

Document 00910

ADDENDUM NO.2

Date of Addendum: 11/14/16

PROJECT NAME: Almeda Sims WWTP and Sludge Processing Facility Improvements –
Package 4

PROJECT NO: WBS No. R-000298-0010-4

BID DATE: November 17, 2016 (There is no change to the Bid Date.)

FROM: J. Timothy Lincoln, P.E., City Engineer
City of Houston, Department of Public Works and Engineering
611 Walker Street
Houston, Texas 77002
Attn: Xiaohua (Shari) Lin, P.E., Project Manager

TO: Prospective Bidders

This Addendum forms a part of the Bidding Documents and will be incorporated into the Contract documents, as applicable. Insofar as the original Project Manual and Drawings are inconsistent, this Addendum governs.

This Addendum uses the change page method: remove and replace or add pages, or Drawing sheets, as directed in the change instructions below. Change bars (|) are provided in the outside margins of pages from the Project Manual to indicate where changes have been made; no change bars are provided in added Sections. Reissued Drawing Sheets show the Addendum number below the title block and changes in the Drawing are noted by a revision mark and enclosed in a revision cloud.

CHANGES TO PROJECT MANUAL

BIDDING REQUIREMENTS

1. Document 00010 – Table of Contents. Remove Section 00010 in its entirety and replace with revised Section 00010.
2. Document 00410B – Bid Form Part B. Remove Section 00410 Part B in its entirety and replace with revised Section 00410 Part B.

CONTRACTING REQUIREMENTS

3. Document 00470 – Bidder's MWSBE Participation Plan. Remove page 00470-1 and replace with revised page 00470-1.
4. Document 00520 – Agreement. Remove page 00520-4 and replace with revised page 00520-4.

SUPPLEMENTARY CONDITIONS

5. Document 00800 – Supplemental Conditions. Remove Section 00800 in its entirety and replace with revised Section 00800.
6. Document 00821 – Wage Scale and Payroll Requirements for Building Construction. Add Document 00821 in its entirety.

SPECIFICATIONS

7. Document 01110 – Summary of Work. Remove page 01110-3 and replace with revised page 01110-3.
8. Document 02050 – Demolition and Modifications. Remove Section 02050 in its entirety and replace with revised Section 02050.
9. Section 03300 – Cast-In-Place Concrete. Remove page 03300-10 and replace with revised page 03300-10.
10. Section 15500 – HVAC – General Provisions. Remove pages 15500-9 and 15500-10 and replace with revised pages 15500-9 and 15500-10.
11. Document 15855 – Air Handling Units. Remove Section 15855 in its entirety and replace with revised Section 15855.
12. Section 16060 – Electrical Demolition. Remove pages 16060-3 and 16060-4 and replace with revised pages 16060-3 and 16060-4.

CHANGES TO DRAWINGS

1. Drawing S-3. Remove Drawing S-3 in its entirety and replace with Revised Drawing S-3.
2. Drawing S-4. Remove Drawing S-4 in its entirety and replace with Revised Drawing S-4.

CLARIFICATIONS

1. **Question:** Is there any sludge material in the storage silos or dryers that we are required to remove prior to demolition? If so, please provide a bid item with quantity for bidding purposes.

Answer: A minimal amount of sludge material may be present in silos, dryers, and other areas of the abandoned Sludge Processing Facility to be demolished. Any materials left shall be responsibility of the contractor to remove prior to demolition. An

additional Bid Item (No. 13) has been added to the Base Bid portion of the Bid Form in Section 00410 Part B to account for potential sludge removal necessary.

2. **Question:** Please confirm our scope does not include any grit/sludge removal from the sludge holding tanks.

Answer: CDM Smith expects minimal sludge material to be left in the existing Aerated Sludge Holding Tanks (ASHTs) after emptying and initial spray wash to be conducted by Wastewater Operations, but the Contractor shall be responsible for final cleaning of the ASHTs to perform the necessary work. Final cleaning shall include final ASHT basin washdown and removing any sludge or grit materials remaining after washdown by wastewater operations. An additional Bid Item (No. 13) has been added to the Base Bid portion of the Bid Form in Section 00410 Part B to account for potential sludge removal necessary.

3. **Question:** Bid Item #10 appears to be for demolished material removal and disposal (spec 02050). Please confirm. If this is for disposal of grit/solids from the holding tanks or sludge dewatering facility, please increase minimum unit price to more reasonable figure.

Answer: Extra Unit Price Item No. 10 has been removed. Sludge and grit removal to be paid under new Base Bid Item No. 13. See modifications to 00410B as part of Addendum No. 2.

4. **Question:** Please confirm that we don't need to salvage anything for the City, as discussed at the prebid and walkthrough. See also question 5 below.

Answer: Contractor will not be responsible to salvage any materials and equipment remaining by the start of construction.

5. **Question:** Specification 02050, par. 3.04.C and D state that wires in abandoned conduits or underground ductbank shall be removed, salvaged, and stored. Why is this required? If we are to salvage wire for the City, the demo cost will increase substantially, as labor to remove is higher and salvage value savings will no longer be passed on to the City in lower demo prices. Please reconsider this requirement and do not require salvage of wire/cable for the City.

Answer: Contractor is to dispose of electrical wiring in the abandoned sludge facility. See revisions to Section 02050 as part of Addendum No. 2.

6. **Question:** Is an Arc Flash study required of the contractor, or will this be provided by the City/Engineer? If required of the contractor, please identify the limits of our scope related to the study.

Answer: Neither the Contractor nor the Engineer will be required to provide an Arc Flash Study for this project scope.

7. **Question:** Document 00470, pg 1 shows an MBE goal of 11% and WBE goal of 11%. Document 00800, pg.2 gives MBE goal of 11% and WBE goal of 7%. Can you confirm 11% and 7% is correct and issue new page for document 00470?

Answer: The original version of Section 00800 was correct, the MBE goal is 11% and the WBE is 7%. Please see revisions to Section 00470 page 1.

8. **Question:** Document 00800, pg 3 and 4 shows "optional"? coverages for Builders Risk, Flood, and Pollution Liability coverage, with an approval signature block for Assistant Director. Assume these coverages apply to this job?

Answer: Please see revisions to Section 00800 as part of Addendum No. 2.

9. **Question:** Document 03300, pg. 12. Please consider raising maximum concrete placing temperature to 95-deg per current ACI code. 90 degrees is tough to meet in Houston, and Ice is very costly. This has been allowed on other CDM projects.

Answer: No changes to specification at this time. Maximum temperature can be reviewed during construction based on the construction scenario (i.e. specific mix, location of batch plant, humidity, curing method, and quality procedures put in place).

10. **Question:** Document 03300, par. 3.13 and 2.03.I. Can you confirm all structural concrete is required to have High Range Water Reducer? Table says NYES?

Answer: Revised to "YES" in modified section 03300 included in Addendum No. 2.

11. **Question:** Several of the Demo sheets call for 12" cores in the bottom slab as needed for additional drainage. Is there a maximum spacing on these cores, or can you provide a quantity so all contractors include the same in their bids?

Answer: Bidders shall include an allowance for up to twenty five (25) cores in the base bid. Any additional corings that are determined to be necessary based on field conditions during construction (as directed by owner or engineer) shall be paid under Extra Unit Price Item 12.

12. **Question:** Note regarding construction joints on sheet S-1 says to place construction joints where shown on the drawings. Construction joints are shown for the slab, but not the walls. Can we assume 40-50' spacing on wall construction joints will be acceptable?

Answer: Do not assume construction joint spacing. Please see revisions to drawings included in Addendum 2.

13. **Question:** Reference sheet C-7. The railroad track demo stops at the east end of the West Loading Facility. Assume the railroad east of this facility remains? If removed, please provide detail for concrete pavement in demo'd area.

Answer: All portions of the railroad tracks is to be removed. Contractor is to place pavement to match adjacent pavement types (i.e. east of the load-out building, the pavement type is concrete, but it is asphalt in other locations). For concrete pavement, reference Details on Drawing CZ-2.

14. **Question:** In reference to the Demolition Site Plan, drawing E-2, notes 1, 2, 3, and 4. Will it be acceptable for the electrical contractor to remove any circuits leaving the existing Sludge Processing Building and make safe for the demolition contractor.

Answer: Disconnect all 2400 Volt and 480 Volt conductors from Power Centers Nos. 1, 2 & 3 before any demolition takes place.

15. **Question:** In reference to the Demolition Site Plan, drawing E-2, notes 1, 2, 3, and 4 and specification section 16060, 3.03, Disposal and salvage. Is it acceptable for Demolition Contractor to demolish all electrical equipment and conductors within the existing Sludge Processing Building and disposal at their own discretion?

Answer: All electrical equipment and conductors in the existing Sludge Processing Building can be disposed of by the contractor at their own discretion. See modifications for Section 16060 in Addendum No. 2.

END OF ADDENDUM NO. 1

November 10, 2016



DATED:

EN.
IMR

XL

Ravi Kaleyatodi
Ravi Kaleyatodi, P.E., CPM
Senior Assistant Director
Department of Public Works and
Engineering

END OF DOCUMENT

<u>Doc. No.</u>	<u>Document Title</u>	<u>Doc. Date</u>
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Document 00010

TABLE OF CONTENTS

NOTE: Capitalized Specification Sections are included in http://documents.publicworks.houstontx.gov/document-center/cat_view/88-engineering-and-construction/92-specifications.html; and are incorporated in Project Manuals by reference as if copied verbatim. Documents listed "for filing" are to be provided by Bidder and are not included in this Project Manual unless indicated for example only. The Document numbers and titles hold places for actual documents to be submitted by Contractor during Bid, post-bid, or construction phase of the Project. Specification Sections marked with an asterisk (*) are amended by a supplemental specification, printed on blue paper and placed in front of the Specification it amends. Documents in the 200, 300 and 400 series of Division 00, except for Document 00410B – Bid Form, Part B, are not part of the Contract.

<u>Doc. No.</u>	<u>Document Title</u>	<u>Doc. Date</u>
------------------------	------------------------------	-------------------------

INTRODUCTORY INFORMATION

00010	Table of Contents	07-20-2016
00015	List of Drawings	02-01-2004
00041	List of Pre-qualified Asbestos & Lead Abatement Contractors	03-21-2012

BIDDING REQUIREMENTS

INSTRUCTIONS TO BIDDERS

00200	Instructions to Bidders	08-01-2015
00210	Supplementary Instructions to Bidders	07-20-2016
00220	Request for Bid Information	06-11-2004

INFORMATION AVAILABLE TO BIDDERS

00320	Geotechnical Information	09-02-2005
00330	Existing Conditions	04-30-2004
00340	Environmental Information	09-14-2005

BID FORMS AND SUPPLEMENTS

00410	Bid Form, Parts A & B	07-20-2016
00430	Bidder’s Bond (For filing; Example Form)	02-01-2004
00450	Bidder’s Statement of SMWBE Status	07-01-2013
00454	Affidavit of Non-interest	02-01-2004
00455	Ownership Information Form	07-11-2016
00456	Bidder’s Certificate of Compliance with Buy American Program	02-01-2004
00457	Conflict of Interest Questionnaire	02-28-2006
00458	Bidder’s Certificate Regarding Foreign Trade Restriction	02-01-2004
00459	Contractor’s Statement Regarding Previous Contracts	

Doc. No.	Document Title	Doc. Date
	Subject to EEO.....	02-01-2004
00460	Pay or Play Acknowledgement Form (POP-1A)	07-03-2012
00470	Bidder's MWSBE Participation Plan.....	07-01-2016
00471	Pre-Bid Good Faith Efforts	08-01-2015
00472	Bidder's Goal Deviation Request	08-01-2015

POST-BID PROCEDURES

00495	Post-bid Procedures.....	03-09-2016
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CONTRACTING REQUIREMENTS**AGREEMENT**

00501	Resolution of Contractor	02-01-2010
00520	Agreement.....	03-02-2016
00570	Amended MWSBE Participation Plan	08-01-2013
00571	Post-Bid Good Faith Efforts	08-01-2013
00572	Contractor's Plan Deviation Request	08-01-2013

BONDS AND CERTIFICATES

00600	List of Proposed Subcontractors and Suppliers, Parts A & B	07-01-2013
00601	Drug Policy Compliance Agreement	02-01-2004
00602	Contractor's Drug Free Workplace Policy (For filing)	
00604	History of OSHA Actions and List of On-the-job Injuries	02-01-2004
00605	List of Safety Impact Positions	02-01-2004
00606	Contractor's Certification of No Safety Impact Positions	02-01-2004
00610	Performance Bond	05-17-2005
00611	Statutory Payment Bond	05-17-2005
00612	One-year Maintenance Bond	05-17-2005
00620	Affidavit of Insurance (with attached Certificates of Insurance)	02-01-2004
00622	Name and Qualifications of Proposed Superintendent (For filing)	
00624	Affidavit of Compliance with MWSBE Program.....	02-01-2004
00630	Certification of Agreement to Comply with Pay or Play Program.....	07-03-2012
00631	City of Houston Pay or Play Program – List of Participating Subcontractors	07-03-2012
00633	Equal Employment Opportunity - Certification By Material Suppliers	02-01-2010
00636	Certificate of Interested Parties.....	03-09-2016
00642	Monthly Subcontractor Payment Reporting Form	02-01-2010
00646	Payment Notification Explanation of Withholding.....	02-01-2010

GENERAL CONDITIONS

00700	General Conditions	07-01-2016
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Doc. No.	Document Title	Doc. Date
SUPPLEMENTARY CONDITIONS		
00800	Supplementary Conditions	07-01-2016
00805	Equal Employment Opportunity Program Requirements	03-01-2016
00808	Requirements for the City of Houston Program for Minority, Women and Small Business Enterprises (MWSBE), and Persons with Disabilities Business Enterprises (PDBE).....	07-01-2016
00820	Wage Scale for Engineering Construction	02-01-2016
00821	Wage Scale and Payroll Requirements for Building Construction ...	02-01-2016
00830	Trench Safety Geotechnical Information	02-01-2004
00840	Pay or Play Program Requirements.....	07-03-2012
ADDENDA AND MODIFICATIONS		
00910	Addendum	02-01-2004
00911	Notice of Addendum.....	02-01-2004
00931	Request for Information.....	02-01-2004

<u>Doc. No.</u>	<u>Document Title</u>	<u>Doc. Date</u>
SPECIFICATIONS		
DIVISION 1 - GENERAL REQUIREMENTS		
01110	Summary of Work	08-22-2016
01114	Construction Sequence	08-22-2016
*01145S	<i>Use of Premises</i>	08-22-2016
01145	Use of Premises	01-01-2011
01172	Pipe Penetrations	08-22-2016
01255	Change Order Procedures	08-01-2003
01270	Measurement and Payment	08-01-2003
01292	Schedule of Values	08-01-2003
01312	Coordination and Meetings	08-01-2003
01321	Construction Photographs	08-01-2003
01325	Construction Schedule	08-01-2003
01326	Construction Schedule (Bar Chart)	08-01-2003
01330	Submittal Procedures	08-01-2003
01340	Shop Drawings, Product Data, and Samples	08-01-2003
01410	TPDES Requirements (with Attachments)	02-01-2011
01422	Reference Standards	08-01-2003
01450	Contractor's Quality Control	08-01-2003
01452	Inspection Services	08-01-2003
01454	Testing Laboratory Services	08-01-2003
01480	Tightness Testing of Liquid Retaining Structures	08-22-2016
01502	Mobilization	08-01-2008
01504	Temporary Facilities and Controls	01-01-2011
01506	Diversion Pumping	08-01-2003
*01520S	<i>Temporary Field Office</i>	08-22-2016
01520	Temporary Field Office	02-08-2012
01555	Traffic Control and Regulation	01-01-2011
01560	Site Security	08-22-2016
01562	Tree and Plant Protection	01-01-2011
01570	Storm Water Pollution Control	01-26-2012
01575	Stabilized Construction Access	02-01-2011
*01576S	<i>Waste Material Disposal</i>	10-12-2016
01576	Waste Material Disposal	08-01-2003
01578	Control of Ground and Surface Water	01-01-2011
01580	Project Identification Signs	08-01-2003
01610	Basic Product Requirements	01-01-2011
01630	Product Substitution Procedures	08-01-2003
01650	Equipment Nomenclature, Data Identification and Data	08-22-2016
01725	Field Surveying	01-01-2011
01731	Cutting and Patching	01-01-2011

<u>Doc. No.</u>	<u>Document Title</u>	<u>Doc. Date</u>
DIVISION 1 - GENERAL REQUIREMENTS - Continued		
01732	Procedure for Water Valve Assistance (with Attachments).....	08-01-2003
01735	Vendor Training.....	08-22-2016
01740	Site Restoration.....	08-01-2003
01755	Starting Systems.....	08-01-2003
01770	Closeout Procedures.....	08-01-2003
*01782S	<i>Operations and Maintenance Data</i>	<i>08-22-2016</i>
01782	Operations and Maintenance Data.....	08-01-2003
01785	Project Record Documents.....	08-01-2003
DIVISION 2 - SITE WORK		
02050	Demolition and Modifications.....	08-26-2015
02082	PRECAST CONCRETE MANHOLES.....	07-01-2016
02084	FRAMES, GRATES, RINGS, AND COVERS.....	12-01-2014
02086	ADJUSTING MANHOLES, INLETS, AND VALVE BOXES TO GRADE.....	01-01-2011
02136	WASTE MATERIAL HANDLING AND DISPOSAL.....	01-01-2011
02221	REMOVING EXISTING PAVEMENTS AND STRUCTURES.....	07-01-2016
02222	ABANDONMENT OF SEWERS.....	01-01-2011
02233	CLEARING AND GRUBBING.....	01-01-2011
02260	TRENCH SAFETY SYSTEM.....	07-01-2016
02316	EXCAVATION AND BACKFILL FOR STRUCTURES.....	01-01-2011
02317	EXCAVATION AND BACKFILL FOR UTILITIES.....	07-01-2016
02318	EXTRA UNIT PRICE WORK FOR EXCAVATION AND BACKFILL.....	01-01-2011
02320	UTILITY BACKFILL MATERIALS.....	01-01-2011
02321	CEMENT STABILIZED SAND.....	01-01-2011
02322	FLOWABLE FILL.....	08-01-2008
02336	LIME-STABILIZED SUBGRADE.....	10-01-2002
02337	LIME/FLY-ASH STABILIZED SUBGRADE.....	10-01-2002
02338	PORTLAND CEMENT STABILIZED SUBGRADE.....	10-01-2002
02501	DUCTILE IRON PIPE AND FITTINGS.....	07-01-2016
02506	POLYVINYL CHLORIDE PIPE.....	07-01-2016
02513	WET CONNECTIONS.....	07-01-2016
02515	HYDROSTATIC TESTING OF PIPELINES.....	01-01-2011
02527	POLYURETHANE COATINGS ON STEEL OR DUCTILE IRON PIPE.....	07-01-2016
02528	POLYETHYLENE WRAP.....	01-01-2011
02531	GRAVITY SANITARY SEWERS.....	07-01-2016
02533	ACCEPTANCE TESTING FOR SANITARY SEWERS.....	01-01-2011
02631	STORM SEWERS.....	12-01-2014

Doc. No.	Document Title	Doc. Date
02633	PRECAST CONCRETE INLETS, HEADWALLS, AND WINGWALLS.....	10-01-2002
02751	CONCRETE PAVING	07-01-2009
02775	CONCRETE SIDEWALKS	07-01-2016
02911	TOPSOIL.....	10-01-2002
02912	TREE, PLANT, AND HARDSCAPE PROTECTION	07-01-2009
02921	HYDROMULCH SEEDING	01-01-2011
02951	PAVEMENT REPAIR AND RESTORATION	07-01-2009
DIVISION 3 - CONCRETE		
03100	Concrete Formwork.....	08-22-2016
03200	Concrete Reinforcement	08-22-2016
03250	Concrete Joints and Joint Accessories	08-22-2016
03300	Cast-In-Place Concrete.....	08-22-2016
03350	Concrete Finishes	08-22-2016
03600	Grout	08-22-2016
03740	Modifications and Repair to Existing Concrete	08-22-2016
DIVISION 4 – MORTAR – NOT USED		
DIVISION 5 - METALS		
05500	Miscellaneous Metal.....	08-22-2016
05510	Metal Stairs	08-22-2016
DIVISION 6 - WOOD AND PLASTICS – NOT USED		
DIVISION 7 - THERMAL AND MOISTURE PROTECTION – NOT USED		
DIVISION 8 - DOORS AND WINDOWS – NOT USED		
DIVISION 9 - FINISHES		
09901	Protective Coatings	08-22-2016
09915	Surface Preparation and Shop Prime Painting	08-22-2016
DIVISION 10 – SPECIALTIES		
10400	Signage	08-22-2016
DIVISION 11 – EQUIPMENT		
11372	Positive Displacement Blowers	08-22-2016
11376	Coarse Bubble Aeration Diffusers	08-22-2016
DIVISION 12 - FURNISHINGS – NOT USED		

Doc. No.	<u>Document Title</u>	<u>Doc. Date</u>
DIVISION 13 - SPECIAL CONSTRUCTION		
13281	Asbestos Abatement	08-22-2016
13300	Instrumentation and Controls – General Provisions	08-22-2016
13302	Instrumentation and Controls – Testing	08-22-2016
13303	Instrumentation and Controls – Training	08-22-2016
13305	Instrumentation and Controls – Control Descriptions	08-22-2016
13306	Instrumentation and Controls – Applications Engineering Services	08-22-2016
13311	Instrumentation and Controls - Plc Hardware and Software	08-22-2016
13330	Instrumentation and Controls – Control Panels and Panel Mounted Equipment	08-22-2016
13340	Instrumentation and Controls – Instruments	08-22-2016
13441	SCADA Software Engineering Security and Quality Requirements	08-22-2016
DIVISION 14 - CONVEYING SYSTEMS – NOT USED		
DIVISION 15 – MECHANICAL		
15051	Piping – General Requirements	08-22-2016
15061	Steel Pipe and Fittings	08-22-2016
15064	PVC Pipe and Fittings	08-22-2016
15072	Ductile Iron Pipe and Fittings – Plant Piping Aboveground	08-22-2016
15100	Valves	08-22-2016
15120	Piping Specialties	08-22-2016
15141	Pipe Hangers and Supports	08-22-2016
15190	Mechanical Identification	08-22-2016
15200	Electric Valve Actuators	08-22-2016
15250	Thermal Insulation	08-22-2016
15500	HVAC General Provisions	08-22-2016
15855	Air Handling Units	08-22-2016
15860	Fans	08-22-2016
15890	Ductwork and Accessories	08-22-2016
15990	Testing, Adjusting and Balancing	08-22-2016
DIVISION 16 – ELECTRICAL		
16010	Basic Electrical Requirements	08-22-2016
16060	Electrical Demolition	08-22-2016
16111	Conduit, Fittings and Bodies	08-22-2016
16120	600-Volt Building Wire and Cable	08-22-2016
16126	Instrumentation Cable	08-22-2016
16131	Device, Pull and Junction Boxes	08-22-2016
16140	Wiring Devices	08-22-2016
16165	Disconnect Switches	08-22-2016
16170	Grounding and Bonding	08-22-2016
16171	Low Voltage Motors	08-22-2016

Doc. No.	<u>Document Title</u>	<u>Doc. Date</u>
DIVISION 16 – ELECTRICAL - Continued		
16195	Electrical Identification	08-22-2016
16402	Underground Duct Banks	08-22-2016
16476	Disconnects and Circuit Breakers	08-22-2016
16950	Uninterruptible Power Supplies	08-22-2016

END OF DOCUMENT

Document 00410B

BID FORM – PART B

1.0 TOTAL BID PRICE HAS BEEN CALCULATED BY BIDDER, USING THE FOLLOWING COMPONENT PRICES AND PROCESS (PRINT OR TYPE NUMERICAL AMOUNTS):

A. STIPULATED PRICE: **\$** N/A

(Total Bid Price; minus Base Unit Prices, Extra Unit Prices, Cash Allowances and All Alternates, if any)

B. BASE UNIT PRICE TABLE:

Item No.	Spec Ref.	Base Unit Short Title	Unit of Measure	Estimated Quantity	Unit Price (this column controls)	Total in figures
1	DIV 01	Mobilization	LS	1	\$165,000 ⁽¹⁾	\$165,000
2	01570	Filter Fabric Fence	LF	3020		
3	DIV 01-16	Demolition of Abandoned Solids Processing Facility; Removal of the West Loading Facility, East Loading Structure, Silo Storage Facility, the Abandoned Sludge Processing Facility, the Stormwater Pump Station, and the Railroad Spur. This includes removal and disposal of all abandoned equipment and structures down to the concrete pad or below grade as indicated on the Drawings, associated electrical demolition within the buildings to be demolished, and reconnection of existing drains to the stormwater and plant drainage systems.	LS	1		
4	DIV 13281	Demolition of Hazardous Materials at Abandoned Solids Processing Facility; Removal Hazardous Materials as specified at the West Loading Facility, East Loading Structure, Silo Storage Facility, the Abandoned Sludge Processing Facility, and the Railroad Spur to the Abandoned Sludge Processing Facility per bid	LS	1		

Item No.	Spec Ref.	Base Unit Short Title	Unit of Measure	Estimated Quantity	Unit Price (this column controls)	Total in figures
		documents. This includes, but is not limited to, removal and disposal of all asbestos and lead based paint in these facilities.				
5	Div 01-16	Construction of Aerated Sludge Holding Tank 3; Furnish all labor, materials, equipment and incidentals required for the Contractor to construct Aerated Sludge Holding Tank 3 complete in place. Activities under this task shall include: all testing for tanks and piping; installation of new sludge holding tank and coarse bubble diffusers, piping and appurtenances, earthwork, structural work, plumbing, equipment electrical and instrumentation and controls for a functioning system.	LS	1		
6	Div 01-16	Modifications to Existing Solids Holding Tanks: This includes relocating valves, plumbing improvements, tie-ins for new cross-walks between the existing structure and new structure, installation of new telescoping valves, and miscellaneous signage improvements.	LS	1		
7	Div 01-16	Modifications to Blower Building: This includes installation complete in place of the fourth blower, HVAC improvements to the building and electrical room, and electrical modifications as defined in the drawings for a complete and functioning system.	LS	1		
8	Div 01-16	Site Work and Yard Piping: Shall include all labor, materials, equipment and incidentals required for site work and grubbing, grading, erosion control, drainage, site restoration, and miscellaneous related items.	LS	1		

Item No.	Spec Ref.	Base Unit Short Title	Unit of Measure	Estimated Quantity	Unit Price (this column controls)	Total in figures
		This item shall also include all labor, materials, equipment and incidentals required for demolition and construction of all yard piping, process water lines, buried sludge lines, and above ground air lines to support and connect the facilities, including excavation, dewatering if necessary, compaction, valves and fittings for all yard piping on this Project. The yard piping shall be installed in conjunction with all related items above. The piping shall be installed so as to not disrupt construction and operation of the existing facilities.				
9	Div 01-16	Instrumentation and Control (I&C) Complete: The I&C Work shall include the furnishing complete in place of all materials, equipment, software, labor and services required to install and configure all instrumentation, field wiring, and PLCs, except where specified as part of equipment supplier's scope. A separate Process Control System Integrator (PCSI) shall design and coordinate the process control system for proper operation with equipment and materials furnished under this contract.	LS	1		
10	Div 01-16	Equipment Checkout and Testing: Perform equipment checkout, field testing and functional testing and acceptance testing (including 7-Day test required by Section 16010) as shown on the Drawings and specified herein.	LS	1		
11	01110	WMS Entry: Complete and provide to City's operations staff equipment data sheets for all new equipment for entry into City's Work Management	LS	1		

Item No.	Spec Ref.	Base Unit Short Title	Unit of Measure	Estimated Quantity	Unit Price (this column controls)	Total in figures
		System (WMS) Attachment A to Section 01110 is a copy of the City's WMS typical equipment data sheet.				
12	02921	Hyro-Mulch Seeding: Seeding, fertilizing, mulching, and maintenance of disturbed non-impervious areas indicated on Drawings	AC	1.15		
13	02136	Accumulated Solids Disposal: Haul off and dispose of accumulated sludge, grit, or other biosolids in the abandoned sludge processing facility and/or existing sludge holding tanks.	CY	200		
<u>TOTAL BASE UNIT PRICES</u>						\$ _____

C. EXTRA UNIT PRICE TABLE:

Item No.	Spec Ref.	Extra Unit Short Title	Unit of Measure	Estimated Quantity	Unit Price (this column controls)	Total in figures
1.	01735	Additional 8-hour Days of Vendor Training	Days	2	_____ [\$100] ⁽²⁾	_____ [\$200] ⁽²⁾
2.	02318	Excavation Around Obstructions	CY	30	_____ [\$100] ⁽²⁾	_____ [\$3,000] ⁽²⁾
3.	02318	Hand Excavation and Backfill	CY	10	_____ [\$100.00] ⁽²⁾	_____ [\$1,000] ⁽²⁾
4.	02318	Machine Excavation and Backfill	CY	20	_____ [\$25.00] ⁽²⁾	_____ [\$500.00] ⁽²⁾
5.	02320	Bank Sand Backfill	CY	10	_____ [\$10.00] ⁽²⁾	_____ [\$100.00] ⁽²⁾
6.	02320	Select Backfill	CY	10	_____ [\$15.00] ⁽²⁾	_____ [\$150.00] ⁽²⁾
7.	02321	Cement Stabilized Sand Backfill	TON	20	_____ [\$40.00] ⁽²⁾	_____ [\$800.00] ⁽²⁾
8.	02751	Concrete Pavement and Subgrade	SY	50	_____ [\$70.00] ⁽²⁾	_____ [\$3,500.00] ⁽²⁾
9.	02084	Installation of Additional Drain Covers	EA	10	_____ [\$200.00] ⁽²⁾	_____ [\$2,000] ⁽²⁾
10.	02050	Additional Coring for Drainage	EA	25	_____ [\$100.00] ⁽²⁾	_____ [\$2500.00] ⁽²⁾

11.	02501	Additional 8" Drain Piping Reroute at Stormwater Pump Station Demolition	LF	100	<u>[\$50.00]⁽²⁾</u>	<u>[\$5,000.00]⁽²⁾</u>
<u>TOTAL EXTRA UNIT PRICES</u>						\$ _____

D. CASH ALLOWANCE TABLE:

Item No.	Spec Ref.	Cash Allowance Short Title	Cash Allowance in figures (1)
1		All Permits Fees	\$20,000
<u>TOTAL CASH ALLOWANCES</u>			\$20,000

E. ALTERNATES TABLE: N/A

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F. TOTAL BID PRICE: \$ _____
(Add Totals for Stipulated Price, Base Unit Price, Extra Unit Price, Cash Allowance, and All Alternates, if any)

2.0 SIGNATURES: By signing this Document, I agree that I have received and reviewed all Addenda and considered all costs associated with the Addenda in calculating the Total Bid Price.

Bidder: _____
(Print or type full name of your proprietorship, partnership, corporation, or joint venture.*)

** By: _____
Signature Date

Name: _____
(Print or type name) Title

Address: _____
(Mailing)

(Street, if different)

Telephone and Fax Number: _____
(Print or type numbers)

* If Bid is a joint venture, add additional Bid Form signature sheets for each member of the joint venture.

** Bidder certifies that the only person or parties interested in this offer as principals are those named above. Bidder has not directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding.

Note: This document constitutes a government record, as defined by § 37.01 of the Texas Penal Code. Submission of a false government record is punishable as provided in § 37.10 of the Texas Penal Code.

Footnotes for Tables B through E:

- (1) Fixed Unit Price determined prior to Bid. Cannot be adjusted by the Bidder.
- (2) Minimum Bid Price determined prior to Bid. Can be increased by the Bidder, but not decreased, by crossing out the Minimum and inserting revised price on the line above. **Cannot** be decreased by the Bidder.

Document 00470
BIDDER'S MWSBE PARTICIPATION PLAN

The Bidder or Proposer shall submit this completed form with the bid, to demonstrate the Bidder/Proposer's plan to meet the contract-specific MWSBE goals ("Contract Goal(s)"). If the Bidder or Proposer cannot meet the Contract Goal(s), the Bidder/Proposer has the burden to demonstrate "Good Faith Efforts", which shall include correctly and accurately preparing and submitting this form, a Record of Good Faith Efforts (Document 00471), a Request for Deviation from the Goal (Document 00472), and providing supporting documentation evidencing their "Good Faith Efforts", as required by the City of Houston's Good Faith Efforts Policy (Document 00808). The City will review the Participation Plan and Good Faith Efforts at the time of bid opening. Visit <http://www.houstontx.gov/obo> for more information.

City Contract Goal	MBE 11%	WBE 7%	<ul style="list-style-type: none"> • MBE and WBE Goals are two separate Contract Goals. • Any excess of one Goal cannot be applied to meet another Goal. • An SBE can be applied to the MBE and/or WBE Goal, but not to exceed 4%. • Only up to 50% of the Total Goal (City Contract Goal) may be met using Suppliers
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NAICS Code (6 digit)	Description of Work (Plan Sheet #, Unit Price #, Scope of Work #, as applicable)	% of Total Bid Price (2 decimal places; for example, 5.00%)	Services or Supplier	Cert. Type for Goal: MBE, WBE, or SBE	Certified Firm Name Firm Address Contact Name Phone No. and E-Mail
				MBE <input type="checkbox"/> WBE <input type="checkbox"/> SBE <input type="checkbox"/>	
				MBE <input type="checkbox"/> WBE <input type="checkbox"/> SBE <input type="checkbox"/>	
				MBE <input type="checkbox"/> WBE <input type="checkbox"/> SBE <input type="checkbox"/>	
				MBE <input type="checkbox"/> WBE <input type="checkbox"/> SBE <input type="checkbox"/>	
				MBE <input type="checkbox"/> WBE <input type="checkbox"/> SBE <input type="checkbox"/>	
				MBE <input type="checkbox"/> WBE <input type="checkbox"/> SBE <input type="checkbox"/>	

Bidder's Participation Plan Total	MBE	WBE	SBE

Signature for Company: _____ *

Printed Name: _____

Company Name: _____

Phone #: _____

Date: _____

*I understand that supplying inaccurate information may violate Texas Penal Code Section 37.10 and lead to City sanctions.

Addendum No. 1, dated	<u>None</u>
Addendum No. 2, dated	<u>None</u>
Addendum No. 3, dated	<u>None</u>
Rider No. [], dated	<u>None</u>

7.1.7 Other documents:

<u>Document No.</u>	<u>Title</u>
<input checked="" type="checkbox"/> 00410B	Bid Form – Part B
<input checked="" type="checkbox"/> 00470	Standard Pre-Bid Participation Plan Document
<input type="checkbox"/> 00471	Pre-Bid Good Faith Efforts Report
<input type="checkbox"/> 00472	Goal Deviation Request
<input type="checkbox"/> 00500	Form of Business
<input checked="" type="checkbox"/> 00501	Resolution of Contractor (if a corporation)
<input type="checkbox"/> 00570	Amended S/MWBE Participation Plan
<input type="checkbox"/> 00571	Contractor's Good Faith Efforts Report
<input type="checkbox"/> 00572	Plan Deviation Request
<input type="checkbox"/> 00608	Contractor's Certification Regarding Non-Segregated Facilities for Project Funded by AIP Grant
<input checked="" type="checkbox"/> 00610	Performance Bond
<input checked="" type="checkbox"/> 00611	Statutory Payment Bond
<input checked="" type="checkbox"/> 00612	One-year Maintenance Bond
<input type="checkbox"/> 00613	One-year Surface Correction Bond
<input checked="" type="checkbox"/> 00620	Affidavit of Insurance (with the Certificate of Insurance attached)
<input type="checkbox"/> 00623	Contractor's Act of Assurance (SRF Form ED-103)
<input checked="" type="checkbox"/> 00624	Affidavit of Compliance with Affirmative Action Program
<input type="checkbox"/> 00628	Affidavit of Compliance with Disadvantaged Business Enterprise (DBE) Program for Project Funded By AIP Grant
<input checked="" type="checkbox"/> 00630	(POP-2) Certification of Compliance with Pay or Play Program
<input checked="" type="checkbox"/> 00631	(POP-3) City of Houston Pay or Play Program – List of Subcontractors
<input checked="" type="checkbox"/> 00800	Supplementary Conditions for Project CIP or AIP Funded
<input type="checkbox"/> 00801	Supplementary Conditions for Project AIP Funded
<input type="checkbox"/> 00802	SRF Supplementary Conditions
<input checked="" type="checkbox"/> 00805	Equal Employment Opportunity Requirements (DELETE If AIP Funded)
<input type="checkbox"/> 00806	EPA DBE and Wage Rate Requirements (SRF only)
<input type="checkbox"/> 00807	Bidder/Contractor Requirements for DBE Program
<input checked="" type="checkbox"/> 00808	Minority and Women-owned Business Enterprise (MWBE) & Persons with Disabilities Business Enterprise (PDBE) Program
<input type="checkbox"/> 00810	Federal Wage Rate - Highway
<input type="checkbox"/> 00811	Federal Wage Rate - Building
<input type="checkbox"/> 00812	Federal Wage Rate - Heavy
<input checked="" type="checkbox"/> 00820	Wage Rate for Engineering Construction
<input checked="" type="checkbox"/> 00821	Wage Rate for Building Construction
<input checked="" type="checkbox"/> 00830	Trench Safety Geotechnical Information
<input checked="" type="checkbox"/> 00840	Pay or Play Program
<input type="checkbox"/> 00912	Rider

Document 00800

SUPPLEMENTARY CONDITIONS

The following Paragraphs amend and supplement the July 1, 2016 edition of the General Conditions. Unaltered portions of General Conditions remain in effect.

ARTICLE 1 - GENERAL PROVISIONS:

1.1 *DEFINITIONS: Insert the following Paragraphs 1.1.23, and 1.1.25 reorder the remaining definitions accordingly. Please insert the amended definition of “Specifications”.*

1.1.23 *Good Faith Efforts.* Steps taken to achieve an MBE, WBE, SBE, or PDBE goal or other requirements which, by their scope, intensity, and usefulness, demonstrate the bidder’s responsiveness to fulfill the business opportunity objective, as well as the Contractor’s responsibility to put forth measures to meet or exceed the MBE, WBE, SBE, or PDBE goal (Contract Goal). These steps apply from before a contract’s award, through its duration, and after its conclusion, in the event the Contractor has been unsuccessful in meeting the Contract Goal. These efforts are required whether a Goal Oriented Contract or a Regulated Contract, as defined in the Office of Business Opportunity’s Policy & Procedures Manual, available at <http://www.houstontx.gov/obo>.

1.1.25 *Incidental Work.* Work described as incidental shall be work defined in Document 01110 - Summary of Work, that do not have a direct pay item listed in the Document 00410B - Bid Form Part B, or less than 1% of the Contract Price and not capable of being measured. If Work is identified as Incidental Work and also covered by Bid Form Part B quantities, then the unit price item quantities in the Bid Form Part B shall govern.

1.1.45 *Specifications.* Divisions 01 through 16 of the documents that are incorporated into the Agreement, consisting of written General Requirements and requirements for Products, standards, and workmanship for the Work, and performance of related services. All specifications are amended to include, under the Measurement and Payment Section, the following sentence: “Work described as Incidental Work shall not be paid as a separate unit price item.”

ARTICLE 3 - THE CONTRACTOR

3.5 *LABOR: Insert the following Paragraphs, 3.5.3.1.1, 3.5.3.1.2, and 3.5.3.1.3.*

3.5.3.1.1 If the Original Contract Price is greater than One Million Dollars, Contractor shall make Good Faith Efforts to comply with the City ordinances regarding Minority Business Enterprises (MBE), Women Business Enterprises (WBE), Persons with Disabilities Business Enterprises (PDBE) and Small Business Enterprise (SBE) participation goals which are as follows:

- 3.5.3.1.1.1 the MBE goal is 11% percent,
- 3.5.3.1.1.2 the WBE goal is 7% percent, and
- 3.5.3.1.1.3 the PDBE goal is N/A percent.
- 3.5.3.1.1.4 The bidder may substitute SBE participation of no more than four percent of the MBE goal, the WBE goal, or portions of the MBE Goal and WBE Goal.
- 3.5.3.1.1.5 The bidder may not use Native-American-owned firms that are certified as MBEs to meet MBE contract goals. Native-Americans firms can only be used as SBEs in fulfillment of the above stated goals.
- 3.5.3.1.1.6 The bidder may not use MWSBE Suppliers to account for more than 50% of the MWSBE participation plan.

3.5.3.1.2 The MBE, WBE, PDBE, and SBE goals are specific to this Agreement. The Contractor shall make reasonable efforts to achieve these goals.

3.5.3.1.3 Failure by Contractor to comply with the goals for MBE, WBE, SBE, or PDBE is a material breach of the Agreement, which may result in termination of the Agreement, or such other remedy permitted as the City deems appropriate.

ARTICLE 8 - TIME

8.1 *PROGRESS AND COMPLETION: Add the following Paragraph 8.1.6.1.*

8.1.6.1 Contractor shall credit the City by Change Order for inspection services for overtime work or work performed on Sundays or Legal Holidays. The amount Contractor credits the City will be [\$50.00 per hour] per inspector for inspection services.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.12 *LIQUIDATED DAMAGES: Insert the following Paragraph 9.12.1.1.*

9.12.1.1 The amount of liquidated damages payable by Contractor or Surety for each and every day of delay beyond Contract Time, are \$1,200.00 per day.

ARTICLE 11 - INSURANCE AND BONDS

11.2 *INSURANCE TO BE PROVIDED BY CONTRACTOR: Insert the following Paragraph 11.2.1.2., and Table 2, "Additional Required Coverage".*

11.2.1.2 Contractor shall purchase for the duration of the Contract the insurance set out in Table 2 in addition to the minimum insurance coverage set out in section 11.2.1.

TABLE 2
 ADDITIONAL REQUIRED COVERAGE
 DEFENSE COSTS EXCLUDED FROM FACE AMOUNT OF POLICY.

(Coverage)	(Limit of Liability)
Property and Casualty Coverage: "All Causes of Loss" Builder's Risk Form for directing physical change to building or plant construction on the Work site and/or all land improvements including all work. (Including but not limited to earthquake, flood, boiler, and machinery including testing, damage to existing or adjoining property, time element coverage, collapse, soft costs (management, architecture, financial costs, pre-opening costs, etc.), transit coverage, off-site storage).	100% of Contract Price, including change orders
<u>Contractor's Pollution Liability:</u> Including pollution coverage for Contractual Liability, Clean-up costs, Abatement, Transport, and Non-owned disposal sites. Including Bodily Injury Liability, Property Damage Liability, and environmental damage arising from pollution conditions caused in performance of operations. Including Asbestos and Lead if part of operations.	\$1,000,000 each occurrence
(MCS - 90 endorsement to Auto Policy and removal of Pollution Exclusion)	\$1,000,000 CSL

END OF DOCUMENT

Document 00821

**WAGE SCALE AND PAYROLL REQUIREMENTS
FOR BUILDING CONSTRUCTION**

Wage Scale Requirements

- 1.1 Contractor and its Subcontractors must pay the general prevailing wage rates for building construction for each craft or type of worker or mechanic employed in the execution of any building construction or repair under the Contract in accordance with Chapter 2258 of the Texas Government Code and City of Houston, Texas Ordinance Nos. 85-2070, 2000-1114, 2001-152, 2006-91 and 2006-168, and 2009-247 all as amended from time to time. City Council has determined the prevailing wage rate in the locality in which the work is being performed, which is set forth in Exhibit "A".
- 1.2 This prevailing wage rate does not prohibit the payment of more than the rates stated.
- 1.3 In bidding, Contractor warrants and represents that it has carefully examined the classifications for each craft or type of worker needed to execute the Contract and determined that such classifications in Exhibit "A" include all necessary categories to perform the work under the Contract.
- 1.4 The wage scale for building construction is to be applied to work on a building including an area within 5 feet of the exterior wall.
- 1.5 If Contractor believes that an additional classification for a particular craft or type of worker is necessary to perform work under the Contract, it must submit with its bid a request to the Contract Compliance Division of the Office of Business Opportunity ("OBO") to use an additional labor classification not listed in Exhibit "A" and specify the proposed new classification. OBO shall determine whether a proposed classification is already covered in Exhibit "A", and, if it is, specify which classification is appropriate. OBO's decision is conclusive. If OBO decides that a new classification is necessary, it will determine the appropriate prevailing wage rate for any resurveyed, amended, new, or additional craft or type of worker not covered by Exhibit "A". Such determination must be decided in accordance with procedures established by OBO, and in compliance with Chapter 2258 of the Texas Government Code and City of Houston, Texas Ordinance Nos. 85-2070, 2000-1114, 2001-152, 2006-91, 2006-168, and 2009-247 subject to City Council approval.
- 1.6 Contractor must not use any labor classification not covered by Exhibit "A" until such classification is established and approved for use by OBO.
- 1.7 A Contractor or Subcontractor who violates Chapter 2258 of the Texas Government Code must pay to the City, \$60 per each worker employed for each calendar day or part of the day that the worker is paid less than the wage rates set forth in Exhibit "A".

00821-1

Edition Date: 02-01-2016

- 1.8 The City may withhold money required to be withheld under Chapter 2258 of the Texas Government Code from the final payment to Contractor or earlier payments if City Council makes a determination that there is good cause to believe that Contractor has not complied with these provisions and Chapter 2258 of the Government Code, in which case the City may withhold the money at any time subsequent to the finding by City Council.
- 1.9 Contractor and Subcontractors must keep records specifying:
- (1) the name and classification of each worker employed under the Contract; and
 - (2) the actual per diem wages paid to each worker, and the applicable hourly rate.
- The records must be open at all reasonable hours for inspection by the officers and agents of the City.
- 1.10 The hourly cost of salary for non-exempt workers for labor in excess of 40 hours per worker per week, shall be calculated at 1.5 times the worker's base pay for the applicable craft and level.

Certified Payroll Requirements

- 2.1 Employees are paid weekly and payrolls are submitted weekly using the City of Houston's electronic payroll submission module, unless the prime Contractor has been instructed to do otherwise by the Office of Business Opportunity. When no work is done after a Contractor has started work, the Contractor is required to submit a weekly compliance statement indicating no work was performed. The payrolls must reflect the exact work and classification of the workers, the exact amount that they were paid. Workers must be paid the contracted amount (prevailing wage rates). The Contractor will be penalized \$60.00 a day for each employee who is underpaid per Texas Government Code §2258.023 for all contracts.
- 2.2 Payrolls must be submitted electronically & indicate whether the worker worked inside or outside the building area when both wage rates are applicable to the project.
- 2.3 Payrolls must be submitted each week until all work by the contractor is complete and the electronic payroll submission is marked as final in the system.
- 2.4 Payrolls must cover a seven day period from the start of the work week and must be consecutive seven day periods until all work is complete.
- 2.5 Payrolls must have employees' names, addresses, last four digits of the social security numbers, and job classifications. The job classifications must be the same as the classifications on the prevailing wage rate schedule.
- 2.6 A payroll deduction authorization form must be submitted for each employee for

any deductions other than Federal and FICA taxes and court ordered child support.

- 2.7 Employees must be paid overtime (time and a half) for all hours worked over 40 hours a week on both federally and City-funded contracts.
- 2.8 The Contractor has the responsibility to comply with all Internal Revenue Service rules and regulations. Contractors who submit certified payrolls with **Owner Operators (truckers)** must submit a signed tax liability statement from each Owner Operator acknowledging their responsibility for Federal Income Tax and FICA reporting obligations.
- 2.9 If the Contractor wants to use the apprentice wage rates for an employee, the apprenticeship certificates must be submitted to the Office of Business Opportunity in advance of the employee working on the project and appearing on the payroll. Contractor must comply with posted number of journeymen to apprentices or helpers as listed on the wage rate.
- 2.10 A poster of the Prevailing Wage Rate Schedule should be clearly displayed on each job site from the time the project starts until the work is completed, or in case of annual service agreements, in the Contractor's office.
- 2.11 The Contractor shall submit the "Certificate from Contractor Appointing Officer or Employee to Supervise Payment of Employees" (Exhibit "B") to the Monitoring Authority listed in Document 00495 prior to final execution of the contract.
- 2.12 During the course of the work, Subcontractors shall submit the "Certificate from Subcontractor Appointing Officer or Employee to Supervise Payment of Employees" (Exhibit "C") to the Monitoring Authority listed in Document 00495.
- 2.13 Upon completion of the Project, as part of the contract-awarding department's total clearance process, the Office of Business Opportunity's Contract Compliance Section must review whether the Wage Rate and Payroll Requirements were met and report the results to the department.

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EXHIBIT "A"

CITY OF HOUSTON, TEXAS
LABOR CLASSIFICATIONS AND PREVAILING WAGE RATES
FOR BUILDING CONSTRUCTION 2016

Worker Classification	Ratio	Base Rate	Fringe Benefit	Wage Total
Asbestos Worker/Insulator *	Ratio 1/1 - Apprentice	\$22.75	\$9.85	\$32.60
Asbestos Abatement Worker (ceilings, walls ,floors only)	Ratio 1/3 – Helpers \$9.10	\$14.00	\$0.00	\$14.00
Boilermaker *	Ratio 5/1 - Apprentice	\$23.14	\$21.55	\$44.69
Brick Layer * (see Mason Tender Brick)	Ratio 1/3 – Mason Tender Brick	\$18.87	\$0.00	\$18.87
Carpenter * (including acoustical ceiling work)	Ratio 2/1 - Apprentice	\$22.50	\$8.33	\$30.83
Cement Mason/Concrete Finisher *	Ratio 1/3 Mason Tender	\$13.93	\$0.00	\$13.93
Drywall Finisher/Taper *	Ratio 1/3 – Helpers \$8.54	\$16.27	\$3.66	\$19.93
Drywall Hanger, * incl. metal studs installation	Ratio 1/3 – Helpers \$9.46	\$17.44	\$3.93	\$21.37
Electrician *(Excluding Alarm & Low Voltage)	Ratio 3/2 - Apprentice	\$27.65	\$7.70	\$35.35
Electrician (Alarm Installation)	Ratio 1/1 - Apprentice	\$17.97	\$3.37	\$21.31
Electrician (Low Voltage)	Ratio 1/3 – Helper \$11.70	\$18.00	\$1.68	\$19.68
Elevator Mechanic *	Ratio 1/1 - Apprentice	\$38.52	\$28.38	\$66.90
Formbuilder/ Formsetter *	Ratio 1/3 – Helpers \$7.67	\$12.77	\$0.00	\$12.77
Glazier *	Ratio 1/3 – Helper \$11.51	\$14.92	\$2.78	\$17.70
Insulator * (Batt and Foam)	Ratio 1/3 – Helper \$7.25	\$22.02	\$6.35	\$28.37
Ironworker *(Reinforcing)	Ratio 1/3 – Helper \$7.83	\$14.87	\$7.73	\$15.60
Ironworker *(Structural)	Ratio 1/3 – Helper \$10.19	\$22.02	\$6.35	\$28.37
Lather *	Ratio 1/3 – Helper \$13.38	\$19.73	\$0.00	\$19.73
Painter * (Brush, Roller, and Spray)	Ratio 1/3 – Helper \$7.42	\$17.24	\$4.41	\$21.65
Pipe Fitter *(HVAC Pipe only)	Ratio 1/1 - Apprentice	\$29.63	\$10.31	\$39.94
Pipe Fitter *(Excluding HVAC)	Ratio 1/3 – Apprentice \$12.40	\$29.39	\$10.31	\$39.70
Plasterer *	Ratio 1/3 Plaster Tenders	\$19.42	\$1.00	\$20.42
Plumber *	Ratio 3/2 - Apprentice	\$30.29	\$9.50	\$39.79
Roofer *	Ratio 1/3 – Helper \$7.85	\$15.40	\$0.00	\$15.40
Sheet Metal Worker *(incl. HVAC duct and system install.)	Ratio 2/1 - Apprentice	\$25.37	\$12.39	\$37.76
Sprinkler Fitter * (Fire sprinklers)	Ratio 1/1 – Apprentice	\$26.36	\$16.52	\$42.88
Tile Finisher *	Ratio 1/3 – Helper \$8.08	\$12.00	\$0.43	\$12.43
Tile Setter *	Ratio 1/3 – Helper \$10.91	\$16.17	\$0.00	\$16.17
Truck Driver		\$14.18	\$0.00	\$14.18
Laborers:				
Common Laborer		\$11.76	\$0.00	\$11.76
Mason Tender (Bricklayer's Helper)		\$13.47	\$0.00	\$13.47
Mason Tender (Cement /Concrete Finisher's Helper)		\$10.48	\$0.00	\$10.48
Pipe Layer		\$12.94	\$0.00	\$12.94
Plaster Tender (Plasterer's helper)		\$12.90	\$2.51	\$15.41
Power Equipment Operator:				
Asphalt Paver		\$16.03	\$0.00	\$16.03
Backhoe – Power Equipment Operator		\$13.94	\$0.00	\$13.94
Crane – Power Equipment Operator		\$34.85	\$9.85	\$44.70
Forklift – Power Equipment Operator		\$16.00	\$0.00	\$16.00
Slab and Wall Saw – Power Equipment Operator		\$15.54	\$3.83	\$19.37
Welders - Receive rate prescribed for craft performing operation in which welding is incidental				
* When Apprentices are shown, Helpers cannot be utilized. See Definitions for allowable journeymen to apprentice /helpers.				

Building Construction Prevailing Wages Classification Definitions

Asbestos Worker/Insulator * - Ratio 1 Journeyman /1 Apprentice (1 Journeyman / 1 Apprentice)
(Including application of all insulating materials, protective coverings, coatings and finishing to all type of mechanical systems). Applies insulating material to exposed surfaces of structures, such as air ducts, hot and cold pipes, storage tanks, and cold storage rooms: Reads blueprints and selects required insulation material (in sheet, tubular, or roll form), such as fiberglass, foam rubber, styrofoam, cork, or urethane, based on material's heat retaining or excluding characteristics. Brushes adhesives on or attaches metal adhesive-backed pins to flat surfaces as necessary to facilitate application of insulation material. Measures and cuts insulation material to specified size and shape for covering flat or round surfaces, using tape measure, knife, or scissors. Fits, wraps, or attaches required insulation material around or to structure, following blueprint specifications. Covers or seals insulation with preformed plastic covers, canvas strips, sealant, or tape to secure insulation to structure, according to type of insulation used and structure covered, using staple gun, trowel, paintbrush, or caulking gun.

Asbestos Abatement Worker * (Ceilings, Floors, & Walls only) Ratio 1 Journeyman /3 Helpers
Removes asbestos from ceilings, walls, beams, boilers, and other structures, following hazardous waste handling guidelines: Assembles scaffolding and seals off work area, using plastic sheeting and duct tape. Positions mobile decontamination unit or portable showers at entrance of work area. Builds connecting walkway between mobile unit or portable showers and work area, using hand tools, lumber, nails, plastic sheeting, and duct tape. Positions portable air evacuation and filtration system inside work area. Sprays chemical solution over asbestos covered surfaces, using tank with attached hose and nozzle, to soften asbestos. Cuts and scrapes asbestos from surfaces, using knife and scraper. Shovels asbestos into plastic disposal bags and seals bags, using duct tape. Cleans work area of loose asbestos, using vacuum, broom, and dustpan. Places asbestos in disposal bags and seals bags, using duct tape. Dismantles scaffolding and temporary walkway, using hand tools, and places plastic sheeting and disposal bags into transport bags. Seals bags, using duct tape, and loads bags into truck.

Boilermaker * - Ratio 5 Journeymen /1 Apprentice
Assembles, analyzes defects in, and repairs boilers, pressure vessels, tanks, and vats in field, following blueprints and using hand tools and portable power tools and equipment: Locates and marks reference points for columns or plates on foundation, using master straightedge, squares, transit, and measuring tape, and applying knowledge of geometry. Attaches rigging or signals crane operator to lift parts to specified position. Aligns structures or plate sections to assemble boiler frame, tanks, or vats, using plumb bobs, levels, wedges, dogs, or turnbuckles. Hammers, flame cuts, files, or grinds irregular edges of sections or structural parts to facilitate fitting edges together. Bolts or arc-welds structures and sections together. Positions drums and headers into supports and bolts or welds supports to frame. Aligns water tubes and connects and expands ends to drums and headers, using tube expander. Bells, beads with power hammer, or welds tube ends to ensure leak proof joints. Bolts or welds casing sections, uptakes, stacks, baffles, and such fabricated parts as chutes, air heaters, fan stands, feeding tube, catwalks, ladders, coal hoppers, and safety hatch to frame, using wrench. Installs manholes, hand holes, valves, gauges, and feed water connection in drums to complete assembly of water tube boilers. Assists in testing assembled vessels by pumping water or gas under specified pressure into vessel and observing instruments for evidence of leakage. Repairs boilers or tanks in field by unbolting or flame cutting defective sections or tubes, straightening plates, using torch or jacks, installing new tubes, fitting

00821-5

Edition Date: 02-01-2016

and welding new sections and replacing worn lugs on bolts. May rivet and caulk sections of vessels, using pneumatic riveting and caulking hammers.

Bricklayer * (See Mason Tender) - Ratio 1 Journeyman /3 Mason Tender Brick

Lays building materials, such as brick, structural tile, and concrete cinder, glass, gypsum, and terra cotta block (except stone) to construct or repair walls, partitions, arches, sewers, and other structures: Measures distance from reference points and marks guidelines on working surface to lay out work. Spreads soft bed (layer) of mortar that serves as base and binder for block, using trowel. Applies mortar to end of block and positions block in mortar bed. Taps block with trowel to level, align, and embed in mortar, allowing specified thickness of joint. Removes excess mortar from face of block, using trowel. Finishes mortar between brick with pointing tool or trowel. Breaks bricks to fit spaces too small for whole brick, using edge of trowel or brick hammer. Determines vertical and horizontal alignment of courses, using plumb bob, gauge line (tightly stretched cord), and level. Fastens brick or terra cotta veneer to face of structures, with tie wires embedded in mortar between bricks, or in anchor holes in veneer brick. May weld metal parts to steel structural members. May apply plaster to walls and ceiling, using trowel, to complete repair work.

Carpenter * (Including Acoustical Ceiling Work) - Ratio 2 Journeymen /1 Apprentice

Constructs, erects, installs, and repairs structures and fixtures of wood, plywood, and wallboard, using carpenter's hand tools and power tools, and conforming to local building codes: Studies blueprints, sketches, or building plans for information pertaining to type of material required, such as lumber or fiberboard, and dimensions of structure or fixture to be fabricated. Selects specified type of lumber or other materials. Prepares layout, using rule, framing square, and calipers. Marks cutting and assembly lines on materials, using pencil, chalk, and marking gauge. Shapes materials to prescribed measurements, using saws, chisels, and planes. Assembles cut and shaped materials and fastens them together with nails, dowel pins, or glue. Verifies trueness of structure with plumb bob and carpenter's level. Erects framework for structures and lays subflooring. Builds stairs and lays out and installs partitions and cabinetwork. Covers sub floor with building paper to keep out moisture and lays hardwood, parquet, and wood-strip-block floors by nailing floors to sub floor or cementing them to mastic or asphalt base. Applies shock-absorbing, sound-deadening, and decorative paneling to ceilings and walls. Fits and installs prefabricated window frames, doors, doorframes, weather stripping, interior and exterior trim, and finish hardware, such as locks, letter drops, and kick plates. Constructs forms and chutes for pouring concrete. Erects scaffolding and ladders for assembling structures above ground level. May weld metal parts to steel structural members.

Cement Mason/Concrete Finisher * (Mason Tender Cement/Concrete) - Ratio 1 Journeyman /3 Mason Tender Cement

Finisher; concrete floater Smooths and finishes surfaces of poured concrete floors, walls, sidewalks, or curbs to specified textures, using hand tools or power tools, including floats, trowels, and screeds: Signals concrete deliverer to position truck to facilitate pouring concrete. Moves discharge chute of truck to direct concrete into forms. Spreads concrete into inaccessible sections of forms, using rake or shovel. Levels concrete to specified depth and workable consistency, using hand held screed and floats to bring water to surface and produce soft topping. Smooths, and shapes surfaces of freshly poured concrete, using straightedge and float or power screed. Finishes concrete surfaces, using power trowel, or wets and rubs concrete with abrasive stone to impart finish. Removes rough or defective spots from concrete surfaces, using power grinder or chisel and hammer, and patches holes with fresh concrete or epoxy compound. Molds expansion joints and edges, using edging tools, jointers, and straightedge. May sprinkle colored stone chips, powdered steel, or coloring powder on concrete to produce prescribed finish. May produce rough concrete surface, using broom. May mix cement, using hoe or concrete-mixing machine. May direct sub

grade work, mixing of concrete, and setting of forms.

Drywall Finisher/Taper - Ratio 1 Journeyman /3 Helpers

Wallboard and plasterboard; sheetrock taper; taper and bedder; taper and floater. Seals joints between plasterboard or other wallboards to prepare wall surface for painting or papering; Mixes sealing compound by hand or with portable electric mixer, and spreads compound over joints between boards, using trowel, broad knife, or spatula. Presses paper tape over joint to embed tape into compound and seal joint, or tapes joint, using mechanical applicator that spreads compound and embeds tape in one operation. Spreads and smooth's cementing material over tape, using trowel or floating machine to blend joint with wall surface. Sands rough spots after cement has dried. Fills cracks and holes in walls and ceiling with sealing compound. Installs metal molding at corners in lieu of sealant and tape. Usually works as member of crew. May apply texturing compound and primer to walls and ceiling preparatory to final finishing, using brushes, roller, or spray gun. May countersink nails or screws below surface of wall prior to applying sealing compound, using hammer or screwdriver.

Drywall Hanger - Ratio 1 Journeyman /3 Helpers

Dry-wall installer; gypsum dry-wall systems installer. Plans gypsum drywall installations, erects metal framing and furring channels for fastening drywall, and installs drywall to cover walls, ceilings, soffits, shafts, and movable partitions in residential, commercial, and industrial buildings: Reads blueprints and other specifications to determine method of installation, work procedures, and material, tool, and work aid requirements. Lays out reference lines and points for use in computing location and position of metal framing and furring channels and marks position for erecting metalwork, using chalk line. Measures, marks, and cuts metal runners, studs, and furring channels to specified size, using tape measure, straightedge and hand and portable power cutting tools. Secures metal framing to walls and furring channels to ceilings, using hand and portable power tools. Measures and marks cutting lines on drywall, using square, tape measure, and marking devices. Scribes cutting lines on drywall, using straightedge and utility knife and breaks board along cut lines. Fits and fastens board into specified position on wall, using screws, hand tools, portable power tools, or adhesive. Cuts openings into board for electrical outlets, vents, or fixtures, using keyhole saw or other cutting tools. Measures, cuts, assembles, and installs metal framing and decorative trim for windows, doorways, and vents. Fits, aligns, and hangs doors and installs hardware, such as locks and kick plates (Includes Installing Metal Studs).

Electrician (Excludes Low Voltage Wiring & Installation)* Ratio 3 Journeymen /2 Apprentice

Plans layout, installs, and repairs wiring, electrical fixtures, apparatus, and control equipment: Plans new or modified installations to minimize waste of materials, provide access for future maintenance, and avoid unsightly, hazardous, and unreliable wiring, consistent with specifications and local electrical codes. Prepares sketches showing location of wiring and equipment, or follows diagrams or blueprints, ensuring that concealed wiring is installed before completion of future walls, ceilings, and flooring. Measures, cuts, bends, threads, assembles, and installs electrical conduit, using tools, such as hacksaw, pipe threader, and conduit bender. Pulls wiring through conduit. Splices wires by stripping insulation from terminal leads, using knife or pliers, twisting or soldering wires together, and applying tape or terminal caps. Connects wiring to lighting fixtures and power equipment, using hand tools. Installs control and distribution apparatus, such as switches, relays, and circuit-breaker panels, fastening in place with screws or bolts, using hand tools and power tools. Connects power cables to equipment, such as electric range or motor, and installs grounding leads. Tests continuity of circuit to ensure electrical compatibility and safety of components, using testing instruments, such as ohmmeter, battery and buzzer, and oscilloscope. Observes functioning of installed equipment or system to detect hazards and need for adjustments, relocation, or replacement (Including Pulling Wire and Low Voltage Wiring and Installation of Fire Alarms,

Security Systems, Telephones, and Computers).

Electrician (Alarm Installation Only) * Ratio 1 Journeymen /1 Apprentice

Plans layout, installs, and repairs wiring, electrical fixtures, apparatus, and control equipment: Plans new or modified installations to minimize waste of materials, provide access for future maintenance, and avoid unsightly, hazardous, and unreliable wiring, consistent with specifications and local electrical codes. Prepares sketches showing location of wiring and equipment, or follows diagrams or blueprints, ensuring that concealed wiring is installed before completion of future walls, ceilings, and flooring. Measures, cuts, bends, threads, assembles, and installs electrical conduit, using tools, such as hacksaw, pipe threader, and conduit bender. Pulls wiring through conduit. Splices wires by stripping insulation from terminal leads, using knife or pliers, twisting or soldering wires together, and applying tape or terminal caps. Connects wiring to lighting fixtures and power equipment, using hand tools. Installs control and distribution apparatus, such as switches, relays, and circuit-breaker panels, fastening in place with screws or bolts, using hand tools and power tools. Connects power cables to equipment, such as electric range or motor, and installs grounding leads. Tests continuity of circuit to ensure electrical compatibility and safety of components, using testing instruments, such as ohmmeter, battery and buzzer, and oscilloscope. Observes functioning of installed equipment or system to detect hazards and need for adjustments, relocation, or replacement (Including Pulling Wire and Low Voltage Wiring and Installation of Fire Alarms, Security Systems, Telephones, and Computers).

Electrician (Low Voltage Wiring Only)* Ratio 1 Journeymen /3 Helpers

Plans layout, installs, and repairs wiring, electrical fixtures, apparatus, and control equipment: Plans new or modified installations to minimize waste of materials, provide access for future maintenance, and avoid unsightly, hazardous, and unreliable wiring, consistent with specifications and local electrical codes. Prepares sketches showing location of wiring and equipment, or follows diagrams or blueprints, ensuring that concealed wiring is installed before completion of future walls, ceilings, and flooring. Measures, cuts, bends, threads, assembles, and installs electrical conduit, using tools, such as hacksaw, pipe threader, and conduit bender. Pulls wiring through conduit. Splices wires by stripping insulation from terminal leads, using knife or pliers, twisting or soldering wires together, and applying tape or terminal caps. Connects wiring to lighting fixtures and power equipment, using hand tools. Installs control and distribution apparatus, such as switches, relays, and circuit-breaker panels, fastening in place with screws or bolts, using hand tools and power tools. Connects power cables to equipment, such as electric range or motor, and installs grounding leads. Tests continuity of circuit to ensure electrical compatibility and safety of components, using testing instruments, such as ohmmeter, battery and buzzer, and oscilloscope. Observes functioning of installed equipment or system to detect hazards and need for adjustments, relocation, or replacement (Including Pulling Wire and Low Voltage Wiring).

Elevator Mechanic * - Ratio 1 Journeyman /1 Apprentice

FOOTNOTES: a. - Employer contributes 8% of basic hourly rate for over 5 years' service and 6% of basic hourly rate for 6 months to 5 years' service as Vacation Pay Credit. Paid Holidays: New Year's Day; Memorial Day; Independence Day Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; Christmas Day.

Erector; elevator installer; elevator mechanic. Assembles and installs electric and hydraulic freight and passenger elevators, escalators, and dumbwaiters, determining layout and electrical connections from blueprints: Studies blueprints and lays out location of framework, counterbalance rails, motor pump, cylinder, and plunger foundations. Drills holes in concrete or structural steel members with portable electric drill. Secures anchor bolts or welds brackets to support rails and framework, and verifies alignment with plumb bob and level. Cuts prefabricated sections of

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framework, rails, and other elevator components to specified dimensions, using acetylene torch, power saw, and disk grinder. Installs cables, counterweights, pumps, motor foundations, escalator drives, guide rails, elevator cars, and control panels, using hand tools. Connects electrical wiring to control panels and electric motors. Installs safety and control devices. Positions electric motor and equipment on top of elevator shaft, using hoists and cable slings.

Formbuilder/Formsetter - Ratio 1 Journeyman /3 Helpers

Constructs built-in-place or prefabricated wooden forms, according to specifications, for molding concrete structures: Studies blueprints and diagrams to determine type and dimension of forms to be constructed. Saws lumber to blueprint dimensions, using handsaw or power saw, and nails lumber together to make form panels. Erects built-in-place forms or assembles and installs prefabricated forms on construction site according to blueprint specifications, using hand tools, plumb rule, and level. Inserts spreaders and tie rods between opposite faces of form to maintain specified dimensions. Anchors and braces forms to fixed objects, using nails, bolts, anchor rods, steel cables, planks, and timbers.

Glazier - Ratio 1 Journeyman /3 Helpers

Installs glass in windows, skylights, store fronts, and display cases, or on surfaces, such as building fronts, interior walls, ceilings, and tabletops: Marks outline or pattern on glass, and cuts glass, using glasscutter. Breaks off excess glass by hand or with notched tool. Fastens glass panes into wood sash with glaziers points, and spreads and smoothes putty around edge of panes with knife to seal joints. Installs mirrors or structural glass on building fronts, walls, ceilings, or tables, using mastic, screws, or decorative molding. Bolts metal hinges, handles, locks, and other hardware to prefabricated glass doors. Sets glass doors into frame and fits hinges. May install metal window and doorframes into which glass panels are to be fitted. May press plastic adhesive film to glass or spray glass with tinting solution to prevent light glare. May install stained glass windows.

Insulator (Batt and Foam) - Ratio 1 Journeyman /3 Helpers

Applies batt and form insulation to walls, ceilings and other surfaces according to manufacturers specifications and blue print instructions. May use sealants such as cement plaster or asphalt compound to seal insulation; may spread concrete over floor slabs to form wearing floor: brushes adhesives, cuts insulating materials to specified shape to cover surfaces; uses tape or other sealants to adhere insulation to surfaces. May use staple gun, towel, paintbrushes and caulking guns.

Ironworker (Reinforcing) - Ratio 1 Journeyman/3 Helpers

Positions and secures steel bars in concrete forms to reinforce concrete; places rods in forms, spacing and fastening together with wire and pliers. Cuts bars using hacksaw, bar cutters or acetylene torch. Bends steel rods with hand tools or rod bending machine; reinforces concrete with wire mesh; welds reinforcing bars together.

Ironworker (Structural) - Ratio 1 Journeyman /3 Helpers

Erector; ironworker; steel erector; structural-iron erector; structural-iron worker; structural steel erector. Performs any combination of following duties to raise, place, and unite girders, columns, and other structural-steel members to form completed structures or structure frameworks, working as member of crew: Sets up hoisting equipment for raising and placing structural-steel members. Fastens steel members to cable of hoist, using chain, cable, or rope. Signals worker operating hoisting equipment to lift and place steel member. Guides member, using tab line (rope) or rides on member in order to guide it into position. Pulls, pushes, or pries steel members into approximate position while member is supported by hoisting device. Forces members into final position, using turnbuckles, crowbars, jacks, and hand tools. Aligns rivet holes in member with corresponding

holes in previously placed member by driving drift pins or handle of wrench through holes. Verifies vertical and horizontal alignment of members, using plumb bob and level.

Lather - Ratio 1 Journeyman /3 Helpers

Fastens wooden, metal, or rockboard lath to walls, ceilings, and partitions of buildings to provide supporting base for plaster, fireproofing, or acoustical material, using hand tools and portable power tools: Erects horizontal metal framework to which laths are fastened, using nails, bolts, and studgun. Drills holes in floor and ceiling, using portable electric tool, and drives ends of wooden or metal studs into holes to provide anchor for furring or rockboard lath. Wires horizontal strips to furring to stiffen framework. Cuts lath to fit openings and projections, using hand tools or portable power tools. Wires, nails, clips, or staples lath to framework, ceiling joists, and flat concrete surfaces. Bends metal lath to fit corners, or attaches preformed corner reinforcements. Wires plasterer's channels to overhead structural framework to provide support for plaster or acoustical ceiling tile.

Painter (Brush, Roller, and Spray) - Ratio 1 Journeyman /3 Helpers

Applies coats of paint, varnish, stain, enamel, or lacquer to decorate and protect interior or exterior surfaces, trimmings, and fixtures of buildings and other structures: Reads work order or receives instructions from supervisor or homeowner regarding painting. Smooths surfaces, using sandpaper, brushes, or steel wool, and removes old paint from surfaces, using paint remover, scraper, wire brush, or blowtorch to prepare surfaces for painting. Fills nail holes, cracks, and joints with caulk, putty, plaster, or other filler, using caulking gun and putty knife. Selects premixed paints, or mixes required portions of pigment, oil, and thinning and drying substances to prepare paint that matches specified colors. Removes fixtures, such as pictures and electric switchcovers, from walls prior to painting, using screwdriver. Spreads dropcloths over floors and room furnishings, and covers surfaces, such as baseboards, doorframes, and windows with masking tape and paper to protect surfaces during painting. Paints surfaces, using brushes, spray gun, or paint rollers. Simulates wood grain, marble, brick, or tile effects. Applies paint with cloth, brush, sponge, or fingers to create special effects. Erects scaffolding or sets up ladders to perform tasks above ground level.

Pipe fitter * (HVAC Pipe Only) - Ratio 1 Journeymen /1 Apprentice (See Schedule included)

Lays out, assembles, installs, and maintains pipe systems, pipe supports, and related hydraulic and pneumatic equipment for steam, hot water, heating, cooling, lubricating, sprinkling, and industrial production and processing systems, applying knowledge of system operation, and following blueprints: Selects type and size of pipe, and related materials and equipment, such as supports, hangers, and hydraulic cylinders, according to specifications. Inspects work site to determine presence of obstructions and to ascertain that holes cut for pipe will not cause structural weakness. Plans installation or repair to avoid obstructions and to avoid interfering with activities of other workers. Cuts pipe, using saws, pipe cutter, hammer and chisel, cutting torch, and pipe cutting machine. Threads pipe, using pipe threading machine. Bends pipe, using pipe bending tools and pipe bending machine. Assembles and installs variety of metal and nonmetal pipes, tubes, and fittings, including iron, steel, copper, and plastic. Connects pipes, using threaded, caulked, soldered, brazed, fused, or cemented joints, and hand tools. Secures pipes to structure with brackets, clamps, and hangers, using hand tools and power tools. Installs and maintains hydraulic and pneumatic components of machines and equipment, such as pumps and cylinders, using hand tools. Installs and maintains refrigeration and air conditioning systems, including compressors, pumps, meters, pneumatic and hydraulic controls, and piping, using hand tools and power tools, and following specifications and blueprints. Increases pressure in pipe system and observes connected pressure gauge to test system for leaks.

Pipe Fitter * (Excluding HVAC Pipe) – Ratio 1 Journeymen /3 Helpers

Lays out, assembles, installs, and maintains pipe systems, pipe supports, and related hydraulic and pneumatic equipment for steam, hot water, heating, cooling, lubricating, sprinkling, and industrial production and processing systems, applying knowledge of system operation, and following blueprints: Selects type and size of pipe, and related materials and equipment, such as supports, hangers, and hydraulic cylinders, according to specifications. Inspects work site to determine presence of obstructions and to ascertain that holes cut for pipe will not cause structural weakness. Plans installation or repair to avoid obstructions and to avoid interfering with activities of other workers. Cuts pipe, using saws, pipe cutter, hammer and chisel, cutting torch, and pipe cutting machine. Threads pipe, using pipe-threading machine. Bends pipe, using pipe bending tools and pipe bending machine. Assembles and installs variety of metal and nonmetal pipes, tubes, and fittings, including iron, steel, copper, and plastic. Connects pipes, using threaded, caulked, soldered, brazed, fused, or cemented joints, and hand tools. Secures pipes to structure with brackets, clamps, and hangers, using hand tools and power tools. Installs and maintains hydraulic and pneumatic components of machines and equipment, such as pumps and cylinders, using hand tools. Installs and maintains refrigeration and air conditioning systems, including compressors, pumps, meters, pneumatic and hydraulic controls, and piping, using hand tools and power tools, and following specifications and blueprints. Increases pressure in pipe system and observes connected pressure gauge to test system for leaks. May weld pipe supports to structural steel members. May observe production machines in assigned area of manufacturing facility to detect machinery malfunctions. May operate machinery to verify repair. May modify programs of automated machinery, such as robots and conveyors, to change motion and speed of machine, using teach pendant, control panel, or keyboard and display screen of robot controller and programmable controller. May be designated Steam Fitter (construction) when installing piping systems that must withstand high pressure

Plasterer * See Plaster Tender - Ratio 1 Journeyman /3 Plaster Tenders

Applies coats of plaster to interior walls, ceilings, and partitions of buildings, to produce finished surface, according to blueprints, architect's drawings, or oral instructions, using hand tools and portable power tools: Directs workers to mix plaster to desired consistency and to erect scaffolds. Spreads plaster over lath or masonry base, using trowel, and smoothes plaster with darby and float to attain uniform thickness. Applies scratch, brown, or finish coats of plaster to wood, metal, or board lath successively. Roughens undercoat with scratcher (wire or metal scraper) to provide bond for succeeding coats of plaster.

Plumber * (Excluding HVAC Pipe) - Ratio 3 Journeymen /2 Apprentice

Assembles, installs, and repairs pipes, fittings, and fixtures of heating, water, and drainage systems, according to specifications and plumbing codes: Studies building plans and working drawings to determine work aids required and sequence of installations. Inspects structure to ascertain obstructions to be avoided to prevent weakening of structure resulting from installation of pipe. Locates and marks position of pipe and pipe connections and passage holes for pipes in walls and floors, using ruler, spirit level, and plumb bob. Cuts openings in walls and floors to accommodate pipe and pipe fittings, using hand tools and power tools. Cuts and threads pipe, using pipe cutters, cutting torch, and pipe-threading machine. Bends pipe to required angle by use of pipe-bending machine or by placing pipe over block and bending it by hand. Assembles and installs valves, pipe fittings, and pipes composed of metals, such as iron, steel, brass, and lead, and nonmetals, such as glass, vitrified clay, and plastic, using hand tools and power tools. Joins pipes by use of screws, bolts, fittings, solder, plastic solvent, and caulks joints. Fills pipe system with water or air and reads pressure gauges to determine whether system is leaking. Installs and repairs plumbing fixtures, such as sinks, commodes, bathtubs, water heaters, hot water tanks, garbage disposal units, dishwashers, and water softeners. Repairs and maintains plumbing by

replacing washers in leaky faucets, mending burst pipes, and opening clogged drains.

Roofer - Ratio 1 Journeyman/3 Helpers

Covers roofs with roofing materials other than sheet metal, such as composition shingles or sheets, wood shingles, or asphalt and gravel, to waterproof roofs: Cuts roofing paper to size, using knife, and nails or staples it to roof in overlapping strips to form base for roofing materials. Installs gutters and downs spouts. Aligns roofing material with edge of roof, and overlaps successive layers, gauging distance of overlap with chalk line, gauge on shingling hatchet, or by lines on shingles. Fastens composition shingles or sheets to roof with asphalt, cement, or nails. Punches holes in slate, tile, terra cotta, or wooden shingles, using punch and hammer. Cuts strips of flashing and fits them into angles formed by walls, vents, and intersecting roof surfaces. When applying asphalt or tar and gravel to roof, mops or pours hot asphalt or tar onto roof base. Applies alternate layers of hot asphalt or tar and roofing paper until roof covering is as specified. Applies gravel or pebbles over top layer, using rake or stiff bristled broom.

Sheet metal worker * Ratio 2 Journeymen /1 Apprentice (Including Setting HVAC Duct & System Installs)

Fabricates, assembles, installs and repairs sheet metal products, including sheet metal roof (also see Roofer). Operates soldering and welding equipment to join together sheet metal parts. Seals seams and joints with sealant. Installs roof sheets, trims, flashing, gutters down spouts and other related items. Performs other related duties.

Sprinkler Fitter (Fire) * - Ratio 1 Journeyman /1 Apprentice

Lays out, assembles, installs, and maintains pipe systems, pipe supports, and related hydraulic and pneumatic equipment for steam, hot water, heating, cooling, lubricating, sprinkling, and industrial production and processing systems, applying knowledge of system operation, and following blueprints: Selects type and size of pipe, and related materials and equipment, such as supports, hangers, and hydraulic cylinders, according to specifications. Inspects work site to determine presence of obstructions and to ascertain that holes cut for pipe will not cause structural weakness. Plans installation or repair to avoid obstructions and to avoid interfering with activities of other workers. Cuts pipe, using saws, pipe cutter, hammer and chisel, cutting torch, and pipe cutting machine. Threads pipe, using pipe-threading machine. Bends pipe, using pipe bending tools and pipe bending machine. Assembles and installs variety of metal and nonmetal pipes, tubes, and fittings, including iron, steel, copper, and plastic. Connects pipes, using threaded, caulked, soldered, brazed, fused, or cemented joints, and hand tools. Secures pipes to structure with brackets, clamps, and hangers, using hand tools and power tools. Installs and maintains hydraulic and pneumatic components of machines and equipment, such as pumps and cylinders, using hand tools. Installs and maintains refrigeration and air conditioning systems, including compressors, pumps, meters, pneumatic and hydraulic controls, and piping, using hand tools and power tools, and following specifications and blueprints. Increases pressure in pipe system and observes connected pressure gauge to test system for leaks. May weld pipe supports to structural steel members. May observe production machines in assigned area of manufacturing facility to detect machinery malfunctions. May operate machinery to verify repair. May modify programs of automated machinery, such as robots and conveyors, to change motion and speed of machine, using teach pendant, control panel, or keyboard and display screen of robot controller and programmable controller.

Tile Finisher - Ratio 1 Journeyman /3 Helpers

Supplies and mixes construction materials for TILE SETTER (construction) 861.381-054, applies grout, and cleans installed tile: Moves tiles, tile setting tools, and work devices from storage area to installation site manually or using wheelbarrow. Mixes mortar and grout according to standard

formulas and request from TILE SETTER (construction), using bucket, water hose, spatula, and portable mixer. Supplies TILE SETTER (construction) with mortar, using wheelbarrow and shovel. Applies grout between joints of installed tile, using grouting trowel. Removes excess grout from tile joints with wet sponge and scrapes corners and crevices with trowel. Wipes surface of tile after grout has set to remove grout residue and polish tile, using nonabrasive materials. Cleans installation site, mixing and storage areas, and installation machines, tools, and equipment, using water and various cleaning tools. Stores tile setting materials, machines, tools, and equipment. May apply caulk, sealers, acid, steam, or related agents to caulk, seal, or clean installed tile, using various application devices and equipment. May modify mixing, grouting, grinding, and cleaning procedures according to type of installation or material used. May assist TILE SETTER (construction) to position and secure metal lath, wire mesh, or felt paper prior to installation of tile. May cut marked tiles to size, using power saw or tile cutter.

Tile Setter - Ratio 1 Journeyman /3 Helpers

Applies tile to walls, floors, ceilings, and promenade roof decks, following design specifications: Examines blueprints, measures and marks surfaces to be covered, and lays out work. Measures and cuts metal lath to size for walls and ceilings with tin snips. Tacks lath to wall and ceiling surfaces with staple gun or hammer. Spreads plaster base over lath with trowel and levels plaster to specified thickness, using screed. Spreads concrete on sub floor, with trowel and levels it with screed. Spreads mastic or other adhesive base on roof deck, using serrated spreader to form base for promenade tile. Cuts and shapes tile with tile cutters and biters. Positions tile and taps it with trowel handle to affix tile to plaster or adhesive base.

Truck Driver

Drives truck with capacity of more than 3 tons, to transport materials to and from specified destinations: Drives truck to destination, applying knowledge of commercial driving regulations and area roads. Prepares receipts for load picked up. Collects payment for goods delivered and for delivery charges. May maintain truck log, according to state and federal regulations. May maintain telephone or radio contact with supervisor to receive delivery instructions. May load and unload truck. May inspect truck equipment and supplies, such as tires, lights, brakes, gas, oil, and water. May perform emergency roadside repairs, such as changing tires, installing light bulbs, tire chains, and spark plugs. May position blocks and tie rope around items to secure cargo during transit.

Laborers

Common Laborer

Performs any combination of the following tasks in erecting, repairing and wrecking buildings; dig, spread and level dirt and gravel; lift carry and hold building materials, tools and supplies; clean tools, equipment, materials and work areas; mix, pour and spread concrete, asphalt, gravel and other materials; join, wrap and seal sections of pipe; routine non-machine tasks such as removing forms from set concrete, filling expansion joints with asphalt, and placing culverts in trench. May also signal construction equipment operators; measure distances from grade stakes, drive stakes and stretch lines; bolt, nail align and block up under forms; mix and finish poured concrete, erect scaffolding; spread paint or coating to seal surfaces; caulking compounds to seal surfaces; remove projections from concrete, and mount pipe hangers.

Mason Tender Brick (Bricklayer's Helper)

Mason Tender Cement (Concrete Mason's / Concrete Finisher's Helper)

Pipe layer

Lay pipe for storm or sanitation sewers, drains, and water mains. Perform any combination of the following tasks: grade trenches or culverts, position pipe, or seal joints.

Plaster Tender (Plaster's Helper)

Tends machine that pumps plaster or stucco through spray gun for application to ceilings, walls, and partitions of buildings: Starts and stops machine on signals from PLASTERER (construction). Fills hopper of machine with plaster. Turns valves to regulate pump and compressor. Assists in erecting scaffolds.

Power Equipment Operators

Asphalt Paver (operator)

Operator; bituminous-paving-machine operator; blacktop-paver operator; blacktop spreader; mechanical-spreader operator; paving-machine operator, asphalt or bituminous. Operates machine that spreads and levels hot-mix bituminous paving material on sub grade of highways and streets: Bolts extensions to screed to adjust width, using wrenches. Lights burners to heat screed. Starts engine and controls paving machine to push dump truck and maintain constant flow of asphalt into hopper. Observes distribution of paving material along screed and controls direction of screed to eliminate voids at curbs and joints. Turns valves to regulate temperature of asphalt flowing from hopper when asphalt begins to harden on screed.

Backhoe (operator)

Operates power-driven machine, equipped with movable shovel, to excavate or move coal, dirt, rock, sand, and other materials: Receives written or oral instructions from supervisor regarding material to move or excavate. Pushes levers and depresses pedals to move machine, to lower and push shovel into stockpiled material, to lower and dig shovel into surface of ground, and to lift, swing, and dump contents of shovel into truck, car, or onto conveyor, hopper, or stockpile. Observes markings on ground, hand signals, or grade stakes to remove material, when operating machine at excavation site.

Crane (operator)

Operates electric-, diesel-, gasoline-, or steam-powered guy-derrick or stiff-leg derrick (mast supported by fixed legs or tripod), to move products, equipment, or materials to and from quarries, storage areas, and processes, or to load and unload trucks or railroad cars: Pushes and pulls levers and depresses pedals to raise, lower, and rotate boom and to raise and lower load line in response to signals.

Forklift (operator)

Drives gasoline-, liquefied gas-, or electric-powered industrial truck equipped with lifting devices, such as forklift, boom, scoop, lift beam and swivel-hook, fork-grapple, clamps, elevating platform, or trailer hitch, to push, pull, lift, stack, tier, or move products, equipment, or materials in warehouse, storage yard, or factory: Moves levers and presses pedals to drive truck and control movement of lifting apparatus. Positions forks, lifting platform, or other lifting device under, over, or around loaded pallets, skids, boxes, products, or materials or hooks tow trucks to trailer hitch, and transports load to designated area. Unloads and stacks material by raising and lowering lifting device.

Slab & Wall Saw (See Related Power Equipment Operator Above)
Use associated power equipment operators already defined.

Apprentices

Apprentices may be used in any of the crafts listed above where noted, if they are currently certified in a program recognized by the Bureau of Apprenticeship and Training, U.S. Department of Labor, providing the proper ratio between journeyman and apprentice is observed. Apprentice certification certificates must be supplied with the first weekly payroll upon which the apprentice's name appears.

Helper (65% of the journeyman classification)

(Must not exceed 3 helpers to 1 journeyman)

A Helper is a semi-skilled worker (rather than a skilled journeyman) who works under the direction of and assists a journeyman. Under the journeyman's direction and supervision, the helper performs a variety of duties to assist the journeyman such as preparing, carrying, and furnishing equipment, supplies and maintaining them in order; cleaning and preparing work areas; lifting, positioning, and holding materials or tools; and other related semi-skilled tasks as directed by the journeyman. A helper may use the tools of the trade at and under the direction of the journeyman. The particular duties performed by a helper vary according to area practice. The journeyman must work in close proximity to the location of the helpers work area. The helpers wage rate shall be calculated at no less than 65% of the prevailing wage for that journeyman's classification.

Helper who assists more than one journeyman craft should be listed with the notation indicating each journeyman craft classification they assist.

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Pipe fitters * Apprentice Schedule (Excluding HVAC Pipe)

Journeyman	Indentured Apprentice	Apprentice Applicant	Total
1	1	0	1 to 1
3	2	1	3 to 3
5	3	2	5 to 5
8	4	3	8 to 7
12	5	4	12 to 9
16	6	5	16 to 11
20	7	6	20 to 13
25	8	7	25 to 15
30	9	8	30 to 17
40	10	9	40 to 19
50	11	10	50 to 21

NOTE: Continue after 50 Journeyman — ONE (1) Indentured Apprentice and one (1) Apprentice Applicant for every ten (10) Journeyman

*** When Apprentices are shown, Helpers cannot be utilized.**

APPRENTICES (see definitions)

Registered Apprenticeship Ratios

For All Apprentices

Apprentice duties consist but are not limited to reading blue prints, lay out, fabrication, installation, and assembly. Other duties are the setting up and operation of fabrication machines, using hand tools, power tools, lifting/handling devices, sealing if necessary according to their particular craft. Apprentices also are trained in the preparation process of a job that include but not limited to staging, planning, distribution, and sectioning of materials. Apprentices may be used in any of the crafts listed where noted on the Prevailing Wage Rate Schedule, if they are currently certified in a program recognized by the Bureau of Apprenticeship and Training, U.S. Department of Labor, providing the proper ratio between journeyman and apprentice is observed. Apprentice certification certificates must be supplied with the first weekly payroll upon which the apprentice's name appears. Helpers or Laborers cannot be utilized when Apprentices are shown.

Asbestos Worker / Insulator

City of Houston allows the use of 1 Journeyman and 1 Apprentice, the Apprentice can be used with the first Journeyman. No other Apprentices can be added until the 2th Journeyman is added. All Apprentices are to be under the direct supervision of a Journeyman.

- 1 Journeyman w/ 1 Apprentice
- 2 Journeymen w/ 2 Apprentices

Boilermakers

City of Houston allows the use of 5 Journeymen and 1 Apprentice, the Apprentice can be used with the first Journeyman. No other Apprentices can be added until the 6th Journeyman is added. All Apprentices are to be under the direct supervision of a Journeyman.

- 1-5 Journeymen w/ 1 Apprentice
- 6-10 Journeymen w/ 2 Apprentices

Carpenter

City of Houston allows the use of 2 Journeymen and 1 Apprentice, the Apprentice can be used with the first Journeyman. No other Apprentices can be added until the 4th Journeyman is added. All Apprentices are to be under the direct supervision of a Journeyman.

- 1-2 Journeymen w/ 1 Apprentice
- 3-4 Journeymen w/ 2 Apprentices
- 5-6 Journeymen w/ 3 Apprentices

Electrician

City of Houston allows the use of 3 Journeymen and 2 Apprentices, the Apprentice can be used with the first Journeyman. No other Apprentices can be added until the 3rd Journeyman is added. All Apprentices are to be under the direct supervision of a Journeyman. All Journeymen and Apprentices must hold a current license from the State of Texas.

- 1 Journeyman w/ 1 Apprentice
- 2 Journeymen w/ 1 Apprentice
- 3 Journeymen w/ 2 Apprentices
- 4 Journeymen w/ 3 Apprentices
- 5 Journeymen w/ 3 Apprentices
- 6 Journeymen w/ 4 Apprentices
- 7 Journeymen w/ 4 Apprentices
- 8 Journeymen w/ 4 Apprentices
- 9 Journeymen w/ 4 Apprentices
- 10 Journeymen w/ 5 Apprentices

Plumbers

City of Houston allows the use of 3 Journeymen and 2 Apprentices, the Apprentice can be used with the first Journeyman. No other Apprentices can be added until the 3rd Journeyman is added. All Apprentices are to be under the direct supervision of a Journeyman. All Journeymen and Apprentices must hold a current license from the State of Texas.

- 1 Journeyman w/ 1 Apprentice
- 2 Journeymen w/ 1 Apprentice
- 3 Journeymen w/ 2 Apprentices
- 4 Journeymen w/ 3 Apprentices
- 5 Journeymen w/ 3 Apprentices
- 6 Journeymen w/ 4 Apprentices
- 7 Journeymen w/ 4 Apprentices
- 8 Journeymen w/ 4 Apprentices
- 9 Journeymen w/ 4 Apprentices
- 10 Journeymen w/ 5 Apprentices

Sprinkler Fitter

City of Houston allows the use of 1 Journeyman and 1 Apprentice, the Apprentice can be used with the first Journeyman. No other Apprentices can be added until the 2th Journeyman is added. All Apprentices are to be under the direct supervision of a Journeyman.

- 1 Journeyman w/ 1 Apprentice
- 2 Journeymen w/ 2 Apprentices

Sheetmetal Worker

City of Houston allows the use of 2 Journeymen and 1 Apprentice, the Apprentice can be used with the first Journeyman. No other Apprentices can be added until the 4th Journeyman is added. All Apprentices are to be under the direct supervision of a Journeyman.

- 1-2 Journeymen w/ 1 Apprentice
- 3-4 Journeymen w/ 2 Apprentices
- 5-6 Journeymen w/ 3 Apprentices

Pipefitter

City of Houston allows the use of 1 Journeymen and 1 Apprentice, the Apprentice can be used with the first Journeyman. No other Apprentices can be added until the 4th Journeyman is added. All Apprentices are to be under the direct supervision of a Journeyman.

- 1 Journeyman w/ 1 Apprentice
- 2 Journeymen w/ 1 Apprentice
- 3 Journeymen w/ 2 Apprentices
- 4 Journeymen w/ 3 Apprentices
- 5 Journeymen w/ 3 Apprentices
- 6 Journeymen w/ 4 Apprentices
- 7 Journeymen w/ 4 Apprentices
- 8 Journeymen w/ 4 Apprentices
- 9 Journeymen w/ 4 Apprentices
- 10 Journeymen w/ 5 Apprentices

HELPER (see definitions)

(Must not exceed 3 helpers to 1 journeyman)

A Helper is a semi-skilled laborer (rather than a skilled journeyman) who works under the direction of and assists a journeyman. Under the journeyman's direction and supervision, the helper performs a variety of duties to assist the journeyman such as preparing, carrying, and furnishing equipment, supplies and maintaining them in order; cleaning and preparing work areas; lifting, positioning, and holding materials or tools; and other related semi-skilled tasks as directed by the journeyman. A helper may use the tools of the trade at and under the direction of the journeyman. The particular duties performed by a helper vary according to area practice. The journeyman must work in close proximity to the location of the helpers work area. The helper's wage rate shall be calculated at no less than 65% of the prevailing wage for that journeyman's classification. Helper who assists more than one journeyman craft should be listed with the notation indicating each journeyman craft classification they assist.

Welders

Receive rate prescribed for craft performing operation in which welding is incidental

Pipefitters * Apprentices Schedule (Excluding HVAC Pipe)

NOTE: Continue after 50 Journeyman - ONE (1) Indentured Apprentice and one (1) Apprentice Applicant for every ten (10) Journeyman

Journeyman	Indentured Apprentice	Apprentice Applicant	Total
1	1	0	1 to 1
3	2	1	3to 3
5	3	2	5 to 5
8	4	3	8 to 7
12	5	4	12 to 9
16	6	5	16 to 11
20	7	6	20 to 13
25	8	7	25 to 15
30	9	8	30 to 17
40	10	9	40 to 19
50	11	10	50 to 21

When Apprentices are shown, Helpers cannot be utilized.

If there are questions as to the classification of a worker, contact the Contract Compliance Officer in writing with a description of the work to be performed. After review the Contract Compliance Officer will respond in writing with the classification and wage rate to be paid the worker in question.

Fringe Benefits

If the worker is not receiving fringe benefits, they must be paid in cash if noted on the prevailing wage schedule along with the base rate. The term wages means the basic hourly rate of pay; any contribution irrevocably made by a contractor or subcontractor to a trustee or to a third person

pursuant to a bona fide fringe benefit fund, plan, or program; and the rate of costs to the contractor or subcontractor which may be reasonably anticipated in providing bona fide fringe benefits to laborers and mechanics pursuant to an enforceable commitment to carry out a financially responsible plan of program, which was communicated in writing to the laborers and mechanics affected. The fringe benefits enumerated in the Davis-Bacon Act include medical or hospital care, pensions on retirement or death, compensation for injuries or illness resulting from occupational activity, or insurance to provide any of the foregoing; unemployment benefits; life insurance, disability insurance, sickness insurance, or accident insurance; vacation or holiday pay; defraying costs of apprenticeship or other similar programs; or other bona fide fringe benefits. Fringe benefits do not include benefits required by other Federal, State, or local law. The prevailing wages (including fringe benefits) as adopted for this contract are based upon a survey performed under the Davis-Bacon Act. Thus determinations in regard to fringe benefits, to the extent practicable, will be based upon the standards set forth in the following federal regulations.

**Title 29, Code of Federal Regulations, Part 4
Labor Standards for Federal Service Contracts**

(29 CFR 4.169-4.171)

29 CFR 4.170 - Furnishing fringe benefits or equivalents.

(a) General. Fringe benefits required under the Act shall be furnished, separate from and in addition to the specified monetary wages, by the contractor or subcontractor to the employees engaged in performance of the contract, as specified in the determination of the Secretary or his authorized representative and prescribed in the contract documents. Section 2(a)(2) of the Act provides that the obligation to furnish the specified benefits "may be discharged by furnishing any equivalent combinations of fringe benefits or by making equivalent or differential payments in cash under rules and regulations established by the Secretary." The governing rules and regulations for furnishing such equivalents are set forth in Sec. 4.177 of this subpart. An employer cannot offset an amount of monetary wages paid in excess of the wages required under the determination in order to satisfy his fringe benefit obligations under the Act, and must keep appropriate records separately showing amounts paid for wages and amounts paid for fringe benefits.

(b) Meeting the requirement, in general. The various fringe benefits listed in the Act and in Sec. 4.162(a) are illustrative of those which may be found to be prevailing for service employees in a particular locality. The benefits which an employer will be required to furnish employees performing on a particular contract will be specified in the contract documents. A contractor may dispose of certain of the fringe benefit obligations which may be required by an applicable fringe benefit determination, such as pension, retirement, or health insurance, by irrevocably paying the specified contributions for fringe benefits to an independent trustee or other third person pursuant to an existing "bona fide" fund, plan, or program on behalf of employees engaged in work subject to the Act's provisions. Where such a plan or fund does not exist, a contractor must discharge his obligation relating to fringe benefits by furnishing either an equivalent combination of "bona fide" fringe benefits or by making equivalent payments in cash to the employee, in accordance with the regulations in Sec. 4.177.

29 CFR 4.171 – "Bona fide" fringe benefits.

(a) To be considered a "bona fide" fringe benefit for purposes of the Act, a fringe benefit plan, fund, or program must constitute a legally enforceable obligation, which meets the

following criteria:

(1) The provisions of a plan, fund, or program adopted by the contractor, or by contract as a result of collective bargaining, must be specified in writing, and must be communicated in writing to the affected employees. Contributions must be made pursuant to the terms of such plan, fund, or program. The plan may be either contractor-financed or a joint contractor employee contributory plan. For example, employer contributions to Individual Retirement Accounts (IRAs) approved by IRS are permissible. However, any contributions made by employees must be voluntary, and if such contributions are made through payroll deductions, such deductions must be made in accordance with Sec. 4.168. No contribution toward fringe benefits made by the employees themselves, or fringe benefits provided from monies deducted from the employee's wages may be included or used by an employer in satisfying any part of any fringe benefit obligation under the Act.

(2) The primary purpose of the plan must be to provide systematically for the payment of benefits to employees on account of death, disability, advanced age, retirement, illness, medical expenses, hospitalization, supplemental unemployment benefits, and the like.

(3) The plan must contain a definite formula for determining the amount to be contributed by the contractor and a definite formula for determining the benefits for each of the employees participating in the plan.

(4) Except as provided in paragraph (b), the contractor's contributions must be paid irrevocably to a trustee or third person pursuant to an insurance agreement, trust or other funded arrangement. The trustee must assume the usual fiduciary responsibilities imposed upon trustees by applicable law. The trust or fund must be set up in such a way that the contractor will not be able to recapture any of the contributions paid in nor in any way divert the funds to its own use or benefit.

(5) Benefit plans or trusts of the types listed in 26 U.S.C. 401(a) which are disapproved by the Internal Revenue Service as not satisfying the requirements of section 401(a) of the Internal Revenue Code or which do not meet the requirements of the Employee Retirement Income Security Act of 1974, 29 U.S.C. 1001, et seq. and regulations thereunder, are not deemed to be "bona fide" plans for purposes of the Service Contract Act.

(6) It should also be noted that such plans must meet certain other criteria as set forth in Sec. 778.215 of 29 CFR part 778 in order for any contributions to be excluded from computation of the regular rate of pay for overtime purposes under the Fair Labor Standards Act (Secs. 4.180-4.182).

(b)(1) Unfunded self-insured fringe benefit plans (other than fringe benefits such as vacations and holidays which by their nature are normally unfunded) under which contractors allegedly make "out of pocket" payments to provide benefits as expenses may arise, rather than making irrevocable contributions to a trust or other funded arrangement as required under Sec. 4.171(a)(4), are not normally considered "bona fide" plans or equivalent benefits for purposes of the Act.

(2) A contractor may request approval by the Administrator of an unfunded self-insured plan in order to allow credit for payments under the plan to meet the fringe benefit requirements of the Act. In considering whether such a plan is bona fide, the Administrator will consider such factors as whether it could be reasonably anticipated to provide the prescribed benefits, whether it represents a legally enforceable commitment to provide such benefits, whether it is carried out under a financially responsible program, and whether the plan has been communicated to the employees in writing. The Administrator in his/her discretion may

direct that assets be set aside and preserved in an escrow account or that other protections be afforded to meet the plan's future obligation.

(c) No benefit required by any other Federal law or by any State or local law, such as unemployment compensation, workers' compensation, or social security, is a fringe benefit for purposes of the Act.

(d) The furnishing to an employee of board, lodging, or other facilities under the circumstances described in Sec. 4.167, the cost or value of which is creditable toward the monetary wages specified under the Act, may not be used to offset any fringe benefit obligations, as such items and facilities are not fringe benefits or equivalent benefits for purposes of the Act.

(e) The furnishing of facilities which are primarily for the benefit or convenience of the contractor or the cost of which is properly a business expense of the contractor is not the furnishing of a "bona fide" fringe benefit or equivalent benefit or the payment of wages. This would be true of such items, for example, as relocation expenses, travel and transportation expenses incident to employment, incentive or suggestion awards, and recruitment bonuses, as well as tools and other materials and services incidental to the employer's performance of the contract and the carrying on of his business, and the cost of furnishing, laundering, and maintaining uniforms and/or related apparel or equipment where employees are required by the contractor, by the contractor's Government contract, by law, or by the nature of the work to wear such items. See also Sec. 4.168.

(f) Contributions by contractors for such items as social functions or parties for employees, flowers, cards, or gifts on employee birthdays, anniversaries, etc. (sunshine funds), employee rest or recreation rooms, paid coffee breaks, magazine subscriptions, and professional association or club dues, may not be used to offset any wages or fringe benefits specified in the contract, as such items are not "bona fide" wages or fringe benefits or equivalent benefits for purposes of the Act.

EXHIBIT "B"

CERTIFICATE FROM CONTRACTOR APPOINTING OFFICER OR EMPLOYEE
TO SUPERVISE PAYMENT OF EMPLOYEES

Project Name _____

E-mail address _____

Project WBS#: _____ Date _____

(I) (We) hereby certify that (I am) (we are) the **Prime Contractor** for _____

(specify type of job)

in connection with construction of the above-mentioned Project, and that (I) (we) have appointed _____, whose signature appears below, to supervise the payment of (my) (our) employees beginning _____, 20___; that he/she is in a position to have full knowledge of the facts set forth in the payroll documents and in the statement of compliance required by the Copeland Act and the City of Houston, which he/she is to execute with (my) (our) full authority and approval until such time as (I) (we) submit to the City of Houston a new certificate appointing some other person for the purposes hereinabove stated.

(Identifying Signature of Appointee)

Phone: _____

Attest:

(Name of Firm or Corporation)

By: _____

(Signature)

By: _____

(Signature)

(Title)

(Title)

NOTE: This certificate must be executed by an authorized officer of a corporation or by a member of a partnership, and shall be executed prior to and be submitted with the first payroll. Should the appointee be changed, a new certificate must accompany the first payroll for which the new appointee executes a statement of compliance required by the Copeland Act and the City of Houston.

EXHIBIT "C"

CERTIFICATE FROM SUBCONTRACTOR APPOINTING OFFICER OR EMPLOYEE TO
SUPERVISE PAYMENT OF EMPLOYEES

Project Name _____

E-mail address _____

Project WBS#: _____ Date _____

(I) (We) hereby certify that (I am) (we are) the **Sub Contractor** for _____

(Specify work subcontractor will be performing on this project)

in connection with construction of the above-mentioned Project, and that (I) (we) have appointed _____, whose signature appears below, to supervise the payment of (my) (our) employees beginning _____, 20____; that he/she is in a position to have full knowledge of the facts set forth in the payroll documents and in the statement of compliance required by the Copeland Act and the City of Houston, which he/she is to execute with (my) (our) full authority and approval until such time as (I) (we) submit to the City of Houston a new certificate appointing some other person for the purposes hereinabove stated.

Phone: _____

(Identifying Signature of Appointee)

Attest:

(Name of Firm or Corporation)

By: _____

(Signature)

By: _____

(Signature)

(Title)

(Title)

NOTE: This certificate must be executed by an authorized officer of a corporation or by a member of a partnership, and shall be executed prior to and be submitted with the first payroll. Should the appointee be changed, a new certificate must accompany the first payroll for which the new appointee executes a statement of compliance required by the Copeland Act and the City of Houston.

END OF DOCUMENT

Attachment A to this section is a copy of the City's WMS typical equipment data sheet.

12. Base Bid Item No. 12 shall consist of the following:
 - a. **Hydro-Mulch Seeding:** Seeding, fertilizing, mulching, and maintenance of disturbed non-impervious areas indicated on Drawings.
13. Base Bid Item No. 13 shall consist of the following:
 - a. **Accumulated Solids Disposal:** Haul off and dispose of accumulated sludge, grit, or other biosolids in the abandoned sludge processing facility and/or existing sludge holding tanks
- B. Extra Unit Price Items are included in Section 00410 for use if extra work is encountered.
- C. The following list of items will need to be submitted by the Contractor to the City Code Enforcement Group individually for permit review and approval once shop drawings are approved by the Construction Manager/Project Manager.
 1. Any items as identified by City Enforcement Group
- D. All submittal information shall comply with 01330 and all materials submitted to the City Code Enforcement Group by the Contractor shall be sealed by a Professional Engineer registered in the State of Texas.
- E. Coordination
 1. Coordination and meetings for this project shall be provided as specified in Section 01312.
- F. Field Office
 1. A field office is required for this project. Refer to Section 01520.
- G. General Construction Notes
 1. The Contractor shall be responsible for verifying the location(s) of all underground utility lines in the areas on proposed construction before beginning construction.
 2. The information contained within the project Drawings with regards to the existing facilities was taken from the original construction plans with the original work shown light and proposed work shown dark. Original work shown light is for the Contractor's information only. Its accuracy is not guaranteed and its use in no way relieves the Contractor or others of any responsibility for loss due to inaccuracies. Refer to Specification Section 00330 Existing Conditions for additional detail.
 3. Contractor shall be responsible for providing required security to protect his own property, equipment and work in progress as defined in Section 01560.

SECTION 02050
DEMOLITION AND MODIFICATIONS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and demolish, modify, remove and dispose of work shown on the Drawings and as specified herein.
- B. Included, but not limited to, are demolition, modifications and removal of existing materials, equipment or work necessary to install the new work as shown on the Drawings and as specified herein and to connect with existing work in approved manner.
- C. Demolition, modifications and removals which may be specified under other Sections shall conform to requirements of this Section.
- D. Demolition and modifications include the following items (as specified and as shown on the Contract drawings). This list is summarizing major demolition components for this project. Minor modifications as shown on the plans and as specified shall also be completed at no additional cost to the Owner.
 - 1. Demolition of existing 15-inch drain line adjacent to the Aerated Sludge Holding Tanks (ASHT).
 - 2. Demolition of existing HVAC equipment in the ASHT Blower Building Electrical Room.
 - 3. Demolition of the Abandoned Solids Processing Facility (SPF), including all structures as identified on the Drawings, power centers, and nearby Stormwater Pump Station.
 - 4. Demolition of existing railroad tracks, along with pavement removal, as shown on the Drawings.
- E. Blasting and the use of explosives will not be permitted for any demolition work.

1.02 MEASUREMENT AND PAYMENT

- A. Except for unit prices indicated below, no separate payment will be made for demolition and modifications and related work under this section. Include the cost for this work in the lump sum base bid line items as appropriate.
- B. Coring for drainage: Payment for extra unit price item of corings for drainage (in excess of the 25 to be included in the base bid) is on a unit price basis for each coring to be provided. Each unit is to include performing the 12-inch opening, as backfill with 1-inch crushed rock as indicated on the drawings.

1.03 RELATED WORK

- A. Summary of Work is included in Section 01110.

- B. Submittals are included in Section 01330.
- C. Construction Schedule is included in Section 01114.
- D. Waste Material Disposal is included in Section 01576.
- E. Clearing and Grubbing is included in Section 02233.
- F. Excavation and Backfill is included in Section 02316
- G. Environmental Information is included in Section 00340.
- H. Removing Existing Pavements and Structures in Section 02084.

1.04 SUBMITTALS

- A. Submit, in accordance with Section 01330 proposed methods of demolition, including abatement of asbestos and lead-based paint as identified in the project information provided with the bid documents, of the structures and utilities prior to the start of work. Include in the schedule the coordination of shutoff, capping and continuation of utility service as required.
- B. Furnish a detailed sequence of demolition and removal work to ensure the uninterrupted progress of the Owner's operations. Sequence shall be compatible with sequence of construction and shutdown coordination requirements as specified in Section 01114 – Construction Sequencing.
- C. Before commencing demolition work, all modifications necessary to bypass the affected structure shall be completed. Actual work shall not begin until the Owner has inspected and approved the modifications and authorized commencement of the demolition work in writing.

1.05 JOB CONDITIONS

- A. Protection
 - 1. Execute the demolition and removal work to prevent damage or injury to structures, occupants thereof and adjacent features which might result from falling debris or other causes, and so as not to interfere with the use, and free and safe passage to and from adjacent structures.
 - 2. Closing or obstructing of roadways, sidewalks and passageways adjacent to the work by the placement or storage of materials will not be permitted and all operations shall be conducted with a minimum interference to traffic on these ways.
 - 3. Erect and maintain barriers, lights, sidewalk sheds and other required protective devices.
- B. Scheduling
 - 1. Carry out operations so as to avoid interference with operations and work in the existing facilities.

C. Notification

1. At least 14 days prior to commencement of a demolition or removal, notify the Owner in writing of proposed schedule therefor. No removals shall be started without the permission of the Owner.

D. Conditions of Structures

1. The Owner and the Engineer assume no responsibility for the actual condition of the structures to be demolished or modified.
2. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner insofar as practicable. However, variations within a structure may occur prior to the start of demolition work.

E. Repairs to Damage

1. Promptly repair damage caused to adjacent facilities by demolition operation when directed by Owner or Engineer and at no additional cost to the Owner. Repairs shall be made to a condition at least equal to that which existed prior to construction.

F. Traffic Access

1. Conduct demolition and modification operations and the removal of equipment and debris to ensure minimum interference with roads, streets, walks both onsite and offsite and to ensure minimum interference with occupied or used facilities.
2. Special attention is directed towards maintaining safe and convenient access to the existing facilities by plant personnel and plant associated vehicles.
3. Do not close or obstruct streets, walks or other occupied or used facilities without permission from the Owner. Furnish alternate routes around closed or obstructed traffic in access ways.

1.06 RULES AND REGULATIONS

- A. The Building Code of the City of Houston as required on the bid date, shall control the demolition, modification or alteration of the existing buildings or structures.
- B. No building or structure, or any part thereof, shall be demolished until an application has been filed with the Building Inspector and a permit issued. The fee for this permit is covered in Section 01110.

1.07 DISPOSAL OF MATERIAL

- A. No materials and items of equipment shall remain the property of the Owner at the time that demolition commences. There is no anticipated equipment to be salvaged and returned to the Owner as part of this contract. All material and items of equipment shall become the Contractor's property and must be removed from the site.

- B. The storage or sale of removed items on the site will not be allowed.
- C. The Abandoned SPF Facility has been tested for asbestos and lead paint. Contractor shall recycle and/or dispose of facilities found to contain these items per the recommendations in the lead and asbestos survey report as enclosed with the Contract Documents at no additional cost to the Owner.
- D. Contractor shall dispose of any remaining sludge, grit, or biosolids present in the abandoned Sludge Processing Facility prior to demolition. Additionally, contractor shall disposed of any necessary remaining sludge, grit, or biosolids in the existing Aerated Sludge Holding Tanks after the owner has emptied tanks and performed an initial washdown.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL

- A. All materials and equipment removed from existing work shall become the property of the Contractor, except for those which the Owner has identified and marked for his/her use. All materials and equipment marked by the Owner to remain shall be carefully removed, so as not to be damaged, cleaned and stored on or adjacent to the site in a protected place specified by the Engineer or loaded onto trucks provided by the Owner.
- B. Dispose of all demolition materials, equipment, debris and all other items not marked by the Owner to remain, off the site and in conformance with all existing applicable laws and regulations.
- C. Pollution Controls
 - 1. Use water sprinkling, temporary enclosures and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with governing regulations pertaining to environmental protection.
 - a. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding and pollution.
 - b. Clean adjacent structures, facilities, and improvements of dust, dirt and debris caused by demolition operations. Return adjacent areas to conditions existing prior to the start of the work.
- D. Building Demolition
 - 1. Unless otherwise approved by Engineer, proceed with demolition from the top of the structure to the ground. Complete demolition work above each floor or tier before disturbing supporting members of lower levels.
 - 2. Demolish concrete and masonry in small sections.
 - 3. Remove structural framing members and lower to ground by means of hoists, derricks, or other suitable methods.

4. Locate demolition equipment throughout the structure and remove material so as to not impose excessive loads to supporting walls, floors or framing.
5. Certain areas shall be modified to allow for drainage and backfill brought in to fill open areas as designated on the plans. Low areas that do not have an existing drainage plan shall be core-drilled to allow for drainage and as described in the Contract Documents.

3.02 STRUCTURAL REMOVALS

- A. Remove structures to the lines and grades shown unless otherwise directed by the Engineer. Where no limits are shown, the limits shall be 4-in outside the item to be installed. The removal of masonry beyond these limits shall be at the Contractor's expense and these excess removals shall be reconstructed to the satisfaction of the Engineer with no additional compensation to the Contractor.
- B. All concrete, brick, tile, concrete block, roofing materials, reinforcement, structural or miscellaneous metals, plaster, wire mesh and other items contained in or upon the structure shall be removed and taken from the site, unless otherwise approved by the Owner. Demolished items shall not be used in backfill adjacent to structures or in pipeline trenches.
- C. After removal of all of masonry walls, slabs and like work which tie into new work or existing work, the point of junction shall be neatly repaired so as to leave only finished edges and surface exposed.

3.03 MECHANICAL REMOVALS

- A. Mechanical removals shall consist of dismantling and removing of existing piping, pumps, motors, equipment and other appurtenances as specified, shown, or required for the completion of the work. It shall include cutting, capping, and plugging as required, except that the cutting of existing piping for the purpose of making connections thereto will be included under Division 15.
- B. Existing process, water, chemical, gas, fuel oil and other piping not required for the new work shall be removed where shown. Piping not indicated to be removed or which does not interfere with new work shall be removed to the nearest solid support, capped and left in place. Chemical and fuel lines and tanks shall be purged and made safe prior to removal or capping. Where piping that is to be removed passes through the floor slab, it shall be cut off and properly capped, unless it is a drain that shall remain.
- C. When underground piping is to be altered or removed, the remaining piping shall be properly capped. Abandoned underground piping may be left in place unless it interferes with new work or is shown or specified to be removed.
- D. Existing building slabs, drains and drain covers are to remain. Waste and vent piping shall be removed the base slab and capped, unless used for connection to the stormwater system. Pipe shall be plugged with cleanouts and plugs. Where buried utilities pass through the floor slab, these shall be cut off and capped (unless for drainage).

- E. Any changes to potable water piping and other plumbing and heating system work shall be made in conformance with all applicable codes and under the same requirements as other underground piping. All portions of the potable water system that have been altered or opened shall be pressure tested and disinfected in accordance with City of Houston Standard Specification Sections 02515 and 02514, and local codes. Other plumbing piping and heating piping shall be pressure tested only.

3.04 ELECTRICAL REMOVALS

- A. Electrical removals shall consist of the removal of existing transformers, distribution switchboards, control panels, motors, conduits and wires, poles and overhead wiring, panelboards, lighting fixtures and miscellaneous electrical equipment all as shown on the Drawings, specified herein, or required to perform the work.
- B. All existing electrical equipment and fixtures to be removed shall be removed with such care as may be required to prevent unnecessary damage, to keep existing systems in operation and to maintain the integrity of the grounding systems.
- C. Conduits and wires shall be abandoned or removed where shown. All wires in abandoned conduits shall be removed and disposed of by the contractor. Abandoned conduits concealed in floor or ceiling slabs or in walls, shall be cut flush with the slab or wall at the point of entrance. The conduits shall be suitable plugged and the area repaired in a flush, smooth and approved manner. Exposed conduits and their supports shall be disassembled and removed from the site. Repair all areas of work to prevent rust spots on exposed surfaces.
- D. Where shown or otherwise required, wiring in the underground duct system shall be removed. All such wiring shall be disposed of by the Contractor. Verify the function of all wiring before disconnection and removing it. Ducts which are not to be reused shall be plugged where they enter buildings and made watertight.
- E. Where shown, direct-burial cable shall be abandoned. Such cable shall be disconnected at both ends of the run. Where it enters a building or structure the cable shall be cut back to the point of entrance. All opening in buildings for entrance of abandoned direct-burial cable shall be patched and made watertight.
- F. Poles and overhead wiring shall be abandoned as shown and specified. Existing substation and poles owned by the power company will be removed by the power company. Poles not owned by the power company shall be completely removed from the site. The overhead wires shall be salvaged and stored. Perform this work after the proposed service has been completed and energized, and in accordance with the approved schedule.
- G. Lighting fixtures shall be removed or relocated as shown. Fixtures not relocated shall be removed from the site. Relocated fixtures shall be carefully removed from their present location and rehung where shown.
- H. Wall switches, receptacles, starters and other miscellaneous electrical equipment, shall be removed and disposed of off the site as required. Care shall be taken in removing all equipment so as to minimize damage to architectural and structural members. Any damage incurred shall be repaired.

3.05 CLEAN-UP

- A. Remove from the site all debris resulting from the demolition operations as it accumulates. Upon completion of the work, all materials, equipment, waste and debris of every sort shall be removed and premises shall be left, clean, neat and orderly.

END OF SECTION

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- I. Proportion admixtures according to the manufacturer's recommendations. Two or more admixtures specified may be used in the same mix provided that the admixtures in combination retain full efficiency and have no deleterious effect on the concrete or on the properties of the other admixture(s).

TABLE 1

Class	Design Strength 1	Cement 2	Fine Aggregate 3	Coarse Aggregate 3	Cementitious Content 4
A	2500	Type II	Sand	57 (9)	440
B	3000	Type II	Sand	57	480
C	4500	Type II	Sand	57	580

Class	W/C Ratio 5	SCM 6	AE Range 7	WR 8	HRWR 10	Slump Range Inches
A	0.62 max.	Yes	3.5 to 5	Yes	No	1-4
B	0.54 max.	Yes	3.5 to 5	Yes	No	1-3
C	0.42 max.	Yes	3.5 to 5	Yes	Yes	3-5

TABLE NOTES:

1. Minimum compressive strength in psi at 28 days
2. ASTM designation in ASTM C150
3. Size Number in ASTM C33
4. Minimum cementitious content in lbs per cubic yard (where fly ash or ground granulated blast furnace slag is used cementitious content is defined as cement content plus fly ash or ground granulated blast furnace slag content)
5. W/C is Maximum Water Cementitious ratio by weight
6. Supplementary Cementitious Material (SCM) fly ash content in the range of 20-25 percent of the total cement content plus fly ash content, by weight. If ground granulated blast furnace slag is used in lieu of fly ash, the content of ground granulated blast furnace slag shall be in the range of 25-45 percent of the total cement plus ground granulated blast furnace slag content, by weight
7. AE is percent air entrainment
8. WR is water reducing admixture
9. HRWR is high-range water-reducing admixture

- J. Shrinkage Tests: Perform shrinkage tests on the design mix for Class C concrete. The tests shall conform to ASTM C157 as modified by ASTM C596 for curing, storage, and comparator readings. Use concrete specimens. Do not use mortar specimens.

1. The average shrinkage at 25 days of air storage shall not exceed 0.036 percent.

PART 3 EXECUTION

3.01 MEASURING MATERIALS

- A. Provide concrete composed of portland cement, fly ash or ground granulated blast furnace slag, fine aggregate, coarse aggregate, water and admixtures as specified and produced by a plant

- D. Where specified, or called for on the following schedule, special corrosion resistant/protective coatings shall be provided. Whenever a protective coating is specified, the equipment shall be coated both inside and out. Whenever necessary to provide full coverage of the equipment, the equipment shall be completely disassembled to allow proper preparation and coating application. Any component that would block the coating process shall be removed. Equipment provided with gaskets or liners shall be coated before the application of the gasketing or liner. The equipment Vendor shall test rotating equipment after coating to confirm dynamic balance. If work needs to be done to correct the equipment balance, the integrity of the coating must be corrected after such work.
- E. Ductwork connections to units that require corrosion resistant coatings shall be made with flanges. Flanges shall be factory drilled before coating. Resilient washers suitable for the environment shall be used to protect the coating from the bolts in the flange. The use of self tapping screws or other fastening methods that will damage the coating are not acceptable.
- F. All items to be provided with a protective coating shall have the following data on the coating included with the unit submittal. Submittal shall include vendor data sheets on the specific coating being used, corrosion resistance data sheets, detailed application data sheets to include surface preparation procedures. For baked coatings submit a letter from the coating manufacturer, that the company doing the actual coating operation is an approved coating company. When an equipment supplier provides the coating, the information shall be supplied by the coating manufacturers.
- G. Coating shall be factory applied by the equipment manufacturer/supplier. If this is not possible, coating shall be applied by a specialty shop under contract to the equipment manufacturer/supplier. After coating application is completed, the equipment manufacturer/supplier shall test the equipment and certify system operation prior to releasing the equipment to the job site.
- H. Coatings shall be of the following types:
1. Type 1: Manufacturer Standard Coatings
 - a. Coating material shall be manufacturers standard as specified in the schedule below. Surfaces shall be prepared, primed and coated as required by the coating supplier. Heat curing shall be provided where required by the coating supplier.
 2. Type 2: Baked Epoxy Polymer (For Heat Transfer Coils)
 - a. The coating shall be Luvata Electrofin by a dip application process. The coating shall be an epoxy polymer material. The coating process shall produce a surface that does not show visible signs of corrosion after a 6,000 hour ASTM B117 salt spray test. The coating dry film thickness shall be approximately 0.6-1.2 mils. The coating shall receive a spray applied polyurethane topcoat for UV resistance.
 3. Type 3: Inorganic Zinc Coating with Epoxy Topcoat (Equipment)
- I. Any holidays, runs, sags, blisters, or inclusions in the coating are unacceptable and will be corrected. With the approval of the Engineer, small areas no more than 4-in by 4-in may be corrected in the field. Larger faults shall be returned to the coater to be repaired. The faulty material shall be removed by sanding and in the case of blisters, the edges feathered. The material used for recoating shall be manufactured by the same manufacturer as the original

coating and shall be suitable for field repairs. The touch up material shall have the same corrosion resistance as the original coating, and if the original coating required an ultraviolet protection, the same protection will be provided as part of the repair. The final mil thickness of the repaired coating shall be equal to the originally specified thickness. Where baked coatings have been damaged, the repair shall be made with heat applied to the repaired surface to cure the coating. After curing a solvent test as recommended by the manufacturer shall be used to confirm that the coating is cured.

- J. The coating manufacturer shall supply direct to the Engineer, a set of coupons showing the final appearance of the cured coatings. Any coating that does not match the supplied coupons will be rejected.

"NO COATINGS WILL BE SPECIFIED ON THE INDIVIDUAL EQUIPMENT SCHEDULES."

COATING SCHEDULE

Equipment Identification	Location	Contaminants	Coating
CU-1	Blower Building Exterior	H2S	Type 2
CU-2	Blower Building Exterior	H2S	Type 2
Exhaust fan EF-3	Blower Room	H2S	Type 3

3.06 BALANCE OF ROTATING EQUIPMENT

- A. All machines shall be balanced both statically and dynamically by the manufacturer within the limits of best commercial practices. The term machine, as used above, is to be considered as any piece of equipment which contains rotating components. All machines furnished shall have operating speed not exceeding 80 percent of the first critical speed.

END OF SECTION

SECTION 15855
AIR HANDLING UNITS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install all split system units, condensing units and filters as shown on the Drawings, schedules, and as specified herein.

1.02 MEASUREMENT AND PAYMENT

- A. No separate payment will be made for work performed under this Section. Include the cost for this work in the lump sum Base Bid Item in Section 00410, Paragraph B.

1.03 SCHEDULES

- A. This Section is incomplete without the information contained in the schedules. All split systems units shall be of the type, capacity and arrangement as listed on the schedules. Units shall consist of the components listed in the schedule and those components obviously required for the type of unit. Particular attention must be paid to the remarks and notes in these schedules.

1.04 SUBMITTALS

- A. Submit, in accordance with Sections 01330 and 15500, the following:
 - 1. Unit data sheets, to include catalog data, pertinent equipment dimension data, a description of the proposed unit, size, type, arrangement, weight, and materials of construction.
 - 2. For belt drive equipment, provide drive data indicating sheave sizes, belt size, number and length.
 - 3. Submittal shall include fan data sheets with a description of the proposed fan, fan size, type, arrangement, materials of construction, weight, motor horsepower, motor type, power supply, sound power levels, and frame size. Provide catalog data and selections for vibration isolators, including materials of construction. Each submittal shall include fan performance operating data information and a performance curve showing the fan operating point and range. Minimum curve size shall be 8-inch by 6-inch. Faxed copies of curves are not acceptable. Where corrosion resistance is required, provide confirmation of material suitability for the specified service. For fan walls, submit the performance curve of the entire bank of fans at design conditions, and submit the performance curve of the entire bank of fans when one fan is non-operational.
 - 4. For heating sections, provide information on type of heating, air entering and leaving conditions, air pressure drop, heating media entering and leaving conditions and flow or consumption, and pressure drop. Provide size, type, arrangement, materials of construction, and operating weight. Where corrosion resistance is required, provide confirmation of material suitability for the specified service.

5. For cooling sections, provide information on type of cooling, air entering and leaving conditions, air pressure drop, cooling media entering and leaving conditions, flow, and pressure drop. Provide size, type, arrangement, materials of construction, and operating weight. Where corrosion resistance is required, provide confirmation of material suitability for the specified service.
6. For condensing sections provide information on number and type of compressors, type of refrigerant and refrigerant charge, controls and operating weight. Provide electrical data for power and controls. For condensing coils, provide air entering conditions and materials of construction. Where corrosion resistance is required, provide confirmation of material suitability for the specified service.
7. For unit-mounted control panels and remote control panels, provide information on the panel enclosure type, panel dimensions and component arrangement, disconnect, control voltage transformer, hand-off-auto or on-off switch, auxiliary input and output contacts, terminal strip, motor thermal overload protection, circuit breakers, electric heating coil controller, microprocessor-based controller, variable frequency drive, etc. Include the unit power and control wiring diagram and schematics.
8. List of accessories to be furnished shall be included on each submittal. Provide catalog data for all accessories including filter pressure drop performance, damper pressure drop performance, damper leakage performance, louver pressure drop performance, louver moisture entrainment performance, humidifier manifold pressure drop performance, roof curb construction details and weight, airflow measurement system, filter pressure gauge, thermostat or space temperature sensor, etc.
9. Provide a recommended list of spare parts to be provided.
10. Significant dimensional differences between the specified equipment versus the proposed equipment shall be noted on the equipment submitted. Contractor shall provide drawings or data to show the dimensionally different equipment will fit within the space and still provide code-minimum or manufacturer's clearance, whichever is greater.
11. For units that will be shipped exposed, provide a description of the protective packaging that will be used during transit.
12. Submittals shall contain a statement that Sections 15500, 15855, 15890, and other referenced Sections have been read and complied with. Certification statement shall be made by all of the following that are applicable: Contractor, sub-contractor, and vendor. Statement shall be an individual statement for each party involved, and shall be included with every submittal and resubmittal.
13. Submit to the Engineer, as provided in Section 01782, operating and maintenance manuals. The following information shall be considered a minimum. Where applicable, provide information required for specific pieces of equipment.
 - a. Personnel familiar with the operation and maintenance of the specific information shall prepare manuals.
 - b. Equipment shall be identified with the Engineer's Equipment Numbers and Identification as shown in the Schedules and on the Drawings.

- c. Provide information in three-ring binders with sheets having reinforced punches. Tabbed dividers shall separate all sections. Drawings will be bound in the manual, or contained in envelopes bound into the manual.
 - d. Contents - Each volume shall contain the following minimum contents:
 - 1) Installation including instructions for unpacking, installing, aligning, checking, and testing. Foundation data, allowable piping loads, and electrical design shall be included.
 - 2) Operating Instructions to provide pre-operational checks, startup and shutdown, and description of all control modes. Include emergency procedures for all fault conditions and actions to be taken for all alarms. Procedures for long-term storage shall be included.
 - 3) Maintenance shall include preventive and corrective. Schedules for test of other functions are to be included. Provide a list of tools required to service the equipment. Troubleshooting instructions, to include a troubleshooting guide, shall be included.
14. Include in the submittal a list of any exceptions to the specifications that are taken and include any supporting documentation that is required to justify the exception.
- B. In general, corrections or comments or lack thereof made relative to submittals during review shall not relieve Contractor from compliance with the requirements of the Drawings and Specifications. Submittals are for review of general conformance with the design concepts of the project and general compliance with the contract documents. Contractor is responsible for the final design conforming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating the work of all trades, and performing the work in a safe and satisfactory manner.

1.05 REFERENCE STANDARDS

- A. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE):
 - 1. ASHRAE 52 - Method of Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter.
- B. Air Movement and Control Association (AMCA).
- C. National Fire Protection Association (NFPA).
 - 1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
 - 2. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems.
- D. ASTM International (ASTM):
 - 1. ASTM C581 - Standard Practice for Determining Chemical Resistance of Thermosetting Resins Used in Glass- Fiber- Reinforced Structures Intended for Liquid Service.

2. ASTM C1071 - Standard Specification for Thermal and Acoustical Insulation (Glass Fiber, Duct Lining Materials).

E. Air-Conditioning, Heating and Refrigeration Institute (AHRI).

F. American Society of Mechanical Engineers (ASME).

G. National Electrical Code (NEC).

H. National Electrical Manufacturers Association (NEMA).

I. Association of Home Appliance Manufacturers (AHAM).

J. Factory Mutual (FM).

K. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.06 QUALITY ASSURANCE

A. Equipment of a given type included in this Section shall be furnished by or through a single manufacturer or as specified on the schedules.

B. Inspection by the Engineer's representative, or failure to inspect, shall not relieve Contractor of responsibility to provide materials and perform the work in accordance with the documents.

C. Owner and Engineer reserve the right to sample and test any materials after delivery and to reject all components represented by a sample that fails to comply with the specified requirements.

D. An authorized representative of the manufacturer shall perform the initial startup of the equipment. The Owner and Engineer shall witness startup. Use of local sales representatives to perform this work is not acceptable unless the manufacturer provides documented evidence that sales representative has been specifically trained for this work.

E. Rotating parts of equipment shall be dynamically balanced at the factory.

F. Units shall be UL, ETL, or CETL listed.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be inspected for size, quality, and quantity against approved shop drawings upon delivery.

B. Delivery schedule of all equipment shall be coordinated with the Contractor. Equipment ready for shipment prior to the agreed on shipping date shall be stored without cost to the Owner by the manufacturer.

- C. Materials shall be suitably packed for shipment and long-term storage. Each package shall be labeled to indicate the project and the contents of each package. Where applicable, equipment numbers shall be marked on the container.
- D. Equipment shipped that is exposed, such as on a flatbed truck, shall be protected during transit. Equipment shall be protected from moisture, road salt, dirt and stones or other materials thrown up from other vehicles. Electrical components shall be protected as above, but with special attention to moisture. Method of shipment protection shall be defined in the submittals.
- E. Instructions for the servicing and startup of equipment in long-term prolonged storage shall accompany each item.
- F. Materials shall be stored in a covered dry location off of the ground. When required to protect the materials they shall be stored in a temperature-controlled location.

1.08 SPARE PARTS

- A. Spare parts shall include all special items on the manufacturer's standard list of spare parts.
- B. In addition to special items, the following spare parts shall be provided:
 - 1. Furnish special tools required for normal operation and proper servicing of the equipment.
 - 2. Spare parts shall include all items on the manufacturer's standard list of spare parts and the following for each unit:
 - a. One complete set of drive belts for each piece of belt-driven equipment.
 - b. One complete set of gaskets for each unit.
 - c. Three full sets of air filters.
 - 3. Provide a minimum of one and at least five percent of the total number of units furnished, for each size and rating of the following components:
 - a. Thermostats.
- C. Pack spare parts in containers suitable for extended storage without deterioration of the parts. Containers shall be clearly labeled designating contents, pieces of equipment for which intended, and equipment identification numbers.

PART 2 PRODUCTS

2.01 GENERAL

- A. In general, units shall be factory assembled with cabinet, fan, heating and/or cooling section, filters, dampers, access sections with hinged or removable access doors, motor, motor base, drive, drive guard, and vibration isolators.
- B. Support brackets or rails are to be provided with the unit. Type of support is to be as required by the schedules and as shown on the Drawings, e.g., hung, floor mounted, etc. Units shall be provided with lugs, brackets, or field-supplied devices to allow the unit to be firmly bolted to the structure or fastened to specified vibration isolators. Lugs, brackets, or field-supplied

devices shall be sized to withstand the expected seismic loads for the area and type of application. Location of the attachments shall be based on the equipment being hung or base mounted as shown on the Drawings and the schedules.

2.02 AHU CASINGS

- A. Casings shall be constructed of double wall aluminum sheet metal with foam block insulation and with structural framing members as required. Pressure class rating shall be plus or minus 4 inches water column. Sections of the unit shall be of the same pressure class. Cabinet panels shall be easily removable for servicing, or removable access panels shall be provided.
 - 1. Wall panel interior liner: 20 gauge.
 - 2. Wall panel exterior panel: 16 gauge.
 - 3. Floor surface: 16 gauge.
 - 4. Floor exterior panel: 20 gauge.
 - 5. Roof interior liner: 20 gauge.
 - 6. Roof exterior panel: 16 gauge.
 - 7. Casing leakage shall not exceed 1 percent of rated air flow at plus or minus 4 inches water column. If the manufacturer reports leakage based on SMACNA leakage classes, submit calculations that convert the leakage into a percentage of scheduled supply air flow to demonstrate compliance.
 - 8. Casing deflection shall not exceed $L/200$ at design pressure class rating.
 - 9. Unit interior liners shall encapsulate the insulation to prevent contact with the airstream.
- B. Unit housing shall provide a minimum of insulation value of R-12. Wall and roof insulation shall be two-in thick foam with a k value of 0.16 BTU-in/h-sf-F. Floor insulation shall be two-in thick foam with a maximum k value of 0.16 BTU-in/h-sf-F.
- C. Provide structural members at shipping splits to facilitate assembly.
- D. Perimeter base rails shall be structural steel channel or tube with integral lifting lugs. Provide full height cross members at shipping splits, floor openings, and as required to limit the floor deflection. For units installed indoors, provide base rails that are designed for mounting on concrete pads. For units installed outdoors, provide either curb-ready base rails that are designed for mounting on roof curbs, or base rails that are designed for mounting on concrete pads as required by the specific application or as indicated on the Drawings.
- E. (Not Used)

- F. Access doors shall be 2-inch thick with double wall, insulated construction. Wall insulation shall be foam with a k value of 0.16 BTU-in/h-sf-F. Door frame shall be aluminum, door hinge shall be stainless steel, and door exterior skin and liner shall be aluminum.

2.03 FAN SECTION

- A. Fans shall be centrifugal cabinet fans with belt drives. Extended external lubrication fittings shall be provided.
- B. Drives shall be adjustable V-belt type, with motor mounted on an adjustable slide base.
- C. Bearings for fan and motor shall be heavy-duty grease lubricated pillow block type ball or roller bearings. Bearings shall have ample thrust provision to prevent end play during the normal life of the bearing. Unless specifically noted otherwise, all fans shall have bearings for both the equipment and motors at ABMA L-10 life of 40,000 hours.
- D. Fan housing and frame shall be epoxy coated steel. Fan wheel shall be aluminum. Backwardly curved blades shall be air foil type.
- E. Fans shall be statically and dynamically balanced before shipment.
- F. Fans shall be AMCA rated for sound and air performance.
- G. (Not used).
- H. Fan type, drive type, and construction shall be as noted on the equipment schedule.

2.04 COOLING SECTION

- A. Cooling coil section shall include drain pan, coil support slide rails, and coil closure plate. Coil mounting shall minimize air bypass around the coil.
- B. Drain pan shall be insulated, be constructed of stainless steel, and sloped two percent in at least two planes to a single drain connection at the lowest point of the pan. Extend a drain nipple through the unit casing. Provide stainless steel channels or hat sections to support the coil frame above the pan.
- C. Refrigerant cooling coils shall be cartridge type with copper tubes, aluminum fins, stainless steel frame, and non-ferrous headers. Fins shall be mechanically attached to the tubes. Coils shall be pressure and leak tested at 300 psig with air under water. Coils shall be certified per AHRI Standards.
- D. Air handling unit shall include factory mounted thermostatic expansion valves, liquid line flash intercoolers, liquid sight glasses, liquid solenoid valves.

2.05 FILTERS

- A. See schedule for filter types by unit.

- B. Filter section shall have tracks or frames for the specified filter types. Sealing material or gaskets and clips shall be provided at tracks and ends to prevent air by-passing the filters.
- C. Disposable filters shall be framed filters, 2-inch thickness as scheduled. Air pressure drop for clean filters at 300 fpm face velocity shall not exceed 0.2-inch WG for 1-inch thickness and 0.15-inch WG for 2-inch thick filters. Filters shall have MERV 8 efficiency per ASHRAE Test Standard 52.2. Manufacturer shall be American Air Filter Co., Camfil Farr Co., Columbus Industries, Airguard, Flanders Precisionaire, Purafil, or equal.

2.06 CONDENSING UNIT

- A. Condensing unit shall consist of casing, compressor(s), refrigerant piping system, condenser, condenser fans and drives, and factory-wired controls and panel. Unit electrical system shall be configured and wired for single point power connection.
- B. Rotating components shall be internally isolated with vibration isolators from the main unit.
- C. Condensing unit for split systems shall be designed and constructed for mounting remote from its associated air handler with field-fabricated interconnecting refrigerant piping, including associated specialties.
- D. Refrigerant compressors shall be of the type, number, and capacity specified on the schedules. Compressors shall be provided with unloading or hot gas bypass as required by the schedule. Compressor shall include suction strainer, crank case oil sight glass, oil strainer and oil heater, and forced feed lubrication. Compressor controls shall include three-phase manual reset overload protection, hi-low refrigerant pressure cutout, manual reset low oil pressure cutout, anti-cycle timer, and non-cycle pump down relay. In addition, multiple compressor units shall have a compressor sequence switch. Refrigerant capacity control shall be achieved by staging multiple compressors or varying the speed or run time of the lead compressor and staging the operation of the constant speed lag compressor.
- E. Air-cooled condenser shall have propeller or centrifugal fans as shown on the schedules. Exposed fans shall be provided with fan guards. Condenser fans motor shall include thermal overload protection. For single fan condensers, head pressure control shall be achieved by varying condenser fan speed to achieve low ambient cooling down to 45 degree F or lower as scheduled. Head pressure control on multiple fan units shall be achieved by varying the speed of the lead condenser fan and by varying the speed or staging the operation of the lag condenser fans. Cycle the operation or speed of the condenser fans for head pressure control to achieve low ambient cooling down to at least 20 degree F.
- F. Coils shall have copper tubes, aluminum fins, stainless steel frame and copper headers or shall be cast aluminum micro channel coils. Coils shall be provided with corrosion resistant coating as specified in Section 15500. Coils shall be protected from hail damage by covered panels or by being recessed into the unit cabinet in a V-shape configuration. Fins shall be mechanically attached to the tubes. Coils shall be pressure and leak tested at 425 psig with air under water.
- G. Unit casing shall be all aluminum construction including frame, casing, and connectors. Provide access doors or removable panels for access to controls.

2.07 REFRIGERANT PIPING SYSTEM

- A. A complete refrigerant piping system shall be factory fabricated and installed in packaged units. Each compressor shall be provided with a complete and independent refrigerant piping system.
- B. For multiple compressor units, refer to the equipment schedule for the quantity of refrigeration circuits.
- C. Field-installed refrigerant piping shall be Heavy Duty Type ACR copper tubing. Field joints shall be done with an inert gas purge.
- D. Valves shall be bronze body brazed connection and shall include compressor and condenser relief valves, condenser liquid line service valve, refrigerant charging valve, compressor discharge, suction service valves, liquid line solenoid and thermal expansion valves.
- E. Insulation: Provide minimum 1-in thick closed cell foam type insulation on all refrigerant lines. Insulation material shall be pre-formed flexible closed cell foam sheet, maximum "K" factor of 0.27 at 75 degrees F mean temperature. Joints shall be sealed using self-sealing seams or adhesive. Adhesives and coatings shall be provided by the insulation manufacturer and shall be compatible with the insulation. Provide field applied 0.016-in thick aluminum jacket on all outdoor piping. Acceptable manufacturers shall be Armacell or equal
- F. Pipe cleaning: Where specially prepared, Type R, cleaned or charged refrigerant piping is not available for equipment interconnection, with the Engineer's approval the following procedure must be completed. The interior of field assembled refrigerant piping after joining shall be cleaned in five steps as follows:
 - 1. Draw a clean lintless cloth through the piping to remove coarse dirt and dust.
 - 2. Draw clean lintless trichlorethylene saturated cloth through the piping until cloth is not discolored with dirt.
 - 3. Draw a clean cloth saturated with compressor oil through the piping.
 - 4. Complete cleaning by drawing a clean, dry, lintless cloth through the piping.
 - 5. Before and during silver soldering refrigerant piping, the pipe and fittings must be purged with nitrogen to avoid formation of oxidation scale on inside of pipe during soldering.
- G. Leak testing: Pressure test the refrigerant system with inert gas. Items which may be damaged by the test pressure shall be either removed or blanked off. Check for leaks by applying soap and water solution on each joint and with electronic leak detector.
- H. Charging: After leak testing, the completed refrigerant system shall be evacuated and charged with the correct refrigerant in accordance with the refrigerant equipment supplier's recommendations.

- I. Size of field-fabricated piping for split systems shall be determined by the equipment manufacturer. Arrangement and layout of field piping shall be reviewed by the equipment manufacturer and approved by the Engineer.
- J. Pipe sleeves and sealing materials
 - 1. Pipe sleeves and sealing materials shall be provided under this Section. Products shall be in accordance with Section 01172.

2.08 UNIT-MOUNTED CONTROL PANEL

- A. A factory wired control panel shall be furnished and mounted on the unit. Panels shall include controls required in other sections, and safety controls and interlocks, control devices, motor starters and terminal strip for remote wired devices. Control type and sequence shall be as specified in other Sections and on the Drawings. Control voltage shall not exceed 120V. Control panel door shall be provided with a keyed lock. A complete wiring diagram shall be permanently attached to the inside of the panel door.
- B. Where specific area classifications are called for or shown on Electrical Drawings, equipment and wiring shall be in conformance with the requirements for that classification.
- C. Type of enclosure shall be 316 stainless steel NEMA 4X.

2.09 ACCESSORY SECTIONS

- A. Accessory sections shall be as called for on the Drawings and schedules and as required for the unit type.
- B. Dampers shall be opposed blade type with blades mounted on 1/2-inch minimum steel rods. Dampers shall be provided with low friction bushings and edge gaskets to reduce air leakage. Blades shall be sectionalized to limit unsupported blade length and warping at full system fan static pressures. Maximum damper blade width shall not exceed 6-inch. Manual dampers shall be provided with an external position indicating handle with a positive locking device.
- C. Spacer and access sections will be provided where specified or required. Access sections shall have hinged doors on each end except for filters.

2.10 AHU ELECTRICAL POWER

- A. (Not Used)
- B. Indicate the minimum circuit ampacity in the submittal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Equipment shall be installed in accordance with manufacturer's recommendation. Provide piping and ductwork connections in accordance with the requirements of the other related Sections.
- B. Contractor shall not install any equipment or materials until the Owner and Engineer have approved all submittals. If any equipment or materials are installed prior to approval of the submittals, it shall be at Contractor's risk.
- C. When units are shipped disassembled, field connect sections together as shown on the Drawings to form single air handling unit. Seal joints with gaskets and/or sealants.
- D. Do not operate equipment without filters. Do not run equipment with dirty filter pressure drop more than twice the clean filter pressure drop. A total of three complete sets of filters shall be provided: first set is to be installed for start-up, test and balancing; second set shall be installed after final cleanup and acceptance by the Owner; and third set shall be turned over to Owner as a spare.
- E. Contractor shall start up each piece of equipment and system and shall make adjustments so that system is placed in proper operating condition.

END OF SECTION

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- D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
- E. Disconnect and remove abandoned panelboards and distribution equipment.
- F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- G. Repair adjacent construction and finishes damaged during demolition and extension work.
- H. Maintain access to existing installations which remain active. Modify installation or provide access panel as appropriate.
- I. Extend existing installations using materials and methods as specified for new work.

3.03 DISPOSAL AND SALVAGE

- A. All electrical and instrumentation equipment and wiring associated with the abandoned Sludge Processing Facility shall be disposed of by the contractor. No salvage of this material is required.
- B. Salvage electrical and instrumentation equipment and wiring size four and larger removed from existing facilities for City's reuse.
- C. Material and equipment which can be reused or salvaged remains the property of the City of Houston. Equipment to be retained by the City of Houston shall be delivered to a specified location by the Contractor.
- D. Materials and equipment which cannot be reused or salvaged will be removed and disposed by the Contractor.

3.04 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

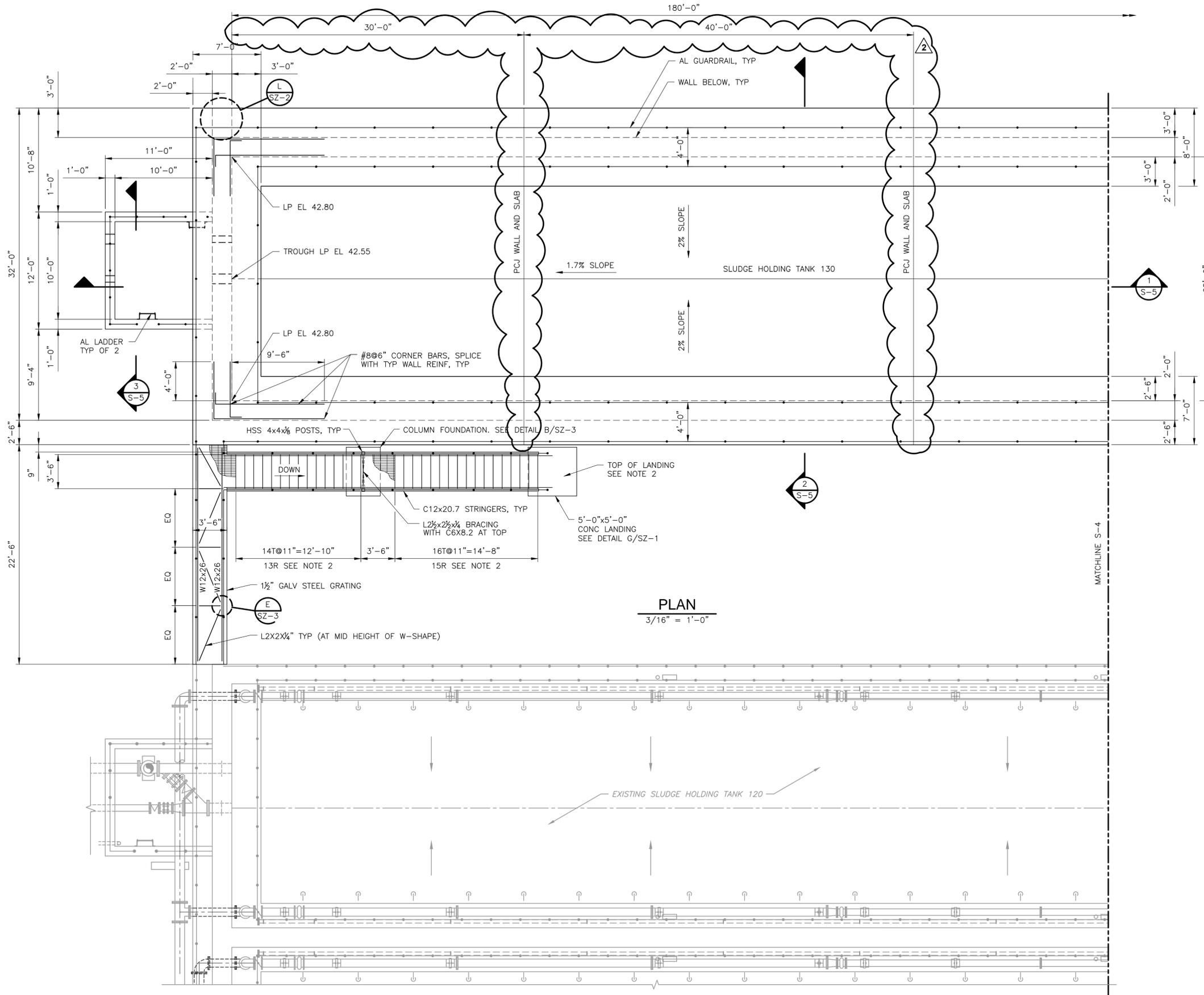
3.05 INSTALLATION

- A. Install relocated materials and equipment under the provisions of Section 02050 – Demolition and Modification.
- B. Electrical installations and materials shall conform to the current issue of the following standard and codes: American National Standards Institute/National Fire Protection Association (ANSI/NFPA), No. 70 - National Electrical Code (NEC), City of Houston Electrical Code, and material and workmanship.

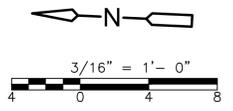
- C. All material shall be free of defects and in safe working condition which will meet electrical classification and functional requirements.
- D. Testing shall be made during the course of construction or at the completion of the job. These tests shall be made by the electrical contractor. The contractor shall furnish all test equipment.
- E. The job will not be complete until work has been inspected and trial start up has been successfully completed.

END OF SECTION

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PLAN
 3/16" = 1'-0"



- NOTES:
1. STEEL SHALL BE GALVANIZED UNLESS NOTED OTHERWISE.
 2. CONTRACTOR TO COORDINATE STAIR RISE AND RUN WITH LANDING ELEVATION.
 3. NEW STRUCTURE AND PIPING ELEVATIONS SHOWN MATCH RECORD DRAWINGS #44488, BUT MAY DIFFER FROM CORRESPONDING SURVEY ELEVATIONS. CONTRACTOR SHALL CONSTRUCT SLUDGE HOLDING TANK, VAULT, AND PIPING TO MATCH EXISTING FIELD CONDITIONS. CONTRACTOR TO NOTE ELEVATION ADJUSTMENT REQUIREMENTS AT EACH TOP OF WALL, TOP OF CONCRETE, AND PIPING CENTERLINE FOR RECORD DRAWINGS.

2	11/9/16	ADDENDUM NO. 2	JLM
No.	Date	Revisions	App.

PRIVATE UTILITY LINES SHOWN

N/A
 CENTER POINT/GAS

N/A
 SBC CO. VALID FOR ONE YEAR
 APPROVED ONLY FOR UNDERGROUND CONDUIT FACILITIES
 UNLESS NOTED.

N/A
 CENTER POINT/ELECTRIC
 APPROVED ONLY FOR CROSSING UNDERGROUND DUCTLINES
 UNLESS NOTED. VALID AT TIME OF REVIEW ONLY.

N/A
 CABLE COMPANY

APPROVED:	DATE:
DESIGNED BY: JLM	DRAWN BY: RC

CDM Smith

11490 Westheimer Road, Suite 700
 Houston, TX 77077
 Tel: (713) 423-7300
 TBPE Firm Registration No. F-3043



SURVEYED BY: BRIONES FB NO. FB 800, PG 13
 FB 801, PG 73

CITY OF HOUSTON
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

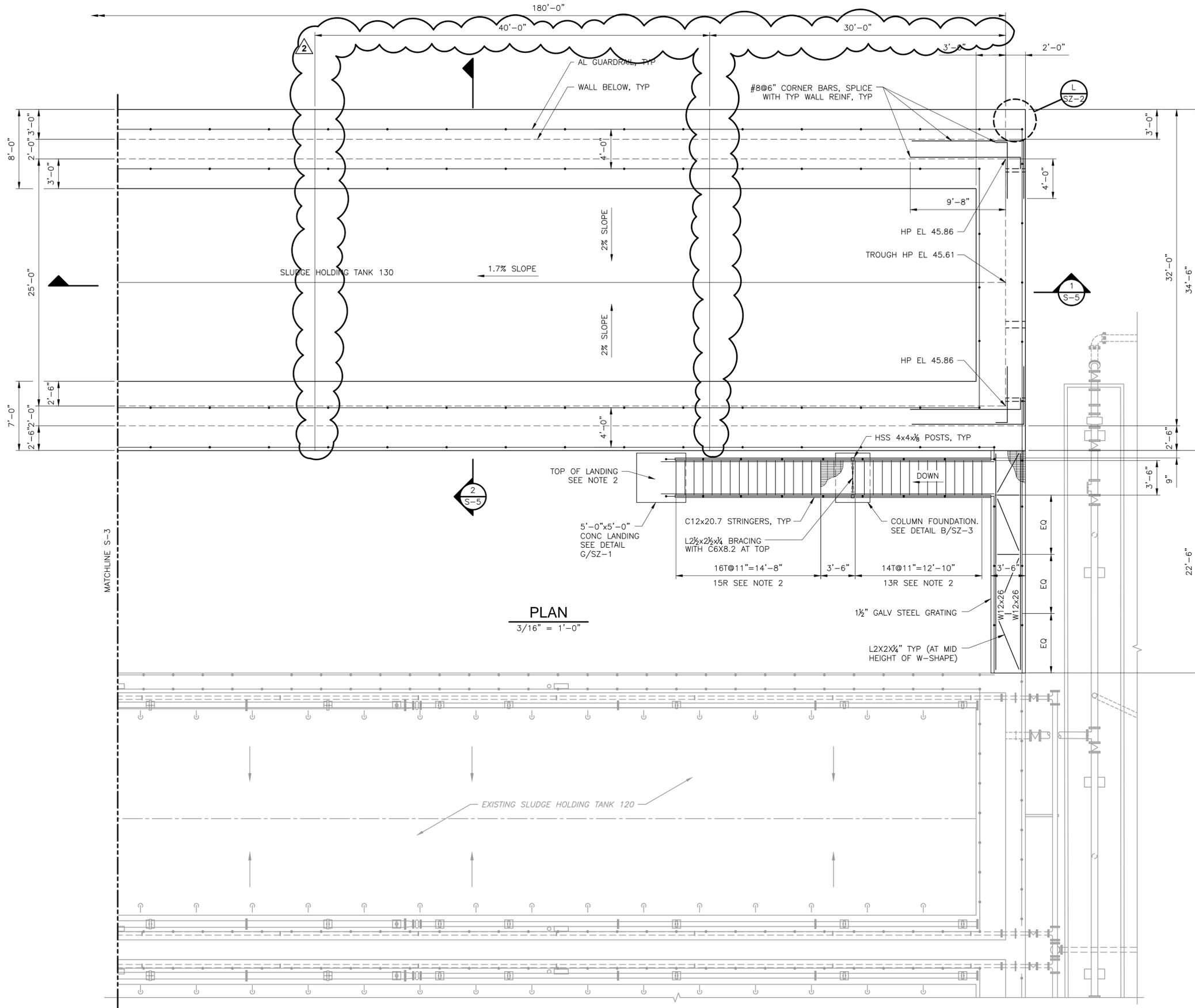
ALMEDA SIMS WASTEWATER TREATMENT
 PLANT AND SLUDGE PROCESSING FACILITY
 IMPROVEMENTS - PACKAGE 4

**PROPOSED
 SLUDGE HOLDING TANK
 PLAN 1 OF 2**

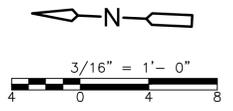
STRUCTURAL

WARNING IF THIS BAR DOES NOT MEASURE 1' THEN DRAWING IS NOT TO SCALE	WBS NO. R-000298-0010-4
	DRAWING SCALE 3/16" = 1'-0"
DWG NO. S-3	CITY OF HOUSTON PM XIAOHUA (SHARI) LIN, P.E.
	SHEET NO. OF

PW-XM1_8138-108878
 DWG: C:\cdm\johnson\42098960\5004SHPL.dwg USER: Johnsons
 DATE: Nov 09, 2016 7:44am XREFS:00-COH TBK SWP000SH XCESITE001



PLAN
 3/16" = 1'-0"



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 Tel: (713) 423-7300
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 FB 801, PG 73

CITY OF HOUSTON
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

ALMEDA SIMS WASTEWATER TREATMENT
 PLANT AND SLUDGE PROCESSING FACILITY
 IMPROVEMENTS - PACKAGE 4

**PROPOSED
 SLUDGE HOLDING TANK
 PLAN 2 OF 2**

STRUCTURAL

WARNING IF THIS BAR DOES NOT MEASURE 1' THEN DRAWING IS NOT TO SCALE	WBS NO. R-000298-0010-4
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DWG NO. S-4	CITY OF HOUSTON PM XIAOHUA (SHARI) LIN, P.E.
	SHEET NO. OF