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CONCRETE MASONRY

- A. REFERENCES:
- TMS 402/ACI 530-08/ASCE 5-08 BUILDING CODE REQUIREMENTS AND SPECIFICATIONS FOR MASONRY STRUCTURES.
- B. MATERIALS:
- MASONRY WALLS SHALL CONSIST OF ASTM C-90, GRADE N-1, HOLLOW CONCRETE MASONRY UNITS
 - MASONRY SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH $f_m = 1,500$ PSI.
 - MORTAR SHALL COMPLY WITH ASTM C-270, AND SHALL BE TYPE N (1800 PSI).
 - CORE FILL GROUT SHALL COMPLY WITH ASTM C-476, WITH A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI.
- C. MASONRY SHALL BE LAID IN A RUNNING BOND PATTERN UNLESS OTHERWISE NOTED. NO CONTINUOUS VERTICAL JOINTS ARE PERMITTED AT WALL CORNERS, INTERSECTIONS, AND OPENING EDGES. SAW TOOTH BLOCK EACH ALTERNATE COURSE AT THESE LOCATIONS TO ACHIEVE MONOLITHIC CONSTRUCTION.
- D. VERTICAL REINFORCEMENT: LOCATION, SIZE AND SPACING SHALL BE AS INDICATED ON THE STRUCTURAL DRAWINGS. WALLS SHALL BE REINFORCED FULL HEIGHT IN GROUT FILLED CELLS AT ALL WALL CORNERS, INTERSECTIONS, ENDS, AND ADJACENT TO OPENINGS.
- E. PROVIDE REINFORCING STEEL DOWELS INTO STRUCTURE ABOVE AND BELOW WITH SIZE AND SPACING TO MATCH VERTICAL REINFORCEMENT, UNLESS OTHERWISE NOTED.
- F. DOWELS TO THE FOUNDATIONS WITH SIZE AND SPACING TO MATCH VERTICAL REINFORCING.
- G. VERTICAL REINFORCEMENT SHALL BE CENTERED IN GROUT FILLED CELLS UNLESS NOTED OTHERWISE. REINFORCEMENT SHALL BE HELD SECURELY IN POSITION AT THE TOP AND BOTTOM OF WALL.
- H. HORIZONTAL JOINT REINFORCEMENT: SHALL BE 9 GAGE GALVANIZED DUR-O-WAL LADDER TYPE OR ENGINEER APPROVED SUBSTITUTE, LOCATED AT SIXTEEN (16) INCHES VERTICALLY.
- J. PROVIDE HORIZONTAL JOINT REINFORCING IN PARAPETS AND FREE STANDING WALLS AT EIGHT (8) INCHES VERTICALLY.
- K. CONTROL JOINTS: SHALL BE PROVIDED AS SPECIFIED BY THE ARCHITECT. TERMINATE REINFORCEMENT EACH SIDE OF CONTROL JOINTS. SEE ARCHITECTURAL DRAWINGS FOR SEALANT REQUIREMENTS AT CONTROL JOINTS.
- L. GROUTING: CONTRACTOR SHALL SUBMIT PROPOSED GROUT MIX DESIGN FOR ENGINEER REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. GROUT SLUMP SHALL BE BETWEEN 8 AND 11 INCHES. USE OF SUPERPLASTICIZER IS PROHIBITED. CELLS WHICH ARE TO RECEIVE GROUT SHALL BE VERTICALLY ALIGNED WITH A CLEAR, UNOBSTRUCTED AND CONTINUOUS VERTICAL SPACE. CELLS SHALL BE FILLED COMPLETELY AND VIBRATION CONSOLIDATED. GROUTING OPERATIONS SHALL BE CONTINUOUS AND SHALL NOT BE STOPPED FOR A PERIOD EXCEEDING ONE HOUR. WALL SHALL BE CONSTRUCTED IN MAXIMUM 12'-8" LIFTS BETWEEN GROUT POURS.
- M. GROUTING AND REINFORCING: ALL MASONRY AND GROUTING AND REINFORCING WORK SHALL BE PERFORMED BY MASONRY CRAFTWORKERS WHO HAVE SUCCESSFULLY COMPLETED THE INTERNATIONAL MASONRY INSTITUTE (1-800-IMI-0988) TRAINING COURSE FOR GROUTING AND REINFORCED MASONRY CONSTRUCTION, OR EQUAL."

OPEN WEB STEEL JOISTS

- A. REFERENCES:
- SJI STANDARD SPECIFICATIONS, LOAD TABLES AND WEIGHT TABLES FOR STEEL JOISTS AND STEEL GIRDERS.
- B. DESIGN LOADS:
- AS INDICATED. MINIMUM NET UPLIFT LOADING: 20 PSF, OR THE VALUES LISTED IN THE COMPONENTS AND CLADDING (C&C) TABLE, WHICHEVER IS GREATER.
- C. CONCENTRATED LOADS:
- ATTACHMENT IN SUCH MANNER OR AT SUCH LOCATION THAT LOCAL BENDING IS NOT INTRODUCED INTO THE CHORDS EXCEPT AS NOTED.
- D. JOIST BEARING HEIGHTS AT THE ROOF ARE BASED ON A 4 1/2" JOIST SEAT. JOIST BEARING HEIGHTS AT THE SECOND FLOOR AND MECHANICAL MEZZANINE ARE BASED ON A 2 1/2" JOIST SEAT. JOIST SEAT HEIGHTS ARE TYPICAL, UNLESS NOTED OTHERWISE.
- E. JOISTS TO BE WELDED OR BOLTED TO SUPPORTS. WELDED CONNECTIONS AT ALL ROOF JOISTS SHALL BE CAPABLE OF RESISTING FULL UPLIFT CAPACITY OF THE JOIST/JOIST GIRDER.
- F. PROVIDE BRIDGING IN ACCORDANCE WITH SJI STANDARDS UNLESS NOTED OTHERWISE. DO NOT HANG CEILING AND DUCTWORK FROM BRIDGING.
- G. SHOP DRAWINGS SHALL BEAR THE ORIGINAL SIGNATURE AND SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE JOISTS WILL BE INSTALLED.

STEEL DECK

- A. REFERENCES:
- SDI DESIGN MANUAL FOR COMPOSITE DECKS, FORM DECKS, AND ROOF DECKS
 - SDI DIAPHRAGM DESIGN MANUAL
- B. MATERIAL: A653 GRADE A (33,000 PSI MIN.), GALVANIZED (G60).
- C. INSTALLATION:
- WHERE POSSIBLE, EXTEND OVER 3 OR MORE SUPPORTS. DECK ATTACHMENTS SHALL BE IN ACCORDANCE WITH SDI SPECS UNLESS NOTED OTHERWISE AND SHALL BE ADEQUATELY SHOWN ON SHOP DRAWING SUBMITTAL.

STRUCTURAL STEEL

- A. REFERENCES:
- AISC STEEL CONSTRUCTION MANUAL, 13TH EDITION
 - AWS D1.1 STRUCTURAL WELDING CODE - STEEL
- B. MATERIALS:
- GRADE STEEL:

| | |
|-----------------------------|----------------------------------|
| WIDE FLANGES | ASTM A992, GRADE 50 |
| CHANNELS, ANGLES AND PLATES | ASTM A36 |
| SHEAR CONNECTOR PLATES | ASTM A572, GRADE 50 |
| STRUCTURAL PIPE | ASTM A 53, GRADE B, $F_y=35$ KSI |
| ROUND HSS: | ASTM A500, GRADE B, $F_y=42$ KSI |
| SQUARE OR RECTANGLE HSS: | ASTM A500, GRADE B, $F_y=46$ KSI |
 - WELDED STUDS: ASTM A108, GRADE 60
 - ANCHOR BOLTS: ASTM F1554, GRADE 55, WELDABLE.
 - STRUCTURAL BOLTS: ASTM A325-N
 - WELDS: E70XX ELECTRODES
- C. CONNECTIONS:
- AISC MANUAL STANDARD CONNECTIONS UNLESS NOTED. HIGH-STRENGTH BOLTS: ASTM A325-N, 3/4" UNLESS NOTED OTHERWISE. BEARING TYPE INSTALLED IN CONFORMANCE WITH "SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS", RESEARCH COUNCIL ON RIVETED AND BOLTED STRUCTURAL JOINTS. UNLESS NOTED OTHERWISE, STANDARD AISC "USUAL GAGE" DIMENSIONS SHALL BE USED FOR LOCATING HOLES FOR BOLTS, EXPANSION ANCHORS, ETC. IN ALL ANGLES, BEAM FLANGES, ETC.
 - THE ASSEMBLY SURFACE, INCLUDING THOSE ADJACENT TO THE WASHER, SHALL BE FREE OF MILL SCALE, OIL, PAINT OR OTHER COATINGS.
 - ALL HIGH STRENGTH BOLTS SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN THAT SPECIFICATION IN THE AISC MANUAL. FULL TENSIONING SHALL BE BY THE TURN OF NUT METHOD, BY A DIRECT TENSION INDICATOR, OR BY PROPERLY CALIBRATED WRENCHES. PROVIDE HARDENED WASHERS UNDER THE NUT OR BOLT HEAD, WHICHEVER IS THE ELEMENT TURNED IN TIGHTENING.
 - WELDING - PERFORM ALL WELDING IN ACCORDANCE WITH AWS D1.1 CODE, LATEST EDITION. WELDS SHALL BE MADE ONLY BY OPERATORS CERTIFIED BY AWS IN PERFORMING THE TYPE OF WORK INDICATED.
 - ALL BEAMS SHALL HAVE SIMPLE SHEAR CONNECTIONS DESIGNED TO SUPPORT 1/2 THE TOTAL UNIFORM LOAD LISTED IN THE AISC MANUAL OF STEEL CONSTRUCTION OR THE REACTION NOTED ON THE DRAWINGS, WHICHEVER IS GREATER.
 - WHERE INDICATED ON THE DRAWINGS, CONNECTIONS SHALL BE DESIGNED FOR THE REACTIONS SHOWN. WHERE NO REACTIONS ARE INDICATED, REFER TO NOTE #5 ABOVE OR DESIGN FOR A MINIMUM REACTION OF 10 KIPS.
- D. TOLERANCES: AISC CODE OF STANDARD PRACTICE (LATEST EDITION).
- E. CAMBER: PROVIDE POSITIVE CAMBER AS NOTED ON DRAWINGS. WHERE NO CAMBER IS NOTED, RESIDUAL MILL CAMBER IS TO BE UPWARDS.
- F. SHOP DRAWINGS:
- SUBMIT ERECTION AND FABRICATION SHOP DRAWINGS. SEE SPECS.
 - SUBMIT ERECTION PROCEDURES AND TEMPORARY BRACING PLAN FOR A/E REVIEW.
 - SUBMIT CONNECTION CALCULATIONS FOR ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTIONS.
 - SHOP DRAWINGS AND CALCULATIONS MUST BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE STRUCTURAL STEEL WILL BE INSTALLED.
- G. ALL EXPOSED ANGLE AND PLATE LINTELS FOR BLOCK/BRICK SUPPORT SHALL BE HOT DIPPED GALVANIZED.
- H. PAINTING:
- AFTER MATERIAL HAS BEEN PROPERLY CLEANED AND TREATED, APPLY SHOP PRIME COAT TO ALL SURFACES, EXCEPT THOSE INTENDED FOR EMBEDMENT INTO CONCRETE OR TO RECEIVE FIELD WELDING, SLIP CRITICAL BOLTS, OR CEMENTITIOUS FIREPROOFING.

STRUCTURAL ALUMINUM

- A. REFERENCES:
- AA ALUMINUM DESIGN MANUAL
 - AA ALUMINUM STANDARDS AND DATA
 - ANSI/DWS D1.2 ALUMINUM WELDING CODE
- B. MATERIALS:
- PLATES AND ROLLED SHAPES: 6061-T6
 - STRUCTURAL BOLTS: 316 STAINLESS STEEL
- C. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER CONSTRUCTION IS FULLY COMPLETED. IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF SHORING, SHEETING, TEMPORARY BRACING, GUYS OR TIE DOWNS WHICH MIGHT BE NECESSARY. SUCH MATERIAL SHALL REMAIN THE CONTRACTOR'S PROPERTY AFTER THE COMPLETION OF THE PROJECT.
- D. PROVIDE MIN. (2) 3/4" DIA. STAINLESS STEEL BOLTS, WASHERS, AND NUTS FOR ALL CONNECTIONS, UNLESS NOTED OTHERWISE.
- E. ALL WELDING SHALL CONFORM TO AWS D1.2". SHOP DRAWINGS SHALL SHOW ALL SHOP AND ERECTION DETAILS INCLUDING CUTS, COPE CONNECTIONS, HOLES, THREADED FASTENERS, RIVETS, AND WELDS. GRIND ALL WELDS FOR SMOOTH TRANSITIONS.
- F. THE APPROVAL OF THE SHOP DRAWINGS WILL BE FOR SIZE AND ARRANGEMENT OF PRINCIPAL AND AUXILIARY MEMBERS AND STRENGTH OF CONNECTIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DIMENSIONS SHOWN ON THE SHOP DRAWINGS.
- G. LAYOUT AND DESIGN FOR GUARDRAIL, HANDRAIL AND THEIR COMPONENTS SHALL ADHERE TO THE APPLICABLE BUILDING CODES.
- H. BURNING OF HOLES IN ALUMINUM IS NOT PERMITTED WITHOUT PRIOR APPROVAL OF THE ENGINEER.

COLD-FORMED STEEL FRAMING

- A. DESIGN, FABRICATION, AND ERECTION: AMERICAN IRON AND STEEL INSTITUTE (AISI), SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS, LATEST EDITION.
- B. MATERIAL: ASTM A 500, STANDARD SPECIFICATION FOR COLD FORMED WELDED AND SEAMLESS CARBON STEEL STRUCTURAL TUBING IN ROUNDS AND SHAPES, ASTM A 653/A 653M, STANDARD SPECIFICATION FOR STEEL SHEETS, ZINC-COATED (GALVANIZED) OR ZINC-IRON ALLOY COATED BY THE HOT DIP PROCESS.
- C. SHOP DRAWINGS: SUBMIT SHOP DRAWINGS BEARING THE SEAL AND SIGNATURE OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE COLD-FORMED METAL FRAMING WILL BE INSTALLED
- D. BRIDGING: IN ACCORDANCE WITH AISI "DESIGN GUIDE FOR COLD-FORMED STEEL STRUCTURAL MEMBERS"
- E. MEMBER DESIGNATION INDICATED ON THE DRAWINGS IS IN ACCORDANCE WITH THE STEEL STUD MANUFACTURERS ASSOCIATION (SSMA) AS DESCRIBED BELOW

COLD-FORMED STEEL TRUSSES

- A. ALL COLD-FORMED STEEL TRUSS DESIGN, INCLUDING CONNECTIONS, SHALL BE BY AN ALABAMA REGISTERED SPECIALTY ENGINEER. COLD-FORMED STEEL DESIGN SHALL BE IN CONFORMANCE WITH THE AMERICAN IRON AND STEEL INSTITUTE (AISI) "SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS".
- B. ENGINEERED COLD-FORMED STEEL TRUSSES SHALL BE DESIGNED FOR THE SUPERIMPOSED LOADS STATED IN THE DESIGN CRITERIA. IN ADDITION TO SPECIAL LOADING CONDITIONS WHERE SPECIFIED ON THE STRUCTURAL DRAWINGS. DESIGN LAYOUT, SPACING AND CONFIGURATION SHALL BE AS INDICATED ON THE STRUCTURAL DRAWINGS. SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL PRIOR TO FABRICATION OR CONSTRUCTION. SHOP DRAWINGS SHALL CLEARLY INDICATE ALL TRUSS TO TRUSS CONNECTIONS, CONNECTIONS AMONG TRUSS MEMBERS, TRUSS TO STRUCTURE CONNECTIONS INCLUDING STEEL EMBED PLATES, AND ANY CONNECTORS RELATED TO ITEMS PROVIDED AS PART OF THE ENGINEERED TRUSS SYSTEM. SHOP DRAWINGS SHALL INCLUDE AN ERECTION PLAN WHICH IDENTIFIES ALL ROOF TRUSS COMPONENTS AND ALL PERMANENT BRACING REQUIRED FOR TRUSS DESIGN. SHOP DRAWINGS SHALL BEAR THE ORIGINAL SIGNATURE AND SEAL OF AN ALABAMA REGISTERED PROFESSIONAL ENGINEER.
- C. ROOF TRUSS LOADING:
- | | |
|-------------|--|
| DEAD LOAD : | 15 PSF (TOP CHORD) |
| | 10 PSF (BOT CHORD) |
| | 10 PSF (USED TO RESIST WIND UPLIFT) |
| LIVE LOAD: | 20 PSF (TOP CHORD) |
| WIND LOAD: | SEE COMPONENT AND CLADDING SCHEDULE OR CALCULATED PER ASCE 7 |

SPECIAL INSPECTIONS

- A. SPECIAL INSPECTION SHALL BE PROVIDED IN ACCORDANCE WITH THE 2009 ALABAMA BUILDING CODE. REFER TO SPEC SECTION 01 40 00 FOR THE STATEMENT OF SPECIAL INSPECTION. SPECIAL INSPECTION REQUIREMENTS PROVIDED ON S-0004

| MASONRY TENSION DEVELOPMENT / LAP SPLICE LENGTH (INCHES) | | | | |
|--|----------------------------------|----|----------|----------|
| BAR # | MIN. CLEAR COVER TO FACE OF CMU: | | | |
| | 1 1/2" | 2" | > 3 1/4" | > 5 1/4" |
| 3 | 19 | 18 | 18 | 18 |
| 4 | 34 | 26 | 24 | 24 |
| 5 | 45 | 40 | 30 | 30 |
| 6 | 54 | 54 | 46 | 36 |
| 7 | 63 | 63 | 62 | 42 |
| 8 | 72 | 72 | 72 | 58 |

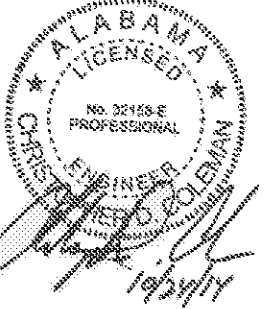
| CONCRETE TENSION DEVELOPMENT / LAP SPLICE SCHEDULE | | | | |
|--|-------------------------|------------|----------------------------------|------------|
| $f_c = 4000$ PSI (MIN) AND UNCOATED BARS | | | | |
| BAR SIZE | DEVELOPMENT LENGTH (IN) | | CLASS 'B' LAP SPLICE LENGTH (IN) | |
| | BAR TYPE 1 | BAR TYPE 2 | BAR TYPE 1 | BAR TYPE 2 |
| 3 | 15 | 22 | 19 | 28 |
| 4 | 19 | 29 | 25 | 37 |
| 5 | 24 | 36 | 31 | 47 |
| 6 | 29 | 43 | 37 | 56 |
| 7 | 42 | 63 | 54 | 81 |
| 8 | 48 | 72 | 62 | 93 |
| 9 | 54 | 81 | 70 | 105 |
| 10 | 61 | 91 | 79 | 118 |
| 11 | 74 | 111 | 97 | 145 |

- BAR TYPE 1 - CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN d_b . CLEAR COVER NOT LESS THAN d_b , AND STIRRUPS OR TIES THROUGHOUT L_d NOT LESS THAN CODE MINIMUM
- OR
- CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN $2 \cdot d_b$ AND CLEAR COVER NOT LESS THAN d_b .
- BAR TYPE 2 - TOP BARS WITH MORE THAN 12" OF FRESH CONCRETE CAST BELOW AND OTHER CASES



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HUNTSVILLE UTILITIES
SOUTHEAST WATER TREATMENT PLANT
STRUCTURAL GENERAL NOTES

Project No.: 200-11740-10003
Designed By: JLB
Drawn By: BRF
Checked By: CDC

S-0002