Colorado Front Range Special Wind Region Study Request for Proposal

The Structural Engineers Association of Colorado (SEAC) is issuing this Request for Proposal for a wind study to update the boundaries of the Colorado Special Wind Region (SWR) and to map the wind hazards within this region consistent with the methodologies of ASCE 7.

Background to Study

The Front Range of Colorado contains a SWR due to the downslope "Chinook" winds it experiences. SEAC has previously provided guidance on suitable design wind speeds for the northern portions of the Front Range and west to the Continental Divide in Colorado. The original analyses used to develop this guidance were performed by Jon Peterka of Cermak Peterka Petersen, Inc. and published as the Colorado Front Range Gust Map in 2006. This work was based upon the provisions of ASCE 7-05 and hence concentrated on strength design mean recurrence intervals of less than 100-years. With the adoption of ultimate design-level wind hazards in ASCE 7-10, the wind speed maps were updated to provide values for longer mean recurrence intervals, as introduced in the 2013 Colorado Front Range Gust Map – ASCE 7-10 Compatible, published in 2013. This update was based upon simple correction factors used to scale the wind speeds between varying recurrence intervals, which are likely to be conservative for the downslope winds that the SWR addresses. The associated wind speed contour geodata has since been incorporated into the online ASCE 7 Hazard Tool.

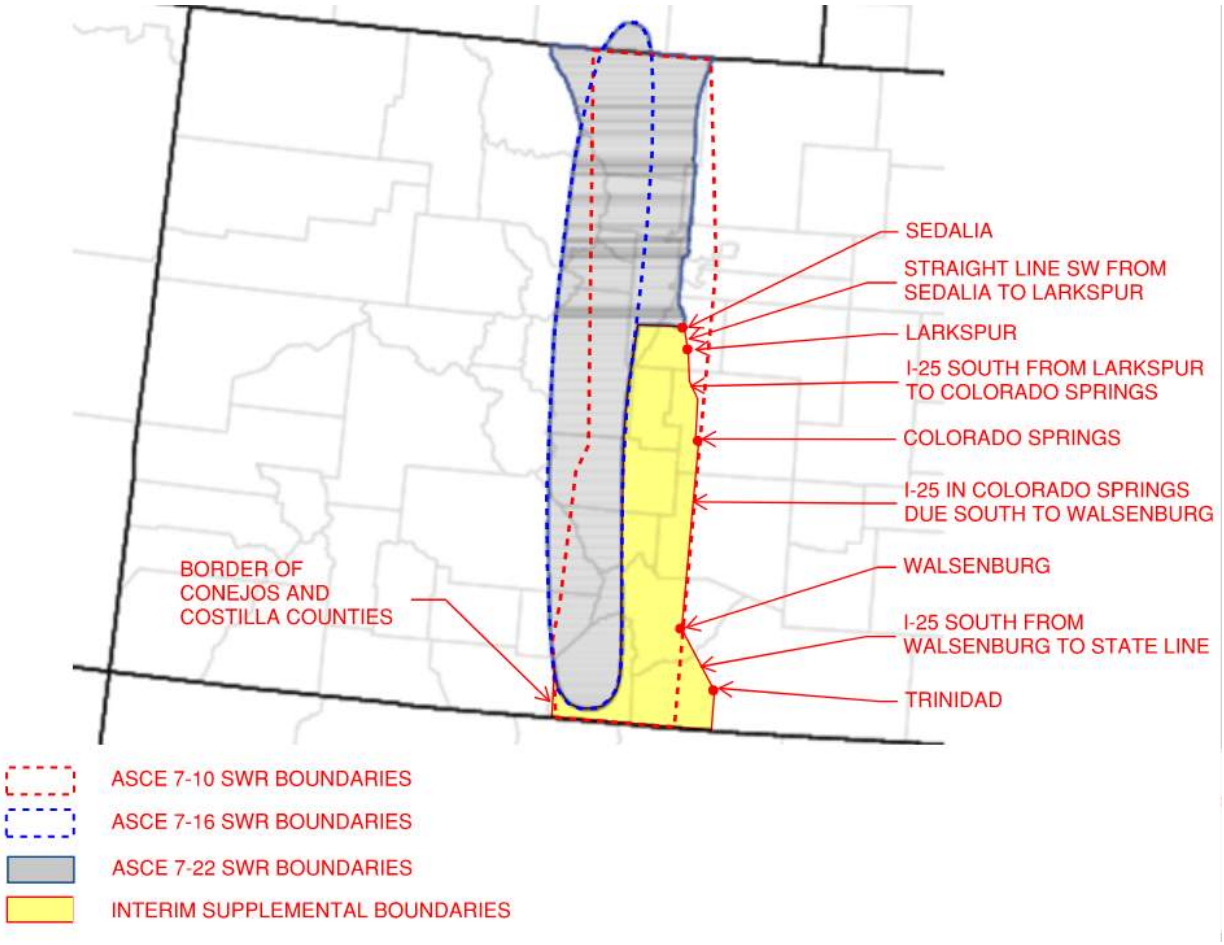
The scope of the Colorado Front Range Gust Map extended geographically from the Continental Divide east to Denver and from the Wyoming state line south to about Castle Rock—only 30 miles south of Denver—representing only about half of the area of the SWR. No regional wind climate study has ever been performed to assess the wind hazard over the southern half of the SWR, leaving those jurisdictions uncertain what wind speeds to specify for design. Additionally, graphical updates in ASCE 7-16 inadvertently moved the SWR too far west into the foothills, leaving out many of the known regions of elevated Chinook winds. Revisions to the SWR boundaries in ASCE 7-22 corrected only the northern front range, leaving out impacted areas to the south including Colorado Springs and Pikes Peak. Finally, there has been no published research to date documenting whether, or to what extent, Colorado's Chinook winds are correlated with drifting of snow. This question is now a topic of uncertainty with the incorporation in ASCE 7-22 of a "winter windiness" factor, the mapping of which did not incorporate any weather stations located within the Colorado SWR.

Therefore, SEAC has identified it as a pressing need to commission a wind climate study that will establish meaningful and accurate boundaries for the Colorado SWR and to develop reliability-based design wind speed contours covering the whole of this region. To fund this significant effort, the SEAC Wind Committee applied for, and was awarded, a FEMA BRIC Grant in 2024 in partnership with the Colorado Department of Homeland Security and Emergency Management. This project

was supported by grant #23BRIC25-SEAC, issued by the Colorado Division of Homeland Security and Emergency Management. This grant will provide up to $150,000 and seventy-five percent of the funding for the proposed study with the remaining twenty-five percent of matching funds and in-kind support being provided by SEAC, its members, and other donors.

Scope of Study

The figure below illustrates the evolving extents of the Colorado SWR, along with the SEAC Wind Committee's tentative supplemental boundaries, for reference by engineers and building departments in the interim until this comprehensive study can be completed. The ultimate geographical extents will depend upon the outcome of the study's analysis of the regional wind climate and where it is determined that the wind hazards merge with the mapped values of ASCE 7.



The base scope of the study is as follows:

1. Acquire, process, and validate the available meteorological data from weather stations around the Colorado SWR.
2. Perform data analytics, statistical fitting, modeling, and verification to determine reliable estimates of mean recurrence interval extreme value wind hazards.

3. Determine the appropriate geographical extents of the SWR where wind hazards merge with the mapped values in ASCE 7.
4. Within the identified SWR boundaries, provide wind speed contours for the range of MRIs consistent with those included in ASCE 7, and associated geodata suitable for integration into the ASCE Hazard Tool. Review the previously published Colorado Gust Map contours within the area of overlap and investigate any significant deviations in severity or pattern to determine the cause(s) of any discrepancies.
5. Prepare a report summarizing the study's methodology, findings, and recommendations in a format suitable for peer review and publication. Identify and fully explain any significant changes between this and prior studies. Make all necessary data accessible to technical reviewers upon request. Review and respond to technical review comments and make revisions to report, as needed.
6. Compile a proposal for submission to the ASCE 7 Wind Loading Subcommittee for adoption of the revised maps into ASCE 7. Provide support in addressing comments and/or negative votes at Subcommittee and Main Committee stages.

Additionally, if project budget allows, the following scope may be incorporated into the study as an add-alternate service to address winter windiness:

1. Identify representative sites spanning the relevant variations in terrain and meteorological conditions across the SWR for detailed study.
2. Compile and correlate the wind and snowfall data to evaluate the association between winter winds and snowfall generating storms. Reduce and separate the storm data as needed to identify windiness that occurs during and immediately following snowfall events when conditions allow drifting to occur.
3. Evaluate results relative to the snow drift load calculation methodologies of ASCE 7-22 and assess what procedures are needed to provide consistent structural reliabilities for drift loading within the Colorado SWR.
4. If needed, extend and verify methodology geographically and develop maps and/or recommendations that apply across the SWR.
5. Incorporate findings and recommendations into the report for the wind study.

Proposal Requirements

Bidders for this work shall provide the following information in the proposal, which will be used by SEAC in its assessment of the bids.

1. Technical approach to the work

The proposal shall describe the techniques that will be employed in the study, sources of data for the analysis, and other technical background to what is being proposed. The proponent shall ensure that approaches are compatible with those employed in the generation of the wind speed maps currently in ASCE 7. Key deliverables shall be clearly identified. The proposal shall include details on how the proponent intends to navigate the recommendations through the code development process, as well as to facilitate adoption

by authorities and jurisdictions and into local building codes, some of which will be likely to occur in advance of ASCE 7-28 and IBC 2030 adoption.

2. **Experience and staffing**

   The bidder shall describe their experience in all of the aspects germane to successful completion of the project and adoption into local and national standards. Examples of past work in this type of study, where available, shall be provided. Short CVs of up to three key staff members who will conduct the work shall be provided.

3. **Timeframe for completion of the work**

   The bidder shall provide a schedule for the work including dates for key deliverables. In particular, the proponent shall show whether this work can be completed within the timeframes consistent with submission for ASCE 7-28 adoption. If the bidder is unaware of these, SEAC can provide the timetable for ASCE Subcommittee and Main Committee reviews.

4. **Exclusions and limitations**

   The bidder shall note any exclusions and limitations to the scope, approach, and timetable for the work being proposed.

5. **Budget, breakdown, and payment schedule**

   The proposal shall contain a total lump sum fee for the analysis and final submission of results to the ASCE 7 Wind Loading Subcommittee and Main Committee. The add-alternate scope of work for the addition of winter windiness to the study shall be provided as a separate lump sum fee. The bidder should provide a proposed payment schedule based on milestones and deliverables.

SEAC involvement during project

The SEAC wind committee will appoint a working group to oversee the project. The first role of the working group will be to answer queries on the above RFP followed by the selection of the successful bidder. The selection will be done on a weighted scoring system based on the five proposal requirements above and how they are being met by the proponents. Thereafter, the working group will negotiate a contract with the successful bidder, process requests for payment, ensure that deliverables are meeting the project intent, and will work with the successful bidder on the technical review and adoption process for local and national codes and standards.

Timetable for proposal and award

Issue of Request for Proposal:	1 April 2025
Pre-Proposal Web-meeting:	8 April 2025, 11am
Due date for queries on RFP:	11 April 2025
Due date for response to queries by SEAC working group:	15 April 2025
Proposal due date:	18 April 2025
Issue of queries from working group to bidders:	25 April 2025

Response from bidders to queries:	30 April 2025
Award of project:	2 May 2025

Submissions are due by 5 pm on the dates noted above. All time references are to Mountain Daylight Time. Submissions and correspondence shall be addressed via email to Jordan Jarrett, SEAC President (president@seacolorado.org).

Limitations

This contract is contingent upon third party reimbursement. Grant funding for this project was awarded by FEMA in 2024 and remains allocated to the project at this time per the Colorado Department of Homeland Security and Emergency Management (CO DHSEM). Applications for payment will be reviewed and processed by SEAC and filed with CO DHSEM for reimbursement. Payments by SEAC to the consultant shall be contingent upon receipt of reimbursement for 75% of total costs from CO DHSEM, and under no circumstances shall SEAC's liability to the consultant exceed the allocated amount of our matching funds. SEAC reserves the right to pause or terminate the work at any time should funds become unavailable and commits to inform the consultant immediately on receipt of any communications from CO DHSEM regarding potential interruption of the funding.