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| PROJECT REFERENCE NO. | SHEET NO. |
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| I-5987A | 2C-9 |

# CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS

ENGLISH DETAIL DRAWING FOR

15″ THRU 48″ PIPE 45° OR 135° SKEW

SHEET 1 OF 2 — 838D03

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.




END ELEVATION

DOWEL BAR- "X"

DOWELS IN ENDWALL WITH REINFORCED CONCRETE PIPE

| LOC. | PIPE DIA. | SINGLE PIPE 15″ | 18″ | 24″ | 30″ | 36″ | 42″ | 48″ | DOUBLE PIPE 15″ | 18″ | 24″ | 30″ | 36″ | 42″ | 48″ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BARS | "X" | "X" | "X" | "X" | "X" | "X" | "X" Y* | "X" | "X" | "X" | "X" | "X" | "X" | "X" Y* |
| G1 | QTY. | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 |
| S | QTY. | - | - | - | - | - | - | 2 | | | | 2 | 2 | 2 | 2 |
| G2 | QTY. | 5 | 5 | 6 | 7 | 8 | 9 | 10 | 5 | 5 | 6 | 7 | 8 | 9 | 10 |
| | TOT. LBS. | 16 | 16 | 19 | 21 | 26 | 73 | 81 | 19 | 19 | 21 | 26 | 30 | 96 | 117 |

| LOC. | PIPE DIA. | SINGLE PIPE 15″ | 18″ | 24″ | 30″ | 36″ | 42″ | 48″ | DOUBLE PIPE 15″ | 18″ | 24″ | 30″ | 36″ | 42″ | 48″ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BARS | "X" | "X" | "X" | "X" | "X" | "X" Y* | "X" Y* | "X" | "X" | "X" | "X" | "X" | "X" Y* | "X" Y* |
| G1 | QTY. | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 3 |
| S | QTY. | - | - | - | - | - | - | 2 | | | | | | 2 | 2 |
| G2 | QTY. | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | TOT. LBS. | 14 | 16 | 19 | 21 | 23 | 69 | 77 | 16 | 19 | 21 | 23 | 28 | 96 | 107 |

DIMENSIONS AND CONCRETE QUANTITIES

USING CONCRETE PIPE

| D | COMMON DIMS. H | B | T | SINGLE PIPE G1 | G2 | L 45 | CU.YD. | DOUBLE PIPE G1 | G2 | S | S 45 | L 45 | CU.YD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15″ | 3'-4″ | 1'-8″ | 1⅞″ | 2'-9″ | 3'-11″ | 6'-8″ | 0.872 | 2'-9⅞″ | 3'-11⅜″ | 2'-3″ | 3'-2¼″ | 9'-0″ | 0.977 |
| 18″ | 3'-7″ | 1'-10″ | 2″ | 3'-2″ | 4'-6″ | 7'-8″ | 1.134 | 3'-2⅛″ | 4'-6⅛″ | 2'-7″ | 3'-7¾″ | 10'-6″ | 1.335 |
| 24″ | 4'-2″ | 2'-1″ | 2½″ | 4'-0″ | 5'-8″ | 9'-8″ | 1.770 | 4'-0″ | 5'-8″ | 3'-5″ | 4'-10″ | 13'-1″ | 1.975 |
| 30″ | 4'-9″ | 2'-5″ | 2¾″ | 4'-7″ | 6'-6″ | 11'-1″ | 2.509 | 4'-7″ | 6'-6″ | 4'-3″ | 6'-0″ | 17'-1″ | 2.927 |
| 36″ | 5'-3″ | 2'-8″ | 3″ | 5'-6″ | 7'-9″ | 13'-3″ | 3.533 | 5'-6⅝″ | 7'-9⅝″ | 5'-1″ | 7'-2¼″ | 20'-6″ | 4.076 |
| 42″ | 5'-10″ | 2'-11″ | 3½″ | 6'-4″ | 8'-11″ | 15'-3″ | 4.772 | 6'-4″ | 8'-11″ | 5'-10″ | 8'-3″ | 23'-6″ | 5.442 |
| 48″ | 6'-5″ | 3'-3″ | 4″ | 7'-2″ | 10'-2″ | 17'-4″ | 6.432 | 7'-2¼″ | 10'-2¼″ | 6'-9″ | 9'-6½″ | 26'-7″ | 7.142 |

USING CORRUGATED METAL PIPE

| D | COMMON DIMS. H | B | SINGLE PIPE G1 | G2 | L 30 | CU.YD. | DOUBLE PIPE G1 | G2 | S | S 45 | L 45 | CU.YD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15″ | 3'-0″ | 1'-6″ | 2'-6″ | 3'-6″ | 6'-0″ | 0.626 | 2'-6⅝″ | 3'-6⅝″ | 2'-1″ | 2'-11¼″ | 9'-0″ | 0.977 |
| 18″ | 3'-3″ | 1'-8″ | 2'-11″ | 4'-2″ | 7'-1″ | 0.916 | 2'-11⅛″ | 4'-2⅛″ | 2'-7″ | 3'-7¾″ | 10'-9″ | 1.335 |
| 24″ | 3'-9″ | 1'-11″ | 3'-8″ | 5'-2″ | 8'-10″ | 1.412 | 3'-8″ | 5'-2″ | 3'-0″ | 4'-3″ | 13'-1″ | 1.975 |
| 30″ | 4'-3″ | 2'-2″ | 4'-5″ | 6'-3″ | 10'-8″ | 2.066 | 4'-5″ | 6'-3″ | 3'-10″ | 5'-5″ | 16'-1″ | 2.927 |
| 36″ | 4'-9″ | 2'-5″ | 5'-2″ | 7'-4″ | 12'-6″ | 2.885 | 5'-2⅝″ | 7'-4⅝″ | 4'-6″ | 6'-4¼″ | 18'-11″ | 4.076 |
| 42″ | 5'-4″ | 2'-8″ | 6'-0″ | 8'-4″ | 14'-3″ | 3.856 | 6'-0″ | 8'-4″ | 5'-3″ | 7'-5″ | 21'-8″ | 5.442 |
| 48″ | 5'-9″ | 2'-11″ | 6'-8″ | 9'-5″ | 16'-1″ | 5.052 | 6'-8¼″ | 9'-5¼″ | 6'-0″ | 8'-5½″ | 24'-7″ | 7.142 |

*SEE SHEET 2




STATE OF NORTH CAROLINA
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ENGLISH DETAIL DRAWING FOR

# CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS

15″ THRU 48″ PIPE 45° OR 135° SKEW

SHEET 1 OF 2 — 838D03

NORTH CAROLINA PROFESSIONAL SEAL 022071 ENGINEER RONALD ELTON DAVENPORT JR.

DocuSigned by:
Ronald Elton Davenport, Jr.
F81B6D3BA47A442...
5/18/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: STD.NO.838.01 DATE: 4-17-99
MODIFIED BY: T.S. SPELL DATE: 12-10-08
CHECKED BY: DATE:
FILE SPEC.: s:user/details/metric/stand/838d02st.dgn

GENERAL NOTES:

ALL CORNERS TO BE CHAMFERED 1".

* THE CONTRACTOR WILL BE REQUIRED TO PLACE 2 - #6 BARS "Y" IN THE TOP OF ALL ENDWALLS FOR PIPE CULVERTS 42" AND OVER WITH A MINIMUM OF 3" COVER AND A LENGTH OF 6" LESS THAN ENDWALL.

FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

WALL THICKNESS (T) SHOWN IS NOT TO BE INTERPRETED TO MEAN THE THICKNESS ACCEPTABLE, BUT ARE USED ONLY IN COMPUTING ENDWALL QUANTITIES.

IF CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE, BAR X OF BARS TO BE APPROXIMATELY 12" CENTER UNLESS ENGINEER DIRECTS OTHERWISE.

WHEN CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE AND POURS BASE SEPERATELY, THE TOP BASE SHALL BE LEFT ROUGH.

WHEN SKEW ANGLE OF PIPE IS OVER 45° USE G-1 DIMENSION FOR 45° PLUS 6" FOR EACH 5° OVER 45°. G2 DIMENSION WILL BE THE NEW DIMENSION DIVIDED BY THE COSINE OF THE ANGLE OF PIPE SKEW.

CLASS "B" CONCRETE SHALL BE USED.

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ENGLISH DETAIL DRAWING FOR

# CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS

15″ THRU 48″ PIPE

SHEET 2 OF 2 — 838D03

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ENGLISH DETAIL DRAWING FOR

# CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS

15″ THRU 48″ PIPE

SHEET 2 OF 2 — 838D03

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