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Research Report
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EXPANSION OF THE ROADWAY REFERENCE LOG
(KYSPR-99-201)

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EXECUTIVE SUMMARY

There has been a need to expand the route log in order to have a more comprehensive and up-to-date log to accurately locate information on the highway system. The objectives of this study were to: 1) expand the current route log resulting in a more comprehensive route log file containing milepoints for all intersections on state maintained roads and any other needed reference points and 2) recommend a procedure for establishing milepoints and maintaining the file with up-to-date information.

Two types of output resulted from the study. One was an expanded route log computer file. The added milepoints were additional intersections between a state maintained and other public roads. While all intersections could not be included because of such problems as not having a name to assign to the intersecting public road, the number of intersections was increased dramatically. The second output was a detailed procedure describing the method used to assign milepoints and a recommended procedure to maintain the file. The use of these guidelines will enable the use of consistent procedures across the state.

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1.0 INTRODUCTION

The accuracy of the location of traffic crashes depends on the existence of a comprehensive and up-to-date roadway reference log. In this past, crash data has been of limited benefit at some locations, especially in urban areas, because of the lack of good milepost index information. The existing milepost log maintained by the Division of Operations does not list every intersection, and this affects the ability to identify locations with a high number of crashes.

The identification of a specific location of an event, such as a traffic collision, or a landmark, such as a bridge, is essential for many activities of the Transportation Cabinet. An example is the identification of high crash locations. The location of the crash must be accurately documented to allow for the buildup of crashes on a section of road to be correctly identified. Numerous other activities associated with areas such as planning, design, construction, and maintenance also rely on specific and accurate location information.

A route log has been used in the past to identify locations on the highway system. However, this log does not contain sufficient detail to allow accurate identification of all events and roadway features. Another source of route identification is contained in the Highway Information System (HIS) file but this file also does not contain the necessary detail.

Another problem is the updating of the existing route log to maintain current information. A standard method has not been developed and consistently used to update the current route log. The procedures currently used vary by highway district which results in different levels of accuracy or up-to-date information in the file.

There is a need to expand the current route log in order to have a comprehensive and up-to-date route log which can be used to accurately locate information on the highway system. A method of maintaining this file must also be established with responsibilities assigned.

The objectives of this study were to: 1) expand the current route log resulting in a comprehensive route log file containing milepoints for all intersections on state maintained roads and any other needed reference points and 2) recommend a procedure for establishing milepoints and maintaining the file with up-to-date information.

2.0 PROCEDURE

The first output of the study was an updated procedure for establishing milepoints. The existing mile posting procedures, as given in the Traffic Guidance Manual, has been under review within the Kentucky Transportation Cabinet. As part of this study a revised procedure was developed through a cooperative effort with personnel from the Transportation Cabinet.

The major effort in the study was identifying milepoints to be added to the current Milepoint Reference Log. The existing log included all intersections of two state maintained roadways. Some intersections between state and county roads or city streets were also included. Other milepoints, such as bridge or culverts, were also part of the existing log. The desire was to greatly expand the number of intersections between state routes and both county and city roads. This would allow a more accurate location of any incident occurring on a state route.

The procedure involved the utilization of two existing GIS coverages (the state road coverage and the local road coverage) for each county to establish additional milepoints. The local roads GIS coverage was used to create intersections, or nodes, where it crossed the state roads coverage. This was accomplished through the use of an ArcMacro Language script, or AML, which was run from within ArcInfo. The output of the AML was an INFO table that contained the milepoint and name information for the intersections of state and local roads. This table was then brought up for viewing in ArcView, through the use of dynamic segmentation, on the state road coverage. The nodes, representing intersections between the two road coverages, yielded a milepoint value on the state road. These nodes were then compared with the existing route log to establish which points were new and which ones had already been identified.

Milepoints for the new intersections were assigned by county and route and then reviewed by the appropriate highway district. The file was merged with the existing milepost log with a new file created containing the added intersections. These new intersections were flagged such that either the old or new milepost log could be viewed or printed.

3.0 RESULTS

Two types of output resulted from the study. One output was an expanded route log computer file. The objective was to expand the current route log to include all intersections between a state maintained and other public road. While all intersections could not be included because of such problems as not having a name to assign to the intersecting public road, the number of intersections in the file was increased dramatically.

The second output was a detailed procedure describing the method to be used to assign milepoints and a recommended procedure to maintain the file. The recommended procedure for establishing milepoints is given in the Appendix. The use of these guidelines will enable the use of consistent procedures across the state. Exhibits are included to describe the method to use for such areas as concurrent routes, one-way streets, and interchanges.

4.0 APPENDIX. PROCEDURES FOR ESTABLISHING MILEPOINTS

PROCEDURES FOR ESTABLISHING MILEPOINTS

Each District Engineer will designate someone in their District to be responsible for maintaining and updating the Milepoint Reference Log. The Operations Management Branch, Division of Operations should be given a list of the individuals who will have this responsibility. Each District should establish a test section (at least one mile long) accurately measured on the roadway. This test section will be used to calibrate the Distance Measuring Instrument (DMI) before updating the Milepoint Reference Log. It is also important that everyone involved in updating the Milepoint Reference Log use the same method of determining the start and stop terminals. The following guidelines will enable the use of consistent procedures.

I. BASIC CRITERIA FOR ESTABLISHING A POINT

Three basic criteria will be used in order to define a specific point on a roadway:

(1) County
(2) Route
(3) Milepoint

II. DETERMINING ZERO REFERENCE POINT

A. Interstates and Parkways

The zero terminal for an Interstate or Parkway route will begin at either the western or southern most state boundary or the terminal of the Interstate or Parkway. The milepoints will increase on the route in an easterly or northerly direction through the state to either its terminal or state boundary. The milepoints will continue across county lines.

Exceptions to this rule include the Pennyrile Parkway in Christian County (it begins at milepoint 7.0 because of plans to extend the parkway), I-275 in Kenton County (the zero milepoint is at I-75 rather than the state line) and I-265 in Jefferson County (the milepoints between I-65 and I-71 are continued from KY 841 rather than starting at zero).

B. All Other State-Maintained Routes

Referencing of state-maintained routes (except Interstates and Parkways) will begin on each roadway within each county at either the southern or western most county or state line, terminal of the route, or limit of state maintenance of the route within a county. Milepoints will then increase in an easterly or northerly direction through the county to either the adjoining county or state line, terminal of the route, or end of state maintenance.

USGS maps are to be used for locating the county line in the absence of county line markers. Where a county line runs down the centerline of a road, the road shall be referenced as being in the county which has the maintenance control number for that route.

The following rule should be used to determine the cardinal direction of a route. Use the two endpoints of the road at the state borders, or within the state if the roadway does not cross a state line, and measure the bearing angle. If the bearing angle exceeds north 45 degrees west or north 45 degrees east, the route is assumed to be a west to east roadway. If the bearing does not exceed these limits, it is assumed that the route is a south to north roadway. IN GENERAL, EVEN NUMBERED ROUTES RUN WEST TO EAST AND ODD NUMBERED ROUTES RUN SOUTH TO NORTH. In the case of circle routes, the milepoints will increase in the clockwise direction from an established zero terminal of the route.

III. LOCATION OF MILEPOSTS

Mileposts will be used as the method to identify milepoints along the roadway. The zero milepoint will be established, and mileposts will be installed at every milepoint across the state (on Interstates and Parkways) or county (on all other state-maintained routes). Markers are installed at less than one-mile intervals on some urban interstates. Where two or more routes run concurrently, mileposts will be placed for the priority route only. If a milepoint cannot be posted at the measured point, it may be moved a maximum of 50 feet. This could occur if a milepoint falls within an intersection. If this location is not feasible, the milepost will be omitted.

IV. FIELD REFERENCING

A. Priority Establishment of Concurrent Routes

Where routes are concurrent, the following rule will be followed to determine route continuity (the route for which the milepoints will continue).

1. Priority order of route number system:
   a. Interstate Routes
   b. Parkway Routes
   c. US Numbered Routes
   d. State Numbered Routes

Within a route system, priority is determined by the Official Orders, with the lowest numbered route generally having priority. Exceptions to this generalization include I-75 having priority over I-64 in Fayette County, I-75 having priority over I-71 in northern Kentucky and KY 3431 having priority over KY 1223 in Laurel County.

EXAMPLES:

1. Interstate vs US Route or KY Route

   I-75 and US 42 run concurrently. I-75 shall be marked as the continuous route.

2. Parkways vs US Route or KY Route

   Pennyrile Parkway and US 41 run concurrently. Pennyrile Parkway shall be marked as the continuous route.

3. US Route vs US Route

   US 60 and US 62 run concurrently. US 60 shall be marked as the continuous route.

4. US Route vs KY Route

   US 68 and KY 52 run concurrently. US 68 shall be marked as the continuous route.

5. KY Route vs KY Route

   KY 11 and KY 15 run concurrently. KY 11 shall be marked as the continuous route.

B. Entering and Departing Routes

The following system for establishing milepoints for low priority routes of concurrent routes will be used. There will not be continuity of milepoints for the lower priority route(s) of concurrent routes (milepoints of lower priority routes will not increase). The letter "J" will be added in the Milepoint Reference Log to the milepoint number of the lesser priority route at its point of junction with the continuous route. The letter "D" (indicating the departing point) will be added to the departing milepoint number of the lesser priority route in the Milepoint Reference Log where the routes separate. Both the joining and departing milepoints will be the same for the lesser priority route (except the addition of the letters "J" and "D") because the mileage between these two points will be considered zero (Exhibit 1). A description will be included in the Milepoint Reference Log to distinguish the "J" and "D" milepoints. Exceptions to this rule include I-64 (where combined with I-75 in Fayette County) and KY 841 (where combined with I-265 in Jefferson County). In these exceptions, milepoints continue to increase for both routes but are posted for only the priority route (I-75 or I-265).

If a route leaves a county being logged, goes through another county or counties, and re-enters the original county, it will be handled the same as a non-continuous route overlap, except that the letter "E" will be added to the milepoint number in the Milepoint Reference Log where the route exits. The re-entry point will be indicated by the letter "K" (Exhibit 2).

C. One-Way Street Systems

One-way street systems (one-way couplets and parallel streets) with the same route number shall be marked with the eastbound and northbound direction continuous. The westernmost or southernmost connecting point shall have the same milepoint number and the westbound or southbound directions shall be backed-in with an equation on the eastern or northern connection (Exhibit 3). The milepoints in the non-cardinal direction will be listed separately.

D. Divided Highways

The milepoints for divided highways will be determined in the cardinal direction with mileposts along the non-cardinal direction placed directly across the highway. If roadway geometrics result in different lengths in the cardinal and non-cardinal directions, the mileposts in the non-cardinal direction will be adjusted so that they remain directly across the roadway from the cardinal direction. If an intersecting route or other feature crosses the roadway near a marked milepoint at an angle such that the feature is on opposite sides of the posted milepost, the milepoint for the cardinal direction will be listed with the milepoint for the non-cardinal direction included in parentheses.

E. Zero Terminal for Intersecting Routes

For a route that begins or ends at an intersection, all mileage from or to the intersection will be measured from or to the near edge of the pavement of the route being intersected (Exhibit 4).

F. Location of Intersecting Routes

The mile point of the near edge of pavement of the route being intersected will be the location of the intersecting route (Exhibit 4).

G. Location of Bridges

The location of a bridge on a roadway will be the milepoint of the near edge of the bridge at the edge of the travel lanes (Exhibit 5). Major culverts which have bridge numbers will be included.

H. Location of Overpasses

The location on a road of the overpass of another road will be the milepoint of the middle of the overpass or overpasses (Exhibit 6).

I. Location of Interchanges and Ramps

When the route crosses over the intersecting roadway, the milepoint of the bridge will be used to locate the interchange (see section G). Where the route passes under the intersecting roadway, the milepoint of the overpass will be used (see section H). The tip of the gore area will be used to assign a milepoint to interchange ramps (Exhibits 7a and 7b).

J. Location of Railroad Crossings

The location of railroad crossings will be the milepoint of the near rail of the crossing (Exhibit 8). If more than one track shares the same crossing number, only one railroad crossing will be identified. If railroad crossings have different crossing numbers, each crossing will be identified separately.

V. DESCRIPTION OF POINT

The following guidelines will be used to describe the route in the Milepoint Reference Log.

A. Intersection

The route number of the intersecting road will be listed first for state roads. If applicable, the name of the intersecting road or street will then be listed in parentheses. For non-state maintained roads, the intersecting road or street name will be given.

B. Bridge

The road, river, railroad, etc. being crossed will be identified along with the bridge number. The point will be identified as either a bridge or culvert.

C. Overpass

The road, railroad, etc. crossing the route will be identified as an overpass.

D. Interchange

The major roadway with which the route is intersecting will be identified. For ramps, list the intersecting route with its direction of travel. The direction of travel is not needed where the driver can travel either direction at the end of the ramp. Ramps should also be identified as either to or from the intersecting route.

E. Railroad Crossing

The railroad company maintaining the crossing will be identified along with the crossing number.

Exhibit 1: Mileposting of Concurrent Routes

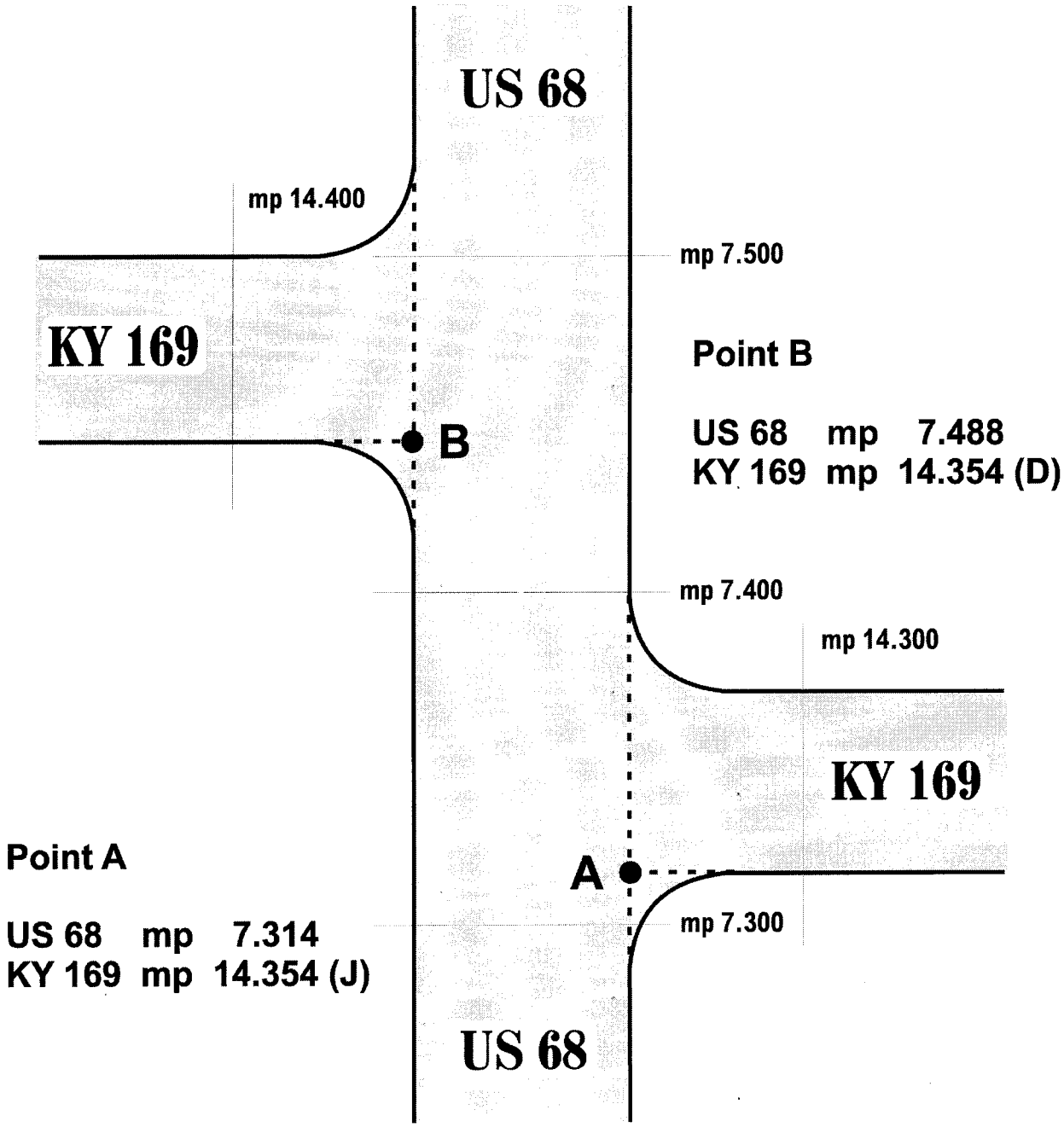

Exhibit 2: Mileposting of Routes Re-Entering a County

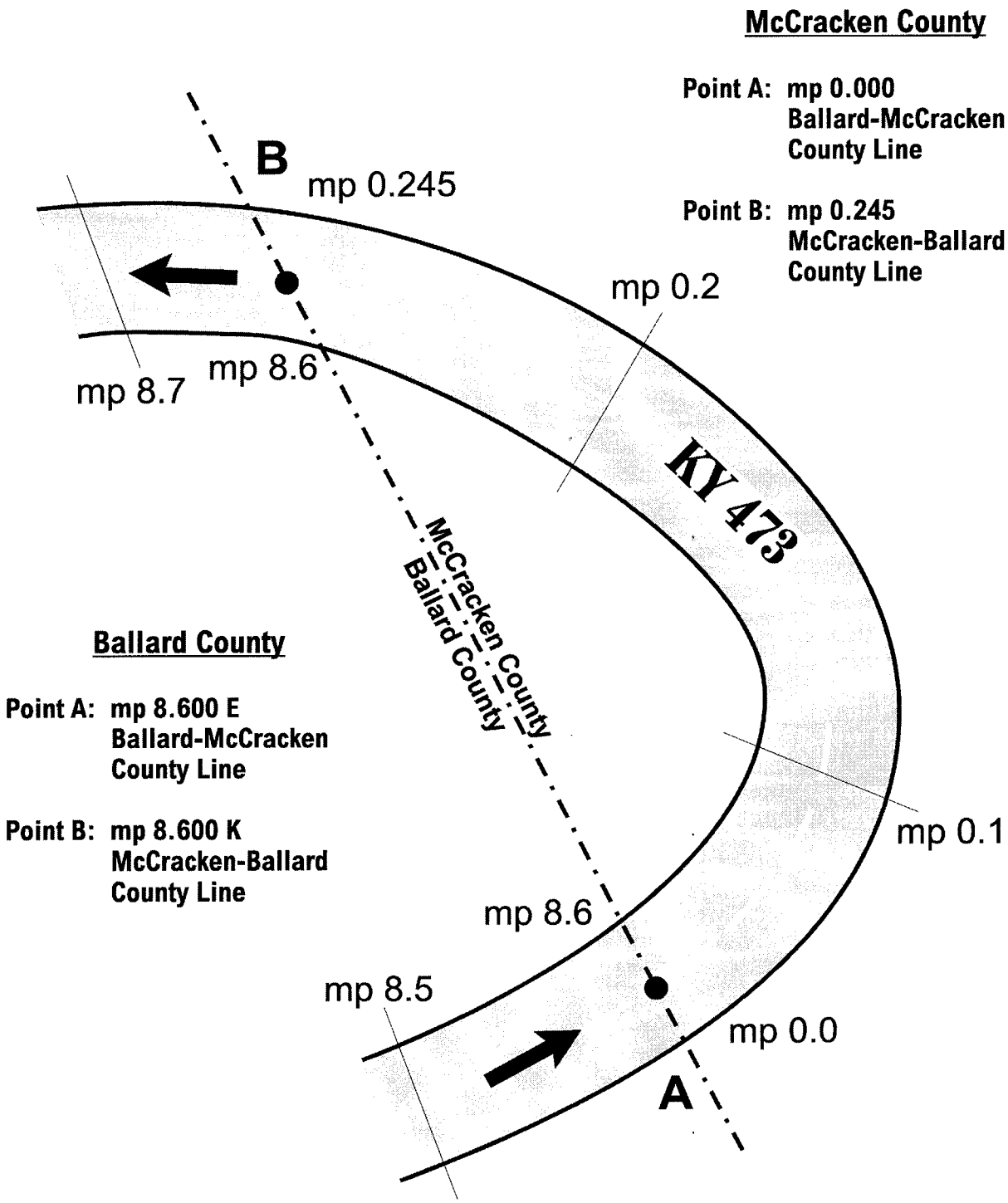

Exhibit 3: Mileposting of One-Way Streets

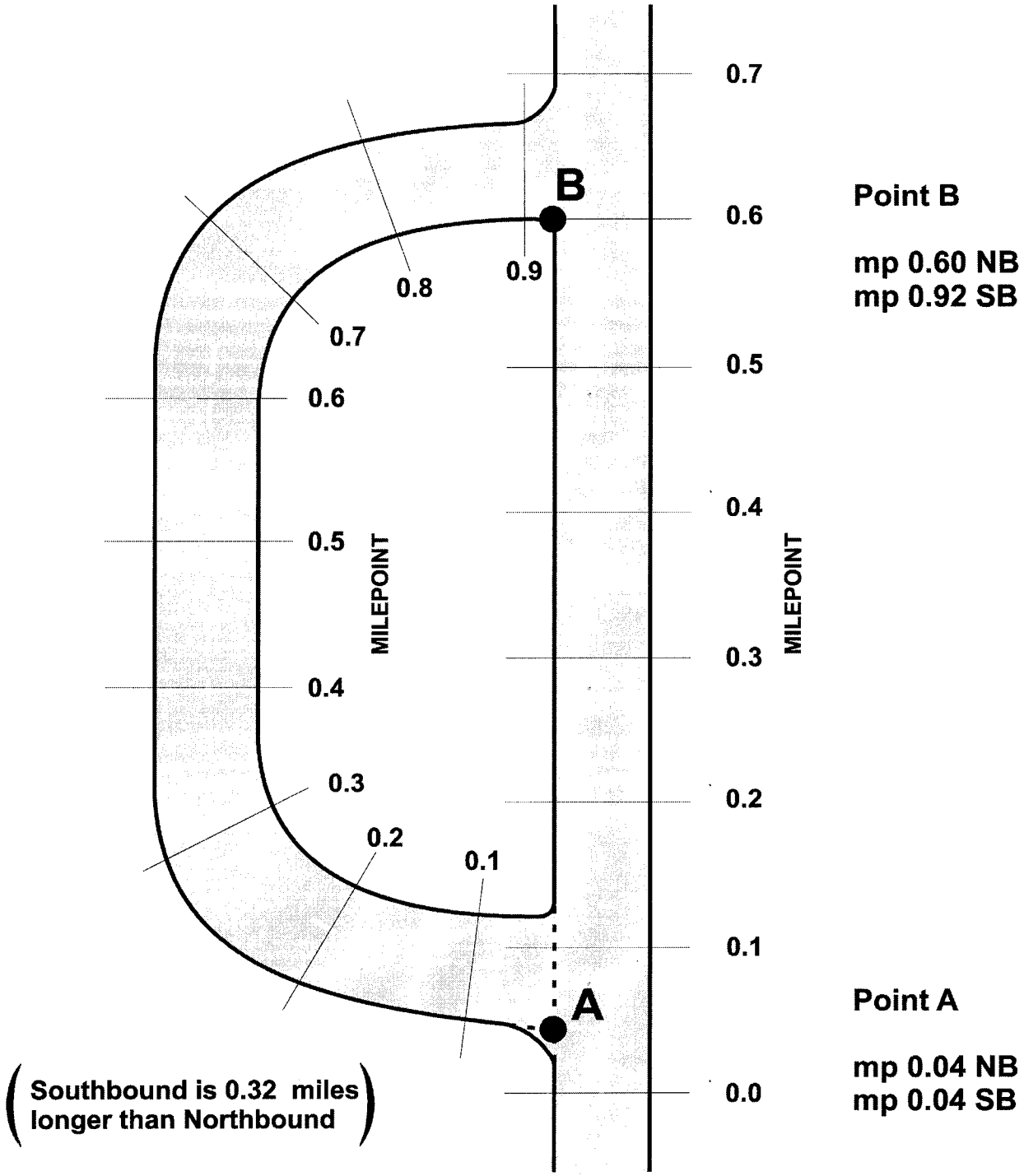

Exhibit 4: Mileposting of Intersecting Routes.

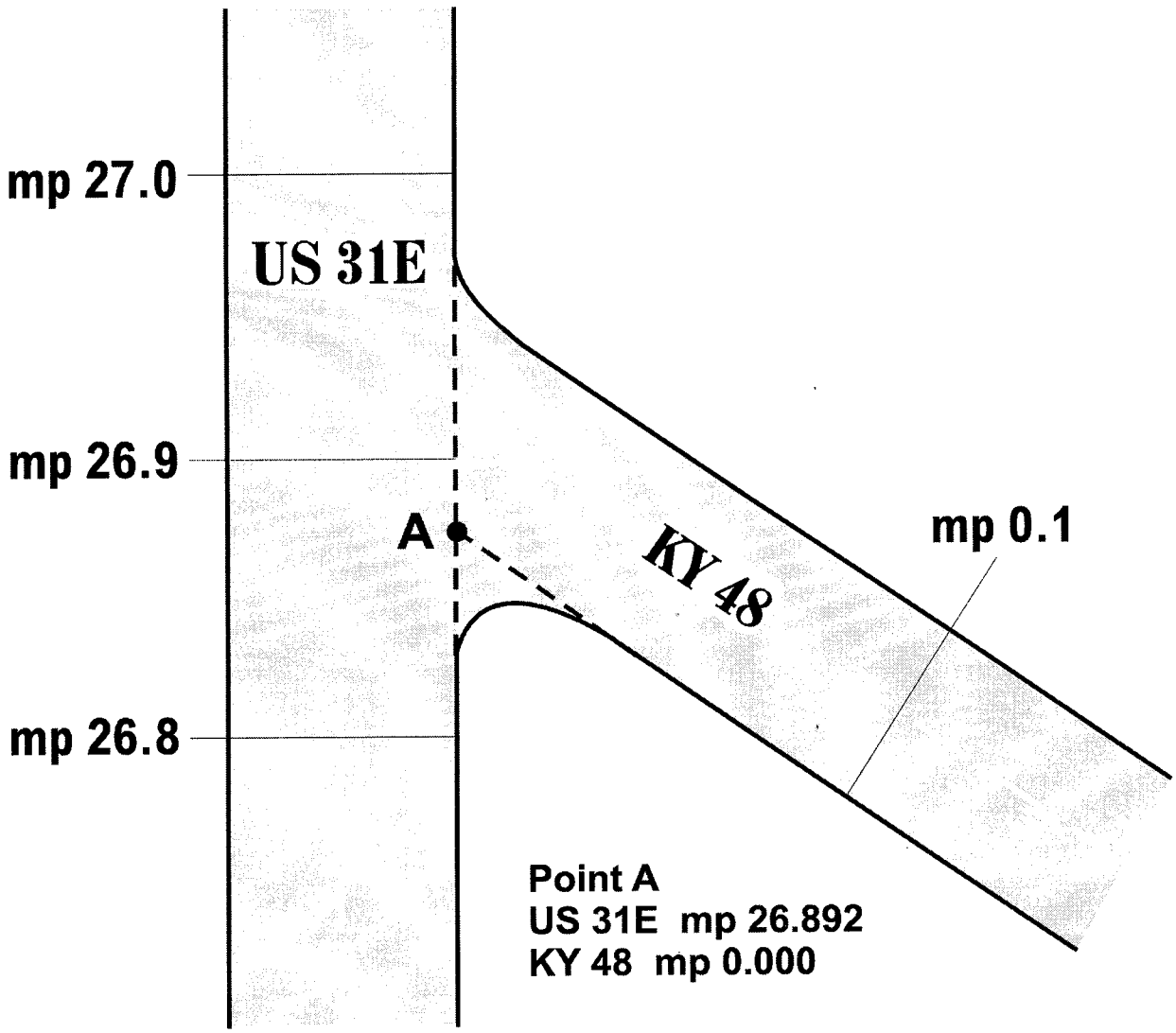

Exhibit 5: Mileposting of Bridges

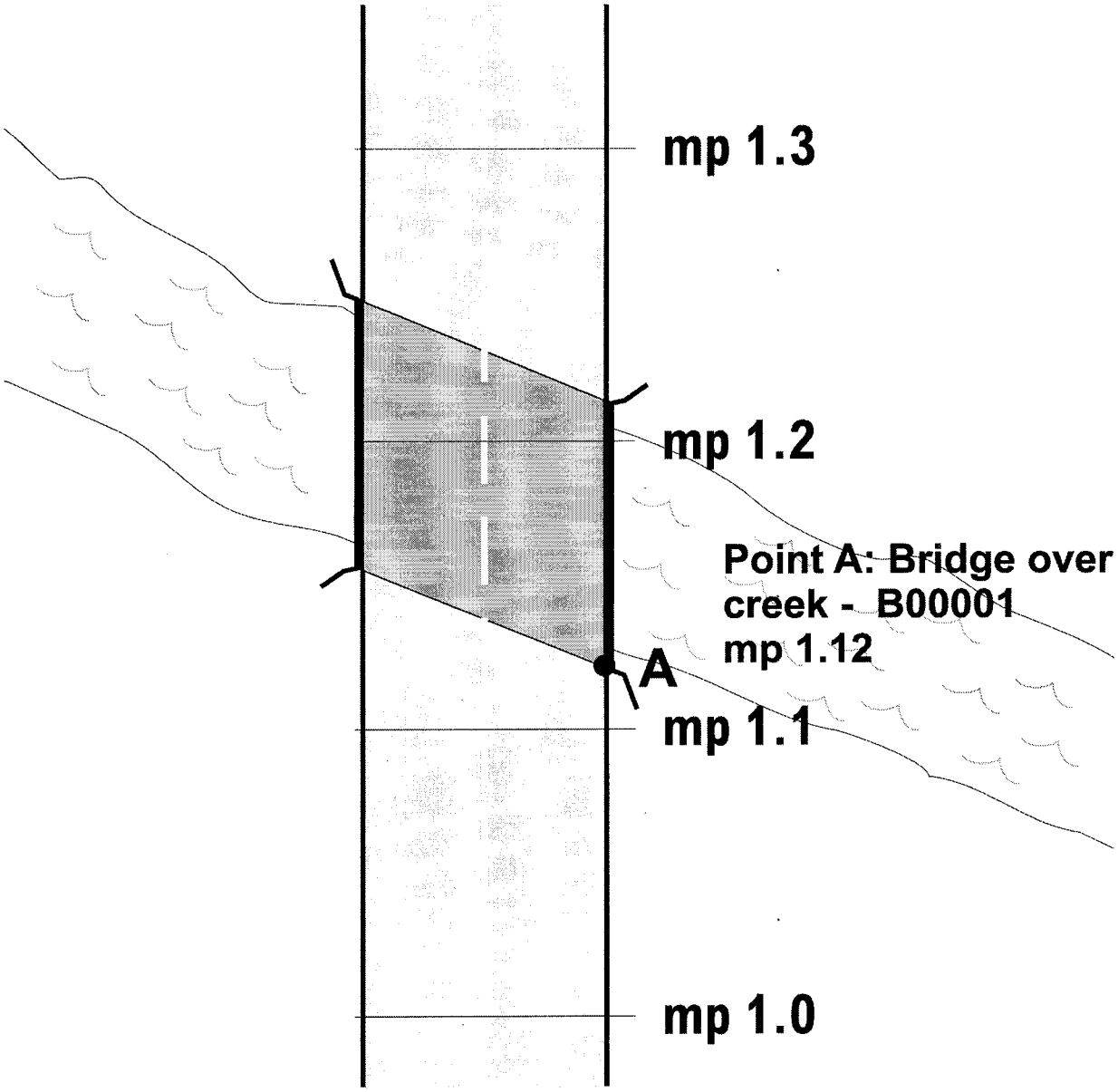

Exhibit 6: Mileposting of Overpass

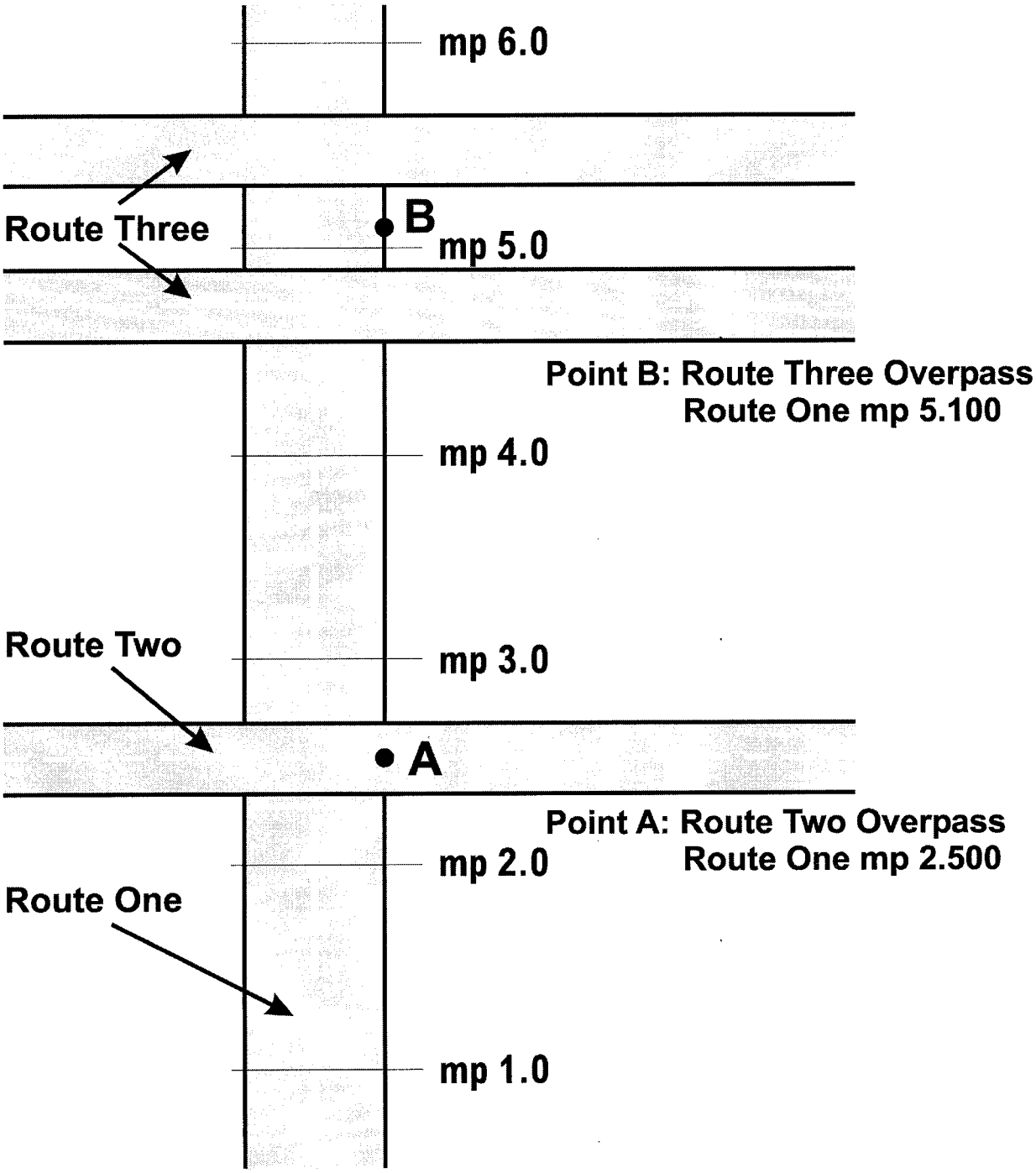

Exhibit 7a: Mileposting of Diamond Interchanges

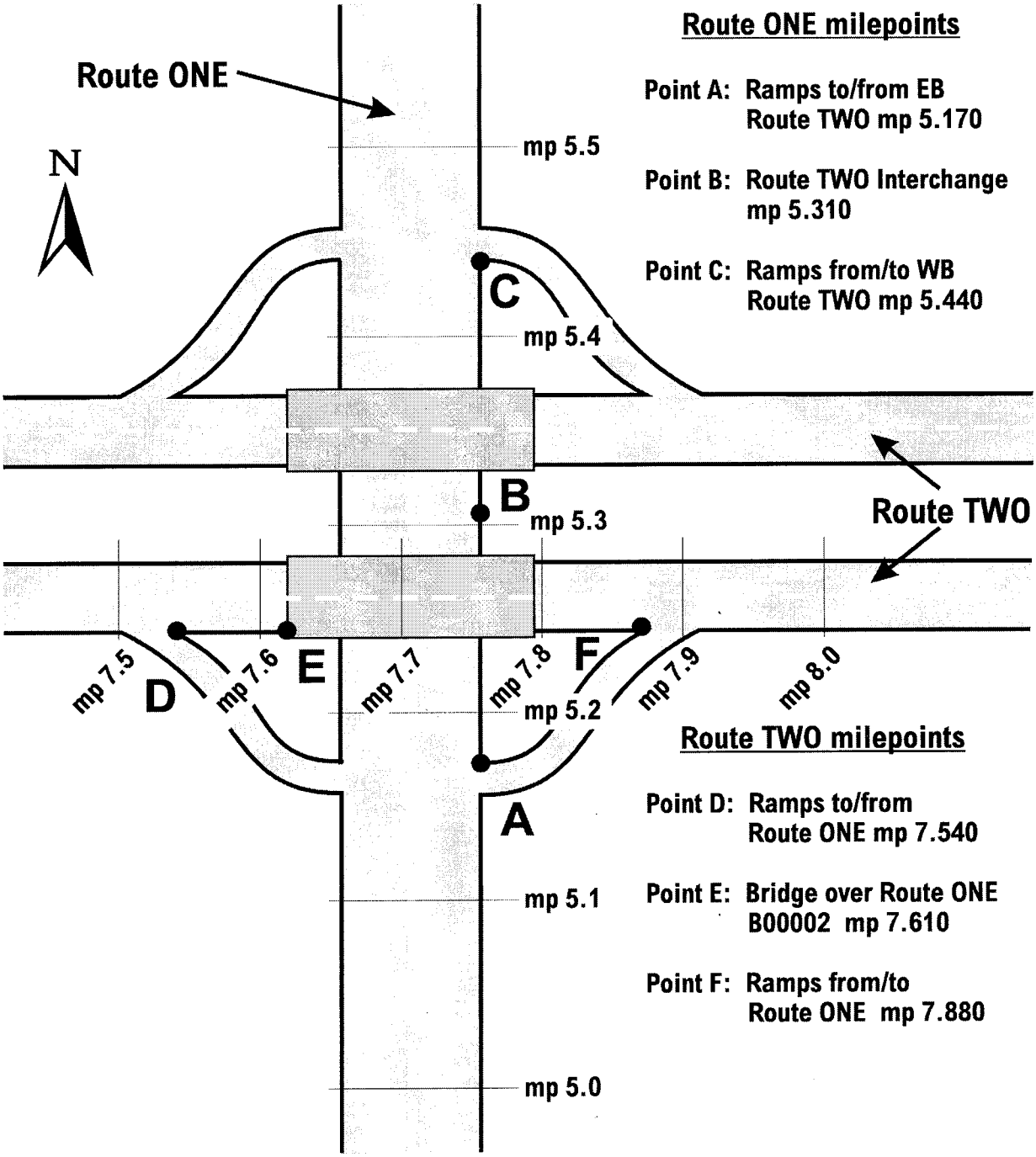

Exhibit 7b: Mileposting of Clover Leaf Interchanges

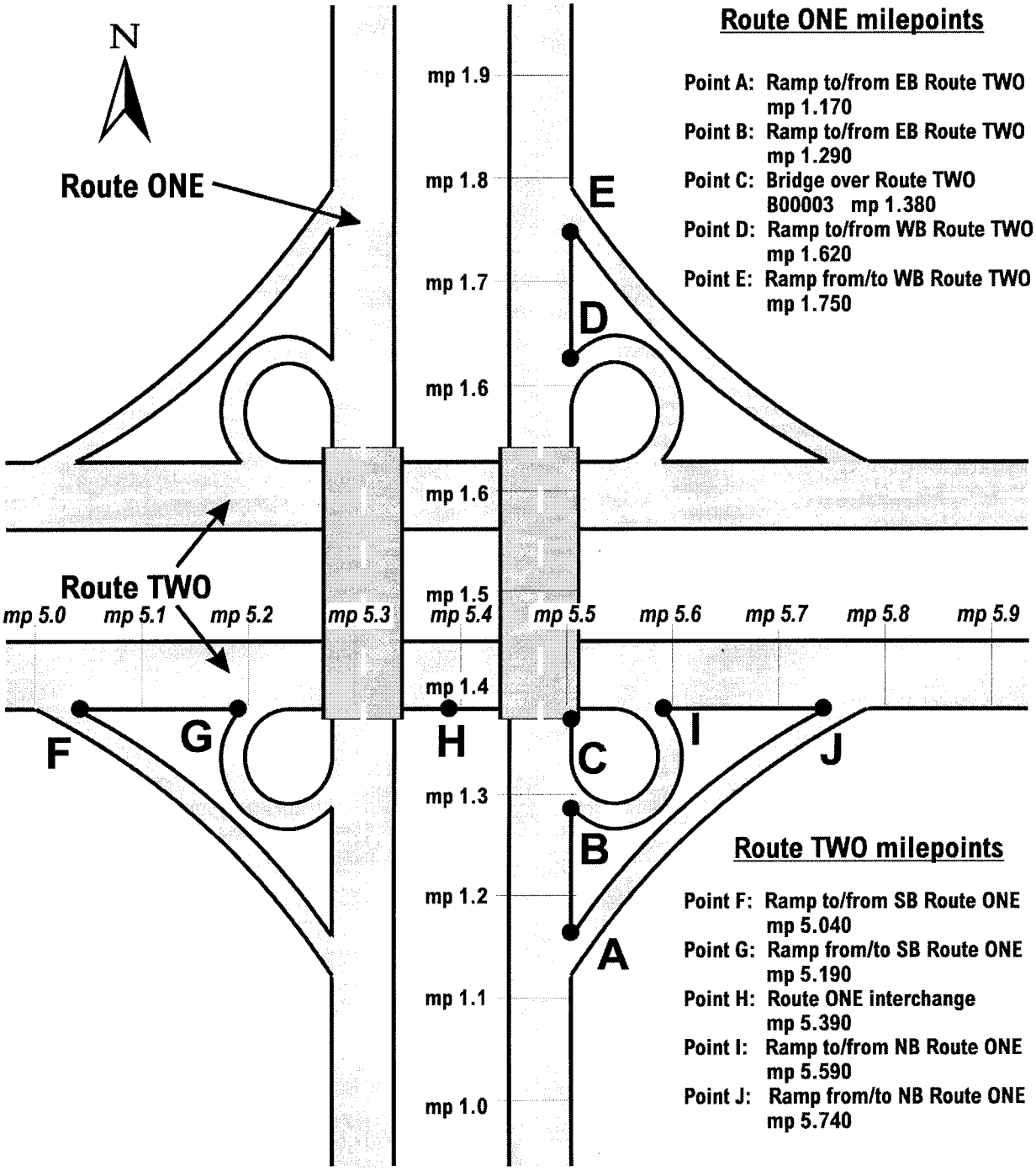
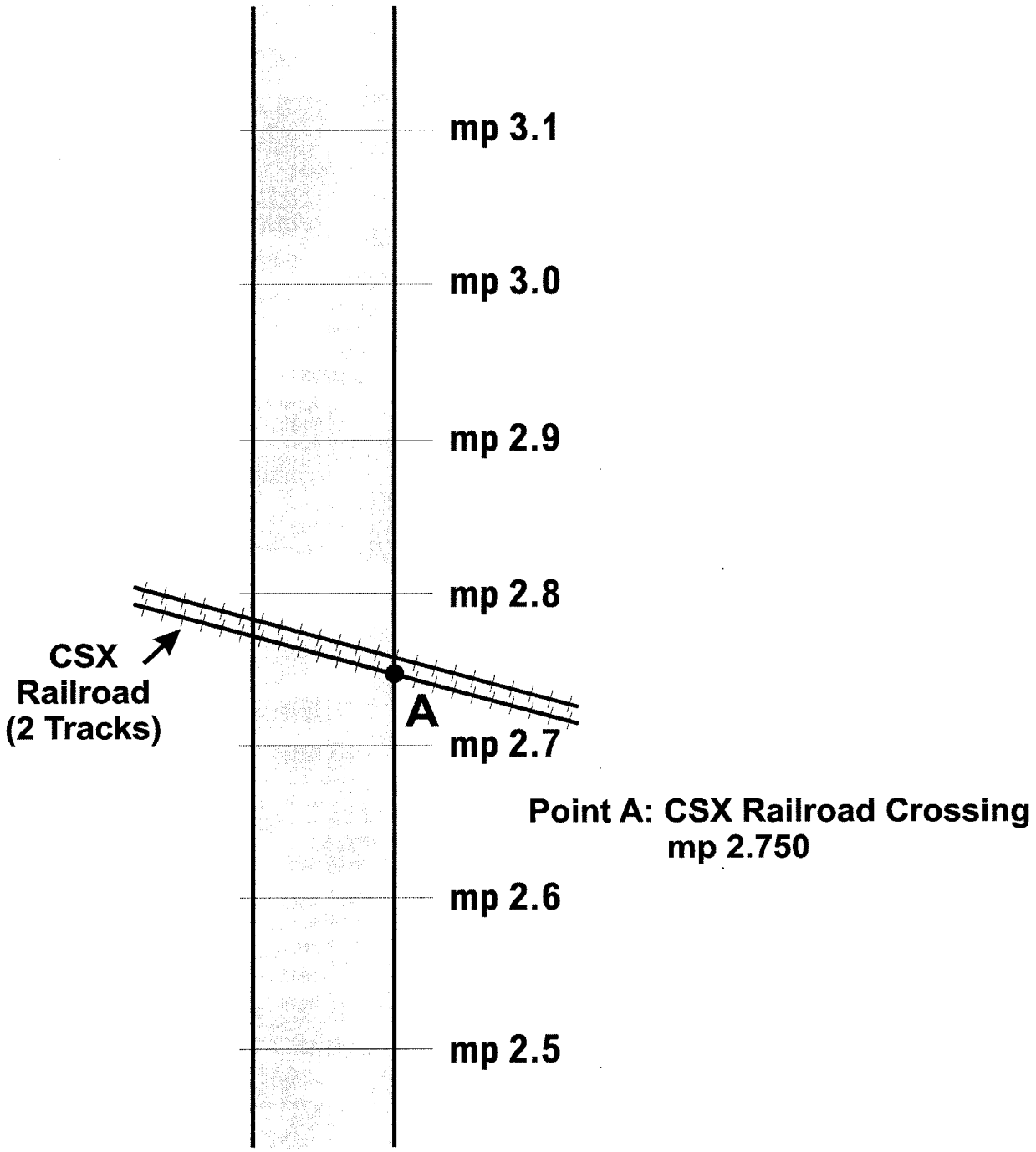
Exhibit 8: Mileposting of Railroads