SNBI Section 4: Features

Ronald Muñoz, PE – SJCA Bridge Inspection Dept. Manager
Amos Denny, PE – INDOT Crawfordsville Bridge Inspection Supv.

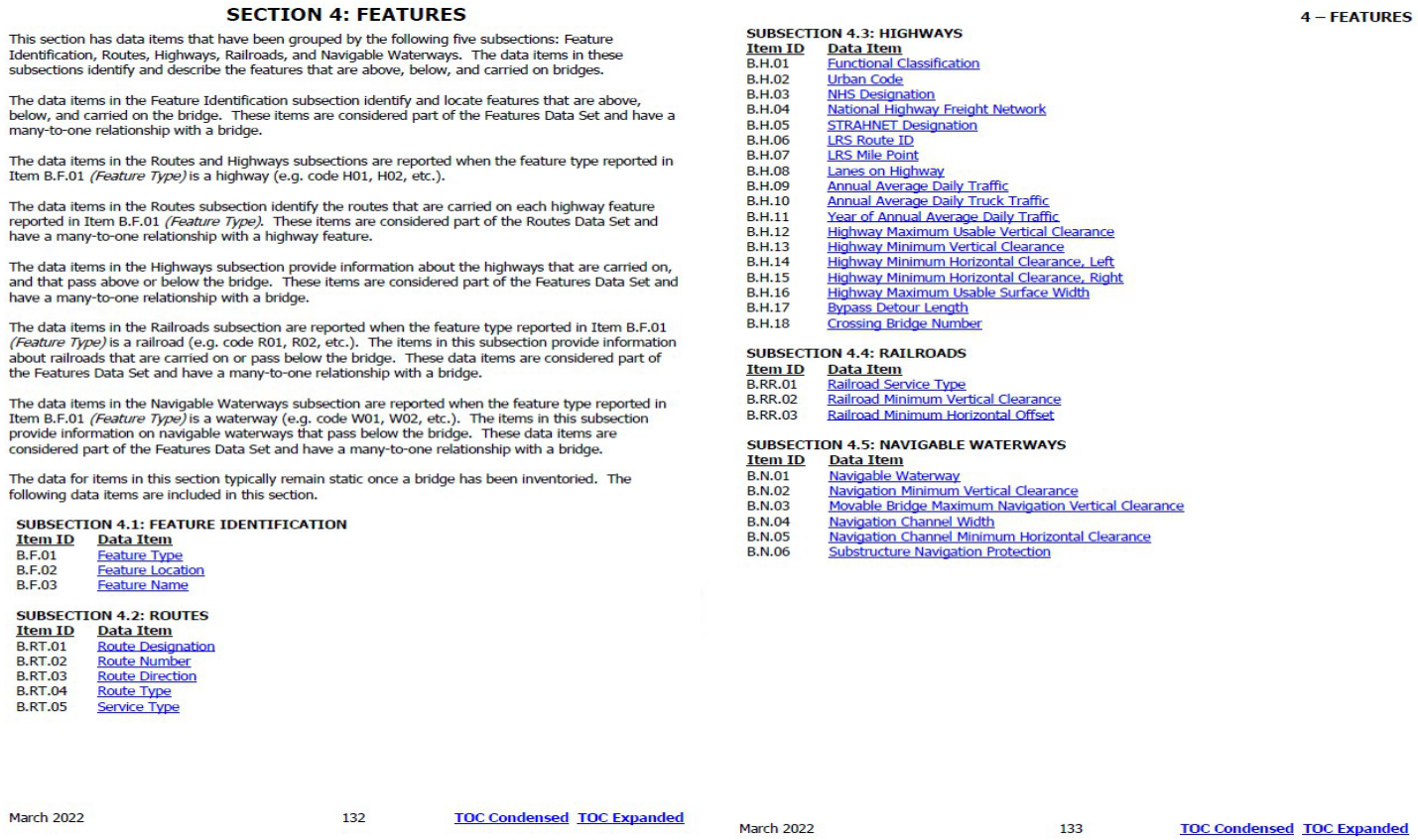
NextLevel INDIANA

Disclaimers

- Except for any statutes or regulations cited, the contents of this presentation do not have the force and effect of law and are not meant to bind the State or the public in any way. This presentation is intended only to provide information regarding existing requirements under the law or agency policies.

Section 4: Features

- Data items in Section 4 of the SNBI have been grouped by five subsections
  - Feature Identification
  - Routes
  - Highways
  - Railroads
  - Navigable Waterways



SECTION 4: FEATURES

This section has data items that have been grouped by the following five subsections: Feature Identification, Routes, Highways, Railroads, and Navigable Waterways. The data items in these subsections identify and describe the features that are above, below, and carried on bridges.

The data items in the Feature Identification subsection identify and locate features that are above, below, and carried on the bridge. These items are considered part of the Features Data Set and have a many-to-one relationship with a bridge.

The data items in the Routes and Highways subsections are reported when the feature type reported in Item B.F.01 *(Feature Type)* is a highway (e.g. code H01, H02, etc.).

The data items in the Routes subsection identify the routes that are carried on each highway feature reported in Item B.F.01 *(Feature Type)*. These items are considered part of the Routes Data Set and have a many-to-one relationship with a highway feature.

The data items in the Highways subsection provide information about the highways that are carried on, and that pass above or below the bridge. These items are considered part of the Features Data Set and have a many-to-one relationship with a bridge.

The data items in the Railroads subsection are reported when the feature type reported in Item B.F.01 *(Feature Type)* is a railroad (e.g. code R01, R02, etc.). The items in this subsection provide information about railroads that are carried on or pass below the bridge. These data items are considered part of the Features Data Set and have a many-to-one relationship with a bridge.

The data items in the Navigable Waterways subsection are reported when the feature type reported in Item B.F.01 *(Feature Type)* is a waterway (e.g. code W01, W02, etc.). The items in this subsection provide information on navigable waterways that pass below the bridge. These data items are considered part of the Features Data Set and have a many-to-one relationship with a bridge.

The data for items in this section typically remain static once a bridge has been inventoried. The following data items are included in this section.

SUBSECTION 4.1: FEATURE IDENTIFICATION

Item ID	Data Item
B.F.01	Feature Type
B.F.02	Feature Location
B.F.03	Feature Name

SUBSECTION 4.2: ROUTES

Item ID	Data Item
B.RT.01	Route Designation
B.RT.02	Route Number
B.RT.03	Route Direction
B.RT.04	Route Type
B.RT.05	Service Type

March 2022 132 TOC Condensed TOC Expanded

4 – FEATURES

SUBSECTION 4.3: HIGHWAYS

Item ID	Data Item
B.H.01	Functional Classification
B.H.02	Urban Code
B.H.03	NHS Designation
B.H.04	National Highway Freight Network
B.H.05	STRAHNET Designation
B.H.06	LRS Route ID
B.H.07	LRS Mile Point
B.H.08	Lanes on Highway
B.H.09	Annual Average Daily Traffic
B.H.10	Annual Average Daily Truck Traffic
B.H.11	Year of Annual Average Daily Traffic
B.H.12	Highway Maximum Usable Vertical Clearance
B.H.13	Highway Minimum Vertical Clearance
B.H.14	Highway Minimum Horizontal Clearance, Left
B.H.15	Highway Minimum Horizontal Clearance, Right
B.H.16	Highway Maximum Usable Surface Width
B.H.17	Bypass Detour Length
B.H.18	Crossing Bridge Number

SUBSECTION 4.4: RAILROADS

Item ID	Data Item
B.RR.01	Railroad Service Type
B.RR.02	Railroad Minimum Vertical Clearance
B.RR.03	Railroad Minimum Horizontal Offset

SUBSECTION 4.5: NAVIGABLE WATERWAYS

Item ID	Data Item
B.N.01	Navigable Waterway
B.N.02	Navigation Minimum Vertical Clearance
B.N.03	Movable Bridge Maximum Navigation Vertical Clearance
B.N.04	Navigation Channel Width
B.N.05	Navigation Channel Minimum Horizontal Clearance
B.N.06	Substructure Navigation Protection

March 2022 133 TOC Condensed TOC Expanded

Subsection 4.1: Feature Identification

SUBSECTION 4.1: FEATURE IDENTIFICATION

The items in this subsection identify and locate features that are above, below, and carried on the bridge. These items are reported for each feature.

These data items are considered part of the Features Data Set and have a many-to-one relationship with a bridge. Therefore, each feature has a unique Feature data set, and there are typically multiple Feature data sets associated with a bridge.

The data for the items in this subsection typically remain static once a bridge has been inventoried. The following data items are included in this subsection.

Item ID	Data Item
B.F.01	Feature Type
B.F.02	Feature Location
B.F.03	Feature Name

Source: INDOT Website

Lesson 4.1

NextLevel INDIANA

Subsection 4.1: Feature Identification

- Data items in this subsection identify and locate features that are above, below, and carried on the bridge
- Data items are considered part of the Features Data Set and have a many-to-one relationship with a bridge
  - Each feature has a unique Feature data set, and there are typically multiple Feature data sets associated with a bridge
- The data for the items in this subsection typically remain static once a bridge has been inventoried

B.F.01 Feature Type

- Format AN (3)
- Report the feature that is above, below, or carried on the bridge using one of the following codes
  - H## Highway
    - Report one highway feature for a highway that is designated with two or more route numbers
    - Report multiple highway features when the highway is divided at the bridge
    - The presence of a flush or mountable median on the bridge does not in itself indicate that the highway is divided
    - For multi-level interchanges, report highway features directly above and below the bridge

B.F.01 Feature Type (cont.)

- Codes (cont.)
  - R## Railroad
    - Report a railroad feature for each separate railroad service type, as identified in Item B.RR.01 (Railroad Service Type), that is carried on or passes below the bridge
    - When a track carries multiple railroad service types, report only one feature
    - When multiple tracks carry the same railroad service type(s), report only one feature
  - P## Pathway
    - Use for separated pathways dedicated for pedestrian, bicycle, equestrian, or other non-highway modes of human transportation not covered in other codes

B.F.01 Feature Type (cont.)

- Codes (cont.)
  - W## Waterway
    - Use for each unique waterway
    - Do not use for roadside ditches or pipes that typically only carry roadway runoff from rain events
  - F## Relief for waterway
    - Use for bridges where one or more spans provide waterway openings for flow only during flood stages to provide additional hydraulic capacity, such as relief channels

B.F.01 Feature Type (cont.)

- Codes (cont.)
  - B## Urban feature
    - Use for urban features such as buildings, parking lots, …
    - Reporting more than one Urban feature is optional
  - D## Dry terrain or side slope
    - Use for features such as a natural depression or sidehill slope when there is no discernable waterway channel and none of the other feature codes apply
  - X## Other
    - Use when no other code applies for features that exist below the bridge
    - Reporting more than one Other feature is optional

B.F.01 Feature Type (cont.)

- Each feature type is numbered sequentially, starting with one (e.g., H01, R01, …)
- Highway features should be numbered beginning with the features carried on the bridge, followed by those below and above (e.g., H01, H02, H03,…)

B.F.01 Feature Type (cont.)

Example 1:

A bridge carries Brookside Glen Drive over Union Creek and carries sidewalks on the north and south sides

The bridge has three feature types:

- Report H01 for Brookside Glen Drive
- Report P01 for the sidewalks
- Report W01 for Union Creek

Source: Google Earth Pro

Active poll

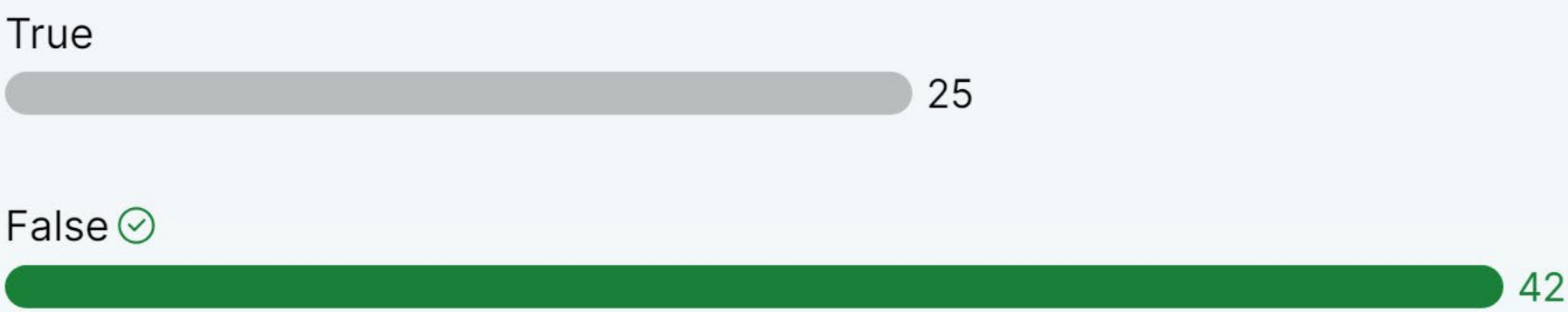
67

Join at

slido.com

#INDOTBI

Data items in this section only identify and locate features that are below or carried on the bridge.



Active poll

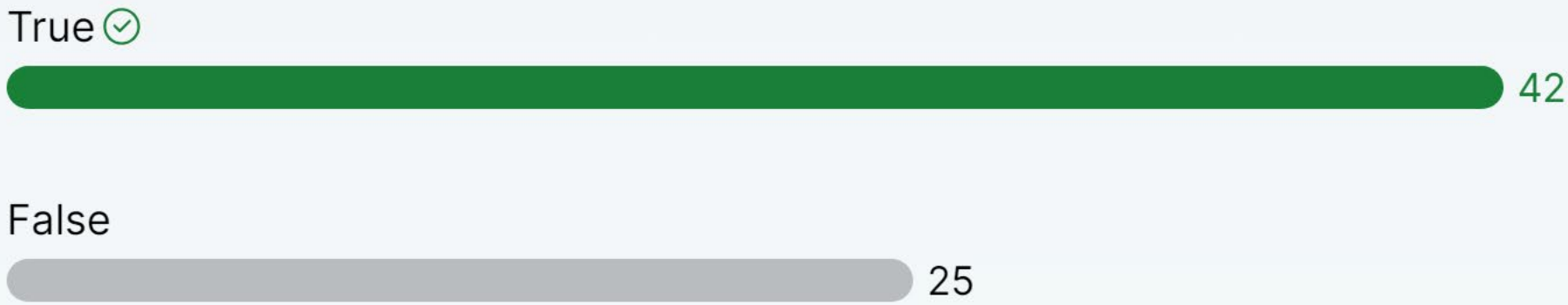
67

Join at

slido.com

#INDOTBI

Report multiple highway features when the highway is divided at the bridge.



Active poll

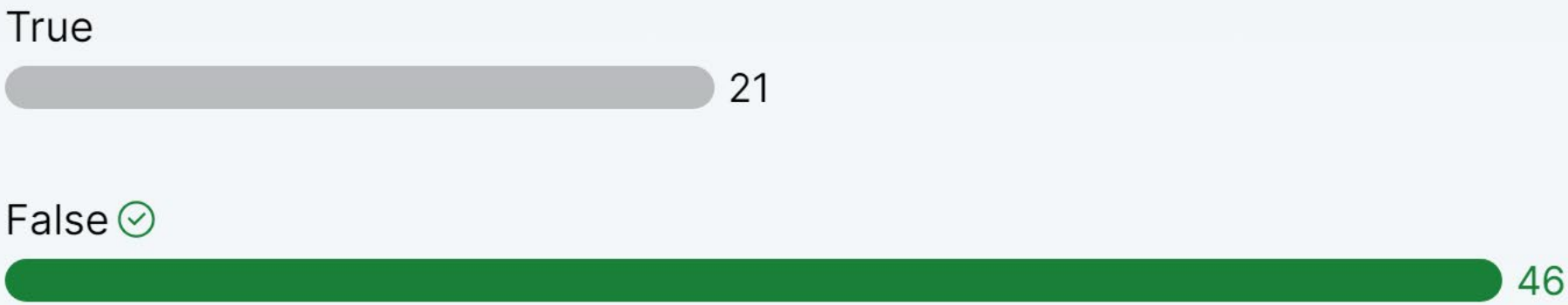
67

Join at

slido.com

#INDOTBI

When a track carries multiple railroad service types, report multiple features.



B.F.02 Feature Location

- Format AN (1)
- This item has a corresponding code for each feature reported for each Feature Type
- Report the location for the feature reported in Item B.F.01 (Feature Type) that is above, below, or carried on the bridge using one of the following codes
  - C Carried on bridge
  - A Above bridge
  - B Below bridge
  - T Top level
  - L Lower level

B.F.02 Feature Location – Example

A bridge carries Brookside Glen Drive over Union Creek and carries sidewalks on the north and south sides

The bridge has three feature types:

- Report ***C*** for Brookside Glen Drive
- Report ***C*** for the sidewalks
- Report ***B*** for Union Creek

Source: Google Earth Pro

B.F.03 Feature Name

- Format AN (300)
- This item has correlating data for each feature reported for Item B.F.01 (Feature Type)
- Report the commonly known name(s) for the feature reported in Item B.F.01 (Feature Type)
  - If the feature has no commonly known name, provide a general description
- For more than one name, report all names with the most common name first
  - Report multiple names separated by pipe (|) delimiters

B.F.03 Feature Name (cont.)

- When applicable, report the route number first followed by other names
- The owner may include directional or other descriptive information in this field
- Official names and local names may be included

B.F.03 Feature Name – Examples

I-90, commonly named Massachusetts Turnpike

Report ***I-90|Massachusetts Turnpike***

US 50 & US 301 carried on one highway commonly named John Hanson Highway

Report ***US 50|US 301|John Hanson Highway***

A bridge carries Brookside Glen Drive over Union Creek and carries sidewalks on the north and south sides

There are three feature types

Report ***Brookside Glen Drive*** for the highway

Report ***Sidewalks*** for the pathways

Report ***Union Creek*** for the waterway

Subsection 4.2: Routes

SUBSECTION 4.2: ROUTES

The data items in this subsection identify the routes that are carried on each highway feature reported in Item B.F.01 *(Feature Type)*. These data items are considered part of the Routes Data Set and have a many-to-one relationship with a highway feature. Therefore, each route reported in Item B.RT.01 *(Route Designation)* has a unique route data set, and there may be multiple route data sets associated with a highway feature.

For each highway feature that is carried on the bridge, report all route items.

For each highway feature that passes below the bridge and is not carried by another bridge, report all route items.

Do not report route items for highway features that pass above or below the bridge and are carried by another bridge. When needed, FHWA obtains the data for these highway feature(s) using the data reported for the crossing bridge, per Item B.H.18 *(Crossing Bridge Number)*.

The data for the items in this subsection typically remain static once a bridge has been inventoried. The following data items are included in this subsection.

Item ID	Data Item
B.RT.01	Route Designation
B.RT.02	Route Number
B.RT.03	Route Direction
B.RT.04	Route Type
B.RT.05	Service Type

Source: INDOT Website

Lesson 4.2

NextLevel INDIANA

Subsection 4.2: Routes

- The data items in this subsection identify the routes that are carried on each highway feature reported in Item B.F.01 (Feature Type)
- Do not report route items for highway features that pass above or below the bridge and are carried by another bridge
  - When needed, FHWA obtains the data for these highway feature(s) using the data reported for the crossing bridge, per Item B.H.18 (Crossing Bridge Number)

B.RT.01 Route Designation (new)

- Format AN (3)
- Report the assigned route designation for the highway reported in Item B.F.01 (Feature Type) using the following code
  - R## Unique Route Designation
    - Replace the ## characters with sequential numbers, with leading zeros, assigned to each unique route designation carried on the highway feature (e.g., R01, R02,…)

B.RT.01 Route Designation (cont.)

- If a highway carries multiple routes, report only those routes that have a route number
- If a highway carries only routes without route numbers, report one route designation
- Typically, the route with the highest-class route type is listed first, using the hierarchy shown in Item B.RT.04 (Route Type)
  - An interstate is considered the highest-class route

Source: FHWA

B.RT.01 Route Designation (cont.)

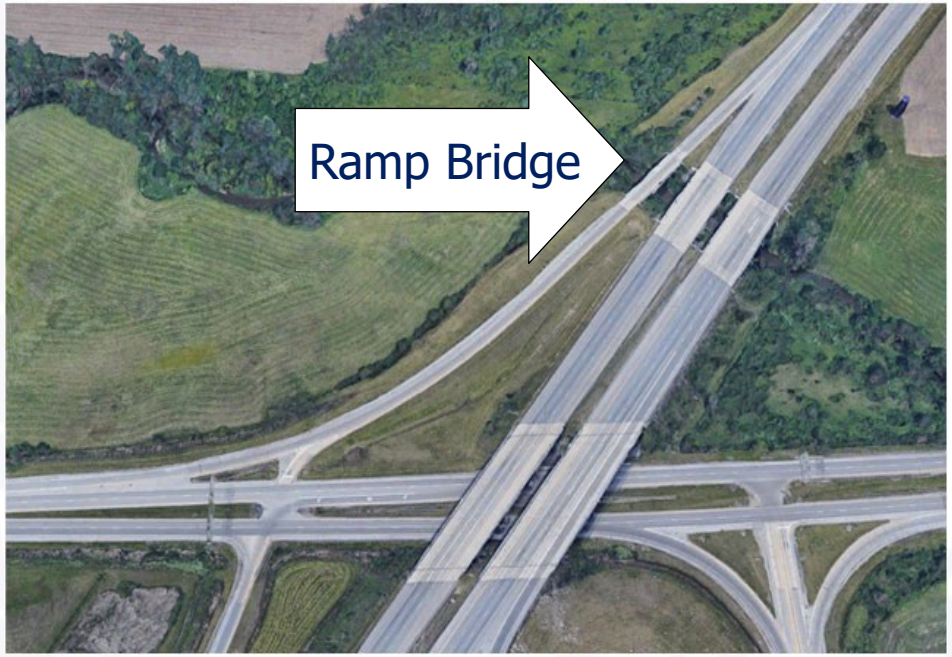
- If the highway feature is carried on a ramp bridge, report all applicable routes for the highways that are being connected

A ramp bridge departs from I-66 westbound and enters I-81 southbound

There are two route designations:

Report ***RO1*** for I-66

Report ***RO2*** for I-81



Source: Google Earth

B.RT.01 Route Designation - Examples

Interstate 66 and State Route 17 northbound share one highway that is not divided at the bridge.

How many Route Designations are reported?

2

A ramp bridge departs from Interstate 66 westbound and enters Interstate 81 southbound.

How many Route Designations are reported?

2

B.RT.02 Route Number

- Format AN (15)
- Report the route number for the route reported in Item B.RT.01 (Route Designation)
- Include letters that are used as part of the route numbers
- For divided highways, do not report the route direction
  - Identify route direction in Item B.RT.03 (Route Direction)
- Report 0 for routes without route numbers

B.RT.02 Route Number - Examples

I-35W southbound

Report ***35W***

State Highway 9A is not divided at the bridge

Report ***9A***

A ramp bridge departs from I-66 westbound and enters I-81 southbound

There are two route designations:

Report ***66*** for the route designated as ***I-66***

Report ***81*** for the route designated as ***I-81***

B.RT.03 Route Direction

- Format AN (2)
- Report the designated route direction for the route reported in Item B.RT.01 (Route Designation) using one of the following codes
  - NB Northbound
  - EB Eastbound
  - SB Southbound
  - WB Westbound

B.RT.03 Route Direction (cont.)

- Codes (cont.)
  - NS Northbound and Southbound
    - Use code NS when the route is not divided at the bridge, and carries traffic in both north and south directions.
  - EW Eastbound and Westbound
    - Use code EW when the route is not divided at the bridge, and carries traffic in both east and west directions.
  - When a bridge carries a ramp only, use the designated route direction for the departure or entrance route (Example to follow)

B.RT.03 Route Direction - Examples

A ramp bridge departs from I-66 westbound and enters I-81 southbound

- Report **WB** for the route designated as I-66
- Report **SB** for the route designated as I-81

I-35W southbound

- Report ***SB***

Bridge carries I-81 northbound and I-64 eastbound

- Report **NB** for the route designated as I-81
- Report **EB** for the route designated as I-64

B.RT.04 Route Type

- Format AN (1)
- Report the route type for the route reported in Item B.RT.01 (Route Designation) using one of the following codes
  - 1 Interstate route
  - 2 U.S. route
  - 3 State route
  - 4 County route
    - Use for parish routes or other county route equivalents
  - 5 City street
    - Use for city or other municipal streets

B.RT.04 Route Type (cont.)

- Codes (cont.)
  - 6 Federal lands road
    - Use when a public highway passes through Federal lands such as national parks, national forests, or DOD facilities and does not meet the description of codes 1 through 5
  - 7 State lands road
    - Use when a public highway passes through State lands such as State parks or State forests and does not meet the description of codes 1 through 5
  - X Other
    - Use when a public highway is not designated as one of the defined route type codes

B.RT.04 Route Type (cont.)

Example

Highway feature is signed for both I-35 and US-77

There are two route designations for the highway feature

Report ***1*** for the route designated as I-35

Report ***2*** for the route designated as US-77

B.RT.05 Service Type

- Format AN (1)
- Report the designated service type for the route reported in Item B.RT.01 (Route Designation), using one of the following codes
  - 1 Mainline
  - 2 Alternate
  - 3 Bypass
  - 4 Spur
  - 6 Business

B.RT.05 Service Type (cont.)

- Codes (cont.)
  - 7 Ramp, connector, etc.
    - Use for all types, arrangements, and sizes of turning roadways that connect two or more highways at an interchange
  - 8 Service or frontage road
    - Use for frontage roads that are typically parallel to the traveled way, may be provided on one or both sides of the mainline, and may or may not be continuous
    - A frontage road may include a U-turn lane
  - X Other
  - The service type designation is determined by the agency, and typically included as part of the signage for the route

B.RT.05 Service Type - Examples

A ramp bridge connects I-66 westbound to I-81 southbound.

- I-66 westbound Report ***7***
- I-81 southbound Report ***7***

I-35W southbound.

- Report ***1***

Subsection 4.3: Highways

SUBSECTION 4.3: HIGHWAYS

The data items in this subsection provide information about the highways that are carried on, and that pass above or below the bridge. These data items are considered part of the Features Data Set and have a many-to-one relationship with a bridge. Therefore, each highway feature reported in Item B.F.01 *(Feature Type)* has a unique highway feature data set, and there are typically multiple highway feature data sets associated with a bridge.

For each highway feature that is carried on the bridge, report all applicable items.

For each highway feature that passes below the bridge and is not carried by another bridge, report all applicable items. Items B.H.12 *(Highway Maximum Usable Vertical Clearance)* and B.H.16 *(Highway Maximum Usable Surface Width)* apply to highway features below a bridge only when the highway feature carries an NHS route.

For each highway feature that passes above or below the bridge and is carried by another bridge, report only Item B.H.18 *(Crossing Bridge Number)*. When needed, FHWA obtains the data for these highway feature(s) using the data reported for the crossing bridge.

The data for the items in this subsection typically remain static once a bridge has been inventoried. The following data items are included in this subsection.

Item ID	Data Item
B.H.01	Functional Classification
B.H.02	Urban Code
B.H.03	NHS Designation
B.H.04	National Highway Freight Network
B.H.05	STRAHNET Designation
B.H.06	LRS Route ID
B.H.07	LRS Mile Point
B.H.08	Lanes on Highway
B.H.09	Annual Average Daily Traffic
B.H.10	Annual Average Daily Truck Traffic
B.H.11	Year of Annual Average Daily Traffic
B.H.12	Highway Maximum Usable Vertical Clearance
B.H.13	Highway Minimum Vertical Clearance
B.H.14	Highway Minimum Horizontal Clearance, Left
B.H.15	Highway Minimum Horizontal Clearance, Right
B.H.16	Highway Maximum Usable Surface Width
B.H.17	Bypass Detour Length
B.H.18	Crossing Bridge Number

Source: INDOT Website

Lesson 4.3

NextLevel INDIANA

Subsection 4.3: Highways

- Data items in this subsection provide information about the highways that are carried on, and that pass above or below the bridge
- These data items are considered part of the Features Data Set and have a many-to-one relationship with a bridge
  - Each highway feature reported in Item B.F.01 (Feature Type) has a unique highway feature data set, and there are typically multiple highway feature data sets associated with a bridge

Subsection 4.3: Highways (cont.)

- For each highway feature that is carried on the bridge
  - Report all applicable items
- For each highway feature that passes below the bridge and is ***not*** carried by another bridge
  - Report all applicable items
- Items B.H.12 (Highway Maximum Usable Vertical Clearance) and B.H.16 (Highway Maximum Usable Surface Width) apply to ***highway features below a bridge*** only when the ***highway feature carries an NHS route***

Subsection 4.3: Highways (cont.)

- For each highway feature that passes above or below the bridge and is carried by another bridge
  - Report only Item B.H.18 (Crossing Bridge Number)
  - When needed, FHWA obtains the data for these highway feature(s) using the data reported for the crossing bridge
- Data for items in this subsection typically remain static once a bridge has been inventoried

Subsection 4.3: Highways – Items

- B.H.01 Functional Classification
- B.H.02 Urban Code
- B.H.03 NHS Designation
- B.H.04 National Highway Freight Network
- B.H.05 STRAHNET Designation
- B.H.06 LRS Route ID
- B.H.07 LRS Mile Point
- B.H.08 Lanes on Highway
- B.H.09 Annual Average Daily Traffic
- B.H.10 Annual Average Daily Truck Traffic
- B.H.11 Year of Annual Average Daily Traffic
- B.H.12 Highway Maximum Usable Vertical Clearance
- B.H.13 Highway Minimum Vertical Clearance
- B.H.14 Highway Minimum Horizontal Clearance, Left
- B.H.15 Highway Minimum Horizontal Clearance, Right
- B.H.16 Highway Maximum Usable Surface Width
- B.H.17 Bypass Detour Length
- **B.H.18 Crossing Bridge Number (new)**

NextLevel INDIANA

B.H.01 Functional Classification

- Format AN (1), Frequency I [SNBI Page 148]
- Report the functional classification for the highway feature reported in Item B.F.01 (Feature Type) using one of the following codes
  - 1 Interstate
  - 2 Principal Arterial – Other Freeways and Expressways
  - 3 Principal Arterial – Other
  - 4 Minor Arterial

B.H.01 Functional Classification (cont.)

- Codes (cont.)
  - 5 Major Collector
  - 6 Minor Collector
  - 7 Local
    - Use for State or Federal parkways and other park roads unless there is a through highway designated at a higher classification
- Functional classifications result from the grouping of highways by the character of service they provide
- Ensure that the functional classification designated in this item is consistent with the HPMS

B.H.01 Functional Classification (cont.)

- When one highway feature carries multiple route types
  - Report the code for the highest-class route following the hierarchy in the code descriptions; Interstate being the highest class
- FHWA Highway Functional Classification Concepts, Criteria, and Procedures website
  - https://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/
- Ensure that the functional classification designated in this item is consistent with the HPMS

NextLevel INDIANA

B.H.02 Urban Code

- Format AN (5), Frequency I [SNBI Page 149]
- Report the urbanized area code consistent with the State's HPMS urban boundaries for the highway feature reported in Item B.F.01 (Feature Type) at the bridge
- For bridges outside urbanized areas
  - Use code 99999 for rural areas with population less than 5,000
  - Use code 99998 for small urban areas with population 5,000 to 49,999
  - In accordance with the HPMS Field Manual

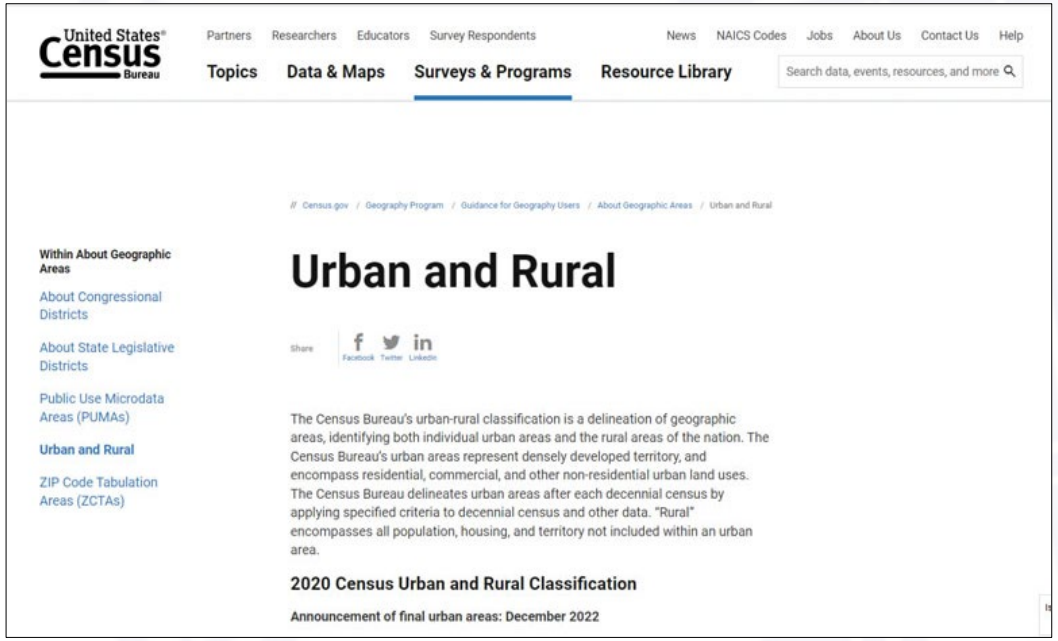
B.H.02 Urban Code (cont.)

- FHWA approves adjusted urban boundaries submitted by State DOT planning offices
  - State's HPMS urban boundaries are based on the FHWA-approved adjusted urban boundaries
- Urban codes website
  - https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural.html
- State maps of the unadjusted U.S. Census urban boundaries with highways (map layers: Labels, Transportation, and Urban Areas checked) website
  - https://tigerweb.geo.census.gov

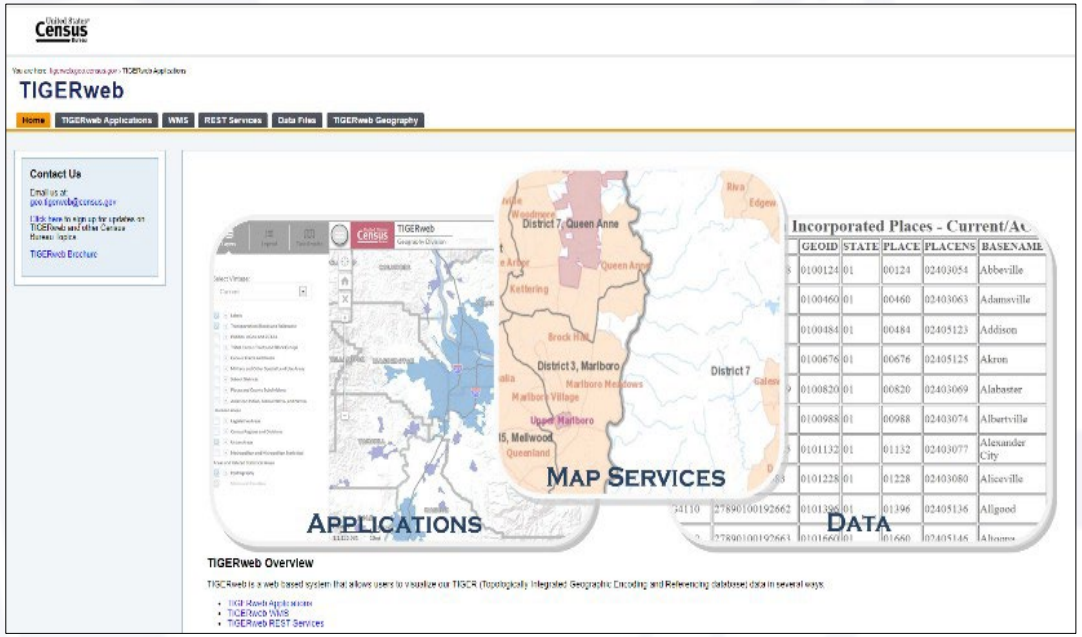
NextLevel INDIANA

B.H.02 Urban Code (cont.)

Website - Urban codes



Website - State maps of the unadjusted U.S. Census urban boundaries with highways



NextLevel INDIANA

B.H.03 NHS Designation

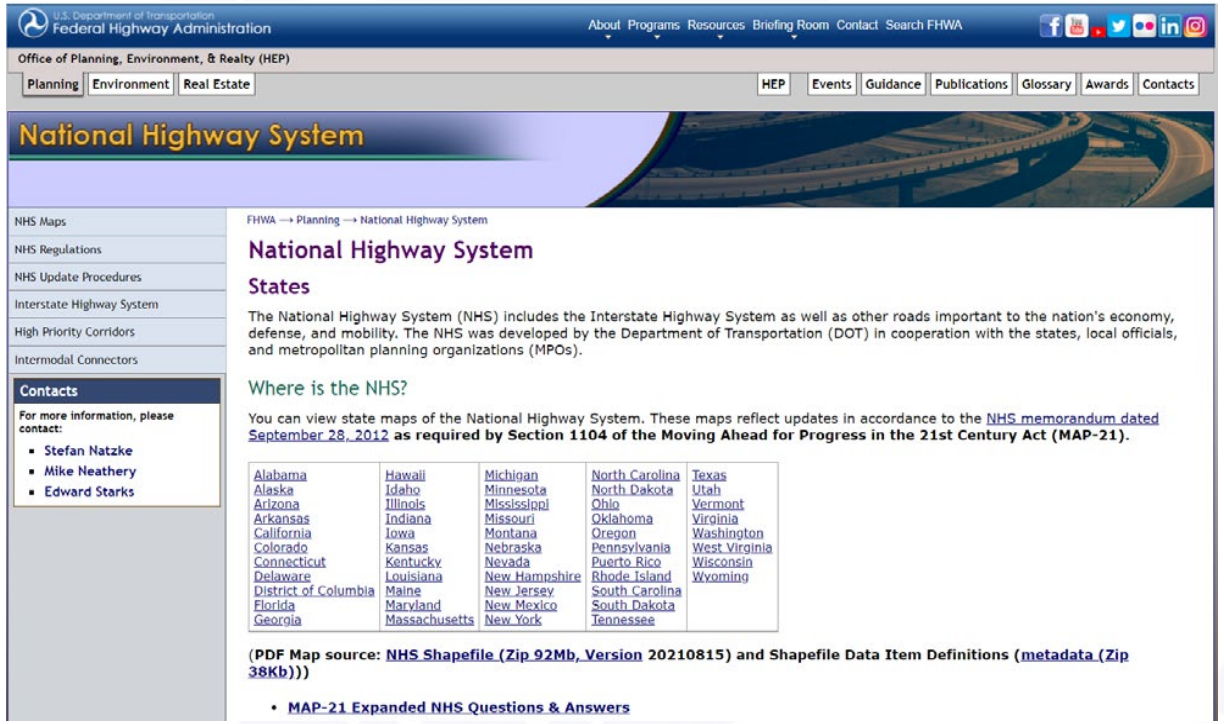
- Format AN (1), Frequency I [SNBI Page 150]
- Report the NHS designation for the highway feature reported in Item B.F.01 (Feature Type), using one of the following codes
  - N Non-NHS
  - Y NHS
- NHS includes the following subsystems of highways
  - Interstate, other principal arterials, STRAHNET, major STRAHNET connectors, and intermodal connectors

B.H.03 NHS Designation (cont.)

- NHS includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility
- NHS was developed by the USDOT in cooperation with the states, local officials, and MPOs
- For border bridges
  - Neighboring State reports this item for all highway features carried on the bridge, as part of their abbreviated bridge record

B.H.03 NHS Designation (cont.)

- Website for State maps of the NHS
  - https://www.fhwa.dot.gov/planning/national_highway_system/nhs_maps/



Active poll

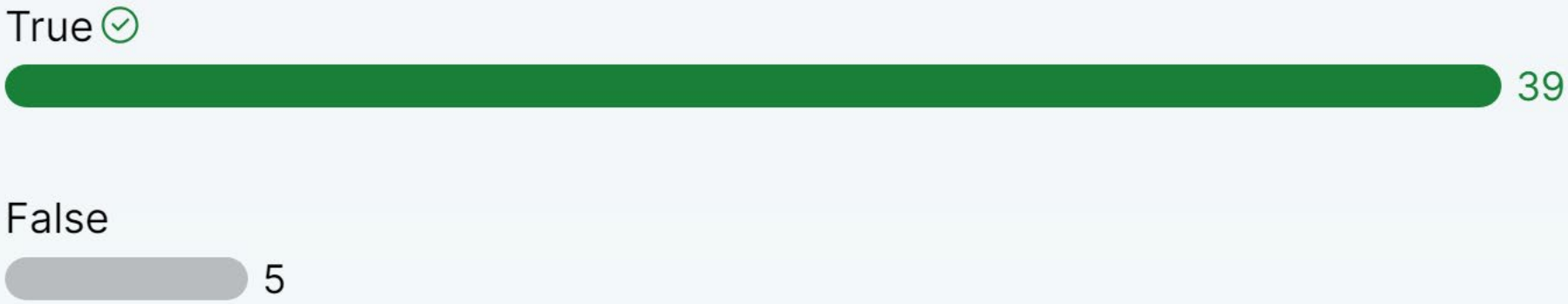
44

Join at

slido.com

#INDOTBI

Report all applicable items for each highway feature that passes below the bridge and is not carried by another bridge.



Active poll

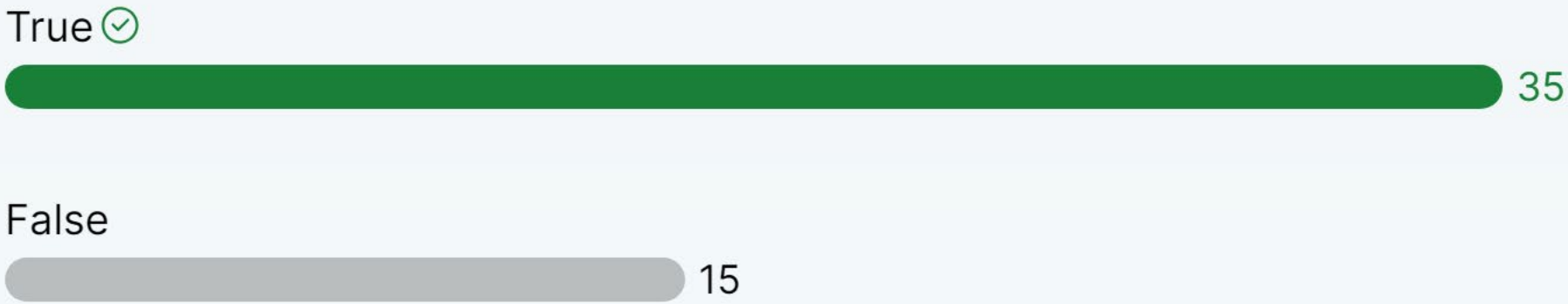
50

Join at

slido.com

#INDOTBI

Items B.H.12 (Highway Maximum Usable Vertical Clearance) and B.H.16 (Highway Maximum Usable Surface Width) apply to highway features below a bridge only when the highway feature carries an NHS route.



Active poll

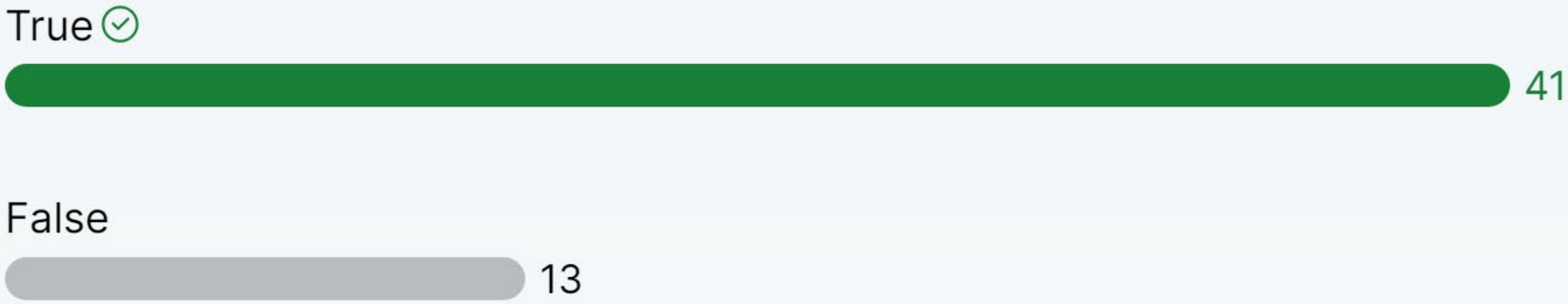
54

Join at

slido.com

#INDOTBI

Report only Item B.H.18 (Crossing Bridge Number) for each highway feature that passes above or below the bridge and is carried by another bridge.



B.H.04 National Highway Freight Network

- Format AN (1), Frequency I [SNBI Page 151]
- Report the NHFN designation for the highway feature reported in Item B.F.01 (Feature Type), using one of the following codes
  - 1 Primary Highway Freight System
  - 2 Interstate portions not on the Primary Highway Freight System
  - 3 Critical Rural Freight Corridor
  - 4 Critical Urban Freight Corridor
  - N Not on the NHFN

B.H.04 National Highway Freight Network (cont.)

- Used to identify the NHFN and to report to Congress on the conditions and performance of the network
- Used with other items to classify bridges according to serviceability, safety, and essentiality for public use and considers the potential impacts to emergency evacuation routes and to regional and national freight and passenger mobility if the serviceability of the bridge is restricted or diminished
- More information
  - https://ops.fhwa.dot.gov/Freight/infrastructure/nfn/index.htm

B.H.05 STRAHNET Designation

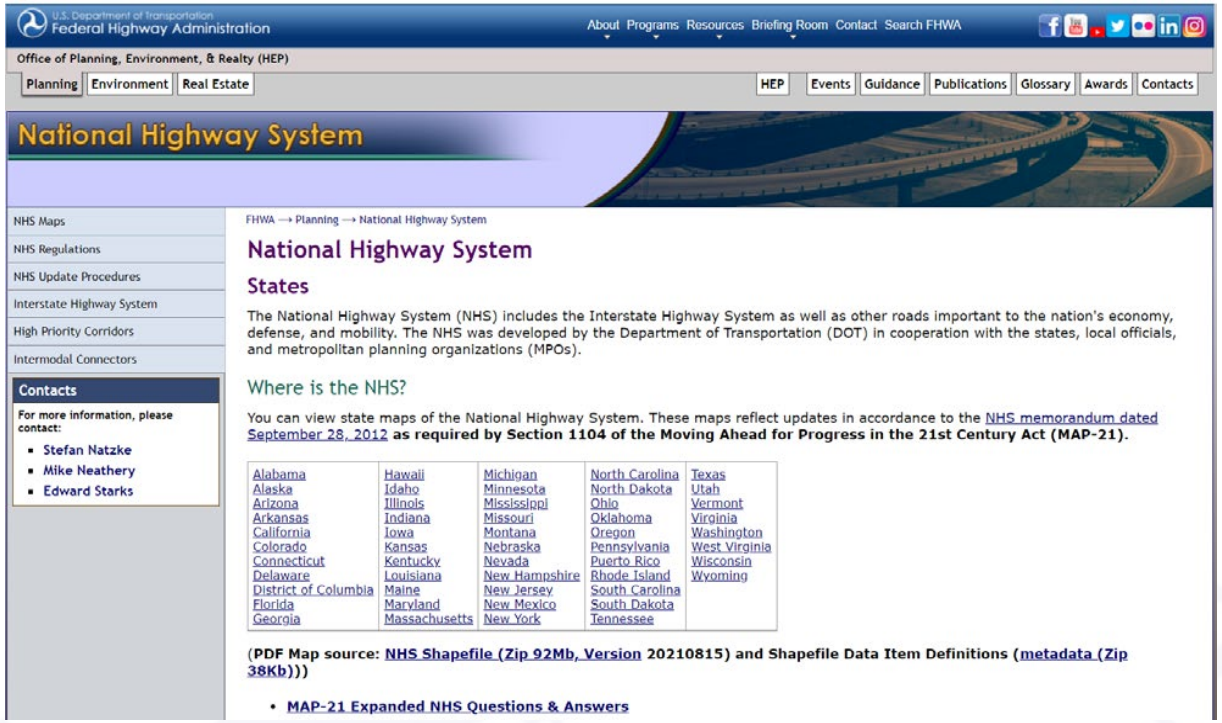
- Format AN (1), Frequency I [SNBI Page 152]
- Report the STRAHNET designation for the highway feature reported in Item B.F.01 (Feature Type), using one of the following codes
  - 1 STRAHNET route
  - 2 STRAHNET Connector route
  - N Not a STRAHNET route

B.H.05 STRAHNET Designation (cont.)

- The STRAHNET is a system of Interstate and primary highways and connectors that provide access to major US military installations and strategic ports, and provides continuity and emergency capabilities for defense purposes
- The STRAHNET is determined by the Surface Deployment and Distribution Command (SDDC) in coordination with FHWA

B.H.05 STRAHNET Designation (cont.)

- STRAHNET routes and STRAHNET Connector routes can be found on NHS State maps website
  - https://www.fhwa.dot.gov/planning/national_highway_system/nhs_maps/



B.H.06 LRS Route ID

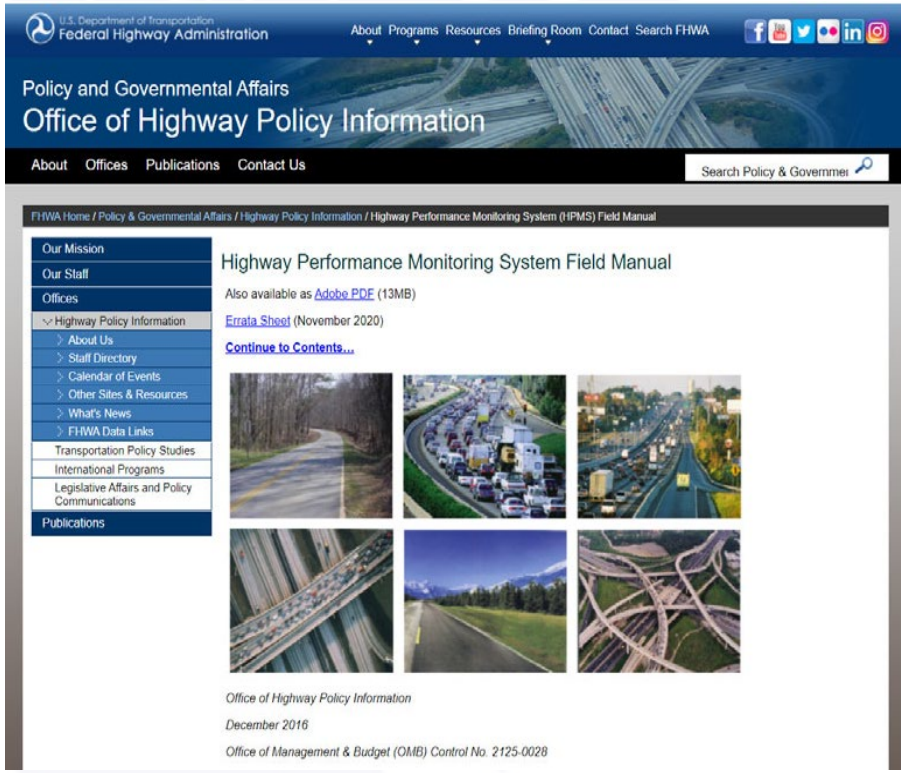
- Format AN (120), Frequency I [SNBI Page 153]
- Report the LRS Route ID defined by the State that is reported to the HPMS for the highway feature reported in Item B.F.01 (Feature Type)
- The LRS Route ID must match the HPMS data exactly
- Report N if an LRS Route ID has not been assigned

B.H.06 LRS Route ID (cont.)

- LRS Route ID is not necessarily the same as the route number posted along the highway, but is a number used to uniquely identify a route within a county or a State for GIS analysis and mapping purposes
- For border bridges
  - Neighboring State reports this item for all highway features carried on the bridge, as part of their abbreviated bridge record

B.H.06 STRAHNET Designation (cont.)

- Refer to the FHWA HPMS Field Manual at http://www.fhwa.dot.gov/policyinformation/hpms/fieldmanual/



B.H.07 LRS Mile Point

- Format N (8,3), Frequency I [SNBI Page 154]
- Report the LRS mile point for the highway feature reported in Item B.F.01 (Feature Type) to the nearest thousandth of a mile
- The mile point must be consistent with the LRS route and mile point system for the HPMS
- For highway features that carry an LRS route, report the mile point at the beginning of the bridge
- When the LRS route passes below the bridge
  - Report the mile point on the LRS route where the bridge is first encountered

B.H.07 LRS Mile Point (cont.)

- The LRS mile point is used to establish the location of the bridge along the LRS route
- If the highway does not carry an LRS route
  - Report the most appropriate mile point
- For border bridges
  - Neighboring State reports this item for all highway features carried on the bridge, as part of their abbreviated bridge record

B.H.07 LRS Mile Point – Examples

LRS Mile Point from HPMS is 130.344

Report ***130.344***

The highway does not carry an LRS route, and the beginning of the bridge is 0.2 miles past the 34.0-mile marker

Report ***34.2***

B.H.08 Lanes on Highway

- Format N (2,0), Frequency I [SNBI Page 155]
- Report the number of highway traffic lanes for the highway feature reported in Item B.F.01 (Feature Type)
- Report 1 when a highway is signed or striped for one-lane, but carries two-way traffic
- Report 1 for a highway feature carried on the bridge when Item B.G.06 (Bridge Width Curb-to-Curb) is less than 16 feet and the bridge is not striped for full width traffic lanes

B.H.08 Lanes on Highway (cont.)

- For highway features ***carried on*** the bridge
  - Include all lanes that are striped or otherwise operated as full width highway traffic lanes and special use lanes (e.g., merge lanes, ramp lanes, and left-turn lanes) - and run the entire length of the bridge
- For highway features ***below*** the bridge that are ***not carried on another bridge***
  - Include all lanes that are striped or otherwise operated as full width highway traffic lanes and special use lanes (e.g., merge lanes, ramp lanes, and left-turn lanes) that pass below the entire width of the bridge

B.H.08 Lanes on Highway (cont.)

- Do not include pedestrian sidewalks, bike paths, or railroad tracks as lanes, unless the railroad tracks are concurrent with the highway lanes
- For double deck bridges and parallel bridges
  - Report the number of lanes consistent with the highway feature reported in Item B.F.01 (Feature Type)
- For sidehill bridges
  - Report the total number of lanes for the highway feature regardless if carried on the bridge or terrain/earth material

B.H.08 Lanes on Highway – Examples

Highway feature carries two-way traffic on unstriped lanes and has a curb-to-curb width of 18 ft.

- Report ***2***

Double deck bridge inventoried as one unique bridge number

- Highway feature on ***top*** level carries five lanes
  - Report ***5***
- Highway feature on lower level carries five lanes
  - Report ***5***

B.H.09 Annual Average Daily Traffic

- Format N (8,0), Frequency I [SNBI Page 156]
- Report the AADT from the most recent count for the highway feature reported in Item B.F.01 (Feature Type)
- AADT must be compatible with the other items reported for the highway feature
- Report the design AADT for a newly inventoried highway feature when actual AADT information is not yet available
- Report the last open AADT for a highway feature that is temporarily closed until repair or replacement can be completed

B.H.09 Annual Average Daily Traffic (cont.)

- Should be updated at intervals in accordance with the standards for the HPMS and standards/policies within the State
- All traffic, including trucks, is counted in the AADT
- The number of trucks counted in the AADT is reported in Item B.H.10 (Annual Average Daily Truck Traffic)
- When HPMS or other planning data are not available
  - Use a best estimate based on site familiarity or functional classification in accordance with State standards and policies

B.H.10 Annual Average Daily Truck Traffic

- Format N (8,0), Frequency I [SNBI Page 157]
- Report the AADTT from the most recent count for the highway feature reported in Item B.F.01 (Feature Type)
- AADTT must be compatible with the other items reported for the highway feature
- Report the design AADTT for a newly inventoried highway feature when actual AADTT information is not yet available
- Report the last open AADTT for a highway feature that is temporarily closed until repair or replacement can be completed

B.H.10 Annual Average Daily Truck Traffic (cont.)

- Should be updated at intervals in accordance with the standards for the HPMS and standards/policies within the State
- When HPMS or other planning data are not available
  - Use a best estimate based on site familiarity or functional classification in accordance with State standards and policies
- Do not include vans, pickup trucks, and other light delivery trucks in the AADTT

B.H.10 Annual Average Daily Truck Traffic (cont.)

- AADTT represents vehicle classes 4-13 as described in FHWA's Traffic Monitoring Guide at:
  - http://www.fhwa.dot.gov/policyinformation/tmguide/

B.H.11 Year of Annual Average Daily Traffic

- Format N (4,0), Frequency I [SNBI Page 158]
- Report the year associated with the data reported in Item B.H.09 (Annual Average Daily Traffic) for the highway feature reported in Item B.F.01 (Feature Type)
- Traffic data should be updated at intervals in accordance with the standards for the HPMS and standards/policies within the State

B.H.12 Highway Maximum Usable Vertical Clearance

- Format N (3,1), Frequency EI [SNBI Page 159-160]
- Report the minimum vertical clearance for the highway feature reported in Item B.F.01 (Feature Type)
  - Measured over the 10-foot-wide envelope of the traveled part of the highway that provides for the maximum usable clearance envelope
  - Rounded down to the nearest tenth of a foot
- Measure the vertical clearance plumb from the deck or highway surface to the lowest bridge member restriction, appurtenance (signs, utilities, etc.) attached to the bridge, or other structure
- Report 99.9 when the clearance is 100 feet or greater or no restriction exists above the highway

NextLevel INDIANA

B.H.12 Highway Maximum Usable Vertical Clearance (cont.)

- Identifies the maximum height of a notional 10-foot wide vehicle that can pass on the highway feature(s) reported in Item B.F.01 (Feature Type)
- Information is sometimes used for preliminary military routing
- Data may not represent the absolute minimum clearance over the highway feature
  - Refer to Item B.H.13 (Highway Minimum Vertical Clearance) for the absolute minimum clearance
- The traveled part of the highway feature does not include shoulders

B.H.12 Highway Maximum Usable Vertical Clearance (cont.)

- Data may be different than the posted vertical clearance due to agency vertical clearance posting policies and procedures.
- Data are not sufficient for permit routing as the location of the 10-foot-wide envelope that provides for the maximum usable clearance is not reported
- For a double decked bridge inventoried as one bridge
  - Report this information for each highway feature on each level of the bridge

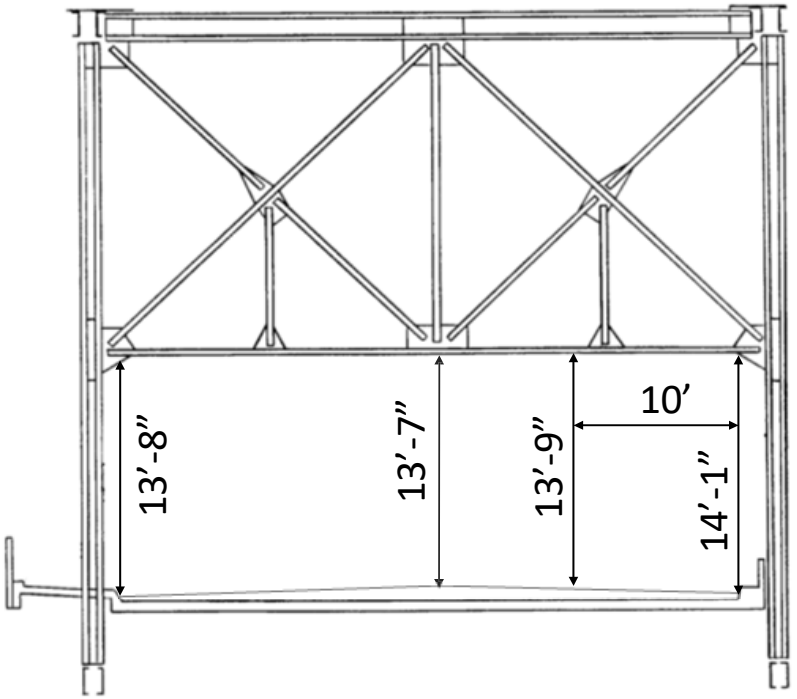
B.H.12 Highway Maximum Usable Vertical Clearance (cont.)

- Update field measurements when alterations are made to the bridge or highway that affect the previously measured clearance
- Reporting this item is optional for highway features below the bridge that do not carry NHS routes as identified in Item B.H.03 (NHS Designation)
- Clearances greater than 30 feet may be estimated

B.H.12 Highway Maximum Usable Vertical Clearance – Examples

The bridge has a 13’-9” maximum usable vertical clearance R

Report ***13.7***



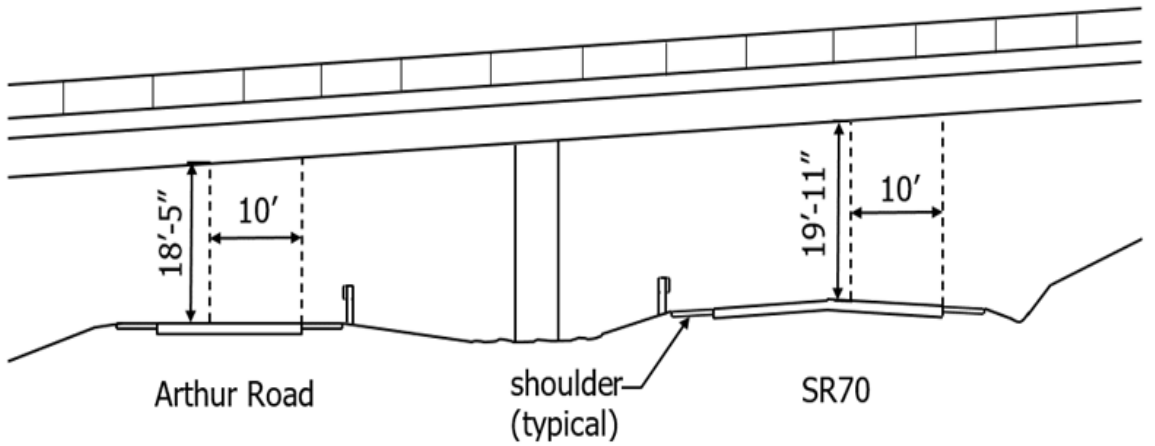
B.H.12 Highway Maximum Usable Vertical Clearance – Examples (cont.)

Arthur Road passes below the bridge and has an 18’-5” maximum usable vertical clearance

Report ***18.4***

SR70 also passes below the bridge and has a 19’-11” maximum usable vertical clearance

Report ***19.9***



B.H.13 Highway Minimum Vertical Clearance

- Format N (3,1), Frequency EI [SNBI Page 161-162]
- Report the minimum vertical clearance measured over the highway feature reported in Item B.F.01 (Feature Type)
  - Rounded down to the nearest tenth of a foot
- Measure the vertical clearance plumb from the deck or highway surface (***including*** paved or stabilized shoulders) to the lowest bridge member restriction, appurtenance (signs, utilities, etc.) attached to the bridge, or other structure
- Report 99.9 when the clearance is 100 feet or greater or no restriction exists above the highway

NextLevel INDIANA

B.H.13 Highway Minimum Vertical Clearance (cont.)

- Several measurements may need to be made to determine the minimum vertical clearance
  - Only the minimum measurement is reported
- Shoulders must be contiguous with the traveled way 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 considered a shoulder for this item
- Refer to agency policy for when and where stabilized shoulders are used

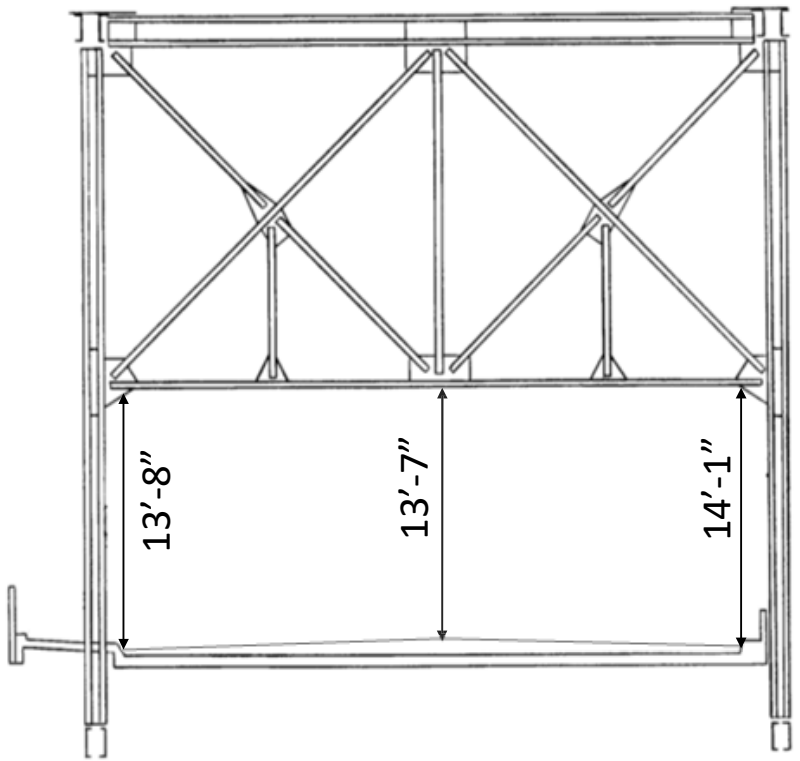
B.H.13 Highway Minimum Vertical Clearance (cont.)

- When it is not readily known if stabilized construction details were used, the presence of rutting, heaving, water retention, or other distress may be used as indicators that the shoulder is not stabilized
- These data may be different than the posted vertical clearance due to agency vertical clearance posting policies and procedures
- Update field measurements when alterations are made to the bridge or highway that affect the previously measured clearance
- Clearances greater than 30 feet may be estimated

B.H.13 Highway Minimum Vertical Clearance – Examples

The bridge has a 13’-7” minimum vertical clearance

Report ***13.5***



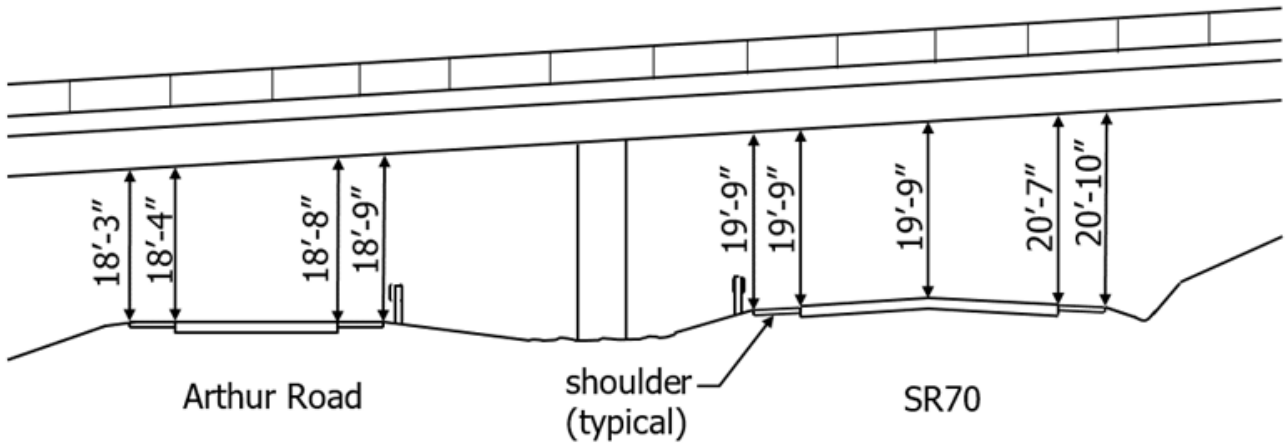
B.H.13 Highway Minimum Vertical Clearance – Examples (cont.)

Arthur Road passes below the bridge and has an 18’-3” minimum vertical clearance

Report ***18.2***

SR70 also passes below the bridge and has a 19’-9” minimum vertical clearance

Report ***19.7***



B.H.14 Highway Minimum Horizontal Clearance, Left

- Format N (3,1), Frequency I [SNBI Page 163-165]
- Report the minimum horizontal clearance on the left, for the highway feature reported in Item B.F.01 (Feature Type), rounded down to the ***nearest tenth of a foot***
- Measure from the left edge line of the highway (***excluding*** shoulders, turn lanes, acceleration, or deceleration lanes) in the direction of travel to the nearest substructure unit, rigid barrier, oncoming traffic lane, or toe of slope that is steeper than 1 to 3 (vertical to horizontal)

B.H.14 Highway Minimum Horizontal Clearance, Left (cont.)

- Report 99.9 when the clearance is 100 feet or greater
- Report 0 when the highway is a two-way highway that is not divided at the bridge
- Do not report this item for highway feature(s) ***carried on*** the bridge
- This item provides data for the highway feature(s) reported in Item B.F.01 (Feature Type) that ***pass below*** the bridge

B.H.14 Highway Minimum Horizontal Clearance, Left (cont.)

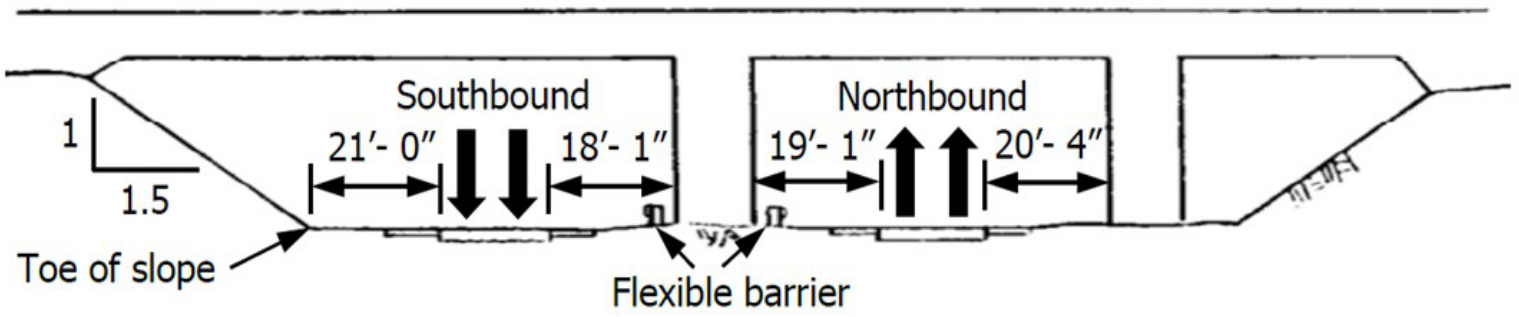
- Highways undivided at the bridge are reported as 0 due to the adjacent oncoming traffic lane which provides no horizontal clearance to the left
- Reinforced concrete and masonry traffic safety features are considered rigid barriers
- Metal and timber railings are not considered rigid barriers
- Clearances greater than 30 feet may be estimated

B.H.14 Highway Minimum Horizontal Clearance, Left – Example

Two highway features below the bridge for a highway that is divided at the bridge

One highway feature carries 1-way traffic southbound, and one carries 1-way traffic northbound

- Report ***18.0*** for the southbound highway feature
- Report ***19.0*** for the northbound highway feature



B.H.15 Highway Minimum Horizontal Clearance, Right

- Format N (3,1), Frequency I [SNBI Page 166-168]
- Report the minimum horizontal clearance on the right, for the ***highway feature below*** the bridge reported in Item B.F.01 (Feature Type), rounded down to the ***nearest tenth of a foot***
- Measure from the left edge line of the highway (***excluding*** shoulders, turn lanes, acceleration, or deceleration lanes) in the direction of travel to the nearest substructure unit, rigid barrier, oncoming traffic lane, or toe of slope that is steeper than 1 to 3 (vertical to horizontal)

B.H.15 Highway Minimum Horizontal Clearance, Right (cont.)

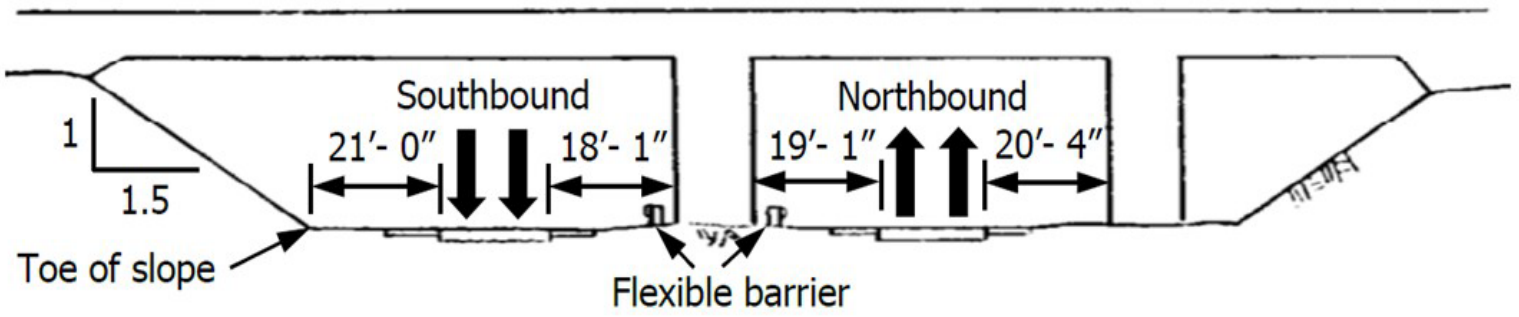
- Report 99.9 when the clearances are 100 feet or greater
- Do not report this item for highway feature(s) carried on the bridge
- This item provides data for the highway feature(s) reported in Item B.F.01 (Feature Type) that pass below the bridge.
- Reinforced concrete and masonry traffic safety features are considered rigid barriers
- Metal and timber railings are not considered rigid barriers
- Clearances greater than 30 feet may be estimated

B.H.15 Highway Minimum Horizontal Clearance, Right – Example

Two highway features below the bridge for a highway that is divided at the bridge

One highway feature carries 1-way traffic southbound, and one carries 1-way traffic northbound

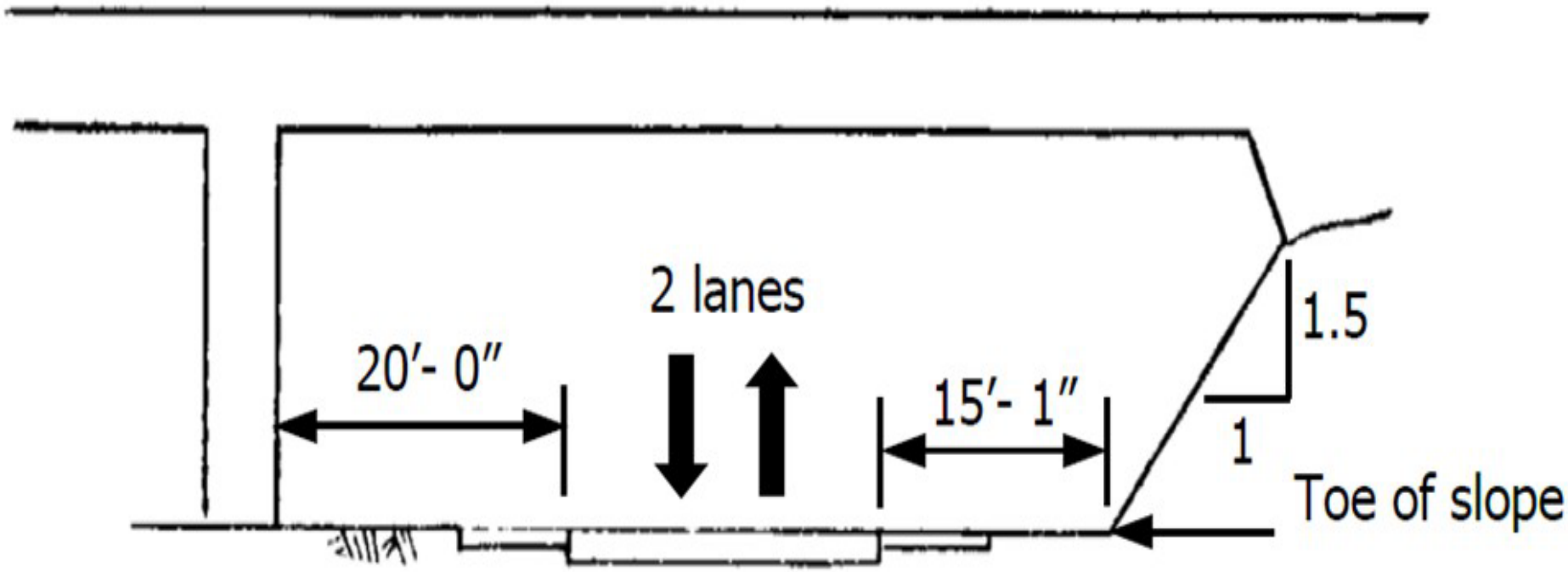
- Report ***21.0*** for the southbound highway feature
- Report ***19.3*** for the northbound highway feature



Knowledge Check

Highway feature below the bridge carries two-way traffic.

What is reported for B.H.14 Highway Minimum Horizontal Clearance, Left?

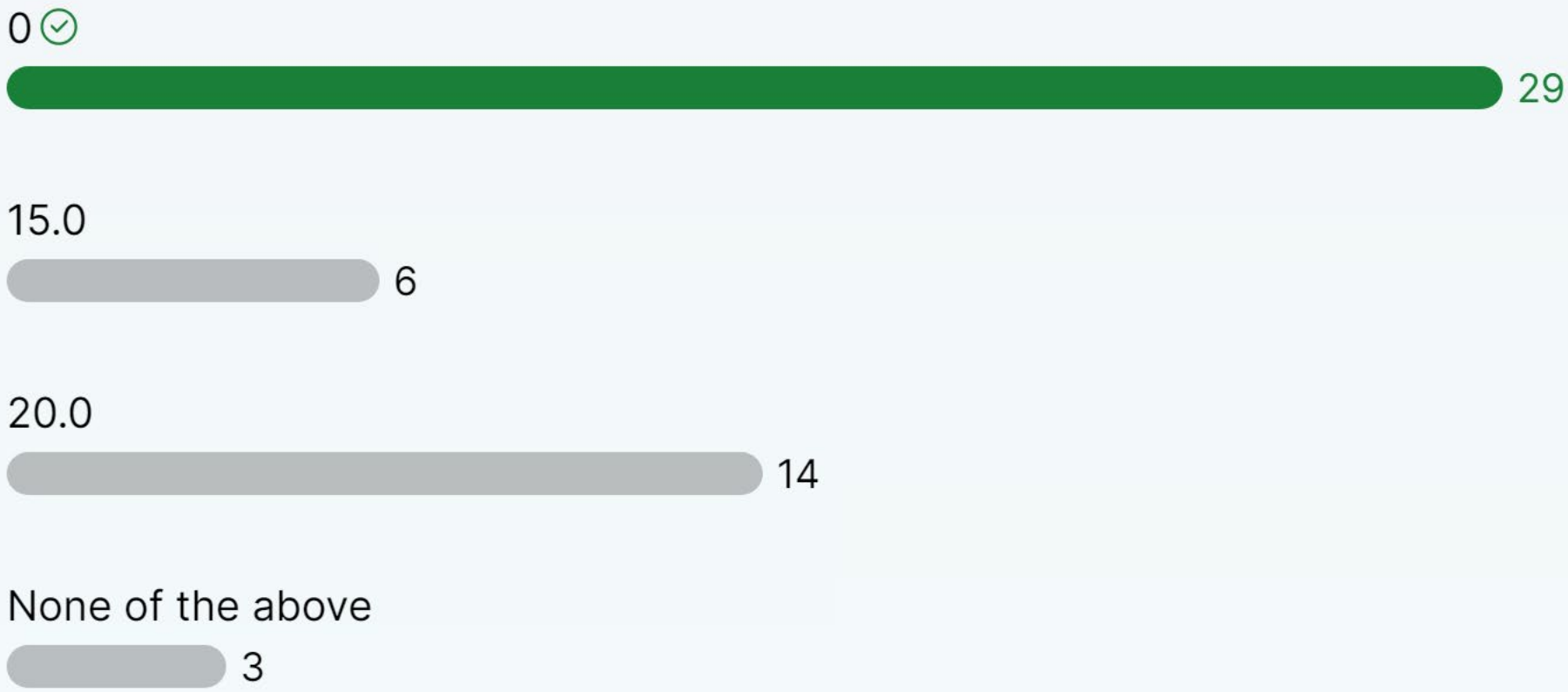


Active poll

52

Join at
slido.com
#INDOTBI

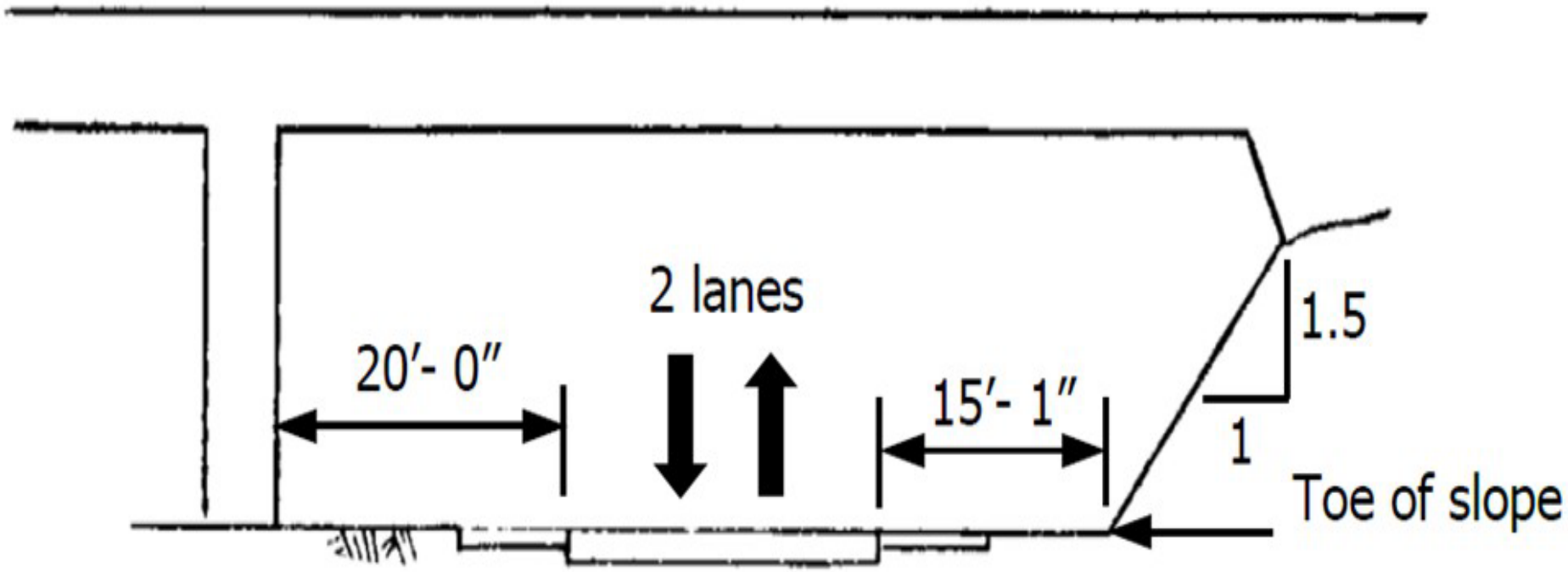
Highway feature below the bridge carries two-way traffic.
What is reported for B.H.14 Highway Minimum Horizontal Clearance, Left?



Knowledge Check

Highway feature below the bridge carries two-way traffic.

What is reported for B.H.15 Highway Minimum Horizontal Clearance, Right?



Active poll

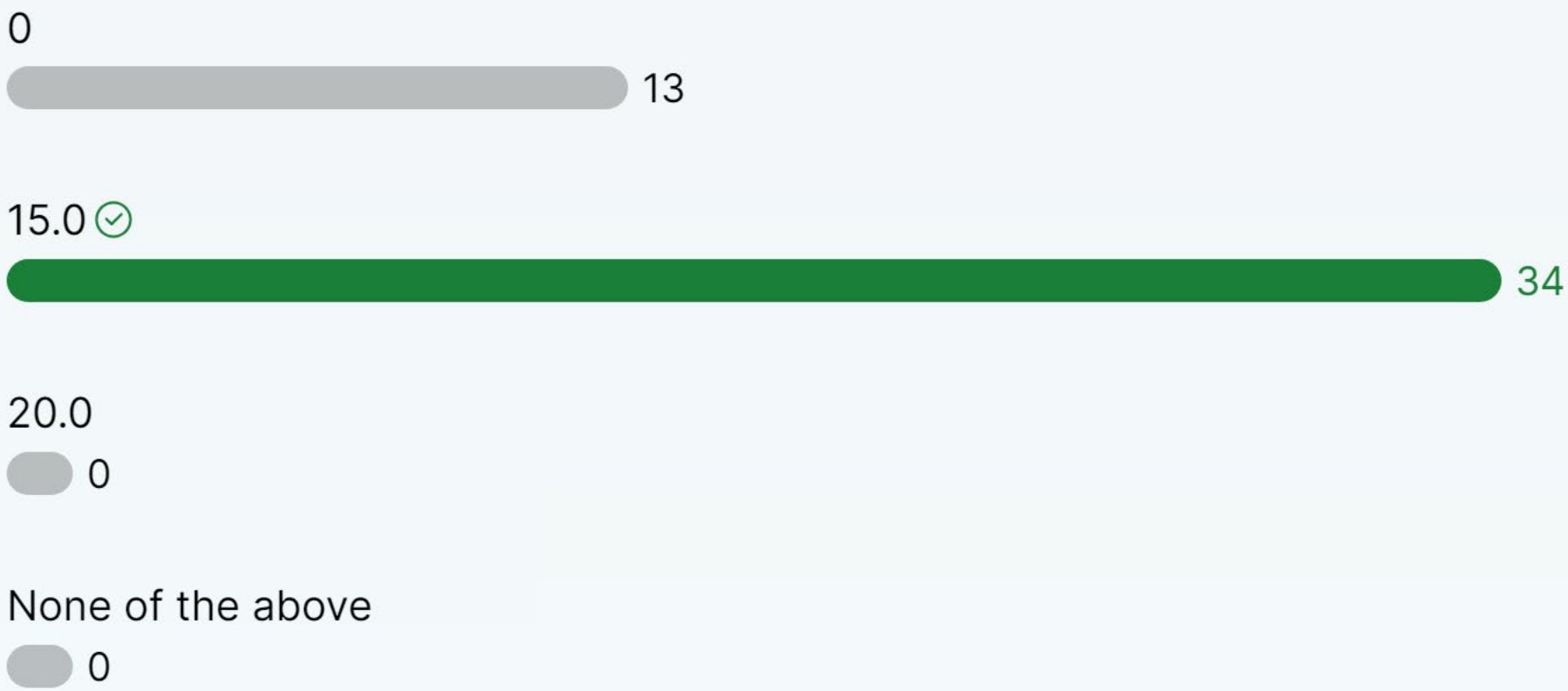
47

Join at

slido.com

#INDOTBI

Highway feature below the bridge carries two-way traffic.
What is reported for B.H.15 Highway Minimum Horizontal Clearance, Right?



B.H.16 Highway Maximum Usable Surface Width

- Format N (3,1), Frequency I [SNBI Page 169-170]
- Report the maximum usable surface width for the highway feature reported in Item B.F.01 (Feature Type) that ***passes below*** or is ***carried on*** the bridge, rounded down to the ***nearest tenth of a foot***
- Measure the width perpendicular to the centerline of the highway (***including*** paved or stabilized shoulders)
- Report 99.9 when the surface width is 100 feet or greater

B.H.16 Highway Maximum Usable Surface Width (cont.)

- Shoulders are *included* when they are contiguous with the traveled way and 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 considered a shoulder for this item
- Refer to agency policy for when and where stabilized shoulders are used

B.H.16 Highway Maximum Usable Surface Width (cont.)

- When it is not readily known if stabilized construction details were used, the presence of rutting, heaving, water retention, or other distress may be used as indicators that the shoulder is not stabilized
- Flush (striped) and mountable medians are not considered restrictions
- A curb greater than 6 inches high may be considered non-mountable for these specifications

B.H.16 Highway Maximum Usable Surface Width (cont.)

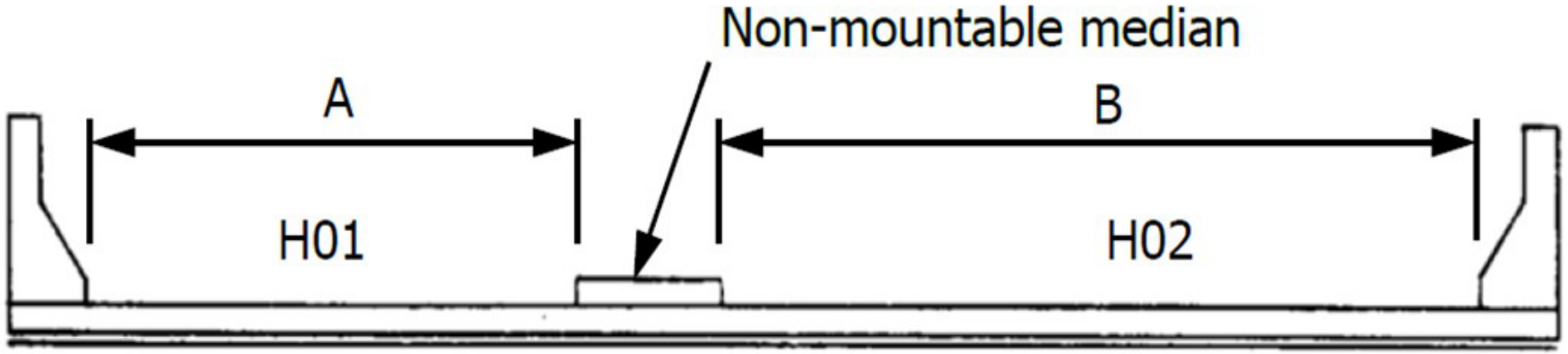
- Use the least restrictive configuration when movable rigid barriers are used to accommodate reversible lanes for non-construction-related applications
- Reporting this item is ***optional*** for highway features ***below*** the bridge that do not carry NHS routes as identified in Item B.H.03 (NHS Designation)

B.H.16 Highway Maximum Usable Surface Width – Example

Two highway features carried on the bridge

Highway 1 (H01) and Highway 2 (H02) are divided at the bridge by the non-mountable median

- Report measurement A for H01
- Report measurement B for H02



B.H.17 Bypass Detour Length

- Format N (3,0), Frequency I [SNBI Page 171-172]
- Report the length to the ***nearest mile*** of the total ***additional travel*** for a vehicle to bypass the bridge for the highway feature reported in Item B.F.01 (Feature Type), that ***passes below*** or is ***carried on*** the bridge
- Report 999 where a detour does not exist
- Report 0 for available ground level bypass
- Report 1 when the highway feature is carried by a bridge, is not at an interchange, and a parallel bridge can be used as a temporary bypass with a reasonable amount of crossover grading

NextLevel INDIANA

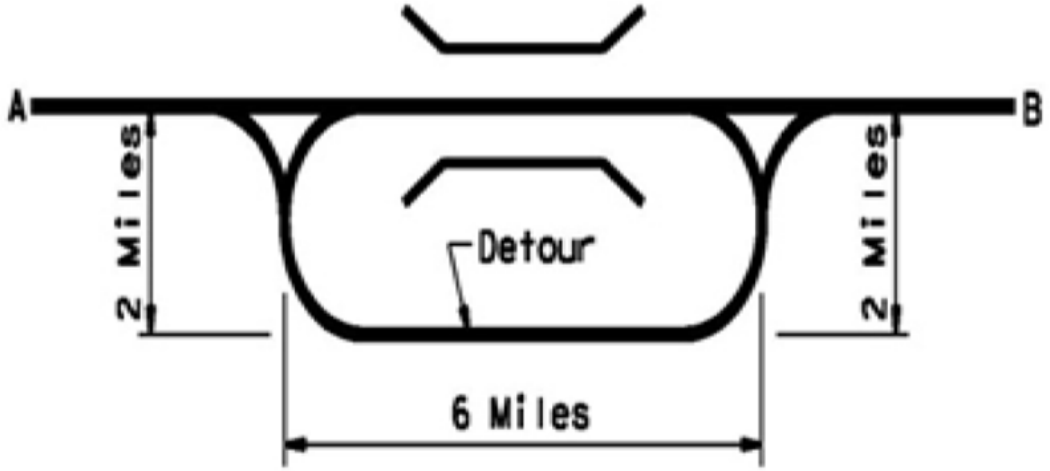
B.H.17 Bypass Detour Length (cont.)

- Determine bypass detour length by evaluating the potential to move traffic, including military vehicles and trucks, around bridges
- Avoid detour routes that have load, height, or capacity limitations unacceptable for the additional traffic detoured onto them
- Consider using the parallel bridge of dual bridges or temporary culverts if emergency detours can be constructed with a reasonable amount of grading within the existing right-of-way
- Consider using ramps and/or frontage roads in interchanges
- Review plans for strategic bridge detour routes

B.H.17 Bypass Detour Length – Example

Highway feature carried on the bridge with a 4-mile detour

Report ***4***



B.H.18 Crossing Bridge Number (new)

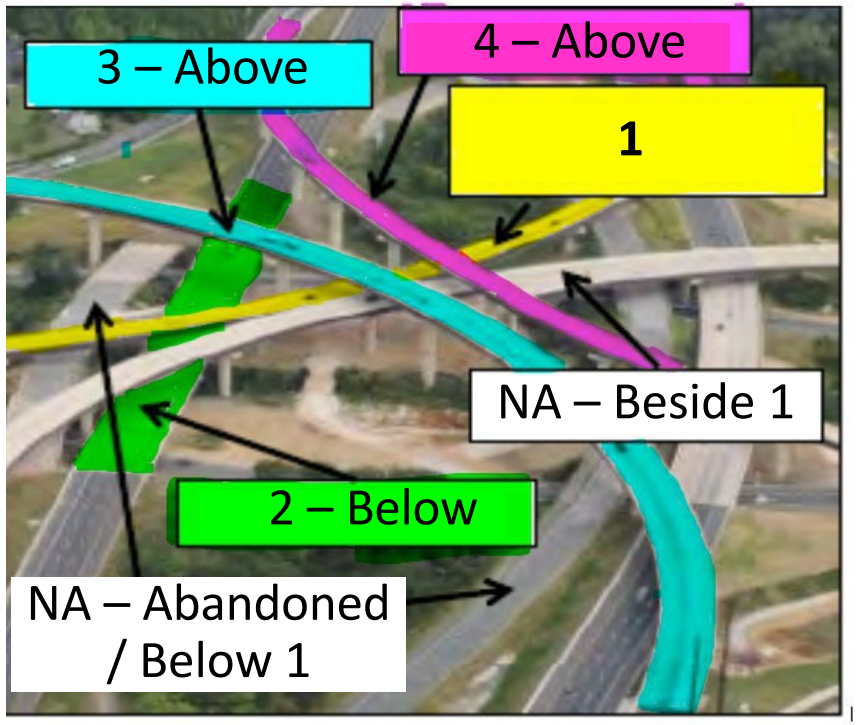
- Format AN (15), Frequency I [SNBI Page 173]
- Intent is to capture the bridge number for bridges of a multi-level interchange, where bridges pass directly above or below other bridges
- Report the exact bridge number(s) as assigned in Item B.ID.01 (Bridge Number) for the bridge carrying a highway feature that is located directly above or below the inventoried highway bridge

B.H.18 Crossing Bridge Number (cont.)

- Do not report this item when the highway bridge does not pass above or below another bridge, or passes above or below a bridge that is not reportable to the NBI
- For border bridges, the Neighboring State reports this item for all highway features that ***pass above*** the bridge, as part of their abbreviated bridge record

Knowledge Check

- Inventoried bridge number **1**
  - Highway Feature Type H01 carried on bridge
- Inventoried bridge passes above bridge number **2 – Below**
  - Highway Feature Type H02 below inventoried bridge
- Inventoried bridge passes below bridge number **3 – Above**
  - Highway Feature Type H03 above inventoried bridge
- Inventoried bridge passes below bridge number **4 – Above**
  - Highway Feature Type H04 above inventoried bridge



Knowledge Check (cont.)

- What Crossing Bridge Number is reported for Feature Type H01?

  None

- What Crossing Bridge Number is reported for Feature Type H02?

  Br. 2 (Below)

- What Crossing Bridge Number is reported for Feature Type H03?

  Br. 3 (Above)

- What Crossing Bridge Number is reported for Feature Type H04?

  Br. 4 (Above)

Subsection 4.4: Railroads

SUBSECTION 4.4: RAILROADS

The data items in this subsection provide information about railroads that are carried on or pass below the bridge. These data items are considered part of the Features Data Set and have a many-to-one relationship with a bridge. Therefore, each railroad feature reported in Item B.F.01 *(Feature Type)* has a unique railroad feature data set, and there may be multiple railroad feature data sets associated with a bridge.

Item B.RR.01 *(Railroad Service Type)* is reported for all railroads, and the remaining items are reported only for railroads below the bridge, i.e. when Item B.F.02 *(Feature Location)* is B.

The dimensional values for the items in this subsection can be obtained from either plans or field measurement.

The data for the items in this subsection typically remain static once a bridge has been inventoried. The following data items are included in this subsection.

Item ID	Data Item
B.RR.01	Railroad Service Type
B.RR.02	Railroad Minimum Vertical Clearance
B.RR.03	Railroad Minimum Horizontal Offset

Source: INDOT Website

Lesson 4.4

NextLevel INDIANA

Subsection 4.4: Railroads (cont.)

- Data items in this subsection provide information about railroads that are ***carried on*** or ***pass below*** the bridge
- Data items are considered part of the Features Data Set and have a many-to-one relationship with a bridge
  - Each railroad feature reported in Item B.F.01 (Feature Type) has a unique railroad feature data set, and there may be multiple railroad feature data sets associated with a bridge

Subsection 4.4: Railroads (cont.)

- Item B.RR.01 (Railroad Service Type) is reported for all railroads, and the remaining items are reported only for railroads below the bridge
  - When Item B.F.02 (Feature Location) is B
- Dimensional values for the items can be obtained from either plans or field measurement
- Data for the items typically remain static once a bridge has been inventoried

Subsection 4.4: Railroads – Items

- **B.RR.01 Railroad Service Type (new)**
- B.RR.02 Railroad Minimum Vertical Clearance
- B.RR.03 Railroad Minimum Horizontal Offset

B.RR.01 Railroad Service Type (new)

- Format AN (2), Frequency I [SNBI pg. 176-177]
- Report the designated railroad service type for the railroad feature reported in Item B.F.01 (Feature Type) using one of the following codes
  - F Freight
  - FE Freight - electrified
  - P Passenger
  - PE Passenger - electrified

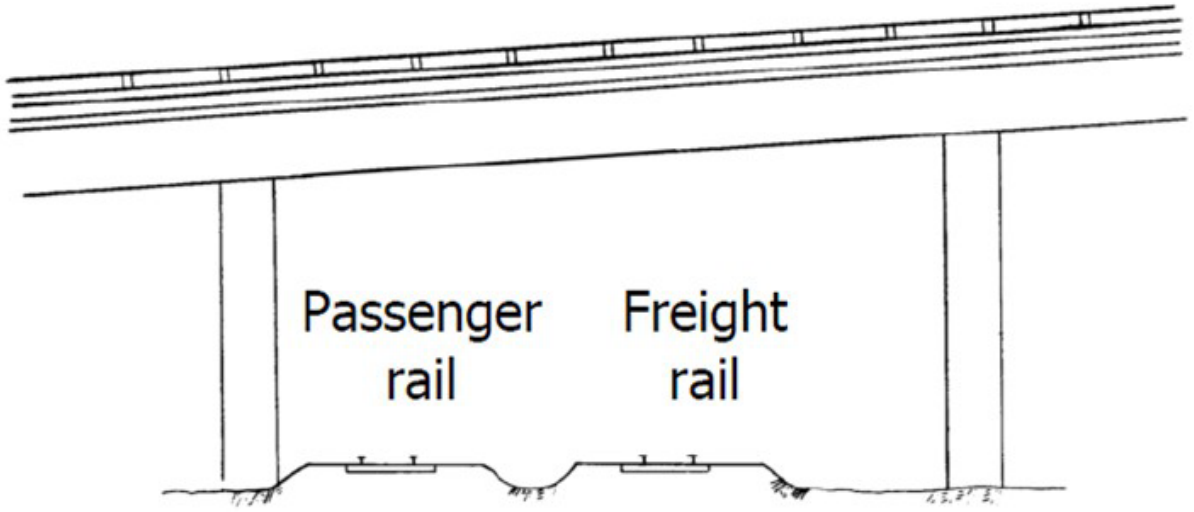
B.RR.01 Railroad Service Type (cont.)

- Codes continued
  - M Multiple services - not electrified
    - Use when multiple rail services (such as freight and passenger rail) use the same tracks and both services are not electrified
  - ME Multiple services – electrified
    - Use when multiple rail services (such as freight and passenger rail) use the same tracks, and at least one is electrified
  - I Inactive
- Electrified is intended for electricity-powered rail lines and third-rails, but not for battery or fuel cell powered lines

B.RR.01 Railroad Service Type – Example

Two railroad tracks below the bridge. One carries passenger rail service, and one carries freight

- Report ***P*** for the passenger rail feature
- Report ***F*** for the freight rail feature

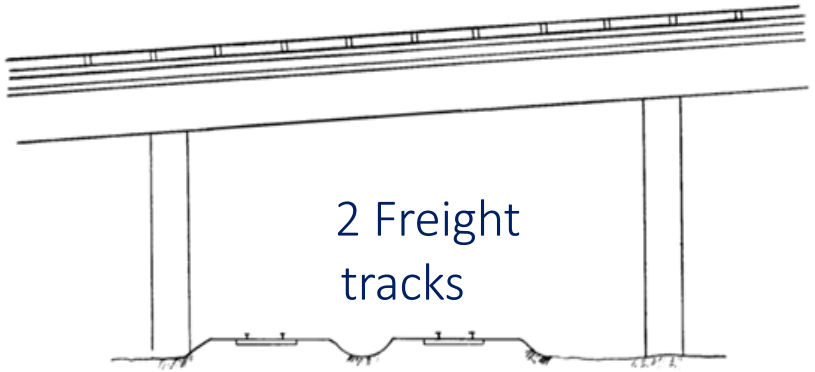


Knowledge Check

Bridge carries two highway features separated by two electrified passenger rail tracks. Two railroad tracks pass below the bridge that both carry freight.

How many railroad features are reported?

Highway features separated by
2 electrified passenger tracks



Active poll

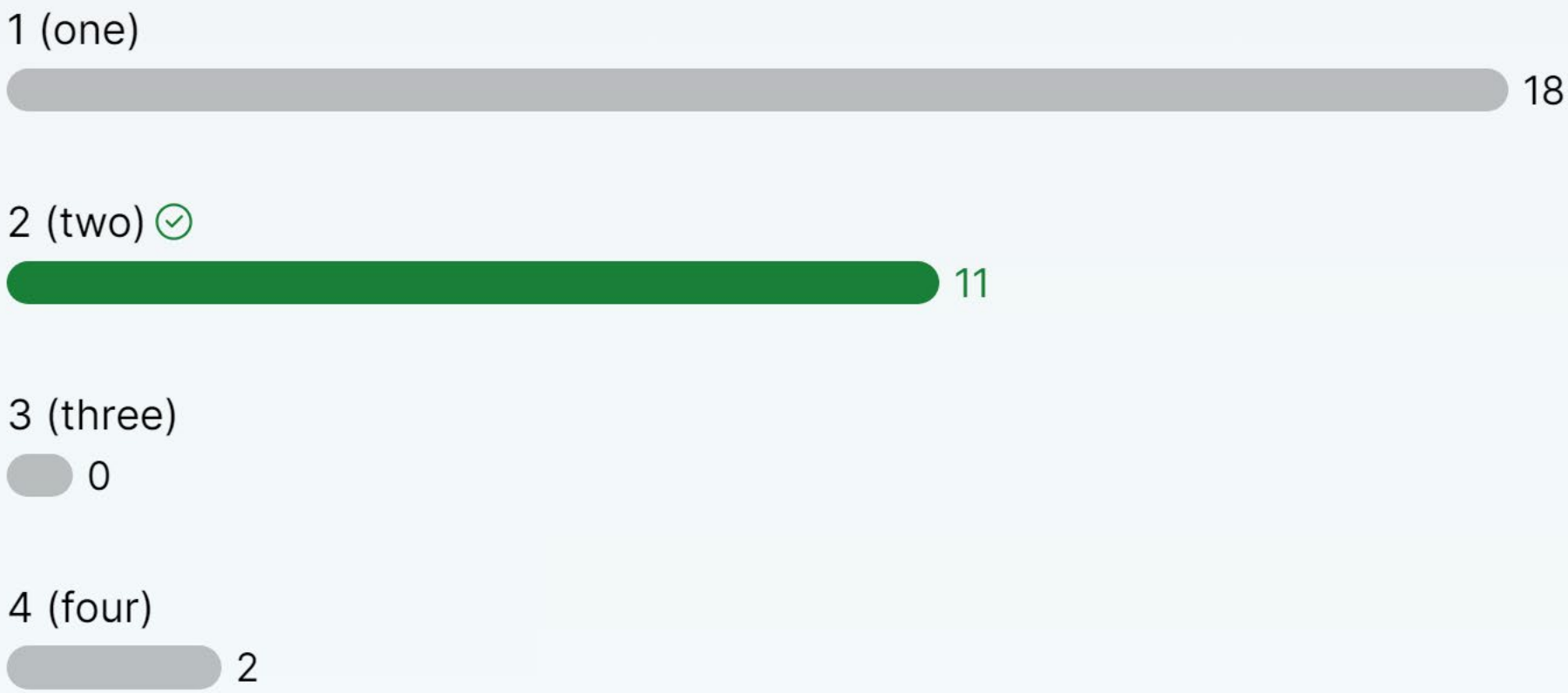
31

Join at

slido.com

#INDOTBI

How many railroad features are reported?

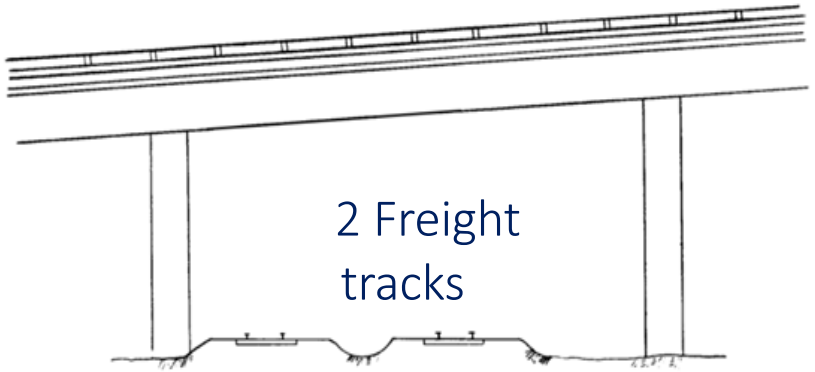


Knowledge Check

Bridge carries two highway features separated by two electrified passenger rail tracks. Two railroad tracks pass below the bridge that both carry freight.

What Railroad Service Type is reported?

Highway features separated by
2 electrified passenger tracks

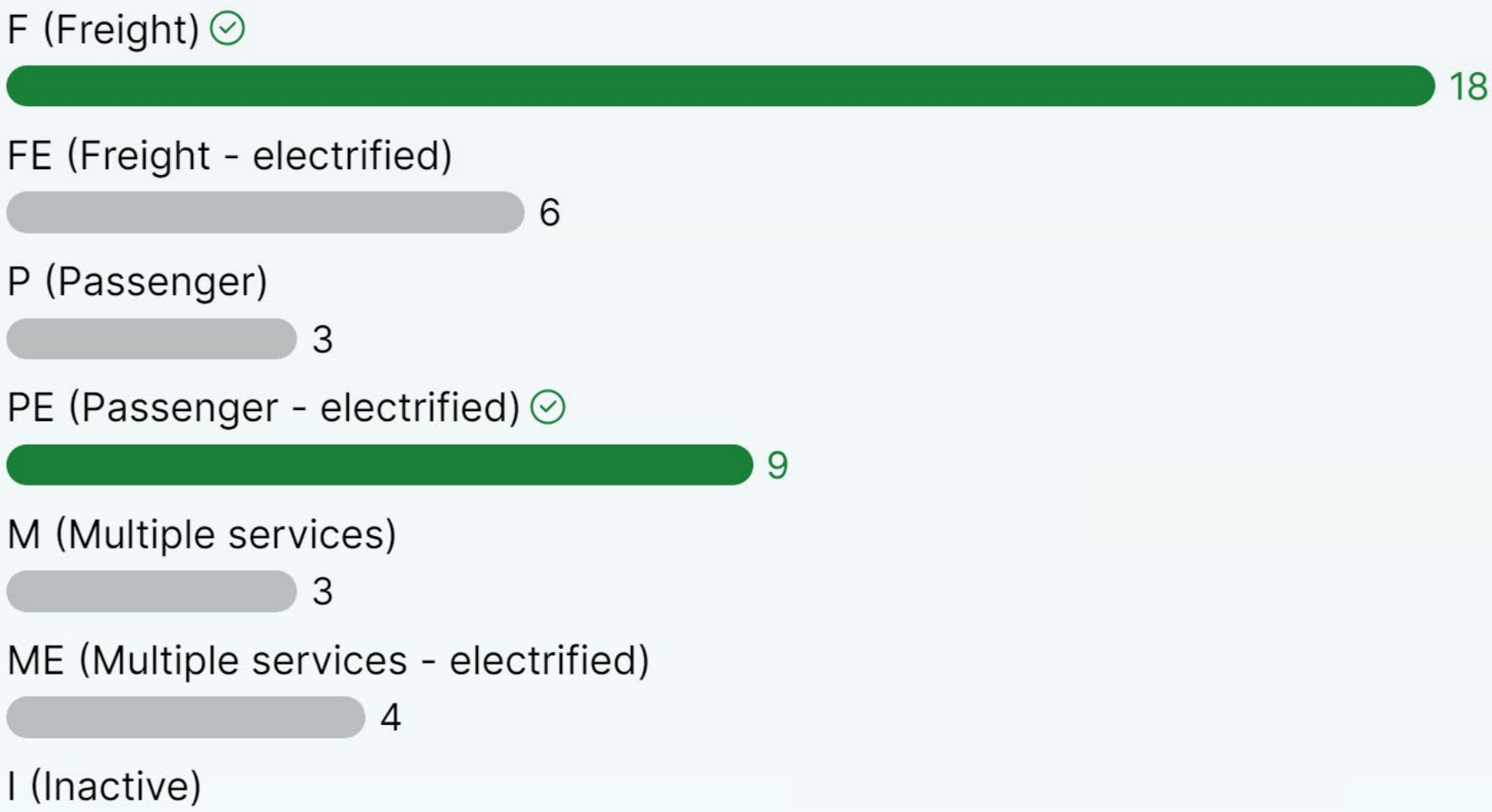


Active poll

30

Join at
slido.com
#INDOTBI

What Railroad Service Type is reported?
(Select two options)



B.RR.02 Railroad Minimum Vertical Clearance

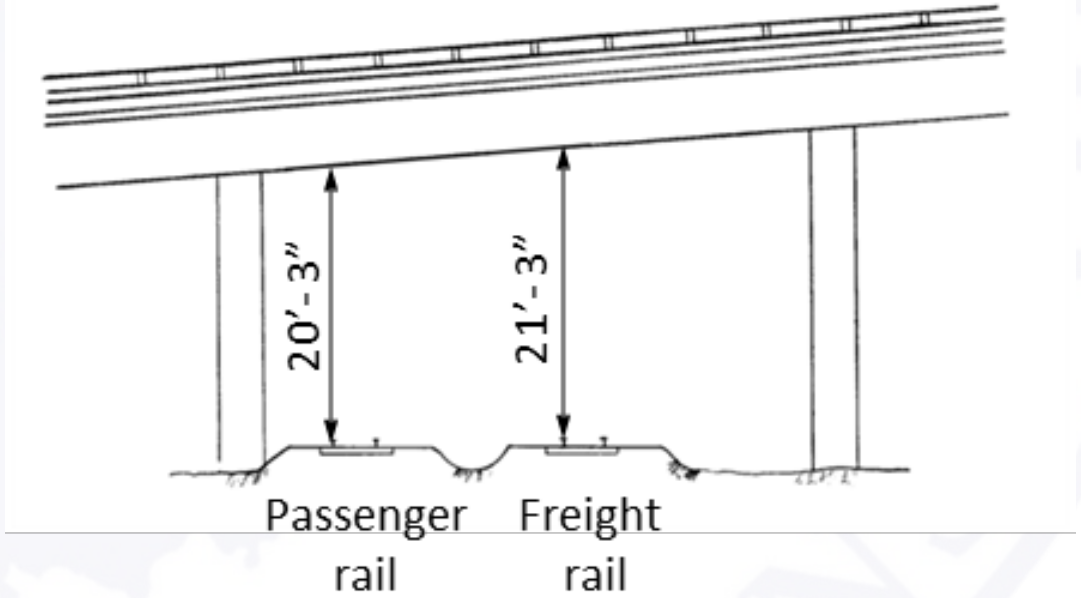
- Format N (3,1), Frequency EI [SNBI pg. 178-179]
- Report the minimum vertical clearance for the railroad feature reported in Item B.F.01 (Feature Type), ***rounded down to the nearest tenth of a foot***
- Measure plumb from the top of rails to the lowest bridge restriction or appurtenance (signs, utilities, etc.) attached to the bridge
  - Appurtenances attached to the bridge that serve only a railroad purpose, such as catenary systems, are excluded from the measurement and do not reduce the vertical clearance measurement

B.RR.02 Railroad Minimum Vertical Clearance(cont.)

- Report 99.9 when the clearance is 100 feet or greater
- Report this item only when Item B.F.02 (Feature Location) is B
- Several measurements may need to be made to determine the minimum vertical clearance for each railroad feature when one or more railroad tracks pass below the bridge
  - Only the minimum measurement is reported
- Update measurements when alterations are made to the bridge or railroad tracks that affect the previously measured clearance
- Clearances greater than 30 feet may be estimated

B.RR.02 Railroad Minimum Vertical Clearance – Example

- Two railroad tracks below the bridge. One carries passenger rail service, and one carries freight
  - Report ***20.2*** for the passenger rail feature
  - Report ***21.2*** for the freight rail feature



B.RR.03 Railroad Minimum Horizontal Offset

- Format N (3,1), Frequency I [SNBI pg. 180-181]
- Report the minimum horizontal offset for the railroad feature reported in Item B.F.01 (Feature Type), ***rounded down to the nearest tenth of a foot***
- Measure perpendicular from the centerline of the tracks to the nearest substructure unit or toe of slope that is steeper than 1 to 3 (vertical to horizontal)

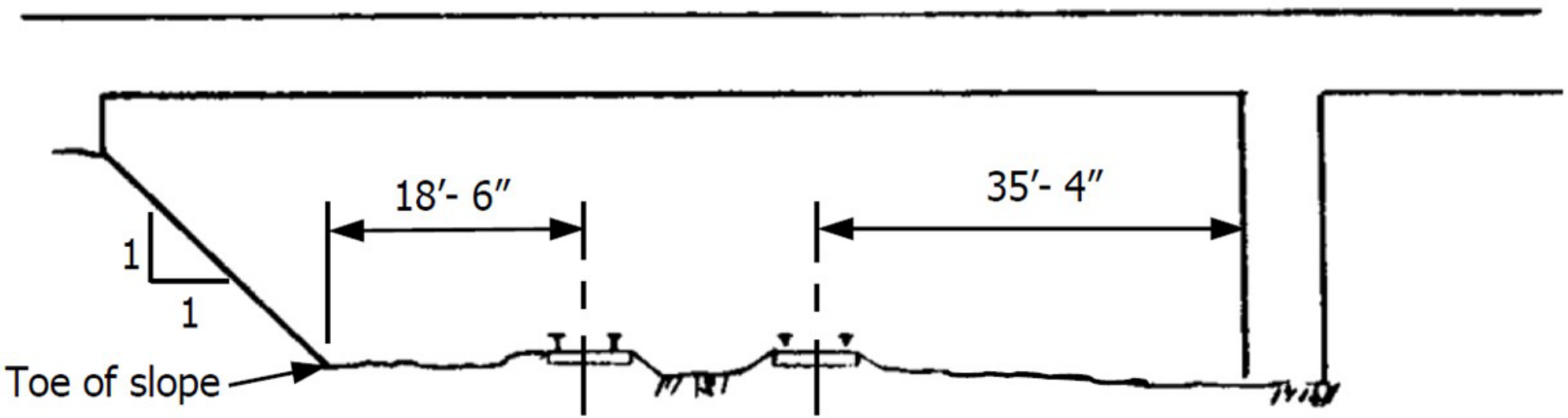
B.RR.03 Railroad Minimum Horizontal Offset (cont.)

- For multiple tracks with the same railroad service type, report the minimum distance after measuring the offsets in both directions from all tracks
- Report 99.9 when the minimum horizontal offset is 100 feet or greater
- Report this item only when Item B.F.02 (Feature Location) is B
- Intent of this item is to collect the minimum distance from the centerline of the railroad track to a bridge related obstruction
- Offsets greater than 30 feet may be estimated

B.RR.03 Railroad Minimum Horizontal Offset – Example

Two railroad tracks below the bridge that both carry freight

Report ***18.5***



Subsection 4.5: Navigable Waterways

SUBSECTION 4.5: NAVIGABLE WATERWAYS

The data items in this subsection provide information about the waterways that pass below the bridge. These data items are considered part of the Features Data Set and have a many-to-one relationship with a bridge. Therefore, each waterway feature reported in Item B.F.01 *(Feature Type)* has a unique waterway feature data set, and there may be multiple waterway feature data sets associated with a bridge.

Item B.N.01 *(Navigable Waterway)* is reported for all waterways, and the remaining items are reported only for navigable waterways, i.e. when Item B.N.01 *(Navigable Waterway)* is Y.

The dimensional values for the items in this subsection can be obtained from either plans or field measurement.

The data for the items in this subsection typically remain static once a bridge has been inventoried. The following data items are included in this subsection.

Item ID	Data Item
B.N.01	Navigable Waterway
B.N.02	Navigation Minimum Vertical Clearance
B.N.03	Movable Bridge Maximum Navigation Vertical Clearance
B.N.04	Navigation Channel Width
B.N.05	Navigation Channel Minimum Horizontal Clearance
B.N.06	Substructure Navigation Protection

Source: INDOT Website

Lesson 4.5

NextLevel INDIANA

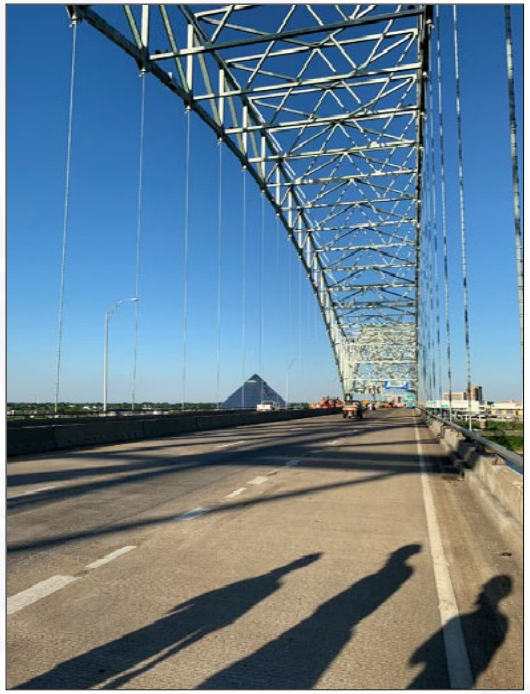
Subsection 4.5: Navigable Waterways

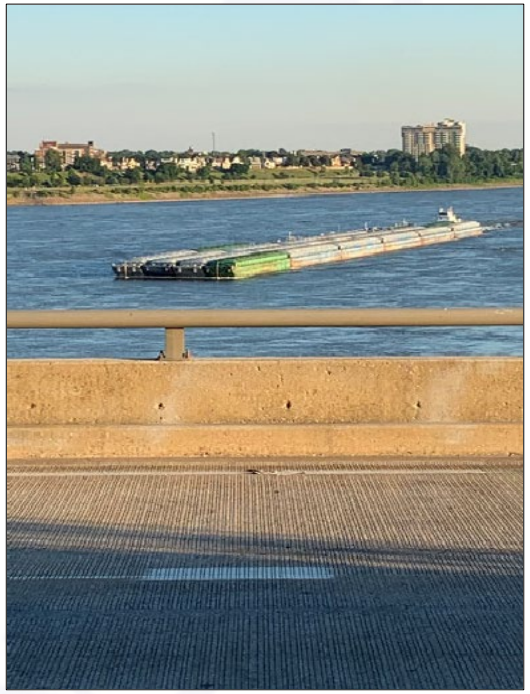
- Data items in this subsection provide information about the waterways that ***pass below*** the bridge
- Data items are considered part of the Features Data Set and have a many-to-one relationship with a bridge
  - Each waterway feature reported in Item B.F.01 (Feature Type) has a unique waterway feature data set, and there may be multiple waterway feature data sets associated with a bridge
- Item B.N.01 (Navigable Waterway) is reported for all waterways, and the remaining items are reported only for navigable waterways, i.e., when Item B.N.01 (Navigable Waterway) is Y
  - Only 6 Navigable Waterways in Indiana

NextLevel INDIANA

Subsection 4.5: Navigable Waterways (cont.)

- Dimensional values for the items can be obtained from either plans or field measurement
- Data for the items typically remain static once a bridge has been inventoried





Source: FHWA

Subsection 4.5: Navigable Waterways – Items

- B.N.01 Navigable Waterway
- B.N.02 Navigation Minimum Vertical Clearance
- B.N.03 Movable Bridge Maximum Navigation Vertical Clearance
- B.N.04 Navigation Channel Width
- **B.N.05 Navigation Channel Minimum Horizontal Clearance (new)**
- B.N.06 Substructure Navigation Protection

B.N.01 Navigable Waterway

- Format AN (1)
- Report whether the waterway feature reported in Item B.F.01 (Feature Type) is considered navigable waters of the United States using one of the following codes
  - N Not navigable waters
  - Y Navigable waters
  - U Navigable waters designation is undetermined

B.N.01 Navigable Waterway (cont.)

- Data item identifies bridges over navigable waters where the United States Coast Guard may exercise jurisdiction, as defined in 33 CFR, Part 2
- Information helps identify bridges at risk from vessel collision and bridges where a Coast Guard permit may be required for modifications to the structure

B.N.01 Navigable Waterway (cont.)

- Information helpful in coding this item may be found in design and construction documentation or prior correspondence with the Coast Guard
- Navigable waterways are determined by the Commandant of the United States Coast Guard per Title 33 of the Code of Federal Regulations, Section 2.36

Active poll

0

Join at

slido.com

#INDOTBI

Each waterway feature reported in Item B.F.01 (Feature Type) has a unique waterway feature data set.

True

0

False

0

Active poll

0

Join at

slido.com

#INDOTBI

There may be multiple waterway feature data sets associated with a bridge.

True

0

False

0

Active poll

0

Join at

slido.com

#INDOTBI

All data items in this subsection are reported for waterways that pass below the bridge.

True

0

False

0

B.N.02 Navigation Minimum Vertical Clearance

- Format N (4,1), Frequency I [SNBI pg. 185-186]
- Report the minimum vertical clearance over the waterway feature reported in Item B.F.01 (Feature Type), ***rounded down to the nearest tenth of a foot***
- Reported clearance is from the highest datum plane referenced in the approved permit plans to the lowest superstructure restriction or other appurtenances attached to the bridge over the designated navigation channel

B.N.02 Navigation Minimum Vertical Clearance (cont.)

- For all movable bridges, the vertical clearance reported is for the bridge in the closed position (i.e., open to vehicular traffic)
- Report the most restrictive clearance when there are multiple designated navigation channels
- Report this item only when Item B.N.01 (Navigable Waterway) is Y

B.N.02 Navigation Minimum Vertical Clearance (cont.)

- Reference datum, designated navigation channels, and vertical clearances can be found on permit plans approved by the United States Coast Guard
- When permit plans are not available, values can be established from field measurements obtained for known navigation channels and the most restrictive clearance recorded
  - Reference field measurements to the following datum

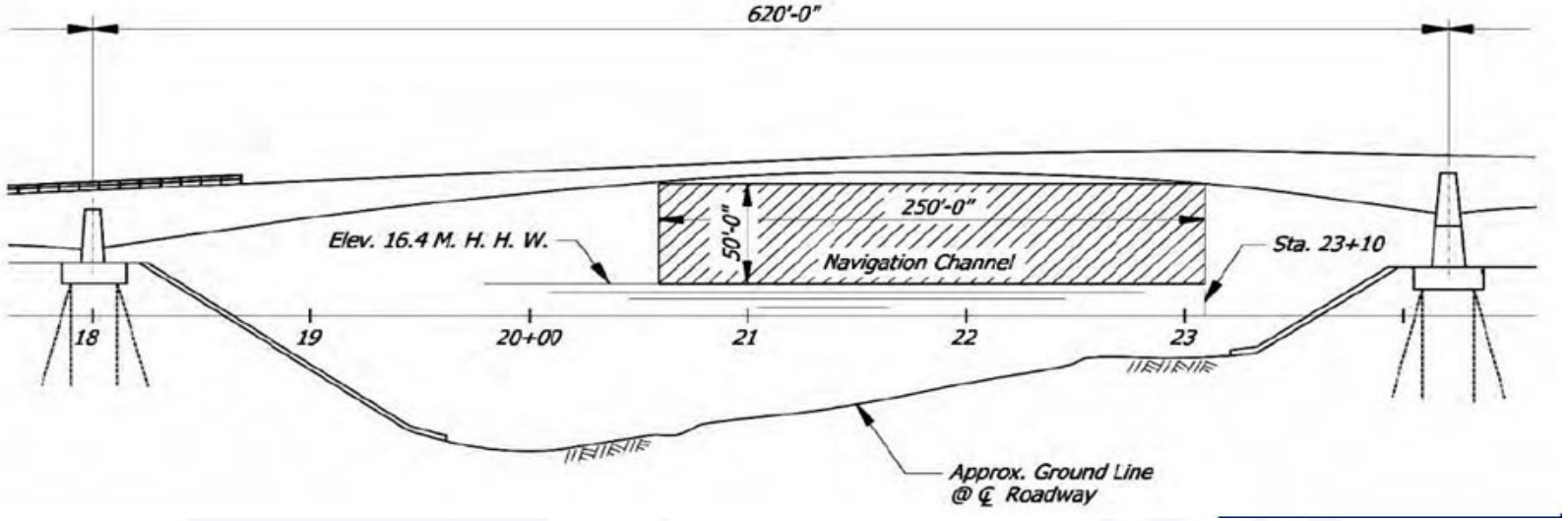
Crossing Type	Datum
Tidal waters	Mean High Water
Non-tidal waters	Extreme High Water
River	Q50 Surface Elevation

B.N.02 Navigation Minimum Vertical Clearance – Example

Permit plans for a bridge over tidal waters with the navigation channel designated by cross-hatched area

Permit plans set the datum at mean higher-high water (M.H.H.W.) instead of mean high water

Report ***50.0***



B.N.03 Movable Bridge Maximum Navigation Vertical Clearance

- Format N (4,1)
- Report the maximum vertical clearance over the waterway feature reported in Item B.F.01 (Feature Type), ***rounded down to the nearest tenth of a foot***
- Reported clearance is from the highest datum plane referenced in the approved permit plans to the lowest superstructure restriction or other appurtenances attached to the bridge over the designated navigation channel, when the movable bridge is in the open position

B.N.03 Movable Bridge Maximum Navigation Vertical Clearance (cont.)

- Report 999.9 when the bridge provides unlimited vertical clearance over the navigation channel in the open position
- Report this item only when Item B.N.01 (Navigable Waterway) is Y and Item B.SP.06 (Span Type) begins with M, indicating that the span type is movable

B.N.03 Movable Bridge Maximum Navigation Vertical Clearance (cont.)

- The value reported is particularly useful for vertical lift bridges and for bascule bridges where the leaf (or leaves) does not provide unlimited vertical clearance over the designated navigation channel in the open position
- When permit plans are not available, values can be obtained from field measurements
  - Reference field measurements to the following datum

Crossing Type	Datum
Tidal waters	Mean High Water
Non-tidal waters	Extreme High Water
River	Q50 Surface Elevation

B.N.03 Movable Bridge Maximum Navigation Vertical Clearance – Example

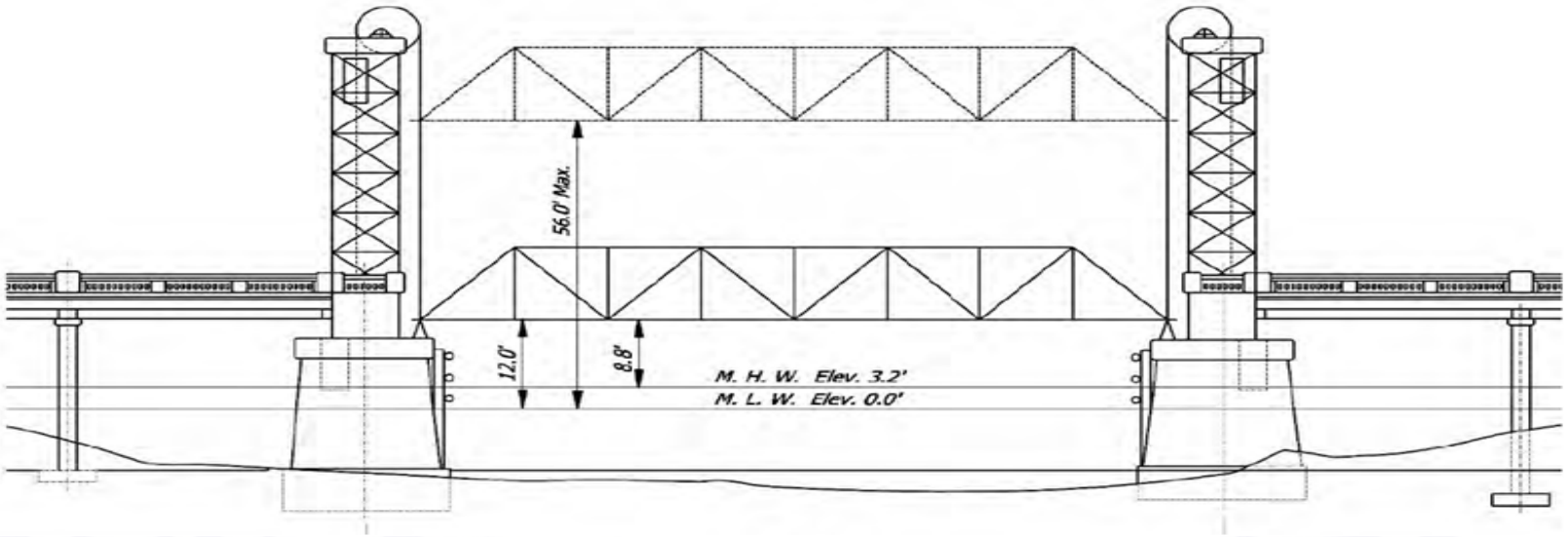
Vertical lift bridge

Information taken from “As-Built” plans as no permit plans are available

Mean High Water elevation is 3.2

Maximum vertical underclearance is 56 ft – 3.2 ft = 52.8 ft

Report ***52.8***



B.N.04 Navigation Channel Width

- Format N (5,1)
- Report the navigation channel width for the waterway feature reported in Item B.F.01 (Feature Type), ***rounded down to the nearest tenth of a foot***
- The width is as shown on the approved permit plans, or field measured when the navigation channel changes or is unmarked

B.N.04 Navigation Channel Width (cont.)

- For field measurements, measure the horizontal distance perpendicular to the centerline of the navigation channel
- For marked channels measure between the markers designating the limits of the channel at the bridge
- For unmarked channels, measure the minimum clear distance between fenders or piers

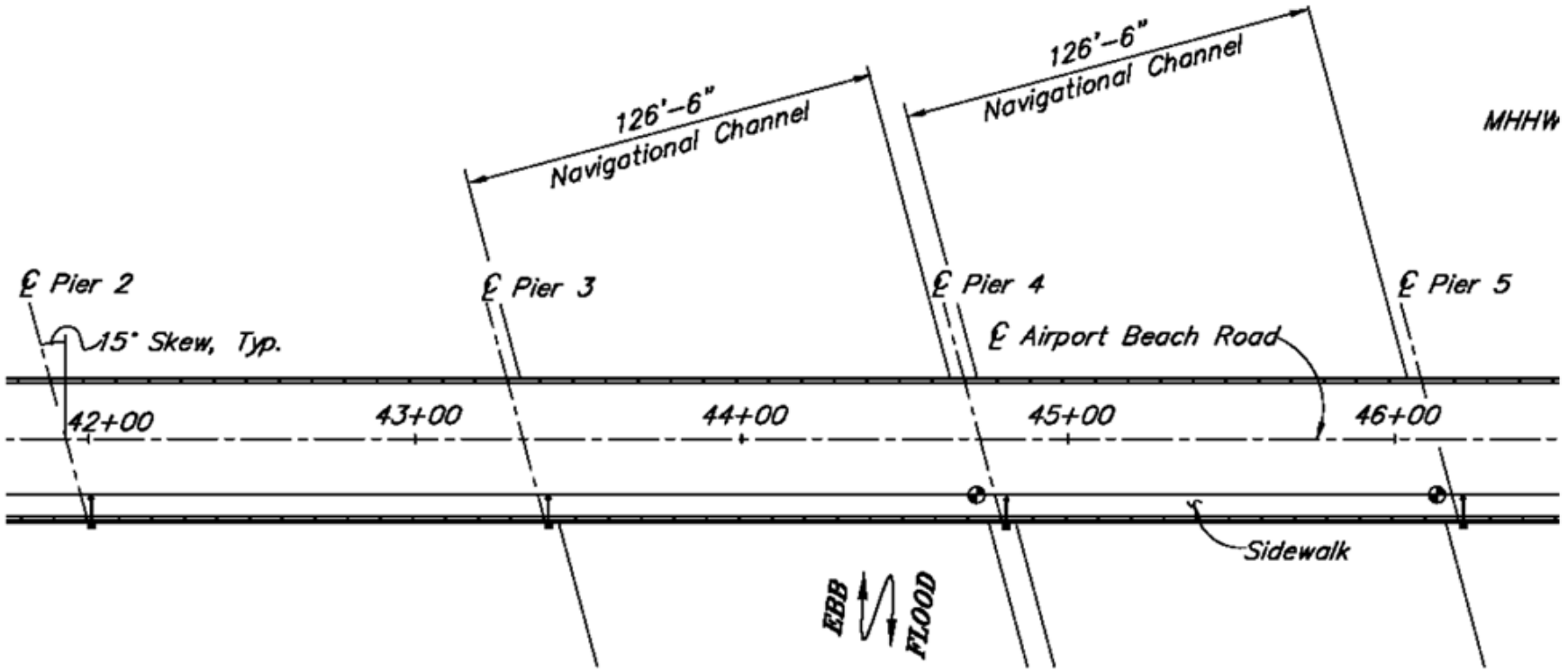
B.N.04 Navigation Channel Width (cont.)

- If multiple channels exist, report the most restrictive
- Report this item only when Item B.N.01 (Navigable Waterway) is Y
- The width provided should be consistent with the navigation channel used in the navigation vertical clearance items
  - Designated navigation channel width may be less than the distance between substructure units

B.N.04 Navigation Channel Width – Example

Bridge with multiple designated navigation channels bounded by piers

Report ***126.5***



B.N.05 Navigation Channel Minimum Horizontal Clearance (new)

- Format N (5,1)
- Report this item only when Item B.N.01 (Navigable Waterway) is Y
- The intent is to collect the most restrictive distance from the edge of the navigational channel to a bridge substructure to assess risk for vessel collision
- Report the minimum horizontal clearance for the waterway feature reported in Item B.F.01 (Feature Type), ***rounded down to the nearest tenth of a foot***

B.N.05 Navigation Channel Minimum Horizontal Clearance (cont.)

- Clearance is the minimum distance from either edge of the navigation channel shown on the approved permit plans, to the face of the nearest bridge substructure unit located within the waterway
- Report 0 when substructure units in the waterway are the boundaries for the navigation channel
- Report 9999.9 when no substructure unit is within the waterway
- Clearance provided should be consistent with the navigation channel used in Item B.N.04 (Navigation Channel Width)

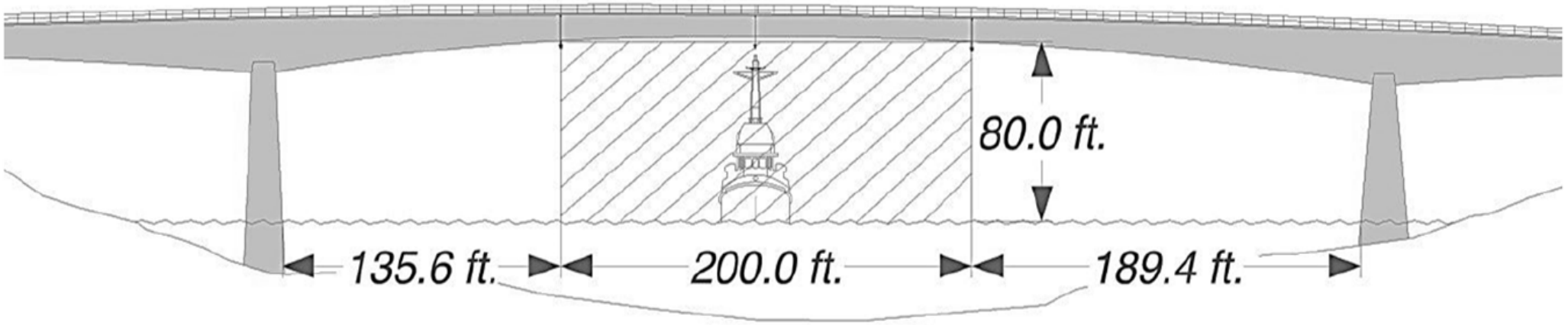
B.N.05 Navigation Channel Minimum Horizontal Clearance (cont.)

- The clearance may be field measured when the placement of navigation markers at the bridge is inconsistent with the permit plans, or if the presence of navigation markers indicates a navigation channel and no permit plans are available
- For field measurements, measure the horizontal distance perpendicular to the centerline of the navigation channel from the markers designating the limits of the channel at the bridge, to the face of the nearest bridge substructure unit located within the waterway

B.N.05 Navigation Channel Minimum Horizontal Clearance – Example

Bridge with navigation channel designated by cross-hatched area
Substructure units within the waterway

Report ***135.6***



Active poll

0

Join at

slido.com

#INDOTBI

Report B.N.05 for all waterways below a bridge.

True

0

False

0

Active poll

0

Join at

slido.com

#INDOTBI

Report 0 when substructure units in the waterway are the boundaries for the navigation channel.

True

0

False

0

Active poll

0

Join at

slido.com

#INDOTBI

Measure the horizontal distance parallel to the centerline of the bridge to the face of the nearest bridge substructure unit located within the waterway.

True

0

False

0

B.N.06 Substructure Navigation Protection

- Format AN (1)
- Report this item only when Item B.N.01 (Navigable Waterway) is Y
- Report the presence and adequacy of substructure navigation protection for the waterway feature reported in Item B.F.01 (Feature Type), using one of the following codes
  - 0 Navigation protection ***not*** ***required***; bridge has been designed or assessed to have adequate capacity to resist anticipated impact loads without collapse
  - 1 Navigation protection ***not*** ***required***; assessment of navigation opening and vessel traffic has determined that there is a low probability that an errant vessel could impact the bridge

B.N.06 Substructure Navigation Protection (cont.)

- Codes (cont.)
  - 2 Protective system in place and functioning
  - 3 Protective system in place, but damage or deterioration impacts ability to protect
  - 4 Protective system in place, but reevaluation of design suggested
  - 5 No protective system in place, but reevaluation of the need for a protective system is recommended

B.N.06 Substructure Navigation Protection (cont.)

- Use codes 0 and 1 to indicate that an assessment of vessel traffic characteristics and/or bridge capacity has determined that navigation protection is not required.
  - AASHTO's Guide Specifications and Commentary for Vessel Collision Design of Highway Bridges provides a method for assessing an existing bridge's vulnerability to vessel collision
  - Codes 0 and 1 should not be assigned based on field observation
- Use codes 4 and 5 to indicate that observed conditions necessitate a review of vessel traffic characteristics, bridge capacity, and protective system capability to determine whether the bridge is adequately protected from vessel collision

QUESTIONS ?

NBIS_SNBI_Questions@dot.gov