

RELEASED FOR CONSTRUCTION 10-05-2010

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.	CSSTP-0008-00(65I)	230	346

MATERIAL PROPERTIES

CONCRETE:

THE 28 DAY COMPRESSIVE STRENGTH OF THE BEAMS SHALL BE 9000 PSI. SUBMIT CONCRETE MIX DESIGN TO THE GEORGIA DOT OFFICE OF MATERIALS AND RESEARCH A MINIMUM OF 60 DAYS PRIOR TO CONSTRUCTION FOR REVIEW AND APPROVAL.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BEAM SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7200 PSI.

THE CONCRETE IN THE BEAM CLOSURE SPLICE DIAPHRAGMS SHALL HAVE A MINIMUM CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS OF 9000 PSI.

THE CONCRETE IN THE DIAPHRAGMS OVER BENTS 7, 8, 9 AND 10 SHALL HAVE A MINIMUM CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS OF 4500 PSI.

DECK SLAB CONCRETE SHALL ATTAIN A MINIMUM CONCRETE COMPRESSIVE STRENGTH OF 3000 PSI PRIOR TO STRESSING OF STAGE 2 POST-TENSIONING TENDONS.

CONCRETE IN PRESTRESSED CONCRETE BEAMS SHALL BE AT LEAST 60 DAYS OLD PRIOR TO STRESSING OF POST-TENSIONING TENDONS.

ALL CONCRETE BEING STRESSED SHALL BE AT LEAST 14 DAYS OLD PRIOR TO STRESSING OF POST-TENSIONING TENDONS.

APPLY EPOXY PROTECTIVE COATING TO END OF BEAM SURFACES INDICATED ON THE "78" P/T CONCRETE BEAM END SEGMENT DETAILS" ON DRAWING 35-22.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE BEAMS.

THE TOP SURFACE OF THE BEAM, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

THE CONTRACTOR IS RESPONSIBLE FOR THE INTEGRITY AND STABILITY OF THE BEAMS. IN HANDLING THE 78" POST-TENSIONED PRESTRESSED BEAMS, THEY SHALL BE MAINTAINED IN AN UPRIGHT POSITION AT ALL TIMES AND THE PROPOSED METHOD FOR ERECTING, STORING AND TRANSPORTING THE BEAMS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. THE SUBMITTAL SHALL INCLUDE DESIGN CALCULATIONS FOR LOCATIONS OF PICK-UP POINTS AND SUPPORT POINTS AS NEEDED TO MAINTAIN THE BEAM STABILITY DURING ERECTION, STORAGE AND TRANSPORTATION.

PRESTRESSING STEEL:

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO ASTM A416 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE GRADE 60.

DESIGN ASSUMPTIONS

CONSTRUCTION SEQUENCE:

SEE "CONSTRUCTION SEQUENCE" DRAWING FOR NOTES AND DETAILS.

BEAMS SHALL BE A MINIMUM OF 28 DAYS OLD WHEN ERECTED.

COEFFICIENTS FOR PRESTRESSING STEEL AND PRESTRESS LOSSES:

MODULUS OF ELASTICITY = 28,500 KSI  
 ANCHOR SET = 0.375 INCHES \*\*  
 FRICTION COEFFICIENT (POLYETHYLENE DUCT) = 0.23  
 WOBBLE COEFFICIENT = 0.0002  
 CONSPICE BY LEAP SOFTWARE, INC. AND ACI-209R-92 WERE USED IN PERFORMING THE TIME-DEPENDENT ANALYSIS OF THE POST-TENSIONED PRESTRESSED CONCRETE MEMBERS.

\*\* ACTUAL ANCHOR SET LOSSES SHALL BE DETERMINED DURING CONSTRUCTION. THE CONTRACTOR MAY REQUIRE ADJUSTMENT OF JACKING FORCES TO COMPENSATE FOR DIFFERENT AMOUNTS OF SET.

POST-TENSIONING TENDONS:

THREE POST-TENSIONING TENDONS CONSISTING OF 15-0.6 INCH DIAMETER LOW-RELAXATION PRESTRESSING STRANDS ARE USED.

TENDONS ARE STRESSED IN TWO STAGES:  
 FIRST STAGE POST-TENSIONING TENDONS (TENDONS PT-1 AND PT-2) ARE STRESSED AFTER BEAMS ARE SPLICED, BUT BEFORE COMPOSITE DECK SLAB IS PLACED.  
 SECOND STAGE POST-TENSIONING TENDON (TENDON PT-3) IS STRESSED AFTER THE COMPOSITE DECK SLAB IS PLACED.

ALL POST-TENSIONING TENDONS ARE STRESSED FROM BOTH ENDS.

DESIGN ASSUMPTIONS

POST-TENSIONING STRESS LIMITS AND DESIGN JACKING STRESSES:

MAXIMUM JACKING STRESS = 0.80 FPU (216.0 KSI)  
 DESIGN JACKING STRESS = 0.78 FPU (210.6 KSI) FOR TENDONS PT-1, PT-2 AND PT-3.

MAXIMUM STRESSES AFTER ANCHORING TENDONS:  
 AT END OF SEATING ZONE = 0.740 FPU (199.8 KSI)  
 AT ANCHOR = 0.700 FPU (189.0 KSI)

WORKING DRAWINGS

THE CONTRACTOR SHALL SUBMIT WORKING DRAWINGS SHOWING COMPLETE DETAILS OF THE POST-TENSIONING SYSTEM TO THE ENGINEER FOR APPROVAL.

THE CONTRACTOR SHALL SUBMIT WORKING DRAWINGS SHOWING COMPLETE DETAILS OF THE DUCT AND DUCT SPLICE FOR APPROVAL BY THE ENGINEER. THESE WORKING DRAWINGS SHALL SHOW COMPLETE DIMENSIONS OF THE DUCT AND DUCT SPLICE, A THOROUGH SEQUENCE OF INSTALLATION OF THE DUCT SPLICE, DETAILS FOR SUPPORT OF THE DUCT, DETAILS OF GROUT VENTS AND THEIR CONNECTION TO THE DUCT, LOCATION OF GROUT VENTS AND OTHER RELATED DETAILS. THE DUCT SHALL NOT BE SHIPPED TO THE PRECASTER UNTIL THIS SUBMITTAL IS APPROVED BY THE ENGINEER.

THE CONTRACTOR SHALL SUBMIT INTEGRATED WORKING DRAWINGS IN AREAS OF POST-TENSIONING ANCHORAGES DUE TO CONGESTION WITH REINFORCING STEEL. THESE WORKING DRAWINGS WILL SHOW COMPLETE DETAILS OF THE ANCHORAGE SYSTEM, INCLUDING ANCHORAGE PROTECTION DETAILS, AND RECESSES REQUIRED TO ACCOMMODATE STRESSING EQUIPMENT. LOCAL ANCHORAGE ZONE REINFORCEMENT SHALL BE DESIGNED BY THE POST-TENSIONING SUPPLIER AND SHOWN ON THE WORKING DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESOLVING CONFLICTS OF LOCAL ANCHORAGE ZONE REINFORCEMENT AND ANCHORAGE WITH OTHER REINFORCEMENT. ANY SHIFTING OF REINFORCING STEEL TO ACCOMMODATE PLACEMENT OF LOCAL ANCHORAGE ZONE REINFORCEMENT SHALL BE APPROVED BY THE ENGINEER.

PRIOR TO CASTING THE BEAMS, THE CONTRACTOR SHALL SUBMIT COMPLETE WORKING DRAWINGS WITH THE EXACT LOCATION AND A COMPLETE DESCRIPTION OF ALL INSERTS CAST IN THE BEAMS TO THE ENGINEER FOR APPROVAL. SUCH INSERTS INCLUDE, BUT ARE NOT LIMITED TO, INSERTS FOR SUPPORTING FALSEWORK AND FORMWORK, INSERTS FOR ATTACHING DIAPHRAGMS, INSERTS FOR CONNECTING STRONGBACKS, INSERTS FOR CONNECTING TEMPORARY TOWERS, INSERTS FOR CONNECTING TEMPORARY BRACING, AND LIFTING INSERTS.

THE CONTRACTOR SHALL SUBMIT WORKING DRAWINGS AND CALCULATIONS SHOWING COMPLETE DETAILS OF TENDON STRESSING FOR APPROVAL BY THE ENGINEER. THESE DETAILS SHALL INDICATE JACKING FORCES, THE SEQUENCE OF STRESSING, CALCULATED TENDON ELONGATIONS, GAUGE PRESSURES, JACK CALIBRATIONS, FRICTION COEFFICIENT, WOBBLE COEFFICIENT AND ANCHOR SET LOSS.

THE CONTRACTOR SHALL SUBMIT COMPLETE DETAILS OF TENDON GROUTING MATERIALS AND PROCEDURES FOR APPROVAL BY THE ENGINEER.

DUCTS

DUCTS FOR POST-TENSION TENDONS SHALL BE CORRUGATED POLYETHYLENE WITH AN INSIDE CLEAR DIAMETER OF 3.63" AND AN OUTSIDE DIAMETER OF 3.82". THE CONTRACTOR HAS THE OPTION OF USING AN ALTERNATE DUCT SIZE AS LONG AS THE ALTERNATE DUCT DOES NOT DECREASE THE 2" OF COVER REQUIRED FOR THE STIRRUPS.

DUCTS SHALL BE SECURELY TIED TO STIRRUPS AT A MAXIMUM INTERVAL OF 1'-6" CTS. TO PREVENT DISPLACEMENT OF DUCTS DURING CONCRETE PLACEMENT. REFER TO GDOT STANDARD SPECIFICATIONS FOR STIRRUP REQUIREMENTS.

DURING STORAGE AND AFTER INSTALLATION, DUCTS AND GROUT VENTS SHALL BE SEALED AT ALL TIMES TO PREVENT ENTRANCE OF WATER AND DEBRIS. DUCTS SHALL BE PROTECTED AND HANDLED WITH CARE TO PREVENT DAMAGE OR UNINTENDED BENDING, CRIMPING OR FLATTENING DURING STORAGE, INSTALLATION AND PLACEMENT OF BEAM CONCRETE.

THE BEAM SIDE FORMS SHALL NOT BE SET IN PLACE UNTIL THE ENGINEER HAS VISUALLY INSPECTED AND APPROVED THE DUCT PROFILE, ANCHORAGE DETAILS, REINFORCING CAGE AND OTHER BEAM FABRICATION DETAILS. THE DUCTS SHALL ALSO BE PRESSURE TESTED FOR POSSIBLE LEAKS BEFORE SIDE FORMS ARE PLACED.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DETAILED DESIGN OF THE DUCT AND THE DUCT SPLICE. A SUGGESTED CONCEPTUAL DESIGN OF THE DUCT SPLICE IS GIVEN ON THE "P/T BEAM DETAILS" DRAWING.

DUCTS SHALL HAVE GROUT VENTS AT EACH INTERIOR SUPPORT (HIGH POINT) AND AT EACH LOW POINT ALONG THE TENDON PROFILE AND 3 TO 6 FEET BEYOND THE HIGH POINT ON THE DOWNSLOPE SIDE.

DUCT SPLICES SHALL BE WATERTIGHT AND PROVIDE A SMOOTH INTERIOR ALIGNMENT WITH NO LIPS OR KINKS. THEY SHALL BE INSTALLED TO THE SAME PLACEMENT TOLERANCE AS CONTINUOUS RUNS OF THE DUCTS. STIRRUP SPACING AT DUCT SPLICES MAY BE ADJUSTED UP TO 4 INCHES PROVIDED THE TOTAL NUMBER OF STIRRUPS WITHIN 3 FEET ON EITHER SIDE OF THE SPLICE IS THE SAME AS REQUIRED BY THE PLANS.

FOLLOWING COMPLETION OF CONCRETE PLACEMENT IN BEAMS AND BEFORE TRANSPORTING BEAMS TO THE JOB SITE, DUCTS SHALL BE TESTED FOR OBSTRUCTIONS BY RUNNING A ROUND TORPEDO THROUGH THE DUCT. THE TORPEDO SHALL HAVE DIMENSIONS NOT LESS THAN 1/4" SMALLER THAN THE INSIDE DIAMETER OF THE DUCT.

DUCT SPLICES IN CLOSURE SPLICE DIAPHRAGMS SHALL BE PRESSURE TESTED FOR ANY LEAKS THAT MAY ALLOW GROUT TO ENTER THE DUCT BEFORE CONCRETE PLACEMENT.

FOLLOWING COMPLETION OF CONCRETE PLACEMENT FOR EACH CLOSURE SPLICE DIAPHRAGM, THE DUCTS SHALL BE TESTED FOR OBSTRUCTIONS BY RUNNING A ROUND TORPEDO THROUGH THE DUCT. THIS STEP SHALL BE PERFORMED BEFORE CONCRETE HAS TAKEN ITS INITIAL SET. THE TORPEDO SHALL HAVE DIMENSIONS NOT LESS THAN 1/4" SMALLER THAN THE INSIDE DIAMETER OF THE DUCT.

FOLLOWING COMPLETION OF GROUTING DUCTS 1 AND 2, DUCT 3 SHALL BE TESTED FOR OBSTRUCTIONS BY RUNNING A ROUND TORPEDO THROUGH THE DUCT. THE TORPEDO SHALL HAVE DIMENSIONS NOT LESS THAN 1/4" SMALLER THAN THE INSIDE DIAMETER OF THE DUCT.

DUCTS CONT'D.

RECESSES FOR POST-TENSIONING ANCHORAGE IN THE TOP OF BEAMS SHALL BE PROVIDED WITH SUITABLE DRAIN PIPES TO PREVENT STANDING WATER. DRAIN PIPES SHALL BE MAINTAINED FREE OF OBSTRUCTIONS AT ALL TIMES UNTIL EPOXY GROUT POUR-BACKS ARE INSTALLED AFTER POST-TENSIONING TENDONS HAVE BEEN STRESSED AND GROUTED.

DUCT PLACEMENT TOLERANCE SHALL BE 1/4" +/- IN THE HORIZONTAL DIRECTION AND 1/2" +/- IN THE VERTICAL DIRECTION.

BRIDGE NO. 1



GEORGIA  
**DEPARTMENT OF TRANSPORTATION**  
 PRECONSTRUCTION DIVISION-OFFICE OF BRIDGE DESIGN

POST-TENSIONED BEAM NOTES  
 SR 204 SPUR (DIAMOND CAUSEWAY)  
 OVER SKIDAWAY NARROWS  
 CHATHAM COUNTY CSSTP-0008-00(65I)

OCTOBER 2010

DRAWING NO. 35-17
BRIDGE SHEET 17 OF 48

DATE					
REVISIONS					
BY					

DESIGNED SAD	CHECKED DGH	REVIEWED WMD / WEI
DRAWN JNA / MDM	DESIGN GROUP DGH	APPROVED PVL