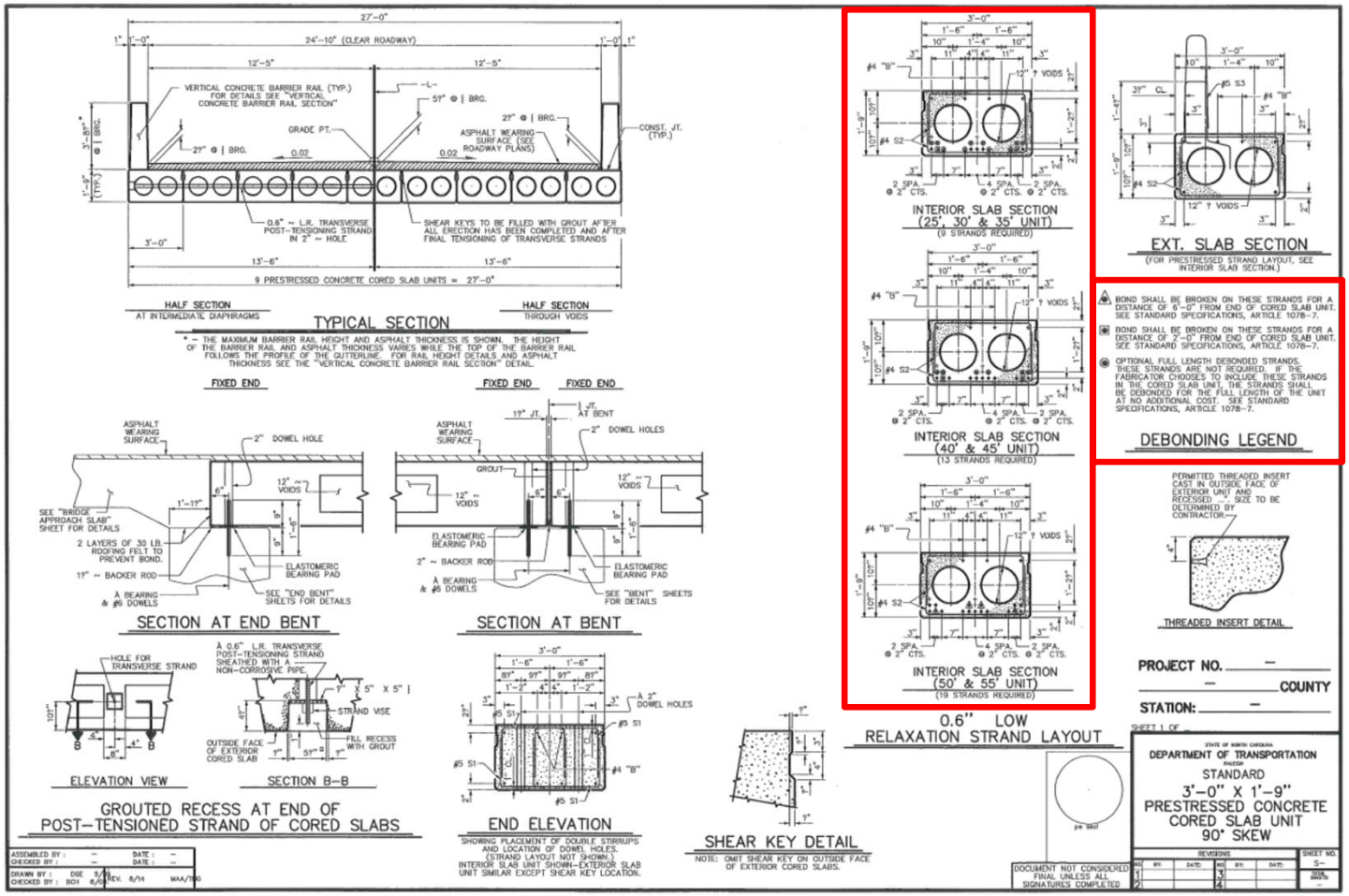
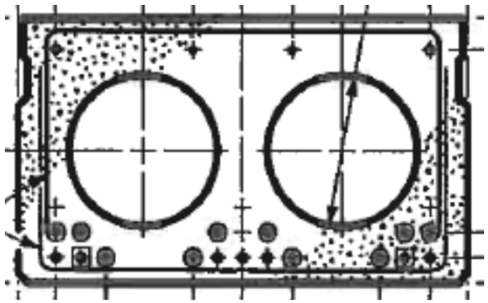
NCDOT Cored Slab Standards



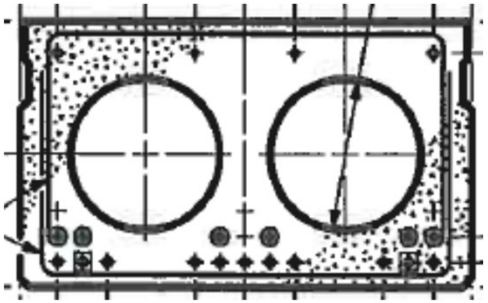
Strand pattern details

NCDOT Cored Slab Standards

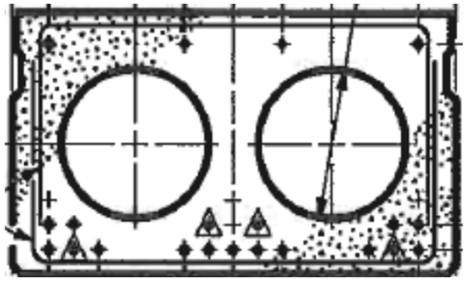
Standard span lengths and strand patterns, including debonding



INTERIOR SLAB SECTION
(25', 30' & 35' UNIT)
(9 STRANDS REQUIRED)



INTERIOR SLAB SECTION
(40' & 45' UNIT)
(13 STRANDS REQUIRED)



INTERIOR SLAB SECTION
(50' & 55' UNIT)
(19 STRANDS REQUIRED)

- 5 ft increments
- 0.6 in. strands

△ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

▣ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

◉ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND

SHEET 1 OF

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3'-0" X 1'-9"
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-
1			3			TOTAL SHEETS
2			4			-

Full Length Debonding of Strands

To allow casting of prestressed concrete cored slabs, box beams, or girders with different strand patterns in the same bed …

… full length debonding of unneeded strands can be used

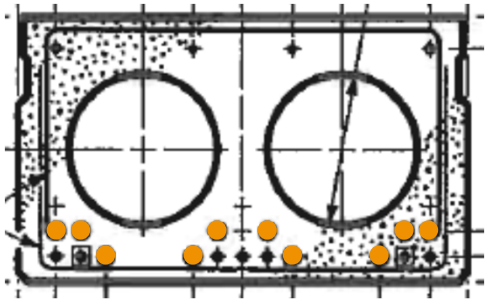
NCDOT includes this in standard plans for cored slabs and box beams

- **Note allowing full length debonding appears on plans so fabricators can bid project this way**
- **Max. no. of full length debonded strands is 10**
- **NCDOT has also approved this practice for girders**

Savings to the DOT are only available if a note appears on plans so project can be bid this way

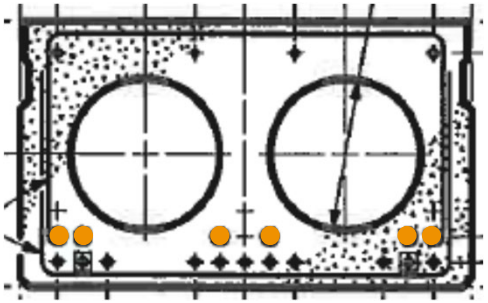
NCDOT Cored Slab Standards

Optional full length debonded strands are shown on standards



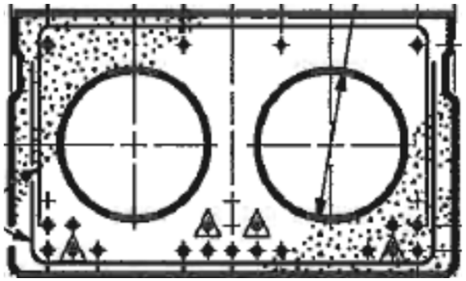
INTERIOR SLAB SECTION
(25', 30' & 35' UNIT)
(9 STRANDS REQUIRED)

10 STRANDS FULLY DEBONDED



INTERIOR SLAB SECTION
(40' & 45' UNIT)
(13 STRANDS REQUIRED)

6 STRANDS FULLY DEBONDED



INTERIOR SLAB SECTION
(50' & 55' UNIT)
(19 STRANDS REQUIRED)

△ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'–0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078–7.

▣ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2'–0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078–7.

● OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078–7.

DEBONDING LEGEND

SHEET 1 OF

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3'–0" X 1'–9"
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S–
1			3			TOTAL SHEETS
2			4			–

Effect of Full Length Debonding of Strands

Full length debonding effectively places a void in the member cross section

- **Effect on section properties was evaluated**
- **18 in. cored slab, Type III girder, Mod BT-72 girder**
- **Looked at 10 strands and 4 or 6 strands debonded to give a range of results**
- **Composite section properties were also evaluated using 6 ft and 10 ft girder spacing (deck width)**

Effect of Full Length Debonding of Strands

Change (%) from gross section properties to section with voids for full-length debonded strands

Type of Girder	Full-Length Debonded Strands	Area	y_b	y_t	I_{xx}	S_b	S_t
Type III	10	-1.4%	0.4%	-0.3%	-1.8%	-2.2%	-1.5%
	4	-0.6%	0.4%	-0.3%	-1.2%	-1.6%	-0.8%
Mod BT-72	10	-0.9%	0.8%	-0.9%	-2.8%	-3.6%	-2.0%
	4	-0.4%	0.3%	-0.3%	-1.1%	-1.4%	-0.8%
21" CS x 3 ft	10	-1.5%	1.0%	-1.0%	-3.3%	-4.3%	-2.3%
	6	-0.9%	0.6%	-0.6%	-1.6%	-2.1%	-1.0%

Changes for composite section properties were very similar and always equal or less (except for y_t)

Changes are relatively small

Full Length Debonding of Strands

Proposed general note for cored slabs, box beams, and girders

THE FABRICATOR HAS THE OPTION, AT NO ADDITIONAL COST TO THE DEPARTMENT, TO PLACE ADDITIONAL STRANDS IN A GIRDER THAT ARE DEBONDED FOR THE FULL LENGTH OF THE GIRDER FOR THE PURPOSE OF ALLOWING GIRDERS WITH DIFFERENT STRAND PATTERNS TO BE FABRICATED IN A PRESTRESSING BED AT THE SAME TIME. THESE DEBONDED STRANDS MUST BE DETAILED ON SHOP DRAWING SUBMITTALS FOR THE ENGINEER'S APPROVAL PRIOR TO CASTING. SEE STANDARD SPECIFICATIONS ARTICLE 1078-7 [NCDOT].

NCDOT *Standard Specifications for Roads and Structures* (2018)

1078-7 PLACING STRANDS, TIES AND REINFORCING STEEL

Where debonding of strands is required, accomplish by encasing the strand in a tubular conduit capable of resisting the pressure exerted by the concrete. Do not use slit conduit. Use a conduit of HDPE or polypropylene with a minimum wall thickness of 0.025 inch. Ensure that the inside diameter of the conduit is of sufficient size to allow free movement of the encased strand but not greater than the diameter of the strand plus 1/8 inch. Secure the conduit so longitudinal movement along the strand is prevented, and bonding of the strand is prevented at the required location ± 1 inch. Prevent concrete from entering the conduit by taping. Use tape manufactured from a non-corrosive material compatible with the concrete, conduit and steel.