



U.S. Department
of Transportation

**Federal Highway
Administration**

FHWA COMPUTATION PROCEDURE FOR THE TRANSPORTATION PERFORMANCE MANAGEMENT BRIDGE CONDITION MEASURES

Based on the Specifications for the National Bridge Inventory (SNBI)

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

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1 Overview

This document presents the steps for Federal Highway Administration (FHWA) to compute bridge condition measures using the National Bridge Inventory (NBI)¹ data based on the *Specifications for the National Bridge Inventory (SNBI)*^{2,3} for the purpose of determining: (1) the minimum bridge condition level for each State (23 Code of Federal Regulations (CFR) 490.411); and (2) whether or not a State DOT has made significant progress towards the achievement of its bridge condition targets (23 CFR 490.109).

Please note that the methods described in this document apply to bridge measure computations for the “2026 NBI dataset” and subsequent years’ datasets. For the computation methods for the “2025 NBI dataset” and all earlier, please refer to the document titled “FHWA Computation Procedure for the Bridge Condition Measures,” dated April 2018, (referred to as the “Coding Guide -based Procedure Document” in this document)⁴.

The steps described in this document includes the measure computation procedure specified in 23 CFR 490.409. The definition of “bridges” is provided in 23 CFR 490.101 and 650.305.⁵ Consistent with the defined definition in the CFR, the term “bridge” in this document encompasses both bridges and bridge-length culverts.

1.1 Performance Measures

Two bridge condition measures apply to the National Highway System (NHS) and were established under subpart D of 23 CFR part 490 for Transportation Performance Management reporting. The established bridge condition measures are:

- (1) “Percentage of NHS bridges classified as in Good condition”; and
- (2) “Percentage of NHS bridges classified as in Poor condition”.

The main attributes of the bridge condition measures and targets are as follows:

- The FHWA annually⁶ computes the “Percentage of NHS bridges classified as in Poor condition” as part of determining minimum condition level⁷ for bridges carrying the NHS (see Section 1.4).

¹ National Bridge Inventory: <http://www.fhwa.dot.gov/bridge/nbi.cfm>; 23 CFR 490.409(b).

² “Specifications for the National Bridge Inventory” (referred to as *SNBI*) incorporated by reference in 23 CFR 490.409 and 490.111: <https://www.fhwa.dot.gov/bridge/snbi.cfm>

³ “Specifications for the National Bridge Inventory” replaced “Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges” (referred to as the “Coding Guide”) in 23 CFR part 650 subpart C under the final rule on “National Bridge Inspection Standards”: Docket No. FHWA-2017-0047, RIN 2125-AF55, 87 FR 27396 - May 6, 2022: <https://www.federalregister.gov/documents/2022/05/06/2022-09512/national-bridge-inspection-standards>.

⁴ “Coding Guide-based Procedure Document”: *FHWA Computation Procedure for the Bridge Condition Measures - Based on the Coding Guide, April 2018* - <https://www.fhwa.dot.gov/tpm/guidance/hif18023.pdf>

⁵ 23 CFR 490.101 “Bridge” - [https://www.ecfr.gov/current/title-23/part-490/subpart-A#p-490.101\(Bridge\)](https://www.ecfr.gov/current/title-23/part-490/subpart-A#p-490.101(Bridge)); 23 CFR 650.305 “Bridge” - [https://www.ecfr.gov/current/title-23/part-650/subpart-C#p-650.305\(Bridge\)](https://www.ecfr.gov/current/title-23/part-650/subpart-C#p-650.305(Bridge)).

⁶ 23 CFR 490.411(d).

⁷ 23 CFR 490.411(a) - Determine whether percentage of the deck area of bridges classified as in Poor condition is less than or equal to 10.0%.

- The FHWA computes both bridge condition measures every two years⁸ for the purpose of FHWA determination of whether a State DOT has made significant progress toward target achievement (see Section 1.5).
- Both bridge condition measures are expressed as percent deck area of bridges (see Section 2).
- Performance measures and targets cover all bridges carrying the NHS, which includes on- and off-ramps connected to the NHS within a State, and bridges carrying the NHS that cross a State border (23 CFR 490.403, 490.409(b), and 490.411(a)).

To ensure consistent definitions, a distinction between “*performance measure*” and “*performance metric*” was made in 23 CFR 490.101. A “*metric*” is defined as a quantifiable indicator of performance or condition whereas a “*measure*” is defined as an expression based on a metric that is used to establish targets and to assess progress toward meeting the established targets. Therefore, “*metrics*” refer to the reported values for Deck Condition Rating (SNBI Data Item ID - B.C.01), Superstructure Condition Rating (SNBI Data Item ID - B.C.02), Substructure Condition rating (SNBI Data Item ID - B.C.03) and Culvert Condition Rating (SNBI Data Item ID - B.C.04) in the National Bridge Inventory, as defined in the SNBI; whereas the “*measures*” refer to the percentages of deck area in Good or Poor condition, computed using the reported “*metrics*”.

1.2 Codes & Conventions Used in this Document.

The Structured Query Language (SQL) and pseudocode presented in this document are intended solely to illustrate computational logic and are not designed for any specific database system or software application.

Additionally, the SNBI field names shown here are represented as Data Item IDs without the dot (period) punctuation, followed by the Data Item Name, for illustrative purposes. For example, the “Deck Condition Rating” Data Item, identified by its Data Item ID as B.C.01 in SNBI, is represented as [BC01_DECK_CONDITION_RATING]. Similarly, the “Culvert Condition Rating” Data Item, identified by its Data Item ID as B.C.04 in SNBI, is shown as [BC04_CULVERT_CONDITION_RATING].

1.3 Data Sources

For the purpose of computing measures, determinations of whether a State DOT has maintained minimum bridge condition level and has made significant progress towards achievement of targets, the following data will be used.

- **National Bridge Inventory:** The governing data source for computing bridge condition measures and determining minimum condition level is the NBI.
 - **Data Reporting:** The NBI is updated annually with State DOTs, Federal agencies, and tribal governments providing FHWA their NBI data submittals.⁹ During processing of the submitted data, FHWA performs a variety of item data validation checks, cross checks, null value checks, safety checks, etc. A detailed list of these checks may be found on the FHWA

⁸ 23 CFR 490.109(b)

⁹State DOTs are required to submit their most current NBI data on highway bridges no later than March 15 of each year, to FHWA, as specified in 23 CFR 490.411(e). Federal agencies and tribes submit information to the NBI. See 23 CFR 650.303 and 650.315. Final Rule on “National Bridge Inspection Standards” 2125-AF55 87 FR 27396 - May 6, 2002: <https://www.federalregister.gov/documents/2022/05/06/2022-09512/national-bridge-inspection-standards>

website.¹⁰ Each June, FHWA archives that year's NBI data. All measure computations described in this document will use that archived data. For the purposes of this document, "archived data" is synonymous with "data contained within the NBI as of June 15th" in 23 CFR 490.109(d)(3) and "the data cleared in the NBI as of June 15 of each year" in 23 CFR 490.411(d).

- **Dataset Year:** The "year" in NBI dataset name refers to the year of data submittal to NBI. For example, the dataset submitted by March 15, 2026, and FHWA archived in June 2026 is referred to as the "2026 NBI dataset", although the data within the dataset are from bridge inspections typically completed during previous calendar years.
- **Data Items:** The bridge component condition metrics - "Deck Condition Rating", "Superstructure Condition Rating", "Substructure Condition Rating", and "Culvert Condition Rating" - come from NBI Data Items [BC01_DECK_CONDITION_RATING], [BC02_SUPERSTRUCTURE_CONDITION_RATING], [BC03_SUBSTRUCTURE_CONDITION_RATING], and [BC04_CULVERT_CONDITION_RATING], respectively.¹¹

Also, the data items necessary to compute deck areas - "Total Bridge Length", and "Bridge Width Out-to-Out" - come from NBI Data Items [BG02_TOTAL_BRIDGE_LENGTH], and [BG05_BRIDGE_WIDTH_OUT_TO_OUT], respectively.¹²

For extracting NHS highway bridge data records, the data items "State Code", "NBIS Bridge Length", "Feature Type", "Feature Location", and "NHS Designation" come from NBI Data Items [BL01_STATE_CODE], [BG01_NBIS_BRIDGE_LENGTH], [BF01_FEATURE_TYPE], [BF02_FEATURE_LOCATION], and [BH03_NHS_DESIGNATION], respectively.

Beginning with the "2028 NBI dataset" and subsequent years' datasets, if reported for a bridge, "Irregular Deck Area" Data Item ([BG15_IRREGULAR_DECK_AREA]) will be used as the deck area for that bridge in lieu of the product of [BG02_TOTAL_BRIDGE_LENGTH] and [BG05_BRIDGE_WIDTH_OUT_TO_OUT] (see Section 2.2.3).

"2026 NBI dataset" and "2027 NBI dataset" are referred to as "NBI Transition Period" datasets¹³, as the implementation of *SNBI* is transitioned from the *Coding Guide*.¹⁴ For these datasets, the "Approach Roadway Width" Data Item ([BG09_APPROACH_ROADWAY_WIDTH]) will be used if "Bridge Width Out-to-Out" ([BG05_BRIDGE_WIDTH_OUT_TO_OUT]) is not reported for the bridge-length culverts (see Section 2.1.3).

1.4 Annual Determination of Minimum Bridge Condition Level

This section provides a description of determining the minimum bridge condition level, as required in 23 U.S.C. 119(f)(2). Per this statutory requirement, FHWA must compute the "Percentage of NHS bridges

¹⁰ SNBI Data Validation Logic: https://www.fhwa.dot.gov/bridge/snbi/data_validation_logic.cfm

¹¹ 23 CFR 490.409(b) and 23 CFR 490.411(b)

¹² 23 CFR 490.409(c) and 23 CFR 411(c)

¹³ Transitioning Data: *Questions and Answers on the Specification for the National Bridge Inventory*: <https://www.fhwa.dot.gov/bridge/snbi/qanda/03.cfm#:~:text=AT%2D1%20Transitioned%20NBI%20data,in%20accordance%20with%20the%20SNBI.>

¹⁴ Memorandum: *ACTION: Implementation of the Specifications for the National bridge Inventory* (May 25, 2022) - https://www.fhwa.dot.gov/bridge/pubs/Memo-Implementation_Specifications_National_Bridge_Inventory_FINAL.pdf

classified as in Poor condition” for the highway bridges carrying the NHS (including on- and off-ramps connecting to the NHS). The FHWA must make these determinations each year by considering the assessment results for three consecutive years. Accordingly, each year, FHWA will use the mid-year archived data¹⁵ of the determination year to assess whether the “Percentage of NHS bridges classified as in Poor condition” for a State is greater than 10.0 percent. In addition to assessing the mid-year archived data, FHWA will look at the assessment results made in the two preceding years on the respective mid-year archived data.

If FHWA determines that the “Percentage of NHS bridges classified as in Poor condition” is greater than 10.0 percent for 3 consecutive years (the year of determination and the two preceding years) for a State, the penalty specified in 23 U.S.C. 119(f)(2) and 23 CFR 490.413 will be imposed on that State DOT during the fiscal year beginning October 1 of the year the annual determination is made. As specified in 23 CFR 490.413, if FHWA determines a State DOT is subject to the penalty, then that State DOT must obligate and set aside from the National Highway Performance Program (NHPP) an amount equal to 50 percent of the State's Highway Bridge Program (HBP) apportionment in Federal Fiscal Year (FY) 2009.¹⁶ The set aside funds are to be used only for eligible projects on bridges on the NHS.

As noted earlier, the “2026 NBI dataset” and “2027 NBI dataset” are collectively referred to as the “NBI Transition Period” datasets. “NBI Transition Period” datasets consist of data collected in accordance with the *Coding Guide*, which has since been converted to *SNBI*-based data¹⁷ and for some bridges or items, data that has been collected or verified using the *SNBI*.

For the 2026 determination, FHWA will use the 2026 NBI dataset (a “NBI Transition Period” dataset) to assess whether the “Percentage of NHS bridges classified as in Poor condition” exceeds 10.0 percent for each State, in accordance with the “NBI Transition Period” measure computation method described in Sections 2.1 and 3. Additionally, for the same determination, FHWA will consider the assessment results from 2025 and 2024, based on the “2025 NBI dataset” and “2024 NBI Dataset”, respectively, both of which were collected and reported in accordance with the *Coding Guide*. The measure computation conducted for these two datasets are in line with the *Coding Guide*-based Procedure Document.¹⁸ If FHWA determines that the “Percentage of NHS bridges classified as in Poor condition” is greater than 10.0 percent in each of the assessments in 2024, 2025, and 2026, then the penalty specified in 23 CFR 490.413 will be imposed on that State DOT during the fiscal year beginning October 1, 2026.

As for the 2028 determination, FHWA will use the 2028 NBI dataset (collected and reported in accordance with the *SNBI*) to assess whether the “Percentage of NHS bridges classified as in Poor condition” exceeds 10.0 percent for each State, in accordance with the “*SNBI*” measure computation method described in Sections 2.2 and 3. Additionally, for the 2028 determination, FHWA will consider

¹⁵ 23 CFR 490.411(d) - The FHWA shall annually determine the percentage of the deck area of NHS bridges classified as in Poor condition for each State DOT and identify State DOTs that do not meet the minimum level of condition for NHS bridges based on data cleared in the NBI as of June 15 of each year.

¹⁶ Apportionment of funds for the Highway Bridge Program Authorized for FY2009:

<https://www.fhwa.dot.gov/legregs/directives/notices/n4510687.cfm>

¹⁷ Transitioning Data: *Questions and Answers on the Specification for the National Bridge Inventory*:

<https://www.fhwa.dot.gov/bridge/snbi/qanda/03.cfm#:~:text=AT%2D1%20Transitioned%20NBI%20data,in%20accordance%20with%20the%20SNBI.>

¹⁸ FHWA Computation Procedure for the Bridge Condition Measures - Based on the *Coding Guide*, April 2018 -

<https://www.fhwa.dot.gov/tpm/guidance/hif18023.pdf>

the assessment results from 2027 and 2026, based on the “2027 NBI Dataset” and “2026 NBI dataset”, respectively. The measure computation conducted for these two “NBI Transition Period” datasets are in line with the “NBI Transition Period” computation method described in Sections 2.1 and 3. If FHWA determines that the “Percentage of NHS bridges classified as in Poor condition” is greater than 10.0 percent in each of the assessments in 2026, 2027, and 2028, then the penalty specified in 23 CFR 490.413 will be imposed on that State DOT during the fiscal year beginning October 1, 2028.

Table 1 below provides an illustration of how “NBI Transition Period” datasets will be incorporated into the FHWA’s minimum condition level determination process.

Table 1 – Measure Computation Methodologies During NBI Transition Period for Minimum Condition Level Determinations

Minimum Condition Level Determination Year (Calendar Year)	NBI Dataset	Measure Computation Year (Calendar Year)	Computation Method
2026	“2024 NBI dataset”	2024	Section 2 of the <i>Coding Guide</i> -based Procedure Document
	“2025 NBI dataset”	2025	Section 2 of the <i>Coding Guide</i> -based Procedure Document
	“2026 NBI dataset”	2026	NBI Transition Period (see Sections 2.1 and 3 of this document)
2027	“2025 NBI dataset”	2025	Section 2 of the <i>Coding Guide</i> -based Procedure Document
	“2026 NBI dataset”	2026	NBI Transition Period (see Sections 2.1 and 3 of this document)
	“2027 NBI dataset”	2027	NBI Transition Period (see Sections 2.1 and 3 of this document)
2028	“2026 NBI dataset”	2026	NBI Transition Period (see Sections 2.1 and 3 of this document)
	“2027 NBI dataset”	2027	NBI Transition Period (see Sections 2.1 and 3 of this document)
	“2028 NBI dataset”	2028	NBI Based on the <i>SNBI</i> (see Sections 2.2 and 3 of this document)
2029	“2027 NBI dataset”	2027	NBI Transition Period (see Sections 2.1 and 3 of this document)
	“2028 NBI dataset”	2028	NBI Based on the <i>SNBI</i> (see Sections 2.2 and 3 of this document)
	“2029 NBI dataset”	2029	NBI Based on the <i>SNBI</i> (see Sections 2.2 and 3 of this document)

1.5 Biennial Determination of Significant Progress towards Achieving NHS Bridge Targets

Starting in 2020¹⁹ and biennially thereafter, FHWA performs data extraction of the mid-year archived data from NBI for computing both bridge condition measures for significant progress determination. 23 CFR 490.109(e)(2) stipulates that a State DOT is determined to have made significant progress toward meeting its targets for a measure when either:

- The actual condition level is better than the baseline condition/performance; or
- The actual condition level is equal to or better than the established target.

¹⁹ 23 CFR 490.109(c) - The FHWA will determine significant progress toward the achievement of a State DOT’s NHPP targets after the State DOT submits the Mid Performance Period Progress Report for progress toward the achievement of 2-year targets, and again after the State DOT submits the Full Performance Period Progress Report for progress toward the achievement of 4-year targets. Accordingly, the first significant progress determination will be made in 2020 (after the State DOT submits the Mid Performance Period Progress Report for the 1st Performance Period).

The baseline conditions are snapshot condition levels at the beginning of a Performance Period²⁰ and are represented by the measures computed with the NBI data archived in June of the year in which State Baseline Performance Period Reports are due (in Calendar Years 2018, 2022, 2026, etc.).²¹ The snapshot condition levels at the midpoint of a Performance Period are referred to as the “2-year actual condition”, and the snapshot condition at the end of a Performance Period are referred as the “4-year actual condition”. The “2-year actual condition” is the condition calculated with the NBI data archived in June of the year in which State Mid Performance Period Progress Reports are due (in Calendar Years 2020, 2024, 2028, etc.).²² The 4-year actual condition is the condition calculated with the NBI data archived in June of the year in which State Full Performance Period Progress Reports are due (in Calendar Years 2022, 2026, 2030, etc.).²³

Accordingly, for the significant progress determination in CY 2026, FHWA will use the mid-year archived NBI dataset in 2026 (“2026 NBI dataset”) for computing the “4-year actual condition” (for the 2nd Performance Period)²⁴ in accordance with the “NBI Transition Period” computation method described in Section 2.1. The “4-year actual condition” computed in 2026 will also be the baseline condition for the 3rd Performance Period. For the significant progress determination in CY 2028, FHWA will use the mid-year archived NBI dataset in 2028 (“2028 NBI dataset”) for computing the actual 2-year condition level (for the 3rd Performance Period) in accordance with the *SNBI* measure computation method described in Section 2.2 of this document.

Table 2 below provides an illustration of how “NBI Transition Period” datasets will be incorporated into the FHWA’s significant progress determination process.

²⁰ 23 CFR 490.107(b)(1)(ii)(B) - Baseline condition/performance derived from the latest data collected through the beginning date of the performance period.

²¹ 23 CFR 490.109(d)(1)(vi) - Baseline condition/performance data contained in NBI of the year in which the Baseline Period Performance Report is due to FHWA that represents baseline conditions/performances for the performance period.

²² 23 CFR 490.109(c) and 23 CFR 490.109(d)(1)(iii) - The most recently available data contained within the NBI as of June 15th of the year in which the significant progress determination is made for targets established for NHS bridge condition measures.

²³ Ibid.

²⁴ 23 CFR 490.107(b)(3)(ii)(A) - 4-year condition/performance is the actual condition/performance derived from the latest data collected through the end of the performance period.

Table 2 – Measure Computation Methodologies During NBI Transition Period for Significant Progress Determinations

Significant Progress Determination Year (Calendar Year)	NBI Dataset	Represented Condition	Measure Computation Year (Calendar Year)	Computation Method
2026	“2026 NBI dataset”	“4-year actual condition” for the 2 nd Performance Period	2026	NBI Transition Period (see Sections 2.1 and 3 of this document)
		“Baseline condition” for the 3 rd Performance Period		
2028	“2028 NBI dataset”	“2-year actual condition” for the 3 rd Performance Period	2028	NBI Based on the <i>SNBI</i> (see Sections 2.2 and 3 of this document)
2030	“2030 NBI dataset”	“4-year actual condition” for the 3 rd Performance Period	2030	NBI Based on the <i>SNBI</i> (see Sections 2.2 and 3 of this document)
		“Baseline condition” for the 4 th Performance Period		

2 Data Preparation

This section describes details for computing bridge condition measures. As described in Section 1, the computation method provided in Section 2.1 only applies “NBI Transition Period” datasets (i.e., “2026 NBI dataset” and “2027 NBI dataset”). For computing measures for “2028 NBI dataset” and subsequent years’ datasets, please refer to Section 2.2.

The *Specifications for the National Bridge Inventory* requires the Designated Lead State to submit a full bridge record for any bridge that crosses the border between two or more States, while the Neighboring State(s) submit only partial bridge records for that bridge.²⁵ In accordance with 23 CFR 490.409, all bridges carrying the NHS that cross a State border within a State must be included in the measure computation, which necessitates a full bridge record. Therefore, the data items not required from the Neighboring State(s) will be populated in the NBI using the corresponding data submitted by the Designated Lead State for bridges that cross a State border.

2.1 NBI Transition Period (2026 and 2027 NBI Datasets)

The method provided in Section 2.1 only applies “NBI Transition Period” datasets (i.e., “2026 NBI dataset” and “2027 NBI dataset”).

2.1.1 Obtain Applicable Data Records

In accordance with 23 CFR 490.409, the query in Table 3 below retrieves the required data for bridges carrying the NHS within a State. Select records for the bridges (including bridge-length culverts) must

²⁵ See section on “BORDER BRIDGES” on Page 21 in the “*Specifications for the National Bridge Inventory*.” - https://www.fhwa.dot.gov/bridge/snbi/errata1_to_snbi_march_2022_publication.pdf

meet all three criteria ((a), (b), and (c)) in Table 3. This query represents all bridges on-, and off- ramps connected to the NHS within a State, as well as those NHS bridges that cross a State border.

Table 3 – Criteria for highway carrying the NHS including on- and off-ramps connecting to the NHS.

Criteria	Description	Criteria
(a)	“State Code” matches the specified state	[BL01_STATE_CODE] = ##
(b)	“NBIS Bridge Length” is <u>at least</u> ²⁶ 20 feet.	[BG01_NBIS_BRIDGE_LENGTH] >= 20.0
(c)	The bridge has <u>at least one feature</u> meeting <u>all</u> three conditions ((i), (ii) and (iii))	(i) “Feature Type” starts with the letter 'H' (indicating a highway): [BF01_FEATURE_TYPE] LIKE 'H##' (ii) “Feature Location” indicates that the feature is carried “on” the bridge: [BF02_FEATURE_LOCATION] = 'C' (iii) “NHS Designation” indicates that the feature is part of the NHS: [BH03_NHS_DESIGNATION] = 'Y'

2.1.2 Classify Condition

For the selected bridge records above in Section 2.1.1, The FHWA determines the “Lowest Condition Rating Code” ([BC13_LOWEST_CONDITION_RATING_CODE]) in the NBI for each bridge.

The “Lowest Condition Rating Code” represents the smallest value among the four component condition metrics: “Deck Condition Rating,” “Superstructure Condition Rating,” “Substructure Condition Rating,” and “Culvert Condition Rating,” as the logic is shown below.

[BC13_LOWEST_CONDITION_RATING_CODE] = **MIN** (
 [BC01_DECK_CONDITION_RATING],
 [BC02_SUPERSTRUCTURE_CONDITION_RATING],
 [BC03_SUBSTRUCTURE_CONDITION_RATING],
 [BC04_CULVERT_CONDITION_RATING]
)

Based on the determined “Lowest Condition Rating Code” above, FHWA also determines corresponding “Bridge Condition Classification” ([BC12_BRIDGE_CONDITION_CLASSIFICATION]) in the NBI.

If the “Lowest Condition Rating Code” for a bridge is equal to 7, 8 or 9, then that bridge is classified as in Good condition (letter ‘G’ would be assigned to the “Bridge Condition Classification” for that bridge). If the “Lowest Condition Rating Code” for a bridge is equal to 5 or 6, then that bridge is classified as in Fair

²⁶ Memorandum: INFORMATION: *Specifications for the National Bridge Inventory - Updates for Data Submittal Schema, Data Validation Logic, and NBIS Bridge Length* (September 17, 2024) -

https://www.fhwa.dot.gov/bridge/pubs/Memo-SNBI_Updates_Schema_ValidationLogic_NBISBridgeLength.pdf

condition (letter 'F' would be assigned to the "Bridge Condition Classification" for that bridge). If the "Lowest Condition Rating Code" for a bridge is equal to 0, 1, 2, 3, or 4, then that bridge is classified as in poor condition (letter 'P' would be assigned to the "Bridge Condition Classification" for that bridge). Table 4 below provides this logic.

Table 4 – Good, Fair, and Poor Classification Criteria

Criteria	Classification	Description
IF [BC13_LOWEST_CONDITION_RATING_CODE] IN (7, 8, 9)	THEN [BC12_BRIDGE_CONDITION_CLASSIFICATION] = 'G'	If the "Lowest Condition Rating Code" for a bridge is equal to 7, 8 or 9, then that bridge is classified as in Good condition.
IF [BC13_LOWEST_CONDITION_RATING_CODE] IN (5, 6)	THEN [BC12_BRIDGE_CONDITION_CLASSIFICATION] = 'F'	If the "Lowest Condition Rating Code" for a bridge is equal to 5 or 6, then that bridge is classified as in Fair condition.
IF [BC13_LOWEST_CONDITION_RATING_CODE] IN (0, 1, 2, 3, 4)	THEN [BC12_BRIDGE_CONDITION_CLASSIFICATION] = 'P'	If the "Lowest Condition Rating Code" for a bridge is equal to 0, 1, 2, 3, or 4, then that bridge is classified as in Poor condition.

The above logic will classify a bridge as in Good, Fair, or Poor condition even when its data record has one or more unreported component condition metric value(s). In this case, the classification will only be done with one or more reported [BC01_DECK_CONDITION_RATING], [BC02_SUPERSTRUCTURE_CONDITION_RATING], [BC03_SUBSTRUCTURE_CONDITION_RATING] and [BC04_CULVERT_CONDITION_RATING] value(s). If the data record for a bridge has all four missing component condition metric values²⁷ (e.g., due to the time lag between data reporting for newly constructed bridge and the inspection), the data record for that bridge will not be classified and will be excluded from the measure computation in Section 3.

2.1.3 Compute Deck Area

The FHWA determines "Calculated Deck Area" ([BG16_CACULATED_DECK_AREA]) in the NBI for each bridge obtained from the Section 2.1.1 logic.

If the bridge has a reported "Bridge Width Out-to-Out" value greater than zero, then the deck area is obtained by multiplying "Total Bridge Length" by "Bridge Width Out-to-Out". Otherwise, the deck area is calculated by multiplying "Total Bridge Length" by "Approach Roadway Width" up to and including the 2027 NBI dataset. Starting with the 2028 NBI Dataset, in accordance with the SNBI, all bridges including buried bridges must have a reported value for Bridge Width Out-to-Out, as provided in Section 2.2.3.

²⁷ It is possible that a data record has all four missing [BC01_DECK_CONDITION_RATING], [BC02_SUPERSTRUCTURE_CONDITION_RATING], [BC03_SUBSTRUCTURE_CONDITION_RATING] and [BC04_CULVERT_CONDITION_RATING] values, but FHWA expects this occurrence to be highly unusual.

The resulting product is then rounded²⁸ to the nearest one-tenth of a square foot to obtain “Calculated Deck Area”. The logic is summarized in Table 5 below.

Table 5 – Deck Area Computation Method

Criteria	Deck Area	Description
IF [BG05_BRIDGE_WIDTH_OUT_TO_OUT] > 0	THEN [BG16_CALCULATED_DECK_AREA] = ROUND ([BG02_TOTAL_BRIDGE_LENGTH] × [BG05_BRIDGE_WIDTH_OUT_TO_OUT], 1)	If the bridge has a reported “Bridge Width Out-to-Out” value greater than zero, then the deck area is obtained by multiplying “Total Bridge Length” by “Bridge Width Out-to-Out”. The resulting product is then rounded ²⁹ to the nearest one-tenth of a square foot to obtain “Calculated Deck Area”.
ELSE	[BG16_CALCULATED_DECK_AREA] = ROUND ([BG02_TOTAL_BRIDGE_LENGTH] × [BG09_APPROACH_ROADWAY_WIDTH], 1)	Otherwise, the deck area is calculated by multiplying “Total Bridge Length” by “Approach Roadway Width”. The resulting product is then rounded ³⁰ to the nearest one-tenth of a square foot to obtain “Calculated Deck Area”.

If the data record for a bridge has missing or zero values for both [BG05_BRIDGE_WIDTH_OUT_TO_OUT] and [BG09_APPROACH_ROADWAY_WIDTH]³¹ (e.g., due to the time lag between data reporting for of newly constructed bridge and the inspection), then the data record for that bridge will be excluded from the measure computation in Section 3.

²⁸ When rounding the resulting product to the nearest tenth, a “half round up” method is used: if the hundredths digit is 5 or greater, the value is rounded up; if it is less than 5, the value is rounded down. For example, a resulting product of 123.44 rounds to 123.4; 123.45 rounds to 123.5; and 123.55 rounds to 123.6.

²⁹ When rounding the resulting product to the nearest tenth, a “half round up” method is used: if the hundredths digit is 5 or greater, the value is rounded up; if it is less than 5, the value is rounded down. For example, a resulting product of 123.44 rounds to 123.4; 123.45 rounds to 123.5; and 123.55 rounds to 123.6.

³⁰ Ibid.

³¹ It is possible that a data record has missing or zero values for both [BG05_BRIDGE_WIDTH_OUT_TO_OUT] and [BG09_APPROACH_ROADWAY_WIDTH], but FHWA expects this occurrence to be highly unusual.

2.1.4 Discard Incomplete Bridge Records

As discussed in Sections 2.1.2 and 2.1.3, a bridge record meeting the condition in Table 6 below will be excluded from the measure computation in Section 3.

Table 6 – Criteria for NBI Transition Period Data Records Exclusion from the Measure Computation

Condition Description	Condition Expression	Measure Computation
If the data record for a bridge has all four missing component condition metric values.	([BC01_DECK_CONDITION_RATING] IS NULL) AND ([BC02_SUPERSTRUCTURE_CONDITION_RATING] IS NULL) AND ([BC03_SUBSTRUCTURE_CONDITION_RATING] IS NULL) AND ([BC04_CULVERT_CONDITION_RATING] IS NULL)	Then bridge data record will be excluded (or discarded) from the measure computation
If both “Bridge Width Out-to-Out” and “Approach Roadway Width” are equal to zero or unreported.	([BG05_BRIDGE_WIDTH_OUT_TO_OUT] IS NULL OR [BG05_BRIDGE_WIDTH_OUT_TO_OUT] = 0) AND ([BG09_APPROACH_ROADWAY_WIDTH] IS NULL OR [BG09_APPROACH_ROADWAY_WIDTH] = 0)	Then bridge data record will be excluded (or discarded) from the measure computation

2.2 NBI Based on SNBI (2028 and Subsequent NBI Datasets)

The method provided in Section 2.2 applies to “2028 NBI dataset” and subsequent years’ datasets.

2.2.1 Obtain Applicable Data Records

In accordance with 23 CFR 490.409, the query in Table 7 below retrieves the required data for bridges carrying the NHS within a State. Select records for the bridges (including bridge-length culverts) must meet all three criteria ((a), (b), and (c)) in Table 7. This query represents all bridges on-, and off- ramps connected to the NHS within a State, as well as those NHS bridges that cross a State border.

Table 7 – Criteria for highway carrying the NHS including on- and off-ramps connecting to the NHS.

Criteria	Description	Criteria
(a)	“State Code” matches the specified state	[BL01_STATE_CODE] = ##
(b)	“NBIS Bridge Length” is <u>greater than</u> 20 feet	[BG01_NBIS_BRIDGE_LENGTH] > 20.0
(c)	The bridge has <u>at least one feature</u> meeting <u>all</u> three conditions ((i), (ii) and (iii))	(i) “Feature Type” starts with the letter 'H' (indicating a highway): [BF01_FEATURE_TYPE] LIKE 'H##' (ii) “Feature Location” indicates that the feature is carried “on” the bridge: [BF02_FEATURE_LOCATION] = 'C' (iii) “NHS Designation” indicates that the feature is part of the NHS: [BH03_NHS_DESIGNATION] = 'Y'

2.2.2 Classify Condition

The condition classification for the NBI based on *SNBI* in this section is identical to the condition classification process for the “NBI Transition Period” in section 2.1.1.

For the selected bridge records above in Section 2.2.1, the FHWA determines the “Lowest Condition Rating Code” ([BC13_LOWEST_CONDITION_RATING_CODE]) in the NBI for each bridge.

The “Lowest Condition Rating Code” represents the smallest value among the four component condition metrics: “Deck Condition Rating,” “Superstructure Condition Rating,” “Substructure Condition Rating,” and “Culvert Condition Rating,” as the logic is shown below.

[BC13_LOWEST_CONDITION_RATING_CODE] = **MIN** (
 [BC01_DECK_CONDITION_RATING],
 [BC02_SUPERSTRUCTURE_CONDITION_RATING],
 [BC03_SUBSTRUCTURE_CONDITION_RATING],
 [BC04_CULVERT_CONDITION_RATING]
)

Based on the determined “Lowest Condition Rating Code” above, FHWA also determines corresponding “Bridge Condition Classification” ([BC12_BRIDGE_CONDITION_CLASSIFICATION]) in the NBI.

If the “Lowest Condition Rating Code” for a bridge is equal to 7, 8 or 9, then that bridge is classified as in Good condition (letter ‘G’ would be assigned to the “Bridge Condition Classification” for that bridge). If the “Lowest Condition Rating Code” for a bridge is equal to 5 or 6, then that bridge is classified as in Fair condition (letter ‘F’ would be assigned to the “Bridge Condition Classification” for that bridge). If the “Lowest Condition Rating Code” for a bridge is equal to 0, 1, 2, 3, or 4, then that bridge is classified as in Poor condition (letter ‘P’ would be assigned to the “Bridge Condition Classification” for that bridge). The logic is shown in Table 8 below.

Table 8 – Good, Fair, and Poor Classification Criteria

Criteria	Classification	Description
IF [BC13_LOWEST_CONDITION_RATING_CODE] IN (7, 8, 9)	THEN [BC12_BRIDGE_CONDITION_CLASSIFICATION] = ‘G’	If the “Lowest Condition Rating Code” for a bridge is equal to 7, 8 or 9, then that bridge is classified as in Good condition.
IF [BC13_LOWEST_CONDITION_RATING_CODE] IN (5, 6)	THEN [BC12_BRIDGE_CONDITION_CLASSIFICATION] = ‘F’	If the “Lowest Condition Rating Code” for a bridge is equal to 5 or 6, then that bridge is classified as in Fair condition.
IF [BC13_LOWEST_CONDITION_RATING_CODE] IN (0, 1, 2, 3, 4)	THEN [BC12_BRIDGE_CONDITION_CLASSIFICATION] = ‘P’	If the “Lowest Condition Rating Code” for a bridge is equal to 0, 1, 2, 3, or 4, then that bridge is classified as in Poor condition.

The above logic will classify a bridge as in Good, Fair, or Poor condition even when its data record has one or more unreported component condition metric value(s). In this case, the classification will only be done with one or more reported [BC01_DECK_CONDITION_RATING], [BC02_SUPERSTRUCTURE_CONDITION_RATING], [BC03_SUBSTRUCTURE_CONDITION_RATING] and [BC04_CULVERT_CONDITION_RATING] value(s). If the data record for a bridge has all four missing component condition metric values³² (e.g., due to the time lag between data reporting for newly constructed bridge and the inspection), the data record for that bridge will not be classified and will be excluded from the measure computation in Section 3.

2.2.3 Compute Deck Area

The FHWA determines “Calculated Deck Area” ([BG16_CACULATED_DECK_AREA]) in the NBI for each bridge.

If the bridge has a reported “Irregular Deck Area” value greater than zero, then the deck area is the reported “Irregular Deck Area”. Otherwise, the deck area is obtained by multiplying “Total Bridge Length” by “Bridge Width Out-to-Out”. Starting with the 2028 NBI Dataset, in accordance with the SNBI, all bridges including buried bridges must have a reported value for Bridge Width Out-to-Out. The resulting product is then rounded³³ to the nearest one-tenth of a square foot to obtain “Calculated Deck Area”. The logic is summarized in Table 9 below.

Table 9 – Deck Area Computation Method

Criteria	Deck Area	Description
IF [BG15_IRREGULAR_DECK_AREA] > 0	THEN [BG16_CACULATED_DECK_AREA] = [BG15_IRREGULAR_DECK_AREA]	If the bridge has a reported “Irregular Deck Area” value greater than zero, then the deck area is the reported “Irregular Deck Area”.
ELSE	[BG16_CACULATED_DECK_AREA] = ROUND ([BG02_TOTAL_BRIDGE_LENGTH] × [BG05_BRIDGE_WIDTH_OUT_TO_OUT], 1)	Otherwise, the deck area is obtained by multiplying “Total Bridge Length” by “Bridge Width Out-to-Out”. The resulting product is then rounded ³⁴ to the nearest one-tenth of a square foot to obtain “Calculated Deck Area”.

³² It is possible that a data record has all four missing [BC01_DECK_CONDITION_RATING], [BC02_SUPERSTRUCTURE_CONDITION_RATING], [BC03_SUBSTRUCTURE_CONDITION_RATING] and [BC04_CULVERT_CONDITION_RATING] values, but FHWA expects this occurrence to be highly unusual.

³³ When rounding the resulting product to the nearest tenth, a “half round up” method is used: if the hundredths digit is 5 or greater, the value is rounded up; if it is less than 5, the value is rounded down. For example, a resulting product of 123.44 rounds to 123.4; 123.45 rounds to 123.5; and 123.55 rounds to 123.6.

³⁴ Ibid.

If the data record for a bridge has missing or zero values for both [BG15_IRREGULAR_DECK_AREA] and [BG05_BRIDGE_WIDTH_OUT_TO_OUT]³⁵ (e.g., due to the time lag between data reporting for newly constructed bridge and the inspection), then the data record for that bridge will be excluded from the measure computation in Section 3.

2.2.4 Discard Incomplete Bridge Records

As discussed in Sections 2.2.2 and 2.2.3, a bridge record meeting the condition in Table 10 below will be excluded from the measure computation in Section 3.

Table 10 – Criteria for NBI Data Based on SNBI Records Exclusion from the Measure Computation

Condition Description	Condition Expression	Measure Computation
If the data record for a bridge has all four missing component condition metric values.	([BC01_DECK_CONDITION_RATING] IS NULL) AND ([BC02_SUPERSTRUCTURE_CONDITION_RATING] IS NULL) AND ([BC03_SUBSTRUCTURE_CONDITION_RATING] IS NULL) AND ([BC04_CULVERT_CONDITION_RATING] IS NULL)	Then bridge data record will be excluded (or discarded) from the measure computation
If both “Irregular Deck Area” and “Bridge Width Out-to-Out” are equal to zero or unreported.	([BG15_IRREGULAR_DECK_AREA] IS NULL OR [BG15_IRREGULAR_DECK_AREA] = 0) AND ([BG05_BRIDGE_WIDTH_OUT_TO_OUT] IS NULL OR [BG05_BRIDGE_WIDTH_OUT_TO_OUT] = 0)	Then bridge data record will be excluded (or discarded) from the measure computation

3 Measure Computation

The measure computation logic in this section applies to both NBI datasets based on *SNBI* and “NBI Transition Period” datasets. Accordingly, the prepared data described in Section 2.1 or Section 2.2 is applied to the logic provided in this section.

The measure equations, in accordance with 23 CFR 490.409(b), with the explanations, are provided below.

$$\%_{\text{Good}} = \frac{\text{Deck_Area_Good}}{\text{Deck_Area_Good} + \text{Deck_Area_Fair} + \text{Deck_Area_Poor}} \times 100$$

$$\%_{\text{Poor}} = \frac{\text{Deck_Area_Poor}}{\text{Deck_Area_Good} + \text{Deck_Area_Fair} + \text{Deck_Area_Poor}} \times 100$$

Where,

$\%_{\text{Good}}$: “Percentage of NHS bridges classified as in Good condition” Measure (rounded³⁶ to the nearest one one-tenth of a percent);

³⁵ It is possible that a data record has missing or zero values for both [BG15_IRREGULAR_DECK_AREA] and [BG05_BRIDGE_WIDTH_OUT_TO_OUT], but FHWA expects this occurrence to be highly unusual.

³⁶ Computed value is rounded to the nearest tenth, a “half round up” method is used: if the hundredths digit is 5 or greater, the value is rounded up; if it is less than 5, the value is rounded down.

%_Poor:	“Percentage of NHS bridges classified as in Poor condition” Measure (rounded ³⁷ to the nearest one one-tenth of a percent);
Deck_Area_Good:	total deck area of NHS bridges classified as in Good condition;
	$\text{Deck_Area_Good} = \sum_{G=1}^{\text{GOOD}} ([\text{BG16_CALCULATED_DECK_AREA}])_{\text{Bridge G}}$
	GOOD: total number of the applicable bridges, where their condition is Good, as defined in Section 2.1.2 or 2.2.2; Bridge G: a bridge determined to be in Good condition per 2.1.2 OR 2.2.2; and [BG16_CALCULATED_DECK_AREA]: deck area of a bridge computed per Section 2.1.3 or 2.2.3 (excluding the records described in Table 6 in Section 2.1.4 or Table 10 in Section 2.2.4).
Deck_Area_Fair:	total deck area of NHS bridges classified as in Fair condition;
	$\text{Deck_Area_Fair} = \sum_{F=1}^{\text{FAIR}} ([\text{BG16_CALCULATED_DECK_AREA}])_{\text{Bridge F}}$
	FAIR: total number of the applicable bridges, where their condition is Fair, as defined in Section 2.1.2 or 2.2.2; Bridge F: a bridge determined to be in Fair condition per Section 2.1.2 or 2.2.2; and [BG16_CALCULATED_DECK_AREA]: deck area of a bridge computed per Section 2.1.3 or 2.2.3 (excluding the records described in Table 6 in Section 2.1.4 or Table 10 in Section 2.2.4).
Deck_Area_Poor:	total deck area of NHS bridges classified as in Poor condition;
	$\text{Deck_Area_Poor} = \sum_{P=1}^{\text{POOR}} ([\text{BG16_CALCULATED_DECK_AREA}])_{\text{Bridge P}}$
	POOR: total number of the applicable bridges, where their condition is Poor, as defined in Section 2.1.2 or 2.2.2; Bridge P: a bridge determined to be in Poor condition per Section 2.1.2 or 2.2.2; and

³⁷ Ibid.

[BG16_CALCULATED_DECK_AREA]: deck area of a bridge computed per Section 2.1.3 or 2.2.3 (the records described in Table 6 in Section 2.1.4 or Table 10 in Section 2.2.4).