S.D. Ireland Companies
Precast Division

193 Industrial Ave. Williston, VT 05495
P.O. Box 2286 South Burlington, VT 05407
p: 802-863-6222 f: 802-860-1528
www.sdireland.com

Attention:	Ted Luck	Date:	2/24/2014
Company:	Luck Brothers	Job Name:	Warren BRF 013-4(32)
Address:		Job Number:	SDI #14046
City, St, Zip:		Regarding:	Approach Slabs submittal-revised
Ph: / Fax:			

WE ARE SENDING:

- [ ] Quote
- [ ] Details
- [ ] Other: _____
- [ ] x
- [ ] Prints
- [ ] Plans
- [ ] Specifications
- [ ] Copy Of Letter
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Copies	Date	Pages	Description
1	2/24/2014	1	Transmittal Cover
1	2/24/2014	4	Fabrication drawings
1	2/24/2014	2	Reinforcing drawings
1	2/24/2014	7	Design calculations for Lifting & Handling
1	2/24/2014	1	Lift device
1	2/24/2014	1	Mix Design

These Are Submitted as Checked Below:

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Notes/Remarks:

NOTE: These submittal documents replace those submitted previously, dated 21 February 2014, specifically pages 6 & 7.

Thank you.

Matt@sdireland.com

Tim Dudley for Matt Wheeler 802-863-6222 ext 253

tdudley@sdireland.com

Copy To: _____

Signed:

If enclosures are not as noted, kindly notify us at once.

Precast Approach Slabs

Warren BRF 013-4(32)

Concrete:

Mix Designation: P60TER

1. Specified Mix Design - 5000 PSI
2. Proposed Mix Design - 6000 PSI
3. Striping Strength - 3000 PSI
4. Handling Strength - 3000 PSI
5. Shipping Strength - 5000 PSI
6. Install Strength - 5000 PSI
7. Traffic Loading - 5000 PSI

Fabrication Tolerances:

1. Width ±1/4"
2. Height ±1/4"
3. Length ±1/2"
4. Rebar Cover 2" Min. (Unless Noted Otherwise)
5. Rebar Spacing ±1"
6. Rebar Clearance ±1/4"
7. Insert Placement ±1/4"

Reinforcing:

General Notes:

1. Reinforcing Steel - ASTM A615, Grade 60, Level II, Dual Coated
2. Materials and Manufacturing shall conform to ASTM C1433
3. Bar tied at every intersection.

Tolerances:

1. Spacing ±1"
2. Clearance ±1/4"

Lap Lengths:

1. Per AASHTO 5.11.2.1.1 & 5.11.5.3.1
   Lap Length for Level II (Dual Coated):
   #4 Bar=17"
   #5 Bar=26"
   #6 Bar=39"
   #7 Bar=53"
   #8 Bar=69"

Shop Drawings

1. Refer to following sheets 'A' and 'B' for rebar shop drawings.

Installation Sequence:

1. Pieces will be shipped 2 per truckload

2. Unload pieces utilizing all pick ponts

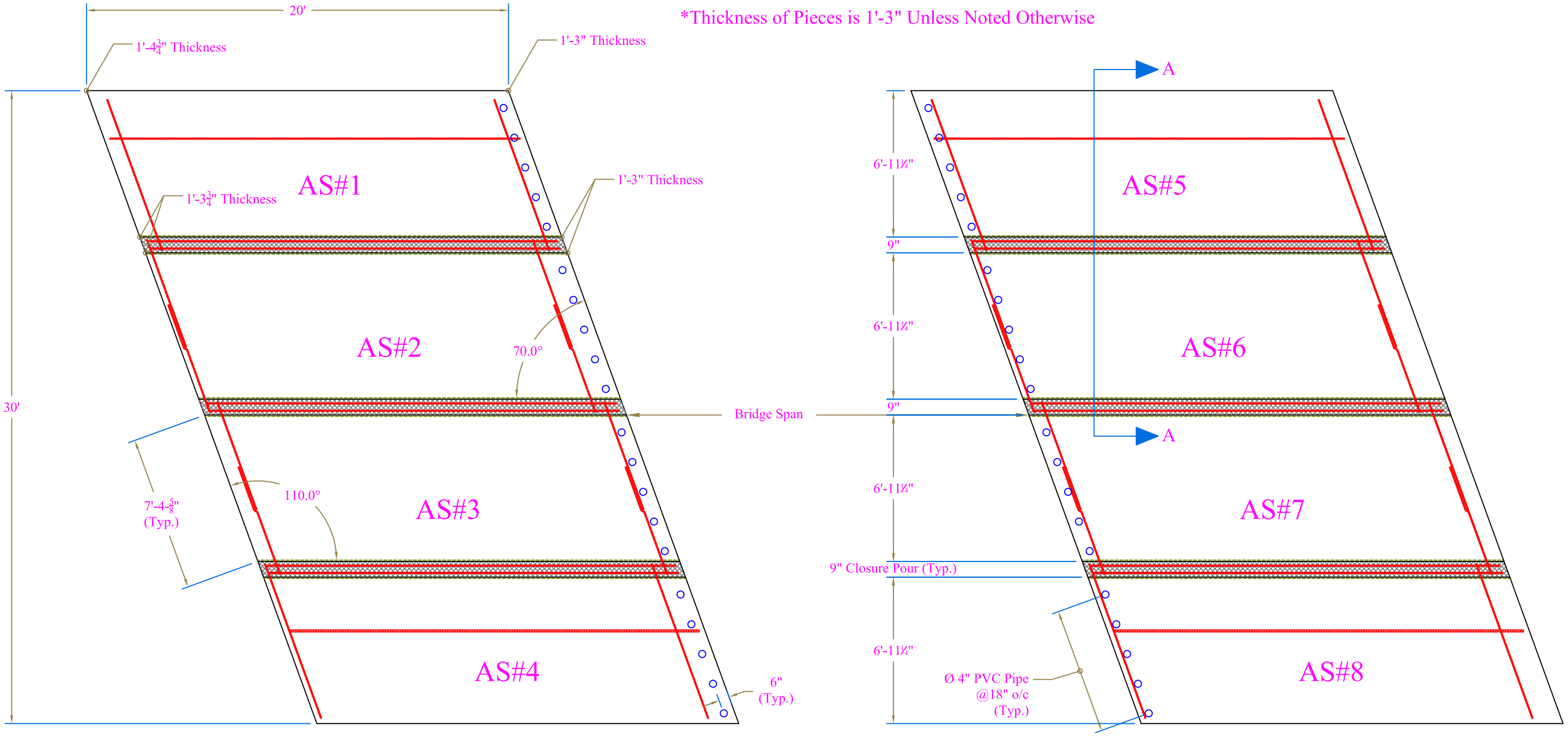
3. Grade base gravel smooth to provide for even contact under slabs.

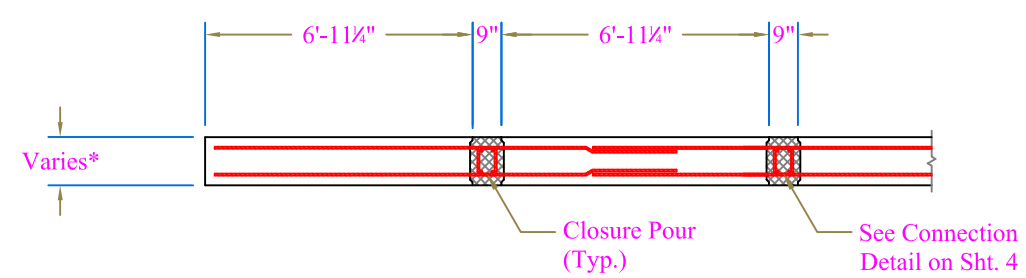
4. Set slabs to desired grade.

5. Install longitudinal bars (4) in each closure pour. Form end of closure pour opening.

6. Install HPC Rapid Set concrete into each of the closure pours.

*Thickness of Pieces is 1'-3" Unless Noted Otherwise





Section A-A

N.T.S.

Table of Pieces

Name	Qty	Thickness	Vol (Cu Yd)	Wt (lbs)
As#1	1	VARIES*	6.68	26,720
As#2	1	VARIES*	6.51	26,050
As#3	1	1'-3"	6.42	25,700
As#4	1	1'-3"	6.42	25,700
As#5	1	1'-3"	6.42	25,700
As#6	1	1'-3"	6.42	25,700
As#7	1	1'-3"	6.42	25,700
As#8	1	1'-3"	6.42	25,700

*See Notes Above on Thickness Variations of Piece AS#1 & AS#2

CONTRACTORS VTSPE:

PRECAST CONCRETE APPROACH SLAB SHOP DRAWINGS (SDI JOB #14046)

SUPERVISOR: M. WHEELER
DETAILER: I. ADAMS
CHECKER: E. Barendse
ENGINEER: N/A

PROJECT NAME: Warren
PROJECT #: BRF 013-4(32)
LOCATION: Bridge #166
Route 100, Warren, VT

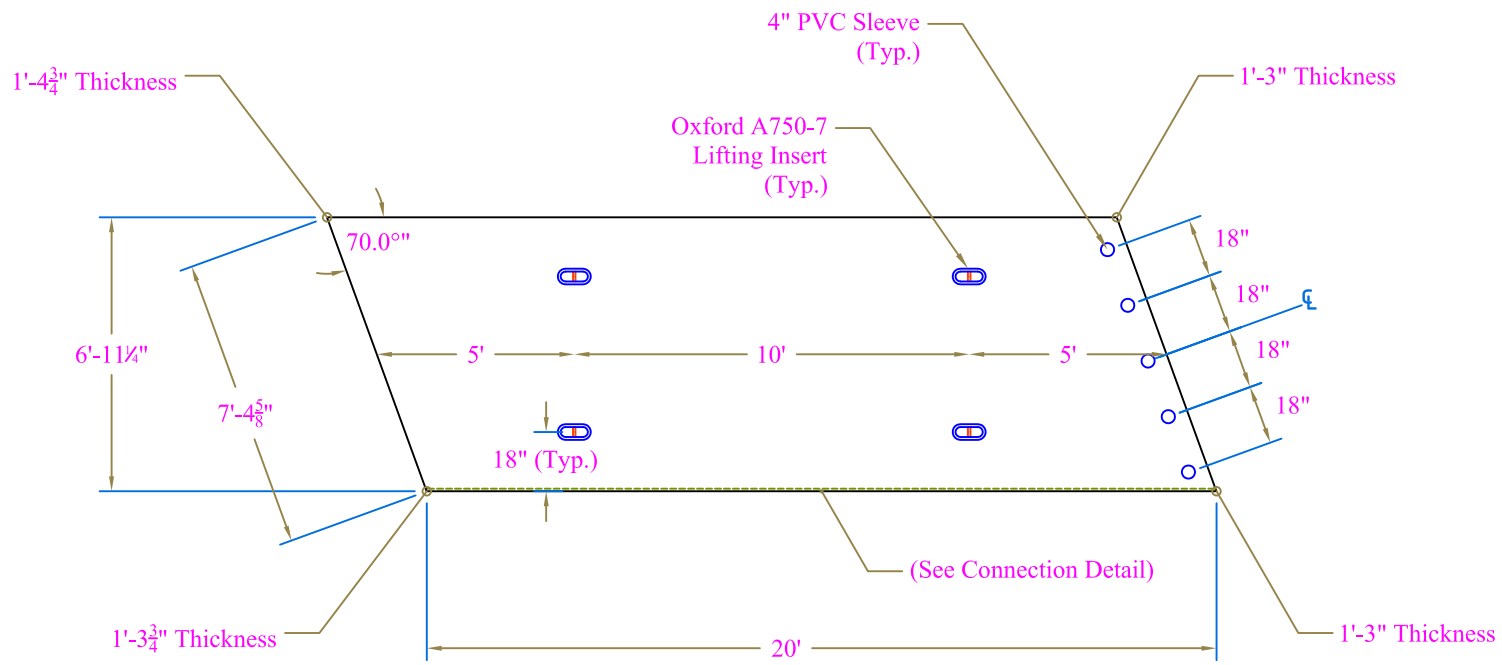
Luck Brothers, Inc
73 Trade Road
Plattsburg, NY, 12901
Ph: (518)-561-4321

FABRICATOR:
193 INDUSTRIAL AVE.
WILLISTON, VT 05495
Ph: (802) 658-0201

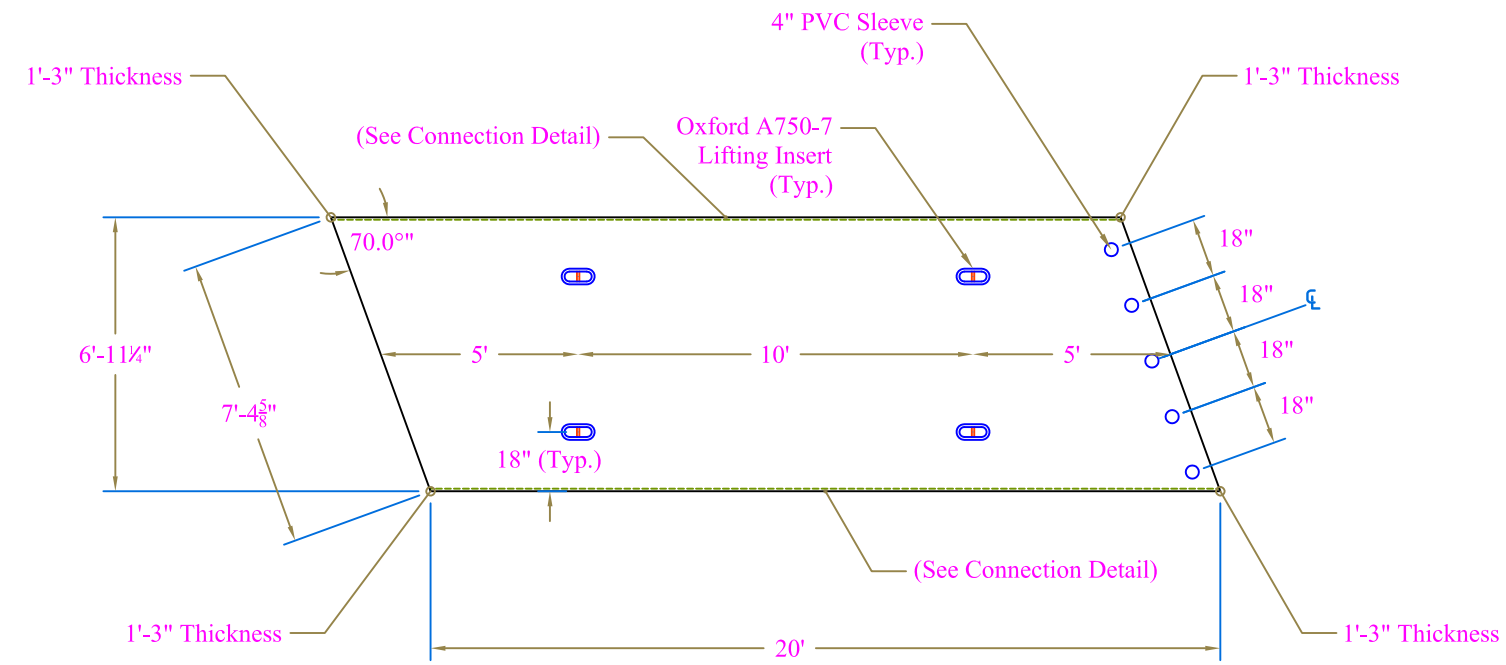
SD Ireland PRECAST

02/07/2014

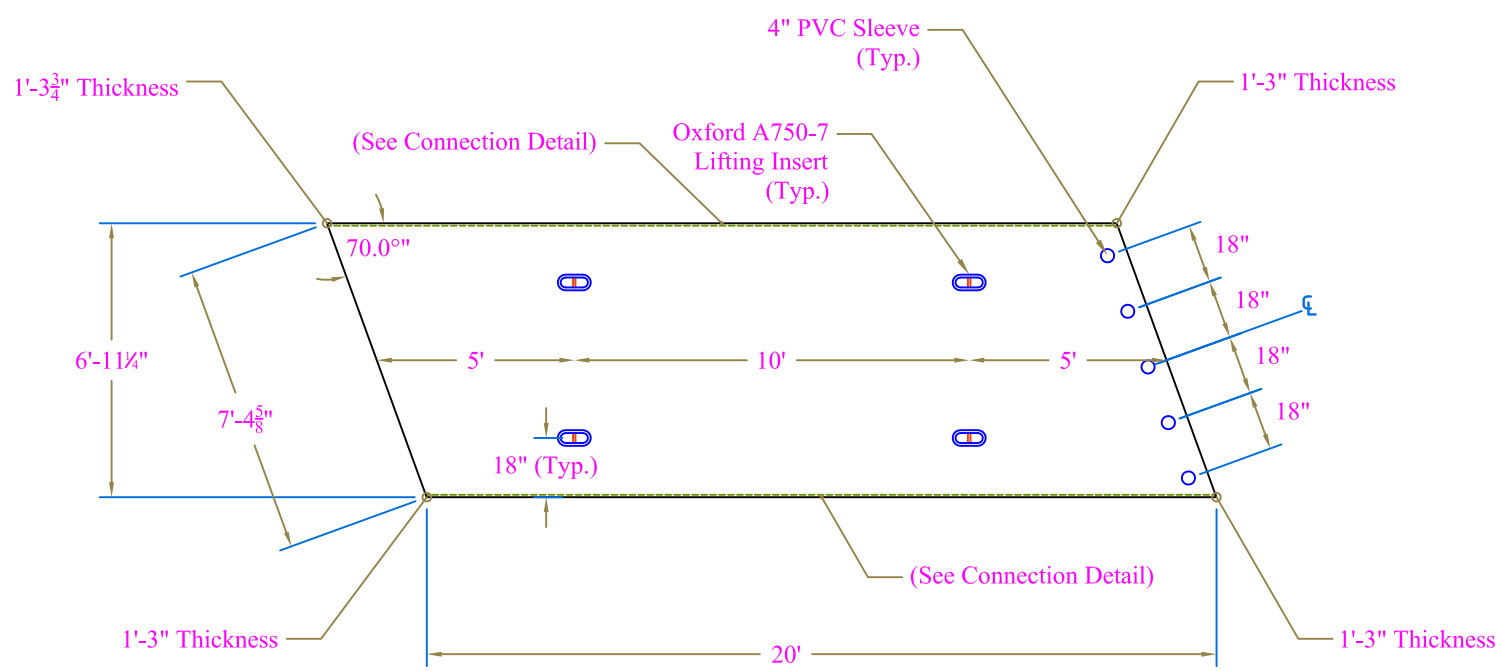
Slab Plan Views



AS#1



AS#3



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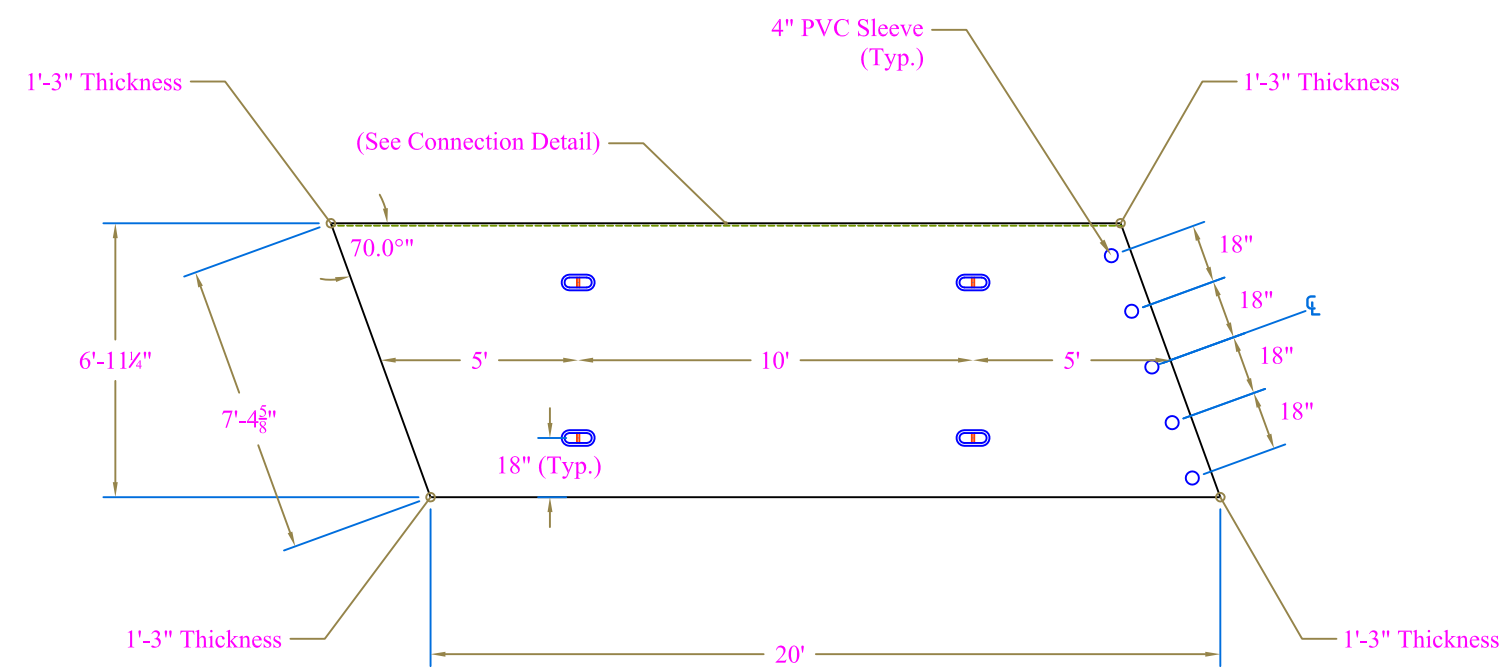
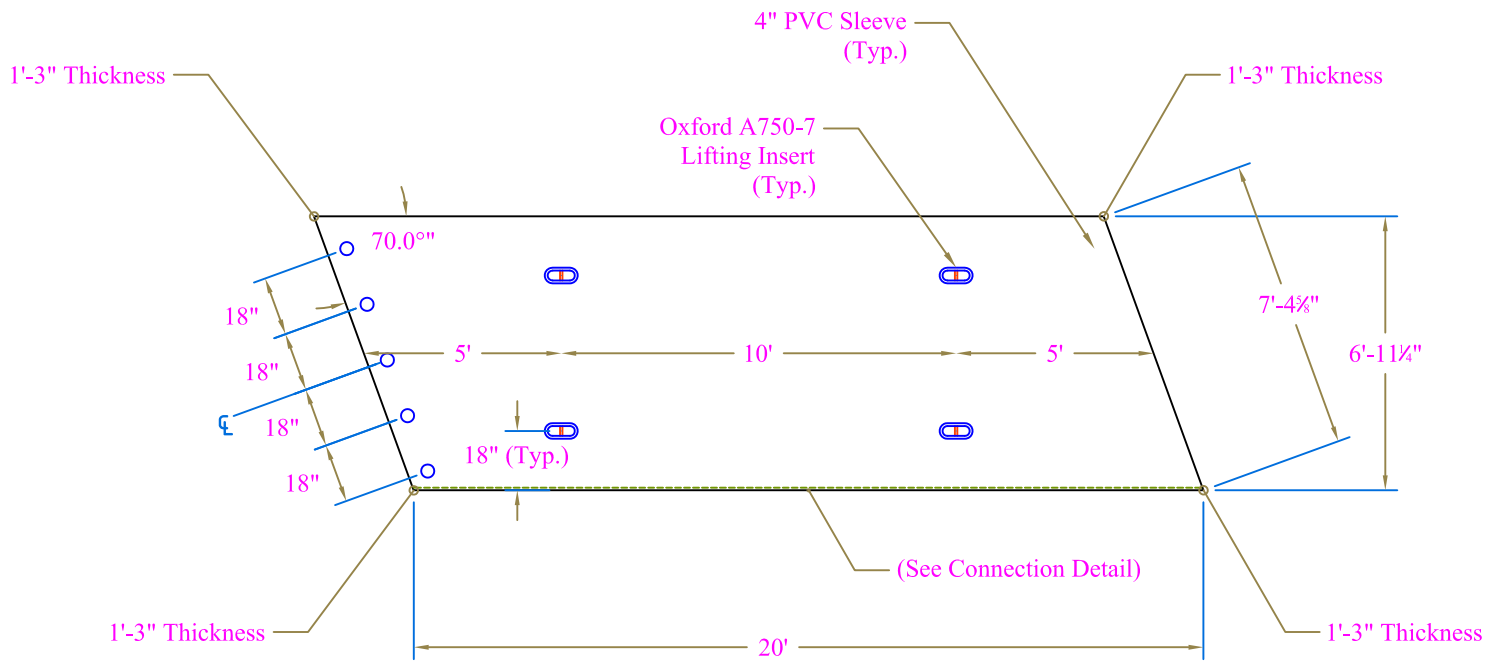


AS#4

CONTRACTORS VTSPE:	PRECAST CONCRETE APPROACH SLAB SHOP DRAWINGS (SDI JOB #14046)	Luck Brothers, Inc 73 Trade Road Plattsburg, NY, 12901 Ph: (518)-561-4321	FABRICATOR: 193 INDUSTRIAL AVE. WILLISTON, VT 05495 Ph: (802) 658-0201	SD Ireland PRECAST
	SUPERVISOR: M. WHEELER DETAILER: I. ADAMS CHECKER: E. Barendse ENGINEER: N/A	PROJECT NAME: Warren PROJECT #: BRF 013-4(32) LOCATION: Bridge #166 Route 100, Warren, VT	02/07/2014	Slab Section Details — 3 of 4



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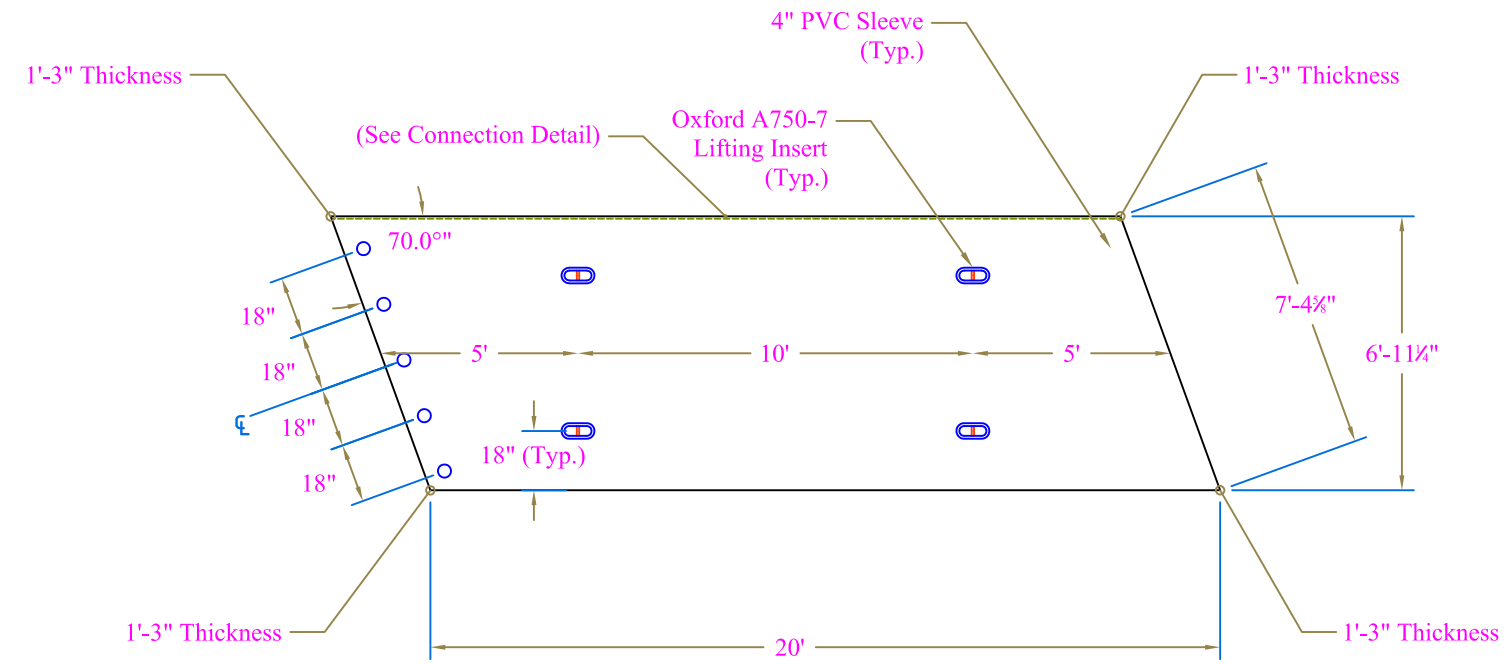

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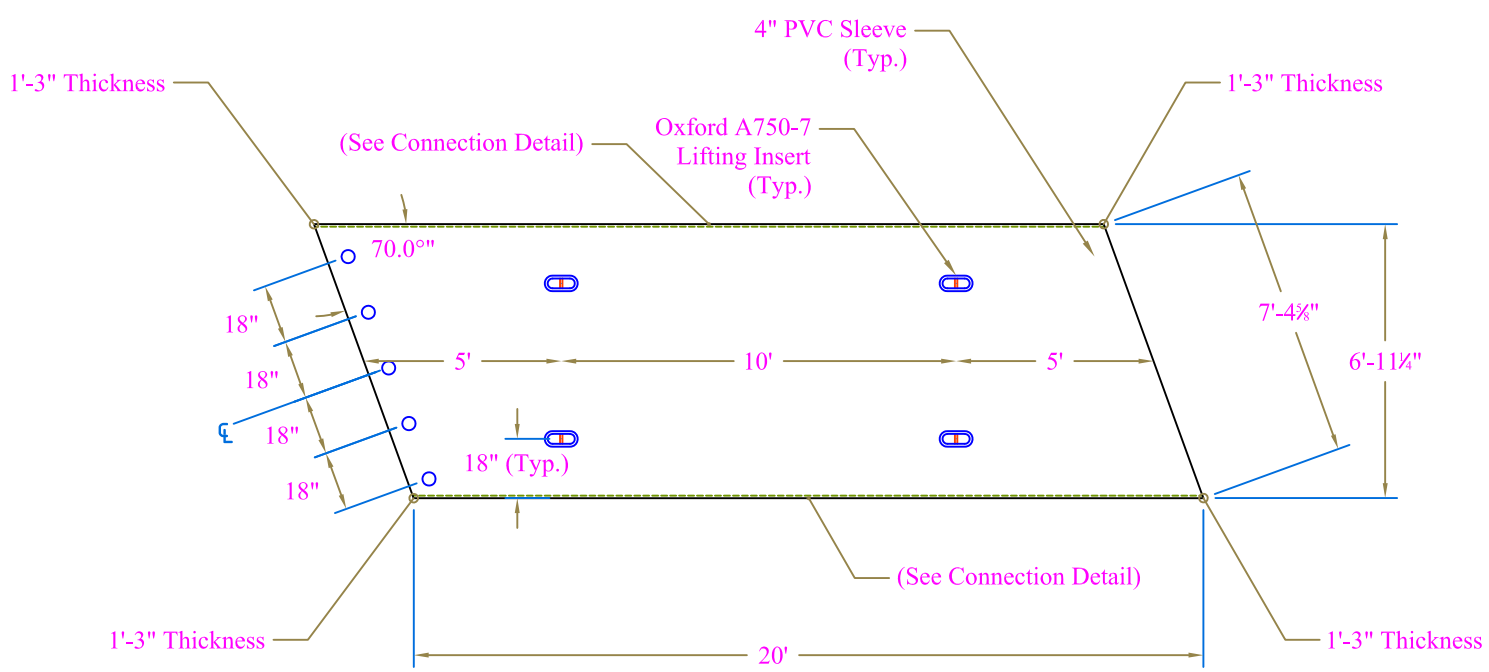
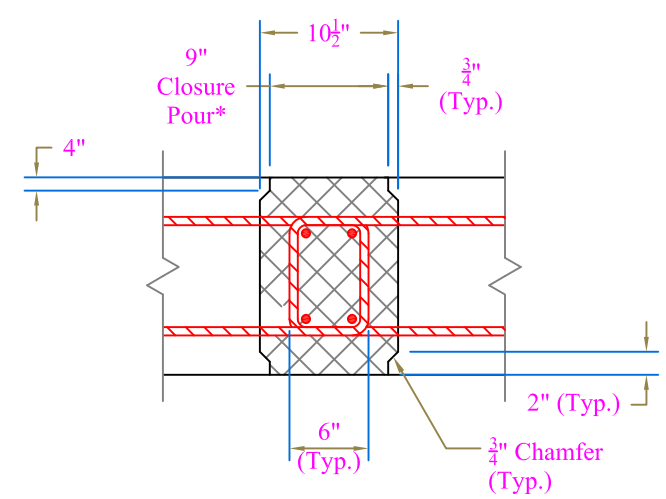
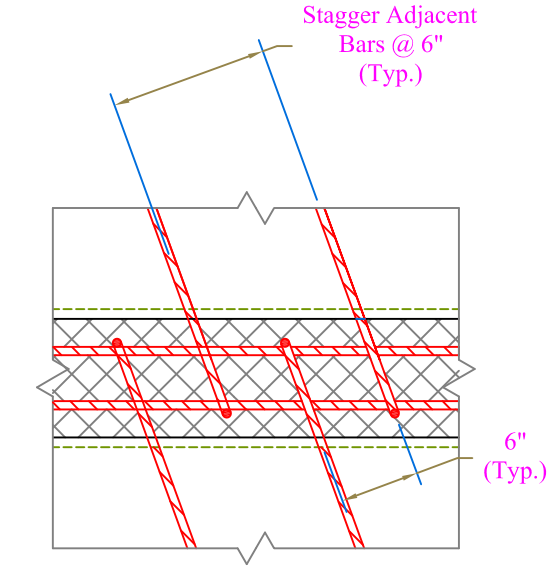


AS#6, 7



Connection Detail Section



Connection Detail Plan

*Note: Fill Approach Slab Closure Pours with HPC Rapid Set Concrete. Concrete Shall Have a 28 Day Min. Compr. Strength of 7000 Psi

CONTRACTORS VTSPE:

Notes:

1. The Top Surface of the Piece Shall Have a Broom Finish Parallel to the Longest Dimension.
2. Slab edges Within Closure Pour Areas Shall be Sand Blasted and Power Washed Clean Prior to Delivery

PRECAST CONCRETE APPROACH SLAB SHOP DRAWINGS (SDI JOB #14046)

SUPERVISOR: M. WHEELER
DETAILER: I. ADAMS
CHECKER: E. Barendse
ENGINEER: N/A

PROJECT NAME: Warren
PROJECT #: BRF 013-4(32)
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Route 100, Warren, VT

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Ph: (518)-561-4321

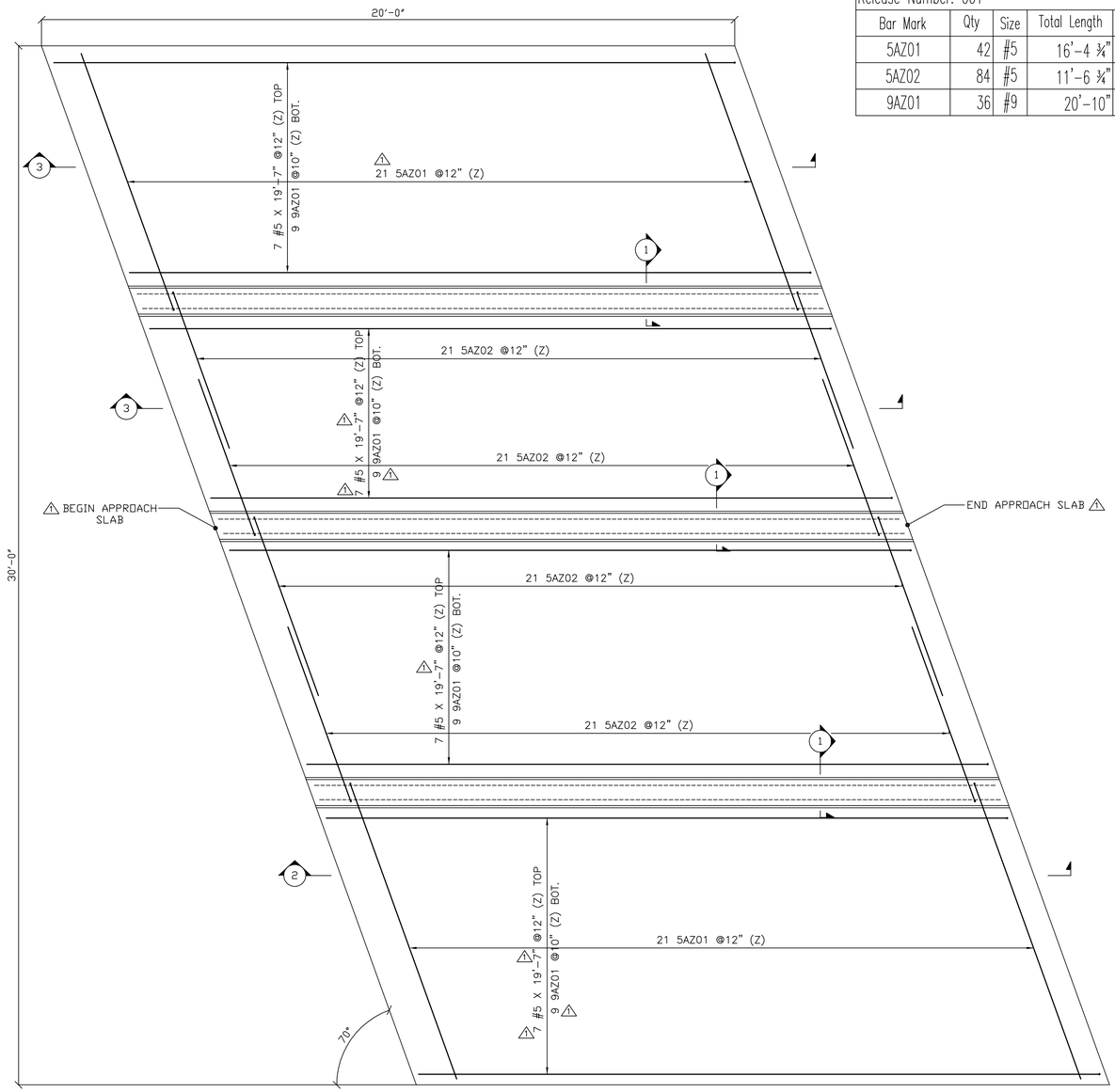
FABRICATOR:
193 INDUSTRIAL AVE.
WILLISTON, VT 05495
Ph: (802) 658-0201

SD Ireland PRECAST

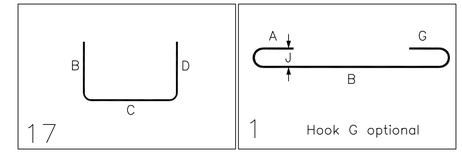
02/07/2014

Slab Section & Connection Details

Release Number: 001																	BAR LIST
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
5AZ01	42	#5	16'-4 ¾"	17		7'-10"	0'-8 ¾"	7'-10"								
5AZ02	84	#5	11'-6 ¾"	17		5'-5"	0'-8 ¾"	5'-5"								
9AZ01	36	#9	20'-10"	1	1'-3"	19'-7"							0'-11 ¾"			



APPROACH SLAB #1 PLAN



ALL DUAL COATED
REINF. DENOTED (Z)

LEGEND:
CONT.-CONTINUOUS
TRANS.-TRANSVERSE
DWLS.-DOWELS
VERTS.-VERTICAL
HORIZ.-HORIZONTAL
T&B -TOP & BOTTOM
I.F.-INNER FACE
O.F.-OUTER FACE
E.E.-EACH END
E.F.-EACH FACE
F.F.-FRONT FACE
R.F.-REAR FACE
E.W.-EACH WAY
O.C.-ON CENTER
L.W.-LONG WAY
S.W.-SHORT WAY

FOR APPROVAL

ELEVATIONS & DIMENSIONS SHOWN ON THIS DWG. ARE FOR REINF. DETAILING PURPOSES ONLY AND ARE NOT INTENDED FOR CONSTRUCTION.

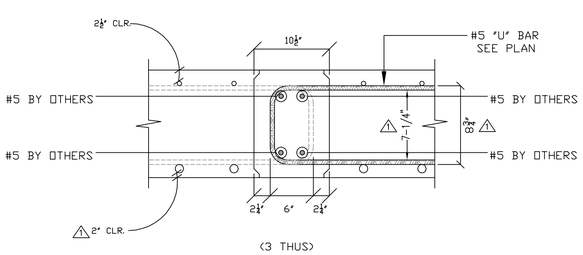
REINF. BARS ASTM A615 GRADE 60 DUAL COATED

VERIFICATION OF UNCLEAR INFORMATION MAY BE REQUESTED ON THIS DRAWING. SHOULD VERIFICATION BE LEFT UN-ADDRESSED IT WILL REMAIN AS SHOWN AND ASSUME TO BE CORRECT.

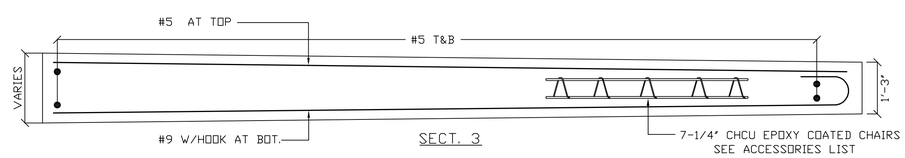
PLEASE CONFIRM SUPPORT CHAIRS

ACCESSORIES	
QUANTITY	DESCRIPTION
250 L.F.	7-1/4" CHCU EPOXY COATED CHAIRS

PLEASE CONFIRM TYP. HOOKS USED



SECT. 1



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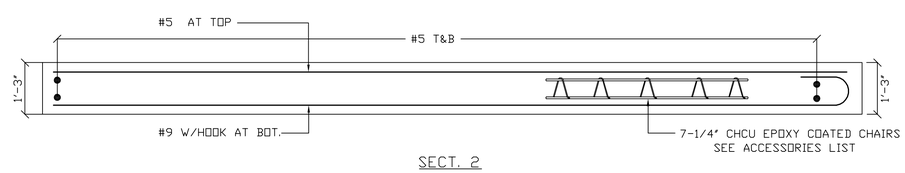

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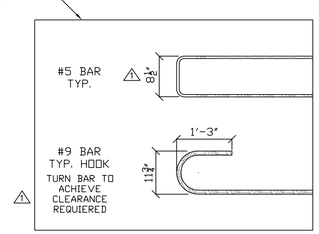

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5			
4			
3			
2	2-21-14	1	DFI INTERNAL REVIEW/FOR APPROVAL
1	2-17-14	0	FOR APPROVAL
	DATE	REV.#	STATUS

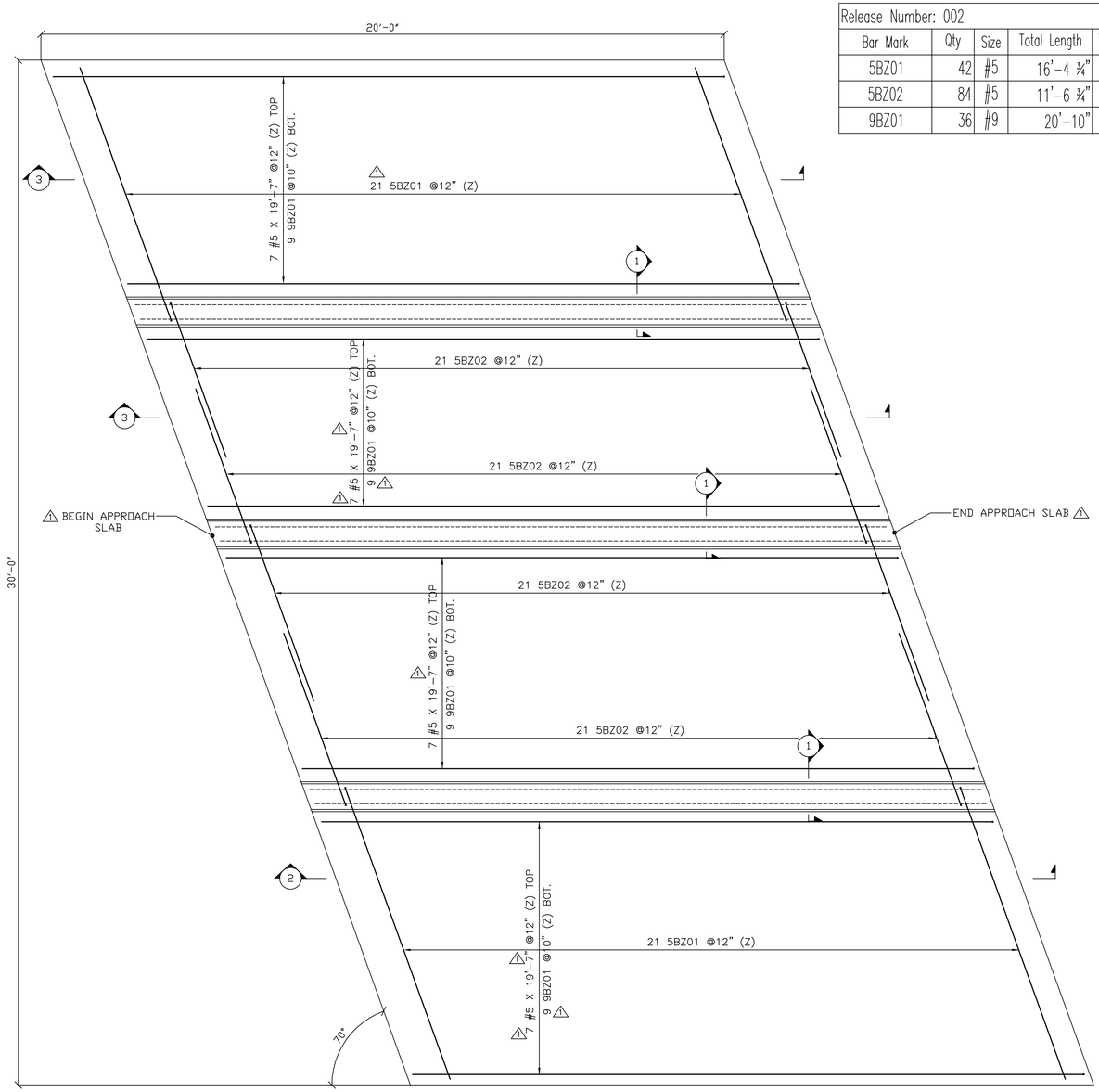
DIMENSION
DIMENSION FABRICATORS INC.
2000 7TH STREET
SCOTIA, N.Y. 12302
PH: (518) 374-1836
FAX: (518) 374-4830
www.dimensionfabricators.com

STRUCTURE	VTAOT WARREN BRF 031-4(32) PRECAST
LOCATION	BRIDGE 166 ROUTE 100 (MINOR ARTERIAL) BURLINGTON, VT
ARCHITECT	
ENGINEER	
CUSTOMER	S.D. IRELAND CONCRETE CONST. CORP.

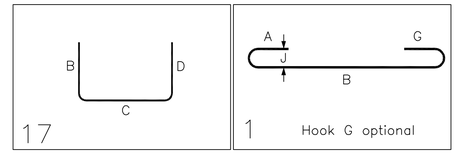
DRAWN BY	DATE	DFI #
ED	2/17/14	8756

DRAWING COVERS	DRAWING #
APPROACH SLAB #1 DUAL COATED REINFORCING	A

Release Number: 002							BAR LIST									
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
5BZ01	42	#5	16'-4 ¾"	17		7'-10"	0'-8 ¾"	7'-10"								
5BZ02	84	#5	11'-6 ¾"	17		5'-5"	0'-8 ¾"	5'-5"								
9BZ01	36	#9	20'-10"	1	1'-3"	19'-7"							0'-11 ¾"			



APPROACH SLAB #1 PLAN



ALL DUAL COATED
REINF. DENOTED (Z)

LEGEND:
CONT.-CONTINUOUS
TRANS.-TRANSVERSE
DWLS.-DOWELS
VERTS.-VERTICAL
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FOR APPROVAL

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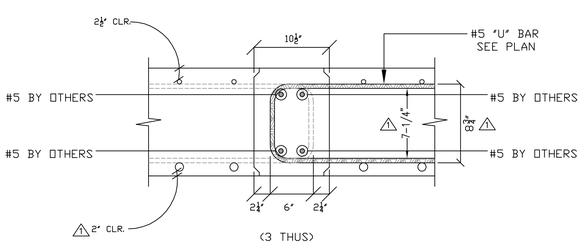
REINF. BARS ASTM A615 GRADE 60 DUAL COATED

VERIFICATION OF UNCLEAR INFORMATION MAY BE REQUESTED ON THIS DRAWING. SHOULD VERIFICATION BE LEFT UN-ADDRESSED IT WILL REMAIN AS SHOWN AND ASSUME TO BE CORRECT.

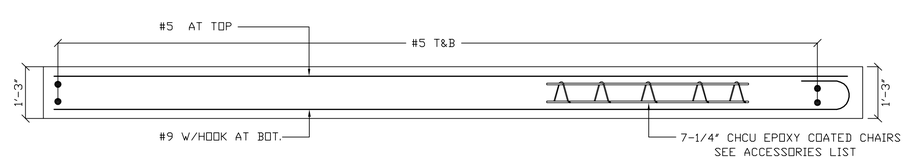
PLEASE CONFIRM SUPPORT CHAIRS

ACCESSORIES	
QUANTITY	DESCRIPTION
250 L.F.	7-1/4" CHCU EPOXY COATED CHAIRS

PLEASE CONFIRM TYP. HOOKS USED



SECT. 1



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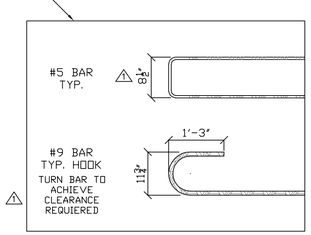

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3			
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	DATE	REV.#	STATUS

DIMENSION
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STRUCTURE	VTAOT WARREN BRF 031-4(32) PRECAST
LOCATION	BRIDGE 166 ROUTE 100 (MINOR ARTERIAL) BURLINGTON, VT
ARCHITECT	
ENGINEER	
CUSTOMER	S.D. IRELAND CONCRETE CONST. CORP.

DRAWN BY	DATE	DFI #
ED	2/17/14	8756

DRAWING COVERS	DRAWING #
APPROACH SLAB #2 DUAL COATED REINFORCING	B

ENGINEERING VENTURES INC

208 Flynn Avenue, Suite 2A, Burlington, VT 05401 · Tel: 802-863-6225 · Fax: 802-863-6306
85 Mechanic Street, Suite 350A, Lebanon, NH 03766 · Tel: 603-442-9333 · Fax: 603-442-9331

Design Calculations

For:

Warren Bridge Lifting/Handling Review
Warren, VT

For:

S.D. Ireland

Submitted On:

February 21, 2014

For Approval

Index | Page

Basis of Design..... 1
Calculations..... 2-5
Lift Sling Configuration..... 6

ENGINEERING VENTURES INC
208 Flynn Avenue, Suite 2A
Burlington, VT 05401
tel. 802.863.6225
fax 802.863.6306
85 Mechanic Street, Suite 350A
Lebanon, NH 03766
tel. 603.442.9333
fax 603.442.9331

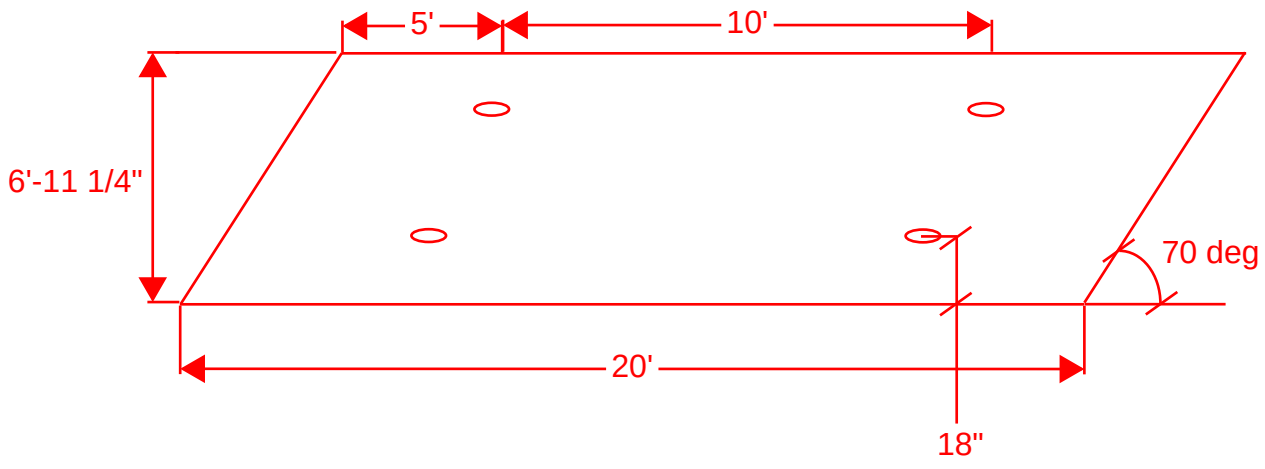
Basis of Design

Reference:

- PCI Design Handbook: Precast and Prestressed Concrete; 6th Edition

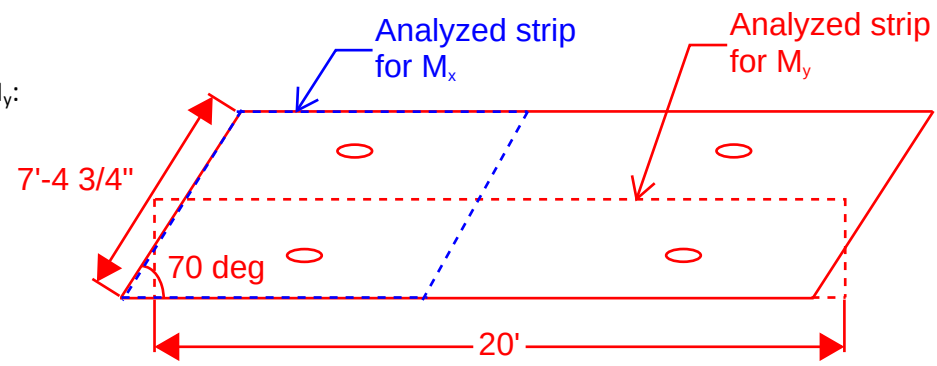
General Design Parameters:

- Stripping Strength: 3000 psi
- Handling Strength: 3000 psi
- Shipping Strength: 5000 psi
- Maximum Slab Thickness: 1'-4 ¾"
- Slab Width: b = 20'
- Slab Length: a = 6'-11 ¼"
- Equivalent Static Load Multipliers (from PCI Table 5.3.3.1)
    - Stripping:
        - Flat, with removable side forms, no false joints or reveals; Smooth mold (form oil only): 1.3
    - Yard Handling and Erection:
        - All products: 1.2
    - Travel:
        - All products: 1.5



ENGINEERING VENTURES INC
208 Flynn Avenue, Suite 2A
Burlington, VT 05401
tel. 802.863.6225
fax 802.863.6306
85 Mechanic Street, Suite 350A
Lebanon, NH 03766
tel. 603.442.9333
fax 603.442.9331

Calculations



Taking the average strip configuration for M_y:

$\cos 70° = \frac{x}{(7'4\frac{3}{4}")/4}$ → x = 0.631'

Distance of lift location to edge of slab:

Left end: 5' – 0.631' = 4.369'

Right end: 5' + 0.631' = 5.631'

Taking the strip configuration for M_x:

$\sin 70° = \frac{1.5\,ft}{h}$ → h = 1.60'

Distance of lift location to edge of slab: 1.59'

A = (20')(12"/ft)(15") = 3600 in^2

Resisting Section for M_y:

$S_{b,y}$* = $bh^2/6$ = (3'-5 5/8")(12")$(15")^2/6$ = 1561 in^3

Resisting Section for M_x:

15t = 15(15")(ft/12")=18.75', or

b/2 = 20'/2 = 10' → Use 10'

$S_{b,x}$* = $bh^2/6$ = (10')(12"/ft)$(15")^2/6$ = 4500 in^3

Unit Weight*: (1'-4 ¾")(150 pcf) = 209 psf = 0.209 ksf

Total Weight: (.209 ksf)(20')(6'-11 ¼") = 29.0 k

*Note: In order to maximize effects, the minimum thickness of 15" was taken for section modulus calculations, while the maximum thickness of 16.75" was taken for the load calculations.

Allowable tensile stresses at stripping and lifting (PCI Eq. 5.3.3.1):

$5\lambda\sqrt{fc'}$ = 5(1.0) $\sqrt{3000\,psi}$ = 0.274 ksi

Allowable tensile stresses at traveling (PCI Eq. 5.3.3.1):

$5\lambda\sqrt{fc'}$ = 5(1.0) $\sqrt{5000\,psi}$ = 0.354 ksi

From PCI Figure 5.3.1.2:

a = 6'-11 ¼" ; b = 20' ; a/2 = 3'-5 5/8"

w_y = (0.209 ksf)(3'-5 5/8") = 0.725 klf

w_x = (0.209 ksf)(10') = 2.09 klf

Using mechanics of materials (see shear and moment diagrams on pages 4 and 5):

M_y = (0.5)(5.63')(4.1 k) = 11.5 k-ft

+ M_x = (0.5)(1.6')(3.2 k) = 2.6 k-ft

- M_x =(2.6 k-ft) - (0.5)(2.1')(4.3 k) = -1.9 k-ft

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For Stripping:

$f_t = M_y / S_{b,y}$ = (11.5 k/ft)(12”/ft)(1.3)/(1561 in^3) = **.115 ksi < 0.274 ksi → O.K.**

$f_t = + M_x / S_{b,x}$ = (2.6 k/ft)(12”/ft)(1.3)/(4500 in^3) = **.009 ksi < 0.274 ksi → O.K.**

$f_t = - M_x / S_{b,x}$ = (-1.9 k/ft)(12”/ft)(1.3)/(4500 in^3) = **.007 ksi < 0.274 ksi → O.K.**

For Yard Handling and Erection:

$f_t = M_y / S_{b,y}$ = (11.5 k/ft)(12”/ft)(1.2)/(1561 in^3) = **.106 ksi < 0.274 ksi → O.K.**

$f_t = + M_x / S_{b,x}$ = (2.6 k/ft)(12”/ft)(1.2)/(4500 in^3) = **.008 ksi < 0.274 ksi → O.K.**

$f_t = - M_x / S_{b,x}$ = (-1.9 k/ft)(12”/ft)(1.2)/(4500 in^3) = **.006 ksi < 0.274 ksi → O.K.**

For Travel:

$f_t = M_y / S_{b,y}$ = (11.5 k/ft)(12”/ft)(1.5)/(1561 in^3) = **.132 ksi < 0.354 ksi → O.K.**

$f_t = + M_x / S_{b,x}$ = (2.6 k/ft)(12”/ft)(1.5)/(4500 in^3) = **.010 ksi < 0.354 ksi → O.K.**

$f_t = - M_x / S_{b,x}$ = (-1.9 k/ft)(12”/ft)(1.5)/(4500 in^3) = **.008 ksi < 0.354 ksi → O.K.**

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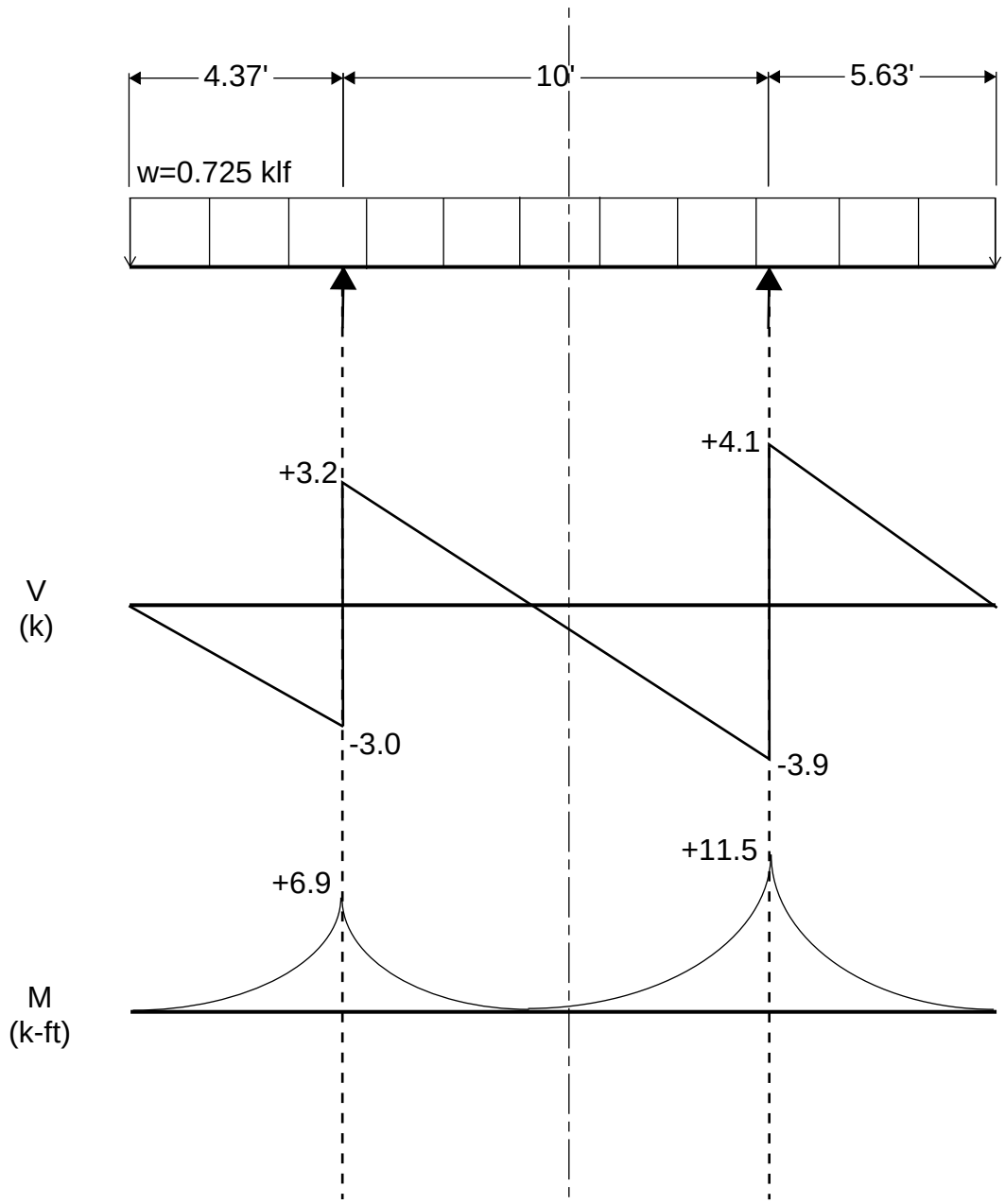
Load, Shear, and Moment Diagrams for M_y :



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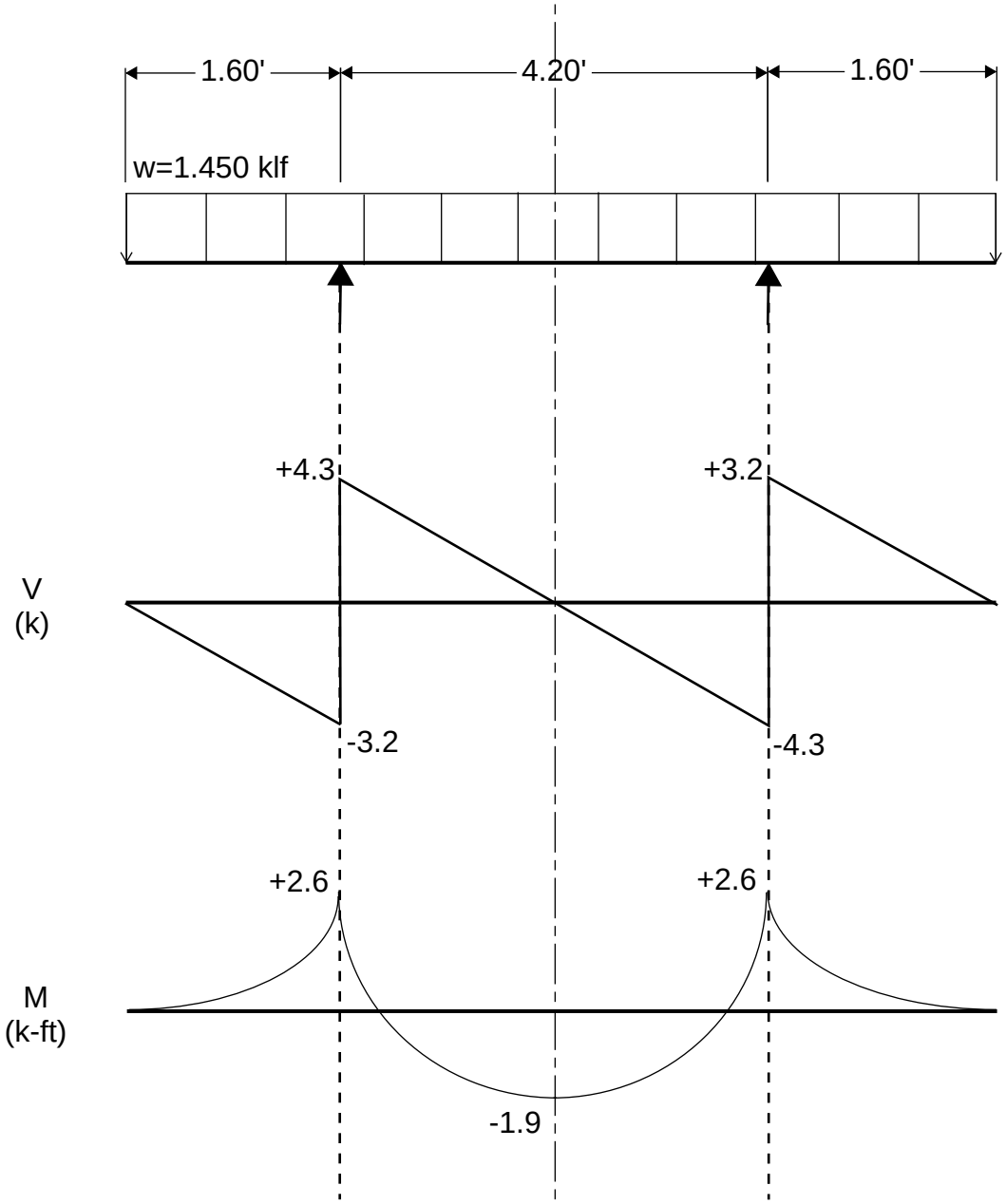
Load, Shear, and Moment Diagrams for M_x :



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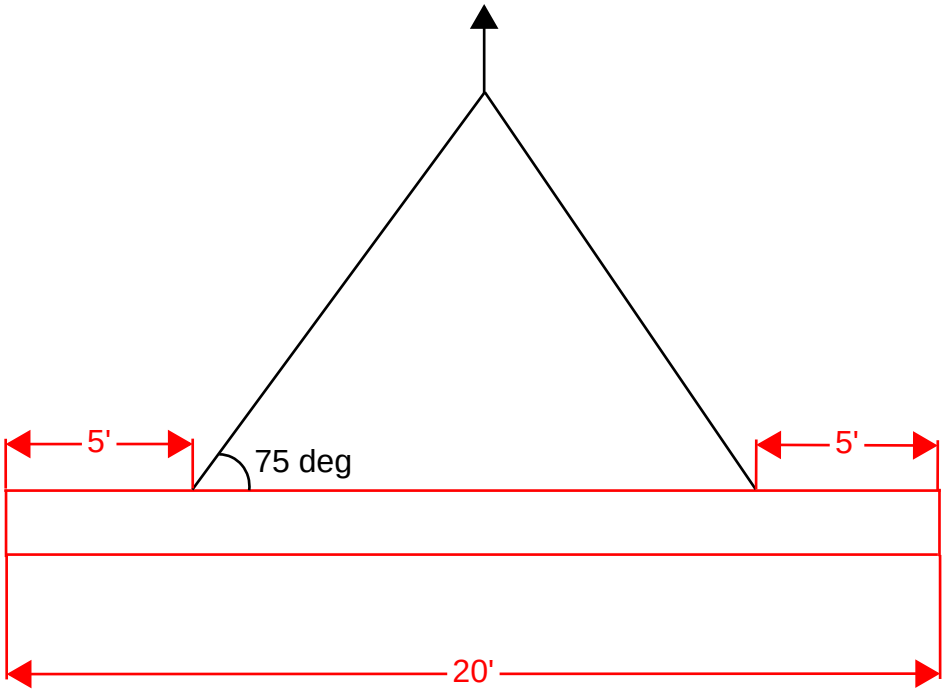
Lift Sling Configuration



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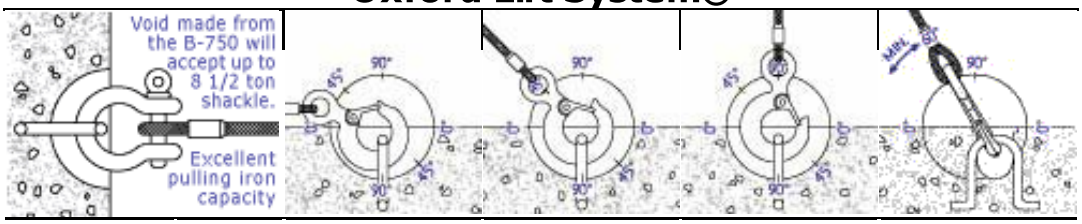
Oxford Lift System®



Anchor Product Code	Slab Min. Inches	Safe Working Load @ 90 degree Shear-0 degree Pull	Safe Working Load @ 90 degree Shear-45 degree Pull	Safe Working Load @ 90 degree Tension-90 degree Pull	Safe Working Load @ 90 degree Shear-60 degree Pull
A 500-3	4.00"	4,500	4,000	3,500	4,000
A 500-4	5.00"	8,000	5,500	4,000	5,000
A 500-5	6.00"	10,500	6,500	5,000	5,500
A 750-5	6.00"	12,500	8,000	7,000	7,000
A 750-7	8.00"	15,000	12,500	10,000	10,000

Note: Safe Working Load provides a factor of safety of approximately 4:1

Test Results are based on a minimum concrete compressive strength of 4,000 psi.

<back next>

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CONCRETE MIX DESIGN

6000 psi

SCC

SDI MIX CODE: P60TER

DATE: July 18, 2013 **PLANT:** Burlington, VT

PROJECT: **General DOT Precast - 2014**

FINE AGGREGATE#1: ASTM C 33	Source:	Hinesburg Sand & Gravel
	Specific Gravity:	2.65 (Abs.: 1.34%)
	Fineness Modulus:	2.92
FINE AGGREGATE#2: Fine Grade	Source:	Hinesburg Sand & Gravel
	Specific Gravity:	2.65 (Abs.: 1.34%)
	Fineness Modulus:	1.49 (17.8% replacement)
COARSE AGGREGATE: ASTM C 33	Source:	S.D. Ireland, Brownell Quarry
	Specific Gravity:	2.80 (Abs.: 0.30%)
	Description	3/4" 100% Crushed Stone (Size #67)
CEMENT:	Ternary Blend Cement; Lefarge North America Lakes and Seaway Re St. Constant, Quebec (Sp. Gvty. 3.02)	
ADMIXTURES:	Water Reducer (HRWR): Glenium 7500; BASF Air Entraining Agent: Darex II AEA; Grace Concrete Chemicals	

CONSTITUENTS (LBS. /YD³)

		Abs.Vol.
Coarse Aggregate (SSD)	1750	10.02
Fine Aggregate #1(SSD)	829	5.01
Fine Aggregate #2 (SSD)	180	1.09
Cement	800	4.25
Water	304.6	4.88
Air Content (Entrained)	6.5%	1.75
Total	3864	27.00ft³

MIX PROPERTIES

Water Cement Ratio: 0.38
Entrained Air Content: 5.0 % – 9.0%
Spread: 20" to 27"
Dry Unit Weight: 144.2 ± pcf

***ADMIXTURE(S) DOSEAGE (OZ. /YD³)**

Glenium 7500 (HRWR)	44 - 64
Darex II AEA	2.5

*Admixture dosage rates are subject to change.