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# HIGHWAY BOUNDARY CONCEPTS

**Part 1**  
**Center Line Recovery**

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# Center Line Recovery

## Importance of Recovery of the Existing Right of Way Center Line

It is needed for every project

- The existing right of way is dependent on the location of the existing right of way center line.
  
- When no new right of way is needed:
  - You need to know what the limits are.
  
- When new right of way is to be acquired:
  - You want to know how much land is being acquired.

## The Primary Element of a Center Line is the Tangent

What is the purpose of a highway?

- To provide a transportation route.

What are the considerations in providing a transportation route?

- Cost - least expensive.
- Safety - least hazardous.
- Travel time - the shortest.
- Traveler comfort - the smoothest.

For each consideration, a tangent is the preferred alignment for a highway. Tangents are the primary components of an alignment, curves are subordinate. Curves are simply mathematical contraptions that define the transition between tangents.

- The most direct route between two points is a straight line (Figure 1

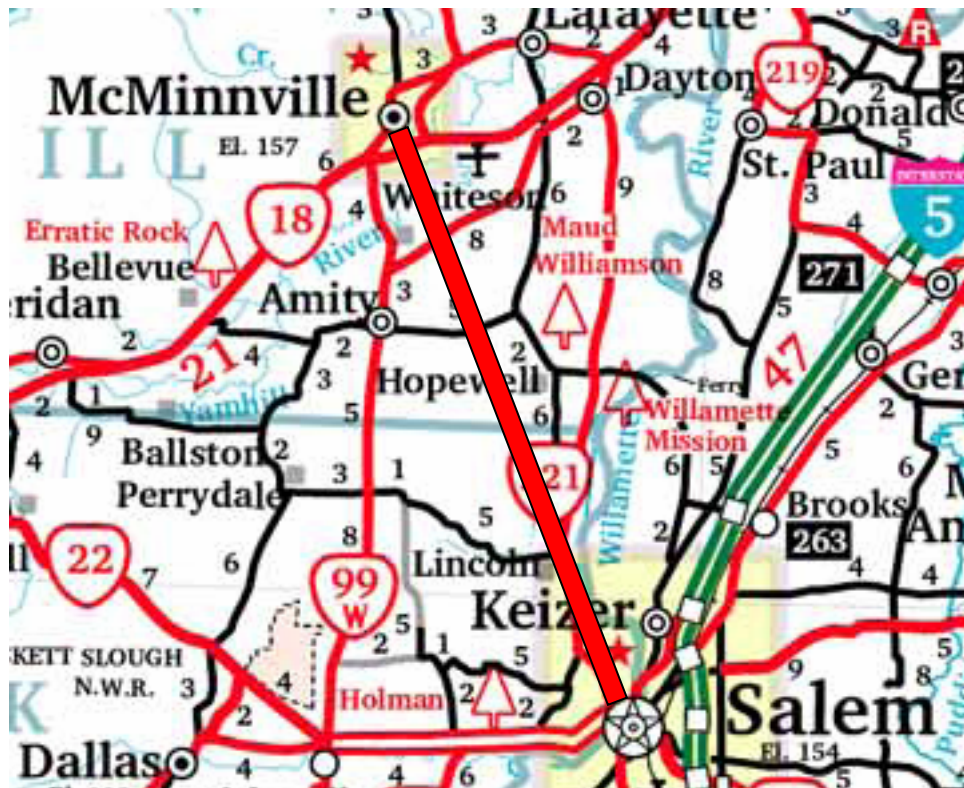


Figure 1

## Curtis M. Brown, Boundary Control and Legal Principles

## Order of importance for conflicting elements of land location

- A. Right of possession (unwritten conveyance)
  - B. Senior right (in the event of an overlap)
  - C. Written intentions of Parties
    1. Call for a survey
    2. Call for monuments
      - a. Natural
      - b. Artificial
    3. Direction and Distance
    4. Direction or Distance
    5. Area
    6. Coordinates
- In surveying, the order of importance is governed by what is most easily understood by a layperson.

That which is most obvious is of higher importance.

- Monuments over distances.
- Distances over bearings.
- Bearings over area.
  
- Since tangents are less complex than curves, tangents should have a higher importance.
- If there is a conflict between tangents and curves, the tangents should prevail.
- Curve definitions or the curve data would yield to the resolved tangents.

## Research

As with all projects, one of the first things you will want to do is research. Specifically gather all the existing documents that will affect the project at hand. Some of these documents serve better in the searching of monuments, others, in researching existing right of way widths.

## County Surveys

County surveys are an excellent source of information on property corners.

## Prior Right of Way Drawings

These drawings serve as an index to the legal documents which transferred the right of way to ODOT. If ODOT has had a project in the current project area, you will be able to track down the deeds conveying the existing widths.

## Assessor Maps

Assessor plats make excellent schematic maps for a location surveys and right of way acquisition projects. Besides being a good way to organize surveys and deeds, they serve as a good overall view of the project area.

## Vesting Deeds

Deeds are the legal instrument which transferred right of way takings to ODOT. The right of way drawing is merely an index to the deeds. The deeds themselves are the best source for the existing right of way widths.

## Court Judgments

Whenever a condemnation is settled in court, a judgment is issued. This will detail the courts findings and the pertinent descriptions will be contained within.

## Field Notes

The field notes should have a full and detailed description of all monuments.

- Is the point a rod, pipe, brass cap, stone, etc.?
- Is it bent, buried, disturbed, etc.?
- Is it an unrecorded monument?
- Is it a PI, PC, PT, etc.?
- Does the cap have any markings or lettering?

When monuments are searched for they should not be limited to ones shown on recorded surveys or right of way drawings.

- Work from the presumption that the existing right of way is fully monumented.
- A thorough search should have been made at every PC, PS, PSC, PCS, and PT.
- Another common place for highway monuments is at even 500-foot or 1000-foot stations.
- Also check for a monument at any PI that falls within the right of way.

The location of the existing right of way is resolved by reconstructing the old centerline. Establishing the old centerline is primarily dependent upon the recovery of highway monuments.

**County Resolutions**

Many state highways began as county roads. When a particular road was transferred to the state, ODOT received whatever the width of the county road was at the time of the transfer. The counties maintain the original acquiring documents often called "The Road Viewers Report".

**Government Land Office (GLO) Maps / Donation Land Claim (DLC) Plats**

Original government surveys showing sections and Donation Land Claims.

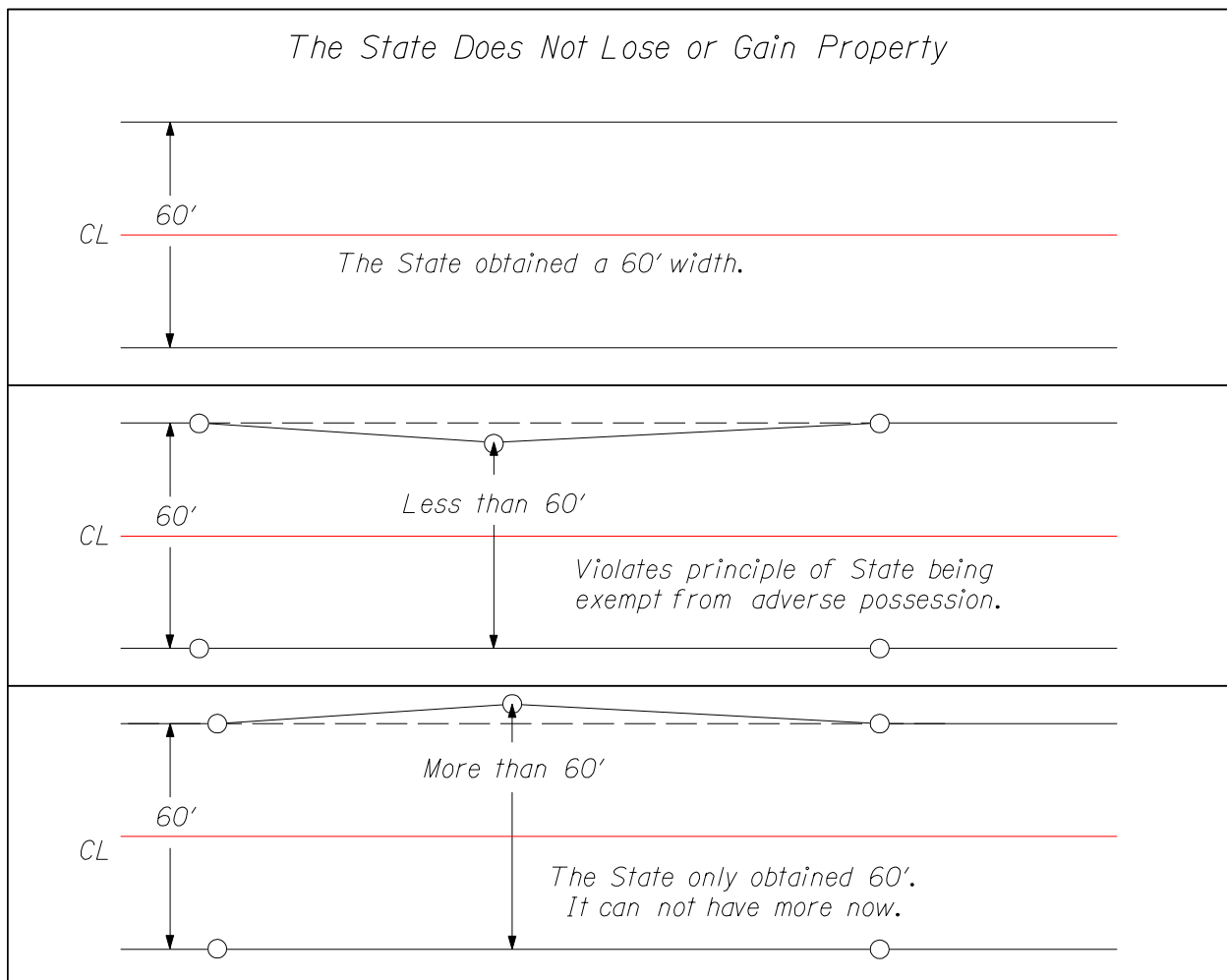
## Public Agencies are Exempt from Adverse Possession

All public agencies are exempt from losing title to property by adverse possession, acquiescence, or any other form of unwritten conveyance.

The Statue of limitations for adverse possession does not operate against the United States; and, unless there is a state statue to the contrary, the same is true for the states.

- Evidence and Procedures for Boundary Location 2<sup>nd</sup> Ed., Brown, Robillard and Wilson pg. 101  
- Public Law 92-562

- Preserving the original width is of the utmost importance.
- The state does not lose right of way width.
- The state does not gain right of way width.



**Figure 2**

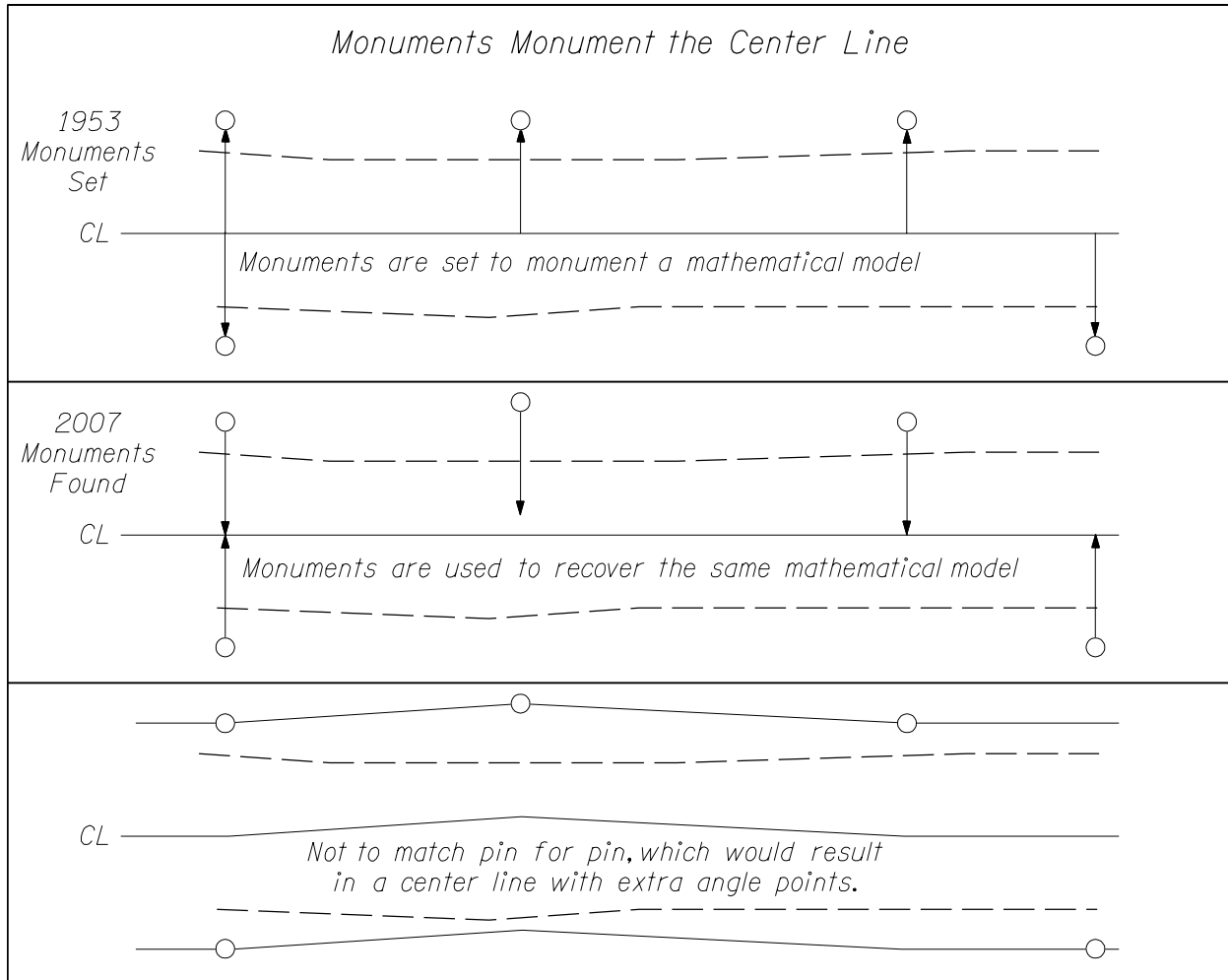
### ODOT Monuments Are a Reference to the Center Line

The monuments are set to monument a new center line (1953 below).

- The center line is developed first.
- The property is purchased.
- Monuments are then set at a certain distance along it and a certain distance offset from it.

The monuments are an aid to later relocate the center line (2007 below).

- We measure from each monument back toward the center line to recover it.



**Figure 3**

The center line is a mathematical model.

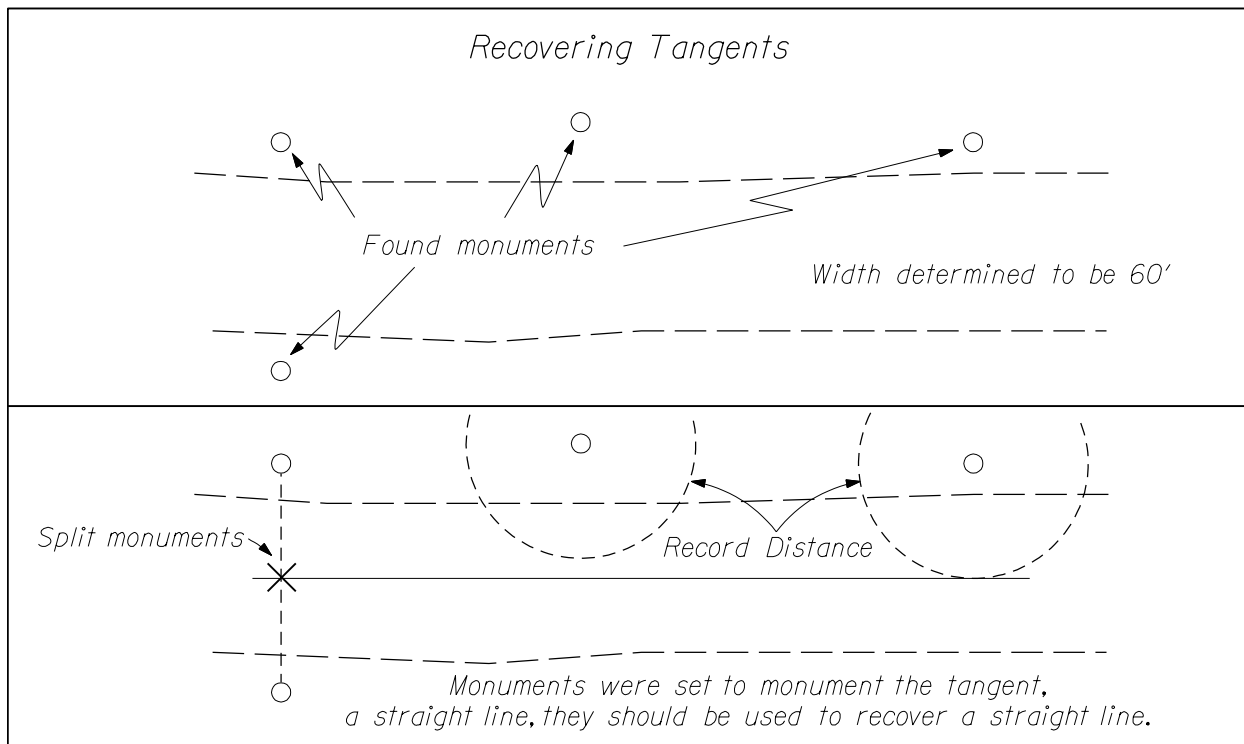
- Not an exact match.
- Where we had a single tangent, we should recover a single tangent.
- Curves should be tangent to the tangents.
- If a curve had spirals, the recovered curve will have spirals.
- Station equations should be perpetuated.

## Monuments Control the Tangents

Highway monuments were set for the purpose of locating the highway. So it is logical that they would be used to relocated said highway.

- Decide which monuments to use. ODOT monuments of higher importance than others.
- If few highway monuments were found then you may also want to accept local property corners as monuments of the right of way.
- Whatever monuments you decide to use, each one must have merit.
- Use the record position of each highway monument relative to the centerline.
- Split opposite monuments.

Figure 4 represents a one tangent project. If all the monuments are found to be in good condition, then you would first want to look at getting lines that come the closest to all, while maintaining the straight lines and the width we have already determined.



**Figure 4**

### The Highway itself or Other Features are Monuments

If no survey monuments were found, then the existing roadway itself is regarded as a monument of the right of way. It is physical evidence of ODOT's past intentions and actions. Splitting the pavement, bridge decks, and/or fences is legitimate in the absence of survey monuments.

- Bridges are monuments.
- The pavement is a monument.
- The fence is a monument.

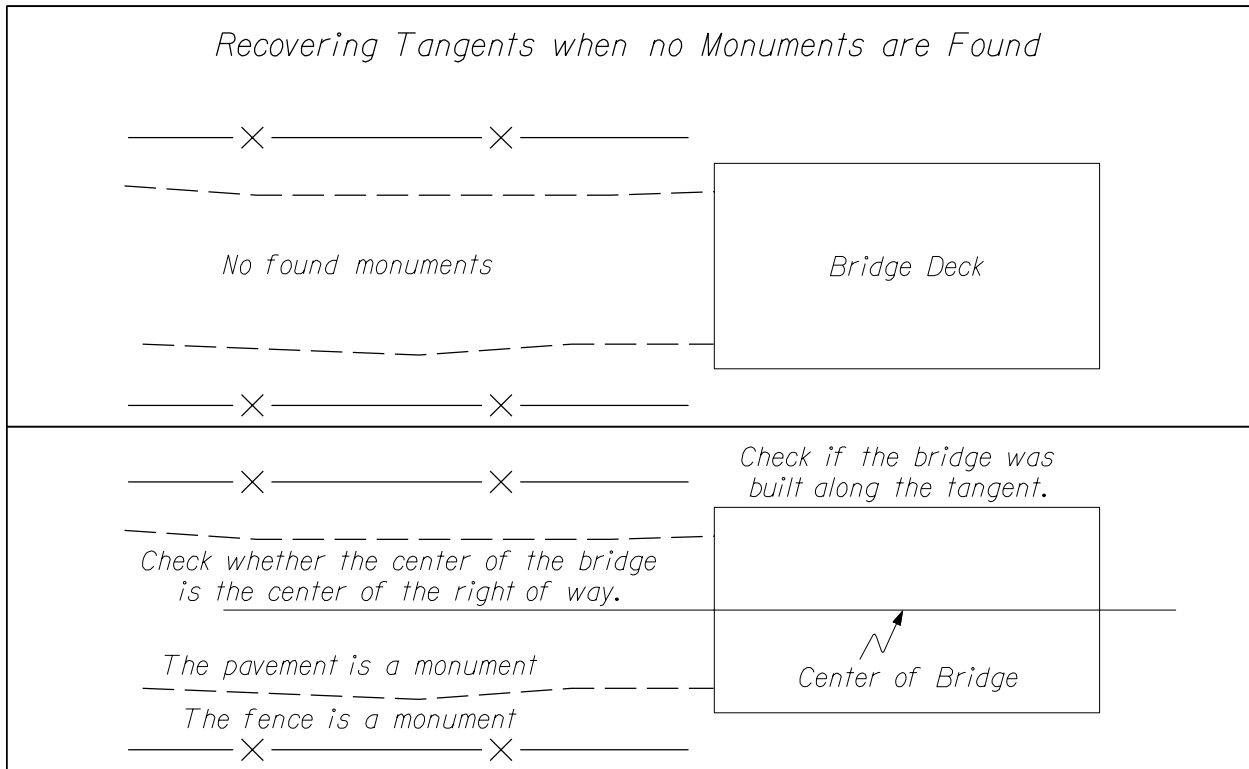


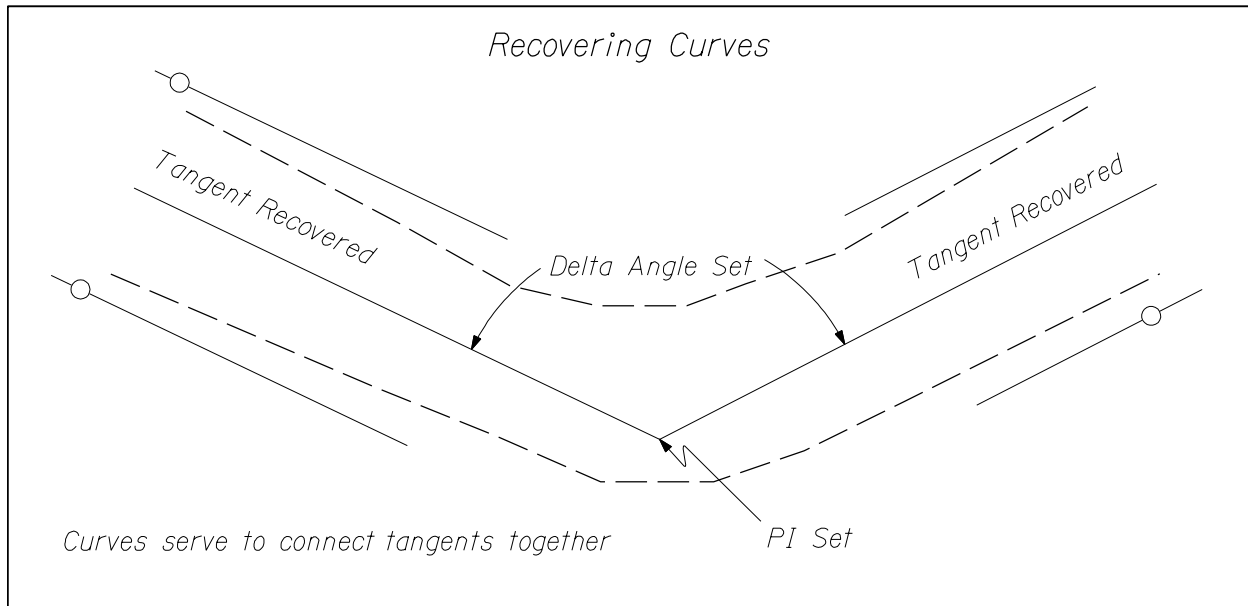
Figure 5

## Tangents Control the Curves - Curves Connect the Tangents Together

- The tangent is the primary element of the highway.

Connecting the tangents together:

- Slight change of delta angle - you may see angle points
- More often simple curves or curves and spiral sets connect the tangents together.



**Figure 6**

- Establishing the tangents, forces the definition for two key elements of any curve: the location of the PI and the delta.
- This leaves you with a choice to complete the curve definition; you can either use the record degree of curve with a different semi-tangent distance or use the record semi-tangent distance with a different degree of curve.
- If the curve contains spirals, there is no need to prorate the curve and the spirals. Maintain the record length of the spiral. All the error of the curve set may go into the curve itself.

### Use of InRoads to Place Curves

Shown in Figure 7 is the Dialog box from InRoads to define a horizontal curve set. The three entries to define are the spiral lengths and the curve radius. If you enter the record spiral lengths, you only need to worry about the radius. If you use this method, the semi tangent lengths are defined by the curve radius used.

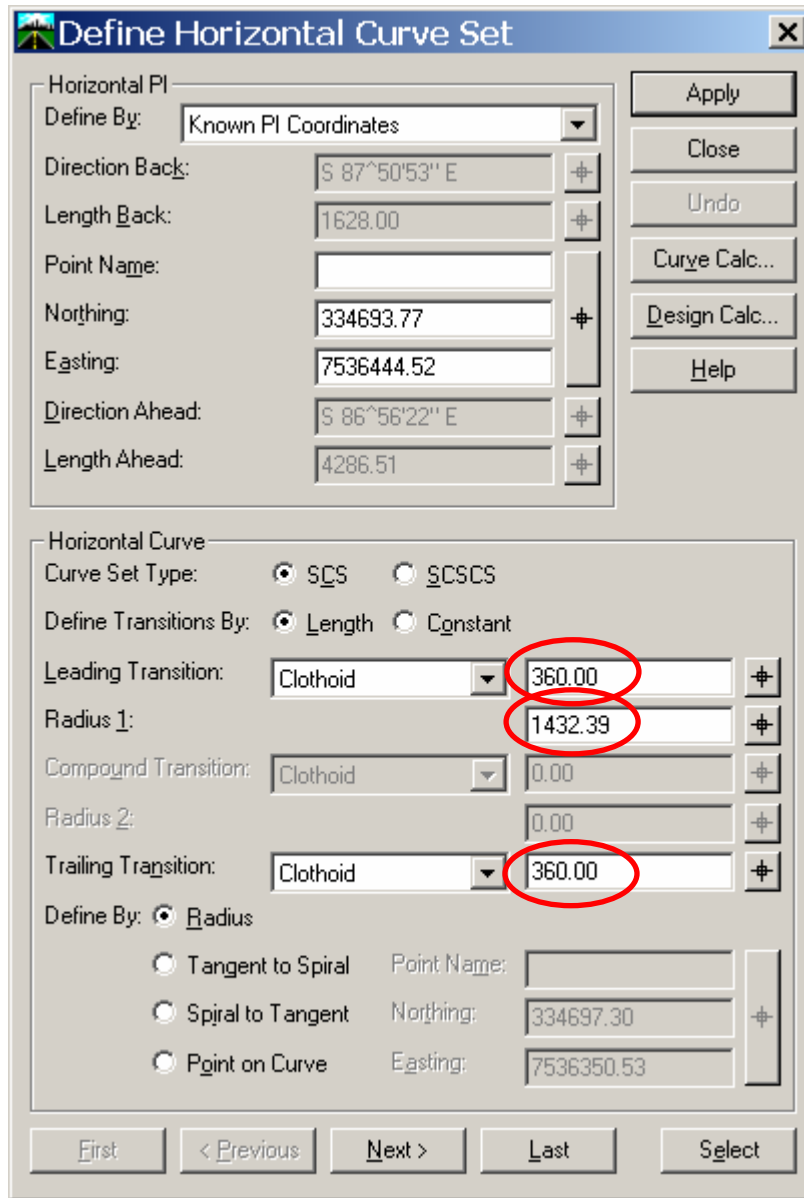
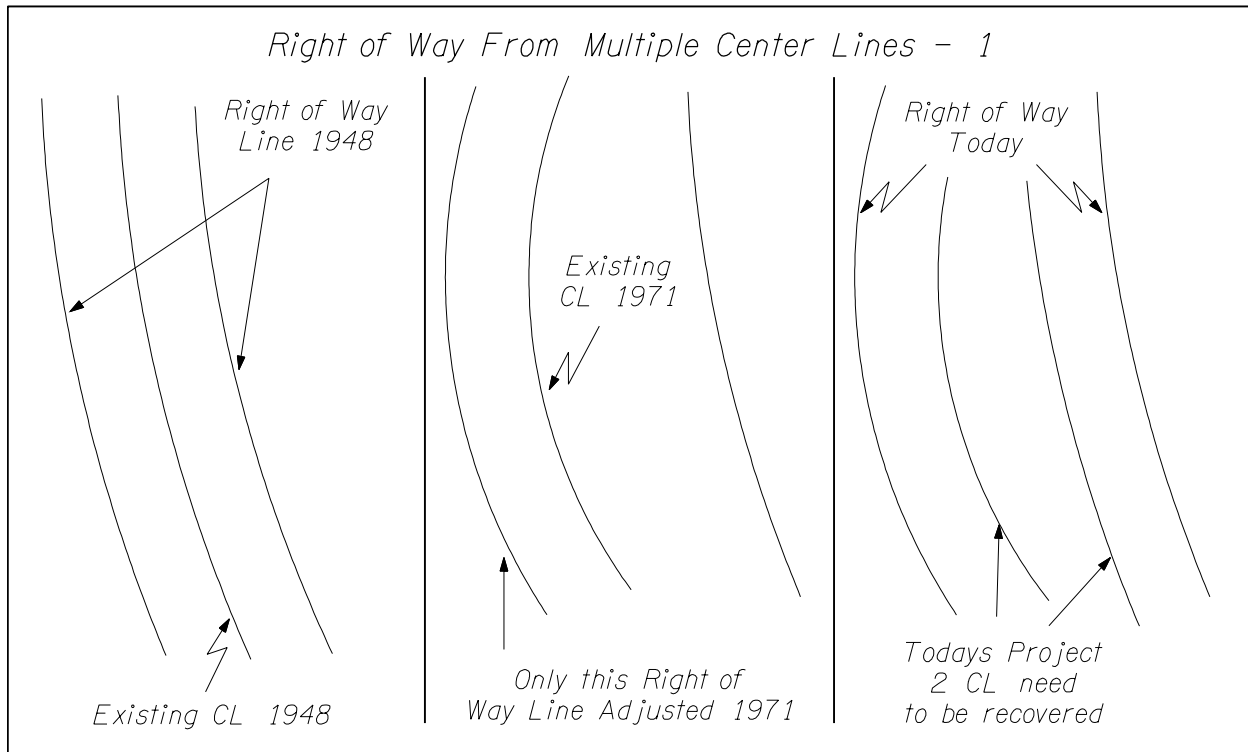


Figure 7

## More Than One Center Line May be Needed to Recover the Right of Way

You will come across projects that require recovering multiply centerlines in order to recover the existing right of way. In the example shown below in Figure 8, there are two center lines.

- Only the right of way on one side of the highway may be affected for a given project.
- More than one center line may need to be recovered.
- Their relationship to each other will need to be determined.



**Figure 8**

And a real world example, in Figure 9 below.

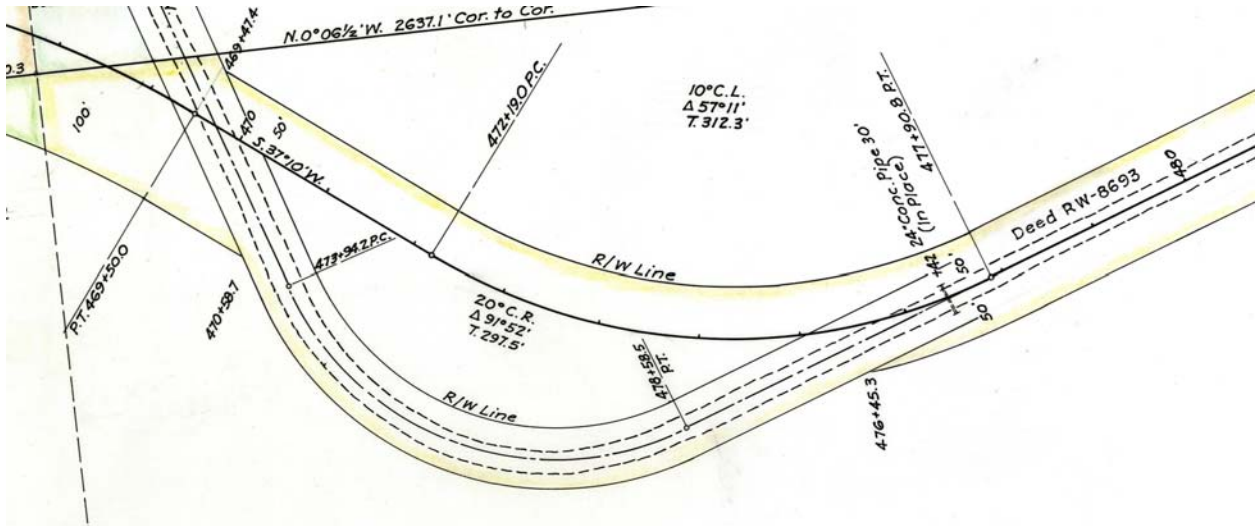


Figure 9

**Two Center Lines May Affect Different Areas of a Project**

- Center lines may be side by side (see above).
- Center lines may be end to end (see below).
- In either case, they need to be tied to each other.

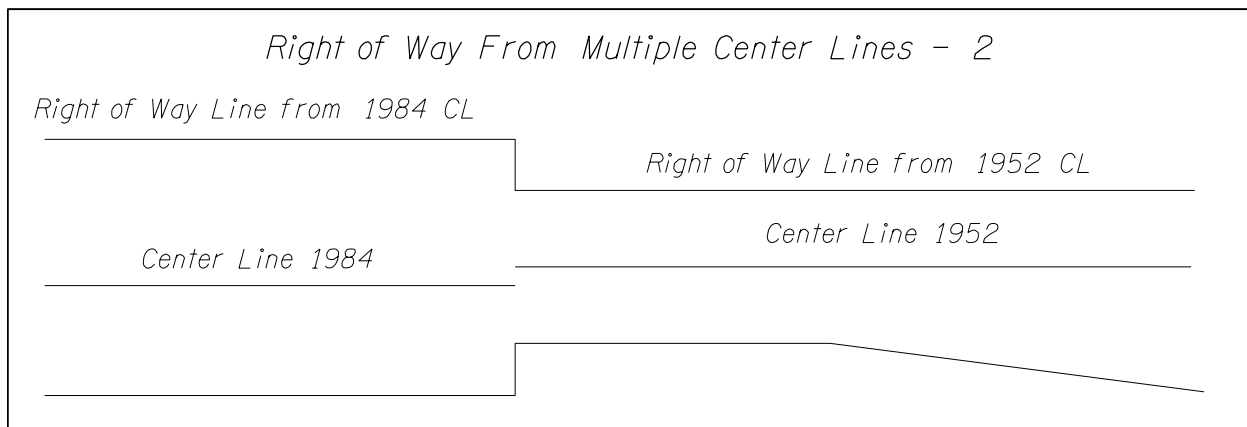
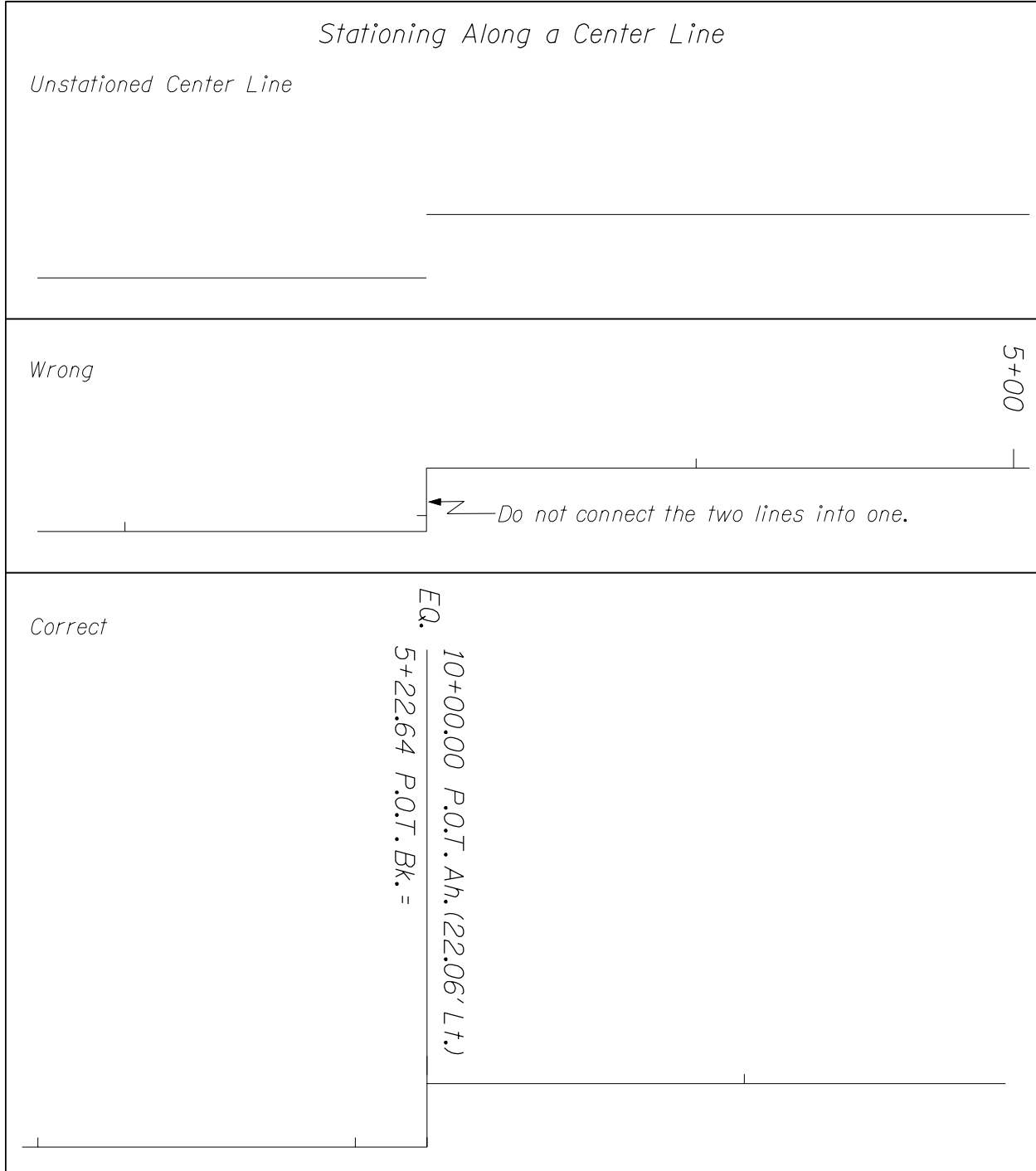


Figure 10

### Stationing Concepts

- Center lines from different projects are independent of each other.
- Stationed as created - tied together with offsets.
- Equations brought forward



**Figure 11**