E. Farach, PE
410 490-7616

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449 Web Foot Lane
Stevensville, MD 21666

Design Considerations:

1. Design uses ACI Code, Latest Edition…
2. Floor Slab Simulated on STAAD.Pro Release 2006…or RISA 3D-7.0
3. Floor Area Modeled is main project area…
4. Weight of Concrete assumed at 144 pcf…
5. Steel and Concrete Strengths are 40,000 and 3,000 psi respectively…UON
6. Work with Model's Sketch for Member and Joints Identification…

Loads from Modeling Analysis or Calculations:

Design Loads and General Arrangements

Member No. ==========▶ M1076

	Col Line→ Z1-7		Col Line→ Z1-8	
	DEAD LOADS			
Total **DL** Negative Moment =	54.83	k-ft	49.58	k-ft
Total **DL** Shear =	22.01	kips	22.37	kips
Total **DL** Positive Moment =	63.54	k-ft		
	LIVE LOADS			
Total **LL** Negative Moment =	22.00	k-ft	22.35	k-ft
Total **LL** Shear =	9.65	kips	9.70	kips
Total **LL** Positive Moment =	25.14	k-ft		
	General Slab Information			
Reinforcement Yield =	40.00	ksi	Slab Thickness =	9.75 inches
Concrete Strength =	3.00	ksi	Design d =	8.75 inches

General Distribution of Moment and Reinforcement:

Col Line→ **Z1-7** Bay Width→ 20.00 feet Col Line→ **Z1-8**

Reinforcement		Reinforcement		Reinforcement	
As(strip)=	6.82	**As(strip)=**	3.41	**As(strip)=**	6.82
ρ =	0.0065	ρ =	0.0032	ρ =	0.0065
As(mid)=	2.48	**As(mid)=**	2.48	**As(mid)=**	2.48
ρ =	0.0024	ρ =	0.0024	ρ =	0.0024
		ρ(min)=	**0.0050**		
		ρ(max)=	**0.0232**		

Member	Col Line TL Neg Mom Col Mom Mid Mom	Mid Span TL Pos Mom Strp Mom Mid Mom	Col Line TL Neg Mom Col Mom Mid Mom	Col Line Shear	Col Line Shear	Member	Col Line Col Mom Mid Mom	Mid Span Strp Mom Mid Mom	Col Line Col Mom Mid Mom
M1076	**Z1-7**		**Z1-8**	**Z1-7**	**Z1-8**		**Mu → CAPACITIES**		
Total Load	76.8	88.7	71.9	31.7	32.1	**Ultimate**	**Z1-7**		**Z1-8**
DL	41.1	38.1	37.2	22.0	22.4	**LLu**	26.4	24.1	26.8
DL	13.7	25.4	12.4			**LLu**	8.8	16.1	8.9
LL	16.5	15.1	16.8	9.7	9.7	**TLu**	**75.7**	**69.9**	**71.4**
LL	5.5	10.1	5.6			**TLu**	**17.6**	**46.6**	**23.8**
TL Col	57.6	53.2	53.9	**Capacity →**		**TLu Col**	**169.9**	**87.2**	**169.9**
TL Mid	19.2	35.5	18.0	**Capacity →**		**TLu Mid**	**63.9**	**63.9**	**63.9**

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Member No. ==========▶			M1076			MuDL - Totals		Mu BALANCED CAPACITIES		
Col Line	Z1-7	Col Mom	16.5	X	1.2=	49.3	k-ft	△Col Mom=	94.1	k-ft
		Mid Mom	5.5	X	1.2=	8.8	k-ft	△Mid Mom=	46.3	k-ft
Mid Span		Strp Mom	15.1	X	1.2=	45.7	k-ft	△Strp Mom=	17.3	k-ft
		Mid Mom	10.1	X	1.2=	30.5	k-ft	△Mid Mom=	17.3	k-ft
Col Line	Z1-8	Col Mom	16.8	X	1.2=	44.6	k-ft	△Col Mom=	98.4	k-ft
		Mid Mom	5.6	X	1.2=	14.9	k-ft	△Mid Mom=	40.1	k-ft

General Reinforcement Distribution…Worksheet.

Col Line➔ **Z1-7** | **Col Strip** | **Z1-8** ←Col Line

Reinforcement 1		Reinforcement 3		Reinforcement 5	
As(strip)=	1.86	As(strip)=	1.86	As(strip)=	1.86

Reinforcement 6: As(strip)= 1.55

Reinforcement 2		Reinforcement 4	
As(strip)=	3.10	As(strip)=	3.10
Total Steel		**Total Steel**	
As(strip)=	**6.82**	As(strip)=	**6.82**

Total Steel As(strip)= **3.41**

For Shear Design Check…

MDL=	56.30	k-ft	← From adjacent Span	From adjacent Span →	MDL=	45.23	k-ft
VDL=	28.37	kips			VDL=	18.96	kips
MLL=	22.27	k-ft			MLL=	22.47	k-ft
VLL=	9.71	kips			VLL=	9.80	kips

Col Line➔ **Z1-7** | **Mid Strip** | **Z1-8** ←Col Line

Reinforcement 7		Reinforcement 9		Reinforcement 11	
As(mid)=	1.24	As(mid)=	1.24	As(mid)=	1.24

Reinforcement 12: As(mid)= 1.24

Reinforcement 8		Reinforcement 10	
As(mid)=	0.00	As(mid)=	0.00
Total Steel		**Total Steel**	
As(mid)=	**2.48**	As(mid)=	**2.48**

Total Steel As(mid)= **2.48**

MDL=	50.23	k-ft	← From adjacent Bay →		MDL=	43.90	k-ft
VDL=	28.37	kips			VDL=	18.96	kips
MLL=	21.97	k-ft	← From adjacent Bay →		MLL=	21.97	k-ft
VLL=	9.67	kips			VLL=	9.67	kips
MDL=	47.18	k-ft	← From other adjacent Bay →		MDL=	47.12	k-ft
VDL=	25.15	kips			VDL=	21.01	kips
MLL=	22.03	k-ft	← From other adjacent Bay →		MLL=	22.00	k-ft
VLL=	9.67	kips			VLL=	9.67	kips

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Shear Design Check…Worksheet.

M1u=	2.20	k-ft	**Moments & Shear for Punching Shear Calculations**	M1u=	5.03	k-ft	
M2u=	3.56	k-ft		M2u=	4.03	k-ft	
Vu=	186.60	kips		Vu=	159.70	kips	
Len of Col=	48.00	ins		Len of Col=	48.00	ins	
Column Width →	**Z1-7**		**Span of Member →**	**M1076**	**Z1-8**		**← Column Width**
Width of Col=	48.00	ins		Width of Col=	48.00	ins	
Col Type=	**Interior...**			Col Type=	**Interior...**		
Vc=	385.3	kips		Vc=	385.3	kips	
Ac=	1,986.3	in2		Ac=	1,986.3	in2	
Jc1=	1,072,477	in3		Jc1=	1,072,477	in3	
Jc2=	1,072,477	in3		Jc2=	1,072,477	in3	
vc=	194.00	psi		vc=	194.00	psi	
vu=	95.77	psi		vu=	83.28	psi	

Summary…

Middle Strip

Mu(Cap)=	31.95	k-ft	Mu(Cap)=	31.95	k-ft	Mu(Cap)=	31.95	k-ft
0.125Mu=	12.62	k-ft	0.20Mu=	23.29	k-ft	0.125Mu=	11.91	k-ft
vc=	194.00	psi				vc=	194.00	psi
Mu(Cap)=	169.88		Mu(Cap)=	87.23	k-ft		Mu(Cap)=	169.88
	Z1-7		Column Strip	MEMBER	M1076	Z1-8		
0.75Mu=	75.75		0.6Mu=	69.88	k-ft		0.75Mu=	71.44
vu=	95.77	psi				vu=	83.28	psi
Moments →	k-ft					Moments →	k-ft	
Mu(Cap)=	31.95	k-ft	Mu(Cap)=	31.95	k-ft	Mu(Cap)=	31.95	k-ft
0.125Mu=	12.62	k-ft	0.20Mu=	23.29	k-ft	0.125Mu=	11.91	k-ft

Middle Strip