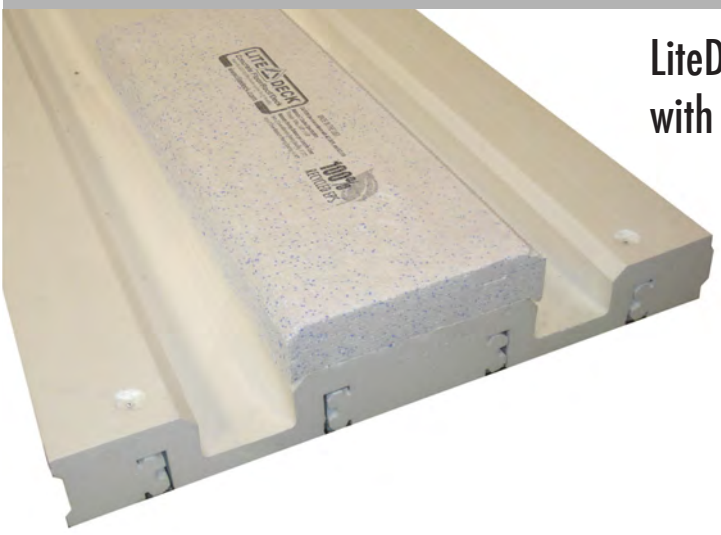
LiteDeck®

Insulated Concrete Floors, Roofs, Decks and Walls

100%
RECYCLED EPS

Technical Evaluation Manual

November, 2013



LiteDeck Top Hats are now manufactured with 100% Recycled EPS

LiteForm continues to establish new ways to conserve energy while saving the environment. Technological innovations in EPS manufacturing techniques allow for production of 100% recycled eps. This 100% recycled eps is used to produce high-efficiency LiteDeck Top Hats while maintaining structural integrity. LiteForm continues to focus on efficiencies for transportation and applications at the jobsite while striving to produce products that are also good for the environment! Learn more about "Lite-Green" innovative concrete building systems at www.liteform.com.

TABLE OF CONTENTS

FORWARD and INTRODUCTION

The Technical Evaluation data contained herein is provided for general information only. It is not to be construed as engineering advice on a particular project and does not replace the engineering judgment, interpretation or conclusions of the Engineer Of Record on a particular project.

Tests and Reports

The tests provided herein were conducted by independent firms and facilities and are warranted to have been done in full compliance with the codes referenced for each test. Further related statements have been secured from information published by the firms, organizations or associations which are referenced herein.

Local Building Codes

The LiteDeck concrete forming system is sold throughout several building code jurisdictions. Construction codes may be subject to various interpretations and periodic changes. LiteForm Technologies does not warrant that the information contained herein complies with any specific local code or building regulation. The engineer, designer or installer must insure that all applications of LiteDeck forms are in compliance with the appropriate local codes and regulations in the jurisdiction and for which the specific applications are being used.

Errors and/or Omissions

The information contained herein could include technical or typographical errors, omissions or other inaccuracies. LiteForm Technologies reserves the right to make changes, corrections and/or improvements without notice. LiteForm Technologies assumes no liability for the accuracy or completeness of the information contained herein. Further, LiteForm Technologies, its' representatives or distributors disclaim any and all liability for damages incurred directly or indirectly as a result of such errors, omissions or inaccuracies.

Liability

LiteForm Technologies, its' representatives or distributors shall not be held liable for any direct, indirect, incidental or consequential damages as a result of the interpretation and subsequent application of any information contained herein.

Description of LiteDeck System

Description of the LiteDeck System

LiteDeck Floor/Roof System – Stay-in-Place EPS formwork
for Concrete Construction

General: The LiteDeck System consists of interlocking rigid polystyrene foam plastic panels with inserted steel or wood stiffeners, and is a permanent formwork for reinforced concrete joists and slab. The system is an ICF (Insulated Concrete Form) panel for floors and roofs to be used in residential and commercial applications.

1.1 Materials

Base Sections: This profile consists of a wire-cut expanded polystyrene (EPS) foam-plastic panel with provision for load-bearing, concrete structural joists. The sides of the panels have an interlocking configuration. Cut-outs for the metal C-channel stiffeners are made on the bottom face of the base sections. The stiffener cut-outs are spaced 12 inches on center. The panels can be either 24 inches or 48 inches wide by lengths as needed.
See Detail Drawings in Section 3

The foam billets used to fabricate the base sections are molded from modified, expandable polystyrene beads that comply with Type 8 EPS classification in accordance with the latest ASTM C578 requirements. The foam plastic has a nominal density of 1.25 lbs. pcf and has a maximum flame-spread rating of 25 and maximum smoke-density rating of 450 when tested in accordance with ASTM E84 in a thickness of 4 inches.

Top Hats: This EPS profile comes molded with 100% recycled EPS. During installation, it is attached to the top of the base sections in order to increase the depth of the load-bearing concrete joist. The top hats come in thicknesses of 2, 4 and 6-inches by 4 foot lengths. The foam plastic has a nominal density of 1.25 lbs. pcf. EPS has a maximum flame-spread rating of 25 and a maximum smoke-density rating of 450 when tested in accordance with ASTM E84 in a thickness of 4 inches. See Detail Drawings Section 3; LD 2.3

Steel C-channel: The channels are formed from 18 gauge (0.0516") Type G90, galvanized steel in compliance with ASTM A653, Chemically Treated, Dry or lightly oiled. The nominal dimensions of the channels are 1 1/2" flange by 3 1/2" web with 3/8" thick return lip. The channels are inserted into the channel cutouts on the bottom face of the base sections. To maintain the base sections in place, 3 inch self-tapping screws with plastic insulation washers are fastened through the top face of the base section and into the stiffener.
See LiteDeck Detail Drawing Section 3; LD 2.1

LiteDeck WRS: LiteDeck WRS or Wood Rib System is developed for use with dimensional lumber in place of what traditionally was a steel rib. LiteDeck WRS has cut outs that will accept 2x6 dimensional lumber. See the specs in the Drawings section of this manual 6.0 for dimensions and details.

1.2 Floor/Roof Formwork Installation

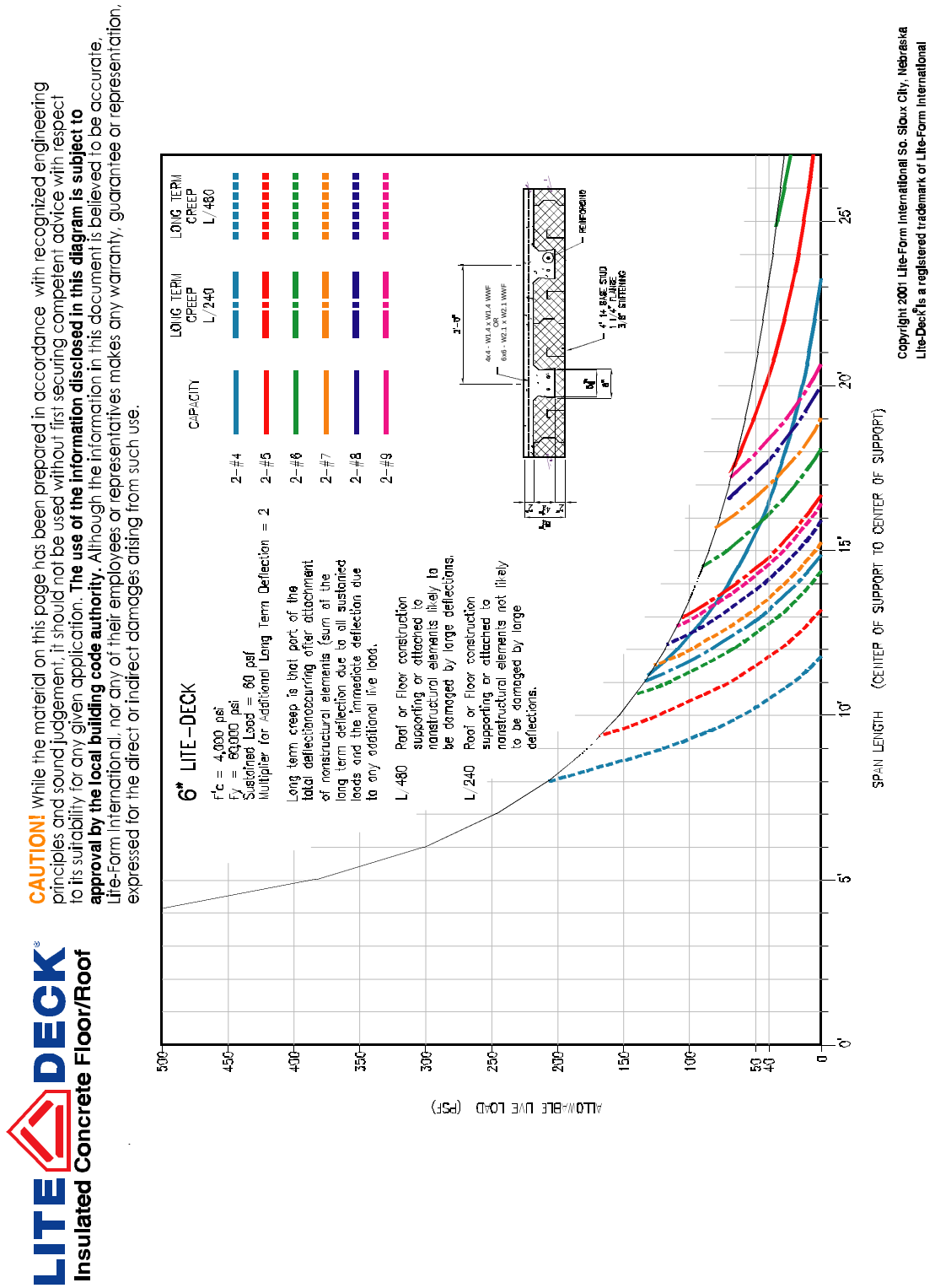
Base Sections are installed over temporary shoring. Top hats are then installed on top of base sections as required by code or design. Reinforcing steel is then installed in the joist and in the top slab. Concrete is then placed on the LiteDeck formwork. Once the concrete reaches the required strength, the temporary shoring is removed from under the LiteDeck form. See Installation Manual in Section 4; Marketing Materials

1.3 Structural Engineering

Structural engineering for all projects using LiteDeck formwork shall have the concrete joist engineered for the clear span and loads to be placed on the completed concrete joist. The design shall be in compliance with applicable building code. If the building code does not address concrete joists, the latest edition of (American Concrete Institute) ACI 318 shall be used to design the joist. Any variance from applicable building code or ACI code must be certified in advance by a Structural Engineer who is licensed for the jobsite location and specifications.
See Section 3; Detail Drawings

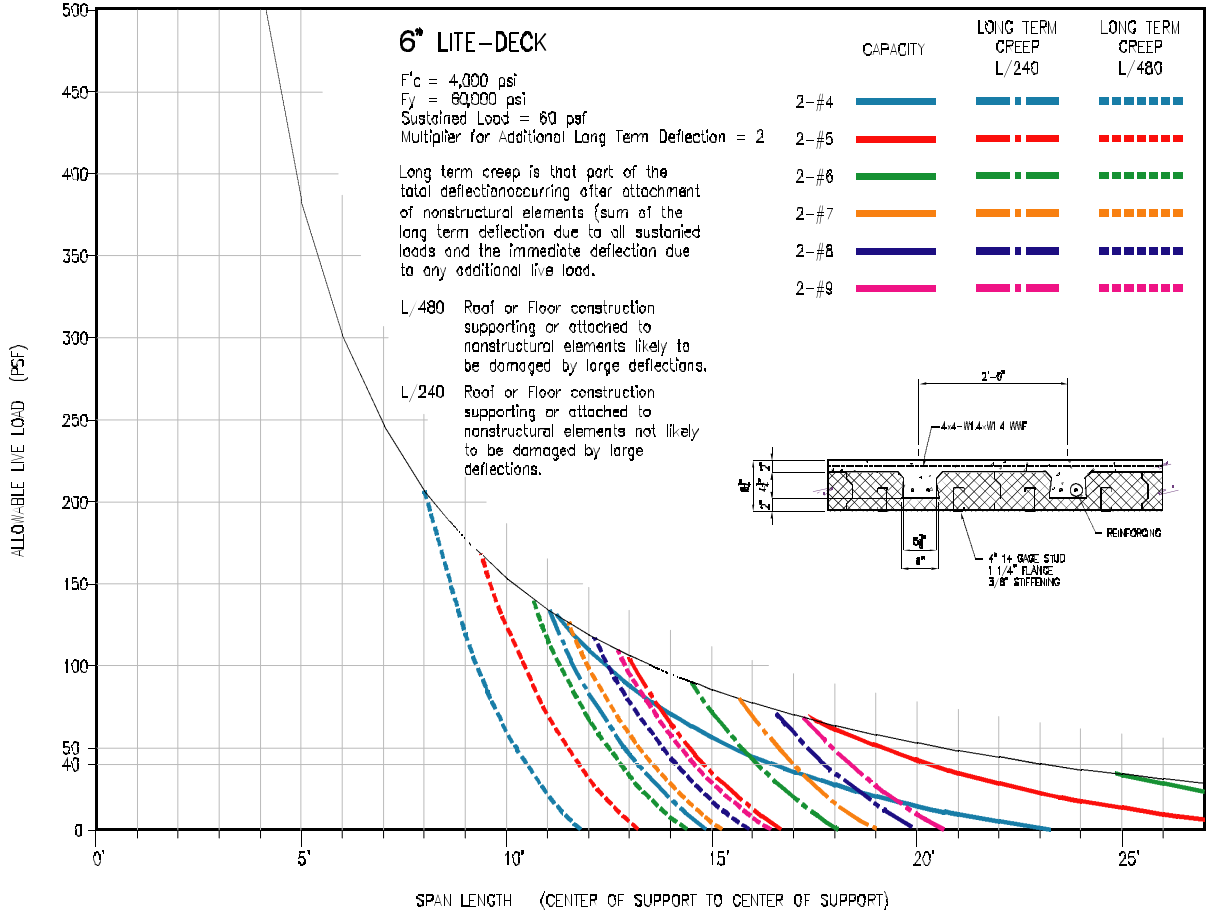
1.4 Span Tables (Autocad and PDF Files of these drawings are located on the enclosed CD)

LiteDeck span tables should not be used without first securing competent advice with respect to its suitablility for any given application. The use of the informatnion disclosed in this diagram is subject to approval by the local building code authority. Although the information in this document is believed to be accurate, LiteForm Technologies, nor any of their employees or representatives makes any warranty, guarantee or representation, expressed for the direct or indirect damages arising from such use.



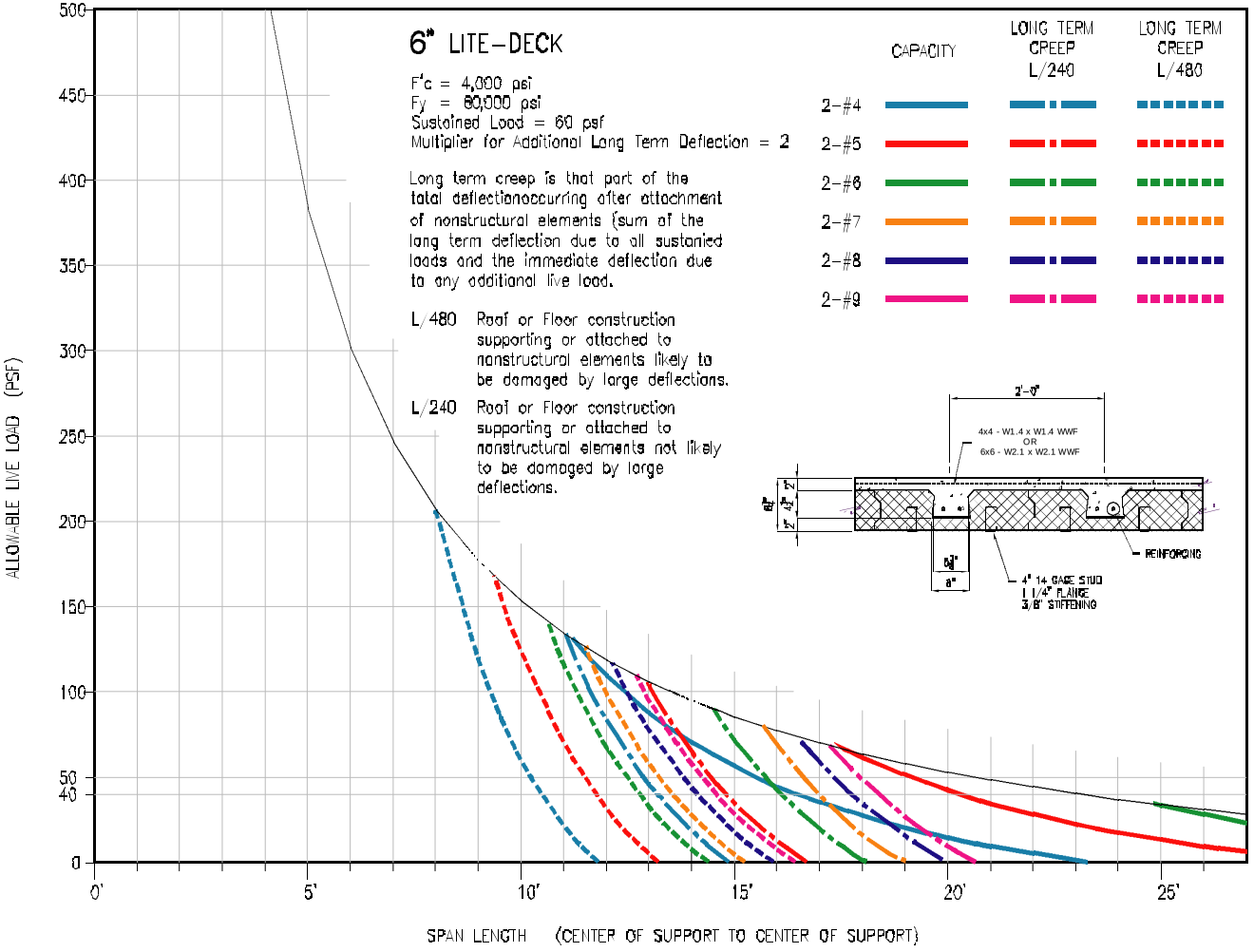
LITE DECK®
Insulated Concrete Floor/Roof

CAUTION! While the material on this page has been prepared in accordance with recognized engineering principles and sound judgement, it should not be used without first securing competent advice with respect to its suitability for any given application. **The use of the information disclosed in this diagram is subject to approval by the local building code authority.** Although the information in this document is believed to be accurate, Lite-Form International, nor any of their employees or representatives makes any warranty, guarantee or representation, expressed for the direct or indirect damages arising from such use.



LITE DECK®
Insulated Concrete Floor/Roof

CAUTION! While the material on this page has been prepared in accordance with recognized engineering principles and sound judgement, it should not be used without first securing competent advice with respect to its suitability for any given application. **The use of the information disclosed in this diagram is subject to approval by the local building code authority.** Although the information in this document is believed to be accurate, Lite-Form International, nor any of their employees or representatives makes any warranty, guarantee or representation, expressed for the direct or indirect damages arising from such use.



LITE-DECK™ Concrete Deck/Floor

System 6+2

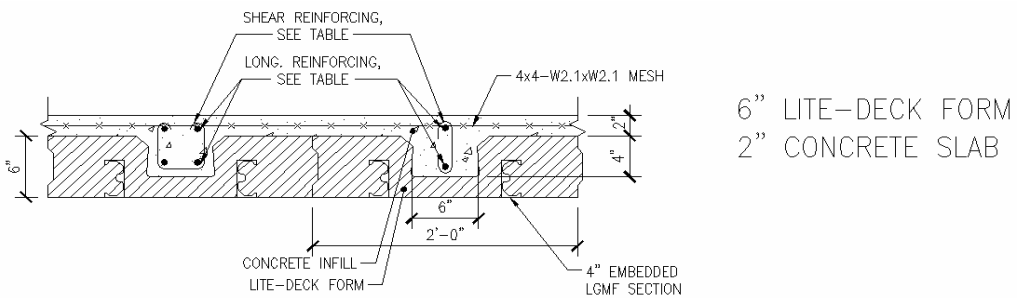
Tabulated spans between 8' and 17'

Material Parameters

Concrete Strength = 3000 psi

Reinforcement Strength = 60 ksi

Normal Weight Concrete = 145 lbs/ft^3



			Minimum Reinforcing Steel Required For Given Span									
	Superimposed		2' to 8'	9'	10'	11'	12'	13'	14'	15'	16'	17'
Span Condition	Live Load (PSF)	Dead Load	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.
1 & 2 Span	40	10	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #6
3+ Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5
1 & 2 Span	80	15	1 - #4	1 - #5	1 - #5	1 - #6	2 - #5	2 - #5	2 - #6	-	-	-
3+ Span	80	15	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #6	-
1 & 2 Span	100	15	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #6	-	-	-	-
3+ Span	100	15	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #6	-	-

Design Table Notes:

1. Design tables are for cost estimating purposes only. Final beam reinforcing to be designed by a licensed design professional in responsible charge.
2. For 1 span condition, longitudinal reinforcing steel only required in bottom of beam.
3. For 2 and 3+ span conditions, longitudinal reinforcing required in both top and bottom of beam.
4. Shaded cells in table reflect need for shear reinforcing in beam. Shear reinforcing to be designed by a licensed design professional in responsible charge.
5. For 2 and 3+ span conditions, center long. reinforcing in bottom of beam at midspan and in top beam at support.
6. Provide 3/4" minimum concrete cover to all reinforcing steel for interior exposure. Refer to the latest ACI318 for minimum clearance for other exposures.
7. Multiple span reinforcing is valid for same length spans only.

LITE-DECK™ Concrete Deck/Floor

System 6+4

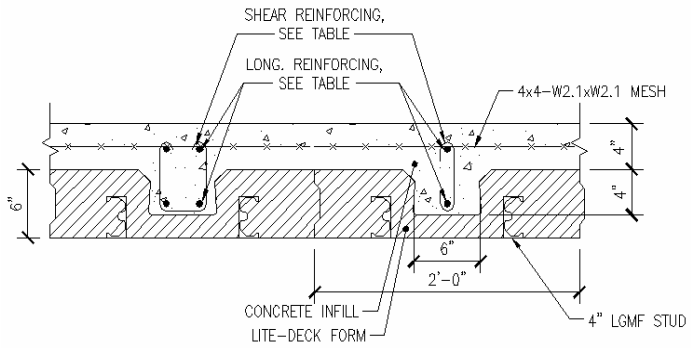
Tabulated spans between 8' and 21'

Material Parameters

Concrete Strength = 3000 psi

Reinforcement Strength = 60 ksi

Normal Weight Concrete = 145 lbs/ft^3



6" LITE–DECK FORM
4" CONCRETE SLAB

			Minimum Reinforcing Steel Required For Given Span													
	Superimposed		2' to 8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'
Span Condition	Live Load (PSF)	Dead Load	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.
1 & 2 Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6
3+ Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5
1 & 2 Span	80	15	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	2 - #7	-	-
3+ Span	80	15	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	2 - #7
1 & 2 Span	100	15	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #6	2 - #6	2 - #7	2 - #7	-	-	-
3+ Span	100	15	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #6	2 - #6	2 - #7	2 - #7	-

Design Table Notes:

1. Design tables are for cost estimating purposes only. Final beam reinforcing to be designed by a licensed design professional in responsible charge.
2. For 1 span condition, longitudinal reinforcing steel only required in bottom of beam.
3. For 2 and 3+ span conditions, longitudinal reinforcing required in both top and bottom of beam.
4. Shaded cells in table reflect need for shear reinforcing in beam. Shear reinforcing to be designed by a licensed design professional in responsible charge.
5. For 2 and 3+ span conditions, center long. reinforcing in bottom of beam at midspan and in top beam at support.
6. Provide 3/4" minimum concrete cover to all reinforcing steel for interior exposure. Refer to the latest ACI318 for minimum clearance for other exposures.
7. Multiple span reinforcing is valid for same length spans only.

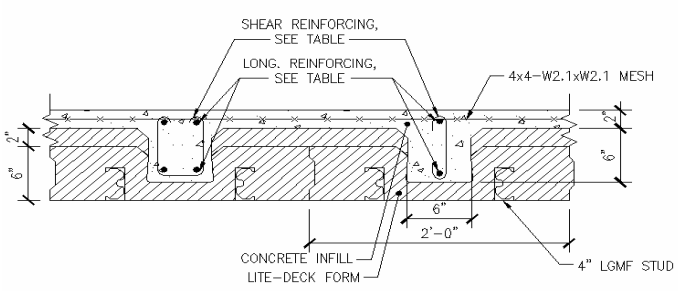
LITE-DECK™ Concrete Deck/Floor

System 8+2

Tabulated spans between 8' and 19'

Material Parameters

Concrete Strength = 3000 psi
Reinforcement Strength = 60 ksi
Normal Weight Concrete = 145 lbs/ft^3



8" LITE–DECK FORM
2" CONCRETE SLAB

			Minimum Reinforcing Steel Required For Given Span											
	Superimposed		2' to 8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'
Span Condition	Live Load (PSF)	Dead Load	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.
1 & 2 Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5
3+ Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6
1 & 2 Span	80	15	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #6	2 - #6	-
3+ Span	80	15	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #6
1 & 2 Span	100	15	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #6	2 - #6	-	-
3+ Span	100	15	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #6	2 - #6

Design Table Notes:

1. Design tables are for cost estimating purposes only. Final beam reinforcing to be designed by a licensed design professional in responsible charge.
2. For 1 span condition, longitudinal reinforcing steel only required in bottom of beam.
3. For 2 and 3+ span conditions, longitudinal reinforcing required in both top and bottom of beam.
4. Shaded cells in table reflect need for shear reinforcing in beam. Shear reinforcing to be designed by a licensed design professional in responsible charge.
5. For 2 and 3+ span conditions, center long. reinforcing in bottom of beam at midspan and in top beam at support.
6. Provide 3/4" minimum concrete cover to all reinforcing steel for interior exposure. Refer to the latest ACI318 for minimum clearance for other exposures.
7. Multiple span reinforcing is valid for same length spans only.

LITE-DECK™ Concrete Deck/Floor

System 8+4

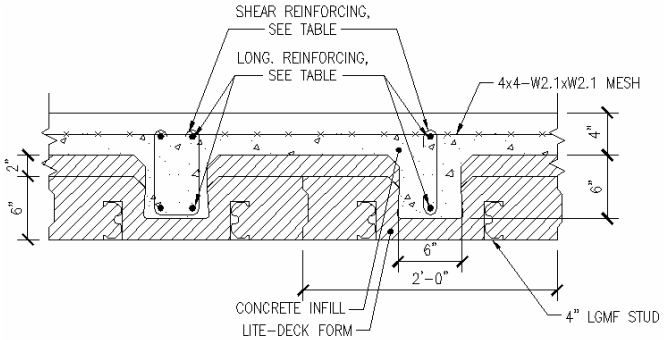
Tabulated spans between 8' and 23'

Material Parameters

Concrete Strength = 3000 psi

Reinforcement Strength = 60 ksi

Normal Weight Concrete = 145 lbs/ft^3



8" LITE–DECK FORM
4" CONCRETE SLAB

			Minimum Reinforcing Steel Required For Given Span															
	Superimposed		2' to 8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'
Span Condition	Live Load (PSF)	Dead Load	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.
1 & 2 Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6
3+ Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5
1 & 2 Span	80	15	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	2 - #7	2 - #7
3+ Span	80	15	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6
1 & 2 Span	100	15	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #7	2 - #7	2 - #7	-
3+ Span	100	15	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	2 - #7

Design Table Notes:

1. Design tables are for cost estimating purposes only. Final beam reinforcing to be designed by a licensed design professional in responsible charge.
2. For 1 span condition, longitudinal reinforcing steel only required in bottom of beam.
3. For 2 and 3+ span conditions, longitudinal reinforcing required in both top and bottom of beam.
4. Shaded cells in table reflect need for shear reinforcing in beam. Shear reinforcing to be designed by a licensed design professional in responsible charge.
5. For 2 and 3+ span conditions, center long. reinforcing in bottom of beam at midspan and in top beam at support.
6. Provide 3/4" minimum concrete cover to all reinforcing steel for interior exposure. Refer to the latest ACI318 for minimum clearance for other exposures.
7. Multiple span reinforcing is valid for same length spans only.

LITE-DECK™ Concrete Deck/Floor

System 10+2

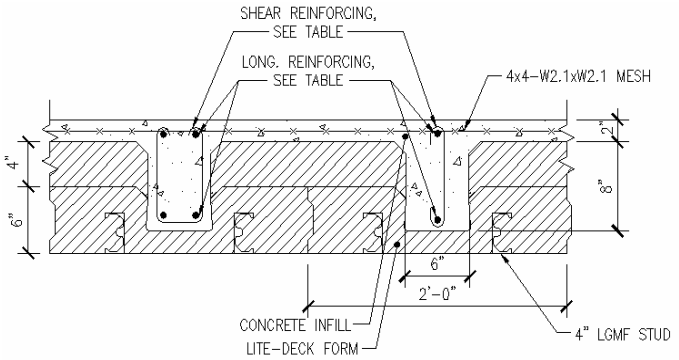
Tabulated spans between 8' and 21'

Material Parameters

Concrete Strength = 3000 psi

Reinforcement Strength = 60 ksi

Normal Weight Concrete = 145 lbs/ft^3



10" LITE–DECK FORM
2" CONCRETE SLAB

			Minimum Reinforcing Steel Required For Given Span													
	Superimposed		2' to 8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'
Span Condition	Live Load (PSF)	Dead Load	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.
1 & 2 Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5
3+ Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6
1 & 2 Span	80	15	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6
3+ Span	80	15	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5
1 & 2 Span	100	15	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	-
3+ Span	100	15	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6

Design Table Notes:

1. Design tables are for cost estimating purposes only. Final beam reinforcing to be designed by a licensed design professional in responsible charge.
2. For 1 span condition, longitudinal reinforcing steel only required in bottom of beam.
3. For 2 and 3+ span conditions, longitudinal reinforcing required in both top and bottom of beam.
4. Shaded cells in table reflect need for shear reinforcing in beam. Shear reinforcing to be designed by a licensed design professional in responsible charge.
5. For 2 and 3+ span conditions, center long. reinforcing in bottom of beam at midspan and in top beam at support.
6. Provide 3/4" minimum concrete cover to all reinforcing steel for interior exposure. Refer to the latest ACI318 for minimum clearance for other exposures.
7. Multiple span reinforcing is valid for same length spans only.

LITE-DECK™ Concrete Deck/Floor

System 10+4

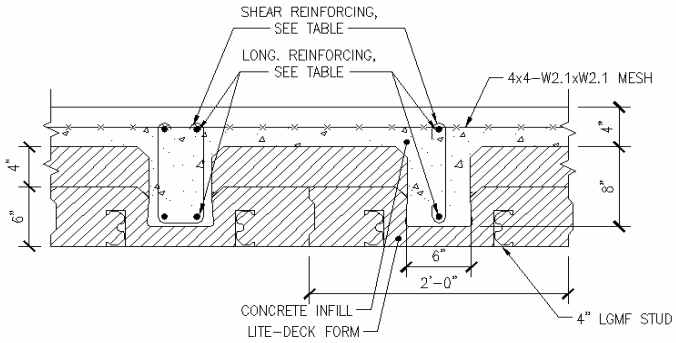
Tabulated spans between 9' and 25'

Material Parameters

Concrete Strength = 3000 psi

Reinforcement Strength = 60 ksi

Normal Weight Concrete = 145 lbs/ft^3



10" LITE–DECK FORM
4" CONCRETE SLAB

			Minimum Reinforcing Steel Required For Given Span																
	Superimposed		2' to 9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'
Span Condition	Live Load (PSF)	Dead Load	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.
1 & 2 Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #5	2 - #6
3+ Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5
1 & 2 Span	80	15	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	2 - #7	2 - #7
3+ Span	80	15	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6
1 & 2 Span	100	15	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	2 - #7	2 - #7	-
3+ Span	100	15	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	2 - #7

Design Table Notes:

1. Design tables are for cost estimating purposes only. Final beam reinforcing to be designed by a licensed design professional in responsible charge.
2. For 1 span condition, longitudinal reinforcing steel only required in bottom of beam.
3. For 2 and 3+ span conditions, longitudinal reinforcing required in both top and bottom of beam.
4. Shaded cells in table reflect need for shear reinforcing in beam. Shear reinforcing to be designed by a licensed design professional in responsible charge.
5. For 2 and 3+ span conditions, center long. reinforcing in bottom of beam at midspan and in top beam at support.
6. Provide 3/4" minimum concrete cover to all reinforcing steel for interior exposure. Refer to the latest ACI318 for minimum clearance for other exposures.
7. Multiple span reinforcing is valid for same length spans only.

LITE-DECK™ Concrete Deck/Floor

System 12+2

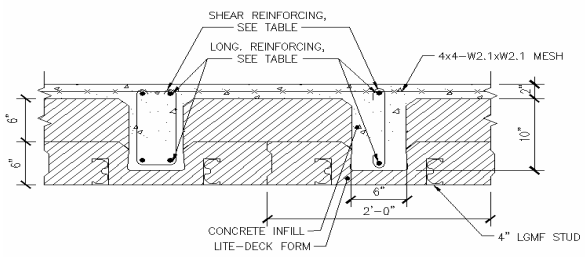
Tabulated spans between 10' and 26'

Material Parameters

Concrete Strength = 3000 psi

Reinforcement Strength = 60 ksi

Normal Weight Concrete = 145 lbs/ft^3



12" LITE–DECK FORM
2" CONCRETE SLAB

			Minimum Reinforcing Steel Required For Given Span																	
	Superimposed		2' to 8'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'	26'
Span Condition	Live Load (PSF)	Dead Load	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.
1 & 2 Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6
3+ Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5
1 & 2 Span	80	15	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	-	-
3+ Span	80	15	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6
1 & 2 Span	100	15	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	-	-	-
3+ Span	100	15	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	2 - #6

Design Table Notes:

1. Design tables are for cost estimating purposes only. Final beam reinforcing to be designed by a licensed design professional in responsible charge.
2. For 1 span condition, longitudinal reinforcing steel only required in bottom of beam.
3. For 2 and 3+ span conditions, longitudinal reinforcing required in both top and bottom of beam.
4. Shaded cells in table reflect need for shear reinforcing in beam. Shear reinforcing to be designed by a licensed design professional in responsible charge.
5. For 2 and 3+ span conditions, center long. reinforcing in bottom of beam at midspan and in top beam at support.
6. Provide 3/4" minimum concrete cover to all reinforcing steel for interior exposure. Refer to the latest ACI318 for minimum clearance for other exposures.
7. Multiple span reinforcing is valid for same length spans only.

LITE-DECK™ Concrete Deck/Floor

System 12+4

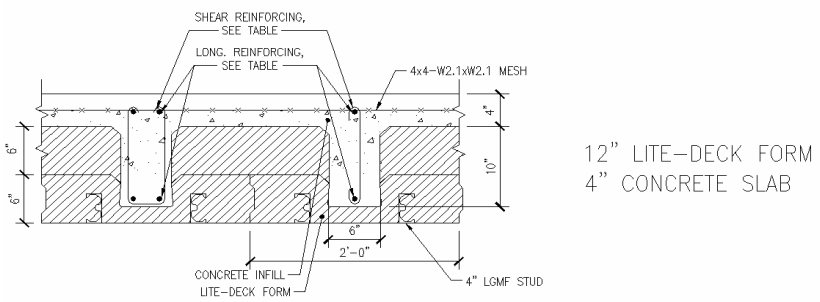
Tabulated spans between 11' and 30'

Material Parameters

Concrete Strength = 3000 psi

Reinforcement Strength = 60 ksi

Normal Weight Concrete = 145 lbs/ft^3



			Minimum Reinforcing Steel Required For Given Span																		
	Superimposed		2' to 11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'	26'	27'	28'	29'	30'
Span Condition	Live Load (PSF)	Dead Load	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.	Long. Reinf.
1 & 2 Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	2 - #6	2 - #6
3+ Span	40	10	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6
1 & 2 Span	80	15	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	2 - #7	2 - #7	2 - #7	2 - #7	-
3+ Span	80	15	1 - #4	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	2 - #6	2 - #7	2 - #7
1 & 2 Span	100	15	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	2 - #6	2 - #7	2 - #7	2 - #7	-	-	-
3+ Span	100	15	1 - #4	1 - #4	1 - #4	1 - #5	1 - #5	1 - #5	1 - #6	1 - #6	1 - #6	1 - #6	2 - #5	2 - #5	2 - #5	2 - #6	2 - #6	2 - #6	2 - #6	2 - #7	2 - #7	2 - #7

Design Table Notes:

1. Design tables are for cost estimating purposes only. Final beam reinforcing to be designed by a licensed design professional in responsible charge.
2. For 1 span condition, longitudinal reinforcing steel only required in bottom of beam.
3. For 2 and 3+ span conditions, longitudinal reinforcing required in both top and bottom of beam.
4. Shaded cells in table reflect need for shear reinforcing in beam. Shear reinforcing to be designed by a licensed design professional in responsible charge.
5. For 2 and 3+ span conditions, center long. reinforcing in bottom of beam at midspan and in top beam at support.
6. Provide 3/4" minimum concrete cover to all reinforcing steel for interior exposure. Refer to the latest ACI318 for minimum clearance for other exposures.
7. Multiple span reinforcing is valid for same length spans only.

1.5 Reinforcing of Concrete

Placement and specifications of all reinforcing steel shall be designed in compliance with the latest editions of ACI 318 and CRSI (Concrete Reinforcing Steel Institute) standards. Any variance from ACI or CRSI standards must be certified in advance by a Structural Engineer who is licensed for the jobsite location and specifications.

1.6 Concrete Placement

Placement of concrete shall be in compliance with latest edition of ACI-614 Code (Handling) and ACI-301 and 306 Codes for cold and hot weather concrete placement. Any variance from ACI standards must be certified in advance by a Structural Engineer who is licensed for the jobsite location and specifications.

1.7 Temporary Shoring (Complete Test Results are available on the attached LiteDeck CD)

All LiteDeck formwork shoring shall be designed in compliance with the latest edition of ACI347R "Guide to Formwork for Concrete" (design chapter) using Load Table 1 as minimum requirements. Loads in Table 1 have a 2 to 1 safety factor included. Distance between support beams under LiteDeck steel stiffener shall be determined by capacity of vertical shores and spacing between vertical shores. The maximum spacing between vertical shores shall be based on ASTM E72-05 Transverse Load Test, submitted as part of this Technical Evaluation.
See Transverse Load Test: RADCO Test Report No. RAD-3860

1.8 Concentrated Loads (Complete Test Results are available on the attached LiteDeck CD)

Maximum loads applied by foot traffic (from construction crews) to the LiteDeck formwork shall be based on ASTM E661-03 Concentrated load Test, submitted as part of this Technical Evaluation. As required by ASTM standard, concentrated loads were placed on the "most vulnerable' portion of the LiteDeck form.
See Concentrated Load Test
RADCO Test Report No. RAD-3861

1.9 Maximum Ceiling Load / Steel Stud Load Capacity
(Complete Test Results are available on the attached LiteDeck CD)

The maximum ceiling load attached to steel C-channels inserted into the base sections shall be based on Steel Channel Withdrawal Test, submitted as part of this Technical Evaluation.
See Ceiling Load Test (Channel Withdrawal)
RADCO Test Report No. RAD-3862

1.10 Fire Resistance Rating (Complete Test Results are available on the attached LiteDeck CD)

LiteDeck formwork has a 1.5 hour fire resistance rating based on the test results which were made in compliance with ASTM E 119-00. See Fire Resistance Rating Test (ASTM E 119-00) SwRI – Test Project No. 01.11579.01.001

1.11 Fire Performance Evaluation with Drywall
(Complete Test Results are available on the attached LiteDeck CD)

Foam plastic insulation used in the LiteDeck formwork system has an average thickness which is in excess of 4 inches. Foam plastic insulation covered with 1/2 inch drywall is in compliance with UBC Standard 26-3, based on Fire Performance Test, submitted as part of this Technical Evaluation.
See Fire Performance Test (UBC 26-3)
SwRI – Test Project No. 01.10934.01.418a

1.12 Fire Performance Evaluation without Drywall

(Complete Test Results are available on the attached LiteDeck CD)

Foam Plastic insulation used in the LiteDeck formwork system has an average thickness which is in excess of 4 inches. Foam plastic insulation without 1/2 inch drywall covering is in compliance with UBC Standard 26-3, based on Fire Performance Test, submitted as part of this Technical Evaluation. See Fire Performance Test (UBC 26-3)
SwRI – Test Project No. 01.10934.01.418b

1.13 STC -Sound Transmission Class (Full Test located on enclosed CD)

A concrete floor's ability to reduce the transmission of outside, ambient sound is rated by a Sound Transmission Class number. The higher the number, the better the barrier to ambient sound pollution.

LiteDeck Floor with 3-inch Concrete Cover and 14-inch load-bearing Concrete Joist
STC by Test – 57
STC by Calculation – 54 – With ½" Drywall attached direct to LiteDeck stiffeners
STC by Calculation – 67 – With ½" Drywall attached with Resilient Clips

LiteDeck Floor with 3-inch Concrete Cover, 14-inch load-bearing Concrete Joist, 1/2 " Carpet w/Pad
STC by Test – 48
STC by Calculation – 52 – With ½" Drywall attached direct to LiteDeck stiffeners
STC by Calculation – 56 – With ½" Drywall attached with Resilient Clips

1.14 IIC – R-Value (Full Test located on enclosed CD)

The insulating value of LiteDeck forms is achieved by its' use of EPS (Expanded Polystyrene) Insulation.
By test (C177 or C518), the insulating value of the EPS used in LiteDeck Base Sections is R-4.40 (@ 25-degrees f) per inch of thickness*.
Based on the above-referenced tests, the calculated, nominal insulating value of LiteDeck Base Sections is R-26.4.

1.15 IIC – Impact Insulation Class (Full Test located on enclosed CD)

A concrete floor's ability to reduce the transmission of sound is rated by an Impact Insulation Class number. This rating quantifies the transmission of "impact sounds" such as foot traffic. The higher the number, the better the barrier to impact sounds.

LiteDeck Floor with 3-inch Concrete Cover and 14-inch load-bearing Concrete Joist
IIC by Test – 44
IIC by Calculation – 48 – With ½" Drywall attached direct to LiteDeck stiffeners
IIC by Calculation – 61 – With ½" Drywall attached with Resilient Clips

LiteDeck Floor with 3-inch Concrete Cover, 14-inch load-bearing Concrete Joist, 1/2 " Carpet w/Pad
IIC by Test – 82
IIC by Calculation – 86 – With ½" Drywall attached direct to LiteDeck stiffeners
IIC by Calculation – 90 – With ½" Drywall attached with Resilient Clips

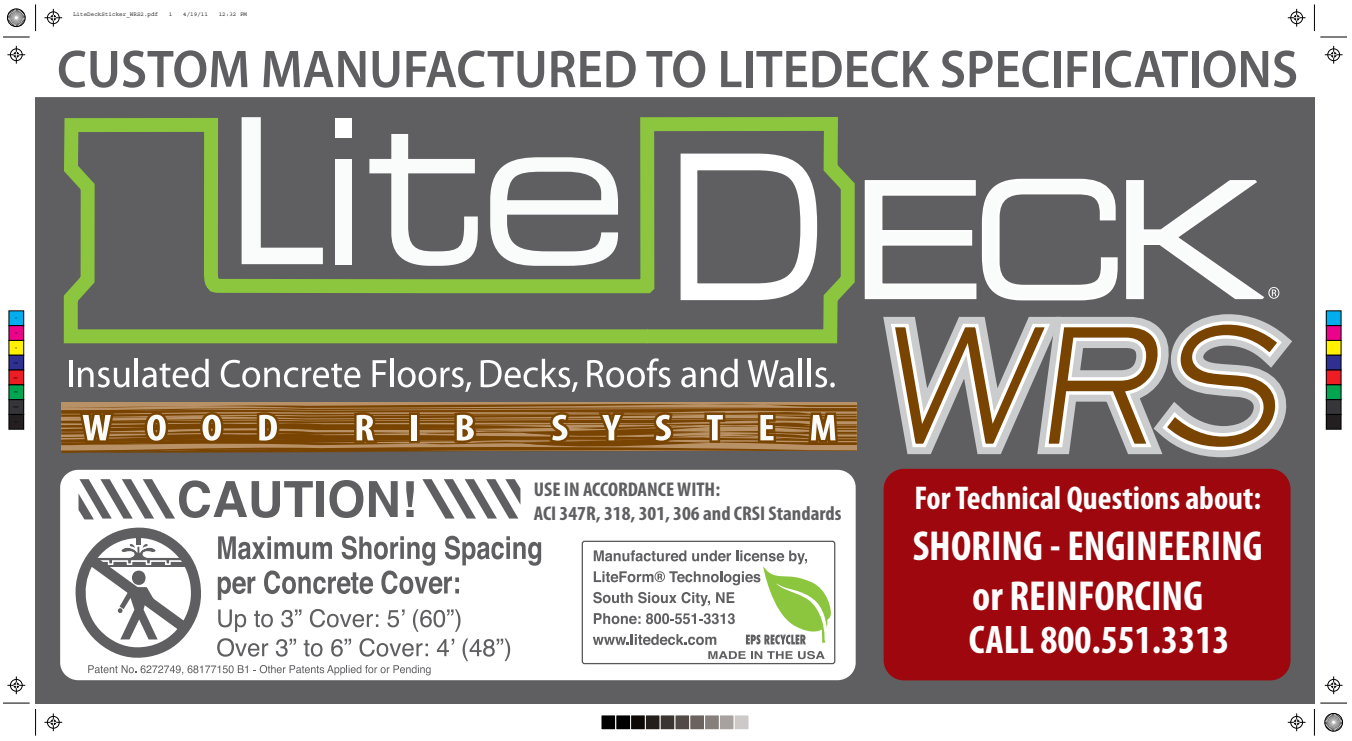
1.16 Patents

1.17 LiteDeck Imprints

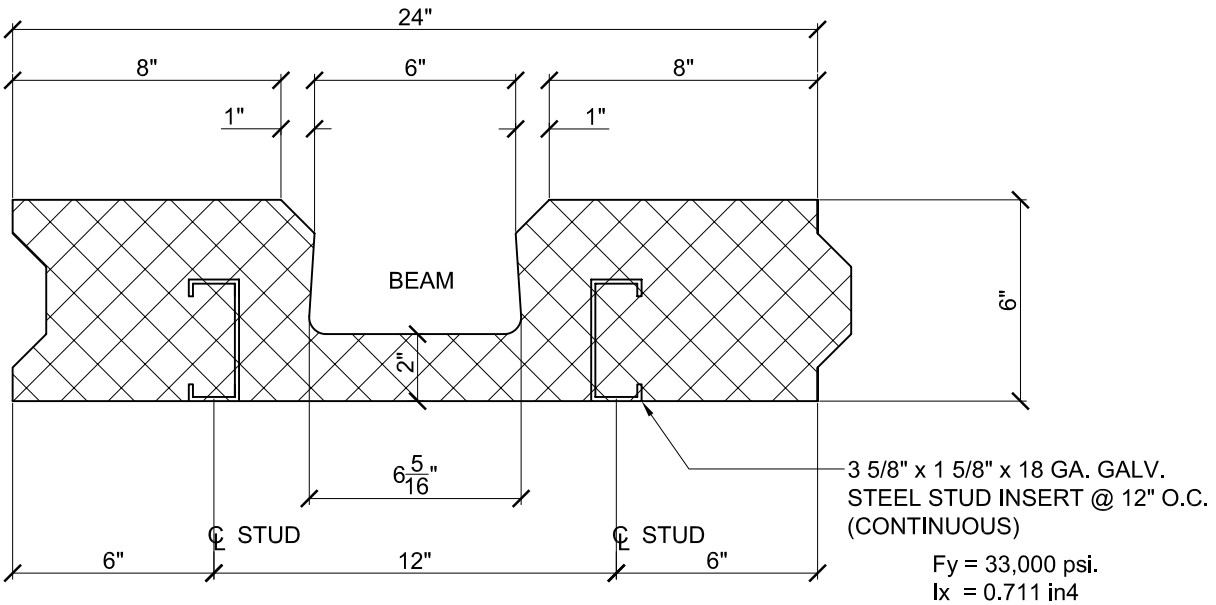
These imprints are printed on all LiteDeck products that leave the South Sioux City, NE. manufacturing facility.

BASE SECTION IMPRINT SRS (Steel Rib System)

BASE SECTION IMPRINT WRS (Wood Rib System)



Detail Drawings



24" WIDE BASE SECTION

EPS Foam Density = 1.25 pcf

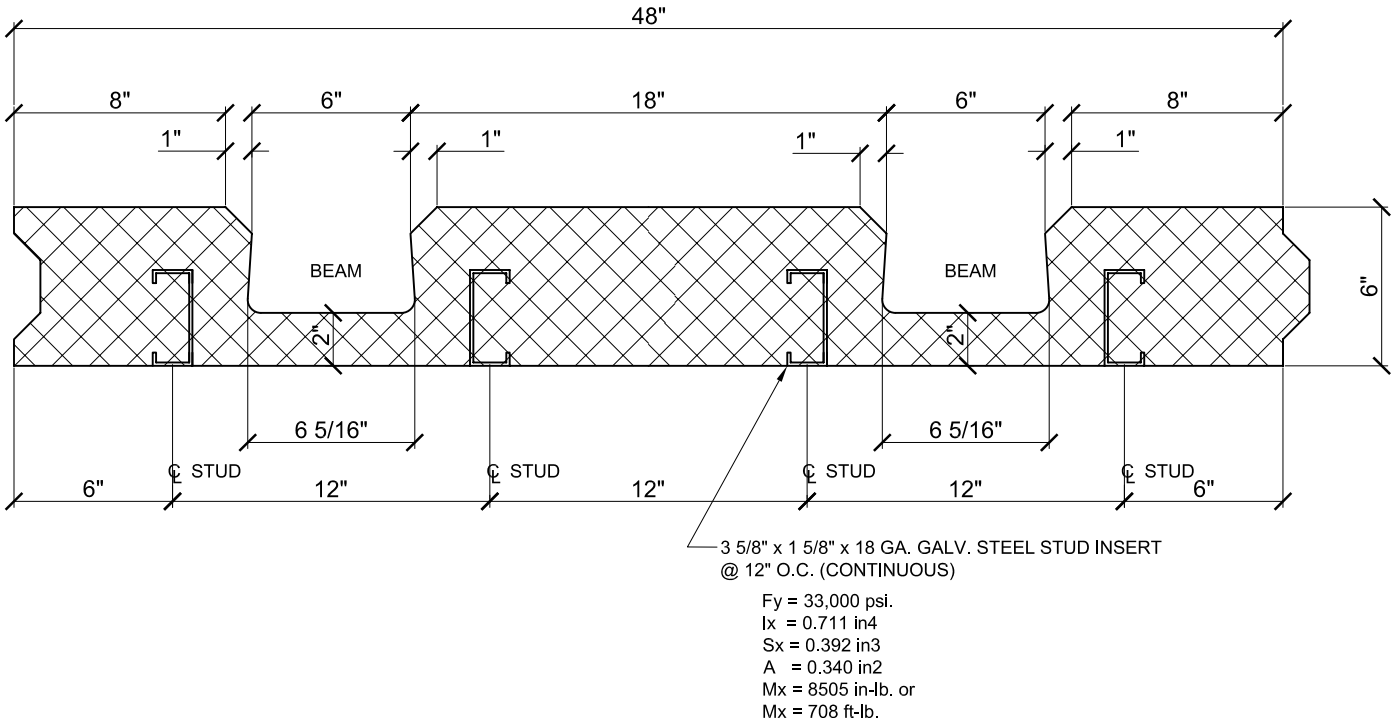
Weight = 4.10 pounds per lineal foot or 2.05 psf

Lite-Deck®

Lite-Form Technologies
1950 West 29th Street
South Sioux City, NE. 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

24" WIDE BASE SECTION DIMENSIONS

DRAWN BY: LFT	REVISION DATE:
DATE: 09/23/08	SCALE: Not to Scale
DETAIL NO:	**LD-2.1**



48" WIDE BASE SECTION

EPS Foam Density = 1.25 pcf

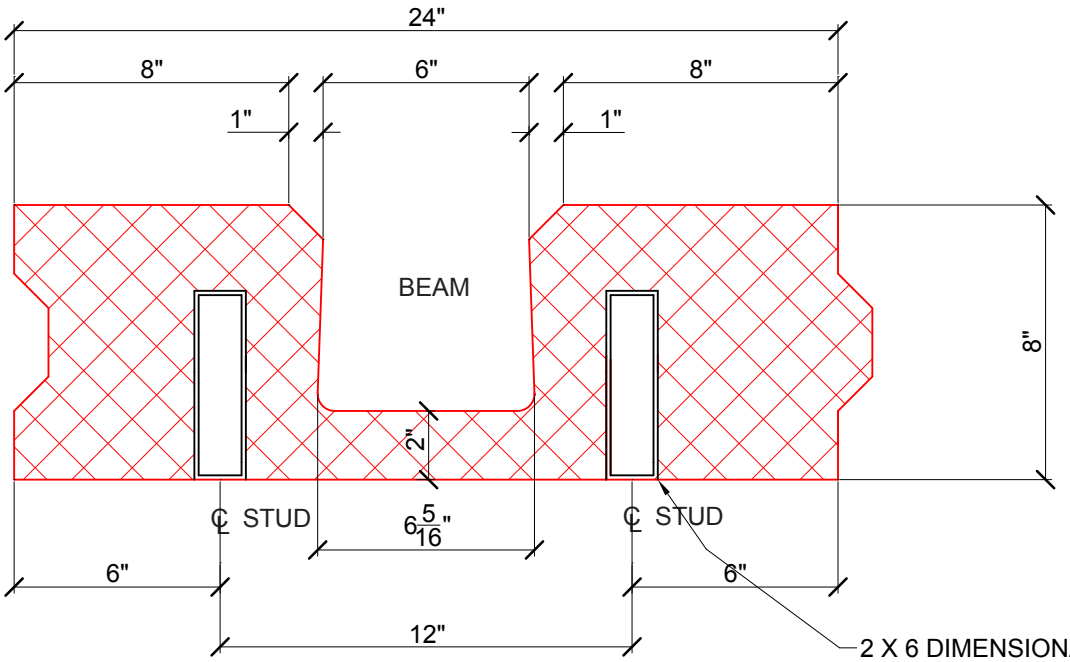
Weight = 8.25 pounds per lineal foot or 2.06 psf

Lite-Deck®

Lite-Form Technologies
1950 West 29th Street
South Sioux City, NE. 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

48" WIDE BASE SECTION DIMENSIONS

DRAWN BY: LFT	REVISION DATE:
DATE: 09/23/08	SCALE: Not to Scale
DETAIL NO:	**LD-2.2**



24" WRS BASE SECTION

EPS Foam Density = 1.25 pcf

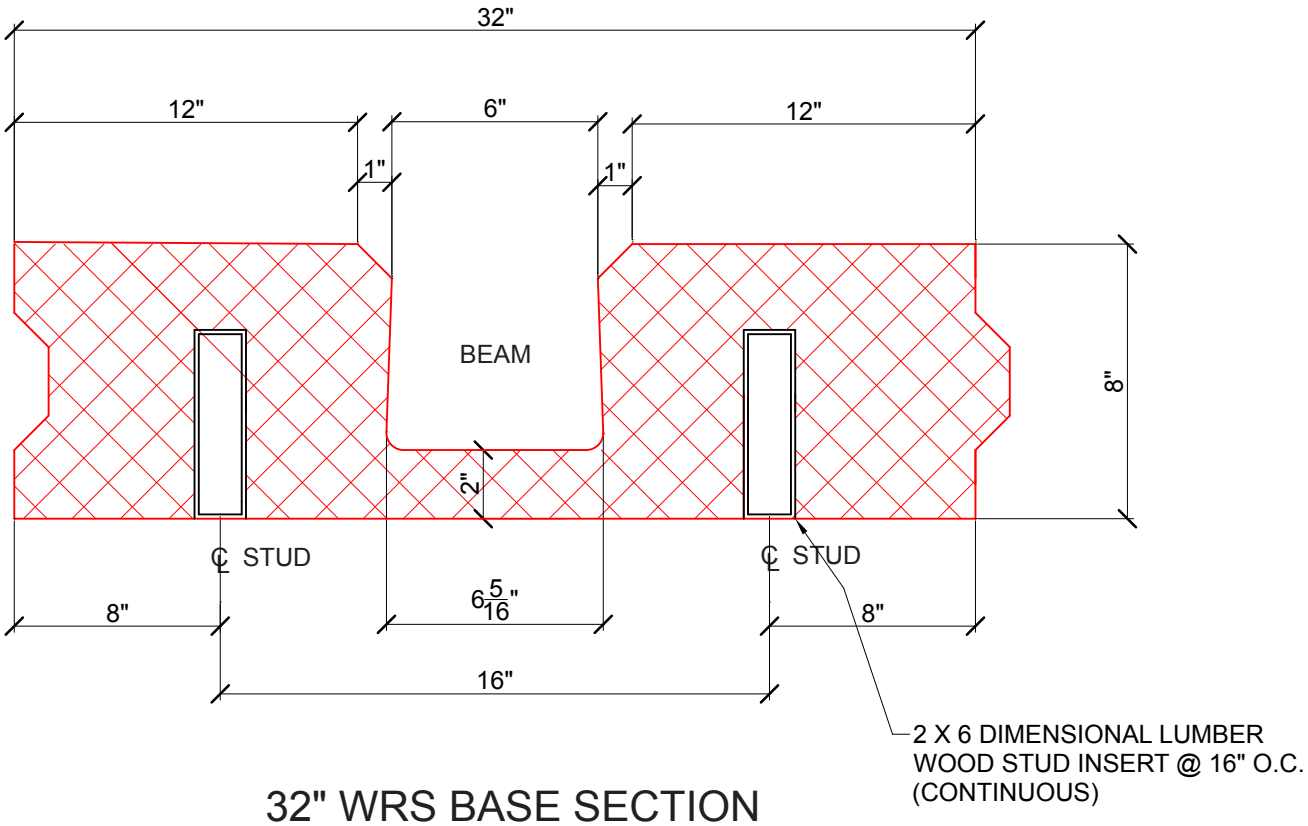
Weight = 4.10 pounds per lineal foot or 2.05 psf

LiteDeck®

Lite-Form Technologies
1950 West 29th Street
South Sioux City, NE. 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

24" WRS BASE SECTION DIMENSIONS

DRAWN BY: LFT	REVISION DATE:
DATE: 03/15/13	SCALE: Not to Scale
DETAIL NO:	**LD-2.1W**



32" WRS BASE SECTION

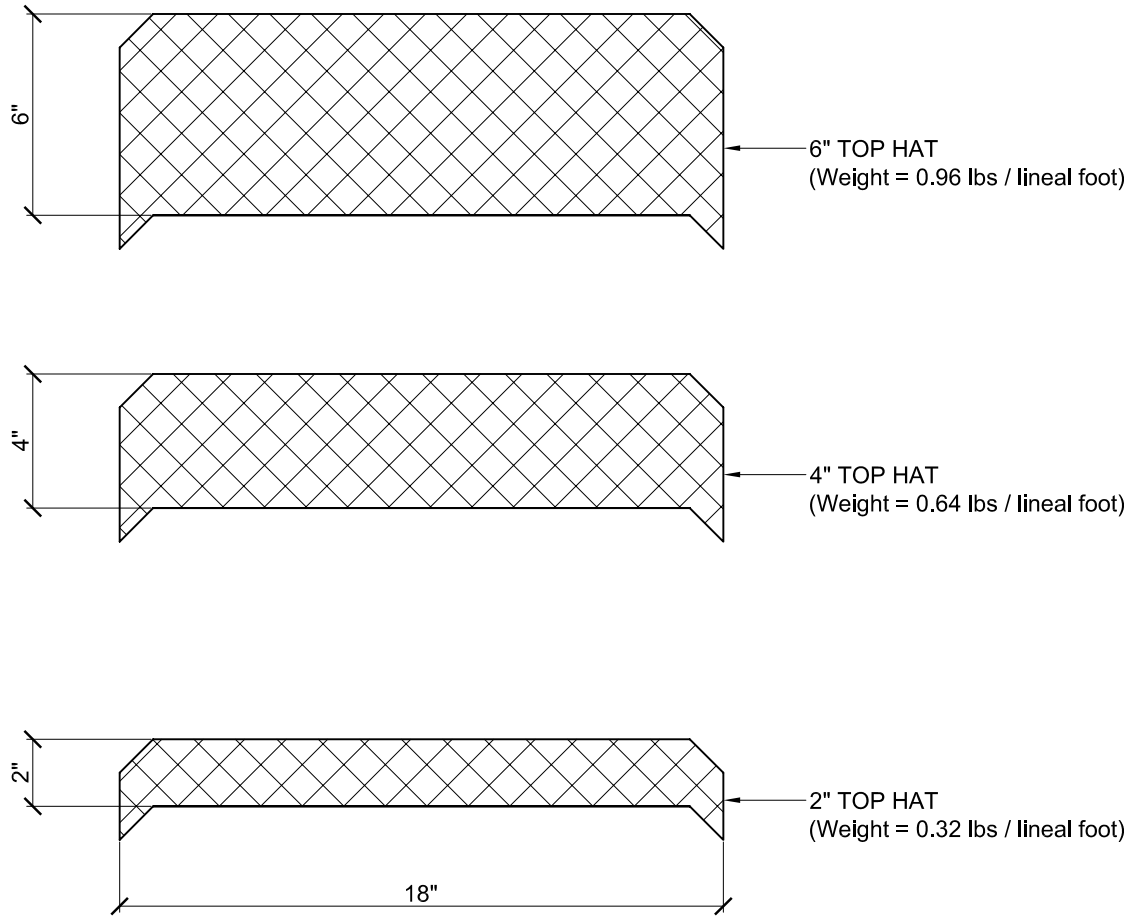
EPS Foam Density = 1.25 pcf

LiteDeck®

Lite-Form Technologies
1950 West 29th Street
South Sioux City, NE. 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

32" WRS BASE SECTION DIMENSIONS

DRAWN BY: LFT	REVISION DATE:
DATE: 03/15/13	SCALE: Not to Scale
DETAIL NO:	**LD-2.2W**



18" WIDE TOP HAT SECTIONS

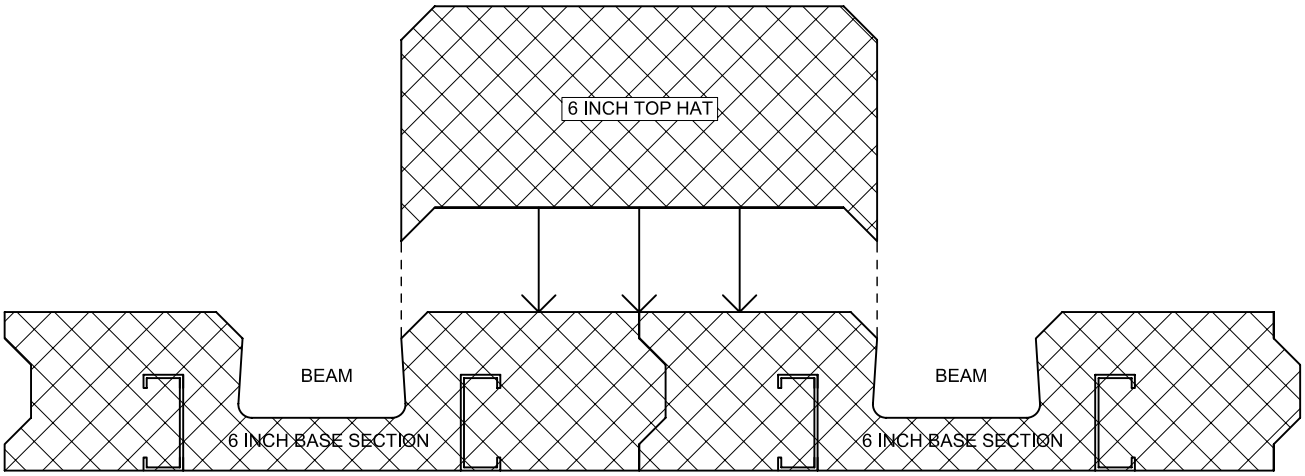
EPS Foam Density = 0.75 pcf

Lite-Deck™

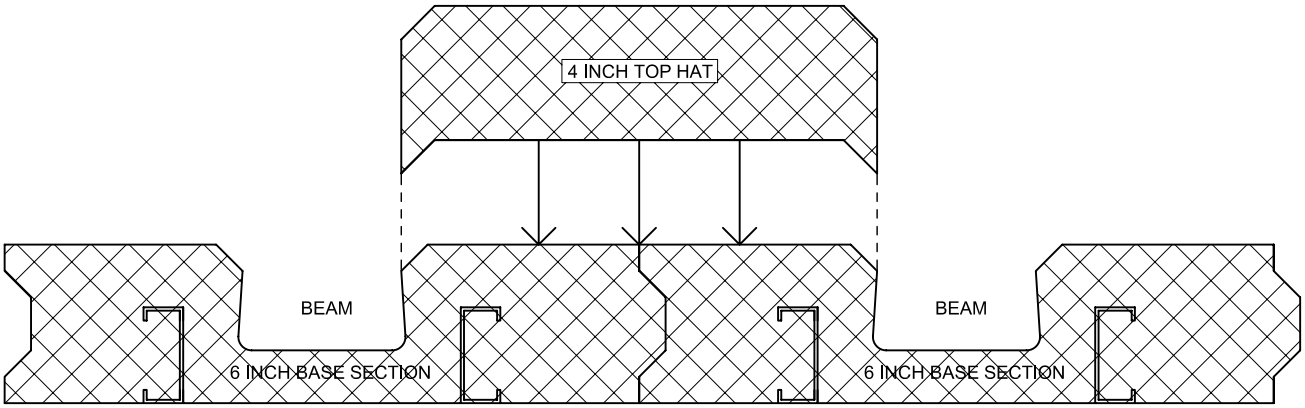
Lite-Form Technologies
1950 West 29th Street
South Sioux City, NE. 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

18" WIDE TOP HAT SECTION DIMENSIONS

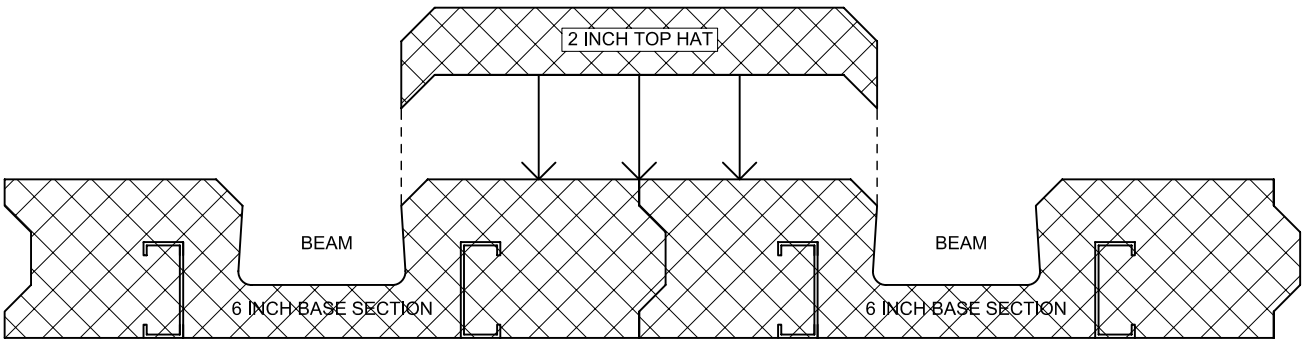
DRAWN BY: LFT	REVISION DATE:
DATE: 09/23/08	SCALE: Not to Scale
DETAIL NO:	**LD-2.3**



12 INCH LITE-DECK FORM



10 INCH LITE-DECK FORM



8 INCH LITE-DECK FORM

TYPICAL COMBINATIONS
BASE SECTION WITH TOP HATS

Lite-Deck®

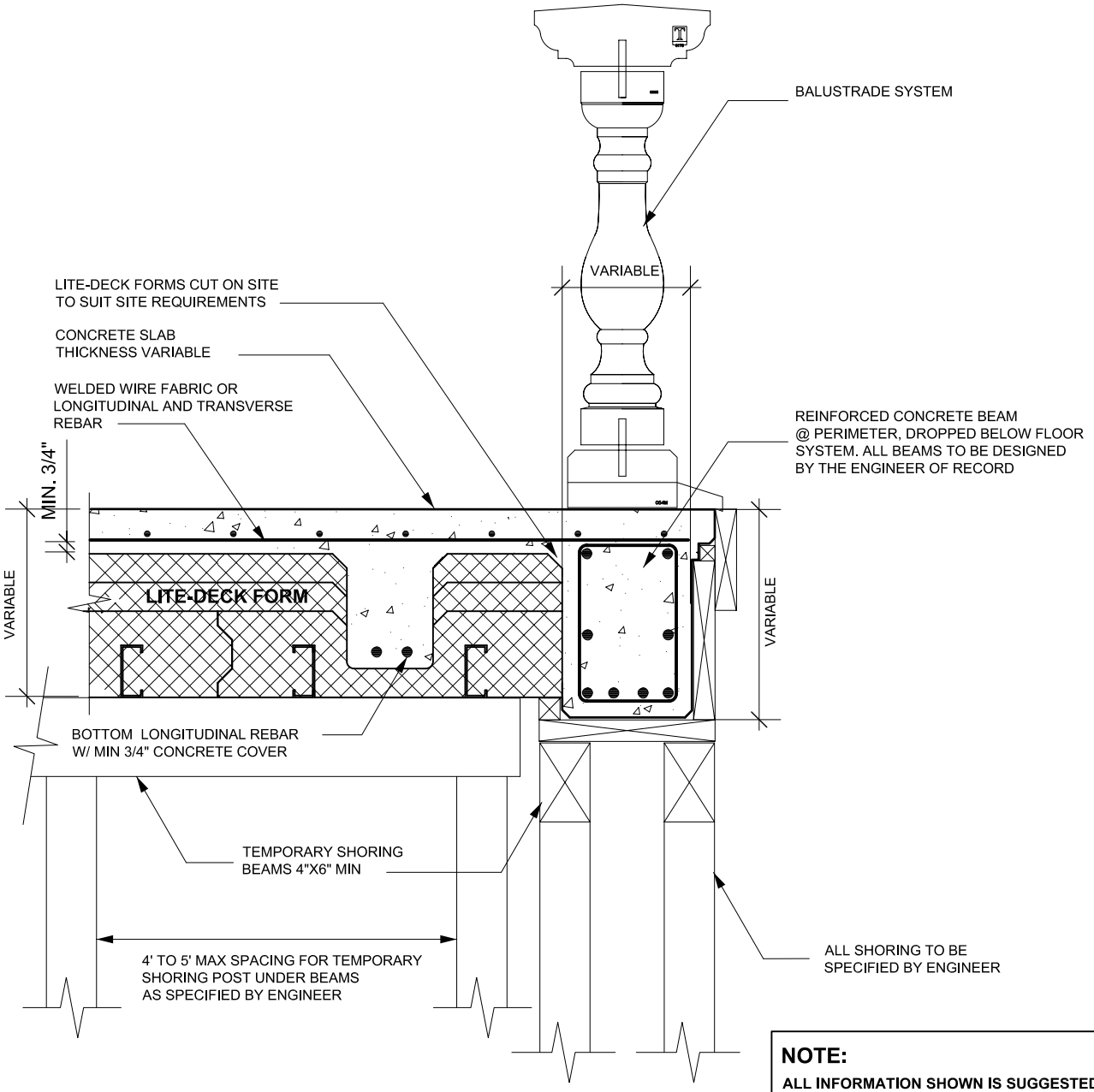
Lite-Form Technologies
1950 West 29th Street
South Sioux City, NE. 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

TYPICAL COMBINATIONS
BASE SECTION WITH TOP HATS

DRAWN BY: LFT	REVISION DATE:
DATE: 08/16/2008	SCALE: Not to Scale
DETAIL NO:	**LD-2.4**

TRANSVERSE SECTION @ PORCH PERIMETER BEAM

(LITE-DECK FORM W/ REINFORCED CONCRETE BEAM)



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

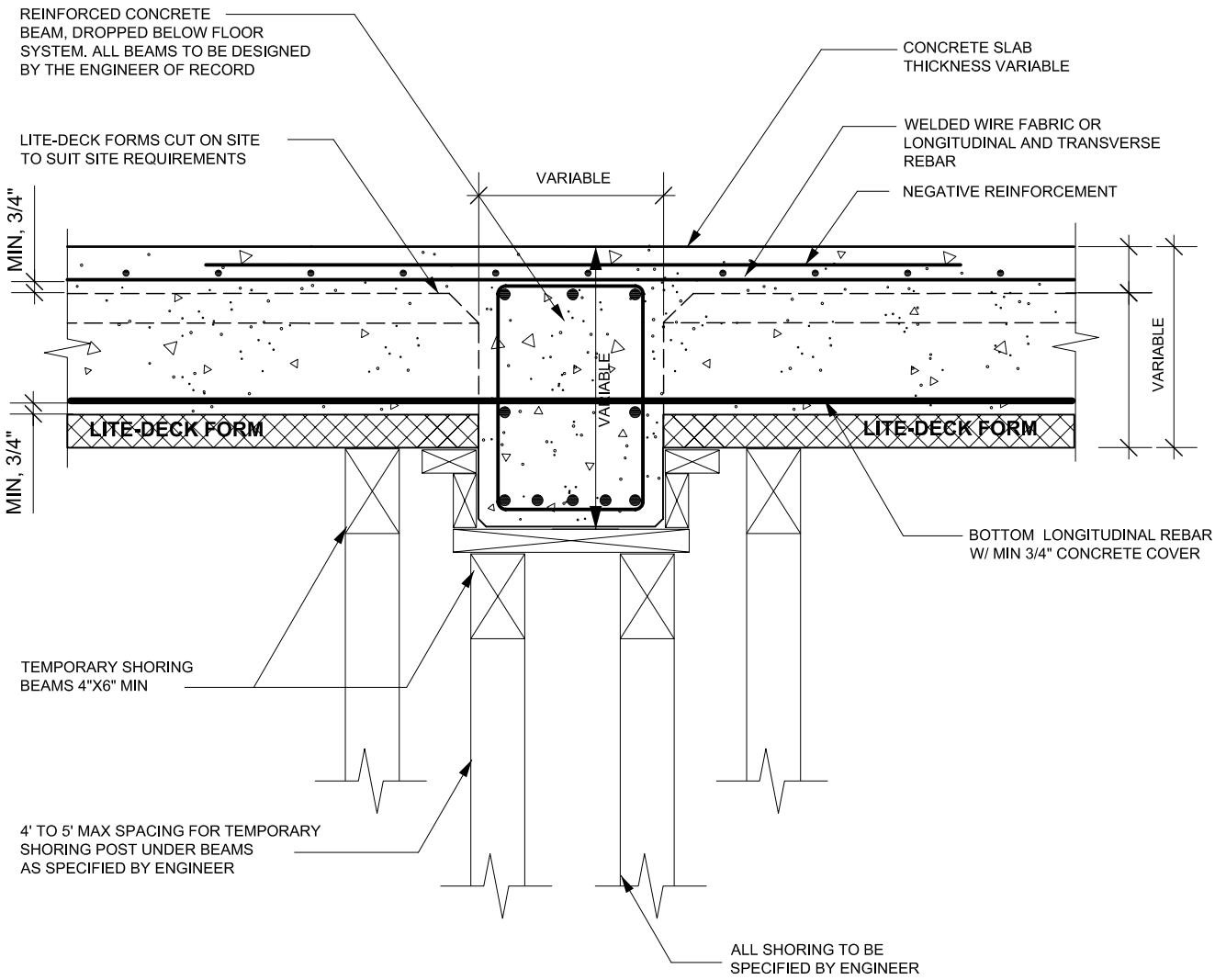
Lite-Deck®

LiteForm Technologies
1950 W. 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

TRANSVERSE SECTION @ PORCH PERIMETER BEAM

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE: 1" = 1'-0"
DETAIL NO:	**LD-2.19**

LONGITUDINAL SECTION @ DROPPED CONCRETE BEAM



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

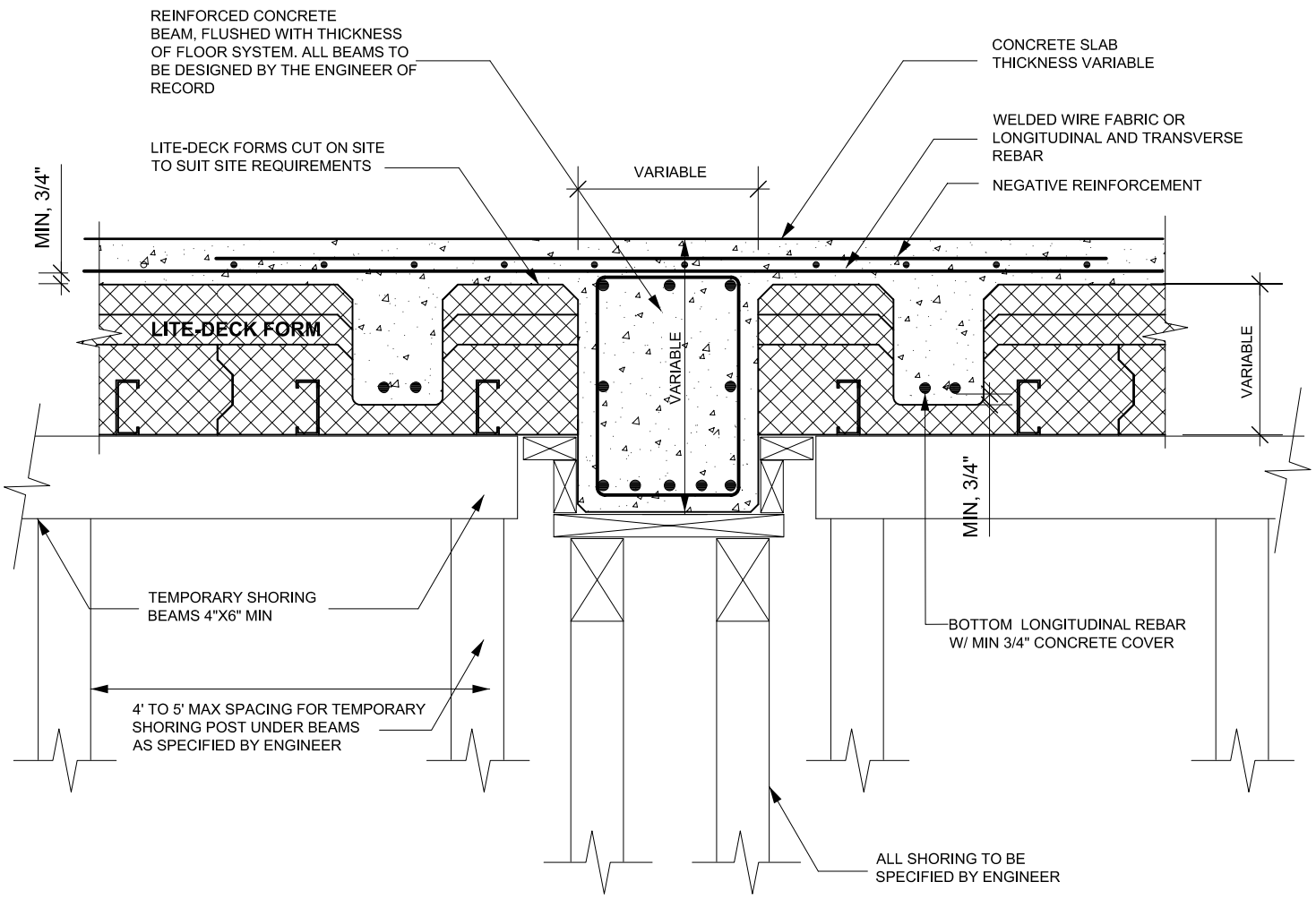
Lite-Deck®

LiteForm Technologies
1950 W. 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

LONGITUDINAL SECTION @ FLUSH CONCRETE BEAM

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE: 1" = 1'-0"
DETAIL NO:	**LD-2.18**

TRANSVERSE SECTION @ DROPPED CONCRETE BEAM



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

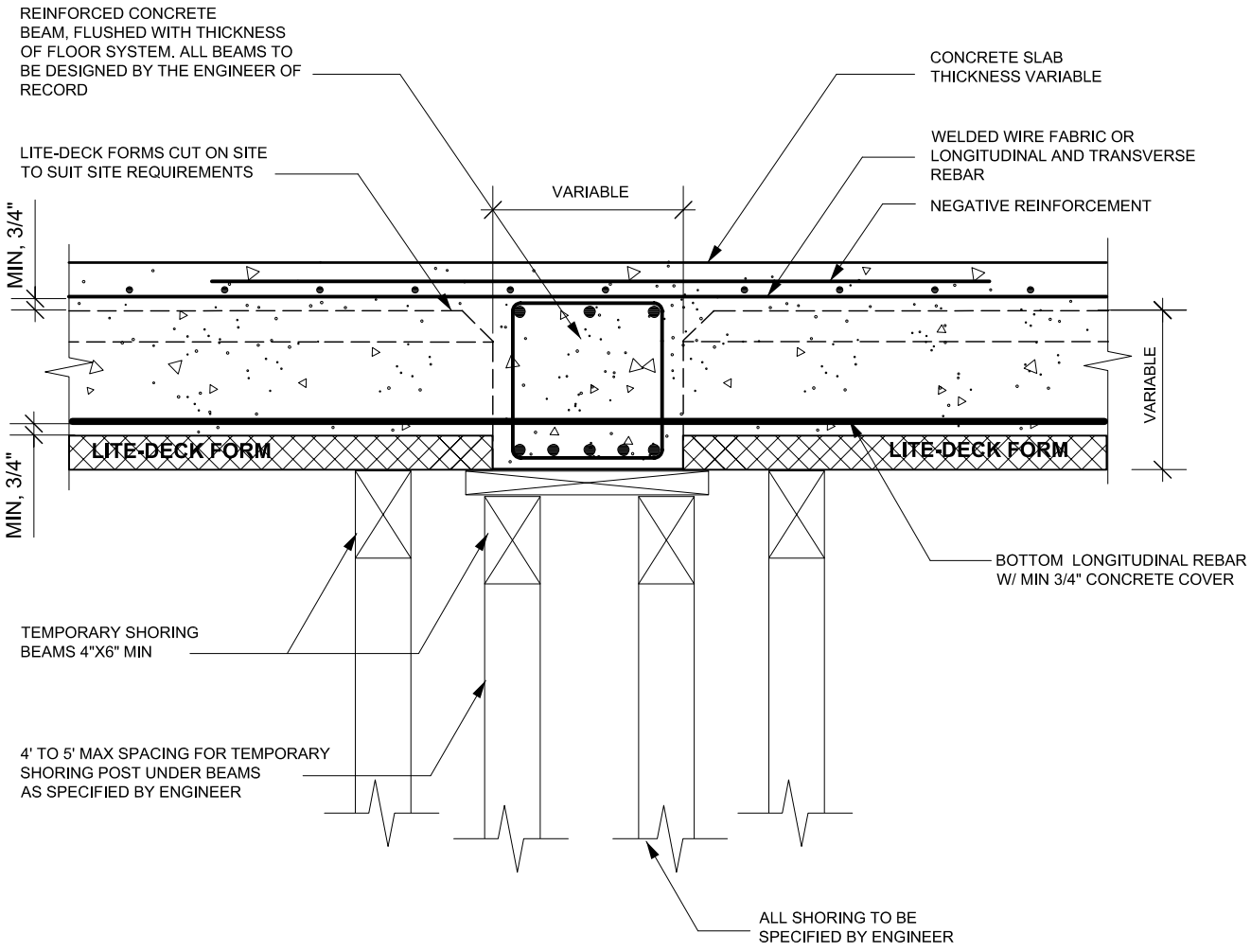
Lite-Deck®

LiteForm Technologies
1950 W. 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

TRANSVERSE SECTION @ DROPPED CONCRETE BEAM

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE: 1" = 1'-0"
DETAIL NO:	**LD-2.17**

LONGITUDINAL SECTION @ FLUSH CONCRETE BEAM



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

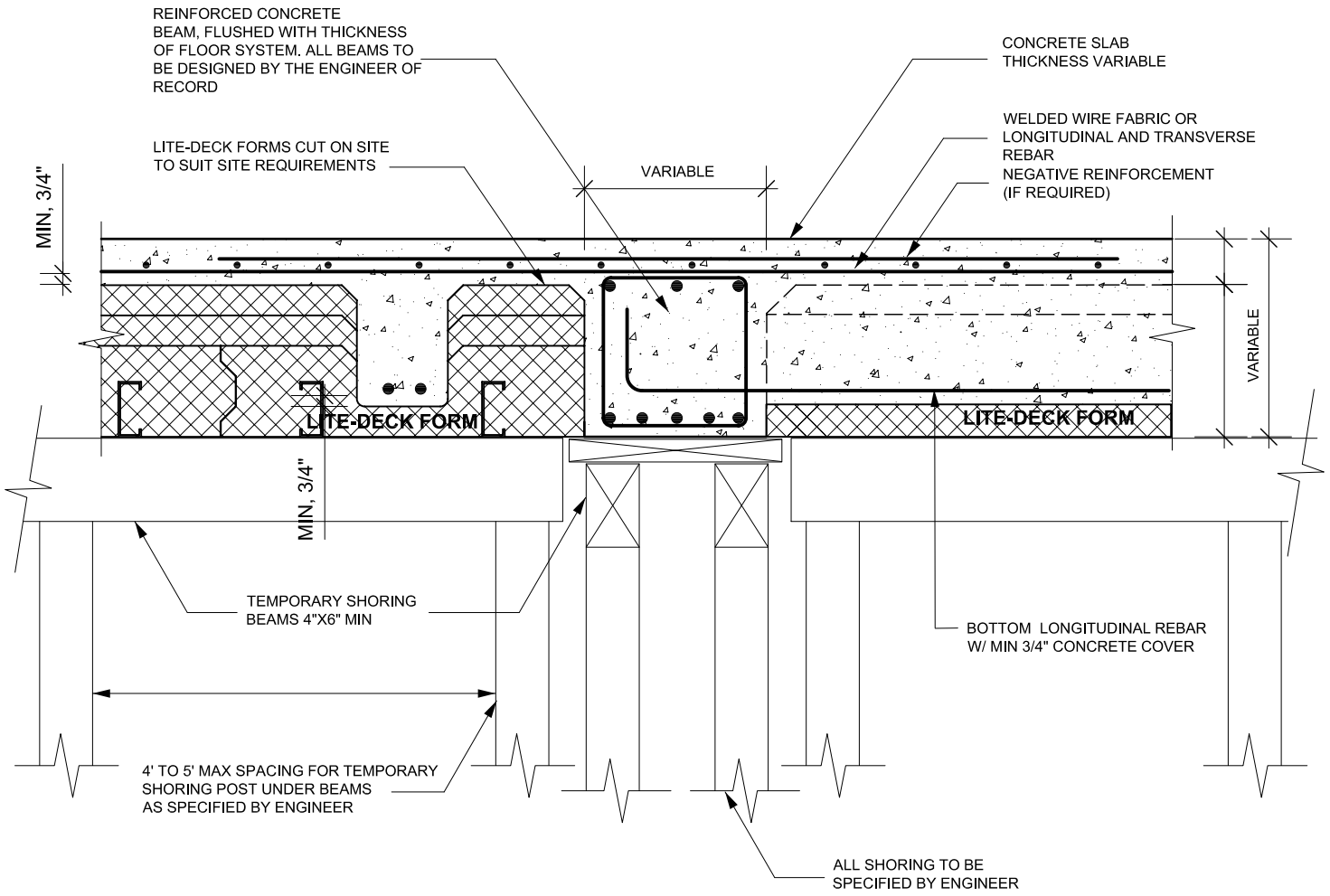
Lite-Deck®

LiteForm Technologies
1950 W. 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

LONGITUDINAL SECTION @ FLUSH CONCRETE BEAM

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE: 1" = 1'-0"
DETAIL NO:	**LD-2.16**

ONE-SIDED TRANSVERSE SECTION @ FLUSH CONCRETE BEAM



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

Lite-Deck®

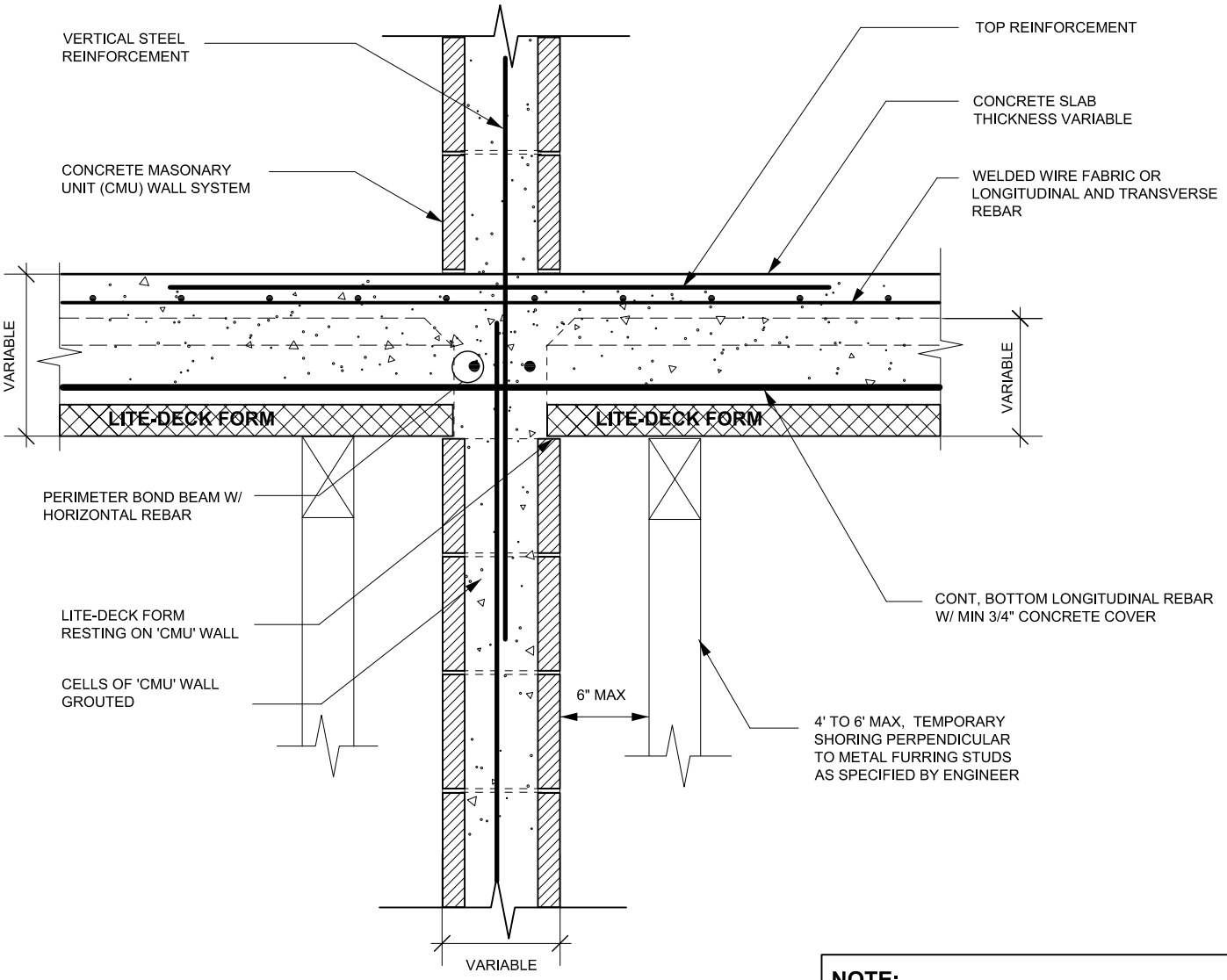
LiteForm Technologies
1950 W. 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

ONE-SIDED TRANSVERSE SECT. @ FLUSH CONCRETE BEAM

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE:
DETAIL NO:	**LD-2.15**

LONGITUDINAL SECTION @ INTERIOR 'CMU' WALL TO LITE-DECK FLOOR

(LITE-DECK FORM RESTING ON CMU WALL)



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

Lite-Deck®

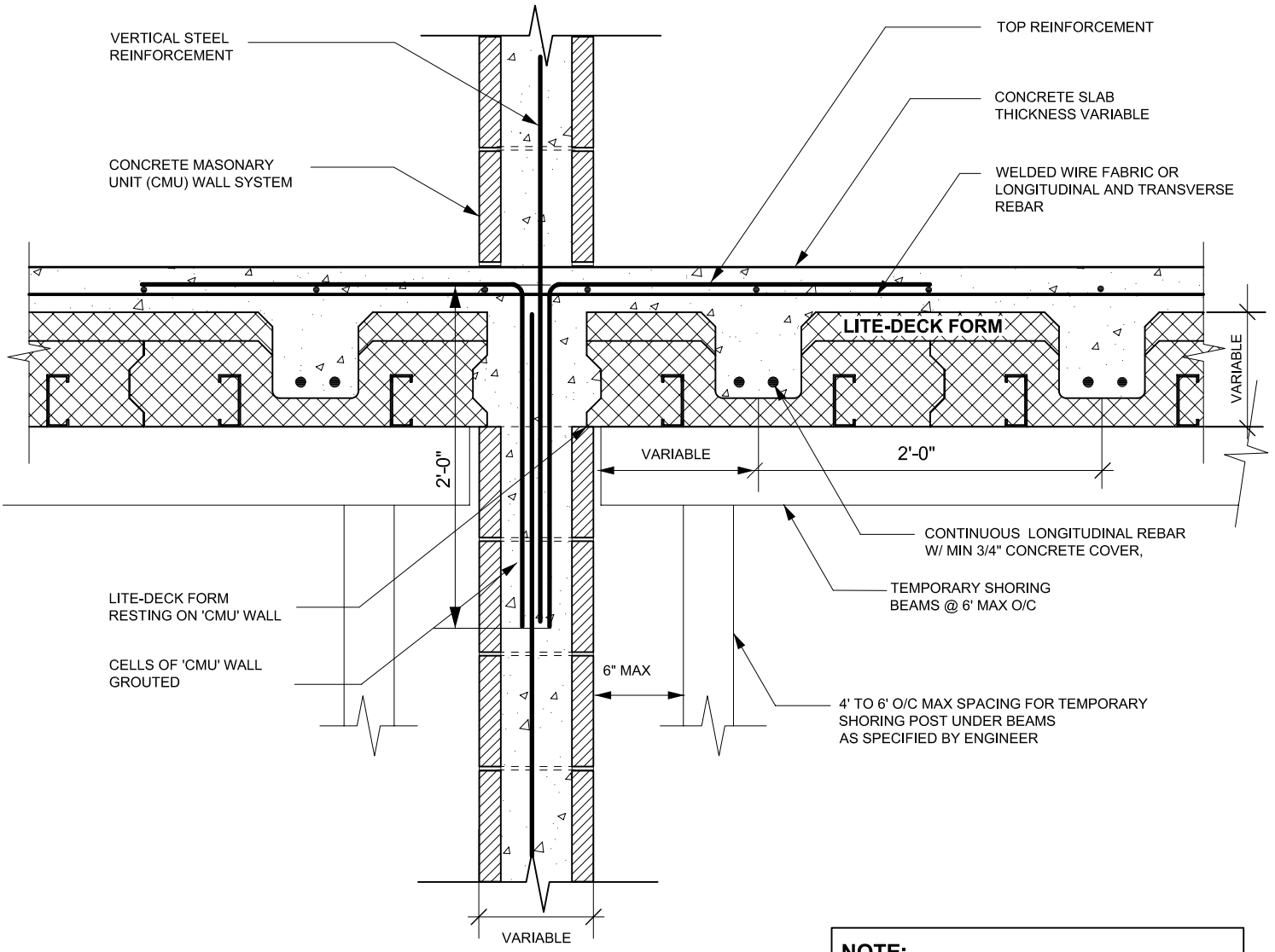
LiteForm Technologies
1950 W. 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

LONG. SECTION @ INTERIOR CMU WALL TO LITE-DECK FLOOR

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE:
DETAIL NO:	**LD-2.14**

TRANSVERSE SECTION @ INTERIOR 'CMU' WALL TO LITE-DECK FLOOR

(LITE-DECK FORM RESTING ON CMU WALL)



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

Lite-Deck®

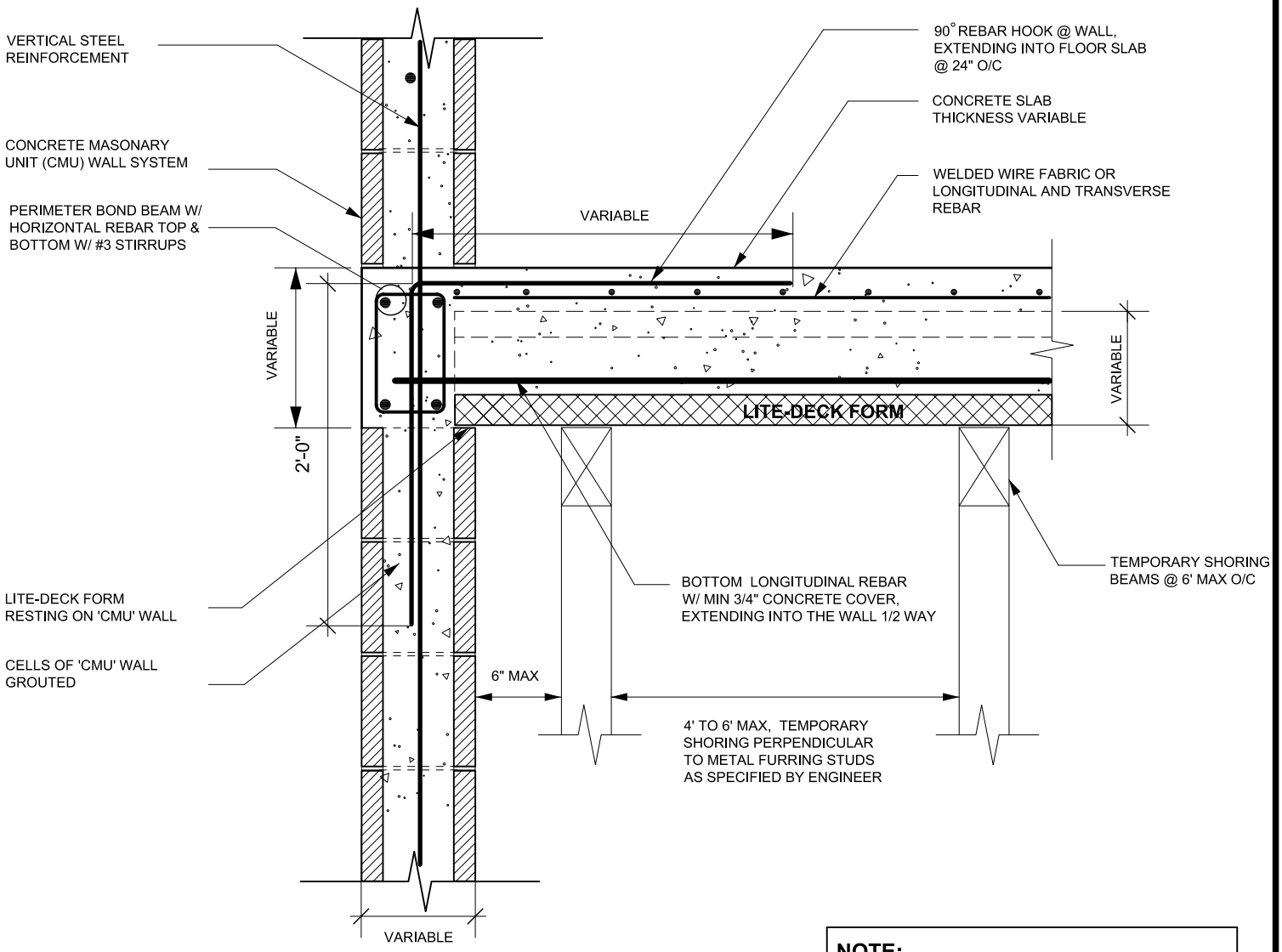
LiteForm Tecnologies
1950 W. 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

TRANS. SECTION @ INTERIOR CMU WALL TO LITE-DECK FLOOR

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE: 1" = 1'-0"
DETAIL NO:	**LD-2.13**

LONGITUDINAL SECTION @ LITE-DECK FLOOR TO 'CMU' WALL

(LITE-DECK FORM RESTING ON CMU WALL)



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

Lite-Deck®

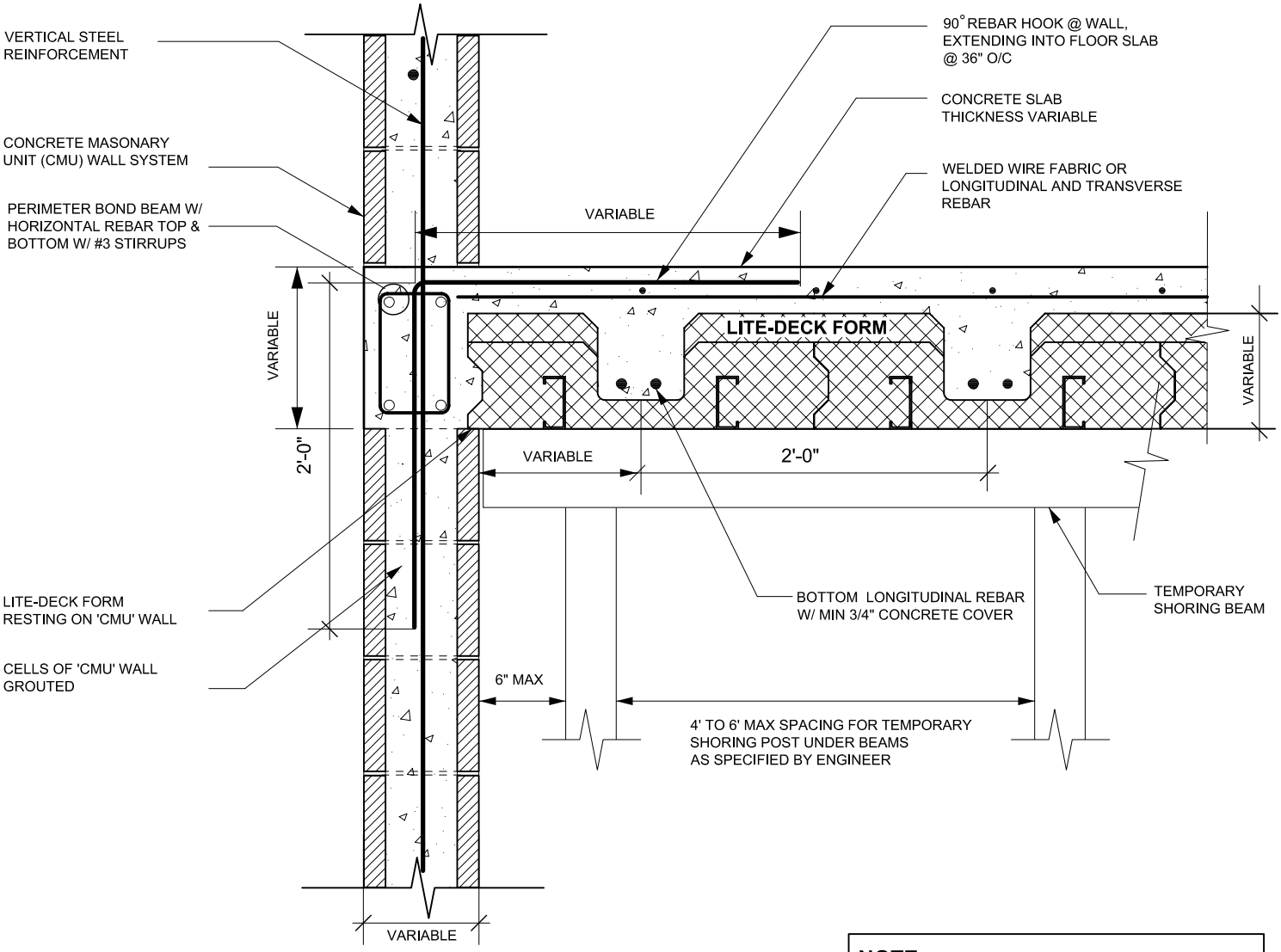
LiteForm Technologies
1950 W. 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

LONG. SECTION @ LITE-DECK FLOOR TO CMU WALL

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE: 1" = 1'-0"
DETAIL NO:	**LD-2.12**

TRANSVERSE SECTION @ LITE-DECK FLOOR TO 'CMU' WALL

(LITE-DECK FORM RESTING ON CMU WALL)



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

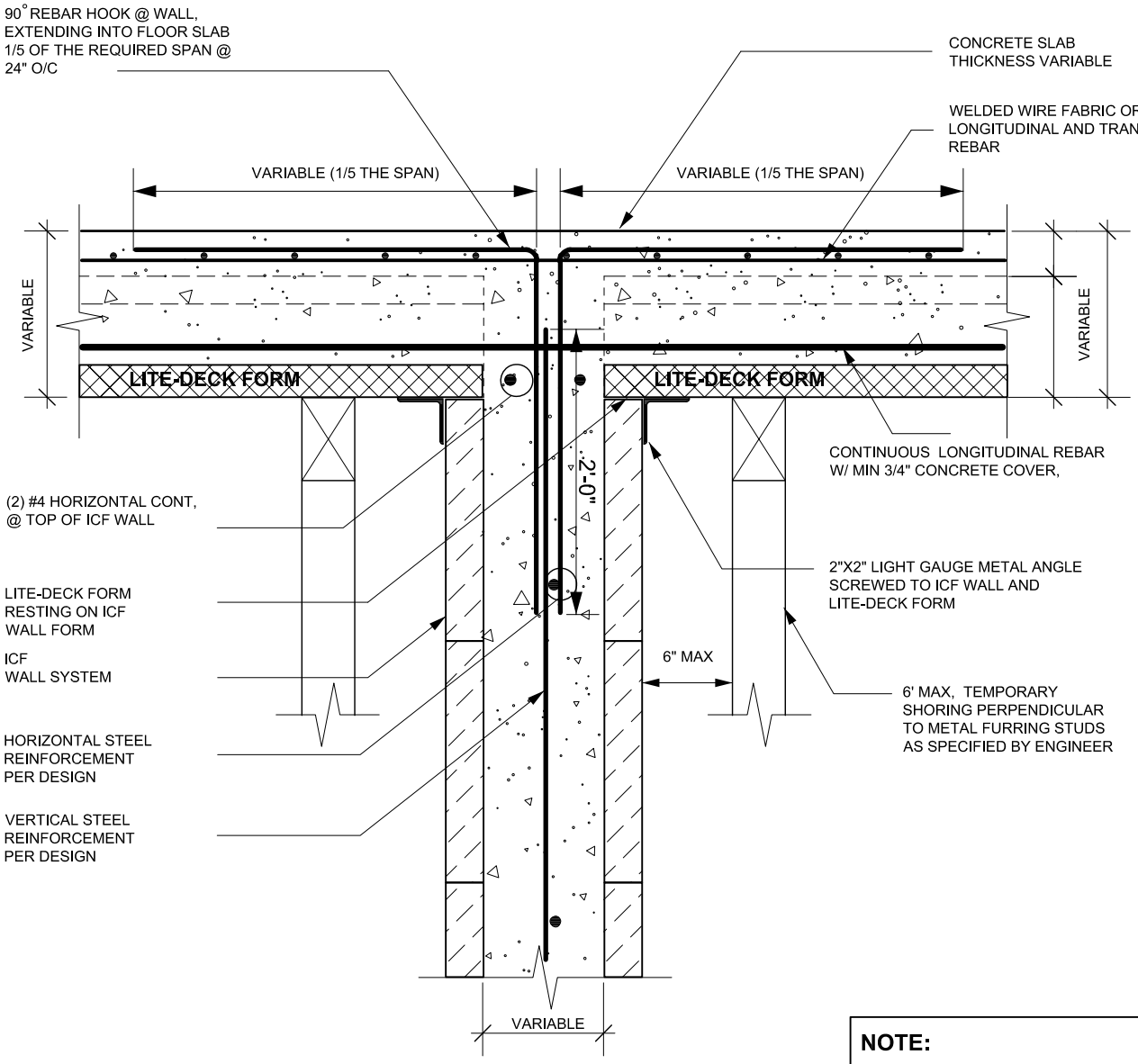
Lite-Deck®

LiteForm Technologies
1950 W. 29th Street
South Sioux City, IA 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

TRANS. SECTION @ LITE-DECK FLOOR TO CMU WALL

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE: 1" = 1'-0"
DETAIL NO:	**LD-2.11**

LONGITUDINAL SECTION @ INTERIOR ICF WALL TO LITE-DECK FLOOR CONNECTION



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

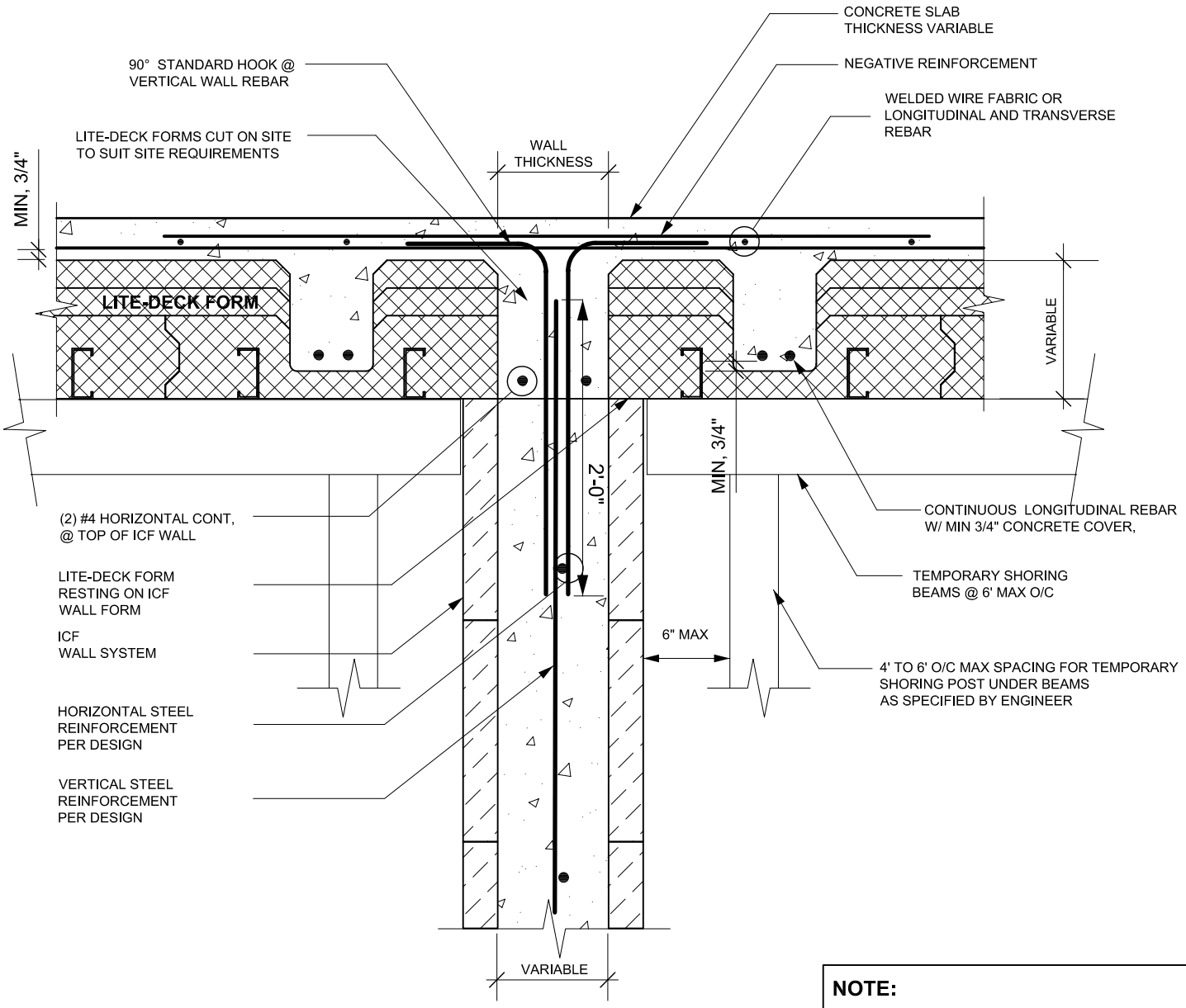
Lite-Deck®

LiteForm Technologies
1950 W. 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

LONGITUDINAL SECTION @ INTERIOR ICF WALL

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE: 1" = 1'-0"
DETAIL NO:	**LD-2.10**

TRANSVERSE SECTION @ INTERIOR ICF WALL TO LITE-DECK FLOOR CONNECTION



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

Lite-Deck®

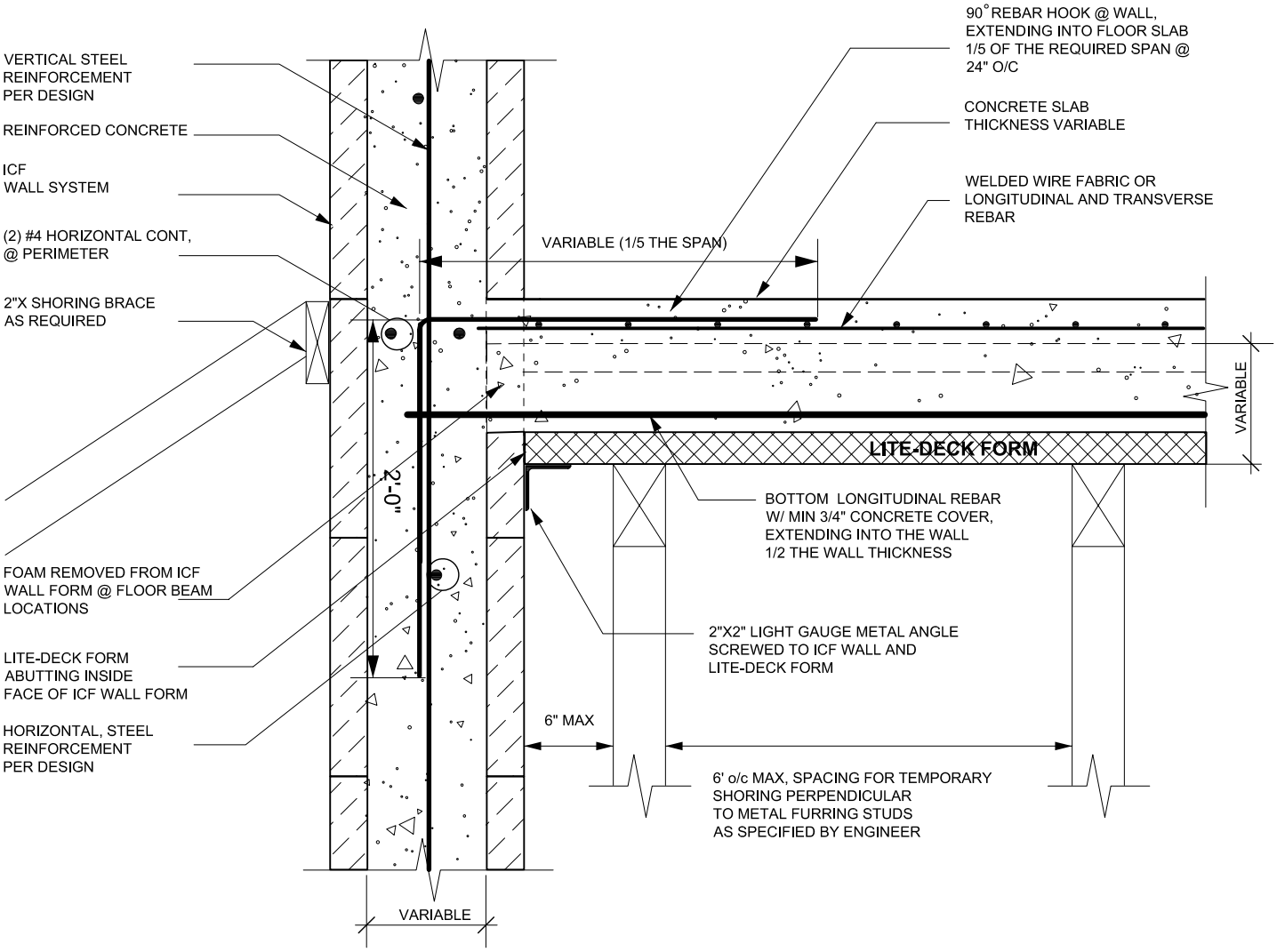
LiteForm Technologies
2950 W. 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

TRANSVERSE SECTION @ INTERIOR ICF WALL

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE: 1" = 1'-0"
DETAIL NO:	**LD-2.9**

LONGITUDINAL SECTION @ LITE-DECK FLOOR TO ICF WALL

(LITE-DECK FORM ABUTTING ICF WALL)



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

Lite-Deck®

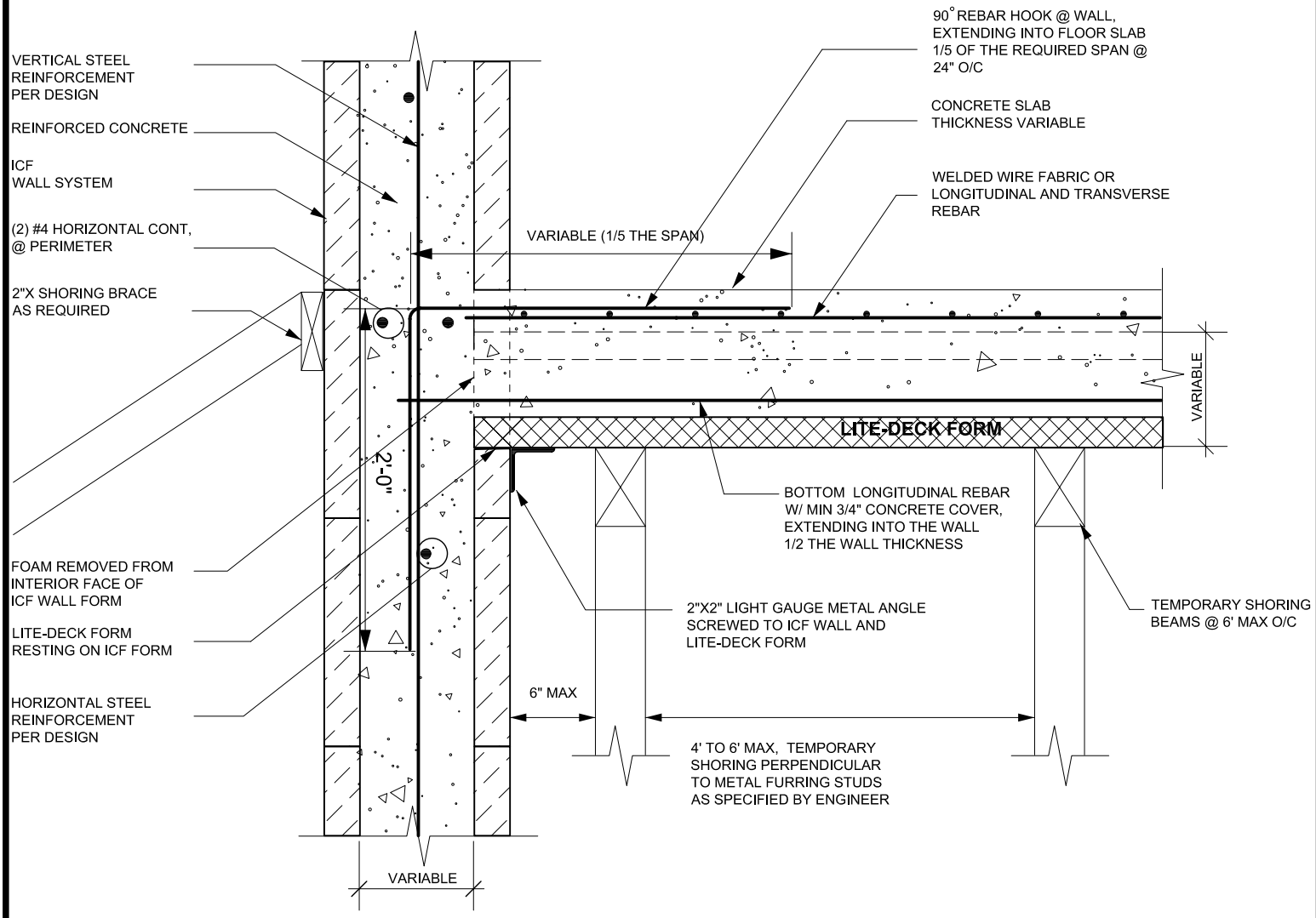
LiteForm Technologies
1950 W. 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

LONG. SECTION @ LITE-DECK FLOOR TO ICF WALL

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE:
DETAIL NO:	**LD-2.8**

LONGITUDINAL SECTION @ LITE-DECK FLOOR TO ICF WALL

(LITE-DECK FORM RESTING ON ICF WALL)



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

Lite-Deck®

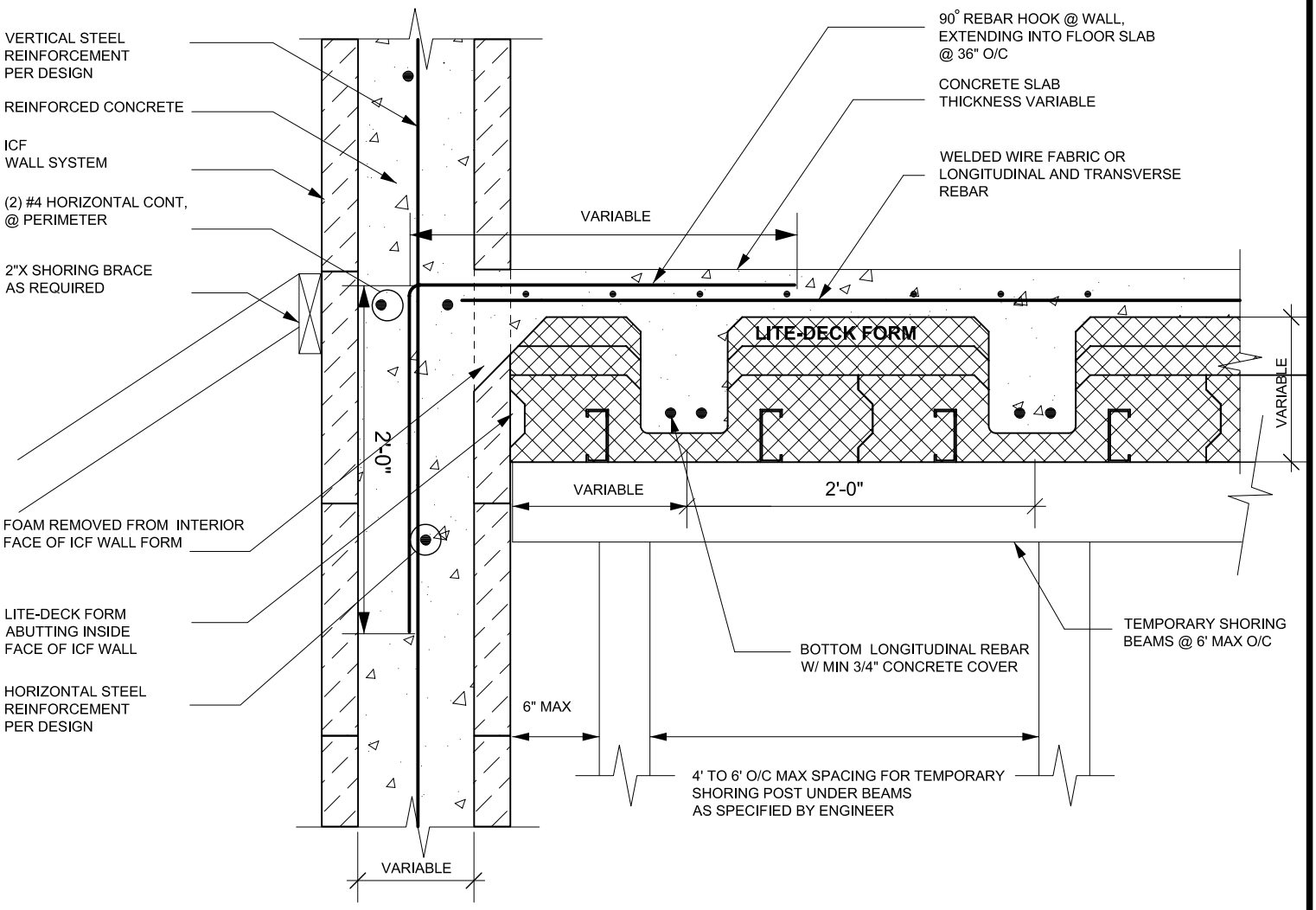
LiteForm Technologies
1950 W 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

LONG. SECTION @ LITE-DECK FLOOR TO ICF WALL

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE: 1" = 1'-0"
DETAIL NO:	**LD-2.7**

TRANSVERSE SECTION @ LITE-DECK FLOOR TO ICF WALL

(LITE-DECK FORM ABUTTING ICF WALL)



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

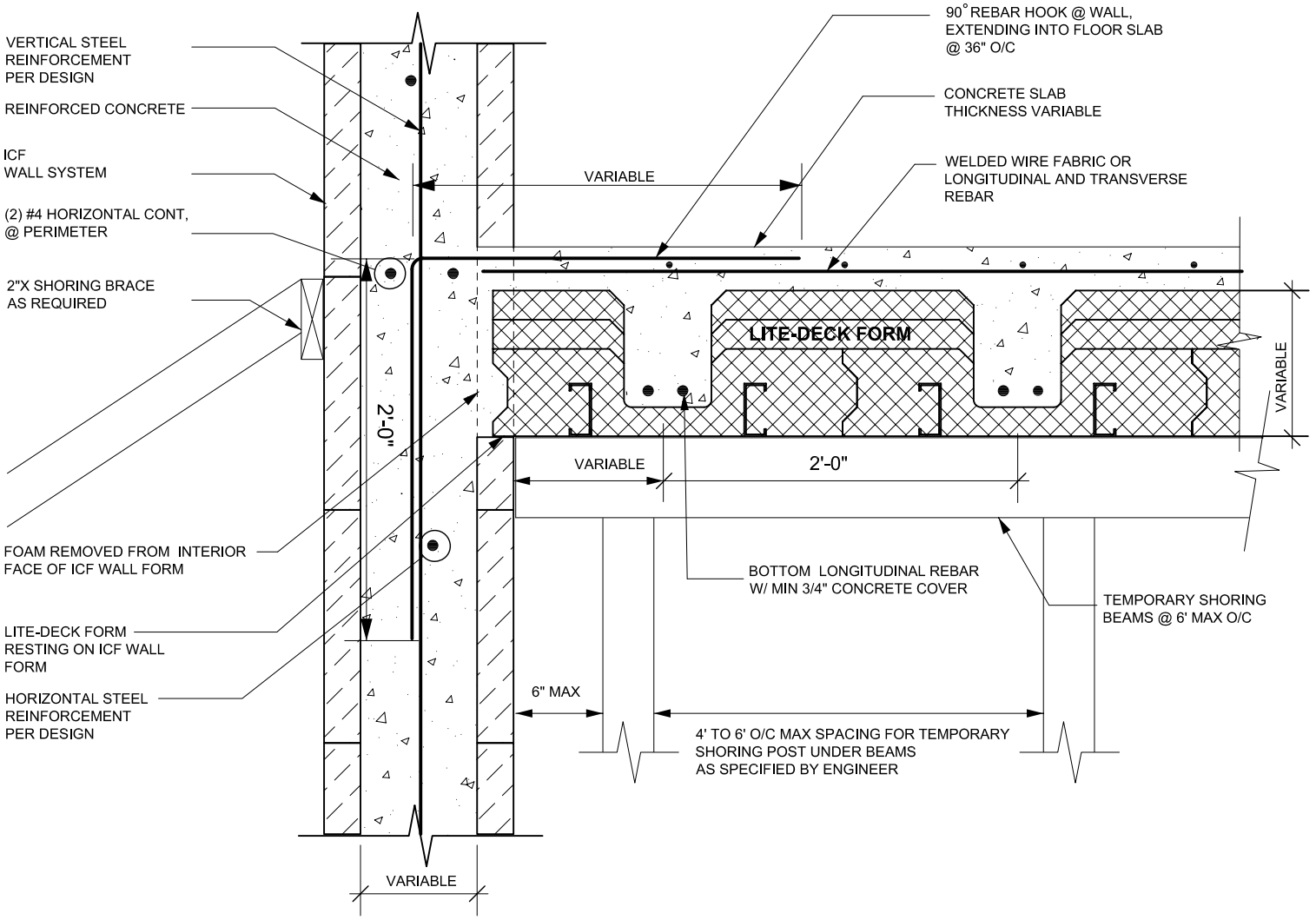
Lite-Deck®

LiteForm Technologies
1950 W 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform.com

TRANS. SECTION @ LITE-DECK FLOOR TO ICF WALL

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE: 1" = 1'-0"
DETAIL NO:	**LD-2.6**

TRANSVERSE SECTION @ LITE-DECK FLOOR TO ICF WALL



NOTE:

ALL INFORMATION SHOWN IS SUGGESTED. DUE TO APPLICATION VARIANCES IT IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD TO PROVIDE ALL INFORMATION REQUIRED TO SUIT LOCAL BUILDING CODES AND REGULATIONS, TO INCLUDE ALL STEEL REINFORCEMENT AND SHORING SCHEDULES. THIS DETAIL SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES UNLESS IT HAS BEEN CERTIFIED AND SEALED BY A QUALIFIED ENGINEER.

Lite-Deck®

LiteForm Technologies
1950 W. 29th Street
South Sioux City, NE 68776
Tel: 800-551-3313
Fax: 402-241-4435
www.liteform..com

TRANS. SECTION @ LITE-DECK

DRAWN BY: LFT	REVISION DATE:
DATE: 10/14/08	SCALE: 1" = 1'-0"
DETAIL NO:	**LD-2.5**

LiteDECK®
Insulated Concrete Floors, Roofs, Decks and Walls

Marketing Materials

Sloped Concrete Roofs

Topping an ICF structure with a concrete roof has a number of advantages. Perhaps the most obvious is disaster resistance. A concrete slab will protect belongs and occupants from hurricanes and tornadoes, and is completely fireproof. (For more information, see *Total Shell, Total Protection* on page 28 of this issue.)

They can support an enormous amount of weight, so concrete roofs can be converted into decks, rooftop gardens, or even additional parking space.

And coupled with a foam forming system, such as Lite-Deck, concrete can create a high-performance roofing system that "completes the energy envelope." Just like ICF walls, the combination of foam and concrete in the roof protects interior spaces from outside temperature fluctuations. Near airports, these "ICF roofs" have proven to dramatically reduce sound infiltration.

But just because a home has a concrete roof doesn't mean that it has to be flat. Thanks to innovative forming systems and improved design software, sloped concrete roofs are easier now than ever before. A few builders, like Mike and Dustin King of Ateg Engineering, are taking on incredibly complex roof designs, with multiple hips, valleys, and ridgelines, and constructing them out of concrete.

The Kings have designed and built a number of complex, sloping concrete roofs in North Texas. One was installed on the 15,000 sq. ft. Hoffman residence just east of Dallas in Forney, Texas. It has 15 rooms on three levels, and the roof is unbelievably multi-faceted. King even did the bay window roof.

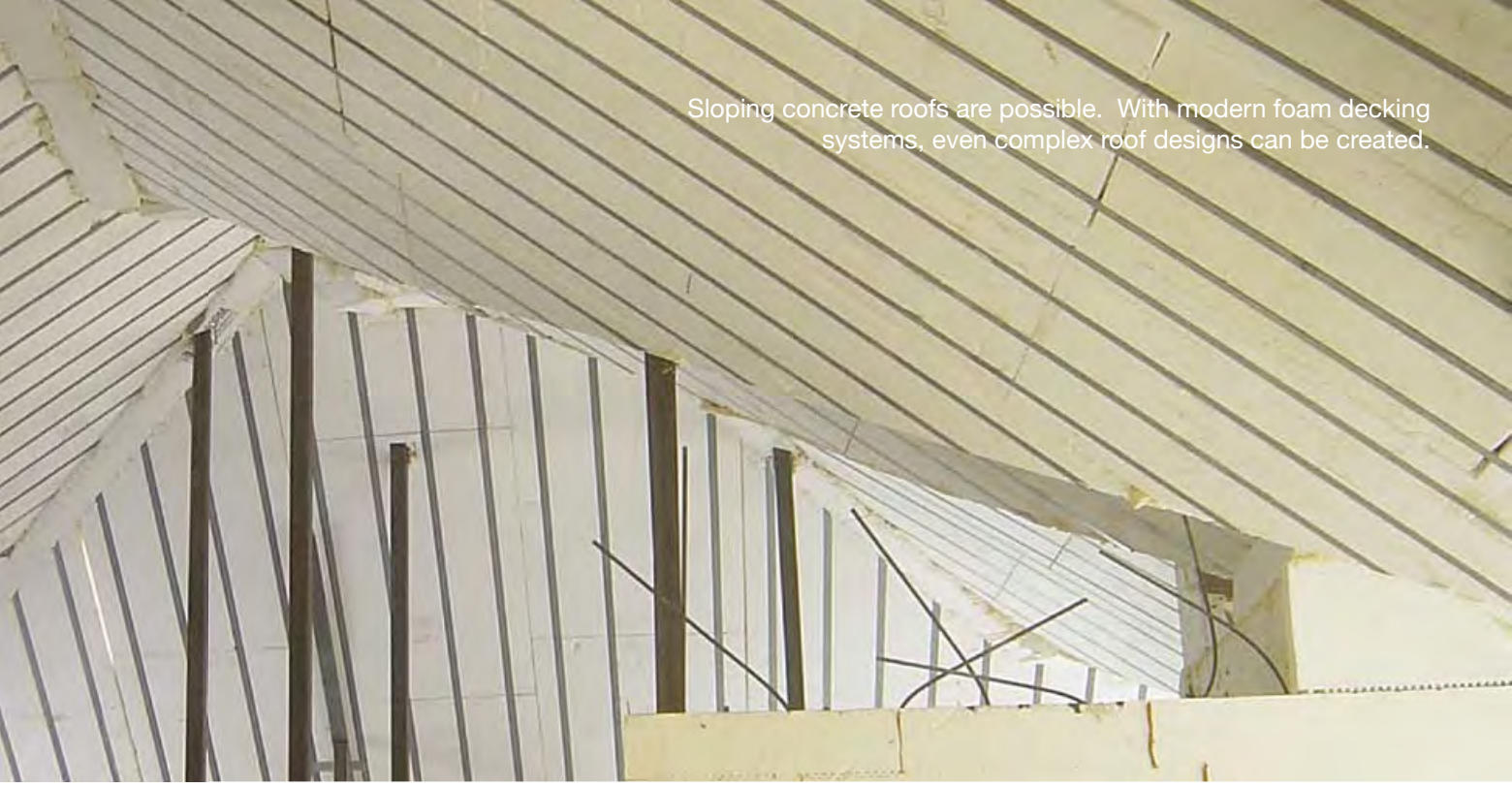
"Most of it was done the same way we do a typical Lite-Deck installation," says Dustin King. "When it's on a slope like that, we take a piece of wood and cut it to match the slope, so the shoring can brace off a surface parallel to the floor. We can run a screw through the top of the bracing, through the wood and into the light-gauge steel stud to make sure that nothing moves."

He uses adjustable Pro-Shore bracing, with beams running 6 feet on center and posts about every 4 feet.

King uses a regular low-slump concrete for most roofs. "We used a 3-inch-slump mix on that project—it has a 7:12 slope—and it stayed in place no problem. I think the steepest we've personally done is a 9:12 pitch, and it worked out just fine.

Pat Boeshart, inventor of the Lite-Deck system, points out that placing concrete on a sloped surface is not new. "They've been

Foam decking creates a series of beam pockets, which are filled with reinforced concrete. Pockets running parallel to the ridgeline are usually cut into the foam on site. Some designers recommend a monolithic slab poured over the top of the beams. Others design the final roof finish to be applied over the foam.



Sloping concrete roofs are possible. With modern foam decking systems, even complex roof designs can be created.

doing it since the 1960s on concrete-lined canals and stormwater drainage channels," he says.

Perhaps the most difficult challenge for sloped roofs is the engineering and design work.

"A sloped concrete roof is much more complicated," King confirms. "Hips and valleys have to be engineered, and a lot of it is using experience and professional judgment."

On the Hoffman home, King spec'ed a steel I-beam at the ridge line, with the Lite-Deck running perpendicular to the ridge. "We've done a lot of steel ridge beams, but we've also done a number of concrete beams too," he says.

All Photos Courtesy Lite-Form Technologies

Channels for concrete beams were cut into the foam at all the hips and valleys. A channel was also cut in the foam halfway between the eaves and the primary ridge line, to tie the other concrete beams together and help support the ridgeline.

One unusual feature of this home is that the roof does not have a monolithic slab poured over the Lite-Deck. Concrete was placed in the beam pockets level with the surface of the foam, but no additional concrete was poured above that."

"There's no reason why you couldn't do the slab," says King. "In this case, it was just the way it was done." The roof was surfaced with Fossilcrete, which was stamped and colored to resemble shingles. The same product was used on the exterior walls, which were carved to resemble ashlar-cut limestone.

Cloyd "Joe" Warnes, a concrete expert and consulting engineer, has more than 40 years of experience with pitched concrete roofs. He built one of the first "all concrete" homes in California in 1966 as part of a study by the U.S. Dept. of Housing and Urban Development (HUD). Warnes points out that if the concrete roof is properly tied into the ICF walls, the entire structure is significantly stronger.

That's precisely what King did with the Hoffman home. "We brought the bars out of the ICF wall several feet and tied them into the roof beams. All of the beam connections have ample connecting steel in them."

All three major brands of foam decking, Lite-Deck, Insuldeck, and Amdeck, have engineering details available on how to make these connections.

Warnes notes that pitched roofs can be built using a number of other technologies—such as steel joists and plywood—but only foam decking includes the insulation, sound attenuation, and other

Foam decking can be capped with a solid concrete slab for maximum protection, or finished with just the beam pockets (bottom right.) The decision will affect the amount of bracing required when the foam panels are set in place (bottom left.)

All Photos Courtesy Lite-Form Technologies

features most owners will want.

At a presentation he gave at the fall 2006 ACI meeting, he explained the general design process. First, design the structural supports at the ridgelines and in the valleys. Second, determine how the building eaves will be formed and shored. Next, calculate the planking (or other forming) requirements, shoring and rebar needed.

The actual construction process follows those steps quite closely. After the ridgeline beams are installed, contractors form the eaves, shore them, and then place the forming for the rest of the roof. After that is also shored, the rebar is placed and tied into the walls. Any additional beam pockets are cut into the foam at this time. When everything is in place, the concrete is poured, first in the beam pockets, and then as a slab over the entire structure.

The Hoffman home is built without eaves, but King says there are a number of different ways it can be done. "We've done it a couple of different ways. You can end the concrete at the wall, but run the foam out past the wall as eaves. We've also formed the eaves with plywood, shored it real well, and poured it with the rest of the roof. Western Forms has an eave form that we've used and had good success." Another possible method is to frame out the eaves as with traditional construction.

Whatever method of pitched roof construction you choose, King says one key is to work closely with the installer and manufacturer. "The beams on that job came out of out plant at Amarillo, and were delivered to the jobsite pre-cut," says King. "We worked closely with Ross Raines [the builder] to ensure it went well."

With foam decking, interior finishes are installed just like they would be in ICF walls. Chases and light boxes are cut in with a hot knife. Insuldeck has pre-cut utility chases molded into the foam. Sheet rock is attached to the integral furring strips. Sometimes, a dropped ceiling—similar to commercial construction—is installed.

Fast Facts

Location: **Forney, Texas**
Size: **13,000 sq. ft.**
Completion Date:
August 2007
Owner: **Alan Hoffman**
Builder: **Ross Raines**
Roof Installer:
Ategeng Engineering
Project Engineer:
Ategeng Engineering
Exterior Walls:
Buildblock ICF
Roof: **Lite-Deck**
Exterior Finish: **Fossilcrete**

King and Warnes are both enthusiastic about the future of pitched concrete roofing. Warnes claims that with the worldwide availability of foam decking, "the last barrier to practical construction of all concrete houses has now been breached."

King was introduced to the technology through Pat Boeshart and others at Lite-Deck, and calls it "the greatest thing." "It really is a great product," he says. "We're still developing what you can do with foam." ■

Miscellaneous

LiteDECK®

Insulated Concrete Floors, Roofs, Deck, and Walls

Technical Evaluation Manual

November, 2013