PART 1 – GENERAL NOTES AND DESIGN CRITERIA

1. GENERAL
   - A. Refer to project specifications for detailed requirements for material and workmanship.
   - B. Unless otherwise noted, details, sections and notes contained in the structural contract documents shall be considered typical for all similar conditions even if not explicitly referenced.
   - C. Deficient work and/or work not in conformance with the contract documents shall be repaired at the contractor's expense. The contractor shall compensate the client for services arising from deficient work, review of modifications/contractor substitution, or expediting of submittals.
   - D. Cost of investigation and/or redesign incurred by the Structural Engineer of Record (SER) due to contractor errors will be at the contractor's expense.
   - E. The contractor shall submit a single dimensioned and coordinated drawing for each level showing the locations of all sleeves and openings required by all trades prior to initiating any work.
   - F. Loads imposed on the base building structure and temporary conditions intended to accommodate construction means and methods are not explicitly considered in this design. The contractor shall advise the Engineer of Record regarding construction loads and temporary conditions imposed on the building structure and shall compensate the SER for reviewing these conditions.
   - G. The Contractor is advised that the Engineer of Record has not evaluated any of the existing structures for the impact of temporary loads due to construction access or equipment. Evaluation of the existing structures to support construction equipment and materials is the responsibility of the Contractor.

2. ELEVATIONS AND DIMENSIONS
   - A. All dimensions, elevations and conditions shall be verified in the field by the contractors and any discrepancies shall be brought to the attention of the SER for clarification before proceeding with the affected part of the work. Dimensions and elevations noted in the contract documents as (±) and all field conditions shall be verified in the field (VIF) by the contractors prior to the submissions of shop drawings. Upon receipt of shop drawings, the SER has the right to assume that all field dimensions, elevations and conditions have been verified by the contractors and that the shop drawings accurately reflect such verifications unless stated otherwise on the shop drawings.

3. BUILDING CODE AND REFERENCE STANDARDS
   - A. Maine Uniform Building Code
   - B. International Building Code 2015 (IBC)
   - C. ASCE/SEI 7–10, Minimum Design Loads for Buildings and Other Structures

4. DESIGN LOADS
   - A. Dead Loads:
     1. All permanent stationary construction including mechanical equipment and their weights where noted on the structural drawings.
   - B. Floor Live Loads (uniform/concentrated)
     Where appropriate, these loads have been reduced in accordance with Section 1607.10 of the IBC.

1.	Public areas (Lobbies, Atriums, Etc.)	100	psf
2.	Stairs and elevator lobbies	100	psf
3.	Corridors above ground floor	80	psf
4.	Typical Floors	80	psf
5.	Partitions (when floor live load does not exceed 80 psf)	15	psf
6.	Roof live (unreducible)	Snow Load Governs	

   - C. Roof Snow Load Parameters
     Where appropriate, drifting snow loads have been considered in accordance with ASCE/SEI 7–10.

1.	Ground Snow Load, P_g	60	psf
2.	Flat Roof Snow Load, P_f	51	psf
3.	Snow Exposure Factor, C_e	1.0	
4.	Snow Load Importance Factor, I_s	1.2	
5.	Thermal Factor, C_t	1.0	

   - D. Wind Load Parameters

1.	Basic Design Wind Speed (3 second gust), V_{des}	127	mph (Risk Category IV)
2.	Wind Exposure	B	(with escarpment)

   - E. Seismic Load Parameters

1.	Seismic Importance Factor, I_e	1.5	
2.	Spectral Response Acceleration, S_s	0.242	
3.	Spectral Response Acceleration, S_1	0.078	
4.	Site Class	D	
5.	Seismic Design Category	C	
6.	Seismic Force Resisting System		
	a. East–West Direction	Steel systems not specifically detailed for seismic resistance, R = 3.0	
	b. North–South Direction	Steel systems not specifically detailed for seismic resistance, R = 3.0	
7.	Analysis Procedure	Equivalent Lateral Force	

PART 2 – FOUNDATIONS

1. REFERENCE GEOTECHNICAL REPORT FOR EXISTING BUILDING
   - A. Foundation design is in accordance with the recommendations provided by S.W. Cole Engineering, Inc.
     1. Draft "Geotechnical Engineering Investigation, Proposed Medical Office Building and Parking Garage, Women and Infants Facility, Charles Street, Portland, ME dated 29 March 2002.

2. FOUNDATION DESIGN PARAMETERS
   - A. Spread Footings
     1. Concrete spread and strip footings are designed for an allowable bearing pressure of 5,000 psf.

PART 3 – CAST–IN–PLACE CONCRETE

1. CONCRETE MIX PROPERTIES:

	Element	Density	28 day strength	Max. W/C	Air Content (Max.)
A.					
1.	Concrete on metal deck	LWC	4000 psi	0.45	less than 3%
2.	Helipad	NWC	6000 psi	0.40	6% ± 1.5%
B.	Portland Cement:	ASTM C150, Type II.			
C.	Density				
1.	Normal weight (NWC) = 145 pcf				
2.	Lightweight (LWC) = 110 pcf ±3%				

   - D. Admixtures: See project specifications for permissible admixtures.
   - E. Supplementary cementitious materials: Refer to specifications for minimum and maximum replacement rates for each class of concrete.
   - F. Mass Concrete: Any concrete placement with a minimum dimension equal to or greater than 3 ft. is considered "mass concrete." Refer to the project specifications for detailed mix, placement, and curing requirements.

2. BASE PLATE GROUT:
   - A. 8,000 psi 28–day compressive strength, placed at fluid consistency, non–metallic, non–shink.

3. STEEL REINFORCEMENT
   - A. ASTM A615 Grade 60, deformed.
   - B. ASTM A706, deformed where rebar is indicated to be welded.
   - C. Do not tack or spot–weld crossing bars.

4. REINFORCEMENT AT OPENINGS
   - A. UON, provide 2 – #6 at each side of all openings in walls and slabs and extend 2 ft 6 in. beyond the opening or as detailed, except vertical bars at sides of openings in walls are to extend from floor to floor.
   - B. Bars may be moved aside at small openings or sleeves, but do not cut or omit.

5. SPLICING OF REINFORCEMENT
   - A. As shown on the typical details.
   - B. Tie bars together at laps.

6. MINIMUM REINFORCEMENT
   - A. Reinforce all walls with at least #4 @ 12 in. each way each face and 2 – #6 each edge.
   - B. In slabs, provide at least 0.0018 times the area of concrete in each direction.

7. REINFORCEMENT SHOP DRAWINGS
   - A. Submit for approval, complete bending and placing details of all reinforcement including welded wire reinforcement, indicating position of splices.
   - B. Include accessory drawings.

8. SPECIFIED CONCRETE CLEAR COVER

A.	Concrete on metal deck top	3 in.
B.	Interior slabs–on–grade top	1 in.
C.	Formed concrete exposed to earth, water, or weather	2 in.
D.	Exterior faces of walls	2 in.
E.	Interior faces of walls	1 in., UON
F.	Pilasters, piers, and columns (transverse to reinforcement)	1 1/2 in., UON
G.	Elevated structural slabs top	3/4 in.
H.	Elevated structural slabs bottom	1 in.
I.	Concrete on metal deck top	3/4 in.
J.	Exterior pavement slabs top	2 in.

9. POST–INSTALLED ANCHORS
   - A. Expansion Anchors: Hilti Kwik Bolt TZ or approved equal.
     1. Install per Hilti installation recommendations.
     2. Provide standard depth of embedment as listed by Hilti, UON.
     3. Provide Stainless Steel anchors and hardware in all exterior applications.
   - B. Adhesive Anchors: Hilti HIT HY 200 Injection Adhesive Anchors or approved equal.
     1. Install per Hilti installation recommendations.
     2. Provide standard depth of embedment as listed by Hilti, UON.
     3. Do not use in an overhead application.
     4. Provide Stainless Steel anchors and hardware in all exterior applications.

10. EXISTING SURFACE TREATMENT
    - A. Roughen all existing concrete surfaces common with new concrete to amplitude of 1/4 in.
    - B. Existing concrete shall also be considered concrete on this job at construction joints or where a secondary pour is required.

11. HOUSEKEEPING PADS AND CURBS
    - A. Pads and curbs may be shown on plan in certain instances for reference only. See Architectural and Mechanical Drawings and Specifications and coordinate with equipment manufacturer's requirements and location.
    - B. Provide the same concrete as base slab, UON.

12. STANDARD SPECIFICATIONS
    - A. CRSI Manual of Standard Practice
    - B. ACI 318–14 – Building Code Requirements for Structural Concrete
    - C. Follow the latest recommendations and specifications of the American Concrete Institute:
      ACI 301 – Specifications for Structural Concrete
      ACI 302 – Concrete Floor and Slab Construction
      ACI 304 – Guide for Measuring, Mixing, Transporting and Placing Concrete
      ACI 305 – Hot Weather Concreting
      ACI 306 – Cold Weather Concreting
      ACI 308 – Guide to Curing Concrete
      ACI 315 – ACI Detailing Manual
      ACI 347 – Guide to Formwork for Concrete

13. STRUCTURAL TESTING AND INSPECTIONS
    - A. Absolutely no concrete is to be placed prior to rebar being inspected and approved.

14. CONSTRUCTION JOINTS
    - A. Refer to Typical Details.

15. CURING COMPOUNDS
    - A. All curing compounds must be approved by the SER and Architect. See specifications for requirements. Curing compounds shall not be used on flatwork.

16. CORE–DRILLED AND SAW–CUT OPENINGS IN CONCRETE CONSTRUCTION
    - A. To the greatest extent possible, openings for plumbing, fire protection, electrical conduits, and mechanical ductwork in concrete walls and slabs shall be coordinated prior to construction; these openings shall be sleeved. A certain amount of core–drilling and saw–cutting may be required. The contractor shall submit a core request form to the SER for review and approval prior to making any cuts or cores. The SER will carry out such reviews as the SER's schedule permits. At a minimum, all cut and core requests must include: the reason for the cut or core; an overall photograph of the area to be cut or cored indicating the project North direction and other nearby openings; and a plan (for slabs) or an elevation (for walls) showing the size and dimensions of the cut or core with respect to column lines and floor levels. The SER will not review requests without all of this information. A request for approval of a cut or core does not guarantee that the SER will approve the cut or core.

17. EDGE OF SLAB
    - A. Refer to architectural edge of slab plans for extents and locations of slab edges, house keeping pads, and curbs not otherwise shown on drawings.

PART 4 – STRUCTURAL STEEL

1. STRUCTURAL SHAPES

A.	Wide Flange Shapes	ASTM A992 (Fy = 50 ksi)
B.	Square and Rectangular Hollow Structural Sections	ASTM A500, Gr. B (Fy = 46 ksi) or ASTM A1085 (Fy = 50 ksi)
C.	Round Hollow Structural Sections	ASTM A500, Gr. B (Fy = 42 ksi)
D.	Angles	ASTM A36, UON (Fy = 36 ksi)
E.	Channels	ASTM A36, UON (Fy = 36 ksi)
F.	Plate	ASTM A36, UON (Fy = 36 ksi)
G.	Pipe	ASTM A53, Type E or S, Grade B

2. BOLTED CONNECTIONS
   - A. ASTM A325 Typ, unless noted as ASTM A490.
   - B. Tension–controlled (TC) bolts may be used in lieu of standard bolts unless otherwise indicated as snug–tight or similar.

3. ANCHOR RODS
   - A. ASTM F1554 Grade 55 bolts (UON) with Supplementary Requirement S1 (weldability).

4. WELDING ELECTRODES
   - A. Conform to AWS Specifications for electrodes based on welding process and the type and grade of steel. E70XX electrodes (MIN.) for all welds.
   - B. See project specifications for additional requirements for beam–column and column splice welds in moment frames.

5. FABRICATION
   - A. Shop fabricate to greatest extent possible by welding including beam stiffeners, column caps and bases, holes and connections.
   - B. Submit complete shop drawings from field dimensions for the Architect's approval of all structural steel prior to fabrication.

6. ERECTION
   - A. Provide anchor rods, steel wedges, threaded screws or shims to support and plumb all columns.
   - B. Grout solid under base plates immediately after columns are plumb. No elevated concrete flatwork shall be placed without grout under base plates reaching its full design strength.
   - C. Provide bearing plates and wall anchors or anchor rods for all beams resting on concrete and all other necessary connecting hardware.
   - D. D.Set anchor rods using template.
   - E. Do not field cut or field modify any structural steel without prior written approval by architect for each specific case.

7. PAINT
   - A. Shop prime all steel not encased in concrete, not fireproofed, or galvanized.
   - B. See Architectural Drawings and Specifications for finish coat requirements.
   - C. Coatings on members with slip critical connections shall satisfy the requirements of a Class A faying surface.

8. HOT–DIP GALVANIZING
   - A. All steel, including but not limited to structural members, connection materials and misc. metals, that is exposed to the exterior elements (weather) shall be hot–dip galvanized. All field welds, or areas where hot–dip galvanizing is damaged, shall be touched–up with a zinc–rich paint ("cold galvanizing") after steel is completely installed.
   - B. Plug weld vent holes after galvanizing.
   - C. Seal weld all seams not otherwise welded.

9. FRAMING
   - A. Beams are equally spaced, UON.
   - B. Cantilevered beams are same size as back span, UON.
   - C. Bolt patterns shown on details illustrate the concept of the connection and do not necessarily show the actual number and arrangement of the bolts in the connection, unless specifically detailed.

10. STANDARD SPECIFICATIONS AND REFERENCE STANDARDS
    - A. AISC 360–10 Specification for Structural Steel Buildings
    - B. AWS D1.1–10 Structural Welding Code – Steel
    - C. RCSC Specification for Structural Joints Using High Strength Bolts, 2009

PART 5 – STEEL DECK AND SHEAR STUDS

1. STEEL DECK
   - A. Provide steel deck made from galvanized steel with minimum yield strength of 40 ksi.
   - B. See Drawings and Specifications for gauge and profile.
   - C. Provide sheet metal pour stops with thickness based on SDI criteria (SDI Publication #31): 14 gauge min. thickness.
   - D. All Steel Deck and supporting members are sized and spaced assuming at least a two span condition for the metal deck. The steel deck supplier, installer, and general contractor shall coordinate installation and shoring requirements for single span deck.

2. HEADED STUDS
   - A. Provide headed type studs which conform to ASTM A108 Grade 1015 or 1020 cold finished carbon steel.
   - B. Provide 3/4 in. diameter by 5 in. long studs, UON.
   - C. See the drawings for number and locations of studs.
   - D. Space studs uniformly along length of beam, UON.
   - E. Provide a minimum of 1 in. from the edge of any stud and the face of concrete, a metal deck rib or similar discontinuity.
   - F. Where composite steel beams on drawings do not show a shear stud designation, provide the following minimum number of shear studs:
     1. Beams designated as part of lateral force–resisting system: 1 stud per foot
     2. All other beams: 1 stud per 2 feet

3. STANDARD SPECIFICATIONS
   - A. AISC 360–10 – Specification for Structural Steel Buildings Part 16, Chapter I.
   - B. AISI S100–12 – North American Specification for the Design of Cold–Formed Structural Steel Members.
   - C. SDI C1.0–10 – Standard for Composite Steel Floor Deck
   - D. AWS D1.3–08 – Structural Welding Code – Sheet Steel
   - E. AWS D1.1–15 – Structural Welding Code – Steel

ABBREVIATIONS

&	And	JST.	Joist
@	At		
A.B.	Anchor Bolt	K	Kips
ACI	American Concrete Institute	KSI	Kips per Square Inch
ADD'L	Additional		
AESS	Architectural Exposed Structural Steel	LBS.	Pounds
AISC	American Institute of Steel Construction	LL	Live Load
ALT.	Alternate	LLH	Long Leg Horizontal
APPROX.	Approximate	LLV	Long Leg Vertical
ARCH.	Architect	LONG.	Longitudinal
ASD	Allowable Strength Design	LTWT.	Lightweight
ASTM	American Society for Testing and Materials	LVL	Laminated Veneer Lumber
AWPA	American Wood Preservers Assoc.	MAX.	Maximum
AWS	American Welding Society	M.B.	Machine Bolt
		MECH.	Mechanical
BLK'G	Blocking	MFR.	Manufacturer
BM.	Beam	M.I.	Malleable Iron
B.N.	Boundary Nail	MIL.	0.001 Inch
BOT.	Bottom	MIN.	Minimum
BRG.	Bearing	MISC.	Miscellaneous
B.S.	Both Sides		
BTWN.	Between	(N)	New
		NO., #	Number
C	Camber	N.S.	Near Side
C.C.	Center to Center	N.T.S.	Not to Scale
C.J.	Control Joint	NWT.	Normal Weight
C.I.P.	Cast–in–place		
C.L., CL	Center Line	O.C.	On Center
CLG.	Ceiling	O.D.	Outside Diameter
CLR.	Clear	O.H.	Opposite Hand
CMU	Concrete Masonry Unit	OPNG.	Opening
COL.	Column	OPP.	Opposite
CONC.	Concrete	OSHPD	Office of Statewide Health Planning and Development
CONN.	Connection		
CONT.	Continuous		
CJP	Complete Joint Penetration	PAF	Powder–Actuated Fasteners
CSK.	Countersink	PART.	Partial
CTBR.	Counterbore	PCF	Pounds per Cubic Foot
CTR.	Center	PL	Plate
		PLY.	Plywood
DBA	Deformed Bar Anchor	PP	Partial Penetration
DBL.	Double	PSF	Pounds per Square Foot
DC	Demand Critical (Weld)	PSI	Pounds per Square Inch
DET., DTL.	Detail	P.T.	Pressure Treated
DF	Douglas Fir	PW	Puddle Weld
DIA., ø	Diameter	PWJ	Plywood Web Joists
DIAG.	Diagonal		
DL	Dead Load	RAD.	Radius
DN.	Down	R.D.	Roof Drain
DO.	Ditto	REINF.	Reinforcing
DSA	Division of the State Architect	REQ.	Required
DWG(S).	Drawing(s)	RF.	Roof
		R.O.	Rough Opening
(E)	Existing	RND.	Round
EA.	Each	R.R.	Remove & Replace
E.F.	Each Face		
E.J.	Expansion Joint	S.A.D.	See Architectural Drawings
ELEV.,EL.	Elevation	SCHED.	Schedule
EMB.,EMBED.	Embedment	SFBC	San Francisco Building Code
E.N.	Edge Nail	SFRS	Seismic Force Resisting System
EQ.	Equal	SHT.	Sheet
EQUIP.	Equipment	SHTG.	Sheathing
E.S.	Each Side	SIM.	Similar
E.W.	Each Way	SLRS	Seismic Load Resisting System
		S.M.D.	See Mechanical Drawings
FDN.	Foundation	S.O.G.	Slab on Grade
F.F.	Finish Floor	S.P.	Southern Pine
F.G.	Finish Grade	S.S.	Stainless Steel
FIN.	Finish	STAGG'D.,STG.	Staggered
FLR.	Floor	STD.	Standard
F.O.C.	Face of Concrete	STIFF.	Stiffener
F.O.M.	Face of Masonry	STL.	Steel
F.O.S.	Face of Stud	STRUCT.	Structural
FRMG.	Framing	SYMM.,SYM.	Symmetrical
FRP	Fiber Reinforced Polymer		
F.S.	Far Side	T&B	Top and Bottom
FT.	Foot, Feet	T&G	Tongue & Groove
FTG.	Footing	T.N.	Toe Nail
		T.O.C.	Top of Concrete
GA.	Gauge	T.O.S.	Top of Steel
GALV.	Galvanized	T.O.W.	Top of Wall
G.L.	Grid Line	TS	Tube Steel (Hollow Structural Section)
GLB	Glued Laminated Beam	TYP.	Typical
GR.	Grade		
		U.O.N.	Unless Otherwise Noted
HDG	Hot–dip Galvanized		
HGR.	Hanger	VERT.	Vertical
HK.	Hook	V.I.F., ±	Verify in Field
HORIZ.	Horizontal		
HSB	High Strength Bolt	W/	With
HSS	Hollow Structural Section	W/O	Without
HT.	Height	W.P.	Work Point
		WHS	Welded Headed Stud
IBC	International Building Code	WTS	Welded Threaded Stud
ICC	International Code Council	WWR	Welded Wire Reinforcing
IN.	Inch, Inches	WWPA	Western Wood Products Association
INT.	Interior		
INV.	Inverted		

SYMBOL LEGEND

- BEAM TO COLUMN MOMENT CONNECTION (PART OF LATERAL FORCE–RESISTING SYSTEM)
- BEAM TO COLUMN CANTILEVER MOMENT CONNECTION
- BEAM TO BEAM CANTILEVER MOMENT CONNECTION
- STANDARD BEAM CONNECTION
- BEAM TO CONC. FOUNDATION WALL CONNECTION USING EMBED PLATE
- DIRECTION OF DECK OR SLAB SPAN
- P_u = FACTORED AXIAL FORCE ON MEMBER (KIPS)
- V_u = FACTORED SHEAR FORCE ON MEMBER (KIPS)
- M_u = FACTORED MOMENT ON MEMBER (KIP–FEET)
- ℄ CENTERLINE
- (#) NUMBER OF HEADED SHEAR STUDS
- C = AMOUNT UPWARD OF BEAM CAMBER
- NEW CAST IN PLACE CONCRETE
- SLAB OR ROOF DECK OPENING
- COMPACTED FILL OR UNDISTURBED SOIL
- GRANULAR FILL
- INDICATES COLUMN STARTS AT THIS LEVEL
- INDICATES COLUMN STOPS AT THIS LEVEL
- INDICATES COLUMN CONTINUES
- [00'–0"] INDICATES BOTTOM OF FOOTING ELEVATION
- BEAM PENETRATION

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VDA (Van Deusen & Associates)
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COST ESTIMATOR
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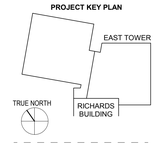
PROJECT TITLE
East Tower 6 & 7 Addition
22 Bramhall Street
Portland, ME 04102

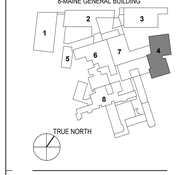
STATE OF MAINE — JOHN H. THOMSEN IV — No. 11120 — LICENSED PROFESSIONAL ENGINEER — 3-21-2018

KEY PLANS

PROJECT KEY PLAN



OVERALL KEY PLAN



CONSTRUCTION DOCUMENTS
JANUARY 26, 2018

NO	ISSUE	DATE
1	ADDENDUM 1	03.22.18

Job Number	152181.000
Drawn	REE
Checked	BMT
Approved	JHT

TITLE
STRUCTURAL GENERAL NOTES

SHEET NUMBER
S00-01