nbbj
From the Office of
NBBJ
223 Yale Avenue North
Seattle, WA 98109

ADDENDUM NO. 01
July 10, 2014

1.1 NOTICE TO BIDDERS

A. This Addendum is issued to all Bidders pursuant to the Instructions to Bidders and Conditions of the Contract. This Addendum serves to clarify, revise, and supersede information in the Project Manual, Drawings, and previously issued Addenda. Portions of the Addendum affecting the Contract Documents will be incorporated into the Contract by enumeration of the Addendum in the Owner/Contractor Agreement.

B. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.

C. The date for receipt of bids is unchanged by this Addendum.

1.2 REVISIONS TO THE PROJECT MANUAL

A. The Project Manual is hereby amended as follows:
   1. Revised Specification Sections; Revised Page Method: Replace corresponding previously issued pages with the following, attached. New text <u>underlined</u>; deleted text strikeover ~~example.~~
      a. 01 1000 -SUMMARY: All pages.
      b. 22 0503 - PLUMBING PIPING AND VALVES: All pages.
      c. 31 6600 - AGGREGATE PIER SOIL REINFORCEMENT: All pages.

1.3 REVISIONS TO DRAWINGS

A. Revised Full Size Drawings: Replace previously issued full size drawing with the following revised drawings, attached:
   1. S2.02-DPW – LEVEL 2 FLOOR FRAMING PLAN ***(drawing not re-issued)***
      a. ***PROVIDE*** DECK EDGE BENT PLATE PER 36/S5.01 at west mechanical shaft between grid lines 3 & 3.5 on west, south and east slab edges in lieu of edge form.
   2. S2.03-DPW – LEVEL 3 FLOOR FRAMING PLAN ***(drawing not re-issued)***
      a. ***PROVIDE*** DECK EDGE BENT PLATE PER 36/S5.01 at west mechanical shaft between grid lines 3 & 3.5 on west, south and east slab edges in lieu of edge form.
      b. ***PROVIDE*** DECK EDGE BENT PLATE PER 36/S5.01 at east mechanical shaft between grid lines 11.4 & 12 on west and east slab edges in lieu of edge form.
   3. S2.04-DPW – MAIN ROOF AND PENTHOUSE FLOOR FRAMING PLAN ***(drawing not re-issued)***

a. ***PROVIDE*** DECK EDGE BENT PLATE PER 36/S5.01 at west mechanical shaft between grid lines 3 & 3.5 on west, south and east slab edges in lieu of edge form.
b. ***PROVIDE*** DECK EDGE BENT PLATE PER 36/S5.01 at east mechanical shaft between grid lines 11.4 & 12 on west and east slab edges in lieu of edge form.

4. M0.01-DPW – LEGENDS, ABBREVIATIONS & SCHEDULES – MECHANICAL
   a. ***REVISE*** FS-3 floor sink on Drains Schedule as indicated on drawing.
5. M2.00-DPW – FOUNDATION PLAN – MECHANICAL
   a. ***ADD*** trap primer piping to connect to Floor Sink trap at Grids 3.7/C.2. Route piping as indicated on attached drawing to location of 1/2" up to ETP-1. Change note to read (TYP-2).
   b. ***CHANGE*** (3) under slab water pipes (1/2"CW, 1/2"HW and 1/2"HWR from copper Type "K" piping to 1/2" pre-insulated PEX piping contained within 2" EMT metal conduit with long-sweep elbows each as indicated on attached drawing and detailed as detail 5 on attached drawing M5.02-DPW.
   c. ***REVISE*** sizing of ARW mains from main riser stacks in four (4) locations, as indicated on attached drawing. The four locations and sizes are as follows: (2) 3" ARW at Grid B with (1) between Grids 10.5 and 11 heading North to approximately Grid A.8 and (1) starting at Grid 4.2 and heading Northeast to approximately Grid A.9. Additional (2) 4" ARW at Grid B with (1) starting at Grid 6.1 heading North to approximately Grid A.8 and (1) starting at Grid 8.1 and heading Northeast to approximately Grid A.8.
   d. ***RELOCATE*** 2" ARW up to 2" Floor Sink Type 1 located at Grids A.8/5.9 to the West 4", see attached drawing.
   e. ***PROVIDE*** new 2" Floor Sink Type 1 with 2" ARW with 2" ARV at Grids A.4/5.8 including 1/2" trap primer piping from electronic trap primer at Grids A.3/7.7. Provide for 2" ARV to proceed to above floor at location indicated on attached drawing.
   f. ***REVISE*** key note "10" located at Grids A.4/4,1 to read 11. As indicated on attached drawing.
   g. ***REVISE*** key note number "10" to read (TYP-7) and key note number 11 to read (TYP-5). As indicated on attached drawing.
   h. ***ADD*** key note number "21" to read, 4"ARW UP, as indicated on attached drawing.
6. M2.01-DPW – FIRST FLOOR PLAN – MECHANICAL
   a. ***RELOCATE*** 2" Floor Sink Type at Grids A.8/5.9 to the West 4", see attached drawing for new location.
   b. ***PROVIDE*** new 2" Floor Sink Type 1 located at Grids A.4/5.8 as indicated on attached drawing.
7. M2.02-DPW – SECOND FLOOR PLAN – MECHANICAL
   a. ***RELOCATE*** block-out for 2" Floor Sink Type at Grids A.8/6.4 to the West 15", see attached drawing for new location.

b. ***PROVIDE*** block-out for new 2" Floor Sink Type 1 located at Grids A.4/6.4 as indicated on attached drawing.

8. M2.03-DPW – THIRD FLOOR PLAN – MECHANICAL
   a. ***PROVIDE*** block-out for new 2" Floor Sink Type 1 located at Grids A.4/6.4 as indicated on attached drawing.
9. M5.02-DPW – DETAILS – MECHANICAL
   a. ***ADD*** detail 5 to indicate 2" EMT metal conduit with long-sweep elbows to contain pre-insulated PEX tubing see attached drawing.

END OF ADDENDUM NO. 01

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
1. Project information.
2. Work covered by Contract Documents.
3. Work under separate contracts.
4. Access to site.
5. Work restrictions.
6. Specification and drawing conventions.

B. Related Sections:
1. 01 1500 - Temporary Facilities and Controls: For limitations and procedures governing temporary use of Owner's facilities.

1.2 WORK UNDER SEPARATE CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

1.3 ACCESS TO SITE

A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
1. Limits: Limit site disturbance, including earthwork and clearing of vegetation, to area indicated on drawings.
2. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
   a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
   b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.4 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.
   1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to ~~9:00~~ 4:00 p.m., Monday through Friday, except as otherwise ~~indicated~~approved in advance by UI Architectural and Engineering Services.
   1. Weekend Hours: Not permitted without prior authorization.
   2. Hours for Utility Shutdowns: Upon Owner's approval.
   3. Hours for noisy activities not allowed during finals weeks, graduation ceremonies, and scheduled special occasions.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
   1. Notify Owner not less than two days in advance of proposed utility interruptions.
   2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
   1. Notify Owner not less than two days in advance of proposed disruptive operations.
   2. Obtain Owner's written permission before proceeding with disruptive operations.

1.5 CONSTRUCTION SITE LAY-DOWN AND STORAGE

A. The use of University of Idaho property for lay-down/storage or parking is under the supervision and sole discretion of the University of Idaho Project Manager and/or the designated UI Field Representative. The UI and the project team will attempt to identify the available spaces(s) prior to bidding projects. The use and size of lay-down/storage space is subject to change during the course of any project should any conflict with UI operations arise. All contractors and subcontractors working on UI property must comply with these guidelines and all contract documents including project meeting minutes and all instructions therein.

B. If a change or reduction in lay-down/storage occurs the UI Project Manager or UI Field Representative will make every effort to locate and identify other areas on campus for additional construction lay-down/storage. Consideration and effort will be made to minimize impacts to the progress of construction.

C. The use of UI/Board of Regents property for lay-down/storage does not grant a contractor the indiscriminate use of the designated area for parking or excessive or unnecessary storage. Any directions or instructions given by non UI personnel are invalid unless agreed upon in advance.

D. Lay-down/storage areas shall be enclosed with six (6) foot high chain link fence and must be secured at all access points with a padlock or equal device that is capable of securing the area against unauthorized entrance unless otherwise instructed.

E. Rehabilitation and restoration of all areas used as lay-down must conform to the direction listed in these guidelines and all directions stated in the construction documents including project meeting minutes, and/or written direction from UI Landscape Exterior Services (LES).

F. Long term storage of trailers, vehicles, or other equipment is not allowed on UI property unless prior arrangements have been made with PTS. Removal of any items will be at the cost of the general contractor and may be held out of retained contract funds.

1.6 CONSTRUCTION PARKING GUIDELINES

A. Ui Parking and Transportation Services, (PTS), provides parking arrangements and guidelines for all parking on UI property. Contractors and subcontractors working on UI property must comply with all University of Idaho Parking Regulations. Information is available at www.uidaho.edu/parking.

B. Construction parking is limited on campus and will be determined and regulated solely by PTS in cooperation with UI Architectural and Engineering Services (UI/AES). Parking availability will depend on the scope and location of the work to be done. No Personally Operated Vehicles (POV) will be allowed inside a fenced construction site or in the core of campus unless specific authorization is granted by the UI Project Manager, UI Field Representative, and PTS.

C. Essential Vehicles only will be allowed at all UI construction sites, or lay-down areas, the determination of an “essential vehicle” will be made by PTS and AES. Essential vehicles are limited to Superintendent’s Vehicle, dump trucks, loaders, forklifts, foreman/service vehicle (limit one per trade unless prior arranged) and other vehicles whose continuous presence is required to perform project tasks.

D. Vehicles allowed to be parked at the construction site or the core of campus will be restricted by the constraints of the project location and may change during the project if deemed necessary by PTS or the UI Field Representative. If no POV parking is available at the construction site, alternative parking location(s) will be located as close as practical to the construction site by PTS.

E. Parking lot restoration/rehabilitation, at a minimum, will require re-grading of the areas, magnetic sweeping for fine construction debris, nails, etc., and the placement of parking bumpers and signage disturbed by the use of UI parking areas to their original location.

F. Three-quarter inch plywood or other suitable material is required to be in place to protect asphalt if tracked vehicles are used.

G. Use of paved areas are not to be used for storage of gravel, dirt or other similar grading materials without prior agreement with UI/AES or PTS for seal-coating and/or re-striping.

H. PTS requires a minimum of one-week notice to close any UI parking lot. Shorter notice may be approved for individual spaces.

1.7 COMMUTING WORKER VEHICLES

A. Personal and non-essential work vehicles that need to park during the work day may obtain temporary construction parking permits through UI/AES. Permits will be required Monday through Friday between the hours of 6 AM and 5 PM.

B. Construction parking permits are valid in all red/blue/silver/green parking lots.

C. During summer and academic breaks, permits will not be required in red/blue/silver/purple parking areas.

D. All citations issued must be paid or appealed within fifteen days per UI Parking and Transportation Services policies. All citations may be paid or appealed online at www.uidaho,edu/parking.

E. UI Project Managers or Field Representatives cannot make void any citations issued.

F. Contact UI Parking and Transportation Services for all questions regarding parking on UI property.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:
   1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 220503 PLUMBING PIPING AND VALVES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sanitary Sewer and Vent Piping, Buried

B. Chemical Resistant Sewer and Vent Piping, Buried

C. Storm Water Piping (Roof and Overflow Drainage), Buried

D. Flanges, Unions, and Couplings

E. General Valves

F. Domestic Water, Buried

1.2 RELATED SECTIONS

A. Division 8

B. Section 20 10 00 – General Requirements

C. Section 20 10 04 – Excavation and Backfill

D. Section 22 05 04 – Plumbing Specialties

E. Section 22 05 29 – Supports, Anchors, Curbs, Seals, and Flashings

F. Section 22 05 53 – Mechanical Identification

G. Section 22 15 00 – Mechanical Identification

1.3 REFERENCES

A. General
1. ASME B31.1 - Power Piping
2. ASME B31.9 - Building Service Piping
3. ASME SEC IX - Welding and Brazing Qualifications
4. ASTM E814 - Fire Tests of Through-Penetration Fire Stops
5. ASTM F708 - Design and Installation of Rigid Pipe Hangers
6. AWWA C651 - Disinfecting Water Mains
7. MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer
8. MSS SP69 - Pipe Hangers and Supports - Selection and Application
9. MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices
10. NCPWB - Procedure Specifications for Pipe Welding

11. UL 1479 - Fire Tests of Through-Penetration Firestops

B. ABS Piping
1. ASTM D2235 - Solvent Cement for Acrylonitrile - Butadiene - Styrene (ABS) Plastic Pipe and Fittings
2. ASTM D2661 - Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings
3. ASTM D2751 - Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings
4. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe

C. Copper Piping
1. ASME B16.22 - Wrought Copper and Bronze Solder Joint Pressure Fittings
2. ASTM B32 - Solder Metal; AWS A5.8 - Brazing Filler Metal
3. ASTM B75 (ASTM B75M) - Seamless Copper Tube
4. ASTM B88 (ASTM B88M) - Seamless Copper Water Tube
5. AWS A5.8 - Brazing Filler Metal

D. Ductile Iron Piping
1. ASME B16.3 – Malleable Iron Threaded Fittings
2. AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and Other Liquids
3. AWWA C110 - Ductile - Iron and Gray - Iron Fittings 3 inches through 48 inches, for Water and Other Liquids
4. AWWA C111 - Rubber-Gasket Joints for Ductile Iron and Gray-Iron Pressure Pipe and Fittings
5. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids

E. PVC Piping
1. ASTM D2564 - Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings
2. ASTM D2665 - Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
3. ASTM D2729 - Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
4. ASTM D2855 - Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings
5. ASTM D3034 - Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
6. ASTM F437 - Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
7. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe
8. ASTM F679 - Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
9. AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe, 4 inches Through 12 inches for Water Distribution

1.4 SUBMITTALS FOR REVIEW

A. Submit under provisions of Section 20 10 00.

B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

1.5 QUALITY ASSURANCE

A. Valves: Manufacturer's name and pressure rating marked on valve body.

B. Welding Materials and Procedures: Conform to ASME SEC IX and applicable state regulations.

C. Welders Certification: In accordance with ASME SEC IX.

1.6 REGULATORY REQUIREMENTS

A. Coordinate and comply with serving utility company requirements.

B. Installation and materials of underground pipe, including service piping, if required, shall be as directed by serving utility company.

C. Include applicable utility company charges - See Section 20 10 00.

1.7 TESTING

A. Sanitary and Acid Resistant Waste and Vent, and Storm Water Piping
   1. Test all building sanitary sewer, vent and storm water (Roof Drainage/Site Drainage) piping to ensure system is water tight.
   2. Drainage piping shall be tested to the point of connection to mains outside the building.
   3. Water test: The water test shall be applied to the drainage and vent systems either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system filled with water to point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest opening of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10 foot head of water. In testing successive sections, at least the upper 10 feet of the next preceding section shall be tested, so that no joint or pipe in the building (except the uppermost 10 feet of the system shall have been submitted to a test of less than 10 feet heat of water. The water shall be kept in the system, or in the portion under test, for at least fifteen minutes before inspection starts. The system shall then be tight at all points. Tests shall be made in the presence of the Owner's Representative.

B. Water Piping

1. Upon completion of a section or of the entire hot and cold water supply system, it shall be tested and proved tight under a water pressure not less than the working pressure under which it is to be used or 100 psig whichever is greater. The water used for tests shall be obtained from a potable source of supply. A fifty (50) pound per square inch air pressure may be substituted for the water test. In either method of test, the piping shall withstand the test without leaking for a period of not less than thirty (30) minutes. Tests shall be made in the presence of the Owner's Representative. Test water piping to connection point at main outside the building.

C. Records
1. Provide record of pipe tests in accordance with Section 20 10 06.
2. Include certificate of Tests in O&M Manual.
3. Include certificate of Health Department approval of domestic water quality in O&M Manual.

1.8 DELIVERY, STORAGE, AND HANDLING (REFER TO SECTION 20 10 00)

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.9 DRAWING SCHEDULES

A. Refer to schedules on drawings for model numbers, symbols, etc. for additional information concerning products specified in this section.

PART 2 PRODUCTS

2.1 SANITARY SEWER AND VENT PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Schedule 40 DWV ABS Pipe: ASTM D2661 or ASTM D2751
1. Fittings: ABS
2. Joints: ASTM D2235, solvent weld

B. Schedule 40 DWV PVC Pipe: ASTM D2665 or ASTM D3034
1. Fittings: PVC
2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement

2.2 CHEMICAL RESISTANT SEWER AND VENT PIPING

A. CPVC Pipe: Spears LabWaste Piping, ASTM F 2618,

1. Fittings: CPVC
2. Joints: ASTM D 3311, solvent weld with ASTM F 493 solvent cement

2.3 WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING-PIPE 2” AND LESS

A. Copper Tubing: ASTM B42, hard drawn, Type K
1. Fittings: ASME B16.22 wrought copper and bronze
2. Joints: AWS A5.8, BCuP silver braze
3. Wrap for Underground Piping: Calpico Inc. pipe wrapping polyvinyl tape, 20 mil thickness, with identification per IAPMO.

B. Copper Tubing: ASTM B42, annealed, Type K
1. Fittings: none
2. Joints: none

2.4 TRAP PRIMER PIPING, BURIED WITHIN BUILDING-PIPE 1/2”

A. Copper Tubing: ~~ASTM B42, hard drawn, Type K~~ Uponor Aqua-PEX Pre-insulated 1/2" PEX tubing.
1. Fittings: ~~ASME B16.22 wrought copper and bronze~~ Uponor Aqua-PEX transition from copper to PEX fittings,
~~2.~~ Joints: ~~AWS A5.8, BCuP silver braze~~ Uponor Aqua-PEX Pre-insulated 100 foot continuous coil tubing.
~~3. Wrap for Underground Piping: Calpico Inc. pipe wrapping polyvinyl tape, 20 mil thickness, with identification per IAPMO.~~

B. ~~Copper Tubing: ASTM B42, annealed, Type K~~
~~1. Fittings: none~~
~~2. Joints: none~~

2.5 WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING-PIPE GREATERTHAN 2”

A. Ductile Iron Pipe: AWWA C151
1. Fittings: AWWA C110, Ductile iron, standard thickness
2. Joints: AWWA C111, rubber gasket with ¾ inch diameter rods

2.6 STORM WATER PIPING, (ROOF DRAINAGE; RDL AND ODL) BURIED WITHIN 5 FEET OF BUILDING

A. Schedule 40 DWV ABS Pipe: ASTM D2680 or ASTM D2751
1. Fittings: ABS
2. Joints: ASTM D2235, solvent weld

B. Schedule 40 DWV PVC Pipe: ASTM D2665
1. Fittings: PVC
2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement

2.7 FLANGES, UNIONS, AND COUPLINGS

A. Pipe Size 2 inches and under:
   1. Ferrous pipe: Class 150 malleable iron threaded unions
   2. Copper tube and pipe: Class 150 bronze unions with soldered joints

B. Pipe Size over 2 inches:
   1. Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets
   2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION – GENERAL

A. Provide pipe and valves in accordance with manufacturer's instructions and as indicated on the drawings.

B. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls. Install piping without sags or bonds.

C. Provide piping and all required offsets and fittings in order to coordinate with other trades, minimize structural interferences, conserve space and maintain headroom. Refer to Section 20 10 00 General Mechanical Requirements.

D. Group piping whenever practical at common elevations.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 22 05 16.

F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 07 00.

G. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

H. Prepare exposed, ferrous metals (unfinished pipe, fittings, supports, and accessories) ready for finish painting. Refer to Division 9.

I. Excavate and backfill in accordance with Section 20 10 04.

J. Install bell and spigot pipe with bell end upstream.

K. Provide supports, hangers, insulation shields, sleeves, escutcheons, and inserts in accordance with Section 22 05 29.

L. Provide pipe wrap for all copper pipe installed below ground.

M. Pipe Insulation thru Concrete.
   1. General: Provide a minimum 1-inch thick fiberglass pipe insulation (23 07 00) for all copper pipe installed through concrete, footings, grade beams, etc.
   2. Cleaning: Remove loose scale, rust, dirt, oil and grease before wrapping.
   3. IMOC, IMCOSHIELD, non-slit pre-lubricated polymer foam insulation.

N. Hubless Piping: Clamps shall be tightened to 80 inch pound and installed in accordance with the manufacturers requirements.

3.3 APPLICATION

A. Flanges / Unions:
   1. Steel Pipe:
      a. Threaded pipe, 2 inches smaller: Install unions downstream of each valve with screwed joint upstream
      b. Welded pipe, 2 ½ inches and larger: Flanged connections both sides of valve
      c. Use unions at final connection to each piece of equipment or apparatus having a threaded pipe connection.
      d. Use flanges at final connection to each piece of equipment or apparatus having a flanged pipe connection.
   2. Copper Pipe:
      a. Threaded pipe: Install union downstream of each valve with screwed joint up stream. Use brass male adapters each side of valve.
      b. Soldered pipe: No unions required either side of valve.
      c. Use unions at final connection to each piece of equipment or apparatus having a threaded pipe connection.
      d. Use flanges at final connection to each piece of equipment or apparatus having a flanged pipe connection.
   3. Notes to above: Temperature control valves shall have unions and/or flanges at each port. Valves with screwed connections that cannot be rotated shall have unions on each side of valve. Do not use direct welded or threaded connections to valves, equipment or other apparatus.

B. Provide brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

3.4 ERECTION TOLERANCES

A. Establish invert elevations, slopes for drainage to ¼ inch/foot, 2 %, minimum unless indicated otherwise on drawings. Maintain gradients.

B. Install piping so that entire system is drainable. Provide drain valves with hose connections at low points.

C. Connect branch piping to top of mains.

3.5 FINALIZATION

A. After pressure testing pipe, blow all water from lines and cap to keep moisture out of lines and to prevent freezing of piping.

3.6 SERVICE CONNECTIONS

A. Provide sanitary and storm sewer connections to sewer services outside the building as indicated. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. This Section specifies aggregate pier soil reinforcement.
   a. Work shall consist of designing, furnishing, and installing aggregate pier elements to the lines and grades designated on the project foundation plan and as specified herein. The aggregate pier elements shall be constructed by compacting aggregate in an excavated hole using special high-energy impact densification equipment. The aggregate pier elements shall be in a columnar-type configuration and shall be used to reinforce soils for the support of high bearing pressure building footings and slab-on-grade.

B. Related Sections:
1. Division 31 Section “Earthwork” and Appendix A ”Geotechnical Data” for information of subsurface conditions.
2. Division 3 Section “Cast-in-place Concrete”

1.2 REFERENCES

A. Reference Standards: Current edition at date of Bid, except as otherwise specified.

B. ASTM International (ASTM):
1. ASTM D1194 - Spread Footing Load Test
2. ASTM D1143 - Pile Load Test Procedures
3. ASTM D1241 - Aggregate Quality

1.3 SUBMITTALS

A. The aggregate pier contractor shall submit design calculations and project-specific construction drawings for approval. All plans and calculations shall be sealed by a professional engineer licensed in the State of Idaho. The drawings shall indicate the spacing, location, sizes, and depth of the aggregate piers to achieve the criteria outlined in this specification and on the Structural Drawings. A detailed explanation of the design parameters for settlement shall be submitted. Calculations shall be submitted showing design is in adherence with the design requirements.

B. Aggregate Pier Contractor shall submit laboratory test results for aggregate used in piers prior to delivery to site.

1.4 QUALIFIED AGGREGATE PIER CONTRACTORS

1. Provide evidence of satisfactory experience with the design and installation of Aggregate Pier Soil Reinforcement. The design and installation shall be conducted and supervised by a registered professional engineer licensed in the state of Idaho.

2. Demonstrate a minimum of 5 years of experience in the installation of Aggregate Pier Soil Reinforcement and the completion of at least 10 projects with construction of a similar size and type. Installer shall be licensed by the aggregate pier designer.
3. ~~The aggregate pier contractor shall be pre-qualified and must be approved by the owner, architect, and structural engineer two weeks prior to bid opening.~~
   a. ~~Pre-qualified contractors are:~~
      1) ~~Geopier Foundation Company Northwest, Inc.~~
      2) ~~Hayward Baker Inc.~~

1.5 QUALITY ASSURANCE

A. There shall be a quality control representative from the aggregate pier contractor onsite to verify and report installation procedures. Conduct under the supervision of a registered professional engineer Owner will retain geotechnical engineer of record for third party quality assurance services. The quality control representative shall immediately report any unusual condition encountered during installation to the structural engineer, general contractor, and to the geotechnical engineer of record.

B. "Daily Aggregate Pier Progress Report" shall be completed during each day of installation. Report shall include the following:
   1. Footing and aggregate pier locations.
   2. Aggregate pier lengths and drilled diameter.
   3. Planned and actual aggregate pier elevations at the top and bottom of the element.
   4. Average lift thickness for each aggregate pier.
   5. Soil types encountered at the bottom of the aggregate pier and along the length of the element.
   6. Depth to groundwater, if encountered.
   7. Documentation of any unusual conditions encountered.
   8. Type and size of densification equipment used.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the jobsite in quantities and at times to assure conformity of activities with the project schedule.

PART 2 PRODUCTS

2.1 MATERIALS

A. Aggregate used shall be as specified by the aggregate pier contractor.

B. Potable water or other suitable source shall be used to increase aggregate pier moisture content where required.

2.2 DESIGN REQUIREMENTS

2.3 AGGREGATE PIER DESIGN

A. The aggregate pier elements shall be designed for an aggregate pier stiffness modulus that satisfies the load bearing and settlement requirements. The stiffness modulus value

shall be verified by the results of the aggregate pier modulus test, described in this specification.

B. Aggregate pier shall be designed in accordance with generally accepted engineering practice and the methods described elsewhere in this specification. The design shall meet the following criteria.
   1. Allowable Bearing Pressure for Aggregate Pier Reinforced Soils: Refer to structural drawings for bearing requirements at columns, walls, and slabs to be supported by Aggregate Piers.
   2. Maximum Aggregate Pier Spacing at continuous wall footings: Per Structural Drawings
   3. Minimum Aggregate Pier Allowable Vertical Capacity at slabs-on-grade: Per structural drawings
   4. Maximum Aggregate Pier Spacing at slabs-on-grade: Per structural drawings.
   5. Maximum Total Long-Term Settlement for Footings or Slabs: 3/4 inch
   6. Maximum Long-Term Differential Settlement of Adjacent Footings: ½ inch

C. The design submitted by the aggregate pier contractor shall consider the bearing capacity and settlement of all footings supported by aggregate piers, and shall be in accordance with acceptable engineering practice and these specifications. Total and differential settlement shall be considered. The design life of the structure shall be 150 years.

D. The aggregate pier system shall be designed to preclude plastic bulging deformations at the top-of-pier design stress and to preclude significant tip stresses as determined from the shape of the telltale test curves from telltales installed in modulus test piers. The results of the modulus test shall be used to verify design assumptions.

PART 3 EXECUTION

3.1 PREPARATION

A. Locate and protect structures, underground utilities, and other construction from damage caused by installation activities. Above and below ground utilities shall be located, clearly marked, and relocated as necessary prior to aggregate pier installation.

B. Provide survey elevation benchmarks on adjacent existing structures before commencing work. Record and report elevation of each benchmark at least twice per day while installation is in progress. Should reading indicate significant displacement, cease installation activities, and provide architect with a written statement or proposed corrective action.

C. Do not install aggregate piers until earthwork in area has been completed as follows:
   1. Site subgrade shall be established within 6 inches of finish subgrade.
   2. Fills should be placed prior to subgrade or to at least 12 inches above top of aggregate pier.

D. The tops of aggregate pier elements shall be protected after installation and prior to footing placement. Measures shall be taken to prevent softening of the matrix soil between and around the aggregate pier elements and to achieve firm contact between the dense, undisturbed aggregate pier elements and the concrete footing.

3.2 EXCAVATION

A. The locations, size, and spacing of the aggregate pier shall be per the approved submittal drawings. Modifications in size and locations shall be approved by the structural engineer.

B. All Aggregate Pier elements shall be pre-augered using mechanical drilling or excavation equipment.

C. If cave-ins occur during excavation such that the sidewalls of the hole are deemed unstable, steel casing or a drilling slurry shall be used to stabilize the excavation.

D. If cave-ins occur on top of a lift of aggregate such that the volume of the caved soils is greater than 10 percent of the volume of the aggregate in the lift, then the aggregate shall be considered contaminated and shall be removed and replaced with uncontaminated aggregate.

E. Should any obstruction be encountered during drilling or excavation for aggregate piers, the General Contractor shall be responsible for removing such obstruction, or the pier shall be relocated or abandoned. Obstructions include, but are not limited to, boulders, timbers, concrete, bricks, utility lines, etc., that prevent installing the aggregate piers to the required depth, or cause the aggregate pier to drift from the required locations. Dense natural rock or weathered rock shall not be deemed obstructions, and piers may be terminated short of design lengths on such materials. Additional aggregate piers shall be installed when required by the presence of obstructions.

3.3 DENSIFICATION

A. The pier excavation shall be cleaned of loose and caved materials prior to placement of the aggregate. No more than 12 inches of loose material shall be allowed in the bottom of the pier excavation.

B. The bottom of the excavation shall be densified prior to the placement of the aggregate. If wet, soft or sensitive soils are present, open-graded aggregate, such as No. 3 Concrete Coarse Aggregate is a similar product in Section 703.03 in the ITD Standards, or 1.5" minus Coarse concrete aggregate in Section 703 ISPWC Standards, or an approved equivalent shall be placed at the bottom of the excavation and compacted to stabilize the element bottom and may serve as the initial lift.

3.4 FOOTING BOTTOMS

A. Footing areas shall be properly prepared following excavation and prior to concrete placement. Excavations for footing bottoms to supported by aggregate piers shall be prepared as follows:
   1. Overexcavation shall be limited to 3 inches below the bottom of the footing elevation. The excavation shall be accomplished using a smooth bucket.
   2. Disturbed surface soils and the tops of aggregate pier elements shall be recompacted in accordance with the structural fill requirements.

B. A standard impact compactor, such as a “whacker or jumping jack” shall be used to compact the loose surface of the aggregate pier and any loose surface soil. Compaction shall be performed over the entire footing bottom.

C. All foundation bearing surfaces shall be observed by the geotechnical engineer of record prior to placement of concrete.

D. The following criteria shall apply, and a written inspection report by the project Geotechnical Engineer shall be furnished to the aggregate pier contractor to confirm:

1. That all aggregate pier elements designed for each footing have been exposed in the footing excavation.

2. That immediately before footing construction, the tops of all the aggregate pier elements exposed in each footing excavation have been inspected and recompacted as necessary with mechanical compaction equipment, and that the tops of any aggregate pier elements which may have been disturbed by footing excavation and related activity have been recompacted to dense and interlocking condition, representative of the installed condition of the pier aggregate.

3. No excavations or drilled shafts have been made after installation of aggregate pier elements within horizontal distance of five feet from the edge of any pier, without the written approval of the aggregate pier contractor.

3.5 PLAN LOCATION AND ELEVATION OF AGGREGATE PIER ELEMENTS

A. The center of each pier shall be within six inches of the plan locations indicated. The final measurement of the top of piers shall be the lowest point on the aggregate in the last compacted lift. Piers installed outside of the above tolerances and deemed not acceptable shall be rebuilt at no additional expense to the Owner.

3.6 REJECTED AGGREGATE PIER ELEMENTS

A. Aggregate pier elements improperly located or installed beyond the maximum allowable tolerances shall be abandoned and replaced with new piers, unless the Designer approves other remedial measures. All material and labor required to replace rejected piers shall be provided at no additional cost to the Owner.

3.7 MODULUS TEST

A. Modulus tests shall be of the type and installed in a manner specified herein. Modulus test data shall be used by the RAP system designer to confirm pier element design parameters for the project.

B. Deflections of the top of the test pier shall be measured by a suitable method. A telltale shall be installed at the bottom of the test pier so that bottom-of-pier deflections may be determined. Acceptable performance shall be determined by the RAP system designer, but shall not be less than that indicated when the bottom of the pier deflection is no more than 20% of the top of pier deflection at the design stress level.

C. The location of the aggregate pier modulus test shall be coordinated with the project Geotechnical Engineer of record to best characterize the nature of the soil conditions encountered.

D. RAP elements used for modulus testing which are located within tolerance and provide meet the design criteria may, upon approval of the system designer, be used in the finished work.

E. Compressive load test procedures shall be conducted in reference to ASTM D1143 and D1194. A test pier shall be loaded to 200 percent of the estimated element design pressure. Alternatively, 2 test piers loaded to 150 percent of the operating load shall be accomplished with at least 1 test performed for the highest 10 percent of anticipated operating column loads and one test for the highest 10 percent of anticipated operating wall loads.

F. The modulus test shall be conducted as follows:

1. ASTM D1143 general test procedures shall be used as a guide to establishing load increments, load increment duration, load decrements and total applied load.

2. With the exception of the load increment representing approximately 112 percent of the design maximum pier element stress, all load increments shall be held for a minimum of 15 minutes, a maximum of 1 hour, and until the rate of deflection reduces to 0.01 inch per hour, or less as shown in the table below.

Load Basis	Hold Time
Alignment Load 0.05 x Design Load	Min. 15 minutes
0.15 x Design Load	Min. 15 minutes
0.33 x Design Load	Min. 15 minutes
0.50 x Design Load	Min. 15 minutes
0.75 x Design Load	Min. 15 minutes
1.00 x Design Load	Min. 15 minutes
1.12 X Design Load	Min. 60 minutes – Creep Test
1.33 x Design Load	Min. 15 minutes
1.50 x Design Load	Min. 15 minutes
2.00 x Design Load	Min. 15 minutes
1.00 x Design Load	Min. 15 minutes
0.75 x Design Load	Min. 15 minutes
0.33 x Design Load	Min. 15 minutes
0.05 x Design Load	Min. 15 minutes

3.8 BOTTOM STABILIZATION VERIFICATION TEST

A. Bottom Stabilization Test shall be performed on representative pier elements, 10 percent of aggregate pier elements installed or 5 tests per day, whichever is greater.

B. After completion of the bottom pier bulb, or at anytime during the process of constructing the pier, the energy source may be turned off, and bottom stabilization verification test may be performed. These tests shall be performed when a new soil formation is encountered, or at the beginning of a project to provide quantitative information on pier stabilization.

C. Bottom Stabilization Tests are performed by placing a reference bar over the cavity, marking the tamper shaft, applying energy to the tamper for an additional 15 seconds, and observing the downward deflection of the tamper shaft by observing the deflection of the mark on the tamper shaft.

D. Acceptable performance is indicated if the vertical movement of the shaft is less than 150% of the vertical movement measured for the modulus test pier.

E. If the measured vertical movement exceeds 150% of the value achieved during the modulus test, added energy is applied to re-densify the bulb. The procedure for measure is then repeated. If there is still movement greater than 150% of that achieved during the modulus test and greater than ½ inch, a lift of loose aggregate may be placed on top of the compacted aggregate, and the verification test may be performed on this next lift after it is densified. If there is excessive movement on this lift, another lift may be placed and tested. Movement must be limited to below 150% of the values achieved for the modulus test before completion of 2/3 of the pier depth.

3.9 DYNAMIC CONE PETROMETER TEST

A. A calibrated dynamic cone penetration test (ASTM STP 399) shall be performed on representative aggregate pier elements, at least 1 test for each 25 aggregate pier installed.

B. The aggregate pier elements shall be tested by the Dynamic Cone Penetrometer method (ASTM STP 399) at locations within the upper 1/3 of the pier shaft length.

C. The minimum acceptable criteria as an indicator of acceptable densification shall be at least 15 blows per 1-3/4 inch penetration.

D. Dynamic Cone Penetrometer testing shall be performed in each aggregate pier until such time as five consecutive tests indicate that the minimum criterion is met. Thereafter, such tests need not be performed on every pier, provided that the aggregate used in the elements is representative of that previously tested. If average penetration resistances measured exceed 15 blows, and less than 10% of tests fall below 15 blows, then testing may be reduced to spot checks. A pattern of successful tests is sufficient to reduce testing to several tests per day.

E. Observation of questionable aggregate moisture content or questionable aggregate gradation appearance may determine the need for additional dynamic penetration testing to verify that the proper densification is being achieved.

F. Use of Dynamic Cone Penetrometer is not appropriate for use on open-graded aggregate such as No. 57 stone.

3.10 UTILITY EXCAVATIONS

A. The General Contractor shall coordinate all excavations made subsequent to aggregate pier installations so that at least five feet of horizontal distance remains between the edge of any installed aggregate pier and the excavation.

END OF SECTION

TEMPERATURE CONTROL SYMBOLS

- ADR AIR DATA ROUTER
- AF AIRFLOW MONITOR
- AVERAGING SENSOR
- CO2 CARBON DIOXIDE SENSOR
- COIL (COOLING)
- COIL (HEATING)
- CONTROL POINT
- CT CURRENT TRANSDUCER
- DAMPER MOTOR ACTUATOR IDENTIFICATION
- DP DIFFERENTIAL PRESSURE SWITCH
- DS DUCT SMOKE DETECTOR
- ES END SWITCH
- EQUIPMENT IDENTIFICATION
- FS FLOW SWITCH
- H HUMIDITY SENSOR
- IN-LINE DEVICE
- R INTERFACE RELAY
- LIGHT (PILOT OR ANNUNCIATOR)
- LIGHT WITH AUDIO ANNUNCIATION
- LL LOW LIMIT FREEZESTAT
- MOTOR STARTER
- MOTOR STARTER WITH CURRENT SENSING RELAY
- POINT SENSOR
- PUMP
- RM REFRIGERANT MONITOR
- S SOLENOID VALVE ACTUATOR
- SP STATIC PRESSURE SENSOR
- S AIR SAMPLING POINT
- PS PRESSURE SENSOR
- OS OCCUPANCY SENSOR
- SWITCH
- SWITCH WITH GUARDED COVER
- SWITCH WITH PILOT LIGHT
- TT TEMPERATURE TRANSMITTER
- TT TEMPERATURE TRANSMITTER WITH SUN SHIELD
- THERMOWELL
- VH VALVE MOTOR ACTUATOR IDENTIFICATION
- WM WATERFLOW METER
- 2-WAY MODULATING VALVE
- 3-WAY MODULATING VALVE
- 2-OR 3-WAY MODULATING VALVE (SEE PLANS OR DETAILS FOR REQUIREMENTS)

TEMPERATURE CONTROL ABBREVIATIONS

AF AIR FLOW
AI ANALOG INPUT
AO ANALOG OUTPUT
C COMMON
CIRC CIRCULATION
CWR CHILLED WATER RETURN
CWS CHILLED WATER SUPPLY
DDC DIRECT DIGITAL CONTROL
DI DIGITAL INPUT
DO DIGITAL OUTPUT
EA EXHAUST AIR
EF EXHAUST FAN
EMCS ENERGY MANAGEMENT & CONTROL SYSTEM
EXH EXHAUST
HWR HOT WATER RETURN
HWS HOT WATER SUPPLY
MBC MODULAR BUILDING CONTROLLER
MEC MODULAR EQUIPMENT CONTROLLER
OSA OUTSIDE AIR
RA RETURN AIR
RF RETURN FAN
RLF RELIEF FAN
SA SUPPLY AIR
SCU STANDALONE CONTROL UNIT
SF SUPPLY FAN
TEC TERMINAL CONTROL UNIT
UC UNITARY CONTROLLER
VFD VARIABLE FREQUENCY DRIVE
WF WATER FLOW

DRAINS SCHEDULE

#	MFR	MODEL #	BODY TYPE	BODY STYLE	BODY MATERIAL	STRAINER STYLE	STRAINER MATERIAL	VARIATIONS	GRATE MODEL	GRATE LOAD CLASS	NOTES
FD-1	JAY R. SMITH	2005Y-B-P050-U-NB	AREA DRAIN	-	CAST IRON	SQUARE	NICKEL BRONZE	-	-	-	(1) (2) (3)
FD-2	JAY R. SMITH	3510Y-F10-P05-NB	COMBO FUNNEL AREA DRAIN	-	CAST IRON	INTEGRAL FUNNEL	NICKEL BRONZE STRAINER AND FUNNEL	-	-	-	(1) (2) (3)
FS-1	JAY R. SMITH	3150Y-14	FLOOR SINK	-	ENAMELED CAST IRON	GRATE WITH 2-1/2" HOLE	NICKEL BRONZE	-	-	-	WITH DOMED BOTTOM STRAINER (3)
FS-2	JAY R. SMITH	3151Y-19	FLOOR SINK	-	ENAMELED CAST IRON	FULL HINGED GRATE WITH SEDIMENT BUCKET	NICKEL BRONZE	-	-	-	(3) (4)
FS-3	JAY R. SMITH	(1) 3160Y-13	FLOOR SINK	-	ENAMELED CAST IRON	(1) 3/4 GRATE	NICKEL BRONZE	-	-	-	(3) (11)
RD-1	JAY R. SMITH	1010Y-E-C-R-"L"-CID	ROOF DRAIN	-	CAST IRON	DOME	CAST IRON	EXTENSION	-	-	(10) -
RD-2	JAY R. SMITH	1080Y-E-C-R-"L"-CID	OVERFLOW ROOF DRAIN	-	CAST IRON	DOME	CAST IRON	EXTENSION	-	-	(10) WITH 2" HIGH WATER DAM
RD-3	JAY R. SMITH	1310Y-CID	ROOF DRAIN	-	CAST IRON	LOW PROFILE	CAST IRON	-	-	-	(10) -
RD-4	JAY R. SMITH	1310Y-WD-CID	OVERFLOW ROOF DRAIN	-	CAST IRON	LOW PROFILE	CAST IRON	-	-	-	(10) WITH 2" HIGH WATER DAM
TD-1	POLYDRAIN	510	PRE-CAST TRENCH DRAIN	-	POLYMER CONCRETE	SLOTTED	GALVANIZED STEEL	-	2412	LOAD CLASS "C"	(1)(3)(5)(6)(7)(8)(9)
DSN-1	JAY R. SMITH	1770Y-BS-FIG. 2646Y-NB	DOWNSPOUT NOZZLE	-	NICKEL BRONZE NO-HUB CONNECTION	-	BIRD SCREEN	-	-	-	(10)

NOTES:

1. PROVIDE WITH VANDAL-PROOF SCREWS
2. PROVIDE WITH TRAP PRIMER CONNECTION
3. EQUIPMENT PROVIDED AND INSTALLED UNDER DPW BID PACKAGE UNLESS OTHERWISE NOTED TO BE BLOCKED OUT FOR ON PLANS AND SCHEDULES
4. 8" DEEP WITH SEDIMENT BUCKET WITH FORMED IN PLACE 50x50 STAINLESS STEEL WIRE MESH FORMED TO BOTTOM OF FLOOR SINK UNDER SEDIMENT BUCKET, TIGHT TO SIDES OF FLOOR SINK
5. HEAVY DUTY GALVANIZED STEEL GRATE
6. PROVIDE SEDIMENT BUCKET WITH CATCH BASIN FOR REMOVAL OF DEBRIS
7. SEE FLOOR PLANS FOR LOCATION AND FOR TRENCH DRAIN DETAIL, SEE 4/M5.02-DPW
8. PROVIDE WITH CONCRETE ANCHORS, GRATE ANCHORS, AND ADDITIONAL ACCESSORIES REQUIRED PER MANUFACTURER'S RECOMMENDATIONS
9. PROVIDE WITH LARGE CATCH BASIN POLY DRAIN MODEL #2611
10. EQUIPMENT FOR REFERENCE ONLY. PROVIDE WALL, ROOF, AND FLOOR BLOCKOUTS PER MANUFACTURER'S SIZES FOR THE SCHEDULED EQUIPMENT.
11. 10" DEEP FLOOR SINK

HOSE BIBB SCHEDULE

#	MANUFACTURER	MODEL #	SIZE	NOTES
FPWH-1	WOODFORD	MB65 C	3/4"	PROVIDE WITH INTEGRAL VACUUM BREAKER & LOOSE "T" KEY LOCK, STAINLESS STEEL DOOR AND FACIA (1)

NOTES:

1. EQUIPMENT PROVIDED AND INSTALLED UNDER DPW BID PACKAGE UNLESS OTHERWISE NOTED TO BE BLOCKED OUT FOR ON PLANS AND SCHEDULES

FINNED TUBE RADIATION

MFR: JAGA

#	MODEL	GPM	WATER TEMP DROP	CASING LENGTH (")	CASING WIDTH (")	CASING DEPTH (")	MBH RATING	NOTES
FT-1.1	MINI CANAL	3.10	10	138	16.5"	7.5	15.5	(1)
FT-1.2	MINI CANAL	4.46	10	193	16.5"	7.5	22.3	(1)
FT-1.3	MINI CANAL	4.46	10	193	16.5"	7.5	22.3	(1)
FT-1.4	MINI CANAL	1.46	10	122	10.5"	7.5	7.3	(1)
FT-1.5	MINI CANAL	1.46	10	122	10.5"	7.5	7.3	(1)

NOTES:

1. EQUIPMENT FOR REFERENCE ONLY. PROVIDE BLOCK OUTS IN SLAB PER MANUFACTURER'S SIZES FOR THE SCHEDULED EQUIPMENT

PLUMBING/PIPING LEGEND

- DOMESTIC COLD WATER
- DOMESTIC HOT WATER
- DOMESTIC RECIRCULATED WATER
- DSP DRY STAND PIPE
- F FIRE
- FDC FIRE DEPARTMENT CONNECTION PIPE
- IW INDIRECT WASTE (ABOVE FLOOR)
- G NATURAL GAS (7" WC, UNLESS OTHERWISE NOTED)
- ODL OVERFLOW DRAIN LINE
- RDL ROOF DRAIN LINE
- SD STORM DRAIN
- SHR SOLAR HEATING RETURN
- SHS SOLAR HEATING SUPPLY
- SS SANITARY SEWER
- VENT
- WASTE
- VENT (BELOW GRADE)
- WASTE (BELOW GRADE)

HYDRONIC PIPING LEGEND

- CWR CHILLED WATER RETURN
- CWS CHILLED WATER SUPPLY
- CD CONDENSATE DRAIN
- CDR CONDENSER RETURN
- CDS CONDENSER SUPPLY
- HR HEAT PUMP RETURN
- HS HEAT PUMP SUPPLY
- HWR HOT WATER RETURN
- HWS HOT WATER SUPPLY
- PC PUMPED CONDENSATE
- PCWS PROCESS CHILLED WATER SUPPLY
- PCWR PROCESS CHILLED WATER RETURN
- SMR SNOW MELT RETURN
- SMS SNOW MELT SUPPLY

STEAM PIPING LEGEND

- HPS HIGH PRESSURE STEAM
- HPC HIGH PRESSURE STEAM CONDENSATE
- LPS LOW PRESSURE STEAM
- LPC LOW PRESSURE STEAM CONDENSATE
- MPS MEDIUM PRESSURE STEAM
- MPC MEDIUM PRESSURE STEAM CONDENSATE
- STM STEAM

LAB AND MEDICAL PIPING LEGEND

- PWS PURE WATER SUPPLY
- PWR PURE WATER RETURN
- NPCW NON-POTABLE COLD WATER
- NPHW NON-POTABLE HOT WATER
- NPHWR NON-POTABLE HOT WATER RETURN
- CO2 CARBON DIOXIDE
- DI DEIONIZED WATER
- DW DISTILLED WATER
- MA MEDICAL AIR
- N2 NITROGEN
- N2O NITROUS OXIDE
- O2 OXYGEN
- RO REVERSE OSMOSIS
- VAC VACUUM
- LV LAB VENT
- LW LAB WASTE

INDUSTRIAL PIPING LEGEND

- ACT ACETYLN
- A AIR
- ARG ARGON
- HE HELIUM
- H HYDROGEN
- TM TRI-MIX

FUEL PIPING LEGEND

- DF DIESEL FUEL
- FFP FUEL FILL PIPE
- FOF FUEL OIL FILL
- FOR FUEL OIL RETURN
- FOS FUEL OIL SUPPLY
- FV FUEL VENT
- GF GASOLINE FUEL
- LP FILL LIQUID PROPANE FILL
- LPG LIQUID PROPANE GAS
- VRP STAGE ONE VAPOR RECOVERY PIPE

MISCELLANEOUS PIPING LEGEND

- AR ACID RESISTANT VENT
- AR ACID RESISTANT WASTE
- GW GREASE WASTE
- RR REFRIGERANT PIPING RETURN
- RS REFRIGERANT PIPING SUPPLY
- SCW SOFT COLD WATER
- SHW SOFT HOT WATER
- (DEG F) TEMPERED WATER AT TEMPERATURE INDICATED
- BW BLENDED WATER

PLUMBING/PIPING SYMBOLS

- BALL VALVE
- BUTTERFLY VALVE
- ANGLE VALVE
- CAP
- CHECK VALVE
- CIRCUIT SETTER
- CIRCULATING PUMP
- CLEAN-OUT (BELOW FLOOR OR GRADE)
- CLEAN-OUT (FLUSH TO FLOOR OR GRADE)
- CROSS
- REDUCER
- ELBOW
- ELBOW DOWN
- ELBOW UP
- EXPANSION JOINT
- FIRE DEPARTMENT CONNECTION
- FLEXIBLE CONNECTION
- FLOOR DRAIN (ROUND OR SQUARE)
- FLOOR SINK
- FLOW DIRECTION
- FLOW DIRECTION AND SLOPE
- FLOW SWITCH
- GAS VALVE
- GLOBE VALVE
- HOSE BIBB/WALL HYDRANT
- MANHOLE/DRYWELL
- PENETRATION (FLOOR OR WALL)
- PIPE ANCHOR
- PIPE CONTINUES ALTHOUGH NOT DRAWN
- PIPE GUIDE
- PIPE SLEEVE
- PRESSURE GAUGE
- PRESSURE AND TEMPERATURE RELIEF VALVE
- GAS & WATER PRESSURE REDUCING VALVE (POINTS TOWARDS LOW PRESSURE)
- ROOF DRAIN
- SANITARY CROSS
- SANITARY ELBOW
- SANITARY TEE
- SANITARY TEE IN RISER
- SOLENOID VALVE
- TEE
- TEE DOWN
- TEE DOWN TO ELBOW
- TEE UP
- TEE UP TO ELBOW
- TEE UP TO RISE
- UNION/COUPLING
- VALVE IN RISER
- VALVE WITH TAMPER SWITCH
- VENT THRU ROOF
- WATER HAMMER ARRESTER
- WYE

HYDRONIC PIPING SYMBOLS

- 2-WAY CONTROL VALVE
- 3-WAY MODULATING CONTROL VALVE
- AIR SEPARATOR
- AUTOMATIC AIR VENT
- ELECTRO-PNEUMATIC CONTROL VALVE
- GAUGE COCK
- MANUAL AIR VENT
- MOTOR OPERATED VALVE
- P-TRAP
- PRESSURE INDEPENDENT BALANCING VALVE
- PRESSURE SWITCH
- SIGHT GLASS
- STRAIGHT THRU MODULATING CONTROL VALVE
- STRAINER
- THERMOMETER
- THERMOWELL
- VENTURI

MISCELLANEOUS PLUMBING SYMBOLS

- ANGLE STOP/CHECK VALVE
- AUTOMATIC BALL DRIP
- BALL VALVE
- BLOW DOWN VALVE
- BUTTERFLY VALVE
- CONNECTION POINT
- DIAPHRAGM VALVE
- DOWNSPOUT NOZZLE
- GATE VALVE
- NRS GATE VALVE, NON-RISING STEM
- KNIFE GATE VALVE
- PLUG VALVE
- SERRATED COCK (COUNTER-TOP MOUNTED)
- SERRATED COCK (WALL MOUNTED)
- SHOWER HEAD
- STOP/CHECK VALVE
- # TRAP SET (AS SPECIFIED) # INDICATES TRAP TYPE
- THRUST RESTRAINT

PLUMBING ABBREVIATIONS

CI CAST IRON
CO CLEAN-OUT
COIW CLEAN-OUT IN WALL
COTF CLEAN-OUT TO FLOOR
COTG CLEAN-OUT TO GRADE
FD FLOOR DRAIN
FRWH FREEZE RESISTANT WALL HYDRANT
FS FLOOR SINK
GPM GALLONS PER MINUTE
GTV GAS TANK VENT
IE INVERT ELEVATION
IW INDIRECT WASTE
PRV PRESSURE REDUCING VALVE
PSI POUNDS PER SQUARE INCH
PSF POUNDS PER SQUARE FOOT
RD ROOF DRAIN
RPBP REDUCED PRESSURE BACKFLOW PREVENTER
SV SUMP VENT
VTR VENT THRU ROOF
WC WATER COLUMN
WHA WATER HAMMER ARRESTER

ANNOTATION

P# FIXTURE ITEM NUMBER (P1)
#"FD-# FLOOR DRAIN SIZE AND TYPE (2"FD-1)
#"FS-# FLOOR SINK SIZE AND TYPE (2"FS-1)
#"RD-# ROOF DRAIN SIZE AND TYPE (2"RD-1)

SYMBOLS & ABBREVIATIONS

GENERAL SYMBOLS

- # KEY NOTE
- EQ-# EQUIPMENT IDENTIFIER
- DETAIL NUMBER / DETAIL REFERENCE / SHEET NUMBER
- DETAIL NUMBER / DETAIL REFERENCE / MATCHED SHEET NUMBER / CURRENT SHEET NUMBER
- MATCH LINE REFERENCE / SH# MATCHED SHEET NUMBER
- ROOM NAME ROOM NUMBER
- CONNECTION TO EXISTING (#" INDICATES EXISTING SIZE)
- REVISION NUMBER
- SECTION NUMBER
- SECTION REFERENCE
- SHEET NUMBER
- NORTH ARROW
- CENTER LINE

NOTE:
SYMBOLS AND ABBREVIATIONS ON THE DRAWINGS SHALL BE INTERPRETED IN ACCORDANCE WITH THE LEGENDS WHEREVER APPLICABLE. NOT ALL SYMBOLS AND ABBREVIATIONS IN THE LEGENDS ARE NECESSARILY USED FOR THE PROJECT. ALL SIZES ARE IN INCHES, UNLESS OTHERWISE NOTED.

LINEWEIGHT LEGEND

- NEW WORK
- EXISTING TO REMAIN OR NOT IN CONTRACT
- DEMOLITION
- FUTURE WORK

ABBREVIATIONS

ABV ABOVE
AFF ABOVE FINISH FLOOR
AFG ABOVE FINISH GRADE
AL ALUMINUM
AR AS REQUIRED
ATS AUTOMATIC TRANSFER SWITCH
BLDG BUILDING
BP1 BID PACK 1 (DPW FOUNDATION ROUGH-IN)
BP2 BID PACK 2 (MAIN BUILDING PACKAGE)
C CONDUIT
CCT CIRCUIT
CFCI CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CKT CIRCUIT
CLG CEILING
CP CHROME PLATED
CO CONDUIT ONLY WITH 1/4" POLYPROPYLENE PULL ROPE
CT CURRENT TRANSFORMER
CU COPPER
DIA DIAMETER
DISC DISCONNECT
DIST DISTRIBUTION
DIV DIVISION
DWG DRAWING
DX DUPLEX
EA EACH
EM EMERGENCY
FLR FLOOR, OR FLOOR MOUNTED
FT FEET
G GROUND
GA GAUGE
GFCI GROUND FAULT CIRCUIT INTERRUPTER
GFI GROUND FAULT INTERRUPTER
GND GROUND
H HIGH
HT HEIGHT
IG ISOLATED GROUND
IN INCHES
L LONG
LSI INDICATES A BREAKER WITH FULLY ADJUSTABLE ELECTRONIC TRIP CHARACTERISTICS
MAX MAXIMUM
MFR MANUFACTURER
MIN MINIMUM
MMS MANUAL MOTOR STARTER
MNT MOUNT(ED)
N NEUTRAL
N.C. NORMALLY CLOSED
NIC NOT IN CONTRACT
NL NIGHT LIGHT
N.O. NORMALLY OPEN
NORM NORMAL
OFOI OWNER FURNISHED, OWNER INSTALLED
PNL PANEL
QIG QUAD ISOLATED GROUND
REQ'D REQUIRED
RM ROOM
SIM SIMILAR
SPD SURGE PROTECTION DEVICE
SPST SINGLE POLE / SINGLE THROW SWITCH
SS STAINLESS STEEL
SW SWITCH
TVSS TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP TYPICAL
W WIDE
W/ WITH
W/IN WITHIN
W/O WITHOUT
WP WEATHERPROOF, RECEPTACLES TO BE GFCI
XFMR TRANSFORMER
Ø DIAMETER
(E) EXISTING TO REMAIN
(N) NEW

ANNOTATION

+XX" MOUNTING HEIGHT (AFF OR AFG)
(N)x"C-a#b+c#d n = QUANTITY OF CONDUIT
x = SIZE OF CONDUIT
a = QUANTITY OF CONDUCTORS
b = CONDUCTOR WIRE SIZE
c = QUANTITY OF GROUND
d = GROUND WIRE SIZE

HVAC SYMBOLS

- RECTANGULAR SUPPLY DUCT (SECTION)
- RECTANGULAR RETURN DUCT (SECTION)
- RECTANGULAR EXHAUST DUCT (SECTION)
- RECTANGULAR OSA DUCT (SECTION)
- ROUND SUPPLY DUCT (SECTION)
- ROUND RETURN DUCT (SECTION)
- ROUND EXHAUST DUCT (SECTION)
- ROUND OSA DUCT (SECTION)
- DUCTWORK WITH INTERNAL LINING
- ALUMINUM/STAINLESS STEEL DUCTWORK (AS SPECIFIED)
- AIR TRANSFER DUCT SLEEVE
- FLEXIBLE DUCT
- UP DN DUCT OFFSET AND DIRECTION
- ROUND MITERED ELL W/ TURNING VANES
- TURNING VANES
- AIR SPLIT TAKEOFF
- SINGLE BLADE VOLUME DAMPER
- OPPOSED BLADE VOLUME DAMPER
- FIRE/SMOKE DAMPER
- 12"x12" RECTANGULAR DUCT SIZE (WIDTHxDEPTH)
- 12"ø CIRCULAR DUCT DIAMETER
- ?12"/12 FLAT OVAL DUCT SIZE
- Size / Flow GRILLE/REGISTER/DIFFUSER INFORMATION: AIR FLOW RATE (CFM), GRD TYPE, SIZE
- T THERMOSTAT
- SUPPLY AIR FLOW
- RETURN AIR FLOW
- FIRE/SMOKE DAMPER TYPE
- SECURITY GRILLE TYPE
- DAMPER MOTOR OPERATOR
- ATTENUATOR
- TERMINAL BOX, HEAT PUMP, OR FAN COIL UNIT
- DUCT SECURITY GRILLE
- RECTANGULAR SUPPLY DIFFUSER (ARROWS INDICATE THROW)
- RECTANGULAR RETURN REGISTER/GRILLE
- RECTANGULAR EXHAUST REGISTER/GRILLE/HOOD
- LINEAR DIFFUSER (ARROWS INDICATE THROW)
- CIRCULAR DIFFUSER (ARROWS INDICATE THROW)
- SIDEWALL DIFFUSER (ARROWS INDICATE THROW)
- LOUVER (ARROWS INDICATE THROW)
- UNIT HEATER
- CHILLED BEAM

MECHANICAL ABBREVIATIONS

AH AIR HANDLING UNIT
AS AIR SEPARATOR
AT ATTENUATOR
BLR BOILER
CFM CUBIC FEET PER MINUTE
CIRC CIRCULATION
CRP CONDENSATE RETURN PUMP
CWP CHILLED WATER PUMP
DCW DOMESTIC COLD WATER
DHW DOMESTIC HOT WATER
DHWR DOMESTIC HOT WATER RETURN
EF EXHAUST FAN
ET EXPANSION TANK
EXH EXHAUST
FC FAN COIL UNIT
FEV FUMEHOOD EXHAUST VALVE
FPM FEET PER MINUTE
GEV GENERAL EXHAUST VALVE
GEX GENERAL EXHAUST TERMINAL UNIT
GF GLYCOL FEEDER
GRD GRILL/REGISTER/DIFFUSER
HWP HEATING WATER PUMP
OBVD OPPOSED BLADE VOLUME DAMPER
OSA OUTSIDE AIR
PRV PRESSURE REDUCING VALVE
PSI POUNDS PER SQUARE INCH
RA RETURN AIR
RC ROOF COWL
SAF SUPPLY AIR VALVE
SC STEAM CONVERTOR
SP STATIC PRESSURE
ST STORAGE TANK
UH UNIT HEATER
VEL VELOCITY
WH WATER HEATER

ANNOTATION

AH-# AIR HANDLING UNIT NUMBER (AH-1)
AS-# AIR SEPARATOR (AS-1)
AT-# ATTENUATOR NUMBER (AT-1)
BLR-# BOILER NUMBER (BLR-1)
CU-# CONDENSER UNIT NUMBER (CU-1)
EF-# EXHAUST FAN NUMBER (EF-1)
ET-# EXPANSION TANK NUMBER (ET-1)
FC-# FAN COIL UNIT (FC-1)
FEV-# FUMEHOOD EXHAUST VALVE (FEV-1)
GEV-# GENERAL EXHAUST VALVE (GEV-1)
GEX-# GENERAL EXAHUST TERMINAL UNIT (GEX-1)
GF-# GLYCOL FEEDER (GF-1)
L-# LOUVER NUMBER (L-1)
RC-# ROOF COWL NUMBER (RC-1)
SAV-# SUPPLY AIR VALVE (SAV-1)
SC-# STEAM CONVERTOR (SC-1)
ST-# STORAGE TANK (ST-1)
UH-# UNIT HEATER NUMBER (UH-1)
WH-# WATER HEATER (WH-1)

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DWG.
LEGENDS, ABBREVIATIONS, & SCHEDULES - MECHANICAL

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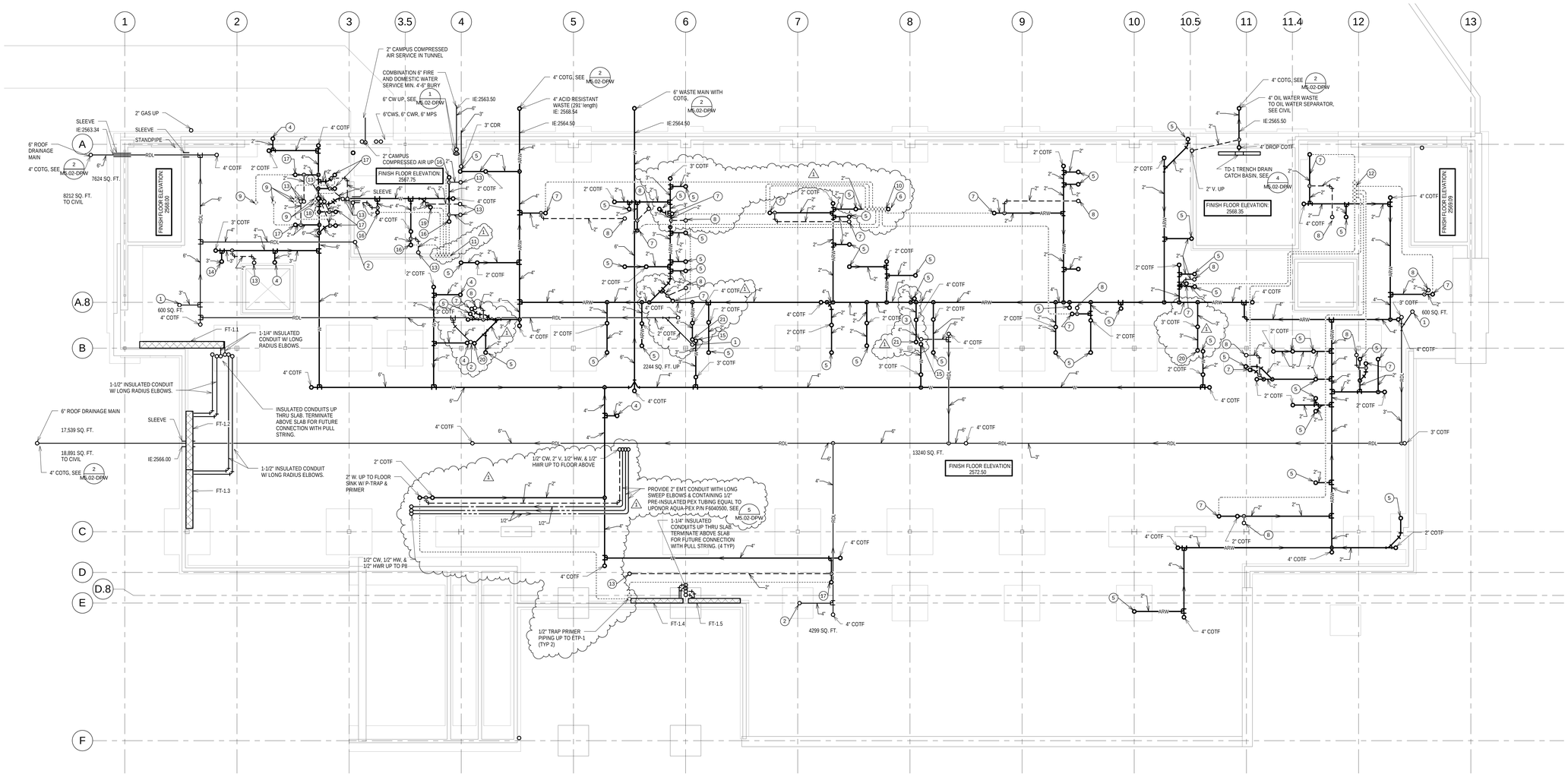

FOUNDATION PLAN - MECHANICAL

1/8" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR SHALL STUB OUT ALL PIPING EXTENDING ABOVE AND BEYOND ALL CONCRETE WORK BEING PROVIDED FOR UNDER BID PACKAGE ONE A MINIMUM OF 12" WITH WATER TIGHT CAPPING. STUB OUTS SHALL PROVIDE FOR FUTURE EXTENSION UNDER BID PACKAGE TWO IN THE FUTURE.

KEY NOTES:

1. 3" RDL UP
2. 4" RDL UP
3. 6" RDL UP
4. 2" WASTE UP
5. 2" ARW UP
6. 2" ARW UP WITH 2" COIW AT +24" AFF
7. 2" ARW UP TO FLOOR SINK OR FLOOR DRAIN W/ P-TRAP & PRIMER CONNECTION
8. 2" ARV UP
9. 1/2" TRAP PRIMER PIPING UP TO FLUSH VALVE PRIMER (TYP 5)
10. 1/2" TRAP PRIMER PIPING TO ETP-1. (TYP 7)
11. 1/2" TRAP PRIMER PIPING UP TO ETP-1 (TYP 5)
12. 1/2" TRAP PRIMER PIPING UP TO ETP-1 (TYP 8)
13. 2" VENT UP
14. 3" WASTE UP TO SERVICE SINK WITH P-TRAP, NO PRIMER CONNECTION
15. 3" WASTE UP
16. 4" WASTE UP TO 4" FLOOR DRAIN WITH P-TRAP & PRIMER CONNECTION
17. 2" WASTE UP TO 2" FLOOR DRAIN WITH P-TRAP & PRIMER CONNECTION
18. 6" WASTE STACK UP
19. 6" WASTE UP TO 6" FLOOR SINK W/ P-TRAP & PRIMER CONNECTION
20. 3" ARW UP
21. 4" ARW UP

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FOUNDATION PLAN - MECHANICAL

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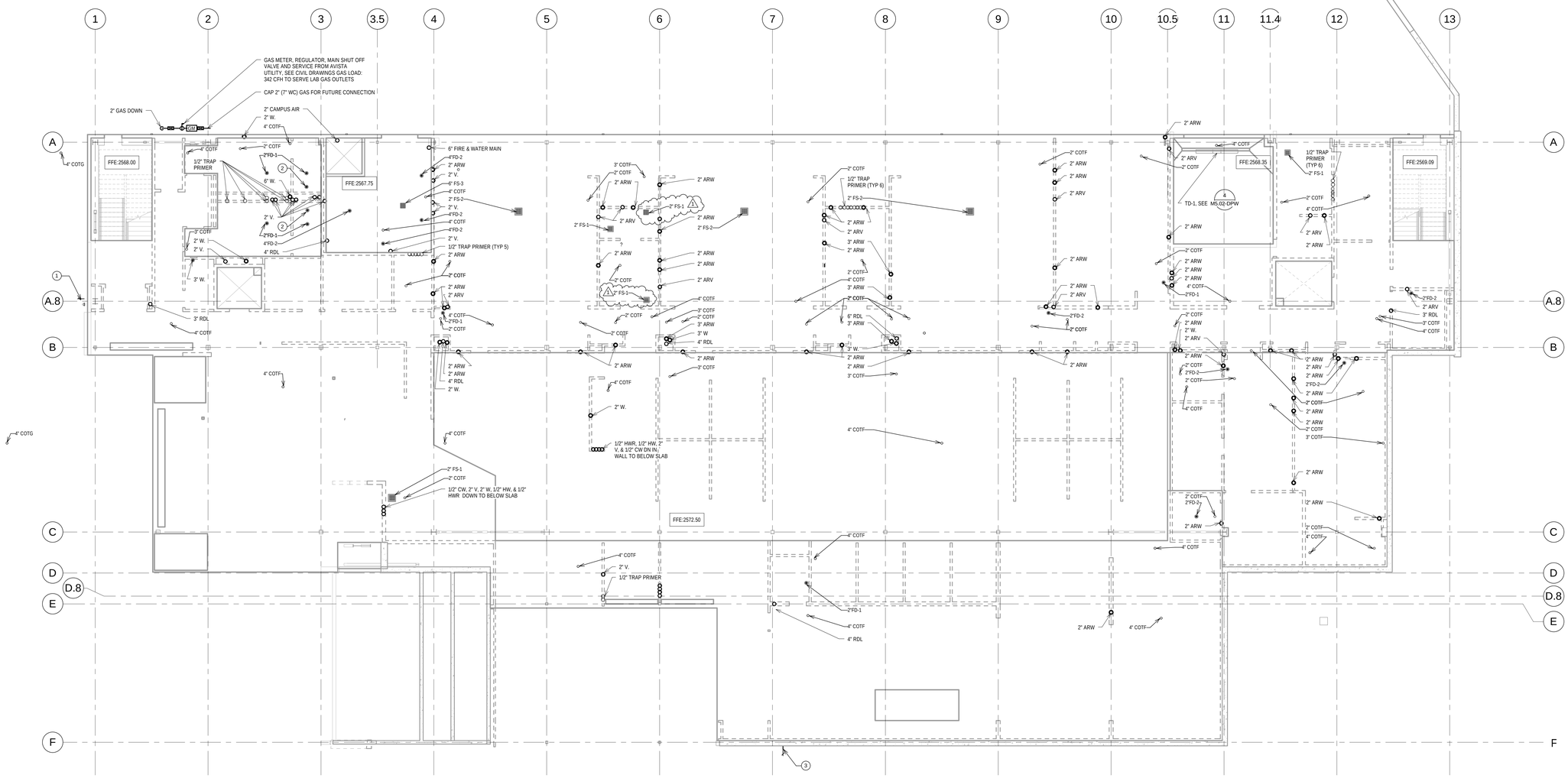

LEVEL 1 FLOOR PLAN - MECHANICAL

1/8" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR SHALL STUB OUT ALL PIPING EXTENDING ABOVE AND BEYOND ALL CONCRETE WORK BEING PROVIDED FOR UNDER BID PACKAGE ONE A MINIMUM OF 12" WITH WATER TIGHT CAPPING. STUB OUTS SHALL PROVIDE FOR FUTURE EXTENSION UNDER BID PACKAGE TWO IN THE FUTURE..

(#) KEY NOTES:

1. BLOCK OUT FOR 3/4" FPWH-1 AND 3" DOWNSPOUT NOZZLE AT +24" AFF
2. 2" SHOWER DRAIN EQUAL TO 2"FD-1.
3. BLOCK OUT FOR 3/4" FPWH-1 AND 4" DOWNSPOUT NOZZLE AT +24" AFG

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FIRST FLOOR PLAN - MECHANICAL

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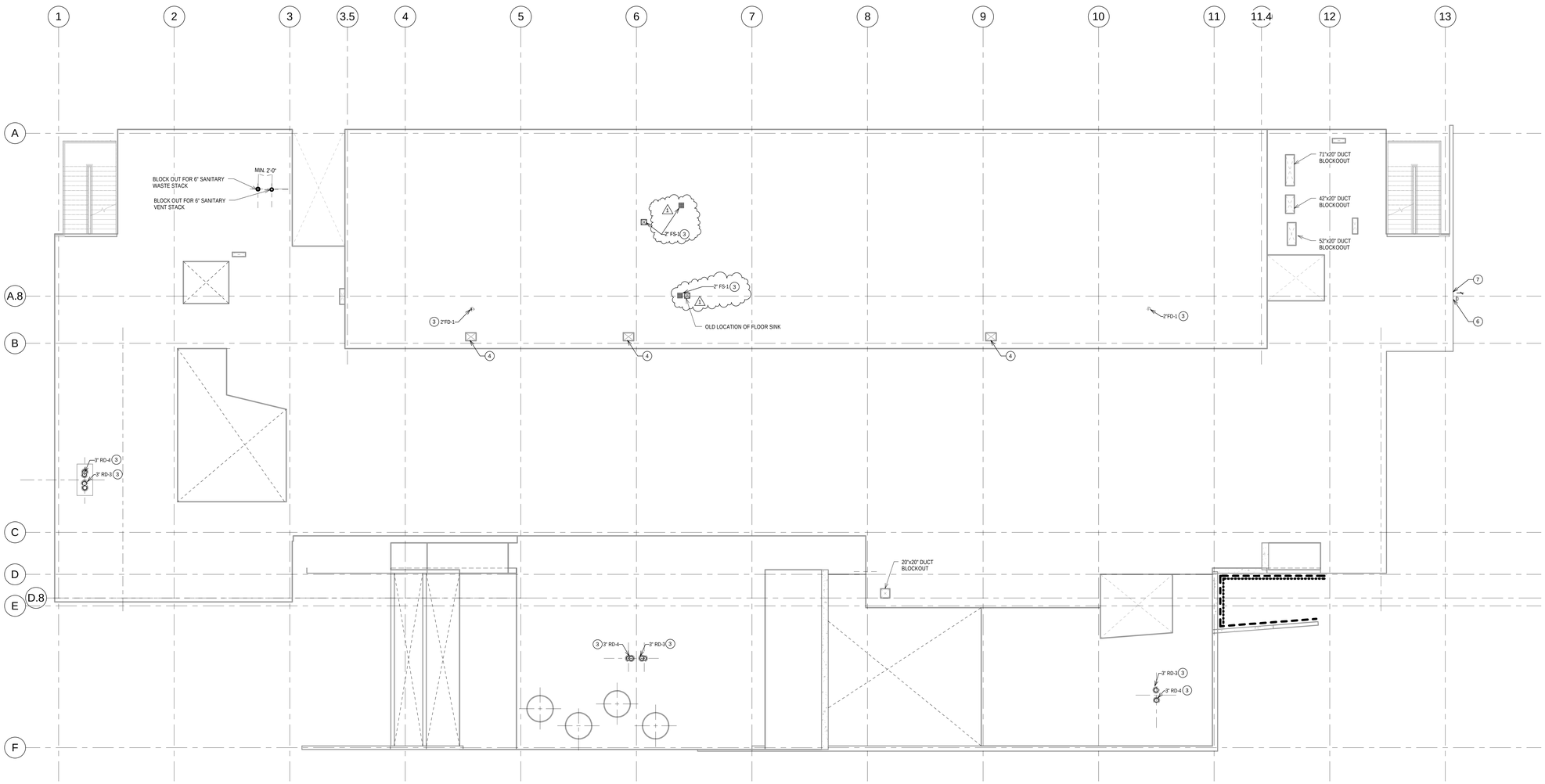

LEVEL 2 FLOOR PLAN - MECHANICAL

1/8" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR SHALL STUB OUT ALL PIPING EXTENDING ABOVE AND BEYOND ALL CONCRETE WORK BEING PROVIDED FOR UNDER BID PACKAGE ONE A MINIMUM OF 12" WITH WATER TIGHT CAPPING. STUB OUTS SHALL PROVIDE FOR FUTURE EXTENSION UNDER BID PACKAGE TWO IN THE FUTURE..

(#) KEY NOTES:

1. NOT USED
2. NOT USED
3. BLOCK OUT FOR INDICATED DRAIN
4. BLOCK OUT FOR CHASE, SEE STRUCTURAL
5. BLOCK OUT FOR 3/4" FPWH-1 AT +24" AFF
6. BLOCK OUT FOR 6" OOL ROOF DRAIN AND OUTSIDE DOWNSPOUT NOZZLE
7. BLOCK OUT FLOR 3/4" FPWH-1 AT +24" AFG

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SECOND FLOOR PLAN - MECHANICAL

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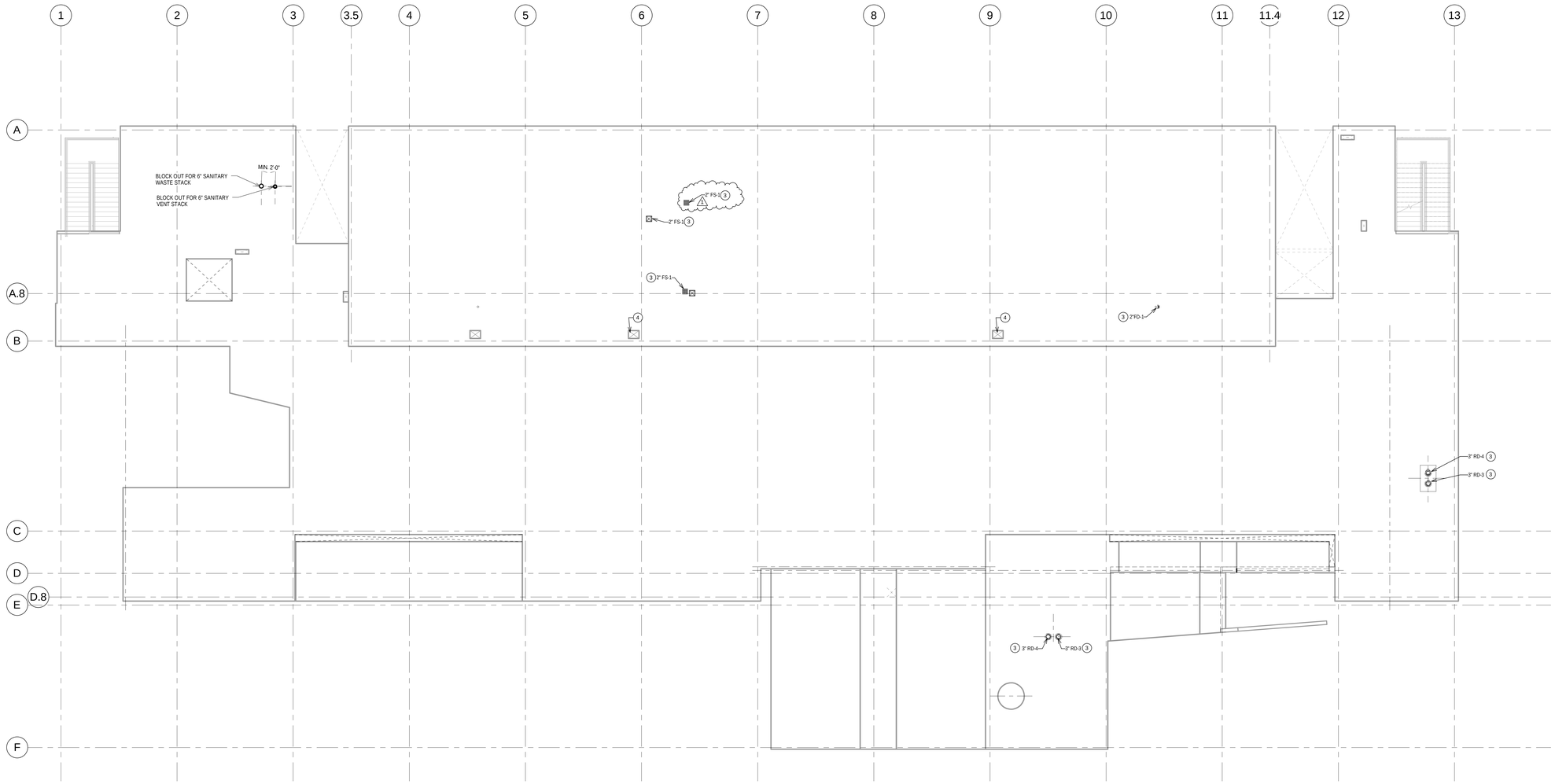

1 LEVEL 3 FLOOR PLAN - MECHANICAL

1/8" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR SHALL STUB OUT ALL PIPING EXTENDING ABOVE AND BEYOND ALL CONCRETE WORK BEING PROVIDED FOR UNDER BID PACKAGE ONE A MINIMUM OF 12" WITH WATER TIGHT CAPPING. STUB OUTS SHALL PROVIDE FOR FUTURE EXTENSION UNDER BID PACKAGE TWO IN THE FUTURE.

(#) KEY NOTES:

1. NOT USED
2. NOT USED
3. BLOCK OUT FOR INDICATED DRAIN
4. BLOCK OUT FOR CHASE. SEE STRUCTURAL

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THIRD FLOOR PLAN - MECHANICAL

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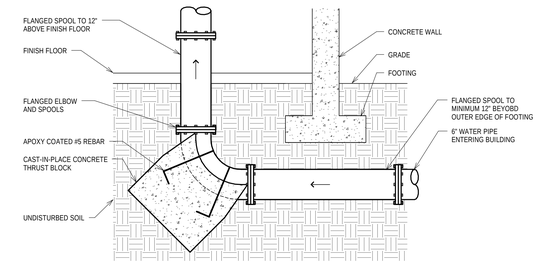
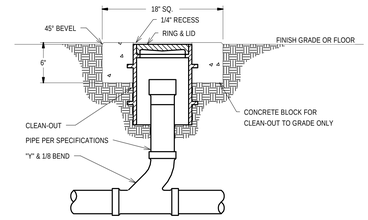


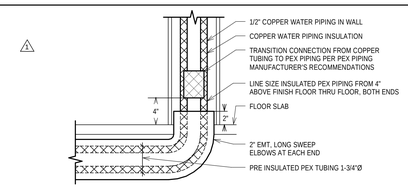
1 BEND THRUST BLOCK
N.T.S.



NOTES:

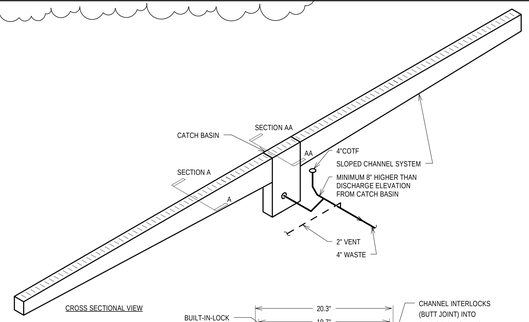
1. CLEAN-OUT SHALL BE LINE SIZE UP TO 4" & 4" ON LINES LARGER THAN 4".
2. CLEAN-OUT TO FLOOR IS SIMILAR. SEE SPECIFICATIONS FOR EXACT MODEL PER APPLICATION.
3. CONCRETE BLOCK REQUIRED IN FINISHED GRADES (GRASS, GRAVEL & PLANTING BEDS). CONCRETE BLOCK NOT REQUIRED IN ASPHALT OR CONCRETE FINISHED GRADES.

2 CLEANOUT TO GRADE OR FLOOR
N.T.S.

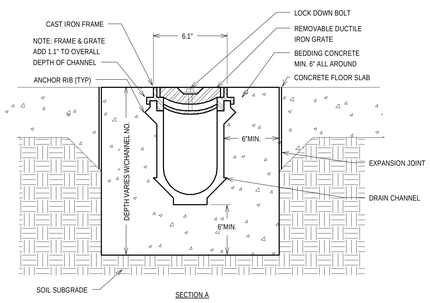


5 METAL CONDUIT WITH 1/2" PRE-INSULATED PEX PIPING DETAIL
N.T.S.

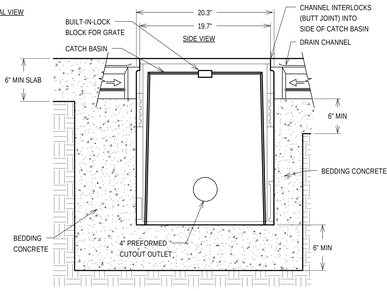
3 NOT USED
N.T.S.



CROSS SECTIONAL VIEW



SECTION A



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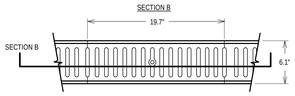
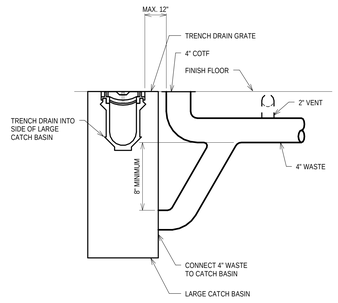


PLAN VIEW



SECTION AA

NOTES:

1. PROVIDE OPTIONAL CONCRETE ANCHORS.
2. PROVIDE EXPANSION JOINT WHEN REQUIRED BY MANUFACTURER

4 TRENCH DRAIN DETAIL
N.T.S.

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REVISIONS

MARK	DATE	DESCRIPTION
1	7-10-2014	Addendum #1

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DETAILS - MECHANICAL

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