Prestressed Concrete Pile Notes:

1. Table of Maximum Pile Pick-Up and Support Lengths

<table>
<thead>
<tr>
<th>D = Square Pile Size (inches)</th>
<th>Required Storage and Transportation Detail</th>
<th>Pick-Up Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td></td>
<td></td>
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<tr>
<td>14</td>
<td></td>
<td></td>
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<tr>
<td>18</td>
<td></td>
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<tr>
<td>20</td>
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<td>24</td>
<td></td>
<td></td>
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<tr>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Pile Length (Feet)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>2, 3, or 4 point</td>
<td>1 Point</td>
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<tr>
<td>69</td>
<td>2, 3, or 4 point</td>
<td>2 Point</td>
</tr>
<tr>
<td>99</td>
<td>3 or 4 point</td>
<td>3 Point</td>
</tr>
</tbody>
</table>

2. Design Specifications:

3. Sprial Ties:
   - Each wrap of spirals shall be tied to at least two corner strands. One turn required for spiral splices.

4. Concrete Class:
   - Concrete for all piles shall be Class V (Special) except designated High Moment Capacity Piles (Index 20631) shall be Class VI.
   - Concrete for the High Capacity Collar Splice shall be Class V (Special).

5. Corrosion Protection of Exposed Strands:
   - For all piles having ends exposed to the environment and not embedded under final conditions, protect the strands as follows:
   - Prior to shipment, cut strands at appropriate ends back to a minimum depth of 1 inch below the concrete surface and patch with a Type F epoxy mortar as recommended by the manufacturer.

6. Reinforcing Steel:
   - All reinforcing steel shall be Grade 60, except that spiral ties shall be manufactured from cold-drawn steel wire meeting the requirements of ASTM A62.

7. Prestressing Steel:
   - Prestressing steel shall be seven-wire strand, Grade 270, Low-Relaxation Strand (LRS).

8. Concrete Class:
   - Concrete for all piles shall be Class V (Special) except designated High Moment Capacity Piles (Index 20631) shall be Class VI.
   - Concrete for the High Capacity Collar Splice shall be Class V (Special).

9. Details Showing Typical Cover:
   - 3" Spiral Ties - #4-6 (30" Piles) #3-4 (All others)
   - 3" Cover
   - 1" Rad. or 3/8" Chamfer (Typ.)
   - W' Max.
NOTES:
1. For Sections D-D, E-E, & F-F see Index Nos. 20612, 20614, 20618, 20620, 20624 or 20630 for applicable concrete pile size and Pile Splice Reinforcement Details.
2. Prestressing strands, spiral ties and/or reinforcement are not shown for clarity.
3. In cases where pile splices are desired due to length limitations in shipping and/or handling, the 'Drivable Preplanned Prestressed Precast Splice Detail' shall be used. Mechanical Pile Splices contained on the Qualified Products List (QPL) may also be used.
4. When preformed dowel holes are utilized, the 1” spiral tie pitch shall be continued to 4’-0” below the head of the pile. See Index Nos. 20618, 20624 & 20634. Preformed holes shall utilize either removable preforming material or stay-in-place corrugated galvanized steel ducts. Stay-in-place ducts shall be fabricated from galvanized sheet steel meeting the requirements of ASTM A653. Coating Designation G90, 26 gauge. Ducts shall be 2” diameter with a minimum corrugation (rib) height of 0.12 in. Ducts shall be fabricated with either welded or interlocked seams. Galvanizing of welded seams will not be required.
5. For tension piles where top of Prestressed Pile is less than 3 feet below Pile Cut-off Elevation, extend No. 10 Dowels into cap beyond Pile Cut-off Elevation to achieve development as approved by the Engineer.
EDC INSTRUMENTATION FOR SQUARE PRESTRESSED CONCRETE PILES

**SECTION A-A**
(Showing Voided Pile, Solid Pile Similar)

- Attach Tip Gauge extension cable to underside of strand one down from top corner strand using nylon wire ties every 6 Ft. maximum.

**SECTION B-B**
(Showing Voided Pile, Solid Pile Similar)

- Attach Tip Gauge extension cable to underside of strand one down from top corner strand using nylon wire ties every 6 Ft. maximum.

**NOTE:**
Provide EDC Instrumentation in square prestressed concrete piles (18" and larger) in accordance with Specification Section 455 for bridge foundations.
**Pile Splice Reinforcement Details**

**NOTES:**
1. Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.
2. Any of the given Alternate Strand Patterns may be utilized. The strands shall be located as follows:
   - Place one strand at each corner and place the remaining strands equally spaced between the corner strands.
   - The total strand pattern shall be concentric with the nominal concrete section of the pile.

**Alternate Strand Patterns**

- 4 - 0.6" Ø, Grade 270 LRS, at 44 kips
- 8 - 0.2" Ø (Special), Grade 270 LRS, at 23 kips
- 8 - 0.3" Ø, Grade 270 LRS, at 24 kips
- 8 - 0.3" Ø (Special), Grade 270 LRS, at 25 kips
- 4 - 0.6" Ø, Grade 270 LRS, at 16 kips

**SECTION A-A**

- 3" Cover (Typ.)
- W3.4 Spiral Ties
- See Alternate Strand Patterns

**SECTION D-D**

- (See Drivable Unforeseen Reinforced Precast Pile Splice Detail)

**SECTION E-E**

- (See Non-drivable Unforeseen Precast Pile Splice Detail)
**ALTERNATE STRAND PATTERNS**

- 8 ~ 0.6" Ø, Grade 270 LRS, at 33 kips
- 8 ~ ½" Ø (Special), Grade 270 LRS, at 21 kips
- 8 ~ ½" Ø, Grade 270 LRS, at 31 kips
- 12 ~ ⅜" Ø, Grade 270 LRS, at 23 kips
- 16 ~ ⅝" Ø, Grade 270 LRS, at 16 kips

*NOTES:
1. Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.
2. Any of the given Alternate Strand Patterns may be utilized.*

The strands shall be located as follows:

- 1. Any of the given Alternate Strand Patterns may be utilized.
- 2. The strands shall be located as follows:
- 3. Place one strand at each corner and place the remaining strands equally spaced between the corner strands.
- 4. The total strand pattern shall be concentric with the nominal concrete section of the pile.
Pile Splice Reinforcement Details

**ALTERNATE STRAND PATTERNS**

1. Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.

2. Any of the given Alternate Strand Patterns may be utilized. The strands shall be located as follows:

   - Place one strand at each corner and place the remaining strands equally spaced between the corner strands.
   - The total strand pattern shall be concentric with the nominal concrete section of the pile.

**NOTES:**

1. Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.

2. Any of the given Alternate Strand Patterns may be utilized. The strands shall be located as follows:

   - Place one strand at each corner and place the remaining strands equally spaced between the corner strands.
   - The total strand pattern shall be concentric with the nominal concrete section of the pile.

**SECTION D-D**

(See Nondrivable Unforeseen Reinforced Precast Splice Detail)

**SECTION E-E**

(See Drivable Prestressed Precast Splice Detail)

**SECTION F-F**

(See Drivable Drivable Unforeseen Reinforced Precast Splice Detail)
** See Note No. 4 on Index No. 20601

ALTERNATE STRAND PATTERNS

1. Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices
2. Any of the given Alternate Strand Patterns may be utilized.
3. The strands shall be located as follows:
   - Place one strand at each corner and place the remaining strands equally spaced between the corner strands.
   - The total strand pattern shall be concentric with the nominal concrete section of the pile.

NOTES:

1. Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices
2. Any of the given Alternate Strand Patterns may be utilized.
3. The strands shall be located as follows:
   - Place one strand at each corner and place the remaining strands equally spaced between the corner strands.
   - The total strand pattern shall be concentric with the nominal concrete section of the pile.
ALTERNATE STRAND PATTERNS

16 - 0.6" Ø, Grade 270 LRS, at 44 kips
20 - 0.75" Ø (Special), Grade 270 LRS, at 34 kips
24 - 0.75" Ø, Grade 270 LRS, at 31 kips

NOTES:
1. Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.
2. Any of the given Alternate Strand Patterns may be utilized.

The strands shall be located as follows:
- Place one strand at each corner and place the remaining strands equally spaced between the corner strands.
- The total strand pattern shall be concentric with the nominal concrete section of the pile.
ALTERNATE STRAND PATTERNS

(See Pile Splice Reinforcement Details)

SECTION B-B

(See Nondrivable Unforeseen Reinforced Precast Pile Splice Detail)

Prestressing Strands, see

Alternate Strand Patterns

W4.0 Spiral Ties

28 ~ 24 ~ 20 ~ 0.6" Ø, Grade 270 LRS, at 41 kips

No. 8 Bars

6'-0" long

(See Pile Splice Reinforcement Details)

(See Drivable Preplanned Pile Splice Detail)

PRESTRESSING STRANDS

2. Any of the given Alternate Strand Patterns may be utilized. The strands shall be located as follows:

3. CONTRACTOR OPTION: The 30" pile may be cast SOLID by omitting the 18" Ø void and the 2" Ø

vent hole. In this event, the Contractor shall submit calculations for approval and a

proposed strand configuration that provide net prestressing after losses equal to 1000 psi. Alternate

configurations for the Diagonal Ties, to maintain the position of the 4 ~ No. 8 Bars, may be approved

by the Engineer.

4. Work this Index with Index No. 20600 - Notes and Details for

Square Prestressed Concrete Piles

and Index No. 20601 - Square Prestressed Concrete Pile Splices.

NOTES:

1. Venting shall be provided by the use of a 1" Ø PVC conduit through a substructure cap or column.

Voids between segments of spliced piles shall be connected by 2" Ø holes(s).

2. Any of the given Alternate Strand Patterns may be utilized. The strands shall be located as follows:

Place one strand at each corner and place the remaining strands equally spaced between the corner

strands. The total strand pattern shall be concentric with the nominal concrete section of the pile.

3. CONTRACTOR OPTION: The 30" pile may be cast SOLID by omitting the 18" Ø void and the 2" Ø

vent hole. In this event, the Contractor shall submit calculations for approval and a

proposed strand configuration that provide net prestressing after losses equal to 1000 psi. Alternate

configurations for the Diagonal Ties, to maintain the position of the 4 ~ No. 8 Bars, may be approved

by the Engineer.

4. Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles

and Index No. 20601 - Square Prestressed Concrete Pile Splices.

INDEX

NO.

20630

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1 of 1
**NOTES:**

1. Venting shall be provided by the use of a 1" Ø PVC conduit through a substructure cap or column. Voids between segments of spliced piles shall be connected by 2" Ø hole(s).

2. After the pile is driven and cut to grade, the top 8'-0" of the 18" Ø Void shall be filled with concrete. Prior to filling the top 8'-0" of the 18" Ø Void with concrete, strip the cardboard form material from the void. A stay-in-place corrugated thin wall galvanized pipe may be used to form the void in lieu of the cardboard form material. The concrete fill material shall be of the same type and strength as called for in the pile cap and paid for as substructure concrete. A stay-in-place corrugated thin wall galvanized pipe may be used to form the void in lieu of the cardboard form material. The concrete fill material shall be of the same type and strength as called for in the pile cap and paid for as substructure concrete.

3. Collar concrete shall reach a strength of 6,000 psi before pile driving is resumed. Voids between segments of spliced piles shall be connected by 2" Ø hole(s).

4. Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles.

**DESCRIPTION:**

**HIGH MOMENT CAPACITY 30" SQUARE PRESTRESSED CONCRETE PILE -PILE SPICE DETAIL-**

**SECTION A-A**

- 2" Ø Hole (Splice Section only)
- Prestressing Strands (Typ.)
- Φ Hole & Φ Hole

**SECTION B-B**

- 2" Ø Hole (Splice Section only)
- Prestressing Strands (Typ.)
- Φ Hole & Φ Hole

**SECTION C-C**

- 8" Ø Hole (Splice Section only)
- Prestressing Strands (Typ.)
- Φ Hole & Φ Hole

**SECTION D-D**

- ELEVATION
- DETAIL A
- DETAIL B
- DETAIL C
- DETAIL D
- ELEVATION

**STRAND PATTERN**

28 - 0.6" Ø, Grade 270 LRS, at 29.5 kips

**SECTION THROUGH PILE AT PILE CAP**

W4.0 DIAGONAL TIE DETAIL

- Φ Hole (see Note 1)
- Φ Hole
- Φ Hole & Φ Hole

**DETAIL OF PILE COLLAR FOR HIGH MOMENT CAPACITY 30" SQUARE PRESTRESSED PILE**

**THEME:**

- Square Prestressed Concrete Piles

**ACTION:**

- Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles.
### PILE PICK-UP DETAILS

#### STORAGE AND TRANSPORTATION SUPPORT DETAILS

<table>
<thead>
<tr>
<th>TABLE OF MAXIMUM PILE PICK-UP AND SUPPORT LENGTHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Pile Length (Feet)</td>
</tr>
<tr>
<td>----------------------------</td>
</tr>
<tr>
<td>119</td>
</tr>
<tr>
<td>170</td>
</tr>
</tbody>
</table>

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**DESIGN SPECIFICATIONS:**

**PRECAST/POST-TENSIONED CONCRETE CYLINDER PILE**

- Pile splices shall reach a minimum strength of 5500 psi before driving is resumed.
- **PILE DRIVING AFTER SPLICING:**
- Prestressing tendons shall be made up of two seven-wire strands. Prestressing strands shall be \( \frac{1}{2}'' \) (Special).
- Grade 270 low relaxation, at 33.8 kips.

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**NOTES**

- One full wrap of spirals is required at both the head and tip of pile. One half turn required for spiral splices. **CONCRETE CLASS:** Concrete for all piles shall be Class V (Special). Concrete for pile splices shall be Class IV. See "GENERAL NOTES" in Structures Plane for any specific locations where the use of Silica Fume is required.
- The material to form the joint between pile sections shall be a Type B Epoxy Compound in accordance with Section 926 of the Specifications. The bonding agent used on internal pile surfaces shall be a Type A Epoxy Compound in accordance with Section 926 of the Specifications. Epoxy Compounds used shall be contained on the Qualified Products List (QPL). Use Epoxy Bonding Compound or Epoxy Mortar as recommended by the Manufacturer. For Epoxy Mortar only use sand or other filler material supplied by the manufacturer and in the proportions recommended.
- **PILE PICK-UP POINTS:** Piles shall be marked at the pick-up points to indicate proper points for attaching handling lines.
- **REINFORCING STEEL:** All reinforcing steel shall be Grade 60, except that smooth steel wire (W11) spiral ties and longitudinal spacers and W20 ties) shall be manufactured from cold drawn steel wire meeting the requirements of ASTM A615.
- **PRESTRESSING STEEL:** Prestressing tendons shall be manufactured from cold drawn steel wire meeting the requirements of ASTM A416.
- Concrete for all piles shall be Class V (Special). Concrete for pile splices shall be Class IV. See "GENERAL NOTES" in Structures Plane for any specific locations where the use of Silica Fume is required.
- Concrete for all piles shall be Class V (Special). Concrete for pile splices shall be Class IV. See "GENERAL NOTES" in Structures Plane for any specific locations where the use of Silica Fume is required.
**REVISION**

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**INDEX**

**DESCRIPTION:**

**REVISION**

**LAST**

**REVISION**

**07/01/13**

**FDOT 2014 DESIGN STANDARDS**

**54" PRECAST/POST-TENSIONED CONCRETE CYLINDER PILE**

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**DRIVABLE UNFORESEEN FIELD SPLICE DETAIL**

(Cast-In-Place Plug)

1. Slightly or Moderately Aggressive Environments: The concrete cover may be reduced to 2 inches.
2. Extremely Aggressive Environments: The concrete cover may be reduced to 2 inches as long as the concrete has a documented chloride ion penetration apparent diffusion coefficient with a mean value of 0.005 in/year or less; otherwise, a 3-inch concrete cover is required.

---

**SECTION A-A**

- Clean inside surface of 54" Ø Pile with a high pressure water blast (3000 psi Min.) and apply bonding agent for Driven Prestressed Pile
- Concrete Seal

**SECTION B-B**

- Full Epoxy Compound Joint around cylinder pile wall only (See Detail "A")
- Roughen inside surface of 54" Ø Pile to 1/4" amplitude for Spliced Pile Section

---

**DETAIL "A"**

- 1'-0" Ø Void, open top and bottom to allow through venting of sections
- Closed No. 4 Bars or W20 Wire Ties @ 1'-0" ± (Typ.)
- No. 4 Bars or W20 Wire Ties

---

**NOTES:**

- For Spun Cylinder Piles, the following requirements for concrete cover apply:
  1. Slightly or Moderately Aggressive Environments: The concrete cover may be reduced to 2 inches.
  2. Extremely Aggressive Environments: The concrete cover may be reduced to 2 inches as long as the concrete has a documented chloride ion penetration apparent diffusion coefficient with a mean value of 0.005 in/year or less; otherwise, a 3-inch concrete cover is required.
**DESIGN SPECIFICATIONS:**

**SPIRAL TIES:**
One full wrap of spirals is required at both the head and tip of pile. One half turn required for spiral splices.

**CONCRETE CLASS:**
Concrete for all piles shall be Class V (Special). Concrete for pile splices shall be Class IV. See "GENERAL NOTES" in Structures Plans for any specific locations where the use of Silica Fume is required.

**CONCRETE STRENGTH:**
The cylinder strength shall be 4,000 psi minimum at time of transfer of the Prestressing Force.

**PILE DRIVING AFTER SPLICING:**
Prestressing steel shall be 0.6" Ø seven-wire strand. Grade 270 low relaxation, at 44.8 kips.

**REINFORCING STEEL:**
All reinforcing steel shall be Grade 60, except that smooth steel wire (W11 spiral ties and W20 ties) shall be manufactured from cold drawn steel wire meeting the requirements of ASTM A62.

**PRESTRESSING STEEL:**
Prestressing steel shall be 0.6" Ø seven-wire strand. Grade 270 low relaxation, at 44.8 kips.

**PILE DRIVING AFTER SPlicing:**
Pile splices shall reach a minimum strength of 5500 psi before driving is resumed.

---

**SUPPORT LENGTHS**

**TABLE OF MAXIMUM PILE PICK-UP AND SUPPORT LENGTHS**

<table>
<thead>
<tr>
<th>Maximum Pile Length (Feet)</th>
<th>Required Storage and Transportation Detail</th>
<th>Pick-Up Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>122</td>
<td>2, 3, or 4 point</td>
<td>1 Point</td>
</tr>
<tr>
<td>174</td>
<td>2, 3, or 4 point</td>
<td>2 Point</td>
</tr>
</tbody>
</table>

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**NOTES**

- The 45" Ø Void in the pile shall be positively vented to water or air after the final pile installation. If the 3½" Ø vents are included in the pile cut-off section, then venting shall be provided by the use of a 1" Ø PVC conduit through the substructure cap or column.

- Piles shall be marked at the pick-up points to indicate proper points for attaching handling lines.

- Use Epoxy Bonding Compound or Epoxy Mortar as recommended by the manufacturer. For Epoxy Mortar only use sand or other filler material supplied by the manufacturer and in the proportions recommended.

- The bonding agent used on internal pile surfaces shall be a Type A Epoxy Compound in accordance with Specification Section 926.

- The material to form the joint between pile sections shall be a Type B Epoxy Compound in accordance with Specification Section 926. The bonding agent used on internal pile surfaces shall be a Type A Epoxy Compound in accordance with Specification Section 926. Epoxy Compounds used shall be contained on the Qualified Products List (QPL). Use Epoxy Bonding Compound or Epoxy Mortar as recommended by the manufacturer. For Epoxy Mortar only use sand or other filler material supplied by the manufacturer and in the proportions recommended.

- Pick-Up Points shall be marked at appropriate points to indicate proper points for attaching handling lines.

- The cylinder strength shall be 4,000 psi minimum at time of transfer of the Prestressing Force.

- Pile splices shall reach a minimum strength of 5500 psi before driving is resumed.
**DESCRIPTION:**

- **Concrete Seal:** 2'-0" Min. Cover

- **Driven Prestressed Pile Section:** 60' Ø

- **Roughen inside surface of 60' Ø Pile to 1/32" amplitude for Spliced Pile Section**

- **Closed No. 4 Bars or W20 Wire Ties @ 1'-0" ± (Typ.)**

- **Full Epoxy Compound Joint around cylinder pile wall only (See Detail "A")**

- **24 ~ No. 11 Bars @ Equal Spaces**

- **Clean inside surface of 60" Ø Pile with a high pressure water blast (3000 psi Min.) and apply bonding agent for Driven Prestressed Pile**

- **2'-0" Ø Void to allow through venting of sections**

- **3" Min. Cover (Typ.)**

- **36 ~ 0.6" Ø Strands @ Equal Spaces**

- **3" Min. Cover (Typ.)**

- **Inside Pile Wall Full epoxy compound joint**

- **Temporary Blocking Form to retain epoxy compound**

- **Gasket Form to retain epoxy compound**

- **Outside Pile Wall**

**DETAIL "A"**

**SECTION A-A**

**SECTION B-B**

**DRIVABLE UNFORESEEN FIELD SPLICE DETAIL**

(Cast in Place Plug)