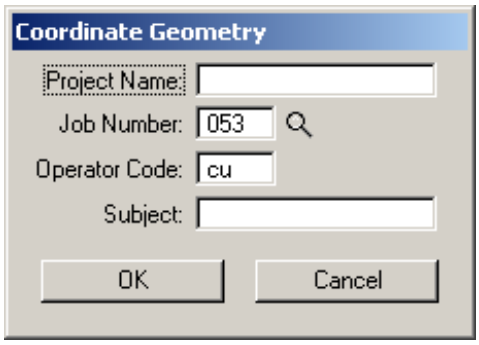
Exercise 5-2

This is an individual exercise to practice storing a horizontal alignment. It is to be done outside of a GEOPAK project.

1. Open the MicroStation file **t:\br-proj\Exercise_5-2\Route_50.dgn**.

2. Enter Coordinate Geometry creating a new GPK called **053**, as shown in the following dialog.



3. Use **Coordinate Geometry** to create the alignments as shown on the following pages.

   Note that all of the **coordinates are in XY** format.

   Do not worry about the graphics (stationing, curve data, etc.) being plotted. These items will be discussed in later chapters.

4. Upon completion of storing the alignments in coordinate geometry, close **coordinate geometry**.

Route50

Beginning Point: X = 1698102.3440 Y = 999551.4260

Ending Point: X = 1702419.9216 Y = 1000116.5660

Intersect the PI point using the direction back and direction ahead of curve.

Direction Back of Curve = S 82° 41’ 55” E

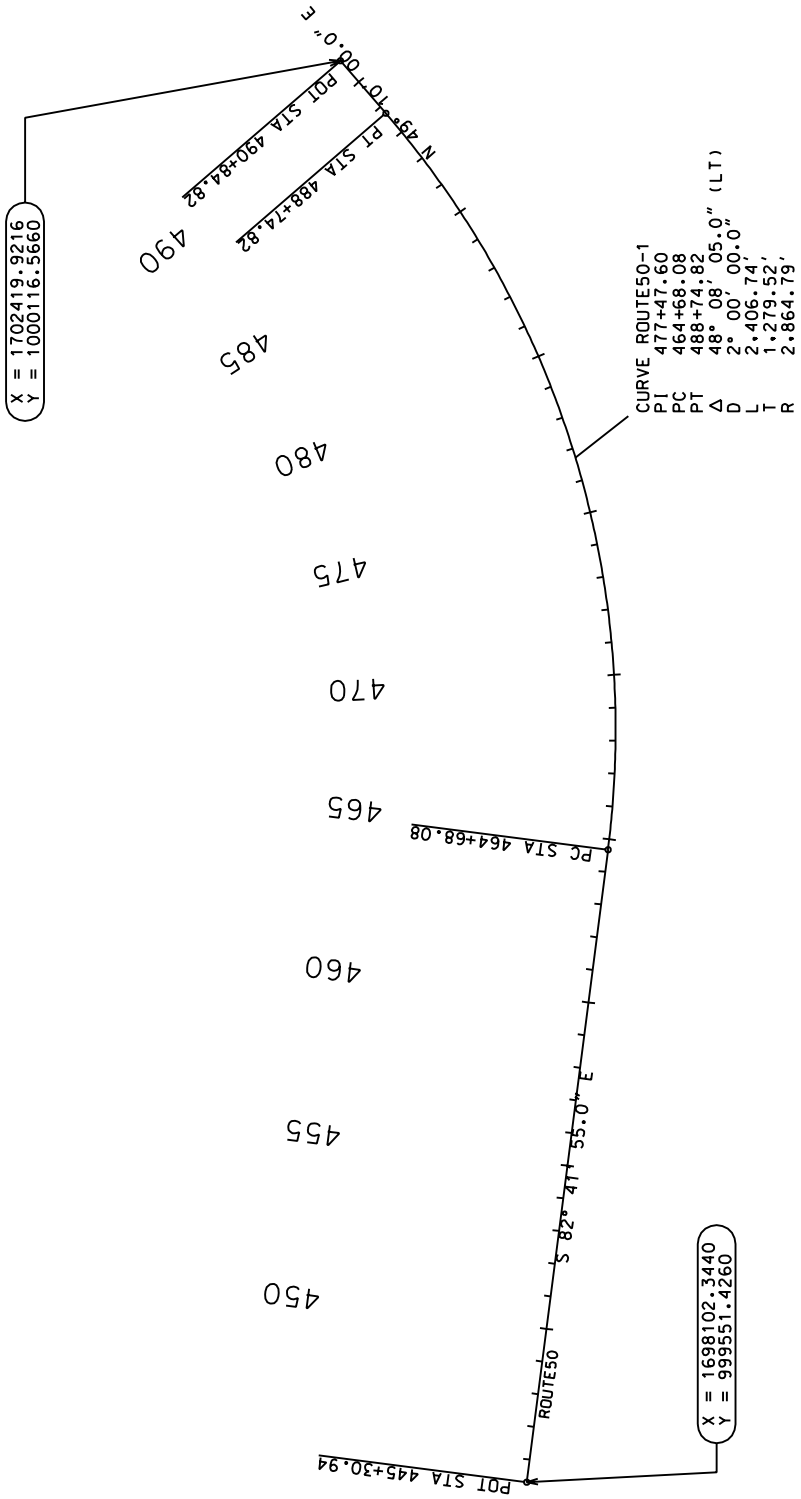
Degree of Curve = 2° 00’ 00”

Direction Ahead of Curve = N 49° 10’ 00” E

Station the chain beginning at 445+30.94

Name the alignment **Route50**.

Route 50


X = 1702419.9216
Y = 1000116.5660
N 49° 10' 00.0" E
POT STA 490+84.82
PT STA 488+74.82
490
485
480
475
470
465
460
455
450
CURVE ROUTE50-1
PI 477+47.60
PC 464+68.08
PT 488+74.82
Δ 48° 08' 05.0" (LT)
D 2° 00' 00.0"
L 2,406.74'
T 1,279.52'
R 2,864.79'
PC STA 464+68.08
S 82° 41' 55.0" E
ROUTE50
X = 1698102.3440
Y = 999551.4260
POT STA 445+30.94

Big Horn

Beginning Point: X = 1700104.5480
Y = 1000188.1340

Ending Point: X = 1700092.3040
Y = 998143.9168

PI of the first curve is exactly 248.8954’ from the beginning point on a bearing of S 1° 04’ 27.8” W

Direction Back of first curve = S 1° 04’ 27.8” W

Degree of Curve for first curve = 5° 00’ 00”

Direction Ahead of first curve = S 6° 32’ 27.3” E

The direction back of second curve matches the direction ahead of the first curve, which is S 6° 32’ 27.3” E

Degree of Curve for second curve = 5° 00’ 00”

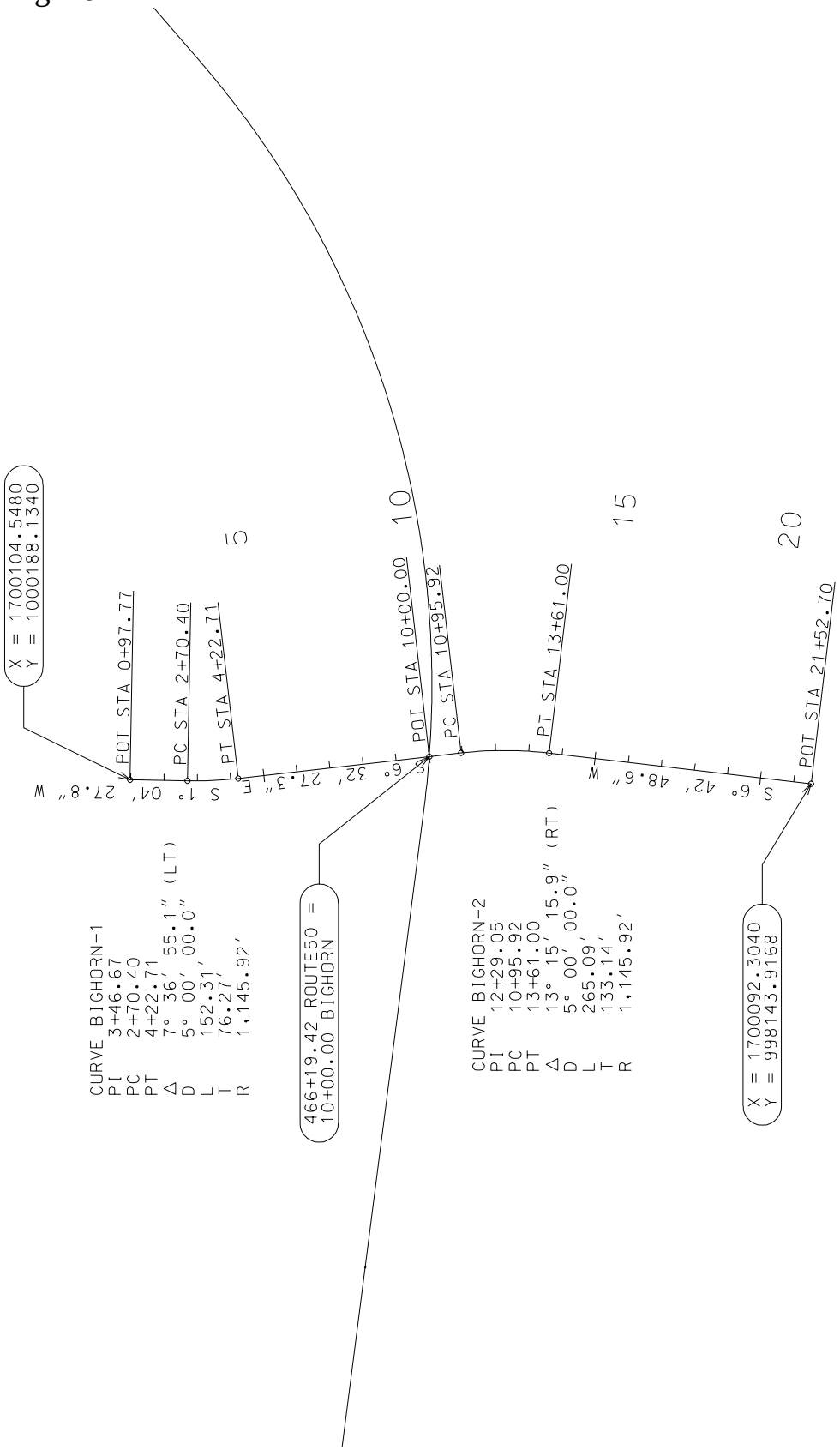
Direction Ahead of second curve = S 6° 42’ 48.6” W

Intersect the alignment chain Route50 with a line segment between the PT of the first curve, and the PC of the second curve. **Note**: The Route 50 station value shown is approximate.

Store the alignment as BigHorn (be sure to include the Route50 intersection point)

Station the alignment with station 10+00 at the intersection point with the Route50 chain.

Big Horn


X = 1700104.5480
Y = 1000188.1340
POT STA 0+97.77
PC STA 2+70.40
PT STA 4+22.71
POT STA 10+00.00
PC STA 10+95.92
PT STA 13+61.00
POT STA 21+52.70
S 10° 04' 27.8" W
S 6° 32' 27.3" E
S 6° 42' 48.6" W
5
10
15
20
CURVE BIGHORN-1
PI 3+46.67
PC 2+70.40
PT 4+22.71
Δ 7° 36' 55.1" (LT)
D 5° 00' 00.0"
L 152.31'
T 76.27'
R 1,145.92'
466+19.42 ROUTE50 =
10+00.00 BIGHORN
CURVE BIGHORN-2
PI 12+29.05
PC 10+95.92
PT 13+61.00
Δ 13° 15' 15.9" (RT)
D 5° 00' 00.0"
L 265.09'
T 133.14'
R 1,145.92'
X = 1700092.3040
Y = 998143.9168

Ramp 1

Beginning Point is at station 452+56.52; offset 66’ LT of Route 50

The PC of the curve is the Beginning Point

Direction Back of the curve is S 82° 41’ 55” E

Degree of Curvature = 4° 00’ 00”

Direction Ahead of the curve is N 83° 27’ 28.56” E

Alignment ends at Big Horn, at **about** Station 6+55.32

Station the alignment beginning at 0+00

Name the alignment Ramp1

Ramp 3

Beginning Point is at station 479+48.31; offset 66’ LT of Route 50

Ending Point is at end of Ramp1; however, use different point numbers for the ending point of each ramp. **Hint**: Element > Point> Equate.

PC of the first curve is the alignment beginning point.

Direction Back for the first curve is S 67° 41’ 47.7” W

Degree of Curvature for first curve = 6° 00’ 00”

Direction Ahead for the first curve is N 69° 50’ 21.3” W

Point Back of the second curve is the PI of the first curve

PI of second curve is at the intersection of a line through the PI of the first curve with a bearing of N 69° 50’ 21.3” W and a line through ending point of Ramp1 with a bearing of N 83° 27’ 28.56” E. **Hint**: Do not use the same point number as the ending point for both ramps.

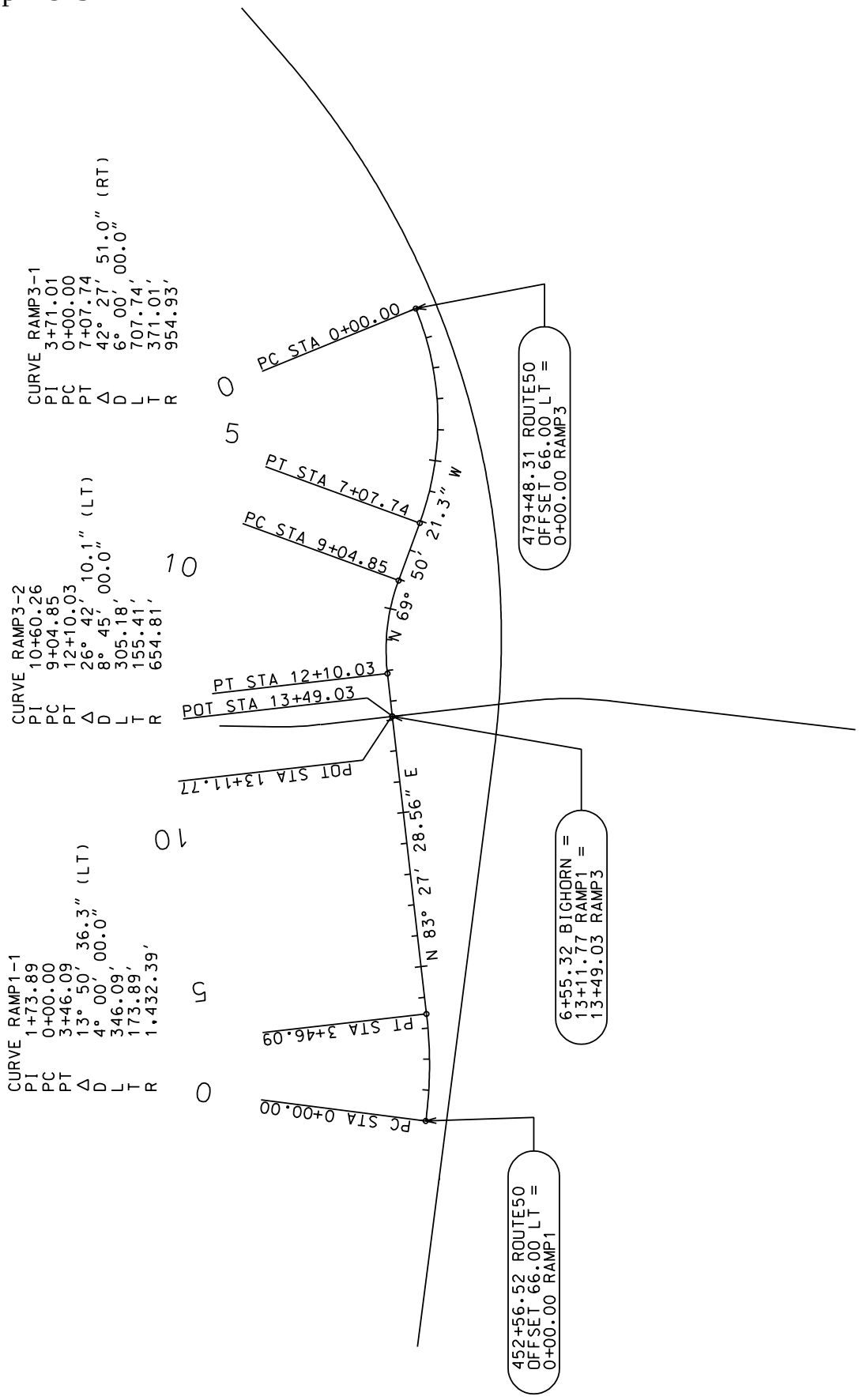
Degree of Curvature for the second curve = 8° 45’ 00”

Point Ahead of the second curve is the alignment end point

Station the alignment beginning at station 0+00

Name the alignment Ramp3

Ramp 1 & 3


CURVE RAMP3-1
PI 3+71.01
PC 0+00.00
PT 7+07.74
Δ 42° 27' 51.0" (RT)
D 6° 00' 00.0"
L 707.74'
T 371.01'
R 954.93'
CURVE RAMP3-2
PI 10+60.26
PC 9+04.85
PT 12+10.03
Δ 26° 42' 10.1" (LT)
D 8° 45' 00.0"
L 305.18'
T 155.41'
R 654.81'
CURVE RAMP1-1
PI 1+73.89
PC 0+00.00
PT 3+46.09
Δ 13° 50' 36.3" (LT)
D 4° 00' 00.0"
L 346.09'
T 173.89'
R 1,432.39'
PC STA 0+00.00
PT STA 7+07.74
PC STA 9+04.85
PT STA 12+10.03
POT STA 13+49.03
POT STA 13+11.77
PT STA 3+46.09
PC STA 0+00.00
N 69° 50' 21.3" W
N 83° 27' 28.56" E
479+48.31 ROUTE50
OFFSET 66.00 LT =
0+00.00 RAMP3
6+55.32 BIGHORN =
13+11.77 RAMP1 =
13+49.03 RAMP3
452+56.52 ROUTE50
OFFSET 66.00 LT =
0+00.00 RAMP1