Indiana Department Of Transportation

Roadway Reference System

Users' Manual

(a.k.a. the Reference Post System Made Simple)

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Developed & Prepared by:
The Division of Roadway Management

Table of Contents

List of Tables

List of Figures

INTRODUCTION

Why A Referencing System is Needed

For a modern roadway management system to function properly, information is required. Traffic data, road roughness, condition evaluation, maintenance performed, history (age, costs, materials), inventory (function, county, lanes, shoulders, access locations), pavement structure components, bridges, drainage features, and accident history are some of the fundamental building blocks of informed decision making. Such information must first: be available and second be managed in such a way as to quickly provide the answers to questions asked by individuals not only at all management levels but also of various disciplines to allow sound and knowledgeable decisions.

Information that is compiled by means other than location, such as date, Contract number or DES number, does not allow easy retrieval if a specific location is desired. Locations which are narrative can not be easily sorted and are often inconsistent, varying greatly in reference to county roads, city streets, municipalities, and land marks. Different highway log mile systems have been developed but not correlated to each other, consequently, a large volume of information has been gathered and stored but it is not readily accessible to various users due to a lack of common location format or correlated references.

Each element of information described above can be related to a *location* on or along a road. A clear, concise and easy to use method of reporting this information to a *location* is necessary in order to retrieve and report the data. In addition the data must be related to common "reference points" in a consistent manner.

What Is The Roadway Referencing System

The Roadway Referencing System (RRS) is a means to relate a data element to a position or extent along a road to a known point. The main distinction between the RRS and other systems that use a "log-mile" method, such as the Road Inventory, is the Roadway Referencing System is a means to report the *location* of information relative to a known, <u>*set*</u> point (reference post) along a route, whereas the Road Inventory relates the point of information as a *distance* (Alog) from a beginning point of the route (see Figure 1: RRS & Log-Mile System Comparison).

Figure 1: RRS & Log-Mile System Comparison

Roadway Referencing System

Log-Mile System
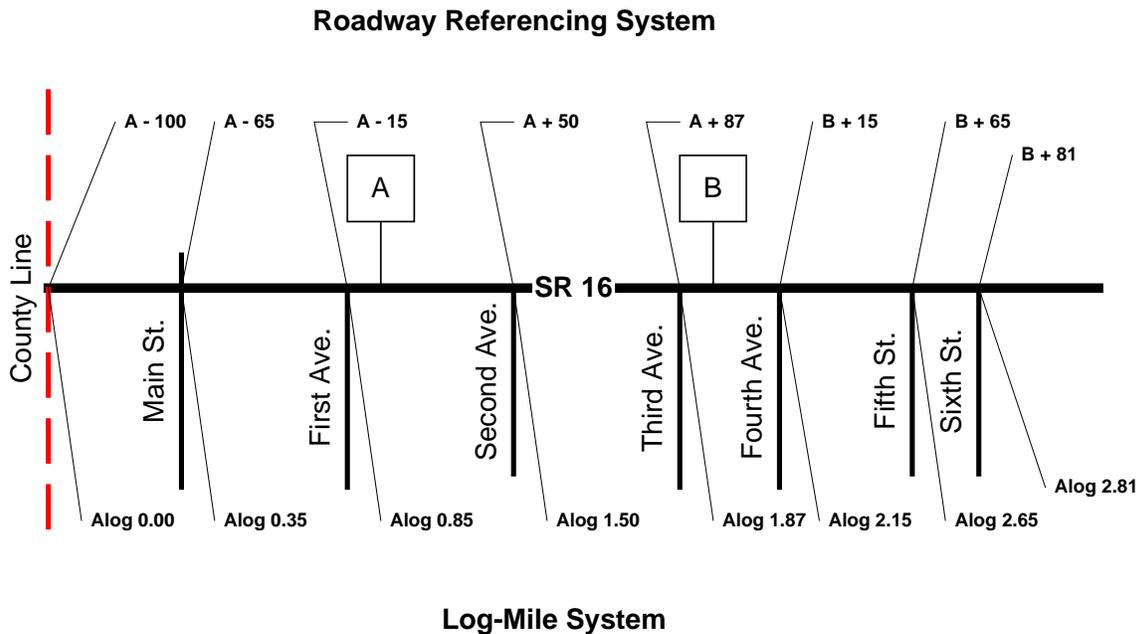
One major advantage to the RRS is that once set, the post location remains constant through time and therefore any information related to that post stays constant through time unaffected by realignments, or relinquishments occurring "upstream" from its' location. The log-mile method of relating occurrences as a distance (Alog) often requires the "relocation" of every occurrence with any change occurring upstream (see Figure 2: RRS & Log-Mile System with Relinquishments).

Roadway Referencing System
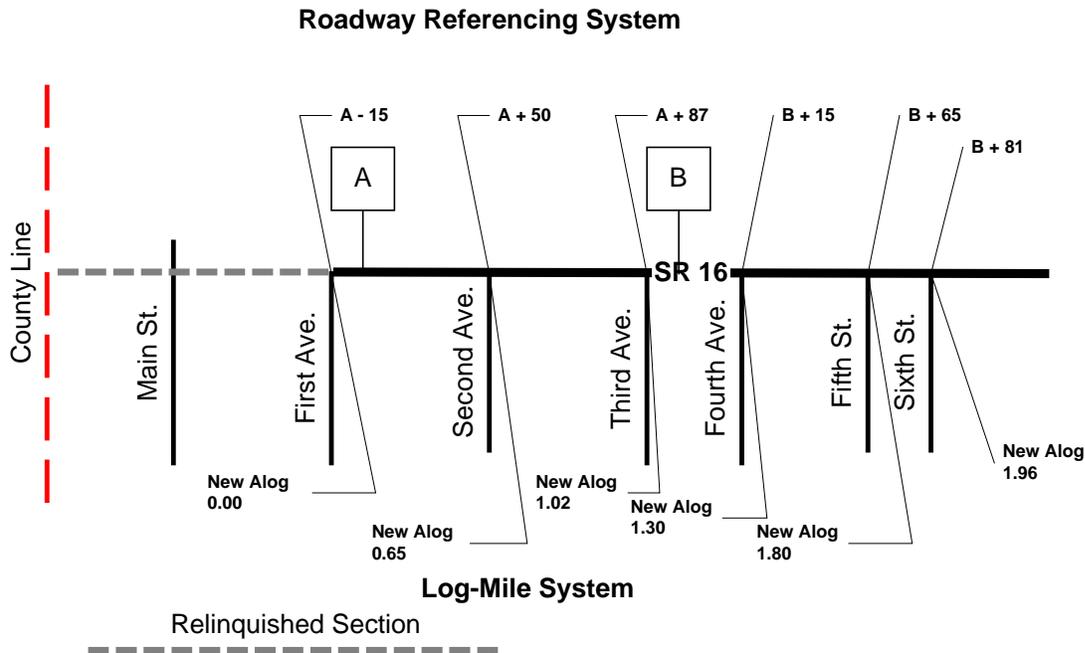
Figure 2: RRS & Log-Mile System with Relinquishments

The Roadway Referencing System (RRS) also provides uniformity to many elements of information. The Referencing system allows data to be extracted for a particular section of road from various computer files maintained by different individuals. All elements must be referenced to the roadway in a consistent manner. The heart of the System is the installation of reference signs on all state roads for quick and consistent reference to locations.

Operation

ROADWAY REFERENCING SYSTEM

Initially, reference signs are placed at nominal 1 mile increments, at the whole mile as determined from the road inventory, on all "active" roads under INDOT jurisdiction. The distance between signs within a given stretch of road may change due to a new alignment in that area. The signs on the Interstate will remain as they currently are. The signs are continuous numbered starting from zero at the south or west start of the road. For most purposes the south or west start of the road can be determined from the numbering of the route. Odd numbered roads run from South to North . Even numbered roads run from West to East. A few exceptions

to this rule occur on the small "spur" roads which usually go to state parks or institutions or are old state roads remaining after bypasses are placed. In any case, the direction as established in the Road Inventory will control.

DATABASES and RRS

Road Inventory

The road inventory database is composed of two tables, one strictly numeric table and one text table. The first table is used to track specific attribute data in numeric form along a route. It uses the route/county intersection as it's point of origination and termination for distance measuring. The second table is comprised of a text field, an adjusted log mile field, and a sort key combination. The text field is used to describe a landmark or point of interest. The adjusted log mile (Alog), measured to the nearest 0.01 mile, relates that feature to (distance from) the route/county line point. The sort key combination enables the text file to be "sorted in order" with the strictly numeric tabular table to provide a more comprehensive view of the route.

The reference signs could be considered points of interest along the route and thereby incorporated into the second of the two above mentioned tables. Once located in this manner, the other points of interest could then be extracted with the distances shown as the reference sign name "plus offsets" similar to stationing. Additional manipulations would be required to extract the other significant attribute data maintained in the other table. Creating a relationship between the three tables would be difficult under current practices.

Bridge Inventory

All bridges are marked with a reference sign which has the plus mileage (offset distance). A mainframe file is maintained in which the reference sign, the bridge N.B.I., and structure number are equated. In this way, knowing the reference location of the bridge from the reference sign, information from the mainframe bridge inventory can be accessed and assimilated into and compared with other datasets.

Other Databases

Other data files which could be linked in this manner are project descriptions, accident reports and permit locations. Then by knowing a location, information can be retrieved and compared to other information such as ADT, pavement width or bridge data which is linked to the same location. Examples of information which can be linked by location through the Referencing system are shown in Figure 3.
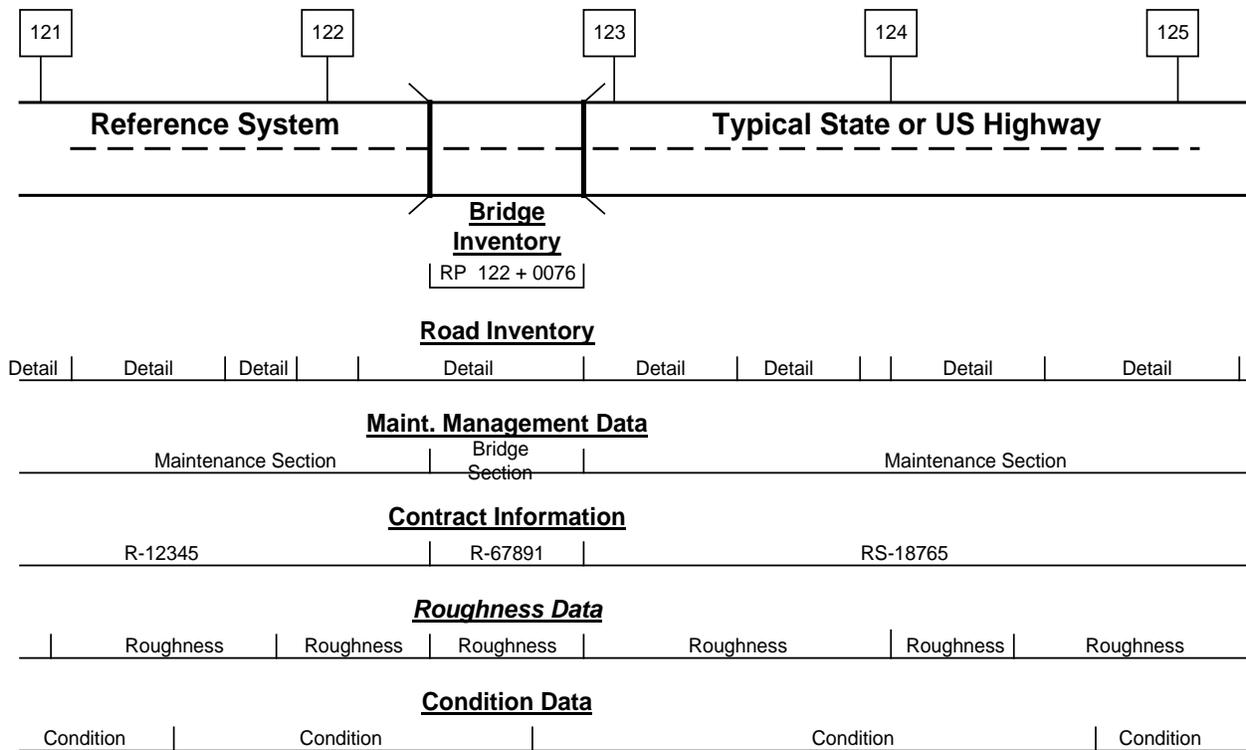
Figure 3: Data Referenced to the Road

RRS and Road Inventory Compared

The reference signs are *REFERENCE POINTS ONLY*. The signs are "names" for known spots on the road. The names happen to be, but are *not required to be* sequentially numbered along the road. By being "names" for known locations the reference sign does not necessarily have to be at the log mile the sign number indicates. The sign is placed to meet field conditions, to avoid obstacles, and also adjusted for new alignments.

Therefore, a record of the log mile as shown in the Road Inventory versus the reference number ("name") must be maintained. For example, when sign #101 is placed in the field, its continuous log mile location can be 101.09 miles from the beginning of the route and have an Alog of 3.85 and this is recorded in the Road Reference file. The sign is a name to index information to the Road Inventory Data Base. But it also serves as a close indicator of roadway mileage for communicating locations. But, the signs are NOT "mile posts" or "mile markers" since total distance can not be accurately determined from the name on the signs. Only the Road Inventory Data Base can provide actual distances.

The Road Inventory Data Base, an actual cumulative distance file, allows the distance between two references to be computed. For example, given two references on a route to describe a project start and end limits, RP 245+30 and RP 258+80, the accurate length, for engineering purposes, is not the difference between these points. The actual locations of reference signs 245 and 258 must be known. The two references define the project location and can give an approximate length. The start of the job is 0.30 miles beyond reference sign 245. The Road Inventory Data Base provides the information for determining more accurate lengths. Suppose the Reference File contains the following entries for these reference signs:

Table 1: Reference Posts and County Log Mile System

Reference Sign	Log Mileage (county log method)
245	24.97
258	38.04

The distance between the two reference signs is 38.04 -24.97, or 13.07 miles, **not** 13 miles (258-245). The length of the project is 13.07 + 0.80 -0.30, or 13.57 miles. But if the references are subtracted; (258+80)-(245+30)= 13.50. This is not the length of the project. The start of the project is 0.30 miles beyond 245 reference sign, and can be physically located in the field and in the data file. The "log mileage" is not needed unless an accurate distance calculation is desired.

A complication which occurs due to the Road Inventory restarting the Adjusted log mileage to zero at each county line. In the previous example, the two references *could have been* in two

different counties, so that the entries in the Reference File might be as follows: (See Table 2 & Figure 4).

Table 2: Multiple Counties, Reference Posts and County Log Miles

Reference sign	Log Mileage	County
245	24.97	1
258	8.04	2

The Reference file also shows County 1 ends and County 2 begins at log mile 30.07. The actual distance between RP 245+30 and RP 258+80 is as follows: 30.07 - (24.97 + 0.30) + (8.04 + 0.80) = 13.64 miles as shown below.

Figure 4: Multiple County Distance Calculation

In general the method for determining distance when in two different counties is:
     (ENDING COUNTY LINE MILEAGE - START MILEAGE + END MILEAGE)
     Where in this example: START =RP 245+30 = 24.97 + 0.30 and
                                  END   =RP 258+80 = 8.04 + 0.80

For most purposes the subtraction of the Start and End reference will be close to the actual distance. Upon installation the reference signs are very close to the true distances. Only as our roads change in length will the actual mileage vary from the Reference Sign's number.

This type of manipulation is also needed to convert existing P.C. inventories in county log format to the referencing system method.

SIGN MAINTENANCE

The repair or replacement of reference signs to keep the referencing system usable is a District sign maintenance activity. Sign installations that are leaning, have holes, or have lost legibility will be noted for replacement. If the location for a missing sign is not physically evident, the replacement location must be verified with the District or Roadway Management in the central office before replacement. Missing signs must be replaced within 0.01 mile of its original position. The periodic replacement of reference signs to provide adequate legibility will constitute a district sign replacement activity. This work should be scheduled in conjunction with other sign replacement programs.

None of the above mentioned activities includes installation of new signs due to construction activities. Such work should be included in RS, R, T, and B contracts. Contracts must make provisions to allow for the removal and proper replacement of the Reference Signs. If removed for construction activities, the sign must be replaced in the same approximate location as it was previously, if possible. If a sign must be relocated inform the Roadway Management. New alignments, new roads, and new bridges, must consider the placement of corresponding reference signs.

USING THE ROADWAY REFERENCING SYSTEM

The description reporting of locations on and along the road are a daily activity by many people. The Roadway Referencing System is an easy way to find locations along a road without back tracking to a county line. An accident, work site, address, drive or any location can be communicated as a distance, measured from a the nearest reference sign, i.e. 0.5 miles north of Reference Sign 76 or .3 miles south of Reference Sign 13 and would be noted as 76 + 0050 and 13 – 0030 respectively.

The reference signs are located to the nearest 0.01 mile with a precision of plus or minus 26 feet. Therefore it is necessary to remember that they are *NOT* surveying monuments. Nor should they be used for engineering detail. The reference signs *ARE* more than precise enough for activities such as radio communications, crew work site locations, and other daily operations where odometer precision is sufficient. In order to use the Roadway Referencing system to describe more precise locations, the use of a DMI (Distance Measuring Instrument) should be considered.

For consistent reporting of information by location using the Road Referencing System a few rules and conventions must be used by all divisions/departments/districts. The key for data files to be relational by location is to use consistent ROUTE NAMES and REFERENCE LOCATIONS. All location information must follow the form of Route Type, Route Name, From, To or At. The format that follows shows how and what information should be recorded for consistent reporting of location descriptions. It is not necessary data be in this order, but must it be in separate fields as shown. Each application must be examined as to how this information can be implemented. Contact Roadway Management for help in coordinating reports and data files.

Table 3: Database & Field Structure

Route Type	Route No.	Direction[1]	From Ref. Post	From Ref. Offset[2,3]	To Ref. Post	To Ref. Offset	
A	NNN	A	NNN	NNNN	NNN	NNNN	A = Alpha N = No.
I	65	I	201	45	207	6	
U	421	D	140	102	142	56	
S	8	I	3	75	15	5	

NOTE: [1]"Direction" is not the compass direction of the piece of road but the primary direction of travel where direction "I" = increasing post number (Northbound or Eastbound) and "D" = decreasing post number (Southbound or Westbound). US 421 is a N & S road and US 8 is an E & W road. See page 9 for more details. [2]"Offset" is measured in hundredths of a mile with an assumed decimal place(e.g. 102 = 1.02miles, 54 = .54 miles). [3] From post and offset are to be used as the description for bridge, culvert work, or sign work, which is considered to be "AT" a location.

In addition to the required information, a narrative "From" & "To" is helpful in understanding of where RP 142+56 is on US 421.

Travel – Over Routes

The Route Type, Route Name and Reference Point define a specific From/To/At. The Route Name must be correct to get the information filed in the right place. The Route Name may be question on travel-overs and one-way pairs. It can also be a problem if directional information is being used. In all cases the Route Name must carry the Route Type. There are some routes of different type with the same number (I 65 and SR 65).

"Travel - overs" occur when two or more routes "travel – over" the same section of pavement. For data maintenance purposes one of the two routes is designated as the primary route and all attribute data is assigned (or tracked) by this route. The rules for determining which route takes precedence are simple. 1) Interstates take precedence over US routes, which take precedence over State Roads. 2) When two routes of the same type are involved, the route with the smaller number takes precedence(see Figure 5). There are a few exceptions to this rule, the most notable being I-465. Following the rules I-465 would travel – over I-74, but in reality the section is reported as I-465.

Figure 5: Travel – Over Routes
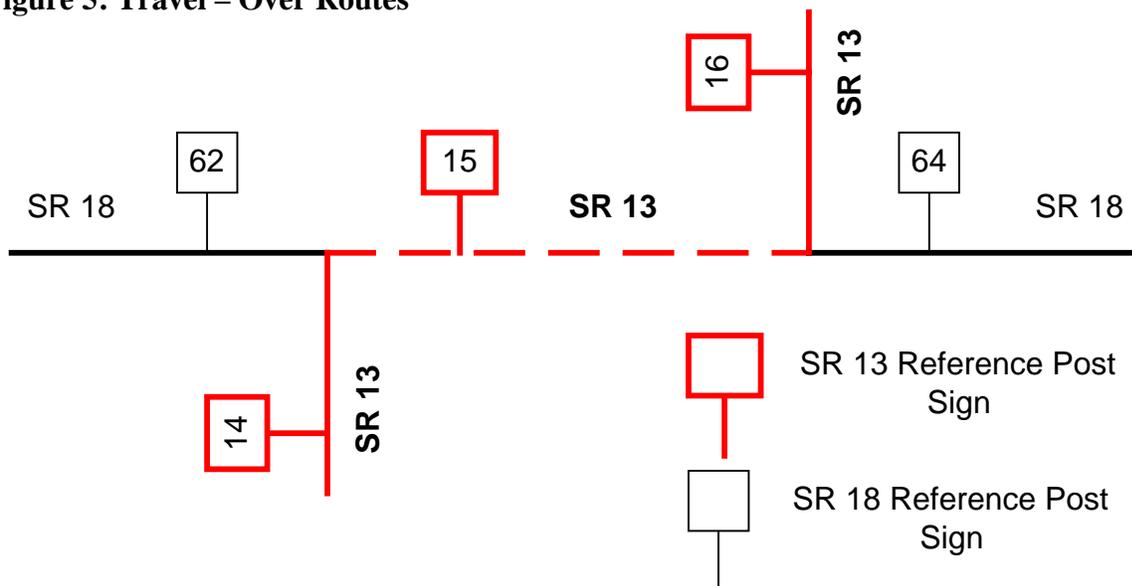
One Way Pairs

In essence a one-way pair is two different state roads which happen to share the route type and the route name. For location descriptions on "one-way Pairs", the Route Type and Name must be clear as to which street is being referred to. Each section (street) of the one way pair must have the travel direction, Increasing or Decreasing, noted in the Route Type/Number/Direction. For example the one-way pair in Terre Haute is US 40 I (eastbound) and US 40 D (westbound). Thus two unique names for the road are made to fit into the proper file slot.   Direction is noted as Increasing distance from the beginning of the road (the primary direction of the route Eastbound or Northbound) or decreasing the distance from the beginning of the route (secondary direction of the route – Southbound or Westbound).
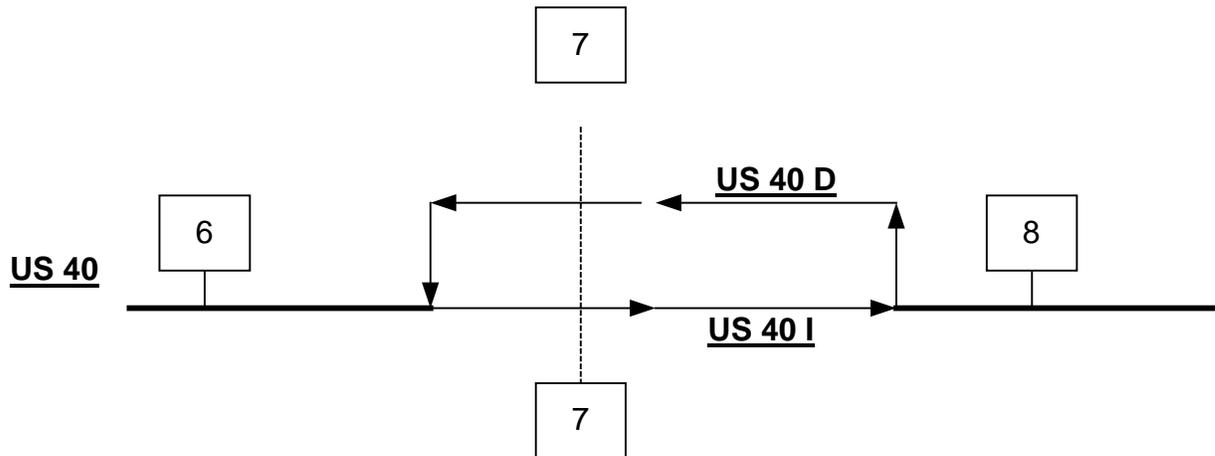
Figure 6: Naming One – Way Pairs

The same I or D designation applies to data which is directional, such as roughness or a project which is on one lane or side of the road. If no direction is indicated, normal, bi-directional routes are assumed. "B", for bi-direction must be used if data is sometimes directional. Each application must be examined for direction. For some applications direction is of no concern. Others may need, or prefer left and right as data fields. These applications should be discussed with Roadway Management to check for compatibility.

Bridges and the Referencing system

Bridges are inventoried and referenced to the Referencing system. Signs are installed that represent the Reference Location for each bridge. Theoretically the distance shown is to the mid-point of the structure. For most purposes the inventory reference sign for that bridge should be used in the From for the location along with the Route Type and Number. Direction of travel is also needed for twin structures. "R" for ramps is also shown on some structures. Both the direction and ramp designation is shown on the signs and inventory. These too must be used when referring to a structure. These locations are "equated" to the bridge structure number and can be used instead of the bridge structure number to identify any bridge. The reference number of the bridge should be used in any project description when bridge rehabilitation or replacements are within a larger "R" contract.

Intersections of State Roads with other State Roads at a grade separation or interchange are assumed to meet at the point where the two center lines intersect. Ramps are not referenced or included in travel distances. Ramp inventories exist and the distances exist, but are not part of the Referencing system.

Location Notation

The other item for location information is the point of reference used by the Referencing system. The reference signs are *points of reference only*! They are a series of known locations along a road which we are "naming" with sequential numbers. It just so happens that they also closely follow the accumulated mileage along the route. The same results would occur if the signs were marked A, B, C, D, ...AA, AB, etc. The reference signs are used to locate **positions** on the road. Each "From", "To", & "AT" point must be referenced from a "whole" road reference sign. (*Points along the road should not be measured from Bridge Reference Signs!*) The format for notation is "Reference Sign + Mileage" or "Reference Sign - Mileage". RP 143 + 43 is the normal fashion to write a "From", "To" & "AT" and the preferred method. The plus or minus distance is called the Offset. However, if Sign #143 and #144 are 1 mile apart, then RP 144-57 describes the same location as RP 143+43.

Because of travel-overs, one-way streets and divided highways the RP " + " or " – " distance has benefits depending on the direction of travel, and whether a location is known and a reference is needed, or whether a reference is known and a position on the road is needed. The direction of travel may only let you measure in one direction. Or the closest sign may be ahead a short distance while the sign behind is several miles back before a travel-over. Care must be given to the fact that the Reference Signs may not be 1 mile apart. RP 144-50 is not the same location on the road as RP 143+50 if Sign #144 and #143 are more or less than 1.00 mile apart. (For day-to-day use with odometer this difference will be minor, if noticeable.) For data entry purposes the Reference Point must be converted from "-" format to the equivalent "+" format. To do this the distance between the posts must be determined and the minus distance is subtracted from this to get the equivalent plus location.

$$d_1 + d_2 = X_1$$

Point P = A "+" d_1 or   B "-" d_2 or   C "-" ($d_3 + d_2$)

Point P = A "+" ($X_1 - d_2$)   or   B "-" ($X_1 - d_1$)

Where A, B, and C are the Sign Post Designators
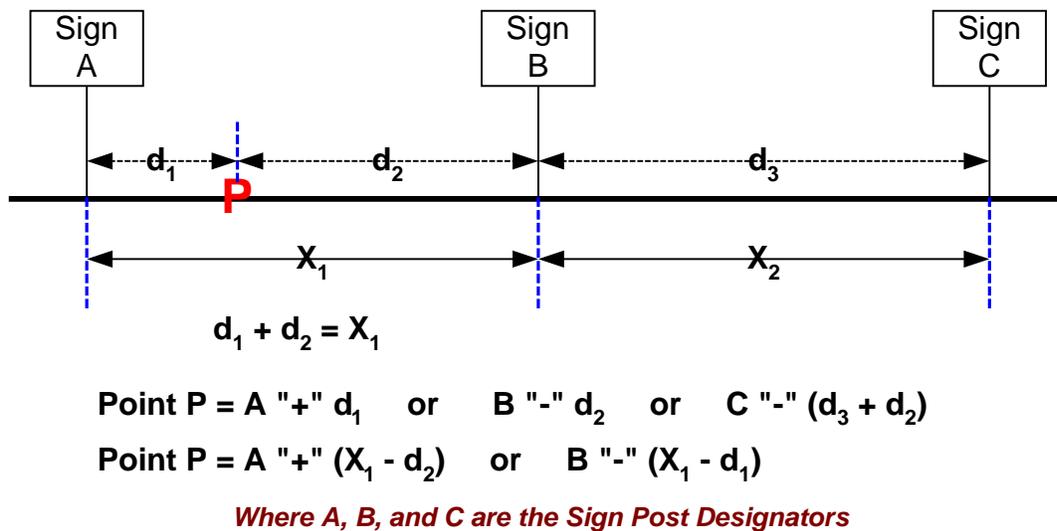
**Figure 7: Calculating Positive and Negative Offsets**

If a location like the intersection of two state roads or a major feature is being described, it may be easier and will be more precise to look up the reference plus in the inventory. The sign and landmark pluses are shown on terminals for office use. Print-outs can be made.

PROJECT LOCATIONS and DESCRIPTIONS

All project, contract and work area descriptions for work on "active" INDOT jurisdiction routes must show the location using the Referencing system. Work and projects on Local Public Agency, institution locations and "old state road" locations will not have references and cannot follow the system. By using consistent location descriptions, DES, Project, and Contract numbers can be correlated by location. As described before, each project location must contain the following elements:

ROUTE: *Type & Number*   DIRECTION*(optional)*:___   FROM:_____ TO:_____   NARRATIVE: FROM:_____ TO:_____

"FROM" always starts at the lower reference number. The offset for the "FROM" and "TO" should be shown to the nearest 0.01 mile and should be shown in the normal format of "SIGN + DISTANCE". See the following examples of project descriptions.

Route: US 231   From: RP 27 + 27   TO: RP 29 + 48
Narrative: On US 231 from .7 mile south of SR 162 to .4 mile south of the Warick Co. line.
*Note: Direction is **not** needed.*

Figure 8: Project Location Description on One Route

In this example SR 218 travels over SR 5. The project really starts on SR 5 and the description using the Referencing system must show the proper route and then the proper reference points for the respective routes. The narrative conveys the simplest description. As a side note, caution should be used when defining projects extending over various routes. The need, standards or importance may not be the same for the various segments. Also, local usage of route numbers must be checked. Not all routes are named what they may be considered locally.

Narrative: On SR 218 From I - 69 to SR 3

| **ROUTE**: SR 5 | **FROM**: RP 13 + 56 | **TO**: RP 17 + 71 |
| **ROUTE**: SR 218 | **FROM**: RP 57 + 56 | **TO**: RP 61 + 41 |
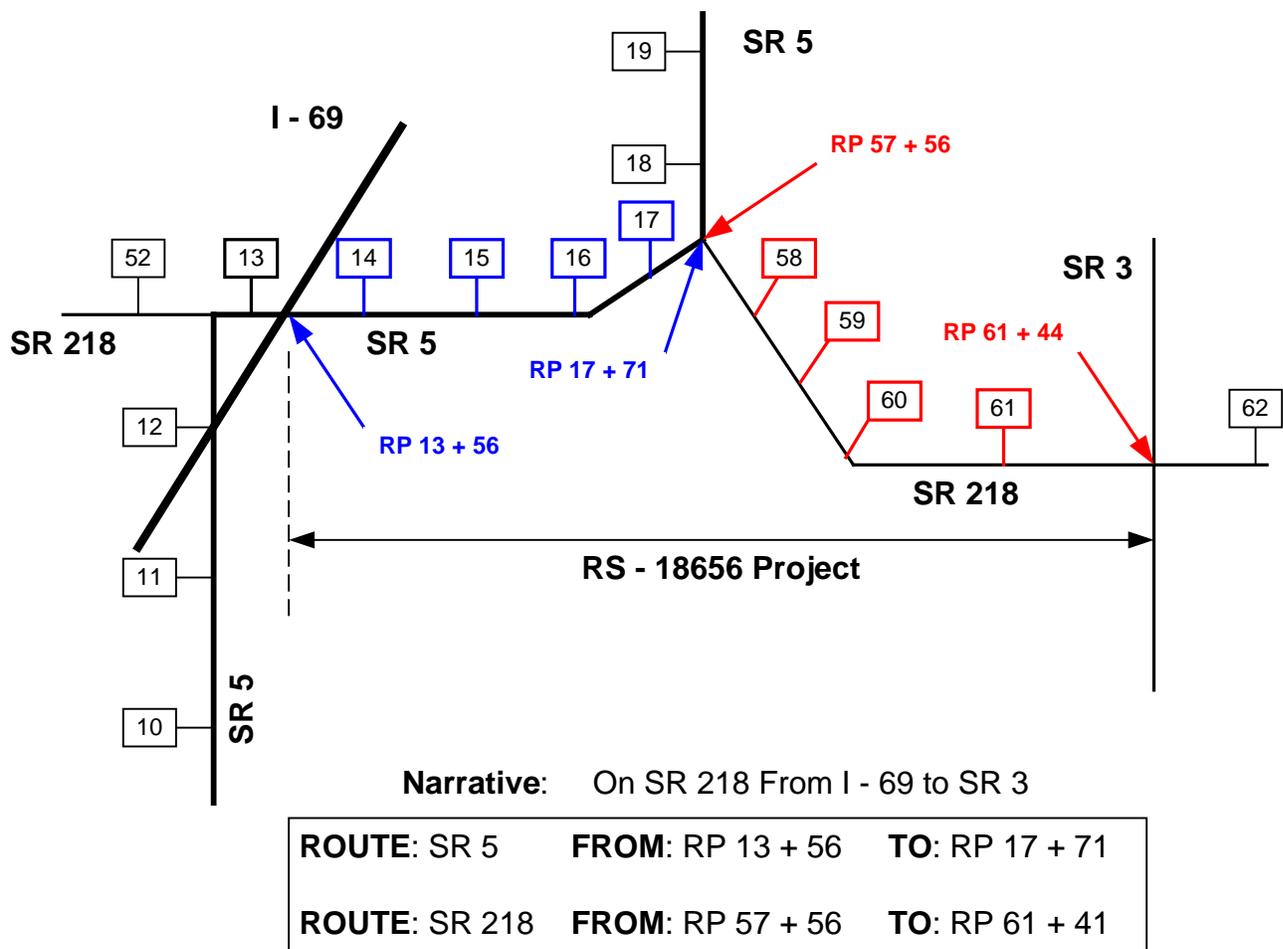
Figure 9: Project Description on Multiple Routes

In this example the project starts on a State Route which begins after traveling over a US route. The signs are continuous for the US route. No sign #15 or #16 exists on the State Route. What is the reference for the start of this project? One possible answer is RP 17-85. The start of the project could also be determined from Sign #14 or from the inventory data which shows this intersection measured from an Imaginary Sign #16. For most applications RP 17-85 should be converted to RP 16+15. In this case the number can be subtracted since Sign #16 exists only on "paper" and is considered to be exactly one mile from Sign #17.
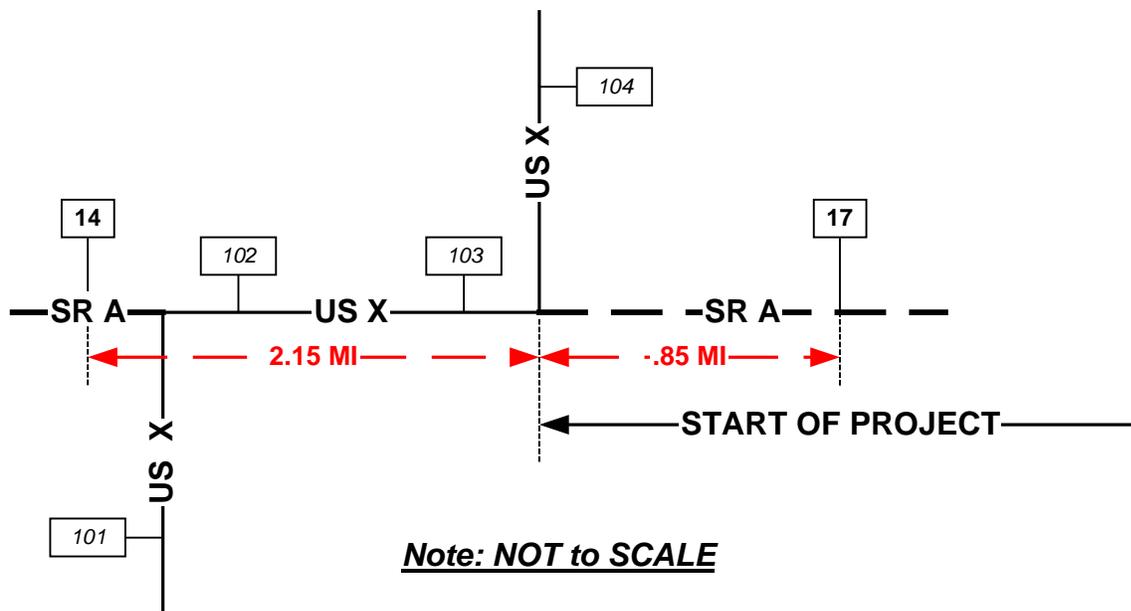

Figure 10: Project Description with Missing Posts

Not all projects follow a single "Route/From/To" description. Examples are Raised Pavement Marker, Mowing, or Guard Rail Maintenance contracts which use descriptions like; Various routes, Various locations. Efforts should be made to assign the work to a route and reference when possible. But some projects, such as district wide guard rail repair or traffic maintenance contracts have no assignment to location. For these types a route of SR 00, a reference of "From" 500 and district should be used . This is a catch-all file and makes retrieval difficult, so should be used as little as possible.

PROJECTS ON NEW ALIGNMENTS OR NEW ROADS

Projects on completely new alignments or new roads pose a different problem. Generally, these projects do not have anything to reference from since they are new. Stationing is used as the design and construction layout. It must be determined at some time where the survey line intersects an existing route. A statement equating a survey station to the existing Reference Point at that intersection must be shown on the project. Then a Reference Point of 900 is assigned this location on the new alignment. Subsequent projects from this one point can then be referenced using the project length and the 900 reference starting point for the location reference. Final Reference Signs can be determined when the road is completed. The use of the 900 series on the new alignment is necessary since the new alignment has the same route name as a portion of existing highway. Until the old highway is abandoned, or renamed the 900 series allows
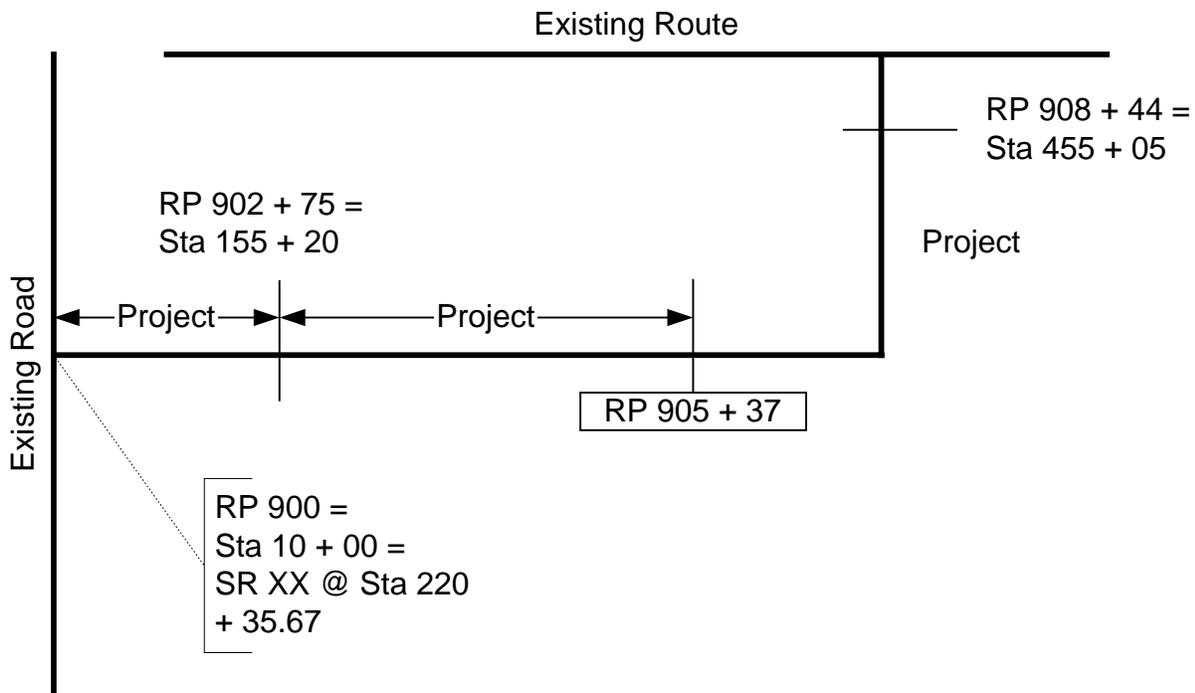
references to be made on the new road.

Figure 11: Numbering of New Road or Alignment

Details in project designs, such as typical sections within resurface contracts, should use the referencing system to show the limits of the Typical Sections. Layout of construction signs or

wedging limits can also use the referencing system. A detail which does not need precision, but general accuracy is desired, can use the system and is encouraged. By using the system for typical sections, ease in maintaining pavement structure history is enhanced. Also, details such as Deflection tests or pavement cores taken prior to the project can be located easier.

OTHER USES

Project descriptions are not the only application of the Referencing system. One desirable use is for permit applications for drives and cut permits. The system allows for consistent location on the road both current and historically of work activities done by non-highway operations. The same rules and procedures would apply where all information should be filed using the "Route/From/To" format. This application may need direction or right & left information in the format.

Testing locations for cores, samples, or deflection should also use the referencing system. The locations of such test results can be referenced to later project development locations easier and with more certainty.

Surface condition information will be taken and recorded using the referencing system. This will allow repeated measurement of the same location on the road over time. With roughness, condition, and contract information tied to historically constant locations, retrieval of information is simplified. Also, the location of the piece of road the numbers are supposed to represent can be found and checked.

Another use which may have possibility is in the video logging being done. The sign will help locate features of interest. If a feature's reference and plus is known the sign in the picture can help locate the information. Further refinements of this are possible.

Information on maintenance activities can be recorded using the signs along with the maintenance section, for more precise details of daily work activities. Maintenance sections are linked to the Referencing system.

Accident information and locations can use the System. Coordination with law enforcement people is needed to make them aware of the possibility and for proper reporting.

Information and Inventory expansion must use the referencing system. If inventories for pipe structures, guard rail, bill boards or RR crossings exist or are built in the future, the system provides a link for others to use the information if the need arises. Drainage structure inventories are an area of need for which the system can be used both locally and state wide. The current sign inventory can inventory the reference signs like any other sign and provide the link for the referencing system to other existing inventories which may use the no-passing zone log.

The reference sign is a visible reminder of the established method of referencing locations on the highway transportation network. The signs provide clear indications for referencing data collected in the field. As information is collected whether from INDOT, Police, or motorists, the sign is easily available and a reminder for locating and communicating uniform positions on the roads. Location in the field of specific road elements (such as county road intersections, bridges, pipes, and so forth) will be made clearer. Translation of inconsistent descriptions to consistent locations will not be needed.

The Roadway Referencing system sign represents a concerted effort by the Department to expand our knowledge base and unify our management procedures. To derive the maximum benefits, the Roadway Referencing system must be used and the highway population, law enforcement agencies, and highway user groups must be educated to its function and potential uses. Each department should examine its information needs and evaluate how the Roadway Referencing system can be used for communicating information. Contact Roadway Management for coordination and assistance in using or developing applications of the System.

APPENDIX

SIGN PLACEMENT

Reference signs, except on the Interstate which will remain the same, shall be horizontal panels having overall dimensions of 6 inch by 12 inch with 3 inch white numerals on a blue background with a 1/2 inch white border. The sign shall be fabricated in accordance with INDOT Standard Specifications. The sign shall be made with reflective sheeting Type II (encapsulated lens). The sign shall be mounted on a Type "A" flanged channel post and fastened per INDOT Standard Specifications.

Signs should be erected on a separate mounting. The erection location should be in a protected area (to avoid being damaged) on the right side (looking in the ascending direction) with the sign face parallel to the road. In urban areas, the signs can be correctly placed on existing supports used for other purposes, such as traffic signals, or other existing INDOT hardware.

The sign should be mounted so that the bottom of the sign is approximately 4 feet above the near edge of pavement. The height of the post may vary in urban locations. More than 4 feet is needed along sidewalks or areas of pedestrian traffic. The post shall be driven a minimum of 2'-6" into the ground. The sign shall be placed not less than 6 feet outside the outer edge of the shoulder or face of curb. Other pluses, such as at the R/W or fence line should be considered on roads with narrower Right-of-ways. Each road must be evaluated for the best offset position to avoid mowers, ditches or embankments and remain visible. Effort should be made to place the signs at a consistent offset for the given section. The sign should be immediately behind guard rail if present. The sign should also be in line with any run of delineators as may exist.

When a sign cannot be erected in its correct mileage location, it may be moved in either direction to the closest feasible point to the true location. This location must be recorded in the Road Reference file.

On four (4) lane or greater highways (divided and undivided), distance determination shall be made from northbound and eastbound lanes for the purposes of setting the signs. The signs for southbound and westbound lanes shall be set at locations directly opposite.

With travel-over routes (two routes on the same road), continuity shall be established for only one of the routes. The reference signs are located for the major through route as designated in the Road Inventory file. The major through route is generally defined as Interstate over U.S., U.S. over State Road, and the smaller numbered over other when the two routes are of the same type (in most cases). The route without reference sign continuity has the first sign past the travel-over area reflects the distance along that route as if the travel-over did not exist. (Route plaques are added to the post on the travel-over section for clarity when needed to show to which route the reference signs belong.) (See example page 19)

On one-way pairs in cities the signs are placed on both of the one way streets. The consecutive signs are placed in 1 mile increments from the last sign on the two-way section for the street in the ascending direction. The first sign past the one-way pair is located in its correct location based on the Road Inventory as any other reference would be. From this first sign past the one-way pair the direction of travel is reversed and the signs on the descending direction street are placed in one mile increments from this sign in descending order. (See example page 20).

Discontinuous routes (routes which end within the state and start again some distance away and are not connected) are measured and marked as any route for the first segment. The second segment, where the route starts elsewhere in the state, begins with referencing at the reference number where the first segment ended plus 0.01 mile. This makes the end of the first segment reference point XX+XX and the start of the second segment XX+XX + 0.01 mile. This makes each reference name on the road unique. A sign is not placed on the second segment until the whole mileage point occurs, however. (See example page 21)


A roadway section that is under construction and/or not yet open to traffic, for purposes of measurement and reference sign placement, will be treated as continuous with the roadway

portion in existence and ascending reference signs established accordingly. Contact Roadway Management for assistance.

Future roadway construction, such as new alignments, bypasses, or abandonment will change the length of portions of the route. A means of referencing the new roadway section is needed. The signs within the affected section will be adjusted to cover the new distance. In other words, a pair of signs originally placed 1.00 mile apart on the old road may be relocated so as to be 1.10 miles apart on the new. Ascending signs past the affected section will not require relocation nor renumbering. New entries into the Reference File will establish a new, revised record of the actual mileage and location of the relocated reference sign's number. The old road will be abandoned or renamed. (Remember, a feature of the Roadway Referencing system is the signs are references only and do not reflect the exact mileage. The number on the sign is the name of a known location. When a reference sign number on the road is used, the location is known and can be converted to actual mileage.) (See example on page 22).

Placement of signs at bridges is shown on pages 23 through 26. Each bridge has a reference sign. The route with state jurisdiction which travels over the bridge deck is the route and sign reference to be used. Bridges such as county roads over the interstate are referenced on the interstate. But a state road over the interstate is referenced on the state road. Bridges such as twins on the interstate have a letter for the direction of travel to differentiate the two structures at the same location and with the same basic structure number.

Bridges on ramps are referenced from the approximate mainline reference location and may carry the letter "R" to differentiate these from mainline structures. Only one double- faced sign is placed on two lane roads per structure. On multi-lane roads a sign in each travel direction is placed. See the diagrams for more details.

**Figure 12: Detail of Travel Over Routes**
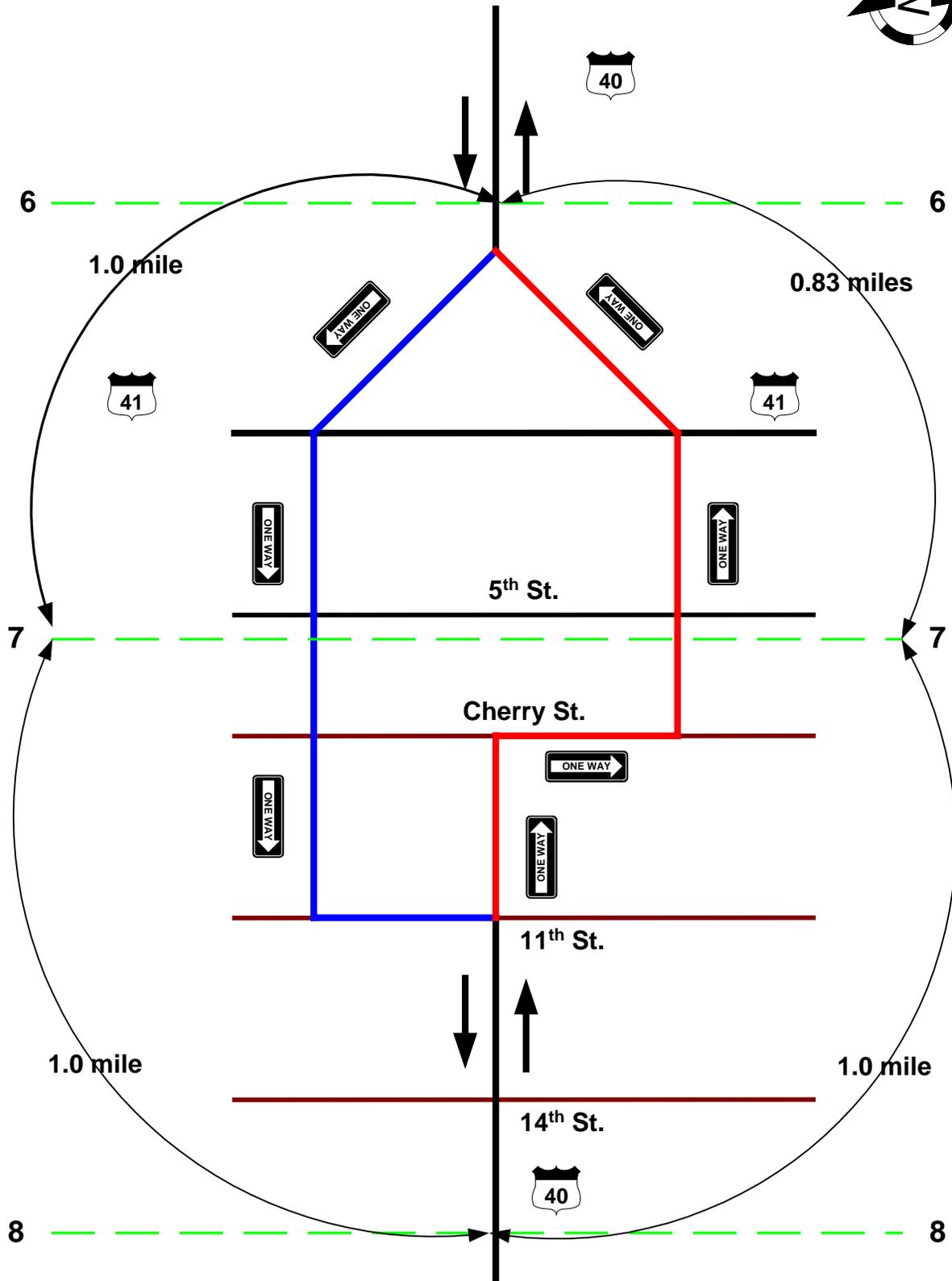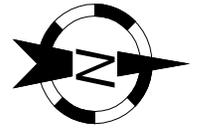
Figure 13: Detail of One - Way pair
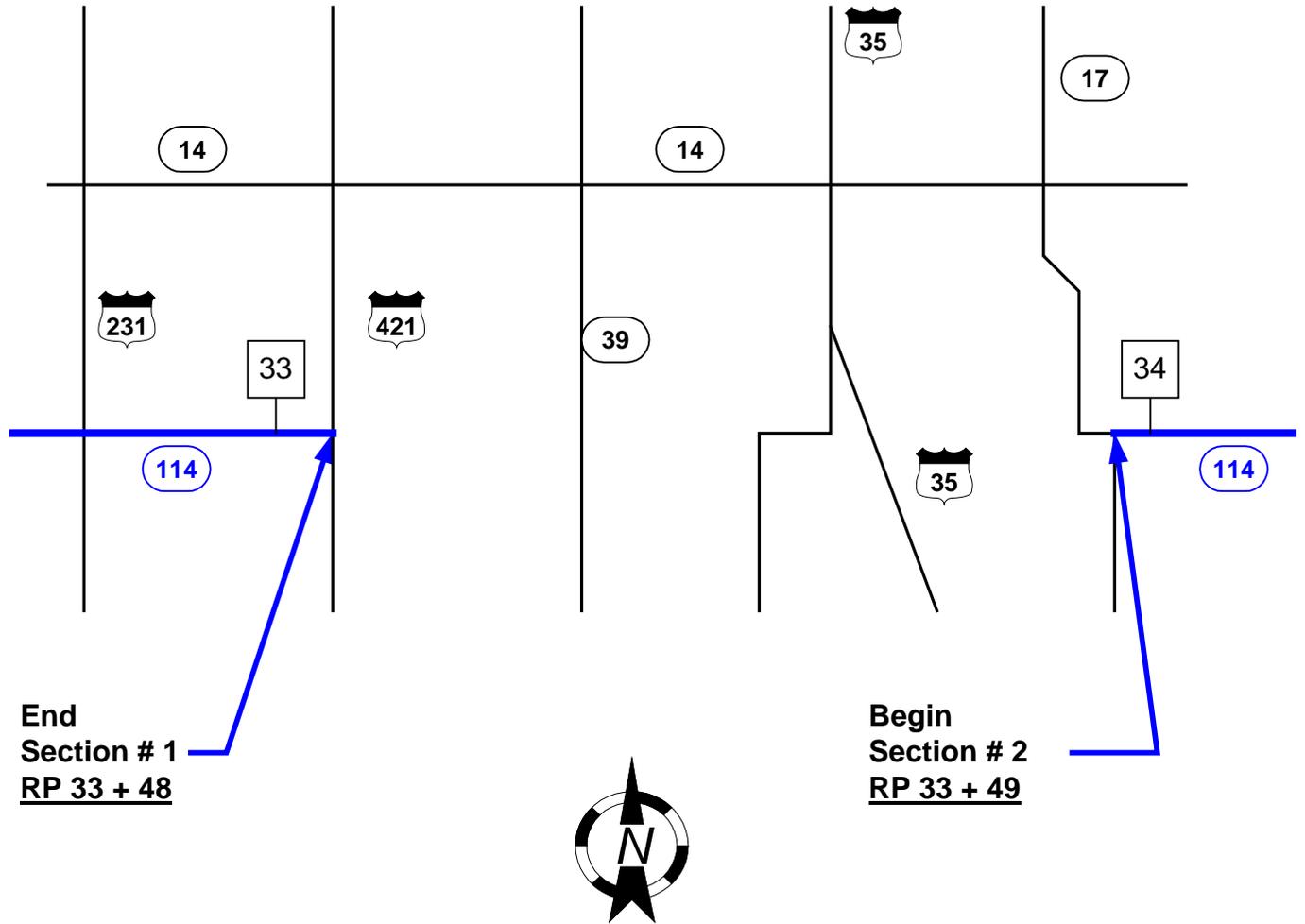
Figure 14: Detail Discontinuous Routes

This Post Does Not Move

Note: Last section
must be same as
original length!

1.00 mile

15

1.0 mile

1.0 mile

14

14

13

1.0 mile

1.10 mile

13

**New Road
Alignment**

1.0 mile

12

**OldRoad
Alignment**

Length = 4.8 miles

Length = 4.3 miles

1.10 mile

12

1.0 mile

11

**Posts 11 thru 15 on the
old road are removed if
the road is abandoned.**

**New posts 11 thru 15
are 1.10 miles apart.**

1.10 mile

11

1.0 mile

1.10 mile

10

1.0 mile

9
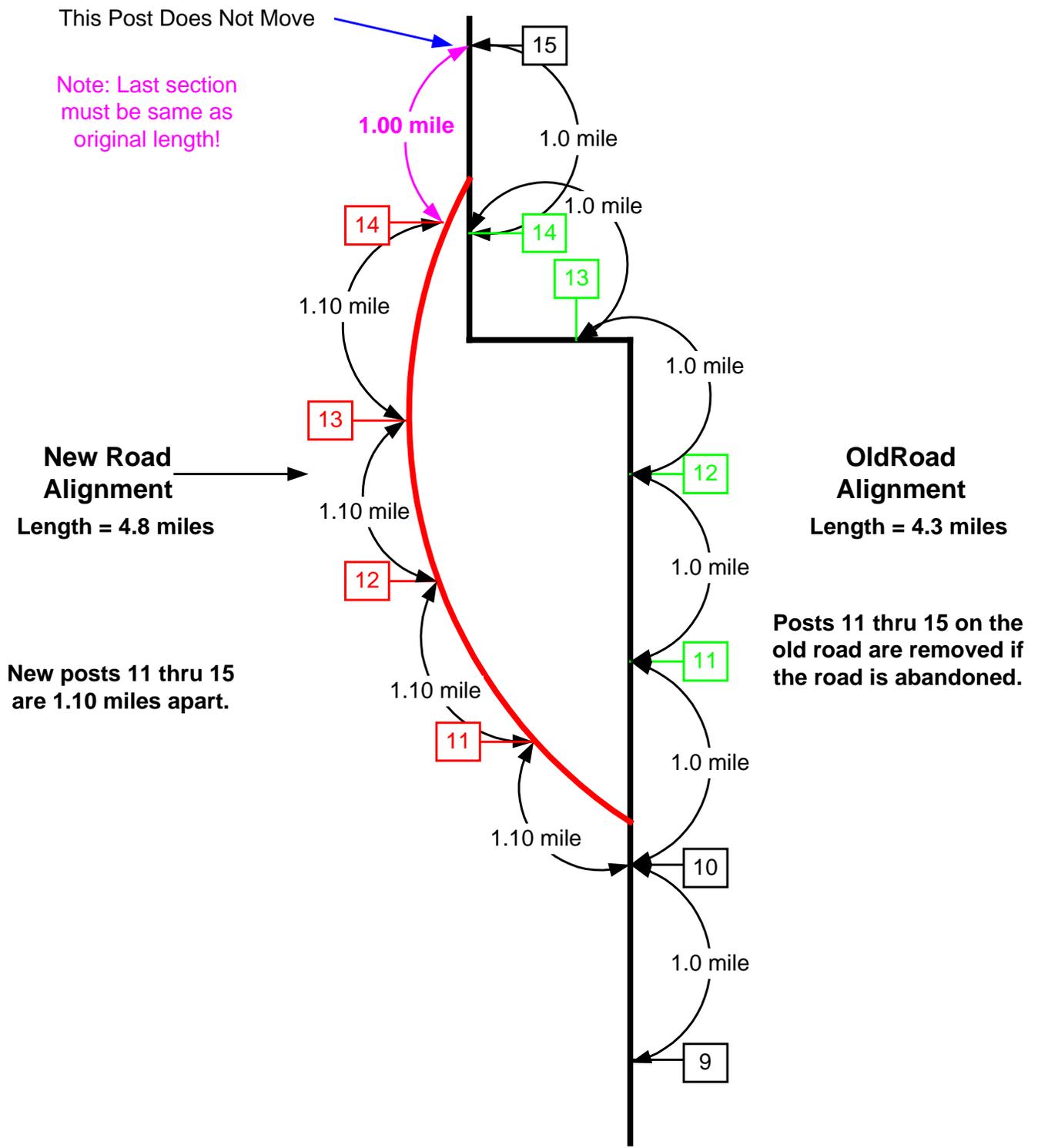
Figure 15: Detail New Alignment

Two Lane Road

Bridge Reference
16 + 45

1
6

1
7

N

Bridge Reference
16 + 45

Multi-Lane Road

Bridge Reference
41 + 31 D

4
1

4
2

4
1

4
2

N

Bridge Reference
41 + 31 I
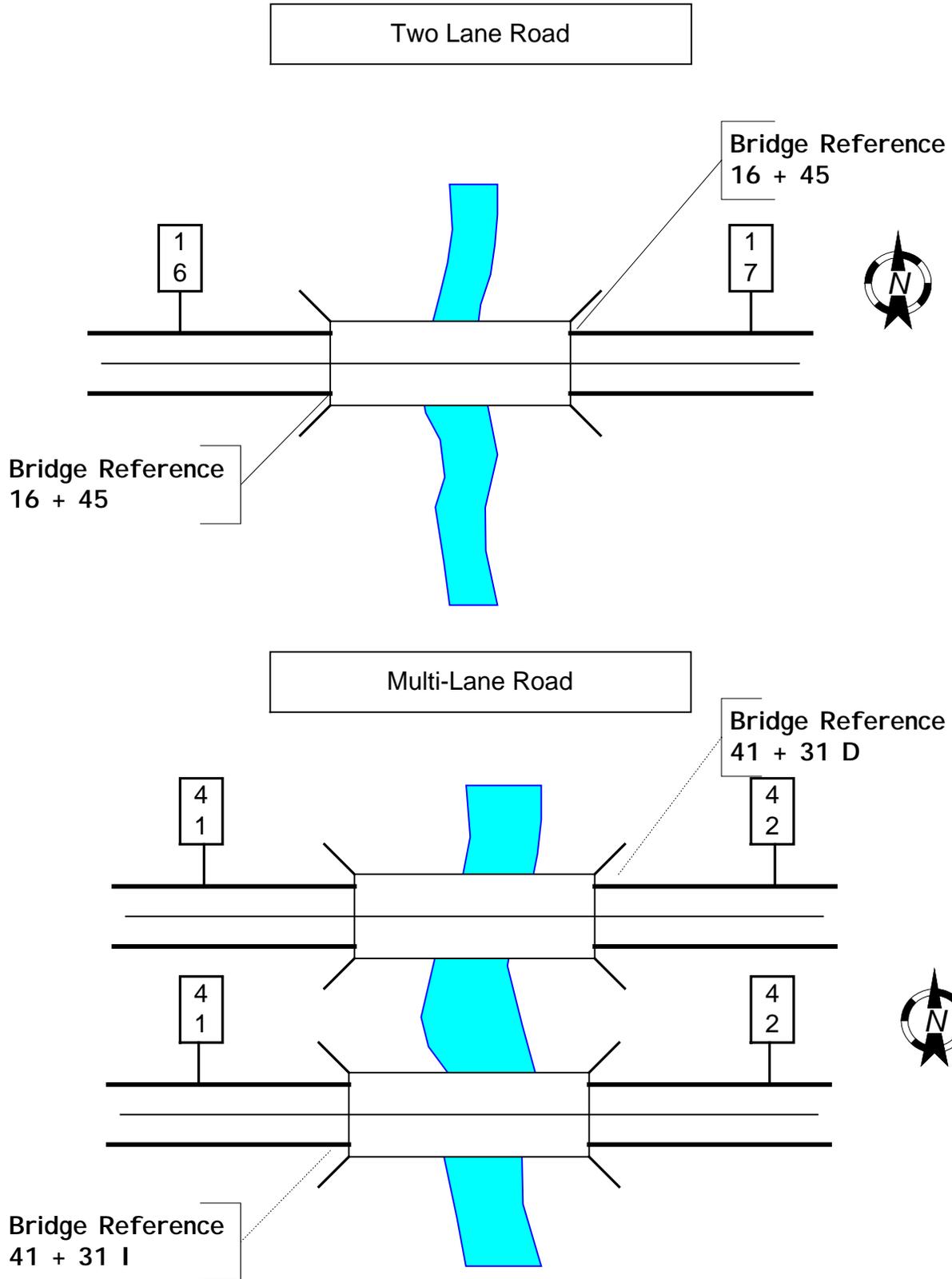
Figure 16: Detail Bridge Referencing

206

Bridge Reference
41 + 31 D

State Road Under Interstate

41

42

90

41

42

90

Bridge Reference
41 + 31 I

Bridge Reference
7 + 25

No Sign

State Road Over Interstate

No Sign

Bridge Reference
7 + 25
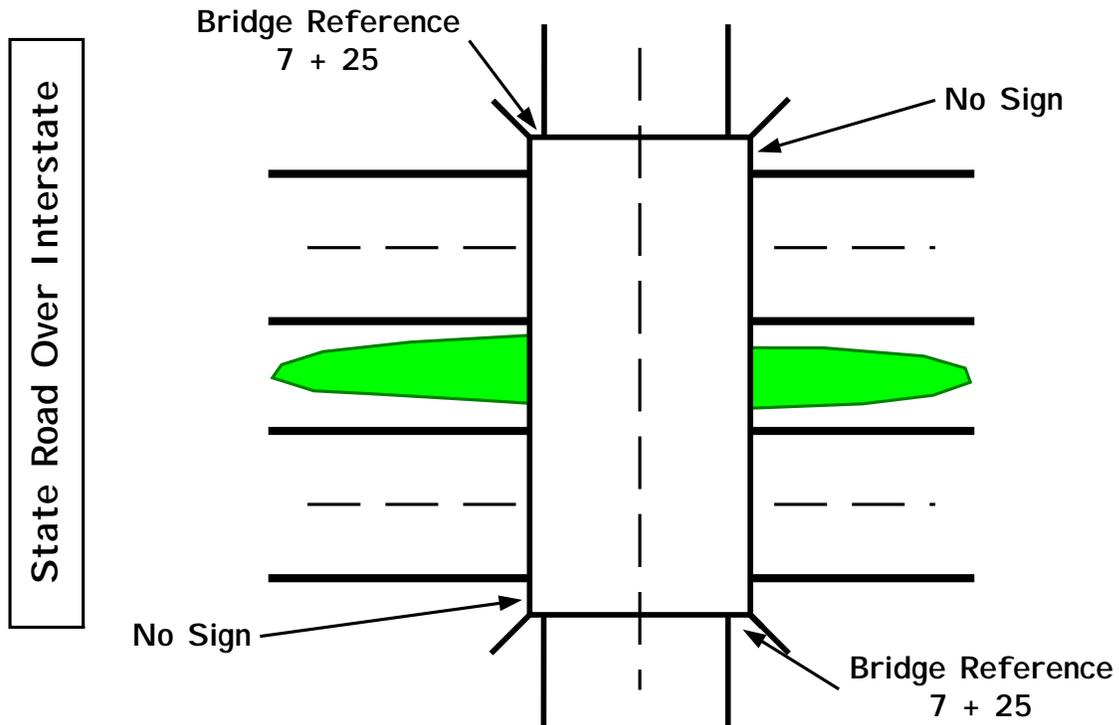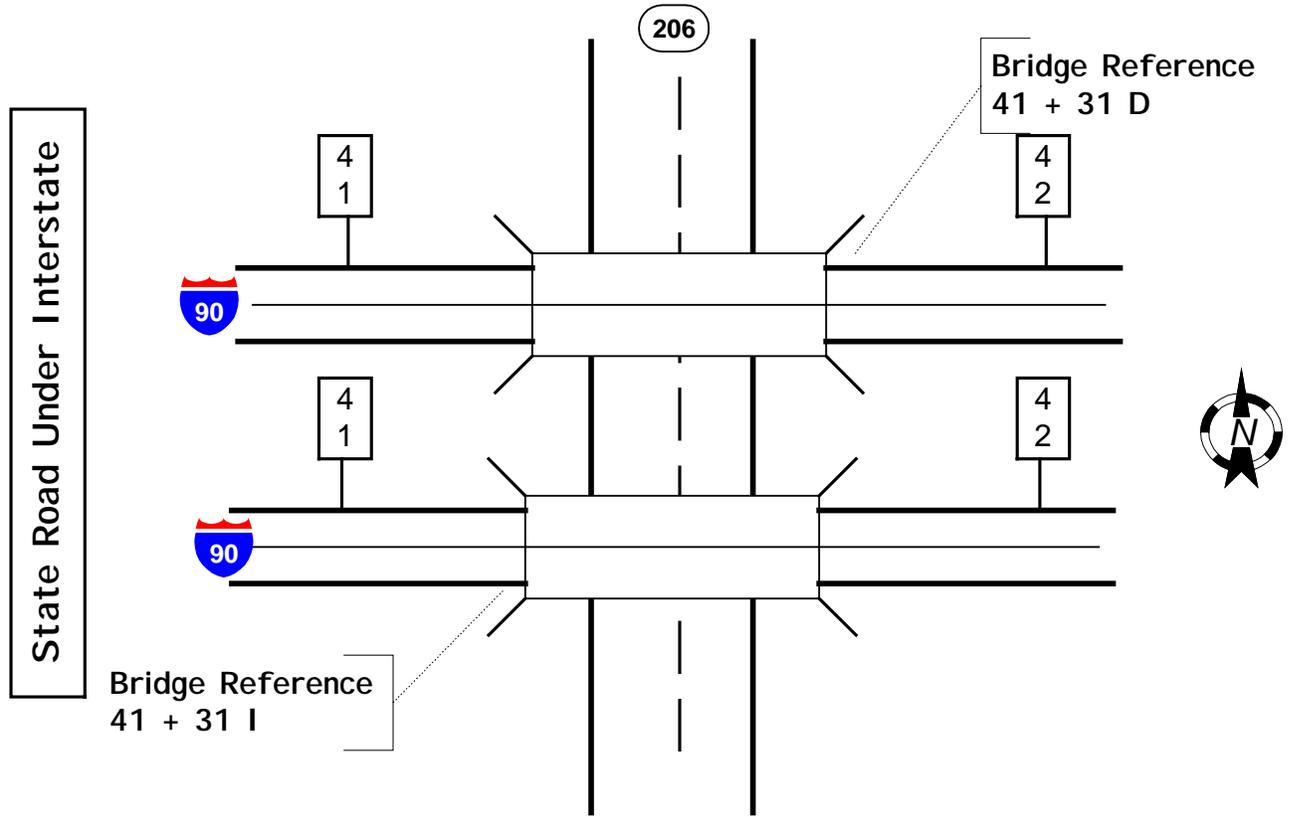
Figure 17: Detail Bridge Route Crossings

**All Three Structures
at same log mile**
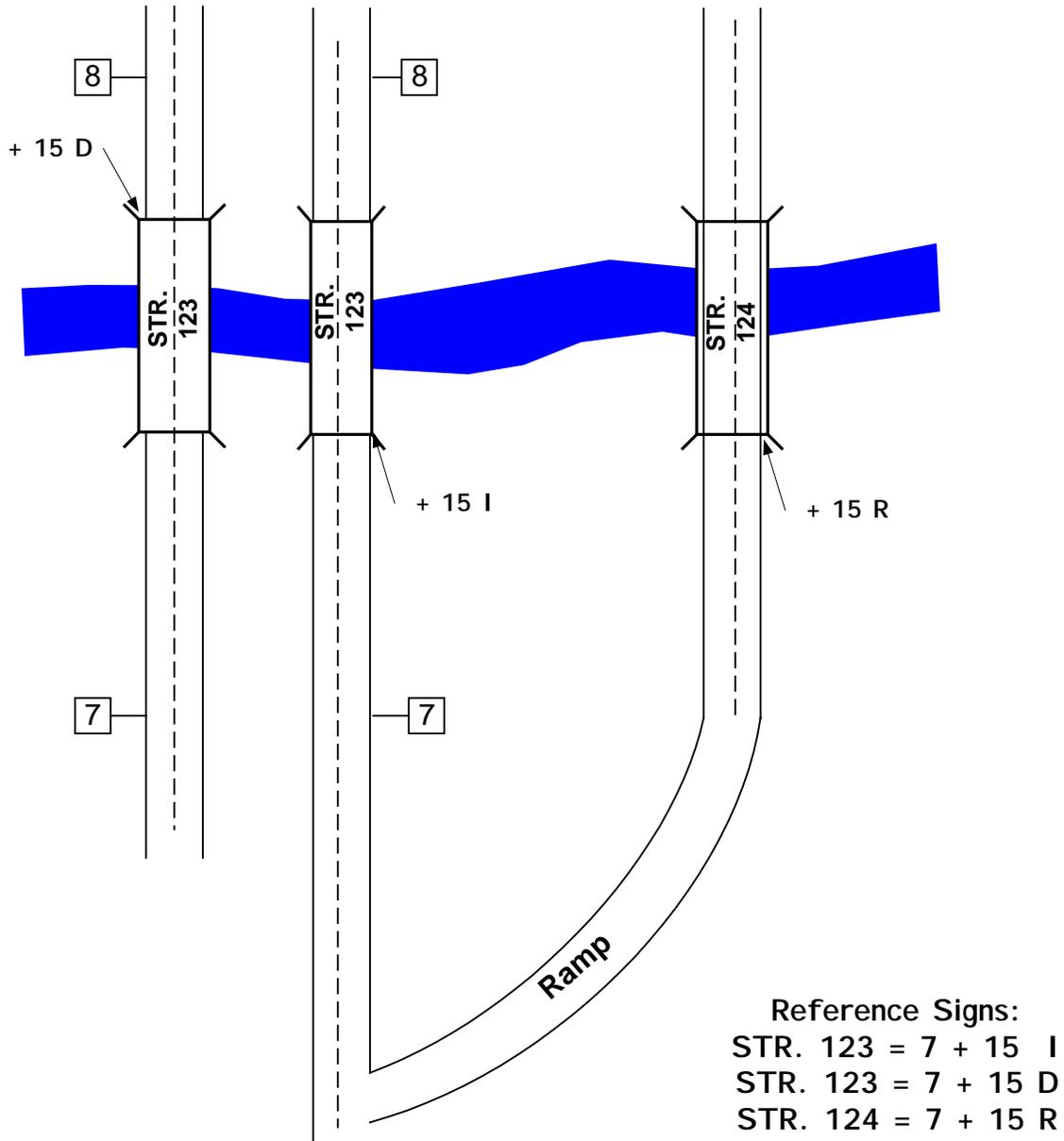
Figure 18: Detail Multiple Structures Same Location

County Road & Other Non-State
Overpass

No Sign

Bridge Reference
7 + 45

7

8

Bridge Reference
7 + 45

No Sign

7

8

N
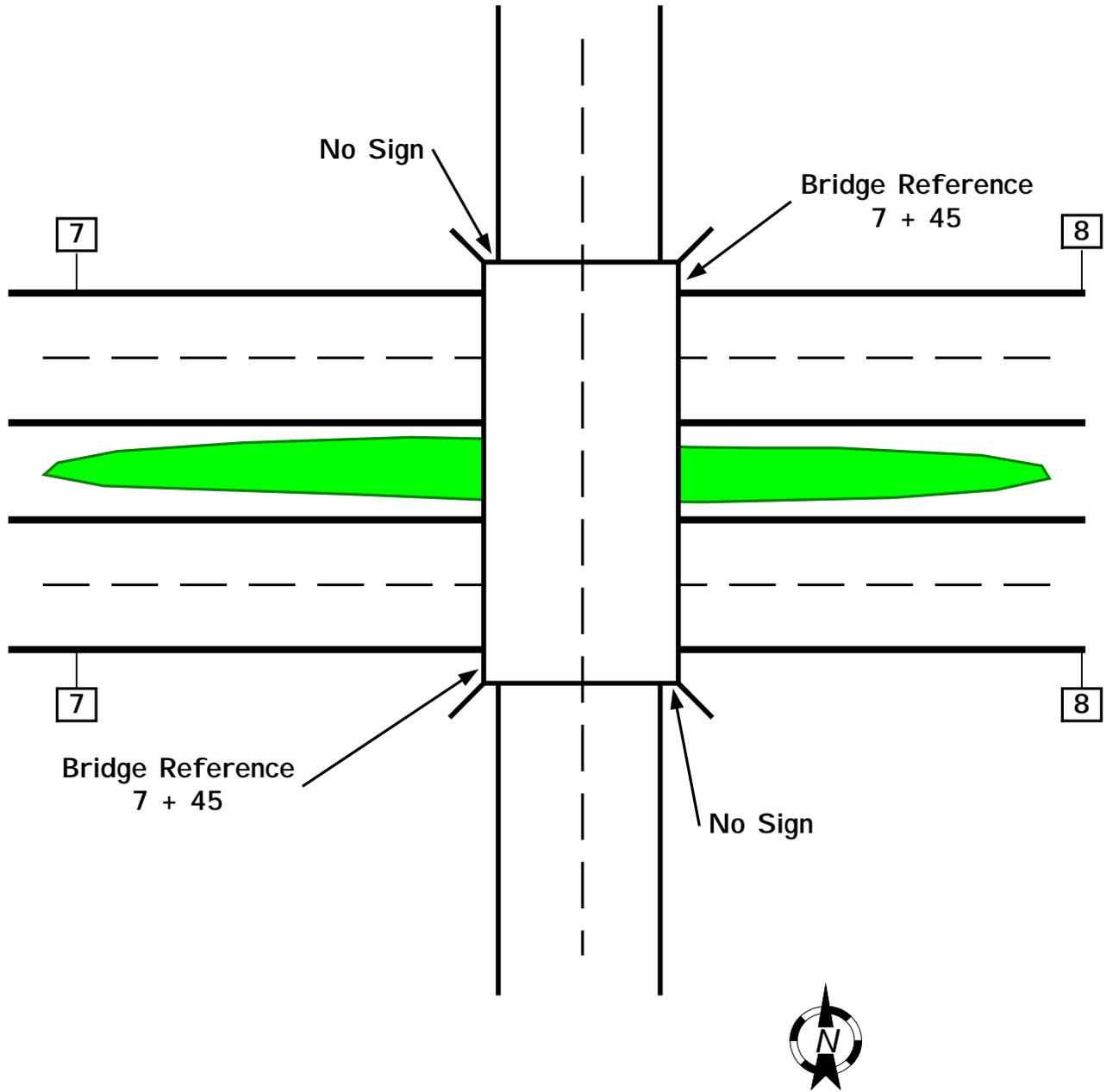
Figure 19: Detail Non-State Road Overpass