

GENERAL NOTES

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TEXAS WOMENS UNIVERSITY HUBBARD HALL ADDITION AND RENOVATION - STUDENT UNION DENTON, TEXAS

REVISIONS

DATE: NOVEMBER 30, 2017
CHECKED: PFE

GENERAL NOTES

PROJECT #: 16032-00
MANAGER: PFE
ISSUED FOR: 100% CD
DRAFTER: PFE
DATE: NOVEMBER 30, 2017
CHECKED: PFE

SHEET

SO-1

OF SHEETS

SECTION 1 - GENERAL INFORMATION AND DESIGN CRITERIA

SECTION 1.1 - DOCUMENTS

1.1.1 Structural Drawings are not stand-alone documents. They are augmented by technical specifications and must be coordinated with Architectural, Civil and Mechanical/Electrical/Plumbing/HVAC documents.

1.1.2 General Notes and Typical Details apply generally throughout the project wherever conditions similar to those depicted exist and are not necessarily referenced specifically in the documents.

1.1.3 Structural documents are protected by U.S.A. Copyright Laws, and shall not be used for any purpose other than construction of the building described in the Architectural documents and at the geographic location shown. The structural design described in these documents is not valid for any other purpose, use or location.

1.1.4 The Geotechnical Report referenced herein is not part of the Structural Documents, however, a copy should be obtained for reference during installation of foundations and subgrade preparation.

1.1.5 COORDINATION Contractor is responsible for coordinating Structural Documents with other trades and disciplines including: architectural, civil, mechanical, electrical, HVAC and fire protection. Some requirements are not known prior to issue and may change as layout and fabrication drawings are developed. Promptly report deviations and interferences with structural components for resolution by the Engineer.

1.1.6 Contractor shall verify dimensional location and depth of slab recesses and offsets with Architectural Drawings.

1.1.7 Contractor shall verify weights, location and details of structurally supported mechanical equipment prior to construction of the supporting structure. Report deviations from assumed conditions to the Engineer prior to fabrication materials.

1.1.8 Contractor shall verify the location, size and detail of roof openings and curbs for mechanical equipment prior to fabricating materials. Report deviations from assumed conditions to the Engineer before proceeding with work.

1.1.9 Contractor shall verify location and size of floor and roof penetrations and sleeves for mechanical and electrical components. Openings in beams, girders, columns and slabs are subject to prior approval of the Engineer.

1.1.10 Contractor shall verify elevator pit dimensions and depth, elevator shaft floor opening dimensions, over-run clearance requirements at top of shaft, and penthouse dimensions with requirements of purchased equipment. Promptly report discrepancies to Architect for resolution prior to construction.

1.1.11 Contractor shall verify dimensions, details, plumbness and squareness of existing structures meeting or tying into new construction.

1.1.12 Do not scale plans, details and sections for quantity, length or fit of materials.

REFERENCE ELEVATIONS

1.1.13 Heights of floor and roof decks and various framing components are given on the drawings relative to a reference elevation of 100'-0". This reference elevation is equivalent to the elevation of the basement level of the existing building.

TEMPORARY BRACING

1.1.14 Structural systems are designed for in-place conditions only. Contractor shall provide temporary bracing of structural components (including but not limited to beams, purlins, joists, columns, trusses, walls, basement walls and structural frame) for conditions that will exist during construction and to meet all regulatory requirements for safety of workmen.

1.1.15 Backfilling of basement walls shall not commence until intersecting floor or roof structures are in place and have attained design strength.

1.1.16 Temporary frame bracing shall remain until installation of permanent structural bracing elements, member connections and floor or roof diaphragms are complete.

SECTION 1.2 - CODES AND STANDARDS

1.2.1 Building Code of Jurisdiction : 2012 International Building Code
1.2.2 Structural Concrete Code - American Concrete Institute (ACI) 318
1.2.3 Structural Steel Code - American Institute of Steel Construction (AISC) 360

SPECIAL INSPECTIONS

1.2.4 See Statement of Special Inspections for minimum special inspections and testing per the Building Code.
1.2.5 See Technical Specifications for other materials testing and inspection requirements.

SECTION 1.3 - DESIGN CRITERIA

1.3.1 Live Loads

Assembly, Fixed Seats	60	psf
Lobbies	100	psf
Ballrooms	100	psf
Corridors	100	psf
Kitchen	100	psf
Mechanical Room	150	psf (1)
Roof	20	psf
Stairs and Exits	100	psf

Notes:
(1) Minimum load, or weight of equipment (the heavier)

LIVE LOAD REDUCTION

1.3.2 Live loads have been reduced in accordance with provisions of the Building Code.

1.3.3 Roof Snow Loads

Ground Snow Load	5	psf
Flat Roof Snow Load	6	psf
Snow Exposure Factor (Ce)	1.0	
Snow Importance Factor (I)	1.2	

1.3.4 Dead Loads

Flooring	3	psf
Ceilings	3	psf
Floor Collateral	3	psf (1)
Floor Sprinklers	3	psf (3)
Roof Collateral	2	psf (1)
Roof Insulation	5	psf
Roof Sprinklers	2	psf (3)
Roofing System	10	psf (2)

Notes:
(1) Collateral loads include: lighting, ductwork, miscellaneous framing.
(2) Roofing system weight is the maximum unit weight of roofing materials and ballast (where applicable) for which the roof structure is designed.
(3) Sprinkler loads are for distribution lines and heads, exclusive of mains which are included separately as concentrated dead loads.

1.3.5 Wind Loads

Base Mean Wind Velocity	120	mph
Wind Exposure Classification	C	

1.3.6 Seismic Loads

Seismic Occupancy Category	III
Seismic Importance Factor	C
Site Class	2
Mapped Spectral Acceleration	Ss
Mapped Spectral Acceleration	S1
Spectral Response Coeff. Sds	0.09
Spectral Response Coeff. Sd1	0.062
Seismic Design Category	A

1.3.7 Concentrated Loads

Location	Load-pounds	Area	Note
Elevator Machine Room	300	4 sq. ft.	
Metal Roof Deck	250	1 sq. ft.	
Roof Joists	250		(3)
Roof Gang Support Frames	500	6.25 sq. ft.	
Sidewalks	8000	6.25 sq. ft.	
Stair Treads	300	4 sq. ft.	

Notes:

(1) Concentrated loads apply to any location on supporting structure, separately from (not in addition to) uniform live loads, except as noted otherwise.
(2) Applies to each structural component individually.
(3) Load applied at any panel point along top or bottom chord.

1.3.8 Elevators - Design Loads for Elevator sheave beam and Foundation supports are based on the Following Manufacturer and Model No.:

EL-1: EnduraMRL 3500i b	
EL-2: EnduraMRL 4500i b	
EL-3: EnduraMRL 5000i b	

1.3.9 Mechanical Units - Assumed weights and locations of roof-supported mechanical equipment are indicated on Roof Framing Plan. Notify Engineer of deviations in weight, location or detail prior to fabrication of materials.

1.3.10 Pedestrian Guardrail - 50 lb/ft horizontal and vertical, or 200 lb concentrated at top, any direction.

SECTION 2 - FOUNDATIONS AND RELATED EARTHWORK

GEO TECHNICAL REPORT

2.1 Design of foundations and structural components in contact with soil is based on the recommendations given in the following:

Report by	: D & S Engineering Labs
Date of Report	: June 16, 2017
Report Number	: G17-2000

2.2 Refer to the soil report for subsol conditions that may be encountered in the installation of foundations, and other information relevant to foundations and site preparation.

2.3 SOIL IMPROVEMENT UNDER BUILDING SLABS

Design of soil-supported building slabs is based on a range of soil movement of 0 inch(es) to 1 inch(es), based on the recommendations of Geotechnical Report.

2.4 Refer to Specifications for soil stabilization under soil-supported building slabs.

2.5 STRAIGHT SHAFT PIERS

Design Criteria:	
Bearing Stratum	: Gray Fresh Limestone
Top of Stratum Elevation	: 30 Feet below existing grade
(For Bidding Purposes Only)	
Allowable End Bearing	: 60,000 psf
Positive Side Friction	: 10,000 psf
Upheaval Side Friction	: 500 psf
Upheaval Design Depth	: 10 ft
Negative Side Friction	: 10,000 psf

2.6 Pier depths indicated are for bidding purposes only. Actual pier depths may vary depending on depth to bearing stratum.

2.7 Steel dowels at tops of piers or footings shall extend 30 bar diameters above and below top of pier unless noted otherwise (noted as "LAP" on Typical Details).

2.8 Top of pier elevations given are relative to reference elevation 100'-0".

2.9 Overpour at tops of piers ("mushrooms") shall be removed to the required pier diameter.

BASEMENT AND EARTH RETAINING WALLS

Design of earth-retaining walls is based on equivalent hydrostatic pressure of 55 pounds per cubic foot as recommended in soil report, based on the following:

- a. Porous, free-draining backfill
- b. Perimeter drain
- c. Drainage mat against wall

2.11 Do not backfill basement walls until lateral bracing structures at top and bottom of each wall between floors are constructed and have attained specified design strength.

SECTION 3 - STRUCTURAL CONCRETE

SECTION 3.1 - CONCRETE FORMS

3.1.1 Formed Voids - Provide retained void spaces between bottom of structural members and subgrade as follows:
Grade Beams: 8 inches
Structural Slabs: 8 inches
Walls: 6 inches

3.1.2 Grade Beams - shall be formed both sides unless specifically shown or noted otherwise in the details.

SECTION 3.2 - STEEL REINFORCING

3.2.1 STEEL REINFORCING All bars shall be deformed in accordance with ASTM A615. Reinforcing indicated to be welded shall conform to ASTM A706.

3.2.2 Strength of all bars shall be Grade 60

3.2.3 SPLICING OF REINFORCING BARS Top bars in beams, slabs or joists shall be spliced at midspan between supports, unless noted otherwise.

3.2.4 Bottom bars in beams, slabs or joists shall be spliced at supports, unless noted otherwise.

3.2.5 LAPPED SPLICE LENGTHS Lap reinforcing 30 bar diameters at splices unless noted or detailed otherwise.

3.2.6 Tension splice lengths shall be calculated in accordance with ACI 318. Use Class "B" splices unless noted otherwise.

3.2.7 Welded wire fabric splice length (overlap), measured between outermost cross wires of each fabric sheet, shall be at least one spacing of cross wires plus 2 inches, but in no case less than 6 inches.

CONCRETE COVER TO REINFORCING

3.2.8 Clearances from face of concrete to face of reinforcing:
Piers: 3"
Formed Grade Beams: 1-1/2" top, 2" sides, 3" bottom
Columns: 1-1/2" interior, 2" exterior or exposure
Walls: 1" interior, 2" exterior or exposure
Beams: 1-1/2" interior, 2" exterior or exposure

3.2.9 PLACEMENT OF REINFORCING Offset of reinforcing bars shall be bent at a ratio of 1 (normal to bar axis) to 6 (parallel to bar axis).

3.2.10 Provide corner bars at intersections of beams and walls in accordance with Typical Details.

3.2.11 Start stirrup spacing in beams 2 inches outside of face of supports.

3.2.12 Place first bar of slab reinforcing parallel to side 2 inches from a free edge or half of required bar spacing from face of edge beam.

3.2.13 Single layer reinforcing in walls shall be placed at center of walls unless noted otherwise.

3.2.14 Place welded wire reinforcing in slabs on concrete joists, in toppings, or in slabs poured on metal deck at center of slab unless noted otherwise.

SECTION 3.3 - CONCRETE MIX DESIGNS

3.3.1 Concrete Mix Schedule:
a) "HRC" refers to hardrock concrete having air dry unit weight of approximately 145 PCF.
b) Where w/c ratio is not indicated in the Concrete Mix Schedule, it shall be as necessary to meet strength requirements.
c) Where the w/c ratio is shown, it shall be adhered to regardless of strength requirements.
d) "Strength" is required compressive cylinder strength at an age of 28 days.

Conc. Class	Strength psi	Agg. Type	Agg. Size	Slump Inches	Max W/C	Notes
A	3000	HRC	1-1/2"	5-7	---	
B	3500	HRC	1"	3-5	---	
C	4000	HRC	1"	3-5	---	
D	4500	HRC	1"	3-5	0.45	
E	3500	LWC	1"	3-5	---	

3.3.2 Mix Usage Schedule:

Description of Use	Concrete Class		Content
	Concrete	Class	Content
Drilled Piers	A	----	----
Grade Beams	B	----	----
Interior Slab-on-Grade	B	----	----
Interior Slab-on-Void	C	----	----
Retaining Walls	D	----	----
Exterior slabs and topping slabs	D	----	3-6%
Elevator Pit Walls	C	----	----
Slab on Composite Metal Deck	B	----	----
TV	UNO	----	----
Ballroom	E	----	----
Structural Beams and Slab	C	----	----
Column	C	----	----
Housekeeping Pads	E	----	----
Vault	D	----	3-6%

SECTION 3.7 - CONCRETE SLABS

3.7.1 Slabs Placed on Grade

Location	Thickness	Reinforcing
All	5 inches	#3 @ 18 EW

a) Reinforcement shall be placed #3 2 inches from top of slab, unless detailed otherwise.
b) Provide construction joints in slabs where indicated on Plans. Allow minimum of 4 days interval between placing adjacent sections of slab.

3.7.2 Slabs on Composite Metal Deck

Type	Overall	Typ Slab	Notes/
Mark	1-inches	Reinf	Admt Top Reinf
CA	7.5	6x6-W2, 9xW2, 9 WWM	#4(6-0)@12 over girders
CB	6.5	6x6-W2, 9xW2, 9 WWM	

Notes:
1. "Girders" refers to interior beams oriented parallel to deck.
2. Slab types correspond to deck type (see Composite to Metal Deck).
3. Locate Typ Slab Reinf at center of slab above deck.
4. Top Cover for Admt Top Reinf: 1".

3.7.3 Crawl space mudslab-on-grade
3" thick w/ #3@18" on center each way
Sawcut joints at 10'-0" on center maximum each way.

3.7.4 Housekeeping Pads

Location	Minimum Thickness	Reinforcing	Concrete
Typical	4-6 inches	#4@12" EW	Class E

SECTION 3.8 - DRILLED IN ANCHORS

3.8.1 Drill holes with rotary impact hammer drill using carbide tipped bits. Drill bits shall be of the diameter as specified by the anchor manufacturer. All holes shall be drilled perpendicular to the concrete or masonry surface.

3.8.2 Embedded items: Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Exercise care in drilling to avoid damaging existing reinforcing or embedded items. Notify the Engineer if reinforcing steel or other embedded items are encountered during drilling. Take precautions as necessary to avoid damaging electrical and telecommunications conduits, and gas lines.

3.8.3 Base Material Strength: Unless otherwise specified, do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.

TESTING

3.8.4 Continuous special inspection is required for adhesive anchors. Remove and replace mis-placed or malfunctioning anchors. Clean and fill empty anchor holes and patch failed anchor locations with high-strength nonshrink, nonmetallic grout. Anchors that fail to meet proof load or installation torque requirements shall be regarded as malfunctioning.

3.8.5 EXPANSION, UNDERCUT, SCREW AND ADHESIVE ANCHORS Concrete base material: provide anchors of size and type shown with ICC-ES or IAPMO-UES compliance required

Expansion Anchors: HITti Kwik Bolt TZ (ICC-ES ESR-1917)
Screw Anchors: HITti Kwik HUS-EZ (ICC-ES ESR-2027)
Adhesive Anchors: HITti HIT-HY 200 Safe Set System (ICC-ES ESR-3187) for use with HITti HIT-Z Rod, HAS-E Rod, & Hollow Drill Bit
HITti HIT-HY-200 (ICC-ES ESR-3187)

3.8.6 Grout filled CMU (Concrete Masonry Unit) base material: provide anchors of size and type shown with ICC-ES or IAPMO-UES compliance required

Screw Anchors: HITti Kwik HUS EZ (ICC-ES ESR-3056)
Simpson Titen HD (ICC-ES ESR-1056)
Adhesive Anchors: HITti HIT-HY 70 (ICC-ES ESR-2682)
Simpson SET-XP (IAPMO-UES ER-265)
Simpson AT-XP (IAPMO-UES ER281)

INSTALLATION

3.8.7 Perform anchor installation in accordance with manufacturer's printed installation instructions (MPII).

3.8.8 Protect threads from damage during anchor installation.

3.8.9 IBC 2012 requires ACI/CRSI certification for adhesive anchor installers (AAI) when installing adhesive anchors of horizontal or vertical inclined conditions. Installers of adhesive anchors shall hold a current AAI certification as accredited by ACI/CRSI in accordance with ACI 318-11 D.9.2.2. Anchor Manufacturer Installation Training is acceptable as a supplement to ACI/CRSI AAI certification. Installers shall submit their certifications to the inspector (testing lab) for each installation.

SECTION 4 - STRUCTURAL MASONRY

4.1 GENERAL Refer to Architectural layout and Drawings and Specifications for details and exact dimensions of brick masonry work including rustications, corbels, coursing, reglets, weep holes, waterproofing and flashing.

4.2 Grout lifts at reinforced masonry walls shall not exceed five feet.

4.3 STRUCTURAL PROPERTIES Required prism strength of structural assembly (F'm) = 2,000psi

4.4 Concrete Masonry Units: ASTM C90 Lightweight with minimum net area compressive strength of 2,000 psi

4.5 Masonry Mortar: ASTM C270, Type S (Proportion Specifications) Masonry cement shall not be used for mortar.

4.6 Masonry Grout: ASTM C476 3,000 psi minimum (Proportion Specifications)

4.7 REINFORCING Horizontal joint reinforcing shall be "Truss Type" 9 ga. welded wire spaced 16 inches on center vertically.