



September 16, 2024

Executive Office of Energy and Environmental Affairs
Massachusetts Environmental Policy Act Office
Attn: Tori Kim, MEPA Director
100 Cambridge Suite, Suite 900
Boston, MA 02114

Re: MEPA Climate Resiliency Policy (Straw Proposal)

Dear Ms. Kim:

Thank you for the opportunity to provide comments on the Massachusetts Environmental Policy Act (MEPA) Office's straw proposal regarding potential updates to the current *2021 MEPA Interim Protocol on Climate Change Adaptation and Resiliency* (2021 Interim Protocol). Our Environmental team has collective knowledge and experience with the 2021 Interim Protocol, in which Page Czepiga was a co-author, and the MA Climate Resilience Design Standards Tool (RMAT Tool), in which Czepiga was a key stakeholder and Julie Eaton Ernst was the consultant project manager and led the development of the RMAT Tool. We appreciate the early engagement with stakeholders so that feedback can inform the draft policy that will be issued for public comment later in Fall 2024.

Currently, the 2021 Interim Protocol requires that all new project filings attach an output report from the RMAT Tool and encourages use of recommended design standard outputs. MEPA's straw proposal includes potential updates to filing requirements for Environmental Impact Reports (EIRs) that would require additional minimum analyses using the RMAT Tool outputs and associated justifications or mitigation measures. We recognize the importance of proactively planning for and mitigating damage from extreme weather events and anticipated climate changes. Additionally, we acknowledge the challenges the MEPA Office faces in developing a protocol that can be applied to a diverse array of projects including residential and commercial developments, energy generation and transmission, transportation, solid waste management, transportation, wastewater, and water supply projects.

Terms and conditions of using RMAT Tool

The RMAT Tool is beneficial during design development and project review since it provides consistent outputs for climate hazards based on project location and asset useful life and criticality. Additionally, the outputs of the RMAT Tool can support identifying opportunities to mitigate heat and stormwater impacts, as well as reduce flood risk. As with any screening tool, there are limitations; specifically, limitations for use as a regulatory tool. The RMAT Tool's supporting documentation notes that ***"This is not a regulatory tool and is intended to provide a basis-of-discussion and point of reference for***

*planning, early design, and evaluation that is standardized across the Commonwealth.*¹ Additionally, using the RMAT Tool requires agreement to terms and conditions for use on the splash screen prior to entry, including but not limited to the following:

- *The data and content are for **informational purposes only** and do not constitute and **should not be construed as legal, financial, professional, or any other type of advice** or counsel.*
- *EOEEA and its partners do not guarantee or warrant that any information submitted by individuals using the Tool is correct and **disclaims any liability for any loss or damage resulting from reliance on any such information.***
- *This Tool is recommended to be used to **inform planning and early design processes** for projects with physical assets. Outputs provided through this Tool **may be used as a reference point or basis-of-discussion in planning, early design, and/or evaluation of projects.** The Tool **does not replace location specific engineering calculations and analyses, existing code and regulatory requirements, risk and vulnerability assessments, or cost-benefit analyses.***
- *This Tool, associated data, and any related materials contained therein are provided “as is,” without warranty of any kind, either express or implied, including, but not limited to, the implied warranties of merchantability, fitness for a particular purpose, and noninfringement. The **entire risk of the use of and reliance upon the Tool, associated data, and any related materials shall be with the user.***

MEPA’s straw proposal requires applicants to use data provided through the RMAT Tool for more than “informational purposes” in the EIR, yet does not absolve the risk applicants assume by using and relying upon the RMAT Tool output. There is an important nuance between providing information that helps inform applicants on the types of conditions assets may be exposed to over the useful life of a project versus requiring applicants to justify why projects did not “meet” those conditions. **This substantial change of intent of the RMAT Tool should be evaluated by all members of the RMAT and terms and conditions of using the Tool need to be appropriately revised.**

Limitations in using the data beyond informational purposes

Other challenges in using the RMAT Tool beyond an initial screening tool are summarized below.

- Projects that receive a High Exposure score to a climate hazard will always receive High Risk Ratings for that hazard for all building/facility and infrastructure assets based on the relationships underlying the RMAT Tool.² Factors that inform risk should consider both site-specific information and the larger context of built, social, and natural environments, not just exposure.
- Infrastructure projects typically have a long useful life, and the RMAT Tool’s outputs are based on the end of the useful life and construction start year. In addition to climate, land use and development also change over time, which can impact exposure and risk to infrastructure. It is unclear how these changes to the landscape will be incorporated into underlying data the RMAT Tool relies on. For example, the RMAT Tool relies on data from the MC-FRM for both exposure and design standard recommendations, but the MC-FRM limitations state: *The landscape of the*

¹ [SECTION 4: CLIMATE RESILIENCE DESIGN STANDARDS](#)

² [SECTION 3: PRELIMINARY CLIMATE EXPOSURE & RISK SCREENING](#): Refer to Table 3.4. Preliminary Climate Risk Rating Relationship Matrix (based on Overall Project Preliminary Exposure Score & Asset Criticality Score)

*model is based on topography and bathymetry conditions at the time of model mesh creation (2016-2017), but anthropogenic features are constantly changing and evolving. As such, if a flood protection project was constructed after the model mesh creation, it is unlikely that it is included in the MC-FRM, and therefore inaccurate flooding risk may be represented within the model for that area.*³ As indicated, any new development or topographical changes since 2017 are not accounted for in the MC-FRM; the data are becoming increasingly outdated, which increases potential for misinformation.

Additionally, the MC-FRM is a proprietary model, which is completely owned by a private consultant, though some of the outputs have been made public. With this in mind, requiring use of a static proprietary product (e.g. MC-FRM) for minimum analyses is not effective public policy, particularly when it is unclear how changes in topography and development will be incorporated. The model does not have a report or peer reviewed methodology available, and there is no ability for applicants to assess the accuracy of the MC-FRM or assumptions built into the model. Without transparency, how can applicants challenge the results of the MC-FRM to justify not meeting Tool recommendations?

- The RMAT Tool outputs are provided only at the “asset type” (aka “Transportation”) level based on criticality and useful life. However, Transportation infrastructure is designed to different annual exceedance probabilities (return periods) based on classification; Bike Trails/Shared Use Paths have a much lower return period (10-yr) than the Interstate (100-yr). The RMAT Tool doesn’t distinguish recommendations at this asset sub-type level. Industry design manuals, such as MassDOT’s Bridge Design Manual, distinguish annual exceedance probabilities by the Hydraulic Design Flood, Scour Design Flood, and Scour Check Flood; and requires that hydraulic performance be evaluated for a range of return periods from the 50% (2-year) to the 0.2% (500-year). Having a range of values associated with different return periods helps applicants assess a risk profile for infrastructure projects. The RMAT Tool output only provides a projected value for one return period, not a range of return periods. Whether that value is used as a “check” event or a “design” event should be left to the applicant based on project and site specific risk profile.

What is justifiable?

The straw proposal notes that project proponents “must provide justification” if a project will not meet the RMAT Tool recommendations. This goes beyond using the outputs as a screening tool and implies that the RMAT Tool recommendations are a standard for design and that applicants will need to demonstrate why that standard is not achieved. Considering the terms and conditions and limitations of data/relationships of the RMAT Tool, **the MEPA Office should clarify what is meant by “If project will not meet Tool recommendation, must provide justification.”** We encourage the MEPA Office to consider strategies beyond “overdesign” and “overbuild” in the updated policy language, such as designing and preparing for rapid infrastructure recovery. This approach is encouraged by the Commonwealth’s 2023 ResilientMass Plan which defines Climate Resilience as *“The ability to prepare for, recover from, and adapt to climate change and associated impacts.”*

³ [SECTION 3: PRELIMINARY CLIMATE EXPOSURE & RISK SCREENING](#): Refer to section 3.3 Additional limitations regarding the Massachusetts Coast Flood Risk Model (MC-FRM).

Tying mitigation requirements to outputs

One of the indicators for extreme heat exposure in the RMA Tool is the absence of tree canopy (<40%) or presence of impervious surfaces (>50%). The straw proposal requires additional mitigation measures for tree clearing and creation of impervious area for projects that meet or exceed this threshold. The documentation for the selection of these thresholds is not published, but it reflects the results of the 2019 study by Zitner et al. called out below. As indicated by the study, cooling benefits by increasing tree canopy are not achieved unless a project proponent is able to increase percent tree canopy cover greater than 40%. Trees are an important environmental resource, and provide localized shade, evapotranspiration, and stormwater management benefits. However, there are few projects in which tree canopy that was already less than 40% can be increased above 40% to reduce extreme heat exposure and impacts. Mitigating extreme heat should be based on the properties of the existing site, such as impervious surface, vegetation, and material properties (albedo), as well as the function of the site. For example, planting trees on a capped hazardous waste landfill, atop flood control structure, or along a rail corridor may increase risk to the environment and surrounding communities. For instance, trees are not permitted on flood barriers because of their root systems; if trees are uprooted during a storm event, it may result in a breach and failure of the barrier. We encourage the MEPA Office to focus on heat mitigation efforts that will have the greatest impact and overall benefits to the community, particularly environmental justice (EJ) populations.

Why 40% Tree Canopy? A 2019 study conducted by Zitner et al. examined the effects of canopy cover and impervious surfaces on air temperature in the urban environment. The authors found that the relationship between canopy cover and temperatures is negative and non-linear with temperatures decreasing more rapidly as canopy increases, with the greatest cooling where canopy cover exceeded 40%. Figure 2 from the study shown below illustrates the “tipping points” where temperature anomalies change with percent canopy and impervious surface. This is not referenced as the rationale for the threshold in the RMA Tool, but understanding the source and reason for the 40% threshold in the RMA Tool’s exposure screening impacts the decisions for site-specific heat mitigation. For example, unless a proponent is able to increase percent tree canopy cover greater than 40%, the temperature benefits are minimal based on this study.

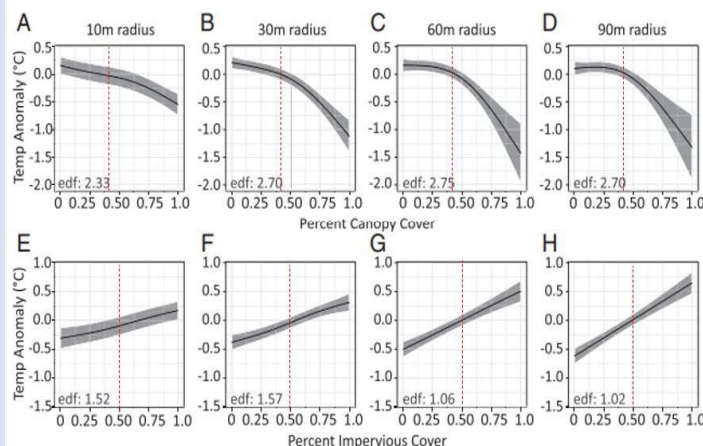


Fig. 2. Estimated smooth curves for the effect of increasing canopy cover (A–D) and impervious cover (E–H) within a surrounding radius of 10, 30, 60, and 90 m on daytime summer air temperature in Madison, Wisconsin. Black lines represent the mean, and shaded areas represent ± 2 SE, both averaged across 100 models each containing 1% of the data. Mean and SEs were generated using type “terms” in mgcv, such that SEs returned for smooth components include uncertainty about the intercept/overall mean (31). Edf represents effective degrees of freedom, averaged over all 100 models.

As a general note, the terminology used when requiring further analysis of resiliency measures has significant impacts to the design process for project proponents. For example, recent certificates issued by the MEPA Office have been inconsistent when using “accommodate” or “attenuate” when requesting information about the resiliency of a stormwater management system to future storm events. However,

stormwater attenuation is the process by which peak flows from precipitation are reduced and runoff velocities are slowed to pre-construction conditions. This differs from stormwater accommodation, which is an ambiguous term, but can be interpreted to convey flows greater than the design event without significant damage to the system. **Exceedance is not synonymous with failure and/or damage.** These subtle distinctions significantly impact the design process.

In summary, we offer the following comments for your consideration:

- The RMAT Tool terms and conditions state the intent and limitations of using the RMAT Tool. MEPA's straw proposal substantially changes the intent of the RMAT Tool, and these changes should be evaluated by all members of the RMAT. Terms and conditions of using the Tool should be revised accordingly.
- The limitations of the underlying data and relationships built into the Tool should be closely considered by the MEPA Office as updates to the 2021 Interim Protocol are drafted, both in terms of minimum analyses and mitigation requirements based on the outputs.
- The MEPA Office should clearly define what is meant by "If project will not meet Tool recommendation, must provide justification" in drafting updates to the 2021 Interim Protocol. What does it mean to meet or not meet a recommendation? What will be considered justifiable given the RMAT Tool limitations?

Thank you for the opportunity to provide early input on MEPA's straw proposal. We are grateful for MEPA's leadership and proactive approach to planning for anticipated climate change impacts. We welcome the opportunity to engage in further discussions with MEPA on this topic. If you have any questions, please don't hesitate to reach out to Julie Eaton Ernst, PE (jeatonernst@hntb.com) or Page Czepiga (pczepiga@hntb.com).

Sincerely,

Mark
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