

RESIDENCE INN

BY MARRIOTT

2345 MILL RD, ALEXANDRIA, VA

JULIA E. PHILLIPS

CONSTRUCTION MANAGEMENT



Appendix D: Structural Calculations and Comparisons

The following can be found in this Structural Appendix:

- *Original Floor Plan of P-1 Level, Drawing S – 103*
- *Stud Rail Calculations*
- *Decon Stud Rail Cut Sheet*
- *Re-Designed Cast In Place Flat Plate Calculations*
- *Filigree Floor Plan*
- *Healy Long & Jevin, Inc. Estimates*
 - *Filigree System*
 - *Original Flat Slab System*
- *Take Off Estimate of Original Flat Slab System*
- *System Comparison Chart*
- *Structural Schedule*

REVISIONS

PERMIT SET	OCT. 20, 2006
95% PRICING	DEC. 01, 2006
FINAL CONSTRUCTION SET	FEB. 16, 2007
△ CCB#03-RELOCATED COLUMNS	APRIL 20, 2007

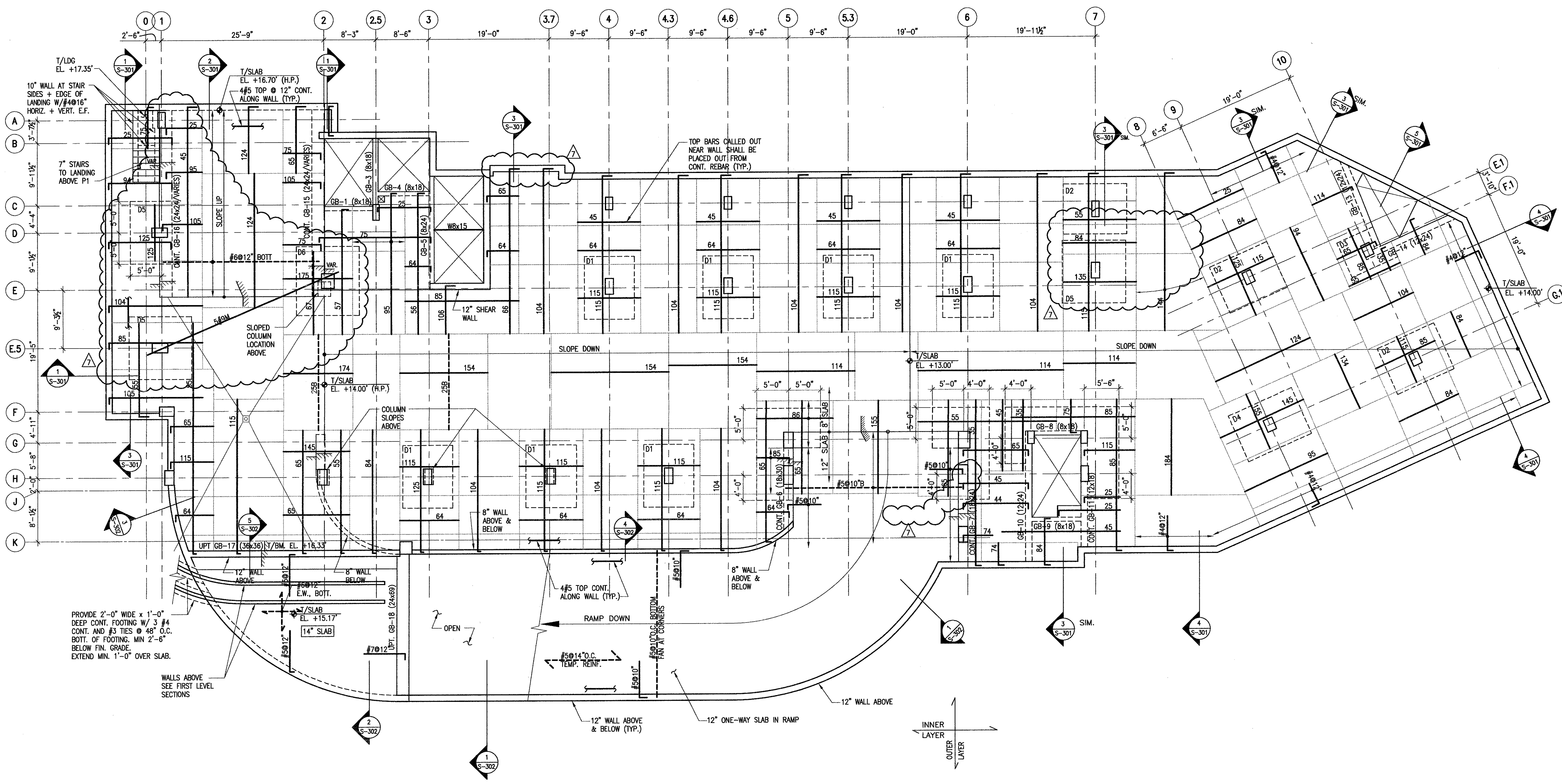
PROJECT TITLE
RESIDENCE
INN
BY
MARRIOTT

2345/2347 MILL ROAD
ALEXANDRIA, VIRGINIA
PROJECT NO. 305412.00

DRAWING TITLE
P-1 LEVEL
FRAMING
PLAN

SCALE AS NOTED
DATE FEBRUARY 16, 2007
DRAWN BY
CHECKED BY

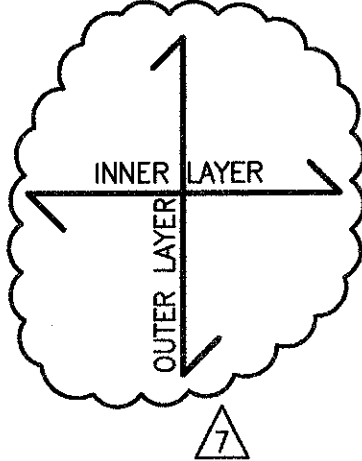
DRAWING NUMBER
S-103
SK&A PROJECT NUMBER: 05-158
SHEET OF



P-1 LEVEL FRAMING PLAN

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

- NOTES:**
- TYPICAL SLAB CONSTRUCTION: 8" THICK (UNLESS NOTED OTHERWISE) NORMAL WEIGHT CONCRETE (FC=5000 PSI) WITH 60,000 PSI REINFORCING STEEL. ALL REINFORCING BARS AND ACCESSORIES SHALL BE EPOXY-COATED PER STRUCTURAL NOTES.
 - BASIC SLAB ELEVATIONS ARE NOTED ON PLAN. SEE ARCHITECTURAL AND MECHANICAL DRAWINGS FOR SLOPES AND FLOOR DRAINS.
 - DROP PANELS ARE 3/8" THICK (1 3/8" TOTAL THICKNESS), AND SIZES ARE PER SCHEDULE, CENTERED ON COLUMN, U.N.O.
 - BOTTOM MAT IS #4@12" O.C. EACH WAY, U.O.N. REINFORCING MARKED THUS 35B ON PLAN ARE 3/8" BOTTOM BARS IN THE DIRECTION SHOWN IN ADDITION TO THE BOTTOM MAT.
 - TOP REINFORCING FOR COLUMN AND MIDDLE STRIPS IS AS SHOWN ON PLAN. REINFORCING MARKED THUS 165 ON PLAN ARE 16#5 TOP BARS.
 - REINFORCING MARKED THUS 144-75 ON PLAN ARE 14-#5 BARS EVENLY DISTRIBUTED ACROSS THE COLUMN STRIP WITH 7-#5 BARS ADDED ACROSS A SLAB WIDTH EXTENDING ON EITHER SIDE OF THE COLUMN A DISTANCE OF 1.5H (WHERE H = SLAB + DROP PANEL THICKNESS).
 - SEE ARCHITECTURAL AND MEP DRAWINGS FOR SIZE AND LOCATION OF ALL SLAB OPENINGS. PROVIDE REINFORCING PER TYPICAL DETAIL ON S-ROZ. CONTRACTOR SHALL COORDINATE AND SUBMIT SLAB PENETRATION SHOP DRAWINGS PRIOR TO CONCRETE POUR.
 - SEE ARCHITECTURAL DRAWINGS FOR LOCATION OF COLUMNS, EDS, CURBS, CMU WALLS, AND SLOPES FOR DRAINS.



NOTATION	SIZE	NOTES
D1	8'-0"x10'-0"	NOTES 1, 2
D2	10'-0"x8'-0"	NOTES 1, 2
D3	8'-0"x8'-0"	NOTES 1, 2
D4	11'-0"x8'-0"	NOTES 1, 2
D5	10'-0"x10'-0"	NOTES 1, 2
D6	10'-0"x11'-0"	NOTES 1, 2

- NOTES:**
- FIRST DIMENSION IS LEFT TO RIGHT ON PLAN.
 - DROP CENTERED OVER COLUMN.

CENTEX CONSTRUCTION
MAY 07 2007

SEE WMATA NOTE ON SHEET A-001.



JULIA E. PHILLIPS
CONSTRUCTION MANAGEMENT

Stud Rail Re-Design of P-1 Garage Level

Typical Bay Size (ft.) = 26.5 x 17.5

Column Size (in.) = 18 x 30

Fy = 60 ksi

No Existing Edge Beams

Exterior Panels (in.) = $l_n/30 = 17.5'/30 (12") = 7.00$ in.

Interior Panels (in.) = $l_n/33 = 26.5'/33 (12") = 9.64$ in.

h = 10 in.

d = 8.50 in.

Factored Load (P)

Live Load = 40 psf

Dead Load = 150 (10/12) = 125.00 psf

P = 1.2D + 1.6L = 214 psf

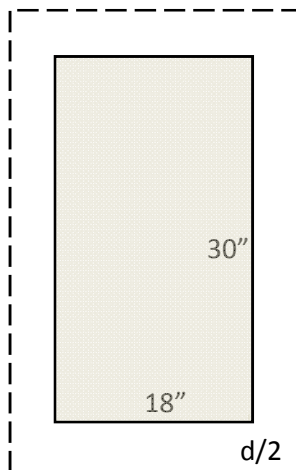
Distributed Load

$\omega = P * w = 3.745$ kips

Tributary Load at Column

$V_u = P * w * (1/2d + 1/2l) = 68.35$ kips

Effective Width (b_o)



$d/2 = 4.25$ in.

$b_{ol} = 38.50$ in.

$b_{os} = 26.50$ in.

$b_o = 130.00$ in.

Shear Strength

$\Phi = 0.75$

$\Phi V_c = \Phi 4 * v_f'c * b_o * d = 234.41$ kips > 68.35 kips

No Shear Stud Rails Required

DECON STUDRAILS

USA: 800-527-RAIL
CAN: 800-36-DECON

PROJECT TITLE: (NONE) (Feb 7,2008)

GENERAL DATA

File Name: C:\...\UNTITLED.INW
Project Title: (NONE)
Design Code: ACI 318-95
System of Units: US (in., lb.)
gamma, 0: 0

STUDRAIL DATA

Stud yield strength (fy): 50000 psi
Stud Diameter: Automatic
Stud Spacing: Automatic

SLAB DATA

Effective depth (d): 8.5 in.
Slab thickness: 10 in.
Top cover: 1 in.
Bottom cover: 1.5 in.
Concrete strength (fc): 5000 psi
Concrete Density: Normal Weight

DESIGN PARAMETERS AT d/2 FROM COLUMN FACE:

Column centroid: $X_o = 0.00$ in.
 $Y_o = 0.00$ in.
Critical Section Area: $A_c = 1105.0$ in²
Moments of Inertia: $J_x = 2.48E+05$ in⁴
 $J_y = 1.41E+05$ in⁴
 $J_{xy} = 0.00E+00$ in⁴
Maximum shear stress: $v_u = 78$ psi at $x = 13.25$ in.
 $y = 19.25$ in.
Shear resistance: $\phi v_n = 240$ psi

WARNING AND OUTPUT MESSAGES

Design Result: Studrails are not required. The maximum shear stress is 78 psi and the factored resistance is 240 psi.

CONNECTION DATA

Connection Name: Column 1
Connection Type: Interior Column
Column size x: 18 in.
Column size y: 30 in.
Overhang (x): 0 in.
Overhang (y): 0 in.
Vu: 68.3 kip
Mox: 20 ft-kip
Moy: 20 ft-kip
Prestress (fpc): 0 psi
Number of Studrails: Automatic

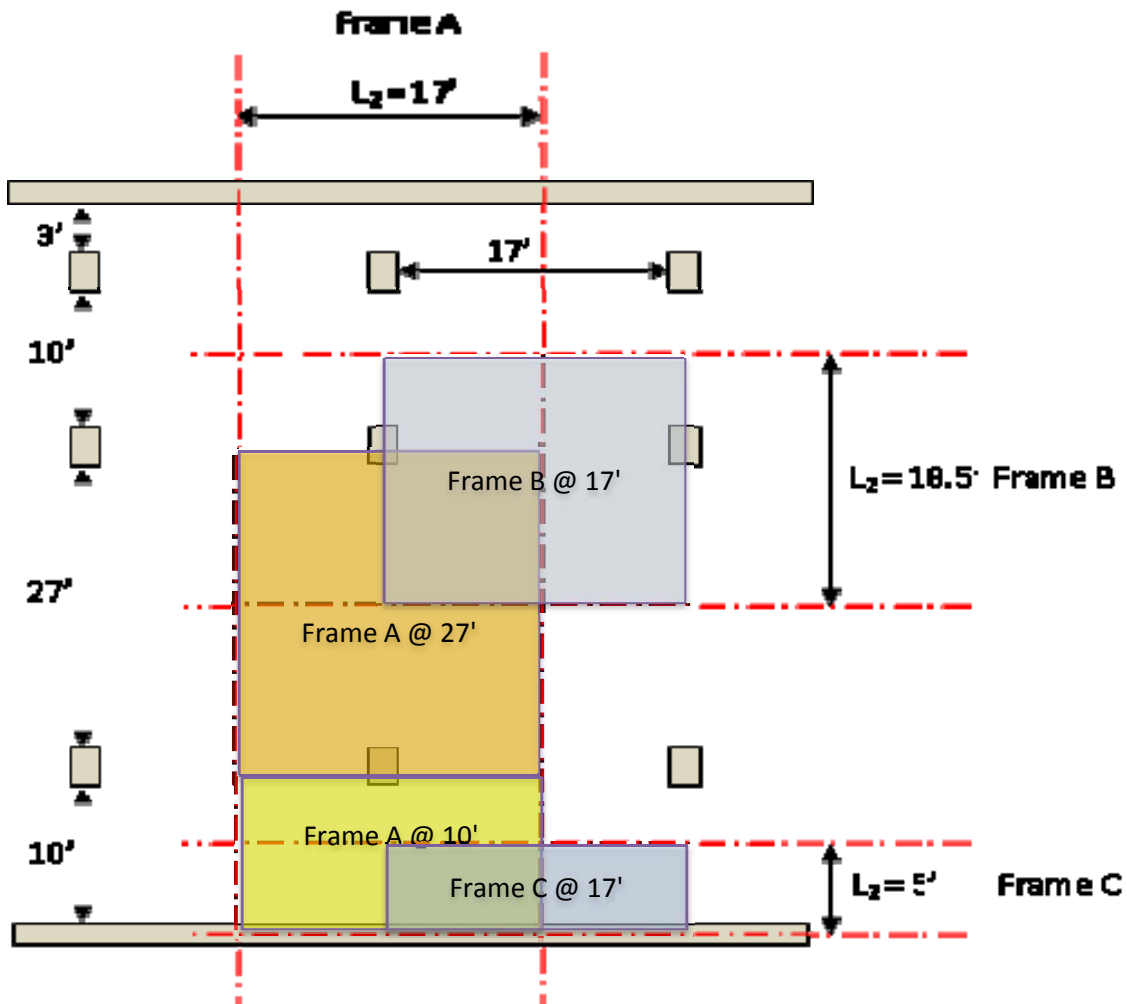


JULIA E. PHILLIPS
 CONSTRUCTION MANAGEMENT

Flat Plate Re-Design of P-1 Garage Level

* Assume Direct Design Method	Frames Analyzed:	From Stud Rail Design
* Assume Columns are In Line	Frame A @ 27'	t = 10"
* Assume 10 Column Lines	Frame A @ 10'	d = 8.5"
* Assume All Columns are 18" x 30"	Frame B @ 17'	
* Frame C is doubled to account for the 3' span	Frame C @ 17'	

Averaged Column Grid:



Factored Loads $W_u = 1.2D + 1.6L$
 $W_u = 1.2 (125) + 1.6 (40) = 214 \text{ psf}$



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 CONSTRUCTION MANAGEMENT

Frame A @ 27'

$$M_0 = \frac{W_U * l_2 * l_n^2}{8} \quad M_0 = 331.51 \text{ K-ft}$$

$$M_{INT}^+ = 0.35 M_0 = 116.03 \text{ K-ft} \quad \alpha_1 = 0 \text{ (No Beams)}$$

$$M_{INT}^- = 0.65 M_0 = 215.48 \text{ K-ft} \quad l_2/l_1 = 17/27 = 0.63$$

Column Strip Moments

$$M_{INT}^+ = 0.60 M_{INT}^+ = 69.62 \text{ K-ft}$$

$$M_{INT}^- = 0.75 M_{INT}^- = 161.61 \text{ K-ft}$$

Middle Strip Moments

$$M_{INT}^+ = 0.40 M_{INT}^+ = 46.41 \text{ K-ft}$$

$$M_{INT}^- = 0.25 M_{INT}^- = 53.87 \text{ K-ft}$$

Rebar Design for Frame A @ 27'

Item	Description	Column Strip		Middle Strip	
		M_{INT}^+	M_{INT}^-	M_{INT}^+	M_{INT}^-
1	Moment (K-ft)	69.62	161.61	46.41	53.87
2	Width b (in.)	102	102	102	102
3	Effective d (in.)	8.5	8.5	8.5	8.5
4	$M_n = M_0 / 0.9$	77.35	179.57	51.57	59.86
5	$R = \frac{M_n (1000)(12)}{b * d^2}$	125.96	292.40	83.97	97.47
6	ρ (Table A.5a)	0.002	0.005	0.0015	0.0015
7	$A_s = \rho b d$	1.73	4.34	1.30	1.30
8	$A_{sMIN} = 0.0018 b t$	1.84	1.84	1.84	1.84
9	$n = A_{sMIN} / A_{BAR}$	4.17	9.85	9.18	9.18
10	$n_{MIN} = b / 2t$	5.1	5.1	5.1	5.1

Solution (6) #6 (10) #6 (10) #4 (10) #4



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Frame C @ 17'

$$M_0 = \frac{W_U * l_2 * l_n^2}{8} \quad M_0 = 38.65 \text{ K-ft}$$

$$M_{INT}^+ = 0.35 M_0 = 13.53 \text{ K-ft} \quad \alpha_1 = 0 \text{ (No Beams)}$$

$$M_{INT}^- = 0.65 M_0 = 25.12 \text{ K-ft} \quad l_2/l_1 = 5/17 = 0.29$$

Column Strip Moments

$$M_{INT}^+ = 0.60 M_{INT}^+ = 8.12 \text{ K-ft}$$

$$M_{INT}^- = 0.75 M_{INT}^- = 18.84 \text{ K-ft}$$

Middle Strip Moments

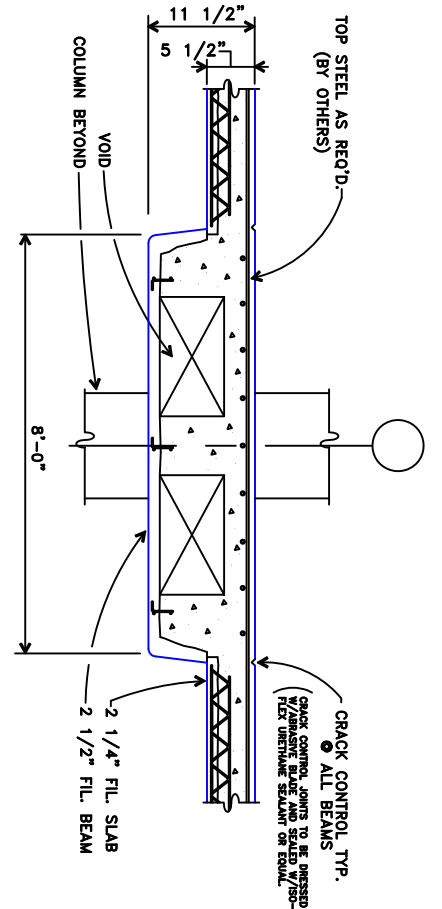
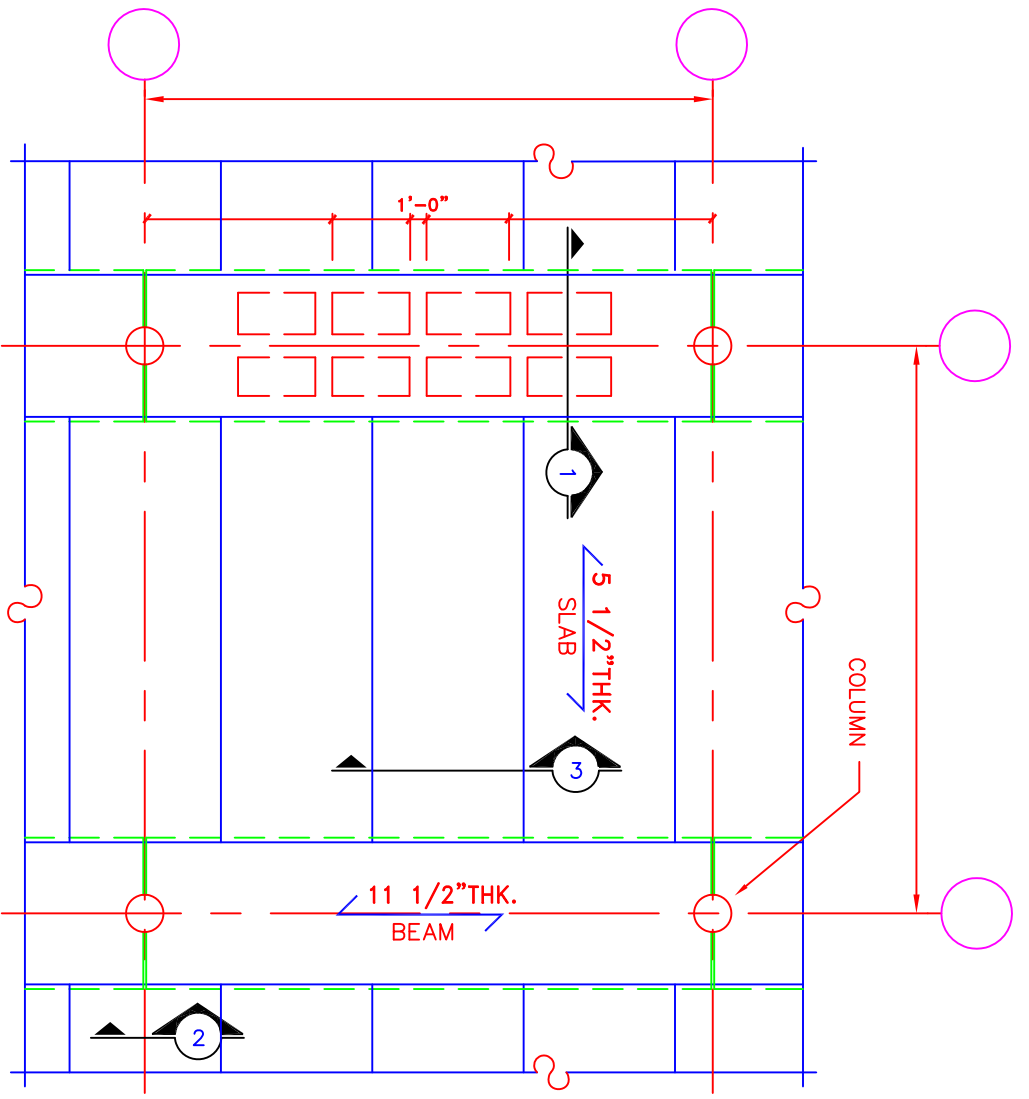
$$M_{INT}^+ = 0.40 M_{INT}^+ = 5.41 \text{ K-ft}$$

$$M_{INT}^- = 0.25 M_{INT}^- = 6.28 \text{ K-ft}$$

Rebar Design for Frame C @ 17'

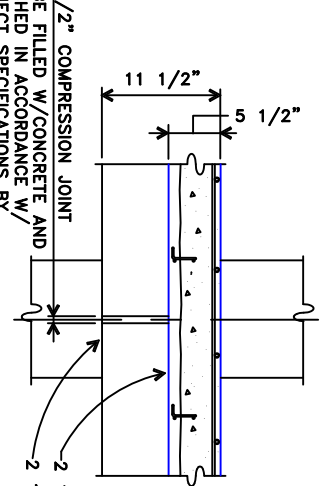
Item	Description	Column Strip		Middle Strip	
		M_{INT}^+	M_{INT}^-	M_{INT}^+	M_{INT}^-
1	Moment (K-ft)	8.12	18.84	5.41	6.28
2	Width b (in.)	15	15	45	45
3	Effective d (in.)	8.5	8.5	8.5	8.5
4	$M_n = M_o / 0.9$	9.02	20.94	6.01	6.98
5	$R = \frac{M_n (1000)(12)}{b * d^2}$	99.87	231.83	22.19	25.76
6	ρ (Table A.5a)	0.0015	0.004	0.0005	0.0005
7	$A_s = \rho b d$	0.19	0.51	0.19	0.19
8	$A_{sMIN} = 0.0018 b t$	0.27	0.27	0.81	0.81
9	$n = A_{sMIN} / A_{BAR}$	1.35	2.55	4.05	4.05
10	$n_{MIN} = b / 2t$	0.75	0.75	2.25	2.25

Solution (2) #4 (3) #4 (5) #4 (5) #4

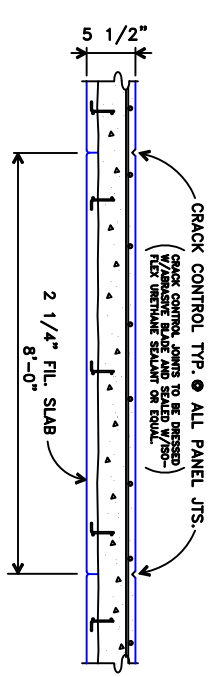


SECTION-1

1 1/2" COMPRESSION JOINT TO BE FILLED W/CONCRETE AND FINISHED IN ACCORDANCE W/PROJECT SPECIFICATIONS BY CONCRETE CONTRACTOR.



SECTION-2



SECTION-3

NO.		REVISION		DATE		FILIGREE WIDE SLAB MID-STATE FILIGREE CRANBURY, N.J.		RESIDENCE @ MARRIOTT FILIGREE BEAM AND SLAB FOR PARKING		DWN DJK CHKD. SEQ.		JOB NO. PROP-SK1 DATE 2/29/08	
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**Residence Inn
Thesis Project
Filigree System**

Project name 22008-999 Thesis Filigree
Estimator MAJ
Labor rate table PA
Job size 36000 SF
Bid date 3/21/2008 2:00 PM
Report format Sorted by 'Group phase/Phase'
'Detail' summary
Allocate addons
Combine items

Item	Description	Takeoff Qty	Labor		Material		Subcontract		Total	
			Unit Cost	Amount	Unit Cost	Amount	Unit Cost	Amount	Name	Amount
10.000 REINFORCING STEEL										
10.364	Buy & Place Rebar									
r	F & I Black Rebar	48.00 ton	-	-	1,083.45 /ton	52,005	831.832 /ton	39,928		91,933
	Buy & Place Rebar					52,005		39,928		91,933
10.416	Detailing Reinforcing									
10	Detailing Reinforcing	48.00 ton	-	-	5.74 /ton	275	40.16 /ton	1,928		2,203
	Detailing Reinforcing					275		1,928		2,203
10.418	Accessories									
r	Accessories	48.00 ton	-	-	64.52 /ton	3,097	-	-		3,097
	Accessories					3,097		-		3,097
REINFORCING STEEL				0		55,378		41,855		97,233
30.000 MISCELLANEOUS WORK										
30.100	General Conditions									
10	General Conditions	763.12 cuyd			6.884 /cuyd	5,253				5,253
20	Travel	763.12 cuyd			4.59 /cuyd	3,502				3,502
	General Conditions					8,756				8,756
30.101	Equipment									
cy	Pump / Crane	763.12 cuyd					50.484 /cuyd	38,525		38,525
	Equipment							38,525		38,525
30.102	Clean-up									
lab	Clean-up	36,000.00 sqft	0.094 /sqft	3,398	0.012 /sqft	438	-	-		3,836
	Clean-up			3,398		438				3,836
30.103	Safety									
carp	Safety	36,000.00 sqft	0.13 /sqft	4,510	0.05 /sqft	1,753	-	-		6,263
	Safety			4,510		1,753				6,263
30.203	Guaranteed Time									
\$	Guaranteed Time	1.00 L/S	2,058.86 /L/S	2,059	-	-	-	-		2,059
	Guaranteed Time			2,059		-		-		2,059
30.205	Shop Expense									
\$	Shop Expense	1.00 L/S	7,079.56 /L/S	7,080	-	-	-	-		7,080
	Shop Expense			7,080		-		-		7,080
MISCELLANEOUS WORK				17,047		10,947		38,525		66,519
38.000 FILIGREE SLAB SYSTEM										
38.316	"Tooled" Filigree Joints									
fin	"Tooled" Joints	5,500.00 lnft	0.784 /lnft	4,310	0.183 /lnft	1,004				5,315
	"Tooled" Filigree Joints			4,310		1,004				5,315
38.327	Finish & Cure Slab									
fin	F & C Slab	36,000.00 sqft	0.63 /sqft	22,571	0.024 /sqft	877				23,447
	Finish & Cure Slab			22,571		877				23,447
38.328	Shore Filigree									
f 14	Shore - 10' to 14' AFF	36,000.00 sqft	2.193 /sqft	78,932	1.04 /sqft	37,251	-	-		116,183
filC	Buy & Set Filigree - Carpenters	36,000.00 sqft	0.63 /sqft	22,552	8.704 /sqft	313,347	-	-		335,899
	Shore Filigree			101,484		350,598				452,082
38.329	Prep Filigree									
f	Prep Filigree Slab	36,000.00 sqft	2.09 /sqft	75,174	0.304 /sqft	10,956	-	-		86,130
	Prep Filigree			75,174		10,956				86,130
38.330	Pour Concrete									
c 50	Pour 5000 psi	763.12 cuyd	23.892 /cuyd	18,232	127.822 /cuyd	97,543	-	-		115,775
	Pour Concrete			18,232		97,543				115,775
FILIGREE SLAB SYSTEM				221,771		460,978		0		682,749

Estimate Totals

Description	Amount	Totals	Rate	Cost per Unit
Labor	238,818			6.63 /SF
Material	527,303			14.65 /SF
Subcontract	80,380			2.23 /SF
Equipment				
Other				
	<u>846,501</u>	<u>846,501</u>		<u>23.51 /SF</u>
Total		846,501		23.51 /SF

Residence Inn
Thesis Project
Flat Plate

Project name	22008-999 Thesis FP
Estimator	MAJ
Labor rate table	PA
Job size	36000 SF
Bid date	3/21/2008 2:00 PM
Report format	Sorted by 'Group phase/Phase' 'Detail' summary Allocate addons Combine items

Item	Description	Takeoff Qty	Labor		Material		Subcontract		Name	Total Amount
			Unit Cost	Amount	Unit Cost	Amount	Unit Cost	Amount		
10.000 REINFORCING STEEL										
10.364	Buy & Place Rebar									
r	F & I Black Rebar	81.00 ton	-	-	1,097.691 /ton	88,913	843.44 /ton	68,318		157,231
	Buy & Place Rebar					88,913	68,318			157,231
10.416	Detailing Reinforcing									
10	Detailing	81.00 ton	-	-	5.82 /ton	471	40.72 /ton	3,298		3,769
	Detailing Reinforcing					471	3,298			3,769
10.418	Accessories									
r	Accessories	81.00 ton	-	-	65.37 /ton	5,295	-	-		5,295
	Accessories					5,295				5,295
REINFORCING STEEL			0		94,679		71,617		166,295	
13.000 STRUCTURAL SLABS										
13.327	Finish & Cure Slab									
fin	F & C Slab	36,000.00 sqft	0.631 /sqft	22,732	0.03 /sqft	888				23,620
	Finish & Cure Slab			22,732		888				23,620
13.328	Form/Shore Slab									
f	Form Structural Slab	36,000.00 sqft	2.104 /sqft	75,750	0.93 /sqft	33,301	-	-		109,051
t 10	Titan Shore - 7'-8" to 11'-8" AFF	36,000.00 sqft	4.734 /sqft	170,437	1.79 /sqft	64,381	-	-		234,818
	Form/Shore Slab			246,187		97,682				343,869
13.329	Prep Slab									
f	Prep Structural Slab	36,000.00 sqft	2.104 /sqft	75,750	0.31 /sqft	11,100	-	-		86,850
	Prep Slab			75,750		11,100				86,850
13.330	Pour Concrete									
c 50	Pour 5000 psi	916.014 cuyd	24.052 /cuyd	22,032	129.503 /cuyd	118,626	-	-		140,658
	Pour Concrete			22,032		118,626				140,658
13.331	Reshore									
ff	Reshore Slab (Titan)	36,000.00 sqft			0.432 /sqft	15,540	-	-		15,540
	Reshore					15,540				15,540
STRUCTURAL SLABS			366,700		243,837		0		610,538	
30.000 MISCELLANEOUS WORK										
30.100	General Conditions									
10	General Conditions	1,008.67 cuyd			6.98 /cuyd	7,041				7,041
20	Travel	1,008.67 cuyd			4.653 /cuyd	4,694				4,694
	General Conditions					11,734				11,734
30.101	Equipment									
cy	Pump / Crane	1,008.67 cuyd					37.23 /cuyd	37,550		37,550
	Equipment							37,550		37,550
30.102	Clean-up									
lab	Clean-up	36,000.00 sqft	0.10 /sqft	3,421	0.012 /sqft	444	-	-		3,865
	Clean-up			3,421		444				3,865
30.103	Safety									
carp	Safety	36,000.00 sqft	0.13 /sqft	4,545	0.05 /sqft	1,776	-	-		6,321
	Safety			4,545		1,776				6,321
30.203	Guaranteed Time									
\$	Guaranteed Time	1.00 L/S	2,074.86 /L/S	2,075	-	-	-	-		2,075
	Guaranteed Time			2,075						2,075
30.205	Shop Expense									
\$	Shop Expense	1.00 L/S	7,127.58 /L/S	7,128	-	-	-	-		7,128
	Shop Expense			7,128						7,128
30.420	Rub									
10	Rub - Slabs, Beams, Columns	36,000.00 sqft	0.564 /sqft	20,296	0.062 /sqft	2,220	-	-		22,516
	Rub			20,296		2,220				22,516
MISCELLANEOUS WORK			37,465		16,175		37,550		91,190	
51.000 COLUMN CAPITALS										
51.328	Form Capitals/Dropheads									
f	Form Drop Edge	1,080.00 sqft	16.833 /sqft	18,180	2.47 /sqft	2,664	-	-		20,844
	Form Capitals/Dropheads			18,180		2,664				20,844
51.330	Pour Concrete									
c 50	Pour 5000 psi	92.654 cuyd	24.052 /cuyd	2,228	129.503 /cuyd	11,999	-	-		14,227
	Pour Concrete			2,228		11,999				14,227
COLUMN CAPITALS			20,408		14,663		0		35,071	

Estimate Totals

Description	Amount	Totals	Rate	Cost per Unit
Labor	424,574			11.79 /SF
Material	369,354			10.26 /SF
Subcontract	109,167			3.03 /SF
Equipment				
Other				
	903,095	903,095		25.09 /SF
Total		903,095		25.09 /SF

RESIDENCE INN
 BY MARRIOTT
 2345 MILL RD, ALEXANDRIA, VA

STRUCTURAL TAKE OFF DATA
 APPENDIX D



JULIA E. PHILLIPS
 CONSTRUCTION MANAGEMENT

3 Level Existing Cast In Place Slab Concrete Reinforcing

Bar No.	Length (LF)	Steel (LBS)	Steel (TONS)	Unit Cost (\$/TON)	Labor Cost	Total Cost
#4	110526	73831.37	36.92	950	455	\$51,866.54
#5	35526.6	37054.24	18.53	950	455	\$26,030.61
#6	6843	10278.19	5.14	950	455	\$7,220.43
#7	555	1134.42	0.57	950	455	\$796.93
#9	495	1683.00	0.84	950	455	\$1,182.31
Total		123981.22	61.99			\$87,096.81

3 Level Existing Cast In Place Slab & Drop Panel Concrete Volume

Panel No.	Depth (IN)	Area (SF)	Concrete (CY)	Unit Cost (\$/CY)	Labor Cost	Equipment Cost (\$/CY)	Total Cost
	8	40428	998.22	274	150	14.3	\$437,520.80
	14	1224	52.89	274	150	14.3	\$23,181.20
D 1 (7)	5.5	1680	199.63	274	150	14.3	\$87,497.67
D 2 (3)	5.5	720	36.67	274	150	14.3	\$16,071.00
D 3 (1)	5.5	192	3.26	274	150	14.3	\$1,428.53
D 4 (1)	5.5	264	4.48	274	150	14.3	\$1,964.23
D 5 (3)	5.5	900	45.83	274	150	14.3	\$20,088.75
D 6 (1)	5.5	330	5.60	274	150	14.3	\$2,455.29
Total			1346.58				\$590,207.48

RESIDENCE INN
 BY MARRIOTT
 2345 MILL RD, ALEXANDRIA, VA

STRUCTURAL TAKE OFF DATA
 APPENDIX D



JULIA E. PHILLIPS
 CONSTRUCTION MANAGEMENT

New 3 Level Cast In Place Slab Concrete Reinforcing

Bar No.	Length (LF)	Steel (LBS)	Steel (TONS)	Unit Cost (\$/TON)	Labor Cost (\$/TON)	Total Cost
#4	60243.6	40242.72	20.12	950	455	\$28,270.51
#5	792	826.06	0.41	950	455	\$580.30
#6	28710	43122.42	21.56	950	455	\$30,293.50
Total		84191.20	42.10			\$59,144.32

New 3 Level Cast In Place Slab Concrete Volume

Panel No.	Depth (IN)	Area (SF)	Concrete (CY)	Unit Cost (\$/CY)	Labor Cost (\$/CY)	Equipment Cost (\$/CY)	Total Cost
n/a	10	44100	1361.11	274	150	14.3	\$596,575.00
Total			1361.11				\$596,575.00

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STRUCTURAL TAKE OFF DATA
 APPENDIX D



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Structural System Comparison			
Analysis Description	Existing CIP Slab with Drop Panels	Re-Designed CIP Slab without Drop Panels	Filigree Slab and Beam System
Steel (TONS)	61.99	42.10	48.00
Steel (lbs./SF)	2.81	1.91	2.25
Steel Cost	\$87,096.81	\$59,144.32	\$67,440.00
Concrete (CY)	1346.58	1361.11	816.67
Concrete Drop/Beam (in.)	13.5	0	11.5
Concrete Slab (in.)	8	10	6
Concrete Cost	\$590,207.48	\$596,575.00	\$357,945.00
Formwork (SF)	46007.95	44100.00	44100.00
Formwork Cost	\$253,043.74	\$242,550.00	\$142,575.30
Slab Duration (Days)	44	27	21
Total Cost	\$930,348.02	\$898,269.32	\$567,960.30
Location Factor Adjustment	0.94	0.94	0.94
Adjusted Total Cost	\$874,527.14	\$844,373.16	\$533,882.68
Savings Analysis			
Steel (TONS)	n/a	19.90	13.99
Steel (lbs./SF)	n/a	0.90	0.56
Steel Cost	n/a	\$27,952.49	\$19,656.81
Concrete (CY)	n/a	-14.53	529.92
Concrete Cost	n/a	-\$6,367.53	\$232,262.48
Formwork (SF)	n/a	1907.95	1907.95
Formwork Cost	n/a	\$10,493.74	\$110,468.44
Slab Duration (Days)	n/a	17	23
Total Cost Savings	n/a	\$32,078.70	\$362,387.72
Location Factor Adjustment	0.94	0.94	0.94
Adjusted Total Cost Savings	n/a	\$30,153.98	\$340,644.45



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