I. GENERAL

A. Construction

1. Construction shall be in accordance with all applicable Federal, State of Iowa, and City of Iowa City codes and ordinances (IBC 2009), including fire codes and VA standards.
2. This structure is classified as an open parking structure, occupancy Group S-2, and as construction Type IIB, Unprotected, Non-Combustible.
3. Contractor shall check all plans, sections, and details shown on Structural Drawings for compatibility with Architectural Drawings. Structural Drawings show only structural elements of parking structure. Discrepancies, if any, shall be reported to Project Manager for clarification or adjustments before proceeding with work.

B. Design Live Loads (all loads are service loads unless noted):

	Description	Roof (Including snow)	Floors
1.	Roof, stair/elevator towers		20 psf
2.	Supported parking and drive areas		
a.	Slabs (unreduced)	61 psf	40 psf
b.	Beams (unreduced)	61 psf	40 psf
c.	Columns (reduced)*	61 psf	32 psf

*Minimum reduced live load shown. Actual reduced live load for each component to be per applicable Building Code equations considering tributary area.

3.	Concentrated wheel load (on 4.5" x 4.5" area)	3,000 lb.
4.	Bumper impact, on 1-ft sq, 18" & 27" (not concurrently) above finished floor	6,000 lb.
5.	Slabs on grade	
a.	Typical S.O.G.	40 psf
b.	10" thick S.O.G.	100psf
6.	Stairs, landings and lobbies	100 psf
7.	Elevator machine room	150 psf
8.	Snow loads	
a.	Ground snow load (Pg)	25 psf
b.	Flat roof snow load (Pf)	21 psf
c.	Snow exposure factor (Ce)	1.0
d.	Snow load importance factor (Is)	1.0
e.	Roof thermal factor (Ct)	1.2
9.	Wind design criteria	
a.	Basic wind speed (3-second gust)	90 mph
b.	Wind load importance factor (Iw)	1.0
c.	Wind exposure	B
d.	Internal pressure coefficient	± 0.18
e.	Components and cladding	see specifications
10.	Earthquake design criteria	
a.	Seismic importance factor (Ie)	1.0
b.	Spectral response acceleration for short period (Ss)	0.10g
c.	Spectral response acceleration at 1-second period (S_1)	0.052g
d.	Site class	C
e.	Design spectral response acceleration for short period (S_{DS})	0.080g
f.	Design spectral response acceleration for 1-second period (S_{D1})	0.059g
g.	Seismic design category	A
h.	Resisting system in east-west direction	
1)	Basic structural system	Ordinary reinforced concrete moment frames
2)	Response modification factor (R)	3
3)	Deflection amplification factor (Cd)	2 1/2
4)	Analysis procedure	Equivalent lateral force
i.	Resisting system in north-south direction	
1)	Basic structural system	Ordinary reinforced concrete moment frames
2)	Response modification factor (R)	3
3)	Deflection amplification factor (Cd)	2 1/2
4)	Analysis procedure	Equivalent lateral force
11.	Mechanical, Electrical, Plumbing (Dead Load)	3 psf
12.	Per PCI Design Handbook (6th Edition)	
a.	Design temperature differential	70 F.
b.	Annual average ambient relative humidity	72%

C. Fire ratings, conforming to MNL-124-89 and ASTM E119 are as follows:

	Structural Element	Hours Provided	Hours Required
1.	Post-tensioned concrete slabs	2	0
2.	Post-tensioned concrete beams	2	0
3.	Concrete columns	2	0
4.	Concrete walls	2	0
5.	Stair/elevator towers	2	0

D. Future Expansion

1. This parking facility is not designed for future expansion.

E. Existing Construction

1. Field verify all existing elevations, dimensions, and conditions shown on Drawings before any material fabrication and erection or concrete placement for new construction. Immediately report all discrepancies to Project Manager.

II. FOUNDATION WORK

A. Foundations, retaining walls, basement walls, foundation drainage and slabs on grade have been designed in accordance with recommendations of Terracon Consultants, Inc., Report Number 05105627.01, dated January 26, 2010.

B. Foundation Design

	Description	Allowable Load
1.	Knee-wall footing	net 2,000 psf
2.	Drilled Piers	net 80,000 psf

C. Retaining Wall Design

1.	Design equivalent fluid pressure behind basement type walls laterally supported top and bottom.	p = (60 x h + 1/2 q**)
2.	Design equivalent fluid pressure behind cantilevered retaining walls	p= (40 x h + 1/2 q**)
3.	Coefficient of sliding friction	tan(delta) = 0.35

p = pressure(psf); h = height(ft); q = surcharge(psf)** = 50 psf @ interior parking, 100 psf @ exterior

D. See Specification Sections of Division 31 for excavation, dewatering and compaction.

E. Footings shall bear on:

1. Knee-wall footings shall bear on undisturbed soil or compacted engineered fill.
2. Drilled pier shall bear on approved limestone, see Detail E6/S-100

F. Excavation depths indicated on Drawings are to be used for bidding purposes only and are approximate.

G. Before placement of granular fill below slab-on-grade, entire surface shall be proofrolled and observed by testing agency for soft or unstable material. Remove unacceptable material and replace with approved granular fill.

III. CONCRETE

A. Material Properties - Concrete:

		F'c, psi at 28 days	Max. W/C Ratio	Max. Slump, inches	Total Air Content (± 1.5%)	Nom. Max. Aggregate Size
1.	Cast-in-place concrete					
a.	Footings	4,000	0.45	4	No test	1"
b.	Drilled piers	4,000	0.45	6#	No test	1"
c.	Caps	4,000	0.45	4	No test	1"
d.	Grade beams	4,000	0.45	4	5	¾"
e.	Columns	See Column Schedule	0.45	3*	5	¾"
f.	Walls	4,000	0.45	3*	5	¾"
g.	Superstructure slabs, beams	5,000	0.40	3*	7	¾"
h.	Slab on grade	4,000	0.45	4	6	1"
i.	Stairs, landings, lobbies	5,000	0.40	3*	7	¾"
j.	All other	4,000	0.45	4	5	¾"
2.	Precast concrete					
a.	Wall panels	6,000	0.40	**	5 ½	¾"
3.	Other concrete					
a.	Masonry wall grout fill	3,000		8-10	No test	3/8"
b.	NSNS grout	8,000		0	No test	No. 4

*Prior to adding water reducer.
**No slump requirement.
#After water reducer addition.

4. For additional information regarding Air Entrainment, see Specification Section 033000.
5. All concrete is Normal Weight: 145 pcf.

B. Material Properties - Reinforcing And Connection Steel:

		Fy, psi	ASTM
1.	Welded bars	60,000	A615*
	OR	60,000	A706
2.	All bars, U.N.	60,000	A615
3.	Welded wire reinforcement (Smooth)	65,000	A185
4.	Prestressing strand	270,000 (fpu)	A416
5.	Post-tensioning strand	270,000 (fpu)	A416
6.	Coil bolts and coil rods	65,000, UN	
7.	Welding for steel reinf. bars		AWS D1.4-YY
8.	Deformed bar anchors	70,000	A496
9.	Headed anchor studs	60,000 (fs)	A108
10.	Headed/terminator bars	60,000	A970

*with proper preheat per AWS standards.

C. General Notes for Cast-in-Place and Precast Concrete

1. Column reinforcing shall be continuous, or shall be spliced according to ACI 318-05, Section 12.14.
2. Welded wire reinforcement shall be spliced per ACI 318-05, Section 12.19.
3. Provide extra reinforcing around all openings, including door openings: two #5 bars all four sides of each opening and extend 2 feet beyond corners of opening. Add two #5 bars 4 feet long as diagonal bars at each corner.
4. Where shown hooked, provide standard 90 degree bar hooks unless noted otherwise.
5. When reinforcement is lap spliced, provide Class B splice typical, unless noted otherwise. See details for splice locations.
6. 6" thick slab-on-grade reinforcement shall be #4 @ 18 in. o.c., ew, placed 2 in. clear from top of slab. 10" thick slab-on-grade reinforcement shall be #4 @ 12" O.C. each way top and bottom. U.N.O.
7. Provide a 3/4 inch chamfer on all exposed corners of concrete. Top edges of walls may be tooled.
8. Provide control/construction joints as shown on the Drawings. For more information, see Specification Section 033000.
9. All inserts and coil rods shall be hot dipped Galvanized. See Division 3 Specifications for more information.
10. Do not place backup bars for P-T anchor plates in contact with plates. Allow one inch between anchor plate and rebar.
11. Do not bundle more than two slab tendons in a single bundle without prior written acceptance by Engineer.
12. For shoring calculations, account for construction loads and assume that beams and slabs below will support a live load of 30 psf when concrete reaches its 28 day compressive strength.
13. For post-tensioning, stress slab tendons parallel to beams first, then tendons perpendicular to beams, then stress beams, and then stress girders. Do not change order of stressing.
14. Stripping of forms shall be in accordance with Specification Section 033000. Shore beams to stressed tiers below as required.
15. All plates or inserts required for connections to post-tensioned members shall be cast into post-tensioned member. Use of power propelled fasteners or drilled-in anchors is prohibited, unless accepted in writing by Engineer.
16. P/C embed shop drawings must be approved and embedded items installed where required prior to placing concrete.

D. Additional notes for precast concrete:

1. Parking Structure contract Drawings are based on performance type design for precast facade. An integral part of this Project is preparation of final Design Drawings, Design Calculations, and Shop Drawings necessary for fabrication and construction of all precast façade components and required accessories in accordance with all code and design requirements. See Specification Section 034500 for more requirements.
2. Provide all openings, reveals, drips, blockouts, inserts, etc., cast into precast according to Architectural, Mechanical and Electrical Drawings. Coordinate exact sizes and locations with respective Contractor.
3. Provide 2 #4 L bars minimum (3'-0" legs) at each corner of precast panels.
4. See Drawings for protection of embedded metals.
5. Structure is designed for its final service condition. Contractor shall be responsible for piece design to withstand handling and erection forces, and bracing as required to assure structural stability during construction. Bracing must remain in place until final stability is achieved through realization of required cast-in-place concrete strength. See structural details.
6. Minimum additional load factor of 1.2 shall be used for design of all façade connections unless superseded by seismic requirements of applicable building code. See specifications section 034500 for more information.

E. Concrete Protection for Reinforcement:

1. Specified concrete protection for reinforcement shall be per ACI 318-05, Section 7.7.
2. For prestressed and non-prestressed reinforcement in prestressed/precast concrete members, specified concrete protection at top of members shall be 1-1/2 inches consistent with ACI 362.1R-97(02),"Guide for the Design of Durable Parking Structures."
3. For prestressed and non-prestressed reinforcement in cast-in-place, post-tensioned concrete, specified concrete protection shall be as follows:

		Concrete Cover (inches)
a.	Slab top reinforcement	2
b.	Slab bottom reinforcement	¾
c.	Beam top reinforcement, UN	4
d.	Beam stirrups at sides and bottom of beam	1-1/2
e.	Beam stirrups at top of beam	3-1/2
f.	Column ties	1-1/2
g.	Girder top reinforcement	3
h.	Girder stirrups at top of girder	2-1/2
i.	Girder stirrups at sides and bottom of girder	1-1/2

F. Epoxy Coating for Reinforcement and Anchors:

1. Epoxy coat the following:

a. Top slab reinforcement in supported slabs.
b. Support bars for top supported slab reinforcement.
c. Upper #4 bar continuous at slab P/T anchors at construction joints only.
d. All reinforcement at pour strips and bumper wall.
e. Column ties within 2'-0" of the top of floor slab, see details on S-610.

2. For additional information regarding epoxy coating, see Specification Section 03300.

IV. CONCRETE MASONRY

A. Material Properties

1. Compressive strength of masonry: f'm = 2000 psi.
2. Mortar type "M" or "S".

B. General Concrete Masonry Notes

1. Provide dowels between foundations and walls equal to size and spacing of vertical wall reinforcing, unless noted otherwise.
2. Minimum reinforcement for masonry walls subject to bumper loads shall be #5 @ 8 in. o.c. for a height of 2 ft. 8 inches above floor and grout all block cores solid up to 2 ft. 8 inches above floor. Minimum reinforcement for masonry walls not subject to bumper loads shall be #4 @ 48 in. o.c. plus one #4 vertical at corners, edges of openings, and ends of walls. Grout block cells with reinforcement full.
3. In masonry walls, provide 8-in.-wide bond beam lintels reinforced with two #5 bars continuous unless shown otherwise on Drawings. Concrete block for three courses directly below bond beam bearing and extending out at an angle of 45 degrees shall be solid block or shall be grouted solid, unless noted otherwise.
4. Provide control joints in masonry walls at 20 ft. on center maximum or as noted on Drawings.

V. STRUCTURAL STEEL

		FY, psi	ASTM
A.	Structural Shapes		
1.	W-shapes	50,000	A992
2.	M-shapes, S-shapes, HP-shapes, channels, angles	36,000	A36
B.	Hollow Structural Sections		
1.	Rectangular and square	46,000	A500 GR. B
2.	Round	42,000	A500 GR. B
C.	Steel Pipes	35,000	A53 GR. B
D.	Structural Plates and Bars	36,000	A36
E.	Bolts		
1.	½" dia. to 1" dia., UN	92,000	A325
2.	1-1/8" dia. to 1-½" dia., UN	81,000	A325
F.	Anchor Rods	36,000	F1554 GR. 36
G.	Welding Electrodes	E70XX	AWS D1.1-YY

H. General Structural Steel Notes

1. Lintels shall have a minimum end bearing on masonry of 8 inches, but not less than 1 inch of such bearing for each foot of opening.

VI. MISCELLANEOUS

A. For exact sizes and locations of mechanical and electrical items and openings, consult respective subcontractors.

B. See Specifications for additional information.

C. Inserts called out on Drawings shall be as designated below for diameters indicated. Nomenclature is for Dayton/Richmond Concrete Accessories.

1. 1/2 inch diameter, Type B-16
2. 3/4 inch diameter, Type F-56, 2 Strut
3. 1 inch diameter, Type F-56, 2 Strut
4. 1-1/4 inch diameter, Type F-58, 4 Strut
5. Provide coil bolts and rods with necessary penetration into inserts to develop full strength per manufacturer's recommendations.

D. Post-Installed Anchors

1. Post-installed anchors shall only be used where shown on the Construction Documents. The Contractor shall obtain approval from the Engineer-of-Record prior to installing post-installed anchors in place of missing or misplace cast-in-place anchors. Care shall be taken in placing post-installed anchors to avoid conflicts with existing rebar. Holes shall be drilled and cleaned in accordance with the manufacturer's written instructions. Substitution requests, for installations other than those shown, shall be submitted by the Contractor to the Engineer-of-Record along with calculations that are prepared and sealed by a registered professional engineer. The calculations shall demonstrate that the substituted product is capable of achieving the pertinent equivalent performance values (minimum) of the specified product using the appropriate design procedure and/or standard(s) as required by the building code. See Specification Section 033000.

a. Concrete Anchors

1) Mechanical anchors for use in cracked and uncracked concrete shall have been tested and qualified for use in accordance with ACI 355.2 and ICC-ES AC193.
2) Adhesive anchors for use in cracked and uncracked concrete shall have been tested and qualified for use in accordance with ICC-ES AC308.

b. Masonry Anchors

1) Anchorage to Solid-Grouted Concrete Masonry

a) Mechanical and concrete screw anchors for use in solid-grouted concrete masonry shall have been tested and qualified for use in accordance with ICC-ES AC01 or AC106, respectively.
b) Adhesive anchors for use in solid-grouted concrete masonry shall have been tested and qualified for use in accordance with ICC-ES AC58.

2) Anchorage to Hollow Concrete Masonry/Unreinforced Clay Brick Masonry

a) Screw anchors for use in hollow concrete masonry shall have been tested and qualified in accordance with ICC-ES AC58 or AC60, as appropriate. The appropriate screen tube shall be used as recommended by the adhesive manufacturer.

E. Abbreviations

1.	AB	=	anchor bolt
2.	CIP	=	cast-in-place concrete
3.	CJ	=	control joint/construction joint
4.	CMU	=	concrete masonry unit
5.	DBA	=	deformed bar anchor
6.	DP	=	drilled pier
7.	EBP	=	elevation bottom of drilled pier
8.	EF	=	each face
9.	EJ	=	expansion joint
10.	ETC	=	elevation top of drilled pier or pile cap
11.	ETF	=	elevation top of footing
12.	ETG	=	elevation top of grade beam
13.	ETP	=	elevation top of concrete pier
14.	ETS	=	elevation top of slab
15.	ETW	=	elevation top of wall
16.	EW	=	each way
17.	EWEF	=	each way, each face
18.	EWP	=	elevation working point
19.	FD	=	floor drain
20.	GC	=	general contractor
21.	HAS	=	headed anchor studs
22.	NSNS	=	non-shrink, non-stain
23.	OC	=	on center
24.	P/C	=	precast concrete
25.	P/T	=	post-tensioned concrete
26.	RD	=	roof drain
27.	SOG	=	slab on grade
28.	UN	=	unless noted
29.	WWR	=	welded wire reinforcement

F. DO NOT SCALE THE DRAWINGS

VII. TESTING & INSPECTION NOTES

A. Following tests and inspection shall be performed by an independent testing and inspection agency employed by contractor and approved by Engineer and Building Official. Test and inspection reports shall be submitted for approval to Engineer and Building Official. Conform to requirements of IBC sections 109 and 1704.

Required Verification and Inspection	Cont.	Periodic
A. Concrete Construction		
1. Inspection of reinforcing steel, including prestressing tendons, and placement		x
2. Inspection of reinforcing steel welding:		
a. Verification of weldability of reinforcing steel other than ASTM A706		x
b. Shear reinforcement	x	
c. Other reinforcing steel		x
3. Inspection of bolts to be installed in concrete prior to and during placement of concrete where allowable loads have been increased or where strength design is used	x	
4. Inspection of anchors installed in hardened concrete.		x
5. Verifying use of required design mix		x
6. Perform sampling and testing of concrete according to specifications	x	
7. Inspection of concrete placement for proper application techniques	x	
8. Inspection for maintenance of specified curing temperature and techniques		x
9. Inspection of prestressed concrete:		
a. Application of prestressing forces	x	
b. Timely installation of and caps at post-tensioned live end anchors (see Specification Section 032300).		x
10. Verification of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs		x
11. Inspect formwork for shape, location and dimensions of concrete member being formed		x
12. Verify finish of concrete slabs and floors (see specification section 033000)		x
13. Verify location and construction of pour strips and joints in concrete slabs and floors (see specification section 033000 and structural drawings)		x
B. Precast Concrete		
1. Erection of precast concrete members		x
2. Verification of precast member connections in accordance with structural drawings and precast construction (shop) drawings		x
C. Steel Construction		
1. Material verification of high-strength bolts, nuts, and washers:		
a. Identification markings to conform to ASTM standards specified in construction documents		x
b. Manufacturer's certificate of compliance required		x
2. Inspection of high-strength bolting:		
a. Bearing-type connections		x
b. Slip-critical connections (see IBC 1704.3.3)	x	x
3. Material verification of structural steel:		
a. Identification markings to conform to ASTM standards in approved construction documents		x
b. Manufacturer's certified mill test reports		x
4. Material verification of weld filler materials:		
a. Identification markings to conform to AWS specification in approved construction documents		x
b. Manufacturer's certificate of compliance required		x
5. Inspection of structural steel welding:		
a. Complete and partial penetration groove welds	x	
b. Multi-pass fillet welds	x	
c. Single-pass fillet welds > 5/16"	x	
d. Single-pass fillet welds ≤ 5/16"		x
e. Floor and deck welds		x
D. Masonry Construction (see IBC section 1704.5.2)		
1. Verification of masonry construction:		
a. Size, location, and placement of masonry units		x
b. Type, size, and location of anchors, including details of anchorage of masonry to structural members, frames, or other construction		x
c. Specified size, grade, type, and placement of reinforcement		x
d. Protection of masonry during cold weather (temperature below 40 deg. F) or hot weather (temperature above 90 deg. F)		x
E. Soils		
1. Verify materials below footings are adequate to achieve design bearing capacity		x
2. Verify excavations are extended to proper depth and have reached proper material		x
3. Perform classification and testing of controlled fill materials		x
4. Verify use of proper materials, densities, and lift thicknesses during placement and compaction of controlled fill	x	
5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly		x
F. Pier Foundations		
1. Observe drilling operations and maintain complete and accurate records for each pier	x	
2. Verify placement locations and plumbness, confirm pier diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable), and adequate end bearing strata capacity	x	
3. Perform additional inspections in accordance with Item A. above		
G. Guardrail Strands		
1. Material verification of guardrail strands (see specification section 051517)		x
2. Inspect placement of guardrail strands		x
3. Verification of backstress to seat wedges at non-stressing ends.		x
4. Verification of specified stressing forces and backstress at stressing ends		x
H. Miscellaneous Items		
1. Verify installation of expansion joints, traffic topping membranes, and joint sealants		x
2. Verify attachment and/or bracing of miscellaneous items such as pipes, equipment, signs, bollards, etc.		x

VIII. DEFERRED SUBMITTALS

A. Following items are portions of design that will not be submitted at time of building permit application. Design of these items will be performed and submitted by a specialty contractor during construction phase of project. For information see appropriate specification sections related to these items.

1. Precast concrete elements.

B. Engineer of Record shall review deferred submittal drawings and calculations prepared by Contractor and forward them to VA Project Manager with notation indicating deferred submittal documents have been reviewed and found to be in general conformance with design requirements. Deferred submittal items shall not be installed until design and submittal documents have been approved by VA Project Manager.

Revisions:	Date
FINAL CONSTRUCTION DOCUMENTS	06/10/11
100% REVIEW SUBMISSION (NOT FOR CONSTRUCTION)	04/11/11
75% REVIEW SUBMISSION (NOT FOR CONSTRUCTION)	02/03/11
75% REVIEW SUBMISSION (NOT FOR CONSTRUCTION) - COST ESTIMATE	01/19/11
35% REVIEW SUBMISSION (NOT FOR CONSTRUCTION)	11/22/10

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Drawing Title: GENERAL NOTES

Project Title: 400 CAR PARKING GARAGE

Project Number: 636-402

Building Number: 43

Approved: Project Director
Iowa City VA Healthcare System
Department of Veterans Affairs Medical Center

Location: IOWA CITY, IA

Date: 06/10/2011 | Checked: BFN | Drawn: MJK

Drawing Number: S-001

Dwg. 79 of 152

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231