STRUCTURAL GENERAL NOTES

1.0. CODES AND STANDARDS:

1.1. International Building Code 2009 edition.
1.2. "Minimum Design Loads for Buildings and Other Structures", American Society of Civil Engineers, ASCE 7-05.
1.3. "Specifications for Structural Steel Buildings", American Institute of Steel Construction, AISC 360-05.
1.4. "Seismic Provisions for Structural Steel Buildings", American Institute of Steel Construction, AISC 341-05, including Supplement No. 1 dated 2006.
1.5. "Structural Welding Code – Steel (AWS D1.1-04)" and "Structural Welding Code Reinforcing Steel (AWS D1.4-98)", American Welding Society.
1.6 "Building Code Requirements for Reinforced Concrete (ACI 318-05)", American Concrete Institute.
1.7. "Building Code Requirements for Masonry Structures" (ACI 530-05) and "Specifications for Masonry Structures" (ACI 530.1-05), American Concrete Institute 2002.
1.8. "Manual of Standard Practice", Concrete Reinforcing Steel Institute, latest edition.
1.9. "Design Manual for Floor Decks and Roof Decks", Steel Deck Institute.
1.10. "North American Specification for the Design of Cold-Formed Steel Structural Members", (NASPEC) American Iron and Steel Institute (AISI), 2001 edition.

2.0. SPECIFICATIONS:

2.1. The Structural Steel General Notes are not a substitute or a replacement for the project specifications. These notes are intended as a guide to the design and/or construction requirements established for this project. No contractor should attempt to design, bid, or construct any portion of the work herein without consulting the Project Specifications. Where conflicts occur between these notes and the specifications, the more stringent requirement shall apply unless a written clarification is issued by the Structural Engineer.

3.0. DESIGN LOADS:

3.1. Superimposed Gravity Loads:

Area	Live Load	Dead Load
Minimum Uniform Roof Live Load	20 psf	25 psf
Slab on Grade	200 psf	–

3.2. Seismic Loads:

Seismic Use Group	III	
Occupancy Importance Factor "Ie"	1.25	
Site Soil Classification	D (assumed)	
Mapped Spectral Response "Ss/S1"	0.224g/0.085g	
Design Spectral Response "Sds/Sd1"	0.229g/0.133g	
Seismic Design Category	C	
Mean Roof Height	13'-0"	
Structural System	North/South Ordinary Reinf. Msry. Shear Walls	East/West Ordinary Reinf. Msry. Shear Walls
Response Modification "R"	2.0	2.0
Deflection Amplification "Cd"	1.75	1.75
Period by Code Formula "Ta"	0.253 sec.	0.253 sec.
Maximum Permissible Period "Tu"	0.405 sec.	0.405 sec.
Seismic Coefficient "Cs"	0.143	0.143
Seismic Base Shear "Vo"	2.1 kips	2.1 kips

3.3. Wind Loads per ASCE 7-05:

Basic Wind Speed (3-Second Gust)	90 mph	
Occupancy Category	III	
Importance Factor "I"	1.15	
ASCE 7 Exposure Category	B	
Mean Roof Height	13'-0"	
Main Wind Force Resisting System	North/South Ordinary Reinf. Msry. Shear Walls	East/West Ordinary Reinf. Msry. Shear Walls
Windward Pressure Coefficient "Cp"	+0.80	+0.80
Leeward Pressure Coefficient	-0.50	-0.50
Wind Base Shear "Vo"	5.7 kips	1.4 kips

Wind pressures for cladding and other components vary with shape factors for those components – see appropriate ASCE 7-05 sections

3.4. Drifting Snow Loads per ASCE 7-05:

50 Year Ground Snow Load "Pg"	5.0 psf
Occupancy Category	III
Importance Factor "I"	1.10
Terrain (Exposure) Category	B
Roof Exposure Type	Partial
Exposure Factor "Ce"	1.00
Thermal Factor "Ct"	1.00
Minimum Roof Snow Load (Pg*I)	5.5 psf
Flat Roof Snow Load "Pf"	4.0 psf
Rain-on-Snow Surcharge	5.0 psf
Flat Roof Design Snow Load	9.0 psf

4.0. FOUNDATIONS:

4.1. No geotechnical study has been performed for this project on this site. Foundation design has been based on bearing strata capable of sustaining a minimum bearing pressure of 2000 psf. Contractor shall be responsible for assuring and obtaining required allowable bearing capacity. Contractor shall explicitly follow all recommendations of the Owner's Geotechnical Engineer with respect obtaining required foundation bearing capacities.
4.2. Footings shall bear on strata capable of sustaining a minimum bearing pressure of 2000 psf.
4.3. Where footing excavations must remain open overnight or if rainfall becomes imminent while bearing soils are exposed, a 2" to 4" thick mud mat of unreinforced lean (f'c = 2000 psi) concrete shall be placed on the bearing soils before placement of the footing reinforcing.
4.4. Top of footing (T/FTG) elevations are shown on the drawings or are to be determined by the Contractor in the field in accordance with the guidelines set forth in the drawings and specifications.
4.5. Bottom of exterior footings shall bear at a minimum depth of 1'-6" below final grade for frost protection.
4.6. Testing and Inspection:
a. All areas to have slabs on grade shall be proof rolled in accordance with the "Report" and under observation of the Geotechnical Engineer and approved prior to preparation for concrete placement.
b. All foundation bearing shall be inspected and approved by the Geotechnical Engineer prior to any concrete placement.
c. Geotechnical Engineer shall be the sole judge as to suitability of all foundation and/or slab bearing/founding strata.
d. Footing bearing elevations shall be adjusted in the field as required to meet the design bearing pressures by additional excavation or compaction and/or backfilling or by other means acceptable to the Geotechnical Engineer.
e. All operations shall be performed by the Contractor in accordance with the specification requirements and unit prices.
4.7. Unacceptable Soils: Contractor shall remove and replace unacceptable soils in accordance with the geotechnical report and/or at the direction of the Geotechnical Engineer. All soils with Plasticity Indices greater than 15 of which more than 10% passes a #200 sieve shall be removed to a depth of not less than 3'-0" or greater as directed by the Geotechnical Engineer where such material occurs below foundations.
4.8. Engineered Fill: All fill material shall be selected in accordance with the Geotechnical Report. Material shall be a clean, low plastic soil with a plasticity index less than 30 (less than 15 is preferred), liquid limit less than 50, unit weight of 120 pcf (+/- 5 pcf), and shall not contain more than 5% by weight of fibrous organic materials. Partially weathered rock materials may be used for structural fill provided the material can reduced to maximum dimensions of 6".
4.9. Deep Fill: Where several feet of structural fill will be required to achieve the final grades, construction shall be delayed to permit the underlying soils settle and consolidate under the weight of the newly placed fill overburden. Several weeks of time may be required for this settling to occur. Settlement pins shall be installed at the top of the fill and monitored to determine when the consolidation has reached a negligible movement thus permitting construction to begin. The Geotechnical Engineer shall be the sole judge as to the requirements for delay and completion of adequate consolidation.
4.10. Extent of Fill Placement: Structural fill shall extend horizontally beyond the edge of building foundations at least a distance of 10'-0" but not less than the height of the fill material placed. Slopes at permanent cuts should not exceed 2:1 (H:V). Slope at permanent fills should not exceed 2.5:1 (H:V) and should be properly compacted.
4.11. Compaction: All fill shall be placed in loose lifts not exceeding 8 inches in thickness and compacted to a minimum of 95 percent Standard Proctor (ASTM D-698) except that the top 12 inches under foundations and the building pad shall be compacted to a minimum of 98 percent Standard Proctor. Moisture shall be controlled to within 3 percent above or below optimum content.
4.12. Mud Slabs: Provide 2" to 4" thick lean concrete (2,000 psi) "mud-mat" slabs where foundation excavations will be left open to potential rainfalls.
4.13. Modulus of Subgrade Reaction for slabs on grade: 200 pci
4.14. Foundation and retaining wall design pressures:

Active pressure	45 psf/ft
Passive pressure	300 psf/ft
Friction coefficient	.30

4.15. Foundation and retaining walls shall have a minimum of two feet (2'-0") of free draining granular fill against the back of the wall or shall have an acceptable commercial grade of drainage mat placed against the back of the wall.
4.16. Foundation walls retaining earth shall be braced against backfill pressures until floor slabs at top and bottom are in place. Backfilling is strictly PROHIBITED until slabs are in place.
4.17. Foundation walls or grade beams having earth placed on each side shall have both filled simultaneously to maintain a common elevation.
4.18. Reinforcing in all continuous strip footings shall have corner bars or dowels provided at all corners and intersections.
4.19. If underpinning of existing foundations adjacent to the new construction will be required, The Contractor will be responsible for all such work and for providing for the adequacy and permanent support for all existing buildings. Contractor shall retain a Professional Engineer registered in North Carolina to design and detail all underpinning work based on conditions uncovered and documented in the field. Calculations and drawings for all underpinning work, signed and sealed by the Contractor's engineer, shall be submitted to the Architect for record only.

5.0. CONCRETE:

5.1. Concrete shall have 28-day compressive strengths and densities as follows:

Element/Member	Strength f'c	Density wc
Footings & Slabs on Grade	3 ksi	145 pcf

5.2. Concrete Mix Designs:
a. Submittals: Submit written reports of each proposed concrete mix not less than 15 days prior to the start of work. Design mixes prepared more than twelve (12) months prior to the date of the submittal are NOT PERMITTED.
b. Mix designs, including w/c ratios and slumps, shall be prepared in accordance with the most current ACI 301 Chapter 4, except where noted otherwise in the Project Specifications. Cement shall conform to ASTM C 150 Type I or at Contractor's option, ASTM C 595 Type IP where fly ash is permitted in accordance with the Specifications. Normal weight aggregate shall conform to ASTM C 33 and light weight aggregate shall conform to ASTM C 330. No admixtures containing calcium chloride shall be permitted in any concrete.
c. Aggregate sizes shall be:

Formed concrete elements, U.N.O.	#67 stone (3/4" max.)
Grade slabs and earth formed elements	#57 stone (1" max.)
Coarse masonry grout per Section 040516	#8 stone (3/8" max.)
Fine masonry grout per Section 040516	#4 stone (3/16" max.)

d. Water reducing admixture shall be used in all concrete.
e. Air entraining admixture in accordance with ACI 301-05 Table 4.2.2.4. shall be used in all concrete exposed to freezing and thawing during construction or service conditions.
f. Water/cement ratio shall not exceed 0.50 for any concrete subjected to freezing/thawing.
g. All pumped concrete shall have a water/cement ratio less than 0.50 and shall contain a high range water reducing admixture (superplasticizer).
h. In no case shall a water/cement ratios exceed the following:
f'c 3000 psi 0.60 max. w/c ratio
5.3. Curing:
a. Liquid membrane curing compound with a minimum 30% solids content shall be applied within two (2) hours after completion of finishing to all concrete flatwork and walls, U.N.O., other than footings and grade beams.
b. Floors in areas receiving quarry tile, ceramic tile and liquid floor hardener shall be cured with specified dissipating liquid membrane curing compound or wet cured by use of moisture retaining cover. Dissipating curing compound shall be thoroughly broomed and washed off prior to application of floor finish.
5.4. When cold weather conditions exist, place and cure concrete in accordance with ACI 306 "Cold Weather Concreting". Where use is desired, SUBMIT FOR ENGINEER'S APPROVAL a non-corrosive, non-chloride, accelerating admixture for concrete exposed to temperatures below 40 degrees. Uniformly heat water and aggregates to a temperature of not less than 50 degrees.
5.5. When hot weather conditions exist, place and cure concrete in accordance with ACI 305 "Hot Weather Concreting". Cool materials before mixing to maintain concrete placement temperature below 90 degrees.
5.6. All construction joints shown on the drawings shall be incorporated into the structure unless the Structural Engineer approves their elimination.
5.7. Additional construction joints, required to facilitate construction, are subject to the approval of the Structural Engineer and may require additional reinforcing. Such joints shall be clearly detailed on the shop drawings and all reinforcing shall pass continuously through the joint.
5.8. Reinforcing in all abutting concrete, including footings, shall be continuous through or around all corners or intersections. Dowels or splices shall be equal in size and spacing to the reinforcing in the abutting members.
5.9. Refer to architectural drawings for door and window openings, drips, reglets, washes, masonry anchors, brick ledge elevations, slab depressions and miscellaneous embedded plates, bolts, anchors, angles, etc.
5.10. Refer to architectural drawings for concrete finishes. Where finish is not specified, conform to requirements of ACI 301.
5.11. Refer to plumbing, mechanical and electrical drawings for underfloor, perimeter and other drains and for sleeves, outlet boxes, conduit, anchors, etc. The various trades are responsible for their items.
5.12. Base plates, anchor bolts, support angles and other steel exposed to earth or granular fill shall be covered with a minimum of 3" of concrete.
5.13. Fill slabs, not shown on the structural drawings, shall be reinforced with a minimum of 6x6-W1.4xW1.4 WWM unless noted otherwise on other drawings or in the specifications.
5.14. Slabs on steel deck shall be placed so the finish surface is screeded to within 1/4" of the top of slab (T/SL) elevation shown on the drawings. Screed supports shall be placed over or immediately adjacent to beam or girder lines – screed supports shall NOT be located on deck spanning between beams or girders.
5.15. Finishing tolerance shall be within Class B in accordance with ACI 301 and consideration shall be given to sequencing of concrete placement to facilitate control of finish elevations.
5.16. Non-shrink grout shall be pre-mixed, non-corrosive, non-metallic, non-staining containing silica sands, Portland cement, shrinkage compensating and water reducing agents. Product shall only require the addition of water. Minimum compressive strength shall be 2500 psi after one day and 7000 psi after 28 days. Grout shall be free of gas producing or air releasing and oxidizing agents and contain no corrosive iron, aluminum or gypsum.
5.17. Provide concrete grout – not mortar – for reinforced masonry lintel and bond beams where indicated on drawings or as scheduled.
5.18. Tolerance for anchor bolts and other embedded items shall be per the AISC Code of Standard Practice Section 7.5.
5.19. Unless otherwise shown in the architectural drawings, provide 3/4" chamfers at all column, wall, slab or beam edges that are exposed to view in the finished structure.

6.0. REINFORCING STEEL:

6.1. Reinforcing shall be domestic new billet steel conforming to ASTM A615, Grade 60 or 60S including stirrups and ties, except that reinforcing which is required to be welded shall conform to ASTM A706.
6.2. Field bending of concrete reinforcing steel IS NOT PERMITTED without written approval of the Structural Engineer.
6.3. Welded wire mat shall conform to ASTM A184 and fabric to ASTM A185.
6.4. All reinforcing shall be detailed, fabricated and placed in accordance with ACI SP-66 "ACI Detailing Manual – 1994" and the "CRSI Manual of Standard Practice", latest edition.
6.5. Minimum concrete cover over reinforcing shall be U.N.O.:
a. Unformed surface cast against earth.......... 3 in.
b. Formed surface exposed to earth/weather.......... 2 in.
c. Formed slabs and walls not exposed to earth/weather for #11 and smaller bar.......... 3/4 in.
d. All other formed elements not exposed to earth/weather.......... 1-1/2 in.
6.6. Development lengths and lap splices shall be in accordance with ACI 318-99 Chapter 12 as indicated below and as indicated on the drawings. Where splices are not called out on the drawings, use Class "B". The basic development length (Ld) is shown as a multiple of the bar diameter (Db) in the table below. The TENSION development lengths shall be multiplied by EACH of the applicable factors in paragraph "c" as indicated for Tension. The COMPRESSION development lengths do not require any modification. The compression lap splice length is noted in paragraph "c". Final lengths shall be rounded up to the nearest whole inch.
a. Two tension development length cases are noted in the table below. These two cases address conditions of minimum bar spacing and minimum clear concrete cover. BOTH spacing AND cover MUST COMPLY in selecting Case 1 of the tensile development length. Where there is ANY question of spacing or cover the larger development length (Case 2) shall be used.
Case 1: Bar spacing GREATER than 2Db AND clear cover GREATER than Db
Case 2: Bar spacing equal/less than 2Db OR Clear Cover equal/less than Db
b. Development lengths (Ld) for reinforcing fy = 60 ksi:

f'c psi	Compression All Cases	Tension Case 1	Tension Case 2
3000	22 Db	55 Db	82 Db

c. Development Length Modifiers: Multiplication factors apply to the basic "Ld" indicated above and are cumulative over each of the requirements noted below.
i. Compression: Class "C" lap splice requirement.......... 30 Db
ii. Tension: Class "A" lap splice requirement (equals Ld).... 1.0
iii. Tension: Class "B" lap splice requirement.......... 1.3
iv. Tension: Top bars with > 12" of concrete below.......... 1.3
v. Tension: Bars smaller than #7.......... 0.8
6.7. A Class "B" splice is required wherever all reinforcing bars crossing a section are spliced.
6.8. Reinforcing bars shall be welded only where shown on the structural drawings and welds shall be in accordance with the "Structural Welding Code – Reinforcing Steel" (AWS D1.4). No other reinforcing may be welded without the approval of the Structural Engineer. Tack welding of any reinforcing is STRICTLY PROHIBITED.
6.9. Welded wire mat/fabric shall be lapped 1'-0" at all splices.
6.10. All reinforcing terminating at the tops of columns and pilasters shall be hooked, U.N.O.
6.11. Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI detailing manual (SP-66) showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required at openings through concrete structures. Include all accessories specified/required to support reinforcing.
6.12. Shop drawings shall be reviewed by the Contractor prior to submission and shall bear the Contractor's approval stamp accepting responsibility for dimensions, quantities and coordination with the other trades.
6.13. Submit 11" x 17" sepia and prints of each shop drawing for review. See Project Specifications for specific requirements.
6.14. Alternatively, where acceptable to Architect, submit ONE (1) PRINT of each shop drawing for review. Drawings may be in a reduced 8 1/2" x 11" format suitable for FAX transmission where necessary to accommodate the project schedule, provided legibility is maintained. Review comments only will be forwarded to the Contractor and submission will be retained by the Structural Engineer.
6.15. Contractor shall provide in his schedule for a shop drawing review and return time of a MINIMUM of fifteen (15) working days in the Structural Engineer's office.
6.16. Contractor shall notify the Structural Engineer a MINIMUM of 48 hours prior to all concrete pours in order to permit reinforcing steel review if required by the Structural Engineer.

7.0. STRUCTURAL STEEL:

7.1. All structural steel shall be of the grades indicated below, unless noted otherwise on plans or details:
a. Wide Flange shapes ASTM A992 Gr50.
b. Other Rolled shapes ASTM A36 typically, U.N.O.
c. Anchor Bolts ASTM F1554 Gr36 U.N.O.
d. Structural tubing (Square and Rectangular) ASTM A500, Grade B, Fy=46 ksi.
e. Structural tubing (Round) ASTM A500, Grade B, Fy=42 ksi.
f. Plates and bars ASTM A36 U.N.O.
g. Miscellaneous ASTM A36 U.N.O.
7.2. All structural steel shall be detailed and, fabricated in accordance with the AISC Code of Standard Practice as modified in these notes and the project specifications.
7.3. Submit shop drawings for details, fabrication, and erection of structural steel. Comply with AISC "Steel Construction Manual", AISC "Detailing for Steel Construction", and AISC "Engineering for Steel Construction" publications.
7.4. Shop drawings shall be reviewed by the Contractor prior to submission. Drawings shall bear the Contractor's approval stamp accepting responsibility for dimensions, quantities and coordination with the other trades.
7.5. Submit 24" x 36" prints of each shop drawing for review. See Project Specifications for specific requirements.
7.6. Contractor shall provide in his schedule for a shop drawing review and return time of a MINIMUM of fifteen (15) working days in the Structural Engineer's office.
7.7. Connection Design: See Specifications for specific requirements.
a. Fabricator is responsible for the design of connections not designed on the structural drawings.
b. Generally, connections shown on the drawings are schematic and are intended to show the relationship of the members.
c. Connections shall be designed for one-half (1/2) the allowable uniform load on the member, as defined in Part 2, "Allowable Loads on Beams" tables in the AISC "Manual of Steel Construction", Ninth Edition, Allowable Stress Design or for the reactions as shown on the drawings or a minimum of 10 kips, whichever is greatest.
d. Member forces and reactions have been reduced in conformance to code provisions related to combinations of loads that include wind and seismic forces. No further reductions in forces or increases in allowable stresses are permitted.
e. Connections shown on drawings are service load reactions.
f. Connections may be bolted or welded, U.N.O. on the drawings.
7.8. Bolted connections:
a. Slip Critical connections with A325SC or A490SC bolts shall be used in ALL BOLTED MOMENT PLATE CONNECTIONS. Oversized or long-slotted holes are permitted.
b. Bearing-type connections with A325N or A490N bolts shall be used for all other bolted connections. Oversized and long-slotted holes are NOT permitted U.N.O. In single tab plate connections ONLY bearing-type fasteners are permitted, fasteners shall not be torqued, and short slotted holes are REQUIRED.
c. Anchor bolts or other bolts, where indicated, shall conform to ASTM F1554 Gr36 U.N.O.
d. Protruding bolt heads, shafts or nuts shall not extend nor prohibit the application of architectural finishes or placement of steel deck at its correct location and elevation.
e. Connection designer is responsible for verifying the axial capacity after a section is reduced for bolt holes. Member size may be increased or plates added to maintain required capacity.
f. Shop drawings shall indicate the type of bolt used in each connection, allowable values for the various bolt types and capacity of each connection shown.
g. Domestic Fasteners (American Or Canadian) Are Required In All Structural Steel Work On This Project. Imported Fasteners Are Prohibited.
7.9. Welded connections:
a. All welding shall be in accordance with the "Structural Welding Code – Steel" (AWS D1.1) of the American Welding Society.
b. Electrodes for welding shall comply with the requirements of AWS D1.1 Table 4.1.1.
c. Shop drawings shall indicate weld type, required electrodes and capacity for each connection detailed on the shop drawings.
7.10. Where cantilever beams occur on plan and the size is noted only for the back-span, the cantilever is intended to be the same size as the back-span.
7.11. Splicing of steel members, unless shown on the drawings, is prohibited without written approval of the Structural Engineer.
7.12. No change in size or position of any structural element nor holes, slots, cuts, etc. shall be made unless detailed and noted as a proposed change on the shop drawings and reviewed and accepted by the Structural Engineer.
7.13. No final bolting or welding shall be performed until as much of the structure as will be stiffened thereby has been properly aligned.
7.14. Fabricate all beams with mill cambers up.
7.15. Minimum plate thickness shall be 3/8" U.N.O.; minimum bolt diameter shall be 3/4" U.N.O.; minimum shop weld shall be 3/16" and minimum field weld shall be 1/4" U.N.O.
7.16. All re-entrant corners (such as copes and blocks) shall be cut and shaped notch free with a radius of at least 1/2".
7.17. Field use of gas cutting torches is PROHIBITED for correcting fabrication errors in primary structural framing.
7.18. Paragraph 4.4.1 of the AISC Code of Standard Practice shall be superseded by the following: Indication of compliance by the Owner of shop drawings prepared by the fabricator indicates that the fabricator has correctly interpreted the contract requirements. Such indication does not relieve the fabricator of the responsibility assigned to him for the design and detailing of connections assigned to him, nor for the accuracy of dimensions on the shop drawings, nor for general fit up of parts to be assembled in field.
7.19. Paragraphs 7.2 through 7.6 of the AISC Code of Standard Practice shall be superseded as follows: All references to "owner" shall be replaced with references to "contractor".
7.20. Expansion bolts shall provide a minimum safety factor of four (4) times the following minimum service load capacities, U.N.O.

Sleeve Anchors (2000 psi masonry) Dia.	Shear	Tension	Wedge Anchors (3000 psi concrete) Dia.	Shear	Tension
1/4"	270 lb.	300 lb.	1/2"	1950 lb.	1250 lb.
1/2"	930 lb.	600 lb.	3/4"	3750 lb.	2250 lb.

8.0 STEEL JOISTS:

8.1. All steel joists shall be designed, fabricated, and erected in accordance with the SJI Specifications.
8.2. Joist ends shall be fixed and bridging shall be placed prior to application of any loads.
8.3. End Support:
a. Minimum bearing requirements shall be in accordance with the SJI Specification. Extended joist ends for bearing on masonry shall be provided by the joist manufacturer where required to accommodate bearing conditions shown on the drawings.
b. K Series joists shall be welded to supports with 1/8" fillet welds, one each side, 2" long.
c. Joists shall be welded to supports as follows U.N.O.:
K Series: 1/8" fillet welds, one each side, 2" long
d. K Series joists at column centerlines shall be bolted to structural steel supports with 2 @ 3/4" diameter bolts (minimum). Where joists do not space on centerlines, bolt connections for each joist adjacent to centerline.
e. Bolt joists as indicated below to structural steel supports at column centerlines or bolt connections for each joist adjacent to centerline.
K Series: 2 @ 1/2" diameter bolts (minimum)
8.4. Joist bridging:
a. Shall be placed per the SJI Specification U.N.O. and shall be:
K Series: Horizontal rods or angles at top & bottom chords
b. Bridging that terminates at or is interrupted by structural steel members, shall be welded or bolted thereto. Provide diagonal ("X") bridging for ends of bridging lines terminating at walls/beams.
c. Where "open-web" joist lengths are 40 feet and longer, install a center row of bolted diagonal ("X") bridging to provide lateral stability before slackening of hoisting lines.
8.5. Special joists:
a. Joists marked "xxKSP" (depth = "xx" as shown on plan) indicate steel joists supporting roof top mechanical equipment with loads shown on the plan. Joist supplier shall design and indicate these joists and loads on the joist shop drawings submitted for review.
b. Contractor shall verify that mechanical roof top equipment furnished is placed only on designated joists (xxKSP) such that the distribution of operating weight does not exceed the design loads given in plan.
8.6. Submittals: Joist manufacturer shall submit shop drawings including Bills of Material for review and acceptance by the Structural Engineer. Submit calculations for special "KSP" joists indicating suppliers conformance with specified design criteria. All shop drawings submitted shall bear the emblem of membership of the Steel Joist Institute indicating supplier's compliance with SJI Specifications. Shop drawings submitted for joists from non-SJI members ARE NOT ACCEPTABLE and will be REJECTED.
8.7. Shop drawings shall be reviewed by the Contractor prior to submission. Drawings shall bear the Contractor's approval stamp accepting responsibility for dimensions, quantities and coordination with the other trades.
8.8. Submit 24" x 36" prints of each shop drawing for review. See Project Specifications for specific requirements.
8.9. Contractor shall provide in his schedule for a shop drawing review and return time of a MINIMUM of fifteen (15) working days in the Structural Engineer's office.
8.10. Holes in joist chords are not permitted, except at bearing end bolted connections.
8.11. Joist ends at roof diaphragm boundaries shall be capable of transmitting the diaphragm boundary shear per lineal foot times the joist spacing to the supporting structure. Diaphragm boundary shears in excess of the 200 plf minimum boundary shear are indicated on the drawings. The joist manufacturer's product shall be designed to transmit the boundary shear indicated on the drawings or a minimum boundary shear of 200 plf, unless special joist end conditions are detailed otherwise on the drawings.
8.12. Joists shall be stockpiled in a vertical position resting on either top or bottom chords and kept free of mud and dirt.
8.13. No joists which are damaged, kinked, bent or have broken welds shall be placed in the structure. The erector shall cull all such joists.

9.0. STEEL DECK:

9.1. Steel decks shall have the depths, minimum gages, and properties shown below. Deck has been selected based on a minimum three span condition. Supplier shall evaluate the ability of his steel deck to accommodate the load conditions indicated in the General Notes for all span conditions required for his proposed detailing. Where supplier details single or two span conditions on his shop drawings deck with a greater thickness may be required subject to approval by the Structural Engineer.

Deck type	Depth	Gage	"I" /ft.	"Sp"/ft.	"Sn"/ft.
Type "B" roof deck	1 1/2"	20 ga.	.210 in.	.232 in.	.245 in.

9.2. Steel deck at roofs and penthouses shall be galvanized per ASTM A525 G60.
9.3. Steel Roof Deck:
a. Steel roof deck shall be designed to function as a diaphragm for transmission of lateral loads. Connections of deck units to each other and to supports shall be designed by the deck manufacturer consistent with the deck properties and shall be designed to transmit a shear force per lineal foot at the diaphragm boundaries denoted as "Q=xx plf" (minimum 200 plf) where shown on the drawings.
b. Fasten steel roof deck units to steel supporting members by not less than 5/8" diameter fusion welds or elongated welds of equal perimeter. Alternatively, fasten with "Hilti" X-ENP-19, X-EDN19 or X-EDNK22 Fasteners conforming to the requirements of the "Hilti" published installation instructions. Attachments shall be spaced not more than 12" o/c. at every support and at closer spacings where required for diaphragm shear resistance.
c. For steel roof deck spans exceeding 5'-0", mechanically fasten side laps at mid-span using "Hilti" #10 self-tapping screw or "Hilti" S-SLC01 or S-SLC02 Sidelap Connectors as shown on drawings. Provide additional sidelap fasteners where required for lateral force resistance.
d. Do not hang pipes or ducts from steel roof deck.
9.4. Steel Deck Submittals: Steel deck manufacturer shall submit shop drawings for review and acceptance by the Structural Engineer indicating deck type, gauge and protective treatment, as well as type, size and layout of deck connections.
9.5. Shop drawings shall be reviewed by the Contractor prior to submission and shall bear the Contractor's approval stamp accepting responsibility for dimensions, quantities and coordination with the other trades.
9.6. Submit 24" x 36" prints of each shop drawing for review. See Project Specifications for specific requirements.
9.7. Contractor shall provide in his schedule for a shop drawing review and return time of a MINIMUM of fifteen (15) working days in the Structural Engineer's office.

10.0. STRUCTURAL MASONRY:

10.1. All structural masonry shall conform to ACI 530-05 standards as appropriate to the material.
10.2. Masonry strength and grade:
a. Concrete Masonry Units (CMU):
i. Units shall be lightweight cellular units conforming to ASTM C 90, Grade N-2. Concrete masonry net area unit strength shall be no less than 1900 psi in accordance with ASTM C 140, with a unit weight not exceeding 95 pcf. See specifications.
ii. Design compressive strength of CMU (f'm) = 1500 psi.
10.3. Submittals: Contractor shall submit for approval test reports on masonry units showing unit weight, compressive strength, absorption, volume change and shrinkage per ASTM C90 no later than 15 working days prior to the commencement of masonry construction.
10.4. Mortar shall conform to ASTM C 270. Mortar shall be type "S" and shall have a 28-day compressive strength of 1800 psi.
10.5. Masonry grout fill shall conform to ASTM C 476. Grout, either fine or coarse aggregate per specifications, shall have a 28-day compressive strength of 3000 psi. Masonry concrete fill shall conform to the requirements noted under "Concrete" in the General Notes.
10.6. Grouting:
a. All bond beams shall be filled with grout and reinforced as indicated on the drawings (details or schedules). Mortar fill is not permitted.
b. All masonry wall cells or cavities indicated as reinforced shall be grouted for the full height of the wall, unless specifically noted otherwise on the drawings. Un-reinforced walls indicated as grouted shall be grouted full height, unless specifically noted otherwise. Mortar fill is not permitted.
c. All masonry cells or cavities below grade shall be grouted solid unless specifically noted otherwise on the drawings. Mortar fill is not permitted.
d. Vertical grouting shall be low lift or high lift as follows:
i. Low lift grouting shall be used for all cavity walls and may be used for all walls at the option of the Contractor. Lifts shall not exceed 4'-0" in height.
ii. High lift grouting is permissible only for filling of cellular masonry units and shall not exceed one story in height. Clean out holes shall be provided at the base of each grouted cell.
e. Grouting shall be stopped 1-1/2" below the top of a course to form a key at the joint.
f. Grouting of masonry beams or lintels shall be done in one continuous operation.
10.7. Reinforcing:
a. All bars marked "Continuous" shall be lapped a minimum of 40 bar diameters at all splices. Unless noted otherwise, all wall/footing dowels shall be lapped 30 bar diameters or 24", whichever is greatest.
b. Foundation dowels may slope a maximum of 1:6 to align with wall cavities or vertical CMU cores. Greater slopes will require replacement of the foundation dowels.
c. Spliced reinforcing shall be lapped under "Reinforcing" above or as shown on drawings, whichever is greatest. All splices shall be wired together or held in place with bar positioners.
d. Vertical reinforcing bars shall have a minimum clearance of 3/4" from masonry and shall be held in position top and bottom and at intervals not exceeding 4'-0". Accessories for such support shall be used. Provide "AA Wire Products Company" (or approved equal) Rebar Positioner AA225 or AA239 for vertical bars and AA238 for horizontal bars or approved equal products from other suppliers.
e. Horizontal joint reinforcing shall be lapped no less than 6" all splices, including corners and tees where no control joint is used.
f. All horizontal joint reinforcing shall stop at control joints.
g. Horizontal reinforcing in bond beams shall be continuous through control joints.
10.8. Masonry shown on the structural drawings defines the structural extents and requirements for masonry for supporting members, floors, roofs or walls and shall be built in conformance with the requirements of these drawings and Note 1 above. Refer to the architectural drawings for the total scope of the masonry and for locations and details of openings, special coursing or other masonry details.
10.9. Masonry contractor shall provide for and coordinate with other trades for placement of all items to be embedded or built into the masonry.
10.10. Electrical conduit, or equipment from other trades, shall not occur in grouted and reinforced cells. Where conflicts occur the contractor shall notify the Engineer for direction prior to proceeding.

11.0. INSPECTION AND TESTING:

11.1. An independent testing laboratory shall be retained in accordance with the Project Specifications to perform testing of foundation bearing strata, engineered fills, concrete, grout, steel, and welding. See Project Specifications for requirements.
11.2. The contractor, in conjunction with the testing laboratory and in accordance with the Project Specifications, shall determine the frequency of the testing necessary to insure that the design requirements are being met.
11.3. The testing agency shall verify that all welders have satisfactorily passed AWS qualification tests for the welds which they will perform.
11.4. The Contractor and testing agency shall require that AWS qualification tests for welding of material less than 1/8" in thickness are passed by welders expected to erect lightgage framing materials. These tests ARE NOT the same as for materials 1/8" or greater in thickness (i.e. structural steel materials)
11.5. All welding shall be inspected and tested in accordance with AWS D1.1 or D1.3 as appropriate to the material thickness.
11.6. The testing agency shall verify that the metal deck is attached to the structural steel in accordance with manufacturer's recommendations and approved shop drawings.
11.7. Concrete testing shall be in accordance with ACI 301 Chapter 16 and appropriate and with the Project Specifications.

12.0. CONSTRUCTION AND SAFETY:

12.1. The Contractor is solely responsible for all safety regulations, programs and precautions related to all work on this project.
12.2. The Contractor is solely responsible for the protection of persons and property either on or adjacent to the project and shall protect same against injury, damage or loss.
12.3. Means and methods of construction and erection of structural materials are solely the Contractor's responsibility.
12.4. Structural drawings are intended to be used in conjunction with the drawings of other consultants and trades. The Contractor shall coordinate the various requirements.
12.5. No openings nor any changes in size, dimension or location shall be made in any structural elements without written approval of the Structural Engineer.
12.6. Openings 1'-0" or less on a side are generally not shown on the structural drawings. Refer to drawings of other consultants for such openings.
12.7. Fireproofing of structural elements is not shown on the structural drawings. Refer to the specifications and architectural drawings for fire rating requirements, materials and methods.
12.8. The Contractor is responsible for limiting the amount of construction load imposed on the structure. Such loads shall not exceed the capacity of the structure at any time.
12.9. The structure is designed to function as a unit upon completion, and any temporary bracing or support required to accommodate the Contractor's means and methods are the responsibility of the Contractor.
12.10. The Contractor shall inform the Structural Engineer, clearly and explicitly in writing, of any deviation or substitution of requirements of the contract documents. Contractor is not relieved of any requirements of the contract documents by virtue of the Structural Engineer's review of shop drawings, product data, etc., unless the Contractor has clearly and explicitly informed the Structural Engineer in writing of any deviations or substitutions at time of submission, and the Structural Engineer has given written approval for the specific deviations or substitutions.
12.11. All things which, in the opinion of the Contractor, appear to be deficiencies, omissions, contradictions or ambiguities in the drawings or specifications, shall be brought to the attention of the Structural Engineer. Corrections or written interpretations shall be issued before affected work may proceed.
12.12. If the Contractor cannot construct any portion of the work identified in the drawings in accordance with these drawings and specifications, then the Contractor is responsible for contacting the Structural Engineer prior to proceeding with the work. Work that does not comply with the drawings may require removal, testing, or engineering evaluation at the Contractor's expense.
12.13. Contractor shall verify all existing conditions prior to ordering materials or proceeding with new work in areas affected by existing conditions. Structural Engineer shall be informed in writing of conflicts between existing and proposed new construction.
12.14. Contractor is responsible for coordinating all dimensions shown on the contract documents. Inconsistencies on the structural drawings or between the structural drawings and any other contract, shop, fabrication, or other drawings or information shall be brought to the attention of the Structural Engineer prior to proceeding with affected work.
12.15. Do not scale these drawings, use the dimensions shown.
12.16. Contractor shall provide in his schedule for a shop drawing review and return time of a MINIMUM of fifteen (15) working days in the Structural Engineer's office.

13.0 STRUCTURAL ABBREVIATIONS:

ABBREV.	DEFINITION
A.B.	anchor bolts
ABV	above
ADDNL	additional
AFF	above finished floor
ALT	alternate
ARCH	architectural
B, BOT	bottom
B/xxx	bottom of xxx
BAL	balance
BB	bond beam
BCX	bottom chord extension
BL	brick ledge
BLDG	building
BLW	below
BM	beam
BRG	bearing
BRK	brick
BTWN	between
CJ	const., control joint
CL,CLR	clear
CMU	conc. masonry unit
COL	column
CONC	concrete
CONN	connection
CONST	construction
CONT	continuous
CTR	center
CTRD	centered
DBA	deformed bar anchor
DET,DTL	detail
DIM	dimension
DK	deck
DWGS	drawings
DWL	dowel
EA	each
EE	each end
EF	each face
EFF	effective
EJ	expansion joint
EL,ELEV	elevation
EOC	edge of concrete
EOD	edge of deck
EOM	edge of masonry
EOS	edge of slab
ES	each side
EW	each way
EXIST	existing
EXP	expansion
EXT	exterior, extension
FK	Foot-Kips
FL, FLR	floor
FOB	face of brick
FOM	face of masonry
FOS	face of stud
FP	full penetration
FT	foot, feet
FTG	footing
GB	grade beam
GEN	general
HEF	horizontal each face
HIF	horizontal inner face

ABBREV.	DEFINITION
HOF	horizontal outer face
HK	hook
HORZ	horizontal
IF	inner face
INT	interior
JT	joint
K	kips (1000 lbs)
L, LEN	length
LAT	lateral
LBS	pounds
LE	left end
LLH	long leg horizontal
LLO	long leg outstanding
LLV	long leg vertical
LONG	longitudinal
MAS	masonry
MAX	maximum
MECH	mechanical
MFR	manufacturer
MIN	minimum
MTL	metal
NOM	nominal
OC, O/C	on center
OF	outer face, opp. face
OH	opposite hand
OPP	opposite
OPNG	opening
PC	precast
PL	plate
RE	right end
REINFG	reinforcing
REINF	reinforcement
REQD	required
RET	retaining
SOG	slab on grade
SC	slip critical
SCHED	schedule
SECT	section
S, SHRT	short
SL	slab
SPA	spacing
STFNR	stiffener
STL	steel
SUPPL	supplier
SUPT	support
T	top
T/xxx	top of xxx
TCX	top chord extension
THK	thick, thickness
TO	throughout
TRAN	transverse
TYP	typical
UNO	unless noted otherwise
VERT	vertical
VEF	vertical each face
VIF	vertical inner face
VOF	vertical outer face
W	wide, width
WF	welded wire fabric
WWM	welded wire mat
XE	extended end joist

COORDINATION DRAWINGS

THE MECHANICAL CONTRACTOR SHALL TAKE THE LEAD IN PREPARATION OF COORDINATION DRAWINGS. SUCH DRAWINGS SHALL BE ARRANGED AND DESIGNED THROUGH AND FROM COORDINATION WITH ALL OTHER MAJOR AND MINOR SUBCONTRACTORS AND THE GENERAL CONTRACTOR. PROVIDE PLAN VIEWS, SECTIONS AND ELEVATIONS AS REQUIRED TO FULLY COORDINATE ALL NEW WORK WITH ITSELF AND EXISTING CONDITIONS. DRAW TO SCALE (AT NOT LESS THAN 3/8" = 1'-0"). DRAWINGS SHALL SHOW, BUT NOT BE LIMITED TO: ALL WALL RATINGS; ALL DUCTWORK; ALL AIR DISTRIBUTION; MECHANICAL EQUIPMENT; MECHANICAL PIPING; FIRE PROTECTION PIPING; ALL PLUMBING PIPING; CABLE TRAYS (WITH ELEVATIONS NOTED); LIGHTING FIXTURES (WHEN CEILING MOUNTED); CEILING GRID AND CEILING HEIGHT; MAJOR BEAMS AND JOISTS (WITH ELEVATIONS MARKED); FIRE ALARM DEVICES AND SPEAKERS (WHERE CEILING MOUNTED); ELECTRICAL CONDUITS LARGER THAN 2-INCH DIAMETER; ELECTRICAL BUSWAY AND REQUIRED CLEARANCES; EQUIPMENT PROVIDED BY OTHERS THAT PROTRUDE INTO CEILING CAVITIES OR IMPEDE THE LOCATION OR ACCESS TO ABOVE CEILING PIPING, DUCTWORK OF OTHER EQUIPMENT. SECTIONS SHALL BE CUT THROUGH AREAS SHOWING MATERIALS AND SYSTEMS OF ALL CONTRACTS. IF THERE ARE ANY OUTSTANDING ISSUES THAT CANNOT BE RESOLVED, CONSULT WITH THE ARCHITECT AND/OR ENGINEER (THROUGH THE VA COTR) FOR GUIDANCE AND MAKE CORRECTIONS IN ACCORDANCE WITH DIRECTIONS GIVEN. IT IS IMPORTANT TO NOTE THAT FABRICATION CANNOT BEGIN UNTIL COORDINATION DRAWINGS HAVE BEEN APPROVED. ANY MATERIAL, EQUIPMENT, SYSTEMS, ETC., PROCUREMENT OR INSTALLATION COMMENCED PRIOR TO APPROVAL IS TAKEN AT THE CONTRACTORS OWN RISK AND MAY HAVE TO BE MODIFIED, MOVED AND/OR RECONFIGURED AT THE CONTRACTORS COST.

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Revisions			

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HSH PROJECT # 10004

Recommended Approvals:	
1. MEDICAL DIRECTOR	6. OPERATIONS SERVICE LINE MANAGER
2. ASSOCIATE DIRECTOR	7. INFECTION CONTROL SAFETY MANAGER
3. CHIEF OF STAFF	8. SAFETY MANAGER
4. ASSOC. DIRECTOR	9. GENERAL ENGINEER
5. SERVICE LINE MGRS.	10. COTR

Drawing Title: STRUCTURAL GENERAL NOTES	Project Title: RENOVATE 13A FOR ENDOSCOPY SUITE			Date: June 10, 2011
				Project Number: 557-10-108
FULLY SPRINKLERED	Drawn	Building Number	AutoCAD File Name	DRAWING No. S-001
	Checked	Reviewed	Const. Contract No.	

Veterans Affairs

three inches = one foot
one and one half inches = one foot
one inch = one foot
three quarters inch = one foot
one half inch = one foot
three eighths inch = one foot
one quarter inch = one foot
one eighth inch = one foot