

GENERAL

- STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH ARCHITECTURAL, MECHANICAL, ELECTRICAL, PLUMBING, AND SITE DRAWINGS. CONSULT THESE DRAWINGS FOR LOCATIONS AND DIMENSIONS OF OPENINGS, CHASES, INSERTS, REGLETS, SLEEVES, DEPRESSIONS, AND OTHER DETAILS NOT SHOWN ON STRUCTURAL DRAWINGS.
- THE CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CONDITIONS SHOWN ON THE DRAWINGS. IN ANY CASE OF CONFLICT BETWEEN THE NOTES, DRAWINGS, DETAILS AND SPECIFICATIONS, THE MOST RIGID (MOST COSTLY) REQUIREMENTS SHALL BE ASSUMED FOR BIDDING PURPOSES BUT ANY CONFLICTS MUST BE RESOLVED IN WRITING BY THE ENGINEER BEFORE THE WORK IS IMPLEMENTED.
- THE CONTRACTORS SHALL VERIFY ALL RELEVANT EXISTING CONDITIONS PRIOR TO COMMENCING ANY OTHER WORK. ANY DISCREPANCIES BETWEEN THE NOTES, PLANS, DETAILS, SPECIFICATIONS AND EXISTING CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ENGINEER'S ATTENTION BEFORE PROCEEDING WITH THE AFFECTED PART OF THE WORK.
- THE STRUCTURE IS DESIGNED TO BE SELF SUPPORTING AND STABLE ONLY AFTER THE STRUCTURAL WORK CONTAINED IN THE DRAWINGS IS COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURES AND SEQUENCE TO ENSURE THE SAFETY OF THE BUILDING AND ITS COMPONENTS DURING ERECTION. THIS INCLUDES THE ADDITION OF NECESSARY SHORING, SHEETING, TEMPORARY BRACING, GUYS OR TIEDOWNS. SUCH MATERIAL SHALL REMAIN AT THE PROPERTY OF THE CONTRACTOR AFTER COMPLETION OF THE PROJECT.
- THE CONTRACTOR IS SOLELY RESPONSIBLE FOR JOB SAFETY, CONSTRUCTION PROCEDURES, COORDINATION OF THEIR WORK WITH OTHER TRADES AND ON-SITE SECURITY.
- THE CONTRACTOR SHALL COORDINATE WORK WITH THE OWNER TO MINIMIZE DISRUPTION TO THE OWNER'S OPERATIONS.
- THE CONTRACTOR SHALL CONTACT ALL INVOLVED UTILITY COMPANIES AND LOCATE ALL UNDERGROUND UTILITIES IN THE VICINITY OF THE WORK BEFORE PROCEEDING WITH ANY EXCAVATION WORK.
- THE CONTRACTOR SHALL PROTECT EXISTING FACILITIES, STRUCTURES AND UTILITIES FROM DAMAGE.
- SHOP DRAWINGS FOR ALL MATERIALS ARE TO BE SUBMITTED AND REVIEWED PRIOR TO THE START OF FABRICATION.
- THE CONTRACTOR SHALL MAKE NO DEVIATION FROM THE DOCUMENTS WITHOUT WRITTEN DIRECTION FROM THE ENGINEER.
- THE OWNER AND ENGINEER SHALL HAVE FREE ACCESS TO ANY FABRICATION, ERECTION AND PAINTING WORK ON ANY COMPONENT OF THIS PROJECT WHICH THEY WISH TO INSPECT DURING AND/OR UPON COMPLETION OF SUCH WORK.

STRUCTURAL DESIGN CRITERIA

- STRUCTURAL DESIGN AND CONSTRUCTION SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS OF THE FOLLOWING BUILDING CODE: IBC (2018) AS MODIFIED BY THE CITY OF WICHITA
- BUILDING RISK CATEGORY: III
- LIVE LOADS:
 - ROOF: 20 PSF
 - FLOORS: 100 PSF / 2,000 #
- SNOW LOADS:
 - GROUND SNOW LOAD (Pg): 15 PSF
 - SNOW EXPOSURE FACTOR (Ce): 1.0
 - THERMAL FACTOR (Ct): 1.1
 - SNOW IMPORTANCE FACTOR (I): 1.1
 - FLAT ROOF SNOW LOAD (Pf): 16.5 PSF
- WIND LOADS:
 - BASIC WIND SPEED (V): 118 MPH
 - BUILDING TYPE: RIGID & ENCLOSED
 - WIND EXPOSURE: EXPOSURE C
 - INTERNAL PRESSURE COEFFICIENT: +/- 0.18
- SEISMIC LOADS
 - SHORT PERIOD SPECTRAL RESPONSE (Ss): 0.086g
 - 1 SEC PERIOD SPECTRAL RESPONSE (S1): 0.053g
 - IMPORTANCE FACTOR: 1.25
 - SITE CLASSIFICATION: D
 - DESIGN SHORT PERIOD RESPONSE (Sds): 0.092g
 - DESIGN 1 SEC PERIOD RESPONSE (Sd1): 0.085g
 - SEISMIC DESIGN CATEGORY: B
 - ANALYSIS PROCEDURE: EQUIV. LATERAL FORCE
 - ORDINARY PLAIN MASONRY SHEAR WALLS
 - RESPONSE MODIFICATION FACTOR (R): 1.5
 - DEFLECTION AMPLIFICATION FACTOR (Cd): 1.25
 - SYSTEM OVERSTRENGTH FACTOR (W): 2.5
 - SEISMIC RESPONSE COEFFICIENT (Cs): 0.076

FOUNDATIONS

- PROTECT ADJACENT STRUCTURES AND FOUNDATIONS FROM DAMAGE DURING CONSTRUCTION OF NEW FOUNDATIONS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION OF ALL EXCAVATION SLOPES. WHERE NECESSARY, SHEETING AND SHORING OF EXCAVATIONS (DESIGNED BY PROFESSIONAL ENGINEER HIRED BY CONTRACTOR) SHALL BE PROVIDED WITH ALL TIE-BACKS AND BRACING.
- FOUNDATIONS ARE DESIGNED TO BEAR ON COMPACTED SUBGRADE OR SLECT FILL WITH A PRESUMPTIVE MINIMUM ALLOWABLE BEARING CAPACITY OF 2,000 PSF.
- SOILS EXPOSED AT THE BASE OF ALL SATISFACTORY FOUNDATION EXCAVATIONS SHOULD BE PROTECTED AGAINST ANY DETRIMENTAL CHANGE IN CONDITION, SUCH AS DISTURBANCE FROM RAIN. SURFACE RUNOFF SHOULD BE DRAINED AWAY FROM THE EXCAVATIONS AND NOT BE ALLOWED TO POND. FOUNDATION EXCAVATIONS SHOULD BE ADEQUATELY PROTECTED FROM RAINFALL.

- ALL SUBGRADE PREPARATION AND FILL PLACEMENT SHALL BE CONDUCTED UNDER THE OBSERVATION AND INSPECTION OF THE CONTRACTOR'S GEOTECHNICAL ENGINEER. NO FILL FOR BUILDING SUPPORT SHALL BE PLACED UNTIL SUBGRADES HAVE BEEN OBSERVED AND APPROVED BY THE GEOTECHNICAL ENGINEER.
- STRUCTURAL FILL CONSISTS OF MATERAIL CLASSIFIED AS GW, GP, SW, OR SP IN ACCORDANCE WITH ASTM D2487. LIQUID LIMIT MUST NOT EXCEED 35 IN ACCORDANCE WITH ASTM D4318, PLASTICITY INDEX MUST NOT BE GREATER THAN 12 PERCENT IN ACCORDANCE WITH ASTM D4318, AND NOT MORE THAN 10 PERCENT BY WEIGHT MAY BE FINER THAN NO. 200 SIEVE IN ACCORDANCE WITH ASTM D1140.

CONCRETE

- CONCRETE WORK SHALL CONFORM TO BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318), AND SPECIFICATIONS FOR STRUCTURAL CONCRETE (ACI 301).
- CONCRETE MUST COMPLY WITH THE REQUIREMENTS OF ASTM C94, AND AS SPECIFIED HEREIN. PROVIDE BATCH TICKET FOR EACH BATCH DISCHARGED AND USED IN WORK, INDICATING PROJECT NAME, MIX TYPE, MIX TIME, BATCH QUANTITY, AND PROPORTIONS OF INGREDIENTS.
- PORTLAND CEMENT SHALL CONFORM TO ASTM C150 TYPE I OR II. BLENDED HYDRAULIC CEMENT SHALL CONFORM TO ASTM C595 TYPE IP OR IS. AGGREGATES SHALL CONFORM TO ASTM C33 CLASS 3M.
- CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH AT 28 DAYS OF 4,000 PSI WITH A MAXIMUM WATER CEMENT (W/C) RATIO OF 0.45.
- GROUT SHALL BE NONSHRINKABLE CONFORMING TO ASTM C1107 AND SHALL HAVE A COMPRESSIVE STRENGTH AT 28 DAYS OF 5,000 PSI IN ACCORDANCE WITH ASTM C827.
- SUBMIT CONCRETE MIX DESIGNS TO THE ENGINEER FOR REVIEW. NO CONCRETE SHALL BE PLACED WITHOUT THE DESIGN MIX BEING REVIEWED BY THE ENGINEER.
- ALL DETAILING, FABRICATION AND ERECTION OF REINFORCING BARS SHALL BE IN ACCORDANCE WITH THE "ACI DETAILING MANUAL" (ACI 315).
- REINFORCING BARS SHALL BE DEFORMED AND PLAIN CARBON STEEL CONFORMING TO ASTM A615 GRADE 60.
- COMPLETE SHOP DRAWINGS AND SCHEDULES OF ALL REINFORCING STEEL SHALL BE PREPARED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR REVIEW. PROVIDE NECESSARY ACCESSORIES TO HOLD REINFORCEMENT SECURELY IN POSITION.
- MINIMUM CONCRETE PROTECTIVE COVERING FOR REINFORCEMENT SHALL BE AS FOLLOWS UNLESS NOTED OTHERWISE:
 - SURFACES CAST AGAINST AND PERMANENTLY IN CONTACT WITH EARTH: 3 INCHES
 - FORMED SURFACES IN CONTACT WITH EARTH OR EXPOSED TO WEATHER: 2 INCHES
 - SURFACES NOT IN CONTACT WITH EARTH OR EXPOSED TO WEATHER: 1.5 INCHES
- REINFORCEMENT SHALL BE CONTINUOUS AROUND CORNERS AND AT INTERSECTIONS. PROVIDE LAPPED BARS AT SPLICES OR HOOKED BARS AT DISCONTINUOUS ENDS. PROVIDE TENSION LAP SPLICES PER THE SCHEDULE FOR ALL REINFORCING UNLESS OTHERWISE SHOWN ON PLAN.
- FOR ALL OPENINGS IN CONCRETE WALLS AND SLABS, PROVIDE SUPPLEMENTAL REINFORCING AROUND OPENING AS SHOWN ON THE DRAWINGS.
- THE CONTRACTOR SHALL TAKE EVERY PRECAUTION TO PROTECT FINISHED SURFACES. PROVIDE ADEQUATE PROTECTION AGAINST OVEREXPOSURE TO SUN, WIND, OR RAIN.
- WATER SHALL NOT BE ADDED TO THE CONCRETE AT THE JOBSITE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE THE REQUIREMENTS OF THE CONCRETE SUPPLIER TO ENSURE PUMPABLE AND WORKABLE MIXES WITHOUT THE ADDITION OF WATER AT THE JOBSITE. THE USE OF CONCRETE ADDITIVES SHALL BE AT THE OPTION OF THE CONTRACTOR SUBJECT TO THE APPROVAL OF THE ENGINEER. ALL MANUFACTURER'S RECOMMENDATIONS FOR THE USE OF ADDITIVES SHALL BE FOLLOWED. THE USE OF CALCIUM CHLORIDE OR OTHER CHLORIDE BEARING SALTS ARE NOT PERMITTED.
- PLACE CONCRETE IN A MANNER SO AS TO PREVENT SEGREGATION OF THE MIX. DELAY FLOATING AND TROWELING UNTIL THE CONCRETE HAS LOST SURFACE WATER SHEEN. FINISHING OF SLAB SURFACES SHALL COMPLY WITH ACI RECOMMENDATIONS ACI 302 AND 304.
- CONCRETE SHALL NOT BE PLACED IN WATER. CONCRETE SHALL BE PLACED WITHOUT HORIZONTAL CONSTRUCTION JOINTS EXCEPT WHERE SHOWN OR NOTED. VERTICAL CONSTRUCTION JOINTS AND STOPS IN CONCRETE WORK SHALL BE MADE AT MIDSPAN OR AT POINTS OF MINIMUM SHEAR.
- ALL ADJOINING SURFACES NOT CAST MONOLITHICALLY SHALL BE ROUGHENED TO ¼ INCH AMPLITUDE FOR THE ENTIRE JOINED SURFACE PER ACI RECOMMENDATIONS. COAT SURFACES TO BE JOINED WITH APPROVED BONDING AGENT.
- CHAMFER ALL EXPOSED CONCRETE EDGES 1 INCH (UNO).

15. PLACE CONCRETE IN A MANNER SO AS TO PREVENT SEGREGATION OF THE MIX. DELAY FLOATING AND TROWELING UNTIL THE CONCRETE HAS LOST SURFACE WATER SHEEN. FINISHING OF SLAB SURFACES SHALL COMPLY WITH ACI RECOMMENDATIONS ACI 302 AND 304.

16. CONCRETE SHALL NOT BE PLACED IN WATER. CONCRETE SHALL BE PLACED WITHOUT HORIZONTAL CONSTRUCTION JOINTS EXCEPT WHERE SHOWN OR NOTED. VERTICAL CONSTRUCTION JOINTS AND STOPS IN CONCRETE WORK SHALL BE MADE AT MIDSPAN OR AT POINTS OF MINIMUM SHEAR.

17. ALL ADJOINING SURFACES NOT CAST MONOLITHICALLY SHALL BE ROUGHENED TO ¼ INCH AMPLITUDE FOR THE ENTIRE JOINED SURFACE PER ACI RECOMMENDATIONS. COAT SURFACES TO BE JOINED WITH APPROVED BONDING AGENT.

18. CHAMFER ALL EXPOSED CONCRETE EDGES 1 INCH (UNO).

19. PROVIDE PVC SLEEVES WHERE PIPES PASS THROUGH EXTERIOR CONCRETE, OR SLABS, UNLESS SHOWN OTHERWISE

20. HOT WEATHER CONCRETING SHALL CONFORM TO ACI 305. COLD WEATHER CONCRETEING SHALL CONFORM TO ACI 306.

21. CONCRETE SHALL BE PLACED IN THE PRESENCE OF A REPRESENTATIVE OF AN APPROVED TESTING AGENCY.

22. WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED (UNO).

23. FINISH FORMED SURFACES TO SF-2.0 IN ACCORDANCE WITH ACI 117. STEEL TROWEL FINISH ALL UNFORMED SURFACES.

24. PROVIDE 7 DAY CURING IMMEDIATELY AFTER FINISHING USING APPROVED CURING METHOD.

25. REPAIR CONCRETE EXHIBITING VOIDS, SPALLS OR OTHERWISE DAMAGED SURFACE WITH DRY PACK OR CEMENT GROUT AND FINISH FLUSH. AT THE DISCRETION OF THE ENGINEER OR AS QUALIFIED BY TESTING. EXCESSIVE "HONEYCOMBS" THAT JEOPARDIZE THE DESIGN SHALL BE REMOVED AND REPLACED AT THE EXPENSE OF THE CONTRACTOR.

CONCRETE MASONRY

- ALL MASONRY SHALL CONFORM TO TMS 402/60-16 BUILDING CODE REQUIREMENTS AND SPECIFICATIONS FOR MASONRY STRUCTURES.
- CONCRETE MASONRY CONSTRUCTION MATERIALS SHALL CONFORM TO THE FOLLOWING (UNO):
 - CONCRETE MASONRY UNITS ASTM C90, GRADE N, TYPE 1
 - DEFORMED REINFORCING BARS ASTM A615, GRADE 60
 - JOINT REINFORCEMENT ASTM A82
 - MASONRY MORTAR ASTM C270, TYPE S
 - MASONRY GROUT ASTM C476, TYPE 1 FINE GROUT
 - REQUIRED DESIGN FM 1,500PSI
- CONCRETE MASONRY UNITS SHALL BE SELCTED FROM THE MANUFACTURER'S STANDARD SPLIT FACE PROFILES AND COLORS. SUBMIT SAMPLES TO OWNER FOR APPROVAL
- CONCRETE MASONRY UNITS WILL BE MANUFACTURED WITH AN INTEGRAL WATER REPELLENT. MORTAR MIX WILL INCLUDE A WATER REPELLENT ADMIXTURE COMPATIBLE WITH THAT IN THE MASONRY UNITS.
- SUBMIT COMPLETE SHOP DRAWINGS FOR REVIEW PRIOR TO CONSTRUCTION.
- PROVIDE GALVANIZED LADDER-TYPE MASONRY REINFORCING IN THE FIRST TWO COURSES, AT EACH ALTERANTING COURSE ABOVE THE FIRST TWO COURSES, AND ABOVE ALL LINTELS. PROVIDE PREFABRICATED CORNERS AND TEES AS REQUIRED.
- MASONRY WALLS SHALL BE OF SINGLE WYTHE CONSTRUCTION AND LAID IN RUNNING BOND (UNO). TOOL ALL JOINTS CONCAVE.
- GROUT SOLID ALL CELLS TO BE REINFORCED.
- REINFORCE MASONRY ON EACH SIDE OF ALL OPENINGS AS DETAILED ON THE DESIGN DRAWINGS
- REINFORCE EACH CORNER, INTERSECTION AND END OF MASONRY WALL AS DETAILED ON THE DEIGN DRAWINGS
- PROVIDE BOND BEAM AT ROOF WHICH TIES INTO THE VERTICAL REINFORCEMENT. ADDITIONALLY, PROVIDE BOND BEAMS AT HORIZONTAL INTERVALS NOT TO EXCEED EIGHTEEN (18) TIMES THE WALL THICKNESS. REINFORCE ALL BOND BEAMS WITH A MINIMUM OF TWO (2) CONTINUOUS #5 BAR.
- PROVIDE CORNER AND END BLOCKS AT FINISH CORNERS AND WALL OPENINGS.
- MORTAR SHALL NOT BE USED WHERE GROUT IS SPECIFIED.

TENSION LAP SPLICE LENGTH (inches) FOR DEFORMED BARS IN CONCRETE				
BAR SIZE	f _c = 3000 psi f _y = 60,000 psi		f _c = 4000 psi f _y = 60,000 psi	
	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS
#3	16	16	13	16
#4	18	23	16	20
#5	22	28	20	25
#6	27	35	23	29
#7	38	49	33	42
#8	43	56	37	48
#9	48	63	42	55
#10	58	76	50	65
#11	71	93	62	80
#14	NOT PERMITTED	NOT PERMITTED	NOT PERMITTED	NOT PERMITTED

α = 1.0 FOR OTHER BARS AND 1.3 FOR TOP BARS
 β = 1.0 FOR UNCOATED BARS
 γ = 0.8 FOR #6 AND SMALLER AND 1.0 FOR #7 AND LARGER BARS
 λ = 1.0 FOR NORMAL WEIGHT CONCRETE

CATEGORY 6 BAR PLACEMENT
 CLEAR SPACING OF BARS > 6d_b
 CLEAR COVER > 2d_b

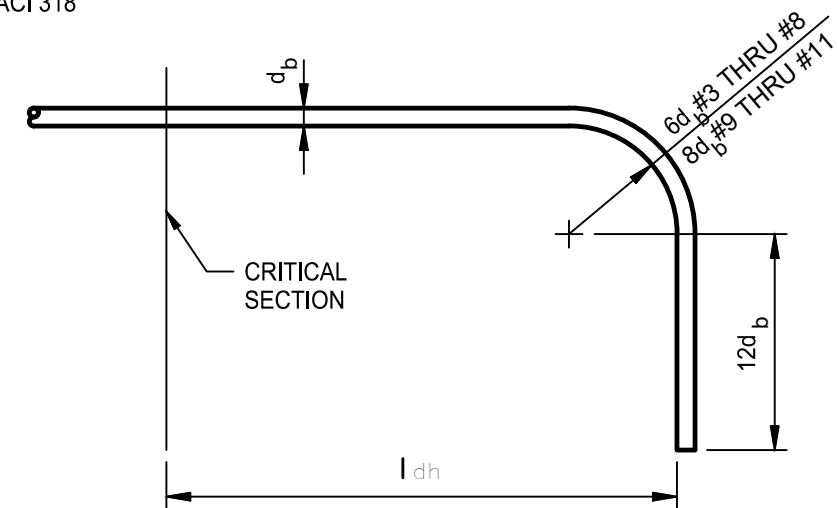
TABLE ASSUMES CLASS B LAP SPLICES
 TABLE BASED ON ACI 318

TENSION LAP SPLICE

TENSION DEVELOPMENT LENGTH (inches) FOR STANDARD 90° HOOKS					
BAR SIZE	f _c (psi)				
	3000	3500	4000	5000	HOOK LENGTH 12d _b
#3	6	6	6	6	5
#4	8	8	7	7	6
#5	10	10	9	8	8
#6	12	11	10	9	9
#7	14	13	12	11	11
#8	16	15	14	12	12
#9	18	17	15	14	14
#10	20	19	17	15	16
#11	22	21	19	17	17

λ = 1.0 FOR NORMAL WEIGHT CONCRETE
 ψ_e = 1.0 FOR UNCOATED BARS

TABLE BASED ON ACI 318



TENSION DEVELOPMENT LENGTH FOR STANDARD 90 DEGREE HOOK

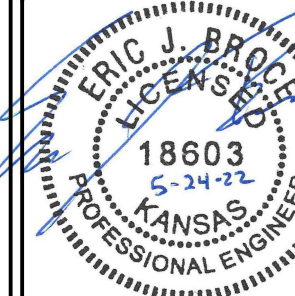
Environment & Infrastructure Solutions, Inc.
 245 N. WACO AVENUE, SUITE 110
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wood.

WELLHOUSE STR-001

EQUUS WELLFIELD SPURLINE REPLACEMENT
 GARY JANZEN, P.E. - CITY ENGINEER
 CITY OF WICHITA

DESIGNED BY: JW
 DRAWN BY: JW
 CHECKED BY: ---
 DATE: MAY 24, 2022



PROJECT NO.
639020

SHEET NO.
28
OF 35

Last Saved By: alex.mckeen Plotted By: Mckean, Alex Plot Date/Time: 5/24/2022 1:41 PM File: L:\8275000373_Wichita_Sourfline\05_CAD\Sheets\Wellhouse_Modifications\Wellhouse-Structural_DTL_1.dwg