



February 9, 2023

Public Buildings Service
General Services Administration
1800 F Street NW
Washington, DC 20405

Re: Response to GSA Inflation Reduction Act Low Embodied Carbon Material Standards

Dear Embodied Carbon Task Force Members,

Thank you for the opportunity to comment on the GSA Inflation Reduction Act Low Embodied Carbon Material Standards that were released for comment on January 25, 2023.

With more than 1,100 member companies, the National Asphalt Pavement Association (NAPA) is the only trade association that exclusively represents the interests of the asphalt pavement producer/contractor on the national level with Congress, government agencies, and other trade and business organizations. NAPA's membership also includes companies and individuals that support the asphalt pavement industry, such as construction equipment manufacturers and material suppliers. NAPA members are leaders in implementing sustainable plant and pavement technologies, such as Reclaimed Asphalt Pavements (RAP) and Warm-Mix Asphalt (WMA), that reduce environmental impacts and greenhouse gas emissions.

As GSA is the agency to take the first step into a new area of science and policy by defining low embodied carbon construction materials, NAPA empathizes with the challenges of defining this new space especially under accelerated implementation time constraints. NAPA, too, wants to find ways to encourage contractors to produce asphalt mixtures with lower embodied carbon. In January 2022, the asphalt industry released *The Road Forward* — the industry plan to reach net zero by 2050. In that plan, two goals are to (1) achieve net zero carbon emission asphalt mixture production and construction by 2050, and (2) develop a net zero materials supply chain. Both goals intrinsically align with reducing the embodied carbon of asphalt mixtures for our customers. With alignment and execution of both industry and agency goals in mind, we offer the following comments to the standards released.

Industry Needs More Time to Respond to This Standard

On January 19, 2023, the Environmental Protection Agency (EPA) released information related to how the agency would apply and implement sections of the Inflation Reduction Act (IRA). One piece of information released was the "interim determination to provide your agencies with actionable determinations on selecting materials and products that meet the standards of Sections 60503 and 60506, which will reduce greenhouse-gas emissions of federally funded building, infrastructure and construction projects, with a particular emphasis on reducing major industrial emissions from production of U.S. construction materials and products." This accompanied a Request for Information on the determination and other aspects of the IRA.

Less than one week later on January 25, 2023, GSA released its Low Embodied Carbon Material Standards and gave industry two weeks to comment on the standard. To fully comment on this standard, industry needs more time to better understand the interim determination, EC3 Uncertainty Methodology, and the data used in the GSA's analysis. This timeline was an impediment as industry has not been able to provide comments on the EPA's interim determination, let alone GSA's application of the EPA's interim determination. As NAPA and its members further analyze and consider the GSA's Low Embodied Carbon Materials Standards, we appreciate the opportunity to provide additional feedback and look forward to working collaboratively with GSA on this topic.

The Current Standard's Methodology Is Inconsistent with the Intended Use of EPDs as Defined by the Product Category Rules (PCR) for Asphalt Mixtures Version 2.0

Both the PCR for Asphalt Mixtures Version 2.0 and every EPD for asphalt mixtures describe the comparability requirements for EPDs for asphalt mixtures, with similar language in both documents. For example, Section 5.5 of the PCR for Asphalt Mixtures Version 2.0 states the following:

EPDs in conformance with this program for asphalt mixtures are comparable if the mixtures are expected to meet similar functional and design performance criteria as specified by the customer.

Comparability may be limited by the presence of data gaps. EPDs with data gaps should not be compared to each other unless the composition and quantity of material ingredients with data gaps are known to be the same for all products being compared.

When asphalt mixtures have different performance expectations, the asphalt mixtures can only be compared by using EPDs as a data input for an LCA that includes additional life cycle stages relevant to the functional unit defined in the LCA study.

Below are a few examples of the impacts that material design specifications can have on the Global Warming Potential (GWP) results of asphalt mixtures:

- Polymer modified asphalt binders, which are typically used for roads and highways with heavy loads to improve durability and longevity, can increase the GWP of a mix by more than 10% relative to a mix with neat (unmodified) asphalt binder.
- The asphalt binder content changes as a function of the nominal maximum aggregate size (NMAS) to account for changes in the surface area-to-volume ratio, resulting in GWP differences of as much as 20% between a large stone mix (typically used for an asphalt treated base course) and a fine aggregate mix (typically used as a surface wearing mix).
- Some agencies require hydrated lime to prevent moisture damage, whereas other agencies allow the use of liquid antistrips to achieve the same goal. The use of hydrated lime can increase the GWP of a mix by more than 30% relative to a mix using a liquid antistrip.

The creation of a single industry average for all asphalt mixtures, without the consideration of data gaps and design performance specifications, directly compares EPDs for asphalt mixture to an inappropriate benchmark by not considering data gaps or agency-defined design performance specifications. This is inconsistent with the intended use of EPDs as defined in the PCR for Asphalt Mixtures and will inevitably lead to unintended consequences when applied in practice.

Most state agencies do not specify performance characteristics of asphalt mixtures but rather specify asphalt mixtures by aggregate size, volumetric requirements, and material ingredient requirements. As the asphalt industry moves toward performance-based metrics in design through Balanced Mix Design (BMD), performance delineations will become more feasible. However, based on current standards, the appropriate way to conduct comparability analyses are within owner specifications. Therefore, industry averages and benchmarks should be established for individual agency specifications.

Additionally, EPDs for asphalt mixtures often have data gaps for some raw materials such as WMA additives, rejuvenators, polymers, liquid antistrips, and fibers. There is a lack of supply chain-specific data for most raw materials used in asphalt mixtures. As these data gaps get filled and supply chain-specific background data become available to replace industry average background data, EPDs for asphalt mixture will change simply as a result of getting better data. The GSA should be prepared to adjust its benchmarks both upward and downward in response to these changes, as appropriate.

NAPA Questions Why the GSA Is Considering Uncertainty

With no clearly vetted methodology for uncertainty and no methodology prescribed by the program operators, it is unclear why GSA is requiring industries to consider uncertainty at this time. The EPA's Interim Determination does not require GSA or FHWA to include this type of analysis. Since not all materials under this section of the Law are equally researched, vetted, or prescribed by program operators, NAPA strongly recommends GSA remove this additional requirement and instead partner with program operators to develop a mutually agreeable approach to consider uncertainty in EPDs.

It is critical to note that the PCR development process and the requirement of EPDs to be conformant with a single PCR per jurisdiction as established by ISO 14025 is to reduce and resolve uncertainty in the communication of the GWP metric for product and facility specific EPDs. Hence, NAPA's PCR has taken steps to specify background data sets with a clear data quality assessment. Furthermore, we developed a tool to ensure the third-party verified digital delivery of all asphalt EPDs use methods and models consistent across all plants in the United States. We have also worked with our upstream producers to develop high quality, reliable industry averages that we specify for use. These steps significantly lower the uncertainty of the GWP metrics communicated in our EPDs. Due to these built-in characteristics of asphalt EPDs, an uncertainty adjustment may not even be necessary for asphalt EPDs due to the quality assessment, consistency, and reliability already provided by the asphalt EPD program.

For these reasons, at a minimum, the standard should be changed to include an uncertainty factor of 1.0 for asphalt mixtures.

Unilaterally Applying Uncertainty Models to Environmental Product Declarations Undermines the Process of Creating and Developing Product Category Rules

NAPA published its updated PCR in April 2022. Later that year, the American Center for Life Cycle Assessment (ACLCA) published the *2022 ACLCA PCR Guidance – Process and Methods Toolkit*. In addressing uncertainty, the toolkit states, "PCR Committee shall specify different types of uncertainties to be propagated in the underlying LCA study and is encouraged to ensure that the PCR describes procedures for reporting uncertainty of results."

This guidance was not available to the Program Operator at the time of the PCR development; however, LCA experts express that uncertainty should be addressed by the same committee who develops the PCR. During the public review process, there were no comments given to the PCR committee stressing the need to

include uncertainty analyses. If organizations require that uncertainty be applied to the PCR, the PCR committee should be empowered to make these decisions, rather than a third party that was not involved in the development of the PCR.

The creation of a PCR is a highly collaborative and consensus-based process, and NAPA stringently followed the ISO standards during the development process. Stakeholders were involved in developing the PCR over a two-year period. A public comment period was advertised, and NAPA transparently displayed how every comment was addressed or found non-persuasive by the PCR committee. The PCR verification letter shows compliance with the ISO standards and best practices for PCRs. These documents are all available at <https://www.asphaltpavement.org/programs/napa-programs/emerald-eco-label/product-category-rules>.

It is a dangerous precedent for any organization to circumvent the international standard process and apply uncertainty factors that have not gone through the same process required for by the ISO for PCRs, especially when the organization has no ownership or expertise with the datasets to which uncertainty is being quantified. The uncertainty methodology used by GSA appears to arbitrarily assign uncertainty adjustments for numerous materials, including asphalt mixtures, with no scientific or statistical analysis to support the uncertainty adjustment factors. The Program Operator is ultimately responsible for delivery of any data associated with the EPD under its jurisdiction, and third parties should not take it upon themselves to deliver those values. It is reasonable for third-party organizations to work with Program Operators as stakeholders and experts; however, third parties are ultimately not responsible for the delivery of the program. Thus, it is not aligned with current guidance for GSA to assign uncertainty adjustments to EPDs for asphalt mixtures.

The Uncertainty Analyses for the Different Materials are Not Equally Researched

GSA should not implement a third party's methodology until all materials have been equivalently researched. The GSA uncertainty worksheet explicitly shows lower uncertainties related to aluminum, flat-glass panels, cement, and ready-mix concrete based on Building Transparency's analysis of these products. Since Building Transparency has not completed uncertainty analyses for the other materials, they inherently have greater uncertainty, making it more difficult for contractors to meet the low-embodied carbon materials standards for GSA.

Before this standard was released, GSA should have approached Program Operators about how to address uncertainty for their given materials. However, since the asphalt industry was unaware of this need, a competitive advantage is given to concrete materials that could be used for parking lots in GSA buildings. While direct comparisons may not be made between asphalt and concrete mixtures, as EPDs from different PCRs should not be compared, it could create an unconscious bias toward one material if a project manager knows it will be easier to meet this standard with one material versus another because of differences in uncertainty.

Current Participation in the Asphalt Mixture EPD Program is Not Representative of the Entire Asphalt Industry Skewing the Results of the EC3 Analysis

There are approximately 3,500 asphalt plants in the United States, and at the time of GSA's analysis 2 to 3% of plants had participated in the EPD program. Many asphalt plants have between 50 and 100 mix designs based on customer specifications and regulations, resulting in several hundred thousand distinct asphalt mixtures. Fewer than 400 published asphalt mixture EPDs were in the Emerald Eco-Label database at the

time of GSA’s analysis, representing less than 1% of asphalt mixtures. Most companies that have published EPDs for asphalt mixtures have done so voluntarily, without customer requirements to do so.

To further demonstrate that the current dataset is not representative of the entire industry, Table 1 provides a comparison of the percentage of EPDs that come from each state versus the total and the percentage of asphalt tons that were produced in each state in 2021.¹ This table also shows that more than 75% of current EPDs come from only 9 states, representing 30% of the 2021 asphalt mixture tonnage in the United States. While this is not a perfect comparison because we do not know allocation of each mixture into the tonnage of each state, it does show that current EPDs do not constitute a statistically representative sample of asphalt mixtures in the United States on which a cumulative distribution can or should be developed.

Table 1. Representativeness of EPD Availability vs Tons Produced

State	EPDS		Tonnage		State	EPDS		Tonnage	
	Total	% of US	Total	% of US		Total	% of US	Total	% of US
AL	4	1.04%	7	1.63%	MT		0.00%	4.5	1.05%
AK		0.00%	5.5	1.28%	NE		0.00%	3.1	0.72%
AZ	14	3.63%	7.9	1.84%	NV		0.00%	3.7	0.86%
AR	25	6.48%	6	1.40%	NH	2	0.52%	1.6	0.37%
CA	6	1.55%	27.2	6.34%	NJ	33	8.55%	10.5	2.45%
CO	47	12.18%	9.1	2.12%	NM		0.00%	4	0.93%
CT	14	3.63%	3	0.70%	NY	9	2.33%	18.5	4.31%
DE		0.00%	1.6	0.37%	NC		0.00%	14	3.26%
FL	54	13.99%	19	4.43%	ND		0.00%	2.6	0.61%
GA		0.00%	14.5	3.38%	OH		0.00%	14.8	3.45%
HI		0.00%	1	0.23%	OK		0.00%	5.1	1.19%
ID	1	0.26%	3	0.70%	OR	17	4.40%	5.5	1.28%
IL	9	2.33%	14.9	3.47%	PA	19	4.92%	20	4.66%
IN	1	0.26%	14	3.26%	RI		0.00%	2.2	0.51%
IA		0.00%	4.9	1.14%	SC		0.00%	7.1	1.65%
KS	2	0.52%	4	0.93%	SD		0.00%	3	0.70%
KY		0.00%	7.5	1.75%	TN		0.00%	9.5	2.21%
LA	6	1.55%	8.1	1.89%	TX	43	11.14%	44.7	10.41%
ME		0.00%	2.9	0.68%	UT	10	2.59%	3.7	0.86%
MD	12	3.11%	6.6	1.54%	VT		0.00%	2	0.47%
MA		0.00%	7	1.63%	VA	4	1.04%	11.5	2.68%
MI		0.00%	14.7	3.42%	WA	9	2.33%	6.2	1.44%
MN	1	0.26%	9.2	2.14%	WV		0.00%	3.8	0.89%
MS		0.00%	5.4	1.26%	WI	3	0.78%	13	3.03%
MO	41	10.62%	8	1.86%	WY		0.00%	2.7	0.63%

¹ Williams, B.A., Willis, J.R., and Shacat, J. (2022) *Asphalt Pavement Industry Survey on Recycled and Warm-Mix Asphalt Usage 2021, Information Series 138, 12th ed.* Published by National Asphalt Pavement Association, Greenbelt, Md, and sponsored by Federal Highway Administration, Washington, D.C.

Regionality of Available Materials, Specifications, and Electricity Providers Is Not Considered

Asphalt contractors can control plant operations, implement best practices for moisture management, and conduct other practices to reduce the embodied carbon of asphalt mixtures; however, many owner specifications dictate a significant portion of the embodied carbon for an asphalt mixture. Specifications such as minimum asphalt contents, maximum recycled material contents, and minimum mixture temperatures can prevent a contractor from reducing embodied carbon. Additionally, some agencies require the use of hydrated lime to prevent moisture damage even when lower carbon alternatives are available, which can increase the embodied carbon of an asphalt mixture by as much as 30%.

Since asphalt can only be shipped a limited distance while maintaining the properties needed for constructability, asphalt is commonly produced near the location where it will be constructed. While asphalt mixtures are often produced with locally available raw materials, there are many parts of the country where the required aggregates are not locally available and must be railed, trucked, or barged great distances. There are other regions of the country where asphalt plants sit in an aggregate quarry, resulting in minimum haul distances for those aggregates. This is a function of local geology and required properties for mixture durability or friction. Contractors who must ship aggregates great distances to meet the quality standards required by owners may automatically be disqualified from participating in this program if national numbers are used to determine the top 20%, 40%, and industry average.

The geographic market of an asphalt plant is limited by constructability requirements to place the material while it's still at temperature. Thus, even within an individual state there can be significant differences in the GWP results for asphalt mixtures that meet the same specifications but are produced by plants located in areas with differing availability of aggregates that meet specifications.

It should be noted that these representative examples are just a few of the concerns related to specifications and regionality.

There Is No Clear Quality Control/Quality Assurance Process for Including Environmental Product Declarations in Databases Such as Embodied Carbon in Construction Calculator (EC3)

NAPA questions the quality control/quality assurance process EC3 uses to include EPDs in its database. For example, two asphalt mixture EPDs (AAA Corona EPDs in Figure 1) in the EC3 database were produced outside of NAPA's Emerald Eco-Label tool. These EPDs were produced under Version 1.0 of the PCR; however, EPDs developed under Version 1.0 of the PCR expired March 31, 2022. The consultant who created these EPDs incorrectly identified the expiration date on the EPD.

NAPA identified these EPDs as non-compliant and informed the consultant about the non-compliance. The consultant let NAPA know that organizations were made aware of this non-compliance, but the EPDs remain in EC3. NAPA took the impetus of Program Operator responsibilities seriously by ensuring that EPDs were compliant; however, a Program Operator cannot police every database to ensure that each EPD in the database is compliant. If EC3 had conducted QC to ensure EPDs were compliant, it would have discovered, at a minimum, that these EPDs misidentified both an incorrect expiration date and Program Operator. NAPA does not support using databases that use non-compliant EPDs as the basis for policy decisions.

Figure 1. Screenshot of EC3 Database on January 31, 2023.

Company	Plant or Plant Group	Product	Description	Value
ion Company	Santa Clara Asphalt Plant	1580 - 3/4" WMA64-10R15	This EPD reports the potential ...	0.03
ion Company	Santa Clara Asphalt Plant	3615 - 1/2"HMA64-10R15	This EPD reports the potential ...	0.03
ion Company	Santa Clara Asphalt Plant	1016 - 1/2"HMA64-10	This EPD reports the potential ...	0.04
ion Company	Santa Clara Asphalt Plant	1230 - 1/2" WMA64-10R15	This EPD reports the potential ...	0.03
ion Company	Santa Clara Asphalt Plant	3924 - 1/2" WMA58-22R25	This EPD reports the potential ...	0.03
ion Company	Santa Clara Asphalt Plant	3923- 3/4" WMA58-22R25	This EPD reports the potential ...	0.03
alt	AAA Corona	Asphalt/Rubber Hot Mix Asphalt	The product system includes th...	0.04
alt	AAA Corona	Polymer modified hot mix asph...	The product system includes th...	0.03

The Methodology for GSA Considering A4 for Materials Outside of a Project’s Location Is Not Consistent with the Asphalt Mixture Product Category Rule. In note 2 on page 1 of the GSA standard, the standard notes that when the second tier of the waterfall is used, A4 (transportation) can be considered using the EPA’s transportation emission factors. Currently, this methodology differs from what is included in the EPDs for asphalt mixtures. Discrepancies in these emission factors can provide imbalance to the EPD as transportation in one portion of the EPD may be weighted more heavily than in others. GSA should require that transportation emissions associated with A2 and associated assumptions should be considered in A4 using a similar methodology. NAPA’s EPD program uses a life cycle emission factor for truck transport of 0.2044 kg CO₂e/metric tonne-mile or 0.1855 kg CO₂e/ton-mile. Please note that these numbers should be used for one-way truck transport, as they include a multiplier of 1.35 to account for empty backhauls in accordance with the PCR for Asphalt Mixtures Version 2.0.

NAPA Has Questions Regarding the Implementation of this Standard

Ambiguity in the procurement process still needs to be defined. Based on the table Measurement & Verification for All GSA IRA material standards, the project team will submit information about IRA-eligible materials in the design phase of the project. What kind of verification process will be conducted to ensure that contractors use the materials associated with that design? What will happen to a contractor if they are unable to source a material? Will they just lose the incentive? Will penalties need to be assessed? Contractors need to know this type of information to assess risk in the bidding process.

Based on the comments listed above, NAPA recommends that GSA, at a minimum, change the uncertainty factor to 1.0 and work with industry and Program Operators to set more appropriate benchmarks.

NAPA appreciates the opportunity to comment on this new standard and wishes to continue engaging GSA on developing and appropriately implementing data associated with the *PCR for Asphalt Mixtures*. Please do not hesitate to reach out to me at rwillis@asphalt pavement.org with any further inquiries.

Sincerely,

A handwritten signature in black ink, appearing to read "J. R. Willis", is written over a horizontal line.

J. Richard Willis, PhD

Vice President for Engineering, Research, & Technology