State of Utah

GARY R. HERBERT
Governor

GREGORY S. BELL
Lt. Governor

Department of Administrative Services
KIMBERLY K. HOOD
Executive Director

Division of Facilities Construction and Management
RICH AMON
Interim Director

Addendum No. 3

Date: September 5, 2013

To: Contractors

From: Lynn Hinrichs - Project Manager

Reference: New Ogden Second District Juvenile Court
Administrative Office of the Courts – Ogden, Utah
DFCM Project No. 08284150

Subject: **Addendum No. 3**

Pages	Addendum Cover Sheet	1	page
	Revised Cost Proposal Form	2	pages
	Architect's Addendum No. 002	61	pages
	Total	64	pages

Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.

3.1 SCHEDULE CHANGES: There are no Project Schedule changes.

3.2 GENERAL ITEMS:

3.2.1 See attached Revised Cost Proposal Form incorporating Additive Alternate No. 2.

3.2.2 See attached Architect's Addendum No. 2 dated September 5, 2013.

COST PROPOSAL FORM – REVISED
PER ADDENDUM NO. 3 DATED SEPTEMBER 6, 2013

NAME OF PROPOSER _____ DATE _____

To the Division of Facilities Construction and Management
4110 State Office Building
Salt Lake City, Utah 84114

The undersigned, responsive to the "Notice to Contractors" and in accordance with the "Request for Proposals" for the **NEW OGDEN SECOND DISTRICT JUVENILE COURT – ADMINISTRATIVE OFFICE OF THE COURTS – OGDEN, UTAH – DFCM PROJECT NO. 08284150** and having examined the Contract Documents and the site of the proposed Work and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of labor, hereby proposes to furnish all labor, materials and supplies as required for the Work in accordance with the Contract Documents as specified and within the time set forth and at the price stated below. This price is to cover all expenses incurred in performing the Work required under the Contract Documents of which this bid is a part:

I/We acknowledge receipt of the following Addenda: _____

Base Bid: For all work shown on the Drawings and described in the Specifications and Contract Documents, I/we agree to perform for the sum of:

_____ DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

Additive Alternate No. 1: For all work shown on the Drawings and described in the Specifications and Contract Documents to finish 4th floor courtrooms, staff and holding space, I/we agree to perform for the sum of:

_____ DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

Additive Alternate No. 2: For all work shown on the Drawings and described in the Specifications (Division 6) and Contract Documents to provide certified wood throughout project per LEED Credit MR7, I/we agree to perform for the sum of:

_____ DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

I/We guarantee that the Work will be Substantially Complete by _____ ***(specific date to be provided by contractor),*** should I/we be the successful proposer, and agree to pay liquidated damages in the amount of **$500** per day for each day after expiration of the Contract Time as stated in Article 3 of the Contractor's Agreement.

This bid shall be good for 45 days after bid opening.

Enclosed is a 5% bid bond, as required, in the sum of _____

The undersigned Contractor's License Number for Utah is _____.

Upon receipt of notice of award of this bid, the undersigned agrees to execute the contract within ten (10) days, unless a shorter time is specified in the Contract Documents, and deliver acceptable Performance and Payment bonds in the prescribed form in the amount of 100% of the Contract Sum for faithful performance of the contract. The Bid Bond attached, in the amount not less than five percent (5%) of the above bid sum, shall become the property of the Division of Facilities Construction and Management as liquidated damages for delay and additional expense caused thereby in the event that the contract is not executed and/or acceptable l00% Performance and Payment bonds are not delivered within the time set forth.

Type of Organization: _____(Corporation, Partnership, Individual, etc.)

Any request and information related to Utah Preference Laws:

_____

Respectfully submitted,

_____
Name of Proposer

ADDRESS:

_____

_____

_____
Authorized Signature

Addendum 002

project:	Ogden Juvenile Courthouse	**project no:**	12500
date:	2013-09-05	**no. pages:**	61
owner:	Administrative Office of the Courts		
contractor:			

This Addendum shall be considered part of the Contract Documents and Project Manual for the above mentioned project as though it had been issued at the same time and shall be incorporated integrally therewith. Where provisions of the following supplementary data differ from those of the original Contract Documents and Project Manual, the Addendum shall govern and take precedence.

General:

Item	Description
2.1	It has come to our attention that the alternate numbers are not consistent. Throughout the specifications and drawings, the 4th floor build-out shall be Alternate No. 1 and the certified wood shall be Alternate No. 2. See the G001 for alternate descriptions.
2.2	All bidders of GFRC panels must meet the PCI certification requirements listed in specification section 03 4910
2.3	Throughout the drawings, the closed cell polyurethane spray foam specified in section 07 2100 is to be applied at a minimum 2" thickness with a minimum R value of R13. Please disregard references to R20 minimum noted in several details.
2.4	Within this addendum, the Composite Metal Wall Panels have been changed to a route and return rainscreen system in lieu of the originally specified exposed fastener system. Not all details showing ACM panel have been reissued. Further dimensional clarifications will follow after contractor selection is complete.
2.5	See the attached 30 page mechanical addendum.
2.6	See the attached 9 page electrical addendum.

Drawings:

Item	Drawing No	Description
2.1	CS1.01	Under general site notes add the following: 9. Fiber mesh to be used in all site concrete unless otherwise noted.

2.2	CU1.01	Add the following notes: 1. The proposed culinary water line on the east side of the building will be sized at 4" diameter from the connection in the street to the building. A 4" water meter will be paid for by the client, delivered by the city and installed by the contractor. The contractor will be responsible for excavation of the connection location of the water and fire lines, the city will construct a sleeve, tap and valve. The contractor will make the connection to the valve and backfill. 2. All the storm drain lines on the site will be RCP, not PVC. 3. Contractor will install "Sweeping Wye" at both sewer connections and field verify both top and flow line. Both wye connections must be inspected by the city previous to backfilling.
2.3	CD5.01	Delete detail 1/CD5.01. All site signs will conform to Architectural detail D3/AS500
2.4	AS100	Drawing A5: Disregard the pilasters shown on the fence at the southern property line. Fence to be built per referenced detail.
2.5	AS500	Drawings D1, D2 and E4: Delete the note " 1/2" EXPANSION JOINT, TYP." Drawing D2: Change the note "8" CMU WALL" to read " 8"X 8"X 16" CMU WALL, INTEGRAL COLOR, HONED BOTH SIDES, SINGLE KERF" Drawing E4: Change the CMU wall note to read " 8"X 8"X 16" CMU WALL, INTEGRAL COLOR, HONED BOTH SIDES, SINGLE KERF"
2.6	A111.4B	Drawing A1: Add the detail call-out D4/A515 at the folding partition occurring within room 1124 (near grid intersection D/4).
2.7	A141.1	Drawing A1: Add the note "AT THE HOLDING AREA, ALL CONCRETE CURBS, GEO FOAM, TOPPING SLABS, CMU WALLS, CONCRETE BENCHES AND PRECAST HOLLOW CORE CONCRETE PLANKS ARE TO BE A PART OF THE BASE BID"
2.8	All RCP Sheets	All Reflected Ceiling Sheets: Within the Ceiling Legends, change the Type A ceiling definition to read as follows: "SUSPENDED 2'X4' ACOUSTICAL LAY-IN TILE CEILING WITH A SINGLE KERF (2'X2' LOOK), 6" HIGH PRE-FINISHED METAL PERIMETER TRIM AT EDGES NOT TOUCHING A WALL"
2.9	A121.4	Drawing A1: Change the two detail call-outs located along grid 1 to read D1/A514, TYP. in lieu of B5/A515. All shades in this project will be concealed within a recessed ceiling box.
2.10	A131.4	Drawing A1: Change the two detail call-outs located along grid 1 to read D1/A514, TYP. in lieu of B5/A515. All shades in this project will be concealed within a recessed ceiling box. The Keyed Notes legend is obscured by the General Ceiling Notes. See previous RCP sheet A121.4 for keyed note definition.
2.11	A141.4alt	Drawing A1: Change the two detail call-outs located along grid 1 to read D1/A514, TYP. in lieu of B5/A515. All shades in this project will be concealed within a recessed ceiling box.

2.12	A151.4	Drawing A1: Add detail call-out D1/A514 at all office windows. All shades in this project will be concealed within a recessed ceiling box.
2.13	A316	Add keyed Note 910 to the Keyed Notes Legend: "910 SUSPENDED GYP. BD. CEILING SYSTEM"
2.14	A422	Drawing D4: Change detail call-out at monitor recess to read E6/A513 in lieu of D4/A511. Detail occurs at all four sides of monitor recess.
2.15	A500	Replace this sheet with the attached revised sheet. Wall types 5A_, 5A_-1, 5B_ and 5C_ have been revised to indicate the switch to a rout and return ACM panel rain screen system.
2.16	A505	Delete details C2 and C4 in their entirety. Replace detail C6 with the attached revised detail.
2.17	A511	Delete details D4 and E4 in their entirety.
2.18	A513	Details C2 and C4: Add note "SEE DETAIL C3/A513 FOR TYPICAL OUTSIDE CORNER CONDITION"
2.19	SB101	Replace with the attached revised sheet showing added concrete piers to support vestibules and entry.
2.20	SB601	Replace sheet with the attached revised sheet showing the revised concrete pier schedule.
2.21	SF202	Replace sheet with the attached revised sheet showing revised side moment frame connection type.

Specifications:

Item	Spec No	Description
2.1		Overall Table of Contents and Division 23 "Heating, Ventilating, and Air Conditioning" division index, Add Sections: 23 5200 Boilers 23 6400 Refrigeration 23 5700 Heat Transfer
2.2	03 3300	Paragraph 2.1.A: Add "HDO" as an approved non-absorptive material.
2.3	05 2100	Delete the specification section STEEL JOISTS in its entirety.
2.4	04 2200	Paragraph 2.3.A: Add the statement "All CMU exposed to the exterior (site walls, fence, etc.) is to contain integral water repellent.
2.5	06 4020	Paragraph 1.2.A: Add the following: 10. Aluminum Base (Finish B3) Add paragraph 2.2 N: "N. Aluminum Trim (Wall Base): 1. 16 gauge (0.064 inch) clear anodized aluminum sheet; brake formed as shown on Drawings. Adhere to 1/2 inch MDF with industrial quality adhesive."

2.6	07 4246	Replace section 07 4246 "Composite Metal Wall Panels" with the attached revised specification. The exposed fasteners system is being replaced with a rout and return system.
2.7	09 0000	Add to finish schedule "F3 - Tack Board Fabric - Maharam - Abacus 466118, 003 Cellar" Add to finish schedule "M1 - CMU Site Walls / Fence - - Integral Color, Honed Both Faces, Single Kerf Both Faces, SCSBA (Light Grey Tones) Finish SC: Add under manufacturer "Selby" and add under description "Selby 700/N300CR, SCSBA". See paint spec for more information. Finishes EP1 and B11: Add under manufacturer "Crossfield Products Group" and add under description "Flex-Sheild (Traffic Coating) SCSBA". See the Traffic Coating spec for more information.
2.8	09 6813	Paragraph 1.2.B: Add an additional state contract number "MA2096"
2.9	32 1313	Paragraph 1.2: Remove items A5 & B3. - There will not be any unit pavers or stamped, colored or decorative concrete. Paragraph 2.7: Remove items B, C, F, G & H - Special finishes are not required Paragraph 2.9: Remove item H - Concrete stains will not be used Paragraph 3.8: Remove items B, C, D & E - Special finishes are not required
2.10	33 1100	Paragraph 1.3: Delete sub section D, E & F 2. All fire line will be AWWA C900 Class 200, DR18 PVC. Paragraph 3.9.B: The fire line will be tested at no less than 225 psi for 2 hours (not 200psi).

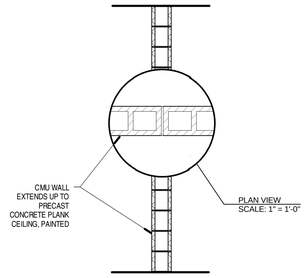
Approvals:

In addition to the manufacturers called out in the contract documents, the following manufacturers, trade names and products are acceptable with the provisions that they shall completely satisfy every requirement of the drawings, specifications, and all addenda, and shall conform to the design, quality and standards specified, established and required for the complete and satisfactory installation and performance of the building and all its respective parts. Any costs incurred due to the use of the following manufacturers shall be paid by the contractor.

Section	Material	Manufacturer	Action
07 1352	Gas Vapor Mitigation System	Tremco, VaporLock-M	Rejected
07 2727	Fluid Applied Vapor Permeable Air Barrier	BASF, Enershield HP	Approved

07 2727	Fluid Applied Vapor Permeable Air Barrier	WR Medows, Air-Shield LMP	Approved
07 2729	Fluid Applied Air and Water Barrier	Sto Guard Systems, Vapor Seal	Approved
09 6903	Access Flooring	ASM	Approved
10 2114	Phenolic Toilet Compartments	Bradley	Approved
10 7500	Flag Poles	Poletech	Approved
06 4020	Interior Architectural Woodwork	Client's Design Inc	Rejected

End of Addendum 002



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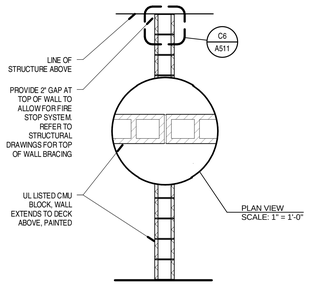

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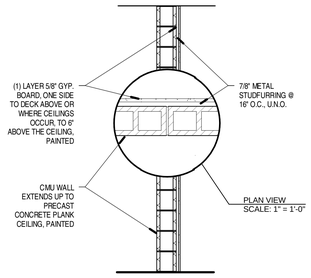
INSTALL C.M.U. WALL PER IBC 2009 TABLE 720.1 (2) 3



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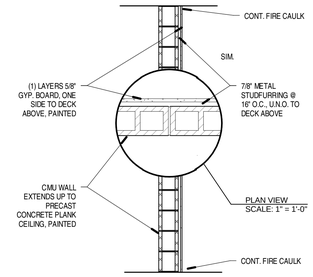

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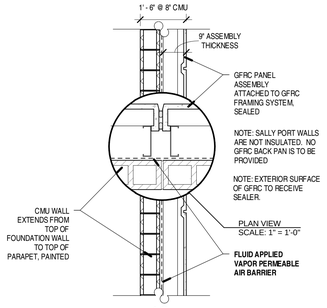

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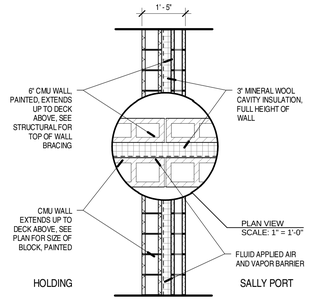

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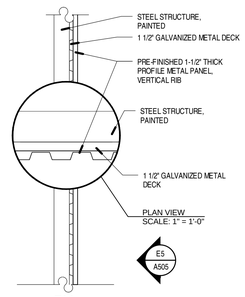


5K_

CMU WALLS

KEY FOR PARTITION TYPES

DENOTES TYPE OF CONSTRUCTION (SPEC. DIVISION) — WALL

3X 0 SERIES	CONCRETE
4X 0 SERIES	MASONRY
5X 0 SERIES	COLD FORMED METAL STUDS, 16ga MIN.
9X 0 SERIES	METAL STUDS

NOMINAL SIZES: V = VARIABLE/MATCHEXISTING
1 = 1 5/8" STUDS
2 = 2 1/2" STUDS
3 = 3 5/8" STUDS
4 = 4" STUDS / 4" (NOM.) C.M.U.
6 = 6" STUDS / 6" (NOM.) C.M.U.
8 = 8" STUDS / 8" (NOM.) C.M.U.
10 = 10" (NOM.) C.M.U. OR CONC.
12 = 12" (NOM.) C.M.U. OR CONC.

EXAMPLE: WALL TYPE 9A3 IS A 3 5/8" METAL STUD WITH 5/8" GYPSUM BOARD ON BOTH SIDES.

NOTE: SEE GENERAL NOTES BELOW FOR ADDITIONAL ELEMENTS IN THE INDIVIDUAL WALL TYPES AND SPECIFIC DETAILS, INCLUDING UL RATINGS.

RATED WALL LEGEND

1 HOUR SEPARATION

2 HOUR SEPARATION

EXAMPLE: WALL TYPE 9A3-1 IS A ONE HOUR RATED, 3 5/8" METAL STUD WALL WITH 5/8" GYPSUM BOARD ON BOTH SIDES. PER ASSEMBLY REQUIREMENTS.

90X-R SERIES
FIRE RATING (ONLY WHEN NOTED):
1 = 1 HOUR RATED ASSEMBLY
2 = 2 HOUR RATED ASSEMBLY
3 = 3 HOUR RATED ASSEMBLY

NON-BEARING METAL HEADER SCHEDULE

MAXIMUM SPAN	HEADER	FY
4'-0"	(2) 400S137-43	33 ksi
6'-0"	(2) 600S162-43	33 ksi
8'-0"	(2) 800S162-43	33 ksi

METAL STUD HEADER NOTES:

1. SCHEDULE TO BE USED FOR NON-BEARING WALLS.
2. HEADERS TO BE CONSTRUCTED AS BOX HEADERS PER SSMA STANDARDS.
3. SEE TYPICAL DETAIL FOR MORE INFORMATION.

NON-BEARING METAL STUD GAUGE SIZING

MEMBER DEPTH IN 1/100 INCHES — FLANGE WIDTH IN 1/100 INCHES

400S137-43

STYLE (S=STUD OR JOIST) — MATERIAL THICKNESS IN MILS

MEMBER DEPTH	MAX STUD HEIGHT	MIN. GA. & SPACING
2 1/2" (250S125-33)	10'-0"	20@16" O.C.
3 5/8" (362S125-33)	14'-0"	20@16" O.C.
3 5/8" (362S162-33)	16'-0"	20@16" O.C.
3 5/8" (362S162-43)	18'-0"	18@16" O.C.
6" (600S162-33)	24'-0"	20@16" O.C.
6" (600S162-43)	26'-0"	18@16" O.C.
6" (600S162-54-50KSI)	28'-0"	16@16" O.C.

METAL STUD NOTES:

1. STEEL STUDS SHALL MEET ICC REPORT ER-4943P AND THE SSMA STANDARDS. HEIGHT BASED ON SSMA 2001 CATALOG AND PROJECT REQUIREMENTS.
2. SEE SCHEDULE FOR STUD SPACING AND GAUGE. ALL STUDS AND BRACES SHALL BE 33 KSI UNLESS NOTED OTHERWISE IN THESE DRAWINGS.
3. AT ALL DOORS PROVIDE TWO TABBED 18 GAUGE STUDS AT BOTH SIDES OF JAMB.
4. PLEASE NOTE THAT DUE TO THE LARGE FLOOR TO FLOOR HEIGHT 18 GAUGE STUDS WILL BE NECESSARY IN MOST INTERIOR NON LOAD BEARING WALLS. REFER TO THE CHART ABOVE.

WALL NOTES

1. SEE SHEETS A500 AND A501 FOR ALL WALL TYPE DEFINITIONS

2. PARTITION TYPE INDICATIONS ARE INDEPENDENT OF APPLIED FINISHES, SUCH AS TILE OR WOOD PANELING. SEE THE FINISH SHEETS AND INTERIOR ELEVATIONS FOR WALL FINISHES INCLUDING COURSING AND PANEL LAYOUT AND/OR THE DESIGNATIONS ON THE PLANS FOR ADDITIONAL INFORMATION REGARDING APPLIED FINISHES.

3. WHERE PARTITION TYPE DESIGNATION ON FLOOR PLANS IS INTERRUPTED BY DOOR OPENING, GLAZED PARTITION, ETC., CONSTRUCTION ABOVE INTERRUPTION (AND WHERE APPLICABLE BELOW) IS TO BE THE SAME AS THAT DESIGNATED FOR THE PARTITION IN WHICH THE INTERRUPTION OCCURRED.

4. THE MINIMUM REQUIREMENTS FOR CONSTRUCTION OF EACH PARTITION TYPE AS EXPRESSED BY THE INDICATED REFERENCE ARE INCORPORATED BY REFERENCE AND ARE APPLICABLE TO THE WORK OF THIS PROJECT. HOWEVER, ADDITIONAL AND/OR MORE RESTRICTIVE REQUIREMENTS MAY BE INDICATED BY THE SPECIFICATIONS AND DRAWINGS. SUCH REQUIREMENTS ALSO APPLY AND SHALL GOVERN. SUCH REQUIREMENTS INCLUDE BUT ARE NOT LIMITED TO:

   A. USE 5/8" THICK GYPSUM BOARD THROUGHOUT UNLESS NOTED OTHERWISE.

   B. USE 16" OC MAX STUD SPACING UNLESS NOTED OTHERWISE IN THESE DOCUMENTS. THE SPACING STATED BY THE REFERENCED APPROVAL OR TEST REPORT IS THE MAX SPACING IF ALLOWED IN THESEDOCUMENTS.

   C. USE STUDS OF GAGE INDICATED ON THE DRAWINGS OR IN THE SPECIFICATIONS. THE GAGE STATED BY THE REFERENCED APPROVAL OR TEST REPORT IS THE MINIMUM GAGE TESTED, 20 GA (30 MILS) IS THE MINIMUM ALLOWED IN THESE DOCUMENTS.

5. USE STUDS OF DEPTH INDICATED BY THIS SET OF DOCUMENTS. THE DEPTH STATED BY THE REFERENCED APPROVAL OR TEST REPORT IS THE MINIMUM DEPTH ALLOWED IN THESE DOCUMENTS.

6. AT INTERIOR STUD WALLS, THE CONTRACTOR IS RESPONSIBLE FOR SELECTING THE STUD GAUGE BASED ON THE HEIGHT OF WALL BEING CONSTRUCTED USING THE REQUIRMENTS FOUND IN THE "NON-BEARING METAL STUD GAUGE SIZING" CHART LOCATED ON SHEET A501.

7. PROVIDE FIRE RATED CONSTRUCTION ASSEMBLIES WHERE INDICATED ON SHEET G200 AND FLOOR PLAN DRAWINGS.

8. ALL DIMENSIONS ARE CENTER OF STUD OR FACE OF CONCRETE, MASONRY OR ROUGH OPENING UNLESS NOTED OTHERWISE.

9. AT ALL WALLS, STUDS, INSULATION AND GYPSUM BOARD ARE TO EXTEND TO THE DECK ABOVE. UNLESS NOTED OTHERWISE.

10. WALL TYPES NOT NOTED ARE ASSUMED TO MATCH ADJACENT ROOMS. NOTIFY ARCHITECT OF ANY DISCREPANCIES.

11. ALL METAL STUD PARTITIONS ARE CONSIDERED ACOUSTIC PARTITIONS AND ARE TO RECEIVE A TYPE 1 SOUND ATTENUATION BLANKET. THICKNESS TO MATCH STUD DEPTH, UNLESS NOTED OTHERWISE.

12. REFER TO SHEET A511 FOR TYPICAL INTERIOR WALL CONDITIONS ASSOCIATED WITH ALL METAL STUD AND CMU PARTITIONS.

13. SEE DETAIL B4/A511 FOR THE TYPICAL TOP OF WALL CONDITION TO BE USED AT ALL INTERIOR STUD WALLS.

14. PROVIDE CONTROL JOINTS IN METAL FRAMED WALLS AT APPROXIMATELY 30 FEET ON CENTER. LOCATE AT CORNER ABOVE DOORS OR INSIDE CORNER OF PILASTERS OR OTHER INCONSPICUOUS LOCATION WHERE POSSIBLE. **CONSULT WITH ARCHITECT PRIOR TO COMMENCING FRAMING.**

15. AT WALL OPENINGS FOR PENETRATION OF PIPES, DUCTS, DEVICES, ETC., GYPSUM BOARD IS TO BE CUT TO MATCH THE SHAPE AND DIMENSION OF THE PENETRATING OBJECT AND THE GAP BETWEEN THE OBJECT AND THE WALL IS TO BE SEALED W/ ACOUSTICAL OR FIRE SEALANT ON ALL SIDES WITH A 3/4" JOINT AT ALL SIDES, MAXIMUM. THE OPENING FOR DUCTS OR LARGE PENETRATIONS SHALL BE FRAMED WITH A HEADER, ADD AN ANGLED CORNER BRACE IF THE GAP EXCEEDS 3" FROM FRAMING TO THE OPENING, SEE DETAIL D5/511.

16. CONTRACTOR TO PROVIDE BLOCKING / BACKING FOR ALL WALL MOUNTED EQUIPMENT. SEE FLOOR PLANS AND INTERIOR ELEVATIONS FOR CABINETS, GRAB BARS ETC. INSTALL BLOCKING AS DETAILED OR AS REQUIRED TO MOUNT SUCH DEVICES. ALL BLOCKING IS TO BE FIRE RETARDANT TREATED OR 20 GA METAL PER DETAIL C4/A511.

17. WHERE THERE IS LIMITED WATER EXPOSURE: INSTALL ONE LAYER OF 5/8" TYPE X WATER RESISTANT GYPSUM BOARD PER ASTM C1396 (WHERE GYPSUM BOARD OCCURS) OF BASIC PARTITION AT THE FOLLOWING LOCATIONS:

   A. WITHIN 2 FEET HORIZONTALLY AND 4 FEET VERTICALLY OF JANITORS SINKS

   B. AT OTHER LOCATIONS, I.E. TOILET ROOMS AND KITCHENS, AND AS INDICATED ON THE ARCHITECTURAL FINISH PLANS AND ELEVATIONS.

18. WHERE CERAMIC TILE FINISHES ARE INDICATED PER THE FINISH PLANS AND ELEVATIONS, INSTALL ONE LAYER OF 5/8" GLASS MAT TILE BACKER BOARD IN LIEU OF GYPSUM BOARD (WHERE GYPSUM BOARD OCCURS) OF BASIC PARTITION WHERE THERE IS NO FIRE RATING AND OVER GYPSUM BOARD FACE LAYER AT FIRE RATED PARTITIONS AT THE FOLLOWING LOCATIONS.

19. ALL EXTERIOR WALLS TO HAVE 2" OF SPRAY FOAM INSULATION APPLIED TO THE INTERIOR FACE OF SHEATHING OR TO THE BACK OF THE GFRC PANEL (UNLESS NOTED OTHERWISE).

20. AT WALLS HOLDING EXTERIOR METAL PANELS, A FLUID APPLIED MEMBRANE IS TO BE APPLIED TO THE EXTERIOR FACE OF THE GYP SHEATHING FOR THE FULL HEIGHT AND LENGTH OF THE WALL, SEAL ALL PENETRATIONS. **PLEASE NOTE THAT TWO MEMBRANE TYPES ARE TO BE USED (VAPOR PERMEABLE AND VAPOR BARRIER)**. SEE WALL TYPES, SPECIFICATIONS AND DETAILS FOR LOCATION OF EACH TYPE.

21. AT EXTERIOR METAL PANELS, 3" OF MINERAL WOOL CAVITY INSULATION IS TO BE PROVIDED.

22. THE FLUID APPLIED MEMBRANE SYSTEMS (PERMEABLE AND VAPOR BARRIER) ARE TO WRAP INTO ALL WINDOW AND DOOR OPENINGS PER THE MEMBRANE MANUFACTURER'S APPROVED DETAILS.

23. SEE STRUCTURAL PLANS FOR ADDITIONAL CONCRETE AND MASONRY WALL INFORMATION.

24. SEE EXTERIOR ELEVATIONS FOR G.F.R.C., ACM AND PROFILE METAL PANEL ORIENTATION AND JOINT PLACEMENT.

25. ALL MASONRY WALLS ARE TO BE REINFORCED AND ARE TO BE SET ON REINFORCED FOOTINGS. CONTROL JOINTS TO BE LOCATED AS PER THE REQUIREMENTS FOUND IN THE STRUCTURAL DOCUMENTS BUT ARE NOT TO EXCEED 30' OC. SEE THE STRUCTURAL DRAWINGS FOR REINFORCING AND OTHER DETAILS PERTAINING TO MASONRY WALLS. IF NOT OTHERWISE NOTED, LOCATE CONTROL JOINTS AT CORNER ABOVE DOORS, INSIDE CORNER OF PILASTERS OR OTHER INCONSPICUOUS LOCATION WHERE POSSIBLE. CONSULT WITH ARCHITECT PRIOR TO INSTALLING.

26. SEE IBC 2009, CHAPTER 7 FOR FIRE RESISTIVE REQUIREMENTS ON NEW CONCRETE AND CONCRETE MASONRY UNIT WALLS.
-CMU WALLS (IBC TABLE 720.1(2), ITEM 3)
-CAST IN PLACE CONCRETE WALLS (IBC TABLE 721.2.1.2(1))

27. AT WALL OPENINGS FOR PENETRATION OF PIPES, DUCTS, DEVICES, ETC., MASONRY IS TO BE CUT TO MATCH THE SHAPE AND DIMENSION OF THE PENETRATING OBJECT AND THE GAP BETWEEN THE OBJECT AND THE WALL IS TO BE SEALED W/ ACOUSTICAL OR FIRE SEALANT ON ALL SIDES WITH A 3/4" JOINT AT ALL SIDES, MAXIMUM.

28. PROTECTION OF MASONRY: DURING CONSTRUCTION, COVER TOPS OF WALLS, PROJECTIONS, AND SILLS WITH WATERPROOF SHEETING AT END OF EACH DAY'S WORK. EXCEPT WHEN THE AMBIENT TEMPERATURE IS EXPECTED TO REMAIN ABOVE 65 DEG F AND NO PRECIPITATION IS FORECAST FOR THE NEXT 24 HOURS. (THIS IS TO PREVENT CONDENSATION FROM COVERED WALLS CAUSING A MOISTURE PROBLEM.) COVER PARTIALLY COMPLETED MASONRY EACH DAY THAT CONSTRUCTION IS NOT IN PROGRESS. WALLS ARE TO BE PROTECTED UNTIL THEY ARE PERMANENTLY PROTECTED BY THE ROOFING MEMBRANE OVER THE CAP PLATE. THE GENERAL CONTRACTOR IS TO PROVIDE TEMPORARY PROTECTION IMMEDIATELY FOLLOWING THE TOPPING OUT OF EACH SECTION OF WALL BY INSTALLING WATERPROOF SHEETING OVER A CONTINUOUS CAP PLATE UNTIL THE ROOFING MEMBRANE IS INSTALLED. **A SOLID GROUTED TOP BOND BEAM SHALL NOT BE CONSIDERED ADEQUATE PROTECTION FOR THE WALL.**

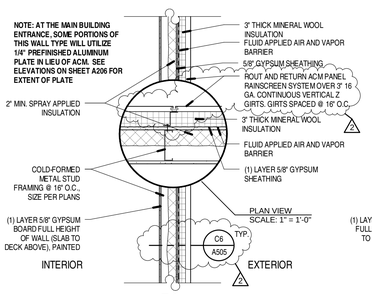
29. AT PAINTED CMU THE HORIZONTAL AND VERTICAL MORTAR JOINTS ARE TO BE CONCAVE. AT ALL HONED BLOCK SITE WALLS THE HORIZONTAL MORTAR JOINT IS TO BE A WEATHERED JOINT AND ALL VERTICAL JOINTS ARE TO BE RAKED.

30. ALL VERTICAL MASONRY CORNERS WHICH FALL WITHIN THE INTERIOR OF THE BUILDING, INCLUDING CORNERS AT DOOR AND WINDOW OPENINGS ARE TO HAVE A 3/4" CHAMFER EXTENDING FROM 4" A.F.F. TO THE DECK ABOVE OR THE BOTTOM OF THE HEADER. SEE DETAIL D6/A512.

31. PROVIDE SPECIAL SHAPES, SUCH AS "U" SHAPED CHANNEL FOR LINTELS OR HEADERS AND CAPPING UNITS FOR SASH AND OTHER SPECIAL CONDITIONS. U SHAPED BLOCKS ARE TO BE 16"X8"X THE WIDTH OF THE WALL.

32. WHERE A FLUID APPLIED MEMBRANES ARE TO BE APPLIED OVER CMU, THE MORTAR JOINTS ARE TO BE STRUCK FLUSH AND SMOOTH.

33. ALL WALL COMPONENTS (GYP. BOARD, VAPOR BARRIER, INSULATION, ETC...) ARE TO EXTEND TO THE DECK ABOVE OR TO TOP OF PARAPET UNLESS NOTED OTHERWISE.



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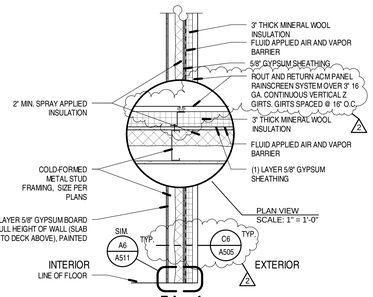

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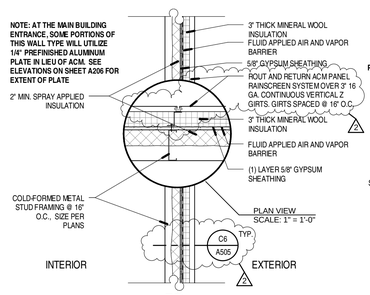

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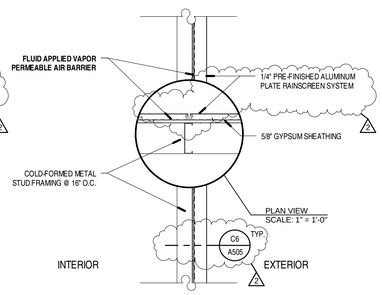

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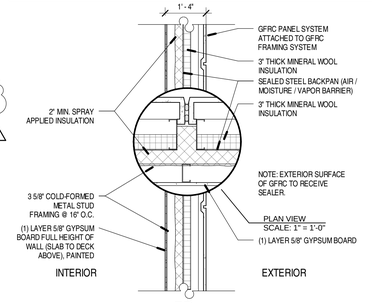

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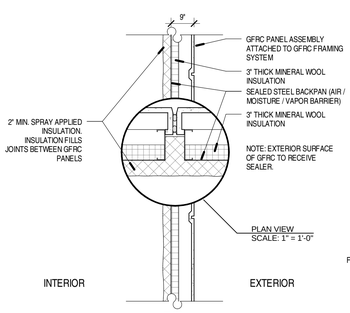

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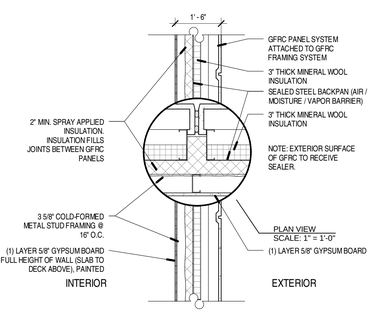

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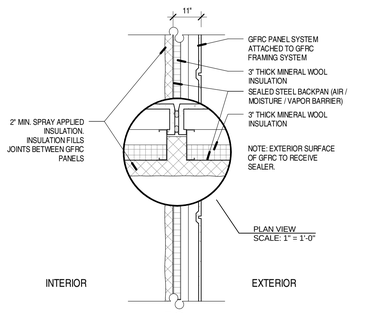

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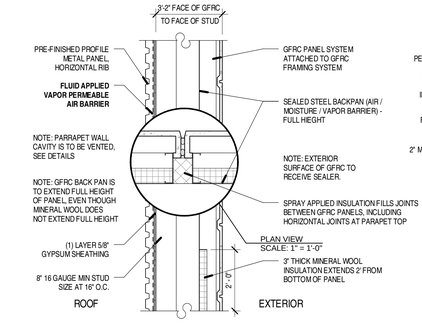

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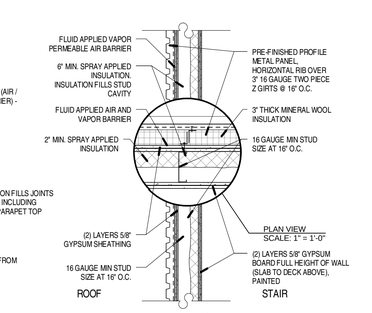

5J_-2
2 HOUR RATED

METAL STUD WALLS

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LICENSED ARCHITECT No. 133912 BRENT R. TIPPETS 8-15-12 STATE OF UTAH

2nd District Juvenile Courthouse

Utah State Courts
08284150
165 West 20th Street, Ogden, Utah
BID DOCUMENTS

Rev #	Date	Description
2	09/05/2013	Addendum 2

Job # 12500
Date August 15, 2013
Owner # 08284150
Ins. #

WALL TYPES AND GENERAL NOTES

A500

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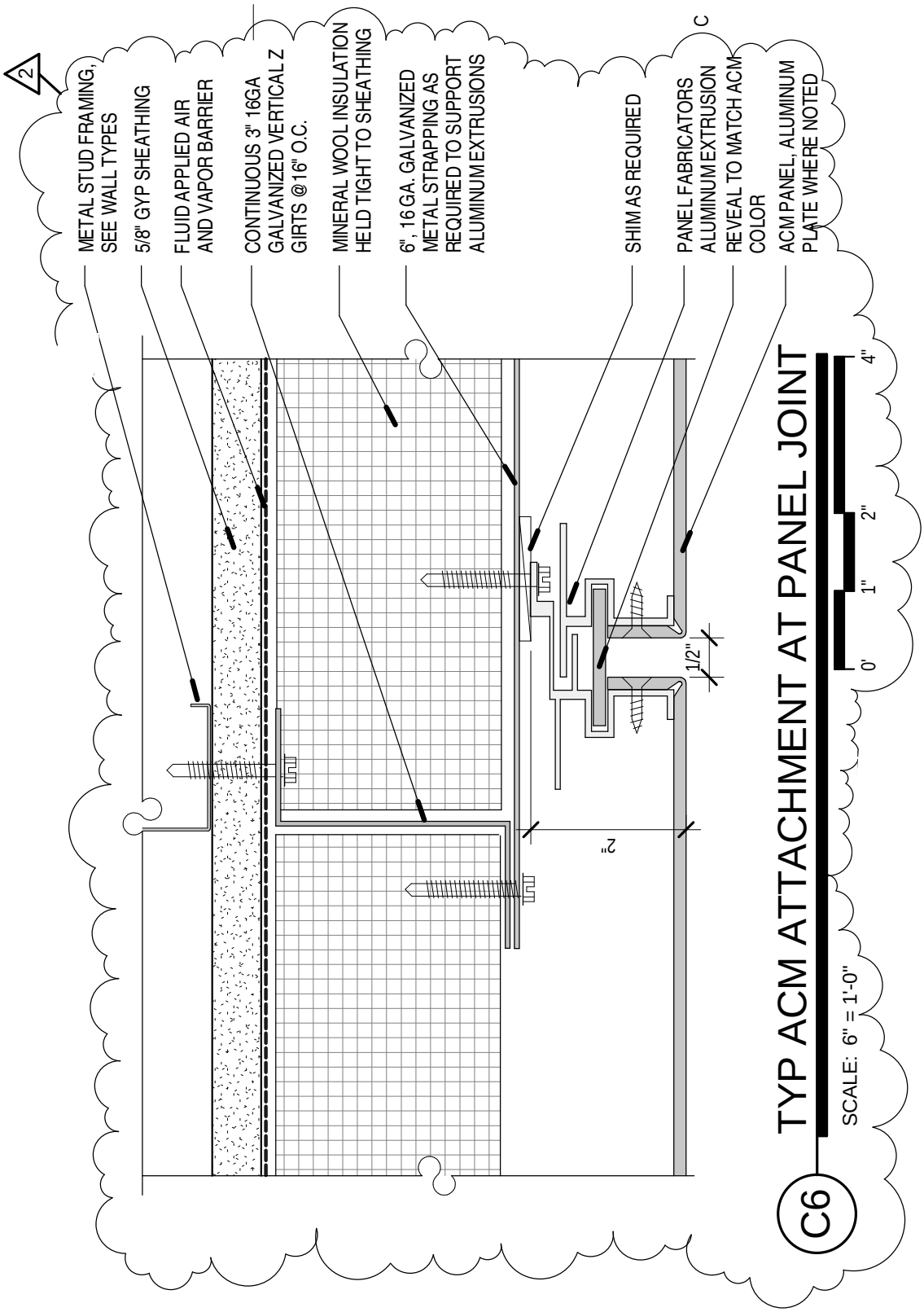


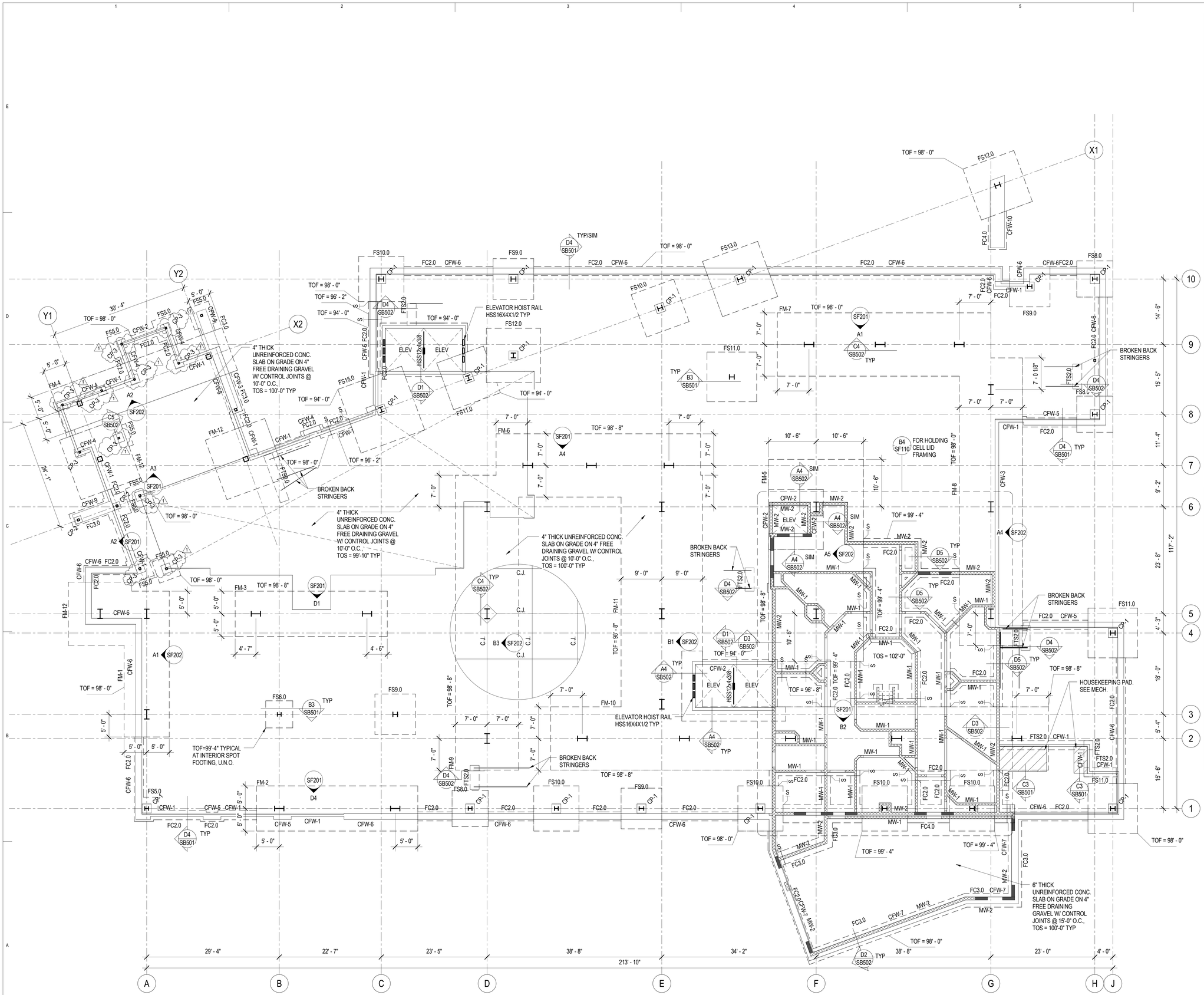
2nd District Juvenile Courthouse
Utah State Courts

ADDENDUM 2

Sheet Name

C6/A505

Project Number 12500
Date September 5, 2013



FOOTING & FOUNDATION PLAN LEGEND

- FOOTING STEP
- FOOTING - CONTINUOUS
- FOOTING - THICKENED SLAB
- FOOTING - SQUARE FOOTING - RECTANGULAR FOOTING - MAT FOOTING
- CONCRETE WALL, CONCRETE FOUNDATION WALL, OR CONCRETE RETAINING WALL
- CONCRETE FOUNDATION WALL - RECESSED
- CONCRETE PIER IN CONCRETE WALL. TOP OF PIER RECESSED 8" BELOW SLAB. TYP U.N.O.
- CONCRETE COLUMN
- CONCRETE JAMB COLUMN POURED MONOLITHIC WITH CONCRETE WALL
- MASONRY WALL
- MASONRY WALL - RECESSED
- MASONRY COLUMN IN MASONRY WALL
- STEEL COLUMN - TUBE
- STEEL COLUMN - WIDE FLANGE
- STEEL COLUMN - PIPE
- 0" CHANGE IN ELEVATION
- SLAB BLOCK-OUT AT COLUMN
- CJ CJ SLAB CONTROL/CONSTRUCTION JOINT
- SPECIAL SLAB AREA
- RECESSED/DEPRESSED SLAB
- OPENING

FOOTING & FOUNDATION PLAN NOTES

1. SEE ARCHITECTURAL, CIVIL AND LANDSCAPE DRAWINGS FOR EXTERIOR CONCRETE WORK AT DOORS, SIDEWALKS ETC.
2. SEE ARCHITECTURAL DRAWINGS AND FINISH SCHEDULE FOR SLAB AREAS TO RECEIVE FLOOR TILE.
3. SEE ARCHITECTURAL DRAWINGS FOR SLAB DEPRESSIONS AND SLOPES TO DRAINS, ETC.
4. SEE ARCHITECTURAL, CIVIL AND LANDSCAPE DRAWINGS FOR ADDITIONAL EXTERIOR CONCRETE RETAINING AND / OR SITE WALLS NOT SHOWN ON THE STRUCTURAL DRAWINGS.
5. SEE TYPICAL STEP DETAIL AT CONTINUOUS FOOTING AND TYPICAL STEP DETAIL AT MAT FOOTING FOR CHANGES IN FOOTING ELEVATIONS.
6. SEE TYPICAL CONCRETE WALL REINFORCING DETAILS FOR REINFORCEMENT AT INTERSECTIONS CORNERS AND ENDS.
7. SEE TYPICAL CONCRETE SLAB ON GRADE DETAILS FOR CONSTRUCTION JOINTS, CONTROL JOINTS AND ADDITIONAL SLAB REINFORCING.
8. SEE TYPICAL CONCRETE SLAB ON GRADE PROFILE DETAIL FOR SUBGRADE REQUIREMENTS.
9. PROVIDE COMPACTED STRUCTURAL FILL UNDER ALL CONCRETE FOOTINGS PER TYPICAL COMPACTED STRUCTURAL FILL DETAIL.

A1 / SB101 FOOTING AND FOUNDATION PLAN

SCALE: 1/8" = 1'-0"

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2nd District Juvenile Courthouse

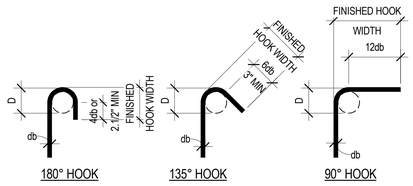
Utah State Courts
08284150
165 West 20th Street, Ogden, Utah
BID DOCUMENTS

Rev #	Date	Description
1	09/04/2013	ADDENDUM #002

Job # 12500
Date August 15, 2013
Owner # 08284150
Ins. #

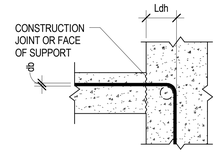
FOOTING AND FOUNDATION PLAN

SB101



180° HOOK 135° HOOK 90° HOOK

END HOOK SCHEDULE				
BAR SIZE	D	FINISHED HOOK WIDTH		
		180° HOOK	135° HOOK	90° HOOK
#3	2.1/4"	3"	3"	6"
#4	3"	4"	3"	8"
#5	3.1/4"	5"	3.3/4"	10"
#6	4.1/2"	6"	4.1/2"	12"
#7	5.1/4"	7"	5.1/4"	14"
#8	6"	8"	6"	16"
#9	9.1/2"	11.3/4"	--	19"
#10	10.3/4"	13.1/4"	--	22"
#11	12"	14.3/4"	--	24"
#14	18.1/4"	21.3/4"	--	31"
#18	24"	28.1/2"	--	41"



TENSION HOOK DEVELOPMENT LENGTH (Ldh)					
BAR SIZE	NORMAL WEIGHT CONCRETE, f'c = PSI				
	3,000	4,000	4,500	5,000	6,000
#3	6"	6"	6"	6"	6"
#4	8"	7"	7"	7"	7"
#5	10"	9"	8"	8"	7"
#6	12"	10"	10"	9"	8"
#7	14"	12"	11"	11"	10"
#8	16"	14"	13"	12"	11"
#9	18"	15"	14"	14"	13"
#10	20"	17"	16"	15"	14"
#11	22"	19"	18"	17"	16"
#14	37"	32"	31"	29"	27"
#18	50"	43"	41"	39"	35"

NOTES:
1. VALUES HERE VALID FOR ALL CASES IF:
   SIDE COVER ≥ 2.1/2"
   END COVER ≥ 2"

2. MULTIPLY VALUES IN SCHEDULE BY 1.2 FOR LIGHTWEIGHT CONCRETE

3. MULTIPLY VALUES IN SCHEDULE BY 1.2 FOR USE WITH EPOXY COATED REBAR

CONCRETE REINFORCING BAR DEVELOPMENT AND LAP SPLICE LENGTH SCHEDULE																						
BAR SIZE	f'c = 3000 PSI				f'c = 4000 PSI				f'c = 4500 PSI				f'c = 5000 PSI				f'c = 6000 PSI				f'c = ALL	
	Ld	Lt	Lsb	Lsbt	Ld	Lt	Lsb	Lsbt	Ld	Lt	Lsb	Lsbt	Ld	Lt	Lsb	Lsbt	Ld	Lt	Lsb	Lsbt	Ldc	Lsc
#3	17"	22"	22"	28"	15"	19"	19"	25"	14"	18"	18"	23"	13"	17"	17"	22"	12"	16"	16"	20"	8"	12"
#4	22"	29"	29"	38"	19"	25"	25"	33"	18"	24"	24"	31"	17"	23"	23"	29"	16"	21"	21"	27"	10"	15"
#5	28"	36"	36"	47"	24"	31"	31"	41"	23"	30"	30"	38"	22"	28"	28"	36"	20"	26"	26"	33"	12"	19"
#6	33"	43"	43"	56"	29"	37"	37"	49"	27"	35"	35"	46"	26"	34"	34"	44"	24"	31"	31"	40"	15"	23"
#7	48"	63"	63"	81"	42"	54"	54"	71"	40"	51"	51"	67"	38"	49"	49"	63"	34"	45"	45"	58"	17"	27"
#8	55"	72"	72"	93"	48"	62"	62"	81"	45"	59"	59"	76"	43"	56"	56"	72"	39"	51"	51"	66"	19"	30"
#9	62"	81"	81"	105"	54"	70"	70"	91"	51"	66"	66"	86"	48"	63"	63"	81"	44"	57"	57"	74"	22"	34"
#10	70"	91"	91"	118"	61"	79"	79"	102"	57"	74"	74"	96"	54"	71"	71"	92"	50"	64"	64"	84"	24"	39"
#11	78"	101"	101"	131"	67"	87"	87"	114"	64"	82"	82"	107"	60"	78"	78"	102"	55"	71"	71"	93"	27"	43"
#14	93"	121"	NA	NA	81"	105"	NA	NA	76"	99"	NA	NA	72"	94"	NA	NA	66"	86"	NA	NA	33"	NA
#18	124"	161"	NA	NA	108"	140"	NA	NA	101"	132"	NA	NA	96"	125"	NA	NA	88"	114"	NA	NA	43"	NA

NOTES:
1. DEFINITIONS:
   Ld: TENSION DEVELOPMENT LENGTH FOR REINFORCEMENT SATISFYING THE FOLLOWING CONDITIONS:
   SLABS AND WALLS: CLEAR SPACING > 2db AND CONCRETE CLEAR COVER > db
   BEAMS AND COLUMNS: CLEAR COVER SPACING > db AND CONCRETE CLEAR COVER > db
   Lt: DEVELOPMENT LENGTH FOR TOP BARS IN TENSION
   Lsb: TENSION LAP SPLICE LENGTH FOR OTHER THAN TOP BARS (CLASS B)
   Lsbt: TENSION LAP SPLICE LENGTH OF TOP BARS.
   Ldc: DEVELOPMENT LENGTH FOR BARS IN COMPRESSION
   Lsc: TIED COLUMN LAP SPLICE IN COMPRESSION
   db: NOMINAL BAR DIAMETER (INCHES)
   TOP BARS: HORIZONTAL BEAM REINFORCEMENT WITH MORE THAN 12 INCHES OF CONCRETE CAST BELOW

2. MULTIPLY VALUES IN SCHEDULE BY 1.5 IF CLEAR SPACING OR CONCRETE COVER DO NOT MEET REQUIREMENTS FOR Ld IN NOTE 1.

3. MULTIPLY VALUES IN SCHEDULE BY 1.3 FOR USE IN LIGHTWEIGHT AGGREGATE CONCRETE.

4. FOR EPOXY COATED BAR: MULTIPLY VALUES IN SCHEDULE BY 1.5 FOR BARS WITH CLEAR COVER < 3db OR CLEAR SPACING < 6db. OTHERWISE MULTIPLY VALUES BY 1.2.

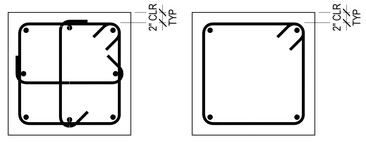
5. a. FOR BUNDLED BARS OF THREE OR LESS MULTIPLY LENGTHS BY 1.2.
   b. FOR BUNDLED BARS OF FOUR OR MORE MULTIPLY LENGTHS BY 1.33.
   c. INDIVIDUAL BAR SPLICES WITHIN A BUNDLE SHALL NOT OVERLAP. ENTIRE BUNDLES SHALL NOT BE LAP SPLICED.

6. SCHEDULE LENGTHS ARE FOR fy=60ksi REINFORCING, MULTIPLY LENGTHS BY 1.25 FOR fy=75ksi REINFORCING.

7. LAP SPLICES ARE NOT PERMITTED FOR #14 & #18 BARS. USE BAR COUPLERS PER G.S.N.

A1 / SB601 — CONCRETE REINFORCING BAR LAP SPLICE SCHEDULE
NO SCALE

CONCRETE PIER SCHEDULE					
MARK	DIMENSIONS		REINFORCING		REMARKS
	DEPTH	WIDTH	VERTICAL	TIES	
CP-1	2' - 0"	2' - 0"	8-#8	#5 @ 12" O.C.	
CP-2	1' - 6"	1' - 6"	4-#9	#5 @ 12" O.C.	
CP-3	2' - 0"	2' - 0"	8-#9	2-#5 @ 6" O.C.	SEE C5/SB502



CP-1 CP-2

A3 / SB601 — TYPICAL CONCRETE PIER CP-1 REINFORCEMENT/TIE DIAGRAM
NO SCALE

CONCRETE FOOTING SCHEDULE												
MARK	WIDTH	LENGTH	THICK	CROSSWISE REINFORCING				LENGTHWISE REINFORCING				REMARKS
				NO.	SIZE	LENGTH	SPACE	NO.	SIZE	LENGTH	SPACE	
FTS2.0	2' - 0"	CONT.	1' - 0"	--	NONE	REQ'D	--	3	#4	CONT.	9"	
FC2.0	2' - 0"	CONT.	1' - 0"	--	NONE	REQ'D	--	3	#4	CONT.	9"	
FC3.0	3' - 0"	CONT.	1' - 0"	--	#5	2' 6"	14"	3	#5	CONT.	15"	
FC4.0	4' - 0"	CONT.	1' - 0"	--	#5	3' 6"	14"	4	#5	CONT.	14"	
FS5.0	5' - 0"	5' 0"	1' - 0"	7	#4	4' 6"	9"	7	#4	4' 6"	9"	
FS6.0	6' - 0"	6' 0"	1' - 2"	7	#5	5' 6"	11"	7	#5	5' 6"	11"	
FS8.0	8' - 0"	8' 0"	1' - 7"	8	#6	7' 6"	12.86"	8	#6	7' 6"	12.86"	
FS9.0	9' - 0"	9' 0"	1' - 9"	10	#6	8' 6"	11.33"	10	#6	8' 6"	11.33"	
FS10.0	10' - 0"	10' 0"	1' - 11"	10	#7	9' 6"	12.7"	10	#7	9' 6"	12.7"	
FS11.0	11' - 0"	11' 0"	2' - 1"	12	#7	10' 6"	11.5"	12	#7	10' 6"	11.5"	
FS12.0	12' - 0"	12' 0"	2' - 3"	14	#7	11' 6"	10.7"	14	#7	11' 6"	10.7"	
FS13.0	13' - 0"	13' 0"	2' - 5"	16	#7	12' 6"	10"	16	#7	12' 6"	10"	
FS15.0	15' - 0"	15' 0"	2' - 8"	17	#8	14' 6"	10.9"	17	#8	14' 6"	10.9"	

1. PLACE ALL FOOTING REINFORCING IN BOTTOM OF FOOTING WITH 3" CLEAR CONCRETE COVER UNLESS NOTED OTHERWISE.
2. TOP REINFORCING, WHERE SPECIFIED, SHALL BE PLACED IN THE TOP OF THE FOOTING WITH 2" CLEAR CONCRETE COVER.
3. SPOT FOOTINGS SHALL BE CENTERED UNDER COLUMNS AND CONTINUOUS FOOTINGS SHALL BE CENTERED UNDER WALLS, UNLESS NOTED OTHERWISE.
4. ALL FOOTINGS SHALL BE FORMED. FOOTINGS SHALL NOT BE EARTH FORMED OR OVERSIZED WITHOUT WRITTEN PERMISSION FROM THE STRUCTURAL ENGINEER.

CONCRETE MAT FOOTING SCHEDULE													
MARK	WIDTH	LENGTH	THICK	CROSSWISE REINFORCING				LENGTHWISE REINFORCING				REMARKS
				NO.	SIZE	LENGTH	SPACE	NO.	SIZE	LENGTH	SPACE	
FM-1	10' 0"	32' 3"	2' - 6"		#9 #9	9' 6" 9' 6"	12" O.C. 12" O.C.		#10 #10	CONT. CONT.	12" O.C. 12" O.C.	TOP BOTTOM
FM-2	10' 0"	35' 8"	2' - 6"		#9 #9	9' 6" 9' 6"	12" O.C. 12" O.C.		#10 #10	CONT. CONT.	12" O.C. 12" O.C.	TOP BOTTOM
FM-3	10' 0"	33' 8"	2' - 6"		#9 #9	9' 6" 9' 6"	12" O.C. 12" O.C.		#10 #10	CONT. CONT.	12" O.C. 12" O.C.	TOP BOTTOM
FM-4	10' 0"	40' 4"	2' - 6"		#9 #9	9' 6" 9' 6"	12" O.C. 12" O.C.		#10 #10	CONT. CONT.	12" O.C. 12" O.C.	TOP BOTTOM
FM-5	21' 0"	44' 8"	3' - 6"		#11 #11	20' 6" 20' 6"	12" O.C. 12" O.C.		#11 #11	CONT. CONT.	12" O.C. 12" O.C.	TOP BOTTOM
FM-6	14' 0"	45' 3"	3' - 0"		#11 #11	13' 6" 13' 6"	12" O.C. 12" O.C.		#11 #11	CONT. CONT.	12" O.C. 12" O.C.	TOP BOTTOM
FM-7	14' 0"	47' 3"	3' - 0"		#11 #11	13' 6" 13' 6"	12" O.C. 12" O.C.		#11 #11	CONT. CONT.	12" O.C. 12" O.C.	TOP BOTTOM
FM-8	14' 0"	63' 7 1/2"	3' - 0"		#11 #11	13' 6" 13' 6"	12" O.C. 12" O.C.		#11 #11	CONT. CONT.	12" O.C. 12" O.C.	TOP BOTTOM
FM-9	14' 0"	65' 3"	3' - 0"		#11 #11	13' 6" 13' 6"	12" O.C. 12" O.C.		#11 #11	CONT. CONT.	12" O.C. 12" O.C.	TOP BOTTOM
FM-10	14' 0"	110' 2"	3' - 0"		#11 #11	13' 6" 13' 6"	12" O.C. 12" O.C.		#11 #11	CONT. CONT.	12" O.C. 12" O.C.	TOP BOTTOM
FM-11	18' 0"	57' 8"	3' - 0"		#11 #11	17' 6" 17' 6"	12" O.C. 12" O.C.		#11 #11	CONT. CONT.	12" O.C. 12" O.C.	TOP BOTTOM
FM-12	14' 0"	14' 0"	3' - 0"		#11 #11	13' 6" 13' 6"	12" O.C. 12" O.C.		#11 #11	CONT. CONT.	12" O.C. 12" O.C.	TOP BOTTOM

NOTES:
1. PLACE ALL FOOTING REINFORCING IN BOTTOM OF FOOTING WITH 3" CLEAR CONCRETE COVER UNLESS NOTED OTHERWISE.

2. TOP REINFORCING, WHERE SPECIFIED, SHALL BE PLACED IN THE TOP OF THE FOOTING WITH 2" CLEAR CONCRETE COVER.

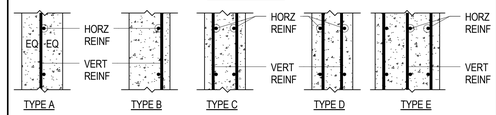
3. SPOT FOOTINGS SHALL BE CENTERED UNDER COLUMNS AND CONTINUOUS FOOTINGS SHALL BE CENTERED UNDER WALLS, UNLESS NOTED OTHERWISE.

4. ALL FOOTINGS SHALL BE FORMED. FOOTINGS SHALL NOT BE EARTH FORMED OR OVERSIZED WITHOUT WRITTEN PERMISSION FROM THE STRUCTURAL ENGINEER.

CONCRETE FOUNDATION WALL SCHEDULE					
MARK	THICK	VERTICAL REINFORCING	HORIZONTAL REINFORCING	T & B HORIZ. BARS	PLACEMENT
CFW-1	6"	#4 @ 12" O.C.	#4 @ 12" O.C.	2-#4	A
CFW-2	8"	#5 @ 12" O.C.	#5 @ 12" O.C.	2-#5	A
CFW-3	10"	#5 @ 12" O.C.	#5 @ 12" O.C.	2-#5	A
CFW-4	1' - 0"	#4 @ 12" O.C.E.F.	#4 @ 12" O.C.E.F.	2-#5	C
CFW-5	1' - 2"	#5 @ 12" O.C.E.F.	#5 @ 12" O.C.E.F.	2-#5	C
CFW-6	1' - 4"	#5 @ 12" O.C.E.F.	#5 @ 12" O.C.E.F.	2-#5	C
CFW-7	1' - 6"	#5 @ 10" O.C.E.F.	#5 @ 10" O.C.E.F.	2-#5	C
CFW-8	2' - 2"	#6 @ 12" O.C. E.F.	#6 @ 12" O.C. E.F.	2-#5	C
CFW-9	2' - 3"	#6 @ 12" O.C. E.F.	#6 @ 12" O.C. E.F.	2-#5	C
CFW-10	3' - 2"	#6 @ 12" O.C. 3 LAYERS	#6 @ 12" O.C. 3 LAYERS	3-#6	E

NOTES:
1. HORIZONTAL WALL REINFORCING SHALL BE CONTINUOUS THRU CONSTRUCTION & CONTROL JOINTS.
2. SPLICES IN HORIZONTAL WALL REINFORCING SHALL BE TYPE Lsb, STAGGERED SUCH THAT SPLICES DO NOT OVERLAP. SPLICES IN TWO CURTAINS SHALL NOT OCCUR IN THE SAME LOCATION.

PLACEMENT TYPE



TYPE A TYPE B TYPE C TYPE D TYPE E

E.F. = EACH FACE
O.F. = OUTSIDE FACE (AGAINST SOIL)
I.F. = INSIDE FACE
3L = THREE LAYERS

VCBO ARCHITECTURE
524 SOUTH 600 EAST
SALT LAKE CITY, UT 84102
Phone: (801) 575-8800
Fax: (801) 531-9850
Web: vcbo.com

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9/4/13
STATE OF UTAH

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Salt Lake City, Utah 84102
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2nd District Juvenile Courthouse

Utah State Courts
08284150
165 West 20th Street, Ogden, Utah
BID DOCUMENTS

Rev #	Date	Description
1	09/04/2013	ADDENDUM #002

Job # 12500
Date August 15, 2013
Owner # 08284150
Ins. #

STRUCTURAL SCHEDULES

SB601

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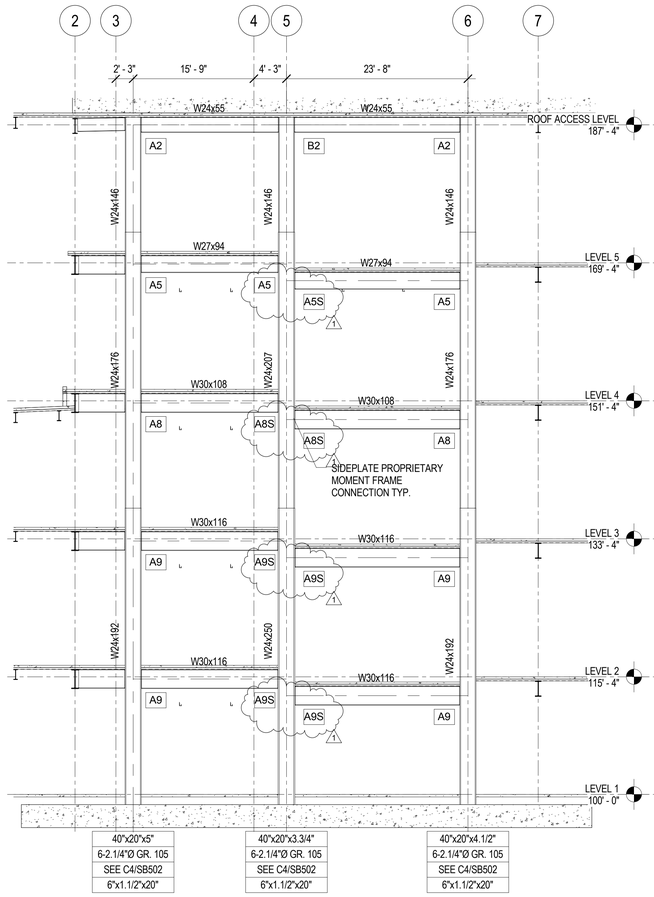
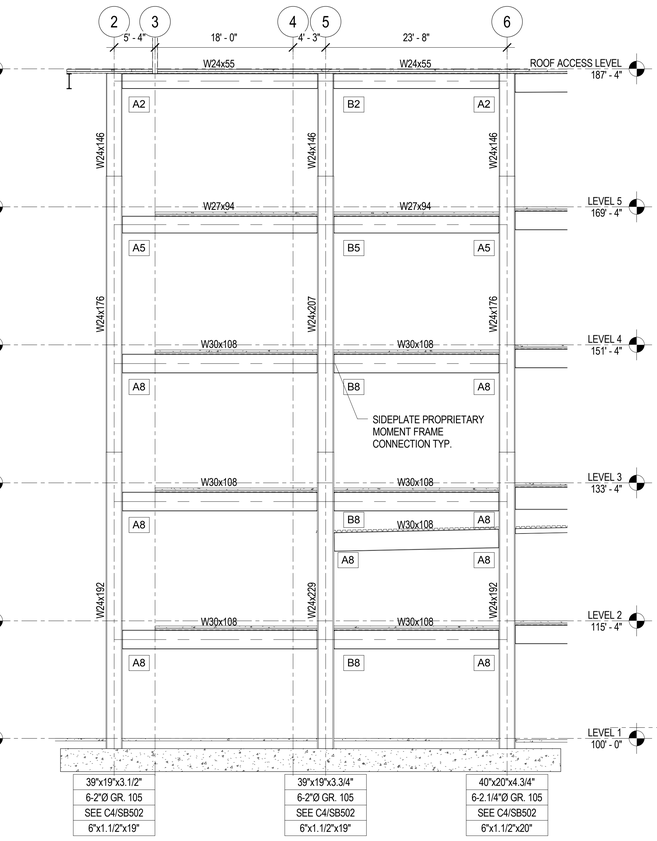


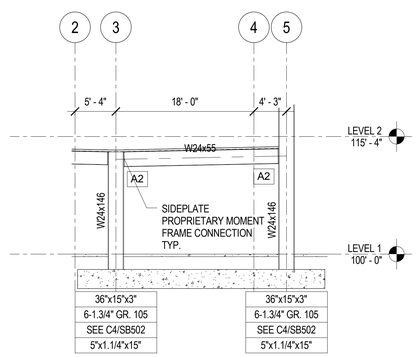
B1 SF202 MOMENT FRAME ELEVATION GRID E

SCALE: 1/8" = 1'-0"



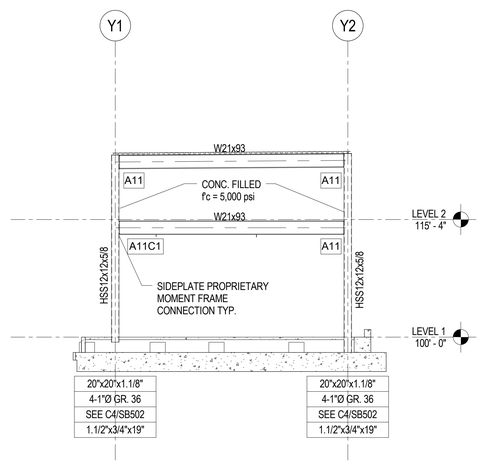
B3 SF202 MOMENT FRAME ELEVATION GRID D

SCALE: 1/8" = 1'-0"



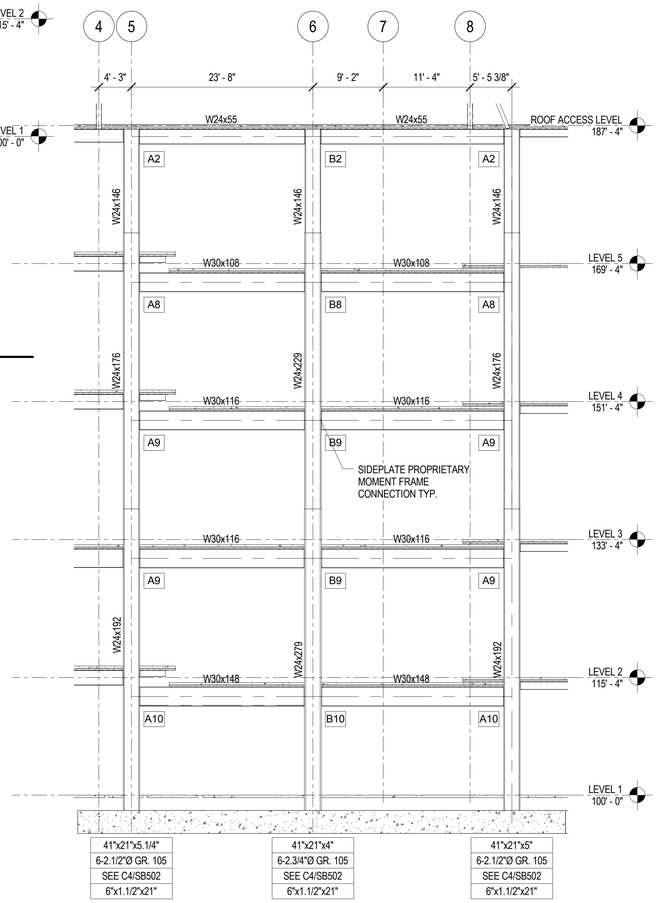
A1 SF202 MOMENT FRAME ELEVATION GRID A

SCALE: 1/8" = 1'-0"



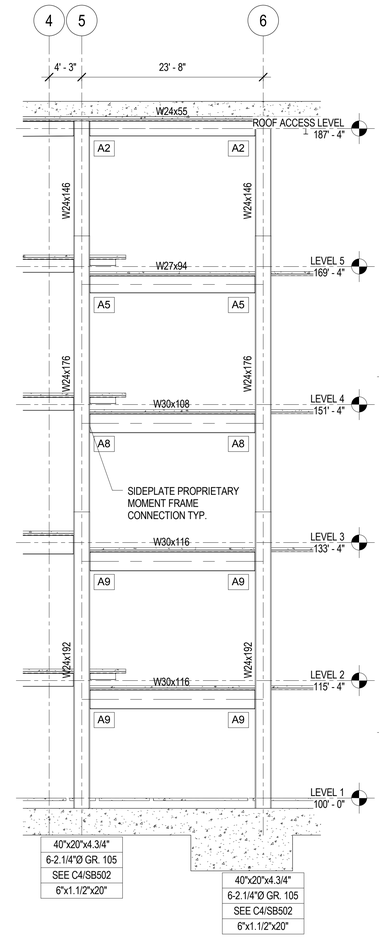
A2 SF202 MOMENT FRAME ELEVATION GRID X.2

SCALE: 1/8" = 1'-0"



A4 SF202 MOMENT FRAME ELEVATION GRID G

SCALE: 1/8" = 1'-0"



A5 SF202 MOMENT FRAME ELEVATION GRID F

SCALE: 1/8" = 1'-0"

MOMENT FRAME ELEVATION NOTES AND LEGEND

1. ALL MOMENT FRAME HORIZONTAL FRAMING MEMBERS (BEAMS) SHALL BE ASTM A992 (Fy = 50KSI) STEEL U.N.O.

2. ALL MOMENT FRAME VERTICAL FRAMING MEMBERS (COLUMNS) SHALL BE ASTM A992 (Fy = 50KSI) STEEL U.N.O.

3. ADD 2-3/4" DIA x 5" LONG HEADED STUD ANCHOR AT 12" O.C. TO ALL MOMENT FRAME HORIZONTAL FRAMING MEMBERS (BEAMS) EXCEPT BEAM AT 1.1/2" ROOF DECK (NO CONCRETE).

4. ## SEE SIDEPLATE CONNECTION DETAILS.

5.

BP
AR
EB
SL

BP = BASE PLATE SIZE. (ASTM A572 GRADE 50)
AR = ANCHOR RODS. (ASTM F1554 GRADE 105)
EB = ANCHOR ROD EMBEDMENT LENGTH
SL = SHEAR LUG SEE STEEL SHEAR LUG DETAIL C4/SB502

6. SEE PLANS FOR ADDITIONAL MOMENT FRAME LOCATIONS.

7. VERIFY ALL DATUM ELEVATIONS W/ ARCHITECTURAL DRAWINGS.

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2nd District Juvenile Courthouse

Utah State Courts
08284150
165 West 20th Street, Ogden, Utah
BID DOCUMENTS

Rev #	Date	Description
1	09/04/2013	ADDENDUM #002

Job # 12500
Date August 15, 2013
Owner # 08284150
Ins. #

MOMENT FRAME ELEVATIONS

SF202

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SECTION 07 4246

COMPOSITE METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. **Section includes**:
1. **Aluminum-faced composite wall panels (ACM)** with rout and return assembly system in a rain screen application.
2. **Aluminum plate wall panels**, to match composite panel system; for use adjacent to entrances and other areas subject to damage.

B. **Related Sections**:
1. **Division 5** Section "**Cold-Formed Metal Framing**" for installation of sheet metal strips coordinated with spacing of metal panel fasteners at exterior locations.
2. **Division 7** Section "**Polyvinyl-Chloride (PVC) Roofing**" for wall caps and fascia furnished and warranted as part of the roofing system.
3. **Division 7** Section "**Sheet Metal Flashing and Trim**" for flashings and other sheet metal work not part of metal wall panel assemblies. Verify sheet metal flashing and trim finish matches composite and metal panel wall panel systems.
4. **Division 7** Section "**Joint Sealants**" for field-applied sealants not otherwise specified in this Section.

1.3 DEFINITION

A. **Metal Wall Panel Assembly:** Metal wall panels, attachment system components, miscellaneous metal framing, and accessories necessary for a complete system.

1.4 PERFORMANCE REQUIREMENTS

A. **General:** Provide metal wall panel assemblies that comply with performance requirements specified as determined by testing manufacturers' standard assemblies similar to those indicated for this Project, by a qualified testing and inspecting agency.

B. **Structural Performance**: Provide metal wall panel assemblies capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 330:
1. **Wind Loads:** Determine loads based on the following minimum design wind pressures:
   a. Uniform pressure as indicated on Drawings.
   b. Maximum deflection of perimeter framing member of L/175 normal to plane of the wall; maximum deflection of individual panels of L/60.
   c. Maximum anchor deflection in any direction of 1/16 inch (1.6 mm) at connection points of framing members to anchors.
   d. Test Pressures: 150 percent of inward and outward wind-load design pressures.

C. **Seismic Performance:** Provide metal wall panel assemblies capable of withstanding the effects of earthquake motions determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."

D. **Thermal Movements:** Provide metal wall panel assemblies that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

E. **Fire Testing:** Entire wall assembly shall have been tested according to NFPA 285 and shall comply with applicable acceptance criteria.

1.5 SUBMITTALS

A. **Product Data:** Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal wall panel and accessory.

B. **Shop Drawings:** Show fabrication and installation layouts of metal wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.
1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:10):
   a. Flashing and trim.
   b. Attachment system, as designed by Fabricator.

C. **Coordination Drawings:** Exterior elevations drawn to scale and coordinating penetrations and wall-mounted items. Show the following:
1. Wall panels and attachments.
2. Stud framing.
3. Wall-mounted items including doors, windows, louvers, and lighting fixtures.

D. **Samples for Selection:** For each type of metal wall panel indicated with factory-applied color finishes.
1. Include similar Samples of trim and accessories involving color selection.

E. **Product Test Reports**: Based on evaluation of comprehensive tests performed by a qualified testing agency, for the following:
1. Metal Wall and Soffit Panels: Include reports for structural performance.

F. **Delegated-Design Submittal:** For composite metal panel system, including stiffeners and attachment system, indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Design shall include necessary fire testing per NFPA 285.

G. **Maintenance Data**: For metal wall panels to include in maintenance manuals.

H. **Warranties**: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

A. **Installer Qualifications**: An employer of workers trained and approved by manufacturer.

B. **Fabricator Qualifications**: Certified by metal-faced composite wall panel manufacturer to fabricate and install manufacturer's wall panel system.
   1. **Delegated Design:** Engage a qualified professional engineer to design composite metal panel system, including attachment system.

C. **Source Limitations**: Obtain each type of metal wall panel through one source from a single manufacturer.

D. **Product Options**: Drawings indicate size, profiles, and dimensional requirements of metal wall panels and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
   1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. **Mockups**: Build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Incorporate mockup in full scale building mockup referenced in Division 1 Section “Mockup Requirements.”
   1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.

F. **Preinstallation Conference**: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to metal wall panel assemblies including, but not limited to, the following:
   1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, metal wall panel fabricator, metal wall panel installer, metal wall panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal wall panels including installers of doors, windows, and louvers.
   2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   3. Review methods and procedures related to metal wall panel installation, including manufacturer's written instructions.
   4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
   5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
   6. Review governing regulations and requirements for insurance, certificates, and testing and inspecting if applicable.
   7. Review temporary protection requirements for metal wall panel assembly during and after installation.

8. Review wall panel observation and repair procedures after metal wall panel installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.7 DELIVERY, STORAGE, AND HANDLING

A. **Deliver** components, sheets, metal wall panels, and other manufactured items **so as not to be damaged** or deformed. Package metal wall panels for protection during transportation and handling.

B. **Unload, store, and erect** metal wall panels in a manner **to prevent bending**, warping, twisting, and surface damage.

C. **Stack metal wall panels horizontally** on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal wall panels to ensure dryness, with positive slope for drainage of water. Do not store metal wall panels in contact with other materials that might cause staining, denting, or other surface damage.

D. **Protect strippable protective covering** on metal wall panels from exposure to sunlight and high humidity, except to extent necessary for period of metal wall panel installation.

1.8 PROJECT CONDITIONS

A. **Weather Limitations**: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal wall panels to be performed according to manufacturers' written instructions and warranty requirements.

B. **Field Measurements**: Verify locations of structural members and wall opening dimensions by field measurements before metal wall panel fabrication and indicate measurements on Shop Drawings.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, either establish framing and opening dimensions and proceed with fabricating metal wall panels without field measurements, or allow for field trimming of panels. Coordinate wall construction to ensure that actual building dimensions, locations of structural members, and openings correspond to established dimensions.

1.9 COORDINATION

A. **Coordinate metal wall panel assemblies** with rain drainage work, flashing, trim, and construction of studs, and other adjoining work to provide a secure, and noncorrosive installation.

1.10 WARRANTY

A. **Special Warranty**: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal wall panel assemblies that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures, including rupturing, cracking, or puncturing.
      b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   2. **Warranty Period: Two years** from date of Substantial Completion.

B. **Special Warranty on Panel Finishes**: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. **Finish Warranty Period: 20 years** from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
   1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
   2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2.2 PANEL MATERIALS

A. **Aluminum Sheet:** Coil-coated sheet, ASTM B 209 (ASTM B 209M), alloy 5005 for anodic finishes, with temper as required to suit forming operations and structural performance required.
   1. **Alloy Types**:
      a. Alloy 5005: H14, H16, H24, H26, H34, or H36 temper.
      b. Surface: Smooth, flat finish.

c. **Exposed Finishes**: Apply the following coating, as specified or indicated on Drawings.

1) **High-Performance Organic Finish:** AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

(a) **Fluoropolymer Two-Coat System (PVDF):** Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat.

d. **Concealed Finish:** Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

B. **Aluminum Extrusions:** ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use and finish indicated.

C. **Panel Sealants:**

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to close joints in metal wall panels; and as recommended in writing by metal wall panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.3 MISCELLANEOUS METAL FRAMING

A. **Steel Sheet Components, General:** Complying with ASTM C 645 requirements for metal and with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized zinc coating.

B. **Fasteners for Metal Framing**: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.4 MISCELLANEOUS MATERIALS

A. **Fasteners**: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal wall panels by means of factory-applied coating. Fasteners to be compatible with metal types; no galvanic action.

1. **Fasteners for Flashing and Trim:** Blind fasteners or self-drilling screws with hex washer head.
2. **Blind Fasteners**: High-strength aluminum or stainless-steel rivets.

B. **Bituminous Coating**: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.5 ALUMINUM-FACED COMPOSITE WALL PANELS

A. **General:** Provide factory-formed and -assembled metal-faced composite wall panels fabricated from two metal facings bonded, using no glues or adhesives, to solid extruded thermoplastic core; formed into profile for installation method indicated. Include attachment system components and accessories required for weathertight system.

B. **Available Manufacturers**: Subject to compliance with requirements of Contract Documents, manufacturers with products that may be incorporated into the Work include, but are not limited to, the following:
1. **Alusuisse** Composites, Inc.; Alucobond.
2. **Mitsubishi** Chemical America, Inc.; Alpolic.
3. **Reynolds** Metals Company; Reynobond PE.
4. **Alucoil**, S.A; Larson PE.

C. **Core:** Noncombustible, with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
1. Flame-Spread Index: 15 or less.
2. Smoke-Developed Index: 105 or less.

D. **Aluminum-Faced Composite Wall Panels**: Formed with 0.020-inch- (0.50-mm-) thick, coil-anodized aluminum sheet facings.
1. Panel Thickness: 0.157 inch (4 mm).
2. Core: Fire retardant.
3. Exterior Finish: PVDF; two **custom colors** as selected by Architect:
   a. Color #1: Match aluminum curtain wall system.
   b. Color #2: Custom “gray” as determined by Architect.

E. **Attachment System Components**: Formed from material compatible with panel facing.
1. **Attachment Assembly:** Rainscreen principle system.
2. Include manufacturer's standard perimeter extrusions with panel stiffeners, panel clips and anchor channels.
3. Supports: Continuous vertical 16 gauge "Z" shaped girts at 16 inches on center.

F. **Flashing and Trim**: Same material, finish, and color as facings of adjacent composite panels, unless otherwise indicated.

2.6 METAL WALL PANELS

A. **Aluminum Plate**: Alloy and temper as recommended by manufacturer for application and in strict adherence to Manufacturers "Design Guide". **Thickness shall be 0.25 inch** per the requirements of the project or unless otherwise specified

B. **Material**: Tension-leveled, smooth 3003-H14 Aluminum.

C. **Panels:** Formed metal panel to match composite panel system.

D. **Exterior Finish:** PVDF; two **custom colors** as selected by Architect:
1. Color #1: Match aluminum curtain wall system.
2. Color #2: Custom “gray” as determined by Architect.

2.7 ACCESSORIES

A. **Wall Panel Accessories:** Provide components required for a complete metal wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels, unless otherwise indicated.
   1. **Closures:** Provide closures at eaves and rakes, fabricated of same metal as metal wall panels.
   2. **Backing Plates:** Provide pre-finished joint metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
   3. **Strapping:** 16 gauge strapping spanning between Z furring, where necessary to properly support system.

B. **Flashing and Trim:** Formed from 0.0179-inch- (0.45-mm-) thick, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Provide flashing and trim as required to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal wall panels.

2.8 FABRICATION

A. **General:** Fabricate and finish metal wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
   1. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.
   2. **Rout and return panel edges** to be received by fabricator's extruded clips.

B. **Fabricators**: Engage fabricator experienced with ACM fabrications and approved by ACM manufacturer.
   1. Fabricator shall design and furnish final system detailing, in accordance with Drawings.
   2. Fabricator shall provide clips, straps, and other attachment system items for a fully functional wall system.
   3. **Available Fabricators:** Subject to compliance with requirements of Contract Documents, system fabricators whose designs may be incorporated into the Work include, but are not limited to, the following:
      a. Engineered Wall Systems, LLC.
      b. Elward Systems Corporation.
      c. LCG Facades

C. **Fabricate metal wall panel**s as a rain screen system; system shall be pressure-equalized and allow water to drain freely.

D. **Aluminum-Faced Composite Wall Panels**: Factory form panels in a continuous process with no glues or adhesives between dissimilar materials. Trim and square edges of sheets with no displacement of face sheets or protrusion of core material.
   1. Fabricate panels with sharply cut edges, with no displacement of face sheets or protrusion of core material. Core material shall be concealed at all times.
   2. Dimensional Tolerances:
      a. Length: Plus 0.375 inch (9.5 mm).
      b. Width: Plus 0.188 inch (4.8 mm).
      c. Thickness: Plus or minus 0.008 inch (0.2 mm).
      d. Panel Bow: 0.8 percent maximum of panel length or width.
      e. Squareness: 0.2 inch (5 mm) maximum.

E. **Sheet Metal Accessories**: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
   3. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
   4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
   5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal wall panel manufacturer.
      a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.9 FINISHES, GENERAL

A. **Comply with NAAMM**'s "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. **Protect mechanical and painted finishes** on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. **Appearance of Finished Work:** Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. **Colors:** PVDF; two **custom colors** as selected by Architect:
   1. Color #1: Match aluminum curtain wall system.
   2. Color #2: Custom “gray” as determined by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. **Examine substrates, areas, and conditions**, with Installer present, for compliance with requirements for installation tolerances, metal wall panel supports, and other conditions affecting performance of work.
   1. Examine wall framing to verify that studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
   2. Examine solid wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
      a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
   3. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.

B. **Examine roughing-in for components and systems** penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal wall panels before metal wall panel installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. **Install flashings and other sheet metal** to comply with requirements specified in Division 7 Section "Sheet Metal Flashing and Trim."

B. **Install fascia and copings** to comply with requirements specified in Division 7 Section "Sheet Metal Flashing and Trim."

C. **Miscellaneous Framing:** Install subgirts, base angles, sills, furring, and other miscellaneous wall panel support members and anchorage according to ASTM C 754 and metal wall panel manufacturer's written recommendations.
   1. Soffit Framing: Wire-tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.

3.3 METAL WALL PANEL INSTALLATION, GENERAL

A. **General:** Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts and subgirts, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

B. **System shall be designed by fabricator** as a "rain screen" system.
   1. Field cutting of metal wall panels by torch is not permitted.
   2. Shim or otherwise plumb substrates receiving metal wall panels.
   3. Rigidly fasten base end of metal wall panels and allow eave end free movement due to thermal expansion and contraction. Predrill panels.
   4. Flash and seal metal wall panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until weather barrier and flashings that will be concealed by metal wall panels are installed, inspected and approved.
   5. Install screw fasteners in predrilled holes. Fasteners shall be concealed.
   6. Install flashing and trim as metal wall panel work proceeds.
   7. Fasten flashings and trim around openings and similar elements with concealed self-tapping screws.

C. **Fasteners:**
   1. Aluminum Wall Panels: Use prefinished fasteners for surfaces exposed to the exterior and aluminum or galvanized steel fasteners for surfaces exposed to the interior. Conceal fasteners.

D. **Metal Protection:** Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal wall panel manufacturer.

E. **Joint Sealers:** Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal wall panel manufacturer.

3.4 ALUMINUM-FACED COMPOSITE WALL PANEL

A. **General**: Install attachment system required to support wall panels and to provide a complete rainscreen wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
   1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.
   2. Do not begin installation until weather barrier and flashings that will be concealed by composite panels are installed.

B. **Rainscreen-Principle Installation**: Install using fabricator's standard assembly with extruded supporting brackets and secondary drainage assembly, draining at base of wall. Attach metal composite material wall panels by screw-fastening to brackets. Leave horizontal and vertical joints with open reveal with matching closure piece.
   1. Do not apply sealants to joints unless otherwise indicated.

C. **Metal Soffit Panels**: Provide metal soffit panels full width of soffits. Install panels perpendicular to support framing.
   1. Flash and seal panels with weather closures where metal soffit panels meet walls and at perimeter of all openings.

3.5 ACCESSORY INSTALLATION

A. **General**: Install accessories with positive anchorage to building and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. **Flashing and Trim**: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
   1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.6 ERECTION TOLERANCES

A. **Installation Tolerances**: Shim and align metal wall panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m), nonaccumulative, on level, plumb, and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING AND PROTECTION

A. **Remove temporary protective coverings** and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal wall panel installation, clean finished surfaces as recommended by metal wall panel manufacturer. Maintain in a clean condition during construction.

B. **After metal wall panel installation**, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. **Replace metal wall panels that have been damaged** or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

COLVIN ENGINEERING ASSOCIATES

MECHANICAL ADDENDUM NO. 02

Job Name: 2nd District Juvenile Courts

CEA PROJECT NO.: 2012-046.00

Date: September 04, 2013

All contractors submitting proposals for this project shall be governed by the following addendum, changes, and explanations to the bidding documents. Bids shall be submitted in accordance with the following:

Item No.	Add, Delete or Clarify	Specification Section or Drawing No.	Reference / Description:
2.01	Clarify	Specification Table of Contents	-added sections 235200, 235700, and 236400 to the table of contents **See highlighted portions of the attached revised Specification Section excerpt.**
2.02	Add	Specification 23 5200	-added section 23 5200-Boilers **See attached Specification Section.**
2.03	Add	Specification 23 5700	-added section 23 5700-Heat Transfer **See attached Specification Section.**
2.04	Add	Specification 23 6400	-added section 23 6400-Refrigeration **See attached Specification Section.**
2.05	Clarify	PL401	-revised the pipe size leaving the sand oil interceptor to be 6" rather than 4"

PRODUCT SUBSTITUTIONS / PRIOR APPROVALS

Item No.	Specification Section	Product Type	Alternate Manufacturers
2.06		Water Softener	Marlo
2.07		Backflow Preventers	Wilkins
2.08		Check Valves, Flexible Sphere Pipe Connectors	MetraFlex
2.09	22 4450	Hot Water Heater	Thermal Solutions
2.10	23 2113	Temp and Pressure Test Plugs	Weksler
2.11	23 3300	Remote Cable Operated Balancing Dampers	Young Regulators, Ruskin
2.12	23 3300	Insulated Flex Duct	JP Lamborn
2.13	23 3400	Air Handling Fans	PennBarry
2.14	23 3400	Plenum Fans	Energy Labs
2.15	23 3400	Exhaust Fans	Acme
2.16	23 3600	VAV Terminal Units	Tuttle & Bailey, Nailor
2.17	23 3713	Punkah Louvers	Seiho
2.18	23 5100	Boiler Flues	Protech Systems

HVAC | Energy Efficient Solutions | Building Simulation
244 West 300 North, Suite 200 | Salt Lake City, Utah 84103-1147 | 801.322.2400

The above named alternate equipment manufacturers stand approved in name only. Approval here in no way relieves the supplier from complying with all other engineering, weight spatial, and quality requirements of equipment indicated in the contract documents. Contractors using products from the above named alternate manufacturers shall refer to Specification Section 230500 for detailed contractor responsibilities related to the use of alternate brands not used as the Basis of Design.

END OF ADDENDUM NO. 02

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DIVISION 21/22/23

TABLE OF CONTENTS

SECTION 23 5200

BOILERS

PART 1 - GENERAL

1.1 RELATED WORK

A. Requirements: Provide Boilers in accordance with the Contract Documents.

B. Related work specified in other sections:
Section 230500 - Basic Mechanical Requirements
Section 230529 - Basic Mechanical Materials and Methods
Section 230548 – Mechanical Seismic Control
Section 230593 - Testing, Adjusting and Balancing
Section 230700 - Mechanical Insulation
Section 230900 - Electronic Controls
Section 232123 - HVAC Pumps

NOTE: Some or all of the equipment in this section will be supplied to the project included in a pre-fabricated, factory built skid as indicated on the plans. Closely coordinate with the prime Division 23 contractor and the awarded skid manufacturer. All of the requirements included in this section and related requirements listed on the project plans and schedules apply.

1.2 SYSTEM DESCRIPTION

A. The work includes, but is not limited to furnishing and installing the following:
1. Packaged hot water boiler system.

1.3 QUALITY ASSURANCE

A. Welder Qualifications: Welding shall be performed by an ASME Certified Welder with current certificate in accordance with ANSI B31.1 for shop and project site welding of piping work.

1.4 REFERENCES

A. Reference Standards: Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
1. Comply with American Welding Society (AWS) National Certified Pipe Welding Bureau (NCPWB) and American National Standards Institute (ANSI) Code Numbers B31.2, B31.9 as applicable for welding requirements.
2. Comply with American National Standards Institute (ANSI B31.1) Code for pressure piping.
3. Section I, VI, IVIII ASME.

1.5 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings and Product Data for the following items in accordance with the General Conditions of the Contract:
1. All boilers and associated equipment.
2. Provide 3D shop drawings of all skids and skid mounted equipment for coordination purposes before fabricating skids.

B. Test Reports: Submit certified Test Reports for the following showing compliance in accordance with the General Conditions of the Contract:
   1. Boiler start-up tests.
   2. Thermal efficiency tests.

C. Certificates: Before proceeding with the Work, submit to the Architect Construction Manager/General Contractor, two copies of Certification that the welding work will be done according to ANSI B31.1 by welders who have been tested and whose qualification test sheets are available, attesting to their ability to weld in accordance with Standard Procedure Specifications as established by the National Certified Pipe Welding Bureau.

D. Operating Instructions and Maintenance Data: Submit printed Operating Instructions and Maintenance Data for the following items in accordance with Operating and Maintenance Data paragraph in Section 230500.
   1. All boilers and associated equipment.

1.6 WARRANTY

A. Provide under provisions of Section 230500 a five year extended warranty for the boiler pressure vessel under all normal operating conditions including operation at high temperature differentials to a maximum differential of 150 degrees F.

1.7 MAINTENANCE SERVICE

A. Manufacturer shall provide 90 days extended service after start-up plus a minimum of four service calls during the first year of building occupancy by the Owner. These calls shall be made, when required by the Owner, for the purpose of normal service, maintenance and instruction of Owner's Representative in proper operation.

PART 2 - PRODUCTS

2.1 CONDENSING BOILER

A. Description: Factory-fabricated, -assembled, and –tested, condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; combustion-air intake connections; water supply, return, and condensate drain connections; and controls. Water heating service only.

B. Approved Manufacturers: Aerco BMK, Lochinvar Crest, Fulton Vantage.

C. Description: Boiler shall be natural gas fired, fully condensing, fire tube design. Power burner shall have full modulation (the minimum firing rate shall not exceed 100,000 BTU/HR input. Boilers that have an input greater than 100,000 BTU/Hr at minimum fire will not be considered) and discharge into a positive pressure vent. Boiler efficiency shall increase with decreasing load (output), while maintaining setpoint. Boiler shall be factory-fabricated, factory-assembled and factory-tested, fire-tube condensing boiler with heat exchanger sealed pressure-tight, built on a steel base, including insulated jacket, flue-gas vent, combustion-air intake connections, water supply, return and condensate drain connections, and controls.

D. Heat Exchanger: The heat exchanger shall be constructed of 439 stainless steel fire tubes and tubesheets, with a one-pass combustion gas flow design. The fire tubes shall be 5/8” OD, with no less than 0.049” wall thickness. The upper and lower stainless steel tubesheet shall be no less than 0.25” thick. The pressure vessel/heat exchanger shall be welded construction. The heat exchanger shall be ASME stamped for a working pressure not less than 160 psig. Minimum access opening shall be no less than 10-inch diameter.

E. Pressure Vessel. The boiler water pressure drop shall not exceed 1.7 psig at 170 gpm. The boiler water connections shall be minimum 4-inch flanged 150-pound, ANSI rated. The pressure vessel shall be constructed of SA53 carbon steel, with a 0.25-inch thick wall and 0.50-inch thick upper head. Inspection openings in the pressure vessel shall be in accordance with ASME Section IV pressure vessel code. The boiler shall be designed so that the thermal efficiency increases as the boiler firing rate decreases.

F. Modulating Air/Fuel Valve and Burner. The boiler burner shall be capable of a 20-to-1 turndown ratio of the firing rate without loss of combustion efficiency or staging of gas valves. The burner shall produce less than 20 ppm of NOx corrected to 3% excess oxygen. All burner material exposed to the combustion zone shall be of stainless steel construction. There shall be no moving parts within the burner itself. A modulating air/fuel valve shall meter the air and fuel input. The modulating motor must be linked to both the gas valve body and air valve body with a single linkage. The linkage shall not require any field adjustment. A variable frequency drive (VFD), controlled cast aluminum pre-mix blower shall be used to ensure the optimum mixing of air and fuel between the air/fuel valve and the burner.

G. Minimum boiler efficiencies shall be as follows at a 20 degree delta-T:

EWT	100% Fire	40% Fire	5% Fire
180 °F	85.3%	85.7%	86.3%
120 °F	86.6%	87.8%	90.2%
60 °F	94.2%	96.9%	99%

H. Exhaust Manifold: The exhaust manifold shall be of corrosion resistant cast aluminum with an 8-inch diameter flue connection. The exhaust manifold shall have a collecting reservoir and a gravity drain for the elimination of condensation.

I. Burner: Natural gas or forced draft.

J. Blower: Centrifugal fan to operate during each burner firing sequence and to prepurge and postpurge the combustion chamber.
1. Motors: Comply with requirements specified in Division 23 Section ‘Motors’.
    a. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

K. Ignition: Spark ignition with 100 percent main valve shut-off with electronic flame supervision.

L. Casing:
1. Jacket: Sheet metal with snap-in or interlocking closures.
2. Control Compartment Enclosures: NEMA 250, Type 1A.
3. Finish: Baked-enamel or Powder-coated protective finish.
4. Insulation: Minimum 2-inch thick, insulation surrounding the heat exchanger.
5. Combustion-Air Connections: Inlet and vent duct collars.
6. Mounting base to secure boiler.
    a. Seismic Fabrication Requirements: Fabricate mounting base and attachment to boiler pressure vessel, accessories, and components with reinforcement strong enough to withstand seismic forces defined in Division 15 Section ‘Mechanical Vibration and Seismic Controls’ when mounting base is anchored to building structure.

M. Characteristics and Capacities:
1. See Boiler Schedule on plans.

N. Controls:

1. Coordinate all controls interfacing with Division 23 0900 contractor prior to ordering boiler to ensure complete integration into the control system. Provide all required interfaces as determined by plans, specs, and Division 23 0900 contractor. Specifically, provide a BACnet interface card so that the boilers and boiler sequencer can be seamlessly integrated into the BAS system.
2. The combustion safeguard/flame monitoring system shall use spark ignition and a rectification-type flame sensor.
3. The control panel hardware shall support both RS-232 and RS-485 remote communications.
4. The controls shall annunciate boiler and sensor status and include extensive self-diagnostic capabilities that incorporate a minimum of eight separate status messages and 34 separate fault messages.
5. The control panel shall incorporate three self-governing features designed to enhance operation in modes where it receives an external control signal by eliminating nuisance faults due to over-temperature, improper external signal or loss of external signal. These features include:
   a. Setpoint high limit: Allows for a selectable maximum boiler outlet temperature and acts as temperature limiting governor. Setpoint limit is based on a PID function that automatically limits firing rate to maintain outlet temperature within a 0 to 10 degree selectable band from the desired maximum boiler outlet temperature.
   b. Setpoint Low Limit: Allows for a selectable minimum operating temperature.
   c. Failsafe Mode: Failsafe mode allows the boiler to switch its mode to operate from an internal setpoint if its external control signal is lost, rather than shut off. This is a selectable mode, enabling the control can to shut off the unit upon loss of external signal, if so desired.
6. The boiler control system shall incorporate the following additional features for enhanced external system interface:
   a. System start temperature feature.
   b. Pump delay timer.
   c. Auxiliary start delay timer
   d. Auxiliary temperature sensor
   e. Analog output feature to enable simple monitoring of temperature setpoint, outlet temperature or fire rate.
   f. Remote interlock circuit.
   g. Delayed interlock circuit.
   h. Fault relay for remote fault alarm.
7. Each boiler shall include an electric, single-seated combination safety shutoff valve/regulator with proof of closure switch in its gas train. Each boiler shall incorporate dual over-temperature protection with manual reset, in accordance with ASME Section IV and CSD-1.
8. The Boiler Manufacturer shall supply as part of the boiler package a completely integrated Control System to control all operation and energy input of the multiple boiler configuration. The Control System must be able to communicate with the Boilers via the RS-485 port. One controller shall have the ability to operate up to 32 boilers. The controller must be supplied with the appropriate interface to operate seamlessly with the BAS systems supplied by the Division 230900 contractor.

   The controller shall have the ability to vary the firing rate and energy input of each individual boiler throughout its full modulating range to maximize the condensing capability and thermal efficiency output of the entire heating plant. The controller shall control the boiler outlet temperature within $\pm$2ºF. The controller shall be a PID type controller and uses Ramp Up/Ramp Down control algorithm for accurate temperature control with excellent variable load response. The controller shall

provide contact closure for auxiliary equipment such as system pumps and combustion air inlet dampers based upon outdoor air temperature.

The control system shall have the following anti-cycling features:

- Manual designation of lead boiler and last boiler.
- Lead boiler rotation at user-specified time interval.
- Delay the firing/shutting down of boilers when header temperature within a predefined deadband.

When set on Internal Setpoint Mode, temperature control setpoint on the controller shall be fully field adjustable from 50ºF to 190ºF in operation. When set on Indoor/Outdoor Reset Mode, the ACS will operate on an adjustable inverse ratio in response to outdoor temperature to control the main header temperature. Reset ratio shall be fully field adjustable from 0.3 to 3.0 in operation. When set on 4ma to 20ma Temperature Control Mode, the control system will operate the plant to vary header temperature setpoint linearly as an externally applied 4-20 ma signal is supplied.

The controller will have the ability to operate the plant to vary discharge temperature setpoint as an external communication via the RS-232 port. The controller shall have a vacuum fluorescent display for monitoring of all sensors and interlocks. Non-volatile memory backup of all control parameters shall be internally provided as standard. The controller will automatically balance the sequence of operating time on each boiler by a first-on first-off mode and provide for setback and remote alarm contacts. Connection between the central boiler controller and individual boilers shall be twisted pair low voltage wiring, with the boilers 'daisy-chained' for ease of installation.

2.2 BOILER START-UP AND TEST REQUIREMENTS

A. At a time requested by the Installing Contractor, the boiler representative shall adjust and start boiler. Three, typewritten copies of the starting report shall be sent to the Architect/Engineer prior to final inspection for insertion into the O & M manuals, submitting a fourth copy directly to the Engineer, and shall include the following information for each boiler:
   1. Temperature and pressure settings of the boiler.
   2. Heating system water pressures, cold and hot.
   3. Gas pressure setting.
   4. Gas volume being burned.
   5. Percent CO2 and CO.

B. A component and integrated check shall be made of all controls. Factory tests do not substitute for this test. A foreman or superintendent of the Installing Division 23 Contractor familiar with the system shall also be present and witness this test.

C. Thermal efficiency shall be 94% minimum with CO2 at 7% minimum,10% maximum. Presence of greater than 100 ppm CO in flue gas or high stack temperature will require corrective action by the Contractor.

D. Contractor shall request and obtain inspection and written approval of the installation by the State Division of Labor prior to building occupancy.

PART 3 - EXECUTION

3.1 BOILER INSTALLATION

A. Installation shall be in accordance with manufacturer's instructions. Pertinent details of the design engineer's plan shall be combined with all rules and regulations of authorities having jurisdiction. Provide adequate space as required by manufacturer for servicing

including tube removal and replacement. Provide piping flanges in tube bundle inlet and outlet piping so that only short sections of piping need be removed to facilitate tube removal.

B. For batteries of modular boilers, the supply and return headers shall be piped in a reverse return configuration.

3.2 BOILER VENTING

A. Boilers shall be vented in accordance with Section 235100 - Breechings, Chimneys, Stacks, and Flues.

B. The boilers, combustion air ducts, and flues comprise a system and must function properly together. The manufacturer of the boilers provided for this project shall analyze the combustion air system and boiler flue system as shown on the contractor's shop drawings and verify these systems will allow their boilers to operate properly. Modify combustion air duct and boiler flue sizes as necessary to ensure proper operation of the make and model of boilers being provided for this project.

3.3 BOILER WIRING

A. All electric wiring for control of boiler operation to be furnished and installed by Division 23 Contractor. All wiring to be heat and moisture resistant, minimum 105 deg.F.

B. Provide emergency boiler shut-off switch outside each boiler room door in accordance with Utah Boiler Code and ASME CDS-1.

3.4 START-UP SERVICE

A. After completion of installation the heating plant shall be test started in the presence of a representative of the boiler manufacturer and a performance chart of the step control system shall be furnished.

3.5 HEAT EXCHANGER SUPPORT

A. Mount heater on steel saddles and pipe stand as indicated.

END OF SECTION

SECTION 23 5700
HEAT TRANSFER

PART 1 - GENERAL

1.1 RELATED WORK

A. The General Conditions, Supplementary Conditions and Division 1, General Requirements apply to this Section, and Contractor shall review and adhere to all requirements of these documents.

B. Related work specified in other Sections:
Section 230500 - Basic Mechanical Requirements
Section 230529 - Basic Mechanical Materials and Methods
Section 230540 - Mechanical Sound and Vibration Control
Section 230593 - Testing, Adjusting and Balancing
Section 230700 - Mechanical Insulation
Section 230900 - Electronic Controls
Section 232113 - HVAC Piping and Specialties
Section 232123 - HVAC Pumps
Section 233400 - Air Handling Fans
Section 235200 - Boilers
Section 236400 - Refrigeration
Section 237400 - Air Handling Systems on Roof

NOTE: Some or all of the equipment in this section will be supplied to the project included in a pre-fabricated, factory built skid as indicated on the plans. Closely coordinate with the prime Division 23 contractor and the awarded skid manufacturer. All of the requirements included in this section and related requirements listed on the project plans and schedules apply.

1.2 SYSTEM DESCRIPTION

A. The work includes, but is not limited to providing the following:
1. Plate Type Heat Exchanger
2. Brazed Plate Heat Exchanger
3. Cabinet Unit Heaters
4. Unit Heaters
5. Radiant Ceiling Panels
6. Chilled Water Coils
7. Heating Water Coils
8. Condenser Water Coils
9. All contactors, relays, terminal boxes, thermostats and other electrical appurtenances for electric heat in accordance with "ELECTRIC WIRING" paragraph in Section 230529 - Basic Mechanical Materials and Methods.
10. Snowmelt Systems
11. Fan Coil Units
12. Direct Evaporative Cooling Media
13. Radiant Floor Heating System

1.3 QUALITY ASSURANCE

A. Quality control shall be in accordance with Section 230500 - Basic Mechanical Requirements.

1.4 REFERENCES

A. Reference Standards: Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
   1. Comply with American National Standards Institute (ANSI B31.1) Code for Pressure Piping.

1.5 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings and Product Data for the following items in accordance with the General Conditions of the Contract:
   1. Plate Type Heat Exchanger
   2. Brazed Plate Heat Exchanger
   3. Fan Coil Units
   4. Cabinet Unit Heaters
   5. Unit Heaters
   6. Radiant Ceiling Panels
   7. Heating Coils
   8. Chilled Water Coils
   9. Snowmelt System
   10. Direct Evaporative Cooling Units
   11. Radiant Floor Heating System
   12. Provide 3D shop drawings of all skids and skid mounted equipment for coordination purposes before fabricating skids.

B. Operating Instructions and Maintenance Data: Submit printed Operating Instructions and Maintenance Data for the following items in accordance with Operating and Maintenance Data paragraph in Section 230500:
   1. Plate Type Heat Exchanger
   2. Brazed Plate Heat Exchanger
   3. Fan Coil Units
   4. Cabinet Unit Heaters
   5. Unit Heaters
   6. Snowmelt System
   7. Direct Evaporative Cooling Units
   8. Radiant Floor Heating System

PART 2 - PRODUCTS

2.1 PLATE/FRAME HEAT EXCHANGER

A. Furnish and install a water to water plate and frame heat exchanger, size and capacity as shown on the drawing, as manufactured by Bell & Gossett, Alfa Laval, Tranter, Moeller, Taco, Polaris, Armstrong, Patterson, Flat Plate, GEA, APV.

B. The exchanger shall be single pass, counter current flow, to facilitate access to the plate pack for maintenance.

C. The frame of the exchanger shall be designed to permit the future installation of 20 percent additional plates at a later date.

D. The maximum allowable pressure drop shall be as shown in the equipment schedule. Plates:
   1. Plate material shall be type 304 or 316 stainless steel.
   2. Port holes not feeding passes between plates shall be fully gasketed and vented to the atmosphere.

3. Design of plates shall be such that metal-to-metal contact exists between adjacent plates. (Free-flow type plate exchangers are excepted from this provision).
4. If frame design includes plate support, plates shall be fully supported from the top stainless steel carrying bar and guided by only the bottom stainless steel bar with reinforced slots integral with the plate.
5. Gasket groove shall be designed so that full gasket support is provided by metal-to-metal plate contact both inboard and outboard of the gasket groove.
6. Plates shall be of one piece design, without need of additional "loose" type hanger straps.
7. Plates shall have a positioning system which will prevent them from shifting during operation and tightening of the plate pack.

E. Fixed and Movable End Frames:
1. Single pass counter-current design shall have nozzle/flange connections located in the fixed end frame.
2. End frame design shall not include stiffeners.
3. Slotted holes for compression bolts shall be uniformly distributed around the periphery of the end frame.
4. If frame design requires, the movable end frame shall be supported from the upper carrying bar by means of rollers and guided by the bottom bars.

F. Top Guide Bar:
1. A smooth surface shall be provided for the roller bearing carrying groove for the whole length of the carrying bar.
2. The carrying bar shall be designed to support 1.5 times the weight of a flooded exchanger, movable cover, compression bolts, nuts, and nozzles.

G. Supports:
1. Supports shall be furnished at the fixed end frame and at the end support. A minimum of two support plates shall be provided at the fixed end frame with anchor bolt holes in each plate.

H. Plate Gaskets:
1. Gaskets shall be positioned in a groove around the heat transfer surface and around the port holes of the plate as required.
2. Gasket and gasket groove detail shall be designed to facilitate positioning of plates. Gaskets shall be compressed to achieve a metal-to-metal contact between plates. (Free-flow type plate exchangers are excepted from this provision).
3. An adhesive compound compatible with the gasket material and having a thickness to insure bond strength between plate and gasket shall be applied to the plate gasket groove surface.
4. Gasket plate surface shall be thoroughly cleaned by means of solvent cleaning and dried before the application of the adhesive. Emery cloth or abrasive powders shall not be used to clean out the gasket grooves.
5. All gaskets except between end plates and frames shall be identical. One-piece gaskets are preferred except when specific plate designs require otherwise.
6. Relieving grooves shall be provided in the outside gasket in those locations where an internal gasket is used. The relieving grooves should be located such that no gasket-caused cross contamination of liquids can occur without external evidence.
7. The compressed plate pack dimensions shall be given on the manufacturer's assembly drawing. This dimension shall also be shown on the permanent nameplate attached to each respective heat exchanger.

I. Suitable lifting means shall be included on the frame to facilitate installation and maintenance of the exchangers.

J. Frame: The frame material is to be carbon steel, SA515 or SA516 grade 70 material unless designated differently in the equipment schedule.

K. Gaskets: Gasket materials must be selected based on fluid and temperature compatibility.

L. Hydrostatic Test: After complete assembly and before shipment, the exchanger shall be hydrostatic tested. ASME code PHE's shall be tested in accordance with the requirements of ASME Section VIII, Division 1.

2.2 CABINET UNIT HEATERS

A. Acceptable Manufacturers: Dunham-Bush, Modine, Carrier, Trane, A.A.F., KHD Co., Airtherm, ITT-Nesbitt, York, McQuay, Sterling, Beacon Morris, Vulcan Inc., First Co., Rittling.

B. Type: Cabinet heaters shall be of the blow-thru cabinet type with hot water heating coil, capacities and model number as shown on the drawings.

C. Arrangement: Arrangement and cabinet type shall be as shown on the drawings.

D. Cabinet: Shall be constructed of 16 - gauge furniture grade steel. Metal surfaces shall be cleaned, phosphatized, prime coated, and all exposed surfaces shall be finished in a baked enamel, color to be selected by Architect. Units on white ceilings shall be white, baked-enamel finish.

E. Fans: Shall be all steel, multi-blade, forward curved, centrifugal-type fan which has been statically and dynamically balanced to eliminate vibration. Fans shall be two-speed direct-drive or driven by V-belt and cast-iron sheaves capable of 25% speed variation. Belts shall be oil and heat resistant.

F. Motor: Shall be of the split-phase, open-type, two-speed, sleeve bearing with resilient mount in the unit. Motor shall be suitable for current characteristics as shown on the drawings, with built-in automatic reset, thermal overload protection. Include all contactors/starters required for automatic operation.

G. Hot Water Heating Coil: Shall be serpentine connected and shall be of the finned copper-tubing type, and shall be hydrostatically tested to twice the working pressure.

H. Filters: Provide 1" thick, disposable filter located in a frame in the return air stream. Filters shall be easily removable by removing front access panel.

I. Control: Unit shall have automatic temperature controls as specified in Section 230900 - Electronic Controls, and shall in addition have internal unit mounted, pre-wired two-speed switch, and "off".

2.3 UNIT HEATER (HORIZONTAL BLOW)

A. Acceptable Manufacturers: Modine, Carrier, Trane, A.A.F., KHD Inc., Airtherm, ITT-Nesbitt, Sterling, McQuay, Beacon Morris, Vulcan Inc., Rittling.

B. Type: Unit heater shall be of the horizontal blow thru propeller fan type with hot water heating coil, capacities as shown on the drawings.

C. Casing: Shall be constructed of heavy gauge furniture steel. It shall be phosphatized and completely dip painted with a heavy duty baked enamel. Cast brass supply and return pipe tap connections shall be bolted to corners of the back.

D. Hot Water Heating Coil: Shall be serpentine connected of the finned copper tubing type, hydrostatically tested to twice the working pressure. Coil capacity shall be rated at low fan speed. Coil piping connection shall be on side of unit, not on top and bottom.

E. Fan: Shall be selected for quiet operation and shall be factory balanced.

F. Speed Control: Units to be furnished with speed control for low speed setting. Include “summer” fan switch for fan-only operation.

G. Motor: Shall be equipped with permanently lubricated bearings and shall be in accordance with "Motors" in Section 230529. Include all contactors/starters required for automatic operation.

H. Louvers: Unit shall be equipped with lateral and horizontal diffusion.

2.4 RADIANT CEILING PANELS (RCP)

A. Manufacturer: Airtex, Aerotech, Embassy, Runtal, Shelley, Vulcan Inc.

B. Furnish and install Radiant Ceiling Panels (RCP) where indicated on the drawings.

C. The RCP shall be placed into the ceiling grid system in accordance with the plans. The panels shall weigh 1.5 lbs. per square foot when filled with water. Radiant panels shall be - 6 - pass Panels, consisting of 0.040" aluminum face plate, with 1/2" O.D. copper serpentine coil bonded to face plate. The panel tubing shall be prepared for interconnection at the factory.

D. Insulation: Provide 1" thick, 3/4 lb. density, glass fiber pads to be placed on back of radiant panels for thermal and acoustical insulation.

E. Finishes: All panels shall be non-perforated with silk screened off-white paint to match lay-in acoustical ceiling tiles per architectural specification.

F. Performance Certification: Panel performance and water pressure drops shall be certified by an independent certified testing lab.

2.5 HEATING WATER, CHILLED WATER, AND CONDENSER/COOLING TOWER WATER COILS IN BUILT-UP SYSTEMS

A. Acceptable Manufacturers: Carrier, Trane, York, Aaon, Pace, Temtrol, Heatcraft, RAE.

B. See details and schedules on Drawings for sizes and capacities.

C. Coils shall be suitable for chilled water, hot water, or glycol service with 5/8” diameter copper tubes of 0.035” wall thickness. Maximum fins per inch shall be 11. Aluminum fin thickness shall be 0.008 inch maximum.

D. Coils to be tested and rated in accordance with Air Conditioning and Refrigeration Institute (ARI) Standard 410-91.

E. Coil casings to be made of galvanized steel sheet.

F. Tube joints from tube-to-return-bend end and tube-to-header end to be made with high-temperature brazing alloys.

G. Circuiting to be designed to provide the greatest degree of counter-flow between air and water. Circuit arrangement to be non-trapping so that liquid will drain from coil when it is installed level. Provide removable drain plug for each coil row.

H. Coils shall be suitable for working pressures up to 200 psig and temperatures to 220°F. Test each coil to a minimum air pressure of 350 pounds per square inch with the coil submerged in water.

2.6 FAN COIL UNITS

A. Acceptable Manufacturers: Carrier, Trane, McQuay, York, Lanco, First Co., Williams, Customair, Sanyo, ETI, Enviro-Tec, Airtherm Inc., Vulcan Inc., Rittling.

B. Units shall consist of coils, drain pan assembly, filter, and centrifugal fan with drive mounted in a common cabinet for independent air delivery from a single unit. Units shall be complete except for controls. All oiling connections shall be extended to exterior of casing to facilitate maintenance without removing sound proofing on exterior of unit.

C. Casings shall be constructed of 16 gauge steel, phosphatized to assure paint adherence and finished with baked enamel. Casings shall be provided with 3/4" glass fiber material meeting NFPA 90A to prevent condensation.

D. Coils shall be of rows shown in schedule. Aluminum fins shall be mechanically bonded to 1/2 inch O.D. seamless copper tubes. All coils shall be specifically designed and circuited for water use. All coils shall be tested at 300 PSI and suitable for working pressures up to 200 PSI.

E. Fans shall be forward curved, centrifugal blower type fans equipped with heavy duty adjustable V-belt drive. The fan shaft shall be supported by a permanently lubricated bearing. All fans shall be dynamically balanced.

F. Drain pans shall be integrally attached to coil casings and are complete with threaded pipe drain connection. All pans shall be galvanized for corrosion resistance and cover the entire coil length. Drain pans shall be waterproofed to prevent leakage.

G. Filters shall be provided on all units. Filters shall be one inch high efficiency throw-away type. Filter access shall be from the side of the unit.

H. Motors shall be as scheduled on the plans. Reference specification Section 230529 for additional requirements.

2.7 DIRECT EVAPORATIVE COOLING MEDIA

A. AirWasher shall consist of a stainless steel basin, casing top panel, and casing side panels, wetted surface fill, upper distribution pad, recirculating pump, water distribution pipe and header, fresh water make-up system, and overflow and drain pipe connections. Entire piping system to be constructed from Type L copper tube, no plastic pipe allowed anywhere in evaporative media section.

B. The basin shall be constructed of 16 gauge 304 stainless steel, formed and welded on both sides. The basin shall include continuous welded stainless steel supports for the fill material and 2-1/2” minimum threaded pipe connections for overflow and drain. The basin shall be 12” deep and extend a minimum of 30" downstream of the leaving air side of

media. Bottom of basin shall slope in two directions to drain connection at ¼"/ft. Drain connection shall be at lowest point to allow all water to be drained.

C. The casing side panels and top panel shall be fabricated from 14 and 16 gauge 304 stainless steel with perforated angle flanges at panel edges and formed intermediate reinforcing ribs for rigidity. Perforated panel edges are required to allow airflow through edges of media to dry media after circulation pump is turned off. Joints between panels and between panels and basin shall be gasketed and caulked to be water and airtight. Removable panels, with stainless steel bolts and wing nuts, shall be furnished as necessary to provide access to all portions of the water distribution header/nozzles.

D. The wetted surface fill shall be Munter's Glasdek with Tuff-Edge non-porous edge treatment. Fill materials shall be formed and laid up using a cross fluted design to produce a highly turbulent mixing of air and water for optimum evaporation and heat transfer. Media fill sections shall not be more than 6 feet tall. Upper media shall be supported by horizontal stainless steel angles with intermediate vertical supports at 4 feet o.c. Design shall provide flushing during water circulation to minimize fouling due to mineral buildup, sand, or atmospheric dust. The upper section of the fill consists of a 2" thick distribution pad of the same material as the fill. Fill depth shall be as scheduled on drawings. Fill face area shall be sized to the nominal dimensions scheduled for operation at no greater than 600 fpm at full airflow to prevent water carryover.

E. The water recirculation system shall consist of a factory furnished and mounted vertical submersible pump, located in the basin. Pump manufacturer Ebara Model NO. EPD The pump shall be protected against entry of debris by removable brass or stainless steel suction screens in stainless steel frames. Pump shall operate on 120v/1 ph./60 Hz power. Provide disconnect switch and low water cutoff to de-energize the pump if water level becomes low enough to damage the pump. Low water cut-off shall automatically reset when sufficient water is present for safe pump operation. Construction and flow rate for the pump discharge piping and distribution header shall be in accordance with Munter's recommendations. A balancing cock and rotometer/flowmeter with flow indication in GPM (Dwyer Model VFC or equal, flow range 2-20 GPM) shall be furnished for adjustment of flow. Ports shall be furnished in the pump discharge pipe for use with bleed valve. Provide exposed ball valves with hose connections at both ends of header for periodic manual flushing of header piping. Provide bleed valve and ¼" copper tube to drain.

F. Make-up water flow is regulated by a ½" non-modulating float valve, Cla-Val 124-01A or equal by OCV Control Valve with float. A fitting and hose bib shall be furnished for use as a quick-fill means and for periodic flushing cleaning of sump. Provide balance valve with locking stop on makeup line. Adjust balance valve to limit maximum fill rate to less than overflow piping flowrate to prevent over-flowing basin if float valve fails.

G. Water drain down/flush valves and controls shall be by 230900 Contractor.

2.8 RADIANT FLOOR HEATING SYSTEM

A. Furnish and install in accordance with manufacturer's recommendations the radiant floor heating system as indicated.

B. All components of system shall be provided by one manufacturer including pipe, manifold, manifold support brackets, wire ties, pipe bend supports, pipe couplings and splicing nipples.

C. Pipe shall be crosslinked polyethylene rated at 180°F maximum working temperature and 100 PSI working pressure. Pipe shall be nominal 3/4" diameter and shall be manufactured in accordance with ASTM standard F876877.

1. The minimum bend radius of the pipe shall not be greater than 7 times the diameter in cold bending.
2. The pipe shall consist of three layers of materials. The interior layer shall be crosslinked polyethylene manufactured by the Engle method. The second layer shall be an oxygen diffusion barrier capable of limited oxygen diffusion through the pipe to no greater than .005 mg/ld (104°F). The third layer shall be crosslinked polyethylene and shall protect the oxygen diffusion barrier and inner layer from moderate jobsite abuse.
3. EPDM, Polybutylene piping and any type of polyolephine piping shall not be approved or considered on this project due to oxygen penetration characteristics.

D. Manifolds shall be stainless steel construction and have integral circuit balancing valves (with individual circuit control valves where required). Manifolds shall be provided with support brackets for wall mounting and pipe bend supports to allow tight bend of pipe up from slab to manifold. Manufacturer to provide stainless steel angle valves to connect manifolds to supply and return piping. Angle valve to be suitable for isolation and balancing. Provide end cap with vents and hose adaptor on each manifold.

1. Provide a powder coated or painted lockable steel cabinet to house each radiant tube manifold. Match cabinet width to the width of the column that it will be installed on (as shown on plans). Provide piping knockouts in the side and bottom of the cabinet, or custom cut in the field.

E. Warranty:
Crosslinked polyethylene pipe shall carry a 10 year non-prorated warranty against failure due to manufacturing defect or exposure to stress cracking agents. Manifolds and other for 1 year from system startup.

PART 3 - EXECUTION

3.1 UNIT HEATERS (HORIZONTAL BLOW)

A. Unless noted otherwise, mount high as possible to give greatest headroom possible. Piping shall be as shown on the plans.

B. Protect the entire unit with a cover during construction.

C. Manufacturers data is to be observed before installation.

3.2 CABINET UNIT HEATERS

A. Install in accordance with manufacturers instructions.

B. Provide access to filters, controls, shut-off valves, etc.

3.3 FAN COIL UNITS

A. Install in accordance with manufacturers instructions.

B. Provide access to filters, controls, shut-off valves, etc.

C. Route condensate drain to approved receptor.

D. Provide auxiliary drain pan with separate drain line extended to a conspicuous point to serve as an indicator that the primary drain is restricted.

3.4 DIRECT EVAPORATIVE COOLING MEDIA

A. Provide make-up water piping from approved back flow device.

B. Provide balance valve with locking stop to limit makeup flowrate to less than overflow piping flowrate so unit cannot overflow if float valve fails to open. Balance to maintain non-overflow condition with both make-up and flush valves open.

3.5 SNOWMELT SYSTEM

A. Pipe joints beneath the pavement slab shall be avoided.

B. Provide factory supplied manifolds to terminate pipe loops:
   1. Provide manifold supporting brackets to secure the assembly in a workmanlike manner.
   2. Simple bend supports shall be provided to retain the pipe radius when a 90° bend is required. Two bend supports shall be supplied with each loop for use where the pipe run changes from horizontal to vertical.

C. Locate piping in slab with approximate 2" cover:
   1. Utilize wire or plastic ties to secure piping to wire mesh to insure that piping remains in place during pour. Division 23 Contractor is responsible for providing wire mesh and any chairs required to maintain the correct depth in the slab.
   2. Insulation per Architectural drawings and specifications shall be provided by General contractor below topping slabs.
   3. Each circuit of manifold shall have a balance valve.
   4. Each manifold shall have a calibrated balancing valve to balance flow to each manifold.

D. Tubing supplier shall provide tube layout for snowmelt areas indicated on contract documents.

E. Prior to pouring the slab, the completed piping system shall be filled with water, all air removed, and a pressure of 40 psi maintained for 24 hours.

F. Prior to pouring slab a detailed as-built drawing shall be prepared with the location of all piping dimensioned and accurately located. The supplier shall visit the site and certify that the installation is in conformance with the manufacturer's instructions and that as-built drawings are accurate.

3.6 RADIANT CEILING PANELS (RCP)

A. Supervision: Shall be provided by distributor of the Radiant Ceiling Panels.

B. Installation:
   1. The panel tubing shall be prepared for interconnection at factory. The radiant panels should not be removed from the protective shipping carton until they are in the immediate area of their installation.
   2. Type "L" copper tube shall be used for interconnection of panels. No fittings should be required for the interconnections between panels. 95-5 tin antimony solder joints shall be used.
   3. After first measuring, cutting, and removing burrs, clean tube end and socket of fittings, apply flux to the cleaned area, assemble, apply heat and solder, remove residual solder and flux.

C. Tests:
   1. The ceiling panels shall be leak-tested before the ceiling is put into operation.
   2. A group of panels shall be pneumatically tested with compressed air to 150 psig.

D. Filling the Ceiling System:
   1. The system shall be filled by the Division 23 Contractor. The filling procedure for the radiant ceiling is similar to filling a conventional forced water system.

E. Washing: Metal pan may be washed using a good detergent cleaner applied with a cellulose sponge, cheese cloth pad or brush. It is best applied with a cellulose sponge holding just an adequate amount of solution to wet the surface.

3.7 CHILLED WATER

A. Install coils on a level concrete curb with ½" thick neoprene pad beneath coils to provide air seal and distribute load evenly.

B. Provide a double-sloped sheet metal condensate drain pan below bottom coil. Pan shall extend from entering air side of coil to a minimum of 24" downstream of coil face, minimum 2" deep. Slope pan to drain in both directions.

   In systems with direct evaporative media downstream of coils, drain pan shall be continuous to and overlap top of evaporative media sump.

C. Pipe drain to floor sink with Type L hard-drawn copper with wrought copper solder fittings.

3.8 RADIANT FLOOR SYSTEM

A. Pipe joints beneath the concrete topping slab shall be avoided. When essential, use splicing nipple to join piping in floor.

B. Provide factory supplied manifolds to terminate pipe loops.
   1. Provide manifold supporting brackets to secure the assembly to the wall in a workmanlike manner. Manifold will be housed in a powder coated or painted lockable steel cabinet. Match cabinet width to the width of the column that it will be installed on (as shown on plans). Provide piping knockouts in the side and bottom of the cabinet, or custom cut in the field. Provide painted plywood and install behind the radiant tubing on the structural column to protect the tubing.
   2. Simple bend supports shall be provided to retain the pipe radius when a 90° bend is required. Two bend supports shall be supplied with each loop for use where the pipe run changes from horizontal to vertical.

C. Locate piping in 4" concrete slab with approximate 2" cover.
   1. Utilize wire or plastic ties to secure piping to wire mesh to insure that piping remains in place during pour. Division 23 Contractor is responsible for providing wire mesh and any chairs required to maintain the correct depth in the slab.
   2. Insulation per Architectural drawings and specifications shall be provided by General Contractor below slabs.

D. Radiant tubing supplier shall provide tube layout for snowmelt areas indicated on contract documents.

E. Prior to pouring the topping slab, the completed piping system shall be filled with water, all air removed, and a pressure of 40 psi maintained for 24 hours.

F. Prior to pouring topping slab a detailed as-built drawing shall be prepared with the location of all piping dimensioned and accurately located.

END OF SECTION

SECTION 23 6400

REFRIGERATION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Air Cooled Condensing Units

B. Screw Chiller (Water Cooled)

C. Cooling Tower (Induced Draft)

D. Installation of cooling tower on supporting steel provided under Division 5 - Metals

E. Side-Stream Solids Separator

F. Cassette-Style Cooling Only Ductless Dx Fan Coil Split-Systems with Air-Cooled Condensing Units

G. Refrigerant Piping Materials and Products

1.2 RELATED WORK

A. The General Conditions, Supplementary Conditions and Division 1, General Requirements apply to this section, and Contractor shall review and adhere to all requirements of these documents.

B. Related work specified in other Sections:
Section 230500 - Basic Mechanical Requirements
Section 230529 - Basic Mechanical Materials And Methods
Section 230540 - Mechanical Sound and Vibration Control
Section 230548 - Mechanical Seismic Control
Section 230593 - Testing, Adjusting and Balancing
Section 230700 - Mechanical Insulation
Section 232113 - HVAC Piping & Specialties
Section 232123 - HVAC Pumps
Section 232500 - HVAC Water Treatment

NOTE: Some or all of the equipment in this section will be supplied to the project included in a pre-fabricated, factory built skid as indicated on the plans. Closely coordinate with the prime Division 23 contractor and the awarded skid manufacturer. All of the requirements included in this section and related requirements listed on the project plans and schedules apply.

1.3 REFERENCES

A. Reference Standards: Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
1. Air Conditioning and Refrigeration Institute (ARI):
Standards for the following:
210/240 - Unitary Air-Conditioning and Air-Source Heat Pump Equipment
270 - Sound Rating of Outdoor Unitary Equipment
410-72 - Plate Fin Type Refrigerant Coils
450 - Water Cooled Condensers

460 - Remote Mechanical-Draft Air Cooled Condensers
520 - Positive Displacement Condensing Units
550/590 - Water Chilling Packages using the Vapor Compression Cycle
575 - Method of Measuring Machinery Sound within an Equipment Space

2. American National Standards Institute (ANSI):
ANSI B9.1 "Safety Code for Mechanical Refrigeration." (Also known as ANSI/ASHRAE 15).
ANSI B31.5 "Refrigeration Piping," and extend applicable lower pressure limits to pressures below 15 psig.

1.4 QUALITY ASSURANCE

A. Quality control shall be in accordance with Section 230500 - Basic Mechanical Requirements.

B. The firm installing the refrigeration piping shall have at least 3 years of successful installation experience on projects with refrigeration piping system work similar to that required for this project.

C. Brazing Qualifications: Certify operators, brazing procedures and brazers in accordance with ANSI B31.5 for shop and job-site brazing of refrigerant piping work.

1.5 WARRANTY

A. All refrigerant compressors in this specification section shall be provided with a four year extended warranty for parts and labor in addition to the standard one year warranty required in Section 230500, for a total of 5 years of warranty coverage.

B. Provide Cooling Tower with 5-year mechanical equipment warranty.

1.6 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings and Product Data for the following items in accordance with the General Conditions of the Contract:
1. Compressors
2. Condensing Units
3. Chillers, Accessories and Auxiliaries
4. Chiller Starters
5. Cooling Towers
6. Solids Separator
7. Cassette-Style Cooling Only Ductless Dx Fan Coil Split-Systems with Air-Cooled Condensing Units
8. Refrigerant Coils
9. Refrigerant Specialties
10. Provide 3D shop drawings of all skids and skid mounted equipment for coordination purposes before fabricating skids.

B. Certificates: Before proceeding with refrigerant piping work, submit to the Architect/Engineer/General Contractor two copies of Certification that brazing procedures, brazers and operators will be in accordance with ANSI B31.5.

C. Operating Instructions and Maintenance Data: Submit printed Operating Instructions and Maintenance Data for the following items in accordance with Operating and Maintenance Data paragraph in Section 230500.
1. Compressors
2. Condensing Units

3. Chillers, Accessories and Auxiliaries
4. Chiller Starters
5. Cooling Towers
6. Solids Separator
7. Condensers
8. Cassette-Style Cooling Only Ductless Dx Fan Coil Split-Systems with Air-Cooled Condensing Units
9. Refrigerant Specialties

PART 2 - PRODUCTS

2.1 ROTARY SCREW CHILLER (WATER COOLED)

A. Acceptable Manufacturer: Trane RW Series is Basis of Design. Also acceptable: Carrier, York.

B. Furnish and install complete factory assembled rotary screw liquid chiller units of the size and capacity shown on the equipment schedules on the drawings. Unit performance shall be certified in accordance with ARI Standard 550 latest edition. Units shall be factory charged with oil and code compliant refrigerant.

C. Unit construction shall comply with ANSI B9.1 safety code, NEC and applicable ASME codes. Units shall be UL listed and CSA certified.

D. Water cooled rotary liquid chillers shall consist of a screw compressor or multiples thereof, direct expansion cooler, one water cooled condenser for each refrigerant circuit and control panel completely factory wired, piped and charged with refrigerant.

E. Each compressor shall be of the twin rotor open or semi-hermetic field serviceable direct drive rotary screw type, with cast iron casing, pressure lubricated rolling element bearings, external replaceable oil filter with isolation valve, and slide valve capacity control.

F. Compressor motor shall be single speed induction type and shall be serviceable without loss of refrigerant.

G. Each compressor shall be equipped with an insert-type crankcase heater of proper size to control oil dilution during shutdown.

H. Cooler shall be steel shell-and-tube type, with removable heads. Individually replaceable seamless copper tubes with integral enhancement shall be rolled into tube sheets.

I. Cooler shall be tested and stamped in accordance with ASME code for refrigerant side working pressure of 300 PSIG and a minimum water side working pressure of 150 PSIG.

J. Shell shall be insulated with 3/4" closed cell elastomeric foam insulation of maximum K factor 0.28.

K. Water cooled condenser shall be mechanically cleanable steel shell-and-tube type with seamless integral finned copper tubes, and removable heads.

L. Condenser shall be tested and stamped in accordance with ASME code for refrigerant side working pressure of 300 PSIG, water side working pressure of 150 PSIG.

M. Construction shall be as such to provide positive sub-cooling of the liquid refrigerant. A pressure relief valve, purge cock and liquid shut-off valve shall be provided on each condenser.

N. Each refrigerant circuit shall include: Combination sight glass and moisture indicator, refrigerant filter-drier (replaceable core on multiple compressor models), discharge isolation valve, and charging valve. Provide manual condenser isolation valves for containment of the entire refrigerant charge in the condenser shell during chiller service. Maximum operating pressure thermal expansion valve shall be provided to prevent compressor overload. All suction lines shall be insulated with close-fitting cellular foam insulation.

O. Unit shall have a control box which contains: Microprocessor-based control and diagnostics system including message and indicator display, keypad interface, 4-20 mA head pressure signal output for control of condenser water bypass or throttling valves, power terminal blocks, circuit breakers for compressor motor overload protection and contactors, control power transformer. All controls, gages and wiring shall be completely factory labeled.

1. Controls shall include the following automatic-restart safety shutdowns: power failure, low voltage, high voltage, loss of chilled water flow, loss of condenser water flow.
2. Controls shall include the following manual-restart safety shutdowns: motor over current, low evaporator refrigerant temperature, high condenser refrigerant pressure, high compressor discharge temperature, low oil pressure or flow, high oil filter pressure drop. Provide alarm relay output to indicate fault condition to the building DDC controls system.
3. Chiller control system shall be interfaced with the building DDC control system an ASHRAE Standard 135 (BACnet) interface. Refer to Section 230900 requirements for this project. Include all software and licenses as needed. Interface connection and wiring to DDC system shall be provided by Section 230900 Contractor. Chiller interface terminal board, point map, configuration files, license, and wiring diagrams shall be provided by chiller supplier. Interface shall include monitoring and control of all control points indicated on drawings as a minimum.

P. Unit shall be arranged for single-point power connection. Unit shall be completely factory wired beyond power connection point, including starters, disconnects, over current protection, and all other required accessories in accordance with NFPA 70 (NEC).

Q. The chiller machine manufacturer shall furnish solid state, SCR type starter complete with unit-mounted NEMA 1 enclosure. Starter to include 2 KVA control transformer, high/low voltage protection, 3-leg sensing overloads, phase rotation and single-phase failure protection, and momentary power loss protection. Chiller manufacturer shall furnish main starter and control wiring diagrams to contractor.

R. Provide full one year parts and labor warranty for the entire chiller package including controls, starters, and refrigerant charge. Provide a four year extended warranty for refrigerant compressors in this section in addition to the standard one year warranty required in Section 230500, for a total of 5 years of warranty coverage.

S. Coordinate all controls interfacing with Division 23 0900 contractor prior to ordering chiller package to ensure complete integration into the control system. Provide all required interfaces as determined by plans, specs, and Division 23 0900 contractor. Specifically, provide a BACnet interface card so that the chiller package can be seamlessly integrated into the BAS system.

T. Machinery room sound pressure rating shall not exceed the following values, when tested in accordance with ARI Standard 575:

Frequency Band (Hz)	63	125	250	500	1000	2000	4000
Full Load (dB)	67	73	62	59	71	69	57
50% Load (dB)	64	70	59	56	68	66	54

2.2 COOLING TOWER (Induced Draft, Vertical Discharge)

A. Acceptable Manufacturer: Marley AV series is Basis of Design. Also acceptable: Baltimore Aircoil, Evapco.

B. Furnish and install cooling tower of size and capacity shown on Drawings. Capacity rating shall be in accordance with Cooling Tower Institute Standards.

C. Cooling tower shall be constructed with heavy gauge, G235/Z700 galvanized steel angle and channel framework, with mill galvanized steel casing. Exterior of panels to be furnished with low VOC acrylic latex finish or zinc chromatized aluminum. All steel components of the tower(s) not exposed to or wetted by condenser water shall be made from G235/Z700 galvanized steel or hot-dip galvanized with cut edges or other exposed surfaces given a protective coat of zinc-rich compound. All wetted metal components of the tower shall be made from Series 300 stainless steel

D. Louvers shall be PVC integral with the fill sheet, or hot-dip galvanized steel. Louvers shall be factory installed.

E. The cold water basin shall be constructed of heavy gauge, Series 300 stainless steel.

F. Hot water distribution basins shall be open gravity type constructed of Series 300 stainless steel. Distribution weirs and plastic metering orifices shall be provided to assure even distribution of water over wet deck surface. Tower shall be furnished with a single inlet water connection to automatically balance and deliver water to distribution basins or with flow control valves.

G. The wet deck surface shall consist of wave-formed sheets of self-extinguishing polyvinyl chloride. It shall be noncombustible per NFPA Standard 220 and impervious to rot, decay, fungus or biological attack.

H. The drift eliminators shall be constructed of polyvinyl chloride.

I. Fan shall be heavy duty cast aluminum with either fixed pitch blades or individually adjustable pitch blades.

J. Fan shall be driven by either a one-piece multi-groove, neoprene/polyester PowerBand designed specifically for cooling tower service or through a right angle gear reducer connected to the drive motor with a non lubricated flexible driveshaft. Gearbox for driveshaft shall be suitable for use at low speeds (fan on VFD) while maintaining adequate lubrication.

K. Fan motor shall be TEAO, VFD compatible, 1800 rpm, reversible, squirrel cage, ball bearing type designed specifically for cooling tower service. Motor shall be furnished with special moisture protection on windings, shafts and bearings.

L. Access doors shall be provided for access to eliminators and plenum section. A heavy gauge, hot-dip galvanized wire fan guard shall be provided over each fan cylinder.

M. Hot water basin covers shall be furnished to eliminate the accumulation of debris in the hot water distribution basins.

N. Cooling tower shall be complete with the following:
1. Energy miser fan system.
2. Side outlet depressed sump.
3. Safety cage and ladder from roof to fan deck.
4. Internal walkway.
5. Electric basin heater with bulb thermostat and intergral contactor (controls connections by 230900, power connections by Division 26.
6. Air inlet screens.
7. Vibration cutout switch.
8. Extended lube and oil fill lines with sight glass or dipstick.
9. Safety railings.
10. Make-up water float valve.
11. Media bypass connection located above the water level.

2.3 SIDE-STREAM SOLIDS SEPARATOR

A. Approved Manufacturers: Griswold, Lakos, Puroflux.

B. Furnish and install packaged solids separator system of size and capacity shown on Drawings. Provide a 2-year standard warranty on equipment.

C. Packaged solids separator system to consist of a centrifugal separator, inlet basket strainer, pump, piping, gauges, inlet and outlet valve kit, starter with HOA switch, disconnect, single-point wiring panel, and control panel all mounted on a welded steel skid.

D. Separator shall remove a minimum of 97.8% of entrained solids 45 micron/325 mesh in size and heavier than 1.20 specific gravity per pass. Separator to be constructed of carbon steel with an exterior grade enamel paint. Separator to be capable of effective separation with a pressure drop of 3 psi across the unit. Solids outlet to be located on bottom of unit to allow removal of separated solids to drain.

E. Pump to be centrifugal type, capable of performance indicated on the unit schedule. Pump to be mounted on skid such that pump or motor can be removed without disassembling piping. Provide with an inline basket strainer and UL approved TEFC motor.

F. Electrical components shall be housed in a NEMA 4 powder coated enclosure with quick release latch. Enclosure to be complete with a single-point wiring panel. Electrical panel to be complete with motor starter, disconnect, and adjustable overload and short circuit protection.

G. Piping, strainer, and separator to be rated at 150 psi maximum working pressure.

H. Note that the Division 232500 Contractor will furnish a motorized ball valve to be installed on the purge outlet on the bottom of the separator. This valve will be controlled by the TDS controller provided by the HVAC Water Treatment Contractor and wired by the Division 230900 Contractor. This valve will open to purge separated solids from the separator. Do not provide a separate purge timer system on the unit.

2.4 CASSETTE-STYLE COOLING-ONLY DUCTLESS DX FAN COIL SPLIT SYSTEMS WITH AIR COOLED CONDENSING UNITS

A. Acceptable Manufacturer: Carrier, Trane, York, Mitsubishi.

B. Furnish and install factory assembled cooling-only split systems of the type, size and capacity shown on the equipment schedule on the Drawings. Unit performance shall be certified in accordance with latest edition of ARI Standards 210 and 270.

C. Condensing units shall be of the packaged air cooled type as shown on the Drawings and consist of a rotary compressor, air cooled condenser and control panel completely factory wired and piped. Unit construction shall comply with ANSI B9.1 safety code, national electric code and ASME code.

D. The condensing unit shall contain sufficient refrigerant (R134, R410A or R407) for complete system and be equipped with refrigerant line fittings which permit mechanical or sweat connection. Brass service valves with fittings and gage ports shall be located on exterior of unit.

E. Compressor shall be of the welded hermetic type with internal vibration isolation and be located in an isolated section of unit.

F. Controls shall be factory wired and placed in a location readily accessible from top of unit. Compressor motor shall have both thermal and current sensitive overload devices.

G. Condenser coil shall be constructed with aluminum plate fins mechanically bonded to nonferrous tubing. Coil shall be protected by a grille. Condenser fan shall be propeller type, direct driven, and arranged for vertical air discharge. Fan motor shall be factory lubricated and internally protected.

H. Unit to be housed in a fully weatherproof housing made of galvaneal steel, zinc phosphatized, with a baked enamel finish.

I. Condensing unit must be capable of serving DX fan coil located 22 vertical feet below the condenser.

J. Fan coil to be of size and capacity indicated on the drawings. Fan coil to mount on vertical wall surface and have a maximum height of 14".

K. Fan coil shall be complete with DX cooling coil, condensate pan and drain, direct drive fan, fan motor, filter, piping connectors, microprocessor control system, and integral thermostat. Include integral wall mounting bracket and mounting hardware.

L. Fan coil cabinet to be fully insulated for improved acoustical and thermal performance.

M. Fan coil to be configured with return air drawn in at top of front vertical face, and supply air discharged at bottom of front vertical face. Discharge to include manually adjustable horizontal and vertical deflection blades, as well as automatic motor driven vertical air sweep with on/off switch.

N. Fan coil unit to include a remote control that allows users to turn unit on/off, change setpoints, and change from fan-only to cooling mode.

O. Fan coil to connect to condensing unit for electrical power as necessary.

P. Provide the following accessories:
1. Start capacitor and relay.
2. Indoor fan relay.
3. Liquid line filter drier.
4. Low ambient kit (0°F).
5. Low voltage control transformer.
6. Device to prevent damage to compressor caused by short cycling.

7. Crankcase heater.
8. 14” high seismic roof curb or 4” high concrete if slab on grade.
9. Factory installed starter and disconnect.

2.5 REFRIGERANT PIPING MATERIALS AND PRODUCTS

A. General:
1. Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide materials and products complying with ANSI B31.5 Code for Refrigeration Piping where applicable, base pressure rating on refrigeration piping system on maximum design pressures. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in refrigeration piping systems. Where more than 1 type of materials or products are indicated, selection is Installer's option.

B. Basic Pipe, Tube and Fittings:
1. Provide pipe, tube and fittings in accordance with the following:
Tube Size 4-1/8" and Smaller: Copper tube.
Wall Thickness: Type ACR, hard drawn temper.
Fittings: Wrought-copper, solder-joints, ANSI B16.22.
Joints: Brazed or soldered.

C. Refrigeration Valves:
1. Globe and Check Valves:
a. Acceptable Manufacturers: Subject to compliance with requirements, provide globe and check valves of one of the following:
Henry Valve Co.
Parker Hannifin Corp., Refrigeration & Air-Conditioning Div.
Sporlan Valve Co.
b. Globe Shutoff Valves: Forged brass, packed, back seating, winged seal cap, 300 deg.F (149 deg.C) temperature rating, 500 psi working pressure.
c. Check Valves: Forged brass, accessible internal parts, soft synthetic seat, fully guided brass piston and stainless steel spring, 250 deg.F (121 deg.C) temperature rating, 500 psi working pressure.

2. Solenoid Valves:
a. Acceptable Manufacturers: Subject to compliance with requirements, provide solenoid valves of one of the following:
Alco Controls Div., Emerson Electric Co.
Automatic Switch Co.
Sporland Valve Co.
b. 2-Way Solenoid Valves: Forged brass, designed to conform to ARI 760, normally closed, Teflon valve seat, NEMA 1 solenoid enclosure, 115 volt, 60 Hz., UL-listed, 1/2" conduit adapter, 250 deg.F (121 deg.C) temperature rating, 400 psi working pressure.

D. Refrigeration Accessories:
1. Acceptable Manufacturers: Subject to compliance with requirements, provide refrigeration accessories of one of the following:
Alco Controls Div., Emerson Electric Co.
Henry Valve Co.
Parker-Hannifin Corp., Refrigeration & Air-Conditioning Div.
Sporlan Valve Co.
Toxalert

2. Refrigerant Strainers: Brass shell and end connections, brazed joints, Monel screen, 100 mesh, UL listed, 350 psi working pressure.
3. Moisture-Liquid Indicators: Forged brass, single port, removable cap, polished optical glass, solder connections, UL listed, 200 deg.F (93 deg.C) temperature rating, 500 psi working pressure.
4. Refrigerant Filter-Driers: Corrosion-resistant steel shell, steel flange ring and spring, wrought copper fittings, ductile iron cover plate with steel cap screws, replaceable filter-drier core, 500 psi working pressure.
5. Evaporator Pressure Regulators: Provide corrosion-resistant, spring loaded, stainless steel springs, pressure operated, evaporator pressure regulator, in size and working pressure indicated, with copper connections.
6. Refrigerant Discharge Line Mufflers: Provide discharge line mufflers as recommended by equipment manufacturer for use in service indicated, UL listed.

PART 3 - EXECUTION

3.1 REFRIGERATION EQUIPMENT INSTALLATION

A. General: Comply with manufacturer's recommended installation instructions.

B. Provide sound and vibration isolation in accordance with Section 230540 - Mechanical Sound and Vibration Control.

C. Equipment manufacturer to provide labor to assemble, test, charge, start-up, calibrate, and instruct Owner's personnel in operation and maintenance.

3.2 WATER CHILLER

A. Comply with manufacturer's recommended installation instructions and jurisdictional codes. Provide all labor, materials, equipment and services to perform all operations required for the complete installation and related work as required in the Contract Documents.

B. Installation and equipment shall be in compliance with Mechanical Refrigeration Safety Code, ANSI B9.1, latest edition.

C. Coordinate the main power and starter installation and control wiring with the Division 26 Contractor per the wiring diagrams and instructions furnished by the chiller manufacturer in accordance with "Electric Wiring" paragraph in Section 230529.

D. Water flow switches shall be wired into control circuit so chiller will not operate unless water flows are proven and maintained in accordance with Section 230900 - Electronic Controls.

E. Contractor shall make water connections to oil cooler and other water supply, drain, and vent connections as are required by Drawings and Jurisdictional Codes.

F. Contractor shall furnish and install refrigerant vent line to outdoors as shown on drawings.

G. Mount chiller on vibration isolators in accordance with Section 230540 - Mechanical Sound and Vibration Control.

H. Provide the services of a factory trained mechanic employed by the chiller manufacturer to; leak test, refrigerant pressure test, evacuate, dehydrate, charge, start and calibrate controls. Verify all strainers have been visually inspected and cleaned before start-up. Start-up supervision only, of contractor personnel, will not be acceptable.

I. After the above services have been performed, the same factory trained representative shall be available for a sufficient length of time, but not less than three working days to instruct the owner's personnel in the proper operation and maintenance of the chiller.

3.3 COOLING TOWER

A. Comply with manufacturer's instructions for installation.

B. Install cooling tower on supporting steel provided under Division 5 - Metals.

C. Mount and level cooling tower on isolators as specified in Section 230540 - Mechanical Sound and Vibration Control. Use steel support beams when required for mounting tower.

D. Verify fan rotation direction.

E. Balance condenser water flow to tower inlet.

F. Pipe main and overflow as directed on plans.

3.4 REFRIGERATION SYSTEM INSTALLATION

A. Refrigerant Piping:

1. General: Install pipe, tube and fittings in accordance with recognized industry practices which will achieve permanently-leakproof piping systems, capable of performing indicated service without piping failure. Install each run with minimum joints and couplings, but with adequate and accessible unions for disassembly and maintenance/replacement of valves and equipment. Comply with ANSI B31 Code for Pressure Piping.
2. Piping to be kept clean and dry with factory installed caps in place until time of installation. Keep the entire system clean and dry during the installation. Piping to be straight and free of kinks, ripples, or restrictions of any kind. Bending the pipe will not be permitted. Fittings required to be of the long radius pattern except when used for oil traps.
3. Clean refrigerant piping by swabbing with dry lintless (linen) cloth, followed by refrigerant oil soaked swab. Remove excess oil by swabbing with cloth soaked in high flash point petroleum solvent, squeezed dry.
4. Pitch refrigerant piping 1" in 15 feet in direction of oil return to compressor. Provide oil traps and double risers where indicated, and where required to provide oil return.
5. Refrigeration system connections shall be of the sweat copper type properly cleaned and silver brazed with Sil-Fos or Easy-Flor solders using Handy and Harmon flux. Circulate nitrogen through tubes being soldered to eliminate the formation of copper oxide during the brazing operation.
6. Evacuation and leak test shall be made after refrigerant piping system is completed. The Contractor shall draw a vacuum on the entire system with a vacuum pump, the vacuum shall hold for 12 hours at 25 inches hg. of vacuum. The Contractor shall then break the vacuum with clean dry refrigerant, he shall then make a test with halide detector, after which he shall then draw another vacuum down to 25 in. and again break the vacuum with new clean dry refrigerant. The system shall then be fully charged with refrigerant and tested with halide detector at all joints.
7. Solder copper tube-and-fitting joints where indicated using silver-lead solder, ASTM B32, Grade 96 TS, in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply solder flux to joint areas of both tubes and fittings.

Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens.

8. Braze joints using American Welding Society (AWS) classification BCuP-4 for brazing filler metal. Bleed dry nitrogen through refrigerant piping during brazing operations.
9. Provide pipe hangers and supports in accordance with Section 230529 - Basic Mechanical Materials and Methods.

B. Refrigerant Valves:
   1. Provide refrigerant type hand valves where indicated on the Drawings and wherever required for routine servicing. Install in accordance with manufacturer's instructions. Remove accessible internal parts before soldering or brazing, replace after joints are completed.
   2. Solenoid Valves: Install in refrigerant piping as indicated with stem pointing upwards. Wire in accordance with "Electric Wiring" paragraph in Section 230529 - Basic Mechanical Materials and Methods.

C. Refrigerant Accessories:
   1. Liquid indicators, strainers and filter-drier: Furnish and install in each refrigerant circuit and in accessible location for service.
   2. Evaporator Pressure Regulators: Install in refrigerant suction lines or evaporator outlets as indicated. Adjust, if required, for proper evaporator pressure.
   3. Refrigerant Discharge Line Mufflers: Install as indicated, in horizontal or downflow portion of hot-gas lines, immediately after leaving compressor; not in riser.

D. Equipment Connections:
   1. General: Connect refrigerant piping to mechanical equipment in manner shown, and comply with equipment manufacturer's instructions where not otherwise indicated.
   2. Provide flexible connections in suction and discharge lines at compressor and install valves where necessary for proper service and maintenance.
   3. The oil level in the compressors to be checked or removed to achieve the correct level. The oil level to be rechecked after extended operation and adjusted accordingly.
   4. Install refrigeration equipment on vibration isolation mountings in accordance with Section 230540 - Mechanical Sound and Vibration Control.

E. Dehydration and Charging System:
   1. Install core in filter dryer after leak test but before evacuation.
   2. Evacuate refrigerant system with vacuum pump, until temperature of 35 deg.F (2 deg.C) is indicated on vacuum dehydration indicator.
   3. Provide manufacturer's recommended refrigerant charge to system to obtain optimum operating conditions.

END OF SECTION

ELECTRICAL ADDENDEUM

Ogden 2nd District Juvenile Courthouse
Addendum #2

September 4, 2013

ELECTRICAL – DIV 26, 27, 28

SPECIFICATIONS

Section 260933 Central Dimming Controls:

1. The specification section that was issued has editor's notes that were inadvertently included in the section. This section is re-issued in its entirety with these notes removed, for clarification.
2. Section 2.1.A: Subject to compliance with contract documents, the following manufacturers have been added to the list of approved products:

   Cooper Controls / Greengate
   Crestron

Section 260943 Network Lighting Controls:

1. Section 2.1.A: Subject to compliance with contract documents, the following manufacturers have been added to the list of approved products:

   Cooper Controls / Greengate
   Hubbell

Section 262726.1 Wiring Device Schedule:

1. Add the following to the Wiring Device Schedule:

20A Single Pole Vandal Proof	20A single pole 125V-277V standard toggle switch labeled as complying UL standard 20 and with Federal Specification W-S-896. Provide Nylon or Lexan face, back and side wired. Rated 1 HP 120V; security wall plate 14 gauge cold rolled steel with zinc-plated polyester power coat paint.	Hubbell CS1221 With SWP1 wall plate

Section 263213 Engine Generators:

1. Paragraph 1.8.B.3: Change Altitude to 4,500 feet (1,350 m).

Section 264113 Lightning Protection for Structures:

1. Section 2.1.B.1 Subject to compliance with contract documents, the following manufacturers have been added to the list of approved products:

   Robbins Lightning, Inc.

Section 275117 IP Paging Systems:

1. Delete this section. IP Paging systems are not used on this project.

Section 283111 Digital Addressable Fire-Alarm System:

1. Paragraph 2.4.A: Delete the manufacturers listed and replace with the following:

A. Manufacturers: Subject to compliance with requirements, provide ***"non-proprietary"*** products by one of the following :
   1. Fire-Lite Alarms.
   2. Silent Knight.

DRAWINGS

Sheet EE501:

1. Detail D2, Parking Lot Light Pole Base Detail: Change the name of detail to "Parking Lot and Street Light Pole Base Detail", as the concrete base also applies to the Ogden City Standard Street Poles Light.

Sheet EP601:

1. Change the following feeder sizes as follows. The CC# refers to the Conduit and Conductor Schedule:
   a. Feeder from Transformer "1TA" to "1LDPA": Change feeder from CC #46 to #48.

Sheet EP602:

1. Change the following feeder sizes as follows. The CC# refers to the Conduit and Conductor Schedule:
   a. Feeder from Transformer "1TQA" to "1QLDPA": Change feeder from CC #46 to #48.
   b. Feeder from Transformer "1TUA" to "1ULDPA": Change feeder from CC #38 to #40.

Sheet EL106:

1. Add outdoor photocell on roof, mounted to north side of stair tower (gridline D2). Circuit to relay panel 5RA, to be programmed to control all outdoor lights through networked relay system.

Sheet EL601:

1. Remove specific section numbers from the lighting fixture schedule header, replace with "required".
2. The following contractor unit cost material allowances are provided:
   Fixture Type (ZX-3): Contractor Allowance: $6,579.60 each.
3. Fixture substitutions: The following lighting fixtures have been reviewed and have been found to be acceptable for use on this project, subject to compliance with the requirements of the contract documents:

TYPE	MANUFACTURER	CATALOG NUMBER
CM-14	ALERA	CVSL-4-2T8-50/50-STEPU
CM-14D	ALERA	CVSL-4-2T8-50/50-STEDU-DIM
CM-18	ALERA	CVSL-8-2T8-50/50-STEPU
CM-18SD	ALERA	CVSL-8-2T8-50/50-STEDU
DX-1	GOTHAM	EVOSQ41226ARUNV
DX-1	LIGHTOLIER	C6X6L20N-U-VB/C6X6L1520DL40KCCLWVB
DX-1	ATLANTIC	LED6X6P-DLM2000-4K-X-SS
DX-2	GOTHAM	EVOSQ41186ARUNV
DX-2	LIGHTOLIER	C6X6L15N-U-VB/C6X6L1520DL40KCCLWVB
DX-2	ATLANTIC	LED6X6P-DLM1300-4K-X-SS
DX-3	GOTHAM	ECSSW41126ARUNV
DX-3	LIGHTOLIER	C6X6L15N-U-VB/C6X6L1520WW40KCCLWVB
DX-3	ATLANTIC	LEDW6X6P-DLM1300-4K-X-SS
DX-4	GOTHAM	EVOSQ41186ARUNV
DX-4	LIGHTOLIER	C6X6L15N-U-VB/C6X6L1520DL40KCCLWVB-SSA

E5-1	EMERGI-LITE	BLSNX42NGCXX
E5-2	EMERGI-LITE	BLSNX43NGMXX
ET	EMERGI-LITE	FTS
LED-1	AXIS	MBRLEDB1-540-SO-4-W-UNV-1-FLANGE
LED-1	ALW	LPLRT DRY 4' HP7-4000 LED DIM WH
LED-2	ALW	LPLRT DRY 8' HP7-4000 LED DIM WH-WALL
LED-3	AXIS	MBRLEDB1-540-SO-4-W-UNV-1-SINGLE FLANGE
LED-4	AXIS	MBRLEDB1-540-SO-4-W-UNV-1
LED-4	ALW	35S-XX-HP7-4000-LLED-DIM 277 EXT WH
OB-1	MCGRAW	BRL-42-100-MP-MT-CBA
OC-32	HUBBELL	TRP-20LU-4K-X-CBA
OF-1	BEACON	ALU-60NB-136-4K-4X4-UNV-PM-PCLX-18SCN
OF-1	QUALITY	QLF-80G1-530-NW-NBF-UNV-MA2-CBA-SQ-QLF1-18SCN
OF-2	BEACON	ALU-60NB-136-4K-5X5-UNV-PM-PCLX-18SCN
OF-2	QUALITY	QLF-80G1-530-NW-HBF-UNV-MA2-CBA-SQ-QLF1-18SCN
PS-1	ALERA	L4-X'-2T8-X-X-EP-U
TV-1	BRITELINE	ST1NUNV-24-FW-XX
TV-1	MARK	MKT 22 G9/DF MOD 1CF55 EDB 0-10VDC
TX-1D	OCL	TB5/4-HORIZ CABLES- CLEW-MW-DIM LED UNV
TX-4	INSIGHT	VT22 40K AC-X DIM 2 W
TX-5	INSIGHT	VT44 40K AC-X IDIM2W MOD 4X4
TX-7	INSIGHT	VTR 24 40K AC-X INT-2 W
V-1	MORELITE	VLP7-S-2-32-UNV-F1-1/2-SB
V-2	CD LIGHTING	DSA-14 T232 UNV .71 EB 25TG/18PP
WB-5	NULITE	X-17-07-07004-2F32-1F17-OC
WB-5	LITHONIA	WT8 232 MVOLT OPXP NESPDT7
WS-1	EUREKA	3530-23 LED.9.30 120 SC WH/3980
WS-1	OXYGEN	2-5131-24
WS-4	BETA CALCO	591101-FW-CBA-UNV
WS-4	SHAPER	673-16-WP-CFL2/27-INV-CBA-FD
WS-4	WINONA	5250 HB F UNV FAH4 CBA
ZX-1	MCGRAW	TLM-BO5-LED-E1-T4-CBA-LCF-SSP20-4.0-11/CBA
ZX-1	SPAULDING	CL1-A-60-LU-4K-035-X/SSS20
ZX-1	LITHONIA	DSX1LED60C70040KY4MMVOLTRPAHSDDBXD/RSS204BDM19FCBDDB
ZX-2	MCGRAW	DUAL TLM-BO5-LED-E1-T4-CBA-LCF-SSP20-4.0-11/CBA
ZX-2	SPAULDING	CL1-A-60-LU-4K-035-X DUAL/SSS20
ZX-2	LITHONIA	2-DSX1LED60C70040KY4MMVOLTRPAHSDDBXD/RSS204BDM28FCBDDB

Sheet EL603:

1. Add the following generator note to this sheet:
   "Relay panels serving emergency circuits shall be provided with a metal barrier to separate normal from emergency power. Relays controlling emergency circuits shall always fail in the "on" position regardless of previous state."

Sheet ET101A:

1. This sheet was inadvertently omitted from the drawing set, and is now included with this addendum (attached).

Sheet ET101B:

1. At Communication Closet 1134, the cable tray stub into the closet (from the 12"-wide north-south run) shall be sized at 24" wide.

2. The cable tray running east above Corridor 1184 shall not extend through the perimeter wall (stop cable tray at gridline G).

Sheet ET601:

1. This sheet was inadvertently plotted out of sequence at the beginning of the "ET" series of sheets, rather than at the end of the "ET" series where it belongs.
2. Telecomm Riser Diagram: Add requirement for first floor floorbox (typical) with 1.25" CND to MDF 1134. All floorboxes throughout building shall be provided with empty 1.25" CND run to telecomm room on the associated floor.

Sheet EY602:

1. Detail 1. Add the following as Note # 10:

#10 "Provide a manual switch control panel for backup control of the Main Control Room/Holding Cell area doors. (See Detail on Sheet EY401). All specified interlock groups shall apply to this panel's door control."

2. Detail 1. Add the following text to the "Manual Switch Control" figure: "See Note 10".

TA Series Sheets:

1. Clarification regarding AV equipment racks: Only the AV equipment rack specified for DFCM / Custodial Office 1129 is a Middle Atlantic SR series equipment rack with a fire treated ¾" plywood back board. All other AV equipment racks specified to house courtroom related AV equipment are the Middle Atlantic WRK series equipment racks

END OF ELECTRICAL ADDENDUM

Attachments:

Specification Section 260933, Central Dimming Controls
Sheet ET101A – Level 1 Telecommunications Plan – Area A

SECTION 26 0933

CENTRAL DIMMING CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes microprocessor-based central dimming controls with the following components:
   1. Digital control network.
   2. Master-control stations.
   3. Partitioned-space master-control stations.
   4. Wall stations.
   5. Dimmer cabinets with emergency transfer section.
   6. Manual switches and plates for controlling dimmers.

1.3 DEFINITIONS

A. Fade Override: The ability to temporarily set fade times to zero for all lighting scenes.

B. Fade Rate: The time it takes each zone to arrive at the next scene, dependent on the degree of change in lighting level.

C. Fade Time: The time it takes all zones to fade from one lighting scene to another, with all zones arriving at the next scene at the same time.

D. Low Voltage: As defined in NFPA 70, term for circuits and equipment operating at less than 50 V or for remote-control, signaling, and power-limited circuits.

E. Scene: The lighting effect created by adjusting several zones of lighting to the desired intensity.

F. SCR: Silicon-controlled rectifier.

G. Zone: A fixture or group of fixtures controlled simultaneously as a single entity. Also known as a "channel."

H. EM Input: a line voltage signal that when “off” forces selected dimmers to full.

I. BMS Input: A 277 volt voltage supply and signal to interface with adjacent lighting relay panel for selecting off preset in both rooms.

J. A/V input/output serial signal to access lighting presets and channels from a separate audio / video control system. RS485 or RS232 to match requirements pf the AV system.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. For central dimming controls; include elevation, features, characteristics, and labels.

2. For Control, Stations; include dimensions, features, dimmer characteristics, ratings, and directories.
3. Device plates, plate color, engraving and material.
4. Ballasts and lamp combinations compatible with dimmer controls.
5. Sound data including results of operational tests of central dimming controls.
6. Operational documentation for software and firmware.

B. Shop Drawings: Detail assemblies of standard components, custom assembled for specific application on Project. Indicate dimensions, weights, arrangement of components, and clearance and access requirements.
1. Include elevation views of front panels of control and indicating devices and control stations.
2. Include diagrams for power, signal, and control wiring and interconnection with A/V and other building controls.

C. Samples for Initial Selection: For master-control stations, partitioned-space master-control stations, wall stations, dimmer cabinets, and faceplates with factory-applied color finishes and technical features.

D. Samples for Verification: For master-control stations, partitioned-space master-control stations, wall stations, dimmer cabinets, and faceplates with factory-applied color finishes and technical features.

1.5 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For central dimming controls with remote-mounting dimmers to include in emergency, operation, and maintenance manuals.
1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
a. Software manuals.
b. Adjustments of scene preset controls, adjustable fade rates, and fade overrides.
c. Operation of adjustable zone controls.
d. Testing and adjusting of panic and emergency power features.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of central dimming controls that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
a. Damage from transient voltage surges.
b. Damage from failure due to design, materials, or workmanship.
2. Warranty Period: Cost to repair or replace any parts for one (1) years from date of Substantial Completion.
3. Extended Warranty Period: Cost of replacement parts (materials only, f.o.b. the nearest shipping point to Project site), for five (5) years, that failed in service due to transient voltage surges.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide or comparable product by one of the following:
   1. Electronic Theatre Controls, Inc.
   2. Leviton Mfg. Company Inc.
   3. Lutron Electronics Co., Inc.
   4. Philips Lighting Business Unit Professional Luminaires North America; Lightolier brand.
   5. Philips Lighting Business Unit Professional Luminaires North America; Strand Lighting brand.
   6. Crestron Electronics, Inc.
   7. ***Cooper Controls / Greengate***

2.2 GENERAL SYSTEM REQUIREMENTS

A. Compatibility:
   1. Dimming control components shall be compatible with lighting fixtures, ballasts, and transformers. All devices controlled are 0-10 VDC.
   2. Dimming control devices shall be compatible with lighting control system components specified in Section 260943.13 "Addressable-Fixture Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls," and in Section 260923 "Lighting Control Devices."

B. Line-Voltage Surge Suppression: Factory installed as an integral part of 120- and 277-V ac, solid-state dimmers and control panels.
   1. Alternative Line-Voltage Surge Suppression: Comply with requirements in Section 264313 "Surge Protection for Low-Voltage Electrical Power Circuits" for Category B locations.

C. Dimmers and Dimmer Modules: Comply with UL 508.
   1. Audible Noise and Radio-Frequency Interference Suppression: Solid-state dimmers shall operate smoothly over their operating ranges without audible lamp or dimmer noise or radio-frequency interference. Modules shall include integral or external filters to suppress audible noise and radio-frequency interference.
   2. Dimmer or Dimmer-Module Rating: Not less than 125 percent of connected load unless otherwise indicated.

2.3 SYSTEM DESCRIPTION

A. Description: Microprocessor-based, solid-state controls consisting of control stations and a separately mounted dimmer cabinet.
   1. Operation: Change variable dimmer settings of indicated number of zones simultaneously from one preset scene to another when a push button is operated.
   2. System control shall include master station(s), wall stations, and dimmer panels.
   3. Each zone shall be configurable to control the following light sources, as required by the circuiting:
      a. Fluorescent lamps with electronic dimming ballasts.
      b. LED lamps.
   4. Control of each zone shall interface with controls for the following accessory functions:
      a. Manually positioned partitions.
      b. Audio Video controls for the room

c. Building Management Systems

5. Memory: Retain preset scenes and fade settings through power failures for at least 90 days by retaining physical settings of controls or by an on-board, automatically recharged battery.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with 47 CFR 15, Subparts A and B, for Class A digital devices.

D. Comply with NFPA 70.

2.4 CONTROL NETWORK

A. Dimmers shall receive signals from control stations that are linked to dimmer cabinet with a common network data cable.

B. Functions of network control stations shall be set up at master station or programming input that include the number and arrangement of scene presets, zones, and fade times at wall stations.
1. Control Voltage: 24- or 10-V dc.
2. Comply with ESTA E1.11/USITT DMX 512-A for data transmission.

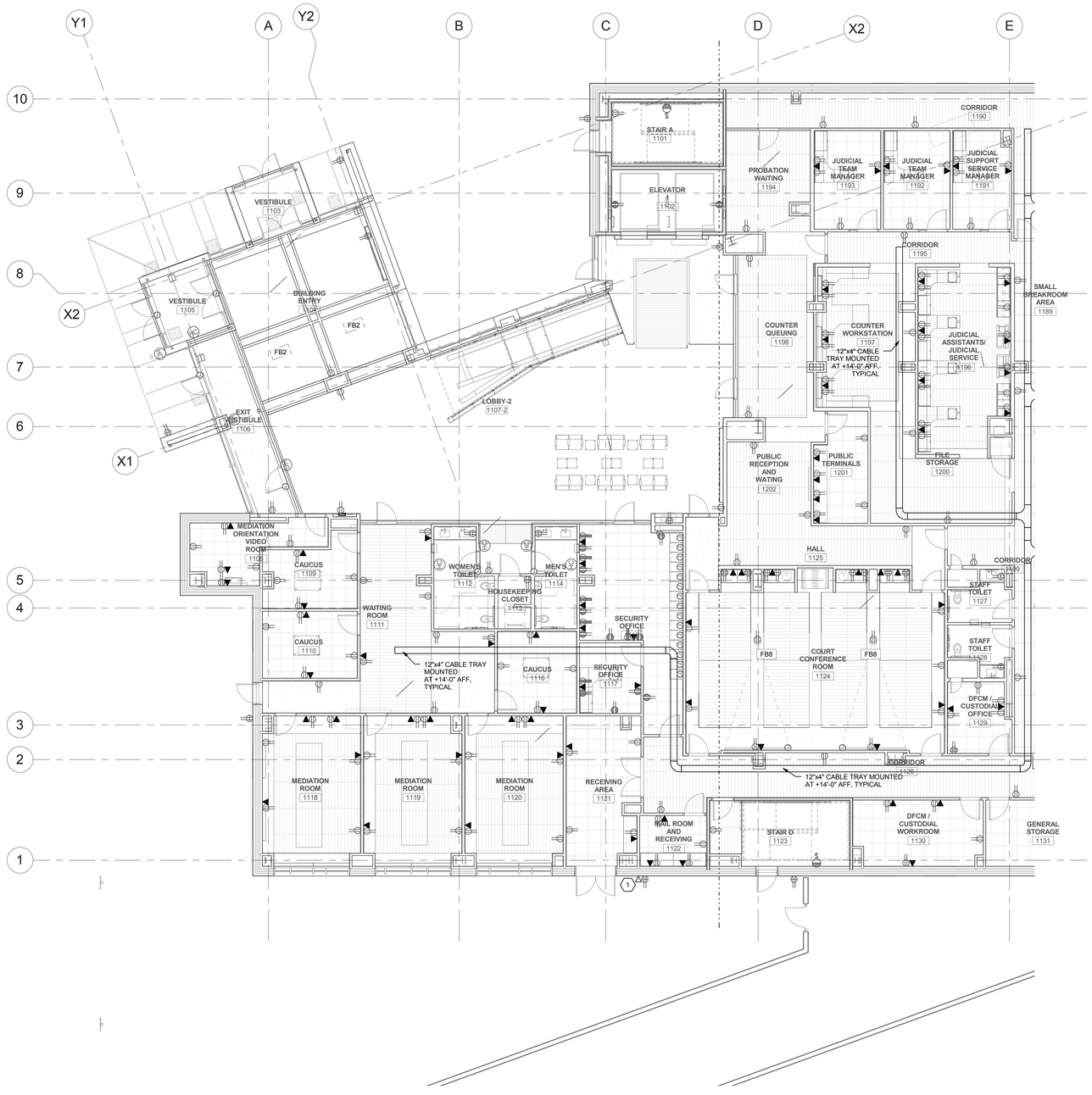
2.5 MASTER-CONTROL STATIONS

A. Functions and Features:
1. Control adjustment of the lighting level for each scene of each zone, and adjustment of fade-time setting for each scene change from one preset scene to another.
2. Master channel shall raise and lower lighting level of all zones.
3. Fade rate for each scene shall be adjustable from zero to 60 seconds.
4. Fade override control for each scene.
5. Recall each preset scene and allow adjustment of zone controls associated with that scene.
6. Lockout switch to prevent changes when set.
7. Master on and off switch; off position enables housekeeping controls.
8. Communications link to other master stations.
9. Provide for connecting a portable computer to program the master station.
10. Rear-illuminate all scene-select buttons.
11. Show lighting-level setting and fade-rate setting graphically using LEDs or backlighted bar-graph indicator.

B. Mounting: Entrance Stations shall be provided with flush wall box with manufacturer's standard faceplate with hinged transparent locking cover.

2.6 PARTITIONED-SPACE MASTER-CONTROL STATION

A. Functions and Features:
1. Automatically combine and separate lighting and accessory function controls as spaces are configured with movable partitions; with controls for adjustment of the lighting level for each scene of each dimmer, and adjustment of fade-rate setting for each scene change from one preset scene to another.
2. Master controls shall accommodate partitioning the space into required adjacent rooms.



1 LEVEL 1 TELECOMMUNICATIONS PLAN - AREA A

SCALE: 1/8" = 1'-0"

GENERAL SHEET NOTES

1 VOICE / DATA CABLE INSTALLER SHALL BE RESPONSIBLE FOR PROVIDING AND TERMINATING 1 EACH CAT 6 UTP CABLE TO ALL VIDEO SURVEILLANCE CAMERA LOCATIONS PER TIA / EIA 568C. REFER TO EY SHEETS FOR CAMERA LOCATIONS.

2 ENLARGED COMM ROOM LAYOUTS ARE SHOWN ON EP FLOOR PLAN SHEETS.

SHEET KEYNOTES

1 PROVIDE 1 EACH CAT 6 CABLE TO COMM ROOM 1134 FOR THE INSTALLATION OF A TELEPHONE / INTERCOM WALL STATION. INSTALL DOUBLE GANG BOX AT 45° AFF. THIS WILL BE AN ANALOG TELEPHONE CONNECTION.

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LICENSED PROFESSIONAL ENGINEER
No. 181563
DAVID E. WESEMANN
2013.8.15
STATE OF UTAH

SPECTRUM ENGINEERS

2nd District Juvenile Courthouse

Utah State Courts
08284150
165 West 20th Street, Ogden, Utah
BID DOCUMENTS

Rev #	Date	Description

Job # 12500
Date August 15, 2013
Owner # 08284150
Ins. #

LEVEL 1 TELECOMMUNICATIONS PLAN - AREA A

ET101A

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