

# The PT Supplier's Role in the Building Process



# Furnish PT Material & Equipment

The PT supplier's "basic" scope is to furnish the PT material, installation drawings and stressing equipment. Because of the critical nature of the prestressing system, the real value of the PT supplier to the successful completion of a building project is much more - requiring PT experience, engineering capabilities and overall knowledge of concrete frame construction systems & techniques.

# PT Material from a PTI Certified Plant

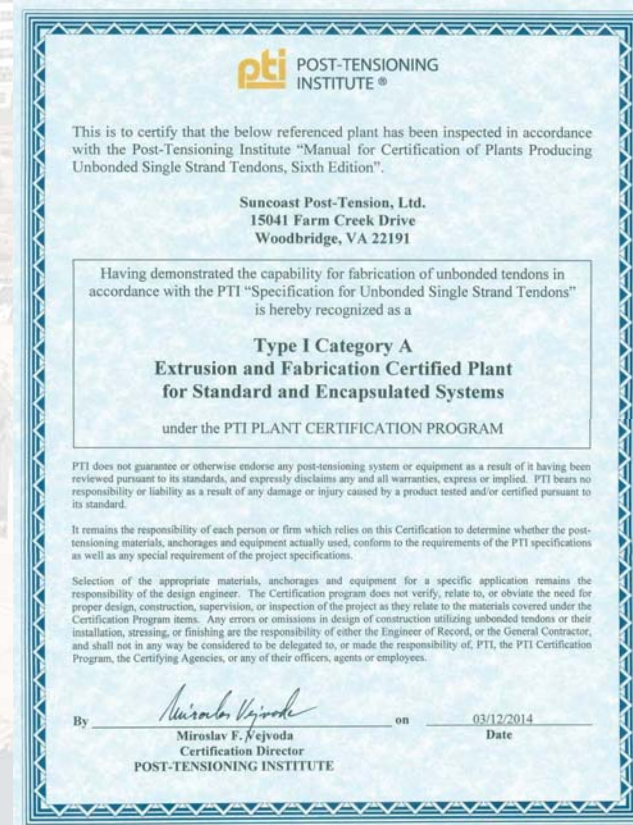
Look for this logo on all material documents



Ask for this certification from all suppliers

For information on the program requirements, go to:

[www.post-tensioning.org](http://www.post-tensioning.org)  
and to the Certification Tab



# PT Material

## Encapsulation System - Watertight encapsulation of the entire anchorage

- Have 50-mil thickness
- Positive connection of all components
- Minimum 4-inch overlap between sleeve & tendon sheathing
- Be translucent



# PT Material Packaging



Look for this logo on all material documents



# PT Material Packaging

Ref Number: 1300750

Client: General Construction Company

☐ Job Name: Project EXAMPLE

Location: Washington, D.C.

Shipping Memo No: 1530542

Bldg: Residential Tower

Level: 4 North

☐ Area: --

Pour: 2

Location: Bands



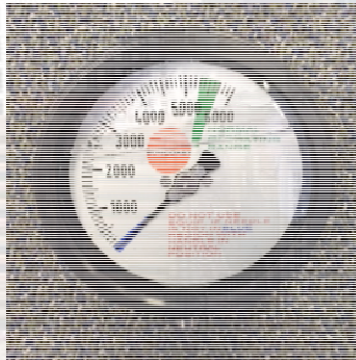
# PT Material Shipments

## Protect Bundles during Transportation

Including loose hardware, stressing anchorages & accessories



# PT Stressing Equipment

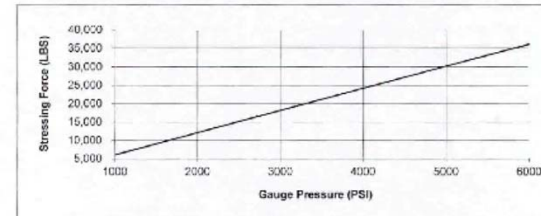


## Suncoast Post-Tension

A Keller Company  
Suncoast Post-Tension, Ltd.  
509 N. Sam Houston Parkway E.  
Suite 300  
Houston Texas 77060  
Tel: (281) 445-8888  
Fax: (281) 445-8633

Web: [www.suncoast-pt.com](http://www.suncoast-pt.com)  
Email: [suncoast@suncoast-pt.com](mailto:suncoast@suncoast-pt.com)

### Suncoast Calibration Document



Gauge Pressure (PSI)	Load Cell Readings (LBS)			Average
	Test 1	Test 2	Test 3	
1000	6,100	6,000	6,000	6,033
2000	12,100	12,100	12,100	12,100
3000	18,200	18,100	18,200	18,167
4000	24,200	24,200	24,200	24,200
5000	30,200	30,200	30,200	30,200
6000	36,000	36,100	36,100	36,067

The Gauge Pressure Corresponding to 33.04 KIPS is:

**5500 PSI**

Jack S/N:	997 ptpm: 2868AL (Black)
Gauge #:	997
Calibrated By:	David Lupton
Date Calibrated:	April 23, 2014
Load Cell:	1042
Strain Indicator:	6.7041
Date Calibrated:	December 3, 2013
Calibrated by (Co):	StrainScan

# Beyond PT Material & Equipment

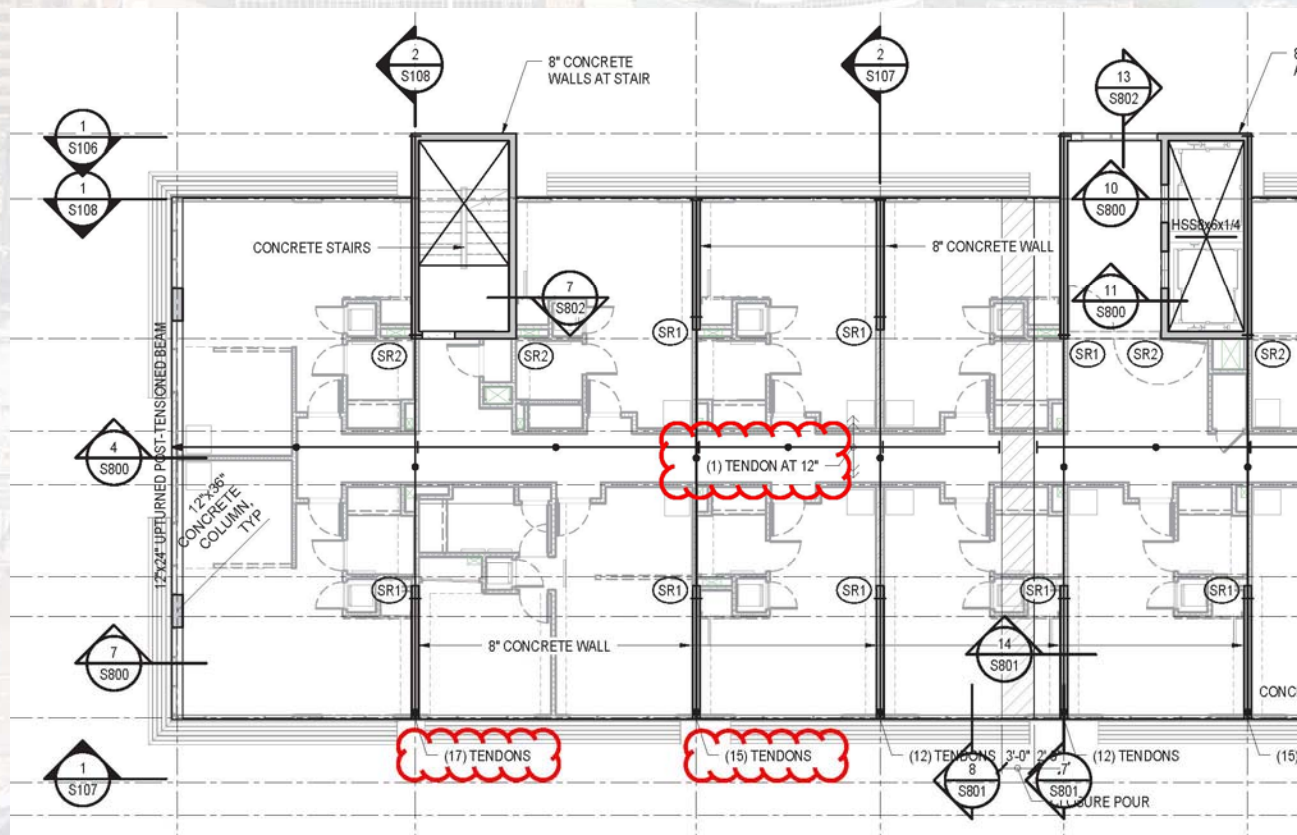
- *Design Phase*
  - Design Assist
  - Construction Joint / Pour Strip Placement
  - Restraint
  - Impact on Shear Wall Forming Systems

# Beyond PT Material & Equipment

- Pre-Bid Phase
  - Value Engineering
  - Construction Schedule
    - Pour & Stressing Sequence (Formwork Utilization)
    - Optimizing details for quicker installation
    - Coordination with non-prestressed reinforcing
    - Congestion
  - Integration with other building systems
    - Curtain Wall Embeds

# Beyond PT Material & Equipment

- Bid Phase - Accurately prepare material estimates

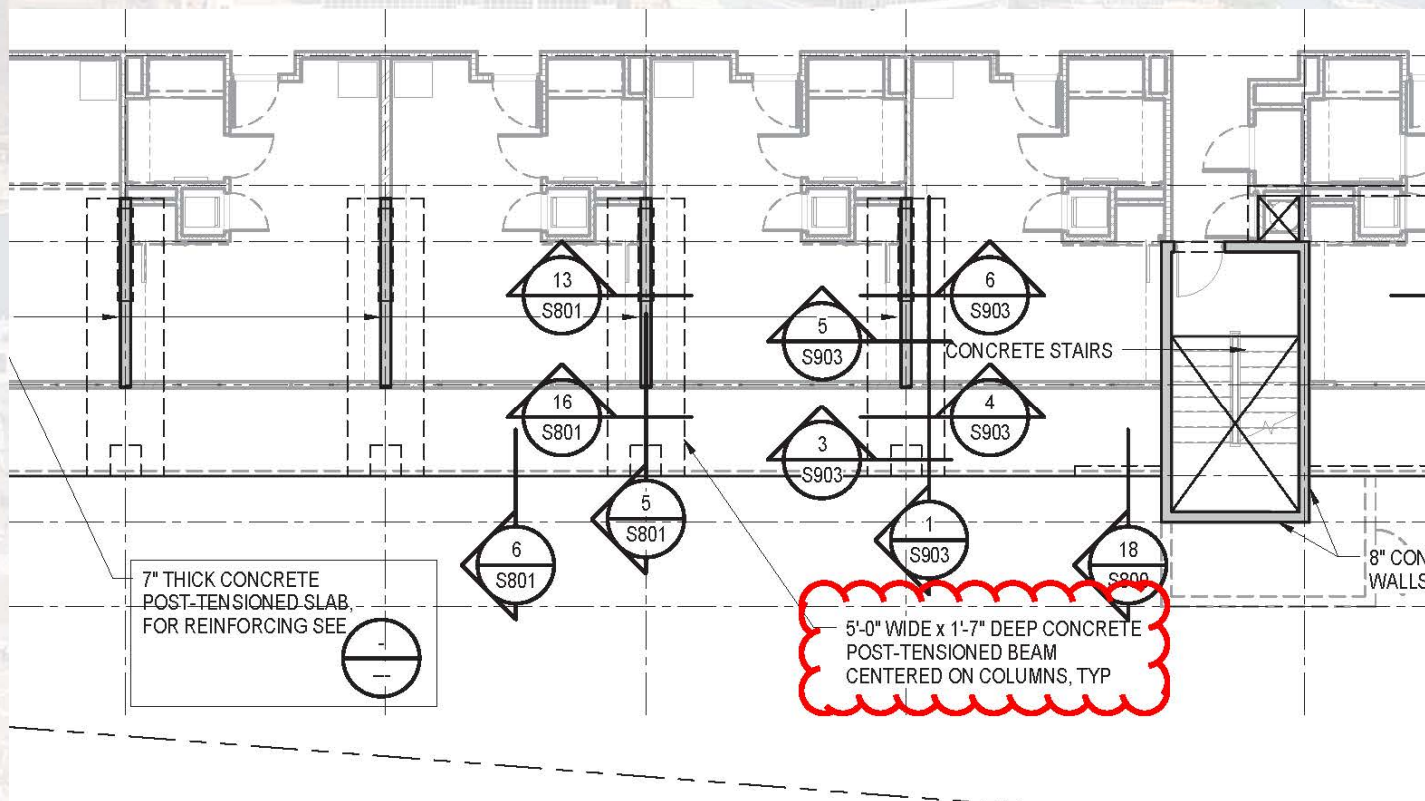


- Bid Phase - Accurately prepare material estimates



# Beyond PT Material & Equipment

- Bid Phase - Accurately prepare material estimates



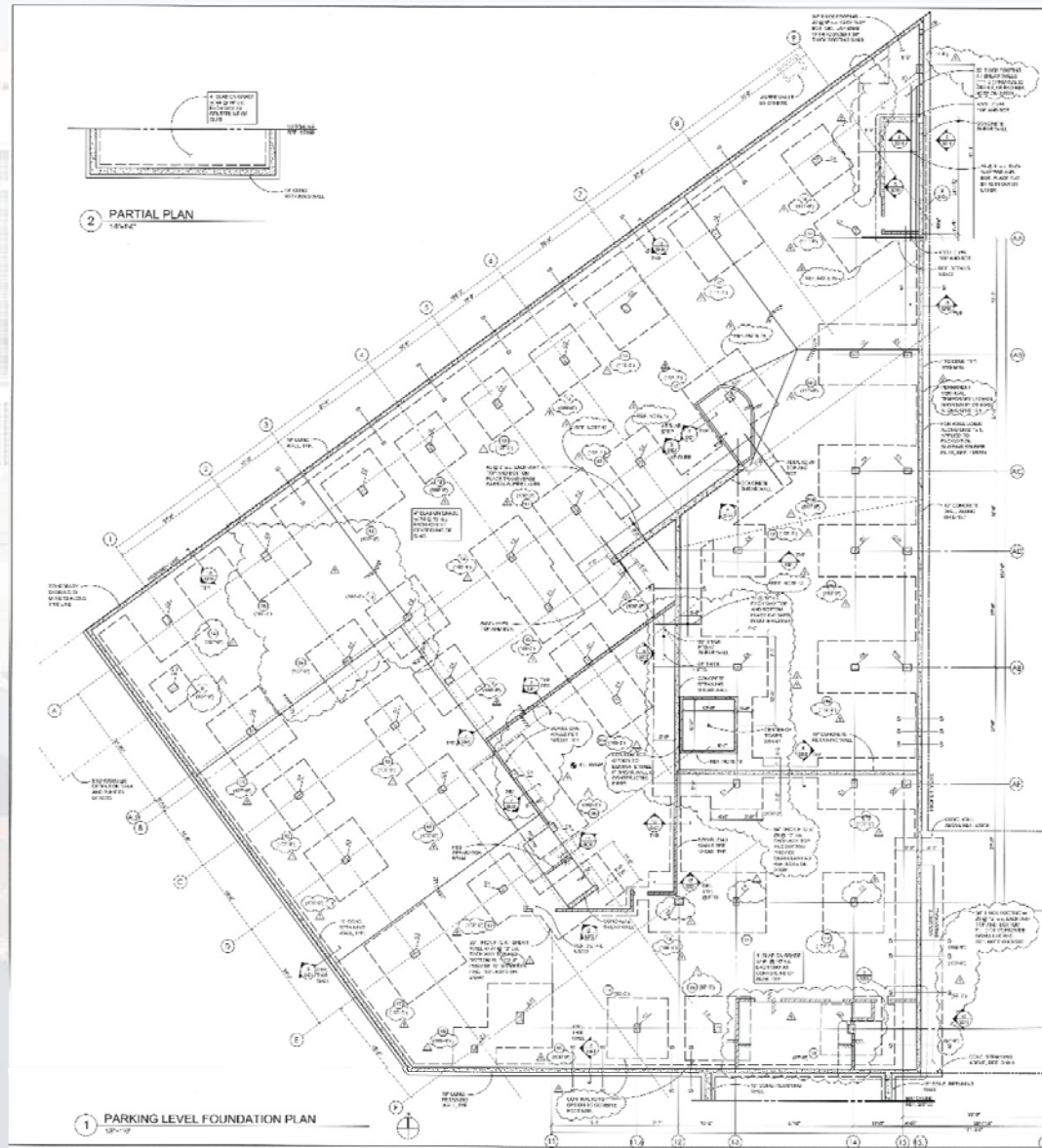
# Beyond PT Material & Equipment

- *Post Award Phase*

- Finalizing the Pour & Stressing Sequence to fit the selected formwork system & construction schedule
- Coordinate with contractor, installer and other trades to facilitate installation details and coordinate other concrete embedded elements
- Impact of Tower Crane or Placing Boom blackout or location on tendon placement & stressing

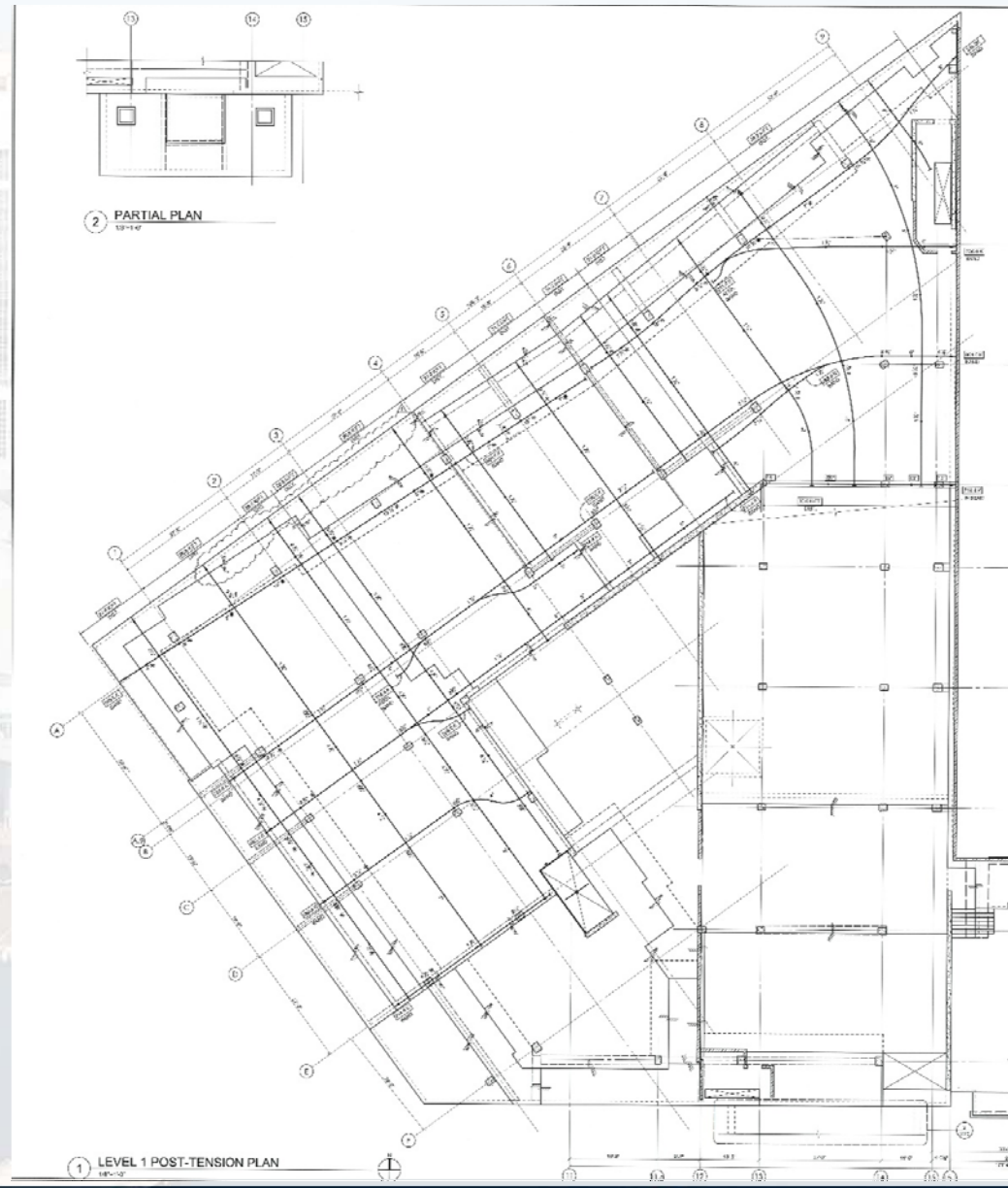
# PT Field Installation Drawings

- The *backbone* of a successful project:

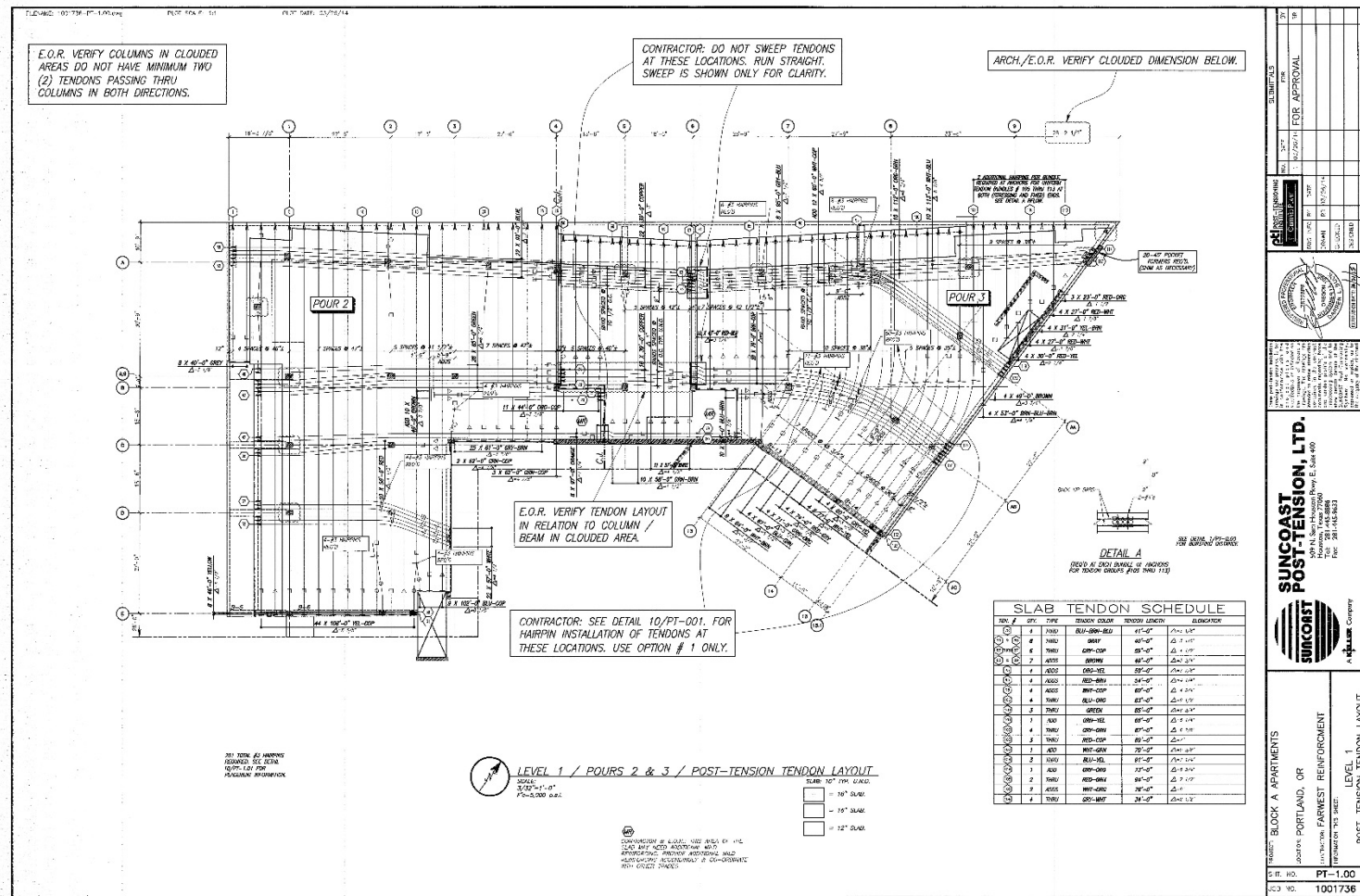


# PT Design Provided by the LDP

- Basic information for PT Forces and Tendon Profile



# PT Layout Provided by PT Supplier



22 X 39'-0" COPPER  
Δ=3'

16 X 45'-0" RED-BLU  
Δ=3 1/4'

10 X 58'-0" GRN-BRN  
Δ=4 1/2'

11 X 57'-0" WHITE  
Δ=4 1/2'

8 X 95'-0" GRN-BLU  
Δ=5 1/2'

ADD 12 X 60'-0" WHIT-COP  
Δ=4 5/8"

8-#3 HAIRPINS REQ'D

10 X 112'-0" ORG-BRN  
Δ=6 3/4"

10 X 113'-0" WHIT-BLU  
Δ=6 7/8"

2 ADDITIONAL HAIRPINS PER BUNDLE  
REQUIRED AT ANCHORS FOR UNIFORM  
TENDON BUNDLES # 105 THRU 113 AT  
BOTH (STRESSING AND FIXED) ENDS.  
SEE DETAIL A BELOW.

9 SPACES @ 38"±

POUR 3

3 X 23'-0" RED-ORG  
Δ=1 1/2'

4 X 27'-0" RED-WHT  
Δ=1 7/8'

4 X 31'-0" YEL-BRN  
Δ=2 1/4'

4 X 27'-0" RED-WHT  
Δ=1 7/8'

4 X 30'-0" RED-YEL  
Δ=2 1/8'

4 X 49'-0" BROWN  
Δ=3 3/4"

4 X 53'-0" BRN-BLU-BRN  
Δ=4 1/8"

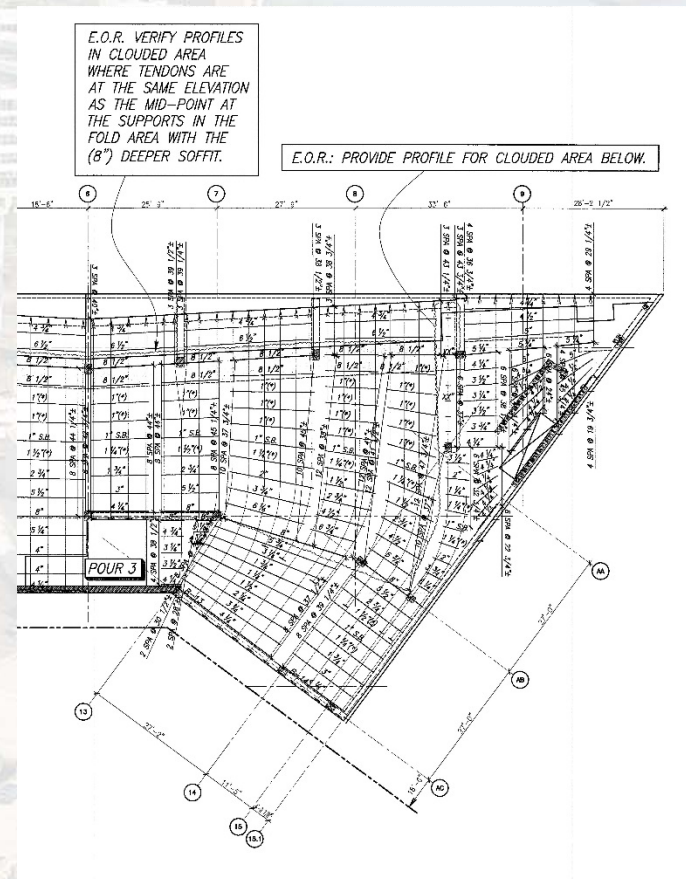
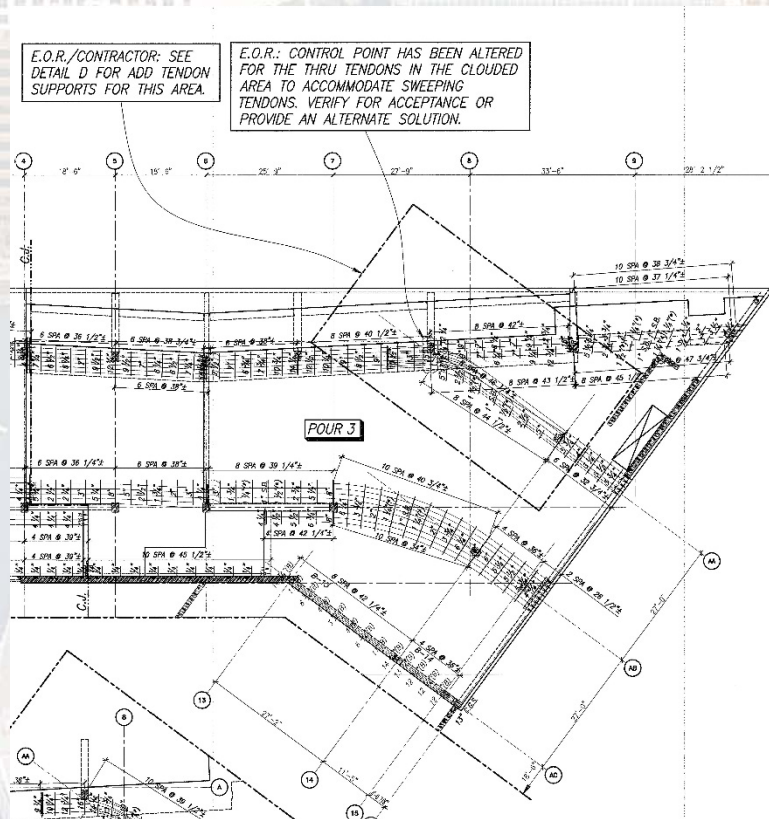
20-45° FORME  
(SHIM AS

BACK UP BARS  
2-#4's

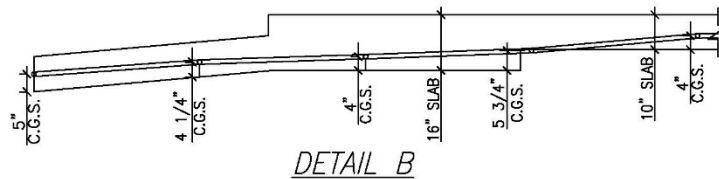
DETAIL A  
(REQ'D AT EACH BUNDLE OF ANCHOR  
FOR TENDON GROUPS #105 THRU 111)

ON LAYOUT  
COLUMN /  
AREA.

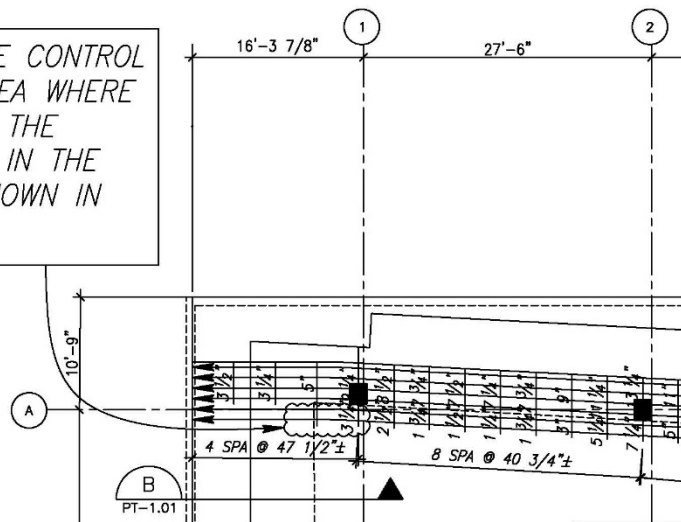
## PT Supports Provided by PT Supplier



# Special Conditions



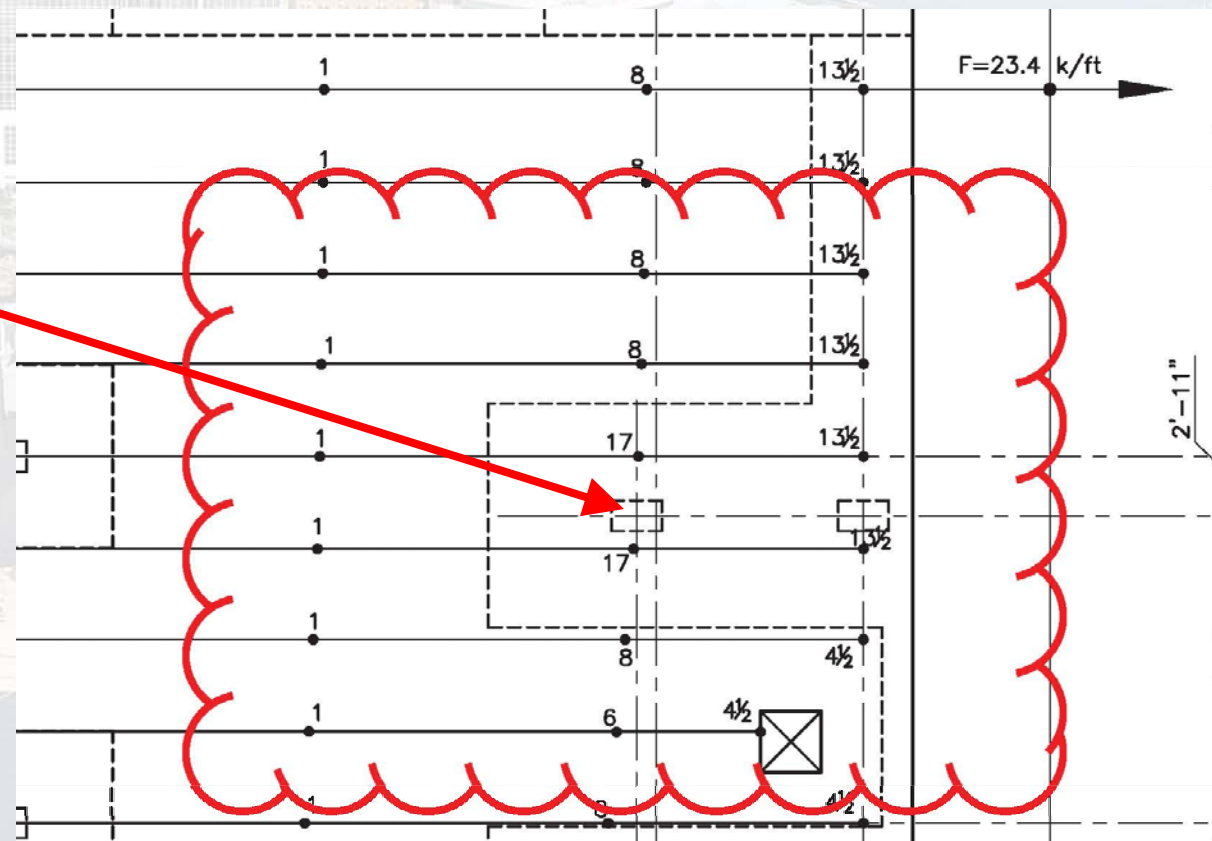
E.O.R. PROVIDE ALTERNATE CONTROL POINTS FOR CLOUDED AREA WHERE THE TENDONS PENETRATE THE UNDERSIDE OF THE SLAB IN THE PROFILE PROVIDED AS SHOWN IN DETAIL B ABOVE.



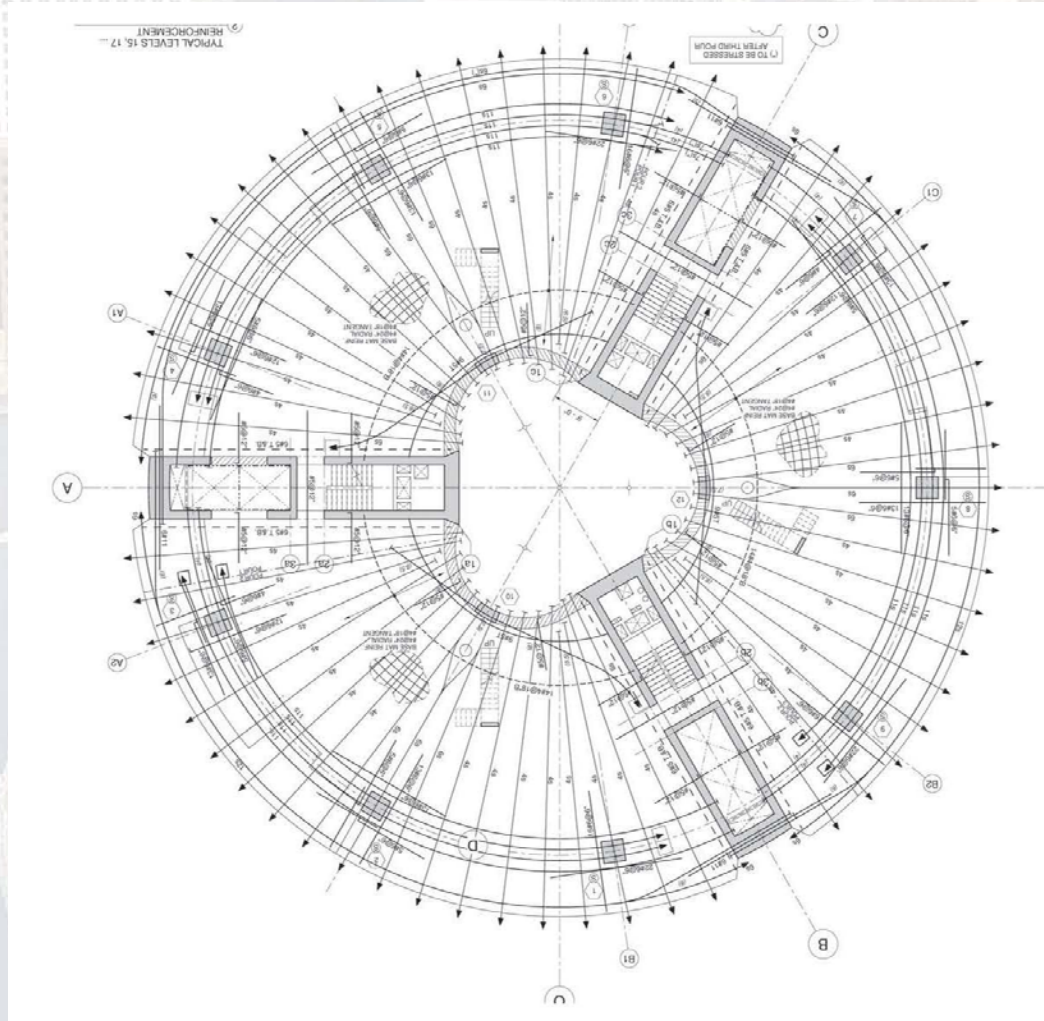


# What the PT Supplier Sees

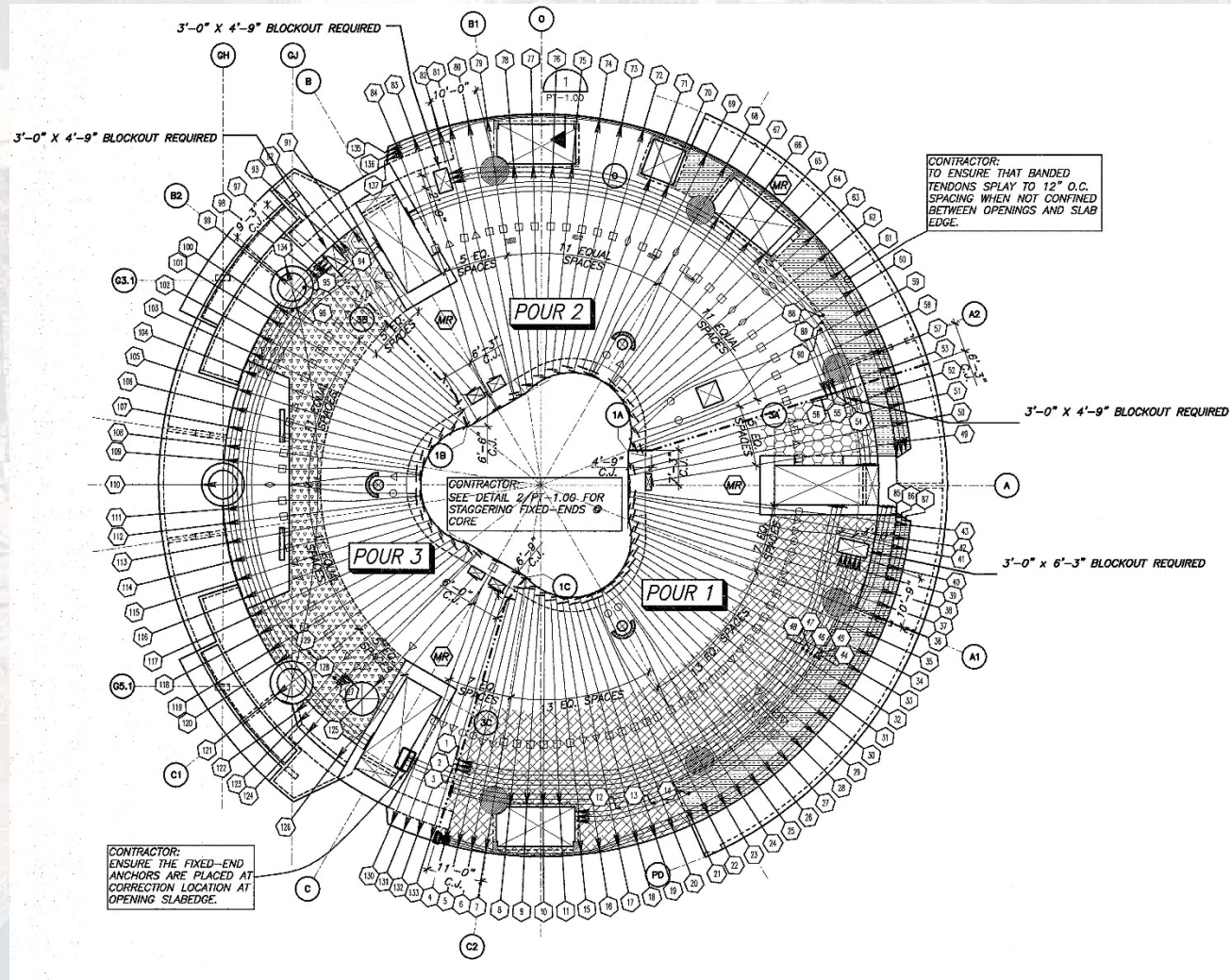
Minimum of 2  
tendons must run  
through the core  
steel of the  
column



# PT Design Provided by the LDP



# What Is Provided by PT Supplier



# Pre-Construction Phase

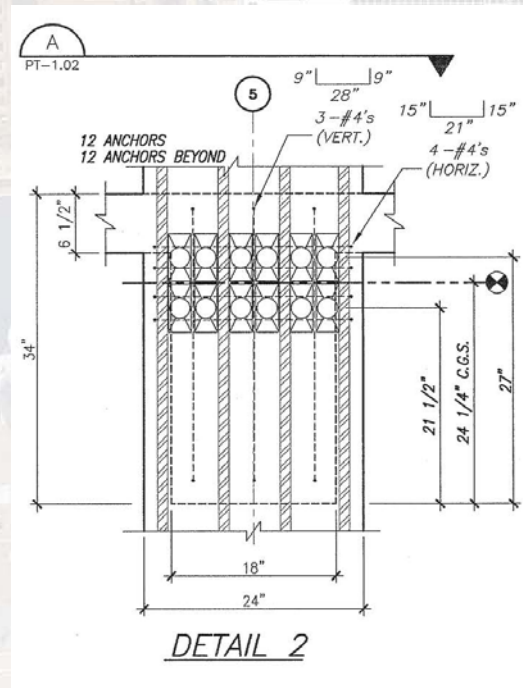
- Product Conflict resolution (embeds, curtain wall systems, penetrations, etc.)
- Congestion Issues (other reinforcement)
- Pre-concrete placement meeting with contractor, LDP and inspection agency

# Construction Phase

- Pre-concreting meeting – enormously important – face to face or conference call
- Jobsite visits to resolve conflicts
- Review of Stressing Reports

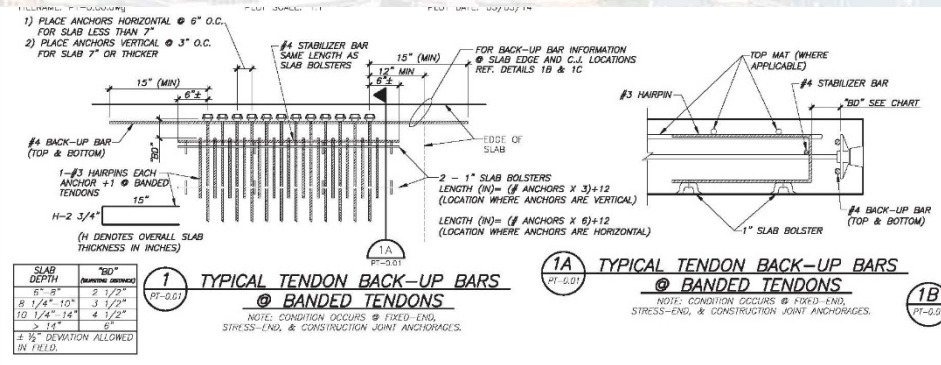
# Construction Phase

- Mislocation of steel



# Construction Phase

## Missing Hairpins

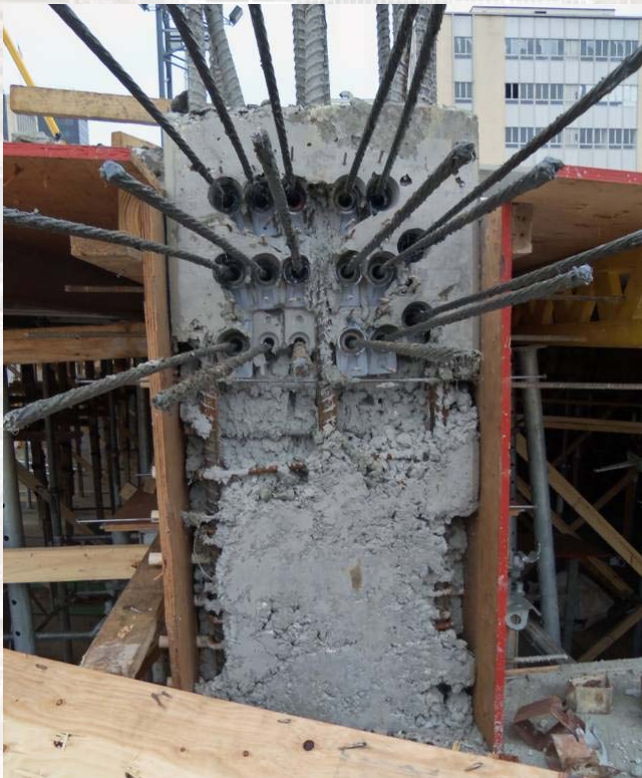


## Honeycombs



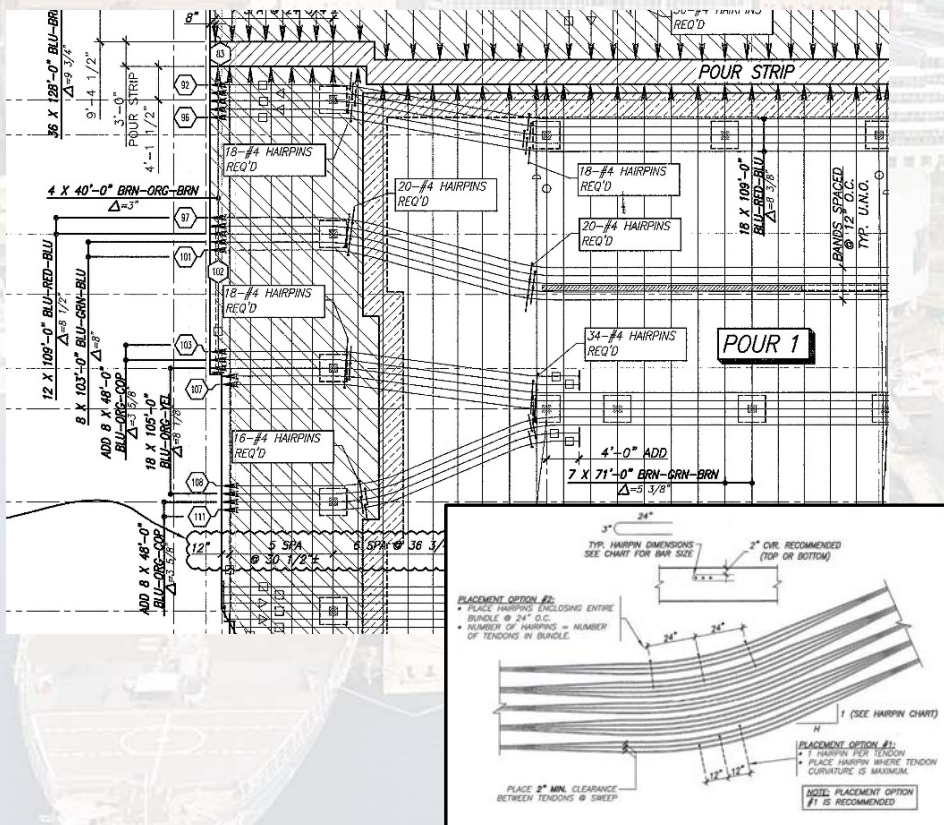
# Construction Phase

- Concrete Placement



# Construction Phase

## Missing Curvature Hairpins



# Construction Phase

- Mislocated Anchors



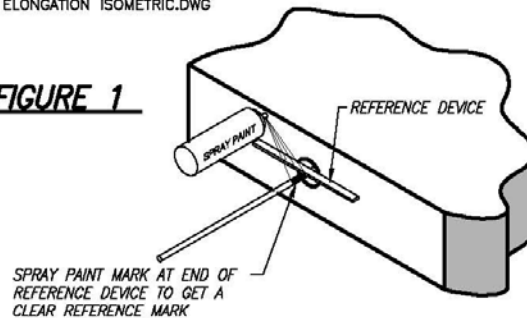
# Field Construction Procedures

FILE NAME: ELONGATION ISOMETRIC.DWG

PLOT SCALE: 1:1

PLOT DATE: 07/01/13

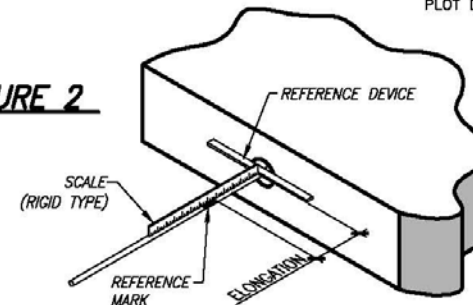
**FIGURE 1**



## **PREPARING SLAB FOR STRESSING:**

1. REMOVE THE POCKET FORMER.
2. CLEAN THE ANCHOR CAVITY.
3. CLEAN THE STRAND FROM THE WEDGE CAVITY TO 6-INCHES FROM SLAB EDGE. THE ANCHOR CAVITY, WEDGES AND STRAND MUST BE CLEAN OF ANY CONCRETE SLURRY, DIRT OR FOREIGN MATERIAL. IF IT IS NOT CLEAN, THE WEDGES WILL NOT SEAT PROPERLY IN THE ANCHOR CAVITY CAUSING THE STRAND TO SLIP THROUGH THE WEDGES RESULTING IN SHORT ELONGATIONS AND LOW FORCE.
4. INSERT THE WEDGES AND SEAT USING A HAND-SEATING TOOL IN ALL STRESSING ANCHORS.
5. USE A SHORT PIECE OF WIDE METAL BANDING STRAP (USED TO SECURE THE MASTER TENDON BUNDLES FOR SHIPPING) AS A REFERENCE DEVICE. PLACE THE REFERENCE DEVICE AGAINST THE SLAB EDGE (SEE FIG 1) AND APPLY THE REFERENCE MARK TO THE TOP OF THE TENDON TAIL USING QUICK DRY SPRAY PAINT OR MARKING PEN (DO NOT USE A LUMBER CRAYON). THIS WILL SET THE INITIAL REFERENCE MARK A FIXED DISTANCE OF 1-1/4" FROM THE SLAB EDGE.
6. FOR TENDONS STRESSING AT ANY ANGLED SLAB EDGE, THE REFERENCE MARK MUST BE MADE COMPLETELY AROUND THE TENDON TAIL (NOT JUST ON THE TOP) SINCE THE MARK WILL TURN RELATIVE TO THE ANGLED SLAB EDGE AS THE TENDON ELONGATES. AS AN ALTERNATE, TAPE CAN BE WRAPPED AROUND THE TENDON TAIL OVER THE REFERENCE MARK.
7. ALL REFERENCE MARKS ARE TO BE CLEAR AND STRAIGHT. OVER-SPRAY OR SMEARED MARKS WILL RESULT IN INACCURATE ELONGATION MEASUREMENTS.
8. FOR TENDONS THAT ARE STRESSED FROM BOTH ENDS, REFERENCE MARKS MUST BE PLACED AT BOTH TENDON ENDS PRIOR TO STRESSING.

**FIGURE 2**



## **ELONGATION MEASURING PROCEDURE:**

1. THE MEASURING TOOL USED MUST BE OF A RIGID STYLE SUCH AS A FOLDING TAPE OR RULER, NOT FLEXIBLE LIKE A RETRACTING TAPE MEASURE. THE SCALE IS TO BE KEPT CLEAN.
2. TENDONS ARE TO NEVER BE STRESSED HIGHER THAN SPECIFIED (33 KIPS FOR 1/2" STRAND). NEVER OVER-STRESS A TENDON IN AN ATTEMPT TO ACHIEVE THE CALCULATED ELONGATION.
3. AFTER THE TENDON HAS BEEN STRESSED TO THE REQUIRED INITIAL JACKING FORCE, THIS MAY TAKE MORE THAN ONE CYCLE OF THE JACK, PLACE THE REFERENCE DEVICE IN THE SAME POSITION AGAINST THE EDGE OF CONCRETE AND MEASURE THE DISTANCE FROM THE MARKING DEVICE TO THE FINAL REFERENCE MARK (SEE FIG 2). MEASURE TO THE CLOSEST 1/8". THIS DISTANCE IS THE MEASURED ELONGATION AND IS TO BE RECORDED ON THE ELONGATION CHART.
4. CARE SHOULD BE TAKEN WHEN MEASURING ELONGATIONS ON TENDONS WITH LONG STRESSING TAILS. THE TAILS WILL BEND DOWNWARDS UNDER THEIR OWN WEIGHT. LIFT THE TENDON TAIL UP SO THAT IT IS STRAIGHT WHEN TAKING THE MEASUREMENT.

## **LIFT-OFF PROCEDURE:**

1. PLACE A NEW REFERENCE MARK ON THE TENDON TAIL FOLLOWING THE REQUIRED PREP PROCEDURE.
2. OPEN THE JACK 3-4 INCHES.
3. PLACE THE JACK ON THE TENDON AND INCREASE THE PRESSURE SLOWLY UNTIL THE JACK IS TIGHT AGAINST THE ANCHOR.
4. INCREASE THE PRESSURE SLOWLY UNTIL THE NEEDLE DROPS BACK. THIS DROP-BACK READING IS THE FORCE ON THE TENDON AND IS TO BE RECORDED AS THE "LIFT-OFF" READING.
5. RESTRESS THE TENDON TO THE SPECIFIED INITIAL JACKING FORCE OF 33-KIPS.
6. MEASURE ANY ADDITIONAL ELONGATION GAINED FOLLOWING THE REQUIRE MEASURING PROCEDURE.
7. IF THE DROP-BACK IS NOT OBSERVED WHEN THE SPECIFIED INITIAL JACKING FORCE OF 33-KIPS IS REACHED, INCREASE THE PRESSURE 1-KIP OR 200PSI. IF NO DROP BACK IS OBSERVED, RECORD AS "NO LIFT OFF".

# Field Elongation Records

<b>SUNCOAST Post-Tension, LTD</b> 500 N. Sam Houston Parkway E., Suite 400 Houston, TX 77060 Tel: 281-445-6986 Fax: 281-959-5765 Email: <a href="mailto:suncoast@suncoast-pt.com">suncoast@suncoast-pt.com</a>	<b>COVER SHEET</b> <b>TENDON ELONGATION REPORT</b>	<b>SUNCOAST POST-TENSION</b> <i>A Keller Company</i>												
Project Name: _____	Stressing Date: _____													
City / State: _____	Weather: _____													
Pour Location:      Level _____ Pour _____	Concrete Placement Date: _____													
Contractor: _____	Initial Concrete Strength $f'_{ci}$ : _____													
Engineer: _____	28-day Design Strength $f'_d$ : _____													
Inspecting Agency: _____	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="4">PT Installation Drawing Information</th> </tr> <tr> <td>Sheet</td> <td>NA</td> <td></td> <td></td> </tr> <tr> <td>Date</td> <td>NA</td> <td></td> <td></td> </tr> </table>		PT Installation Drawing Information				Sheet	NA			Date	NA		
PT Installation Drawing Information														
Sheet			NA											
Date	NA													
Stressing Company: _____														

Stressing Equipment Information		
Set No. 1	Jack Serial #:	538
	Gauge Pressure:	5400
	Calibration Date:	05/01/14
Set No. 2	Jack Serial #:	
	Gauge Pressure:	
	Calibration Date:	
Set No. 3	Jack Serial #:	
	Gauge Pressure:	
	Calibration Date:	
Set No. 4	Jack Serial #:	
	Gauge Pressure:	
	Calibration Date:	

### Stressing Notes

Before beginning the stress exercise, confirm that the wedge ports have been cleaned and visually inspected and that the wedge pressure is set to the initial reference marks are legible and consistently a fixed distance from the edge of console.

- Check the operation of the stressing jack and be sure the wedge seating pump is operating properly.
- NEVER use a gauge that the needle is not on zero or within the "BLUE" range on the DCPT gauge when the stressing jack is used. Monitor this gauge during the course of the stressing operation.
  - Tendons that are to be stressed from both ends are to be stressed from the center of each end with the exception at each end record and add together to get the total stress.
  - When performing a 180° turn, the gauge 3-inches, place the jack on the tendon and increase the pressure slowly until the tendon yields. It is permitted to exceed the yield point for a short period of time. The pressure is then reduced and the tendon pulled out the other end. (Here will be a "popping" sound. The pressure is then increased until the tendon pressure is the "180° pressure" that is to be recorded. After recording the 180° pressure, reduce the tendon to the original gauge pressure for 3-5-eps, and the wedges and gauge check record any additional elongation that has occurred.

[illegible]

Signature of 3rd Party Independent Inspector \_\_\_\_\_ Date \_\_\_\_\_

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Project Name: **Project X**

Pour Location: Bldg **NA** Level **2** Area **2** Pour **1**

[illegible]

**SUNCOAST POST-TENSION LTD.**  
Houston, TX

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She

# Elongation Record Review

Name  
**Company**  
Address  
City / State / Zip

Date

**PROJECT:**  
**LEVEL/POUR:**  
**TESTING LAB NAME:**  
**REPORT DATE:** [Signed and sealed testing lab report received on XX/XX/201X]

Page 1 of 1

This letter addresses the review of elongations for the indicated pour based on the elongation report prepared by the testing agency listed. By submitting a signed and sealed cover letter, the testing agency is confirming to Suncoast that:

1. They were on-site and witnessed the stressing operation from beginning to end.
2. All tendons, as shown on the For Construction PT installation drawings prepared by Suncoast, were installed and accounted for prior to concrete placement and all tendons have been listed in the referenced elongation report.
3. All tendons were stressed up to but not above the specified gauge reading, and any observed anomalies in the equipment or the stressing operation has been noted in the referenced elongation report.
4. The elongations have been measured correctly and are accurately recorded on the referenced elongation report.

*Based on receiving the signed and sealed letter from the Testing Lab which confirms that the four items listed above were verified and our review of the referenced elongation report, the forces stated on the contract documents have been provided to the structure, with the exception of the items noted below, if any.*

Tendon elongations that fall within the +/- 7% tolerance are acceptable per ACI 318 and the project specifications.

**EXCEPTIONS:**

**COMMENTS:**

Please forward this letter to the LDP for their review

# The PT Supplier's Role Extends Beyond Just Furnishing Material



Experience and knowledge, support and dedication, and understanding the total construction process for building slabs with unbonded tendons – the role of the PT supplier.