headroom, working clearance, and access.**

PART 2 PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. RMC

1. Conduit: Hot dipped galvanized steel with threaded ends meeting ANSI C80.1.
2. Couplings: unsplit, NPT threaded steel cylinders with galvanizing equal to the conduit.
3. Nipples: same as conduit, factory made through eight inches, no running threads.

B. PLASTIC-COATED STEEL CONDUIT AND FITTINGS

NEMA RN 1.

C. LFMC

1. Conduit: flexible, galvanized steel convolutions forming a continuous raceway, covered by a liquid tight PVC layer. Electri-Flex Type LA or American Sealtite, Type UA.
2. Connectors: galvanized steel, screw in, grounding type with a ferrule which covers the end of the conduit inside and out.

D. FITTINGS

NEMA FB 1; compatible with conduit/tubing materials.

2.2 DEVICE BOXES

- A. Galvanized, cast iron alloy or cast aluminum box, one piece, with threaded holes or hubs, and with neoprene gaskets and galvanized cast iron alloy cover.

1. Surface mount boxes have integral mounting lugs.

2.3 PULL AND JUNCTION BOXES

A. DRY LOCATIONS

Stamped steel, deep drawn one piece (without welds or tab connections), galvanized, with knockouts for conduit or connector entrance, meeting NEMA OS 1. Boxes 6" x 6" x 4" or larger may be code gauge fabricated steel continuously welded at seams and painted after fabrication.

B. WET LOCATIONS

1. FRP plastic with gasketed screw-down cover.
2. Cast-Metal Boxes meeting NEMA FB 1, with gasketed screw down cover.
3. Boxes 6" x 6" x 4" or larger may be code gauge fabricated steel continuously welded at seams and hot-dipped galvanized after fabrication with floor seams and rubber gasketed covers.

2.4 MISCELLANEOUS FITTINGS

- A. Conduit bodies shall be cast or malleable iron, hot dipped galvanized. Covers shall be of the same material and finish as the fitting. Appleton, Crouse Hinds, OZ Gedney, or equal.
- B. Locknuts and conduit bushings shall be malleable iron. Appleton, Crouse Hinds, OZ Gedney, or equal
- C. Cord grip connectors shall be OZ Gedney CGA, or equal Appleton or Crouse Hinds.
- D. **EXTERNAL CABLE GRIP**

Woven wire mesh type made of high-strength galvanized or stainless steel wire strand and matched to cable diameter and with attachment provision designed for the corresponding connector.

PART 3 EXECUTION

3.1 WIRING METHODS

- A. Use the following wiring methods:
 - 1. Exposed raceway runs: RMC.
 - 2. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC. Do not use flexible conduit in place of elbows, offsets, or fittings to attach to equipment. See below for further requirements for the installation of raceway terminations and connections using flexible connections.

3.2 INSTALLATION

- A. Install raceways, boxes, enclosures, and cabinets according to manufacturer's written instructions.
- B. **MINIMUM RACEWAY SIZE**

1/2-inch trade size.
- C. Install rigid metal conduit unless other raceways are required by Code, or under these Specifications.

- D. Install conduit as a complete, continuous system without wires, mechanically secure and electrically connected to all metal boxes, fittings and equipment. Blank off all unused openings using factory made knockout seals.
- E. Install raceways in lines parallel or perpendicular to the equipment or structural members lines except where the structure is not level. Follow the surface contours of equipment as much as practical. Do not install crossovers or offsets that can be avoided by installing the raceway in a different sequence or a uniform line. Provide adequate headroom.
 - 1. Run parallel or banked raceways together, on common supports where practical.
 - 2. Make bends in parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- F. Keep raceways at least 6 inches away from parallel runs of heat sources operating at temperatures above 100 degrees F. Install horizontal raceway runs above water and steam piping.
- G. Support raceways as specified in Section 16050 “Basic Electrical Materials and Methods.”
 - 1. Provide anchors, hangers, supports, clamps, etc., to support the raceways from the structures in or on which they are installed. Do not space supports further apart than 10 feet.
 - 2. Provide sufficient clearance to allow conduit to be added to racks, hangers, etc., in the future.
 - 3. Support raceway within three feet of every outlet box, junction box, gutter, panel, fitting, etc.
- H. Bend and offset metal conduit with hickey or power bender, standard elbows, conduit fittings or pull boxes. Make elbows, offsets and bends uniform and symmetrical. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel.
- I. Support conduit connections to motors or other equipment independently of the motor or equipment. Rise or drop vertically to the nearest practicable point of connection to the unit. Run conduit on equipment frames or supports to closely follow the contours of the equipment.

Locate conduit to maintain access to all equipment services and adjustment points and so as not to interfere with operation of the equipment.

- J. Connect conduit to hubless enclosures, cabinets and boxes with double locknuts and with insulating type bushings. Use grounding type bushings where connecting to concentric or eccentric knockouts. Connect to enclosures, boxes and devices from below in wet areas. Make conduit connections to enclosures at the nearest practicable point of entry to the enclosure area where the devices are located to which the circuits contained in the conduit will connect.

K. RACEWAY TERMINATIONS AND CONNECTIONS

1. Join raceways with fittings designed and approved for the purpose and make joints tight.
2. Make threaded connections waterproof and rustproof by application of a watertight, conductive thread compound. Clean threads of cutting oil before applying thread compound.
3. PVC Externally Coated, Rigid Steel Conduits: Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduits.
4. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.
5. Cut ends of conduit square with hand or power saw or pipe cutter. Ream cut ends to remove burrs and sharp ends. Make conduit threads which are cut in the field to have same effective length and same thread dimensions and taper as specified for factory-cut threads.
6. Flexible Connections: Use maximum of 18 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for all motors. Install flexible conduit in a straight length. Do not use flexible conduit in place of elbows, offsets, or fittings to attach to fixed equipment. With the Engineer's approval, longer lengths of flexible conduit may be used for connection to items of equipment which requires longer lengths for installation and removal of the equipment for maintenance or replacement purposes. Use liquid-tight flexible metal conduit in

wet or damp locations. Do not strap flexible conduit to structures or other equipment.

7. Provide double locknuts and insulating bushings at conduit connections to boxes and cabinets. Align raceways to enter squarely and install locknuts with dished part against the box. Use grounding type bushings where connecting to concentric or eccentric knockouts. In “wet” areas, use locknuts of the sealing type or use Myers hubs.
 8. Connect conduits to enclosures at the location of the gutter or device to which the contained conductors will be routed. Route or stub conduits to motors and/or mechanical equipment directly to the connection and locate as close as possible to equipment terminals.
 9. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.
- L. Keep conduits clean and dry and close each end left exposed.
- M. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

***** END OF SECTION *****

SECTION 16910

PROGRAMMABLE AUTOMATION CONTROLLER HARDWARE, SOFTWARE AND PROGRAMMING

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section shall consist of the Supplier providing electrical work as specified herein and as required for proper operation and/or monitoring/alarming functions related to the Biosolids Drying System.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01300	Submittals
11000	Equipment General Provisions
Division 11	Equipment
16940	Control Panels

1.3 WARRANTY

The warranty shall be provided in accordance with Section 11000-1.6.

1.4 SUMMARY

- A. Section Includes:
1. Programmable automation controller (PAC) control system(s), including:
 - a. hardware, installation in control panels, factory testing, field testing, and training.
 2. PAC Programming to provide the required functionality for operation of the Biosolids Drying System.

1.5 REFERENCES

- A. REFERENCED STANDARDS
1. National Electrical Manufacturers Association (NEMA):
 - a. ICS 1, General Standards for Industrial Control and Systems.

- b. ICS 1.1, Safety Guidelines for the Application, Installation and Maintenance of Solid State Control.
 - c. ICS 4, Terminal Blocks for Industrial Use.
 - d. ICS 6, Enclosures for Industrial Controls and Systems.
 - e. Publication No.250, Enclosures for Electrical Equipment (1000 V maximum).
- 2. National Fire Protection Association (NFPA):
 - a. National Electric Code (NEC).

1.6 SYSTEM DESCRIPTION

A. DESIGN REQUIREMENTS

- 1. The PAC will provide the primary source of control for the Biosolids Drying System.
- 2. The system includes racks, central processing units (CPUs), input/output (I/O) modules, communication modules, power supplies, and associated accessory items to provide a complete and functional control system for the Biosolids Drying System.

B. PLC PROGRAMMING

- 1. Programming of the PLC shall be provided by the Supplier.

C. PERFORMANCE REQUIREMENTS

- 1. The installed system performs the functional and operational algorithms required for control of the process.

1.7 SUBMITTALS

A. See Section 01300.

B. PRODUCT DATA

- 1. Manufacturer's data sheets for each hardware component including specific model numbers for each device, and size of memory provided in each CPU.

2. Manufacturer's installation manual, operation and maintenance manual(s) for each component and/or device.

C. SHOP DRAWINGS

1. Drawings
 - a. System diagram showing the arrangement, connection and interconnection of PLC system components.
 - b. Wiring diagrams for the PLC equipment in each control enclosure showing devices, wiring internal to the center, terminal blocks, and distinguishing field wiring from wiring internal to the enclosure.
2. Schedule of system I/O including the following data:
 - a. I/O point, with name, tag number, and indication of type and the characteristics of the I/O signal.
3. Listing of spare parts provided with the system.

D. OPERATION AND MAINTENANCE MANUALS

1. See Section 01300.
2. Provide specific information including:
 - a. Manufacturer's published operation and maintenance manual, and troubleshooting guide.
 - b. Information for obtaining assistance and troubleshooting, parts ordering information, and field service personnel requests.
3. Include final system drawings, and final I/O lists.

1.8 QUALITY ASSURANCE

A. SHOP TESTING

1. The PAC hardware and interconnection wiring will be tested by the Supplier in conjunction with the control panel shop test specified in Section 16940.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the additional requirements of this section, provide products by one of the following manufacturers:
 - 1. Allen Bradley or approved equal.

2.2 COMPONENTS

- A. Provide all components and incidental materials and equipment required for a complete, functional, and successfully operating PAC system. These items include, but are not limited to:
 - 1. central processing units
 - 2. I/O modules
 - 3. communications modules
 - 4. power supplies
 - 5. chassis racks
 - 6. filters
 - 7. isolation transformers
 - 8. relays
 - 9. delay or suppression devices
 - 10. interconnecting devices
 - 11. uninterruptible power supply of sufficient size to power the PLC and associated I/O modules and accessories for five minutes
 - 12. other items ordinarily furnished as part of a complete system
- B. The PAC system shall be comprised of Allen Bradley ControLogix series or equivalent Square D central processing units, I/O modules, communications modules, and other components.
- C. Third party components that comprise a portion of the PAC system for Allen Bradley PAC systems shall be as manufactured by Allen Bradley Encompass Partners for compatibility with the ControLogix components.

2.3 ACCESSORIES

- A. Provide all accessories required for a complete PLC control system to accomplish the requirements of the process and the Specifications.
- B. Provide one copy of the PAC programming software. Programming software must be compatible with the computer operating system (see Section 16920 HMI Hardware and Software).

2.4 EXTRA MATERIALS

- A. Provide the following extra materials:
 - 1. Provide one spare processor module for each type of processor module furnished.
 - 2. Provide one spare I/O card for every 10 cards, or fraction thereof, of each type of card installed.
 - 3. Provide one spare power supply for each type of power supply furnished.
 - 4. Provide a list of the manufacturer's recommended spares for maintenance purposes. Include in the list any special tools and test equipment necessary or recommended by the manufacturer for the maintenance of the complete system. Provide any recommended spares not supplied above along with the recommended special tools and test equipment.
 - 5. Provide one spare chassis for each type of chassis furnished.

PART 3 EXECUTION

3.1 PLC PROGRAMMING

- A. Provide programming of the PAC control system to provide the required functionality and control of the Biosolids Drying System and associated components.

3.2 TESTING

- A. Test, verify and demonstrate access to and functionality of PAC system in accordance with Sections 11000, 11650, and 01800.

***** END OF SECTION *****

SECTION 16940

CONTROL PANELS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section shall consist of the Supplier providing electrical work as specified herein and as required for proper operation and/or monitoring/alarming functions related to the Biosolids Drying System.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<u>Section</u>	<u>Item</u>
01300	Submittals
11000	Equipment General Provisions
11650	Biosolids Drying System
16910	Programmable Logic Controller Hardware, Software and Programming

1.3 SUMMARY

- A. Control panels (whether provided under Division 16, or provided, or specified to be provided, with equipment specified under other Divisions).

1.4 REFERENCES

A. REFERENCED STANDARDS

1. National Electrical Manufacturers Association (NEMA):
 - a. ICS 1, General Standards for Industrial Control and Systems.
 - b. ICS 4, Terminal Blocks for Industrial Use.
 - c. ICS 6, Enclosures for Industrial Controls and Systems.
 - d. Publication No.250, Enclosures for Electrical Equipment (1,000 V maximum).

2. National Fire Protection Association (NFPA):
 - a. National Electric Code (NEC).
3. Joint Industrial Council
 - a. JIC-EMP-1.

1.5 SYSTEM DESCRIPTION

A. CONTROL PANELS

1. The system includes new control panels for control and/or monitoring of the process equipment. Control panels, whether provided under Division 16 or other Divisions, shall meet the requirements of this Section.

1.6 SUBMITTALS

A. SHOP DRAWINGS

1. See Section 01300 “Submittals.”
2. Dimensioned and to-scale panel layout drawings.
3. Materials of construction.
4. Drawings showing conduit and wiring access locations.
5. Elementary wiring diagrams and terminal block drawings, differentiating between panel and field wiring.
6. Bill of Materials including the reference name or number, quantity, complete English language description, manufacturer, model number, local supplier and wiring or piping reference.
7. Product Information: including manufacturer name, catalog descriptions, ratings, wiring and piping diagrams, dimensional drawings, anchoring details, installation instruction, and test results.
8. Loop diagrams with all components connected.
9. Nameplate text.

B. OPERATION AND MAINTENANCE MANUALS

1. See Section 01300 "Submittals."
2. Provide manufacturer's operating and maintenance manuals for each device or item provided.
3. Recommended spare parts stocking list.
4. Record Drawings of completed control panels.

1.7 QUALITY ASSURANCE

- A. Control panels supplied under this Section shall be provided by a single manufacturer.
- B. Provide control panels bearing the label of a recognized testing laboratory, or otherwise acceptable to the State of Washington Department of Labor and Industries.
- C. Panels shall be field tested. The Engineer and/or Owner shall be permitted to observe the field test. Notify the Engineer at least 1 week before testing.
 1. Provide a test plan at time of notification of testing. Coordinate the time of testing of the panels with the Construction Schedule.
 2. The entire assembled panel shall be meggered and tested to be free from grounds and shorts.
 3. Controllers, circuits and interlocks shall be rung out and tested to assure that they function correctly. Each device and control loop shall be tested and demonstrated to function properly in each mode (such as "hand," "local," "automatic"). Discrete input signals shall be tested in both the "on" and "off" state. Analog signals (4-20 milliamp, or similar type) shall each be tested at not less than three values (4.08 mA or 0.5 percent, 12 mA or 50 percent, and 19.92 mA or 99.5 percent). Test results shall be documented.
 4. Provide signal generators, multimeters, and other test equipment as required to verify proper operation of the assembled panel. Simulate input signals, both discrete and analog, to verify operation of control and monitoring circuits.

5. Correct, replace, or repair panel wiring, and/or components until testing demonstrates proper operation.
- D. Revise all drawings upon completion of the work to show “as constructed” status of the panel at time of project acceptance.

1.8 STORAGE AND HANDLING

- A. After completion of shop assembly and testing, enclose panels in heavy-duty polyethylene envelopes or secured sheeting to provide complete protection from dust and moisture. Place dehumidifiers inside the polyethylene covering.
- B. Skid-mount the equipment for final transport. Show shipping weight on shipping tags, together with instructions for unloading, transporting, storing, and handling on job site.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Control panel enclosures shall be factory UL labeled enclosures fabricated into a rigid, self-supporting structure. Panels shall be of NEMA type construction as required for the location indicated on the Drawings.
 1. Welded construction.
 2. Completely enclosed, self-supporting, and gasketed dust-tight.
 3. Seams and corners welded and ground smooth.
 4. Provide full length piano hinges rated for 1.5 times the weight of the door and door mounted instruments.
 5. Furnish doors with keyed alike locking handles and three point catch.
 6. Provide each floor mounted panel with lifting eyebolts and stainless steel base channels.
 7. Provide slotted bolt holes in the base, 1-1/2-inches long for field adjustment.

B. HINGES

Stainless steel.

C. NAMEPLATES

Phenolic.

2.2 COMPONENTS

A. FUSES

1. Control power fuses are FRN for ratings above ten amperes and FNQ for ten amperes and below. FRN fuses are mounted in phenolic blocks with a fuse puller mounted adjacent to them. FNQ fuses are mounted in a buss HPC fuseholder. Label all fuseholders with fuse identification number and fuse size and type. Provide three spare fuses of each type and size in each panel. Provide box mounted on panel interior marked "SPARE FUSES" to hold the spares.

B. PILOT DEVICES (CONTROL UNITS AND STATIONS)

Heavy duty, oil-tight type per NEMA ICS-1; pilot lights push-to-test transformer type.

1. Allen-Bradley
2. Furnas
3. General Electric
4. Square D

C. RELAYS

1. Control relays for switching 120 Vac power circuits or motor starting circuits shall be electro-mechanical machine tool, heavy-duty type per NEMA ICS Standard with 120 volt coils and double-break contacts rated B-300 by NEMA standards: Allen-Bradley 700 N, General Electric CR 120, Gould-ITE J10, Square D Company Class 8501, Type G or equal, Cutler-Hammer. Equip relays with surge suppressers. IEC rated relays are not permitted.
2. Control relays for logic control circuits shall be permitted to be enclosed octal or 11 pin socket mounted type relays. Coils shall be rated 120 Vac or 24 VDC (as required). Contacts shall be double

break type rated B300 by NEMA standards. Potter-Brumfield, or equal.

3. Time delay relays shall be pneumatic type Agastat 7000 Series.

D. TERMINALS

1. Phenolic barrier type strip screw terminals for power circuits. Marathon, or equal.
2. Rail mounted, thermoplastic or thermoset insulating frame, compression clamp style terminal blocks for control and instrumentation circuits. Entrelec, or equal. Provide all accessories such as jumper bar, end stops, end sections needed for a complete and functional system of terminal blocks.

- E. Power supplies for DC voltage applications shall be 120 Vac input, 24 VDC output.

- F. Uninterruptible Power Supplies shall be APC Back-UPS 500 VA (minimum), or equal.

G. WIREWAYS

1. Wireways are a minimum of one inch wide and three inches deep with removable snap-on covers and perforated walls for easy wire entrance. Wireways shall be constructed of non-metallic materials with a voltage insulation in excess of the maximum voltage carried therein. Wireways shall be Panduit type G, Panel Channel or equal.

H. NAMEPLATES

1. Nameplates shall be of rigid phenolic plastic laminate with engraved lettering or engraved metal plate with filled lettering. Use black background with white lettering.

2.3 ACCESSORIES

A. PANEL NAMEPLATES AND IDENTIFICATION

1. Identify each item on the control panel with rectangular nameplates.

2. Provide nameplates of rigid phenolic plastic laminate with engraved lettering or engraved metal plate with filled lettering. Use black background with white lettering.
3. Minimum letter height is 1/2 inch for instrument description and 1/4-inch height for instrument tag number.
4. Provide each panel with a 2" by 10" (minimum) main nameplate with 1 inch high lettering with panel identification.
5. Abbreviations are not permitted unless approved by the Engineer or specifically shown on the nameplates, schedules, or Drawings.
6. Install nameplates plumb and parallel to the lines of doors or structure to which they are attached. Attach to the sheet metal structure by a thin coat of adhesive and sheet metal screws. Make adhesive and screw application in a manner to avoid buckling or distorting nameplates due to use of excessive adhesive or over tightening of screws.

2.4 SOURCE QUALITY CONTROL

A. TESTING

1. The entire assembled panel shall be meggered and tested to be free from grounds and shorts.
2. Controllers, circuits and interlocks shall be rung out and tested to assure that they function correctly before the panel is shipped.
3. Revise all drawings upon completion of the work to show "as shipped" condition of the panel.

PART 3 EXECUTION

3.1 DESIGN

- A. Design of the control panel is the responsibility of the Dryer Equipment manufacturer. The control panel design shall comply with other requirements of this Specification Section.

3.2 FABRICATION

A. GENERAL

1. Control panels shall be factory or shop fabricated units completely assembled, wired and tested before shipment to the job site.
2. Panel construction, in general, shall meet JIC EMP-1 standards and applicable NEMA and IEEE standards.
3. The panels shall be constructed in accordance with electrical testing laboratory standards and shall be so labeled (the standards of a recognized electrical testing laboratory).
4. Size panels for the enclosed equipment and the available space for mounting of the panel, but not smaller than as shown on the Contract Documents.
5. Panels shall be descaled, cleaned and primed in preparation for painting. Painting shall consist of one coat of flat white enamel in the interior and two coats of hard finish exterior enamel, gray in color for the exterior. Paint shall be suitable for field touch-up. Spare paint (one quart) shall be provided for touch-up purposes.

B. COMPONENT INSTALLATION

1. Minimize welding to panel fronts and avoid distortion of panel metal.
2. Reinforce around areas of the enclosure weakened by openings or mounting of heavy equipment/components.
3. Accurately and cleanly cut or nibble cut-outs, and finish free of sharp edges or burrs. Make cutouts plumb, level, and on-line vertically or horizontally within 1/32 of an inch where components are in rows or columns.
4. Provide minimum 1-5/8 inches spacing between horizontal rows of externally mounted components; 1-1/2 inches minimum between vertical columns of components.
5. The distance from the bottom row of components to the floor shall be not less than 36 inches, unless specifically shown as less. In general, all indicating lights, pushbuttons, and similar control

devices, shall be mounted in accordance with the sequence of operation from left to right and top to bottom.

6. Provide minimum 1/4-inch spacing between components mounted on the panel sub-plate, Provide minimum spacing between the component and the wire duct of 1-1/2 inches above and one inch below. Provide additional space if required to access terminals, adjusting screws, and similar items.
7. Components mounted in the interior shall be fastened to an interior subpanel using machine screws plus adhesive to insure vibration-free attachment.
8. Interior component mounting and wiring shall be grouped as much as possible by function and then by component type. Interiors shall be so arranged that control relays, terminal blocks, fuses, etc., can be replaced or added without disturbing adjacent components.

C. PANEL WIRING

1. Line voltage (120 volt or higher) wiring in panels shall be Class C stranded copper conductor with Type MTW or SIS insulation. Color coding of insulation shall be black for power, white for 120V neutrals, red for AC controls which derive their source from within the panel, yellow for AC controls which derive their source external to the panel, blue for low voltage DC controls, green for grounding conductors.
2. Instrumentation wiring for DC analog circuits shall be stranded #18 AWG, minimum size copper conductor with conductor insulation of thermoplastic with foil or stranded wire shielding and overall gray PVC jacket.
3. Shop or factory wire panels to identified terminal blocks equipped with screw type lugs.
4. Provide raceways for panel wiring.
 - a. Size raceways per the requirements of NEC.
 - b. Provide panel wireways between each row of components, and adjacent to each terminal strip.
 - c. Wireways shall be a minimum of one inch wide and three inches deep with removable snap-on covers and perforated

walls for easy wire entrance. Wireways shall be constructed of non-metallic materials with a voltage insulation in excess of the maximum voltage carried therein. Panduit type LG, Panel Channel or equal

5. Provide wire bending space per NEMA ICS 6.
6. Label wiring within the panel with wire numbers and run in wiring duct neatly tied and bundled with tie wraps or similar materials. Identify each wire termination, including all jumpers, with permanently marked, heat shrink type wire markers. Arrange wire labels to permit reading of identification when installed. Apply heat per manufacturer's instructions to create a tight fit of the label to the wire.
7. Connect wiring internal to the panel to the "inside" of the terminal strip. Connect field wiring to the "outside" of the terminal strip. Wires to enclosure door mounted components are considered as internal wires. Connect no more than two wires to any one control terminal point. Provide terminal jumpers where more than two wires terminate at the same point.
8. Arrange wiring inside the panel to separate low voltage control signals of the milliamp-millivolt or other low energy type from inductive power circuits.
9. Connect grounds and shields of circuits which derive power internal to the panel to a panel common ground bus which shall be grounded by the electrical contractor in the field.
10. Physically separate signals entering controllers for amplification as control outputs from all line voltage wiring and shield with continuous foil shielding or enclose them in metal raceway.
11. Provide necessary power supplies for control equipment.
12. Termination requirements:
 - a. Terminate panel wiring on device or terminal block screw terminals using stripped and tinned conductor ends. Stranded conductors shall not be terminated bare to terminals or devices.
 - b. Provide terminal strips for the termination of panel wiring not directly connected to panel mounted devices.

- c. Terminals shall facilitate wire sizes as follows:
 - i. AC voltage applications: Wire size 12 AWG and smaller.
 - ii. Other: Wire size 14 AWG and smaller.
- d. Label each I/O terminal to indicate tag number of the conductor and connected device. Locate terminals for termination of multiconductor shielded cables adjacent to each other to minimize lengths of unshielded conductor at the terminations.
- e. Provide terminals for individual termination of each signal shield. Locate the terminal adjacent to the terminals for the signal conductors.
- f. Provide 20 percent excess terminals for future expansion.
- g. In general, mount terminal strips on the bottom horizontal edge of the sub-plate. Mount additional terminal strips, if required, on a thirty degree angle bracket at the bottom of the sub-plate. Where terminal strips are mounted side-by-side, elevate one set of terminals 1-1/2 inches above the sub-plate to allow wire to pass underneath.
- h. Provide a minimum of two inches between terminal strips and wireways or between terminal strips.
- i. Shielded cables used for analog signals shall be terminated with not greater than 1-1/2 inch of conductor left outside the shield. This applies to field wires entering the panel for termination, and to panel conductors. Conductor twist shall be maintained over the unshielded length to as close as possible to the point of termination. Where the overall jacket is cut back to expose the individual conductors, provide a heat shrink sleeve over the jacket, the signal, and the shield (drain) conductors. Insulate the shield (drain) conductor where not covered by the jacket or the sleeve. Where shield (drain) conductors are not terminated, cut the conductor even with the jacket so that it is covered by the sleeve to prevent inadvertant contact with other devices, terminals, or conductors in the panel.

D. PANEL LIGHTING AND POWER

1. Provide at least one convenience electrical outlet in panels 30-inches wide and larger, and in panels with PLC processors.
2. Provide one LED light fixture with switch in panels 30-inches wide and larger.

***** END OF SECTION *****

SUBJECT: Elm Street Sidewalks - Construction Contract Award

CATEGORY: Consent

BUDGET IMPACT:

Expenditure Required: XXXXXX

Within Budget Allocation: Yes

ATTACHMENTS:

STAFF CONTACT: Courtney Littrell, Engineering Specialist

SUMMARY BACKGROUND:

The Elm St Sidewalks project consists of a new sidewalk segment that will extend the existing sidewalk along the north side of Elm St that currently ends just west of Wright Ave, and continue the sidewalk to Bonney Ave, allowing for better and safer access to Seibenthaller Park. The project will also include the installation of a flashing beacon at the crosswalk leading to the park at the intersection of Bonney Ave and Elm St, along with the construction of curb and gutter and curb ramps on the north side of Elm St.

NUMBER (#) bids were received on June 4,2024 for this project. The lowest responsible bidder was submitted by CONTRACTOR, with a bid amount of \$XXXXXXXX. The engineer's estimate was \$291,209.10.

The contractor will have one hundred (100) working days to complete the project.

COUNCIL COMMITTEE/STUDY SESSION: Public Works Committee

MEETING/STUDY SESSION DATE: 6/4/2024

COMMITTEE RECOMMENDATION: Do Pass

STAFF RECOMMENDATIONS/MOTION:

A motion authorizing the Mayor and City Administrator to execute all necessary contract documents with CONTRACTOR, in an amount not-to-exceed \$XXX for the Elm St Sidewalks Project (CIP23-02), substantially in a form approved by the City Attorney.

SUBJECT: Cemetery Maintenance Facility - PSE Easement

CATEGORY: Consent

BUDGET IMPACT:

Expenditure Required: None

Within Budget Allocation: N/A

ATTACHMENTS:

1. RW-134727 City of Sumner 105103219 UG elec
 2. EASEMENT LOCATION 105103219_Sumner Cemetery(Approved_2023.10.30_NL)
-

STAFF CONTACT: Drew McCarty, Engineering Specialist

SUMMARY BACKGROUND:

In order to construct the Cemetery Maintenance Facility project, an easement is needed for Puget Sound Energy to place Hand Hole near the SW corner of the existing cemetery building to get power to the new facility.

COUNCIL COMMITTEE/STUDY SESSION: PW Committee

MEETING/STUDY SESSION DATE: 6/4/2024
--

COMMITTEE RECOMMENDATION: Do Pass

STAFF RECOMMENDATIONS/MOTION:

A motion authorizing the Mayor to execute any and all necessary easement documents with Puget Sound Energy, as part of the Cemetery Maintenance Facility project (CIP 22-03) substantially in a form approved by the City Attorney and ratify and confirm any and all prior acts consistent with this approval.

Puget Sound Energy, Inc.
Attn: ROW Department
3130 S. 38th Street
Tacoma, WA 98409
MLT



EASEMENT

REFERENCE #:
GRANTOR (Owner): **SUMNER, CITY OF**
GRANTEE (PSE): **PUGET SOUND ENERGY, INC.**
SHORT LEGAL: **PTN SE ¼ SW ¼ 23-20N-04E**
ASSESSOR'S PROPERTY TAX PARCEL: **042023-3-047**

For and in consideration of good and valuable consideration, the receipt and sufficiency of which are acknowledged, **CITY OF SUMNER**, a municipal corporation ("Grantor" herein), hereby grants and conveys to **PUGET SOUND ENERGY, INC.**, a Washington corporation ("PSE" herein), for the purposes described below, a nonexclusive perpetual easement over, under, along across and through the following described real property (the "Property" herein) in **PIERCE** County, Washington:

BEGINNING 2012.5 FEET SOUTH AND 1145.57 FEET WEST OF THE NORTHEAST CORNER OF THE WOOLERY DONATION LAND CLAIM; THENCE WEST 903.1 FEET; THENCE NORTH 241.17 FEET; THENCE EAST 903.1 FEET; THENCE SOUTH 241.17 FEET TO THE POINT OF BEGINNING, LESS THE EAST 15 FEET. ALL LOCATED IN THE SOUTHWEST QUARTER OF SECTION 23, TOWNSHIP 20 NORTH, RANGE 4 EAST OF THE W.M., CITY OF SUMNER, COUNTY OF PIERCE, STATE OF WASHINGTON.

Except as may be otherwise set forth herein PSE's rights shall be exercised upon that portion of the Property ("Easement Area" herein) described as follows:

AN EASEMENT AREA THAT IS TEN (10) FEET IN WIDTH HAVING FIVE (5) FEET OF SUCH WIDTH ON EACH SIDE OF THE CENTERLINE OF GRANTEE'S FACILITIES LOCATED AS CONSTRUCTED OR TO BE CONSTRUCTED, EXTENDED OR RELOCATED, LYING WITHIN THE EAST 15 FEET OF THE ABOVE DESCRIBED REAL PROPERTY.

EXCEPT THOSE PORTIONS OF THE PROPERTY OCCUPIED BY EXISTING BUILDING FOOTINGS, FOUNDATIONS AND/OR SUBSURFACE STRUCTURES.

1. Purpose. PSE shall have the right to use the Easement Area to construct, operate, maintain, repair, replace, improve, remove, upgrade and extend one or more utility systems for the purposes of transmission, distribution and sale of electricity. Such systems may include:

Underground facilities. Conduits, lines, cables, vaults, switches and transformers for electricity; fiber optic cable and other lines, cables and facilities for communications; semi-buried or ground-mounted facilities and pads, manholes, meters, fixtures, attachments and any and all other facilities or appurtenances necessary or convenient to any or all of the foregoing.

Following the initial construction of all or a portion of its systems, PSE may, from time to time, construct such additional facilities as it may require for such systems.

2. Access. PSE shall have a reasonable right of access to the Easement Area over and across the Property to enable PSE to exercise its rights granted in this easement.

3. Restoration. After the exercise of any rights by PSE under this Easement, PSE shall, to the extent reasonably practicable, restore landscaping and surfaces and portions of the Property affected by PSE's work to the condition existing immediately prior to such work. PSE shall use good faith efforts to perform its restoration obligations under this paragraph as soon as reasonably possible after the completion of PSE's work. This clause is not applicable to any work performed at the request of the Owner or its contractor.

4. Easement Area Clearing and Maintenance. PSE shall have the right to cut, remove and dispose of any and all brush, trees or other vegetation in the Easement Area. PSE shall also have the right to control, on a continuing basis and by any prudent and reasonable means, the establishment and growth of brush, trees or other vegetation in the Easement Area.

5. Owner's Use of Easement Area. Owner reserves the right to use the Easement Area for any purpose not inconsistent with the rights herein granted, provided, however, Owner shall not perform the following activities without PSE's prior written consent: (1) excavate within or otherwise change the grade of the Easement Area; (2) construct or maintain any buildings, structures or other objects on the Easement Area; and/or (3) conduct any blasting within 300 feet of PSE's facilities.

6. Indemnity. PSE agrees to indemnify Owner from and against liability incurred by Owner as a result of PSE's negligence, or the negligence of PSE's employees, agents or contractors in the exercise of the rights herein granted to PSE, but nothing herein shall require PSE to indemnify Owner for that portion of any such liability attributable to the negligence of Owner, its employees, agents or contractors or the negligence of third parties.

7. Attorneys' Fees. The prevailing party in any lawsuit brought to enforce or interpret the terms of this Easement shall be entitled to recover its reasonable attorneys' fees and costs incurred in said suit, including on appeal.

8. Successors and Assigns. This Easement is binding upon and will inure to the benefit of the successors and permitted assigns of the parties. PSE may not assign or otherwise transfer any of its rights, obligations or interest under this Easement without the prior written consent of Owner, which consent may not be unreasonably withheld. Notwithstanding the foregoing, PSE may assign this Easement to an affiliate or in connection with a merger, acquisition, corporate reorganization, sale of assets or other change in control.

9. Complete Agreement; Amendment; Counterparts. This Easement contains the entire agreement of the parties with respect to this subject matter and supersedes all prior writings or discussions relating to the Easement. This Easement may not be amended except by a written document executed by the authorized representatives of Owner and PSE. This Easement may be executed in counterparts, each of which shall be treated as an original for all purposes and all executed counterparts shall constitute one agreement.

10. Warranty and Representation of Authority. The parties each represent to the other that the person or persons executing this Easement have authority to do so and to bind the parties hereunder. All consents, permissions and approvals related to this Easement, and the obligations hereunder, have been obtained. Owner further warrants to PSE that it has the necessary right, title and interests in the Property to grant the easement rights set forth herein.

11. Severability. Invalidation of any of the provisions contained in this Easement, or of the application thereof to any person, by judgment or court order, shall in no way affect any of the other provisions thereof or the application thereof to any other person and the same shall remain in full force and effect. If a provision is found to be unenforceable or invalid, that provision shall be modified or partially enforced to the maximum extent permitted by law to effectuate the purpose of this agreement.

12. Non-Waiver. The failure of any party to insist upon strict performance of any of the terms, covenants or conditions hereof shall not be deemed a waiver of any rights or remedies which that party may have hereunder or at law or equity and shall not be deemed a waiver of any subsequent breach or default in any of such terms, covenants or conditions.

DATED this _____ day of _____, 2024.

GRANTOR: **CITY OF SUMNER**, a municipal corporation

BY: _____

TITLE: _____

STATE OF WASHINGTON)
) ss
COUNTY OF _____)

On this _____ day of _____, 2024, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ (Name), to me known to be the person who signed as _____ (Title), of the **CITY OF SUMNER**, a municipal corporation, the municipal corporation that executed the within and foregoing instrument, and acknowledged said instrument to be his/her free and voluntary act and deed and the free and voluntary act and deed of the **CITY OF SUMNER**, for the uses and purposes therein mentioned; and on oath stated that he/she was authorized to execute the said instrument on behalf of said municipal corporation.

IN WITNESS WHEREOF I have hereunto set my hand and official seal the day and year first above written.

(Signature of Notary)

(Print or stamp name of Notary)
NOTARY PUBLIC in and for the State of
Washington, residing at _____
My Appointment Expires: _____



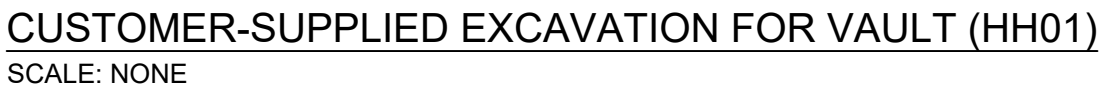
Foreman to redline field changes

Installed at site:	P01
Grid Number:	568643-156195
Bank Configuration:	
☐ WYE/WYE ☐ WYE/DELTA ☐ OPEN WYE/OPEN DELTA ☐ WYE/WYE 120/208v W/1Ø 120/240v	
Secondary Voltage:	
☐ 120/208v ☒ 277/480v ☐ 120/208v W/120/240v 1Ø ☐ 120/240v ☐ 240/480v	
AØ Xfmr MID #	6209200 kVA 37.5
BØ Xfmr MID #	6209200 kVA 37.5
CØ Xfmr MID #	6209200 kVA 37.5
Foreman to redline the following information	
AØ Xfmr Company ID#:	
BØ Xfmr Company ID#:	
CØ Xfmr Company ID#:	
Tested Secondary Voltage	/

NOTE: The foreman should record one phase-to-neutral and one phase-to-phase voltage. If the bank is a combination 120/208V with single phase 120/240V, record the tested voltage of the 240V connection in addition to the voltage of the 120/208 transformer connections.



SCALE: NONE



THE CUSTOMER IS RESPONSIBLE FOR PROVIDING ALL TRENCHING, SELECT BACKFILL, COMPACTION & RESTORATION PER PUGET SOUND ENERGY STANDARDS 6750.6500

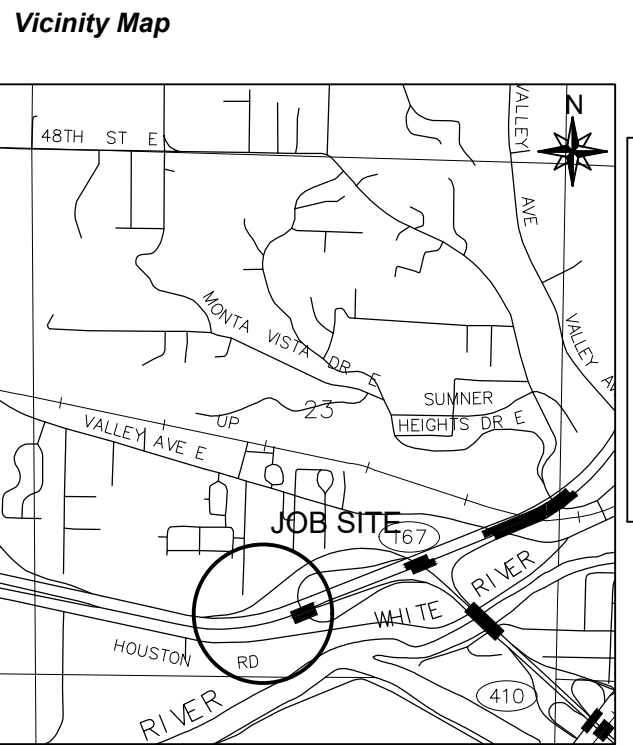
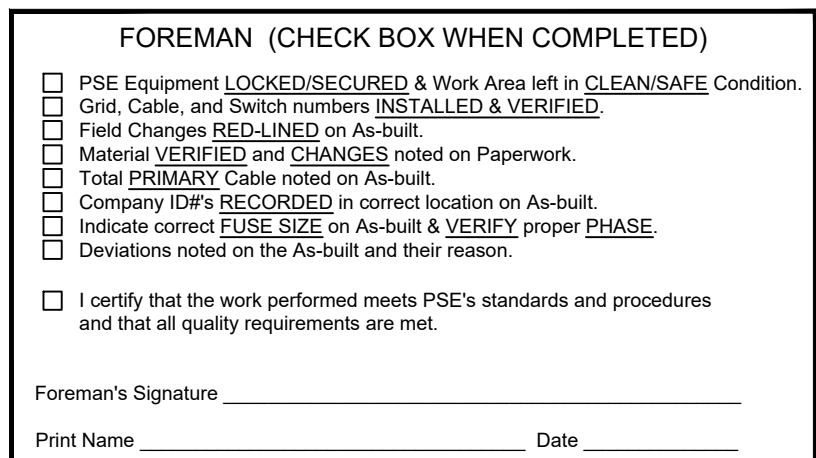
- REQUIRED TO PROVIDE 6' X 6' WORK PIT WITH 6" OF COMPACTED BEDDING OF 5/8" MINUS CRUSH ROCK AT HH01
- REQUIRED TO PROVIDE 4' X 4' WORK PIT AT P01
- REQUIRED TO FOLLOW ALL TRENCH DETAILS ON SELECT BACKFILL
- REQUIRED TO PROVIDE EQUIPMENT TO PUMP OUT WATER FOR WORK PITS & TRENCH AT ALL TIMES
- EXCAVATE & EXPOSE EXISTING PSE UG FACILITIES 48 HOURS PRIOR TO CONSTRUCTION
- PSE INSPECTION IS REQUIRED PRIOR TO FINAL BACKFILL
- PSE WILL NOT ENERGIZE FACILITIES UNTIL BACKFILL IS COMPLETE
- CUSTOMER IS REQUIRED MAINTAIN 5' OF CLEARANCE FROM SEPTIC TANKS TO PSE OWNED FACILITIES
- CUSTOMER IS REQUIRED TO MAINTAIN 10' OF CLEARANCE FROM SEPTIC DRAIN FIELDS TO TRANSFORMER, PRIMARY CABLE, AND SERVICE CABLES
- L&I INSPECTION & APPROVAL IS REQUIRED PRIOR TO SCHEDULING
- RESPONSIBLE FOR ALL TREE TRIMMING AND BRUSH CLEARING



1. All materials to be installed in accordance with Puget Sound Energy's (PSE) standards. Any deviation from this work sketch must be AUTHORIZED by PSE's Project Manager and NOTED on the Foreman's Copy.
2. All switching arrangements and/or outage arrangements are to be made with the Project Manager at least three (3) working days in advance.
3. Contact the Utilities Underground Location Center (1-800-424-5555) at least 48 hours prior to commencing work to get the underground facilities located.
4. STAKING: The customer will provide all staking (transformer, handhole, trench, grade, lot, pole, sidewalk, etc.). See sketch and details for locations. Equipment locations must be approved by the Project Manager.
5. SITE PREPARATION: The work area will be at or near finished grade, clear of trench spoils or construction materials which would restrict construction and/or equipment access, before work can begin.
6. Roads shall be paved or have a compacted , crushed rock base in place.
7. CLEARANCES: Transformers require a minimum of 6 feet from fire fighting equipment, 10 feet from combustible walls, overhangs, doors, and windows, and a minimum of 5 feet from the back of curb (or guard posts will be required per PSE standards). All conduits and vaults are to be at least 5 feet away from water, storm and sewer lines when paralleling them in the right of way, and at least 1 foot when crossing them.
8. All work is to be done in accordance with local municipal and county permit requirements as applicable.
9. Customer/Developer is responsible to provide, install and maintain all secondary service cables, conduits and crossings from the individual unit's meter base to the designated connection point.
10. Inclement weather conditions may cause delays in construction times and dates.
11. EXCAVATION: The customer is to provide all trenching, backfill, vault excavations, compaction and restoration per this sketch and per PSE standards. A minimum protective cover of 36" is required over PSE's primary voltage equipment and 24" is required of PSE's secondary voltage equipment. The customer will provide any and all shoring or they will side slope the trench to 1:1.

CIRCUIT LOADING TABLE			
Circuit:	SMR-26	Customer 3Ø Load:	11
As Of:	2019	Power Factor:	.85
		Phase to Phase Voltage:	12500
	A Phase	B Phase	C Phase
Existing Peak Load:	227.0	230.0	229.0
Estimated New Load:	0.6	0.6	0.6
Total:	227.6	230.6	229.6

EROSION & SEDIMENT CONTROL SHALL BE PER PSE STANDARD PRACTICE - F. 050.3200 TECHNIQUES FOR TEMPORARY EROSION & SEDIMENT CONTROL & ANY ADDITIONAL LOCAL JURISDICTION REQUIREMENTS. (LOCAL JURISDICTIONS MAY HAVE ADDITIONAL REQUIREMENTS INCLUDING NOTES DETAILING WHERE EROSION OR SEDIMENT CONTROL STRUCTURES ARE TO BE INSTALLED, CROSS SECTION DETAILS OF THE TYPICAL EROSION STRUCTURES, & SPECIAL REQUIREMENTS FOR WORK IN SENSITIVE AREAS.)



Owner / Developer Contact Info

CITY OF SUMNER - ALISA O'HAVER-AYALA
6108 124TH AVE CT E
PUYALLUP, WA 98372
ATTN: DREW MCCARTY 253-299-5719

For contacts below dial 1-888-CALL PSE (225-5773)

Project Manager Contact Information:

Manager: Luanne Yu
Cell Phone: 253.841.6553
E-Mail: Luanne.Yu@pse.com

PSE Locates Required	YES
Customer Locates Required	YES
Outages Required	YES
Flagging Required	NO

3						FUNCTION	CONTACT	PHONE NO	DATE
2						PROJECT MGR	Luanne.Yu	253.841.6553	07/25/23
1						ENGR - POWER	D. TEA	N/A	07/25/23
REV#	DATE	BY	DESCRIPTION			ENGR - GAS	N/A	N/A	N/A
COUNTY		Emer Sec	Gas Wk Ctr		POWER WK CTR	DRAWN BY	D. TEA	N/A	07/25/23
PIERCE		N/A	N/A		OSWPRE	CHECKED BY	D. RICKETT	N/A	08/04/23
1/4 SEC		OP MAP			PLAT MAP	APPROVED BY	<i>Nota Lemke</i>	(253) 970-7284	10/30/23
SW-23-20N-04E		N/A			N/A	FOREMAN #1			
U-MAP NO (POWER)		OH CKT MAP	UG CKT MAP		CIRCUIT NO	FOREMAN #2			
2004E091		2004E104	2004E091		SMR-26	MAPPING			

JOINT FACILITIES ARRANGEMENTS				
UTILITIES	N/A	N/A	N/A	N/A
CONTACT	N/A	N/A	N/A	N/A
PHONE#	N/A	N/A	N/A	N/A



SUMNER CEMETERY FACILITY
COMMERCIAL UPGRADE OH 3PH XFRM BANK & HH
6108 124TH AVE CT E, PUYALLUP, WA 98372

INCIDENT N/A	MAOP N/A
Gas Order N/A	Elect Order 105103219
SCALE	PAGE





SUBJECT: Water Rights Appraisal - Regional Water and Sonoco

CATEGORY: Information Only

BUDGET IMPACT:

Expenditure Required: None

Within Budget Allocation: N/A

ATTACHMENTS:

STAFF CONTACT: Ryan Johnstone, Public Works Deputy Director - Operations

SUMMARY BACKGROUND:

COUNCIL COMMITTEE/STUDY SESSION:

MEETING/STUDY SESSION DATE:

COMMITTEE RECOMMENDATION:

STAFF RECOMMENDATIONS/MOTION:



Monthly Project Management Report

June 2024

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Major Projects

Project: Stewart Road Bridge Replacement (13-08)		Project Manager: Drew McCarty	Budget: \$33,500,000
Finance: \$7,000,000 NHFP Grant, \$6,000,000 TIB Grant, \$2,800,000 Congressional Appropriation, \$6,833,959 STP Grant, \$187,074 City of Sumner, \$4,260,000 Pierce County, \$50,000 Tarragon, \$3,000,000 FMSIB, \$50,000 Port of Tacoma, \$150,000 City of Auburn			
Description: This project will replace the existing two lane bridge over the White River at Stewart Road. The existing bridge will be removed. The new bridge will accommodate four lanes of traffic, and a separated shared use path on the north side of the roadway. Adjacent intersections at Butte Avenue and 140th Street Court East will be modified to accommodate the new roadway grade and lane configurations.			
Schedule/Milestones: ☒ Selection of Design Consultant (10/13) ☒ Design Consultant Contract Award (12/13) ☒ ROW Environmental Review Completed (11/16) ☒ Start Final Design (2/21) ☐ ROW Acquisitions Complete (6/24) ☒ Design Complete (9/23) ☐ Construction Contract Award (9/24) ☐ Construction Complete (12/26)		Status: 6/2024 - Currently working through the PSE easement with pierce county and to include letter from Puyallup Tribes. 5/2024 - Currently working through the PSE easement with pierce county and to include letter from Puyallup Tribes. 04/2024 - Removal of the Luminaire on the existing NW quadrant mast arm at the 140th St/Stewart Rd intersection. Work was pending to be completed after storm season. This has been completed. 1/2023 - Currently working through the PSE easement with pierce county. 12/2023 - 4 ROW easement agreements have been worked through with pierce county and will be going to PW committee for approval and then to council for approval. Currently working through the PSE easement with pierce county. 11/2023 - Working on removal of the Luminaire on the existing NW quadrant mast arm at the 140th St/Stewart Rd intersection. Work to be completed after storm season (tentatively planning for early March). Construction Obligation Paperwork in process to be sent to WSDOT for approval once ROW is completed. 100% plans at City for review, acquiring Right of Way and permitting, and coordinating utility relocations City is Reviewing 90% Design Plans Final Design Kickoff completed, Value Engineering Effort Underway. BergerABAM is completing the environmental design and right of way acquisitions. Project is in formal ESA consultations since 2/2019. Project awarded new grants (City of Auburn \$150,000)(Federal STP funds \$4,920,000, construction phase; Port of Tacoma, \$50,000, design phase) Pacific has received full funding for the design, ROW and construction of their adjacent project. The right of way services are now under contract. BergerABAM is beginning the preliminary work to engage the property owners. The Scope and Budget for Right of Way services has been received and will go to the 6/19 Council Meeting. The City is currently working with BergerABAM on the Scope & Fee for Right of Way services. The City is working with WSDOT and PSRC to finalize a process that will allow the right of way to proceed concurrent with the environmental studies of the White River currently being undertaken.	
Next Critical Activities (dates): Right-of-Way Acquisition (ongoing)			
Next Council Actions (dates): Right-of-Way Acquisition (ongoing)			
Next Public Actions (dates):			

Project: East Sumner Neighborhood Stormwater Ponds – Phase II (13-10)		Project Manager: Michael Kosa	Budget: \$2,000,000
Description: Complete the design and construction of a regional stormwater pond and relocation of Salmon Creek on City properties located near Sumner Tapps Hwy, between 64 th St E and 60 th St E.			
Schedule/Milestones: ■ Design Consultant Contract Award (09/13) ■ Design Complete (07/15) ■ Construction Contract Award (08/15) ■ Construction Complete (12/19) ■ Complete Plant Establishments (01/22)		Status: Project in Closeout. Project in plant establishment period. Project 90% constructed. 60th reopened to traffic, there are no other major traffic impacts planned during project. Work restarted July 2019. The culvert has been delivered to the site. 60th Street may be closed for culvert installation, depending on contractor availability. Corps permit secured, contractor beginning project restart. The City is currently waiting on permit approval from the Army Corps of Engineers. Permit meeting occurred on site and an ESA consultation is pending. The contractor is currently on winter shutdown. Contractor to start work mid September. Plantings at the mitigation site are 100% complete. Contractor to provide construction schedule for Mitigation Pond the week of 8/8/16. Contract has been suspended until further notice.	
Next Critical Activities (dates):			
Next Council Actions (dates): Project Acceptance			
Next Public Actions (dates):			

Project: 166 th Ave E Widening (13-11)		Project Manager: Michael Kosa	Budget: \$16 Million (15% funded)
Finance: Port of Tacoma \$25,000, \$950,000 City (TIF & Storm), \$1,219,650 (Federal – STP), \$500,000 State Leg Appropriation			
Description: Construct Improvements to 166 th Ave E to decrease congestion and improve safety at 64 th St E and at SR 410 westbound ramps			
Schedule/Milestones: ■ Consultant Award (12/18) ■ Intersection Control Evaluation (6/20) ■ Concept Report Complete (07/20) ■ WSDOT Preliminary Design Approval (1/23) ☐ Complete Fish Passage Culvert Design/Permitting (12/24) ☐ Design/ROW Complete (2/27) ☐ Construction Complete (12/29)		Status: Design Development underway for preliminary roadway and culvert/creek design, environmental reports at Federal Services for ESA Review Updated scope in progress. Concept report approved. Project will contact adjacent property owners, then publicize the findings. Concept Report (Intersection Control Evaluation) being reviewed at WSDOT.	
Next Critical Activities (dates): Complete Fish Passage Culvert Design/Permitting (2/27)			
Next Council Actions (dates):			

Next Public Actions (dates):	
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Project: Fryar Ave Trail (14-01)	Project Manager: Andrew Leach	Budget: \$5,000,000 (construction unfunded), \$580,000 design, federal and City REET
Finance: \$197,760.00 (CMAQ-Design Only) and \$30,864 (City)		
Description: To design the last missing link of trail in town between Bridge Street Bridge and Fryar Bridge. The trail currently consists of a sidewalk & bike lane.		
Schedule/Milestones: ☒ Selection of Design Consultant (05/14) ☒ Design Consultant Contract Award (05/14) ☒ Consultant Supplement Award (6/21) ☒ Resume Design (7/21) ☐ Design Complete (12/24) ☐ Begin ROW Phase (6/24) ☐ Begin Construction Phase (2/25) ☐ Construction Contract Award (TBD) ☐ Construction Complete (TBD)	Status: The City has selected Commonstreet as the ROW consultant. ROW Phase has begun. The City is currently working on hiring a ROW consultant. The City will be receiving grant funding for the ROW phase of the project. The City is currently moving forward with the design and environmental phases of the project. The City is currently looking at grant opportunities to purchase right of way and moving forward with the environmental phase of the project. The design on this project is moving forward. A few alternatives for the trail layout were reviewed and a final layout was selected. Selecting the final layout will allow for the environmental phase to move forward. The design on this project is on hold until FEMA discussions allow for the trail to be constructed in the floodway. BergerABAM is proceeding with the design.	
Next Critical Activities (dates): Design Complete (12/24)		
Next Council Actions (dates):		
Next Public Actions (dates):		

Project: Left Bank Setback/White River Restoration (14-10)		Project Manager: Doug Beagle/Robby Wright	Budget: \$60 Million
Description: Enhance nearly 3.2 miles of riverbank. The channel will be widened by up to 200ft landward of the ordinary high to allow capacity for 100-yr event			
Schedule/Milestones: ☒ Selection of Design Consultant (09/14) ☒ Design Consultant Contract Award (09/14) ☒ Design Complete – 24 th St (05/22) ☒ Bid Award – 24 th St (06/22) ☒ Construction Complete – 24 th (01/24) ☐ Phase 1 Bid Advertisement (05/24) ☐ Bid/Award – White River Restoration (06/24) ☐ Construction Complete (12/27) ☐ ROW Acquisition (TBD)		Status: Preparing bid package for phase 1 earthwork contract Contractor for the 24 th St E Utility Relocation project has achieved Substantial Completion and is working on the punchlist. Currently in the RFQ process for a CM consultant. Expected to have a consultant selected and scope/fee agreed on for June PW Committee meeting. Contractor for the 24 th St E Utility Relocation project has complete drilling for the new sewer and water lines and will soon start construction of the new pump station. Preparing CM consultant RFQ for expected advertisement early February. The Contractor for the 24 th St E Utility Relocation project has mobilized and is working on drilling for the new sewer and water lines. Working through pre-construction and material procurement with the 24 th St Utility Relocation project (CIP 18-03) contractor (Johansen Construction). Construction is expected to start in January 2023. Bids opening on 6/7/22 for 24 th St Utility Relocation project (CIP 18-03). Permit Submitted to June Corp April 2021, out for Public Comment Moving from 65% to 90% Plans NSD Consultant Supplement Contract PW committee Meeting August A meeting took place on 5/11 and the next meeting is scheduled for 6/8. Draft Hydraulic and Sediment reports have been presented to the Dialogue Group and the next meeting is scheduled for May 11 th . Hydraulic and Sediment models are under review. The dialogue group continues to meet. Consultant has begun hydraulic and sediment work. Two (2) Consultant Service Contracts are going to the 7/18/16 Council Meeting. One is Amendment #2 with West Consultants and the 2 nd is with Natural Systems Design.	
Next Critical Activities (dates):			
Next Council Actions (dates): ROW Acquisition (TBD) CM Contract (Expected June)			
Next Public Actions (dates):			

Project: Pacific Pointbar / Stewart Setback (14-10)		Project Manager: Doug Beagle/Robby Wright	Budget: \$59,474,432
Description: Over 30 acres of floodplain reconnection and fish habitat. Installation of a floodwall along 16th and levee along 140th for increased flood protection.			
Schedule/Milestones: ☐ 90% Design Complete (12/24) ☐ Property Acquisitions Complete (12/24)		Status: Awaiting counteroffer on Ream/Robison Property. Nearing PSA with Kondratyuk Awaiting Purchase and Sale draft for DMI Drilling Mierendorf Property Acquired	
Next Critical Activities (dates):		The contract to demolish the structures on the Bushore and Eagle properties has been awarded. Staff is preparing a notice to proceed authorizing the contractor to move forward with the demolition work.	
Next Council Actions (dates):			

Project: Decant Facility (15-02)		Project Manager: Michael Kosa	Budget: \$747,000	Finance: \$390K Ecology Grant
Description: Design and construct upgrades to the Decant Facility. Improvements will include a concrete slab and a pre-engineered metal building.				
Schedule/Milestones: ■ Selection of Design Consultant (10/16) ■ Design Consultant Contract Award (11/16) ■ Design Complete (04/17) ■ Construction Contract Award (09/17) ■ Construction Complete (11/19) ■ Asphalt Contractor Selected (6/21) ■ Start Construction (8/21) ■ Construction Complete (9/21)		Status: Project in closeout Asphalt Paving Complete, Landscaping remaining Asphalt pavement work begins in mid-August Asphalt pavement work advertising for construction as small works project Project awaiting asphalt pavement after SR 410/Traffic Ave Interchange Contractor is complete Project in closeout Working on final Ecology Reimbursement. Stormwater pond construction is complete. Project is entering close out. Negotiating change order with contractor to construct stormwater pond required by Ecology. Coordinating plans with ecology, plan to construct storm water pond and asphalt paving in 2019. Notified of \$390K Ecology Grant Building construction complete. Investigating adding asphalt driving surface to project. This project is under construction and the contractor is currently working on final completion and punchlist. This project is under construction and the contractor is currently working on floor slabs. This project is under construction and the contractor is currently working on subgrade and foundations. Western Engineering Constructors, Inc., was awarded the construction contract at a Special Council Meeting on 8/14/17. Contracts are currently being signed.		
Next Critical Activities (dates): Completion Report				
Next Council Actions (dates):				
Next Public Actions (dates):				

Project: 410/Traffic Ave Interchange (15-04)	Project Manager: Andrew Leach	Budget: \$17,000,000; Construction 100% grant funded
Description: Construct a new overpass for the SR 410/Traffic Ave Interchange to meet the demands of freight and commuter traffic.		
Finance: <i>Design:</i> Sound Transit \$100K, WA State Legislature #1 \$300K, Private Dev. \$75K, Port of Tacoma #1 \$11.5K, City of Sumner \$75K, STP Grant \$313K <i>Construction:</i> FIMSB \$2.5M, Sound Transit \$5.0M, Port of Tacoma #2 \$45k, WA State Legislature #2 \$500K, Private Development \$1.0M, TIB \$3M		
Schedule/Milestones: ■ Selection of IJR Consultant (10/15) ■ Preliminary Design Consultant Contract Award (08/16) ■ Final Design Consultant Contract Award 07/17) ■ Final Design Complete (12/18) ■ Construction Contract Award (07/19) ■ Construction Complete (1/22) ☐ Project Acceptance (TBD)	Status: City is working on the project closeout process with the contractor. Contract is in the plant establishment period of the project. Contractor has completed final paving. Contractor is now working on streetlights and landscaping. New signals have been installed. Contractor is working near final paving. Contractor is working on new signals on either end of the new bridge. Construction on new bridge has started. Construction has begun, contractor is working on temp water main. Ceccanti, Inc. was awarded the contract at the July 22nd special council meeting. A preconstruction meeting will be scheduled for early August. Bids opened 7/3/19. The final design is currently underway. The consultant agreement with Parametrix has been executed and the final design will begin in July.	

Project: Operations Facilities (17-13)	Project Manager: Alisa O'Haver-Ayala	Budget: \$30-40 Million (General and Utility Funds)
Description: Construct a new operations facility to house the water, sewer, storm and street maintenance staff and equipment. The current shops facility will be modified to house the Parks & Facilities maintenance staff and equipment as well as the community float, 1932 Kenworth fire engine, DARE GTO and the Police Department's impound and oversized evidence.		
Schedule/Milestones: ■ Consultant Services Contract (08/18) ■ Design Complete (8/22) ■ Phase 1: Early Works Contract Award (09/23) ■ Phase 2: North Parcel Contract Award (04/24) ☐ Phase 1: Early Works Construction Complete (Q3-2024) ☐ Phase 3: Operations Facility Contract Award (Q4-2024) ☐ Phase 2: North Parcel Construction Complete (Q1-2025) ☐ Construction Complete (Q1 2026)	Status: The Pre-Construction meeting for the North Parcel was held on 5/14 and the Contractor is expecting to mobilize by the end of May. The final phase of the preload on the main site is in place and is expected to be complete in August. The Pre-Construction meeting for the North Parcel is scheduled for 5/14 and the Contractor is expected to start work this month. The preload on the main site is being moved to the 4th (and final) phase and is expected to be complete in Q3. The preload is complete for 2 of the 4 preload phases and the 3rd phase is currently preloaded and is being monitored to verify it reaches the required compaction — this is likely to be achieved in June. The North Parcel is ready for the Phase 2 contractor when this contract is awarded in April. The earthwork for 2 of the 4 preload phases is still in place until early February to receive the required compaction. A Construction Management consultant has been selected and the scope and the consultant agreement will be presented to PW Committee and council in February. The Contractor (Rodarte) has complete the abatement and demolition of the buildings. The earthwork for 2 of the 4 preload phases is in place and is expected to sit until late January to receive the required compaction. The Early Work Package was awarded to Rodarte Construction.	

Next Critical Activities (dates):	The City was successful in getting the Public Works Trust Fund Loan for the construction of the decant facility. The Hearing Examiner's decision regarding the Conditional Use Permit was issued on 02/06/23.
Next Council Actions (dates): Q4-2024 Construction Contract Award for Phase 3: Operations Facility	Building Permit has been submitted and is in review. Open House 9-30-21 4 – 7 pm onsite Review of final concept 11-24-20 Work group session have begun and waiting for review of sessions. The Consultant contract has been fully executed. RFP for Consultant Services to be advertised in February. Properties are under contract with new phase 1 environmental being done soon. Consultant is working on initial diagram/layout of facility. In negotiations with property owners and wrapping up. Design consultant has done 3-D modeling/massing studies at multiple locations. Site locations have been narrowed down and the City is moving forward with contacting property owners.

Project: Rainier View Covered Court (18-04)	Project Manager: Andrew Leach	Budget: \$1,475,000
Description: This project consists of renovating the basketball court at Rainier View Park. The court will be covered with a new roof to encourage use in all weather conditions and include ADA upgrades. The court will also be painted to accommodate basketball, volleyball and pickle ball courts. The City has received grant funding from RCO and Washington State's Local Community Project Program.		
Schedule/Milestones: ☒ Consultant Services Contract (10/21) ☒ Design Complete (8/23) ☒ Construction Contract Award (9/23) ☐ Construction Complete (12/24)	Status: Contractor has started work on the project. The City is working with the contractor to order long lead items. The City received 4 bids on 8/29/2023. Andy Johnson & Company, Inc. was the low bidder. The City is moving forward with the design of the project. The Consultant contract has been fully executed.	
Next Critical Activities (dates):		
Next Council Actions (dates):		

Project: Sumner Tapps Highway Guardrail Upgrade (19-01)	Project Manager: Alisa O'Haver-Ayala	Budget: \$1,455,300
Finance: City Funds \$112,700, Federal HSIP Funds \$448,600, Federal STP Funds \$749,000		
Description: Evaluate and construct upgrades to existing obsolete guardrail along Sumner-Tapps Highway, resurface Sumner-Tapps Highway		
Schedule/Milestones: ☒ Design Award (12/19) ☒ Design Complete (06/20) ☒ Obligate Construction (8/20)	Status: Guardrail relocation work is complete, project is in closeout. Contractor for Guardrail relocation is making good progress. Aerial utility relocations in the vicinity of the replaced guardrail are ongoing.	

■ Award Construction Contract (11/20) ■ Complete Resurfacing Construction (6/21) ■ Advertise Guardrail Construction (10/21) ■ Award Guardrail Construction (1/22) ■ Complete Guardrail Construction (5/22) ■ Project Acceptance (2/23)	Resurfacing project in closeout, Guardrail relocation begins in February. Guardrail project bid opening complete, award in January Resurfacing Punchlist in progress Resurfacing Construction Underway Resurfacing scheduled to begin in late April, weather permitting Project delayed until April 2021. Bids opened and came in underbudget. Guardrail portion of project in design. Funding secured for Phase 1 resurfacing construction. Resurfacing project will construct in 2020. Consultant kickoff in February. The survey fieldwork is complete. Consultant agreement at council. Consultant qualifications being evaluated. RFQ is out for advertisement. Funding has been obligated. Staff is working w/ WSDOT to obligate Design funds. Staff is preparing paperwork to add project to federal programming
Next Critical Activities (dates):	
Next Council Actions (dates):	
Next Public Actions (dates):	

Project: Main St/Wood Ave Intersection Improvements (19-02)		Project Manager: Courtney Littrell	Budget: \$209K (Design), \$250K (ROW), \$1.8M (Con.)
Finance: City funds \$1,864,000, Federal STP Funds \$405,000, \$225,000, \$1,330,000.			
Description: Develop design for replacing the obsolete signal and complete ADA upgrades to bring the intersection into compliance			
Schedule/Milestones: ■ Design Award (10/19) ■ Begin ROW Acquisition (09/20) ■ 90% Design (5/21) ■ Design Complete (6/22) ■ Complete ROW Acquisition (6/22) ■ Obligate Construction (8/22) ■ Advertise for Construction (10/22) ■ Contract Award (12/22) ■ Begin Construction (5/23) ☐ Complete Construction (10/24)		Status: Utility poles have been removed, trees have been planted, and final storm connection has been made. Currently waiting for the delivery of the signal poles. All communication lines have been relocated underground. Pole removal to take place in the near future, and work will resume by the contractor to complete their storm line connection and install signal poles. Intersection is open with permanent striping and the project is suspended. Work will resume once Zayo has relocated their communication line to the JUT and the utility pole is removed. The project will then be resuspended until the new signal poles arrive and can be installed. Intersection has been poured with the stamped colored concrete and sidewalks are complete. Intersection is set to be reopened by Aug. 4 th . PSE has completed their power line relocation. All utility work has been completed besides relocation of power and communication lines. Sidewalks are being poured, and intersection will be closed for one month starting Wednesday July 5th. The closure will last approximately 4 weeks, and the intersection will be graded and paved during the closure. Project construction started on May 1st. Construction is currently ongoing with night work. Sewer and storm main replacements are nearing completion, and the water main work has started. The Joint Utility Trench (JUT) will begin in the next week to relocate the overhead power and communication lines underground through the intersection. Project is currently suspended due to material procurement. Construction is anticipated to begin in May. Project is out for bid and the Construction Management Services Consultant has been selected.	
Next Critical Activities (dates):			
Next Council Actions (dates):			
Next Public Actions (dates):			

	Project to be advertised for construction in October Additional federal funding acquired. WSDOT Review set being developed, 2 of 4 ROW acquisitions complete 90% Design at City for Review Beginning 90% design, ROW acquisition, City funding Construction phase in 2022 Internal review of 30% Design. Additional funding acquired for right-of-way acquisition phase. Project progressing toward 30% design. Project survey complete in November. Consultant agreement award at Council. Consultant selection completed. Developing consultant agreement. Staff is completing federal obligation paperwork.
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Project: Alder & Kincaid Utility Improvements (19-05)	Project Manager: Alisa O'Haver-Ayala	Budget: \$7,002,990
Description: Replacement of utilities in the Alder and Kincaid Right-of-Way in the vicinity of the Red Apple property. Necessary to replace aging infrastructure and support the town center plan redevelopment.		
Schedule/Milestones: ■ Select Design Consultant (10/19) ■ Award Final Design Contract (7/20) ■ Bid Award (06/22) ■ Construction Complete (02/24)	Status: The Contractor achieved Physical Completion. This project is in closeout. The Contractor achieved Substantial Completion and is working through completing punchlist items. The majority of construction was completed in July. The only remaining item is hydroseeding (must wait until after 9/1/23). Contractor has completed the south half of the Main St / Kincaid Ave / Cherry Ave intersection and is working on the north half. Cherry Ave is still under construction. Kincaid Avenue has been re-opened and Cherry Avenue is closed for construction. Construction at the Main St. intersection is expected to start on 4/3. Contractor is making progress on installation of waterline and water service connections in Kincaid Avenue, Academy Street, and Park Street. There are some material procurement challenges with the parts for the water service connections City gave Notice to Proceed (NTP) to the contractor (Reed) on 8/8/22 Construction bids opened on 05/19. Pending award. Consultant is packaging phase 1 of the bid set plans/specs with the Academy Street Bike Lanes project for construction under the Town Center: Utility and Woonerf project. Design work has begun to incorporate Main Street Visioning streetscape components along with the Academy Street Bike Lanes within Alder and Kincaid around Heritage Park.	
Next Critical Activities (Dates):		
Next Council Actions (dates): Project Acceptance (TBD)		
Next Public Actions (dates):		

Project: Ryan House Historic Rehabilitation (19-07)	Project Manager: Drew McCarty	Budget: \$825,000 + \$750,000 = \$1,575,000 (Grants)
Description: Rehabilitation of the Ryan house Phase 1 to include structural upgrades, structural repairs and ADA accessibility.		

Schedule/Milestones: ☒ Design Consultant (11/22) ☐ Select Contractor (XX/XX) ☐ Construction Complete (XX/XX)	Status: June 2024 – Project is on hold May 2024 – Project is on hold April 2024 – Project is on hold March 2024 – Project is on hold January 2024 – Project is on hold until after LUPA Determination November 2023 – Project is on hold until after Growth Management Act & LUPA Determination October 2023 – Petition sent to city on the Growth management Act & LUPA for the Demolition Permit September 2023 – Council voted to demolish the Ryan House September 2023 – Ryan House to Council based on Finance Committee recommendation. August 2023 – Ryan House Update at Finance Committee to present options on which way to go with the Ryan House June 2023 – Received a schematic design cost estimate & WJE is working through drawings for Phase 1 June 2023 – Dickson Company to perform abatement June 2023 – Additional Openings completed by City Staff for WJE Inspection May 2023 – Received \$750,000 grant from LTAC May 2023 – Take Ryan House Rehabilitation Project to Finance Committee March 2023 – Pierce Count Grant Contract to be Executed March 2023 – WJE to assess Interior & Exterior inspection openings for structural upgrades February 2023 – Additional Asbestos discovered; testing was performed. Mastic in ceiling tile adhesive in cedar cabin February 2023 – WJE performing Interior & Exterior inspections for Phase 1 January 2023 – WJE Selected as Design Consultant
Next Critical Activities (dates): Project is on hold until after Growth Management Act & LUPA Determination	
Next Council Actions (dates):	

Project: 160 th Retrofit and Pervious Sidewalks (19-08)	Project Manager: Andrew Leach	Budget: \$450,000 (State and City funds)
Finance: Ecology and Complete Street Funds		

Description: Installing pervious sidewalks on 160 th that will fill in the sidewalk gap between the YMCA and main Street	
Schedule/Milestones: ☒ Selection of Design Consultant (09/19) ☒ Design Consultant Contract Award (03/20) ☒ Design Complete (3/22) ☒ Construction Contract Award (4/22) ☒ Construction Complete (12/23)	Status: Project is physically complete and is now in closeout process. Project is substantially complete and is in the plant establishment period. Construction has begun. Contractor has installed the storm line and is graded for curb and gutter. The project is awarded and awaiting start of construction. Plans have been approved by Ecology. The project will be going out to bid. The 100% plans have been submitted to Ecology for review. 90% Plans have been accepted by Ecology. The City is finalizing the 100% plans and will be sending them to Ecology for review before bidding the project for construction. The 90% design is with Ecology for Review. Design is 30% complete and moving forward to final design. Starting project design. Grant agreement passed by Council. City is working on grant agreement with DOE. Staff is currently reviewing SOQs to select a design consultant for the project.
Next Critical Activities (dates):	
Next Council Actions (dates): Project Acceptance (TBD)	
Next Public Actions (dates): N/A	

Project: South Tank Seismic Retrofit (19-10)	Project Manager: Andrew Leach/Courtney Littrell	Budget: \$2,463,900
Description: Design and construction of seismic improvements to improve the resiliency of the south tank reservoir.		
Schedule/Milestones: ☒ Select Design Consultant (1/20) ☐ Bid Award (TBD) ☐ Construction Complete (TBD)	Status: Plans and specifications approved by Department of Health, seeking permission to advertise from FEMA. A delay in the design was encountered due to damages to the facilities during the Sumner Grade Fire that prevent the tank from being drained. Design work resumed in March 2021.	
Next Critical Activities (Dates): Construction Contract Award (TBD)		
Next Council Actions (dates): Construction Contract Award (TBD)		
Next Public Actions (dates): N/A		

Project LS #2 and #6 Control Panel Replacement (20-04)	Project Manager: Drew McCarty	Budget: \$1,010,000
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Description: Design and installation of replacement control panels at lift stations #2 and #6	
Schedule/Milestones: ☒ Select Design Consultant (10/20) ☐ Bid Award (05/24) ☐ Construction Complete (12/24)	Status: Due to long lead times of PLC hardware and procurement, project will be advertised in 6/2024. Design is complete & finalizing project specs/front end documents to advertise. PLC Hardware and Panels to be ordered by the city April 2023. PLC Hardware and Panels have been procured. Plan to advertise Project the end of the Summer.
Next Critical Activities (Dates): Project Advertised 05/24	
Next Council Actions (dates): Bid Award 10/23	
Next Public Actions (dates): N/A	

Project: Rivergrove Community Pedestrian Bridge over SR 410 (20-07)	Project Manager: Andrew Leach	Budget: \$5,000,000
Finance: Sound Transit funds (\$452,000) (Design Only)		
Description: Construct a new pedestrian bridge over SR 410 at Sumner Ave to provide a non-motorized connection to the Rivergrove Neighborhood.		
Schedule/Milestones: ☒ Grant Agreement Complete (06/20) ☒ RFQ (06/20) ☒ Consultant Agreement Award (12/20) ☐ Design Complete (12/25) ☐ Construction Complete (12/27)	Status: The 30% plans have been reviewed and approved by WSDOT. The 30% plans are complete and have been sent to WSDOT for approval. The Consultant is working towards 30% design of the project. Contract will be awarded at the December Council Meeting The City has completed consultant interviews and will be working with V+M Structural Design to execute a scope and fee. City has advertised a request for qualifications for a project design consultant.	
Next Critical Activities (dates): Consultant Design Supplement (6/24)		
Next Council Actions (dates): Consultant Design Supplement (6/24)		
Next Public Actions (dates):		

Project: Academy Street Bike Lanes (20-08)	Project Manager: Alisa O'Haver-Ayala	Budget: \$1,342,700
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Finance: Sound Transit funds (\$875,000)	
Description: Develop an east-west bicycle corridor extending east from the Sumner Sound Transit Station to Wood Avenue.	
Schedule/Milestones: ■ Grant Agreement Complete (06/20) ■ RFQ (06/20) ■ Consultant Agreement Award (10/20) ■ Preliminary Design Complete (3/21) ■ Public Outreach (04/21) ■ Design Complete (4/22) ■ Construction Contract Award (06/22) ■ Construction Complete (02/24)	Status: The Contractor achieved Physical Completion. This project is in closeout. The Contractor achieved Substantial Completion and is working through completing punchlist items. The majority of construction was completed in July. The only remaining item is hydroseeding (must wait until after 9/1/23). Contract awarded to Reed Construction. Notice to Proceed (NTP) issued on 8/8/22. Construction bids opened on 05/19. Pending award. Consultant is packaging bid set plans/specs with the Alder/Kincaid Utilities project for construction under the Town Center: Utility and Woonerf project. Public Engagement completing, consultant beginning Final Design Consultant beginning conceptual design phase City is evaluating consultant qualifications City has advertised a request for qualifications for a project design consultant.
Next Critical Activities (dates):	
Next Council Actions (dates): Project Acceptance (TBD)	
Next Public Actions (dates):	

Project: Sidewalk Improvements (20-10)	Project Manager: Andrew Leach	Budget: \$1.7 million
Description: This project provides for the improvement of sidewalk and ADA curb ramps within the Sound Transit Focus Area and Rivergrove Area. The project also includes erosion control, installation of new hydrants, storm utilities and electrical conduit for future street lighting, as well as paving, all in accordance with the Contract Plans, the Contract Provisions, and the Standard Specifications.		
Schedule/Milestones: ■ Consultant Services Contract (09/20) ■ Design Complete (05/21) ■ Construction Contract Award (06/21) ■ Construction Complete (11/22)	Status: The City is working on the closeout process with the contractor. Project has reached substantial completion. Contractor is working on punchlist items. Contractor is steadily moving forward with sidewalk replacement. Contractor is almost complete with the sidewalk work in the Rivergrove Neighborhood. Contractor is currently working on Ryan Ave and Maple Street Construction is set to begin beginning of August Project is out to bid and the construct contract award will go to City Council in 06/21.	
Next Critical Activities (dates): Project Acceptance (TBD)		
Next Council Actions (dates): Project Acceptance (TBD)		

Project: Treatment Facility Access Platforms (21-04)	Project Manager: Drew McCarty and Alisa O'Haver-Ayala	Budget: \$135,000
Description: Installation of access platforms at the headworks screens.		

Schedule/Milestones: ☒ Select Design Consultant (5/21) ☒ Bid Award (2/23) ☐ Construction Complete (9/23)	Status: 6/2024 - Contractor has completed the project 5/2024 Contractor is currently working through punch list items/special inspections. 08/14/2023 Platform arrived on site and contractor has been working to install. Stairs will arrive any day for install and the contractor will complete the piping work during stair install. 08/2023 Contractor shall install platform & complete piping modification work 07/2023 Contractor shall perform some piping modification work 03/2023 NTP to Contractor 03/2023 Preconstruction meeting with Contractor (Aqua Tech) 2/27/2023 Contract Executed with Contractor The bid package is being prepared to solicit for construction bids. Bid package has been advertised & Bids are due on 2/2/2023 Staff has reviewed 90% design drawings.
Next Critical Activities (dates):	
Next Council Actions (dates): N/A	

Project: ESN Salmon Creek Channel Realignment (21-08)		Project Manager: Robby Wright	Budget: \$ 380,000 (City Storm Funds)
Description: Reconfigure Salmon Creek to new stream channel, modify fish exclusions, and rehab existing culvert under 60th St.			
Schedule/Milestones: ■ Consultant Agreement (6/21) ■ Design Complete (5/22) ■ Construction Contract Award (5/23) ■ Construction Complete (08/23)	Status: Project Substantially Complete Construction expected to begin 7/15/23 Construction contract has been awarded to Rodarte. Project to re-advertise March 2023		
Next Critical Activities (dates):	All bids rejected. Project being revised and will be re-bid in Fall 2022 for Summer 2023 construction. Project pending award		
Next Council Actions (dates):	Project design underway RFQ Process Completed, Consultant Selected, Design Agreement heading to Council		

Project: Auto Lane Sewer Force Main Replacement (21-09)	Project Manager: Andrew Leach/Courtney Littrell	Budget: \$300,000
Description: Replace portions of the sewer force main extending from Auto Lane into 166th Avenue E.		

Schedule/Milestones: ☒ Select Design Consultant (6/21) ☐ Bid Award (TBD) ☐ Construction Complete (TBD)	Status: Project design is on hold.
Next Critical Activities (dates): Construction Contract Award	
Next Council Actions (dates): Construction Contract Award	

Project: Sumner Tank Recoating (21-10)	Project Manager: Andrew Leach	Budget: \$657,000
Description: Recoating of the Sumner Springs Reservoir.		
Schedule/Milestones: ☒ Select Design Consultant (6/21) ☒ Bid Award (10/22) ☒ Construction Complete (6/23)	Status: Construction is complete. City is working on the closeout process with the contractor. Construction is underway. Construction contract Awarded to Coatings Unlimited. Work to begin in December 2022. Approved by department of health, pending advertisement 90% plans at Department of Health for Review	
Next Critical Activities (dates): Project Acceptance (TBD)		
Next Council Actions (dates): Project Acceptance (TBD)		

Project: Maple St Ped Signal, Citywide Backplates (21-11)	Project Manager: Alisa O'Haver-Ayala	Budget: \$431,000 (95% federal, 5% city general fund)
Description: Upgrade Traffic Ave and Maple St Crosswalk to a pedestrian signal, install signal backplates.		

Schedule/Milestones: ☒ Programming (9/21) ☒ Consultant Services Agreement (3/22) ☒ Design Complete (03/23) ☒ Reject All Bids (01/24) ☐ Construction Contract Award (09/24) ☐ Construction Complete (12/25)	Status: City staff are working with WSDOT to receive additional grant funding to cover the full cost of this project. Council approved Resolution to reject all bids and re-bid. This project is out to bid with bid opening expected on 12/12/2023. Design is complete. Working through obligation process with WSDOT. WSDOT NEPA documentation has been approved. Consultant has completed 100% design and NEPA documentation has been resubmitted. Met with WSDOT for NEPA kick-off. Consultant is continuing design with preferred alternative. Consultant is beginning design. A consultant agreement will be at Council in March. Qualifications of firms are being evaluated. Interviews in January. RFQ advertised. Project being programed and obligated to begin the design phase
Next Critical Activities (dates):	
Next Council Actions (dates): 09/24 Construction Contract Award	

Projec	Biosolids Dryer Replacement (21-17)	Project Manager: Ryan Johnstone	Budget: \$16-20 Million
Description: Biosolids Equipment Modernization at the Wastewater Treatment Facility.			
Schedule/Milestones: ☒ Consultant Services Agreement (2/22) ☒ Concept Report (12/22) ☐ Final Design Complete (12/24) ☐ Construction Contract Award (TBD) ☐ Construction Complete (TBD)	Status: Completing application for PWTF Loan – Deadline is June 28 th for application submission. Contract for dryer procurement scheduled for June 4 th Public Works Committee. Advertisement for procurement of Biosolids Dryer complete and low apparent bid selected. Bid is currently being evaluated by staff and consultant for responsiveness to technical specifications. City reviewing preprocurement bid document Beginning Final Design, project currently experiencing minor delay to secure PWTF loan Project setting evaluation criteria, completing feasibility study and sizing Study in progress, draft study delayed due to non-responsive supplier estimates Dryer Repairs complete A committee consisting of Bonney Lake and Sumner staff have reviewed the Statements of Qualifications received and identified Gray & Osborne as the most qualified firm for this work. A Request for Qualifications to solicit interest from firms in the development, design, and implementation of this project has been published. Project may include the Dryer, Dissolved Air Flotation Thickener, Polymer Feed Systems, and Waste Gas Burner.		
Next Critical Activities (dates):			
Next Council Actions (dates): 6/17/24 Dryer procurement contract award			

Project: 63rd St Ct Trunk Line Relocation (21-21)	Project Manager: Robby Wright	Budget: \$198,900
Description: Reroute existing storm main from under existing building.		
Schedule/Milestones: ☒ Consultant Task Order (9/21) ☒ Design Complete (1/23) ☐ Construction Award (TBD) ☐ Construction Complete (TBD)	Status: On Hold Design complete, finalizing bid packet. Preliminary Design concept completed. Scope modified to include enhanced treatment. Utility potholing showed conflicts between proposed storm and existing sewer. Re-planning alternatives to minimize conflicts and disturbance.	
Next Critical Activities (dates):		
Next Council Actions (dates):		

Project: Cemetery Facility Building (22-03)	Project Manager: Drew McCarty	Budget: \$3,000,000
Description: New Construction of Cemetery Building that will include maintenance/storage area, office, breakroom and restrooms.		
Schedule/Milestones: ☒ Design Consultant (08/22) ☒ Select Contractor (08/23) ☐ Construction Complete (06/24)	Status: 6/2024 - PSE to set pole for new Maintenance Facility, Contractor will be working on interior finishes and fence installation. Project is projected to be completed at the end of this month. 5/2024 Contractor is working to Complete Mechanical and Electrical. Doors, insulation, drywall, and plywood all to be installed this month. 3/2024 Contractor completed the roof last month and is about 90% complete with plumbing and now working on electrical. 1/2023 Contractor is ready to pour the slab and working on pre building the framed walls 11/2023 Contractor is working on foundation and utility work 10/2023 Contractor is working on foundation and utility work 10/2023 Begin Construction 08/2023 Award Construction Contract 08/01/2023 Construction Bids Due 07/2023 Advertise for Construction 03/27/2023 Cemetery Facility Update at Council Study Session 90% Civil plans in review & Septic plans in review	
Next Critical Activities (dates):		
Next Council Actions (dates):		

Project: Salmon Creek Culvert Replacements (22-06)		Project Manager: Robby Wright	Budget: \$609,700
Description: Replacement of remaining culverts on Salmon Creek, downstream of Main. Phase 1 will be design & permitting.			
Schedule/Milestones: ■ Consultant Contract (6/23) □ Bid Award (7/25) □ Construction Complete (12/27)		Status: Alternative Analysis complete, working with property owners Initial culvert sizing memo completed 125k Grant request put in to FCZD to help fund design Consultant contract with Osborn Consulting signed	
Next Critical Activities (dates):			
Next Council Actions (dates):			

Project: Elm Street Sidewalk (23-02)		Project Manager: Courtney Littrell	Budget: \$550,000
Description: Project will improve pedestrian safety by constructing curb, gutter, curb ramps, and sidewalk on the north side of Elm Street between Wright Avenue and Bonney Avenue.			
Schedule/Milestones: ■ Project Advertisement (2/23) ■ Select Consultant (3/23) ■ Design Complete (5/24) ☐ Project Advertisement (5/24) ☐ Bid Award (6/24) ☐ Construction Complete (09/24)		Status: Project is currently out for bid. Bid opening is June 4 th . City has returned 100% design comments. Looking to advertise for bid in May. City has returned 90% design comments to MacKay Sposito. City has returned 60% design comments to MacKay Sposito. City has received 60% plans from MacKay Sposito and are currently in review. Design has begun, and 30% plans have been reviewed and comments were returned to MacKay Sposito for the next round of submission. Mackay Sposito was selected as the Design Consultant and design is underway. Consultant selection is underway. Project has been advertised for design consultant selection.	
Next Critical Activities (dates):			
Next Council Actions (dates): N/A			

Project: Sidewalk Repair Program (Street Tree, Helping Homeowners, ADA Program) (23-03)		Project Manager: Courtney Littrell	Budget: \$500,000 (Street Tree), \$50,000 (Helping Homeowners), & \$40,000 (ADA Program)
Description: Repair sidewalks that are failing due to street tree damages and sidewalks that have been damaged that are the responsibility of the homeowner, with the assistance of the city (50/50 cost share program).			
Schedule/Milestones: ☒ Identify Replacement Locations (10/23) ☒ Begin Project Design (1/24) ☒ Design Complete (5/24) ☒ Project Advertisement (5/24) ☐ Bid Award (6/24) ☐ Construction Complete (10/24)		Status: Project is out for bid. Bid opening is June 11 th . Design is nearing completion and working on the bid package. Looking to advertise in May. Payments have been received from homeowners who are participating in the program. Currently finalizing the location list and documentation to prepare for bid advertisement. Decision letters have been mailed out to those who applied to participate in the program. Thirteen locations were selected for repairs this biennium. Street Tree Damaged locations are now being selected for repairs. Helping Homeowner Notices and Application Letters have been mailed. Applications are due in January of 2024, and location selection will be completed at the end of January 2024. Location selection is underway for Street Tree Damages. Design of sidewalk replacements to begin after replacement locations have been identified.	
Next Critical Activities (dates):			
Next Council Actions (dates): Bid Award (3/24)			

Project: Town Center: Cherry and Maple Utilities		Project Manager: Andrew Leach	Budget: \$4,330,800 (Utilities and Roadway Funds)
Description: Replacement of Utilities due to age and to support Town Center redevelopment.			
Schedule/Milestones: ☒ Select Design Consultant (10/19) ☒ Award Final Design Contract (7/20) ☒ 90% Plans Completed (03/21) ☐ Project Advertisement (2025) ☐ Select Contractor (2025) ☐ Construction Complete (2025)		Status: 90% Plans completed and this project work divided out as Phase 2. Phase 1 is the TCUW project. Phase 2 will be completed and bid in 2025. Design development work has been completed and staff is recommending a final design contract for council approval. Request for Qualifications were received in August. Staff is working on finalizing the project extents before negotiating a scope and budget with the consultant. Project requirements are being compiled in advance of design consultant selection.	
Next Critical Activities (dates):			
Next Council Actions (dates):			

Project: Pavement Chip Seal	Project Manager: Gursimran Singh	Budget: \$510,000
Description: Resurfacing designated existing roadways with a pavement chip seal and fog seal treatment.		
Schedule/Milestones: ☐ Project Advertisement ☐ Select Contractor ☐ Construction Contract Award ☐ Construction Complete	Status: Plan to tag team Chip Seal project with City of Bonney Lake, work to be performed in August 2024 Double Chip Seal on Washington St planned – April 2024	
Next Critical Activities (dates):		

Project: Systemic Horizontal Curve Improvements (23-08)	Project Manager: Thi Le	Budget: \$903,000 (Federal HSIP funds)
Description: Install curve warning signs, speed feedback signs, rumble strips, profiled striping, reflective markers, channelization, guardrail, and street lighting.		
Schedule/Milestones: ☒ Project Advertisement (11/23) ☒ Consultant Selection (01/2024) ☒ Start Preliminary Design (02/24) ☒ Bid Award (2/24) ☐ Construction Complete (9/25)	Status: SCJ is working on analyzing the crash data along the corridors and develop countermeasures as well as priority of implementation. SCJ Alliance was selected as the Design Consultant Project has been advertised for design consultant selection. Project Obligated Project being programmed with WSDOT	
Next Critical Activities (dates):		
Next Council Actions (dates):		

Project: Tacoma Ave Overlay & Intersection (23-09)	Project Manager: Gursimran Singh	Budget: \$380,000 (86.5% Federal/ 13.5% City general fund)
Description: Improvements consist of plane, repair, and overlay Tacoma Avenue from Puyallup Street to the White River Bridge, complete intersection channelization improvements, add an eastbound left turn pocket on Puyallup Street at Tacoma Avenue, and upgrade the intersection of Puyallup Street and Tacoma Avenue to a signalized intersection. Project shall include ADA upgrades/sidewalks, associated utility work and illumination as needed.		
Schedule/Milestones: ☒ Project Advertisement (11/23) ☒ Consultant Selection (12/23) ☒ Start Preliminary Design (03/24) ☐ Bid Award (3/25) ☐ Construction Complete (9/25)	Status: May 2024 City evaluation options – Roundabout or Traffic Signal Preliminary design started in March 2024 Consultant Selection – Parametrix, negotiated hourly agreement signed by both City and consultant and reviewed and submitted to WSDOT. Project has been advertised for design consultant selection.	
Next Critical Activities (dates):	Project Obligated	

Next Council Actions (dates):	Project being programmed with WSDOT
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Small Works Projects

Project: Stewart Road Pond Repair (21-15)	Project Manager: Robby Wright	Budget: \$120,000 (General Funds)
Description: Complete pavement repairs by removing and replacing small sections of failed pavement to preserve roadway surfaces		
Schedule/Milestones: ☐ Project Advertisement (6/24) ☐ Select Contractor (7/24) ☐ Construction Complete (9/24)	Status: Project bid package being finalized. Obtaining TCE's Amending scope to reflect change in the design requested by Operations Waiting on pothole information from Shops and updates from Parametrix. Project pushed to 2023 after shops requested a change in treatment system. Project under re-design Project being set up. Work areas being identified. Project may be pushed back to 2022.	
Next Critical Activities (dates):		
Next Council Actions (dates): N/A		

Project: West Well Watermain and Cemetery Irrigation (23-04)	Project Manager: Andrew Leach	Budget: \$350,000
Description: A new water main will be routed to maintain the city connection between the City's west well and the rest of the water distribution system. The Sumner Cemetery's irrigation will also be updated to current standards.		
Schedule/Milestones: ☒ Project Advertisement (2/23) ☒ Select Consultant (4/23) ☒ Design Complete (5/24) ☐ Select Contractor (7/24) ☐ Construction Complete (11/24)	Status: Design is complete and the project is out for bid advertisement. Design of the project is underway. BHC has been selected for design of the project. Project has been advertised for design consultant selection.	
Next Critical Activities (dates): Construction Contract Award (7/24)		
Next Council Actions (dates): Construction Contract Award (7/24)		

Project: Roadway Paint Line Application 2024	Project Manager: Gursimran Singh	Budget: \$71,050 (General Funds) (2 years of painting)
Description: Complete annual paint pavement marking		
Schedule/Milestones: ☐ Verify Painting Schedule (TBD) ☐ Complete Construction (TBD)	Status: City on the Pierce County Stripping list, work to be performed in Summer – May 2024 Working with Pierce County to verify pavement paint line schedule.	

Next Critical Activities (dates): N/A	
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Project: Crack Seal Application 2024	Project Manager: Gursimran Singh	Budget: \$125,000 (General Funds) (2 years of sealing)
Description: Complete crack sealing application to local roads to preserve roadway surfaces		
Schedule/Milestones: ☐ Project Advertisement (05/2024) ☐ Select Contractor (05/2024) ☐ Construction Complete (TBD)	Status: Project request for bids in May 2024 March/April - Preparing Plans, Specifications and estimates for bid package	
Next Critical Activities (dates): Project advertisement in 05/2024		
Next Council Actions (dates): N/A		

Project: Heritage Park Masterplan, Activated Alley and Wayfinding (W-22-04)	Project Manager: Drew McCarty	Budget: \$280,000 (Sumner & 2023 Pierce County LTAC) + \$1,600,000 (2024 Pierce County LTAC)
Description: Heritage Park – Provide a master plan of the expanded park. Alley Activation – Develop the alley between Kincaid & Alder to 30% plans. Wayfinding Signs – finalizing elements such as posts, materials, etc. Additional Scope: Develop 100% plans for Heritage Park, Hops Alley and the Event Building that will be located within Heritage Park.		
Schedule/Milestones: ■ Project Advertisement (05/22) ■ Consultant Selected (10/22) ■ Alley 30% Completed (03/23) ■ Heritage Park Masterplan Complete (07/23) ■ Wayfinding Design Complete (2/24) ☐ Wayfinding out to Ad (3/24) ☐ 30% Design (06/24) ☐ 60% Design (09/24) ☐ 100% Design (12/24)	Status: 5/2024 - Project team is working through the programing for the event building and CUP/SEPA documents. 3/2024 – The city was awarded an additional \$1.6M for 2024 from Pierce County LTAC to complete the design of Hertiage Park, Hops Alley, and Event Building. JETT Landscape and Architecture is continuing their hard work to get the city 100% plans by the end of 2024. 3/2024 – Wayfinding design was completed and is out to Ad currently with bids being due on 4/4/2024. A draft of the Masterplan as well as fly over renderings has been completed. Alley draft 30% plans completed. Heritage Park Masterplan narrowed to 2 alternatives. Heritage Park Masterplan Open House 01/23 at Electric Coffee Alley Stakeholder Meeting at JMJ Office (11/22)	

Next Critical Activities (dates):	
Next Council Actions (dates): N/A	

Project: Pavement Patching 2024	Project Manager: Gursimran Singh	Budget: \$249,150 (General Funds)
Description: Complete pavement repairs by removing and replacing small sections of failed pavement to preserve roadway surfaces		
Schedule/Milestones: ☐ Project Advertisement (05/2024) ☐ Select Contractor (05/2024) ☐ Construction Complete (07/2024)	Status: Project Request for Bids in May 2024 March/April - Preparing plans, specifications and estimates for Bid package	
Next Critical Activities (dates): Project Advertisement 05/2024		
Next Council Actions (dates): N/A		

Other Projects

Project: City Hall HVAC Replacement	Project Manager: Derek Barry	Budget: \$40,000
Description: Replace City Hall HVAC equipment		
Schedule/Milestones: ☐ Project Advertisement () ☐ Select Contractor () ☐ Construction Complete ()	Status: Work to be completed if HVAC replacements are needed	
Next Critical Activities (dates):		
Next Council Actions (dates): N/A		

Project: Senior Center Exterior Painting	Project Manager: Derek Barry	Budget: \$40,000 (General Funds)
Description: Repaint Senior Center, which is currently peeling/end-of-life.		

Schedule/Milestones: ☐ Project Advertisement (TBD) ☐ Construction Complete (TBD)	Status: Project programmed to 2024
Next Critical Activities (dates):	
Next Council Actions (dates): N/A	

Project: Overlay Program	Project Manager: Gursimran Singh	Budget: \$300,000 (General Funds)
Description: Place layer of new asphalt over existing base layer of asphalt to preserve roadway base.		
Schedule/Milestones: ☐ Project Advertisement () ☐ Select Contractor () ☐ Construction Complete ()	Status: Project planned for 2025.	
Next Critical Activities (dates):		
Next Council Actions (dates): N/A		

Project: Transportation Plan Update	Project Manager: Michael Kosa	Budget: \$250,000 (General Funds)
Description: Update the 2015 Transportation Plan in coordination with the 2024 Comprehensive Plan Update		
Schedule/Milestones: ☒ Begin Plan Update (12/22) ☐ Complete Plan Update (10/24)	Status: Final draft included in Draft Comprehensive Plan for adoption Final draft in progress, draft document has been reviewed by Planning Commission Plan in Development Project kickoff meeting occurred in January	
Next Critical Activities (dates):		
☐ Council Adoption (10/24)		
Next Council Actions (dates): N/A		

Project: Watershed Vegetation Management	Project Manager: Ryan Johnstone	Budget: \$50,000 (Water Utility Funds)
Description: Contract out for vegetation management services to effectively manage invasive species and dead trees in the watershed		

Schedule/Milestones: ☐ Preliminary Design (6/24) ☐ Bid Award (9/24) ☐ Construction Complete (12/24)	Status: Watershed walkthrough with geotechnical engineer scheduled for June 4. Collecting data on hazard trees that require removal and assembling map for contractor bids. Project in pre design
Next Critical Activities (dates):	
Next Council Actions (dates): N/A	

Project: Utility Rate Study (CIP 23-01)	Project Manager: Andrew Leach	Budget: \$50,000
Description: Financial analyses of the Water, Wastewater, and Storm Water utilities		
Schedule/Milestones: ☒ Project Advertisement (1/23) ☒ Select Consultant (4/23) ☒ Study Complete (12/23)	Status: Study Complete – Policy Updates continue FCS Group was selected for the project and has begun working on the study. Project advertised for consultant selection.	
Next Critical Activities (dates): Policy Updates (TBD)		
Next Council Actions (dates): N/A		

Project: Sewer Main Replacement and Rehabilitation (Sewer Jet Study)	Project Manager: Ryan Johnstone	Budget: \$150,000 (Sewer Utility Funds)
Description: Complete analysis of sanitary sewer mains that require regular sewer jet activities and determine how best to eliminate regular maintenance issues.		
Schedule/Milestones: ☒ Begin Study (4/24) ☐ Study complete (8/24)	Status: Consultant is collecting sewer main data. Public Works staff is video inspecting sewer mains. Study is under contract with consultant and preliminary mapping and data collection is underway. Project in pre design	
Next Critical Activities (dates):		
Next Council Actions (dates): N/A		