

**Recording and Coding Guide for the  
Structure Inventory and Appraisal of the  
Nation's Bridges (NBI)**



U.S. Department  
of Transportation  
**Federal Highway  
Administration**

# Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges

Report No. FHWA-PD-96-001



Office of Engineering  
Bridge Division

December 1995

## FOREWORD

The Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (Guide) has been revised several times in the past. This latest edition revises the Guide to convert all of the units of measurement to the International System of Units. This revised Guide represents several years of effort by the Federal Highway Administration with the States' cooperation and comments, both individually and through the AASHTO Subcommittee on Bridges and Structures.

Initial distribution of the Guide is being made directly to each FHWA field office for distribution to the States. Additional copies are available from the Bridge Management Branch (HNG-33) of the FHWA Bridge Division.

William A. Weseman, Director  
Office of Engineering

Under the Paper Work Reduction Act and CFR 1320 the Structure Inventory and Appraisal Sheet reporting requirements have been cleared by OMB under 2125-0501.

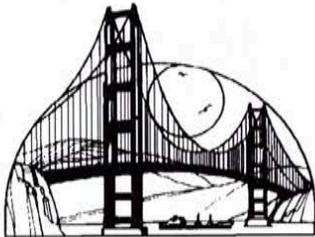
**RECORDING AND CODING GUIDE  
FOR THE STRUCTURE INVENTORY AND APPRAISAL OF THE NATION'S BRIDGES**

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U.S. Department  
of Transportation  
**Federal Highway  
Administration**



Prepared by

Office of Engineering  
Bridge Division  
Bridge Management Branch  
Washington, D.C. 20590

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## INTRODUCTION

The Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, hereafter referred to as the Guide, has been revised several times in the past. This latest edition revises the Guide to convert all of the units of measurement to the International System of Units (SI). It also provides more thorough and detailed guidance in evaluating and coding specific bridge data. New items have been added to include the reporting of Federal Lands Highway Systems, each State's existing linear referencing system (LRS), and the method used to determine the load ratings. Some items in the Guide have also been expanded to provide more definitive and explicit explanations and instructions for coding. Further, more basic definitions applicable to the instructions in the Guide are provided. The changes are based on comments received on the previous Guide and the metric version (January 1994) draft Guide. This revised Guide should be thoroughly reviewed by each individual involved with the National Bridge Inspection Program.

This Guide has been prepared for use by the States, Federal and other agencies in recording and coding the data elements that will comprise the National Bridge Inventory data base. By having a complete and thorough inventory, an accurate report can be made to the Congress on the number and state of the Nation's bridges. The Guide also provides the data necessary for the Federal Highway Administration (FHWA) and the Military Traffic Management Command to identify and classify the Strategic Highway Corridor Network and its connectors for defense purposes.

The coded items in this Guide are considered to be an integral part of the data base that can be used to meet several Federal reporting requirements, as well as part of the States' needs. These requirements are set forth in the National Bridge Inspection Standards (23 CFR 650.3) which are included as Appendix C. A complete, thorough, accurate, and compatible data base is the foundation of an effective bridge management system. Reports submitted in connection with the Highway Bridge Replacement and Rehabilitation Program and the National Bridge Inspection Program also are related to this Guide.

The AASHTO Manual for Condition Evaluation of Bridges discusses the various items of information that are to be recorded as part of original bridge reports. That manual and the Bridge Inspector's Training Manual/90, with supplements, discuss inspection procedures and the preparation of detailed reports about the structure components. These reports will be the basis for recording values for many of the data elements shown in the Guide, particularly those having to do with the condition or the appraisal ratings.

Some bridge owners are collecting bridge condition ratings for items included in this Guide (Items 58-Deck, 59-Superstructure, 60-Substructure, and 62-Culvere) using the American Association of

Highway and Transportation Officials' (AASHTO) Guide for Commonly Recognized (CoRe) Structural Elements. CoRe element inspection ratings provide detailed condition assessments that can serve as input into a comprehensive bridge management system (BMS). The FHWA has provided bridge owners with a computer program for translating bridge condition data in the CoRe element format to National Bridge Inventory (NBI) condition ratings for the purpose of NBI data submittal to FHWA. The purpose of the program is to permit bridge inspectors to record condition information in a format that satisfies both BMS and NBI data collection requirements.

The Structure Inventory and Appraisal (SI&A) Sheet and the sufficiency rating formula, with examples, are included as Appendices A and B, respectively. The SI&A sheet is intended to be a tabulation of the pertinent elements of information about an individual structure. Its use is optional, subject to the statements in the preceding paragraph of this Introduction. It is important to note that the SI&A Sheet is not an inspection form but merely a summary sheet of bridge data required by the FHWA to effectively monitor and manage a National bridge program.

States, Federal and other agencies are encouraged to use the codes and instructions in this Guide. However, its direct use is optional; each agency may use its own code scheme provided that the data are directly translatable into the Guide format. When data are requested by FHWA, the format will be based on the codes and instructions in this Guide. An agency choosing to use its own codes shall provide for translation or conversion of its own codes into those used in the Guide. In other words, agencies are responsible for having the capability to obtain, store, and report certain information about bridges whether or not this Guide or the SI&A Sheet is used. Any requests by the FHWA for submittals of these data will be based on the definitions, explanations, and codes supplied in the Guide, the AASHTO Manual for Condition Evaluation of Bridges and the Bridge Inspector's Training Manual/90 plus supplements.

The values provided in the tables or otherwise listed in this Guide are for rating purposes only. Current design standards must be used for structure design or rehabilitation. All possible combinations of actual site characteristics are not provided in this Guide. If a special situation not listed in the Guide is encountered, the evaluation criteria closest to the actual site situation should be used.

The implementation of this Guide may require some restructuring of an agency's data base and support software. If so, it is suggested that the agency consider the additional enhancements that would be necessary to support a bridge management system.

Appendix D is a Commentary that compares, item by item, the 1988 Guide to this Guide. The Commentary will provide a ready reference for item changes.

## DEFINITION OF TERMS

The definitions of terms used in the Guide are provided below.

- (1) Bridge. The National Bridge Inspection Standards published in the Code of Federal Regulations (23 CFR 650.3) give the following definition:  
A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet\* between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening.  
\* (6.1 meters)
- (b) Culvert. A structure designed hydraulically to take advantage of submergence to increase hydraulic capacity. Culverts, as distinguished from bridges, are usually covered with embankment and are composed of structural material around the entire perimeter, although some are supported on spread footings with the streambed serving as the bottom of the culvert. Culverts may qualify to be considered "bridge" length.
- (c) Inventory Route. The route for which the applicable inventory data is to be recorded. The inventory route may be on the structure or under the structure. Generally inventories along a route are made from west to east and south to north.
- (d) National Bridge Inventory (NBI). The aggregation of structure inventory and appraisal data collected to fulfill the requirements of the National Bridge Inspection Standards. Each State shall prepare and maintain an inventory of all bridges subject to the NBIS.
- (e) National Bridge Inventory (NBI) Record. Data which has been coded according to the Guide for each structure carrying highway traffic or each inventory route which goes under a structure. These data are furnished and stored in a compact alphanumeric format on magnetic tapes or disks suitable for electronic data processing.
- (f) National Bridge Inspection Standards (NBIS). Federal regulations establishing requirements for inspection procedures, frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of a State bridge inventory. The NBIS apply to all structures defined as bridges located on all public roads.
- (g) Public Road. Any road under the jurisdiction of and maintained by a public authority and open to public travel.

- (h) Structure Inventory and Appraisal (SI&A) Sheet. The graphic representation of the data recorded and stored for each NBI record in accordance with this Guide.
- (i) Strategic Highway Corridor Network (STRAHNET). A system of highways which are strategically important to the defense of the United States. It includes the Interstate Highways and 25,215 kilometers of other non-interstate highways. The Military Traffic Management Command Report SE 89-4b-27, Strategic Highway Corridor Network, January 1991, contains additional information on STRAHNET.
- (j) STRAHNET Connectors are roads that connect military installations and ports of embarkation to the STRAHNET. The connector routes represent about 3,042 kilometers of roads that complement STRAHNET.
- (k) Indian Reservation Road (IRR). A public road that is located within or provides access to an Indian reservation as described in Title 23, U.S.C., Sect.101. The terminus of a road providing access to an Indian reservation or other Indian land is defined as the point at which the road intersects with a road functionally classified as a collector or higher classification (outside the reservation boundary) in both urban and rural areas. In the case of access from an Interstate Highway, the terminus is the first interchange outside the reservation.
- (l) Land Management Highway System (LMHS). Consists of adjoining state and local public roads that provide major public access to Bureau of Land Management administered public lands, resources, and facilities.
- (m) Forest Highway (FH). A road, under the jurisdiction of, and maintained by, a public authority and open to public travel; wholly or partly within, or adjacent to, and serving the National Forest System (NFS) and which is necessary for the protection, administration, and utilization of the NFS and the use and development of its resources. (23 CFR 660).
- (n) Forest Service Development Road. A forest road wholly under the jurisdiction of the Forest Service, which may be "open to public travel". Bridges on Forest Service Development Roads which are "open to public travel" are subject to the NBIS.

- (o) Base Highway Network. The Base Highway Network includes the through lane (mainline) portions of the NHS, rural/urban principal arterial system and rural minor arterial system. Ramps, frontage roads and other roadways are not included in the Base Network.
- (p) Highway Performance Monitoring System. The Highway Performance Monitoring System (HPMS) is a database of universe and sample data that describes the nation's public road mileage. The data are annually updated and submitted to FHWA by the State Highway Agencies, Puerto Rico and the District of Columbia. The universe data provides some basic characteristics of all public road mileage while the sample of the arterial and collector systems allows for assessment of the condition, performance, usage and additional characteristics of the nation's major highway systems.
- (q) Conversion of Numerical Data. Throughout this Guide the following conversion factors are used:  
Convert                   - foot to meter multiply by 0.3048  
                                 - mile to kilometer multiply by 1.609  
                                 - english ton to metric ton multiply by .9
- (r) Rounding and Truncating of Numerical Data. All numeral values in this Guide, except as specifically noted, will follow standard rounding criteria, that is, 5 and above will be rounded up to the next higher unit and 4 and below will be rounded down to the next lower unit. This is applicable to all decimal roundings. **In certain items where rounding may cause a safety hazard for clearance, the numeric measurements will be truncated at the appropriate decimal place.** This means that a fractional portion less than a whole unit will be dropped to the lower whole number, for example 2.88 would be truncated to 2.8 when using tenth of a meter accuracy. All decimal points are assumed in the locations as specified in the Guide.
- (s) Commonly Recognized (CoRe) Structural Elements). A group of structural elements endorsed by AASHTO as a means of providing a uniform basis for data collection for any bridge management system, to enable the sharing of data between States, and to allow for a uniform translation of data to NBI Items 58, 59, 60 and 62.
- (t) Bridge management System (BMS). A system designed to optimize the use of available resources for the inspection, maintenance, rehabilitation and replacement of bridges.

**General Note:** If an inspection member or team leader is unsure of how to exactly code any of the following NBI items, then please direct any and all questions to the Bridge Inspection Engineer (BIE). The BIE may not have the answer right then and there, but will get back to the inspector within a reasonable time frame. Decisions may be made on case-by-case issue versus a hard and fixed rule depending on the circumstances.

DATA ITEMS

Item 1 - State Code

3 digits

The first 2 digits are the Federal Information Processing Standards (FIPS) code for States, and the third digit is the FHWA region code. (New Jersey and New York will retain an FHWA region code of 2.)

<u>Code</u>	<u>State</u>	<u>Code</u>	<u>State</u>
014	Alabama	308	Montana
020	Alaska	317	Nebraska
049	Arizona	329	Nevada
056	Arkansas	331	New Hampshire
069	California	342	New Jersey
088	Colorado	356	New Mexico
091	Connecticut	362	New York
103	Delaware	374	North Carolina
113	District of Columbia	388	North Dakota
124	Florida	395	Ohio
134	Georgia	406	Oklahoma
159	Hawaii	410	Oregon
160	Idaho	423	Pennsylvania
175	Illinois	441	Rhode Island
185	Indiana	454	South Carolina
197	Iowa	468	South Dakota
207	Kansas	474	Tennessee
214	Kentucky	486	Texas
226	Louisiana	498	Utah
231	Maine	501	Vermont
243	Maryland	513	Virginia
251	Massachusetts	530	Washington
265	Michigan	543	West Virginia
275	Minnesota	555	Wisconsin
284	Mississippi	568	Wyoming
297	Missouri	721	Puerto Rico

Item 2 - Highway Agency District

2 digits

The highway agency district (State or Federal) in which the bridge is located shall be represented by a 2-digit code. Existing district numbers shall be used where districts are identified by number. Where districts are identified by name, a code number shall be assigned based on an alphabetical or organizational listing of the districts.

-----  
*002 Resource Location: Maps in Appendix A of this manual*

<u>Code</u>	<u>District</u>
01	North
02	Central
03	South
05	Canal

Item 3 - County (Parish) Code

3 digits

Counties shall be identified using the Federal Information Processing Standards (FIPS) codes given in the current version of the Census of Population and Housing - Geographic Identification Code Scheme.

-----  
*003 - Resource Location: ADC Map (Contact Bridge Inspection Engineer for bridges on a border)*

<u>Code</u>	<u>County</u>
001	Kent
003	New Castle
005	Sussex

Item 4 - Place Code

5 digits

Cities, towns, townships, villages, and other census-designated places shall be identified using the Federal Information Processing Standards (FIPS) codes given in the current version of the Census of Population and Housing - Geographic Identification Code Scheme. If there is no FIPS place code, then code all zeros.

-----  
*004 - Resource Location: Place Code list in Appendix B of this manual in conjunction with the ADC Map.*

*-Start with the nearest neighborhood or land feature and work your way away from the structure until you find the proper place code. If a structure is within the limits of a town or city, then the place code for that structure would be that town or city.*

Item 5 - Inventory Route

9 digits

The inventory route is a 9-digit code composed of 5 segments.

<u>Segment</u>	<u>Description</u>	<u>Length</u>
5A	Record Type	1 digit
5B	Route Signing Prefix	1 digit
5C	Designated Level of Service	1 digit
5D	Route Number	5 digits
5E	Directional Suffix	1 digit

Item 5A - Record Type

1 digit

There are two types of National Bridge Inventory records: "on" and "under". Code the first digit (leftmost) using one of the following codes:

<u>Code</u>	<u>Description</u>
1	Route carried "on" the structure
2	Single route goes "under" the structure
A through Z	Multiple routes go "under" the structure

A signifies the first of multiple routes under the structure.  
B signifies the second of multiple routes under the structure.  
Z signifies 26 routes under the structure.

"On" signifies that the inventory route is carried "on" the structure. Each bridge structure carrying highway traffic must have a record identified with a type code = 1 (numeric). All of the NBI data items

Item 5A - Record Type (cont'd)

must be coded, unless specifically excepted, with respect to the structure and the inventory route "on" it.

"Under" signifies that the inventory route goes "under" the structure. If an inventory route beneath the structure is a Federal-aid highway, is a STRAHNET route or connector or is otherwise important, a record must be coded to identify it. The type code must be 2 or an alphabetic letter A through Z. Code 2 for a single route under the structure. If 2 or more routes go under a structure on separate roadways, the code of 2 shall not be used. Code A, B, C, D, etc. consecutively for multiple routes on separate roadways under the same structure. STRAHNET routes shall be listed first. When this item is coded 2 or A through Z, only the following items must be coded: Items 1, 3-13, 16, 17, 19, 20, 26-30, 42, 43, 47-49, 100-104, 109 and 110. All other items may remain blank.

It cannot be overemphasized that all route-oriented data must agree with the coding as to whether the inventory route is "on" or "under" the structure.

Tunnels shall be coded only as an "under" record; that is, they shall not be coded as a structure carrying highway traffic.

There are situations of a route "under" a structure, where the structure does not carry a highway, but may carry a railroad, pedestrian traffic, or even a building. These are coded the same as any other "under" record and no "on" record shall be coded.

-----  
*005A - Resource Location: RIMS, in conjunction with past inspection photos and the ADC Map.  
-If the under record is a dual highway, such as I-95 N&S or US13N&S, one under record is to be used(Item 5A = 2), unless the functional class is different for the two different directions.*

Item 5B - Route Signing Prefix 1 digit

In the second position, identify the route signing prefix for the inventory route using one of the following codes:

<u>Code</u>	<u>Description</u>
1	Interstate highway
2	U.S. numbered highway
3	State highway
4	County highway
5	City street
6	Federal lands road
7	State lands road
8	Other (include toll roads not otherwise indicated or identified above)

When 2 or more routes are concurrent, the highest class of route will be used. The hierarchy is in the order listed above.

-----  
*005B - Resource Location: RIMS  
- Subdivisions shall be marked as a "5" (City Street)  
- Park Roads with a maintenance road number shall be coded as a "4"  
- Park Roads without a maintenance road number shall be marked as a "7"  
- On/Under records for bridges in a service plaza shall be coded as "8"  
- Unclassified frontage road or shopping plaza shall be coded as an "8"*

Item 5C - Designated Level of Service 1 digit

In the third position, identify the designated level of service for the inventory route using one of the following codes:

<u>Code</u>	<u>Description</u>
0	None of the below
1	Mainline
2	Alternate
3	Bypass
4	Spur
6	Business
7	Ramp, Wye, Connector, etc.
8	Service and/or unclassified frontage road

-----  
*005C - Resource Location: ADC Map*  
 - City streets, subdivisions and park roads (with or without a maintenance road number) are to be coded as "1".  
 - Service plaza, shopping plaza or unclassified frontage roads shall be coded as an "8"

Item 5D - Route Number 5 digits

Code the route number of the inventory route in the next 5 positions. This value shall be right justified in the field with leading zeros filled in. (See examples below.)

If concurrent routes are of the same hierarchy level, denoted by the route signing prefix, the lowest numbered route shall be coded. Code 00000 for bridges on roads without route numbers.

-----  
*005D - Resource Location: RIMS*

Item 5E - Directional Suffix 1 digit

In the last position, code the directional suffix to the route number of the inventory route when it is part of the route number, using one of the following codes:

<u>Code</u>	<u>Description</u>
0	Not applicable
1	North
2	East
3	South
4	West

In some cases, letters may be used with route numbers and as part of the route numbers and not to indicate direction. In such cases, the letter should be included in the 5-position route number field.

EXAMPLES:	<u>Record</u>	<u>Code</u>
Interstate 95, on	1 1 1 00095 0	111000950
Interstate 70S, under	2 1 1 00070 3	211000703
State Highway 104, Spur, under	2 3 4 00104 0	234001040
U.S. 30E Bypass, on	1 2 3 00030 2	123000302

Item 5E - Directional Suffix - (cont'd)

EXAMPLES:

	<u>Record</u>	<u>Code</u>
City street, on	1 5 0 00000 0	150000000
Ramp from I-81, under	2 1 7 00081 0	217000810
County Highway 173 on	1 4 1 00173 0	141001730
Interstate 84 under	2 1 1 00084 0	211000840
Interstate 495 on	1 1 1 00495 0	111004950
State Hwy 120 (STRAHNET Rte) under	A 3 1 00120 0	A31001200
Alternate State Hwy 130 under	B 3 2 00130 0	B32001300
Tunnel on Interstate 70	2 1 1 00070 0	211000700

Item 6 - Features Intersected

25 digits

This item contains a description of the features intersected by the structure and a critical facility indicator. When Item 5A indicates an "under" record, this item describes the inventory route and/or features under the structure. There are 25 digits divided into 2 segments.

<u>Segment</u>	<u>Description</u>	<u>Length</u>
6A	Features Intersected	24 digits
6B	No Longer Coded (Blank)	1 digit

The information to be recorded for this item in the first 24 digits shall be the name or names of the features intersected by the structure. When one of the features intersected is another highway, the signed number or name of the highway shall appear first (leftmost) in the field. The names of any other features shall follow, separated by a semicolon or a comma. Parentheses shall be used to provide a second identification of the same feature (see third example). Abbreviations may be used where necessary, but an effort shall be made to keep them meaningful. The data in this segment shall be left justified in the first 24 positions without trailing zeros.

EXAMPLES:

I 81, US 51, MILL ROAD  
 MISSISSIPPI RIVER  
 SR 42 (POND ROAD)

-----  
*006 - Resource Location: ADC Maps or RIMS*

Item 7 - Facility Carried by Structure

18 digits

The facility being carried by the structure shall be recorded and coded. In all situations this item describes the use "on" the structure. This item shall be left justified without trailing zeros.

EXAMPLES:

US 66  
 MAIN STREET  
 COUNTY ROAD 450  
 C & O RAILROAD (appropriate for "under" record only)  
 PEDESTRIAN BRIDGE (appropriate for "under" record only)

-----  
*007 - Resource Location: RIMS or ADC Map if not in RIMS*

Item 8 - Structure Number

15 digits

It is required that the official structure number be recorded. It is not necessary to code this number according to an arbitrary national standard. Each agency should code the structure number according to its own internal processing procedures. When recording and coding for this item and following items, any structure or structures with a closed median should be considered as one structure, not two. Closed medians may have either mountable or non-mountable curbs or barriers.

The structure number must be unique for each bridge within the State, and once established should preferably never change for the life of the bridge. If it is essential that structure number(s) must be changed, all 15 digits are to be filled. For any structure number changes, a complete cross reference of corresponding "old" and "new" numbers must be provided to the FHWA Bridge Division. The cross reference shall include both a computer tape or diskette and a printed listing in the FHWA required format.

The identical structure number must appear on the "on" and all "under" records associated with a particular structure. (Refer to Item 5 - Inventory Route).

Item 9 - Location

25 digits

This item contains a narrative description of the bridge location. It is recommended that the location be keyed to a distinguishable feature on an official highway department map such as road junctions and topographical features. This item shall be left justified without trailing zeros.

EXAMPLES:

6 km SW. OF RICHMOND  
3.5 km S. OF JCT. SR 69

-----  
*009 - Resource Location: ADC Maps*

Item 10 - Inventory Route, Minimum Vertical Clearance  
(XX.XX meters)

4 digits

Code the minimum vertical clearance over the inventory route identified in Item 5, whether the route is "on" the structure or "under" the structure. The minimum clearance for a 3-meter width of the pavement or traveled part of the roadway where the clearance is the greatest shall be recorded and coded as a 4-digit number truncated to the hundredth of a meter (with an assumed decimal point). For structures having multiple openings, clearance for each opening shall be recorded, but only the greatest of the "minimum clearances" for the two or more openings shall be coded regardless of the direction of travel. This would be the practical maximum clearance. When no restriction exists or when the restriction is 30 meters or greater, code 9999. Coding of actual clearances between 30.0 and 99.99 meters to an exact measurement is optional.

-----  
*010 - Resource Location: Measure out in field @ edge of each lane at both faces of the bridge during the inspection. Measurements are to be recorded on Under-clearance Sketch Sheet for bridge.*

Item 11 - Kilometer point (XXXX.XXX)

7 digits

The linear referencing system (LRS) kilometer point is used to establish the location of the bridge on the Base Highway Network (see Item 12). It must be from the same LRS Inventory Route and kilometer point system as reported in the Highway Performance Monitoring System (HPMS). The kilometer point coded in this item directly relates to Item 13 - LRS Inventory Route, Subroute Number.

This item must be coded for all structures located on or overpassing the Base Highway Network. Code a 7-digit number to represent the LRS kilometer-point distance in kilometers to the nearest thousandth (with an assumed decimal point). For structures carrying the LRS Inventory Route, code the kilometer point at the beginning of the structure (i.e. the lowest kilometer-point on the bridge). When the LRS Inventory Route goes under the structure (Item 5A coded 2 or A-Z), then code the kilometer point on the underpassing route where the structure is first encountered.

Code all zeros in this field for all records where kilometer points are not provided. Kilometer points may be coded for bridges that are not located on the Base Highway Network, however Item 12 - Base Highway Network shall be coded 0 for these records.

The kilometer point is coded aligned to the assumed decimal point and zero filled where needed to fill the 7 digits.

EXAMPLES:

Code

Kilometer point is 130.34	0130340
Kilometer point is 9.60	0009600

-----  
*011 - Resource Location: RIMS for state maintained roads & Geomedia or Inform for non-state owned roads. Can also utilize DelDOT's video logging (<http://gis1/roadware/index.html>)*

*- For parallel bridges, use the mile point in the "forward" or "reverse" direction for at the beginning of corresponding each bridge. (Ex. 1-394N&S; milepoint for forward direction from RIMS says 1.24 miles, then 1.24 miles would be used for 1-394N / milepoint in reverse direction from RIMS says 8.49 miles - 8.49 would be used for 1-394S)*

Item 12 - Base Highway Network

1 digit

This item is to be coded for all records in the inventory. The Base Highway Network includes the through lane (mainline) portions of the NHS, rural/urban principal arterial system and rural minor arterial system. Ramps, frontage roads and other roadways are not included in the Base Network. For the inventory route identified in Item 5 - Inventory Route, indicate whether the inventory route is on the Base Highway Network or not on that network. Use one of the following codes:

<u>Code</u>	<u>Description</u>
0	Inventory Route <u>is not</u> on the Base Network
1	Inventory Route <u>is</u> on the Base Network

-----  
*012 - Coding Notes: Code 1 if the road has Functional Class (Item #26) coded as a 1,2,6,11,12, or 14; otherwise code 0.*

Item 13 - LRS Inventory Route, Subroute Number 12 digits

If Item 12 - Base Highway Network has been coded 1, the information to be recorded for this item is inventory route for the State's linear referencing system (LRS). If Item 12 has been coded 0, this entire item should be left blank. This item is a 12-digit code composed of 2 segments.

<u>Segment</u>	<u>Description</u>	<u>Length</u>
13A	LRS Inventory Route	10 digits
13B	Subroute Number	2 digits

The LRS inventory route and subroute numbers to be reported in this item must correspond to the LRS inventory route and subroute numbers reported by the State for the HPMS. The LRS inventory route number is coded in the ten positions of segment 13A, right justified and zero filled. The subroute number, if it exists, is coded in the two positions of segment 13B, right justified and zero filled.

The LRS inventory route number can be alphanumeric, but must not contain blanks. The LRS inventory route number is not necessarily the same as that posted along the roadway, but is a number used to uniquely identify a route within at least a county and perhaps throughout the State.

The subroute number is a number that uniquely identifies portions of an inventory route sections where duplicate kilometer points occur. These subroute numbers, if they exist, are identified in the State's HPMS-LRS records. If there is no subroute number, code 00 in this segment.

<u>EXAMPLES:</u>	<u>13A Code</u>	<u>13B Code</u>
Maintenance Road 277	0000000277	00
Maintenance Road 325A	000000325A	00
Maintenance Road 3	0000000003	00

-----  
*013A & 13B - Resource Location: RIMS*

Item 14 and Item 15

(Reserved)

Item 16 - Latitude (XX degrees XX minutes XX.XX seconds) 8 digits

For bridges on STRAHNET and STRAHNET Connector highways and on the NHS, record and code the latitude of each in degrees, minutes and seconds to the nearest hundredth of a second (with an assumed decimal point). The point of the coordinate may be the beginning of the bridge in the direction of the inventory or any other consistent point of reference on the bridge which is compatible with the LRS. If the bridge is not on a STRAHNET highway or the NHS, a code of all zeros is acceptable, but it is preferable to code the latitude if available.

The reason for the increased precision is to facilitate the use of Global Positioning System (GPS) data directly into this item. The increased precision is not currently mandatory and, if GPS readings are not available, the current measuring methods and level of precision may continue to be used. The minimum precision should be to the nearest minute, but the preferred precision is to the nearest

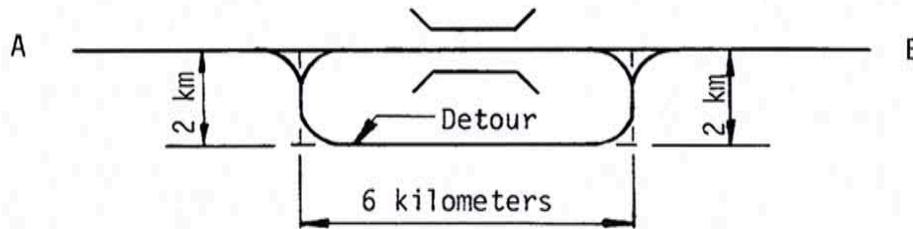


Item 19 - Bypass, Detour Length (cont'd)

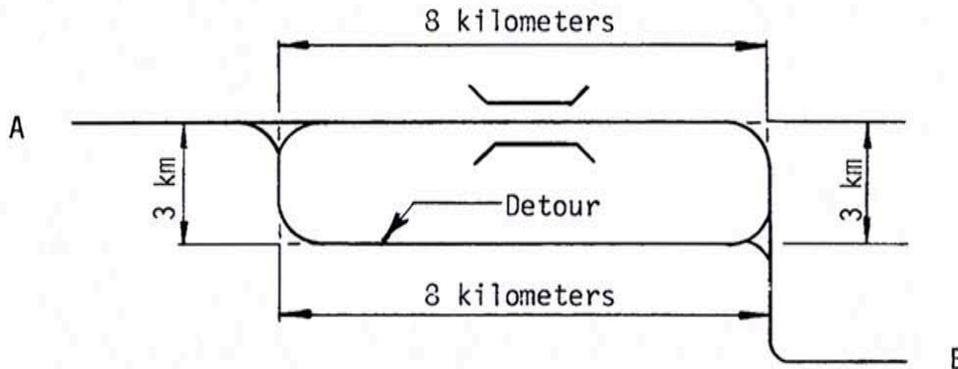
If the bridge is one of twin bridges and is not at an interchange, code 001 where the other twin bridge can be used as a temporary bypass with a reasonable amount of crossover grading. The detour route will be established following allowable criteria determined by the governing authority. (Some authorities will not allow a designated detour over a road or bridge of lesser "quality.") Code 199 for 199 kilometers or more.

EXAMPLES:

	<u>Code</u>
Diamond interchange, structure bypassable	000
Cloverleaf, not bypassable; 18-kilometer detour	018
Structure over river; 121-kilometer detour	121
Structure over highway, no interchange,	
bypassable at ground level	000
Structure on dead end road	199



Bypass, Detour Length A to B = 4 kilometers



Bypass, Detour Length A to B = 0 kilometers

-----  
*019 - Resource Location: Inform or scaled off of ADC Maps*

Item 20 - Toll

1 digit

The toll status of the structure is indicated by this item. Interstate toll segments under Secretarial Agreement (Title 23 - United States Code - Highways Section 129 as amended by 1991 ISTEA and prior legislation) shall be identified separately. Use one of the following codes:

<u>Code</u>	<u>Description</u>
1	Toll bridge. Tolls are paid specifically to use the structure.
2	On toll road. The structure carries a toll road, that is, tolls are paid to use the facility, which includes both the highway and the structure.
3	On free road. The structure is toll-free and carries a toll-free highway.
4	On Interstate toll segment under Secretarial Agreement. Structure functions as a part of the toll segment.
5	Toll bridge is a segment under Secretarial Agreement. Structure is separate agreement from highway segment.

-----  
*020 - Coding Notes: Toll facility locations include:*

- *I95 from Maryland Line to SR141 (Exit 5)*
- *SR1 from JCT SR72 (Wrangle Hill Rd - Exit 152) to Dover Airforce Base - North Gate (Exit 93)*

Item 21 - Maintenance Responsibility

2 digits

The actual name(s) of the agency(s) responsible for the maintenance of the structure shall be recorded on the inspection form. The codes below shall be used to represent the type of agency that has primary responsibility for maintaining the structure. If more than one agency has equal maintenance responsibility, code one agency in the hierarchy of State, Federal, county, city, railroad, and other private.

<u>Code</u>	<u>Description</u>
01	State Highway Agency
02	County Highway Agency
03	Town or Township Highway Agency
04	City or Municipal Highway Agency
11	State Park, Forest, or Reservation Agency
12	Local Park, Forest, or Reservation Agency
21	Other State Agencies
25	Other Local Agencies
26	Private (other than railroad)
27	Railroad
31	State Toll Authority
32	Local Toll Authority
60	Other Federal Agencies (not listed below)
61	Indian Tribal Government
62	Bureau of Indian Affairs
63	Bureau of Fish and Wildlife
64	U.S. Forest Service
66	National Park Service
67	Tennessee Valley Authority
68	Bureau of Land Management
69	Bureau of Reclamation
70	Corps of Engineers (Civil)
71	Corps of Engineers (Military)
72	Air Force
73	Navy/Marines
74	Army
75	NASA
76	Metropolitan Washington Airports Service
80	Unknown

Item 22 - Owner

2 digits

The actual name(s) of the owner(s) of the bridge shall be recorded on the inspection form. The codes used in Item 21 - Maintenance Responsibility shall be used to represent the type of agency that is the primary owner of the structure. If more than one agency has equal ownership, code one agency in the hierarchy of State, Federal, county, city, railroad, and other private.

Item 23 through Item 25

(Reserved)

Item 26 - Functional Classification of Inventory Route 2 digits

For the inventory route, code the functional classification using one of the following codes:

<u>Code</u>		<u>Description</u>
	<u>Rural</u>	
01		Principal Arterial - Interstate
02		Principal Arterial - Other
06		Minor Arterial
07		Major Collector
08		Minor Collector
09		Local
	<u>Urban</u>	
11		Principal Arterial - Interstate
12		Principal Arterial - Other Freeways or Expressways
14		Other Principal Arterial
16		Minor Arterial
17		Collector
19		Local

The bridge shall be coded rural if not inside a designated urban area. The urban or rural designation shall be determined by the bridge location and not the character of the roadway.

-----  
*026 - Resource Location: RIMS & REFERENCE CHART IN APPENDIX F*

Item 27 - Year Built 4 digits

Record and code the year of construction of the structure. Code all 4 digits of the year in which construction of the structure was completed. If the year built is unknown, provide a best estimate. See also Item 106 - Year Reconstructed.

EXAMPLES:

		<u>Code</u>
Construction completed	1956	1956
	1892	1892

-----  
*027 - Resource Location: Plans, Historic Bridge Book, Archived Documents*

Item 28 - Lanes On and Under the Structure 4 digits

Record and code the number of lanes being carried by the structure and being crossed over by the structure as a 4-digit number composed of 2 segments. The number of lanes should be right justified in each segment with leading zero(s) coded as required.

<u>Segment</u>	<u>Description</u>	<u>Length</u>
28A	Lanes on the structure	2 digits
28B	Lanes under the structure	2 digits

Include all lanes carrying highway traffic (i.e., cars, trucks, buses) which are striped or otherwise operated as a full width traffic lane for the entire length of the structure or under the structure by the owning/maintaining authority. This shall include any full width merge

Item 28 - Lanes On and Under the Structure (cont'd)

lanes and ramp lanes, and shall be independent of directionality of usage (i.e., a 1-lane bridge carrying 2-directional traffic is still considered to carry only one lane on the structure). It should be noted here that for the purpose of evaluating the Deck Geometry - Item 68, any "1-lane" bridge, not coded as a ramp (Item 5C = 7), which has a Bridge Roadway Width, Curb-to-Curb - Item 51 coded 4.9 meters or greater shall be evaluated as 2 lanes.

When the inventory route is "on" the bridge (the first digit of Item 5 - Inventory Route is coded 1), the sum of the total number of lanes on all inventoried routes under the bridge shall be coded. When the inventory route is "under" the bridge (the first digit of Item 5 - Inventory Route is coded 2 or A through Z), only the number of lanes being identified by that "under" record shall be coded in Item 28B.

When the inventory route is "under" the structure, the obstruction over the inventory route may be other than a highway bridge (railroad, pedestrian, pipeline, etc.). Code 00 for these cases if there are no highway lanes on the obstructing structure.

Double deck bridges may be coded as 1 or 2 structures as noted in the examples on the next page. Either method is acceptable, however, all related data must be compatible with the method selected.

EXAMPLES\*:

	<u>Code</u>
1 lane on, 0 lanes under	0100
3 lanes on, 1 lane under	0301
8 lanes on 2-way, 12 lanes under **	0812
5 lanes on double deck each direction, 2 lanes under	1002***
5 lanes on double deck each direction, 2 lanes under	0502****
Railroad and pedestrian on, 4 lanes under	0004

\* For the inventory route on the bridge, the first digit of Item 5 - Inventory Route is coded 1.

\*\* This example has 3 inventory routes under the bridge of 6, 4, and 2 lanes of 2-way traffic respectively. When coding an "under" record for each of these inventory routes, the first digit of Item 5 - Inventory Route is coded A, B, and C, and Item 28 is coded 0806, 0804, and 0802 respectively for the 3 required records.

\*\*\*Acceptable if coded as 1 bridge. However, other data such as ADT, curb- to-curb width, etc., must be for both decks (preferred method).

\*\*\*\*Acceptable if coded as 2 separate bridges. However, other data such as ADT, curb-to-curb width, etc., must be for a single deck.

Item 29 - Average Daily Traffic

6 digits

Code a 6-digit number that shows the average daily traffic volume for the inventory route identified in Item 5. Make certain the unit's position is coded even if estimates of ADT are determined to tens or hundreds of vehicles; that is, appropriate trailing zeros shall be coded. The ADT coded should be the most recent ADT counts available. Included in this item are the trucks referred to in Item 109 - Average Daily Truck Traffic. If the bridge is closed, code the actual ADT from before the closure occurred.

The ADT must be compatible with the other items coded for the bridge. For example, parallel bridges with an open median are coded as follows: if Item 28 - Lanes On and Under the Structure and Item 51 - Bridge Roadway Width, Curb-to-Curb are coded for each bridge separately, then the ADT must be coded for each bridge separately (not the total ADT for the route).

EXAMPLES:

		<u>Code</u>
Average Daily Traffic	540	000540
	15,600	015600
	24,000	024000

-----  
*029 - Resource Location: DeIDOT Traffic Summary book found on intranet  
([http://mydot/deidot/reports/traffic\\_summary.htm](http://mydot.deidot/reports/traffic_summary.htm))*

Item 30 - Year of Average Daily Traffic

4 digits

Record the year represented by the ADT in Item 29. Code all four digits of the year so recorded.

EXAMPLE:

	<u>Code</u>
Year of ADT is 1994	1994

Item 31 - Design Load

1 digit

Use the codes below to indicate the live load for which the structure was designed. The numerical value of the railroad loading should be recorded on the form. Classify any other loading, when feasible, using the nearest equivalent of the loadings given below.

<u>Code</u>	<u>Metric Description</u>	<u>English Description</u>
1	M 9	H 10
2	M 13.5	H 15
3	MS 13.5	HS 15
4	M 18	H 20
5	MS 18	HS 20
6	MS 18+Mod	HS 20+Mod
7	Pedestrian	Pedestrian
8	Railroad	Railroad
9	MS 22.5	HS 25
0	Other or Unknown (describe on inspection reporting form)	

-----  
*031 - Inspectors shall leave this item alone.*

Item 32 - Approach Roadway Width (XXX.X meters)

4 digits

Code a 4-digit number to represent the normal width of usable roadway approaching the structure measured to the nearest tenth of a meter (with an assumed decimal point). Usable roadway width will include the width of traffic lanes and the widths of shoulders where shoulders are defined as follows:

Shoulders must be constructed and normally maintained flush with the adjacent traffic lane, and must be structurally adequate for all weather and traffic conditions consistent with the facility carried.

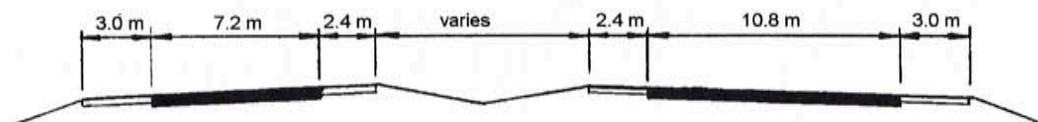
Unstabilized grass or dirt, with no base course, flush with and beside the traffic lane is not to be considered a shoulder for this item.

For structures with medians of any type and double-decked structures, this item should be coded as the sum of the usable roadway widths for the approach roadways (i.e., all median widths which do not qualify as shoulders should not be included in this dimension). When there is a variation between the approaches at either end of the structure, record and code the most restrictive of the approach conditions.

EXAMPLES:

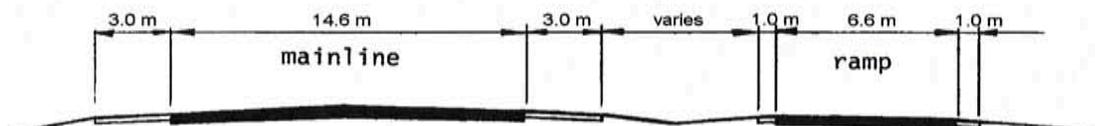
<u>Left Shoulder</u>	<u>Left Roadway</u>	<u>Median Shoulders</u>	<u>Right Roadway</u>	<u>Right Shoulder</u>	<u>Code</u>
1.2	-	-	4.8	1.8	0078
1.8	-	-	10.8	3.6	0162
3.6	14.4	9.0	14.4	3.6	0450
3.0	7.2	4.8	10.8	3.0	0288

The last example above represents the coding method for a structure in which the most restrictive approach has the cross-section shown below:



Regardless of whether the median is open or closed, the data coded must be compatible with the other related route and bridge data (i.e., if Item 51 - Bridge Roadway Width, Curb-to-Curb is for traffic in one direction only, then Items 28, 29, 32, etc. must be for traffic in one direction only).

If a ramp is adjacent to the through lanes approaching the structure, it shall be included in the approach roadway width. The total approach roadway width for the example below is 29.2 meters (a code of 292).

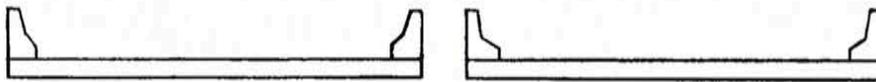


Item 33 - Bridge Median

1 digit

Indicate with a 1-digit code if the median is non-existent, open or closed. The median is closed when the area between the 2 roadways at the structure is bridged over and is capable of supporting traffic. All bridges that carry either 1-way traffic or 2-way traffic separated only by a centerline will be coded 0 for no median.

<u>Code</u>	<u>Description</u>
0	No median
1	Open median
2	Closed median (no barrier)
3	Closed median with non-mountable barriers



Open Median



Closed Median



Closed Median with Non-mountable Barrier

Item 34 - Skew (XX degrees)

2 digits

The skew angle is the angle between the centerline of a pier and a line normal to the roadway centerline. When plans are available, the skew angle can be taken directly from the plans. If no plans are available, the angle is to be field measured if possible. Record the skew angle to the nearest degree. If the skew angle is 0E, it should be so coded. When the structure is on a curve or if the skew varies for some other reason, the average skew should be recorded, if reasonable. Otherwise, record 99 to indicate a major variation in skews of substructure units. A 2-digit number should be coded.

EXAMPLES:

Skew angle	Code
0°	00
10°	10
8°	08
29°	29

Item 35 - Structure Flared

1 digit

Code this item to indicate if the structure is flared (i.e., the width of the structure varies). Generally, such variance will result from ramps converging with or diverging from the through lanes on the structure, but there may be other causes. Minor flares at ends of structures should be ignored.

<u>Code</u>	<u>Description</u>
0	No flare
1	Yes, flared

-----  
*035 - Coding Notes: Does not apply to flared pipe ends.*

Item 36 - Traffic Safety Features

4 digits

Bridge inspection shall include the recording of information on the following traffic safety features so that the evaluation of their adequacy can be made.

- (A) Bridge railings: Some factors that affect the proper functioning of bridge railing are height, material, strength, and geometric features. Railings must be capable of smoothly redirecting an impacting vehicle. Bridge railings should be evaluated using the current AASHTO Standard Specifications for Highway Bridges, which calls for railings to meet specific geometric criteria and to resist specified static loads without exceeding the allowable stresses in their elements. Bridge railing should be crash tested per FHWA policy. Railings that meet these criteria and loading conditions are considered acceptable. Other railings that have been successfully crash tested are considered acceptable even though they may not meet the static loading analysis and geometric requirements. Acceptable guidelines for bridge railing design and testing are also found in the AASHTO Guide Specifications for Bridge Railings 1989. Additional guidance for testing is found in National Cooperative Highway Research Program - Report 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features 1993.

Item 36 - Traffic Safety Features (cont'd)

- (B) Transitions: The transition from approach guardrail to bridge railing requires that the approach guardrail be firmly attached to the bridge railing. It also requires that the approach guardrail be gradually stiffened as it comes closer to the bridge railing. The ends of curbs and safety walks need to be gradually tapered out or shielded.
- (C) Approach guardrail: The structural adequacy and compatibility of approach guardrail with transition designs should be determined. Rarely does the need for a barrier stop at the end of a bridge. Thus, an approach guardrail with adequate length and structural qualities to shield motorists from the hazards at the bridge site needs to be installed. In addition to being capable of safely redirecting an impacting vehicle, the approach guardrail must also facilitate a transition to the bridge railing that will not cause snagging or pocketing of an impacting vehicle. Acceptable guardrail design suggestions are contained in the AASHTO Roadside Design Guide and subsequent FHWA or AASHTO guidelines.
- (D) Approach guardrail ends: As with guardrail ends in general, the ends of approach guardrails to bridges should be flared, buried, made breakaway, or shielded. Design treatment of guardrail ends is given in the AASHTO Roadside Design Guide.

The data collected shall apply only to the route on the bridge. Collision damage or deterioration of the elements are not considered when coding this item. Traffic safety features is a 4-digit code composed of 4 segments.

<u>Segment</u>	<u>Description</u>	<u>Length</u>
36A	Bridge railings	1 digit
36B	Transitions	1 digit
36C	Approach guardrail	1 digit
36D	Approach guardrail ends	1 digit

The reporting of these features shall be as follows:

<u>Code</u>	<u>Description</u>
0	Inspected feature does not meet currently acceptable standards or a safety feature is required and none is provided.*
1	Inspected feature meets currently acceptable standards.*
N	Not applicable or a safety feature is not required.*

\* For structures on the NHS, national standards are set by regulation. For those not on the NHS, it shall be the responsibility of the highway agency (state, county, local or federal) to set standards.

Item 36 - Traffic Safety Features (cont'd)

EXAMPLE: All features meet currently acceptable standards except transition Code  
1011

-----  
*036A,B,C,D - Resource Location: "Bridge Inspector Traffic Safety Features Rating Manual"*

Item 37 - Historical Significance 1 digit

The historical significance of a bridge involves a variety of characteristics: the bridge may be a particularly unique example of the history of engineering; the crossing itself might be significant; the bridge might be associated with a historical property or area; or historical significance could be derived from the fact the bridge was associated with significant events or circumstances. Use one of the following codes:

<u>Code</u>	<u>Description</u>
1	Bridge is on the National Register of Historic Places.
2	Bridge is eligible for the National Register of Historic Places.
3	Bridge is possibly eligible for the National Register of Historic Places (requires further investigation before determination can be made) or bridge is on a State or local historic register.
4	Historical significance is not determinable at this time.
5	Bridge is not eligible for the National Register of Historic Places.

-----  
*037 - Resource Location: Appendix G of this manual or online at:  
[http://www.del.dot.gov/static/projects/archaeology/historic\\_pres/delaware\\_bridge\\_book/appendix.pdf](http://www.del.dot.gov/static/projects/archaeology/historic_pres/delaware_bridge_book/appendix.pdf)*

Item 38 - Navigation Control 1 digit

Indicate for this item whether or not navigation control (a bridge permit for navigation) is required. Use one of the following codes:

<u>Code</u>	<u>Description</u>
N	Not applicable, no waterway.
0	No navigation control on waterway (bridge permit not required).
1	Navigation control on waterway (bridge permit required).

-----  
*038 - Resource: Appendix C gives the criteria for Navigable Waterways.*

Item 39 - Navigation Vertical Clearance (XXX.X meters) 4 digits

If Item 38 - Navigation Control has been coded 1, record the minimum vertical clearance imposed at the site as measured above a datum that is specified on a navigation permit issued by a control agency. The measurement shall be coded as a 4-digit number truncated to the tenth of a meter (with an assumed decimal point). This measurement will show the clearance that is allowable for navigational purposes. In the case of a swing or bascule bridge, the vertical clearance shall be measured with the bridge in the closed position (i.e., open to vehicular traffic). The vertical clearance of a vertical lift bridge shall be measured with the bridge in the raised or open position. Also, Item 116 - Minimum Navigation Vertical Clearance Vertical Lift Bridge shall be coded to provide clearance in a closed position. If Item 38 - Navigation Control has been coded 0 or N, code 000 to indicate not applicable.

EXAMPLES:

		<u>Code</u>
Measured Vertical Clearance	50.00 meters	0500
	20.65 meters	0206
	24.28 meters	0242

-----  
*039 - Resource Location: Plans, Measure in field if possible*

Item 40 - Navigation Horizontal Clearance (XXXX.X meters) 5 digits

If Item 38 - Navigation Control has been coded 1, record the horizontal clearance measurement imposed at the site that is shown on the navigation permit. This may be less than the structure geometry allows. If a navigation permit is required but not available, use the minimum horizontal clearance between fenders, if any, or the clear distance between piers or bents. Code the clearance as a 5-digit number truncated to the tenth of a meter (with an assumed decimal point). If Item 38 - Navigation Control has been coded 0 or N, code 0000 to indicate not applicable.

EXAMPLES:

		<u>Code</u>
Horizontal Clearance	53.57 meters	00535
	95.00 meters	00950
	202.09 meters	02020

-----  
*040 - Resource Location: Plans, measure in field if possible*

Item 41 - Structure Open, Posted, or Closed to Traffic 1 digit

This item provides information about the actual operational status of a structure. The field review could show that a structure is posted, but Item 70 - Bridge Posting may indicate that posting is not required. This is possible and acceptable coding since Item 70 is based on the operating stress level and the governing agency's posting procedures may specify posting at some stress level less than the operating rating. One of the following codes shall be used:

Item 41 - Structure Open, Posted, or Closed to Traffic (cont'd)

<u>Code</u>	<u>Description</u>
A	Open, no restriction
B	Open, posting recommended but not legally implemented (all signs not in place or not correctly implemented)
D	Open, would be posted or closed except for temporary shoring, etc. to allow for unrestricted traffic
E	Open, temporary structure in place to carry legal loads while original structure is closed and awaiting replacement or rehabilitation
G	New structure not yet open to traffic
K	Bridge closed to all traffic
P	Posted for load (may include other restrictions such as temporary bridges which are load posted)
R	Posted for other load-capacity restriction (speed, number of vehicles on bridge, etc.)

-----  
*041 - Coding Notes: Inspectors shall not change this item!*  
 -----

Item 42 - Type of Service 2 digits

The type of service on the bridge and under the bridge is indicated by a 2-digit code composed of 2 segments.

<u>Segment</u>	<u>Description</u>	<u>Length</u>
42A	Type of service on bridge	1 digit
42B	Type of service under bridge	1 digit

The first digit indicates the type of service "on" the bridge and shall be coded using one of the following codes:

<u>Code</u>	<u>Description</u>
1	Highway
2	Railroad
3	Pedestrian-bicycle
4	Highway-railroad
5	Highway-pedestrian
6	Overpass structure at an interchange or second level of a multilevel interchange
7	Third level (Interchange)
8	Fourth level (Interchange)
9	Building or plaza
0	Other

Item 42 - Type of Service (cont'd)

The second digit indicates the type of service "under" the bridge and shall be coded using one of the following codes:

<u>Code</u>	<u>Description</u>
1	Highway, with or without pedestrian
2	Railroad
3	Pedestrian-bicycle
4	Highway-railroad
5	Waterway
6	Highway-waterway
7	Railroad-waterway
8	Highway-waterway-railroad
9	Relief for waterway
0	Other

-----  
*042A & 042B - Resource Location: RIMS, Plans, photos and/or field review*  
*Coding Notes: Overpass structures at an interchange that have a sidewalk get coded as a '6'.*  
*- Park roads (with or without a maintenance road number), subdivisions, service plaza, unclassified frontage roads or shopping plazas all get coded as "1"*

Item 43 - Structure Type, Main

3 digits

Record the description on the inspection form and indicate the type of structure for the main span(s) with a 3-digit code composed of 2 segments.

<u>Segment</u>	<u>Description</u>	<u>Length</u>
43A	Kind of material and/or design	1 digit
43B	Type of design and/or construction	2 digits

The first digit indicates the kind of material and/or design and shall be coded using one of the following codes:

<u>Code</u>	<u>Description</u>
1	Concrete
2	Concrete continuous
3	Steel
4	Steel continuous
5	Prestressed concrete *
6	Prestressed concrete continuous *
7	Wood or Timber
8	Masonry
9	Aluminum, Wrought Iron, or Cast Iron
0	Other

\* Post-tensioned concrete should be coded as prestressed concrete.

Item 43 - Structure Type, Main (cont'd)

The second and third digits indicate the predominant type of design and/or type of construction and shall be coded using one of the following codes:

<u>Code</u>	<u>Description</u>
01	Slab
02	Stringer/Multi-beam or Girder
03	Girder and Floorbeam System
04	Tee Beam
05	Box Beam or Girders-Multiple( <i>adjacent box beams</i> )
06	Box Beam or Girders - Single or <i>Multiple Spread Box Beams (ex. Newport Viaduct; 1-501)</i>
07	Frame (except frame culverts)
08	Orthotropic
09	Truss - Deck
10	Truss - Thru
11	Arch - Deck
12	Arch - Thru
13	Suspension
14	Stayed Girder
15	Movable - Lift
16	Movable - Bascule
17	Movable - Swing
18	Tunnel
19	Culvert (includes frame culverts)
20 *	Mixed types
21	Segmental Box Girder
22	Channel Beam
00	Other

\* Applicable only to approach spans - Item 44

EXAMPLES:

	<u>Code</u>
Wood or Timber Through Truss	710
Masonry Culvert	819
Steel Suspension	313
Continuous Concrete Multiple Box Girders	205
Simple Span Concrete Slab	101
Tunnel in Rock	018

-----  
*043A & 043B - Resource Location: Plans, past inspection photos*

Item 44 - Structure Type, Approach Spans

3 digits

Indicate with a 3-digit code composed of 2 segments, the type of structure for the approach spans to a major bridge or for the spans where the structural material *or design* is different. The codes are the same as for Item 43 preceding. However, code 000 if this item is not applicable. Use code 20 (Item 44B) when no one type of design and/or construction is predominate for the approach units. If the kind of material (Item 44A) is varied, code the most predominant.

Item 44 - Structure Type, Approach Spans (cont'd)

<u>Segment</u>	<u>Description</u>	<u>Length</u>
44A	Kind of material and/or design	1 digit
44B	Type of design and/or construction	2 digits

EXAMPLES:

	<u>Code</u>
Simple prestressed concrete I-beam	502
Continuous concrete T-beam	204
Continuous steel deck truss	409

-----  
*044A & 044B - Resource Location: Plans, past inspection photos, field review*

Item 45 - Number of Spans in Main Unit 3 digits

Record the number and indicate with a 3-digit number the number of spans in the main or major unit. This item will include all spans of most bridges, the major unit only of a sizable structure, or a unit of material or design different from that of the approach spans.

-----  
*045 - Resource Location: Plans, past inspection photos, field review*

Item 46 - Number of Approach Spans 4 digits

Record the number and indicate with a 4-digit number the number of spans in the approach spans to the major bridge, or the number of spans of material different from that of the major bridge.

-----  
*046 - Resource Location: Plans, past inspection photos, field review*

Item 47 - Inventory Route, Total Horizontal Clearance 3 digits  
(XX.X meters)

The total horizontal clearance for the inventory route identified in Item 5 should be measured and recorded. The clearance should be the available clearance measured between the restrictive features -- curbs, rails, walls, piers or other structural features limiting the roadway (surface and shoulders). The measurement should be recorded and coded as a 3-digit number truncated to the nearest tenth of a meter (with an assumed decimal point). When the restriction is 100 meters or greater, code 999.

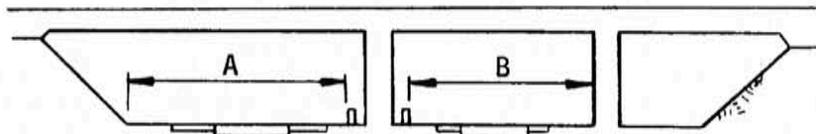
The purpose of this item is to give the largest available clearance for the movement of wide loads. Flush and mountable medians are not considered to be restrictions. This clearance is defined in 2 ways; use the most applicable:

1. Clear distance between restrictions of the inventory route either "on" or "under" the structure.
2. Roadway surface and shoulders - when there are no restrictions.

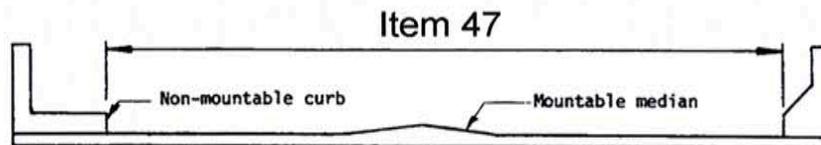
For a divided facility with a raised or non-mountable median, or an "under" route divided by piers, record the greater of the restricted widths in either direction, not both directions.

Item 47 - Inventory Route, Total Horizontal Clearance (cont'd)

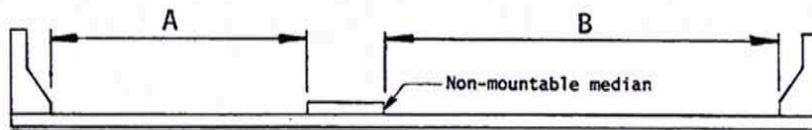
EXAMPLES:



Clearance A > B    Item 47 = A



No Median or Flush or Mountable Median



Raised Median or Non-mountable Median

B > A    Item 47 = B

-----  
 047 - Resource Location: Plans or measure out in field if plans do not exist

Item 48 - Length of Maximum Span (XXXX.X meters)

5 digits

The length of the maximum span shall be recorded. It shall be noted whether the measurement is center to center of bearing points or clear open distance between piers, bents, or abutments. The measurement shall be along the centerline of the bridge. For this item, code a 5-digit number to represent the measurement to the nearest tenth of a meter (with an assumed decimal point).

EXAMPLES:

Length of Maximum Span	35.5 meters	Code
	117.0 meters	00355
	1219.2 meters	01170
		12192

-----  
 048 - Resource Location: Plans or measure out in field if plans do not exist  
 Coding Notes: **Arches & culverts are clear span; all other structures are to be measured from center-to-center of bearings.**

Item 49 - Structure Length (XXXXX.X meters)

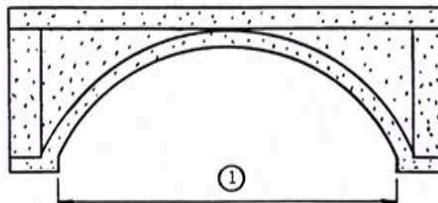
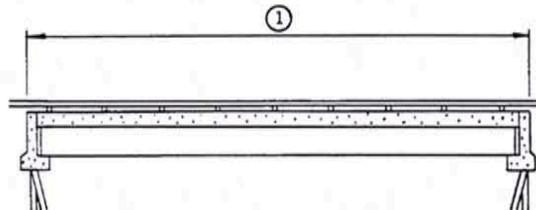
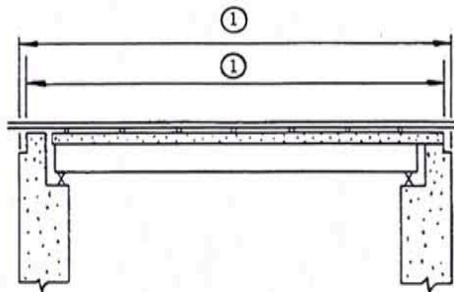
6 digits

Record and code a 6-digit number to represent the length of the structure to the nearest tenth of a meter (with an assumed decimal point). This shall be the length of roadway which is supported on the bridge structure. The length should be measured back to back of backwalls of abutments or from paving notch to paving notch.

Culvert lengths should be measured along the center line of roadway regardless of their depth below grade. Measurement should be made between inside faces of exterior walls. Tunnel length should be measured along the centerline of the roadway. Be sure to code Item 5A = 2 for all tunnels.

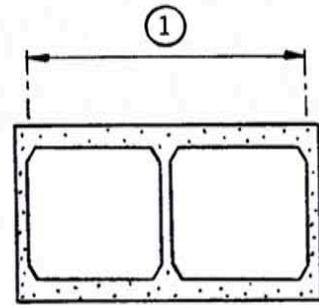
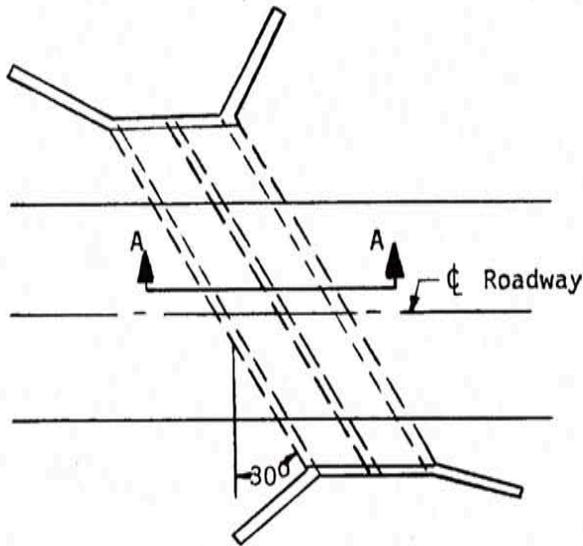
EXAMPLES:

Structure Length		<u>Code</u>
	35.5 meters	000355
	542.1 meters	005421
	333.0 meters	003330
10	123.5 meters	101235

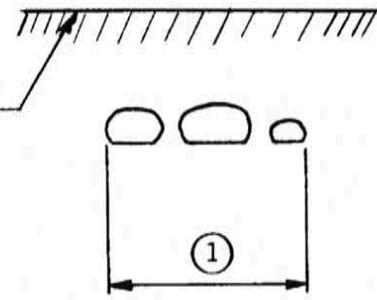
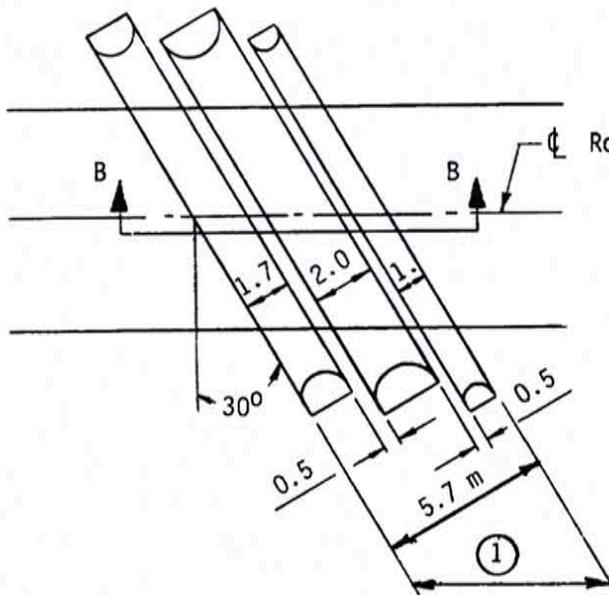


(1) Item 49 - Structure Length

Item 49 - Structure Length (cont'd)



SECTION A-A



SECTION B-B

(1) Item 49 - Structure Length =  $\frac{5.7 \text{ m}}{\cos 30^\circ} = 6.58 \text{ m}$

Code  
000066

049 - Resource Location: Plans or measure out in field if plans do not exist  
Coding Notes: Arches & culverts are clear span; all other structures are to be measured from back-to-back of the abutment backwalls. If the back of the backwall locations are not known, then from paving notch to paving notch.

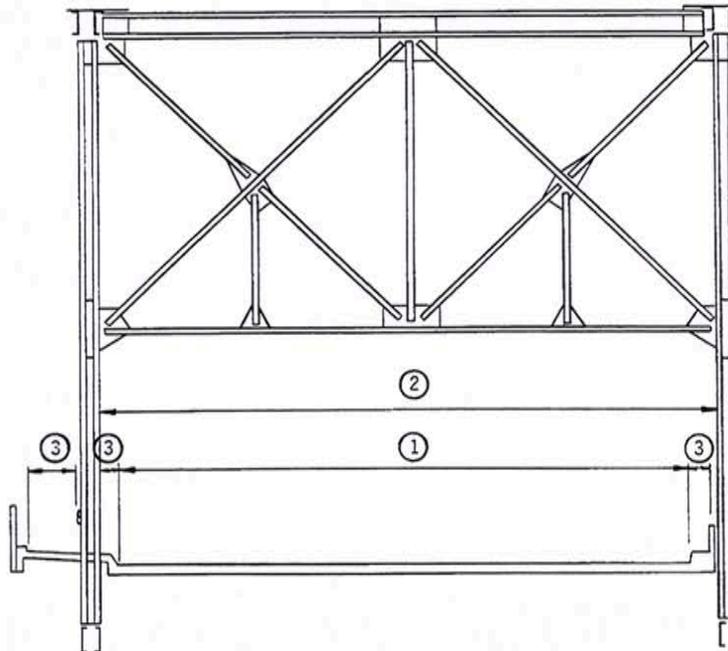
Item 50 - Curb or Sidewalk Widths (XX.X meters, XX.X meters) 6 digits

Record and code two contiguous 3-digit numbers to represent the widths of the left and right curbs or sidewalks to nearest tenth of a meter (with assumed decimal points). This is a 6-digit number composed of 2 segments, with the leftmost 3 digits representing the left curb or sidewalk and the rightmost 3 digits representing the right curb or sidewalk. "Left" and "Right" should be determined on the basis of direction of the inventory.

<u>Segment</u>	<u>Description</u>	<u>Length</u>
50A	Left curb or sidewalk width	3 digits
50B	Right curb or sidewalk width	3 digits

EXAMPLES:

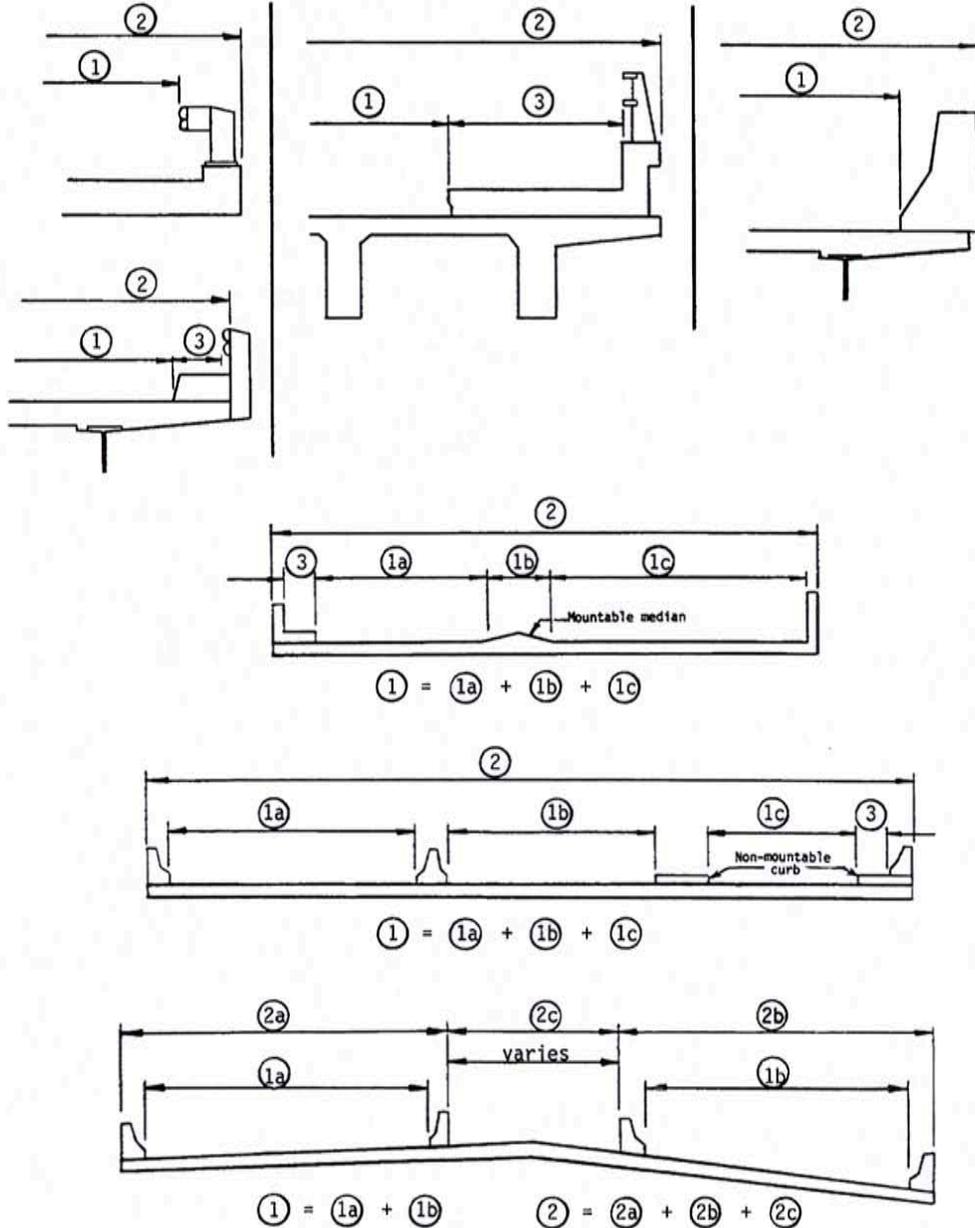
	<u>Left Side</u>	<u>Right Side</u>	<u>Code</u>
Curb or sidewalk	None	2.3 meters	000023
	3.0 meters	4.1 meters	030041
	3.3 meters	None	033000
	12.1 meters	11.5 meters	121115
	None	None	000000
	0.6 meters	1.5 meters	006015



- (1) Item 51 - Bridge Roadway Width, Curb-to-Curb
- (2) Item 52 - Deck Width, Out-to-Out
- (3) Item 50 - Curb or Sidewalk Width

Item 50 - Curb or Sidewalk Widths (cont'd)

EXAMPLES:



- (1) Item 51 - Bridge Roadway Width, Curb-to-Curb
- (2) Item 52 - Deck Width, Out-to-Out
- (3) Item 50 - Curb or Sidewalk Width

-----  
 050 - Resource Location: Plans or measure out in field if plans do not exist  
 - Code the actual sidewalk width no matter if sidewalk is on fill or attached directly to the bridge structure. If on fill, then you would not have a Pontis sidewalk element.

Item 51 - Bridge Roadway Width, Curb-to-Curb (XXX.X meters) 4 digits

The information to be recorded is the most restrictive minimum distance between curbs or rails on the structure roadway. For structures with closed medians and usually for double decked structures, coded data will be the sum of the most restrictive minimum distances for all roadways carried by the structure\*. The data recorded for this item must be compatible with other related route and bridge data (i.e., Items 28, 29, 32, etc.). The measurement should be exclusive of flared areas for ramps. A 4-digit number should be used to represent the distance to the nearest tenth of a meter (with an assumed decimal point). See examples on pages 30 and 31.

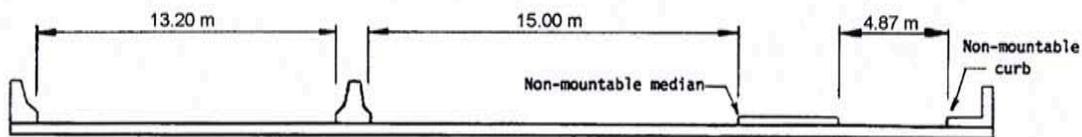
Where traffic runs directly on the top slab (or wearing surface) of a culvert-type structure, e.g. an R/C box without fill, code the actual roadway width (curb-to-curb or rail-to-rail). This will also apply where the fill is minimal and headwalls or parapets affect the flow of traffic.

Where the roadway is on fill carried across a structure and the headwalls or parapets do not affect the flow of traffic, code 0000. This is considered proper inasmuch as a filled section simply maintains the roadway cross-section. However, for sidehill viaduct structures code the actual full curb-to-curb roadway width. See figure in the Commentary Appendix D.

\* Raised or non-mountable medians, open medians, and barrier widths are to be excluded from the summation along with barrier-protected bicycle and equestrian lanes.

EXAMPLES:

	<u>Code</u>
Bridge Roadway Width 16.00 meters wide	0160
21.43 meters wide	0214



33.07 meters wide 0331

The last example above would be the coded value for the deck section shown below.

-----  
*051 - Resource Location: Plans or measure out in field if plans do not exist  
 Coding Notes: Refer to Deck Related Item Sheet located in Appendix D*

Item 52 - Deck Width, Out-to-Out (XXX.X meters) 4 digits

Record and code a 4-digit number to show the out-to-out width to the nearest tenth of a meter (with an assumed decimal point). If the structure is a through structure, the number to be coded will represent the lateral clearance between superstructure members. The measurement should be exclusive of flared areas for ramps. See examples on pages 30 and 31.

Where traffic runs directly on the top slab (or wearing surface) of the culvert (e.g., an R/C box without fill) code the actual width (out-to-out). This will also apply where the fill is minimal and the culvert headwalls affect the flow of traffic. However, for sidehill viaduct structures code the actual out-to-out structure width. See figure in the Commentary Appendix D.

Where the roadway is on a fill carried across a pipe or box culvert and the culvert headwalls do not affect the flow of traffic, code 0000. This is considered proper inasmuch as a filled section over a culvert simply maintains the roadway cross-section.

-----  
*052 - Resource Location: Plans or measure out in field if plans do not exist  
 Coding Notes: Refer to Deck Related Item Sheet located in Appendix D*

Item 53 - Minimum Vertical Clearance Over Bridge Roadway 4 digits  
 (XX.XX meters)

The information to be recorded for this item is the actual minimum vertical clearance over the bridge roadway, including shoulders, to any superstructure restriction, rounded down to the nearest hundredth of a meter. For double decked structures code the minimum, regardless whether it is pertaining to the top or bottom deck. When no superstructure restriction exists above the bridge roadway, or when a restriction is 30 meters or greater, code 9999. Coding of actual clearances between 30 meters and 99.99 meters to an exact measurement is optional. A 4-digit number should be coded to represent the clearance to the nearest hundredth of a meter (with an assumed decimal point).

EXAMPLES:		<u>Code</u>
Minimum Vertical Clearance	No restriction	9999
	5.25 meters	0525
	23.00 meters	2300
	38.50 meters	9999

-----  
*053 - Resource Location: Measure out in field.*

Item 54 - Minimum Vertical Underclearance 5 digits  
 (X code, XX.XX meters)

Using a 1-digit code and a 4-digit number, record and code the minimum vertical clearance from the roadway (travel lanes only) or railroad track beneath the structure to the underside of the superstructure. (When both a railroad and highway are under the structure, code the most critical dimension.)

<u>Segment</u>	<u>Description</u>	<u>Length</u>
54A	Reference feature	1 digit
54B	Minimum Vertical Underclearance	4 digits

Item 54 - Minimum Vertical Underclearance (cont'd)

Using one of the codes below, code in the first position, the reference feature from which the clearance measurement is taken:

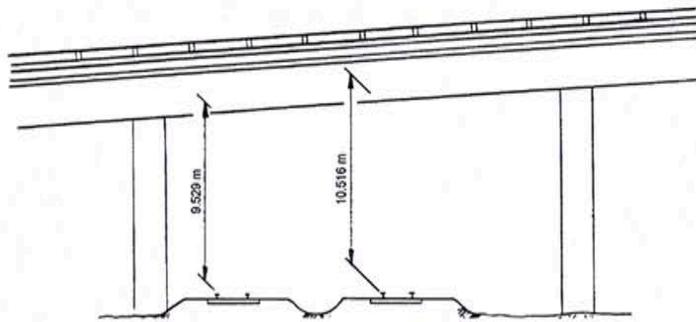
<u>Code</u>	<u>Description</u>
H	Highway beneath structure
R	Railroad beneath structure
N	Feature not a highway or railroad

In the next 4 positions, code a 4-digit number to represent the minimum vertical clearance from that feature to the structure, truncated to the hundredth of a meter (with an assumed decimal point). When a restriction is 30 meters or greater, code 9999. Coding of actual clearances between 30 meters and 99.99 meters to an exact measurement is optional. If the feature is not a highway or railroad, code the minimum vertical clearance 0000.

**EXAMPLES:**

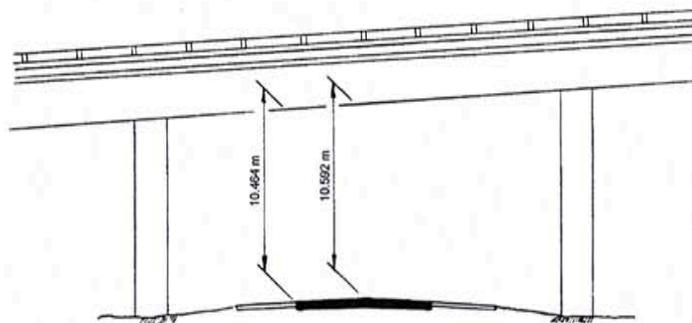
River beneath structure

CODE  
N0000



Railroad 9.529 meters beneath structure

R0952



Highway 10.464 meters beneath structure

H1046

054 - Resource Location: Measure out in field.

*Coding Notes: Measurements are to be recorded on the Under Record Sketch Sheet during the time of inspection. Under Record Sketch Sheet shall be verified during each routine inspection.*