

GENERAL STRUCTURAL NOTES

A. DESIGN CRITERIA

1. BUILDING CODE: INTERNATIONAL BUILDING CODE (IBC), 2006 EDITION, INCLUDING LOCAL SUPPLEMENTS. THIS STRUCTURE IS CLASSIFIED AS AN OCCUPANCY CATEGORY IV FACILITY.

2. GRAVITY LOADS:

LOCATION	UNIFORM LIVE LOAD	CONCENTRATED LIVE LOAD	UNIFORM DEAD LOAD
SLAB ON GRADE	100 PSF	2000 LB	-----

B. DELEGATED ENGINEERING OF STRUCTURAL COMPONENTS & SYSTEMS

1. ALL STRUCTURAL COMPONENTS & SYSTEMS SPECIFIED TO BE DESIGNED AND SEALED BY A SPECIALTY STRUCTURAL ENGINEER (SSE) SHALL MEET THE GUIDELINES PUBLISHED BY THE COUNCIL OF AMERICAN STRUCTURAL ENGINEERS (CASE) FOR DELEGATED SPECIALTY STRUCTURAL ENGINEERING.
2. WHEN COMPONENTS & SYSTEMS SPECIFIED ARE DELEGATED, THE SHOP DRAWINGS SHALL HAVE THE FOLLOWING:
 - A. PROVIDE A FULL DESIGN ANALYSIS INCLUDING CALCULATIONS WITH A SEALED COVER SHEET IDENTIFYING THE PROJECT NAME AND ADDRESS.
 - B. THE ENGINEER THAT SEALED THE CALCULATIONS SHALL ALSO SEAL THE FABRICATION, PLACING, AND ERECTION PLANS. EACH PLAN SHALL IDENTIFY THE PROJECT NAME AND ADDRESS.
 - C. IF THE ENGINEER THAT SEALED THE CALCULATIONS AND PLANS IS AN EMPLOYEE OF A COMPANY, THE COMPANY'S CERTIFICATE OF AUTHORIZATION NUMBER SHALL BE INCLUDED ON THE SUBMITTALS. BOTH THE SEALING ENGINEER AND THE CERTIFICATE OF AUTHORIZATION SHALL BE ISSUED BY THE STATE IN WHICH THE PROJECT IS LOCATED, INCLUDING PROJECTS ON FEDERAL LAND.
 - D. THE COMPANY THAT EMPLOYS THE ENGINEER SHALL PROVIDE AN INSURANCE CERTIFICATE FOR PROFESSIONAL LIABILITY INSURANCE WITH AN AGGREGATE AMOUNT OF NO LESS THAN TWO MILLION DOLLARS (\$2,000,000). NO CONTRACTS OR SUB-CONTRACTS FOR THIS PROJECT SHALL INCLUDE A LIMITATION OF LIABILITY.
 - E. THE ENGINEER THAT SEALED THE PLANS SHALL STATE THAT HE HAS COMPLETED A DETAILED REVIEW OF THE CONTRACT DOCUMENTS AND HAS INCORPORATED THE PERFORMANCE CRITERIA INTO THE SUBMITTAL.
3. THE CONTRACTOR SHALL REVIEW THE SUBMITTAL FOR QUANTITIES AND DIMENSIONS AND VERIFY THAT THE ABOVE INFORMATION HAS BEEN INCLUDED IN THE SUBMITTAL.
4. NO SUBMITTAL WILL BE REVIEWED UNLESS ALL OF THE ABOVE INFORMATION IS INCLUDED. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR DELAYS CAUSED BY INCOMPLETE SUBMITTALS.

PREFABRICATED BUILDING

1. THE FOUNDATION ENGINEER ASSUMES NO RESPONSIBILITY, EITHER EXPRESSED OR IMPLIED, FOR THE PREFABRICATED BUILDING DESIGN OR ADEQUACY TO CONFORM TO ANY CODES OR STRENGTH REQUIREMENTS.
2. DESIGN LOADS AND CRITERIA FOR THE FOUNDATION: THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THE FOLLOWING LOADS AND DESIGN CRITERIA HAVE BEEN MET BY THE PREFABRICATED BUILDING SUPPLIER.
 - A. CODES: WHEN CONFLICTS OCCUR BETWEEN THESE DOCUMENTS, THE MOST STRINGENT SHALL CONTROL.
 1. INTERNATIONAL BUILDING CODE (IBC), 2006 EDITION, INCLUDING LOCAL SUPPLEMENTS.
 2. AISI

B. GRAVITY LOADS:

1. ROOF LIVE LOAD: 20 PSF (NON-REDUCIBLE)
2. GROUND SNOW LOAD: 15 PSF + DRIFT IN ACCORDANCE WITH THE CODE

SNOW EXPOSURE FACTOR: 1.0
SNOW IMPORTANCE FACTOR: 1.0
THERMAL FACTOR: 1.1
3. COLLATERAL ROOF DEAD LOAD*: 5 PSF
4. MISCELLANEOUS LOADS: AS NOTED ON THE STRUCTURAL, MECHANICAL, AND ELECTRICAL PLANS

*COLLATERAL ROOF LOAD SHALL BE SUPERIMPOSED TO ACTUAL STRUCTURAL WEIGHTS AND THE MISCELLANEOUS LOADS. THE COLLATERAL LOADS SHALL BE APPLIED ON ALL ROOF FRAMING MEMBERS INCLUDING THE ROOF DECK, PURLINS, FRAMES, ETC.

C. LATERAL LOADS (PER ASCE 7):

1. WIND LOADS:
 - A. BASIC WIND SPEED: 90 MPH (3 SECOND GUST)
 - B. WIND EXPOSURE: C
 - C. WIND IMPORTANCE FACTOR: 1.0
 - D. INTERNAL PRESSURE COEFFICIENT: +/- 0.18
 - E. COMPONENTS AND CLADDING: 25 PSF, UNLESS NOTED OTHERWISE

COMPONENTS AND CLADDING PRESSURE SHALL BE USED FOR DESIGN OF EXTERIOR WALLS, WINDOWS, DOORS, AND MISCELLANEOUS MATERIALS NOT SPECIFICALLY SHOWN ON THE PLANS.

2. SEISMIC LOADS:

- A. SEISMIC DESIGN CATEGORY: B
- B. SEISMIC IMPORTANCE FACTOR: 1.0
- C. SEISMIC USE GROUP: I
- D. SDS: 0.144
- E. SD1: 0.082
- F. SITE CLASS: D (ASSUMED)
- G. ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE

NON-STRUCTURAL BUILDING COMPONENTS INCLUDING DUCTWORK, FURNACES, AND GENERAL ELECTRICAL EQUIPMENT SHALL BE DESIGNED FOR A SEISMIC FORCE, $F_p=0.08W_p$. COMPONENTS CONSIDERED CRITICAL TO LIFE-SAFETY OPERATION SHALL BE DESIGNED FOR A SEISMIC DESIGN FORCE, $F_p=0.12W_p$.

D. SERVICEABILITY REQUIREMENTS:

1. LATERAL DEFLECTION OF FRAMES: H/120
2. LATERAL DEFLECTION OF WIND COLUMNS AND WALL GIRTS: L/240
3. VERTICAL DEFLECTION OF ALL ELEMENTS: L/240

3. SUBMITTAL REQUIREMENTS: THE FOLLOWING SUBMITTALS SHALL BE PROVIDED TO THE ENGINEER FOR APPROVAL. REF. THE PROJECT SPECIFICATIONS FOR ADDITIONAL SUBMITTAL REQUIREMENTS.

- A. A SUMMARY OF THE DESIGN ANALYSIS SHOWING THE LOADINGS USED IN THE DESIGN, SERVICEABILITY CRITERIA, AND COLUMN REACTIONS.
 1. ALL COLUMNS AND FRAMES SHALL BE DESIGNED WITH PINNED END COLUMN BASES.
 2. SHOP DRAWINGS SHALL INCLUDE AN ANCHOR BOLT LAYOUT AND OTHER EMBED REQUIREMENTS, IN ADDITION TO ERECTION DRAWINGS INDICATING THE SIZE AND LOCATION OF STRUCTURAL MEMBERS.
 3. SHOP DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED BEARING THE SEAL OF AN ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS LOCATED.
- D. SUBMITTALS SHALL BE APPROVED PRIOR TO START OF ANY FOUNDATION WORK.
4. PRIOR TO THE START OF ANY FOUNDATION WORK, THE CONTRACTOR IS RESPONSIBLE TO VERIFY THE FOLLOWING ITEMS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES:
 - A. VERIFY ALL BUILDING DIMENSIONS WITH THE PREFABRICATED BUILDING MANUFACTURER. THE EXACT COLUMN CENTERLINE AND ANCHOR BOLT LOCATION SHALL BE COORDINATED WITH THE BUILDING FOUNDATION BY THE CONTRACTOR AND PREFABRICATED BUILDING SUPPLIER.

C. SOIL PREPARATION AND FOUNDATIONS

1. THE FOUNDATION SYSTEM IS DESIGNED AS RECOMMENDED IN THE GEOTECHNICAL INVESTIGATION PREPARED BY ALLIED LABORATORIES, JOB NO. 74-11123-147. A COPY IS IN THE SPECIFICATIONS OR IS AVAILABLE FOR INSPECTION AT THE ENGINEER'S PLACE OF BUSINESS.
2. REMOVE TOP SOIL CONTAINING ORGANIC MATERIAL AND PREPARE THE BUILDING PAD IN ACCORDANCE WITH THE CIVIL ENGINEERING PLANS, SPECIFICATIONS, AND GEOTECHNICAL INVESTIGATION.
3. REMOVE SOIL AS REQUIRED TO ALLOW FOR A LOW VOLUME CHANGE ZONE 24" THICK UNDER THE FLOOR SLAB AND DRAINAGE MATERIAL. FILL TO SUBGRADE ELEVATION SHOWN ON THE DRAWINGS WITH NON-EXPANSIVE FILL OR STABILIZED SOIL PER SPECIFICATION.
4. SOIL SUPPORTED FOUNDATIONS:
 - A. DESIGN BEARING PRESSURE (NET) IS 2000 PSF FOR FOUNDATIONS BEARING ON UNDISTURBED SOIL OR APPROVED ENGINEERED FILL MATERIAL. BEARING MATERIALS SHALL BE VERIFIED BY A LICENSED GEOTECHNICAL ENGINEER.
 - B. ALL FOUNDATIONS ARE DESIGNED WITH EARTH FORMED SIDES; THE TOP 7 1/4" OF THE FOUNDATION SHALL BE FORMED TO THE DESIGN DIMENSION. THE CONSTRUCTED FOUNDATION DIMENSION SHALL BE NO LESS THAN THE DESIGN DIMENSION, AND NO MORE THAN 6" GREATER THAN THE DESIGN DIMENSION.
5. DO NOT BACKFILL FOUNDATION/BASEMENT WALLS UNTIL THE RESTRAINING SLABS OR ADEQUATE BRACING ARE IN PLACE. ALL BACKFILL SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH THE SPECIFICATION.
6. EXTERIOR SLABS SHALL SLOPE AWAY FROM THE STRUCTURE A MINIMUM OF 1/4" PER FOOT UNLESS NOTED OTHERWISE.

D. CAST-IN-PLACE CONCRETE

1. ALL STRUCTURAL CONCRETE HAS BEEN DESIGNED IN ACCORDANCE WITH THE ACI 318 AND THE BUILDING CODE, AND IN CONFORMANCE WITH THE CURRENT "ACI MANUAL OF CONCRETE PRACTICE."
2. THE CONCRETE REQUIREMENTS ARE:
 - A. CEMENT SHALL BE TYPE I OR II CONFORMING TO ASTM C150. FLY ASH CONFORMING TO ASTM C618 TYPE C OR F MAY BE USED TO REPLACE A MAXIMUM OF 20% OF THE CEMENT.
 - B. FINE AND COARSE AGGREGATES FOR NORMAL WEIGHT CONCRETE SHALL CONFORM TO ASTM C33 AND MEET #67, #56 OR #5 GRADATION REQUIREMENTS. COARSE AGGREGATES SHALL BE NO LESS THAN 50% OF THE TOTAL AGGREGATE BY WEIGHT, UNLESS APPROVED BY THE ENGINEER PRIOR TO MIX DESIGN SUBMITTAL.

C. MIX REQUIREMENTS ARE:

LOCATION	MIN. F'C	MIN. F'CI	MIN. CEM. W/C	MAX. AIR ENT.	SLUMP INCHES
FOUNDATIONS	4000	N/A	470	0.45	5%+/-1% 2-5

3. MISCELLANEOUS CONCRETE DETAILS:

- A. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4" INSIDE FORMS OR TOOLED TO 3/4" RADIUS UNLESS NOTED OTHERWISE.
- B. VERTICAL CONSTRUCTION JOINTS, IF REQUIRED SHALL BE LOCATED AT MIDSPAN OF ELEVATED BEAMS AND SLABS. ALL JOINTS SHALL BE THOROUGHLY CLEANED AND PURPOSELY ROUGHENED TO 1/4" AMPLITUDE PRIOR TO PLACING ADJACENT CONCRETE.
- C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF ALL FORMING, TEMPORARY BRACING AND SHORING.
- D. NO ALUMINUM SHALL BE EMBEDDED IN CONCRETE. CONDUITS AND PIPING EMBEDDED IN CONCRETE WALLS SHALL BE SPACED A MINIMUM OF FOUR DIAMETERS AND THE OUTSIDE DIAMETER SHALL BE LESS THAN 30% OF THE MEMBER THICKNESS PLACED BETWEEN LAYERS OF REINFORCING.

E. CONCRETE REINFORCING (CAST-IN-PLACE)

1. MATERIALS:

	ASTM	GRADE
REINFORCING BARS:	A615	60
WELDABLE REINFORCING BARS:	A706	60
WELDED WIRE FABRIC (WWF):	A185	60 (MIN.)
HEADED STUDS:	A108	---
DEFORMED BAR ANCHORS:	A706	60
ANCHOR RODS (BOLTS):	F1554	36

2. DETAILS:

- A. WELDING OF REINFORCING BARS IS PROHIBITED UNLESS NOTED OTHERWISE. WHEN WELDING IS APPROVED, WELDING SHALL BE IN ACCORDANCE WITH AWS D1.4 "WELDING REINFORCING STEEL, ETC."
- B. WELDED WIRE FABRIC SHALL BE FURNISHED IN FLAT SHEETS.
- C. SHOP DRAWINGS SHALL BE SUBMITTED WITH REINFORCING STEEL IN ACCORDANCE WITH ACI 315.
- D. WHEN MECHANICAL SPLICES ARE INDICATED ON THE PLANS, THE SPLICE SHALL DEVELOP 125% OF THE SPECIFIED YIELD STRENGTH OF THE BAR. REQUESTS BY THE CONTRACTOR FOR MECHANICAL SPLICES MUST BE SUBMITTED IN WRITING.

3. PLACEMENT

- A. ALL REINFORCING (BARS, EMBEDMENTS, WWF, ETC.) SHALL BE SUPPORTED ON CHAIRS/BOLSTERS TO THE DESIGN DIMENSIONS. SPACING SHALL BE SUFFICIENTLY CLOSE TO PREVENT DISPLACEMENT OR PERMANENT DEFORMATION DUE TO CONCRETE PLACEMENT, FOOT TRAFFIC, OR VIBRATION. "PUDDLING IN" OR "PULLING UP" REINFORCING IS NOT AN ACCEPTABLE METHOD FOR PLACING REINFORCING. CHAIRS/BOLSTERS SHALL HAVE PLASTIC COATED FEET OR BE MADE OF STAINLESS STEEL. CHAIRS/BOLSTERS IN CONTACT WITH EARTH SHALL HAVE BOTTOM PLATES AND BE COATED TO PREVENT CORROSION. ANCHOR BOLTS SHALL BE HELD IN PLACE WITH TEMPLATES SUFFICIENTLY STRONG TO PREVENT DISPLACEMENT OR TILTING.
- B. MAINTAIN ACI CLEAR COVER ON REINFORCING AS LISTED BELOW UNLESS NOTED OTHERWISE.

CAST AGAINST EARTH (BOTTOM OR SIDES):	3"
FORMED - EXPOSED TO SOIL, WEATHER OR LIQUIDS:	2"
SLABS ON GRADE (FROM TOP OF SLAB):	1.5"
- C. PROVIDE CORNER BARS OF THE SAME SIZE AND SPACING AS ADJACENT REINFORCING. REFERENCE DETAILS. CONTINUOUS WALL FOOTING REINFORCING NEED ONLY TO OVERLAP.
- D. ALL REINFORCING BARS ARE TO BE MADE CONTINUOUS OR LAPPED PER TABLE A.

F. STRUCTURAL STEEL

1. STRUCTURAL STEEL SHALL MEET THE LATEST "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES," AND HAS BEEN DESIGNED IN ACCORDANCE WITH THE BUILDING CODE AND AISC "MANUAL OF STEEL CONSTRUCTION, ALLOWABLE STRESS DESIGN, NINTH EDITION."
2. STRUCTURAL STEEL SHALL BE NEW AND MEET THE FOLLOWING REQUIREMENTS UNLESS NOTED OTHERWISE ON THE DRAWINGS:

TYPE	ASTM	GRADE
M & S SHAPES, PLATES	A36	-----
STRUCTURAL BOLTS	A325	----- (ASTM F1852)
ERECTION BOLTS	A307	-----
HEADED ANCHOR STUDS	A108	1015/1025
ANCHOR RODS (BOLTS)	F1554	36
3. ALL WELDING SHALL BE IN ACCORDANCE WITH LATEST AWS CODE, SECTION D1.1. ALL WELDS SHALL USE E70XX WELD MATERIAL.
- G. MISCELLANEOUS
 1. THE SPECIFICATIONS ARE PART OF THE CONSTRUCTION DOCUMENTS AND MUST BE USED IN CONJUNCTION WITH THE PLANS. WHERE CONFLICTS OCCUR, THE MOST STRINGENT REQUIREMENT SHALL CONTROL.

2. DO NOT SCALE PLANS FOR THE PURPOSE OF ESTABLISHING DIMENSIONS.
3. DETAILS LABELED "TYPICAL" ARE INTENDED TO REPRESENT A CONDITION THAT OCCURS AT SEVERAL LOCATIONS IN THE PLANS WHETHER OR NOT THE DETAIL WAS REFERENCED.
4. THE STRUCTURAL PLANS REPRESENT THE STRUCTURE IN THE COMPLETED CONDITION. IT IS THE CONTRACTOR'S RESPONSIBILITY FOR THE MEANS AND METHODS OF CONSTRUCTING THE STRUCTURE. THE CONTRACTOR SHALL DESIGN AND PROVIDE ALL TEMPORARY SHORING OR BRACING REQUIRED TO SAFELY CONSTRUCT THE STRUCTURE AND PREVENT DAMAGE TO THE STRUCTURE DURING CONSTRUCTION.
5. SLABS ON GRADE ARE NOT DESIGNED TO SUPPORT CRANES, FORKLIFTS, MANLIFTS, OR TRUCK TRAFFIC UNLESS NOTED AS SUCH. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE IF CONSTRUCTION EQUIPMENT CAN BE SAFELY OPERATED ON SLABS ON GRADE AND ELEVATED SLABS AND TO REPAIR ANY DAMAGE SUCH EQUIPMENT MAY CAUSE.
6. THE CONTRACTOR SHALL REVIEW AND APPROVE ALL SHOP DRAWINGS PRIOR TO SUBMITTAL, NOTING ALL CHANGES MADE THAT DO NOT COMPLY WITH THE CONSTRUCTION DOCUMENTS.
7. ON NEW CONSTRUCTION, THE CONTRACTOR SHALL VERIFY ALL ARCHITECTURAL, ELECTRICAL, AND MECHANICAL OPENINGS AND EQUIPMENT WEIGHTS PRIOR TO COMMENCING CONSTRUCTION.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ATTACHING NON-STRUCTURAL ELEMENTS TO THE STRUCTURE TO RESIST ALL LOADS INCLUDING SEISMIC FORCES IN A WAY THAT DOES NOT OVERSTRESS STRUCTURAL MEMBERS. NON-STRUCTURAL ELEMENTS CAN BE FOUND IN THE ARCHITECTURAL, ELECTRICAL, OR MECHANICAL PLANS.
9. WHEN THE CONTRACTOR OR HIS SUBCONTRACTOR(S) FAILS TO CONSTRUCT ANY PORTION OF THE STRUCTURE IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS, THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE REMEDIATION OF THE DEFECT AND ALL RELATED COSTS INCLUDING ENGINEERING SERVICES. WHEN A DEFECT IS FIRST IDENTIFIED, IT SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION. THE ENGINEER MAY THEN REQUIRE THE CONTRACTOR TO MODIFY/REPLACE THE ELEMENT TO RECTIFY THE SITUATION, OR REQUIRE THE CONTRACTOR TO SUBMIT A RECOMMENDED REPAIR SEALED BY A LICENSED ENGINEER FOR APPROVAL.
10. WHEN THE CONTRACTOR, SUB-CONTRACTOR, OR MATERIAL SUPPLIER PROVIDES A PIECE OF EQUIPMENT THAT IS DIFFERENT FROM THE EQUIPMENT THAT THE STRUCTURE IS DESIGNED FOR BY EITHER SIZE, WEIGHT, OR CONFIGURATION, THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH REMEDYING THE SITUATION. THOSE COSTS SHALL INCLUDE THE COSTS TO HIRE A LICENSED ENGINEER TO REDESIGN PORTIONS OF THE STRUCTURE OR THE COSTS OF THE ENGINEER OF RECORD TO REDESIGN PORTIONS OF THE STRUCTURE TO ACCOMMODATE THE SUBSTITUTED PIECE OF EQUIPMENT.
- H. STRUCTURAL TESTS, INSPECTIONS, AND QUALITY ASSURANCE
 1. ALL STRUCTURAL TESTS AND INSPECTIONS SHALL BE PERFORMED PER CHAPTER 17 OF THE BUILDING CODE WITH LOCAL SUPPLEMENTS, UNLESS MORE STRINGENT REQUIREMENTS ARE SPECIFIED.

TABLE A - REINFORCEMENT LAPS, EMBEDMENTS, AND HOOK LENGTHS.					
f _y = 60000 psi f'c = 4000 psi					
BAR SIZE	EMBEDMENT & CLASS A LAP (in)		CLASS B LAP (in)		HOOKS
	TOP BAR	OTHER BARS	TOP BAR	OTHER BARS	
#3	14	12	19	14	8
#4	20	15	25	20	10
#5	24	19	31	24	12
#6	28	22	37	28	15
#7	33	25	43	33	18
#8	38	29	49	38	20

1 TABLE A
S1.1 NO SCALE

	No.	Revision	By	Date
	SEDGWICK COUNTY RURAL WATER DISTRICT #1 WATER DISTRIBUTION SYSTEM IMPROVEMENTS BOOSTER PUMP STATION GENERAL NOTES GARY JANZEN, P.E. - CITY ENGINEER CITY OF WICHITA PROJECT NO. 448-90565			
	PROFESSIONAL ENGINEERING CONSULTANTS, P.A. 303 SOUTH TOPEKA WICHITA, KS 67202 316-262-2691 www.pec1.com			
	Designed by	MWK	Job No.	34-11123
Drawn by	DGC	Date	JULY 2013	