WYOMING DEPARTMENT OF TRANSPORTATION
ROAD DESIGN MEMORANDUM #2
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Issued by: Project Development, WYDOT, Cheyenne

GENERAL TOPIC: PLAN SHEETS
SUBJECT: RIGHT-OF-WAY DATA

General

To arrive at greater consistency between Right-of-Way Program exhibits, plan sheet data, and CADD software coordinate staking data, implement the following procedures. These procedures are not a reflection of the level of accuracy for which practical surveying methods can locate features on the ground, and one method of computation is not more correct than another method. Do not "manually" alter or override CADD software coordinate geometry solutions displayed on the plans to arrive at identical values for the sake of consistency when the discrepancies are minute.

Coordinate Rounding

Round to the following number of decimal places for coordinate geometry calculations and for display on the plans:

Label Type	Format	
Coordinates	4 decimal	0.0000
Stationing	2 decimal	00+00.00
Distances	2 decimal	0.00
Angular	1 decimal	0° 00' 00.0"
Curve Data Distances	2 decimal	0.00

Developing the Alignment (Project Development)

Where possible, the designer should define the alignment using the coordinates with a minimum of four decimal places for the beginning POT, all intermediate PIs, and the ending POT.

Back and ahead tangent bearings are calculated from those PIs and POTs (called inversing) in the direction of ascending stations from the beginning POT and the first intermediate PI, from intermediate PI to intermediate PI, and from the last intermediate PI to the ending POT, which will then serve as the basis for generating all simple and spiral curves that make up a horizontal alignment.

Coordinate Labeling on Plan Sheets (Project Development)

Ensure all alignments, including ramps, have coordinates labeled with the following:

1. Beginning and ending POTs
2. Back and ahead equation stations
3. Angle points
4. Simple curve PIs
5. Total "main PIs" for spiral/curve/spiral combinations

The Right-of-Way Program prefers that intermediate PIs, such as spiral PIs, not be shown on the plans. One solution is to move this data to a different level and turn that level off.

Calculate derived coordinates (coordinates that are not defined by the designer) using CADD Software coordinate geometry methods and not graphical "snap to" solutions in the CAD drawings.

Plan & Profile Sheet Survey Datum Note (Project Development)

Ensure projects related to the Wyoming Coordinate System have the following statement on each plan and profile sheet:

"Coordinates are based on the Wyoming Coordinate System NAD xxxx, xxxxx Zone, and have been multiplied by a project factor of: 1.000xxxxxx. Labeled plan data (coordinates, curve data, bearings, distances, and stationing) exceed survey accuracy. Existing land lines, property lines, and easement lines not surveyed or tied to the alignment should be considered approximate."

Note: Values for the *"NAD xxxx, xxxxx Zone"* and *"1.000xxxxxx"* portions of the statement will be defined by the Photogrammetry & Surveys Section and confirmed by the Right-of-Way Program.

Projects based on Arbitrary Coordinate Systems normally have the following statement on each plan and profile sheet:

"Coordinates are based on an Arbitrary Coordinate System. Labeled plan data (coordinates, curve data, bearings, distances, and stationing) exceed survey accuracy. Existing land and property lines not surveyed or tied to the alignment should be considered approximate."

Ensure projects <u>not</u> related to the Wyoming Coordinate System have survey datum statements as defined by the Photogrammetry & Surveys Section, the Right-of-Way Program, or both.

Labeling Curve Data on the Plans (Project Development)

Label English projects with curve data with both the curve radius and the <u>degree of curvature</u> based on the 100-foot arc length definition. Ensure metric projects only show the curve radius. Label transition spiral curve data with the "main PI" stationing and coordinates. Do not show spiral PIs.

Label curve data on the plans as shown in the following examples:

<u>Simple Curve</u>
PI STA. 23+50.<u>12</u>
N = 305,456.<u>0177</u>
E = 672,898.<u>5601</u>
D = 2° 00' 00.<u>0</u>"
Δ = 10° 30' 23.<u>3</u>"
T= 263.<u>40</u>'
L = 525.<u>32</u>'
R= 2864.<u>79</u>'
e = 0.065 FT/FT
S= 300'
C= 92'
DESIGN SPEED = 70 M.P.H.

<u>Spiral Curve</u>
PI STA. 64+23.<u>07</u>
N = 350,771.<u>2200</u>
E = 682,123.<u>4555</u>
D = 3° 00' 33.<u>0</u>"
Δ = 50° 25'23.<u>8</u>"
Δs= 4° 30' 00.<u>0</u>"
Ts= 1050.<u>08</u>'
Lc= 1380.<u>78</u>'
Ls= 300.<u>00</u>'
R = 1909.<u>86</u>'
e = 0.058 FT/FT
S = 220'
C = 76'
DESIGN SPEED = 50 M.P.H.

The CADD software will not by default output all the curve data as previously shown. It will be necessary to manually label missing data (i.e. Design Speed, S, and C). Underlining shown in the previous examples is used only to emphasize the number of decimal places to use for labeling and is not needed in actual labeling.

For curves with different approach and departure spirals, provide separate spiral data for each spiral and labeled "(in)" or "(out)" as applicable:

Δs= 6° 38' 46.2" (in)
Δs= 9° 10' 02.4" (out)
Ts= 277.92' (in)
Ts= 305.07 (out)
Ls=176.78 (in)
Ls=243.84 (out)

Right-of-Way Widths & Offsets

(Right-of-Way Program) Annotate existing right-of-way with dimension lines across the total width, and label them similar to the following example: 150.00'.

(Project Development) Annotate proposed right-of-way with dimension lines as offsets from centerline, and label them similar to the following example: 100.00'.

Construction Permits (Project Development)

Ensure construction permits are dimensioned in width with respect to the existing right-of-way or proposed right-of-way, as applicable. Dimensions are generally indicated to the nearest 5 feet. Limit labeling of construction permit purposes to the following:

1. Plant Site, Pit, or Staging Area Construction Permit
2. Wetland Construction Permit
3. Top Soil Storage Construction Permit
4. Borrow Source Construction Permit (also show the estimated volume or quantity in cubic yards or cubic meters, as applicable)
5. Construction Permit (all other permit uses)

Land Ties, Land Systems & Ownership

(Right-of-Way Program and Project Development) Ensure all land ties are based on surveyed coordinate positions, with bearings and distances from a centerline station. Calculate land ties using CADD software coordinate geometry methods and not graphical "snap to" solutions using the CAD software.

Label land ties as follows:

1. Round and label stationing and distances to two decimal places (i.e. S 61° 23' 20.7" E, 1246.60' from Sta. 17+50.07 to Sec. Cor. 3-2/10-11).

2. Where practical to include in the plans, annotate the descriptions and coordinates for land tie monuments using the format similar to the following example: 1916 GLO BC, N 1534601.1584, E 488296.9271.

(Right-of-Way Program)   Annotate right-of-way section, quarter section, and quarter-quarter section (1/16) lines using established WYDOT standard line styles. Place land lines using surveyed coordinate positions, or in the absence of such, place them using the best available reference or method (i.e. survey plats, as-constructed plans, USGS maps, protraction/scaling). Annotate plans with township, range, and section designations for each section traversed by the plan coverage and within the applicable section (i.e. T45N, R102W, Section 10). Annotate quarter-quarter section designations in each applicable quarter-quarter section (i.e. SENW).

(Right-of-Way Program)   Label preliminary ownership based on the best available reference in respective areas on the plans. Right-of-Way's Engineering Section will provide a comprehensive title check on said ownership.