See Sheet 1-A For Index of Sheets

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| N.C. | 42642 & 3614.3.17 | 1 | 18 |

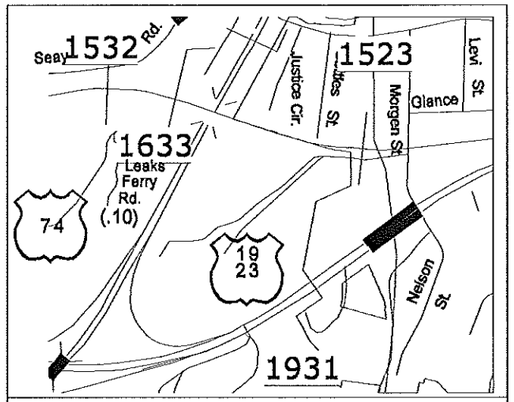
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION |
|---|---|---|
| | | |

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

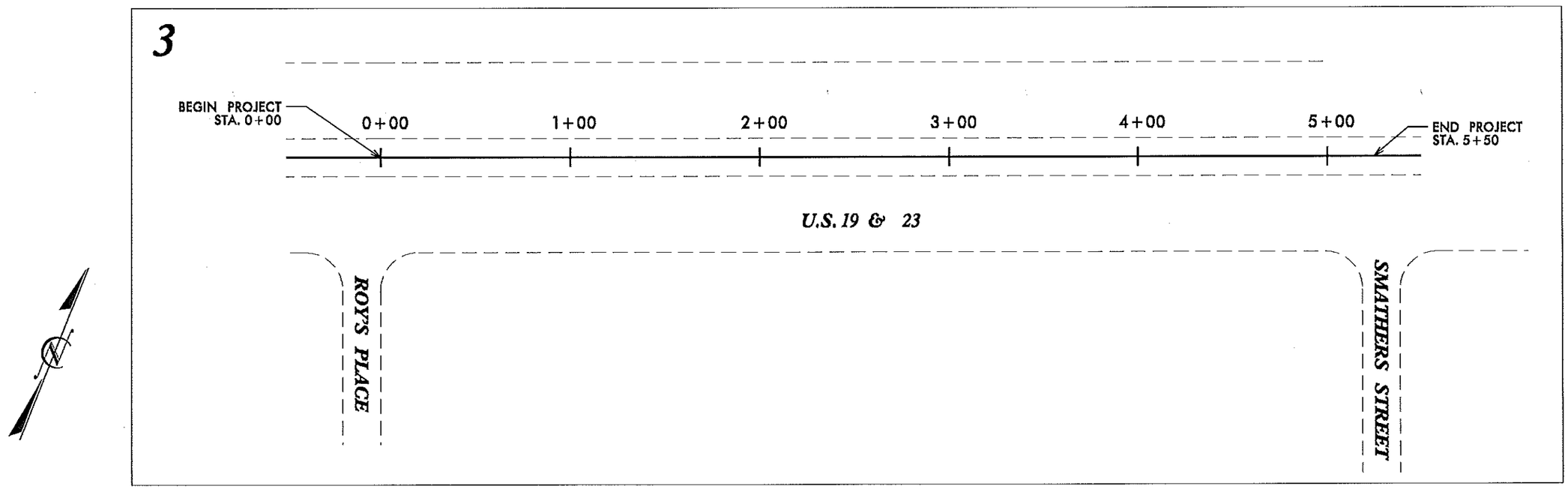
# HAYWOOD COUNTY

**LOCATION:** *U.S. 19 & 23 FROM ROY'S PLACE TO SMATHERS STREET, IN CLYDE, NC*

**TYPE OF WORK:** *GRADING, DRAINAGE, SIDEWALK*




VICINITY MAP




**GRAPHIC SCALES**

25 12.5 0 25 50
PLANS

**DESIGN DATA**

**PROJECT LENGTH**

- L - 550'

Prepared In the Office of:
**DIVISION OF HIGHWAYS**
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:

J. L. WOODARD, P.E.
PROJECT ENGINEER

J. L. WOODARD, P.E.
PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

SIGNATURE: P.E.

**ROADWAY DESIGN ENGINEER**

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

**TIP PROJECT: 42642 & 3614.3.17**

**CONTRACT:**

05/08/99

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$$$$USERNAME$$$$

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| 42642 & 36144.3.17 | 1-A |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

INDEX OF SHEETS


| SHEET NUMBER | SHEET |
|---|---|
| 1 | TITLE SHEET |
| 1 - A | INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS |
| 1 - B | CONVENTIONAL SYMBOLS |
| 2 | PAVEMENT SCHEDULE, TYPICAL SECTION |
| 2 - A | SUMMARY OF QUANTITIES |
| 3 | PLAN SHEET |
| 4 | DRAINAGE DETAILS |
| 5 | GABION BASKET INSTALLATION DETAIL |
| EC - 1 | EROSION CONTROL PLAN |
| TCP - 1 THRU TCP - 5 | TRAFFIC CONTROL DETAILS |
| X - 1 THRU X - 4 | CROSS SECTIONS |


GENERAL NOTES:

2012 SPECIFICATIONS
EFFECTIVE : 1/17/2012
REVISED: 11/1/2011

GRADING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION AT GRADE POINTS SHOWN ON THE TYPICAL SECTION. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTERLINE OF SURVEY. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

NIGHT WORK OPTION:

THE CONTRACTOR MAY OPT TO PERFORM ANY OF THE CONTRACT WORK AT NIGHT, HOWEVER; LIGHT PLANTS SHALL BE CONSIDERED INCIDENTAL TO THE WORK.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II. CLEARING ACTIVITIES SHALL BE A PART OF LUMP SUM GRADING, AND SHALL INCLUDE, BUT NOT BE LIMITED TO: ASPHALT REMOVAL, INCIDENTAL DEMOLITION.

SIDE ROADS:

THE CONTRACTOR SHALL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLECONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICES FOR THE PARTICULAR ITEMS INVOLVED.

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHALL MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE TOWN OF CLYDE WATER AND SEWER, PUBLIC SERVICE NATURAL GAS (PSNG), PROGRESS ENERGY, MCNC (FIBER OPTIC), AT&T, CHARTER COMMUNICATIONS (CABLE TV), NCDOT (TRAFFIC SIGNAL). ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

2012 ROADWAY ENGLISH STANDARD DRAWINGS
The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C. , Dated January 2012 are applicable to this project and by reference hereby are considered a part of these plans:

| STD. NO. | TITLE |
|---|---|
| DIVISION 2 - EARTHWORK | |
| 200.02 | Method of Clearing - Method II |
| DIVISION 3 - PIPE CULVERTS | |
| 300.01 | Method of Pipe Installation |
| DIVISION 8 - INCIDENTALS | |
| 838.01 | Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90° Skew |
| 840.02 | Concrete Catch Basin |
| 840.03 | Frame, Grates and Hood |
| 846.01 | Concrete Curb, Gutter and Curb & Gutter |
| 848.01 | Concrete Sidewalk |
| 848.05 | Curb Ramp |
| 850.01 | Concrete Paved Ditches |
| 876.04 | Drainage Ditches with Class B Rip Rap |
| DIVISION 16 - EROSION CONTROL AND ROADSIDE DEVELOPMENT | |
| 1605.01 | Temporary Silt Fence |


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Haywood County\U.S. 19 - 23\US 19-23 Channelization Project\DGN\General Plan Sheets\

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| 39759 | 1-B |

*Note: Not to Scale*

**S.U.E. = Subsurface Utility Engineering*

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

# CONVENTIONAL PLAN SHEET SYMBOLS

## *BOUNDARIES AND PROPERTY:*

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — IP
- Property Corner
- Property Monument — PM
- Parcel/Sequence Number — 23
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary
- Proposed Wetland Boundary
- Existing Endangered Animal Boundary
- Existing Endangered Plant Boundary
- Known Soil Contamination: Area or Site
- Potential Soil Contamination: Area or Site

## *BUILDINGS AND OTHER CULTURE:*

- Gas Pump Vent or U/G Tank Cap
- Sign
- Well
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

## *HYDROLOGY:*

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FDM
- False Sump

## *RAILROADS:*

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

## *RIGHT OF WAY:*

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line
- Proposed Right of Way Line with Iron Pin and Cap Marker
- Proposed Right of Way Line with Concrete or Granite R/W Marker
- Proposed Control of Access Line with Concrete C/A Marker
- Existing Control of Access
- Proposed Control of Access
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage / Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

## *ROADS AND RELATED FEATURES:*

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

## *VEGETATION:*

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

## *EXISTING STRUCTURES:*

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

## *UTILITIES:*

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

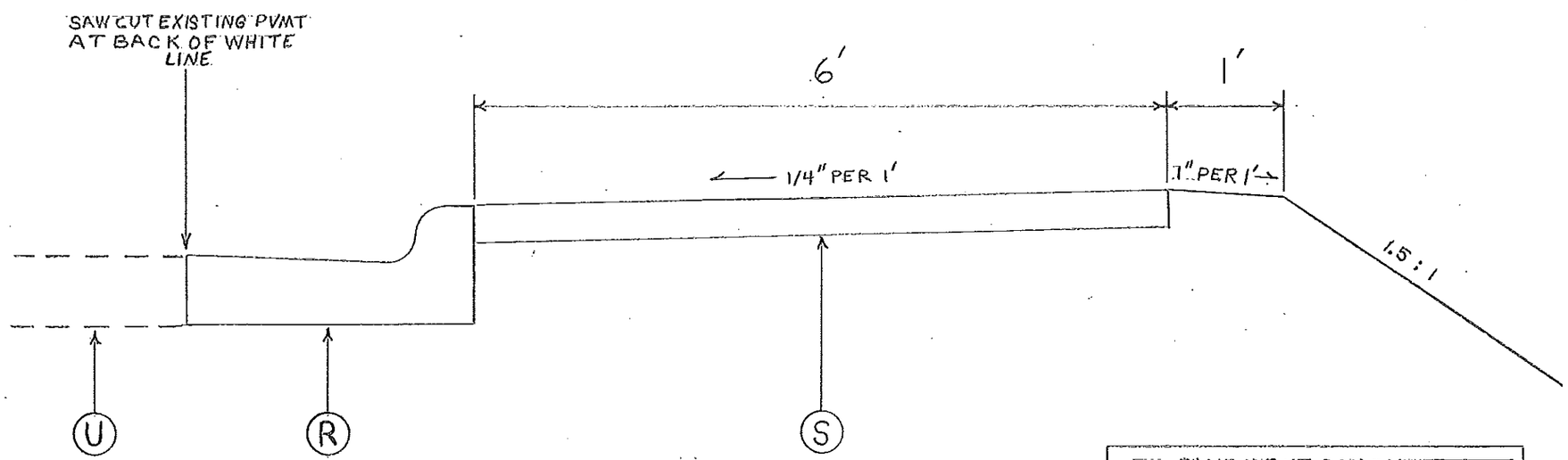
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ? ? ?
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| 42642 E3614.3.17 | 2 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

# TYPICAL SECTION




| PAVEMENT SCHEDULE | |
|---|---|
| R | 2'-6" CURB & GUTTER |
| S | 4" CONCRETE SIDEWALK |
| U | EXISTING PVMT |

REVISIONS

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| 42642 & 3614.3.17 | 2-A |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

# SUMMARY OF QUANTITIES

| Line Item | Sec. No. | Description | Quantity | Unit |
|---|---|---|---|---|
| 0000100000-N | 800 | MOBILIZATION | 1 | LS |
| 0063000000-N | 226 | GRADING | 1 | LS |
| 0536000000-E | 310 | 12" HDPE PIPE CULVERTS | 30 | LF |
| 0335850000-E | 305 | 12" DRAINAGE PIPE ELBOWS | 1 | EA |
| 1220000000-M | 545 | INCIDENTAL STONE BASE | 10 | TON |
| 1704000000-M | SP | PATCHING EXISTING PAVEMENT | 5 | TON |
| 2209000000-E | 838 | ENDWALLS | 0.5 | CY |
| 2286000000-N | 840 | MASONRY DRAINAGE STRUCTURES | 2 | EA |
| 2374000000-N | 840 | FRAME WITH GRATE & HOOD, STD 840.03, TYPE F | 2 | EA |
| 2538000000-E | 846 | 2'-6" CONCRETE CURB & GUTTER | 540 | LF |
| 2591000000-E | 848 | 4" CONCRETE SIDEWALK | 340 | SY |
| 2605000000-N | 848 | CONCRETE CURB RAMP | 2 | EA |
| 2619000000-E | 850 | 4" CONCRETE PAVED DITCH | 15 | SY |
| 2845000000-N | 858 | ADJUSTMENT OF METER BOXES OR VALVE BOXES | 4 | EA |
| 2905000000-N | 859 | CONVERT EXISTING DROP INLET TO JUNCTION BOX | 1 | EA |
| 8594000000-E | 876 | RIP RAP, CLASS B | 150 | TON |
| 0000960000-E | 876 | GEOTEXTILE FOR DRAINAGE | 30 | SY |
| 4589000000-N | SP | TRAFFIC CONTROL | 1 | LS |
| 6000000000-E | 1605 | TEMPORARY SILT FENCE | 550 | LF |
| 6036000000-E | 1631 | MATTING FOR EROSION CONTROL | 650 | SY |
| 6084000000-M | 1660 | SEEDING AND MULCHING | 0.25 | ACR |
| 8847000000-E | SP | GABION RETAINING WALL | 756 | SF |

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| PROJECT REFERENCE NO. | SHEET NO. |
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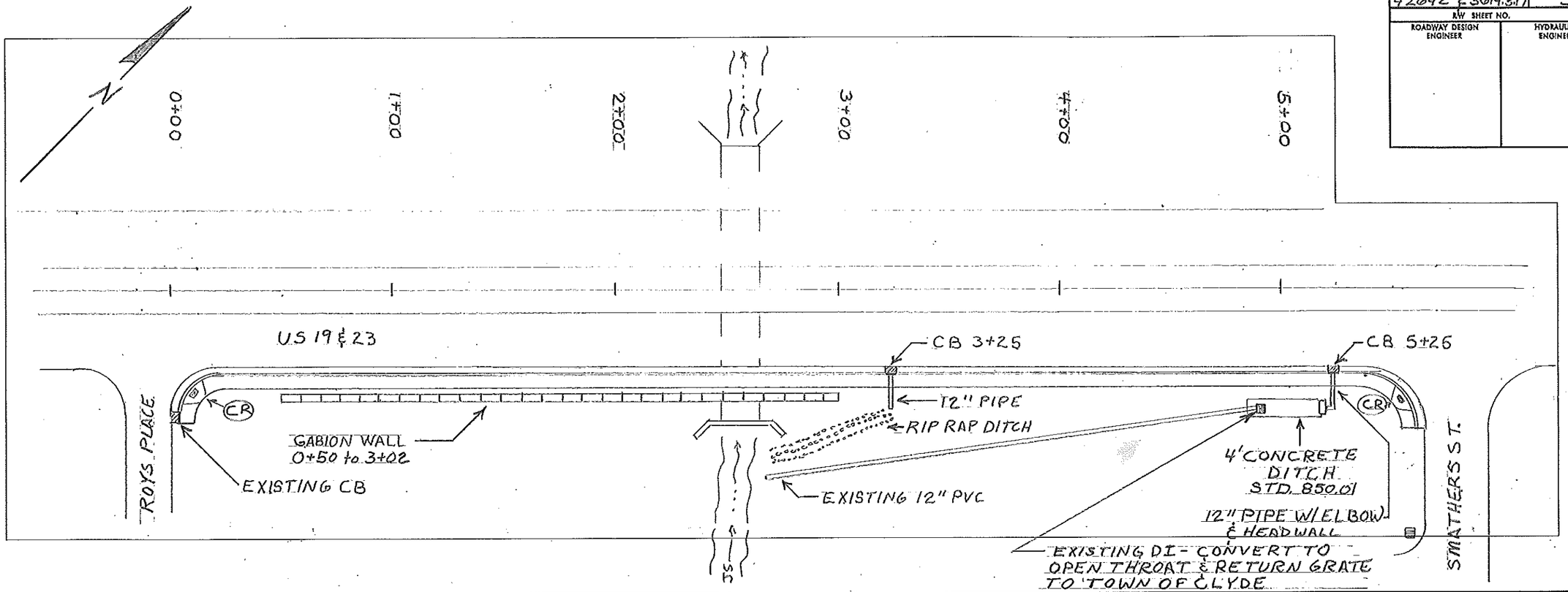
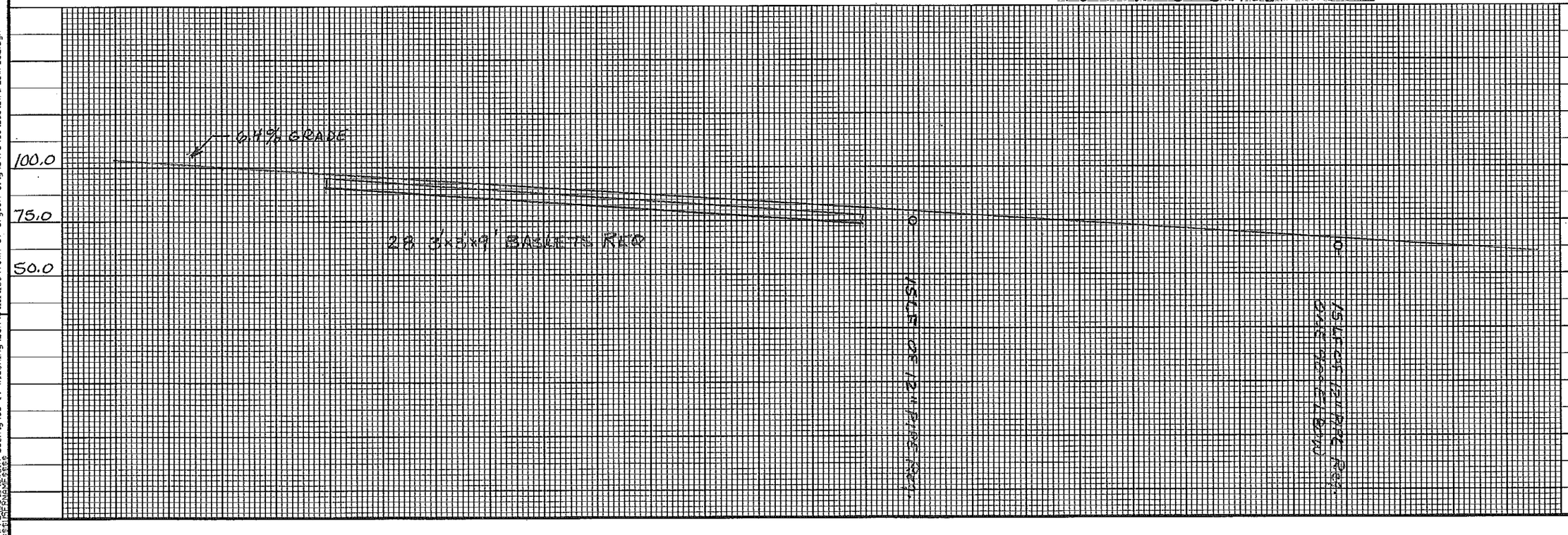
| 42642 & 3614.3.17 | 3 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

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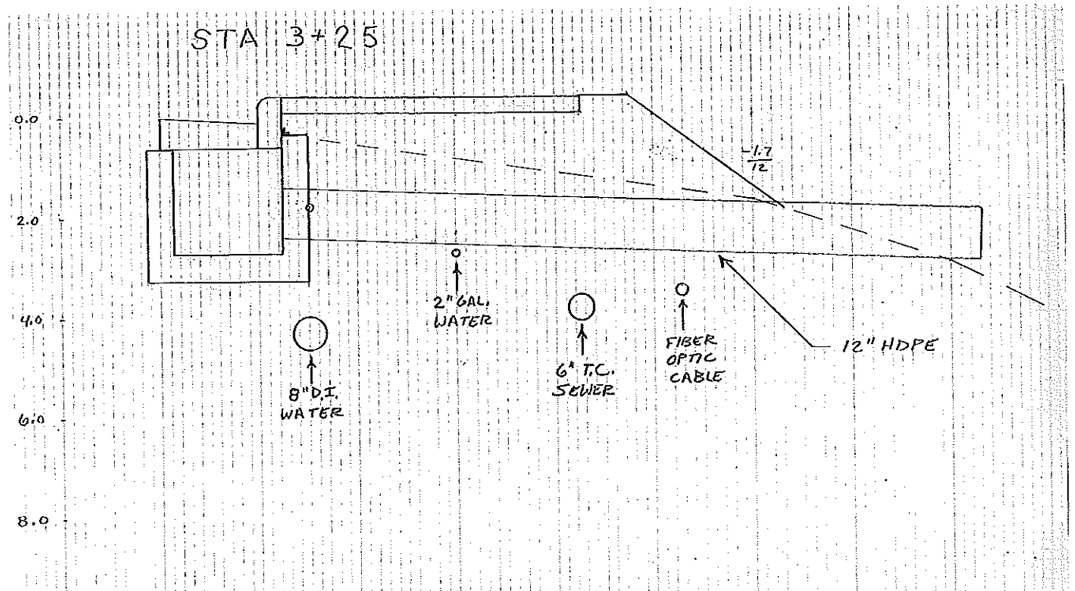
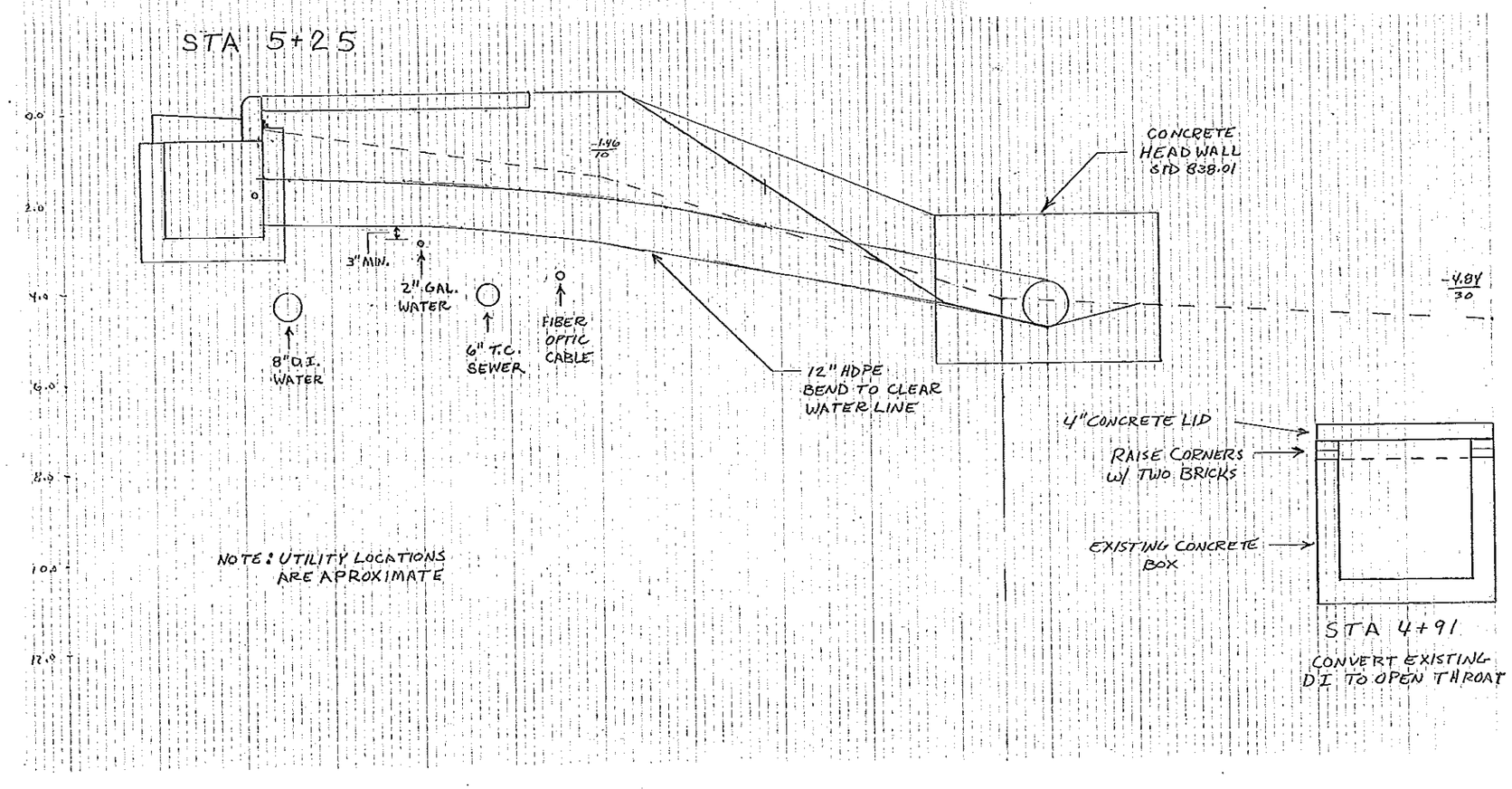
| 42642 & 3614.3.17 | 4 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

# DRAINAGE DETAILS

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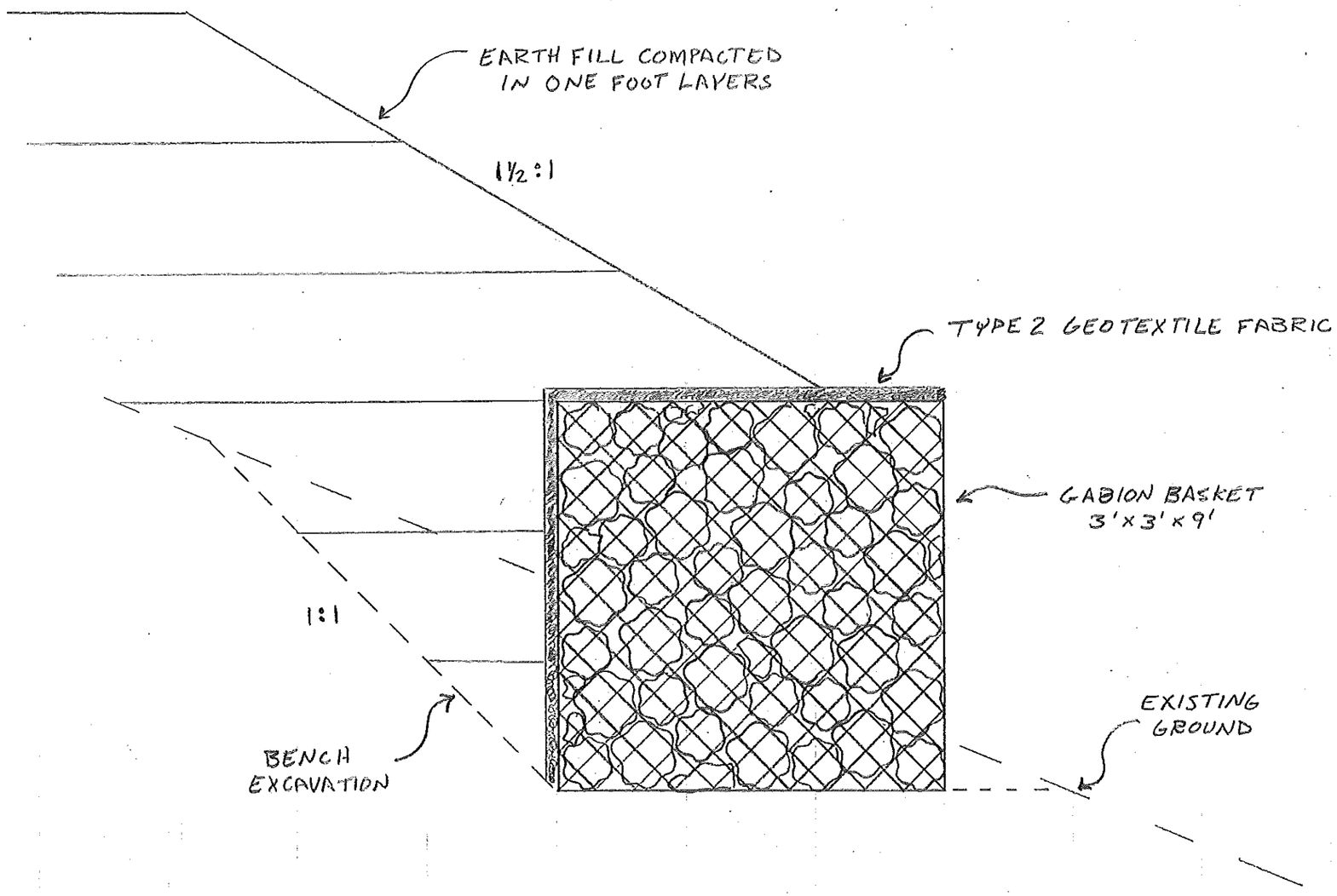
| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
| 42642 & 3614.3.17 | 5 |
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

# GABION BASKET INSTALLATION DETAIL

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| PROJECT REFERENCE NO. | SHEET NO. |
|---|---|
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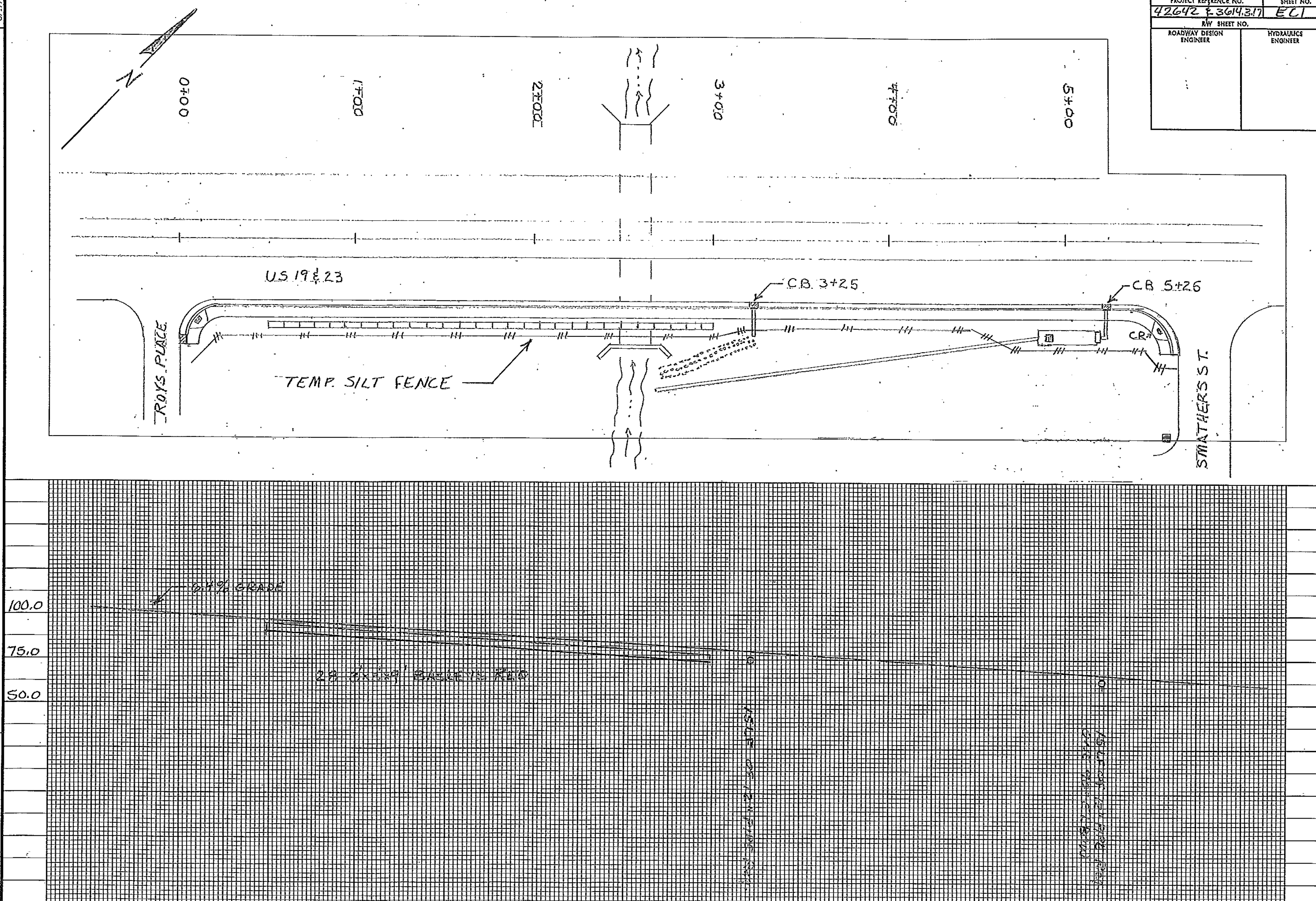
| R/W SHEET NO. | |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |

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TCP-1


DETAIL A
DETAIL B
DETAIL C
DETAIL D
EXIT RAMPS
ENTRANCE RAMPS
-Y- LINES
MAIN ROADWAY WORK ZONE
CONSTRUCTION LIMITS
END ROAD WORK
ROAD WORK AHEAD
-Y- LINE
GENERAL NOTES
1- USE FLUORESCENT ORANGE SHEETING (TYPE VII OR HIGHER) ON ALL ADVANCED WORK ZONE SIGNS.
2- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK UNLESS COVERED.
3- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT OVERNIGHT. FOR SHORT-TERM DAILY MAINTENANCE TYPE OPERATIONS, THIS SIGNING APPLICATION IS OPTIONAL; MAY USE ONLY APPLICABLE ROADWAY STANDARD DRAWINGS INSTEAD. HOWEVER, IF THIS SIGNING APPLICATION IS USED, SIGNS MAY BE PORTABLE MOUNTED.
4- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.
5- USE 3LB STEEL U-CHANNEL POST OR 4" X 4" WOOD POST FOR ALL WORK ZONE SIGNS. 3LB STEEL U-CHANNEL POSTS MUST MEET THE REQUIREMENTS OF STANDARD SPECIFICATION SECTION 1094-1(B). MAY BE GALVANIZED STEEL, OR MAY BE PAINTED GREEN BY THE POST MANUFACTURER. SQUARE STEEL TUBING POSTS HAVING EQUIVALENT STRENGTH OF THE 3 LB STEEL U-CHANNEL POST ARE ALSO ACCEPTABLE FOR USE. ERECT SIGNS PER ROADWAY STANDARD DRAWING 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATION "WORK ZONE SIGNS" SECTION 1110.
8- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1110.01.
7- DO NOT BACK BRACE SIGN SUPPORTS.
8- TWO-WAY UNDIVIDED ADVANCE WARNING SIGN CONFIGURATION MAY BE USED ON URBAN MULTI-LANE FACILITIES WHERE CONDITIONS LIMIT THE USE OF DUAL MOUNTED SIGNS AS DETERMINED BY THE ENGINEER.
LEGEND
STATIONARY SIGN
DIRECTION OF TRAFFIC FLOW
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
1-12
ENGLISH STANDARD DRAWING FOR
WORK ZONE ADVANCE WARNING SIGNS FOR FACILITIES ≤ 55 MPH
SHEET 2 OF 3
1101.01

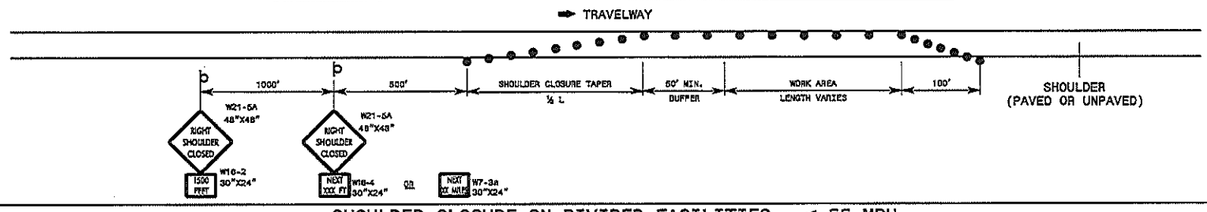

LEFT LANE CLOSURE
RIGHT LANE CLOSURE
MEDIAN
SHOULDER TAPER
MERGE TAPER
BUFFER SPACE
SEE NOTE 7
WORK AREA
2 MILES MAX.
200' MIN.
1 MILE INITIAL PLACEMENT (SEE NOTE 8)
TMA ROLL-AHEAD DISTANCE (SEE NOTE 7)
MESSAGE NO. 1
MESSAGE NO. 2
LEFT LANE CLOSED
RIGHT LANE CLOSED
CHANGEABLE SIGN MESSAGE
GENERAL NOTES
1- IF NECESSARY USE THIS STD. FOR ONE-WAY CITY TYPE STREETS WHERE SIGNS MAY BE MOUNTED ON BOTH SIDES OF THE ROADWAY.
2- PLACE ARROW BOARDS ON THE SHOULDER (PAVED OR UNPAVED). PLACE ARROW BOARDS WITHIN THE TAPER IF SHOULDERS DO NOT EXIST. MEET THE REQUIREMENTS FOR STOPPING SIGHT DISTANCE AT THE ARROW BOARD LOCATION. IF NEEDED, EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE TO THE ARROW BOARD IS MET (SEE STD. 1101.11 SHEET 2).
3- PLACE DRUMS IN TAPERS AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT. PLACE DRUMS ALONG THE WORK AREA AT THE MAXIMUM SPACING EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.
4- REFER TO STD. 1101.11 FOR "L" DISTANCE, SIGN SPACING, AND BUFFER SPACE.
5- REFER TO STD. 1101.02 SHEETS 9 AND 10 FOR TREATMENT OF LANE CLOSURES THRU INTERCHANGES.
6- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
7- POSITION THE TMA TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY THE MANUFACTURER AND CONTINUOUSLY ADVANCE TMA'S AS WORK PROGRESSES.
8- PLACE CHANGEABLE MESSAGE SIGN (CMS) ON THE OUTSIDE OF THE TRAVELWAY AS DIRECTED BY TRAFFIC ENGINEER. PLACE APPROXIMATELY 1 MILE IN ADVANCE OF THE WZD-5 SIGNS. 1/2 MILE IN ADVANCE OF ANTICIPATED BACKUP. CONTINUE TO MONITOR TRAFFIC, MOVE CMS APPROXIMATELY 1/2 MILE IN ADVANCE OF ANTICIPATED BACKUP.
9- DO NOT EXCEED A 2 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.
LEGEND
FLASHING ARROW BOARD (TYPE C)
FLASHING ARROW BOARD, TYPE "C" (96"X48" MIN.), "CAUTION MODE"
TRUCK MOUNTED ATTENUATOR(TMA)
CHANGEABLE MESSAGE SIGN (CMS)
DRUM
PORTABLE SIGN
DIRECTION OF TRAFFIC FLOW
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
1-12
ENGLISH STANDARD DRAWING FOR
TEMPORARY LANE CLOSURES
DIVIDED MULTI-LANE ROADWAY-1 LANE CLOSED (FOR ROADWAYS < 60 MPH)
SHEET 3 OF 15
1101.02

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

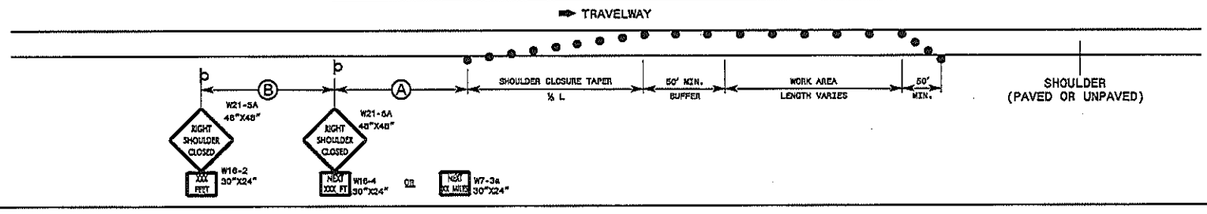
1-12

ENGLISH STANDARD DRAWING FOR
**TEMPORARY SHOULDER CLOSURES**

## SHOULDER CLOSURE ON CONTROLLED ACCESS FACILITIES - ≥ 60 MPH

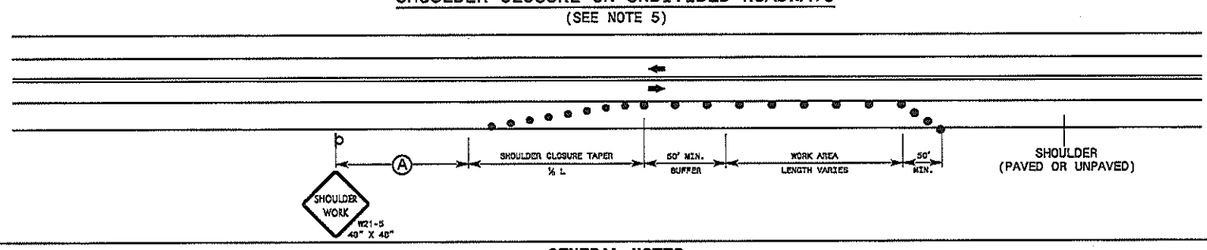



## SHOULDER CLOSURE ON DIVIDED FACILITIES - ≤ 55 MPH




## SHOULDER CLOSURE ON UNDIVIDED ROADWAYS

(SEE NOTE 5)




### GENERAL NOTES

1- PLACE SHOULDER CLOSURE SIGNS ON THE SAME SIDE AS THE SHOULDER THAT IS CLOSED.

2- PLACE DRUMS IN THE SHOULDER TAPER AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT. THE MAXIMUM SPACING OF DRUMS ALONG THE WORK AREA IS EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.

3- USE STATIONARY SIGNS FOR LONG TERM OPERATIONS (LONGER THAN 3 DAYS).

4- REFER TO STD. 1101.11 FOR "L" DISTANCE AND SIGN SPACING.

5- THE TWO-LANE, TWO-WAY DRAWING MAY BE APPLIED TO UNDIVIDED, MULTI-LANE FACILITIES.

**LEGEND**

- ● DRUM
- ⊳ STATIONARY OR PORTABLE SIGN
- ➡ DIRECTION OF TRAFFIC FLOW

SHEET 1 OF 1
**1101.04**

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

1-12

ENGLISH STANDARD DRAWING FOR
**TEMPORARY SHOULDER CLOSURES**

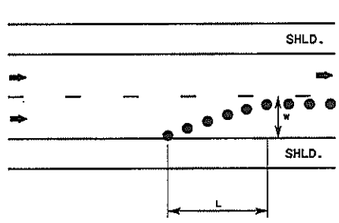
SHEET 1 OF 1
**1101.04**

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

1-12

ENGLISH STANDARD DRAWING FOR
**TRAFFIC CONTROL DESIGN TABLES**
"L" DISTANCE AND CHANNELIZING
DEVICE TAPER CRITERIA

## EXAMPLE OF "L" & "W" DESIGNATIONS




## TAPER LENGTH CRITERIA FOR CHANNELIZING DEVICES IN WORK ZONES

| TYPES OF TAPERS | TAPER LENGTH |
|---|---|
| UPSTREAM TAPER | |
| MERGING TAPER | L MINIMUM |
| SHIFTING TAPER | ½ L MINIMUM |
| SHOULDER TAPER | ½ L MINIMUM |
| TWO-WAY TRAFFIC TAPER | 60 - 100 FEET MAXIMUM |
| DOWNSTREAM TAPER | 100 FEET MAXIMUM |

**QUICK REFERENCE - "L" DISTANCE TABLE**

MINIMUM LONGITUDINAL DISTANCE "L" (FEET) (ROUNDED VALUES)

| POSTED SPEED "S" (MPH) | LATERAL WIDTH "W" (FEET) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 20 | 10 | 15 | 20 | 30 | 35 | 40 | 50 | 55 | 60 | 70 | 75 | 80 |
| 25 | 15 | 25 | 35 | 45 | 55 | 65 | 75 | 85 | 95 | 105 | 115 | 125 |
| 30 | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 |
| 35 | 25 | 45 | 65 | 85 | 105 | 125 | 145 | 165 | 185 | 205 | 225 | 245 |
| 40 | 30 | 55 | 80 | 110 | 135 | 160 | 190 | 215 | 240 | 270 | 295 | 320 |
| 45 | 45 | 90 | 135 | 180 | 225 | 270 | 315 | 360 | 405 | 450 | 495 | 540 |
| 50 | 50 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 |
| 55 | 55 | 110 | 165 | 220 | 275 | 330 | 385 | 440 | 495 | 550 | 605 | 660 |
| 60 | 60 | 120 | 180 | 240 | 300 | 360 | 420 | 480 | 540 | 600 | 660 | 720 |
| 65 | 65 | 130 | 195 | 260 | 325 | 390 | 455 | 520 | 585 | 650 | 715 | 780 |
| 70 | 70 | 140 | 210 | 280 | 350 | 420 | 490 | 560 | 630 | 700 | 770 | 840 |

### GENERAL NOTES

1- TABLE FOR "L" DISTANCE IS BASED ON CHANNELIZATION TAPER FORMULA FROM THE M.U.T.C.D. WHERE:

| SPEED LIMIT | FORMULA |
|---|---|
| 40 MPH OR LESS | $L_{MIN} = \frac{W \times S^2}{60}$ |
| 45 MPH OR GREATER | $L_{MIN} = W \times S$ |

L = MINIMUM TAPER LENGTH IN FEET (LONGITUDINAL DISTANCE)
W = WIDTH OF OFFSET IN FEET (LATERAL DISTANCE)
S = POSTED SPEED LIMIT, OR OFF-PEAK 85 PERCENTILE SPEED IN MPH PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH

2- "L" DISTANCE IS FOR APPLICATION WITH CHANNELIZING DEVICE AND PAVEMENT MARKING TAPERS AND TRANSITIONS. CHANNELIZING DEVICES INCLUDE DRUMS, CONES, TUBULAR MARKERS, BARRICADES, RAISED ASPHALT ISLANDS, AND VERTICAL PANELS.

SHEET 1 OF 4
**1101.11**

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

1-12

ENGLISH STANDARD DRAWING FOR
**TRAFFIC CONTROL DESIGN TABLES**
"L" DISTANCE AND CHANNELIZING
DEVICE TAPER CRITERIA

SHEET 1 OF 4
**1101.11**

TCP-2

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

1-12

ENGLISH STANDARD DRAWING FOR
**TRAFFIC CONTROL DESIGN TABLES**
BUFFER SPACE & SIGHT DISTANCE

| DESIGN SPEED (MPH) | MINIMUM SIGHT DISTANCE | | MINIMUM LONGITUDINAL BUFFER SPACE (FEET) |
|---|---|---|---|
| | STOPPING SIGHT DISTANCE (FEET) | PASSING SIGHT DISTANCE (FEET) | |
| 30 | 200 | 1090 | 85 |
| 35 | 250 | 1280 | 120 |
| 40 | 305 | 1470 | 155 |
| 45 | 360 | 1625 | 195 |
| 50 | 425 | 1835 | 240 |
| 55 | 495 | 1985 | 290 |
| 60 | 570 | 2135 | 345 |
| 65 | 645 | 2285 | 405 |
| 70 | 730 | 2480 | 470 |
| 75 | 820 | 2580 | 540 |
| 80 | 910 | 2860 | 615 |

## GENERAL NOTES

1- TABLES ARE BASED ON THE AASHTO GREEN BOOK "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AND THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". MINIMUM SIGHT DISTANCE VALUES ARE FOR PASSENGER CAR VEHICLES ON WET AND LEVEL ROADWAYS. CONSULT THE AASHTO GREEN BOOK TO MAKE FINAL DETERMINATION OF STOPPING SIGHT DISTANCE REQUIREMENTS.

2- BUFFER SPACE TABLE IS BASED ON THE BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS.

3- USE OF STOPPING SIGHT DISTANCE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE FOR TRAFFIC APPROACHING A LANE CLOSURE. PROVIDE 2-LANE, 2-WAY ROADWAYS STOPPING SIGHT DISTANCE TO THE FLAGGER. FOR LANE CLOSURES ON MULTILANE ROADWAYS PROVIDE STOPPING SIGHT DISTANCE TO THE BEGINNING OF THE LANE CLOSURE MERGE TAPER, OR FLASHING ARROW BOARD. EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED.

4- USE OF MINIMUM PASSING SIGHT DISTANCE TABLE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE REQUIREMENTS FOR PLACEMENT OF PAVEMENT MARKING PASSING/NO-PASSING ZONES FOR 2-LANE, 2-WAY ROADWAYS.

SHEET 2 OF 4
1101.11

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

1-12

ENGLISH STANDARD DRAWING FOR
**TRAFFIC CONTROL DESIGN TABLES**
BUFFER SPACE & SIGHT DISTANCE

SHEET 2 OF 4
1101.11

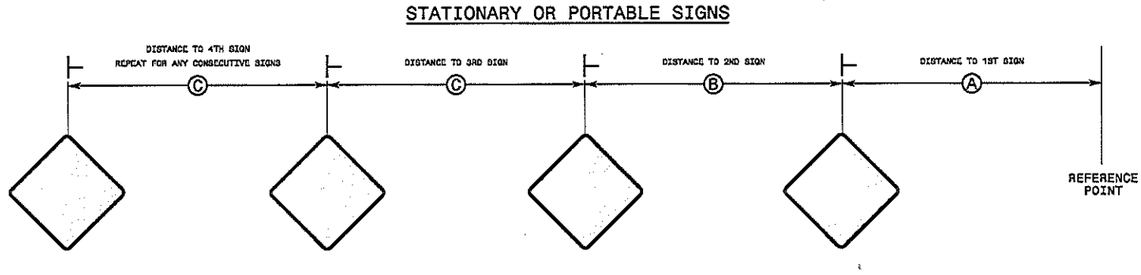
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
**TRAFFIC CONTROL DESIGN TABLES**
SPACING OF TEMPORARY SIGNS IN SERIES

| ADVANCE WARNING SIGN SPACING CHART | | | |
|---|---|---|---|
| POSTED SPEED LIMIT (MPH) | RECOMMENDED DISTANCE BETWEEN SIGNS (FEET)± | | |
| | Ⓐ | Ⓑ | Ⓒ |
| ≤ 35 | 200 | 200 | 200 |
| 40-50 | 350 | 350 | 350 |
| 55 | 500 | 500 | 500 |
| CONTROLLED ACCESS ROADS (≥ 55) | 1000 | 1500 | 2700 |

## STATIONARY OR PORTABLE SIGNS




## GENERAL NOTES

1- REFER TO 2009 MUTCD.

2- USE THIS STANDARD DRAWING IN CONJUNCTION WITH OTHER TRAFFIC CONTROL ROADWAY STANDARD DRAWINGS WHERE SIGN SPACING DISTANCES A, B, C, ARE SPECIFIED.

3- APPLY THE ADVANCE WARNING SIGN SPACING CHART WHERE A SERIES OF 2 OR MORE SIGNS ARE USED. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS VARIOUS CONDITIONS OCCUR, SUCH AS LIMITED SIGHT DISTANCE, OBSTRUCTION INTERFERENCE, ETC.

SHEET 4 OF 4
1101.11

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

1-12

ENGLISH STANDARD DRAWING FOR
**TRAFFIC CONTROL DESIGN TABLES**
SPACING OF TEMPORARY SIGNS IN SERIES

SHEET 4 OF 4
1101.11

TCP-3

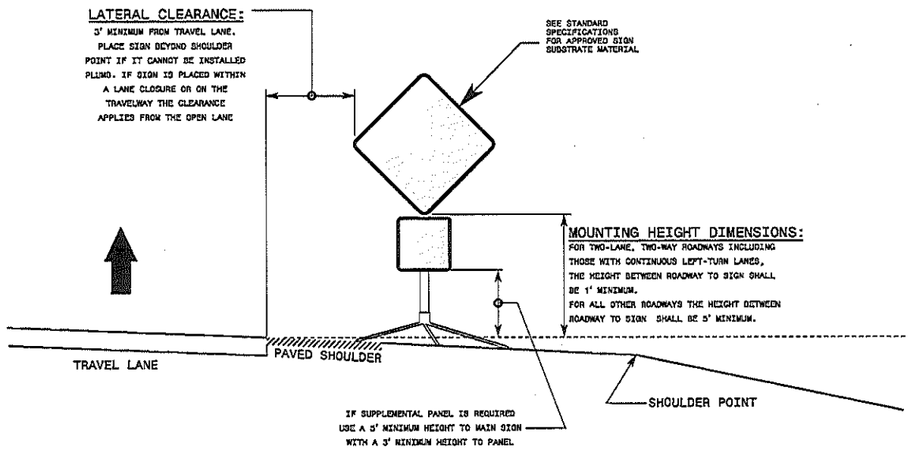
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR

**PORTABLE WORK ZONE SIGNS**

MOUNTING HEIGHT & LATERAL CLEARANCE




## GENERAL NOTES

1- DIMENSIONS SHOWN ARE MINIMUM VALUES. MOUNT SIGNS SO THEY WILL BE CLEARLY VISIBLE TO APPROACHING TRAFFIC EVEN WHEN SIGNS ARE MOUNTED BEHIND TRAFFIC CONTROL DEVICES SUCH AS DRUMS, BARRIER, OR OTHER OBJECTS.

2- ALL PORTABLE SIGNS AND STANDS MUST MEET OR EXCEED THE REQUIREMENTS OF NCHRP 350 FOR CATEGORY II DEVICES. USE PORTABLE WORK ZONE SIGNS AND STANDS SPECIFICALLY DESIGNED FOR ONE ANOTHER.

3- ALL PORTABLE WORK ZONE SIGNS AND STANDS MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST AT https://apps.dot.state.nc.us/vendor/approvedproducts.

SHEET 1 OF 1

1110.02

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

1-12

ENGLISH STANDARD DRAWING FOR

**PORTABLE WORK ZONE SIGNS**

MOUNTING HEIGHT & LATERAL CLEARANCE

SHEET 1 OF 1

1110.02

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

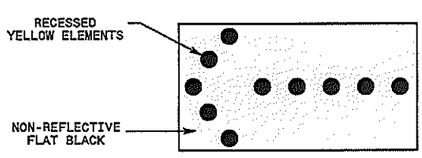
1-12

ENGLISH STANDARD DRAWING FOR

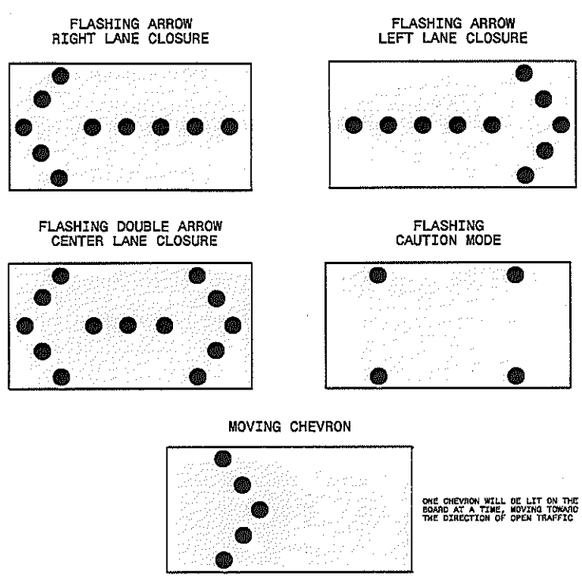
**FLASHING ARROW BOARDS**

| FLASHING ARROW BOARD TYPE | | | |
|---|---|---|---|
| PANEL TYPE | MINIMUM SIZE (W x H INCHES) | MINIMUM LEGIBILITY DISTANCE (MILES) | MINIMUM NUMBER OF ELEMENTS |
| C | 96 X 48 | 1 | 15 |

TYPICAL FLASHING ARROW BOARD




FLASHING ARROW BOARD MODES




## GENERAL NOTES

1- DO NOT USE STRAIGHT-LINE CAUTION OR CHEVRON DISPLAYS.

2- USE A MINIMUM MOUNTING HEIGHT OF 7 FEET FROM GROUND LEVEL TO THE BOTTOM OF THE PANEL FOR TRAILER-MOUNTED ARROW BOARDS, EXCEPT ON VEHICLE-MOUNTED PANELS WHICH SHOULD BE AS HIGH AS PRACTICAL.

3- USE ARROW BOARD ELEMENTS CAPABLE OF A MINIMUM 50 PERCENT DIMMING FROM THEIR FULL RATED LAMP VOLTAGE. USE FULL LAMP VOLTAGE DURING THE DAY, AND USE THE DIMMED MODE AT NIGHT.

4- DO NOT USE ARROW BOARDS IN FLASHING ARROW MODE ON A TWO-LANE, TWO-WAY ROADWAY DURING A ONE LANE OPERATION, NOR ON MULTILANE ROADWAYS WHEN SHIFTING ALL TRAFFIC LANES LATERALLY.

5- SEE THE DEPARTMENT'S APPROVED PRODUCTS LIST AT https://apps.dot.state.nc.us/vendor/approvedproducts.

SHEET 1 OF 1

1115.01

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

1-12

ENGLISH STANDARD DRAWING FOR

**FLASHING ARROW BOARDS**

SHEET 1 OF 1

1115.01

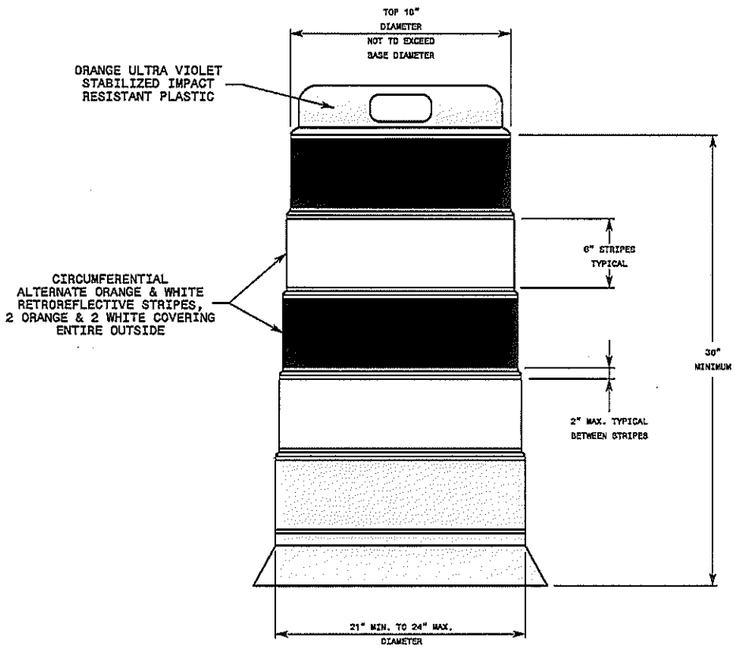
TCP-4

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

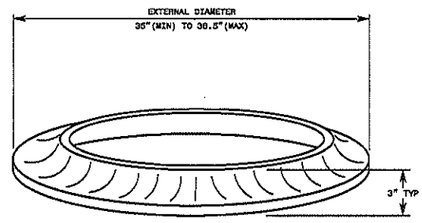
1-12

ENGLISH STANDARD DRAWING FOR

**DRUM**




## TIRE BALLAST




ALL RUBBER COLLARS MUST BE BLACK IN COLOR AND FREE OF ANY COLORED PAINT

BALLAST COLLAR SHOULD HAVE GOOD CONTACT WITH THE BARREL FLANGE AND BALLAST OUTER EDGE MUST LAY FLAT WITH ROAD SURFACE

DRUMS THAT USE TIRE BALLASTS ARE MANUFACTURED SPECIFICALLY FOR THAT PURPOSE. DO NOT USE TIRE BALLASTS WITH OTHER DRUM DESIGNS.

### GENERAL NOTES

1- BALLASTING SHALL BE ACHIEVED BY THE SAND BAG, TIRE-SIDEWALL, OR PREFORMED WEIGHTED BASE METHODS. USE THE TIRE BALLAST AS SPECIFIED BY THE MANUFACTURER. DO NOT PLACE BALLAST ON TOP OF THE DRUM.

2- IF NECESSARY PLACE THE NAME OF THE AGENCY, CONTRACTOR, OR SUPPLIER ON NON-RETROREFLECTIVE DRUM SURFACES. SHOW THE LETTERS AND NUMBERS USING A NON-RETROREFLECTIVE COLOR AND NOT OVER 2" IN HEIGHT.

3- USE TYPE 3 OR HIGHER HIGH INTENSITY PRISMATIC SHEETING.

4- SEE THE DEPARTMENT'S APPROVED PRODUCT LIST AT https://apps.dot.state.nc.us/vendor/approvedproducts.

5- REFER THE STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES FOR ADDITIONAL INFORMATION.

SHEET 1 OF 1
**1130.01**


1-12
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR

**DRUM**

SHEET 1 OF 1
**1130.01**


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

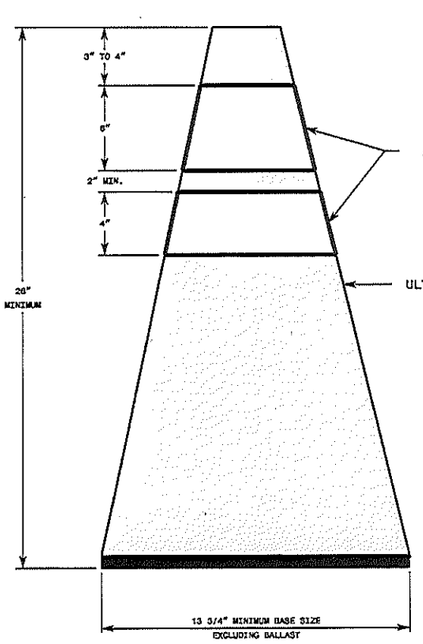
1-12

ENGLISH STANDARD DRAWING FOR

**CONES**

## 28 INCH CONE

(MINIMUM SIZE CONE FOR ALL CLASSES OF ROADS EXCEPT FREEWAYS AND INTERSTATES)

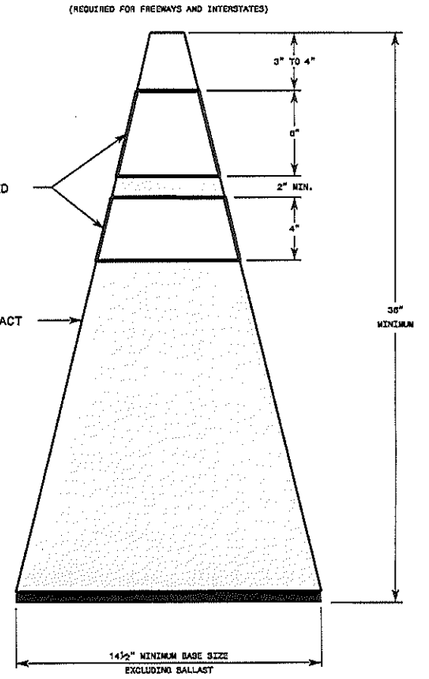



WHITE RETROREFLECTIVE ADHESIVE SHEETING REQUIRED BETWEEN DUSK AND DAWN

ORANGE ULTRA-VIOLET STABILIZED IMPACT RESISTANT PLASTIC

## 36 INCH CONE

(REQUIRED FOR FREEWAYS AND INTERSTATES)




### GENERAL NOTES

1- ACHIEVE BALLASTING BY USING SPECIAL WEIGHTED BASES SUCH AS SAND BAG RINGS, DOUBLING CONES, OR BASES THAT CAN BE FILLED WITH BALLAST. SEVENTY PERCENT OF THE WEIGHT OF THE CONE MUST BE IN THE BASE. USE BALLAST'S THAT DO NOT PRESENT A HAZARD WHEN STRUCK.

2-SEE THE DEPARTMENT'S APPROVED PRODUCTS LIST AT https://apps.dot.state.nc.us/vendor/approvedproducts.

3-USE TYPE IV OR HIGHER HIGH INTENSITY PRISMATIC SHEETING.

SHEET 1 OF 1
**1135.01**

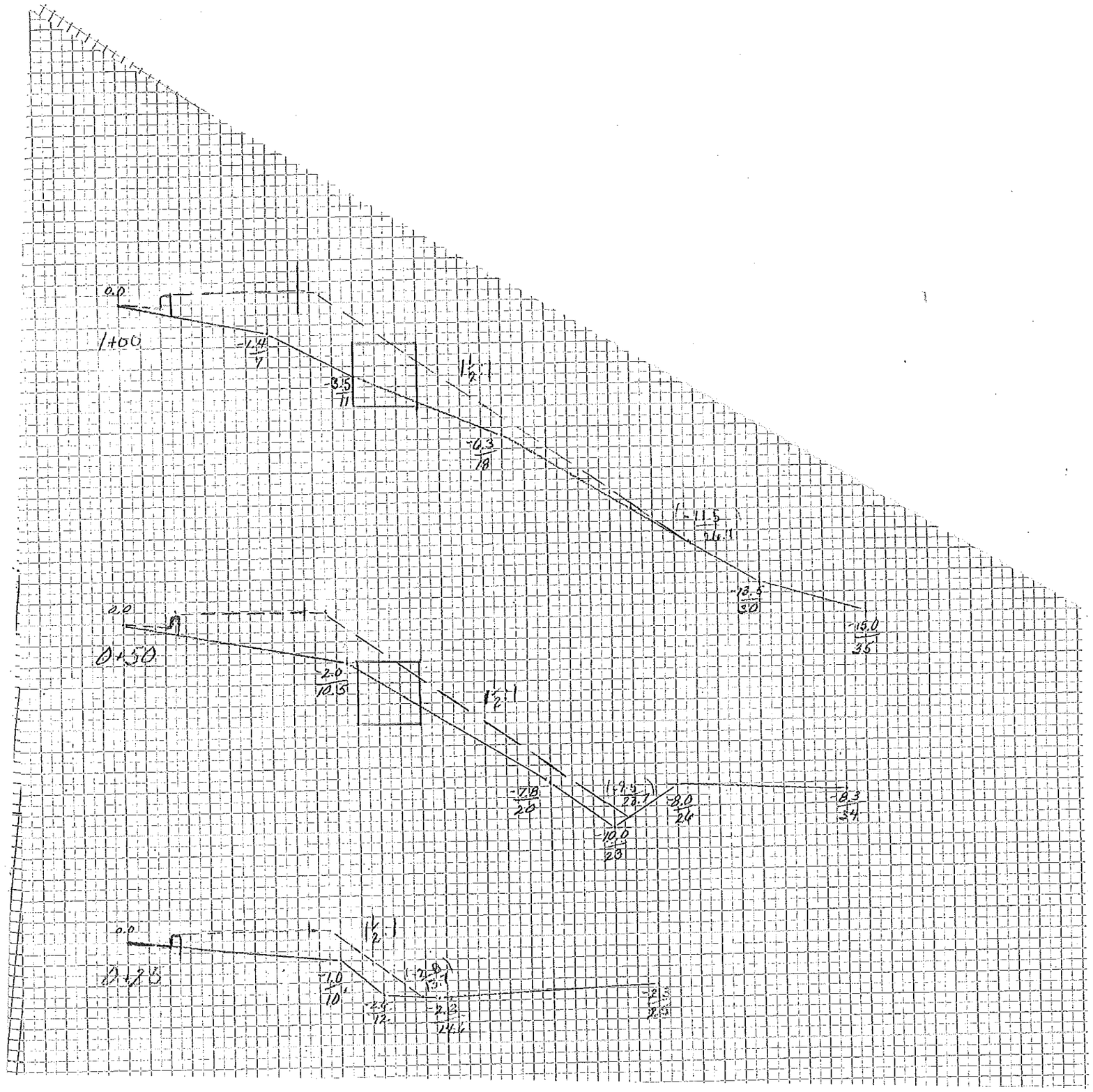

1-12
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

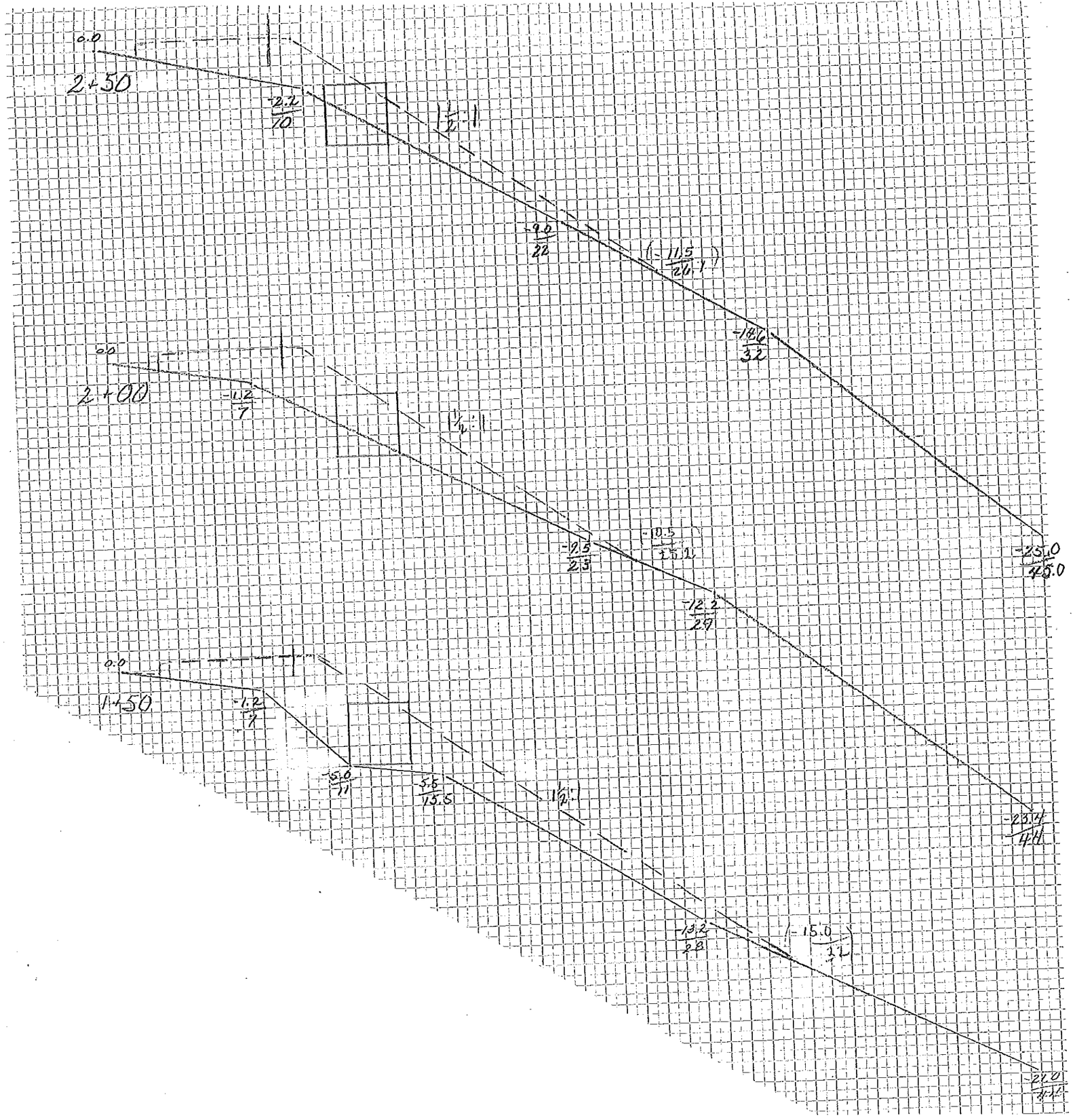
ENGLISH STANDARD DRAWING FOR

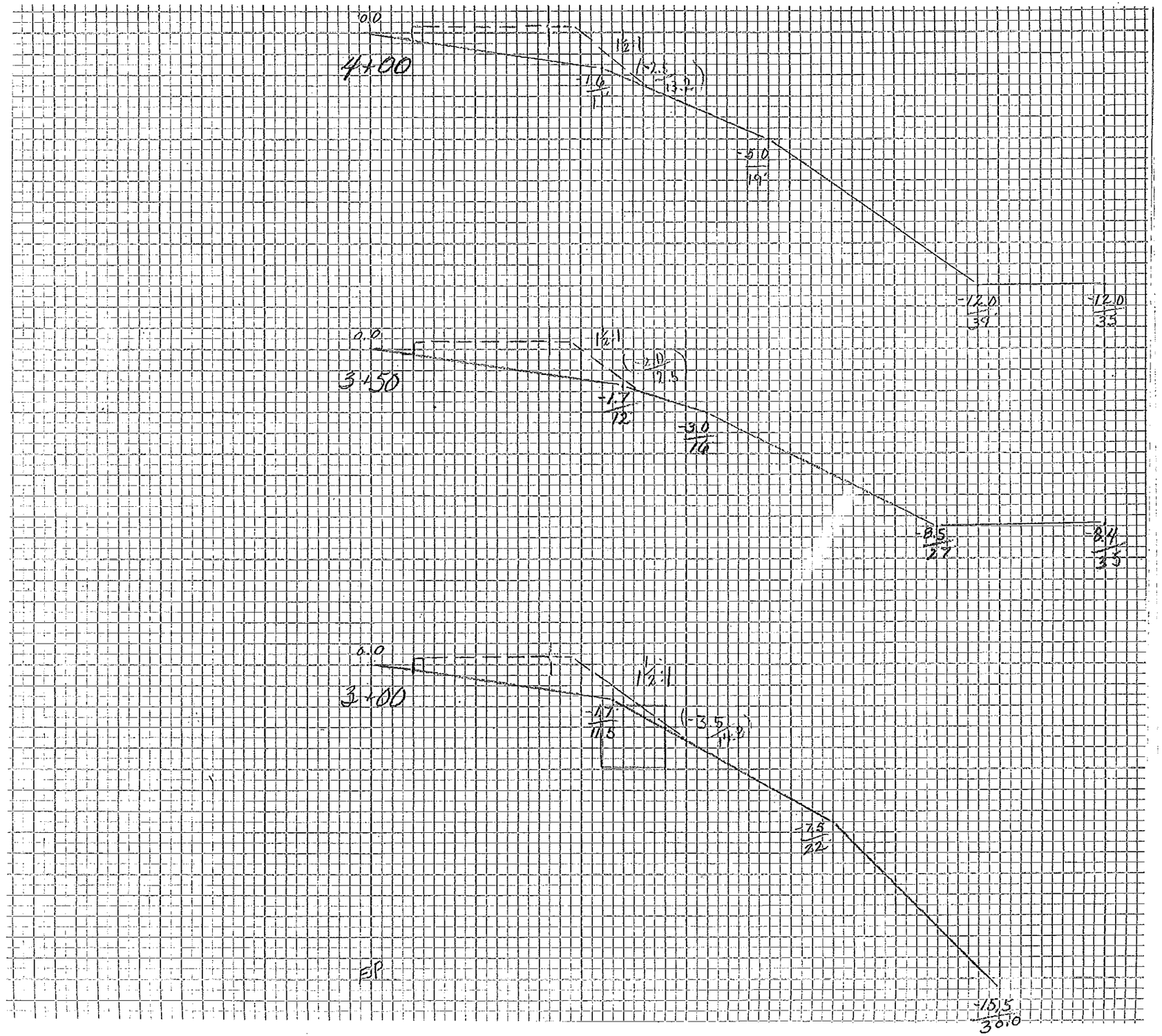
**CONES**

SHEET 1 OF 1
**1135.01**


TCP-5


0.0
1+00
-1.4/7
-3.5/11
1½:1
-0.3/18
(-11.5/26.1)
-13.5/30
-15.0/35
0.0
0+50
-2.0/10.5
1½:1
-7.8/20
(-9.5/20.1)
-8.0/24
-8.3/34
-10.0/28
0.0
0+28
1½:1
-1.0/10
-2.4/12
(-2.8/5.1)
-2.3/24.6
-2.5/28


0.0
2+50
-2.2/10
1/2:1
-9.0/22
(-11.5/26.1)
-16.6/32
-25.0/45.0
0.0
2+00
-1.2/7
1/2:1
-9.5/23
-10.5/25.1
-12.2/29
0.0
1+50
-1.2/7
-5.0/11
5.5/15.5
1/2:1
-13.2/28
(-15.0/32)
-23.4/44
-22.0/44


0.0
4+00
1½:1
(-2.3 / -13.2)
-1.6 / 1
-5.0 / 19
-12.0 / 39
-12.0 / 35
0.0
3+50
1½:1
(-2.0 / 7.3)
-1.7 / 12
-3.0 / 16
-8.5 / 27
-8.4 / 35
0.0
3+00
1½:1
-1.7 / 11.8
(-3.5 / 11.9)
-7.5 / 22
EP
-15.5 / 30.0

0.0
5.00
-2.7
13
-6.5
23
-7.0
24
-6.7
30
0.0
4.50
-2.0
12
-2.8
14
-5.0
17
-9.0
24
-8.7
30