4717 NE Gateway Dr

Apex Engineers, Inc.
1600 Baltimore Ave, Suite 102
Kansas City, MO 64108
Ph. 816.421.3222
Fax 816.421.1050
www.apex-engineers.com

Project Title:
Engineer:
Project Descr:

Project ID:

Lot 56 Monticello

Printed: 15 FEB 2016, 3:22PM

Concrete Beam

File = G:\Projects\D & D Building\2016 Ridgestone Meadows - 20916 W 86th St\beam calcs\beam calcs.ec6
ENERCALC, INC. 1983-2016, Build:6.16.2.3, Ver:6.16.2.3

Lic. # : KW-06005244 — Licensee : APEX ENGINEERS INC

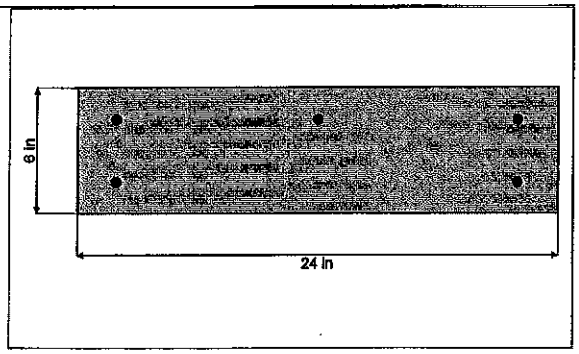
Description : Suspended Slab

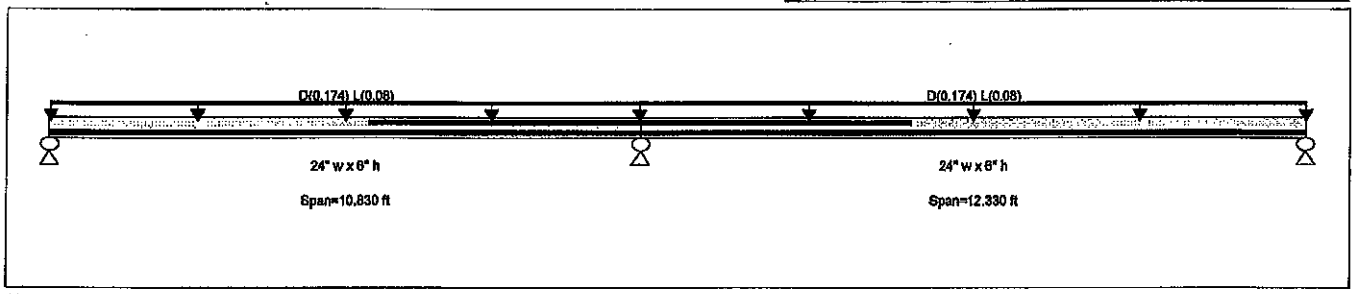
CODE REFERENCES

Calculations per ACI 318-11, IBC 2012, ASCE 7-10
Load Combination Set : ASCE7-10

Material Properties

f'c	= 3.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c^1/2 * 7.50	= 410.792 psi		Shear :	0.750
ψ Density	= 145.0 pcf	β 1	=	0.850
λ LtWt Factor	= 1.0			
Elastic Modulus	= 3,122.0 ksi	Fy - Stirrups		40.0 ksi
fy - Main Rebar	= 40.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	= 29,000.0 ksi	Stirrup Bar Size #		3
		Number of Resisting Legs Per Stirrup =		2





Cross Section & Reinforcing Details

Rectangular Section, Width = 24.0 in, Height = 6.0 in

Span #1 Reinforcing....
2-#4 at 1.50 in from Bottom, from 0.0 to 10.830 ft in this span
3-#4 at 1.50 in from Top, from 5.830 to 10.830 ft in this span

Span #2 Reinforcing....
2-#4 at 1.50 in from Bottom, from 0.0 to 12.330 ft in this span
3-#4 at 1.50 in from Top, from 0.0 to 5.0 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Load for Span Number 1
Uniform Load : D = 0.0870, L = 0.040 ksf, Tributary Width = 2.0 ft

Load for Span Number 2
Uniform Load : D = 0.0870, L = 0.040 ksf, Tributary Width = 2.0 ft

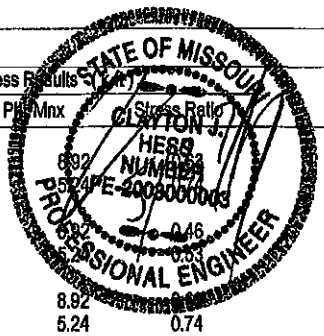
DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.736 : 1	Maximum Deflection		
Section used for this span	Typical Section	Max Downward Transient Deflection	0.015 in	Ratio = 10097
Mu : Applied	3.861 k-ft	Max Upward Transient Deflection	0.000 in	Ratio = 0<360
Mn * Phi : Allowable	5.243 k-ft	Max Downward Total Deflection	0.047 in	Ratio = 3180
Location of maximum on span	7.549 ft	Max Upward Total Deflection	0.000 in	Ratio = 999<600
Span # where maximum occurs	Span # 2			

Maximum Forces & Stresses for Load Combinations

Load Combination		Location (ft)	Bending Stress Results (k-ft)	
Segment Length	Span #	in Span	Mu : Max	Phi*Mnx
MAXimum BENDING Envelope				
Span # 1	1	10.830	-5.61	8.92
Span # 2	2	12.330	3.86	5.24
+1.40D+1.60H				
Span # 1	1	10.830	-4.06	8.92
Span # 2	2	12.330	2.79	5.24
+1.20D+0.50Lr+1.60L+1.60H				
Span # 1	1	10.830	-5.61	8.92
Span # 2	2	12.330	3.86	5.24
+1.20D+1.60L+0.50S+1.60H				



Apex Engineers, Inc.
1600 Baltimore Ave, Suite 102
Kansas City, MO 64108
Ph. 816.421.3222
Fax 816.421.1050
www.apex-engineers.com

Project Title:
Engineer:
Project Descr:

Project ID:

LOT 56 MONTICELLO

Printed: 15 FEB 2016, 3:23PM

Steel Beam

File = G:\Projects\D & D Building\Lot 56 Ridgestone Meadows - 20916 W 86th St\beam calcs\beam calcs.ec6
ENERCALC, INC. 1983-2016, Build:6.16.2.3, Ver:6.16.2.3

Lic. # : KW-06005244
Licensee : APEX ENGINEERS INC

Description : --None--

CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE7-10

Material Properties

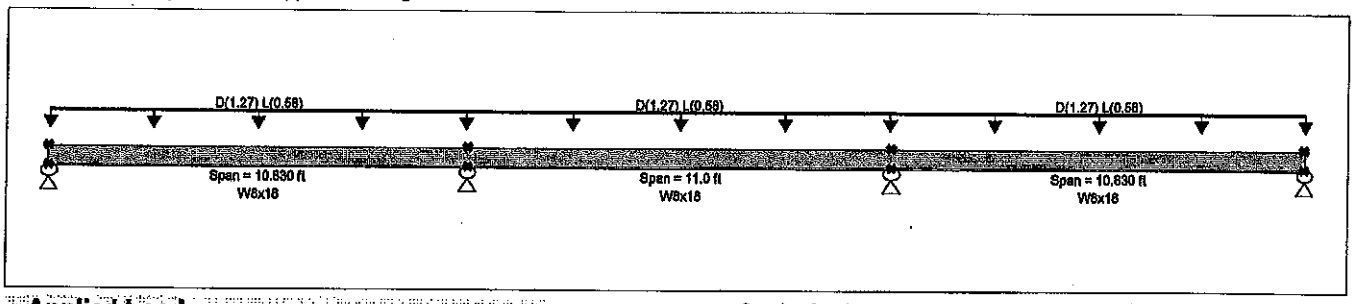
Analysis Method : Allowable Strength Design
Beam Bracing : Beam bracing is defined as a set spacing over all spans
Bending Axis : Major Axis Bending

Fy : Steel Yield : 36.0 ksi
E: Modulus : 29,000.0 ksi

Unbraced Lengths

Note : User has selected to conside

First Brace starts at ft from Left-Most support
Regular spacing of lateral supports on length of beam = ft



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Load for Span Number 1
Uniform Load : D = 1.270, L = 0.580 k/ft, Tributary Width = 1.0 ft
Load for Span Number 2
Uniform Load : D = 1.270, L = 0.580 k/ft, Tributary Width = 1.0 ft
Load for Span Number 3
Uniform Load : D = 1.270, L = 0.580 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.160 : 1	Maximum Shear Stress Ratio =	0.091 : 1
Section used for this span	W8x18	Section used for this span	W8x18
Ma : Applied	4.880 k-ft	Va : Applied	2.440 k
Mn / Omega : Allowable	30.539 k-ft	Vn/Omega : Allowable	26.960 k
Load Combination	+D+L+H	Load Combination	+D+L+H
Location of maximum on span	4.000ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.010 in	Ratio =	9,796
Max Upward Transient Deflection	0.000 in	Ratio =	0 <600
Max Downward Total Deflection	0.031 in	Ratio =	3051
Max Upward Total Deflection	0.000 in	Ratio =	0 <600

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values						Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
	1	0.0000	0.000		0.0000	0.000
	2	0.0000	0.000		0.0000	0.000
	3	0.0000	0.000		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4

STATE OF MISSOURI
CRAYTON J. HESS
NUMBER
PE-2003000003
PROFESSIONAL ENGINEER

Apex Engineers, Inc.
1600 Baltimore Ave, Suite 102
Kansas City, MO 64108
Ph. 816.421.3222
Fax 816.421.1050
www.apex-engineers.com

Project Title:
Engineer:
Project Descr:

Project ID:

LOT 56 MONTICELLO

Printed: 16 FEB 2016, 3:23PM

Steel Beam

File = G:\Projects\D & D Building\Lot 56 Ridgestone Meadows - 20916 W 86th St\beam calcs\beam calcs.ec6
ENERCALC, INC. 1983-2016, Build:6.16.2.3, Ver:6.16.2.3

Lic. # : KW-06005244
Licensee : APEX ENGINEERS INC

Description : --None--

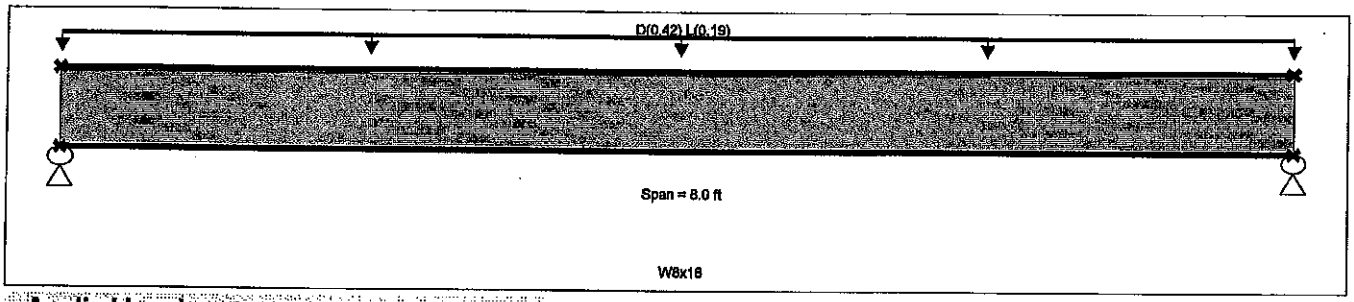
CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, ASCE 7-10
Load Combination Set : ASCE7-10

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 36.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.420, L = 0.190 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

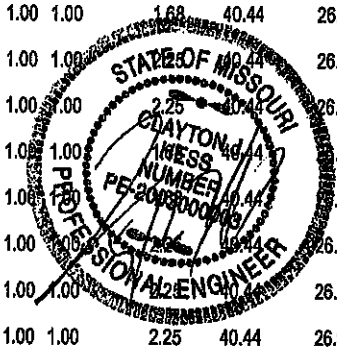
Maximum Bending Stress Ratio =	0.160 : 1	Maximum Shear Stress Ratio =	0.091 : 1
Section used for this span	W8x18	Section used for this span	W8x18
Ma : Applied	4.880 k-ft	Va : Applied	2.440 k
Mn / Omega : Allowable	30.539 k-ft	Vn/Omega : Allowable	26.960 k
Load Combination	+D+L+H	Load Combination	+D+L+H
Location of maximum on span	4.000ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

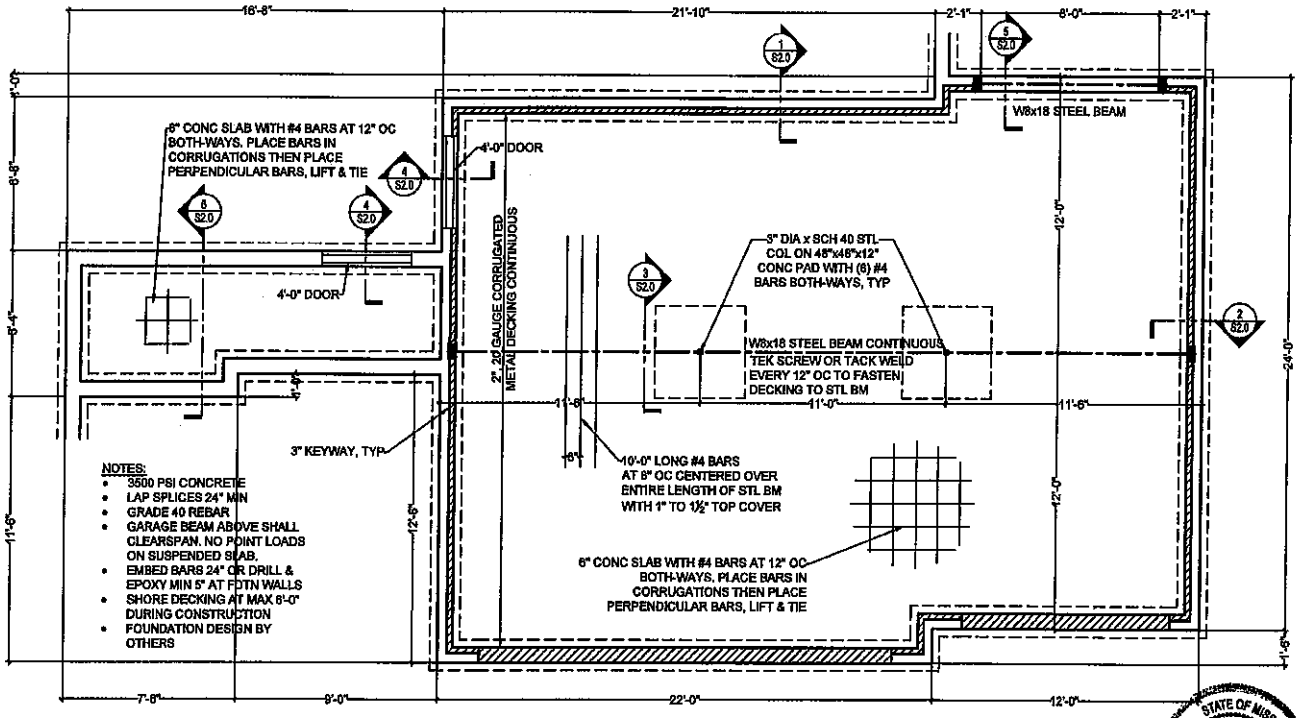
Maximum Deflection

Max Downward Transient Deflection	0.010 in	Ratio =	9,796
Max Upward Transient Deflection	0.000 in	Ratio =	0 <600
Max Downward Total Deflection	0.031 in	Ratio =	3051
Max Upward Total Deflection	0.000 in	Ratio =	0 <600

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 8.00 ft	1	0.110	0.062	3.36		3.36	51.00	30.54	1.00	1.00	1.68	40.44	26.96
+D+L+H													
Dsgn. L = 8.00 ft	1	0.160	0.091	4.88		4.88	51.00	30.54	1.00	1.00	2.44	40.44	26.96
+D+Lr+H													
Dsgn. L = 8.00 ft	1	0.110	0.062	3.36		3.36	51.00	30.54	1.00	1.00	1.68	40.44	26.96
+D+S+H													
Dsgn. L = 8.00 ft	1	0.110	0.062	3.36		3.36	51.00	30.54	1.00	1.00	1.68	40.44	26.96
+D+0.750Lr+0.750L+H													
Dsgn. L = 8.00 ft	1	0.147	0.083	4.50		4.50	51.00	30.54	1.00	1.00	2.25	40.44	26.96
+D+0.750L+0.750S+H													
Dsgn. L = 8.00 ft	1	0.147	0.083	4.50		4.50	51.00	30.54	1.00	1.00	2.25	40.44	26.96
+D+0.60W+H													
Dsgn. L = 8.00 ft	1	0.110	0.062	3.36		3.36	51.00	30.54	1.00	1.00	1.68	40.44	26.96
+D+0.70E+H													
Dsgn. L = 8.00 ft	1	0.110	0.062	3.36		3.36	51.00	30.54	1.00	1.00	1.68	40.44	26.96
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 8.00 ft	1	0.147	0.083	4.50		4.50	51.00	30.54	1.00	1.00	2.25	40.44	26.96
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 8.00 ft	1	0.147	0.083	4.50		4.50	51.00	30.54	1.00	1.00	2.25	40.44	26.96
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 8.00 ft	1	0.147	0.083	4.50		4.50	51.00	30.54	1.00	1.00	2.25	40.44	26.96
+0.60D+0.60W+0.60H													
Dsgn. L = 8.00 ft	1	0.066	0.037	2.02		2.02	51.00	30.54	1.00	1.00	1.01	40.44	26.96
+0.60D+0.70E+0.60H													





NOTES:
- 3500 PSI CONCRETE
- LAP SPLICES 24" MIN
- GRADE 40 REBAR
- GARAGE BEAM ABOVE SHALL CLEARSPAN. NO POINT LOADS ON SUSPENDED SLAB.
- EMBED BARS 24" OR DRILL & EPOXY MIN 5" AT FDTN WALLS
- SHORE DECKING AT MAX 6'-0" DURING CONSTRUCTION
- FOUNDATION DESIGN BY OTHERS

1 / S1.0 SUSPENDED STOOP/GARAGE SLAB
SCALE 1/4" = 1'-0"

STATE OF MISSOURI
CLAYTON J. HESS
NUMBER PE-2003000003
PROFESSIONAL ENGINEER

APEX ENGINEERS
1800 SALTIMORE AVE, SUITE 102
KANSAS CITY, MO 64108
Ph: 816.421.3222
Fax: 816.421.1050
www.apex-engineers.com

STRUCTURAL DESIGN REVIEW
KANSAS ENGINEERING LICENSE: 992
MISSOURI ENGINEERING LICENSE: 2003004673

PROJECT:
4717 NE GATEWAY DR
LOT 56 MONTICELLO
LEE'S SUMMIT, MO

CLIENT:
D & D BUILDING
PO BOX 7014
LEE'S SUMMIT, MO

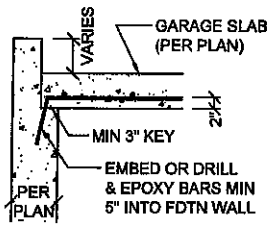
PROJECT #

DRAWING NAME

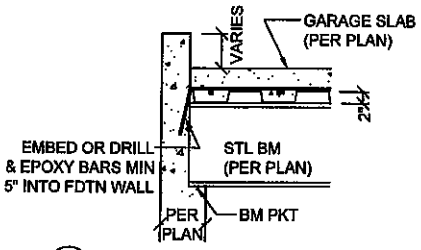
DATE:	COMMENTS:
---	---

DRAWN BY: APEX
CHECKED BY: ---

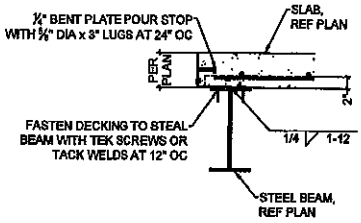
SHEET #
S1.0



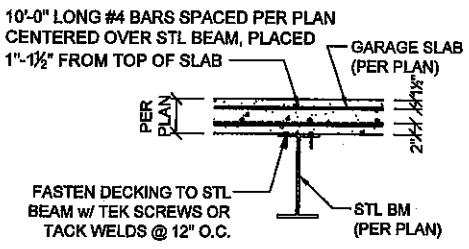
1 S2.0 GARAGE SLAB BEARING
SCALE 3/4" = 1'-0"



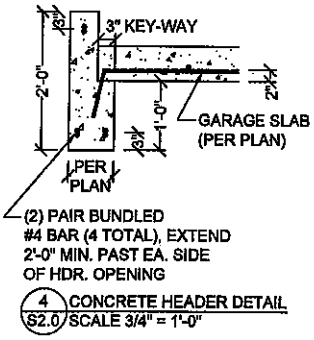
2 S2.0 GARAGE SLAB BEAM BEARING
SCALE 3/4" = 1'-0"



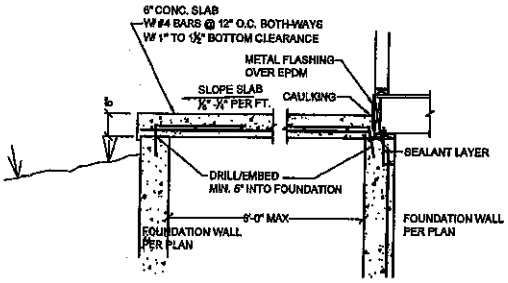
5 S2.0 GARAGE SLAB BEARING
SCALE 3/4" = 1'-0"



3 S2.0 GARAGE SLAB BEAM BEARING
SCALE ¾" = 1'-0"



4 S2.0 CONCRETE HEADER DETAIL
SCALE 3/4" = 1'-0"



FORMWORK OPTIONS:
1) PROVIDE VULCRAFT 2VLI (OR EQUAL CORRUGATED DECKING (SHORE AT MID-SPAN DURING CONSTRUCTION), or
2) PLYWOOD FORMS WITH EXPANDABLE BAR JOISTS OR TEMPORARY FRAMED WALLS BY CONTRACTOR

6 S2.0 SUSPENDED PORCH STOOP
SCALE1/2" = 1'-0"

STEEL DECKING NOTES:
- MINIMUM 1½" BEARING
- FASTEN TO SUPPORT STEEL W/ ⅝" VISIBLE PUDDLE WELDS @ EDGE RIBS & 12" CTRS. ALONG END BEARING
- FASTEN SIDE LAPS & PERIMETER EDGES @ 36" CTRS. W/ #10 TEK SCREWS OR ⅝" PUDDLE WELDS
- MAX UNSUPPORTED CONSTRUCTION SPAN 6'-0"

APEX ENGINEERS
1500 BALTIMORE AVE, SUITE 102
KANSAS CITY, MO 64108
Ph: 816.421.3222
Fax: 816.421.1000
www.apex-engineers.com

STRUCTURAL DESIGN REVIEW
KANSAS ENGINEERING LICENSE: 002
MISSOURI ENGINEERING LICENSE: 2008004679

PROJECT: 4717 NE GATEWAY DR
LOT 56 MONTICELLO
LEE'S SUMMIT, MO
CLIENT: D & D BUILDING
PO BOX 7014
LEE'S SUMMIT, MO

PROJECT #
—
DRAWING NAME
—

DATE:	COMMENTS:
—	—

DRAWN BY: APEX
CHECKED BY: —

STATE OF MISSOURI
CLAYTON J. HEER
NUMBER PE-2009020005
PROFESSIONAL ENGINEER

SHEET #
S2.0