# INDEX OF DRAWINGS



FDOT

PCI
CERTIFIED PLANT

PRELIMINARY

# GENERAL NOTES FOR DESIGNERS AND PRODUCERS OF PRECAST, PRESTRESSED CONCRETE SPLICED U-GIRDERS WITH BONDED AND UNBONDED TENDONS

PURPOSE AND INTENT OF THIS INFORMATION:

THIS SET OF DRAWINGS HAS BEEN DEVELOPED THROUGH A TASK FORCE OF PCI-CERTIFIED MANUFACTURING PLANTS IN FLORIDA, A SUBSET OF PLANTS IN PCI GEOGRAPHIC ZONE 6 (SOUTHEAST UNITED STATES). THESE CONCEPT DRAWINGS AND DETAILS EXPLAIN TO OWNERS, DESIGNERS, AND CONTRACTORS THE PRELIMINARY INFORMATION NECESSARY TO UTILIZE THESE BRIDGE FRAMING SOLUTIONS. SPLICED U-GIRDERS HAVE BEEN SUCCESSFULLY USED ON SEVERAL PROJECTS. THE SPLICED PRECAST CONCRETE U-GIRDER HAS ENABLED PCI-CERTIFIED PLANTS TO OFFER AN ECONOMICAL STRUCTURAL DESIGN SOLUTION FOR BOTH LONG-SPAN AND HORIZONTALLY CURVED BRIDGES FOR VEHICULAR AND RAIL TRAFFIC. THIS WU SERIES OF DRAWINGS IS COMPATIBLE WITH THE 2016 DETAILS DEVELOPED BY THE FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT) FOR UNBONDED TENDONS (TENDONS WITH FLEXIBLE FILLER).

BACKGROUND:

COMPLEX INTERCHANGES AND LONG-SPAN GRADE SEPARATIONS CREATED A DEMAND FOR NEW INNOVATIVE SOLUTIONS. TRADITIONALLY, THESE STRUCTURES WERE BUILT WITH CIP CONCRETE OR STRUCTURAL STEEL. THE SUCCESS OF RECENT U-GIRDER PROJECTS CLEARLY DEMONSTRATES THE ADVANTAGES OF USING ENGINEERED-TO-ORDER PRECAST CONCRETE COMPONENTS TO CONSTRUCT HIGHLY COST-EFFECTIVE, COMPLEX, LONG-SPAN STRUCTURES IN HIGH PROFILE APPLICATIONS WHERE AESTHETICS AND URBAN GEOMETRICS ARE IMPORTANT DESIGN CONSIDERATIONS.

EARLIER ADVANCEMENTS IN THE USE OF SPLICED, POST-TENSIONED PRECAST GIRDERS HAVE EXTENDED THE SPAN RANGE OF PRECAST CONCRETE CONSTRUCTION. THE DEVELOPMENT OF THE U-GIRDER INTRODUCED A NEW CROSS SECTION THAT HAS SUFFICIENT STRENGTH AND STABILITY TO MAKE THE CASTING OF HORIZONTALLY CURVED SECTIONS FEASIBLE. COMBINING THESE TWO ADVANCEMENTS ESTABLISHED THE POSSIBILITY OF USING PRECAST CONCRETE FOR LONG-SPAN INTERCHANGE PROJECTS. DEVELOPMENTS IN 2016 INTRODUCED THE USE OF STANDARD DIABOLOS, STANDARD DEVIATION BLISTERS, AND A NEW LOAD CASE AS A PERFORMANCE MEASURE.

ENHANCED DURABILITY, LOWER LIFE-CYCLE COSTS, AND LOWER INITIAL CONSTRUCTION COSTS MAKE PRECAST CONCRETE AN ATTRACTIVE DESIGN OPTION. COMPETITIVE LOCAL MANUFACTURERS REINFORCES THE APPEAL OF USING PRECAST CONCRETE THROUGH REDUCED LEAD TIMES FOR FABRICATION AND LOWER SHIPPING COSTS.

SPLICED U-GIRDER CONSTRUCTION REQUIRES ONLY INTERMITTENT VERTICAL SHORING THAT REDUCES INTERFERENCE WITH EXISTING TRAFFIC. CONVENTIONAL CONSTRUCTION METHODS AND EQUIPMENT ARE USED TO ERECT THE GIRDERS ELIMINATING THE NEED TO INVEST IN SPECIALIZED EQUIPMENT. USING PCI-CERTIFIED PLANTS AND STANDARD DETAILS AND CASTING FORMS OFFERS SHORTER LEAD TIMES FOR FABRICATION AND DELIVERY OF GIRDERS, WHICH GREATLY ENHANCES THE COST EFFECTIVENESS OF CONSTRUCTION.

THE USE OF PRECAST CONCRETE U-GIRDERS UNIFIES THE APPEARANCE OF ALL SPANS IN A PROJECT. TRAPEZOIDAL SLOPED WEBS CREATE A CONTEXT-SENSITIVE SOLUTION THAT HAS BEEN WELL RECEIVED IN HIGH VISIBILITY APPLICATIONS.

CONSTRUCTION CHALLENGES:

CONSTRUCTION OF U-GIRDER BRIDGES REQUIRES HANDLING AND ERECTING LARGE, HEAVY, CURVED GIRDERS IN CHALLENGING SITE CONDITIONS USING TEMPORARY SUPPORTS AND STABILIZATION.

SUMMARY:

THE DEVELOPMENT OF SPLICED, PRECAST CONCRETE U-GIRDERS HAS CREATED AN OPPORTUNITY TO USE PRECAST CONCRETE IN NEW APPLICATIONS FOR BRIDGE CONSTRUCTION.

THE DETAILS IN THESE DRAWINGS WERE DEVELOPED CONSIDERING CONSTRUCTED PROJECTS WITH CHALLENGING SITE CONDITIONS WHERE MAINTENANCE OF EXISTING TRAFFIC WAS ESSENTIAL. THE USE OF THESE PCI ZONE 6 CONCEPT PLANS, PREFABRICATED WITHIN A WELL-ESTABLISHED PCI CERTIFICATION QUALITY ASSURANCE SYSTEM, WILL HELP ASSURE RAPID ASSEMBLY AT THE JOBSITE. THE UNMITIGATED SUCCESS OF EARLIER PROJECTS CLEARLY DEMONSTRATES THAT THE APPLICATION OF PRECAST CONCRETE IN LONG-SPAN BRIDGES IS LIMITED ONLY BY CREATIVITY AND IMAGINATION OF THE ENGINEER AND CONTRACTOR. THIS EFFORT AT STANDARDIZATION WILL ASSIST THE PCI-CERTIFIED PLANTS FROM HAVING AN UNLIMITED SET OF SECTIONS AND DETAILS.

## GENERAL NOTES

1. INFORMATION SHOWN ON THIS SET OF DRAWINGS IS INTENDED TO ILLUSTRATE A WORKING CONCEPT FOR SPLICED U-GIRDERS.
2. ALL CONCRETE DIMENSIONS AND REINFORCEMENT SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.
3. USE A MINIMUM OF 4 EXTERNAL UNBONDED TENDONS PER WEB.
4. SIZE WEB THICKNESS FOR EXTERNAL PLASTIC DUCTS.
5. PRESSURE TEST ALL DUCTS PRIOR TO GROUT OR FLEXIBLE FILLER INJECTION. SEE FDOT SPECIFICATIONS & PT STANDARDS.

## DESIGN CRITERIA

1. DESIGN SPECIFICATIONS:
   - AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (LRFD)
   - SDG
2. DEAD LOAD ASSUMPTIONS:
   - DESIGN CURVED GIRDERS FOR GIRDER LENGTHS ALONG ℄ OUTSIDE WEB OF OUTSIDE GIRDER
   - REINFORCED CONCRETE 150 PCF
   - SUPERIMPOSED DEAD LOAD APPLIED TO COMPOSITE SECTION FOR CONSTRUCTION INCIDENTALS 10 PSF
   - THE 8½ INCH DECK THICKNESS INCLUDES ½ INCH SACRIFICIAL THICKNESS INCLUDED IN DEAD LOAD OF THE DECK BUT OMITTED FROM THE SECTION PROPERTIES USED FOR DESIGN.
3. LIVE LOADS:
   - HL-93 WITH DYNAMIC LOAD ALLOWANCE
   - PERMIT VEHICLE PER STATE AND LOCAL REQUIREMENTS
4. PRECAST, PRESTRESSED CONCRETE ASSUMPTIONS:
   - 28-DAY FIELD COMPRESSIVE STRENGTH, $f'c = 8.5$ KSI
   - 0.6" DIA, GRADE 270 LOW-RELAXATION STRAND
   - FRICTION COEFFICIENTS: INTERNAL GROUTED BAR TENDONS, $K = 0.0002$ AND $\mu = 0.30$ INTERNAL GROUTED STRAND TENDONS, $K = 0.0002$ AND $\mu = 0.14$ EXTERNAL FLEXIBLE FILLER STRAND TENDONS, $K = 0$ AND $\mu = 0.14$ (PLASTIC), $\mu = 0.30$ (STEEL)
   - ANCHOR SET OF 3/8" AT JACKING ENDS
   - ELASTIC SHORTENING AND PROVISIONS FOR ADDITIONAL LONG TERM LOSS IN STRESS PER LRFD
5. GRADE 60 REINFORCING STEEL

## NOTES TO DESIGNER

STRAIGHT AND CURVED GIRDERS

1. THIS SET OF DRAWINGS IS CONCEPTUAL ONLY. ALL DESIGNS BASED ON THESE CONCEPTS MUST BE PREPARED BY A LICENSED PROFESSIONAL ENGINEER AND SHALL CONFORM TO LRFD AND ALL STATE AND LOCAL DESIGN REQUIREMENTS.
2. SATISFY SERVICE LOAD STRESS LIMITATIONS FOR ALL PRESTRESSED CONCRETE MEMBERS.
3. CHECK ALL ULTIMATE LOAD COMBINATIONS FOR THE COMPOSITE SECTION.
4. CHECK SERVICE AND ULTIMATE LOAD CONDITIONS AND CONFORM TO LRFD AND LOCAL GUIDELINE REQUIREMENTS FOR FLEXURE, SHEAR, TORSION, CRACK CONTROL AND SERVICABILITY DURING ALL STAGES OF CASTING, ERECTION, AND CONSTRUCTION.
5. DECK SLAB REINFORCEMENT SHALL BE PROPORTIONED TO CONTROL CRACKING IN NEGATIVE MOMENT REGIONS UNDER SERVICE LOAD CONDITIONS. (MAXIMUM LONGITUDINAL REBAR TENSION STRESS IS 24 KSI)
6. ALLOWABLE PRINCIPAL TENSILE STRESSES IN GIRDER WEBS UNDER CONSTRUCTION AND SERVICE LOADINGS AS PER LFRD.
7. SECTIONAL CAPACITIES ARE PROVIDED BY A COMBINATION OF BONDED TENDONS, UNBONDED TENDONS, AND MILD REINFORCING STEEL. INCLUDE SECTIONAL STRAIN COMPATIBILITY OF BONDED TENDONS AND CONCURRENT STRAIN INCREASES IN UNBONDED TENDONS WHEN COMPUTING STRENGTH LIMIT STATE CAPACITIES. LIMIT SECTIONAL CAPACITIES TO STRAINS IN BONDED TENDONS LESS THAN THOSE ACHIEVED AT 95% OF GUTS.

CURVED GIRDERS

1. ERECT AND ALIGN GIRDERS IN A MANNER TO PRODUCE A SMOOTH PROFILE IN TOP INTERNAL TENDONS TO AVOID KINKS AND UNDESIRABLE ANGLE BREAKS. (ANGLE BREAKS AT SPLICES LIMITED TO 4½ HORIZONTAL DEGREES)
2. DESIGN TIE BACK REINFORCEMENT AROUND WEB TENDONS IN CURVED GIRDERS TO RESIST ALL LATERAL FORCES DUE TO CURVATURE AND INCIDENTAL MISALIGNMENT.
3. CURVED GIRDERS MAY BE ERECTED IN AN OPEN-TOP CONDITION IF TORSIONAL STRESSES ARE ACCOUNTED FOR, CONTROLLED AND STRENGTH REQUIREMENTS ARE MET DURING ALL STAGES OF CONSTRUCTION. PRIOR TO DECK PLACEMENT OR APPLICATION OF SIGNIFICANT LOADING, CLOSE (IN SOME MANNER) TOP OF CURVED, OPEN U-GIRDERS TO PREVENT TORSIONAL CRACKING DURING CONSTRUCTION.

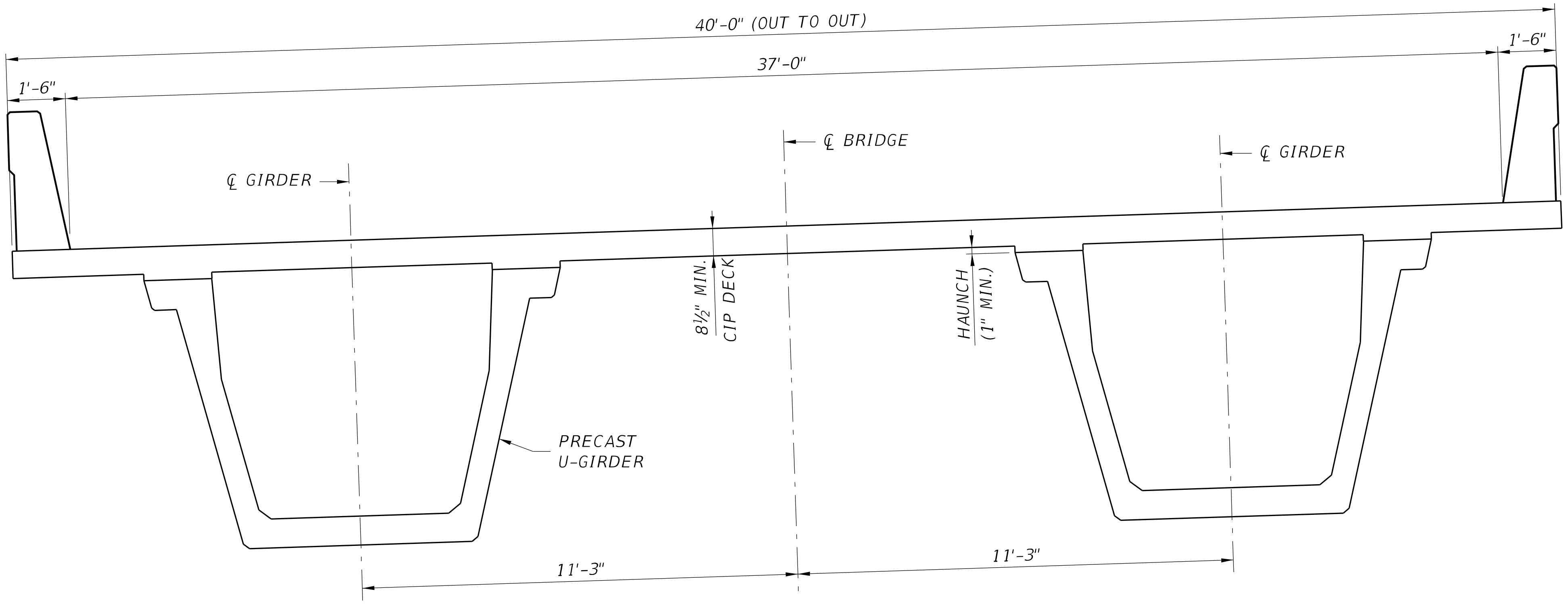
## ABBREVIATIONS

SDG - FDOT STRUCTURES DESIGN GUIDELINES
CIP - CAST IN PLACE
PT - POST-TENSIONING
GUTS - GUARANTEED ULTIMATE TENSILE STRENGTH

FDOT

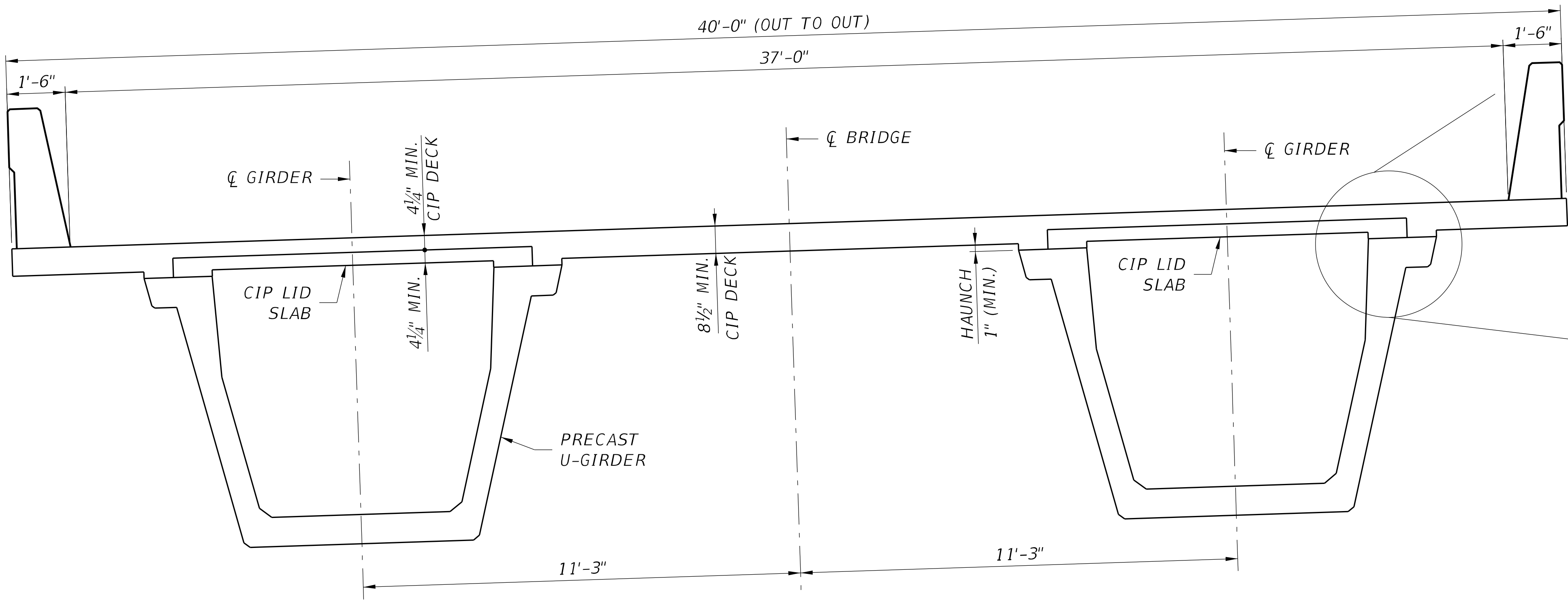
PCI CERTIFIED PLANT

PRELIMINARY




CROSS SECTION WITH CONVENTIONAL DECK W/O LID SLABS

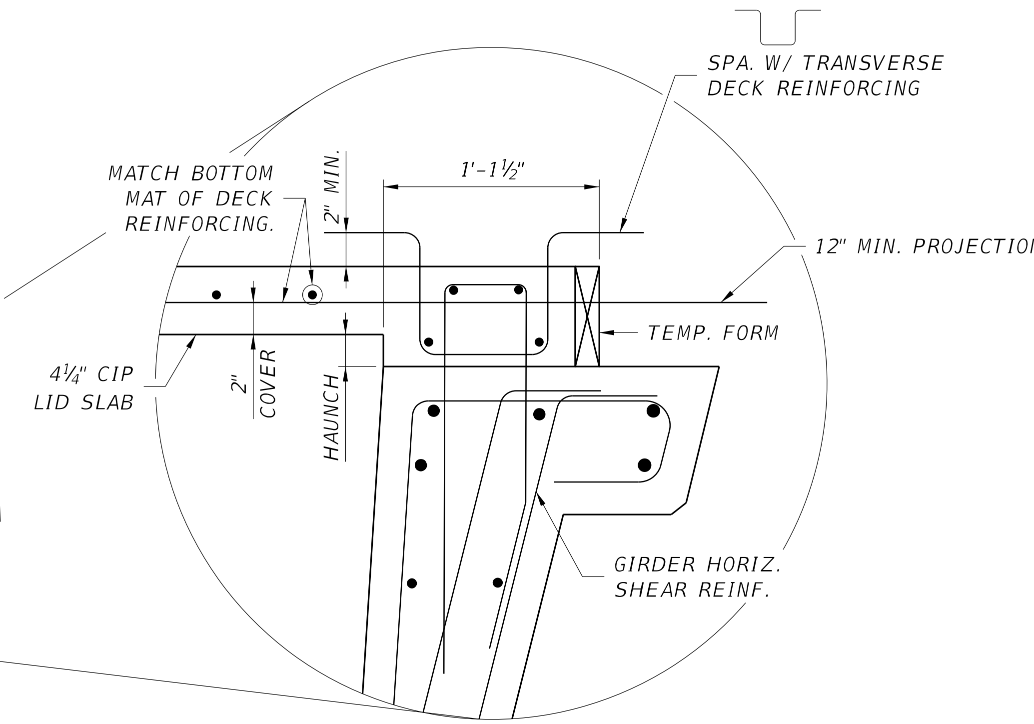
(STRAIGHT GIRDERS OR GIRDERS WITH LARGE RADIUS ONLY)




CROSS SECTION WITH CONVENTIONAL DECK WITH LID SLABS

NOTES:

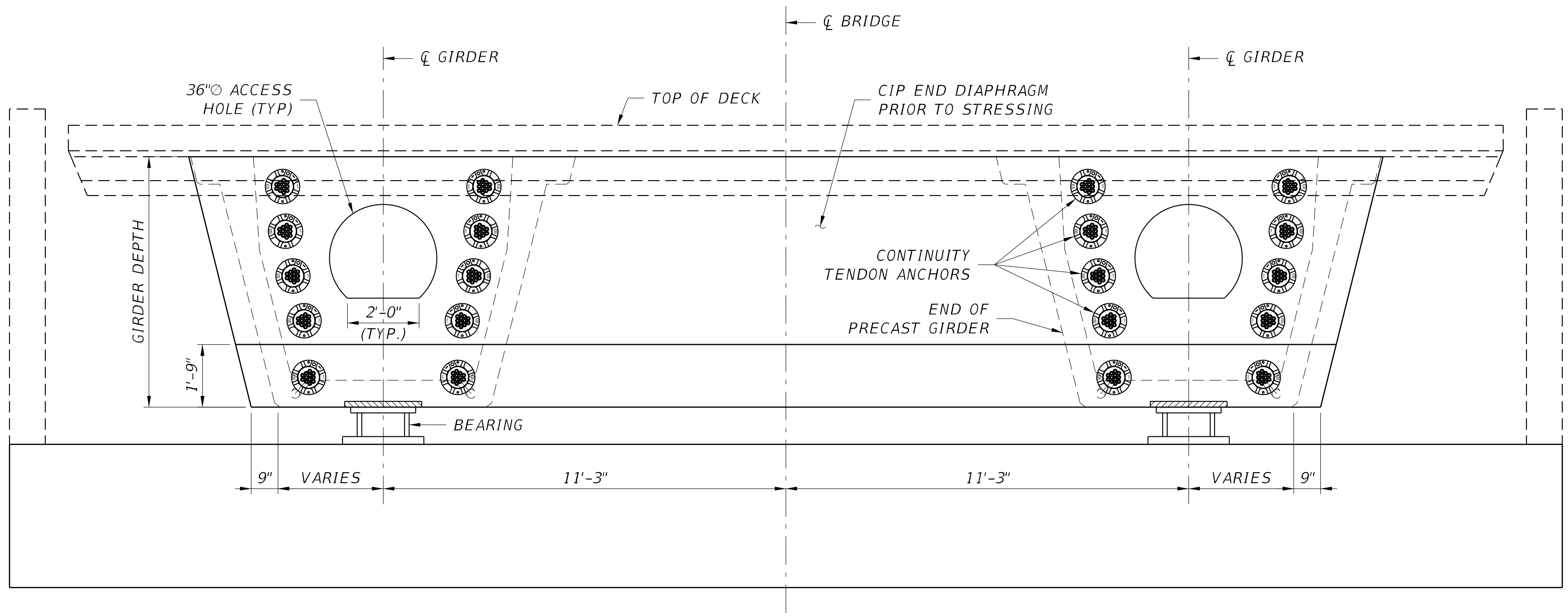
1. PRECAST SLABS NOT ALLOWED.




PRELIMINARY

Drawing/Sheet Number FDOT WU-2

TYPICAL BRIDGE CROSS SECTIONS
PCI Zone 6 (SE Region) U-Girders




ELEVATION

NOTES:

1. SEE SHEET FDOT WU-16 FOR GIRDER END DETAIL AT ABUTMENT.

FDOT

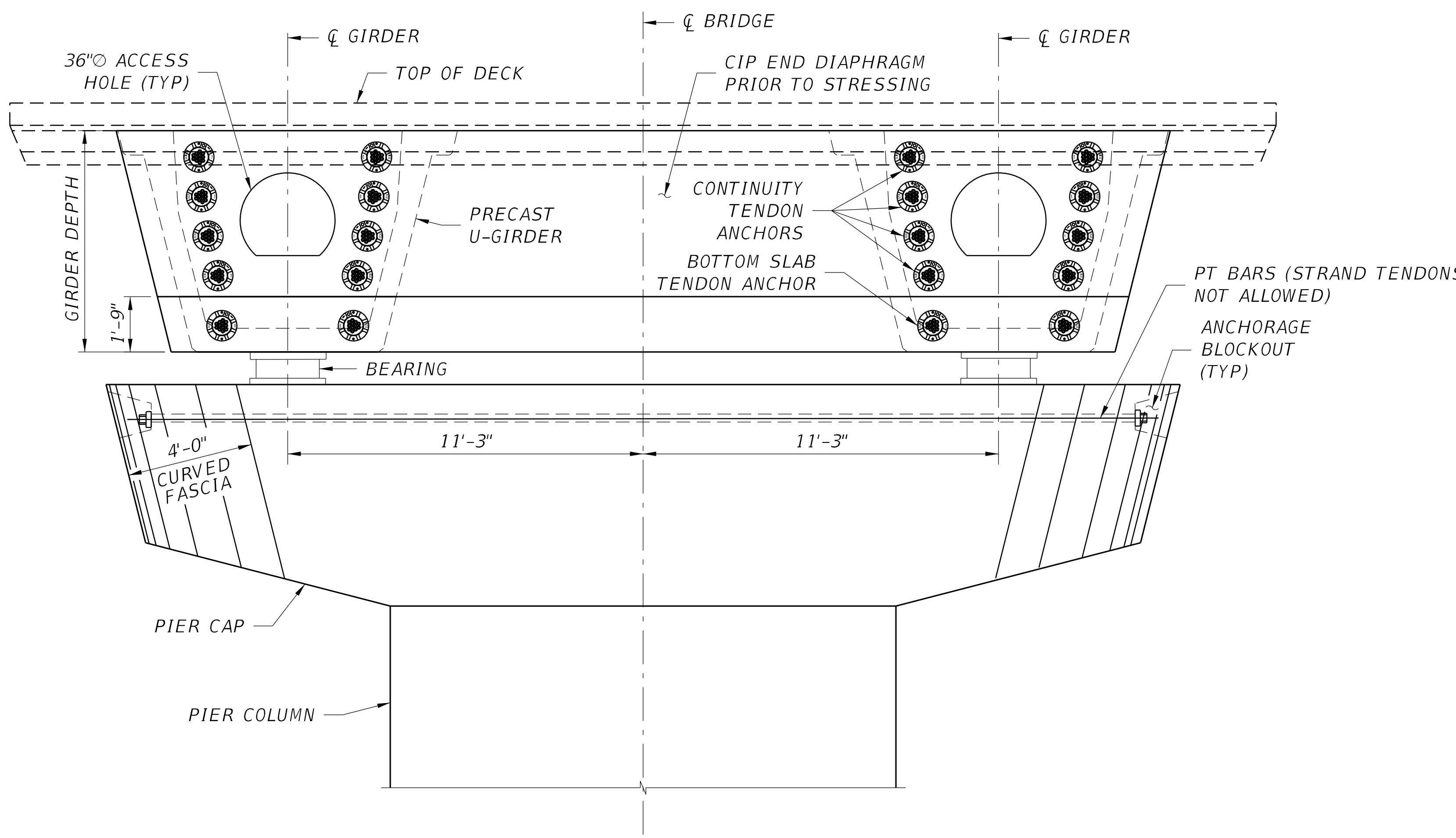
PCI CERTIFIED PLANT

PRELIMINARY

Drawing/Sheet Number FDOT WU-3

END DIAPHRAGM AT ABUTMENT

PCI Zone 6 (SE Region) U-Girders




ELEVATION

NOTES:

1. SEE SHEET FDOT WU-16 FOR GIRDER END DETAIL AT INTERIOR PIER.

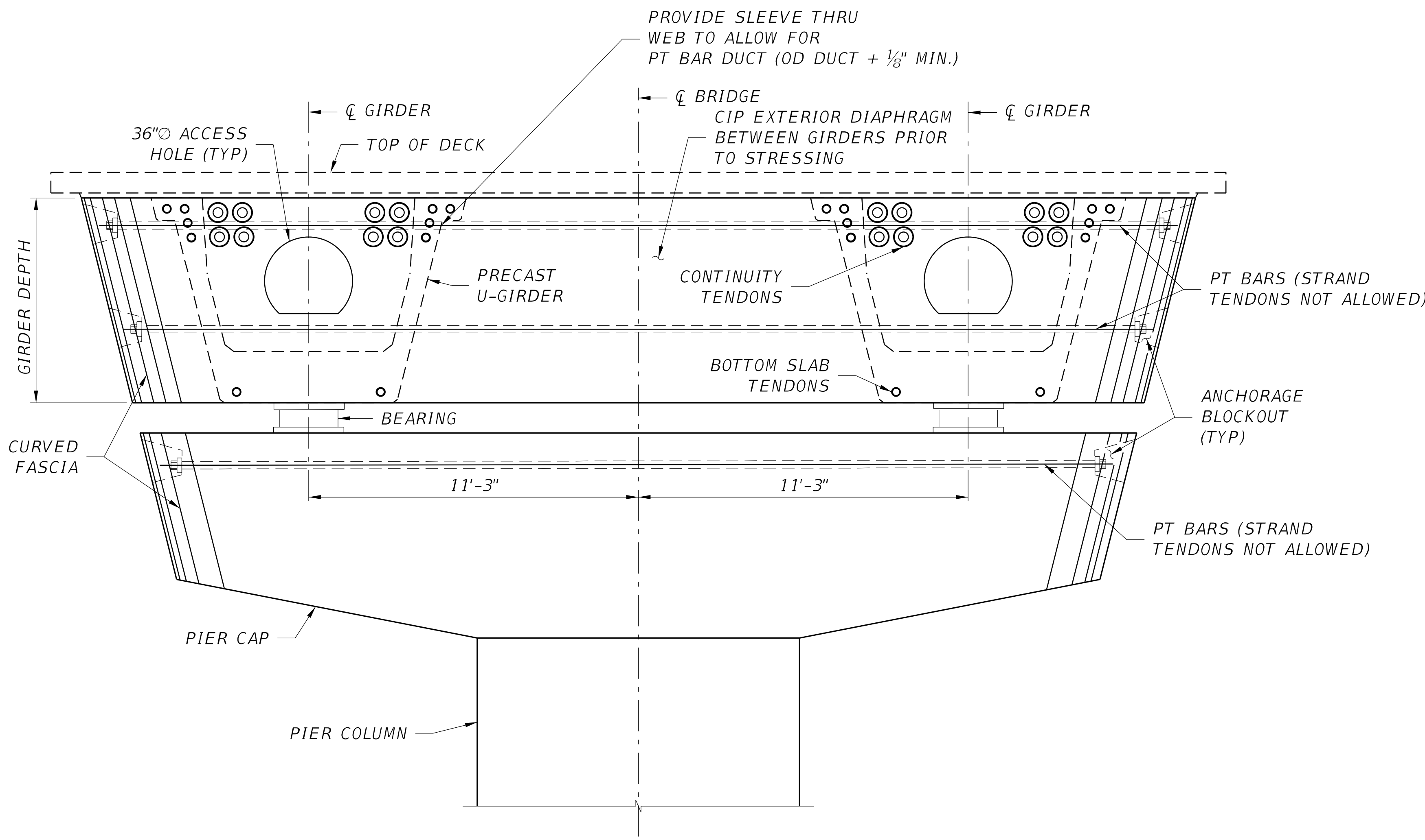
FDOT

PCI CERTIFIED PLANT

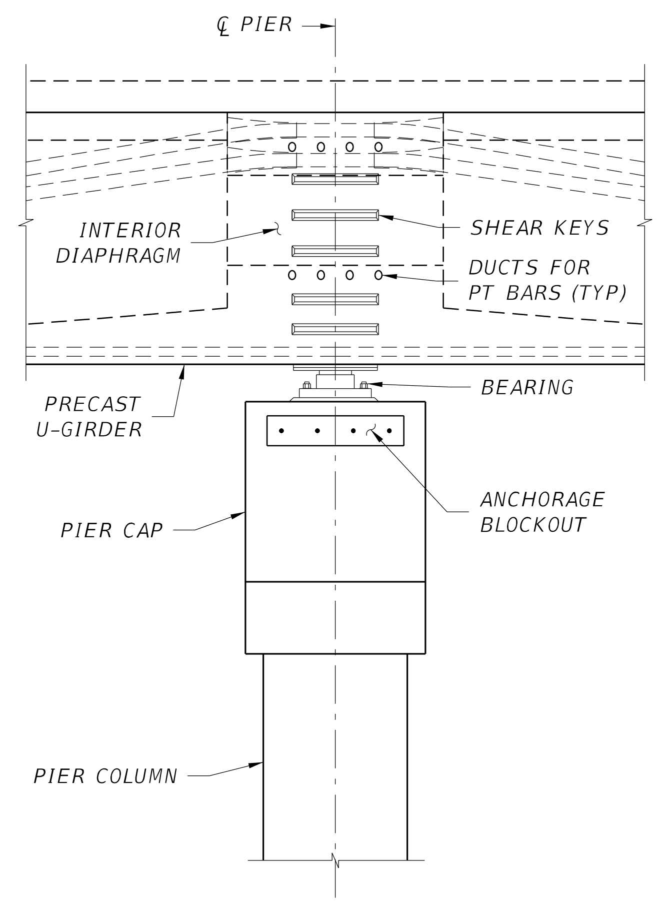
PRELIMINARY

Drawing/Sheet Number FDOT WU-4

TYPICAL EXPANSION PIER
PCI Zone 6 (SE Region) U-Girders




ELEVATION




SECTION

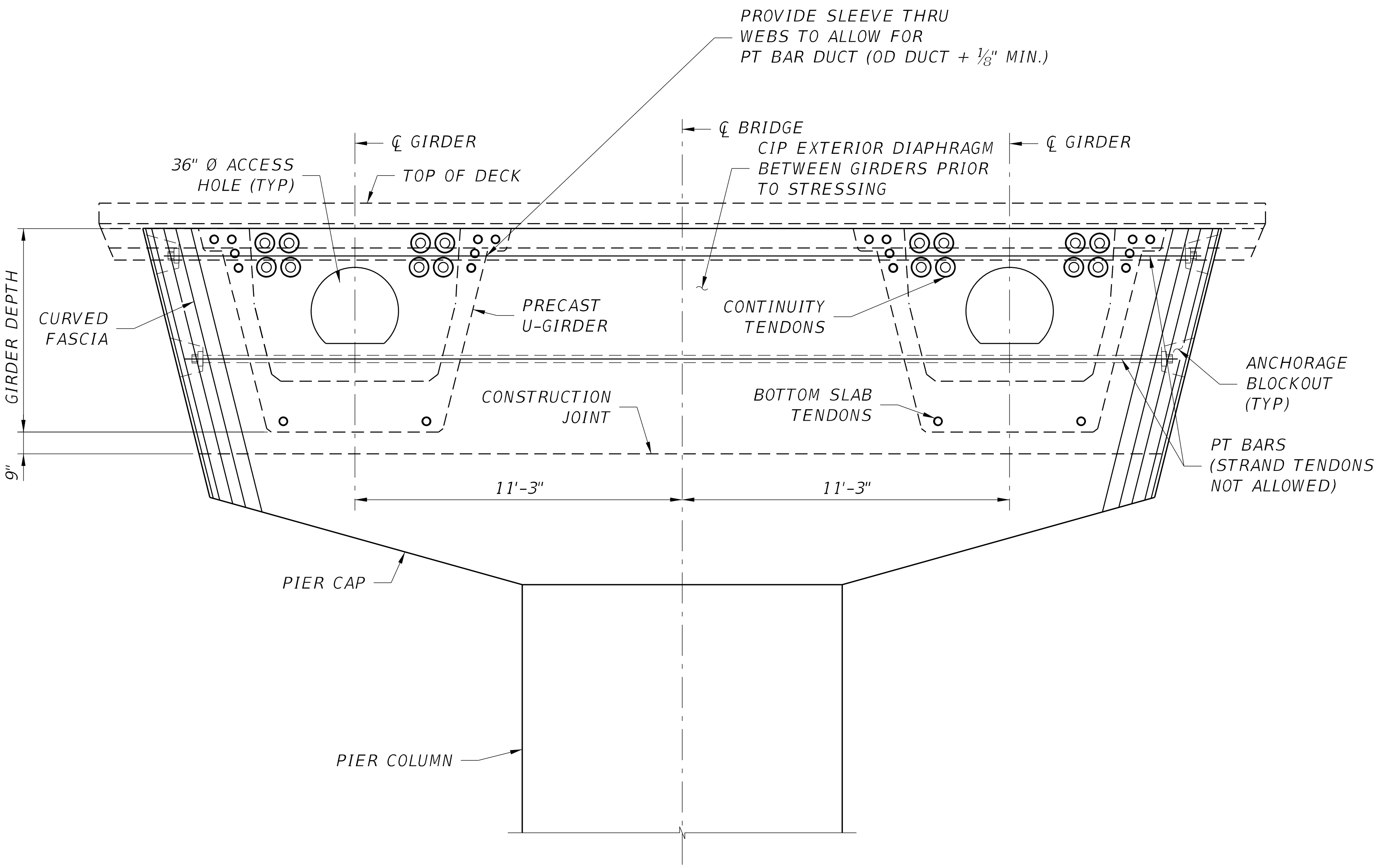
FDOT

PCI CERTIFIED PLANT

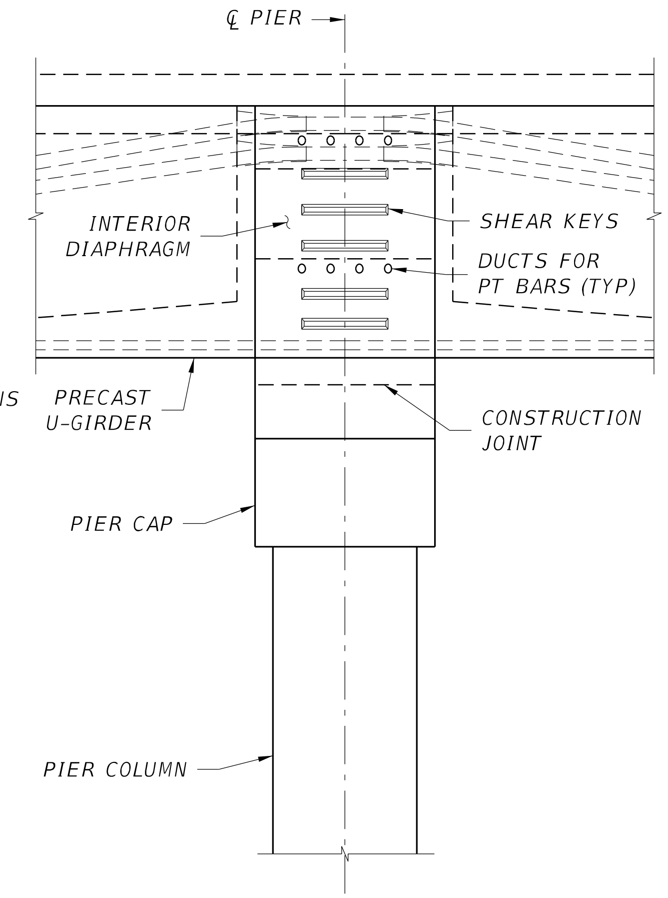
PRELIMINARY

Drawing/Sheet Number FDOT WU-5

TYPICAL INTERIOR PIER
WITH BEARINGS
PCI Zone 6 (SE Region) U-Girders




ELEVATION

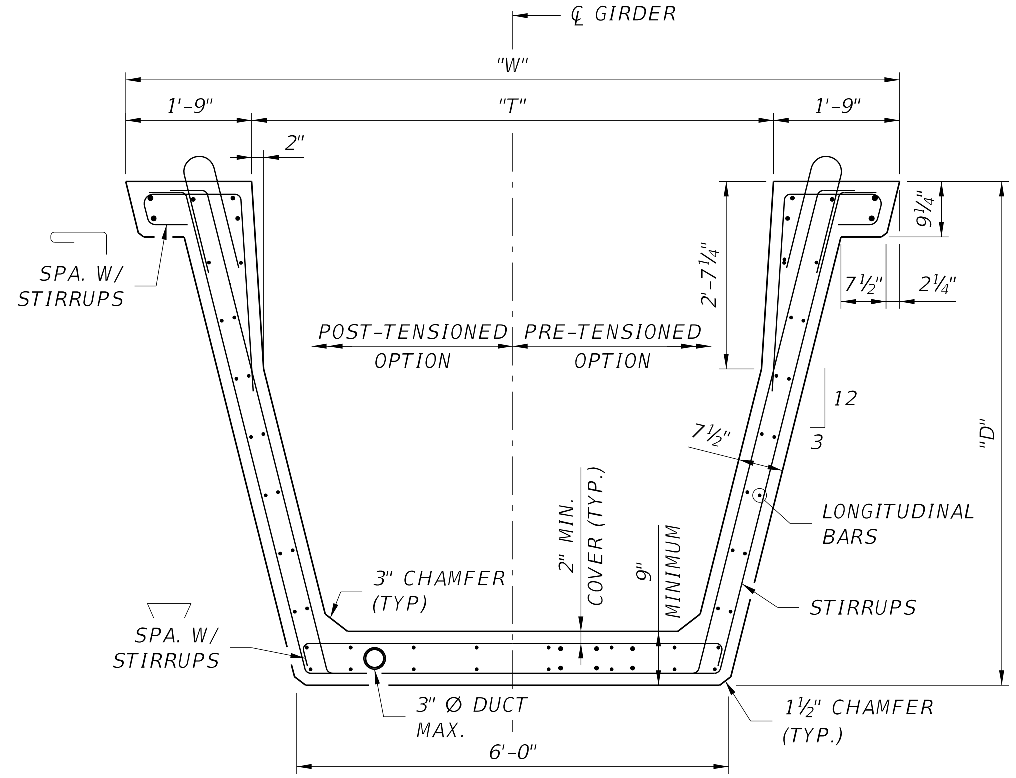



SECTION

PRELIMINARY

Drawing/Sheet Number FDOT WU-6

TYPICAL INTEGRAL INTERIOR PIER
PCI Zone 6 (SE Region) U-Girders



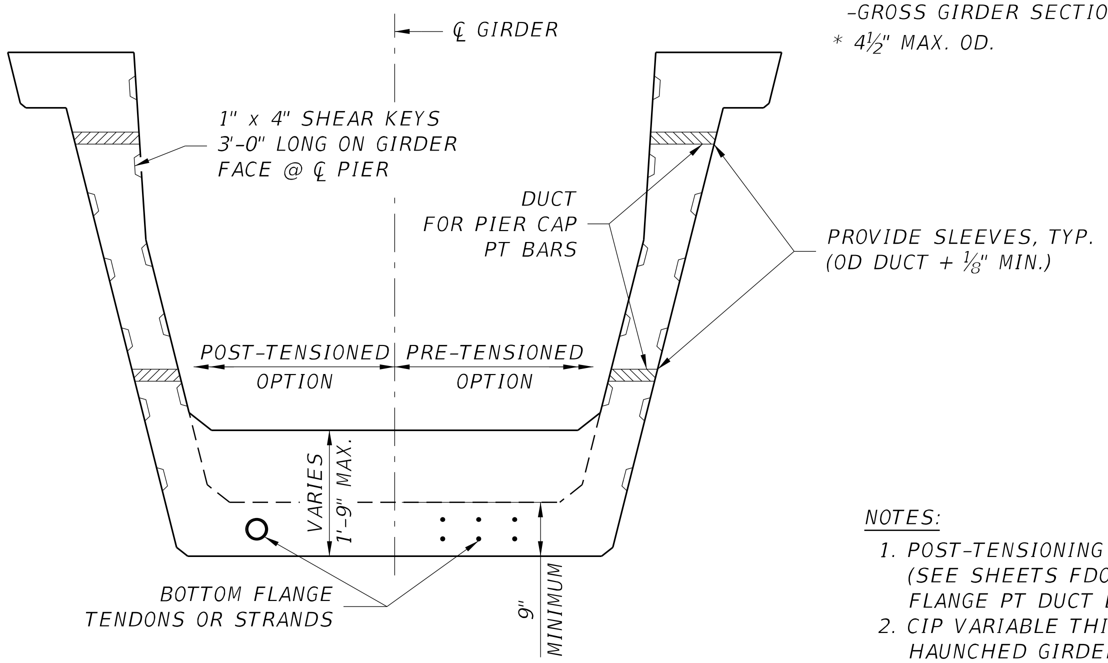

TYPICAL GIRDER GEOMETRY & REINFORCING

| GIRDER | "D" | EXTERNAL PT. DUCT SIZE* | "W" | "T" |
|---|---|---|---|---|
| U84-4 | 7'-0" | 4"Ø MAX. | 10'-9" | 7'-3" |
| U96-4 | 8'-0" | 4"Ø MAX. | 11'-3" | 7'-9" |

ASSUMPTIONS:

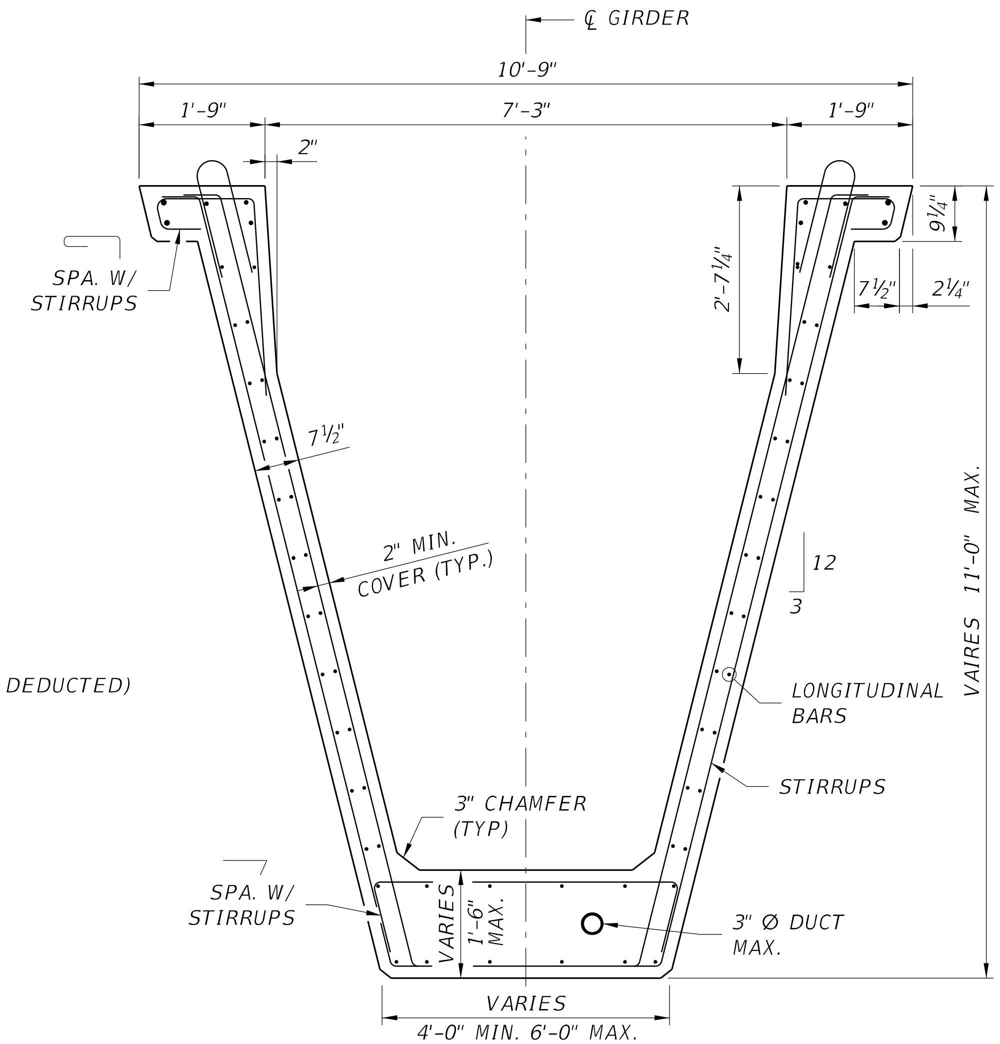
-GROSS GIRDER SECTION USED (DUCT VOID VOLUME NOT DEDUCTED)

* 4½" MAX. OD.




GIRDER GEOMETRY OVER PIER

CONSTANT DEPTH 84" & 96"




HAUNCHED GIRDER GEOMETRY & REINFORCING

HAUNCHED 84"

NOTES:

1. POST-TENSIONING SHALL BE USED FOR ALL CURVED GIRDERS. (SEE SHEETS FDOT WU-12 THRU FDOT WU-14 FOR BOTTOM FLANGE PT DUCT LOCATIONS).
2. CIP VARIABLE THICKNESS BOTTOM FLANGE IS ALLOWED FOR HAUNCHED GIRDER. MINIMUM INTERIOR BOTTOM FLANGE WIDTH IS 2'-0".
3. FOR HAUNCHED GIRDERS INCLUDE SHEAR KEYS AND SLEEVES FOR DUCTS AT PIER LOCATIONS, SIMILAR TO CONSTANT DEPTH GIRDER.

FDOT

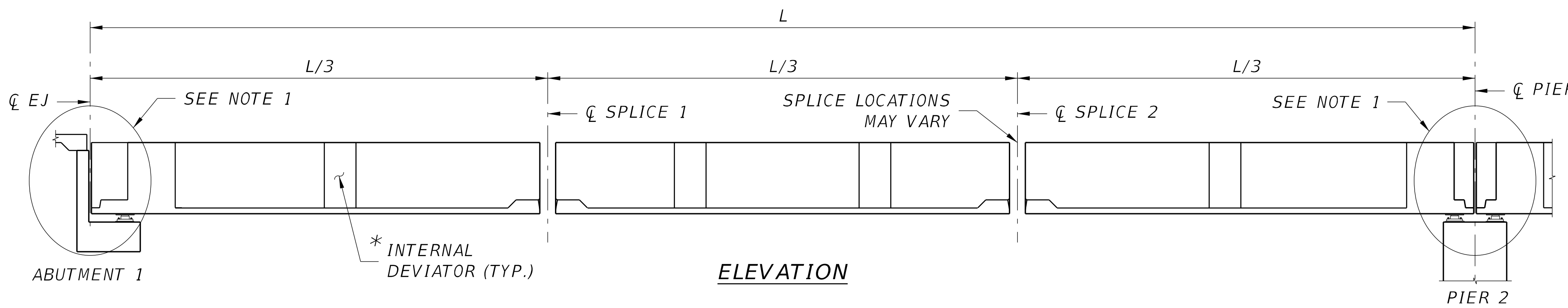
PCI CERTIFIED PLANT

PRELIMINARY

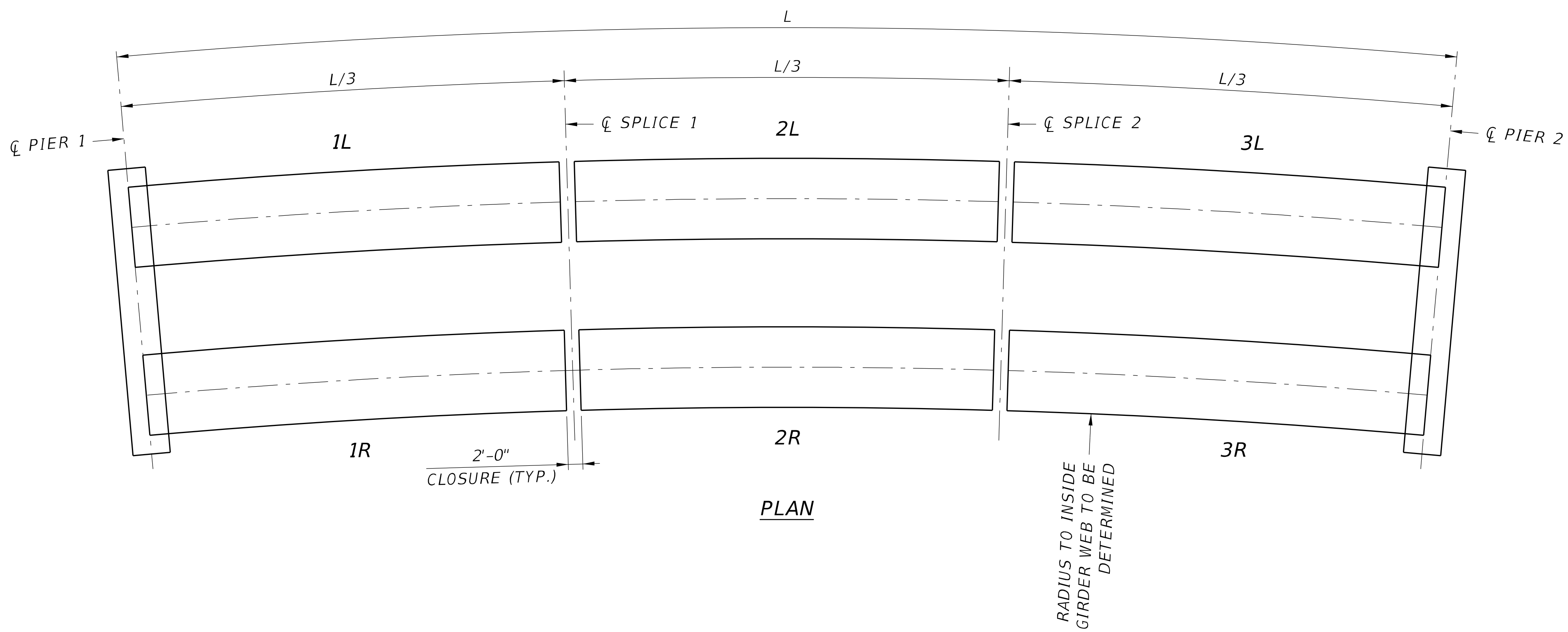
Drawing/Sheet Number FDOT WU-7

GIRDER DIMENSIONS AND REINFORCEMENT

PCI Zone 6 (SE Region) U-Girders




ELEVATION




PLAN

NOTES:

1. STRESSING CHAMBER DIMENSIONS VARY WITH LOCATION IN THE BRIDGE. SEE SHEET FDOT WU-16 FOR CHAMBER DIMENSIONS.

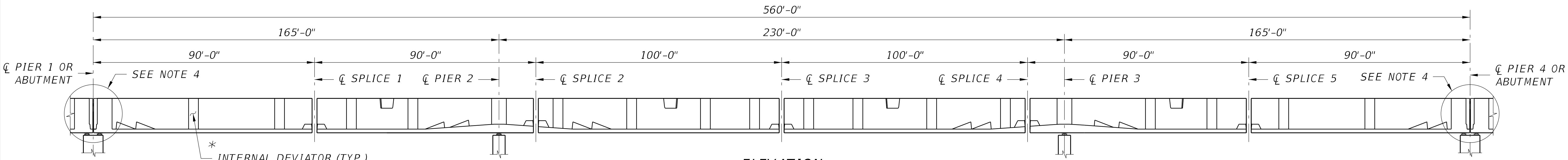
*INTERNAL DEVIATOR NOTES:

1. CURVED GIRDERS MAY BE FABRICATED USING SHORT CHORD FORMS 5' IN LENGTH.
2. INTERNAL DEVIATORS ARE 4' IN LENGTH AND LOCATED WITHIN A SHORT CHORD FORM.
3. INTERNAL DEVIATORS ARE FABRICATED WITH TRANSVERSE SYMMETRY TO MAINTAIN TENDON LOCATIONS.
4. WHEN A GIRDER SEGMENT CONTAINS ONLY ONE INTERNAL DEVIATOR, IT MAY BE PLACED AT ANY LOCATION. FORMS ARE LOCATED ACCORDINGLY, AND END BULKHEADS PLACED WITHIN THE FIRST AND LAST FORMS AS REQUIRED.
5. WHEN A GIRDER SEGMENT INCLUDES MULTIPLE INTERNAL DEVIATORS, SPACE DEVIATORS AT INCREMENTS OF 5' ON CENTER.
6. MAXIMUM SPACE BETWEEN INTERNAL DEVIATORS SHALL BE 50'.

PRELIMINARY

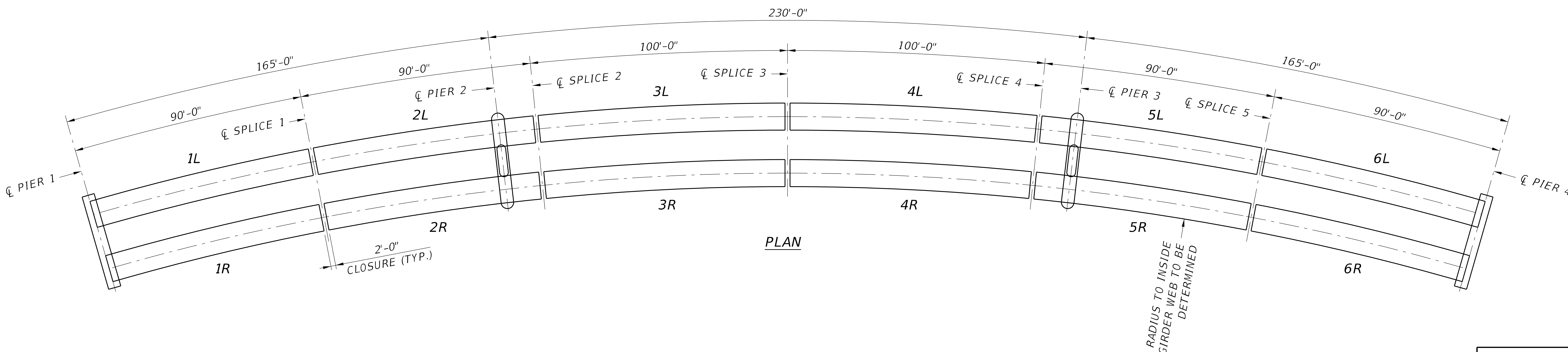
Drawing/Sheet Number FDOT WU-8

GIRDER SEGMENT LAYOUT 1
- SIMPLE SPAN
PCI Zone 6 (SE Region) U-Girders




ELEVATION

(VERTICAL SCALE IS TWICE HORIZONTAL FOR CLARITY)




PLAN

NOTES:

1. PIERS ARE ASSUMED PERPENDICULAR TO A TANGENT AT ℄ GIRDERS ALONG CURVE.
2. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.
3. ALL GIRDERS MAY BE CAST ON CENTERLINE RADIUS. THIS WILL REQUIRE SMALL HORIZONTAL ANGLE BREAK AT CLOSURE POURS.
4. STRESSING CHAMBER DIMENSIONS VARY WITH LOCATION IN THE BRIDGE. SEE SHEET FDOT WU-16 FOR CHAMBER DIMENSIONS.
5. MEET SDG REQUIREMENTS FOR THE JACK ENVELOPE DIMENSIONS.

*INTERNAL DEVIATOR NOTES:

1. CURVED GIRDERS MAY BE FABRICATED USING SHORT CHORD FORMS 5' IN LENGTH.
2. INTERNAL DEVIATORS ARE 4' IN LENGTH AND LOCATED WITHIN A SHORT CHORD FORM.
3. INTERNAL DEVIATORS ARE FABRICATED WITH TRANSVERSE SYMMETRY TO MAINTAIN TENDON LOCATIONS.
4. WHEN A GIRDER SEGMENT CONTAINS ONLY ONE INTERNAL DEVIATOR, IT MAY BE PLACED AT ANY LOCATION. FORMS ARE LOCATED ACCORDINGLY, AND END BULKHEADS PLACED WITHIN THE FIRST AND LAST FORMS AS REQUIRED.
5. WHEN A GIRDER SEGMENT INCLUDES MULTIPLE INTERNAL DEVIATORS, SPACE DEVIATORS AT INCREMENTS OF 5' ON CENTER.
6. MAXIMUM SPACE BETWEEN INTERNAL DEVIATORS SHALL BE 50'.

FDOT

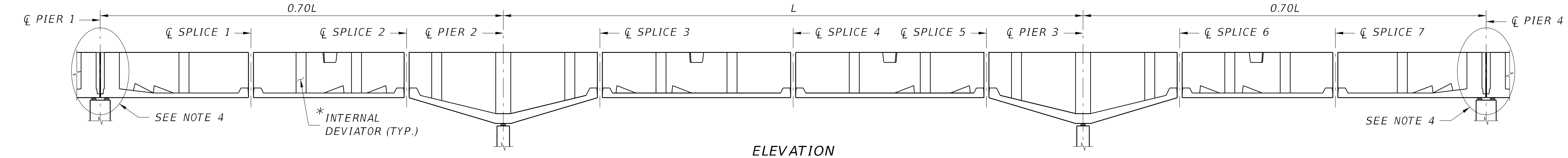
PCI CERTIFIED PLANT

PRELIMINARY

Drawing/Sheet Number FDOT WU-9

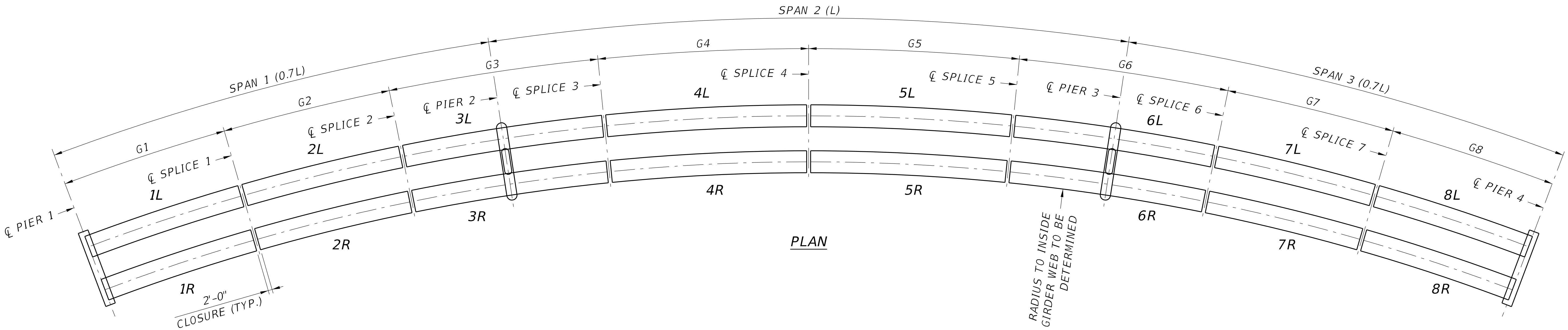
GIRDER SEGMENT LAYOUT 2 – CONSTANT DEPTH CONTINUOUS

PCI Zone 6 (SE Region) U-Girders




ELEVATION

(VERTICAL SCALE IS TWICE HORIZONTAL FOR CLARITY)




PLAN

NOTES:

1. PIERS ARE ASSUMED PERPENDICULAR TO ℄ GIRDERS ALONG CURVE.
2. CIP VARIABLE THICKNESS BOTTOM FLANGE IS ALLOWED.
3. MIXING CURVED AND STRAIGHT BEAMS IN SAME SPAN NOT ALLOWED.
4. STRESSING CHAMBER DIMENSIONS VARY WITH LOCATION IN THE BRIDGE. SEE SHEET FDOT WU-16 FOR CHAMBER DIMENSIONS.
5. MEET SDG REQUIREMENTS FOR THE JACK ENVELOPE DIMENSIONS.

*INTERNAL DEVIATOR NOTES:

1. CURVED GIRDERS MAY BE FABRICATED USING SHORT CHORD FORMS 5' IN LENGTH.
2. INTERNAL DEVIATORS ARE 4' IN LENGTH AND LOCATED WITHIN A SHORT CHORD FORM.
3. INTERNAL DEVIATORS ARE FABRICATED WITH TRANSVERSE SYMMETRY TO MAINTAIN TENDON LOCATIONS.
4. WHEN A GIRDER SEGMENT CONTAINS ONLY ONE INTERNAL DEVIATOR, IT MAY BE PLACED AT ANY LOCATION. FORMS ARE LOCATED ACCORDINGLY, AND END BULKHEADS PLACED WITHIN THE FIRST AND LAST FORMS AS REQUIRED.
5. WHEN A GIRDER SEGMENT INCLUDES MULTIPLE INTERNAL DEVIATORS, SPACE DEVIATORS AT INCREMENTS OF 5' ON CENTER.
6. MAXIMUM SPACE BETWEEN INTERNAL DEVIATORS SHALL BE 50'.

FDOT

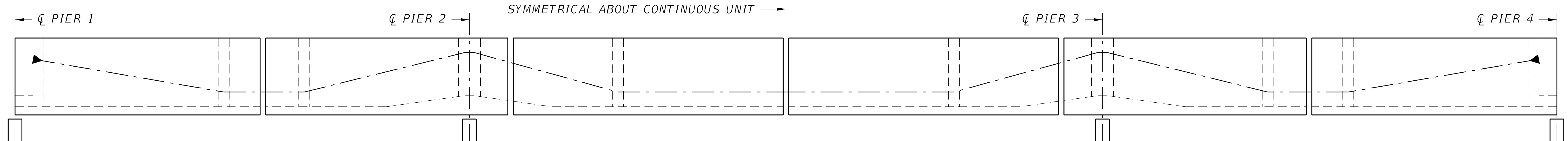
PCI CERTIFIED PLANT

PRELIMINARY

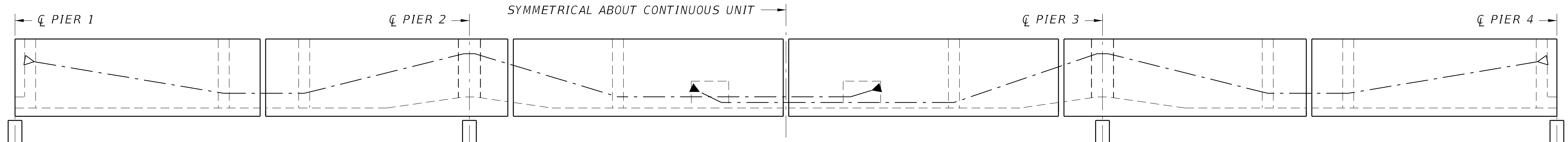
Drawing/Sheet Number FDOT WU-10

GIRDER SEGMENT LAYOUT 3 – HAUNCHED CONTINUOUS

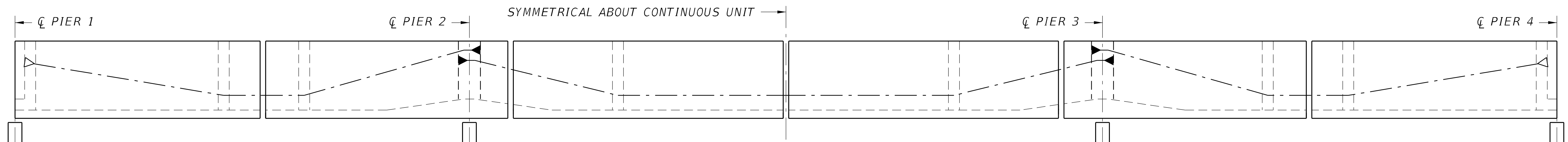
PCI Zone 6 (SE Region) U-Girders



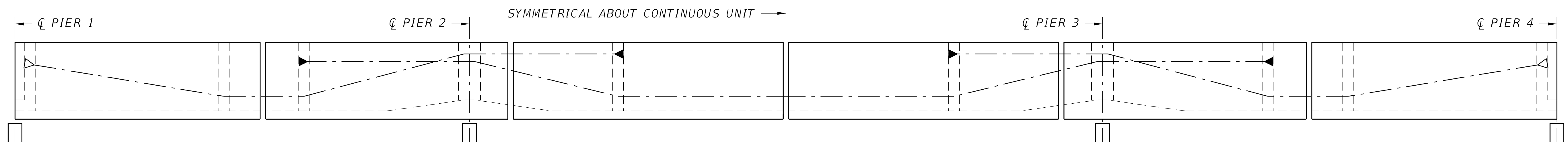

PASS-THRU OPTION




MODIFIED PASS-THRU OPTION




LACED OPTION




MODIFIED LACED OPTION

▶ DENOTES STRESSING ANCHOR

▷ DENOTES NON-STRESSING ANCHOR

NOTES:

1. TENDON LAYOUTS ON THIS SHEET DEPICT ALTERNATIVE LAYOUTS FOR EXTERNAL, CONTINUITY TENDONS WITH FLEXIBLE FILLER.
2. THE ALTERNATIVE LAYOUTS SHOWN ARE SCHEMATIC ONLY, AND DO NOT SHOW ALL OF THE EXTERNAL TENDONS.
3. THE LOCATION AND DETAILS OF ALL TENDONS SHALL CONFORM TO FDOT REQUIREMENTS.
4. PROVIDE STRESSING END CHAMBER FOR PASS-THRU OPTION. SEE SHEET FDOT WU-16.

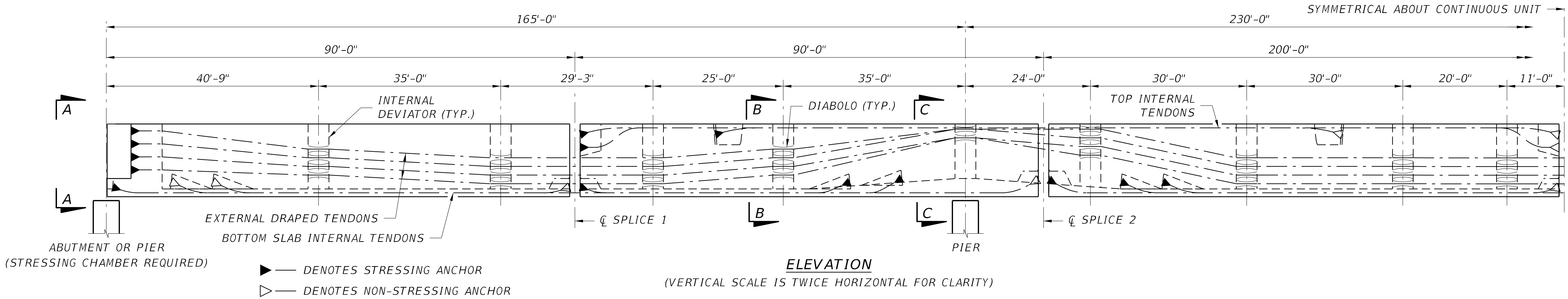
FDOT

PCI CERTIFIED PLANT

PRELIMINARY

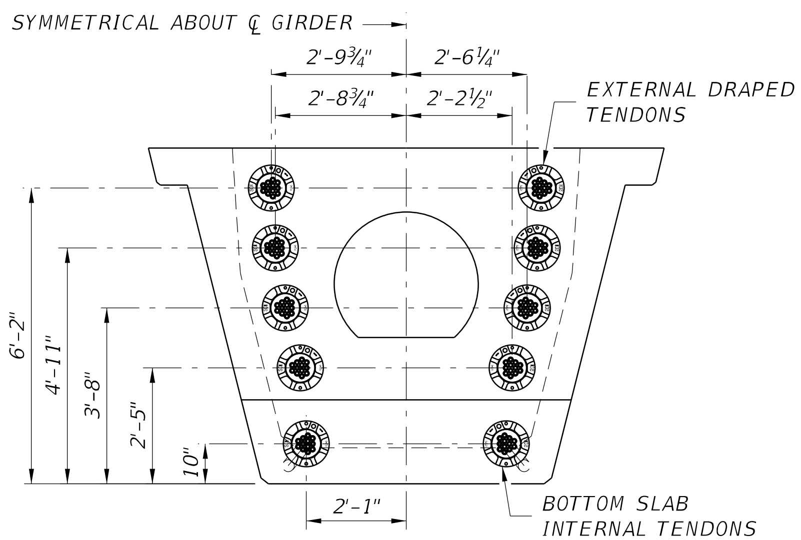
Drawing/Sheet Number FDOT WU-11

COMPARATIVE POST-TENSIONING
LAYOUT SCHEMATICS
PCI Zone 6 (SE Region) U-Girders

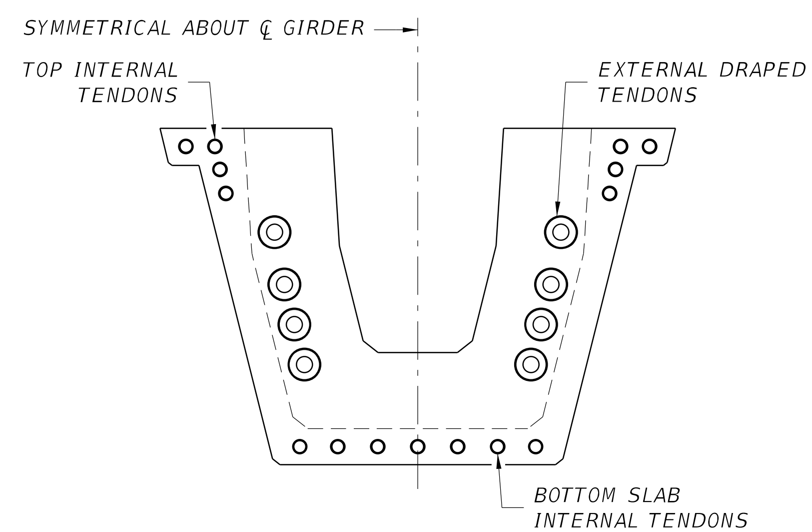



ELEVATION

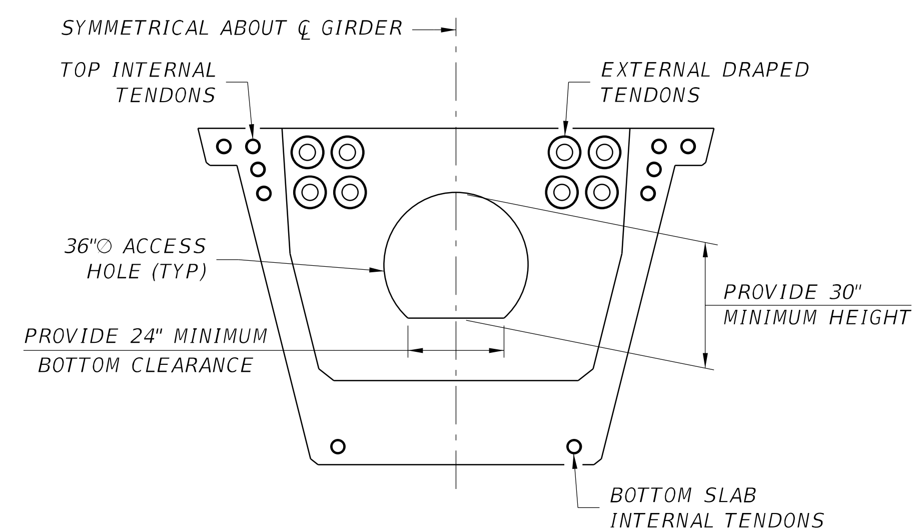
(VERTICAL SCALE IS TWICE HORIZONTAL FOR CLARITY)




SECTION A-A AT END DIAPHRAGM




SECTION B-B AT INTERNAL DEVIATOR




SECTION C-C AT INTERIOR PIER

NOTES:

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.
2. ASSUMPTIONS:
   - 3"○ PLASTIC DUCTS - 12 STRAND MAX. TOP AND BOTTOM INTERNAL TENDONS GROUTED WITH CEMENTITOUS MATERIAL.
   - 4"○ PLASTIC DUCTS - EXTERNAL TENDONS WITH FLEXIBLE FILLER
3. FOR DIABOLO LAYOUT, SEE SHEET FDOT WU-15.
4. MEET SDG REQUIREMENTS FOR THE JACK ENVELOPE DIMENSIONS.

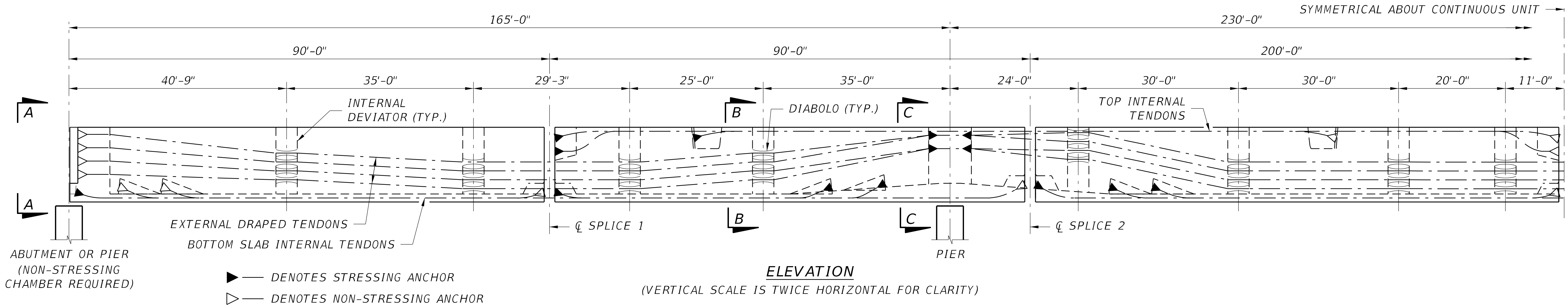
FDOT

PCI
CERTIFIED PLANT

PRELIMINARY

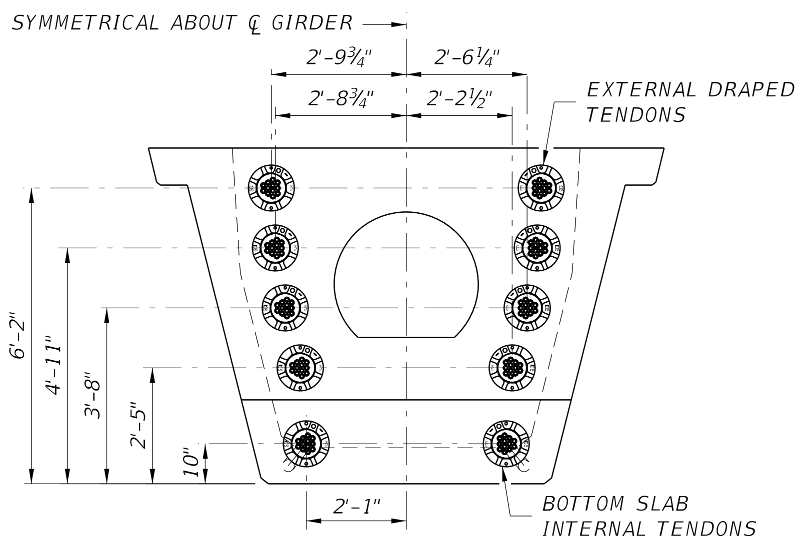
Drawing/Sheet Number FDOT WU-12

POST-TENSIONING LAYOUT 1
- PASS THRU OPTION
PCI Zone 6 (SE Region) U-Girders

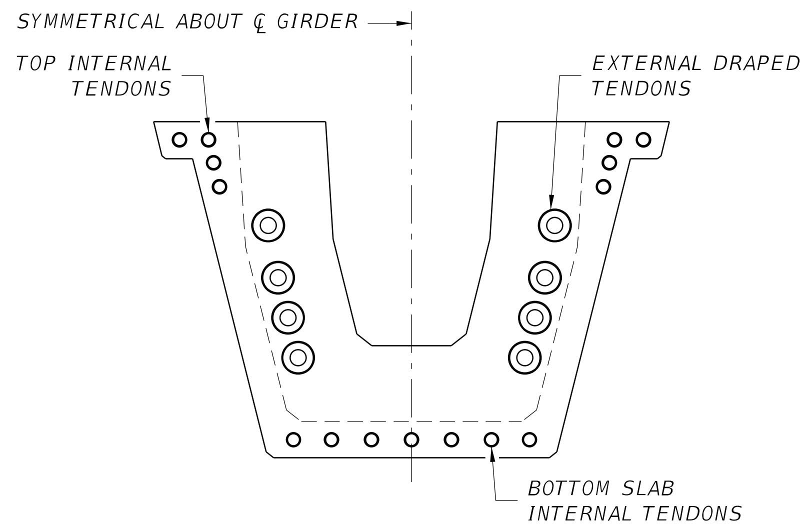



ELEVATION

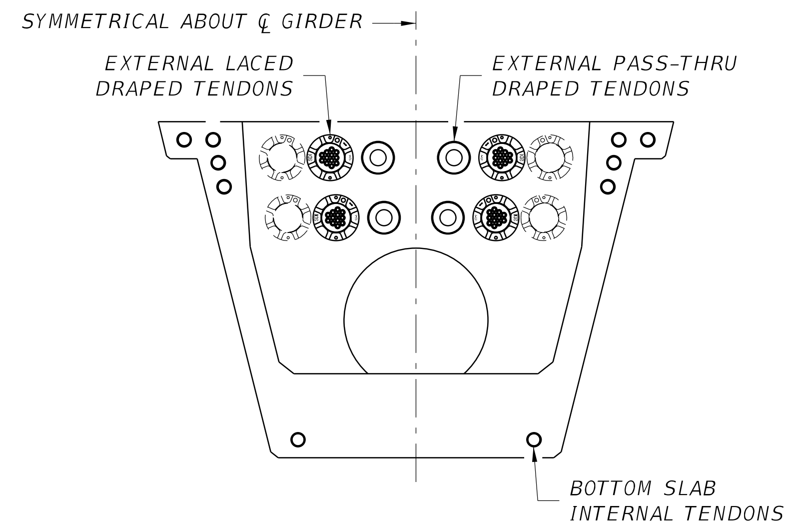
(VERTICAL SCALE IS TWICE HORIZONTAL FOR CLARITY)




SECTION A-A AT END DIAPHRAGM




SECTION B-B AT INTERNAL DEVIATOR




SECTION C-C AT INTERIOR PIER

NOTES:

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.
2. ASSUMPTIONS:
   - 3"∅ PLASTIC DUCTS - 12 STRAND MAX. TOP AND BOTTOM INTERNAL TENDONS GROUTED WITH CEMENTITOUS MATERIAL.
   - 4"∅ PLASTIC DUCTS - EXTERNAL TENDONS WITH FLEXIBLE FILLER
3. FOR DIABOLO LAYOUT, SEE SHEET FDOT WU-15.
4. MEET SDG REQUIREMENTS FOR THE JACK ENVELOPE DIMENSIONS.

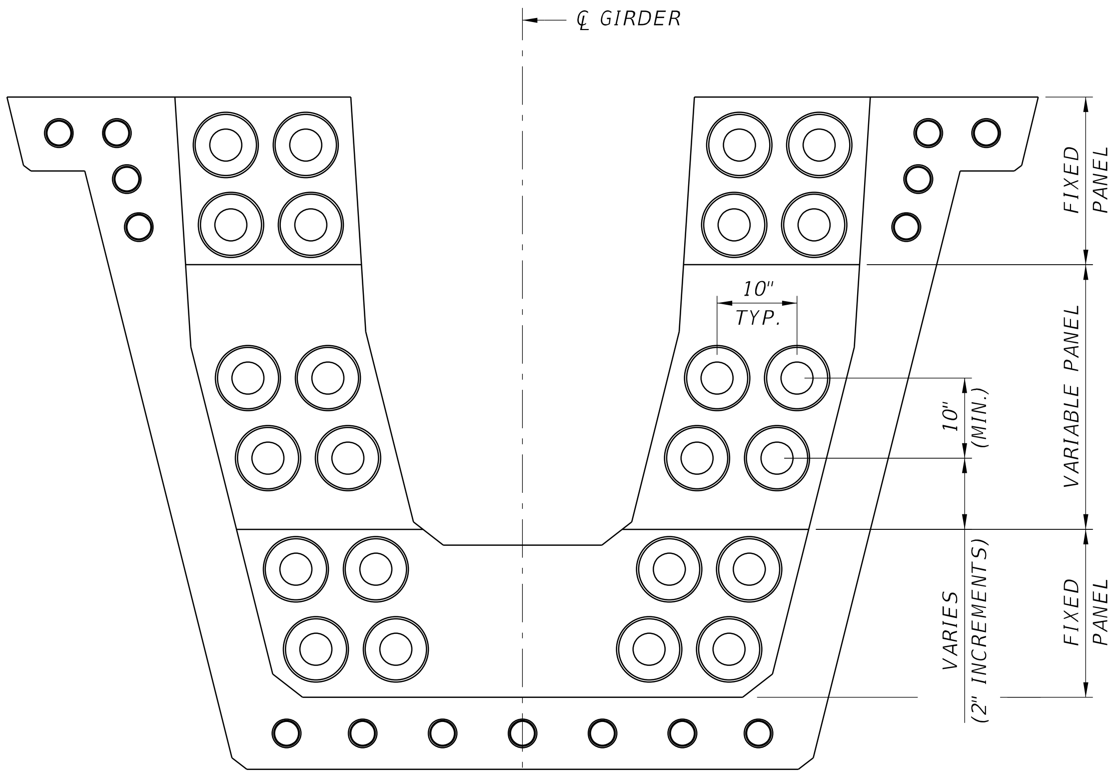
FDOT

PCI CERTIFIED PLANT

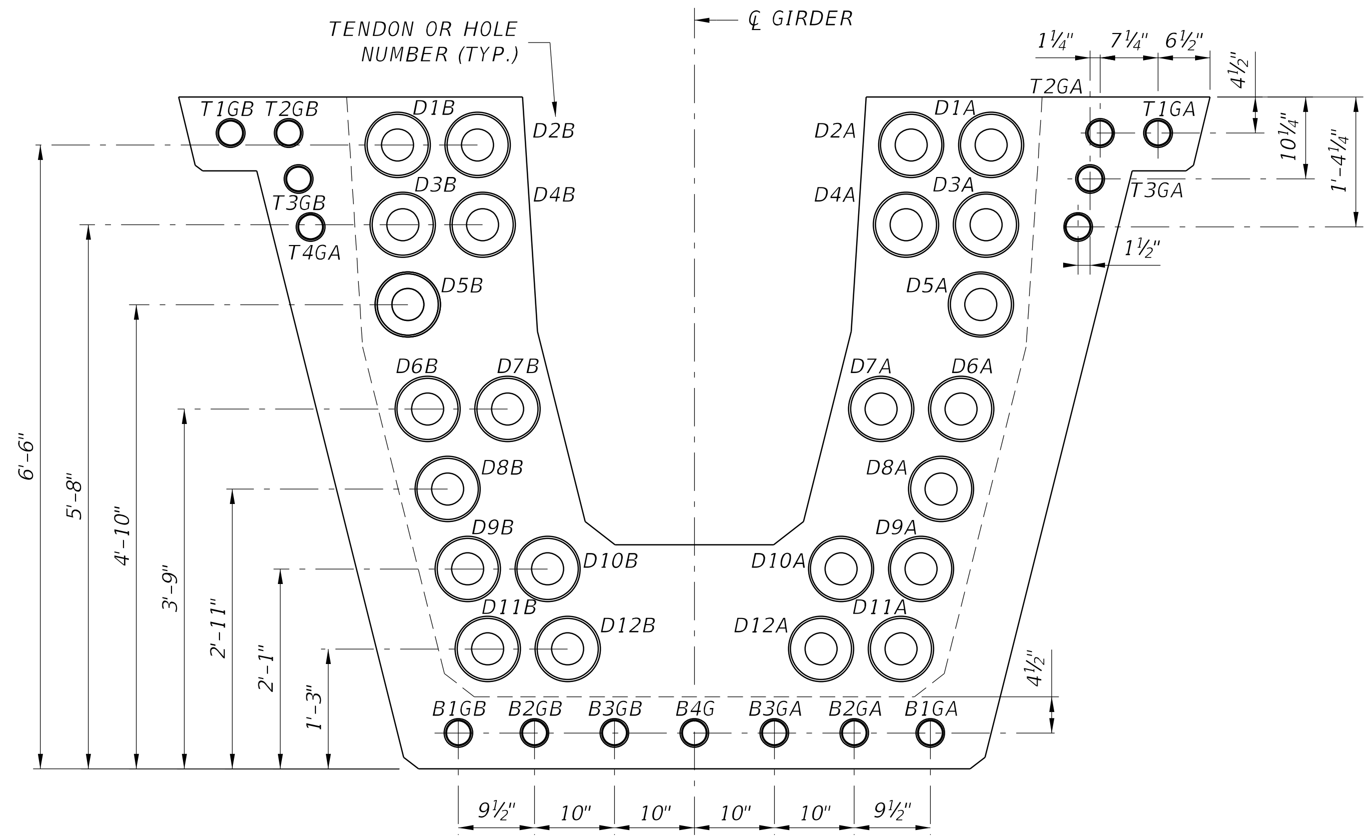
PRELIMINARY

Drawing/Sheet Number FDOT WU-13

POST-TENSIONING LAYOUT 2
- LACED OPTION
PCI Zone 6 (SE Region) U-Girders




DETAILS AT DEVIATOR
(84" GIRDER SHOWN)

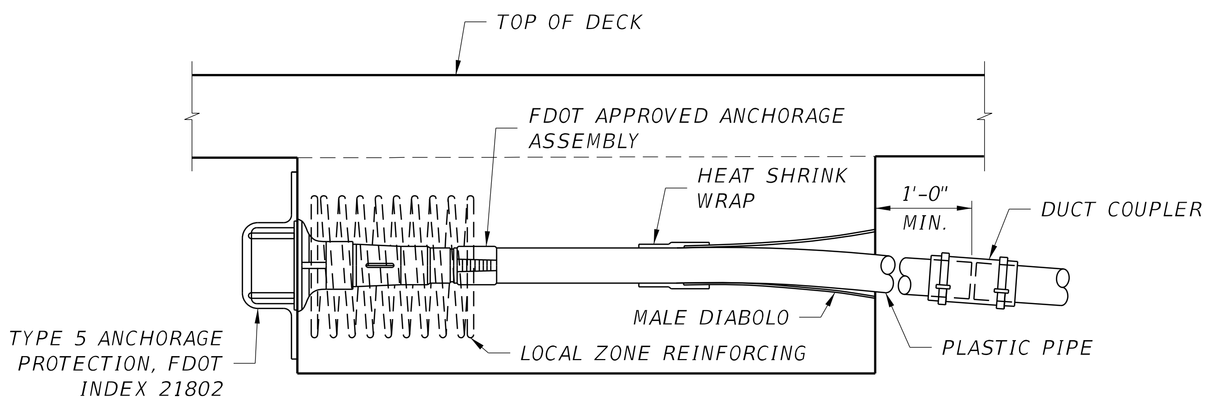



GIRDER SECTION AT DEVIATOR
(84" GIRDER SHOWN)

NOTES:

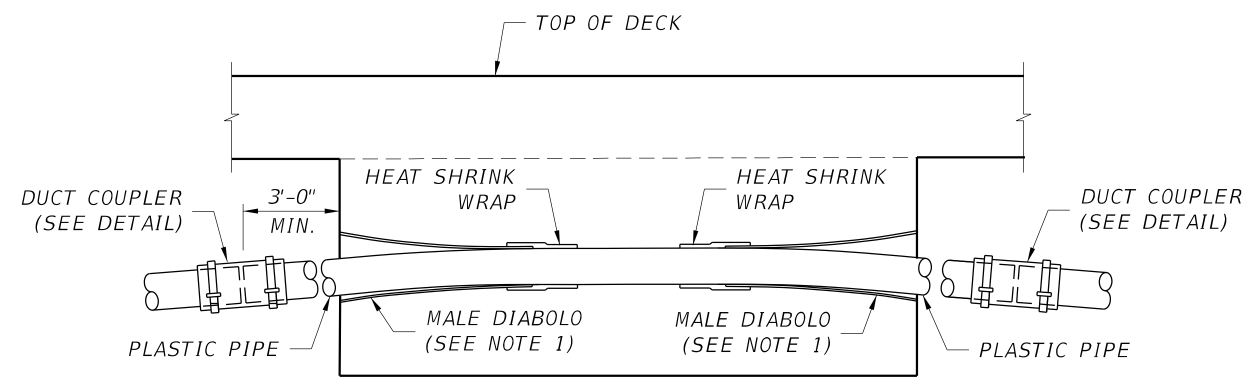
1. THE DETAILS SHOWN DEPICT STANDARD DIABOLO LOCATIONS WITHIN AN INTERNAL DEVIATOR VIABLE TO THE ENGINEER FOR USE IN DETAILING THE LOCATIONS OF EXTERNAL FLEXIBLE-FILLED CONTINUITY TENDONS.
2. THE EXTERNAL TENDON WILL ONLY DEVIATE THOSE DIABOLOS AS REQUIRED TO ACCOMMODATE TENDON PROFILE AND HORIZONTAL CURVATURE. AVOID CONTACT BETWEEN DUCT AND THE WEB OF THE U-GIRDER.
3. UNUSED, VACANT DIABOLOS MAY BE CAST AT THE PRECASTER'S OPTION.
4. THE MAXIMUM 3-DIMENSIONAL (HORIZONTAL AND VERTICAL) ANGLE BREAK AT A DIABOLO SHALL NOT EXCEED 0.1 RADIANS.
5. IN CONDITIONS WHERE USING DIABOLOS IN STANDARD CONFIGURATIONS PRODUCE INTERFERENCE BETWEEN A TENDON AND INTERMEDIATE DIAPHRAGM, SPECIAL PANELS AS SHOWN IN THE SPECIALIZED DEVIATOR DETAILS MAY BE USED TO ADJUST DIABOLO VERTICAL LOCATIONS.

PRELIMINARY



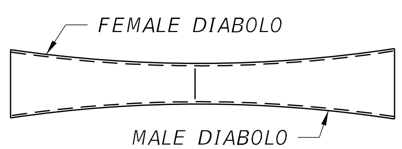

PIER DIAPHRAGM - ANCHORED TENDON

STAY IN PLACE FORMED DIABOLO



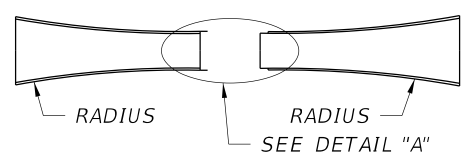

PIER DIAPHRAGM - PASS-THRU TENDON

STAY IN PLACE FORMED DIABOLO



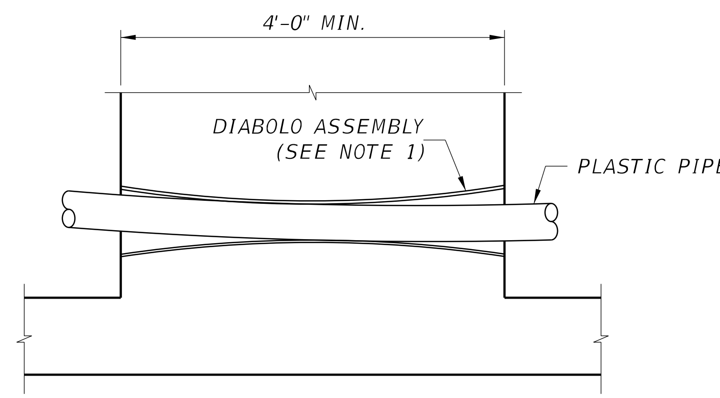

DIABOLO LAYOUT

REMOVABLE NYLON FORM

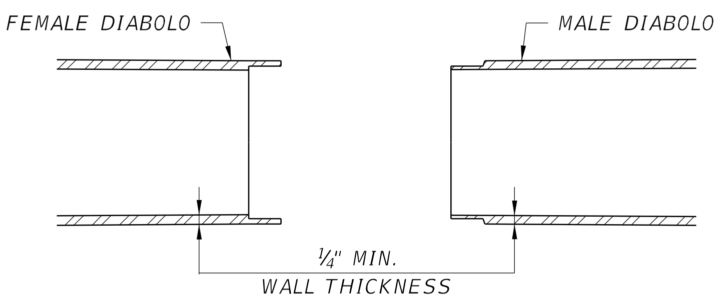



FEMALE DIABOLO MALE DIABOLO

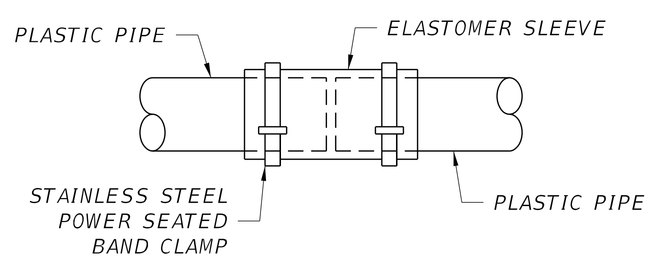
REMOVABLE NYLON FORM




INTERNAL DEVIATOR DIAPHRAGM




DETAIL A




DUCT COUPLER DETAIL

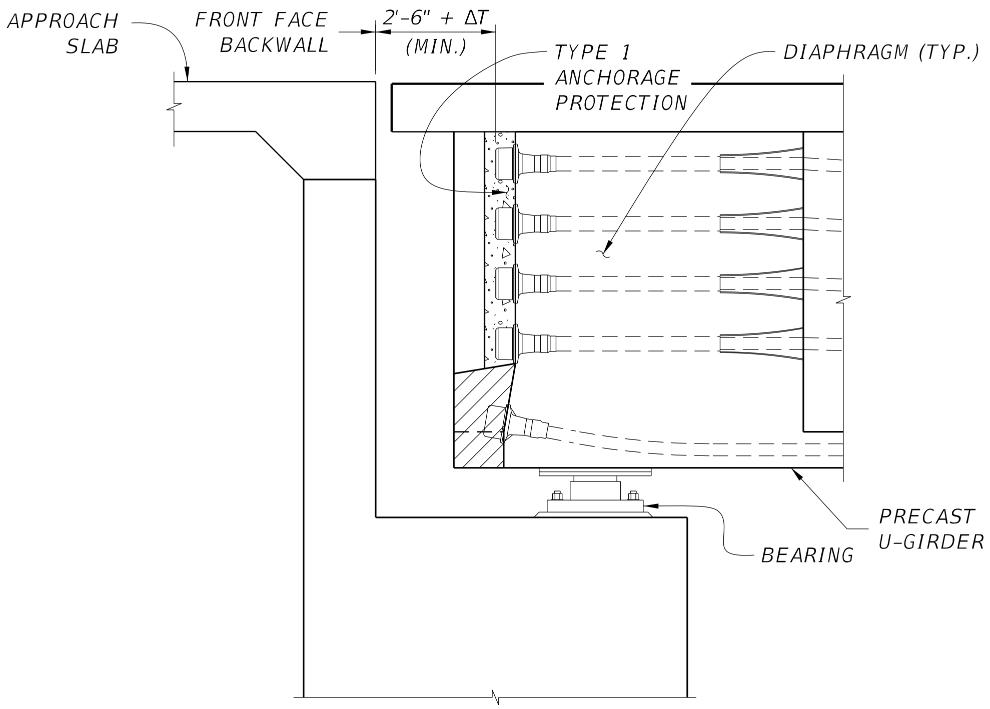
NOTES:

1. FABRICATE DIABOLO FOR POLYETHYLENE PIPE O.D. TOLERANCES SPECIFIED IN ASTM F714 OR D3035 + ⅛".

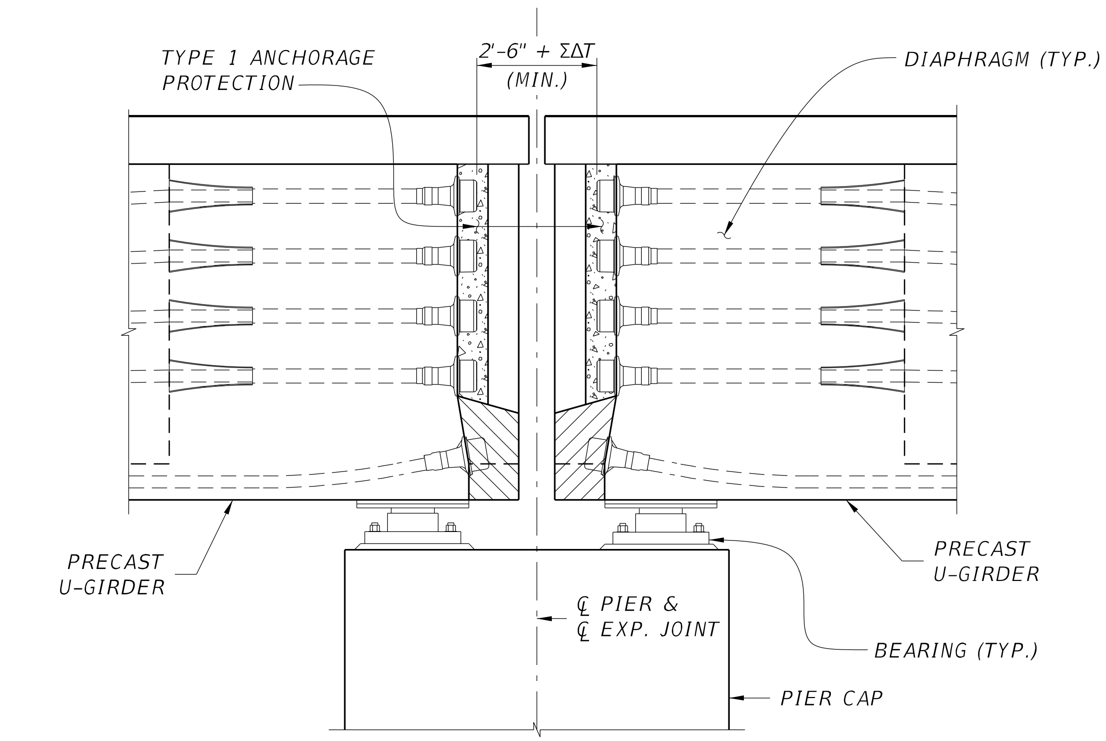
PRELIMINARY

Drawing/Sheet Number FDOT WU-15

GIRDER POST-TENSIONING DETAILS 2
PCI Zone 6 (SE Region) U-Girders

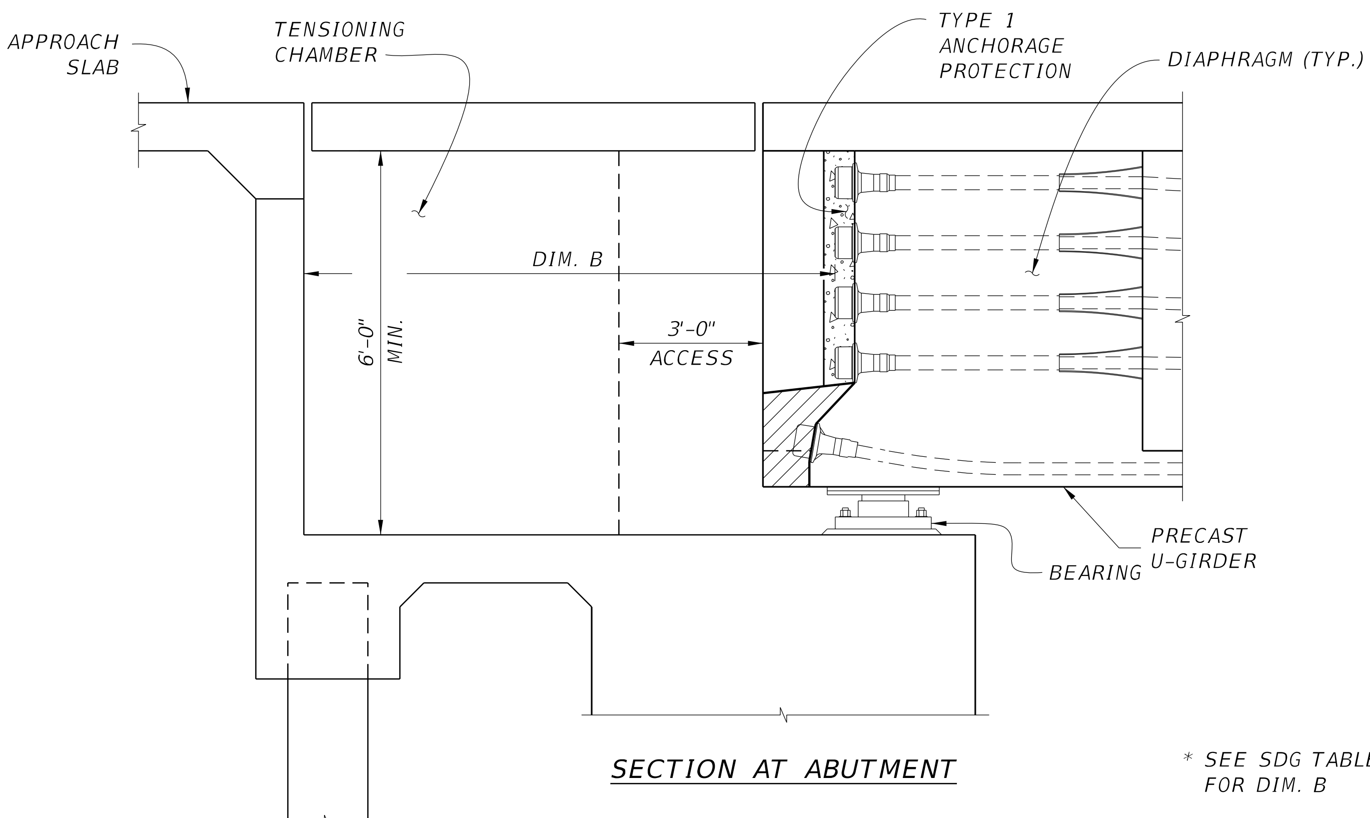



SECTION AT ABUTMENT



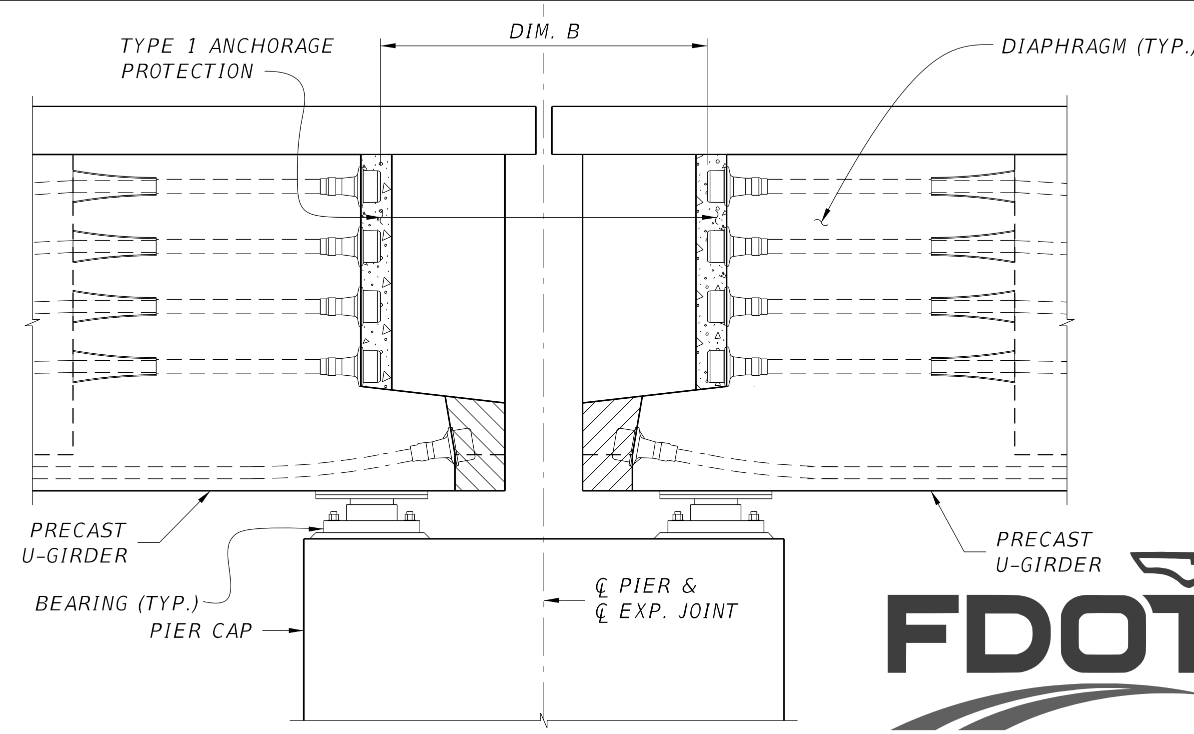

SECTION AT INTERIOR PIER

## NON-STRESSING END CHAMBERS




SECTION AT ABUTMENT

* SEE SDG TABLE 1.11.1-2
FOR DIM. B




SECTION AT INTERIOR PIER

## STRESSING END CHAMBERS

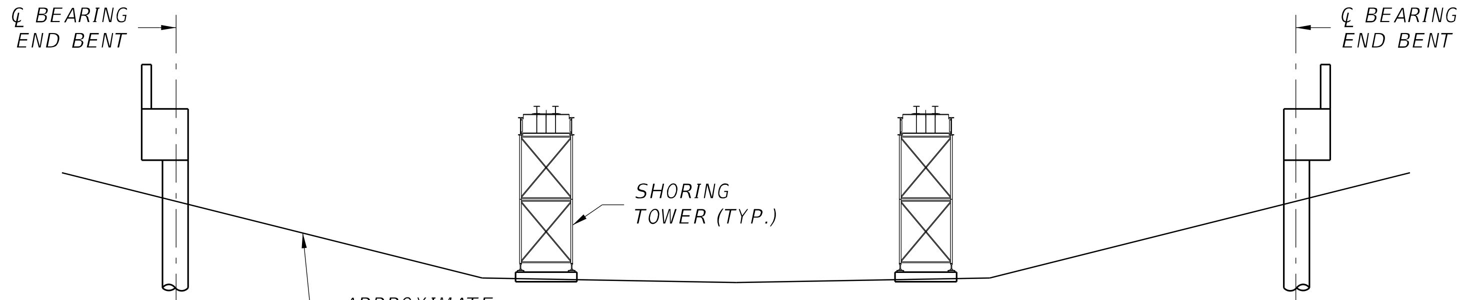
PRELIMINARY

Drawing/Sheet Number FDOT WU-16

STRESSING CHAMBER DETAILS
PCI Zone 6 (SE Region) U-Girders

PHASE 1

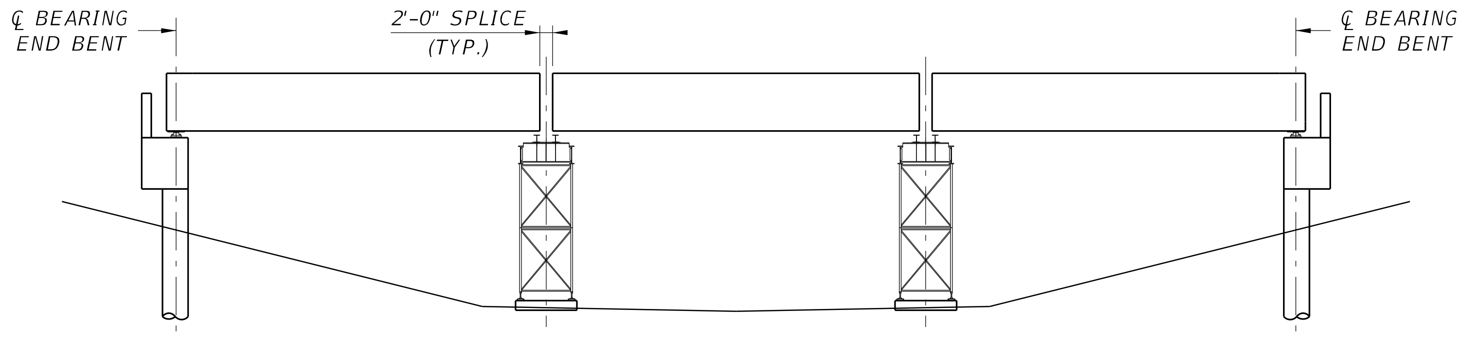
1. CONSTRUCT FOUNDATIONS, ABUTMENTS, AND PIERS.
2. ERECT SHORING TOWERS.




PHASE 1

PHASE 2

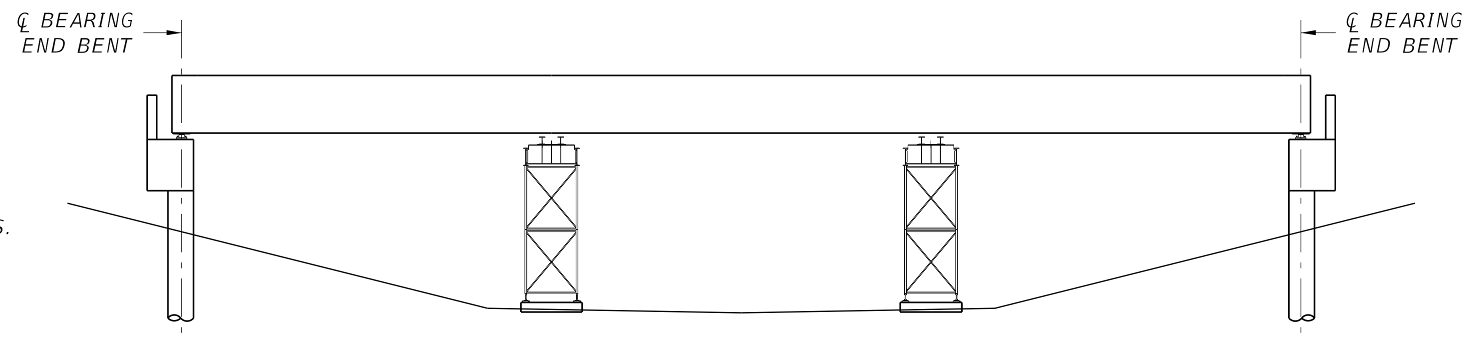
1. ERECT GIRDER SEGMENTS.
2. BRACE CURVED SEGMENTS.
3. FORM & CAST LID SLABS OVER GIRDERS.
4. CAST ALL CLOSURES.




PHASE 2

PHASE 3

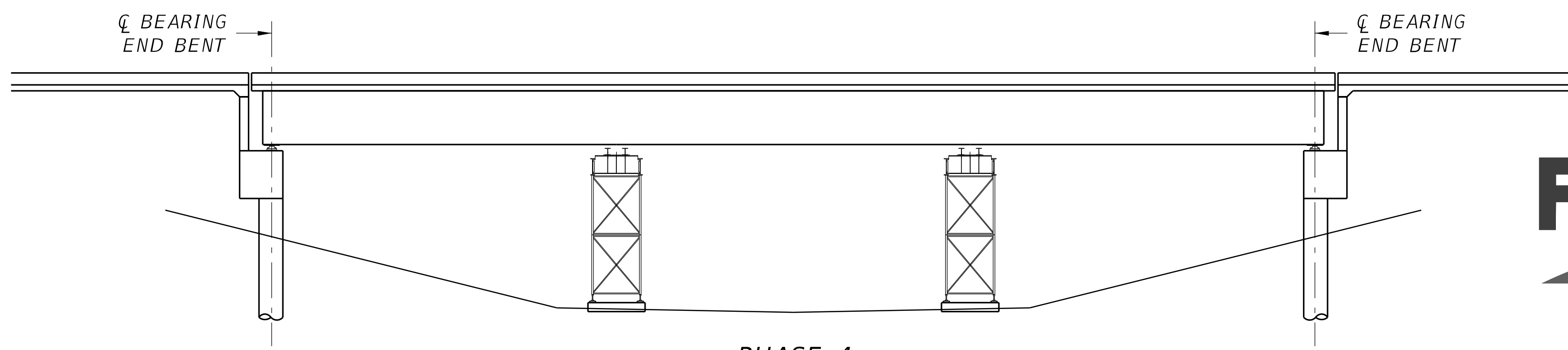
1. STRESS CONTINUITY TENDONS.
2. GROUT TOP AND BOTTOM INTERNAL CONTINUITY PT.
3. PLACE FLEXIBLE FILLER IN ALL EXTERNAL TENDONS.




PHASE 3

PHASE 4

1. CAST DECK SLAB.
2. REMOVE SHORING TOWERS.
3. CAST APPROACH SLABS AND BRIDGE RAIL.
4. INSTALL EXPANSION JOINTS.




PHASE 4

NOTES:

1. INCLUDE TOWER LOCATIONS AND REACTIONS IN THE PLANS.
2. INCLUDE MAX TOWER VERTICAL DISPLACEMENT IN THE PLANS.
3. CONTRACTOR SHALL DEVELOP A MONITORING PROGRAM FOR ERECTING SHORING TOWERS.

FDOT

PCI CERTIFIED PLANT

PRELIMINARY

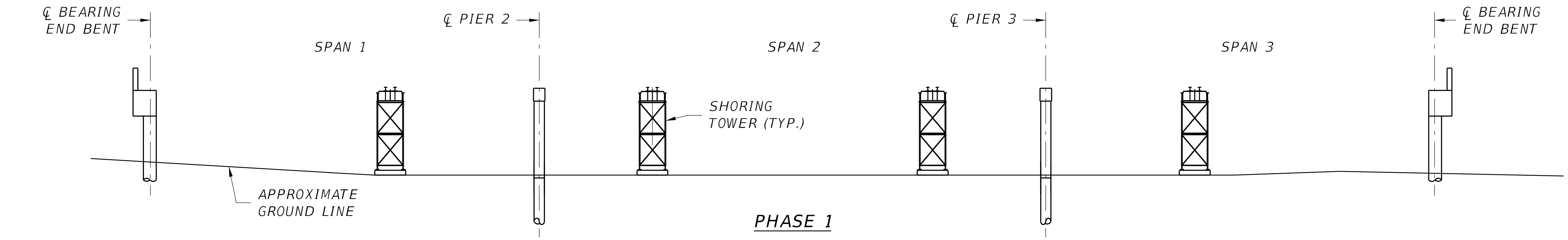
Drawing/Sheet Number FDOT WU-17

CONSTRUCTION SEQUENCE 1 - SIMPLE SPAN

PCI Zone 6 (SE Region) U-Girders

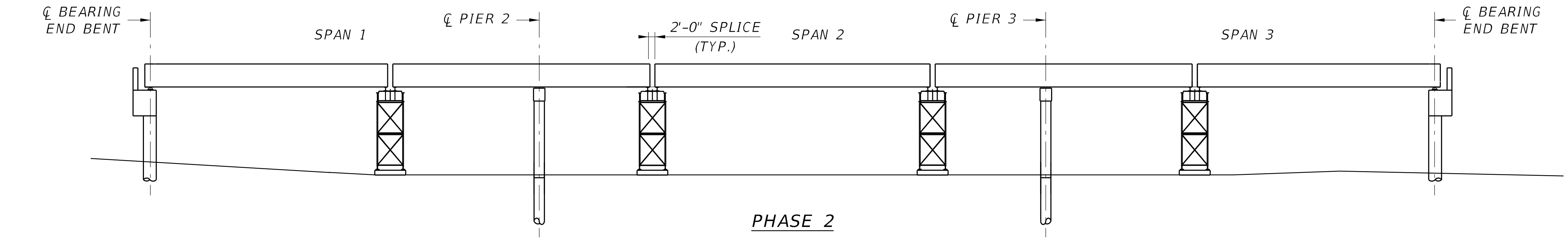
PHASE 1

1. CONSTRUCT FOUNDATIONS, ABUTMENTS, AND PIERS.
2. STRESS PT AT PIER CAPS AND PLACE GROUT (OR FLEXIBLE FILLER).
3. ERECT SHORING TOWERS.



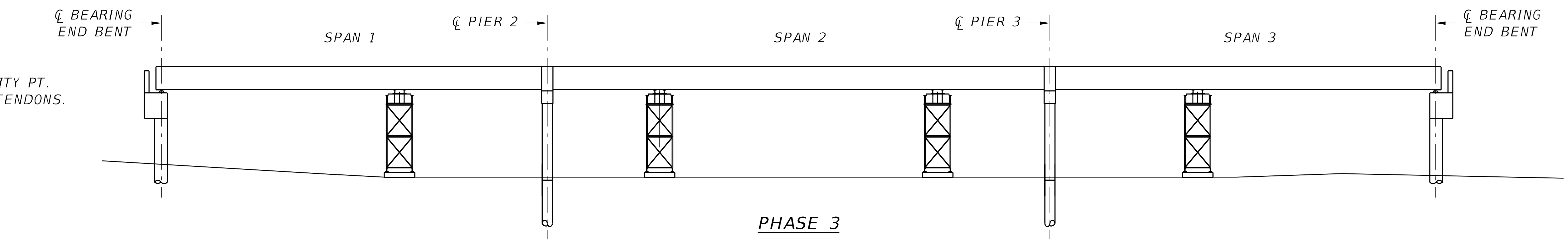

PHASE 2

1. ERECT GIRDER SEGMENTS (PIER GIRDERS ARE NOT SET ON INTERIOR PIERS.)
2. BRACE CURVED SEGMENTS.
3. CAST ALL CLOSURES.
4. CAST DIAPHRAGMS OVER INTERIOR PIERS.
5. CAST DIAPHRAGMS AT EXPANSION PIERS.
6. FORM & CAST LID SLABS OVER GIRDERS.
7. STRESS TRANSVERSE PT AT INTEGRAL BENTS AND GROUT (OR PLACE FLEXIBLE FILLER).



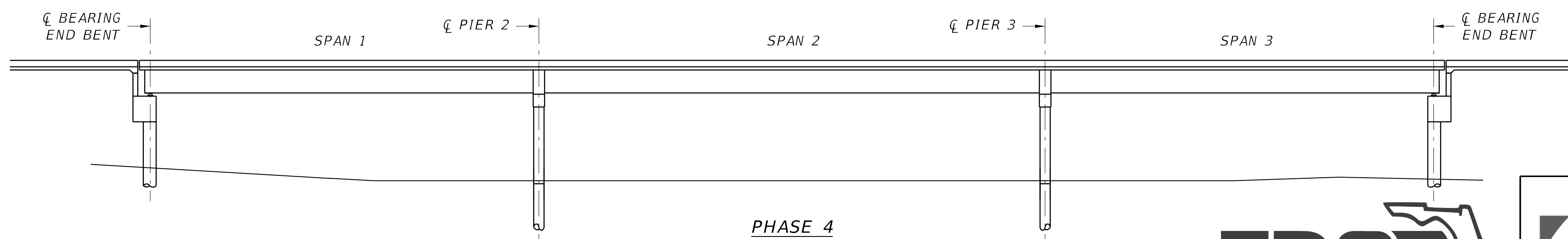

PHASE 3

1. STRESS CONTINUITY TENDONS.
2. GROUT TOP AND BOTTOM INTERNAL CONTINUITY PT.
3. PLACE FLEXIBLE FILLER IN ALL EXTERNAL TENDONS.




PHASE 4

1. REMOVE ALL SHORING TOWERS.
2. CAST DECK SLAB.
3. CAST APPROACH SLABS AND BRIDGE RAIL.
4. INSTALL EXPANSION JOINTS.



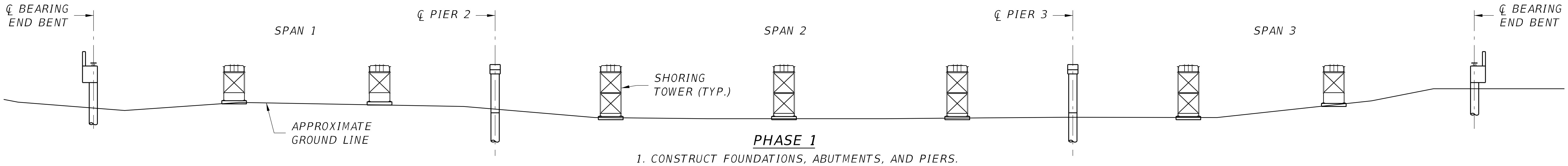

NOTES:

1. INCLUDE TOWER LOCATIONS AND REACTIONS IN THE PLANS.
2. INCLUDE MAX TOWER VERTICAL DISPLACEMENT IN THE PLANS.
3. CONTRACTOR SHALL DEVELOP A MONITORING PROGRAM FOR ERECTING SHORING TOWERS.

PRELIMINARY

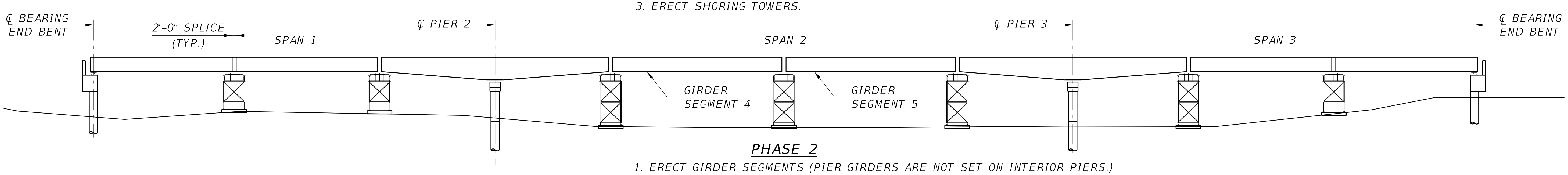
Drawing/Sheet Number FDOT WU-18

CONSTRUCTION SEQUENCE 2 – CONSTANT DEPTH GIRDER
PCI Zone 6 (SE Region) U-Girders



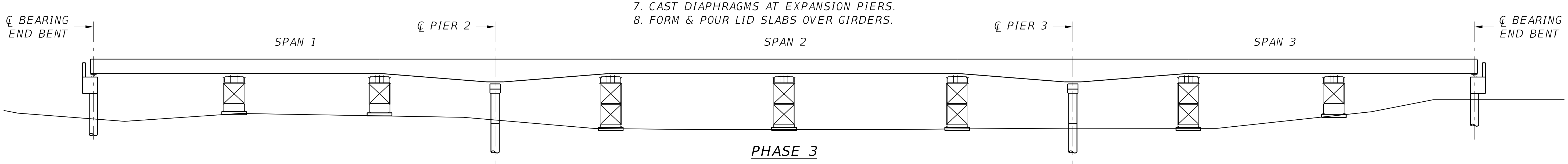

## PHASE 1

1. CONSTRUCT FOUNDATIONS, ABUTMENTS, AND PIERS.
2. STRESS PT AT PIER CAPS AND PLACE GROUT (OR FLEXIBLE FILLER).
3. ERECT SHORING TOWERS.



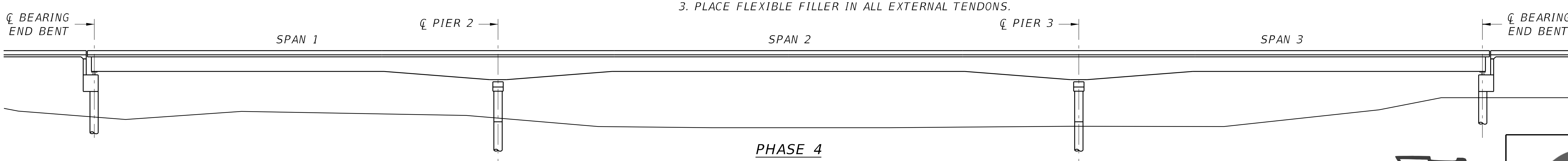

## PHASE 2

1. ERECT GIRDER SEGMENTS (PIER GIRDERS ARE NOT SET ON INTERIOR PIERS.)
2. BRACE CURVED SEGMENTS.
3. CAST CLOSURE BETWEEN GIRDER SEGMENTS 4 & 5.
4. STRESS BOTTOM FLANGE TENDON TO CONNECT GIRDER SEGMENTS 4 & 5.
5. CAST ALL OTHER CLOSURES.
6. CAST DIAPHRAGMS OVER INTERIOR PIERS.
7. CAST DIAPHRAGMS AT EXPANSION PIERS.
8. FORM & POUR LID SLABS OVER GIRDERS.




## PHASE 3

1. STRESS CONTINUITY TENDONS.
2. GROUT TOP AND BOTTOM INTERNAL CONTINUITY PT.
3. PLACE FLEXIBLE FILLER IN ALL EXTERNAL TENDONS.




## PHASE 4

1. REMOVE ALL SHORING TOWERS.
2. CAST DECK SLAB.
3. CAST APPROACH SLABS AND BRIDGE RAIL.
4. INSTALL EXPANSION JOINTS.

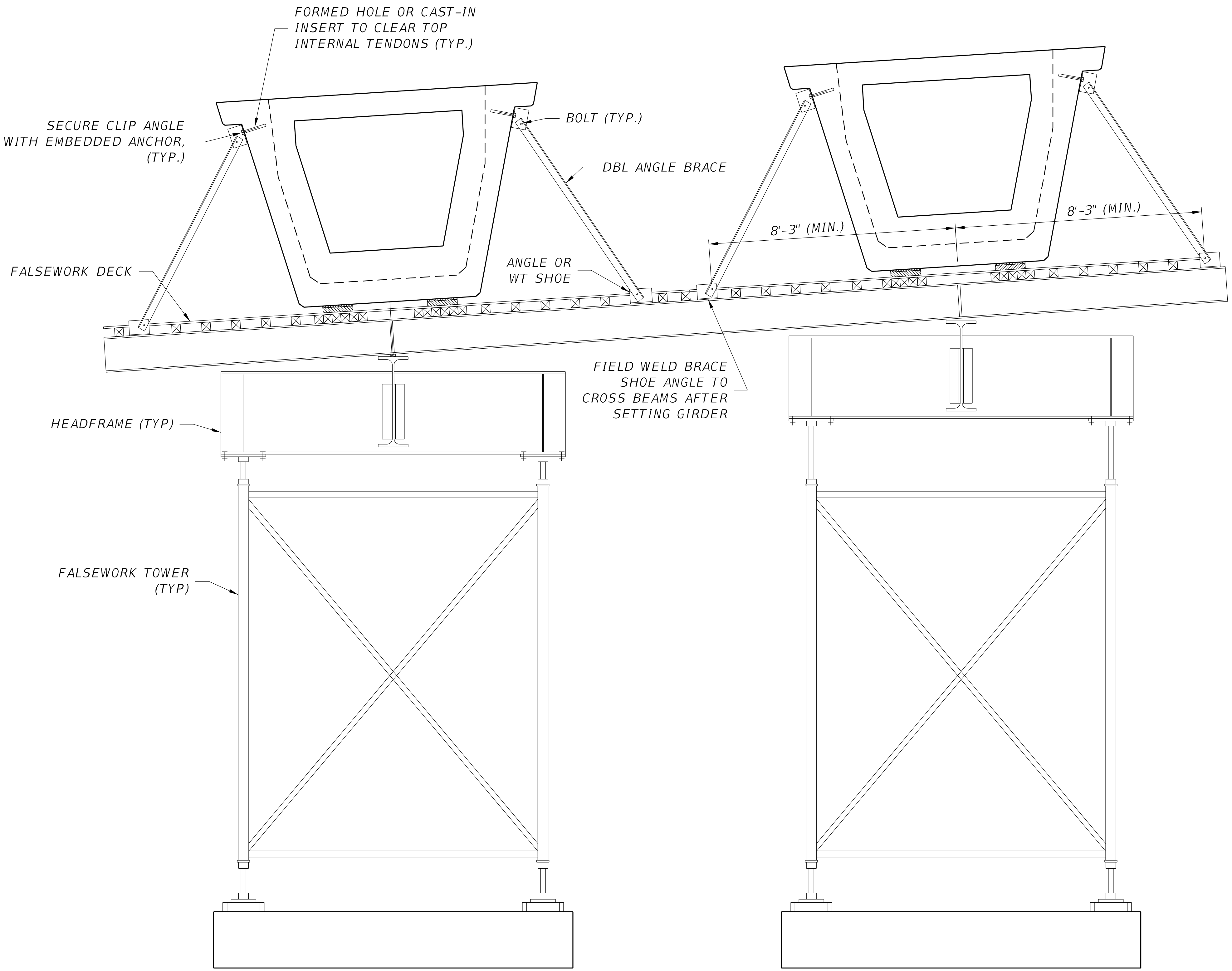
NOTES:

1. INCLUDE TOWER LOCATIONS AND REACTIONS IN THE PLANS.
2. INCLUDE MAX TOWER VERTICAL DISPLACEMENT IN THE PLANS.
3. CONTRACTOR SHALL DEVELOP A MONITORING PROGRAM FOR ERECTING SHORING TOWERS.

PRELIMINARY

Drawing/Sheet Number FDOT WU-19

CONSTRUCTION SEQUENCE 3
- HAUNCHED GIRDER
PCI Zone 6 (SE Region) U-Girders




ERECTION BRACING AT ENDS OF PRECAST GIRDERS

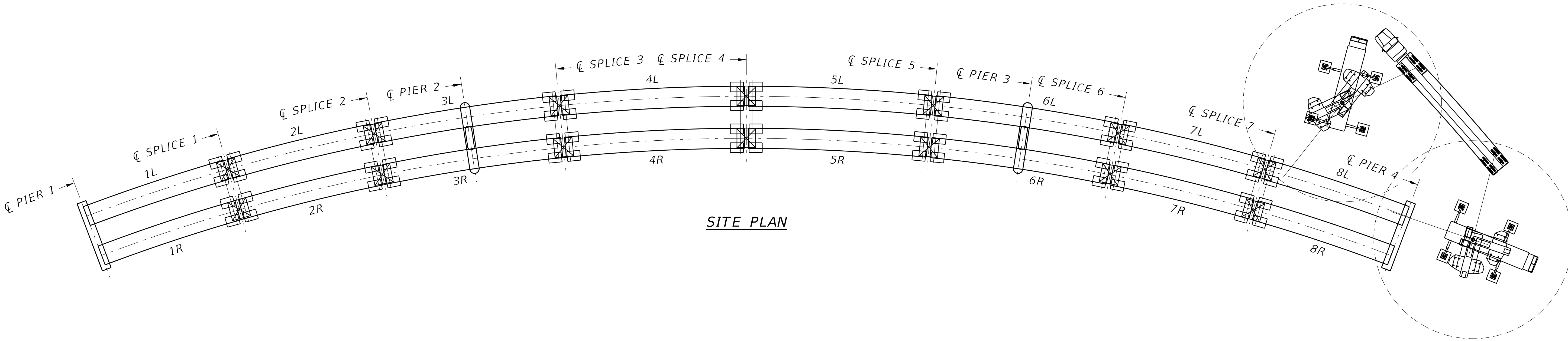
NOTES:

1. THIS DRAWING IS INTENDED TO REPRESENT SUGGESTED METHODS FOR BRACING THE PRECAST GIRDERS DURING ERECTION TO RESIST ROLLING, PROVIDE STABILITY AND LIMIT TORSIONAL STRESSES AND DEFLECTIONS.
2. GIRDERS SHALL BE SUPPORTED AND TORSIONALLY BRACED ON FALSEWORK AT EACH END AT EACH SPLICE DURING ERECTION.
3. ALL GIRDERS SHALL BE BRACED AT EACH END PRIOR TO RELEASING ANY SIGNIFICANT LOAD FROM ERECTION EQUIPMENT TO PREVENT ROLLING.
4. BRACES AND ALL ASSOCIATED CONNECTIONS SHALL BE DESIGNED BY FALSEWORK ENGINEER.
5. SUPPORTING FALSEWORK SHALL BE DESIGNED TO PROVIDE ADEQUATE STIFFNESS UNDER BRACE LOADS TO PREVENT SIGNIFICANT DEFLECTIONS WHEN RELEASING GIRDERS.
6. INCLUDE TOWER LOCATIONS AND REACTIONS IN THE PLANS.
7. INCLUDE MAX TOWER VERTICAL DISPLACEMENT IN THE PLANS.
8. CONTRACTOR SHALL DEVELOP A MONITORING PROGRAM FOR ERECTING SHORING TOWERS.

FDOT

PCI CERTIFIED PLANT

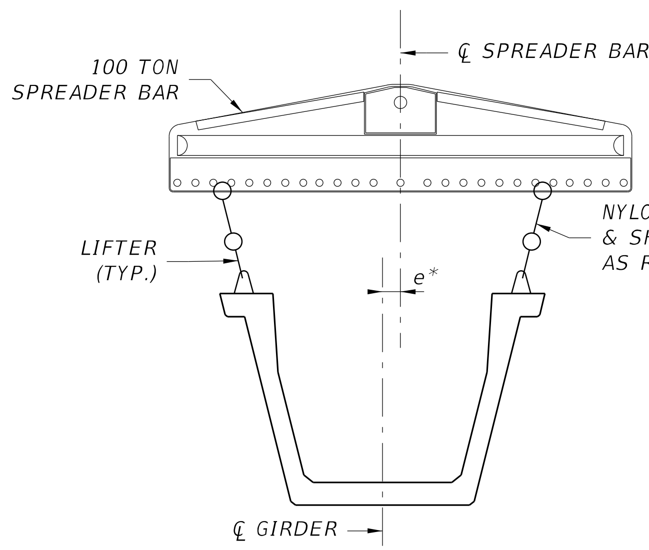
PRELIMINARY



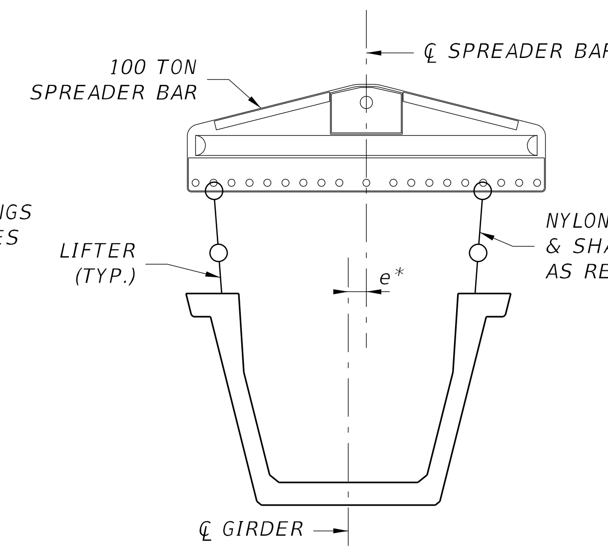

SITE PLAN

## GENERAL NOTES

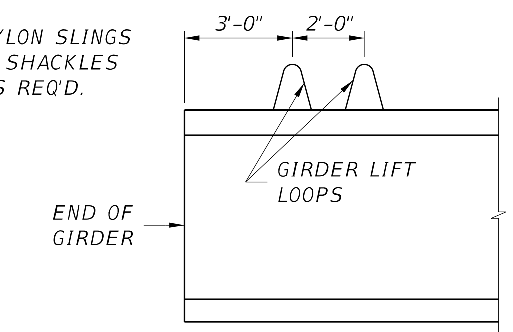
1. SOIL FOR ANY CRANE PAD SHALL BE COMPACTED BY THE CONTRACTOR AND SHALL BE ACCEPTED BY THE CRANE OPERATOR PRIOR TO COMMENCING WITH ERECTION.
2. RIGGING SHALL BE PROVIDED BY THE ERECTOR WITH A MINIMUM SAFE WORKING LOAD OF THE CHARTED MAXIMUM LIFT WEIGHT. FURTHER DETAILS REGARDING RIGGING SHALL BE PROVIDED BY THE ERECTION SUBCONTRACTOR.
3. THE CONTRACTOR SHALL VERIFY THAT CRANE MOVEMENT DOES NOT INTERFERE WITH EXISTING FACILITIES, UTILITIES, OR TERRAIN PRIOR TO PROCEEDING WITH GIRDER ERECTION.
4. GIRDER ERECTION SHALL NOT PROCEED DURING INCLEMENT WEATHER OR WIND SPEEDS IN EXCESS OF 25 MPH.
5. GIRDERS SHALL CONFORM TO PCI TOLERANCES. BEAMS ACCEPTED BY THE OWNER ARE ASSUMED TO MEET THE PCI SPECIFICATIONS.
6. ACTUAL GIRDER ERECTION SCHEDULE AND DETAILED SCHEDULE REGARDING WORKING HOUR RESTRICTIONS SHALL BE PROVIDED BY CONTRACTOR.
7. GIRDER LAUNCHERS AND TROLLEYS WILL NOT BE USED.
8. REFER TO FALSEWORK DRAWINGS FOR FALSEWORK AND CONNECTION DETAILS AT SPLICES.
9. ALL GIRDERS SHALL BE LIFTED BY END LIFT LOOPS PER SHOP DRAWINGS.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR SAFETY ISSUES RELATING TO TRAFFIC IN AREAS ADJACENT TO ERECTION OPERATIONS.




SLOPED SLING OPTION




LIFT LOOP OPTION




RIGGING DETAILS

* RIGGING OFFSET e IS TOWARD OUTSIDE OF GIRDER CURVE

PRELIMINARY

GIRDER ERECTION PLAN

Drawing/Sheet Number FDOT WU-21

EXAMPLE ERECTION PLAN DETAILS
PCI Zone 6 (SE Region) U-Girders