Appendices

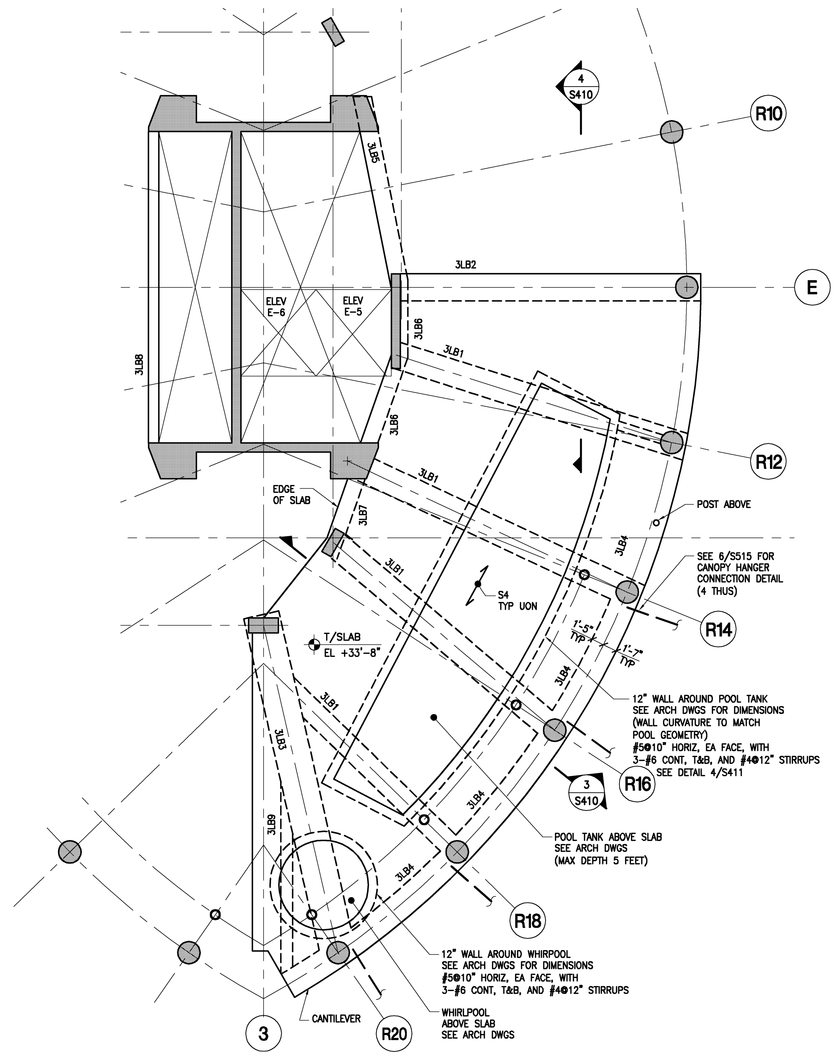
Appendix A: Existing structural plans

Appendix B: Hand Calculations

Appendix C: New floor plan designs

**Complete hand calculations and computer output are available upon request

Appendix A: Existing Structural Plans



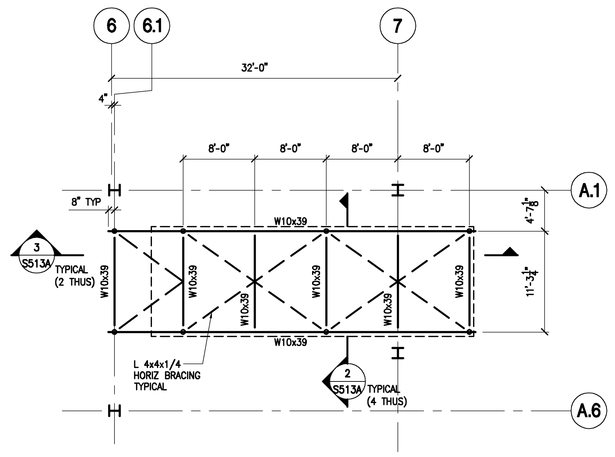
N 3 **PARTIAL FRAMING PLAN**

SCALE: 1/8"=1'-0"

TOWER PLAN NOTES:

1. TOP OF SLAB EL SEE PLAN

2. CONCRETE STRENGTH (SLABS AND BEAMS)
   f'c = 5000 PSI WITH PUDDLING
   f'c = 7150 PSI WITHOUT PUDDLING
   SEE S404 FOR TYPICAL PUDDLING DETAILS



N 4 **PLATFORM FRAMING PLAN**

SCALE: 1/8"=1'-0"

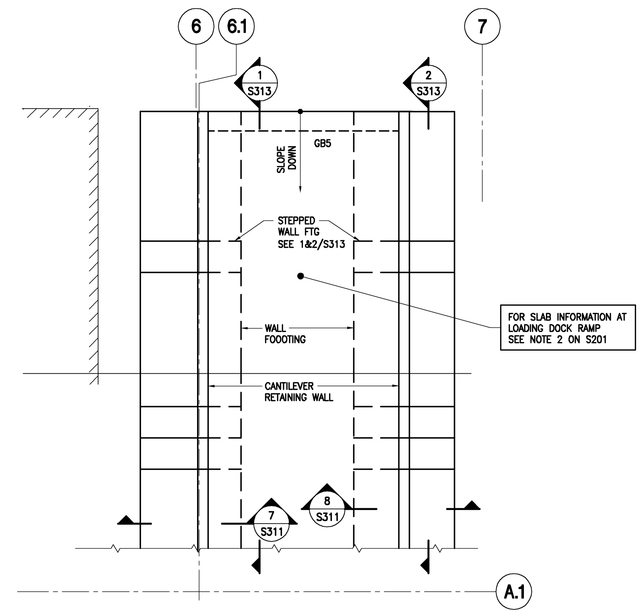
COOLING TOWER SUPPORT PLATFORM

NOTES:

1. TOP OF STEEL EL +36'-2"

2. ALL DIMENSIONS AND ELEVATIONS MUST BE VERIFIED BY ELEVATOR MANUFACTURER. CONTRACTOR TO COORDINATE.

3. REFER TO EQUIPMENT DRAWINGS FOR MOUNTING HOLE LOCATIONS.

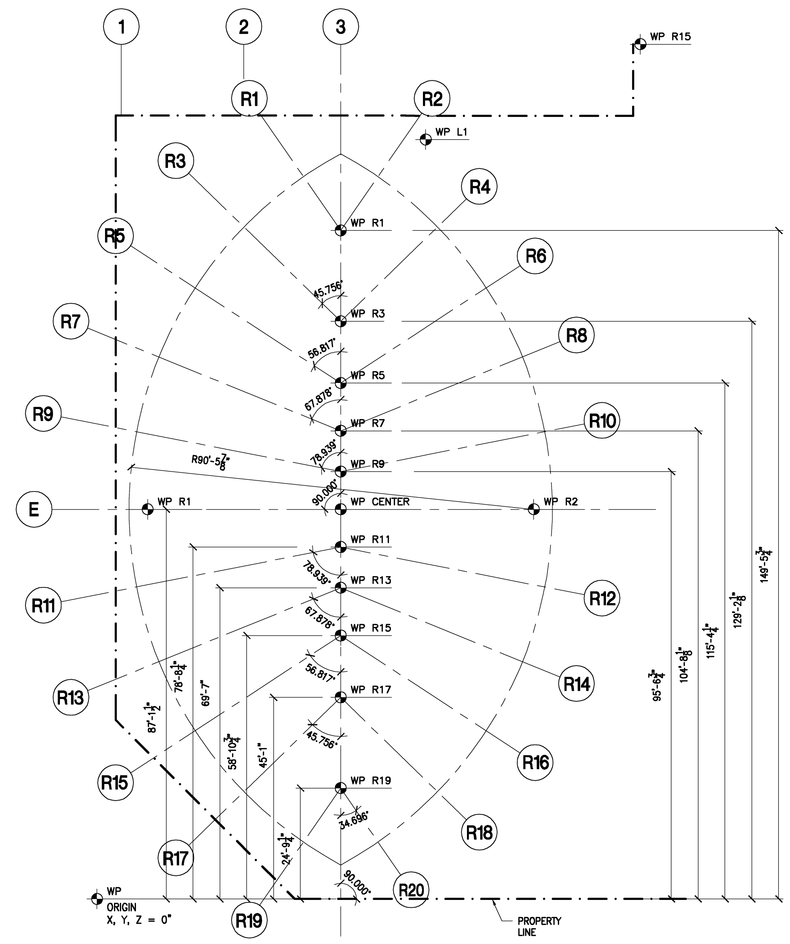


N 1 **PARTIAL PLAN**

SCALE: 1/8"=1'-0"

NOTES:

1. SEE S201 FOR ADDITIONAL INFORMATION



NOTE:
1. SEE ARCH DRAWINGS FOR ADDITIONAL INFORMATION

N 2 **TOWER GEOMETRY**

SCALE: 1/16"=1'-0"

JW MARRIOTT GRAND RAPIDS

OWNER
Alticor, Inc. - HP3, LLC
220 Lyon St NW Suite 405 Grand Rapids, MI 49503
Tel: 616-787-6546 www.alticor.com

ALTICOR

MARRIOTT INTERNATIONAL
Franchisor
Marriott Drive Washington, D.C. 20058
Tel: 301.380.3000 www.marriott.com

LOHAN CAPRILE GOETTSCH architects
Architect
224 S. Michigan Avenue Suite 1700 Chicago, IL 60604
Tel: 312.356.0600 www.lohan.com

BETA DESIGN GROUP
Associate Architect
70 Ionia SW, Suite 400 Grand Rapids, MI 49503
tel. 616-235-6220 www.betadesign.com

BRENNAN BEER GORMAN MONK
Interior Architect
515 Madison Avenue New York, NY 10022
Tel: 212.888.7663 www.bbg-bbgm.com

THORNTON-TOMASETTI GROUP
Structural Engineer
14 East Jackson Blvd, Suite 1100 Chicago, IL 60604-2209
Tel: 312.596.2000 www.theTTgroup.com

PMA CONSULTANTS
Program Manager
226 West Liberty Street Ann Arbor, MI 48104
Tel: 734-769-0530 www.pmaconsultants.com

COSENTINI ASSOCIATES
MEP & FP Engineer
One East Wacker Drive Chicago, IL 60601
Tel: 312-670-1800 www.cosentini-il.com

FISHBECK, THOMPSON, CARR HUBER, INC.
Civil / Environmental Engineer
1515 Arboretum Drive, SE Grand Rapids, Michigan 49546
Tel: 616-575-3824 www.ftch.com

DANIEL WEINBACH & PARTNERS, LTD.
Landscape Architect
53 W. Jackson Blvd., Suite 1850 Chicago, IL 60604
Tel: 312-427-2888 www.dwpltd.com

NO.	DATE	DESCRIPTION
17	02 DEC 05	ISSUED FOR CONSTRUCTION AND PERMIT
16	28 OCT 05	OWNER AND MARRIOTT CO REVIEW
15	24 OCT 05	TOWER CONCRETE BID PACKAGE
9	29 JULY 05	STRUCTURAL STEEL BID PACKAGE

SHEET TITLE:

PARTIAL FRAMING PLANS

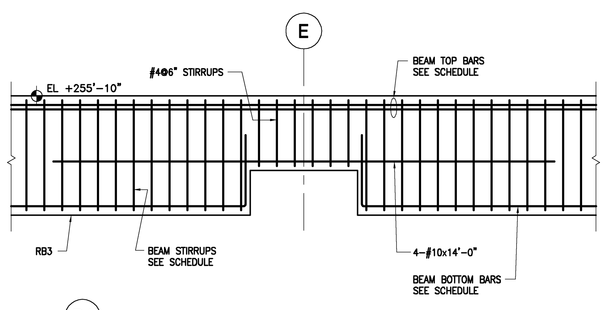
PROJECT ELEVATION + 0.0" = GRAND RAPIDS + 615.0"

SEAL:

SCALE: AS SHOWN
DRAWN BY:
CHECKED BY:
PROJECT NO.: CC4467.00

DRAWING NUMBER:

S266



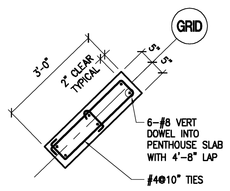
5 RB3 ELEVATION

SCALE: 1/2"=1'-0"

2 ROOF FRAMING PLAN

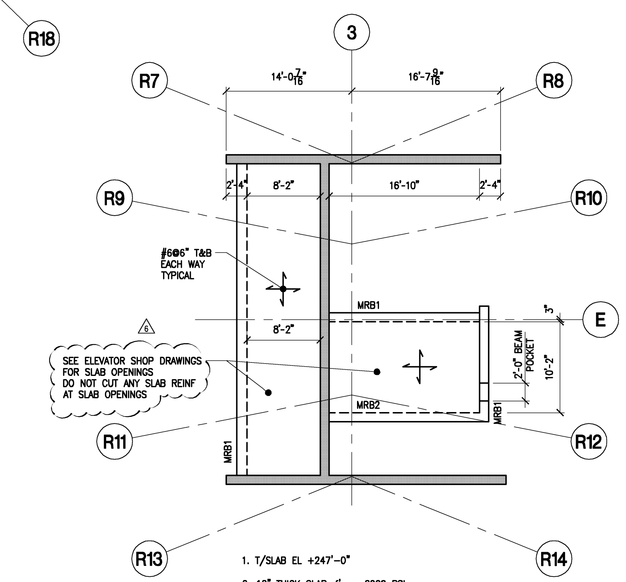
SCALE: 1/8"=1'-0"

1. T/STRUCTURAL SLAB EL +255'-10"
2. T/TOPPING SLAB EL +256'-8" LP, +256'-6 1/2" HP--SEE ARCH FOR SLOPES
3. STRUCTURAL SLAB 10" THICK, NORMAL WEIGHT CONCRETE
4. TOPPING SLAB = 4" THICK WITH #4@12" EACH WAY EPOXY COATED AT MID DEPTH OF SLAB. PROVIDE CONTRACTION JOINTS AT 12'-0" OC MAXIMUM SPACING
5. CONCRETE STRENGTH f'c = 6000 PSI
6. BAR PLACEMENT SEQUENCE:
   1. E-W BOTTOM
   2. N-S BOTTOM
   3. N-S TOP
   4. E-W TOP
7. CLEAR COVER TO TOP AND BOTTOM BARS = 3/4"



4 SCREEN WALL COLUMN DETAIL

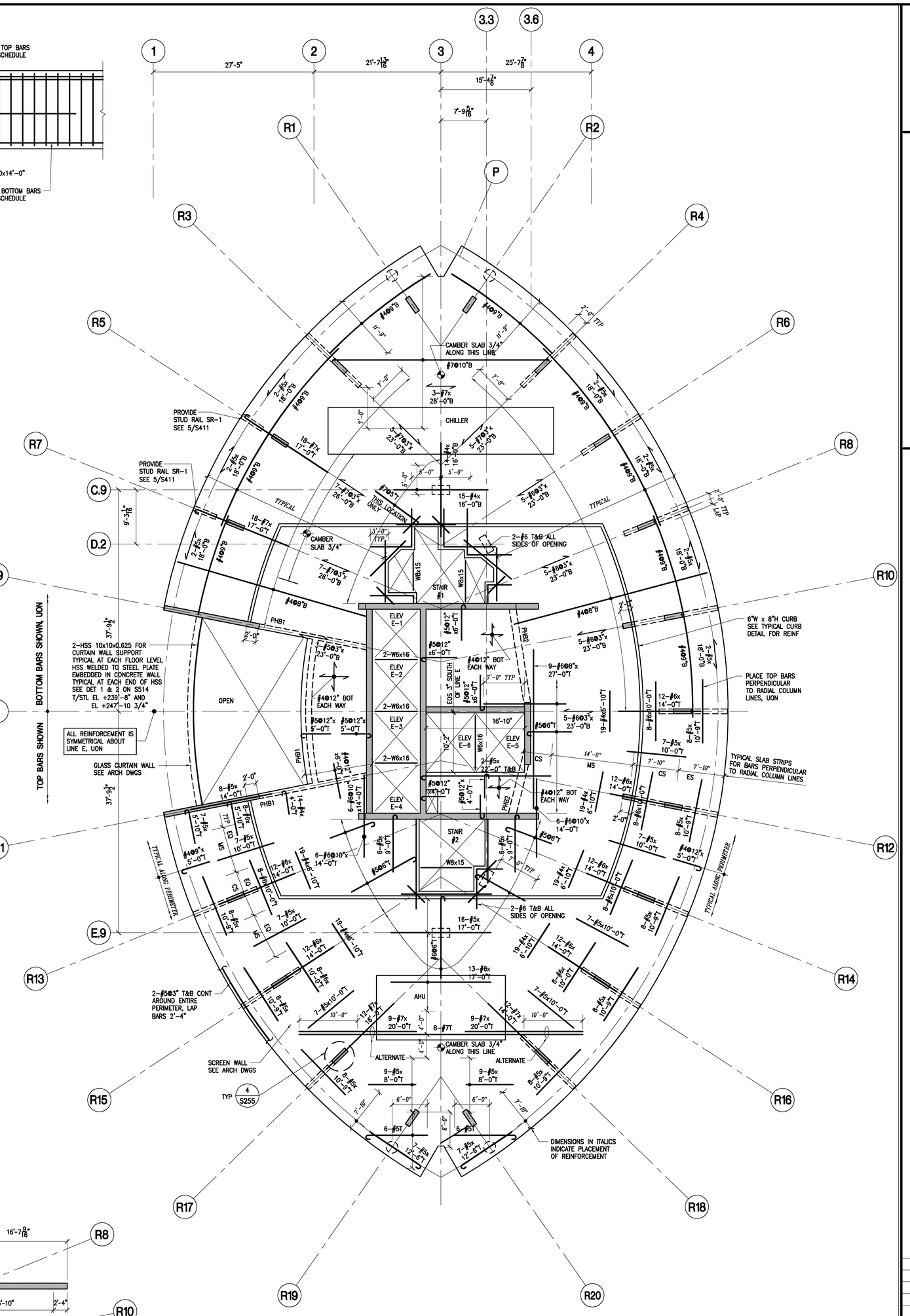
f'c=5000 PSI



1. T/SLAB EL +247'-0"
2. 18" THICK SLAB, f'c = 6000 PSI

3 ELEVATOR MACHINE ROOM FRAMING PLAN

SCALE: 1/8"=1'-0"



1 MECHANICAL PENTHOUSE FLOOR FRAMING PLAN

SCALE: 1/8"=1'-0"

1. T/SLAB EL +239'-8" LP AND INSIDE MECHANICAL PENTHOUSE EL +240'-2" HP -- SEE ARCH DWGS FOR ROOF SLOPES
2. B/SLAB EL +238'-8" CONSTANT
3. 12" THICK SLAB, NORMAL WEIGHT CONCRETE
4. CONCRETE STRENGTH f'c = 6000 PSI
5. BOTTOM BARS SHOWN THUS ⟷ ARE IN ADDITION TO TYPICAL CONTINUOUS BOTTOM BARS
6. BAR PLACEMENT SEQUENCE:
   1. BOTTOM BARS PARALLEL TO RADIAL COLUMN LINES
   2. BOTTOM BARS PERPENDICULAR TO RADIAL COLUMN LINES
   3. TOP BARS PERPENDICULAR TO RADIAL COLUMN LINES
   4. TOP BARS PARALLEL TO RADIAL COLUMN LINES
7. CLEAR COVER TO TOP AND BOTTOM BARS = 3/4"

REFERENCE:

1. SEE DRAWING S001 FOR GENERAL NOTES.
2. SEE DRAWING S400 FOR CONCRETE COLUMN DETAILS.
3. SEE DRAWINGS S401 & S402 FOR CONCRETE WALL DETAILS.
4. SEE DRAWINGS S403 & S404 FOR CONCRETE SLAB DETAILS.
5. SEE DRAWINGS S405 & S405A FOR CONCRETE BEAM DETAILS.

JW MARRIOTT GRAND RAPIDS

OWNER
Alticor, Inc. - HP3, LLC
220 Lyon St NW Suite 405 Grand Rapids, MI 49503
Tel: 616-787-6546 www.alticor.com

ALTICOR

MARRIOTT INTERNATIONAL
Franchisor
Marriott Drive Washington, D.C. 20058
Tel: 301.380.3000 www.marriott.com

LOHAN CAPRILE GOETTSCH architects
Architect
224 S. Michigan Avenue Suite 1700 Chicago, IL 60604
Tel: 312.356.0620 www.lohan.com

BETA DESIGN GROUP
Associate Architect
70 Ionia SW, Suite 400 Grand Rapids, MI 49503
tel: 616-235-6220 www.betadesign.com

BRENNAN BEER GORMAN MONK
Interior Architect
515 Madison Avenue New York, NY 10022
Tel: 212.888.7663 www.bbg-bbgm.com

THORNTON-TOMASETTI GROUP
Structural Engineer
14 East Jackson Blvd, Suite 1100 Chicago, IL 60604-2209
Tel: 312.596.2000 www.theTTgroup.com

PMA CONSULTANTS
Program Manager
226 West Liberty Street Ann Arbor, MI 48104
Tel: 734-769-0530 www.pmaconsultants.com

COSENTINI ASSOCIATES
MEP & FP Engineer
One East Wacker Drive Chicago, IL 60601
Tel: 312-670-1800 www.cosentini-il.com

FISHBECK, THOMPSON, CARR HUBER, INC.
Civil / Environmental Engineer
1515 Arboretum Drive, SE Grand Rapids, Michigan 49546
Tel: 616-575-3824 www.ftch.com

DANIEL WEINBACH & PARTNERS, LTD.
Landscape Architect
53 W. Jackson Blvd., Suite 1850 Chicago, IL 60604
Tel: 312-427-2888 www.dwpltd.com

NO.	DATE	DESCRIPTION
1	10 DEC 04	SCHEMATIC DESIGN
2	15 APR 05	IN-PROGRESS DESIGN DEVELOPMENT
3	29 APR 05	DESIGN DEVELOPMENT
5	20 MAY 05	REVISED DESIGN DEVELOPMENT
9	03 AUG 05	STRUCTURAL STEEL BID PACKAGE
15	24 OCT 05	TOWER CONCRETE BID PACKAGE
16	28 OCT 05	OWNER AND MARRIOTT CD REVIEW
17	02 DEC 05	ISSUED FOR CONSTRUCTION AND PERMIT
6	09 JAN 06	ADDENDUM #6

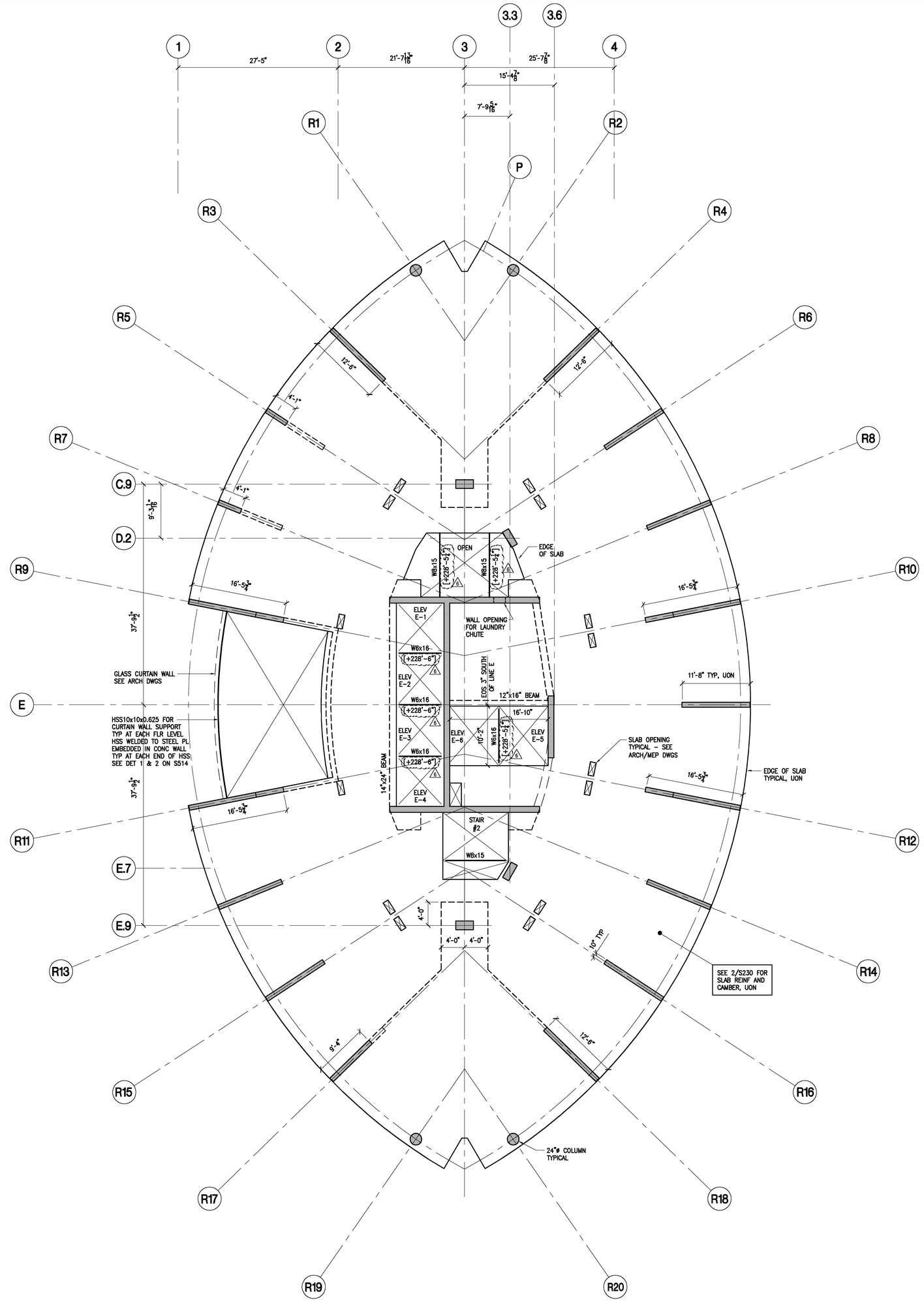
SHEET TITLE:

MECHANICAL PENTHOUSE AND ROOF FRAMING PLAN

PROJECT ELEVATION + 0.0" = GRAND RAPIDS + 615.0'

SCALE: AS SHOWN
DRAWN BY:
CHECKED BY:
PROJECT NO.: CC4467.00
DRAWING NUMBER:

S255



N

2 23RD FLOOR FRAMING PLAN

SCALE: 1/8"=1'-0"

1. T/SLAB EL +228'-8"
2. 7 1/2"THICK SLAB, UON, NORMAL WEIGHT CONCRETE
3. CONCRETE STRENGTH f'c = 5700 PSI AT 6TH – 8TH FLOORS
   f'c = 5000 PSI, TYPICAL
4. BOTTOM BARS SHOWN THUS ⟵ ARE IN ADDITION TO TYPICAL CONTINUOUS BOTTOM BARS
5. BAR PLACEMENT SEQUENCE:
   1. BOTTOM BARS PARALLEL TO RADIAL COLUMN LINES
   2. BOTTOM BARS PERPENDICULAR TO RADIAL COLUMN LINES
   3. TOP BARS PERPENDICULAR TO RADIAL COLUMN LINES
   4. TOP BARS PARALLEL TO RADIAL COLUMN LINES
6. CLEAR COVER TO TOP AND BOTTOM BARS = 3/4"

REFERENCE:

1. SEE DRAWING S001 FOR GENERAL NOTES.
2. SEE DRAWING S400 FOR CONCRETE COLUMN DETAILS.
3. SEE DRAWINGS S401 & S402 FOR CONCRETE WALL DETAILS.
4. SEE DRAWINGS S403 & S404 FOR CONCRETE SLAB DETAILS.
5. SEE DRAWINGS S405 & S405A FOR CONCRETE BEAM DETAILS.

JW MARRIOTT
GRAND RAPIDS

OWNER
Alticor, Inc. - HP3, LLC
220 Lyon St NW Suite 405 Grand Rapids, MI 49503
Tel: 616-787-6546 www.alticor.com

ALTICOR

MARRIOTT INTERNATIONAL
Franchisor
Marriott Drive Washington, D.C. 20058
Tel: 301.380.3000 www.marriott.com

LOHAN CAPRILE GOETTSCH architects
Architect
224 S. Michigan Avenue Suite 1700 Chicago, IL 60604
Tel: 312.356.0600 www.lohan.com

BETA DESIGN GROUP
Associate Architect
70 Ionia SW, Suite 400 Grand Rapids, MI 49503
tel. 616-235-6220 www.betadesign.com

BRENNAN BEER GORMAN MONK
Interior Architect
515 Madison Avenue New York, NY 10022
Tel: 212.888.7663 www.bbg-bbgm.com

THORNTON-TOMASETTI GROUP
Structural Engineer
14 East Jackson Blvd, Suite 1100 Chicago, IL 60604-2209
Tel: 312.596.2000 www.theTTgroup.com

PMA CONSULTANTS
Program Manager
226 West Liberty Street Ann Arbor, MI 48104
Tel: 734-769-0530 www.pmaconsultants.com

COSENTINI ASSOCIATES
MEP & FP Engineer
One East Wacker Drive Chicago, IL 60601
Tel: 312-670-1800 www.cosentini-il.com

FISHBECK, THOMPSON, CARR HUBER, INC.
Civil / Environmental Engineer
1515 Arboretum Drive, SE Grand Rapids, Michigan 49546
Tel: 616-575-3824 www.ftch.com

DANIEL WEINBACH & PARTNERS, LTD.
Landscape Architect
53 W. Jackson Blvd., Suite 1850 Chicago, IL 60604
Tel: 312-427-2888 www.dwpltd.com

NO.	DATE	DESCRIPTION
4	09 JAN 06	ADDENDUM #6
17	02 DEC 05	ISSUED FOR CONSTRUCTION AND PERMIT
16	28 OCT 05	OWNER AND MARRIOTT CO REVIEW
15	24 OCT 05	TOWER CONCRETE BID PACKAGE
5	20 MAY 05	REVISED DESIGN DEVELOPMENT
3	29 APR 05	DESIGN DEVELOPMENT
2	15 APR 05	IN-PROGRESS DESIGN DEVELOPMENT

SHEET TITLE:

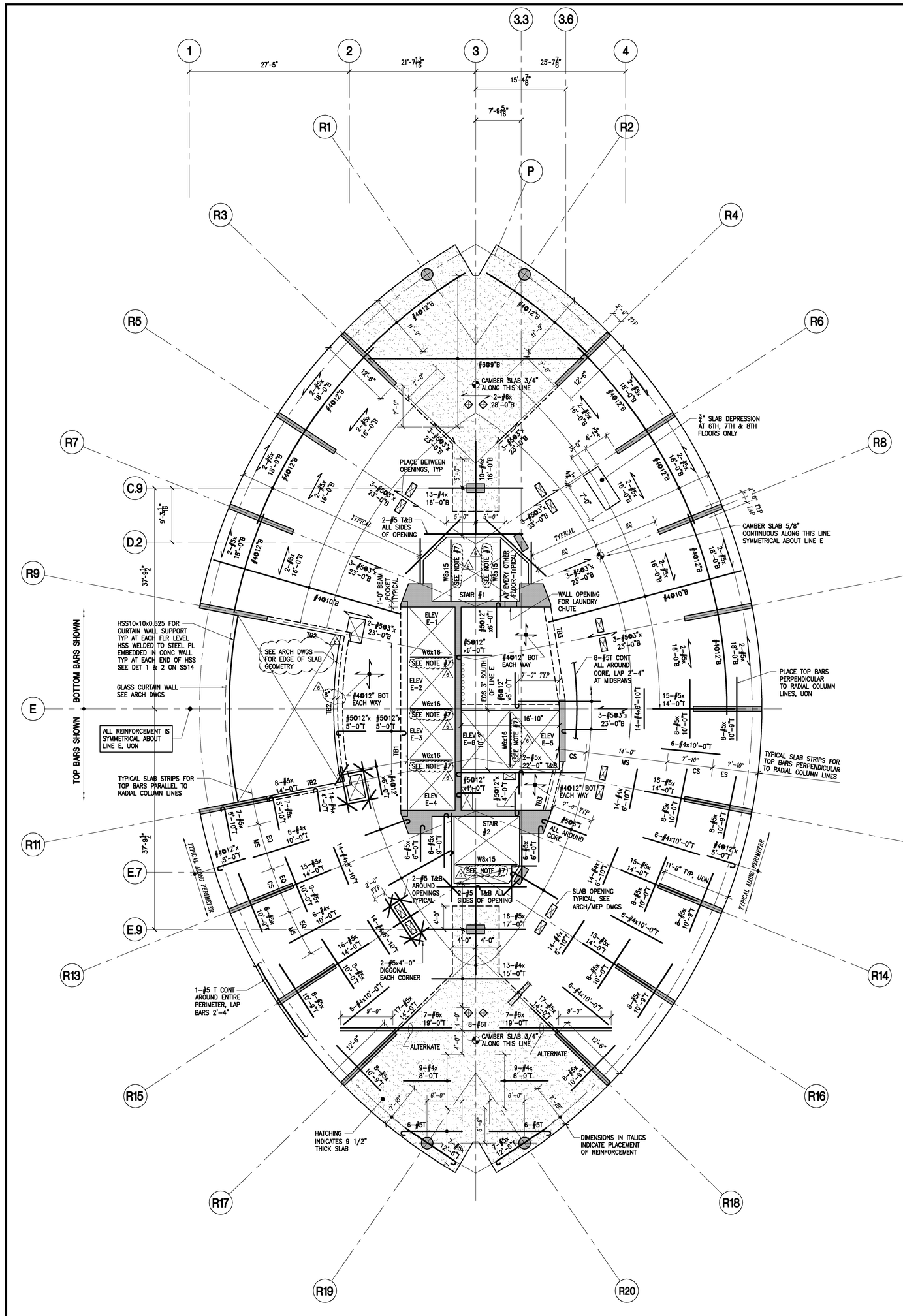
23RD FLOOR FRAMING PLAN

PROJECT ELEVATION + 0.0" = GRAND RAPIDS + 615.0"

SEAL:

SCALE: AS SHOWN
DRAWN BY:
CHECKED BY:
PROJECT NO.: CC4467.00
DRAWING NUMBER:

S240



6TH-22ND FLOOR FRAMING PLAN

SCALE: 1/8"=1'-0"

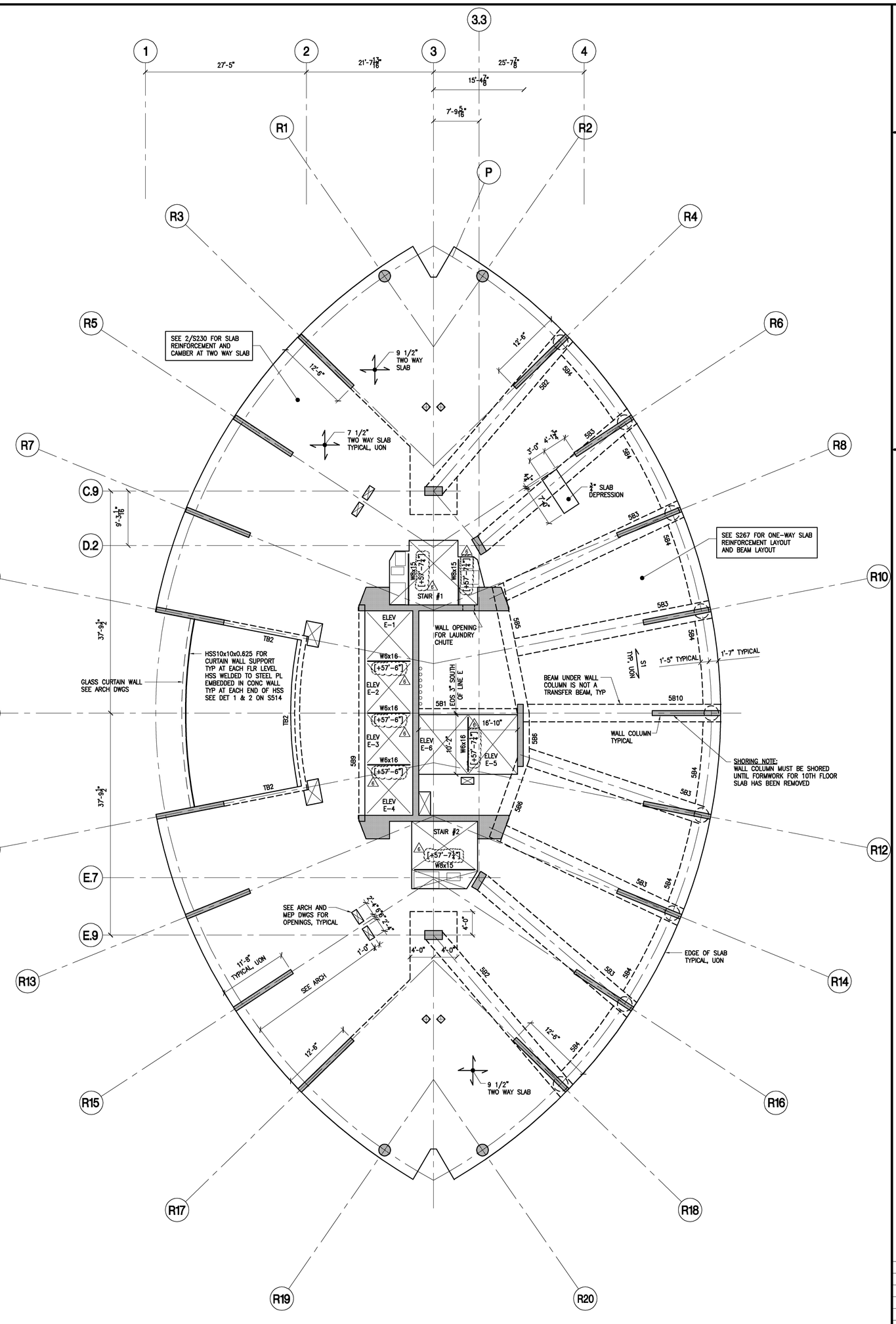
1. T/SLAB EL: SEE LIST ON THIS DRAWING
2. 7 1/2"THICK SLAB, UON, NORMAL WEIGHT CONCRETE
3. CONCRETE STRENGTH f'c = 5700 PSI AT 6TH - 8TH FLOORS
   f'c = 5000 PSI, TYPICAL
4. BOTTOM BARS SHOWN THUS ⟷ ARE IN ADDITION TO TYPICAL CONTINUOUS BOTTOM BARS
5. BAR PLACEMENT SEQUENCE:
   1. BOTTOM BARS PARALLEL TO RADIAL COLUMN LINES
   2. BOTTOM BARS PERPENDICULAR TO RADIAL COLUMN LINES
   3. TOP BARS PERPENDICULAR TO RADIAL COLUMN LINES
   4. TOP BARS PARALLEL TO RADIAL COLUMN LINES
6. CLEAR COVER TO TOP AND BOTTOM BARS = 3/4"
7. T/W8 EL AT ELEVATORS E1-E4 = 2" BELOW T/SLAB EL
   T/W8 EL AT ELEVATORS E5-E6 = 3/4" BELOW T/SLAB EL
   T/W8 EL AT STAIRS #1 AND #2 = 3/4" BELOW T/SLAB EL

T/SLAB ELEVATIONS:

6TH FLOOR	+67'-2"
7TH FLOOR	+76'-8"
8TH FLOOR	+86'-2"
9TH FLOOR	+95'-8"
10TH FLOOR	+105'-2"
11TH FLOOR	+114'-8"
12TH FLOOR	+124'-2"
13TH FLOOR	+133'-8"
14TH FLOOR	+143'-2"
15TH FLOOR	+152'-8"
16TH FLOOR	+162'-2"
17TH FLOOR	+171'-8"
18TH FLOOR	+181'-2"
19TH FLOOR	+190'-8"
20TH FLOOR	+200'-2"
21ST FLOOR	+209'-8"
22ND FLOOR	+219'-2"

REFERENCE:

1. SEE DRAWING S001 FOR GENERAL NOTES.
2. SEE DRAWING S400 FOR CONCRETE COLUMN DETAILS.
3. SEE DRAWINGS S401 & S402 FOR CONCRETE WALL DETAILS.
4. SEE DRAWINGS S403 & S404 FOR CONCRETE SLAB DETAILS.
5. SEE DRAWINGS S405 & S405A FOR CONCRETE BEAM DETAILS.



5TH FLOOR FRAMING PLAN

SCALE: 1/8"=1'-0"

1. T/SLAB EL +57'-8", UON
2. CONCRETE STRENGTH, f'c = 5700 PSI

REFERENCE:

1. SEE DRAWING S001 FOR GENERAL NOTES.
2. SEE DRAWING S400 FOR CONCRETE COLUMN DETAILS.
3. SEE DRAWINGS S401 & S402 FOR CONCRETE WALL DETAILS.
4. SEE DRAWINGS S403 & S404 FOR CONCRETE SLAB DETAILS.
5. SEE DRAWINGS S405 & S405A FOR CONCRETE BEAM DETAILS.

JW MARRIOTT
GRAND RAPIDS

OWNER
Alticor, Inc. - HP3, LLC
220 Lyon St NW Suite 405 Grand Rapids, MI 49503
Tel: 616-787-6546 www.alticor.com

ALTICOR

MARRIOTT INTERNATIONAL
Franchisor
Marriott Drive Washington, D.C. 20058
Tel: 301.380.3000 www.marriott.com

LOHAN CAPRILE GOETTSCH architects
Architect
224 S. Michigan Avenue Suite 1700 Chicago, IL 60604
Tel: 312.356.0620 www.lohan.com

BETA DESIGN GROUP
Associate Architect
70 Ionia SW, Suite 400 Grand Rapids, MI 49503
tel. 616-235-6220 www.betadesign.com

BRENNAN BEER GORMAN MONK
Interior Architect
515 Madison Avenue New York, NY 10022
Tel: 212.888.7663 www.bbg-bbgm.com

THORNTON-TOMASETTI GROUP
Structural Engineer
14 East Jackson Blvd, Suite 1100 Chicago, IL 60604-2209
Tel: 312.596.2000 www.theTTgroup.com

PMA CONSULTANTS
Program Manager
226 West Liberty Street Ann Arbor, MI 48104
Tel: 734-769-0530 www.pmaconsultants.com

COSENTINI ASSOCIATES
MEP & FP Engineer
One East Wacker Drive Chicago, IL 60601
Tel: 312-670-1800 www.cosentini-il.com

FISHBECK, THOMPSON, CARR HUBER, INC.
Civil / Environmental Engineer
1515 Arboretum Drive, SE Grand Rapids, Michigan 49546
Tel: 616-575-3824 www.ftch.com

DANIEL WEINBACH & PARTNERS, LTD.
Landscape Architect
53 W. Jackson Blvd., Suite 1850 Chicago, IL 60604
Tel: 312-427-2888 www.dwpltd.com

NO.	DATE	DESCRIPTION
1	10 DEC 04	SCHEMATIC DESIGN
2	15 APR 05	IN-PROGRESS DESIGN DEVELOPMENT
3	29 APR 05	DESIGN DEVELOPMENT
5	20 MAY 05	REVISED DESIGN DEVELOPMENT
15	24 OCT 05	TOWER CONCRETE BID PACKAGE
16	28 OCT 05	OWNER AND MARRIOTT CO REVIEW
17	02 DEC 05	ISSUED FOR CONSTRUCTION AND PERMIT
1	09 JAN 06	ADDENDUM #6

SHEET TITLE:

5TH AND 6TH-22ND FLOOR FRAMING PLANS

PROJECT ELEVATION + 0.0" = GRAND RAPIDS + 615.0"

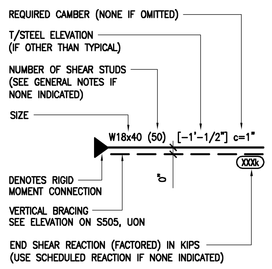
SEAL:

SCALE: AS SHOWN
DRAWN BY:
CHECKED BY:
PROJECT NO.: CC4467.00

DRAWING NUMBER:

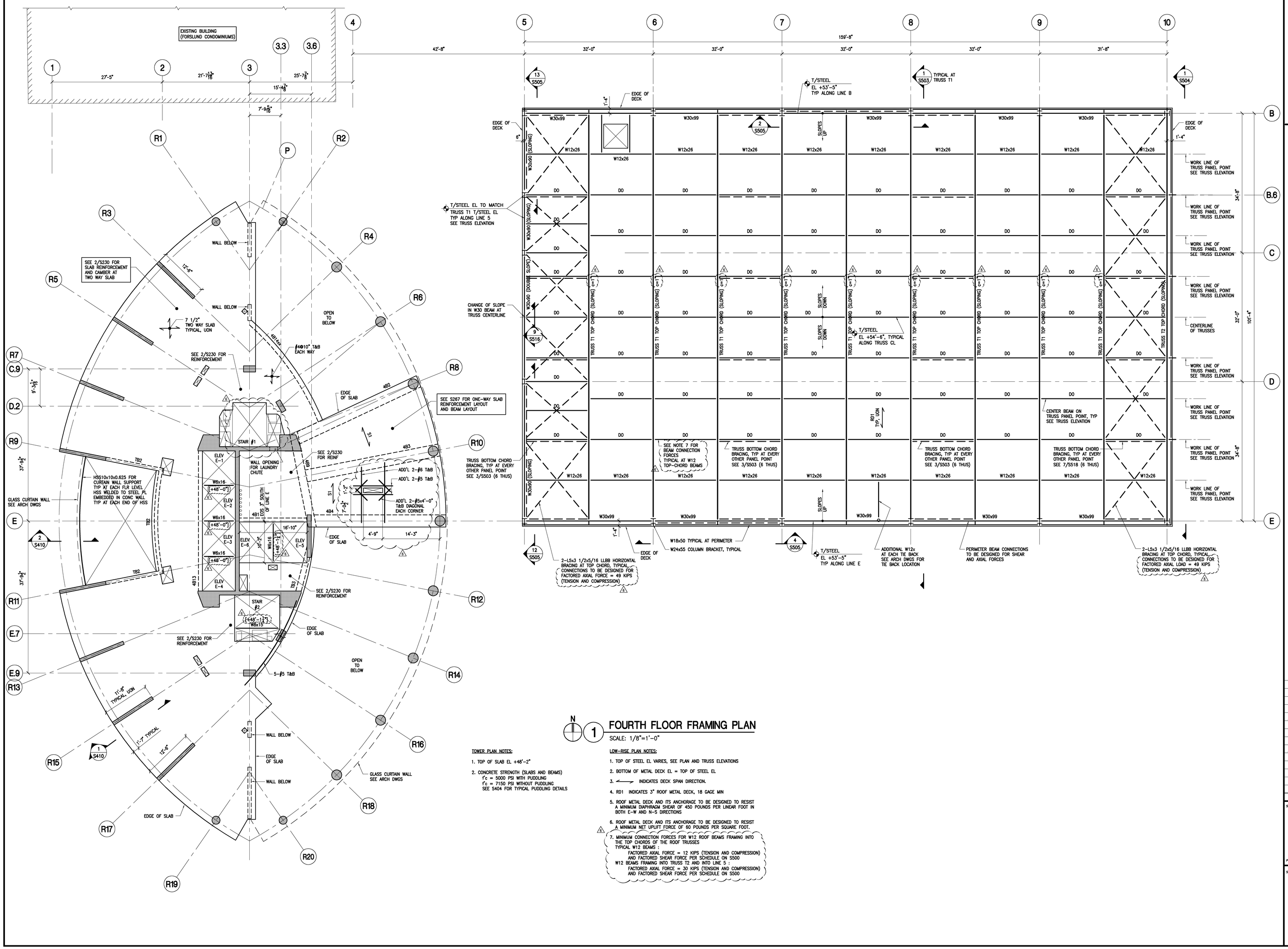
S230

STEEL BEAM KEY PLAN:



REFERENCE:

1. SEE DRAWING S001 FOR GENERAL NOTES.
2. SEE DRAWING SERIES S300 FOR TYPICAL CONCRETE DETAILS.
3. SEE DRAWING SERIES S500 FOR TYPICAL STEEL DETAILS.
4. SEE DWGS S501 & S501A FOR TYPICAL COMPOSITE SLAB DETAILS.
5. SEE DRAWING S505 FOR BRACING ELEVATIONS.
6. SEE DRAWING S503 AND S504 FOR TRUSS ELEVATIONS.



N

1 FOURTH FLOOR FRAMING PLAN

SCALE: 1/8"=1'-0"

TOWER PLAN NOTES:

1. TOP OF SLAB EL +48'-2"
2. CONCRETE STRENGTH (SLABS AND BEAMS)
   f'c = 5000 PSI WITH PUDDLING
   f'c = 7150 PSI WITHOUT PUDDLING
   SEE S404 FOR TYPICAL PUDDLING DETAILS

LOW-RISE PLAN NOTES:

1. TOP OF STEEL EL VARIES, SEE PLAN AND TRUSS ELEVATIONS
2. BOTTOM OF METAL DECK EL = TOP OF STEEL EL
3. ⟷ INDICATES DECK SPAN DIRECTION.
4. RD1 INDICATES 3" ROOF METAL DECK, 18 GAGE MIN
5. ROOF METAL DECK AND ITS ANCHORAGE TO BE DESIGNED TO RESIST A MINIMUM DIAPHRAGM SHEAR OF 450 POUNDS PER LINEAR FOOT IN BOTH E-W AND N-S DIRECTIONS
6. ROOF METAL DECK AND ITS ANCHORAGE TO BE DESIGNED TO RESIST A MINIMUM NET UPLIFT FORCE OF 60 POUNDS PER SQUARE FOOT.
7. MINIMUM CONNECTION FORCES FOR W12 ROOF BEAMS FRAMING INTO THE TOP CHORDS OF THE ROOF TRUSSES
   TYPICAL W12 BEAMS :
   FACTORED AXIAL FORCE = 12 KIPS (TENSION AND COMPRESSION)
   AND FACTORED SHEAR FORCE PER SCHEDULE ON S500
   W12 BEAMS FRAMING INTO TRUSS T2 AND INTO LINE 5 :
   FACTORED AXIAL FORCE = 30 KIPS (TENSION AND COMPRESSION)
   AND FACTORED SHEAR FORCE PER SCHEDULE ON S500

JW MARRIOTT
GRAND RAPIDS

OWNER
Alticor, Inc. - HP3, LLC
220 Lyon St NW Suite 405 Grand Rapids, MI 49503
Tel: 616-787-6546 www.alticor.com

ALTICOR

MARRIOTT INTERNATIONAL
Franchisor
Marriott Drive Washington, D.C. 20058
Tel: 301.380.3000 www.marriott.com

LOHAN CAPRILE GOETTSCH architects
Architect
224 S. Michigan Avenue Suite 1700 Chicago, IL 60604
Tel: 312.356.0600 www.lohan.com

BETA DESIGN GROUP
Associate Architect
70 Ionia SW, Suite 400 Grand Rapids, MI 49503
tel. 616-235-6220 www.betadesign.com

BRENNAN BEER GORMAN MONK
Interior Architect
515 Madison Avenue New York, NY 10022
Tel: 212.888.7663 www.bbg-bbgm.com

THORNTON-TOMASETTI GROUP
Structural Engineer
14 East Jackson Blvd, Suite 1100 Chicago, IL 60604-2209
Tel: 312.596.2000 www.theTTgroup.com

PMA CONSULTANTS
Program Manager
226 West Liberty Street Ann Arbor, MI 48104
Tel: 734-769-0530 www.pmaconsultants.com

COSENTINI ASSOCIATES
MEP & FP Engineer
One East Wacker Drive Chicago, IL 60601
Tel: 312-670-1800 www.cosentini-il.com

FISHBECK, THOMPSON, CARR HUBER, INC.
Civil / Environmental Engineer
1515 Arboretum Drive, SE Grand Rapids, Michigan 49546
Tel: 616-575-3824 www.ftch.com

DANIEL WEINBACH & PARTNERS, LTD.
Landscape Architect
53 W. Jackson Blvd., Suite 1850 Chicago, IL 60604
Tel: 312-427-2888 www.dwpltd.com

NO.	DATE	DESCRIPTION
6	09 JAN 06	ADDENDUM #6
17	02 DEC 05	ISSUED FOR CONSTRUCTION AND PERMIT
16	28 OCT 05	OWNER AND MARRIOTT CO REVIEW
15	24 OCT 05	TOWER CONCRETE BID PACKAGE
4	23 SEPT 05	BID ADDENDUM #4 -STRUCTURAL STEEL & FOUNDATIONS
9	03 AUG 05	STRUCTURAL STEEL BID PACKAGE
5	20 MAY 05	REVISED DESIGN DEVELOPMENT
3	29 APR 05	DESIGN DEVELOPMENT
2	15 APR 05	IN-PROGRESS DESIGN DEVELOPMENT
1	10 DEC 04	SCHEMATIC DESIGN

SHEET TITLE:

FOURTH FLOOR FRAMING PLAN

PROJECT ELEVATION = 0.0" = GRAND RAPIDS + 615.0'

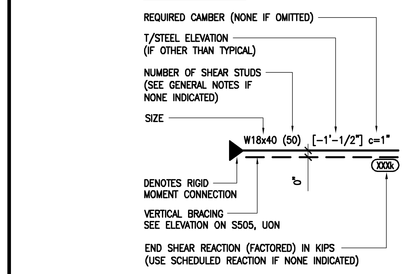
SEAL:

SCALE: AS SHOWN
DRAWN BY:
CHECKED BY:
PROJECT NO.: CC4467.00

DRAWING NUMBER:

S226

STEEL BEAM KEY PLAN:



REFERENCE:

1. SEE DRAWING S001 FOR GENERAL NOTES.
2. SEE DRAWING SERIES S300 FOR TYPICAL CONCRETE DETAILS.
3. SEE DRAWING SERIES S500 FOR TYPICAL STEEL DETAILS.
4. SEE DWGS S501 & S501A FOR TYPICAL COMPOSITE SLAB DETAILS.
5. SEE DRAWING S505 FOR BRACING ELEVATIONS.
6. SEE DRAWING S503 AND S504 FOR TRUSS ELEVATIONS.

TOWER PLAN NOTES:

1. TOP OF SLAB EL +38'-8", UON
2. CONCRETE STRENGTH (SLABS AND BEAMS)
   f'c = 5000 PSI WITH PUDDLING
   f'c = 7150 PSI WITHOUT PUDDLING
   SEE S404 FOR TYPICAL PUDDLING DETAILS

N

1 THIRD FLOOR FRAMING PLAN

SCALE: 1/8"=1'-0"

LOW-RISE PLAN NOTES:

1. TOP OF SLAB EL VARIES, SEE PLAN
2. TOP OF STEEL EL = T/SLAB EL MINUS SLAB THICKNESS, UON
3. ⟷ INDICATES DECK SPAN DIRECTION.
4. CS1 INDICATES 3" COMPOSITE METAL DECK, 20 GAGE MIN WITH 3 1/4" LIGHTWEIGHT CONCRETE TOPPING SLAB f'c=4000 PSI, REINFORCED WITH WWF 6x6-W2.1xW2.1 TOTAL SLAB THICKNESS: 6 1/4"
5. CS1A INDICATES COMPOSITE SLAB SAME AS CS1 WITH 18 GAGE MIN
6. CS1-R INDICATES COMPOSITE SLAB SAME AS CS1 WITH ADDITIONAL BARS @5@12" TOP AND BOTTOM
7. CS3 INDICATES 3" COMPOSITE METAL DECK, 16 GAGE MIN WITH 5" NORMALWEIGHT CONCRETE TOPPING SLAB f'c=4000 PSI, REINFORCED WITH WWF 6x6-W2.1xW2.1 TOTAL SLAB THICKNESS: 8"
8. PT1 INDICATES W10x33 POST WITH BASE PL 3/4x10x1'-0" WITH 4-3/4"Ø A325 BOLTS
9. "W16x67*" AND "W18x76*" INDICATE BEAM CENTERLINE TO MATCH CENTERLINE OF TRUSS BOTTOM CHORD
10. MINIMUM CONNECTION FORCES FOR W10 BEAMS FRAMING INTO THE BOTTOM CHORDS OF THE ROOF TRUSSES
    TYPICAL W10 BEAMS :
    FACTORED AXIAL FORCE = 10 KIPS (TENSION AND COMPRESSION)
    FACTORED SHEAR FORCE = 12 KIPS (PER NOTE SC-7 ON S001)
    W10 BEAMS FRAMING INTO TRUSS T2 :
    FACTORED AXIAL FORCE = 25 KIPS (TENSION AND COMPRESSION)
    FACTORED SHEAR FORCE = 12 KIPS (PER NOTE SC-7 ON S001)

JW MARRIOTT GRAND RAPIDS

OWNER
Alticor, Inc. - HP3, LLC
220 Lyon St NW Suite 405 Grand Rapids, MI 49503
Tel: 616-787-6546 www.alticor.com

ALTICOR

MARRIOTT INTERNATIONAL
Franchisor
Marriott Drive Washington, D.C. 20058
Tel: 301.380.3000 www.marriott.com

LOHAN CAPRILE GOETTSCH architects
Architect
224 S. Michigan Avenue Suite 1700 Chicago, IL 60604
Tel: 312.356.0600 www.lohan.com

BETA DESIGN GROUP
Associate Architect
70 Ionia SW, Suite 400 Grand Rapids, MI 49503
tel. 616-235-6220 www.betadesign.com

BRENNAN BEER GORMAN MONK
Interior Architect
515 Madison Avenue New York, NY 10022
Tel: 212.888.7663 www.bbg-bbgm.com

THORNTON-TOMASETTI GROUP
Structural Engineer
14 East Jackson Blvd, Suite 1100 Chicago, IL 60604-2209
Tel: 312.596.2000 www.theTTgroup.com

PMA CONSULTANTS
Program Manager
226 West Liberty Street Ann Arbor, MI 48104
Tel: 734-769-0530 www.pmaconsultants.com

COSENTINI ASSOCIATES
MEP & FP Engineer
One East Wacker Drive Chicago, IL 60601
Tel: 312-670-1800 www.cosentini-il.com

FISHBECK, THOMPSON, CARR HUBER, INC.
Civil / Environmental Engineer
1515 Arboretum Drive, SE Grand Rapids, Michigan 49546
Tel: 616-575-3824 www.ftch.com

DANIEL WEINBACH & PARTNERS, LTD.
Landscape Architect
53 W. Jackson Blvd., Suite 1850 Chicago, IL 60604
Tel: 312-427-2888 www.dwpltd.com

NO.	DATE	DESCRIPTION
18	09 JAN 06	ADDENDUM #6
17	02 DEC 05	ISSUED FOR CONSTRUCTION AND PERMIT
16	28 OCT 05	OWNER AND MARRIOTT CO REVIEW
15	24 OCT 05	TOWER CONCRETE BID PACKAGE
13	23 SEPT 05	BID ADDENDUM #4 -STRUCTURAL STEEL & FOUNDATIONS
9	03 AUG 05	STRUCTURAL STEEL BID PACKAGE
5	20 MAY 05	REVISED DESIGN DEVELOPMENT
3	29 APR 05	DESIGN DEVELOPMENT
2	15 APR 05	IN-PROGRESS DESIGN DEVELOPMENT
1	10 DEC 04	SCHEMATIC DESIGN

SHEET TITLE:

THIRD FLOOR FRAMING PLAN

PROJECT ELEVATION = 0.0" = GRAND RAPIDS + 815.0'

SEAL:

SCALE: AS SHOWN
DRAWN BY:
CHECKED BY:
PROJECT NO.: CC4467.00

DRAWING NUMBER:

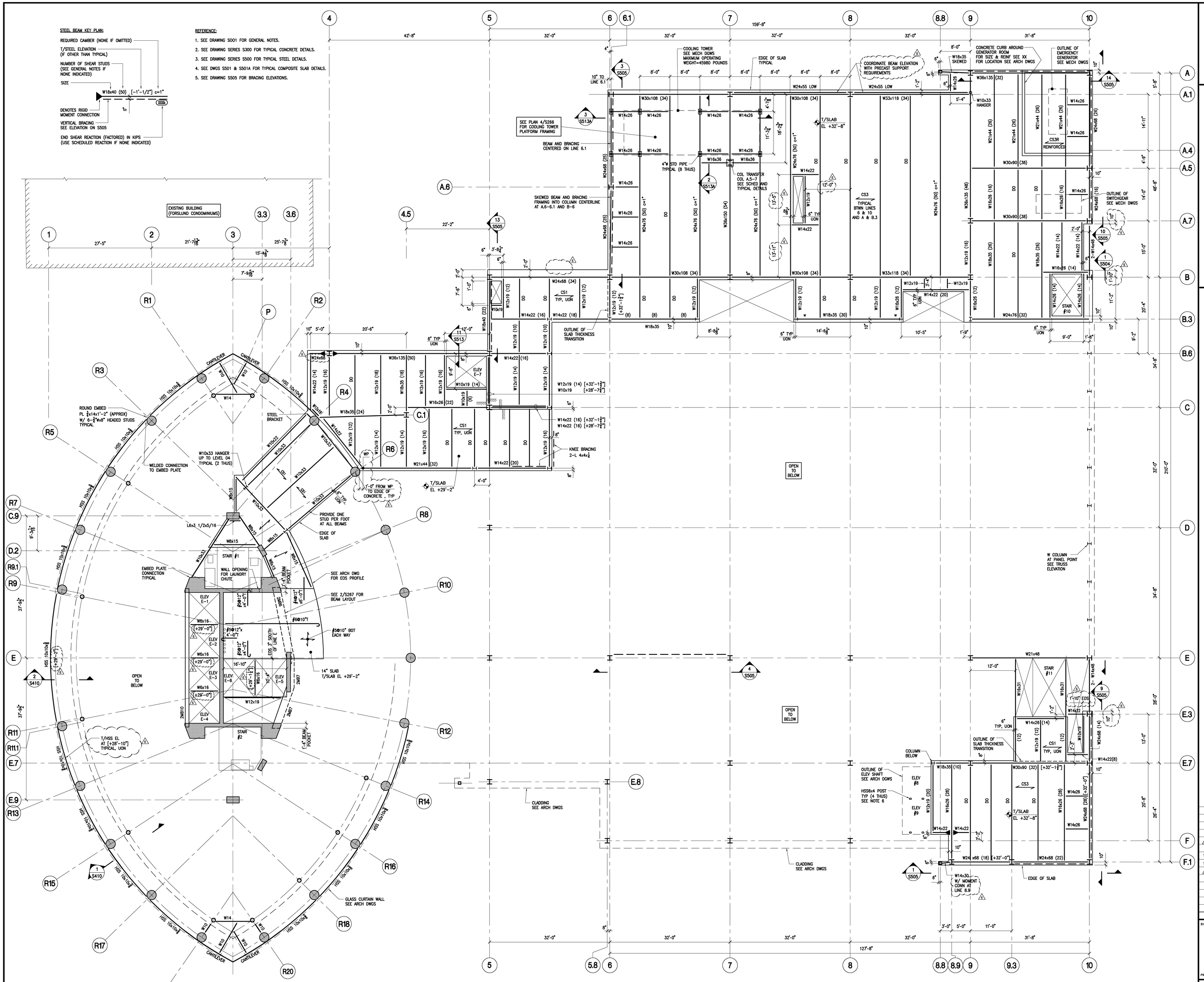
S221

STEEL BEAM KEY PLAN:

REQUIRED CAMBER (NONE IF OMITTED)
T/STEEL ELEVATION (IF OTHER THAN TYPICAL)
NUMBER OF SHEAR STUDS (SEE GENERAL NOTES IF NONE INDICATED)
SIZE
W18x40 (50) [-1'-1/2"] c=1"
DENOTES RIGID MOMENT CONNECTION
VERTICAL BRACING SEE ELEVATION ON S505
END SHEAR REACTION (FACTORED) IN KIPS (USE SCHEDULED REACTION IF NONE INDICATED)

REFERENCE:

1. SEE DRAWING S001 FOR GENERAL NOTES.
2. SEE DRAWING SERIES S300 FOR TYPICAL CONCRETE DETAILS.
3. SEE DRAWING SERIES S500 FOR TYPICAL STEEL DETAILS.
4. SEE DWGS S501 & S501A FOR TYPICAL COMPOSITE SLAB DETAILS.
5. SEE DRAWING S505 FOR BRACING ELEVATIONS.



TOWER PLAN NOTES:

1. TOP OF SLAB EL SEE PLAN
2. CONCRETE STRENGTH, f'c = 5000 PSI WITH PUDDLING
   f'c = 7150 PSI WITHOUT PUDDLING
   SEE S404 FOR TYPICAL PUDDLING DETAILS

1 SECOND MEZZANINE FLOOR FRAMING PLAN

SCALE: 1/8"=1'-0"

LOW RISE PLAN NOTES:

1. TOP OF SLAB EL VARIES, SEE PLAN
2. TOP OF STEEL EL = T/SLAB EL MINUS SLAB THICKNESS, UON
3. ⟷ INDICATES DECK SPAN DIRECTION.
4. CS1 INDICATES 3" COMPOSITE METAL DECK, 20 GAGE MIN WITH 3 1/4" LIGHTWEIGHT CONCRETE TOPPING SLAB f'c=4000 PSI, REINFORCED WITH WWF 6x6-W2.1xW2.1 TOTAL SLAB THICKNESS: 6 1/4"
5. CS3 INDICATES 3" COMPOSITE METAL DECK, 16 GAGE MIN WITH 5" NORMALWEIGHT CONCRETE TOPPING SLAB f'c=4000 PSI, REINFORCED WITH WWF 6x6-W2.1xW2.1 AND #5@12 TOP & BOTTOM TOTAL SLAB THICKNESS: 8"

5A. CS3-R INDICATES COMPOSITE SLAB SAME AS CS3 WITH ADDITIONAL BARS #5@12" TOP AND BOTTOM

6. HSS6x4 POST IS PROVIDED FOR SUPPORT OF ELEVATOR GUIDE RAILS. EXACT NUMBER AND LOCATION OF POSTS TO BE DETERMINED BASED ON ELEVATOR REQUIREMENTS. CONTRACTOR TO COORDINATE WITH ELEVATOR MANUFACTURER. SEE DETAIL.

JW MARRIOTT GRAND RAPIDS

OWNER
Alticor, Inc. - HP3, LLC
220 Lyon St NW Suite 405 Grand Rapids, MI 49503
Tel: 616-787-6546 www.alticor.com

ALTICOR

MARRIOTT INTERNATIONAL
Franchisor
Marriott Drive Washington, D.C. 20058
Tel: 301.380.3000 www.marriott.com

LOHAN CAPRILE GOETTSCH architects
Architect
224 S. Michigan Avenue Suite 1700 Chicago, IL 60604
Tel: 312.356.0600 www.lohan.com

BETA DESIGN GROUP
Associate Architect
70 Ionia SW, Suite 400 Grand Rapids, MI 49503
tel. 616-235-6220 www.betadesign.com

BRENNAN BEER GORMAN MONK
Interior Architect
515 Madison Avenue New York, NY 10022
Tel: 212.888.7663 www.bbg-bbgm.com

THORNTON-TOMASETTI GROUP
Structural Engineer
14 East Jackson Blvd, Suite 1100 Chicago, IL 60604-2209
Tel: 312.596.2000 www.theTTgroup.com

PMA CONSULTANTS
Program Manager
226 West Liberty Street Ann Arbor, MI 48104
Tel: 734-769-0530 www.pmaconsultants.com

COSENTINI ASSOCIATES
MEP & FP Engineer
One East Wacker Drive Chicago, IL 60601
Tel: 312-670-1800 www.cosentini-il.com

FISHBECK, THOMPSON, CARR HUBER, INC.
Civil / Environmental Engineer
1515 Arboretum Drive, SE Grand Rapids, Michigan 49546
Tel: 616-575-3824 www.ftch.com

DANIEL WEINBACH & PARTNERS, LTD.
Landscape Architect
53 W. Jackson Blvd., Suite 1850 Chicago, IL 60604
Tel: 312-427-2888 www.dwpltd.com

NO.	DATE	DESCRIPTION
19	09 JAN 06	ADDENDUM #6
17	02 DEC 05	ISSUED FOR CONSTRUCTION AND PERMIT
16	28 OCT 05	OWNER AND MARRIOTT CO REVIEW
15	24 OCT 05	TOWER CONCRETE BID PACKAGE
14	23 SEPT 05	BID ADDENDUM #4 -STRUCTURAL STEEL & FOUNDATIONS
9	03 AUG 05	STRUCTURAL STEEL BID PACKAGE
5	20 MAY 05	REVISED DESIGN DEVELOPMENT
3	29 APR 05	DESIGN DEVELOPMENT
2	15 APR 05	IN-PROGRESS DESIGN DEVELOPMENT
1	10 DEC 04	SCHEMATIC DESIGN

SHEET TITLE:

SECOND MEZZANINE FLOOR FRAMING PLAN

PROJECT ELEVATION + 0.0" = GRAND RAPIDS + 615.0'

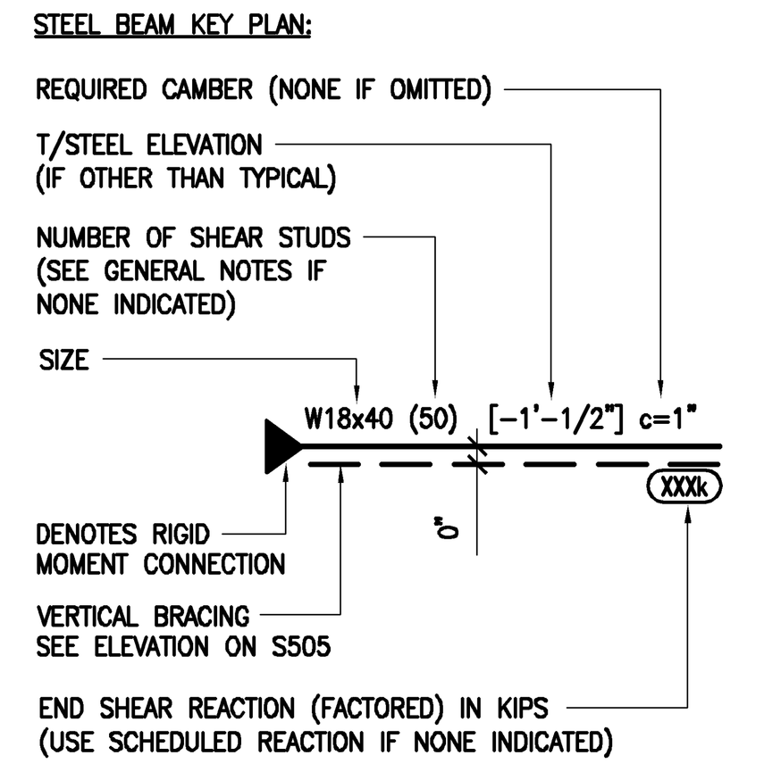
SEAL:

SCALE: AS SHOWN
DRAWN BY:
CHECKED BY:
PROJECT NO.: CC4467.00

DRAWING NUMBER:

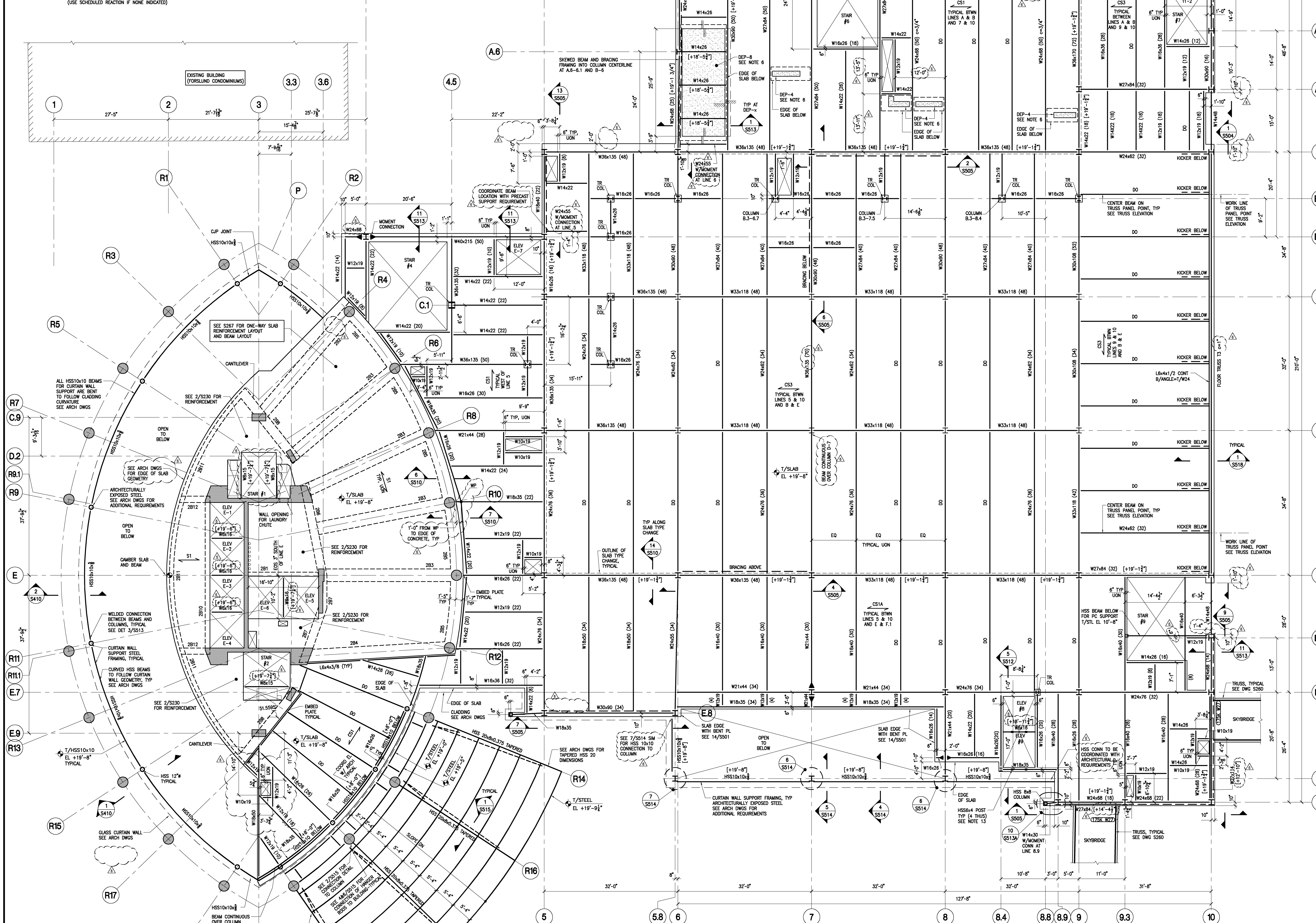
S216

STEEL BEAM KEY PLAN:



REFERENCE:

1. SEE DRAWING S001 FOR GENERAL NOTES.
2. SEE DRAWING SERIES S300 FOR TYPICAL CONCRETE DETAILS.
3. SEE DRAWING SERIES S500 FOR TYPICAL STEEL DETAILS.
4. SEE DWGS S501 & S501A FOR TYPICAL COMPOSITE SLAB DETAILS.
5. SEE DRAWING S505 FOR BRACING ELEVATIONS.



1 SECOND FLOOR FRAMING PLAN

SCALE: 1/8"=1'-0"

TOWER PLAN NOTES:

1. TOP OF SLAB EL VARIES, SEE PLAN
2. CONCRETE STRENGTH (SLABS AND BEAMS): f'c = 5000 PSI WITH PUDDLING f'c = 7150 PSI WITHOUT PUDDLING SEE S404 FOR TYPICAL PUDDLING DETAILS

NOTES:

1. TOP OF SLAB EL VARIES, SEE PLAN
2. TOP OF STEEL EL = T/SLAB EL MINUS SLAB THICKNESS, UON
3. ⟵⟶ INDICATES DECK SPAN DIRECTION.
4. CS1 INDICATES 3" COMPOSITE METAL DECK, 20 GAGE MIN WITH 3 1/4" LIGHTWEIGHT CONCRETE TOPPING SLAB f'c=4000 PSI, REINFORCED WITH WWF 6x6–W2.1xW2.1 TOTAL SLAB THICKNESS: 6 1/4"
5. CS3 INDICATES 3" COMPOSITE METAL DECK, 16 GAGE MIN WITH 5" NORMALWEIGHT CONCRETE TOPPING SLAB f'c=4000 PSI, REINFORCED WITH WWF 6x6–W2.1xW2.1 TOTAL SLAB THICKNESS: 8"
6. DEP–x INDICATES SLAB DEPRESSION, VALUE "x" INDICATES DEPTH OF DEPRESSION IN INCHES (8" OR 4") COMPOSITE SLAB AT DEPRESSION IS SIMILAR TO TYPE CS1 WITH 3" COMPOSITE DECK, 18 GAGE MIN, SEE DET 1/S513 CONTRACTOR TO COORDINATE SIZE AND LOCATION WITH ARCH DWGS AND WITH EQUIPMENT REQUIREMENTS.
7. CS1A INDICATES COMPOSITE SLAB SAME AS CS1 WITH MIN 18 GAGE
8. TR COL INDICATES COLUMN TRANSFER, SEE TYPICAL DETAILS
9. HSS6x4 POST IS PROVIDED FOR SUPPORT OF ELEVATOR GUIDE RAILS. EXACT NUMBER AND LOCATION OF POSTS TO BE DETERMINED BASED ON ELEVATOR REQUIREMENTS. CONTRACTOR TO COORDINATE WITH ELEVATOR MANUFACTURER. SEE DETAILS 9 & 10 ON S507

JW MARRIOTT
GRAND RAPIDS

OWNER
Alticor, Inc. - HP3, LLC
220 Lyon St NW Suite 405 Grand Rapids, MI 49503
Tel: 616-787-6546 www.alticor.com

ALTICOR

MARRIOTT INTERNATIONAL
Franchisor
Marriott Drive Washington, D.C. 20058
Tel: 301.380.3000 www.marriott.com

LOHAN CAPRILE GOETTSCH architects
Architect
224 S. Michigan Avenue Suite 1700 Chicago, IL 60604
Tel: 312.356.0600 www.lohan.com

BETA DESIGN GROUP
Associate Architect
70 Ionia SW, Suite 400 Grand Rapids, MI 49503
tel. 616-235-6220 www.betadesign.com

BRENNAN BEER GORMAN MONK
Interior Architect
515 Madison Avenue New York, NY 10022
Tel: 212.888.7663 www.bbg-bbgm.com

THORNTON-TOMASETTI GROUP
Structural Engineer
14 East Jackson Blvd, Suite 1100 Chicago, IL 60604-2209
Tel: 312.596.2000 www.theTTgroup.com

PMA CONSULTANTS
Program Manager
226 West Liberty Street Ann Arbor, MI 48104
Tel: 734-769-0530 www.pmaconsultants.com

COSENTINI ASSOCIATES
MEP & FP Engineer
One East Wacker Drive Chicago, IL 60601
Tel: 312-670-1800 www.cosentini-il.com

FISHBECK, THOMPSON, CARR HUBER, INC.
Civil / Environmental Engineer
1515 Arboretum Drive, SE Grand Rapids, Michigan 49546
Tel: 616-575-3824 www.ftch.com

DANIEL WEINBACH & PARTNERS, LTD.
Landscape Architect
53 W. Jackson Blvd., Suite 1850 Chicago, IL 60604
Tel: 312-427-2888 www.dwpltd.com

NO.	DATE	DESCRIPTION
6 (△)	09 JAN 06	ADDENDUM #6
17	02 DEC 05	ISSUED FOR CONSTRUCTION AND PERMIT
16	28 OCT 05	OWNER AND MARRIOTT CD REVIEW
15	24 OCT 05	TOWER CONCRETE BID PACKAGE
4 (△)	23 SEPT 05	BID ADDENDUM #4 –STRUCTURAL STEEL & FOUNDATIONS
9	03 AUG 05	STRUCTURAL STEEL BID PACKAGE
5	20 MAY 05	REVISED DESIGN DEVELOPMENT
3	29 APR 05	DESIGN DEVELOPMENT
2	15 APR 05	IN–PROGRESS DESIGN DEVELOPMENT
1	10 DEC 04	SCHEMATIC DESIGN

SHEET TITLE:

SECOND FLOOR FRAMING PLAN

PROJECT ELEVATION + 0.0' = GRAND RAPIDS + 615.0'

SEAL:

SCALE: AS SHOWN
DRAWN BY:
CHECKED BY:
PROJECT NO.: CC4467.00
DRAWING NUMBER:

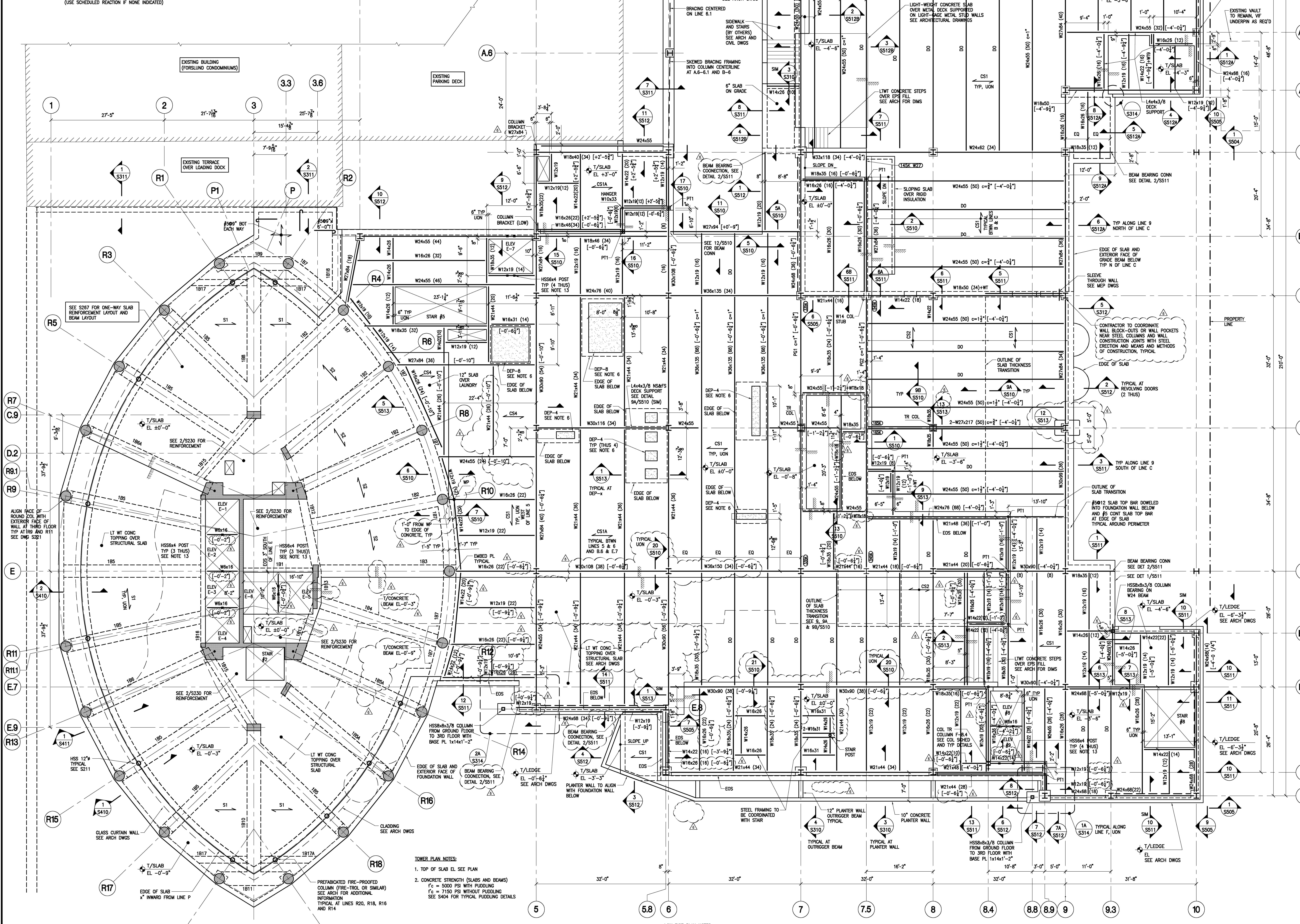
S211

STEEL BEAM KEY PLAN:

- REQUIRED CAMBER (NONE IF OMITTED)
- T/STEEL ELEVATION (IF OTHER THAN TYPICAL)
- NUMBER OF SHEAR STUDS (SEE GENERAL NOTES IF NONE INDICATED)
- SIZE
- W18x40 (50) [-1'-1/2"] c=1" (XXXk)
- DENOTES RIGID MOMENT CONNECTION
- VERTICAL BRACING SEE ELEVATION ON S505
- END SHEAR REACTION (FACTORED) IN KIPS (USE SCHEDULED REACTION IF NONE INDICATED)

REFERENCE:

1. SEE DRAWING S001 FOR GENERAL NOTES.
2. SEE DRAWING SERIES S300 FOR TYPICAL CONCRETE DETAILS.
3. SEE DRAWING SERIES S500 FOR TYPICAL STEEL DETAILS.
4. SEE DWGS S501 & S501A FOR TYPICAL COMPOSITE SLAB DETAILS.
5. SEE DRAWING S505 FOR BRACING ELEVATIONS.



TOWER PLAN NOTES:

1. TOP OF SLAB EL SEE PLAN
2. CONCRETE STRENGTH (SLABS AND BEAMS)
   f'c = 5000 PSI WITH PUDDLING
   f'c = 7150 PSI WITHOUT PUDDLING
   SEE S404 FOR TYPICAL PUDDLING DETAILS

1 GROUND FLOOR FRAMING PLAN

SCALE: 1/8"=1'-0"

LOW RISE PLAN NOTES:

1. TOP OF SLAB EL +0'-0" (GRAND RAPIDS +615.0'), UON
2. TOP OF STEEL EL = T/SLAB EL MINUS SLAB THICKNESS, UON
3. ⟷ INDICATES DECK SPAN DIRECTION.
4. CS1 INDICATES 3" COMPOSITE METAL DECK, 20 GAGE MIN WITH 3 1/4" LIGHTWEIGHT CONCRETE TOPPING SLAB f'c=4000 PSI, REINFORCED WITH WWF 6x6-W2.1xW2.1 TOTAL SLAB THICKNESS: 6 1/4"
5. CS2 INDICATES 3" COMPOSITE METAL DECK, 16 GAGE MIN WITH 9" NORMAL WEIGHT CONCRETE TOPPING SLAB f'c=4000 PSI, REINFORCED WITH WWF 6x6-W2.9xW2.9 TOTAL SLAB THICKNESS: 12" METAL DECK TO BE SHORED
6. DEP-x INDICATES SLAB DEPRESSION, VALUE "x" INDICATES DEPTH OF DEPRESSION IN INCHES (8" OR 4") COMPOSITE SLAB AT DEPRESSION IS SIMILAR TO TYPE CS1 WITH 3" COMPOSITE DECK, 18 GAGE MIN, SEE DET 1/S513 CONTRACTOR TO COORDINATE SIZE AND LOCATION WITH ARCH DWGS AND WITH EQUIPMENT REQUIREMENTS.
7. SEE S201 FOR PIERS/PILASTERS AND GRADE BEAMS
8. TR COL INDICATES COLUMN TRANSFER, SEE TYPICAL DETAILS
9. CS1A INDICATES COMPOSITE SLAB SAME AS CS1 WITH 18 GAGE MIN
10. CS4 INDICATES 3" COMPOSITE METAL DECK, 16 GAGE MIN WITH 7" NORMAL WEIGHT CONCRETE TOPPING SLAB f'c=4000 PSI, REINFORCED WITH #7@12"B AND #5@6"T, SEE DET 11/S501 TOTAL SLAB THICKNESS: 10" METAL DECK TO BE SHORED
11. PT1 INDICATES W10x33 POST WITH BASE PL 3/4x10x1'-0" WITH 4-3/4"ø A325 BOLTS
12. PGx INDICATES PLATE GIRDER. REFER TO SHEET S507 FOR PLATE GIRDER SCHEDULE AND DETAILS
13. HSS6x4 POST IS PROVIDED FOR SUPPORT OF ELEVATOR GUIDE RAILS. EXACT NUMBER AND LOCATION OF POSTS TO BE DETERMINED BASED ON ELEVATOR REQUIREMENTS. CONTRACTOR TO COORDINATE WITH ELEVATOR MANUFACTURER. SEE DETAIL

JW MARRIOTT
GRAND RAPIDS

ALTICOR

OWNER
Alticor, Inc. - HP3, LLC
220 Lyon St NW Suite 405 Grand Rapids, MI 49503
Tel: 616-787-6546 www.alticor.com

MARRIOTT INTERNATIONAL
Franchisor
Marriott Drive Washington, D.C. 20058
Tel: 301.380.3000 www.marriott.com

LOHAN CAPRILE GOETTSCH architects
Architect
224 S. Michigan Avenue Suite 1700 Chicago, IL 60604
Tel: 312.356.0600 www.lohan.com

BETA DESIGN GROUP
Associate Architect
70 Ionia SW, Suite 400 Grand Rapids, MI 49503
tel. 616-235-6220 www.betadesign.com

BRENNAN BEER GORMAN MONK
Interior Architect
515 Madison Avenue New York, NY 10022
Tel: 212.888.7663 www.bbg-bbgm.com

THORNTON-TOMASETTI GROUP
Structural Engineer
14 East Jackson Blvd, Suite 1100 Chicago, IL 60604-2209
Tel: 312.596.2000 www.theTTgroup.com

PMA CONSULTANTS
Program Manager
226 West Liberty Street Ann Arbor, MI 48104
Tel: 734-769-0530 www.pmaconsultants.com

COSENTINI ASSOCIATES
MEP & FP Engineer
One East Wacker Drive Chicago, IL 60601
Tel: 312-670-1800 www.cosentini-il.com

FISHBECK, THOMPSON, CARR HUBER, INC.
Civil / Environmental Engineer
1515 Arboretum Drive, SE Grand Rapids, Michigan 49546
Tel: 616-575-3824 www.ftch.com

DANIEL WEINBACH & PARTNERS, LTD.
Landscape Architect
53 W. Jackson Blvd., Suite 1850 Chicago, IL 60604
Tel: 312-427-2888 www.dwpltd.com

NO.	DATE	DESCRIPTION
△6	09 JAN 06	ADDENDUM #6
17	02 DEC 05	ISSUED FOR CONSTRUCTION AND PERMIT
16	28 OCT 05	OWNER AND MARRIOTT CD REVIEW
15	24 OCT 05	TOWER CONCRETE BID PACKAGE
△4	23 SEPT 05	BID ADDENDUM #4 -STRUCTURAL STEEL & FOUNDATIONS
△2	03 AUG 05	BID ADDENDUM #2 - FOUNDATION AND SITE UTILITIES
9	03 AUG 05	STRUCTURAL STEEL BID PACKAGE
△1	01 JULY 05	BID ADDENDUM #1
6	17 JUNE 05	FOUNDATION AND SITE UTILITIES BID PACKAGE
5	20 MAY 05	REVISED DESIGN DEVELOPMENT
3	29 APR 05	DESIGN DEVELOPMENT
2	15 APR 05	IN-PROGRESS DESIGN DEVELOPMENT
1	10 DEC 04	SCHEMATIC DESIGN

SHEET TITLE:

GROUND FLOOR FRAMING PLAN

PROJECT ELEVATION + 0.0' = GRAND RAPIDS + 615.0'

SEAL:

SCALE: AS SHOWN

DRAWN BY:

CHECKED BY:

PROJECT NO.: CC4467.00

DRAWING NUMBER:

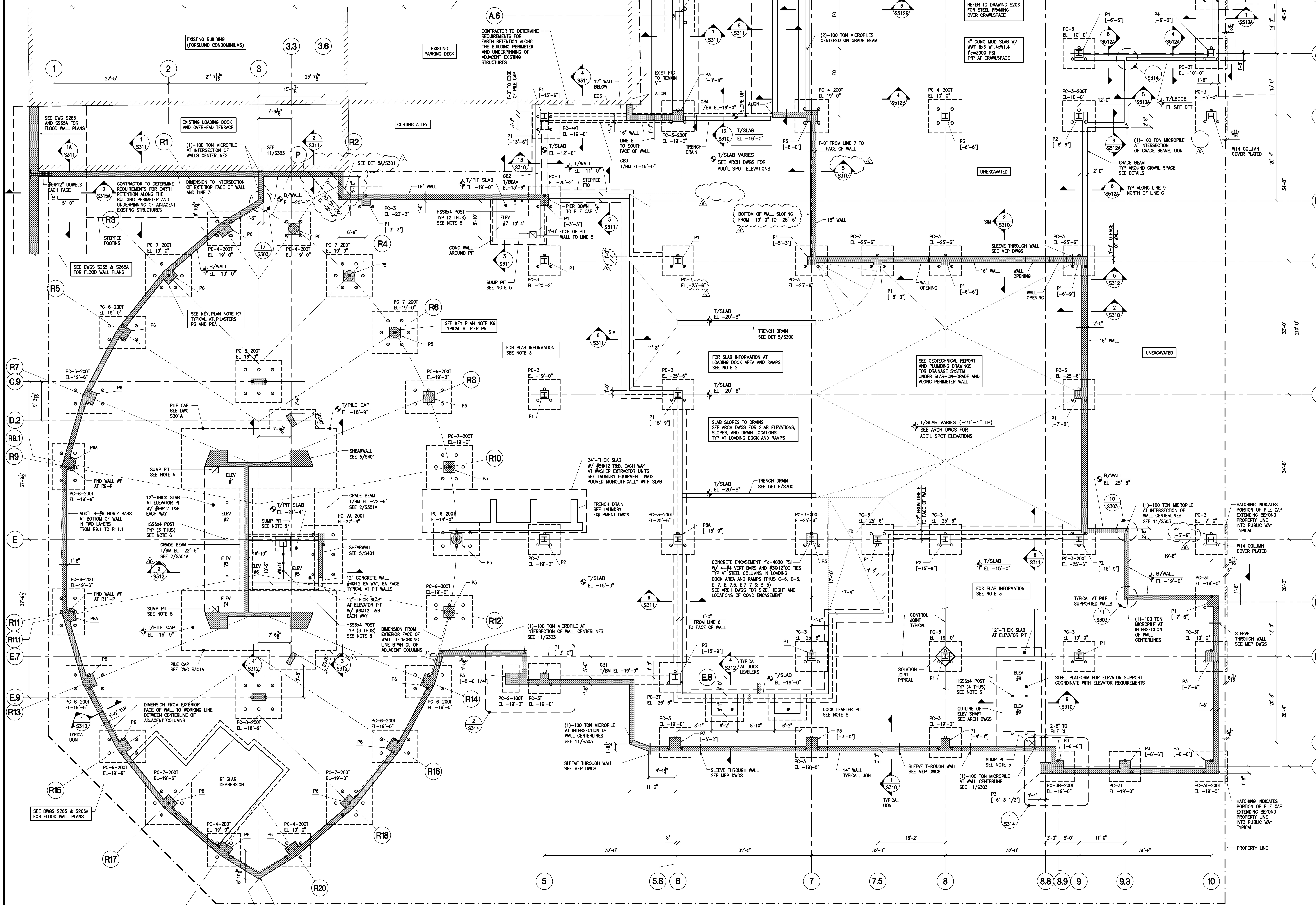
S206

KEY PLAN FOR MICROPILE, PILE CAP, AND PIER:

"T" INDICATES TENSION PILE CAP
INDICATES 200-TON PILE
PILE CAP MARK — PC-xT-200T EL x'-x"
T/PILE CAP ELEVATION
PILE, TYP
PIER/PILASTER ABOVE
PIER/PILASTER MARK
PILE CAP
Px [x'-x"]
T/PIER ELEVATION IF OTHER THAN TYP. SEE NOTES K5,K6,K7

KEY PLAN NOTES:
K1. SEE SHEET S301 FOR PILE & PILE CAP SCHEDULE AND DETAILS
K2. "T" INDICATES TENSION PILE CAP
K3. 200T INDICATES 200-TON MICROPILE
K4. SEE SHEET S303 FOR TYPICAL PIER/PILASTER DETAILS.
K5. T/PIER EL 1'-6" BELOW T/SLAB TYP, UON
K6. T/PIER P5 EL = B/SLAB EL
K7. T/PILASTER P6 & P6A EL = B/BEAM EL AT GROUND FLR

REFERENCE:
1. SEE DRAWING S001 FOR GENERAL NOTES.
2. SEE DRAWING SERIES S300 FOR TYPICAL FOUNDATION DETAILS.
3. SEE DRAWING SERIES S400 FOR TYPICAL CONCRETE DETAILS.
4. SEE DRAWING SERIES S500 FOR TYPICAL STEEL DETAILS.



1 FOUNDATION AND BASEMENT PLAN
SCALE: 1/8"=1'-0"

PLAN NOTES:
1. TOP OF SLAB EL VARIES, SEE PLAN
2. BASEMENT SLAB AT LOADING DOCK AREA AND RAMPS:
   10" CONCRETE SLAB ON GRADE, f'c=4000 PSI, REINFORCED WITH #4@12" TOP & BOTTOM EACH WAY
   SLAB TOP BARS TO BE EPOXY COATED
   SUBGRADE PREPARATION REQUIRED PER GEOTECHNICAL RECOMMENDATIONS
   REMOVE AND REPLACE UNSUITABLE EXISTING SOIL BELOW BASEMENT SLAB PER GEOTECHNICAL RECOMMENDATIONS
3. BASEMENT SLAB AT EL -15'-0":
   6" CONCRETE SLAB ON GRADE, f'c=4000 PSI, REINFORCED WITH WWF 6x6-W2.9xW2.9
   SUBGRADE PREPARATION REQUIRED PER GEOTECHNICAL RECOMMENDATIONS
   REMOVE AND REPLACE UNSUITABLE EXISTING SOIL BELOW BASEMENT SLAB PER GEOTECHNICAL RECOMMENDATIONS
4. Px INDICATES CONCRETE PIER OR PILASTER SEE LEGEND ON THIS SHEET
5. ELEVATOR SUMP PIT: 1'-6"x1'-6"x1'-6" VERIFY SIZE AND LOCATION WITH ELEVATOR REQUIREMENTS
6. HSS6x4 POST IS PROVIDED FOR SUPPORT OF ELEVATOR GUIDE RAILS. EXACT NUMBER AND LOCATION OF POSTS TO BE DETERMINED BASED ON ELEVATOR REQUIREMENTS. CONTRACTOR TO COORDINATE WITH ELEVATOR MANUFACTURER. SEE DETAIL
7. GBx INDICATES CONCRETE GRADE BEAM SEE DWG S302 FOR TYPICAL DETAILS AND SCHEDULE
8. ALL DIMENSIONS AND ELEVATIONS AT DOCK LEVELER PITS MUST BE VERIFIED WITH MANUFACTURER AND WITH THE ARCH DWGS. CONTRACTOR TO COORDINATE. SEE ARCH DWGS FOR ADD'L INFORMATION.

JW MARRIOTT GRAND RAPIDS
ALTICOR

OWNER
Alticor, Inc. - HP3, LLC
220 Lyon St NW Suite 405 Grand Rapids, MI 49503
Tel: 616-787-6546 www.alticor.com

MARRIOTT INTERNATIONAL
Franchisor
Marriott Drive Washington, D.C. 20058
Tel: 301.380.3000 www.marriott.com

LOHAN CAPRILE GOETTSCH architects
Architect
224 S. Michigan Avenue Suite 1700 Chicago, IL 60604
Tel: 312.356.0600 www.lohan.com

BETA DESIGN GROUP
Associate Architect
70 Ionia SW, Suite 400 Grand Rapids, MI 49503
tel. 616-235-6220 www.betadesign.com

BRENNAN BEER GORMAN MONK
Interior Architect
515 Madison Avenue New York, NY 10022
Tel: 212.888.7663 www.bbg-bbgm.com

THORNTON-TOMASETTI GROUP
Structural Engineer
14 East Jackson Blvd, Suite 1100 Chicago, IL 60604-2209
Tel: 312.596.2000 www.theTTgroup.com

PMA CONSULTANTS
Program Manager
226 West Liberty Street Ann Arbor, MI 48104
Tel: 734-769-0530 www.pmaconsultants.com

COSENTINI ASSOCIATES
MEP & FP Engineer
One East Wacker Drive Chicago, IL 60601
Tel: 312-670-1800 www.cosentini-il.com

FISHBECK, THOMPSON, CARR HUBER, INC.
Civil / Environmental Engineer
1515 Arboretum Drive, SE Grand Rapids, Michigan 49546
Tel: 616-575-3824 www.ftch.com

DANIEL WEINBACH & PARTNERS, LTD.
Landscape Architect
53 W. Jackson Blvd., Suite 1850 Chicago, IL 60604
Tel: 312-427-2888 www.dwpltd.com

NO.	DATE	DESCRIPTION
6 (rev.)	09 JAN 06	ADDENDUM #6
17	02 DEC 05	ISSUED FOR CONSTRUCTION AND PERMIT
16	28 OCT 05	OWNER AND MARRIOTT CD REVIEW
15	24 OCT 05	TOWER CONCRETE BID PACKAGE
4 (rev.)	23 SEPT 05	BID ADDENDUM #4 -STRUCTURAL STEEL & FOUNDATIONS
2 (rev.)	03 AUG 05	BID ADDENDUM #2 – FOUNDATION AND SITE UTILITIES
9	03 AUG 05	STRUCTURAL STEEL BID PACKAGE
1 (rev.)	01 JULY 05	BID ADDENDUM #1
6	17 JUNE 05	FOUNDATION AND SITE UTILITIES BID PACKAGE
5	20 MAY 05	REVISED DESIGN DEVELOPMENT
3	29 APR 05	DESIGN DEVELOPMENT
2	15 APR 05	IN-PROGRESS DESIGN DEVELOPMENT
1	10 DEC 04	SCHEMATIC DESIGN

SHEET TITLE:

FOUNDATION AND BASEMENT PLAN

PROJECT ELEVATION + 0.0' = GRAND RAPIDS + 615.0'

SEAL:

SCALE: AS SHOWN
DRAWN BY:
CHECKED BY:
PROJECT NO.: CC4467.00
DRAWING NUMBER:

S201

Appendix B: Hand Calculations

CBEAM | GROUND – 12

$V_u = 213^k$

$M_u = 213\left(\frac{8}{2}\right) = 852$ K-FT

$A_s = \frac{852}{4.3(27)} = 7.33$ IN^2 $\quad 4\#11 = 6.24$ IN^2

$M_{pr} = \frac{6.24(4.3)(27)}{0.9} \times 1.25 = 1006$ K-FT

$V_n = \frac{2M_{pr}}{\ell} = \frac{2}{8}(1006) = \underline{\underline{251^k}} > 213^k$

$\phi V_s = \phi A_v f_y d/s \rightarrow 0.75(60)\frac{A_v}{12''} \times 27 > 251$

$A_{v/FT} = \frac{251(12)}{27(.75)(60)} = 2.48$ IN^2/FT

TRY 4 LEGS #5 @ 6"

$4(.31)\left(\frac{12''}{6''}\right) = 2.48$ IN^2/FT

$251 < \phi\, 8\sqrt{f'_c}\, b\, d$

$251 = \phi\, \underline{\underline{5.44}}\sqrt{f'_c}\, b\, d$

∴ USE 4#11 TOP & BOTTOM
W/ 4 VERTICAL LEGS #5 @ 6 IN O.C.

CBEAM | FLOOR 13 – 18 | $V_{ETABS} = 225^k$

$V_u = 182^k$

$M_u = 182^k \times 8 \times \frac{1}{2} = 728$ K FT

$A_s = \frac{M_u}{c\,d} = \frac{728}{4.3(27)} = 6.27$ IN^2 $\quad 4\#10 = 5.08$ IN^2

$M_{pr} = \frac{A_s(c)\,d}{0.9} \times 1.25 = \frac{5.08(4.3)(27)}{0.9} \times 1.25 = 819$ K FT

$V_n = \frac{M_{pr} \times 2}{d} = 819\left(\frac{2}{8}\right) = 205^k > 181^k$

$\phi V_s = \phi A_v f_y \frac{d}{s} = 0.75(4\text{ LEGS})(0.31)(60)\left(\frac{27}{6}\right)$

$= 251^k$ $\quad \phi V_s = 251\left(\frac{6}{8}\right) = 188^k$

$\Rightarrow$ MUST USE 6" SPACING

$251^k < \phi 8\sqrt{f'_c}\, b\, d$

$251 = \phi \underline{\underline{5.44}}\sqrt{f'_c}\, b\, d$

4#4? $\phi V_s = 251\left(\frac{.20}{.31}\right) = 162^k$

$\Rightarrow$ 4#4 NO GOOD

$\therefore$ USE 4#10 TOP & BOTTOM

W/ 4 LEGS #5 @ 6 IN O.C.

* METHOD ABOVE IS A SHORT CUT, BELOW IS LONG WAY

$a = \frac{A_s f_y}{0.85 f'_c b} = \frac{5.08(60)}{0.85(9)(24)} \times 1.25 = 2.08$ IN

$\phi M_n = 5.08\text{IN}(1.25 \times 60)\left(27 - \frac{2.08}{2}\right) \times \frac{1}{12} = 824$ K FT $\simeq 819$

* $\frac{M_u}{c\,d} = 5.08 \rightarrow c = \frac{824}{27(5.08)} \times \frac{0.9}{1.25} = 4.3$

$V_u = 122^k$

$M_u = 122\left(\frac{8}{2}\right) = 488^{k\text{-}ft}$

$A_s = \frac{488}{4.3(27)} \times 1.25 = 5.25\ in^2$ CHECK $4\#9$ $A_s = 4\ in^2$

$a = \frac{4(60)}{0.85(9)(24)} = 1.31\ in$

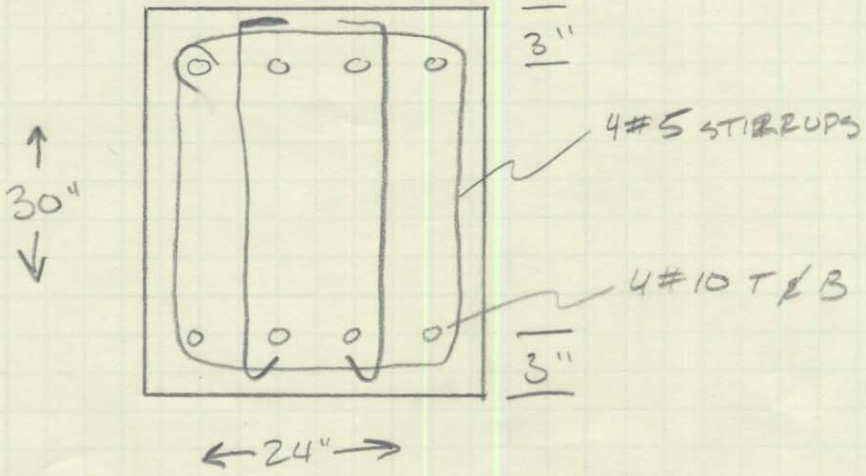
$M_{pr} = A_s f_y \left(d - \frac{a}{2}\right) = 4(1.25 \times 60)\left(27 - \frac{1.31}{2}\right) \times \frac{1}{12} = 442^{k\text{-}ft}$

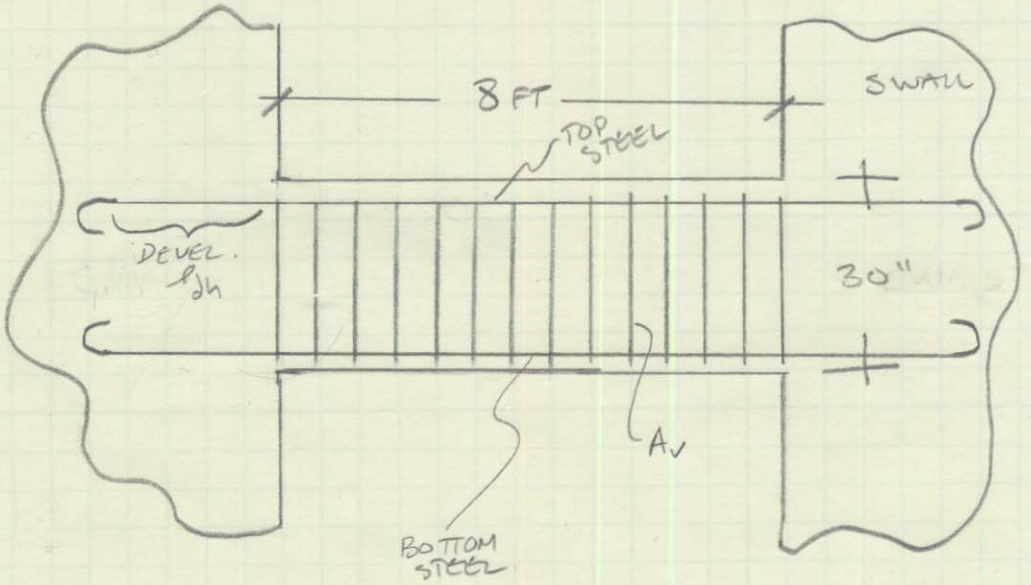
$V_u = 442^{k\text{-}ft}\left(\frac{2}{8'}\right) = 111^k$ NO GOOD

USE $4\#10$ $A_s = 5.08\ in^2$ FOR EASE OF CONSTRUCTION
W/ $4\#5$ VERTICAL

$V_n = 205^k$
$\phi V_s = 251^k$
} SEE CBEAM FLOOR 13-18

EXAMPLE DETAIL





ℓ_{dh}: MUST USE 180° HOOK IN HIGH SEISMICITY

$$\ell_{dh} = \frac{f_y \alpha \beta \lambda}{20\sqrt{f'_c}} d_b$$

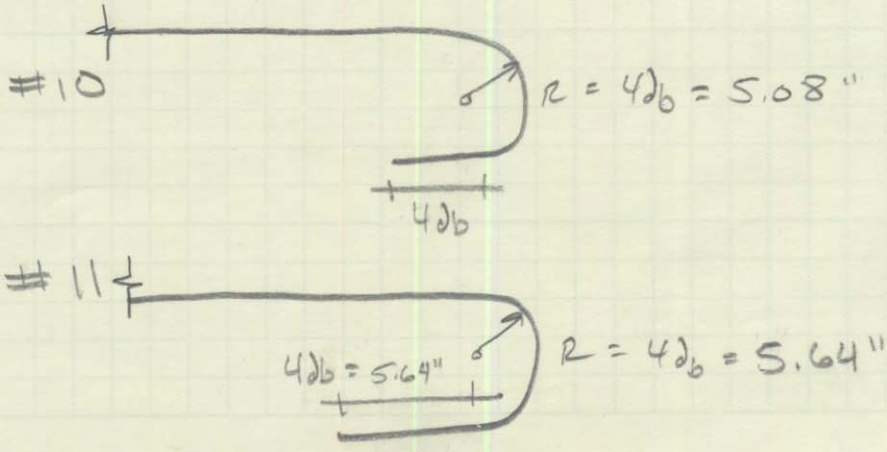
$\alpha = 1.3$ TOP BAR
$\beta = 1.0$ NO EPOXY
$\lambda = 1.0$ N.W.C.

$$\ell_{dh} = \frac{60000(1.3)}{20\sqrt{9000}} d_b = 42(0.7) \cong 30 d_b$$

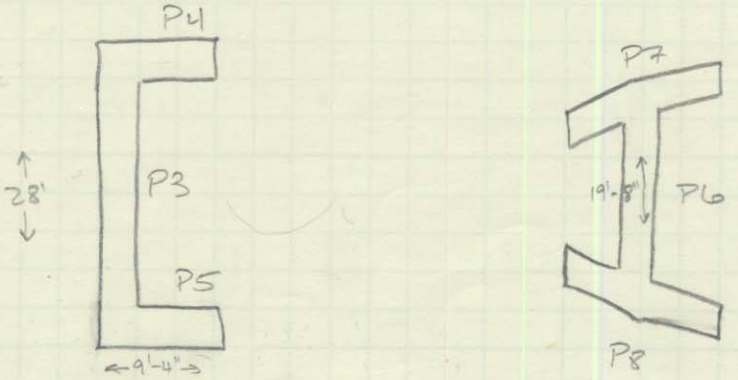
0.7 ← 180° M_f

#10 — $\ell_{dh} = 53.3\text{ IN}\,(0.7) \cong 40\text{ IN}$

#11 — $\ell_{dh} = 59.22\text{ IN}\,(0.7) \cong 45\text{ IN}$



BOUNDRY & TRANSVERSE REINFORCEMENT | BASE LEVEL



P3 - 1100 k
P4 - 317 k
P5 - 343 k ← USE THIS FOR P4

P6 - 876 k
P7 - 328 k
P8 - 350 k ← USE FOR P7

A_{gross} (OUT TO OUT)
P3 - 37.33 SF
P4/5 - 18.67

P6 - 26 SF
P7/8 - 9.77 + 12.18
(38° / 22°)

CONCRETE SHEAR CHECK $V_u < \phi \frac{4}{=} \sqrt{f'_c}\, A_v$

P3: $1100 = \phi\, 3.59 \sqrt{f'_c}\, A_v$

P4/5: $343 = \phi\, 2.24 \sqrt{f'_c}\, A_v$

P6: $876 = \phi\, 4.11 \sqrt{f'_c}\, A_v$, $4.11 \sim 4.0$

P7/8: $350 = \phi\, 3.78 \sqrt{f'_c}\, A_v$

TRANSVERSE REINF

P3: $\rho_l = \frac{A_{sl}}{A_{cv}}$ $\quad A_{cv} = 12(16) = 192\ in^2/ft$

$A_{sl} = .0025(192) = 0.48\ in^2/ft$

ASSUME 2#5 $A_{sl} = 0.62\ in^2$

$\frac{0.48}{12} = \frac{0.62}{s} = 15.5"$ USE 2 CURTAINS #5 @ 15" OC

P4/P5: $A_{cv} = 12(24) = 288$ $A_{st} = .0025 A_{cv} = 0.72\ in^2/ft$

ASSUME 2#5 $\frac{0.72}{12} = \frac{0.62}{s} \rightarrow s = 10.33" \rightarrow 10"$ OC

∴ USE 2 CURTAINS #5 @ 10" OC FOR P4/5

USE 2 CURTAINS #4 @ 10" OC FOR P3 $\left(\frac{0.48}{12} = \frac{A_s}{10}\right)$

$A_s = 0.4\ in^2/ft$ ↔ 2#4

BOUNDRY & TRANSVERSE REINF

P7/8 : $A_{cv} = 288$ $A_{sf} = 0.72$ in²/ft — SEE P3 & P4/P5

USE (2)#5 @ 10" OC

P6 : $A_{cv} = 192$ in²/ft $A_{sf} = 0.48$ in²/ft, USE (2)#4 @ 10" OC

CHECK 21.9.7.1 $V_n = A_{cv}(2\sqrt{f'_c} + \rho_t f_y)$, $\rho_t = \left(\frac{V_n}{A_{cv}} - 2\sqrt{f'_c}\right) / f_y$

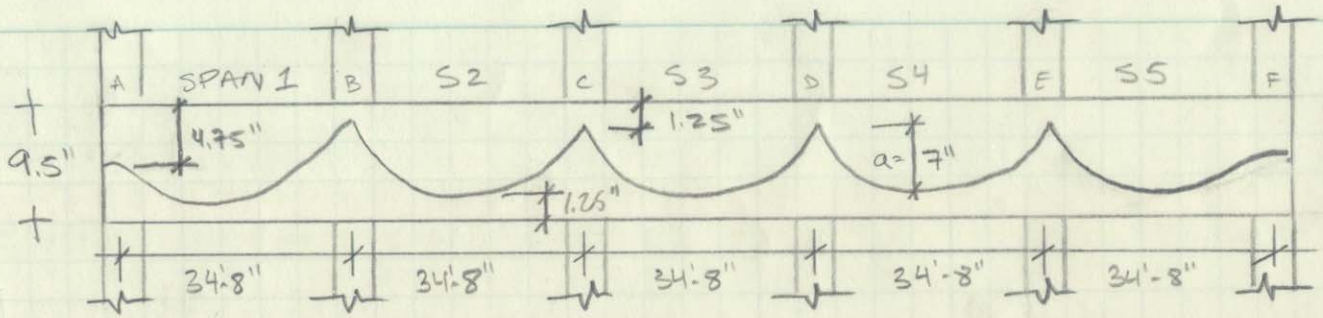
P3: $\rho_t = \frac{\frac{1100}{37.33 \times 144} - 2\sqrt{9000}}{60000} = -.003 < 0.0025$

P4/5: $\rho_t = \frac{\frac{343}{18.67 \times 144} - 2\sqrt{9000}}{60000} = -.003 < 0.0025$

P6 : $\rho_t = \frac{\frac{876}{26 \times 144} - 2\sqrt{9000}}{60000} = -0.003 < 0.0025$

P7/8: $\rho_t = \frac{\frac{350}{(9.77\cos 33 + 12.18\cos 22)\,144} - 2\sqrt{9000}}{60000} = -3.4 \times 10^{-5} < 0.0025$

∴ $\rho = 0.0025$ OK IN ALL PIERS



$T_{SLAB} = \frac{SPAN}{45} \approx \frac{35'(12')}{45} = 9.33\,IN \rightarrow$ USE 9.5 IN FLAT SLAB

LOADS: SLAB + DEAD = $\frac{9.5}{12}(150) + 20 = 140$ PSF

LIVE = 40 PSF

PLF = (140 + 40)(4 FT SPACING) = 720 PLF

BALANCE 85% DEAD = 0.85(140) = 119 PSF

USE ½"ϕ 270ᵏ TENDONS, ASSUME 30ᵏ LOSSES

f_e = 0.153 * (0.7)(270ᵏ - 30ᵏ) = 25.7 K PER TENDON SAY 4 TENDON

F_e = 25.7ᵏ (4) / 4' = 25.7ᵏ

F/A = 25.7 / (9.5" x 12") = 0.225 KSI < 250 PSI INDUSTRY STANDARD

$\omega_{BAL} = \frac{8Fa}{\ell^2} = \frac{8(25.7^k)(7")}{(35\,FT)^2} \times \frac{1'}{12"} = 0.098$ KSF x 4 FT = 0.392 KLF

ω_{NET} = 0.180 KSF - 0.098 KSF
= 0.082 KSF

NET LOAD

$\omega_{NET} = 180 - 119 = 61$ PSF x 4' = 476 PLF

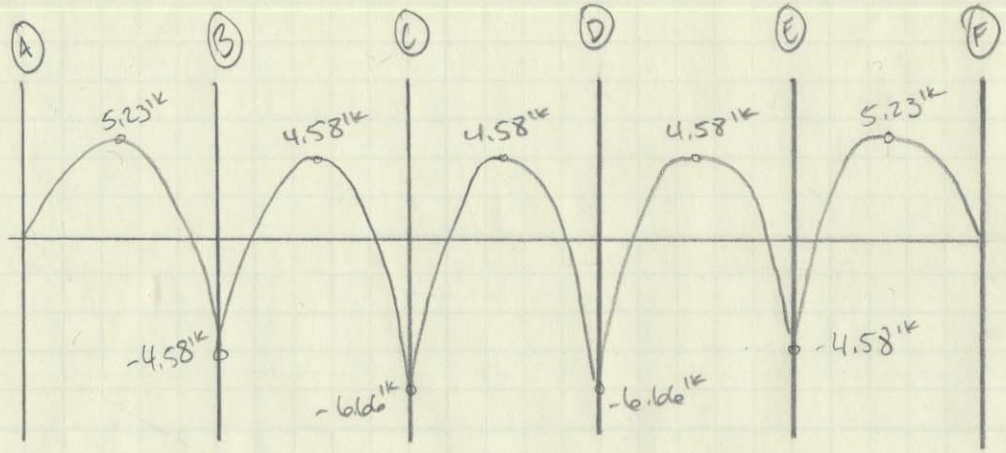
END MOMENTS

$$-M_{BA} = \frac{w\ell^2}{16} = \frac{0.061(34.66)^2}{16} = 4.58^{1k}$$

$$+M_{AB} = \frac{w\ell^2}{14} = \frac{0.061(34.66)^2}{14} = 5.23^{1k}$$

$$+M_{\text{ALL OTHER}} = \frac{w\ell^2}{16} = 4.58^{1k}$$

$$-M_{\text{ALL OTHER}} = \frac{w\ell^2}{11} = 6.66^{1k}$$



AVERAGE STRESSES : $A = 12 \times 9.5 = 114\ in^2$ $\quad S = 2 \times 9.5^2 = 181\ in^3$

- NEGATIVE MOMENT

INTERIOR SPANS, $M_N^- = 6.66^{k}$

$$f = \frac{F}{A} \pm \frac{M_N}{S} = \frac{25700}{114} \pm \frac{6660(12)}{181} = -225 \pm 442$$

$$= +217 < 380 = 6\sqrt{f'_c}$$
$$-667 < 0.3 \times 4000 = 1200\ psi$$

- POSITIVE MOMENT

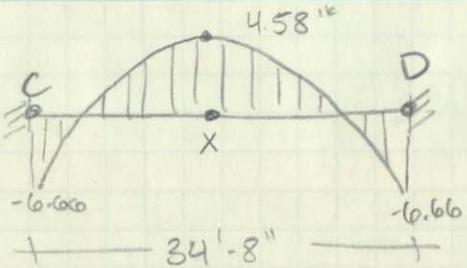
INTERIOR SPANS, $M_N^+ = 4.58^{k}$

$$f = -225 \pm \frac{4580(12)}{181} = -225 \pm 304 = +79 < 2\sqrt{f'_c} = 126\ psi$$
$$= -529$$

PT

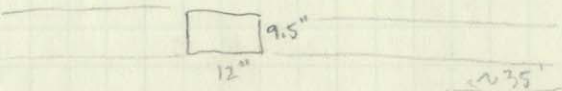
④ DEFLECTION: CONJUGATE BEAM

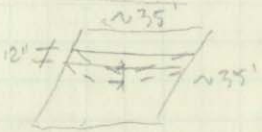
SPAN C D:

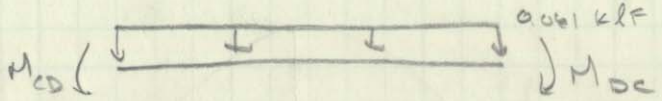


$E = 57\sqrt{4000} = 3605$ ksi

$I = \frac{bh^3}{12} = \frac{12(9.5)^3}{12} = 857.$ in^4/FT







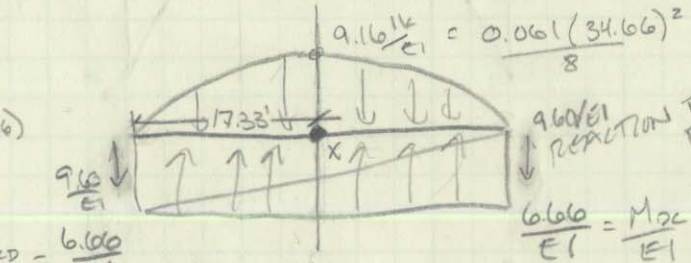
REACTION:

$\Sigma A: \frac{2}{3}(34.66)\frac{(9.16)}{EI} - 6.666(34.66)\frac{}{EI}$

$\Sigma f_y: \frac{-19.18}{EI} + 22 = 0$

REACTION $= \frac{-19.18/EI}{2}$

$= \frac{-9.60}{EI}$



PT

$\Sigma M_X =$

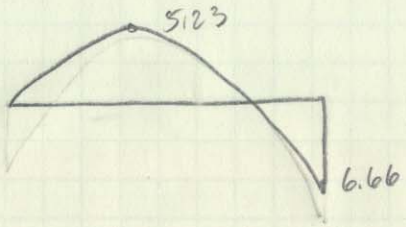
MID SPAN DEFL. $: \left[\left(\frac{2}{3}\right)\frac{9.16}{EI}(17.33)\right]\left(\frac{3}{8}(17.33)\right) - \frac{6.66(17.33)}{EI}\left(\frac{17.33}{2}\right) - \frac{9.60}{EI}(17.33)$

$\Sigma M_X = \Delta_X = \frac{-146}{EI} \quad \frac{-479}{EI}$

$\Delta_X = \frac{-479\ (\text{FT}^3\text{K})}{\left(3605\ \frac{16}{\text{in}^2}\right)\left(857\ \text{in}^4/\text{FT}\right)}(1728) = -0.268$ in

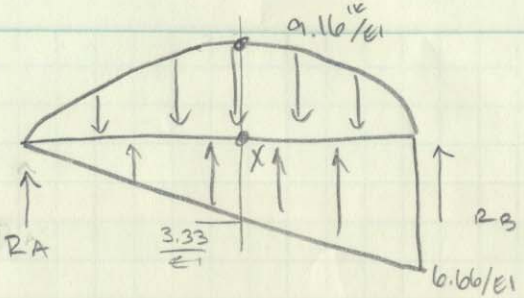
DEFL CONJ BEAM

SPAN AB: M



$E = 3605$ ksi
$I = 857$ in^4/ft

CB:



$9.16 = \frac{(.0061)(34.67)^2}{8}$

$\Sigma A: -\frac{2}{3}(9.16)(34.67) + 6.66(34.67)(\frac{1}{2})$

$= -96.2/EI$

$-R_A(34.67) + [9.16(\frac{2}{3})(34.67)](17.33) - \frac{6.66(34.67)}{2}(\frac{34.67}{3})$

$R_A = \frac{67.3}{EI}$ k $\quad R_B = \frac{28.9}{EI}$ k

MID SPAN DEF

ΣM_x:

$\left[(\frac{2}{3})(9.16)(17.33)\right] \times \frac{3}{8}(17.33) - \left[3.33(\frac{1}{2})(17.33)\right](\frac{17.33}{3}) - 67.3(17.33)$

$= \frac{-645}{EI} = \frac{-645}{3605(857)}(1728) = -0.361$ IN

ULTIMATE STR

SPAN CD $+M_{CD} = 4.58$ FT-K/FT $-M = 6.66$ FK/FT

ESTIMATE: $\frac{4.58}{4.3(8.25)} = 0.129 \text{ IN}^2/\text{FT} \rightarrow$ T24 #5 AT 18" $A_S = 0.21$ IN^2/FT

$$a = \frac{0.21(60)}{.85(f'_c)b} = \frac{0.21(60)}{.85(4)(12)} = 0.31 \text{ IN}$$

$$\phi M_n = 0.9(0.21)(60)\left(8.25 - \frac{0.31}{2}\right)\frac{1}{12} = 7.65 \text{ K-FT/FT}$$

#5 @ 24" $A_S = 0.155$ IN^2/FT

$$a = \frac{0.155(60)}{.85 f'_c b} = 0.23$$

$$\phi M_n = 0.9(0.155)(60)\left(8.25 - \frac{0.23}{2}\right)\frac{1}{12} = 5.67 \text{ K-FT/FT}$$

USE #5 @ 24, M+

ESTIMATE: $\frac{6.66}{4.3(8.25)} = 0.19 \text{ IN}^2/\text{FT}$ T24 #5 @ 18" $A_S = 0.21$ IN^2/FT

$a = 0.31$ IN $\phi M_n = 7.65$ K-FT/FT ✓OK

#5 @ 20" $A_S = .186$ IN^2/FT

$$a = \frac{.186(60)}{.85(4)(12)} = 0.27$$

$$\phi M_n = 0.9(.186)(60)\left(8.25 - \frac{.27}{2}\right)\frac{1}{12} = 6.79 \text{ K-FT/FT}$$

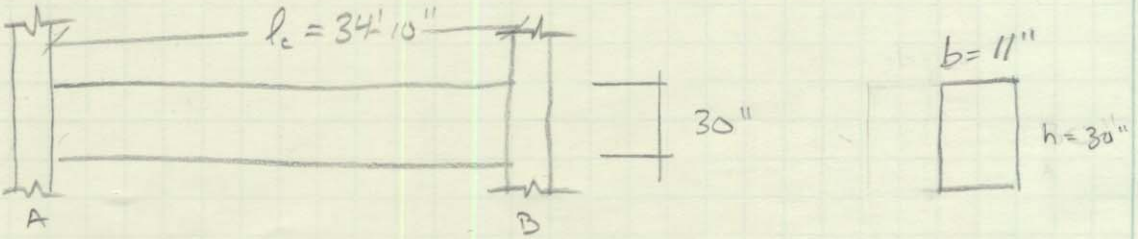
USE #5 @ 20 IN, M-

LONG TERM DEF

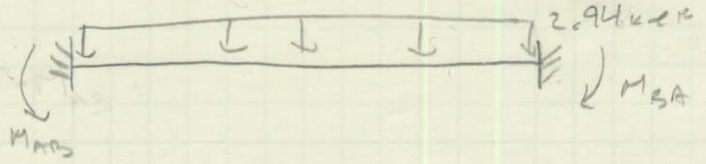
ASSUME: ① BEAM AREA LOAD = 100 PSF

② TRIB WIDTH NORMALIZED AS 32.7 FT

③ FIXED END CONDITIONS



$$w = (90\ PSF)(32.7\ FT) = 2.94\ KLF$$



$$M_{AB} = \frac{wl^2}{12} = \frac{2.94(34.83)^2}{12} = 296\ K\text{-}FT$$

$$M+ = \frac{wl^2}{24} = \frac{296}{2} = 148\ K\text{-}FT$$

STEEL

TOP: $\frac{M_u}{cd} = \frac{330}{4.3(27)} = 2.84\ IN^2$ TRY 3 #9

$$a = \frac{A_s f_y}{.85 f'_c b} = \frac{3.0(60)}{.85(4)(11)} = 4.81$$

$$\phi M_n = 0.9(3)(60)\left(27 - \frac{4.81}{2}\right)\frac{1}{12} = 332\ FT\text{-}K \quad \checkmark OK$$

$$A_{s\,MIN} = \frac{3\sqrt{f'_c}\, bd}{f_y} = \frac{\sqrt{4000}\,(11)(27)}{60000} = 0.93\ IN^2$$

$$\frac{200\, b_w d}{f_y} = \frac{200(11)27}{60000} = 0.99 \quad \checkmark OK$$

BOTTOM: $\frac{M_u}{cd} = \frac{165\ K\text{-}FT}{4.3(27)} = 1.42\ IN^2$ TRY 2 #9

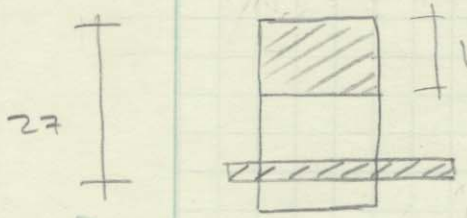
$$a = \frac{A_s f_y}{.85 f'_c b} = \frac{2(60)}{.85(4)(11)} = 3.21\ IN$$

$$\phi M_n = .9(2.0)(60)\left(27 - \frac{3.21}{2}\right)\frac{1}{12} = 228\ FT\text{-}K \quad \checkmark OK$$

L.T.D.

$E_c = 3$
$E_s = 29000$ ksi
$n = 8$
$f_r = 7.5\sqrt{4000} = 474$ psi

$I_g = 24750$ in^4



$$M_{cr} = 474\left(\frac{24750}{15}\right)\times\frac{1}{12000} = 65.2$$

$$M_{cr}/M_a = 0.44$$

$$kd = \frac{kd(b)(kd/2) + nA_s(d)}{b\,kd + nA_s} = \frac{\frac{11}{2}kd^2 + 24(27)}{11\,kd + 24}$$

$$11kd^2 + 24kd = 5.5kd^2 + 648$$

$$5.5kd^2 + 24kd - 648 = 0 \quad kd = 8.9$$

$$I_{cr} = \frac{b(kd)^3}{3} + nA_s(d-kd)^2$$

$$= \frac{11(8.9)^3}{3} + 24(27-8.9)^2 = 10447 \text{ in}^4$$

$$I_e = 0.44^3 \times 24750 + (1-.44^3)10447 = 11665$$

$$\Delta = \frac{5}{384}\frac{w_s\,us\,\ell^4}{E_c I_e} = \frac{5}{384}\frac{2.94(34.83)^4}{(3600)(11665)}(1728) = 2.31 \text{ in}$$

$$\lambda = \frac{\xi}{1+50\rho'} = \frac{2}{1+50(.01)} = 1.33$$

$\Delta_{sus} = 1.33(2.31) = 3.08 \simeq \ell/136$ More steel

~~#24~~ 4#10 $A_s = 5.08$ in^2

$$\frac{b}{2}kd^2 + nA_s kd - nA_s d = 0$$

$$\frac{11}{2}kd^2 + 40.64(kd) - 1098 = 0 \quad kd = 10.9$$

$$I_{cr} = 11\frac{(10.9)^3}{3} + 40.64(27-10.9)^2 = 15282$$

$$I_e = .44^3 \times 24750 + (1-.44^3)15282 = 16100 \text{ in}^4$$

$$\Delta = \frac{5}{384}\frac{2.94(34.83)^4}{3600(16100)}1728 = 1.68 \text{ in} \quad \Delta_{sus} = \frac{2}{1+50(.017)}1.68$$

$$= 1.81 \simeq \ell/231$$

TR4 $b = 14''$ w/ 4#11 $A_s = 6.24\ in^2$

$I_g = 14\frac{(30)^3}{12} = 31500$

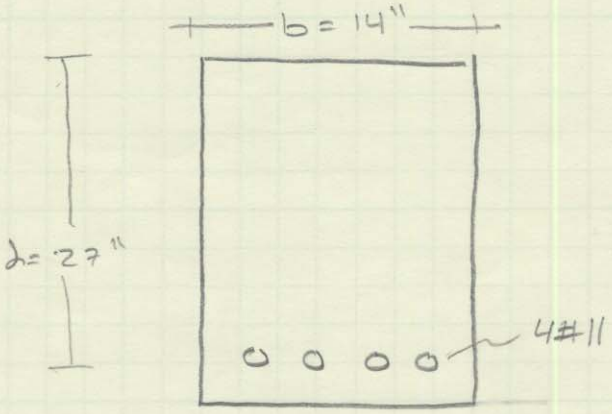
$\frac{14}{2} kd)^2 + 8(6.24)kd - 1348 = 0 \quad kd = 10.8\ in$

$I_{cr} = \frac{14(10.8)^3}{3} + 49.9(27-10.8)^2 = 18980\ in^4$

$I_e = .44^3(31500) + (1-.44^3)(18980) = 20050$

$\Delta = \frac{5}{384}\frac{2.97(34.83)^4}{3600(20050)}1728 = 1.36\ in$

$\Delta_{SUS} = 1.50 \sim \ell/280$ OKAY



- 50 PPL CREW FOR FLOOR PLATE MAX APROG - JAN 07 ~47 WEEKS

FLOOR - 10600 SF

OLD - 5707 CY MI - LOCATION FACTOR = 83.3

NEW - 7228 CY → 6086 (8" SLAB) CA - LOC. FACTOR = 121.8

COST ANALYSIS

OLD 2100 FLAT PLATE, 125 PSF SUP LOAD, 15' SPAN

CREW C-14B → 28 WORKERS

D.O. - 30.24 CY

L.H. - 6.878/CY

COST = 5707 CY ($519/CY) = $2,960,000 TOTAL

SCHEDULE = 5707 CY / 30.24 CY/DAY = 189 DAYS x 1 WEEK/5 DAYS = 38 WEEKS < 47 W

NEW 03 41 36.50 POST TENSIONE JOBS

0200 LARGE JOB

CREW C-17B → 10.75 WORKERS

D.O. - 10 CY
L.H. - 8.200/CY

COST = 7230 CY ($821/CY) = $5930000 W/ 1 CREW

SCH = 7230 CY / 10 CY/DAY = 723 DAYS / 2.5 CREWS = 289 DAYS = 58 WEEKS
/ 3 CREWS = 241 DAYS = 48 WEEKS

COST ANALYSIS

OLD 3/4 CREW → 24 WORKERS

DO: 30.24 (.75) = 22.68 CY

SCH: 5707 CY / 22.68 CY/DAY = 250 DAYS = 50 WEEKS ≃ 47 WEEKS ACTUAL

COST: 5707 CY ($242 + $0.75(253) + $24) = $2,600,000 —
MATERIAL LABOR EQP

NEW 2.5x CREW

COST: 7230 CY ($475 + 2.5($315) + $31) = $9,350,000 —

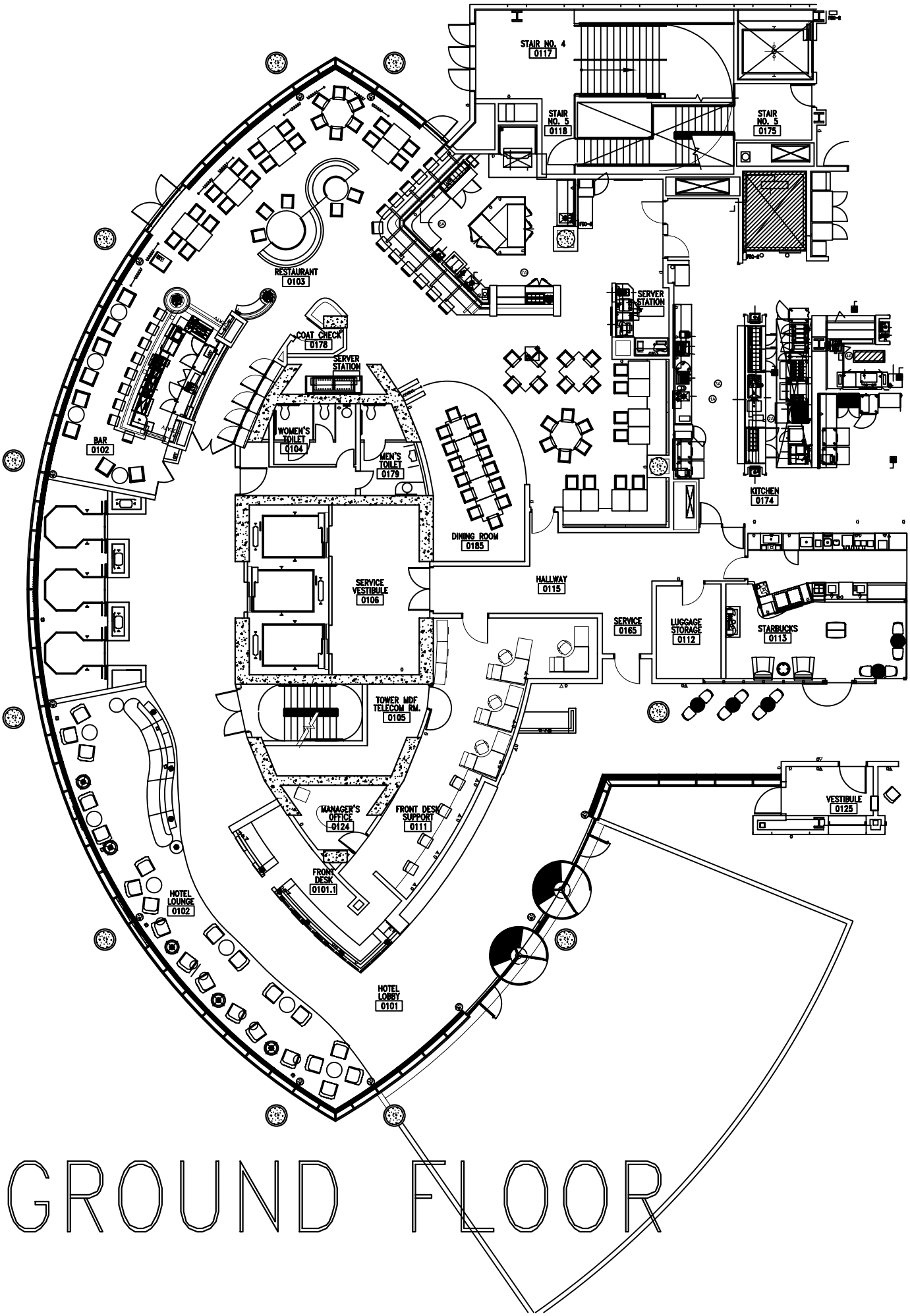
SCH: 7230 CY / (2.5 x 10 CY/DAY) = 289 D = 58 WEEKS > 47 W

NEW 3x CREW

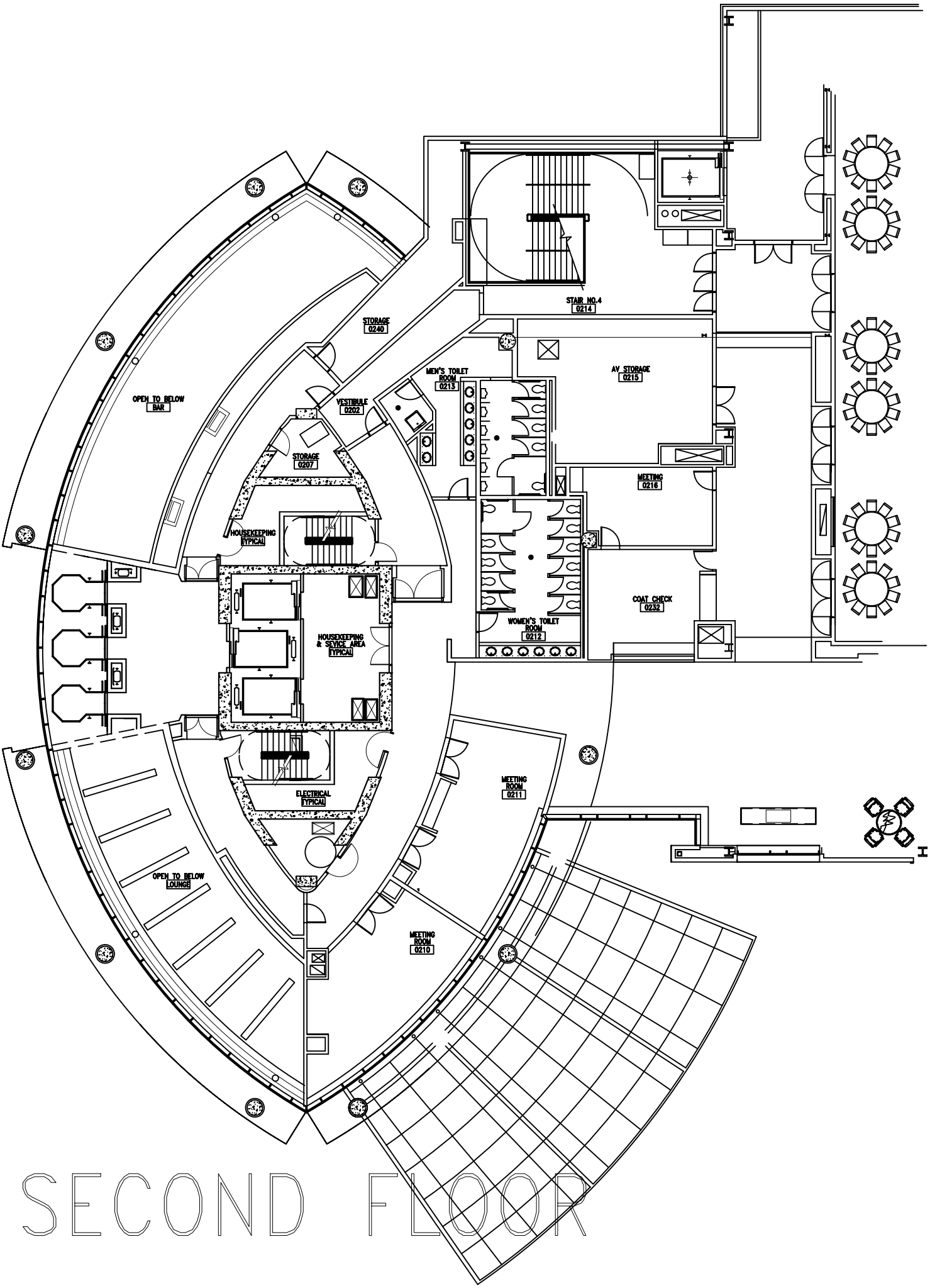
COST: 7230 CY (475 + 3.0(315) + 31) = $10,490,000 —

SCH: 7230 / 3.0x10 CY/DAY = 240 D = 48 WEEKS ≃ 47 W

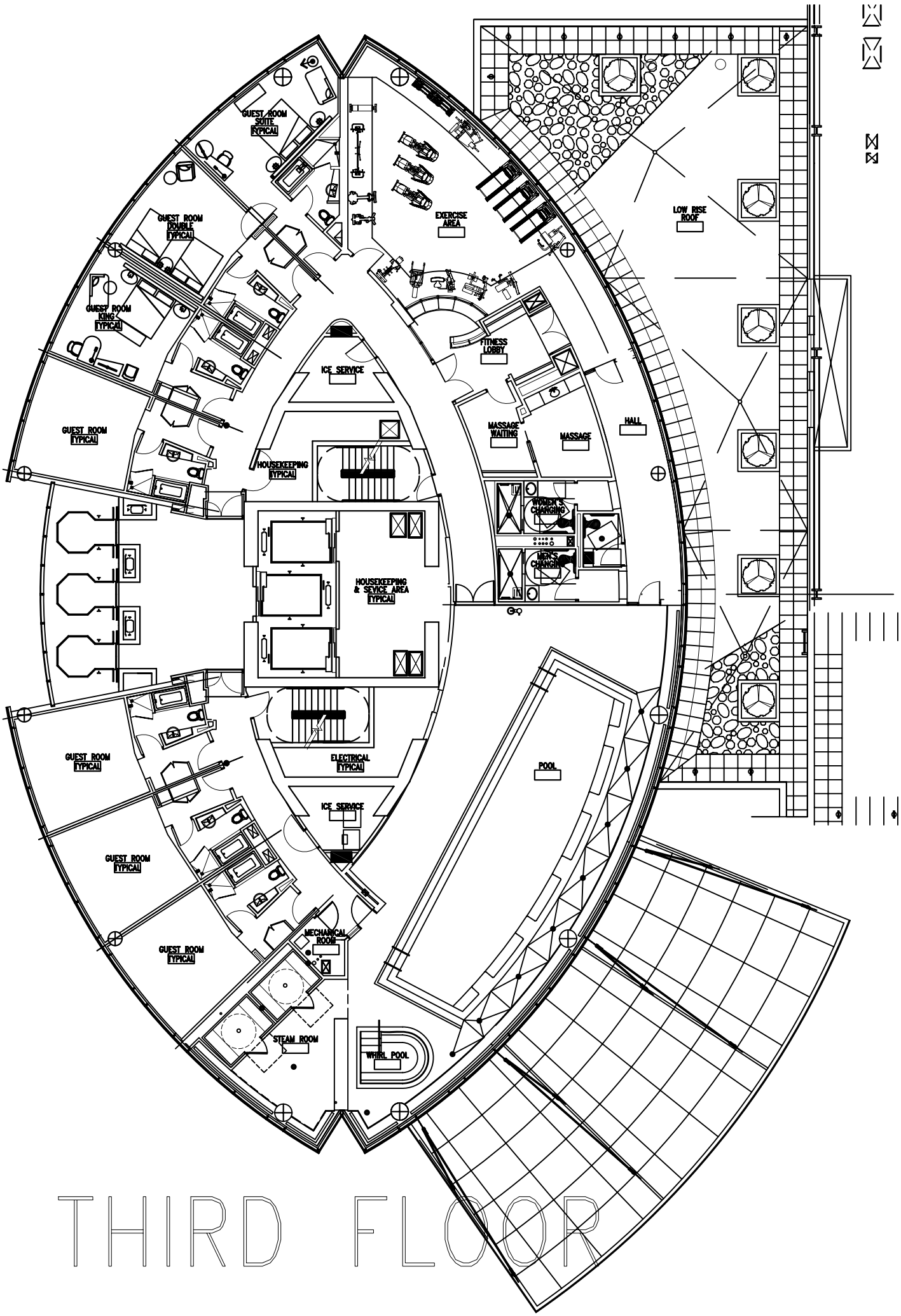
Appendix C: New Floor Plans



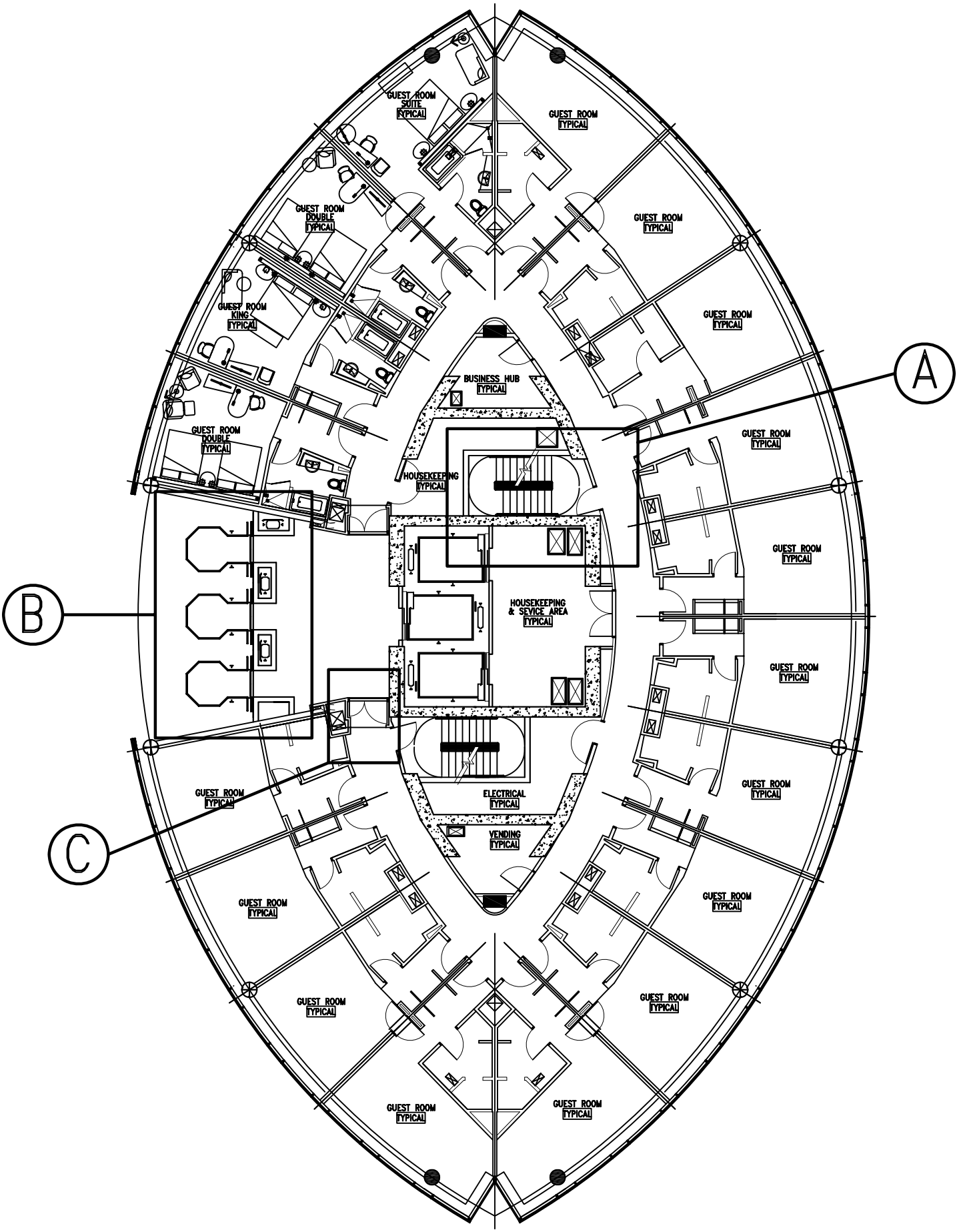
GROUND FLOOR



SECOND FLOOR


GUEST ROOM SUITE TYPICAL
GUEST ROOM DOUBLE TYPICAL
GUEST ROOM KING TYPICAL
GUEST ROOM TYPICAL
GUEST ROOM TYPICAL
GUEST ROOM TYPICAL
GUEST ROOM TYPICAL
EXERCISE AREA
FITNESS LOBBY
ICE SERVICE
HOUSEKEEPING TYPICAL
HOUSEKEEPING & SEVICE AREA TYPICAL
ELECTRICAL TYPICAL
ICE SERVICE
MECHANICAL ROOM
STEAM ROOM
WHIRL POOL
MASSAGE WAITING
MASSAGE
HALL
WOMEN'S CHANGING
MEN'S CHANGING
POOL
LOW RISE ROOF

THIRD FLOOR



TYPICAL FLOOR