

DOCUMENT 00 90 10

ADDENDUM No. 1

Issued to all Bid Document Holders of Record via Ogden City's Purchasing page.

Date: June 12, 2024

Project: OCWTP Dewatering Building Canopy Project

This Addendum forms a part of the Contract described above. The original Contract Documents and any prior Addenda remain in full force and effect except as modified by the following which shall take precedence over any contrary provisions in the prior documents.

PART 1 GENERAL

1.0 DOCUMENT INCLUDES

- A. Changes to Specifications
- B. Changes to Plan Set
- C. Clarifications and Response to Questions

1.1 MISCELLANEOUS

- a. Last day for questions is Thursday June 14th, 2024 at 2:00 PM
- b. Addendums will be posted on Ogden City's Purchasing page.
<https://www.ogdencity.com/264/Purchasing>

PART 2 CHANGES TO BID DOCUMENTS

2.0 DOCUMENTS INCLUDED

- A. No changes to bid documents



PART 3 CHANGES TO SPECIFICATIONS

3.0 DOCUMENTS INCLUDED

- A. 09910 Specification for Primer and Epoxy Coatings added
- B. 130100SP Specifications for Shaftless Screw Conveyors revised

PART 4 CHANGES TO PLAN SET

4.0 DOCUMENTS INCLUDED

- A. Sheet G-3

- i. Updated Design Criteria Item 12 to specify Contractor as responsible for acquiring building permits.
- B. Sheet C-2
 - i. Revised to show correct bubbles for conveyor
- C. Sheet C-3
 - i. Revised to show VFD and electrical wiring requirements
- D. Sheet ST3
 - i. Dimensions clarified for footing plan
 - ii. Footing length has been revised from 6'-4" to 6'-8"
- E. Sheet ST4
 - i. Length of masonry column has been revised from 4'-4" to 4'-8".
 - ii. Atlas CMU block size revised from 8x8x16" to 8x4x16"

PART 5 ITEMS OF DISCUSSION

5.0 Clarifications and Response to Questions & Comments

As Stated in 00 10 00 1.4A, completion time for the project is 216 calendar days after the Notice to Proceed.

Contractor shall be responsible for obtaining and paying for the building permit. The City has contacted the county and anticipates no more than \$300 for the building permit.

Enclosure:

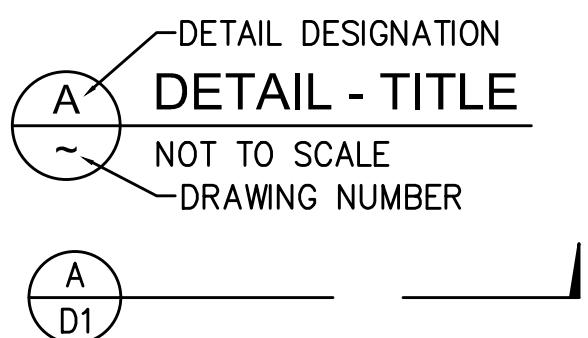
- 1) Plan Sheet G-3, C-2, C-3, ST3, & ST4
- 2) Specification 09910 Painting
- 3) Specification 130100SP Specifications for Shaftless Screw Conveyors

DESIGN CRITERIA

- LOCATIONS AND DEPTHS OF ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE PROJECT DRAWINGS AND SPECIFICATIONS. THE CONTRACTOR SHALL NOT MOVE THE ALIGNMENT OR LOCATION OF ANY OF THE SHOWN OR INTENDED IMPROVEMENTS WITHOUT THE WRITTEN CONSENT OF THE OWNER. THE OWNER WILL COORDINATE WITH THE CONTRACTOR TO RELOCATE PLANNED IMPROVEMENTS WHICH CONFLICT WITH ACTUAL SITE CONDITIONS.
- THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY DISCREPANCIES, OMISSIONS OR CONFLICTS BETWEEN THE VARIOUS ELEMENTS OF THE DRAWINGS AND/OR SPECIFICATIONS BEFORE PROCEEDING WITH THE RELATED WORK.
- CONSTRUCTION TO BE COORDINATED WITH OGDEN CITY.
- CONSTRUCTION STAKING FOR THE SITE SHALL BE PROVIDED BY THE CONTRACTOR USING DATA AVAILABLE IN THE DRAWINGS.
- CONSTRUCTION AND STAGING AREAS TO BE SECURELY FENCED AND SCREENED FOR THE DURATION OF CONSTRUCTION.
- CONSTRUCTION TO PROVIDE ON-SITE PORTA-POTTY.
- ANY DEBRIS RESULTING FROM THE PROJECT SHALL BE DISPOSED OF BY THE CONTRACTOR. THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR DISPOSAL SITES AT WHICH DEBRIS MAY BE LAWFULLY WASTED.
- FINAL GRADING OF DISTURBED AREAS IS SUBJECT TO THE OWNER'S APPROVAL AND SHALL BE COMPLETED IN A NEAT WORKMANLIKE MANNER.
- STAGING AREA TO BE RESTORED TO EXISTING CONDITION BY BROADCASTING SPECIFIED SEED WITHIN DISTURBED AREA. PROTECT EXISTING CURB AND GUTTER WITH SECURED DUNNAGE AND PROTECT EXISTING SIDEWALKS AND PAVEMENT FROM CRACKING WITHIN VEHICLE CROSS AREA. REPLACEMENT OF DAMAGED SIDEWALK, CURB, OTHER PAVEMENT, IRRIGATION, LANDSCAPING, ETC. IS INCIDENTAL TO THE PROJECT.
- NO CONSTRUCTION WORK WILL BE ALLOWED OUTSIDE DAYLIGHT HOURS OR ON SUNDAYS, OR HOLIDAYS OBSERVED BY THE OWNER UNLESS OTHERWISE PERMITTED IN WRITING BY THE OWNER.
- THE CONTRACTOR SHALL BE RESPONSIBLE TO ACQUIRE ANY NECESSARY ENCROACHMENT, ROAD CUT, OR OTHER TEMPORARY PERMITS FOR THIS PROJECT.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACQUIRING ANY BUILDING PERMITS FOR THIS PROJECT. 
- WORK INTENDED BY THE DRAWINGS AND SPECIFICATIONS BUT NOT SPECIFICALLY IDENTIFIED IN A PARTICULAR BID ITEM SHALL BE CONSIDERED INCIDENTAL TO THE OTHER BID ITEMS.
- THE CONTRACTOR SHALL PROVIDE MEANS OF MANAGING ANY STORM WATER, GROUND WATER, OR NUISANCE SURFACE WATER WHICH MAY INTERFERE WITH THE WORK.
- THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY DISCREPANCIES, OMISSIONS OR CONFLICTS BETWEEN THE VARIOUS ELEMENTS OF THE DRAWINGS AND/OR SPECIFICATIONS BEFORE PROCEEDING WITH THE RELATED WORK.
- DUST CONTROL AND WATERING SHALL BE PROVIDED BY THE CONTRACTOR AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
- THE CONTRACTOR RECOGNIZES THAT TIME IS OF THE ESSENCE WITH THIS PROJECT AND SHALL SELECT AND UTILIZE LABOR, EQUIPMENT, AND MATERIALS THAT MINIMIZE THE CONSTRUCTION TIMELINE. CONSTRUCTION SCHEDULE TO BE SUBMITTED AT PRE-CONSTRUCTION CONFERENCE. THE CONTRACTOR SHALL ALSO REGULARLY APPRISE THE OWNER OF ELEMENTS REQUIRING LONG LEAD, INSTALLATION, OR CURING TIMES.
- CONTRACTOR IS RESPONSIBLE TO VERIFY TIE-IN POINTS TO EXISTING IMPROVEMENTS PRIOR TO CONSTRUCTION. CONTRACTOR SHALL NOTIFY THE ENGINEER 5 WORKING DAYS PRIOR TO CONSTRUCTION IF THE EXISTING CONDITIONS ARE DIFFERENT FROM WHAT IS SHOWN ON THESE PLANS.
- CONTRACTOR MAY PREPARE AND MAINTAIN CONSTRUCTION ACCESS AS NECESSARY TO ACCOMMODATE HIS CONSTRUCTION METHODS AND SEQUENCES, BUT SHALL RESTORE ALL SURFACE IMPROVEMENTS & EXISTING UTILITIES TO THEIR PRE-CONSTRUCTION CONDITION OR BETTER.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL OSHA REGULATIONS AND STANDARDS ARE COMPLIED WITH ON THE PROJECT SITE DURING THE CONSTRUCTION PERIOD.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING EXISTING UTILITIES, FACILITIES AND IMPROVEMENTS IN PLACE. WHERE DAMAGE IS CAUSED BY THE CONTRACTOR, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING OR REPLACING DAMAGED ITEMS TO AN EQUAL OR BETTER CONDITION AT HIS SOLE EXPENSE.
- ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE PROJECT SPECIFICATION AND LOCAL, STATE, AND FEDERAL CODES, AND SHALL OTHERWISE BE COMPLETED IN A NEAT, WORKMANLIKE MANNER.
- CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A DETAILED SET OF RECORD DRAWINGS FOR REVIEW AND ACCEPTANCE BY THE ENGINEER FOLLOWING PROJECT COMPLETION. RECORD DRAWINGS SHALL CONTAIN DETAILED INFORMATION CONCERNING ANY DEVIATIONS FROM PLANS.

EQUIPMENT NOTES

- ALL EQUIPMENT AND MATERIALS TO BE SUPPLIED BY THE SUPPLIER ARE SHOWN ON THE DRAWINGS (NOTED IN THE VARIOUS EQUIPMENT SCHEDULES). THE CONTRACTOR IS REQUIRED TO INSTALL ALL OF THE EQUIPMENT AND MATERIALS SUPPLIED BY THE SUPPLIER. ALL OTHER EQUIPMENT AND MATERIALS REQUIRED TO PROVIDE A COMPLETE AND FUNCTIONING ASSEMBLY AS SHOWN IN THESE PLANS ARE THE RESPONSIBILITY OF THE CONTRACTOR TO FURNISH AND INSTALL.
- THE CONTRACTOR IS REQUIRED TO COORDINATE DELIVERIES OF THE EQUIPMENT WITH THE SUPPLIER. THE CONTRACTOR IS RESPONSIBLE FOR: THE REQUEST FOR DELIVERY; UNLOADING AND STORAGE OF ALL MATERIALS FURNISHED AND SUPPLIED BY THE SUPPLIER; AND ANY LOSS OR DAMAGE TO SAID MATERIALS AFTER THEY HAVE BEEN DELIVERED. ALL DELIVERIES SHALL ALSO BE COORDINATED WITH THE ENGINEER AND IN ACCORDANCE WITH THE CONTRACTOR'S CONSTRUCTION SCHEDULE (AS SUBMITTED AT THE START OF THE PROJECT).
- THE CONTRACTOR SHALL BECOME FAMILIAR WITH ALL PARTS OF THE PLANS AND SPECIFICATIONS AND ENSURE THAT ALL SUBCONTRACTORS ARE FAMILIAR WITH THE SECTIONS PERTAINING TO THEIR AREA OF WORK. NO DEVIATIONS FROM THE DRAWINGS WILL BE ALLOWED UNLESS AGREED UPON BY ALL PARTIES IN WRITING PRIOR TO CONSTRUCTION AND/OR FABRICATION.
- THE CONTRACTOR IS RESPONSIBLE TO COORDINATE ALL WORK BETWEEN THE VARIOUS TRADES REQUIRED OF THE TREATMENT PLANT FACILITIES AND APPURTEINANT SITE WORK IMPROVEMENTS.
- ANY OMISSIONS OR CONFLICTS BETWEEN THE PLANS AND THE ACTUAL CONDITIONS ENCOUNTERED IN THE VARIOUS ELEMENTS OF THE PROJECT SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND RESOLVED BY THE SAME BEFORE PROCEEDING WITH ANY WORK INVOLVED.
- ALL CONSTRUCTION, WORKMANSHIP, AND MATERIALS SHALL CONFORM TO THE LATEST EDITIONS OF THE INTERNATIONAL BUILDING CODE, PLUMBING CODE, ELECTRICAL CODE, AND PROJECT SPECIFICATIONS.
- THE CONTRACTOR IS RESPONSIBLE TO VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS AND CONDITIONS AT THE SITE WITH THE CONSTRUCTION DRAWINGS.



LEGEND

DETAIL REFERENCING

SECTION REFERENCING

EXISTING ASPHALT

DEMOLITION AREA

PROPOSED ASPHALT

PROPOSED CANOPY

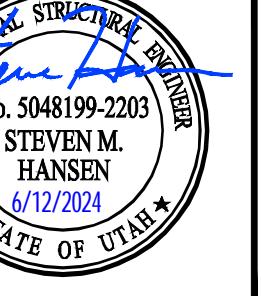
EXISTING LANDSCAPE AREA

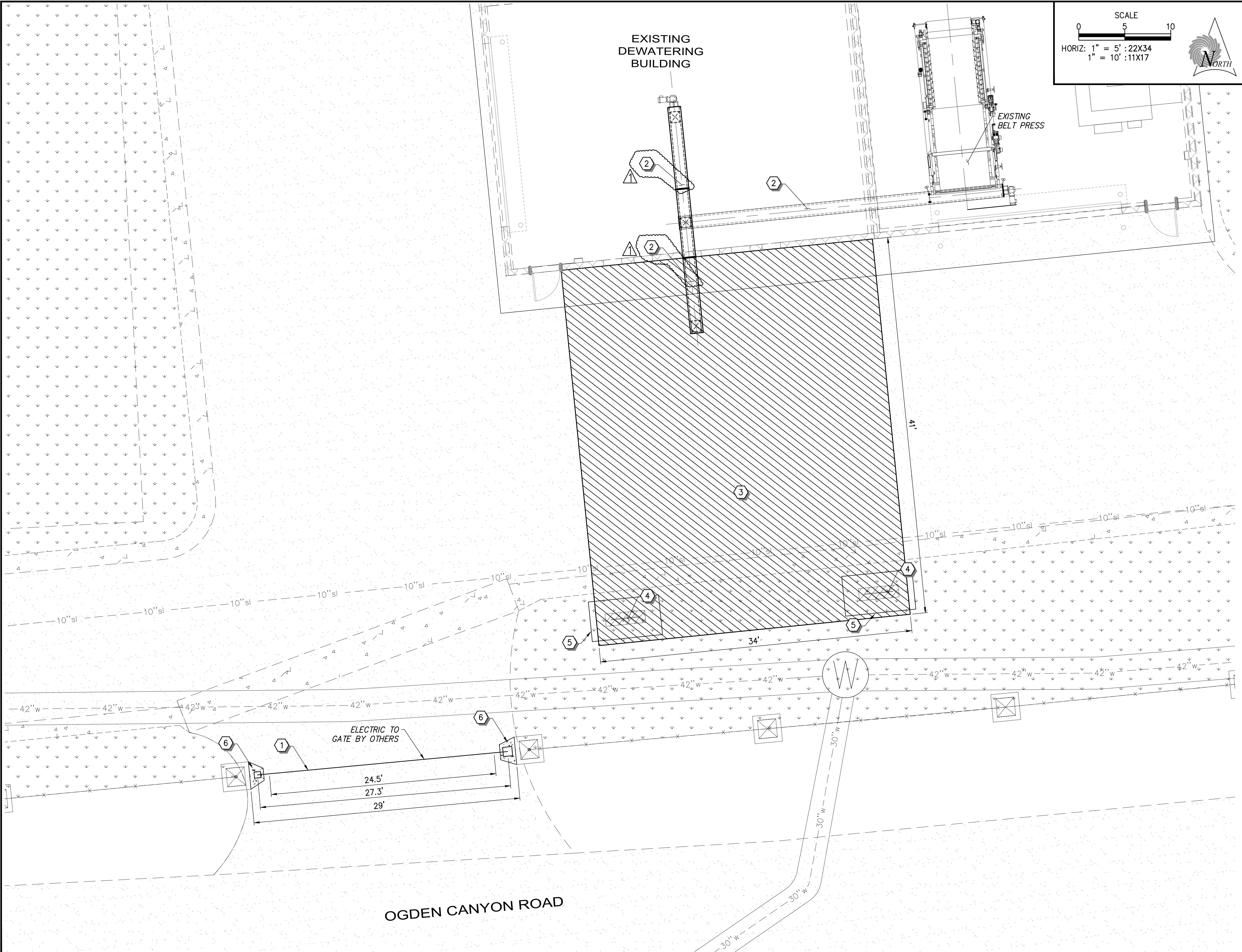
PROPOSED MAJOR CONTOUR

PROPOSED MINOR CONTOUR

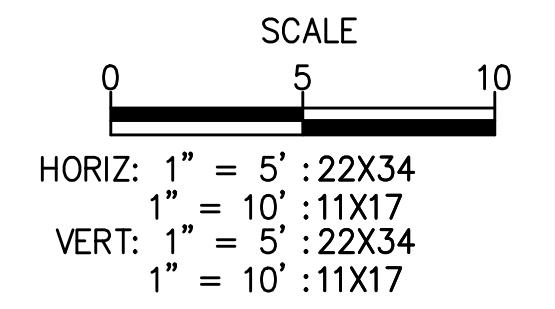
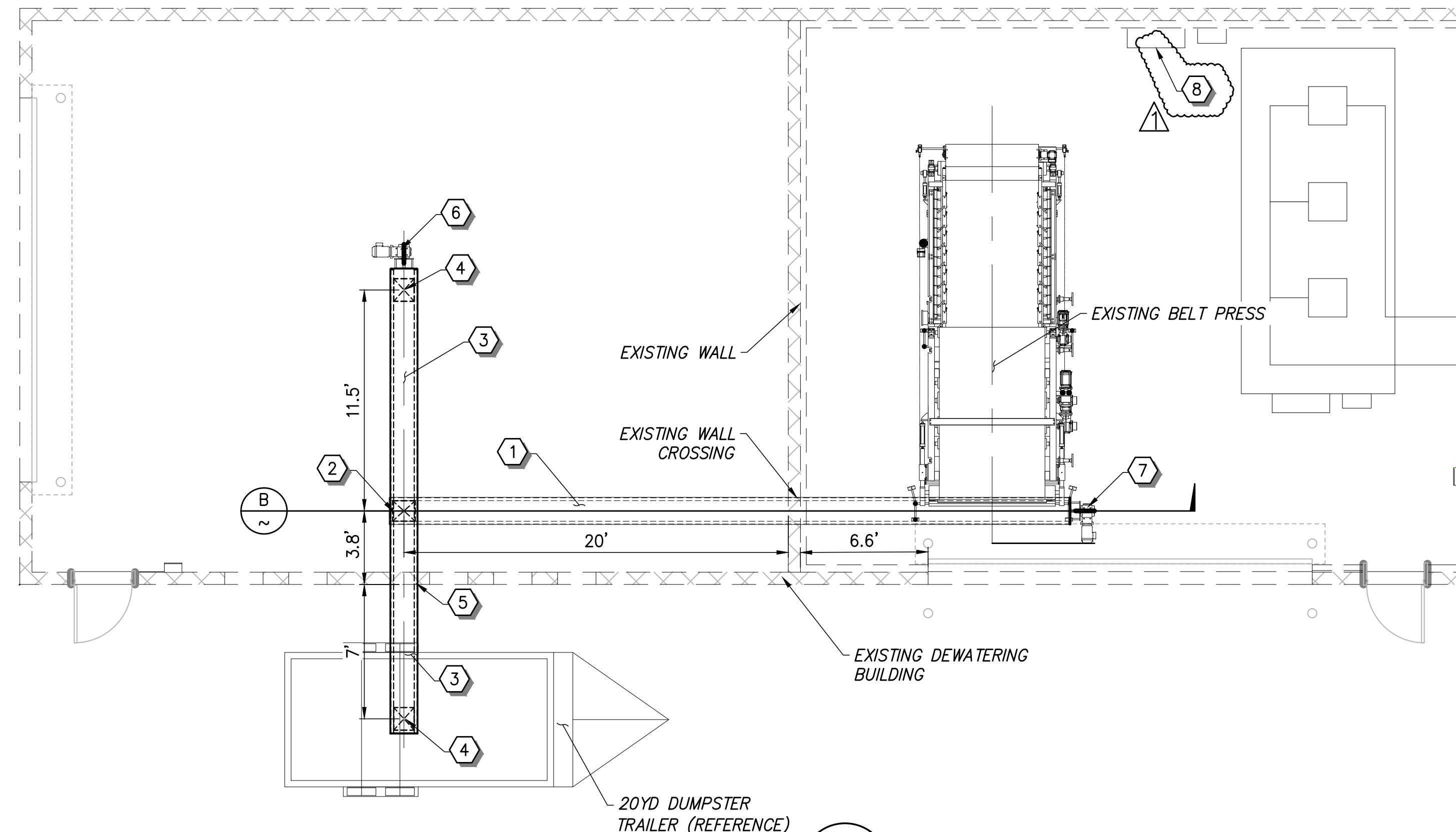
EXISTING MAJOR CONTOUR

EXISTING MINOR CONTOUR

1	ADDENDUM 1	06-12-24		
REV NO.	COMMENT	DATE		
 No. 5048199-2203 STEVEN M. HANSEN 6/12/2024 * STATE OF UTAH		SUNRISE ENGINEERING 6875 SOUTH 900 EAST SALT LAKE CITY, UTAH 84047 TEL 801.523.0100 • FAX 801.523.0990 www.sunrise-eng.com		
OGDEN CITY				
2023 WATER SYSTEM IMPROVEMENTS				
GENERAL NOTES – LEGEND				
SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.
09955	EL	EL	SH	# of 12
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REV NO.	COMMENT	DATE		
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OGDEN CITY				
2023 WATER SYSTEM IMPROVEMENTS SITE PLAN				
SEI NO.	DESIGNED	DRAWN	CHECKED	SHEET NO.
09955	SA	SA	SH	5 of 12
C-2				

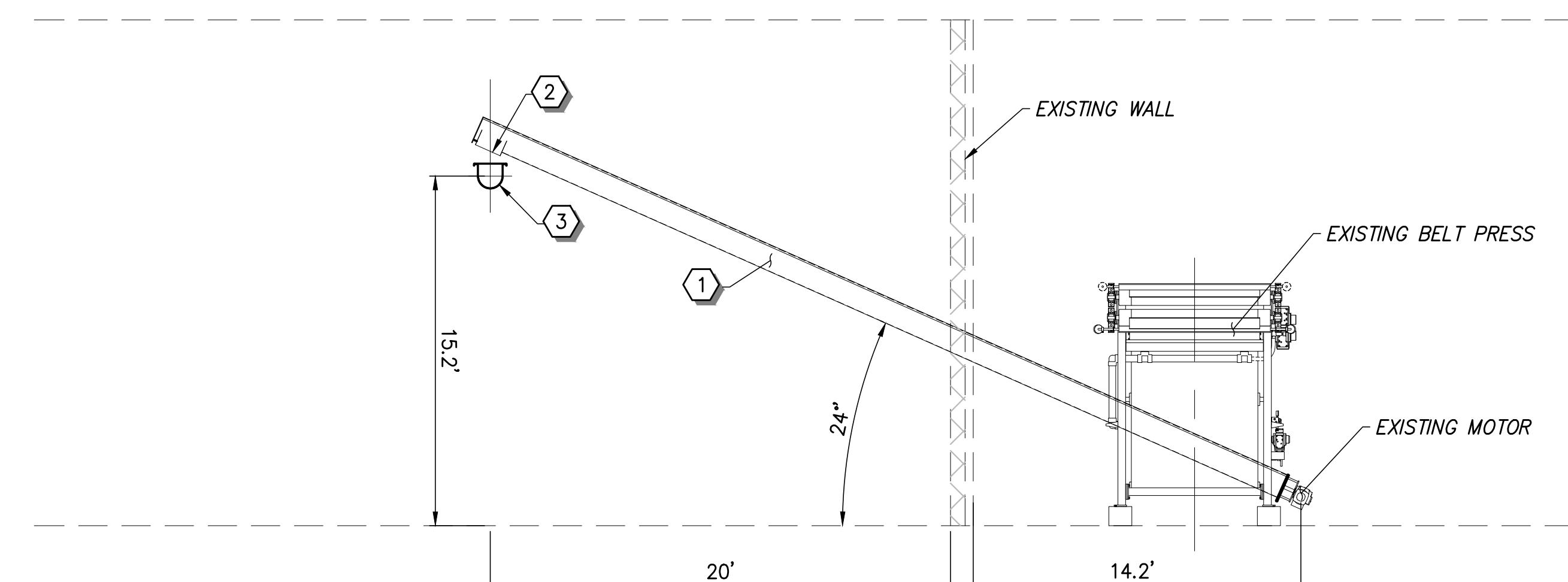


NOTES

- ① UPSIZE TO 12" CONVEYOR
- ② LOAD OUT INLET PER SEMA STANDARDS
- ③ 12" TWO WAY LOAD OUT CONVEYOR
- ④ DISCHARGE
- ⑤ PROPOSED WALL PENETRATION SEE SHEET ST4
- ⑥ MOTOR WITH REVERSING MOTOR STARTER BY CONVEYOR MANUFACTURER
- ⑦ UPGRADE INCLINED CONVEYOR MOTOR TO XX HP MOTOR
- ⑧ VARIABLE FREQUENCY DRIVE (VFD) DESIGNED FOR REVERSIBLE MOTOR

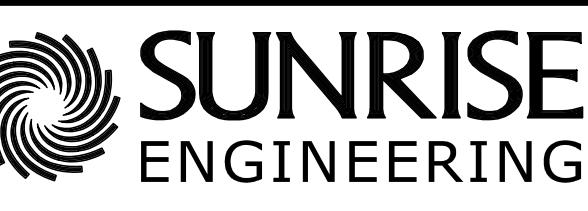
EQUIPMENT NOTES

1. CONVEYOR SYSTEM TO BE DESIGNED FOR HEAVIEST, WET SLUDGE IN COORDINATION WITH OGDEN CITY OPERATORS.
2. REMOVAL OF EXISTING CONVEYOR AND EQUIPMENT TO BE COMPLETED BY OGDEN CITY.
3. CONVEYOR EQUIPMENT TO BE PROVIDED BY SPIRAC, JIM MEYERS AND SONS (JMS) OR JDV EQUIPMENT
4. CONVEYOR ASSEMBLY TO BE DESIGNED BY APPROVED SUPPLIER AS LISTED IN NOTE (2) ABOVE.
5. CONVEYOR SUPPORTS TO BE DESIGNED BY APPROVED SUPPLIER AS LISTED IN NOTE (2) ABOVE.
6. CONVEYOR EQUIPMENT TO MEET ALL APPLICABLE SEMA STANDARDS.
7. OGDEN CITY IS RESPONSIBLE FOR ANY REWIRING REQUIRED TO PROVIDE APPROPRIATE POWER SUPPLY FOR UPSIZED MOTORS.
8. CONTRACTOR TO COORDINATE WITH OGDEN CITY TO MODIFY EXISTING CONTROL PANEL TO ALLOW FOR REVERSING MOTOR STARTER.



B CONVEYOR LAYOUT PROFILE VIEW

SCALE: 1"=5'

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OGDEN CITY

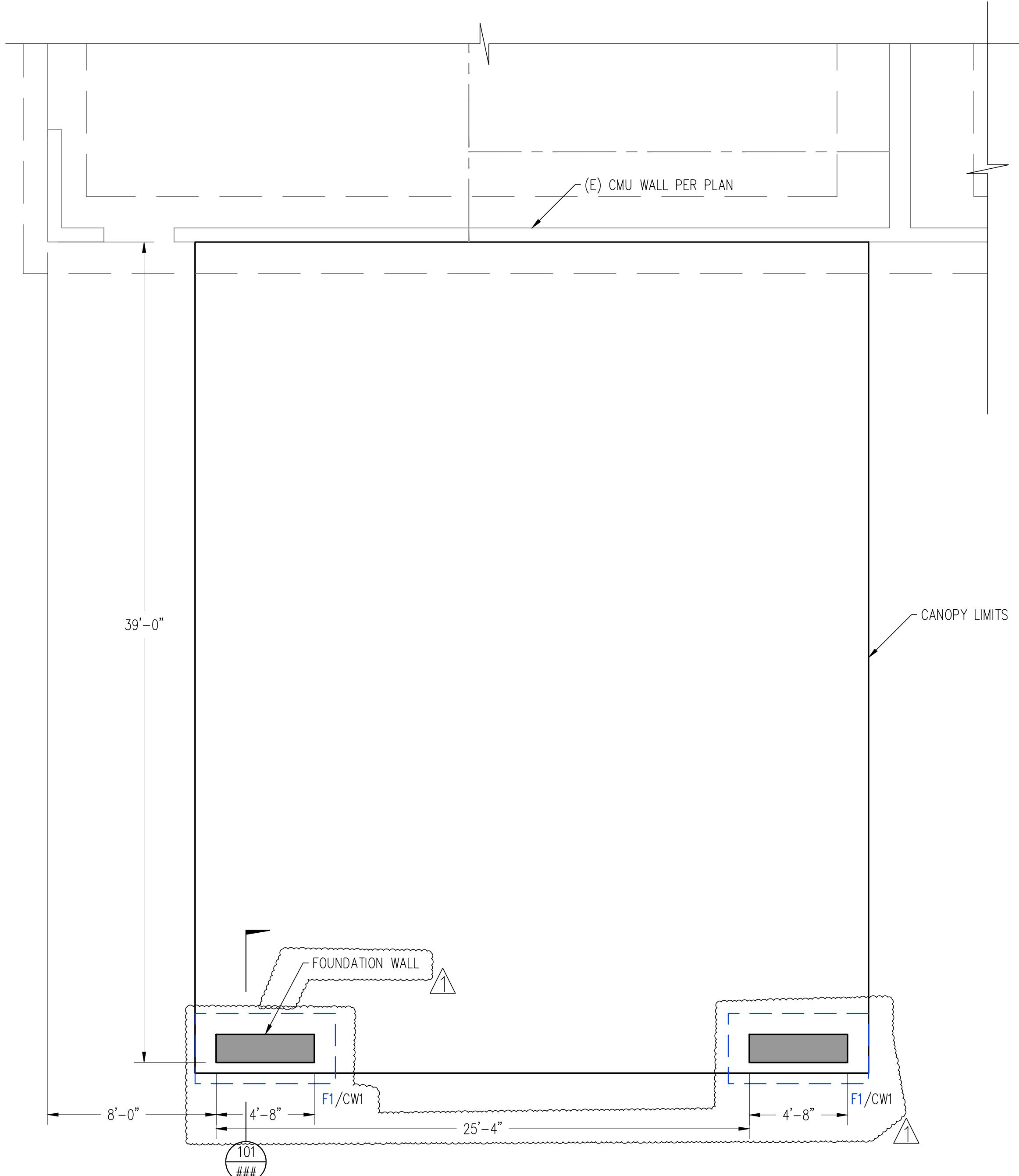
2023 WATER SYSTEM IMPROVEMENTS
CONVEYOR PLAN

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C-3

FOOTING SCHEDULE					
MARK	WIDTH	LENGTH	THICKNESS	BOTTOM REINF.	TOP REINF.
F1	3'-4"	6'-8"	12"	#5 @ 12" O.C., BOTH WAYS	NONE

CONCRETE WALL SCHEDULE					
LABEL	THICKNESS (IN.)	HEIGHT (FT.)	EXTERIOR REINF.	INTERIOR REINF.	NOTES
CW1	16	6'-0"	#5 VERT. AT (4) CORNERS AND AT 16" O.C. #4 TIES HORIZ. @ 16" O.C.	NONE	NONE



FOUNDATION REQUIREMENTS

F1. VERIFY LOCATION AND SIZE OF ALL INSERTS AND OPENINGS IN SLAB, WALLS, AND FLOORS WITH ARCH'L, MECH, PLUMBING, AND ELECT. PRIOR TO CONSTRUCTION.

F2. ALL FOOTINGS AND SLABS SHALL BE PLACED ON STRUCTURAL FILL AS DEFINED IN THE GEOTECHNICAL REPORT. THE MOISTURE CONTENT OF STRUCTURAL FILL SHOULD BE CONDITIONED TO NEAR OPTIMUM WATER CONTENT, PLACED IN UNIFORM LIFTS NOT EXCEEDING 8 INCHES IN LOOSE THICKNESS, AND COMPAKTED PER REQUIREMENTS OF THE GEOTECHNICAL REPORT.

F3. ALL STANDARD WALL FOOTINGS SHALL EXTEND TO AT LEAST 30 INCHES BELOW FINISHED GRADE FOR FROST PROTECTION.

F4. F1, F2, F3, ETC... DENOTES FOOTING PER FOOTING SCHEDULE ON THIS SHEET.

F5. CW1, CW2, CW3, ETC... DENOTES CONCRETE WALL PER CONCRETE WALL SCHEDULE ON THIS SHEET.

F6. CONCRETE CONTRACTOR TO REFER TO SHEET ST4 FOR REQUIRED REINFORCEMENT TO MATCH MASONRY REINFORCEMENT.

F7. CONCRETE LAP SPLICING REQUIREMENTS PER DETAIL 102 ON SHEET ST3

CONCRETE LAP AND DEVELOPMENT SCHEDULE

F'c = 2500 PSI				
BAR SIZE (#)	TENSION			
	LTE TOP ①	LTE OTHER	LTS TOP ①	LTS OTHER
#3	18	9	24	18
#4	24	12	32	24
#5	30	15	39	30
#6	36	18	47	36

ALL TABULATED VALUES ARE IN UNITS OF INCHES U.N.O.

AT CONTRACTOR'S OPTION, MECHANICAL SPLICE COUPLERS PER G.S.N. MAY BE USED IN LIEU OF LAP SPLICES

SEE G.S.N. FOR ACTUAL CONCRETE SPECIFICATIONS AND MIN. CLR. COVER / CLR. SPACING REQUIREMENTS

SCHEDULED VALUES ARE BASED ON CLASS "B" TENSION LAP SPLICES U.N.O., NORMAL WT. CONCRETE, AND UNCOATED GRADE 60 REINF. FOR OTHER CONDITIONS NOTED BELOW, MODIFY TABULATED VALUES AS INDICATED:

E.1. FOR DEVELOPMENT LENGTH AND CLASS "A" LAP SPLICES, WHERE SPECIFICALLY NOTED ON PLANS OR DETAILS, DIVIDE TABULATED VALUES BY 1.3. CLASS "A" SPLICES SHALL BE LOCATED SUCH THAT NO MORE THAN 1/2 OF THE TOTAL REINF. IS LAPPED WITHIN THE REQUIRED LAP LENGTH

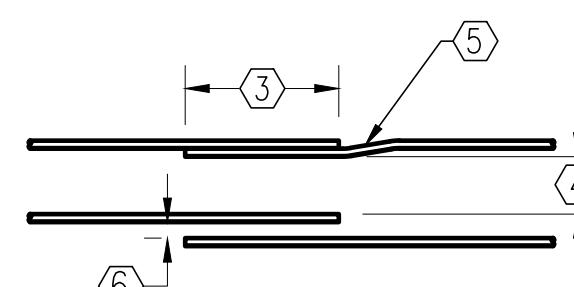
E.2. FOR LIGHTWEIGHT CONCRETE, MULTIPLY TABULATED VALUES BY 1.3

E.3. FOR EPOXY COATED REBAR, MULTIPLY TABULATED VALUES BY 1.5

E.4. FOR GRADE 75 REINF., MULTIPLY TABULATED VALUES BY 1.25

LCE = COMPRESSION EMBEDMENT LENGTH
LCS = COMPRESSION LAP SPLICE LENGTH
LTE = TENSION EMBEDMENT LENGTH
LTS = TENSION LAP SPLICE LENGTH

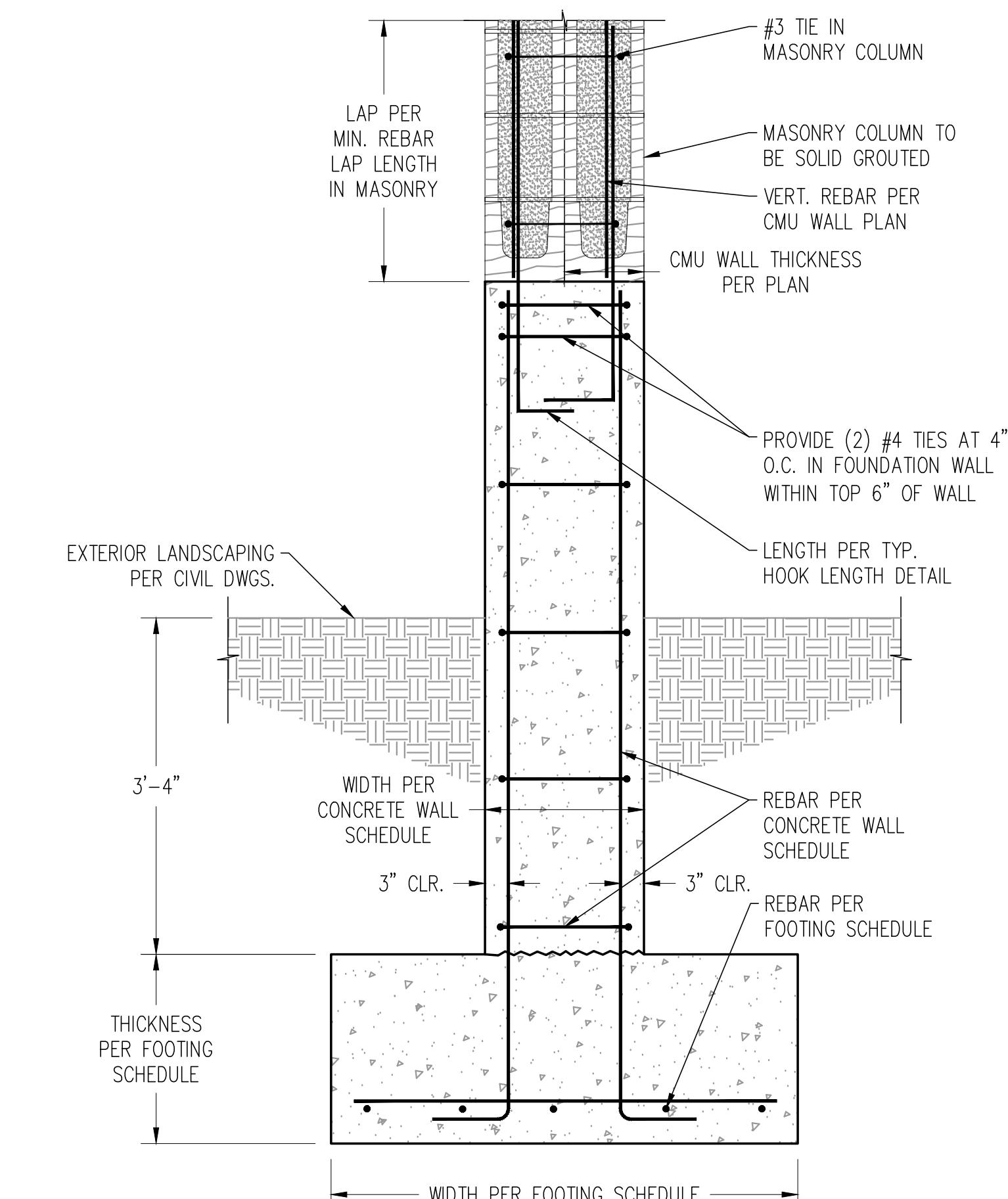
"TOP" BARS ARE HORIZONTAL BARS PLACED SUCH THAT MORE THAN 12 IN. OF FRESH CONCRETE IS CAST BELOW BAR. ALL BARS THAT ARE NOT "TOP" BARS ARE "OTHER" BARS UNLESS NOTED OTHERWISE ALL HOOKS SHALL EXTEND TO THE FAR FACE (LESS 2" COVER)



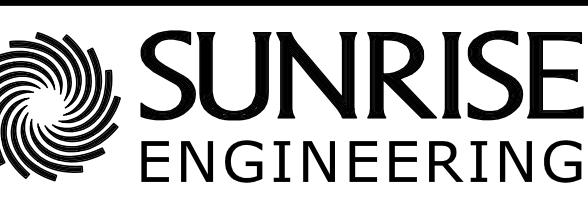
CONCRETE LAP AND DEVELOPMENT NOTES

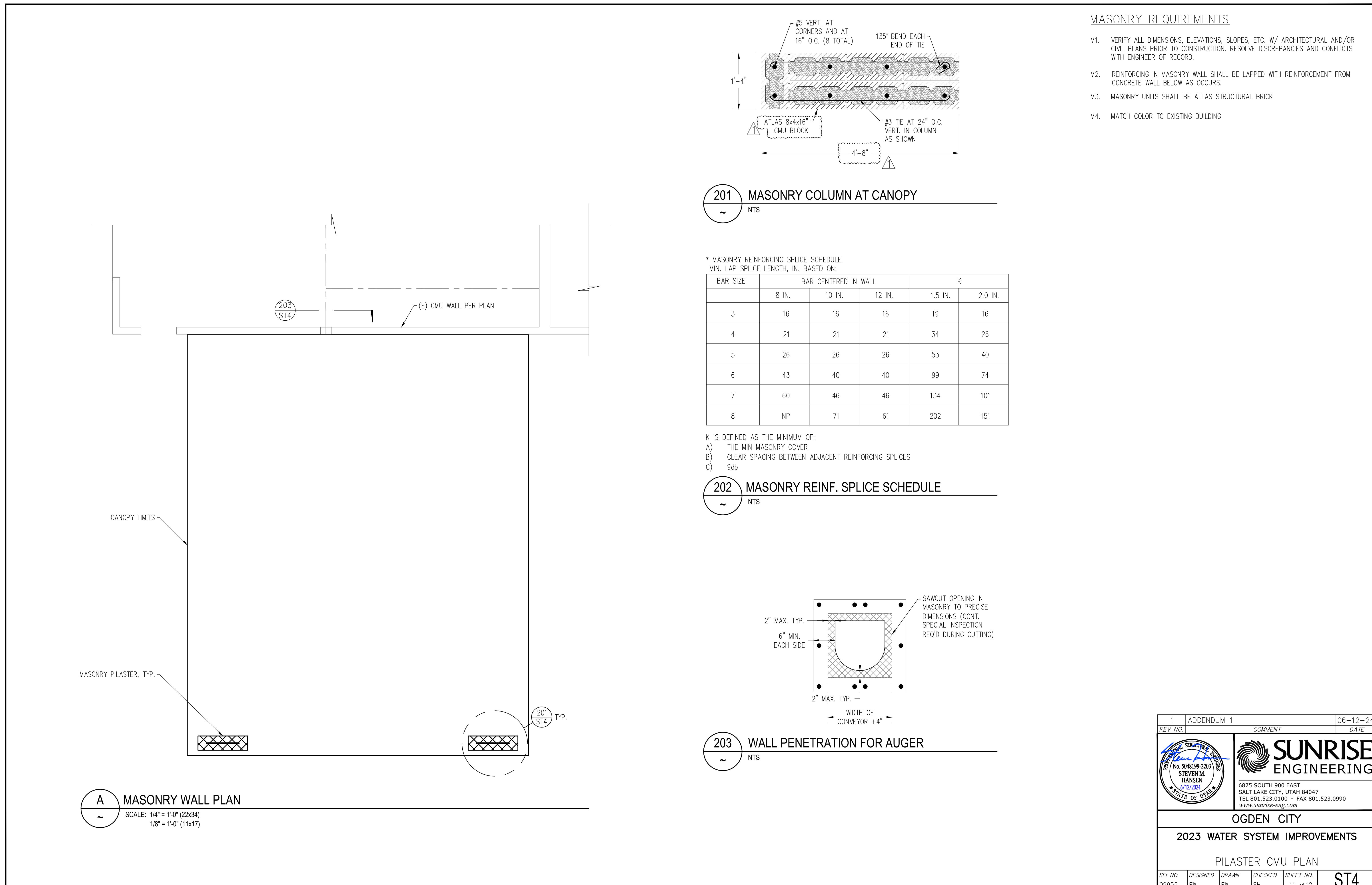
- ① TOP BARS ARE HORIZ. BARS PLACED SUCH THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN MEMBER BELOW SPLICE
- ② WHERE BARS OF UNEQUAL SIZE LAP ONE ANOTHER, USE TABULATED LAP LENGTH FOR SMALLER BAR U.N.O.
- ③ LAP SPLICE LENGTH PER SCHEDULE
- ④ CLEAR DISTANCE BETWEEN ADJACENT BARS OR SPLICES TO BE USED IN DETERMINING APPLICABLE LAP LENGTH FROM SCHEDULE
- ⑤ OPTIONAL OFFSET. SEE STANDARD REBAR BEND DETAILS FOR OFFSET REQUIREMENTS
- ⑥ FOR NON-CONTACT LAP SPLICES, MIN. CLEAR DISTANCE BETWEEN SPLICED BARS SHALL BE PER GENERAL STRUCTURAL NOTES. MAX. CLEAR DISTANCE SHALL BE 1/5 THE TABULATED LAP LENGTH OR (6" - "DB"), WHICHEVER IS LESS, WHERE "DB" = BAR DIA.

102 CONC. LAP/DEVELOPMENT SCHED.



101 ISOLATED FOUNDATION / FOOTING

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 <p>SUNRISE ENGINEERING</p> <p>6875 SOUTH 900 EAST SALT LAKE CITY, UTAH 84047 TEL 801.523.0100 • FAX 801.523.0990 www.sunrise-eng.com</p>		
OGDEN CITY		
2023 WATER SYSTEM IMPROVEMENTS PILASTER FOOTING/FOUNDATION PLAN & DETAILS		
SEI NO.	DESIGNED	DRAWN
09955	SIA	SIA
CHECKED	SH	SH
SHEET NO.	10 of 12	ST3



09910.1 DESCRIPTION

The Contractor shall furnish all labor, materials and equipment necessary to paint all designated components of buildings, piping and equipment in accordance with these Specifications.

09910.1.1 RELATED WORK

Not used.

09910.1.2 SUBMITTALS

09910.1.2.1 **DESCRIPTIVE LITERATURE** - Descriptive literature identifying manufacturer, type, content, application recommendations, and color samples, shall be provided in accordance with Section 01300 of these Specifications.

09910.1.2.2 **DATA FOR PAINT APPROVAL** - Complete data on each type and kind of paint and primer shall be submitted to the Engineer for approval. Approval shall be received from the Engineer before the paint is delivered to the jobsite. This procedure must be followed whether or not the paint that the Contractor proposes to use is named in the Specifications. Approval data shall show where and for what uses each paint product is proposed. Information submitted on each proposed type and kind of paint shall include data to show that the paint meets the detailed requirements of these Specifications.

09910.1.2.3 **SAMPLES** - The Contractor shall prepare and submit sample colors for all items which require color selection by the Engineer. No color selection will be made until all samples of all paints have been submitted. After all samples of all paints have been submitted, the Engineer will prepare a color scheme using the submitted colors. Colors will not necessarily be standard colors with all suppliers. The manufacturer shall mix colors, to secure the desired color when it is not one of his standard colors.

09910.1.2.4 **SAND BLAST PANELS** - The Contractor, at the beginning of the Project, shall furnish one square foot steel panels sandblasted in accordance with the sandblasting specifications and coated with non-yellowing shellac or clear non-yellowing plastic coating. Panels shall be used as the standards for preparation of steel surfaces for the duration of the project.

09910.1.2.5 **PAINT REMNANT** - At the end of the project, the Contractor shall turn over to the Engineer a gallon can of each type and color of paint, primer, thinner, or other coating used in the field painting. If the manufacturer packages the material concerned in gallon cans, then it shall be delivered in unopened labeled cans as it comes from the factory. If the manufacturer does not package the material in gallon cans, and in the case of special colors, the materials shall be delivered in new gallon containers, properly closed with typed labels indicating brand, type, color, etc. The manufacturers' literature describing the materials and giving directions for their use shall be furnished in three bound copies. A typewritten inventory list shall be furnished at the time of delivery.

09910.1.3 DEFINITIONS

Submerged Surfaces - In general, items shall be treated as submerged if they are to be at any time under water or are in structures that normally contain water. Unless specified otherwise, anything below the tops of the walls of such structures shall be considered as submerged.

09910.2 MATERIALS**09910.2.1 QUALITY CONTROL**

This Specification is not intended to be exclusive or limit competition, but rather to set forth the minimum standards for quality and performance. The Owner reserves the right to reject substitutions if in his opinion, the proposed substitutions will not achieve comparable equipment installation and performance standards.

09910.2.2 COLOR

The Engineer will make color selection from color samples provided by the Contractor.

09910.2.3 PAINT SELECTION

All paint and coating systems shall include high quality materials, resistant to temperatures up to 130°F, and sunlight exposure. Paints selected shall meet the manufacturer's recommendations and suitability standards for the specific application where it will be used.

09910.2.3.1 MINIMUM REQUIREMENTS - Minimum requirements for paint materials and their application shall be as shown in the tables below:

EXTERIOR PAINT APPLICATION TABLE

Application Substrate	No. of Coats	Paint Materials and Manufacturer*	Coating Thickness (Mils Per Coat)
Wood Siding, Trim, Doors	1	A-100 Exterior Alkyd Wood Primer	2.3
	2	A-100 Exterior Latex Flat House & Trim by Sherwin Williams - OR -	1.3
	1	SUPRIME 8 Exterior	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert- OR -	1.3
	1	System 2H-4 Alkyd by Tnemec	
	2	Tnemec Series 10-99W Undercoater 2H-Color Hi-Build Tnemec Gloss	2.5
Porous Masonry (Block)		Series 156 Modified Epoxy Sand Texture Finish by Tnemec	
	2	Series 156, 25 BR	4-8
Concrete Walls, Above Grade	1	Loxon Ext. Masonry Acrylic Primer	3.1
	2	A-100 Exterior Latex Satin House & Trim by Sherwin Williams -OR -	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert – OR –	1.3
	2	Series 1029 Acrylic Latex Low Sheen by Tnemec	2.5
Metal (Aluminum)	2	A-100 Exterior Latex Satin House & Trim by Sherwin Williams - OR -	1.3
	1	SUPRIME 3 Latex Metal Primer	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert – OR –	1.3
	1	DEFLEX 4020 Primer	3
	1	DEFLEX 4206 S/G Waterborne Acrylic Enamel by DeVoe	1.5
Metal, New Steel, (Mild Service)	1	Kem Kromik Universal Metal Primer	2.5
	2	Direct to Metal Enamel by Sherwin	3.0

Application Substrate	No. of Coats	Paint Materials and Manufacturer*	Coating Thickness (Mils Per Coat)
	1	Williams - OR - SUPRIME 3 Latex Metal Primer	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert - OR -	1.3
	1	Devguard 4160 Primer followed by	2
	1	Devguard 4308 Alkyd Enamel or	2
	2	DEFLEX 4218 DTM Enamel by DeVoe	2
Metal, New Steel, (Severe Service)	1	Series 27 WB Typoxy by Tnemec	4
	1	73-Color Endura-Shield	2
Metal, Galvanized Steel, (Mild Service)	1	Galvite HS	2.0
	2	A-100 Exterior Latex Satin House & Trim by Sherwin Williams -OR -	1.3
	1	SUPRIME 2 Latex Metal Primer	1.3
	2	Pro-Hide Plus Latex Satin House by Pratt & Lambert - OR -	1.3
	1	Devguard 4020 Primer	3
	2	DEFLEX 4206 S/G Waterborne Acrylic Enamel by DeVoe	1.5
Metal, Galvanized Steel, (Severe Service)	1	Series 27 WB Typoxy by Tnemec	4
	1	Series 10 Primer by Tnemec	2
PVC Pipe		System 66-23 Epoxy Polyamide by Tnemec	
	1	66-Color Hi-Build Epoxoline	4

INTERIOR PAINT APPLICATION TABLE

Application Substrate	No. of Coats	Paint Materials and Manufacturer*	Coating Thickness (Mils Per Coat)
Woodwork	1	ProMar 200 Alkyd Enamel Undercoater	1.9
	2	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams-OR	1.7
	1	SUPRIME 11 Int Alkyd Wood Primer	1.5
	2	Pro-Hyde Plus Alkyd Satin by Pratt & Lambert - OR -	1.5
Woodwork Continued	1	System 2H-4 Alkyd by Tnemec	
	2	Series 10-99W Tnemec Primers	2.5
		2H-Color Hi-Build Tnemec Gloss	2
Drywall	1	ProMar 200 Latex Wall Primer	2.5
	2	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR -	1.8
	1	SUPRIME 1 100% Acrylic MP Primer	1.1
	2	Pro-Hyde Plus Latex Satin by Pratt & Lambert - OR -	1.5
		System 6-1 Acrylic Latex Low Sheen by Tnemec	
	2	Series 1029 Enduratone	2

Application Substrate	No. of Coats	Paint Materials and Manufacturer*	Coating Thickness (Mils Per Coat)
Metal (Aluminum)	1	SUPRIME 9 Int/Ext Alkyd Metal Primer	1.1
	2	Pro-Hyde Plus Alkyd Satin by Pratt & Lambert – OR –	1.5
	1	DEFLEX 4020 Primer	3
	1	DEFLEX 4206 Semi-Gloss Waterborne Acrylic Enamel	1.5
Metal, New Steel, (Mild Service)	1	Kem Kromik Universal Metal Primer	2.5
	2	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR -	1.7
	1	SUPRIME 9 Int/Ext Alkyd Metal Primer	1.1
	2	Pro-Hyde Plus Alkyd Satin by Pratt & Lambert – OR –	1.5
	1	Devguard 4160 Primer followed by	2
	1	Devguard 4308 Alkyd Enamel or	2.5
	2	DEFLEX 4218 DTM Enamel by DeVoe	2
Metal, New Steel, (Severe Service)		System 66-2 Epoxy Polyamide by Tnemec	
	1	66-1211 Epoxoline Primer	3.5
	1	66-Color Hi-Build Epoxoline	4
Metal, Galvanized Steel, (Mild Service)	1	Galvite Paint	2.0
	2	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR -	1.8
	1	SUPRIME 9 Int/Ext Alkyd Metal Primer	1.1
	2	Pro-Hyde Plus Alkyd Satin by Pratt & Lambert – OR –	1.5
	1	Devguard 4020 Primer	3
	2	DEFLEX 4206 S/G Waterborne Acrylic Enamel by DeVoe	1.5
Metal, Galvanized Steel, (Severe Service)		System 66-2 Epoxy Polyamide by Tnemec	
	1	66-1211 Epoxoline Primer	3.5
	1	66-Color Hi-Build Epoxoline	4
Ductile Iron (DI) Pipe and fittings	1	SUPRIME 9 Int/Ext Alkyd Metal Primer	1.1
	2	Pro-Hyde Plus Alkyd Satin by Pratt & Lambert – OR –	1.5
	1	Devguard 4160 Primer followed by	2
	1	Devguard 4308 Alkyd Enamel or	2.5
	2	DEFLEX 4218 DTM Enamel by DeVoe	2
		System 6-1 Acrylic Latex Low Sheen by Tnemec	
PVC Pipe (Mild Service, Interior Only)	2	Series 1029 Enduratone	2
PVC Pipe (Severe Service)	1	System 66-23 Epoxy Polyamide by Tnemec	
		66-Color Hi-Build Epoxoline	4
Concrete Walls and Ceilings (Mild Service)	1	ProMar 200 Latex Wall Primer	1.1
	2	ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR -	1.3
	1	SUPRIME 4 Latex Wall Primer	1.2

Application Substrate	No. of Coats	Paint Materials and Manufacturer*	Coating Thickness (Mils Per Coat)
	2	Pro-Hyde Plus Latex Satin by Pratt & Lambert	1.5
Concrete Walls and Ceilings (Severe Service)	2	System 66-4 Epoxy Polyamide by Tnemec Series 27 WB Typoxy by Tnemec	4
Porous Masonry Walls (Mild Service)	1 2 1 2	Pre-Prime 167 by Devoe ProMar 200 Latex Wall Primer ProMar 200 Int Alkyd Semi-Gloss by Sherwin Williams - OR - SUPRIME 4 Latex Wall Primer Pro-Hyde Plus Latex Satin by Pratt & Lambert	1.5 1.1 1.3 1.2 1.5
Porous Masonry Walls (Severe Service)	1 2	System 66-15 Epoxy Polyamide by Tnemec 54-660 Masonry Filler Series 27 WB Typoxy by Tnemec	75-100 4
Concrete Floors (Mild Service)	1 1 2 2 2	Pre-Prime 167 by Devoe Concrete and Terrazzo Sealer (ANCO Cure and Hard by Intermountain Concrete Specialties. Industrial Enamel by Sherwin Williams - OR - With STAND Alkyd Floor Enamel by Pratt & Lambert - OR - Devguard 4328 Alkyd Enamel by DeVoe	1.5 None 2 1 2
Concrete Floors (Severe or Mild Service)	2	System 67-1 Epoxy Polyamide Semi-Gloss by Tnemec 67-Color Tneme Tread	2.5

*Brand names of materials have been used to indicate the types and quantities of materials required. Approved equals will be accepted.

09910.2.3.2

PAINT FOR WASTEWATER SYSTEMS - All paint for concrete and metal surfaces in wastewater systems shall be especially adapted for such use.

- Fume Resistance. All paint for final coats shall be fume resistant, compounded with pigments suitable for exposure to sewage gases, especially to hydrogen sulfide and to carbon dioxide. Pigments shall be materials, which do not tend to darken, discolor, or fade due to the action of sewage gases. If a paint manufacturer proposes use of paint which is not designated "fume resistant" in its literature, it shall furnish full information concerning the pigments used in this paint.
- Lead Paint. No lead paints shall be used.

09910.2.3.3

PAINT FOR POTABLE WATER SYSTEMS - All paint systems to be used in potable water service shall meet NSF requirements. See also Subsection 09910.2.3.5 below.

09910.2.3.4 PAINT FOR SUBMERGED SURFACES

- Coal Tar Epoxy. Coal tar epoxy shall meet and conform with Government Specification Mil P-23236 with further qualification that the coal tar epoxy manufacturer and product must be listed on the current U.S. Navy Qualified Products List. Coal tar epoxy shall be subject to the Engineer's approval.
- Alternate Systems. Alternate coating systems for submerged service, such as Epoxy Polyamide Epoxoline by Tnemec, Epoxy Bar Rust 233H, by DeVoe, or equal, may be required for some applications, or may be approved in lieu of coal tar by the Engineer, upon request. Some colors of Epoxy Polyamide Epoxoline, or equal may be acceptable for use in potable water systems, however the manufacturer must be consulted for verification of acceptability prior to use in potable water applications.

09910.2.3.5 HIGH TEMPERATURE SURFACE TO 400°F - Paint for high temperature surfaces shall be DeVoe Hi-Heat Aluminum HT-4, Glidden 592 Metallite Aluminum, or Sherwin-Williams Silver-Brite Heat resisting aluminum paint B59 S1, or approved equal.

09910.2.4 CLEANING MATERIALS

Cleaning materials shall be best quality solvents, chemicals or detergents, which are commercially prepared for preparing painted surfaces and delivered to the site in sealed containers bearing an identifying label and the manufacturer's name.

09910.3 APPLICATION REQUIREMENTS

ALL paint and coating systems shall be applied in strict accordance with the manufacturer's published instructions for use.

09910.3.1 SURFACE PREPARATION

09910.3.1.1 CLEANING - All surfaces to be painted shall be clean and dry except that in some cases the paint manufacturer's directions may require wetting the surface before painting. Grease and oil shall be removed by wiping with mineral spirits or naphtha per Specification SP-1. Rust, scale, welding slag, and spatter shall be removed and the surface prepared by hand tool cleaning, power tool cleaning, or blast cleaning in accordance with the appropriate Specification SP-2 through SP-10.

09910.3.1.2 METAL SURFACES - Except as otherwise provided, all preparation of metal surfaces shall be in accordance with Specifications SP-1 through SP-10 of the Steel Structures Painting Council (SSPC). Sandblasting procedures shall be as follows:

- No surface, which is to be sandblasted, shall be given a coat of primer or paint in the shop or in the field before sandblasting.
- Unless otherwise specified, all iron or steel surfaces which are to be painted as submerged metal shall be dry sandblasted on the site in accordance with Specification SP-10, near white blast cleaning.
- Except as otherwise specified, all metal surfaces, which are to be painted as non-submerged metal, shall be commercial blast cleaned per Specification SP-6. This sandblasting shall be done not more than 12 hours ahead of the painting, subject to humidity and weather conditions between the time of sandblasting and painting operations. If any rusting of sandblasted surfaces occurs before painting, such rusting shall be removed by additional sandblasting.

- Threaded portions of valve and gate stems, machined surfaces intended for sliding contact, surfaces to be assembled against gaskets, surfaces of shafts for sprockets or to fit into bearings, machined surfaces of bronze trim on slide gates, and similar surfaces shall be masked off to protect them from the sandblasting of adjacent surfaces.
- Cadmium-plated or galvanized items shall not be sandblasted except that cadmium plated, zinc-plated, or sheradized fasteners used in assembly of equipment to be sandblasted shall be sandblasted in the same manner as the other metal.
- Surfaces which cannot be sandblasted, or cannot be sandblasted and then painted after the assembly of which they are a part has been completed and placed in final position, shall be sandblasted, or sandblasted and painted, before the items are put into final position. In some cases, while the painting could be done after the items concerned were in place, the limitation on time between sandblasting and painting may make it necessary to paint the surfaces before installation of those items.
- Sand or other media residue from sandblasting operations shall be thoroughly removed, using any method necessary and consistent with the requirements of the painting system, including vacuum cleaners or other means.

09910.3.1.3 **GALVANIZED SURFACES** - Galvanized surfaces which are to be painted shall first be treated with Koppers No. 40 Metal Conditioner; Amercoat No. 59 as manufactured by Amercoat Corporation, Brea, California; Galvaprep No. 5 as manufactured by Amchem Products, Fremont, California; or approved equal.

09910.3.1.4 **CONCRETE SURFACES** - Concrete and masonry surfaces shall be free of dust, mortar droppings and spatter, fins, loose concrete particles, form release materials, oil, grease, and other deleterious materials. If required by the coating manufacturer, such surfaces shall be etched as specified below or brush off blast cleaned per Specification SP-7.

Concrete surfaces specified to be acid etched shall be etched with a 15 to 20 percent solution of muriatic or sulfamic acid until the surface has the texture of fine sandpaper. The surface shall then be thoroughly scrubbed with clean water, rinsed, and allowed to dry.

09910.3.1.5 **WOOD SURFACES** - Wood shall be cleaned and dusted immediately prior to painting. Final dusting shall be accomplished using tack cloth. Shelves, drawers, benches, and associated woodwork shall be sanded before painting and lightly sanded between coats. Prior to application of each coat, the surfaces shall be again dusted with tack cloth to remove all dust.

09910.3.1.6 **BITUMINOUS PAINTED SURFACES** - Surfaces, which are to be painted with other than bituminous paint, and which have a bituminous coating (such as coal tar varnished pipe), shall be sealed with not less than 2 coats of Inertol Tar Stop; Sherwin-Williams Metalatex B42W100; Glidden Insulcap as manufactured by the Glidden Company; or approved equal. This seal coating shall be applied in sufficient quantity to permanently prevent bleeding of the bituminous coating.

09910.3.1.7 **HIGH TEMPERATURE SURFACES** - In general, high temperature paint shall be applied to exposed (un-insulated) steam line valves and traps, heat exchangers, and miscellaneous metal piping and equipment in piping and mechanical systems exposed to high temperatures. The Contractor shall paint these surfaces with two coats of high temperature paint as specified herein or as otherwise shown or directed. No painting shall be done on surfaces with a temperature in excess of 125 degrees F at the time of application. Immediately before application of the first coat of paint, the surface shall be sandblasted according to SSPC-SP-5 (Blast Cleaning to "white" metal). See also Subsection 09910.3.1.2 above.

09910.3.1.8 THINNING - No thinning of paint other than as directed by the manufacturer's published directions shall be done without the approval of the Engineer. No painting shall be done under conditions, which, in the opinion of the Engineer, will jeopardize the appearance or quality of the painting in any way.

09910.3.1.9 TINTING OF FIRST COAT - When two coats of the same material are specified, the first coat applied shall be tinted with aluminum powder, lampblack, or other suitable pigment to distinguish it from the top coat.

09910.3.1.10 BETWEEN-COATS TREATMENT - All painted surfaces shall be dusted between coats, and high gloss finish shall be lightly sanded and dusted between coats unless otherwise directed by the manufacturer.

09910.3.2 PAINT APPLICATION

09910.3.2.1 PAINTER QUALIFICATIONS - Contractor or subcontractor personnel applying the coating system shall have had past experience in application of the type or types of coatings and under similar conditions that it will be required to meet in this contract. The qualifications of personnel applying the coating system, whether Contractor or subcontractor shall be verified by the Contractor prior to allowing application to proceed. The Contractor shall not subcontract paint application to a subcontractor that is not qualified to apply the coating system.

09910.3.2.2 WEATHER CONDITIONS - No painting shall be done under dusty conditions, during or immediately after a rain, during rainy weather, or when the temperature is less than 50°F.

09910.3.2.3 GENERAL REQUIREMENTS FOR APPLICATION OF PAINT – These requirements shall be as follows:

- All work shall be done in a workmanlike manner, leaving the finished surfaces free from drops, ridges, waves, holidays, laps, or brush marks.
- Where possible, prime coats shall be applied by brush and well worked into the surface, unless directed otherwise by the paint manufacturer.
- Other paints may be applied by brush, roller, trowel, or spray, unless manufacturer's recommendations or these Specifications require a particular method of application.
- Primer and intermediate coats of paint shall be un-scarred and completely integral at the time of application of each succeeding coat.
- Each coat shall be subject to the inspection and approval of the Engineer before the next succeeding coat is applied, and defective work of any kind shall be deemed sufficient cause for re-coating the entire surface involved.
- Where spray application is used, each coat of paint shall be applied to a thickness equivalent to a brush coat application at a coverage rate not greater than that specified by the manufacturer for a brush coat application. All spray painting shall be done with airless type spray units.
- The time interval between paint coats shall meet the recommendations of the paint manufacturer, and these Specifications. The Contractor shall not allow excessive time or exposure between coats, where such excessive time or exposure will impair the bond between the coats.

- The number of coats specified in these Specifications is the minimum to be applied. Suction spots between coats shall be touched up, and additional coats shall be provided if required to produce a finished surface with a solid, even color free from defects.
- The total thickness of the coating shall be as specified. Additional coats of paint shall be added if necessary to bring the total thickness up to not less than that specified. For control, the Contractor shall determine the dry film thickness of the coatings on metal surfaces with a correctly calibrated thickness meter. The Contractor also shall check for holidays with a low voltage holiday detector. The Engineer may use the Contractor's meter and detector for additional inspection and checking deemed necessary.
- Particular care shall be used to assure that the specified coverage is secured on the edges and corners of all surfaces. Additional brush coats shall be applied if necessary to ensure coverage of the edges and corners.
- Damaged paint or scratched painted surfaces shall be sanded smooth before repainting. Sanding and repainting shall be done to such a degree and in such a manner that all evidence of the scratches or damages is obscured.

09910.3.2.4 COAL TAR EPOXY – Application of coal tar epoxy shall be as follows:

- Where called for in the Painting Schedule, shown on the Drawings, or required in these Specifications, concrete and some other submerged surfaces shall be coated with not less than two coats of coal tar epoxy.
- Only components from new, previously unopened containers shall be used to mix coal tar epoxy coatings. Coal tar epoxy shall be mixed and applied in accordance with the manufacturer's recommendations. All coating components shall be mixed with power mixers. The time during pouring or stirring will not be allowed as mixing time. The minimum mixing time as recommended by the manufacturer shall be met. Only unit quantities shall be mixed.
- Coal tar epoxy shall be applied to a total dry film thickness of not less than 16 mils.
- Some metal surfaces may require sandblasting prior to application of the coating system. See Subsection 09910.3.1.2 above.
- In some cases it may also be necessary to apply coatings to parts or subassembly surfaces before they are actually installed at their final Project or system location. All support brackets, stem guides, pipe clips, fasteners, etc. that are bolted to concrete shall be painted on all sides.
- Application of coal tar epoxy shall be performed only at the job site unless specific approval is granted for offsite application. Offsite application will not be allowed unless by an applicator with acceptable proven and documented experience in the application of coal tar epoxy systems.
- Each succeeding coat shall be applied over the previous coat as soon as possible in accordance with the manufacturer's instructions, without causing sagging. Succeeding coats shall not be delayed longer than allowed by the manufacturer's instructions. In no case shall the application of subsequent coats be made after the previous coat has set or oxidized. All coats, and the full thickness on all parts, shall be applied before the previous coat has cured. The Contractor shall check the film thickness after application, and before the coating has cured, to ensure that sufficient coating thickness has been applied. If additional coating is necessary, it

shall be applied the same day. Checking and control of thickness at this stage shall be the Contractor's obligation and responsibility and not the Engineer's.

- If the surface coating has been applied for a longer period of time than the limits in the Table below, and if it is found that bituminous paint has not been applied to the specified thickness, the areas that are too thin shall be sandblasted to remove the surface film from the coating. These sandblasted areas shall then be washed and cleaned with the solvent recommended by the manufacturer and shall be re-coated within the time limits specified for coating over fresh bituminous paint. Washing or cleaning the surface of the paint with solvents or other solutions will not be a satisfactory substitute for the specified sandblasting if the painted surface is older than the time limits indicated in the table. This applies even if the paint manufacturer approves the solvent method as adequate for preparing the old surface.

TEMPERATURES AND COATING TIMES

Average Temperature	Maximum Time Between Coats
50 - 60° F	36 hours
60 - 70° F	24 hours
70 - 80° F	12 hours
80 - 120° F	4 hours

Coal tar epoxy shall not be applied when the ambient temperature is less than 50 degrees.

09910.3.2.5 EDGES AND CORNERS - The Contractor is hereby CAUTIONED that the edges and corners of members are difficult places upon which to build the required thickness of paint. The required thickness must be applied to all surfaces, including the corners and edges, by applying as many spray coats as necessary or by additional brush coats on the corners and edges, if necessary, in order to build up the required thickness.

09910.3.3 FINISH SCHEDULE

The Contractor shall finish all work as follows unless indicated otherwise on the Drawings or within these Specifications:

TABLE OF FINISH SCHEDULES

NO FINISH	FACTORY FINISH	SITE FINISH
Stainless Steel Surfaces	Heating Units	Interior Concrete Building
Polished Aluminum Surfaces	Electric Control Panel Cabinets	Floors and Walls
Chain Link or Stock Fencing	Cranes & Hoists	Interior Building Walls & Ceiling
Name Plates	Gauges and Meters	All Interior and Exterior
Exterior Concrete	Instruments	Exposed Piping Valves & Pipe Supports
Exterior Masonry Surfaces	Light Fixtures and Cover Plates	Exposed Electrical Conduit & Junction Boxes
Exposed Plastic Pipe & Fittings	Electrical Wiring & Transformers	Entry Doors and Frames
Warning Labels	Ventilating Fans	Wood Moldings and Trim
Operating Instructions	Dampers	Other Exterior Surfaces
Gratings	Air Conditioning Units	Indicated on drawings
Buried or Encased Pipe	Metal Soffit & Fascia Covering	
	Roofing and Siding	
	Roll-Up Overhead Doors	
	Motors, Pumps, Equipment	

09910.3.4 CLEANUP

Upon completion of painting, the Contractor shall remove all masking and protective covers and properly dispose of all rubbish, debris and unused paint materials. The Contractor shall remove and cleanup all paint overspray, drips, spatters and etc. from any and all surfaces where it does not belong.

09910.4 METHOD OF MEASUREMENT**09910.4.1 NO MEASUREMENT**

Separate measurement for Painting will not be made when painting is included as part of an item, building or structure listed in the Bid Schedule.

09910.4.2 SEPARATE MEASUREMENT

Separate measurement for Painting will be made as a Lump Sum when painting is listed as a separate item in the Bid Schedule.

09910.5 BASIS OF PAYMENT

When Painting is included as part of the measurement of another item, structure or building listed in the Bid Schedule, separate payment will not be made.

When Painting is required for a specific item, the accepted quantity will be paid for at the contract unit price for:

PAY ITEM	UNIT
Paint (<i>Item Description</i>)	Lump Sum

DOCUMENT 130100SP
SPECIFICATIONS FOR SHAFTLESS SCREW CONVEYORS

1. **SCOPE**. This section covers furnishing shaftless screw conveyors for the conveyance of dewatered sludge from a belt filter press.
2. **GENERAL**. Equipment furnished in this specification shall be fabricated and assembled in full conformity with this specification and as shown in the contract drawings. Each conveyor shall be furnished complete with all supports; all mechanical equipment required for proper operation, including complete drive units; all steel, iron, and other metal construction specified herein; and all additional materials or fabrication as required by the supplier's design.

All equipment included in this section shall be furnished by a single supplier who shall be responsible for the design, coordination, and the satisfactory operation of the system. The conveyor system shall be the shaftless type as manufactured by Spirac, Jim Meyers and Sons (JMS), or approved equal, including all equipment, materials and appurtenances necessary and as specified herein.

Any requirement included in this specification that is solely produced or fabricated by only one of the companies above, may be waived by the City as the goal for this specification is to aid contractors in providing a competitive bid.

The OWNER shall make the sole determination if the alternate bid shaftless conveyor system will be acceptable.

Any re-design required to accommodate the OWNER approved alternate bid equipment shall be borne by the contractor and equipment manufacturer.

The shaftless screw conveyor equipment shall include, but not be limited to the following:

- * Spiral flighting.
- * Troughs and Liners.
- * Chutes.
- * Covers.
- * End Seals
- * Motor Reducer.
- * Mounting and Support Structure.
- * Safety Accessories.

2.01. **Power supply**. Power supply to the equipment will be 480 volts, 60 Hz, 3-phase. Power supply for controls shall be 120 volts, 60 Hz, single phase.

2.02. **Electrical Equipment**. All electrical equipment shall conform to applicable standard of the National Electrical Manufacturers Association (NEMA) and the National Electrical Code (NEC). Both power and control equipment shall be insulated for not less than 600 volts even though operating voltages may be lower.

All motors shall be totally enclosed, fan cooled (TEFC).

2.03. Fabrication. All welds shall be continuous unless otherwise specified. Facing surfaces of bolted joints shall be shop primed. Facing surfaces of field welded components shall be beveled and match marked.

2.04. Edge Grinding. Sharp corners of all cut and sheared edges shall be made smooth by a power grinder.

2.05. Fasteners. All bolts, nuts, washers, and other fasteners shall be AISI 316 stainless steel.

2.06. Surface Preparation. All iron and mild steel surfaces to be painted shall be dry abrasive grit blasted to "near white metal" in accordance with SSPC-SP6 or SSPC-SP10, and in accordance with the painting section of these specifications. Grit blasted surfaces shall be painted within 24 hours to prevent rusting and surface discoloration.

2.07. Painting. After surface preparation, metal surfaces except for the spiral flighting shall receive a minimum of one coat of primer or equal for the spiral, and for other surfaces one primer and one coat epoxy paint prior to shipment to jobsite. The spiral shall receive one coat of primer. Stainless steel components shall be furnished unpainted.

3. MANUFACTURER'S QUALIFICATIONS. (Horizontal and Inclined Conveyors)

The shaftless screw conveyors shall be manufactured by a reputable supplier with not less than 15 operating installations of shaftless screw conveyors in North America. The Contractor shall provide the Engineer with a written statement indicating that the conveyor manufacturer has at least 5 years' experience in the construction and manufacture of shaftless conveyor systems incorporating the design features as herein specified.

The Supplier shall acknowledge that he is familiar with all the requirement of the contract documents relevant to the equipment supplied herein and agrees to perform and observe all obligations under the contract documents which relates to the portion of the work covered by this section and related sections.

The Supplier of the material and/or products included in this section undertakes and agrees to defend, at Supplier's own expense, all suits, action or proceeding brought against the municipality or its Contractor(s) for actual or alleged infringement on any United States patent or foreign letters patent because or on account of the employment of sales of such material or products, and further agrees to pay and discharge any and all judgments or decrees which may be rendered in any such suit, action or proceeding against the defendants herein.

3.1 STANDARD SCREW CONVEYORS with shafts and intermediate bearings will not be acceptable due to their inherit ability to become clogged from the stringy, sticky, gelatinous, thixotropic characteristics of the conveyed material. Conveyor rotational speeds shall not be greater than herein specified.

4. PERFORMANCE AND DESIGN REQUIREMENTS. The shaftless screw conveyor system shall be designed to meet the following minimum performance and design requirements. The standards for conveyor selection shall be based on the operational experience of the manufacturer with shaftless screw

conveyors, and not standards developed for shafted screw conveyors.

POSITION	CONVEYOR #1	CONVEYOR #2
Cubic ft per Hour	240	240
Material	Sludge	Sludge
Material Density (lbs./ft. ³)	65	65
Max Solids		
Length	15 ft.	25 ft.
Angle	Horizontal	Horizontal
Max Screw Speed RPM	20	20
Max Trough Fill	50%	50%
Minimum Flight OD	11.2"	11.2"
Min. Spiral Weight per Ft.	27 lbs.	27 lbs.
Minimum Trough Width	12.5"	12.5"
Minimum HP	3.0	3.0
Drive Location	Inlet End	Inlet End
Motor Type	TEFC	TEFC
Reversing Screw	No	Yes

4.01. Material. Unless otherwise specified or permitted, the materials used in the fabrication of the equipment under this section shall conform to the following:

Chutes

AISI 304, ASTM A167, 18-8

Troughs, End Plates, Covers

AISI 304, ASTM A167, 18-8

Supports

AISI 304, ASTM A167, 18-8

Hoppers

AISI 304, ASTM A167, 18-8

Spiral Flighting

Cold formed, High Strength Micro Alloy Carbon Steel with a minimum hardness of 220 Brinell

Wear Liner

Ultrahigh molecular polyethylene (4.02.04A)

Bolts, Nuts, and Washers
For Conveyor Supports

AISI 304, ASTM A167, 18-8

For Conveyor Trough,
Lids, and Drive

AISI 304, ASTM A167, 18-8

4.02. Shaftless Screw Conveyor Construction.

4.02.01. **Spiral Flighting.** Spiral flighting for the shaftless screw conveyors shall be designed to convey material without a center shaft. The minimum overall spiral weight and surface pressure shall be as specified herein. The conveyor will include an inner flight to increase axial strength and capacity of the conveyor. The minimum spiral weight shall be specified herein.

Spiral flights shall be cold-formed high strength micro alloy steel with a hardness of 220 Brinell +/- . The spiral flights shall be designed with the stability to prevent distortion and jumping in the trough. The torsional rating of the auger flighting shall be reached at 30% of the Fy value in the extreme fiber of the flight material. Supplier shall demonstrate that, at 250% of the motor nameplate horsepower, the drive unit cannot produce more torque than the torsional rating of the flighting, and that the "spring effect" of the spiral shall not exceed + 0.8 mm per meter of length at maximum load conditions.

Spiral flight material, fabrication technique, strength, hardness, and overall quality are critical to the proper operation of the conveying system as herein designed. Spiral flights that do not meet the characteristics herein specified are subject to review and approval by the City and may be rejected at no additional cost to the owner. Supplier shall provide certified written documentation that the spiral flights conform to the following:

Material: Micro Alloy Steel
Hardness: 220 Brinell +/-
Concentricity: 2.0 mm +/-

Supplier shall maintain a certified factory quality control program which shall include certification of spiral flighting as described herein

The spiral flighting shall be formed in sections from one continuous flat bar and shall be concentric to within 2mm +/- . Sectional flighting formed from plate shall not be permitted.

Spiral flighting shall have full penetration welds at all splice connections. The flights shall be aligned to assure true alignment when assembled in the field and shall be made in accordance with the supplier's requirements. The spiral flights shall be coupled to the end shaft by a flanged, bolted connection.

The connection of the spiral to the drive system shall be through a flanged connection plate that is welded to the spiral forming a smooth and continuous transformation from the flange plate to the spiral. The drive shaft shall have a mating flange and shall be bolted to the spiral connection plate.

4.02.02. **Horizontal and Inclined Troughs.** Troughs shall be similar to the dimensional standards of CEMA 300 and enclosure classification IIE. Each conveyor trough shall be U-shaped, fabricated from a minimum 1/8-inch stainless steel plate.

Stiffeners shall be placed across the top of the trough and bolted to both sides of the trough to maintain trough shape and act as a face seal for the covers; apply a continuous gasket, one half inch width, to the entire top face of the trough top flange and stiffeners.

Each trough shall be equipped with filling and/or discharge openings as required by the contract drawings. If required, each filling and discharge opening shall be flanged suitable for interconnection to other devices. Any interconnecting devices such as chutes and hoppers shall be fabricated from the same material as the troughs.

A flanged covered drain outlet shall be provided with each conveyor to facilitate cleaning.

The portion of each trough that is not covered by the filling chute shall be covered by a bolted cover of a material identical to the trough. The covers shall be manufactured in maximum four-foot length section to allow for access to the conveyors. To prevent unsafe access to the conveyors, quick opening covers will not be allowed.

4.02.03 Wear Liner (Anti-Wear UHMW) The wear liner for each conveyor shall be fabricated of ultra-high molecular weight polyethylene sintered with an anti-wear filler to reduce wear and synthetic lubricant to reduce friction. The liner shall be provided with a visual (two different color) indicator of excessive wear. The wear liner shall be furnished in maximum four-foot sections, 3/8" minimum thickness, to provide ease of replacement. The liner shall be held in place with clips; no fasteners will be allowed.

4.02.04. Inlet and Discharge Chutes. Inlet and discharge chutes shall be provided by the conveyor supplier as shown on the drawings. All chutes shall be fabricated from the same material as the conveyor trough.

4.02.05. Conveyor Supports. Each conveyor shall be furnished complete with supports suitable for mounting as shown on the contract drawings and as required by the supplier's design. The supports shall be shop fabricated from structural steel shapes and plates, and shall be assembled and fitted to the conveyor prior to its delivery to the jobsite. Supports and conveyor segments shall be match marked and shipped to the jobsite for assembly by the contractor others. At a minimum, each conveyor shall be provided with supports at the inlet and discharge end, with intermediate supports as required. Supports shall be fabricated of AISI 304 stainless steel or equal.

All shop welding shall conform to the latest standards of the American Welding Society (AWS). The supports shall be designed to avoid interference with other equipment or equipment supports.

4.02.06. Structural Design. All structural supporting members shall be designed such that the ratio of the unbraced length to least radius of gyration (slenderness ratio) shall not exceed 120 for any compression member and shall not exceed 240 for any tension member (of angles about Z-Z axis). In addition, all structural members and connections shall be designed so that the unit stresses will not exceed the American Institute of Steel Construction allowable stresses by more than 1/3 when subject to loading of twice the maximum design operating torque of the spiral conveyor drive motors.

4.02.07. Drive Units. Each spiral conveyor shall be driven by a constant-speed integral gear reducer/motor drive unit mounted to an adapter flange mounted to the end plate of the conveyor. The adapter flange shall allow the leakage of any material from the conveyor trough to atmosphere rather than into the gear reducer/motor drive unit. Direct coupling of the gear reducer/motor drive unit to the end flange of the conveyor will not be acceptable.

The drive unit shall be rigidly supported so there is no visible "wobble" movement under any operating condition. In the event of a prolonged power failure or emergency system shutdown the drive system shall be designed, at a minimum, to start the conveyor from a dead stop with the trough filled throughout its entire cross-sectional area and length with partially dried and hardened dewatered material.

Each motor shall be 460-volt, 60 Hz, 3-phase conforming to the General Equipment specifications, except as modified herein. Each motor shall be high efficiency, 40C ambient rated, 1.15 service factor and shall have Class F insulation. Motor shall have a TEFC enclosure with Design B speed/torque characteristics.

4.02.08 Gear Reducers. All gears shall be AGMA Class II, single or double reduction, helical gear units with high capacity roller bearings. Bearings shall be designed for the thrust loads from the fully loaded startup condition and shall have an AFBMA B10 life of 30,000 hours. The reducer will be the standard air-cooled unit with no auxiliary cooling. The gear reducer shall be sized with a torque service factor of 1.5 times the absorbed power or 1.1 times the motor nameplate, at the driven shaft speed, whichever is greater.

4.02.09A Packing Gland Seal. An adjustable greased gland packing ring consisting of two Teflon coated packing rings shall seal the drive shaft at its penetration through the end plate.

4.02.10. Motion Failure Alarm Unit. Each conveyor drive unit shall be equipped with a motion failure alarm unit. The location and mounting details shall be as recommended by the conveyor manufacturer. Motion sensors shall be the non-contacting type using a probe with a pre-amplifier and main electronic assembly. The main electronic unit shall operate on 120 volts, single phase, 60 Hz power supply, and shall be housed in a NEMA 4X enclosure. A 0 to 60 second time delay shall be provided for startup of the conveyor.

4.02.11. Emergency Shutdown. Each conveyor shall be furnished with an emergency trip cord and safety switch. The cord shall run the full length of each conveyor. The trip switch shall immediately stop all conveyors when the switch is actuated.

4.02.12 Heat Tracing and Insulation. Exterior section the load out conveyor shall be equipped with a self-regulating, low temperature heating cable. The cable shall be Chromalox, or equal, Type SRL rated 10 watts per foot at 120VAC. The cable shall consist of twin 16 AWG copper buss wires, semi conductive polymer core, flame retardant polyolefin jacket, tinned copper braid and a high temperature Fluoropolymer or TPR over jacket. Two heating cables shall be run on both sides of the trough as a minimum and additional strip shall be provided to ensure enough heat for the outside temperatures expected.

Conveyor be insulated with closed cell foam and an aluminum or stainless-steel protective covering. The amount of insulation required shall be determined by ambient temperature of the location.

Controls shall include, but not limited to, termination box or thermostat.

5. CONTROLS

A. General

1. The screw conveyors and all associated equipment and accessories supplied under this section shall be controlled by the existing belt filter press panel. The existing belt press panel shall be modified as necessary to accommodate new conveyor system. Conveyor manufacturer to coordinate with OWNER.
2. All electrical components mounted on the conveyor and conveyor frame, including junction boxes and instrumentation shall be of NEMA 4X construction.
3. All wiring shall be in accordance with the National Electrical Code.

6. QUALITY ASSURANCE. Conveyors shall be inspected and operated in the shop with the actual drive unit for this project in its entire length. Conveyor longer than the required shipping lengths will have the screws tack welded together and tested in their entire length. Conveyors should be operated for a minimum of 15 minutes and observed for alignment and abnormal operation. Conveyors shall be corrected as necessary. Prior to shipment the tack welds will be broken apart and conveyors suitably prepared for shipment. A video of the test should be supplied on disk to the contractor to be forwarded on to the engineer for record purposes. Video must be received to get paid.

7. MANUFACTURER'S FIELD SERVICES. After the equipment is installed the supplier shall provide a factory trained, experienced, competent, and authorized representative of the supplier to the jobsite to inspect, check, and approve the equipment installation supervise initial operation, and to train operating personnel in the proper operation and maintenance of the system. These services shall be performed by the supplier's representative at the jobsite for a minimum of six (6), eight (8) hour days (not necessarily consecutive) when the equipment is placed in service.

The supplier's representative shall furnish to the Owner, through the Engineer, a written report certifying that the equipment has been properly installed and lubricated, is in accurate alignment, is free from any undue stress imposed by connecting piping or anchorage, and has been operated under full load conditions and that it operates satisfactorily.

END OF SECTION