SEAW Wind Engineering Committee	**WHITE PAPER WEC #3-2025**

ASCE 7 Special Wind Regions in Washington State	**Date: January 24, 2025**
ABSTRACT: This white paper summarizes *Special Wind Region Study – Washington State and Columbia River,* a report by CPP Wind Engineering Consultants, Inc., dated 01 August 2022, and proposes revisions to the Special Wind Regions in the State of Washington. A reconfiguration of the Special Wind Region boundaries, and recommended design wind speeds for use within those boundaries is included. (Referenced chapter and section numbers, unless noted, are specifically for both the ASCE 7-16 and 7-22 editions. In this White Paper they will be referenced as ASCE 7-16/22).	**Task Group Members:** *Scott Douglas, P.E, S.E., Chair* *Don Scott, P.E, S.E.* *Russell Larsen, P.E., S.E.* *Jeff Dragovich, P.E., S.E*

COMMITTEE MISSION STATEMENT:

- *Provide guidelines for wind design and analysis issues in the Standard that are not completely clear.*
- *Provide guidance for wind design and analysis for conditions and methodology which are not in the Standard.*
- *Participate in the ICC/ASCE 7 code and standard processes to monitor/testify on wind design and analysis issues.*

The recommendations in this White Paper represent the opinion of the Task Group and the Structural Engineers Association of Washington Wind Engineering Committee (SEAW WEC). It is intended for use as a design aid reference by engineers and building officials in conjunction with their own judgement and actual project design requirements and assumptions.

I. ACKNOWLEDGMENTS:

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II. INTRODUCTION & BACKGROUND:

In 1972 the first national consensus wind speed maps and design load criteria were published as ANSI A58.1-1972. The next edition of the standard, ANSI A58.1-1982, added Special Wind Regions (SWRs). The SWRs indicated the presence of areas on the wind speed map where typical mapped design wind speeds may be, per ASCE 7-16/22 Section C26.5.2, "*substantially higher than the values indicated on the map."* It is believed these SWRs were determined by a meteorologist on the committee, without the benefit of in-depth data analysis. In 1988, ANSI 58.1 became ASCE 7-88. There have been eight subsequent editions of ASCE 7, the most recent being ASCE 7-22. Over the years, with additional data, research, and methodologies, significant wind related revisions and additions have been made to each edition. One general exception is the SWRs. The criteria and corresponding SWRs for Washington State that were originally published in ANSI A58.1-1982 are essentially unchanged in ASCE 7-16/22.

III. COMMENTARY:

ASCE 7-16/22 Section 26.5.2 for **Special Wind Regions** states: *"Mountainous terrain, gorges, and special wind regions shown in Figure 26.5-1* [the Basic Wind Speed Maps] *shall be examined for unusual wind conditions. The Authority Having Jurisdiction shall, if necessary, adjust the values given in Figure 26.5-1 to account for higher local wind speeds. Such adjustment shall be based on meteorological information and an estimate of the basic wind speed obtained in accordance with the provisions of Section 26.5.3."*

ASCE 7-16/22 Section 26.5.3 for **Estimation of Basic Wind Speeds from Regional Climatic Data**

states: *"…regional climatic data shall only be used in lieu of the basic wind speeds given in Figure 26.5-1 when (1) approved extreme-value statistical analysis procedures have been used in reducing the data, and (2) the length of record, sampling error, averaging time, anemometer height, data quality, and terrain exposure of the anemometer have been taken into account."*

SWRs in Washington State are identified in ASCE 7-16/22 Figure 26.5-1 along the Pacific Coastline, along the north coast of the Olympic Peninsula, and along the western extents of the Columbia River. This is indicated by crosshatching on ASCE 7-16/22 Figure 26.5 (See Figure 1).

These SWRs are predominately in rural areas of the state where the county government is the Authority Having Jurisdiction (AHJ). These AHJs have neither the resources nor budget to determine higher local wind speeds in conformance with the requirements of ASCE 7 Section 26.5.3. Therefore, SWR wind speeds were likely determined by the individual AHJs as estimates based on local knowledge and experience. As a result, the current SWR wind speeds independently established by the State of Washington AHJs are not complete or consistent from county to county.

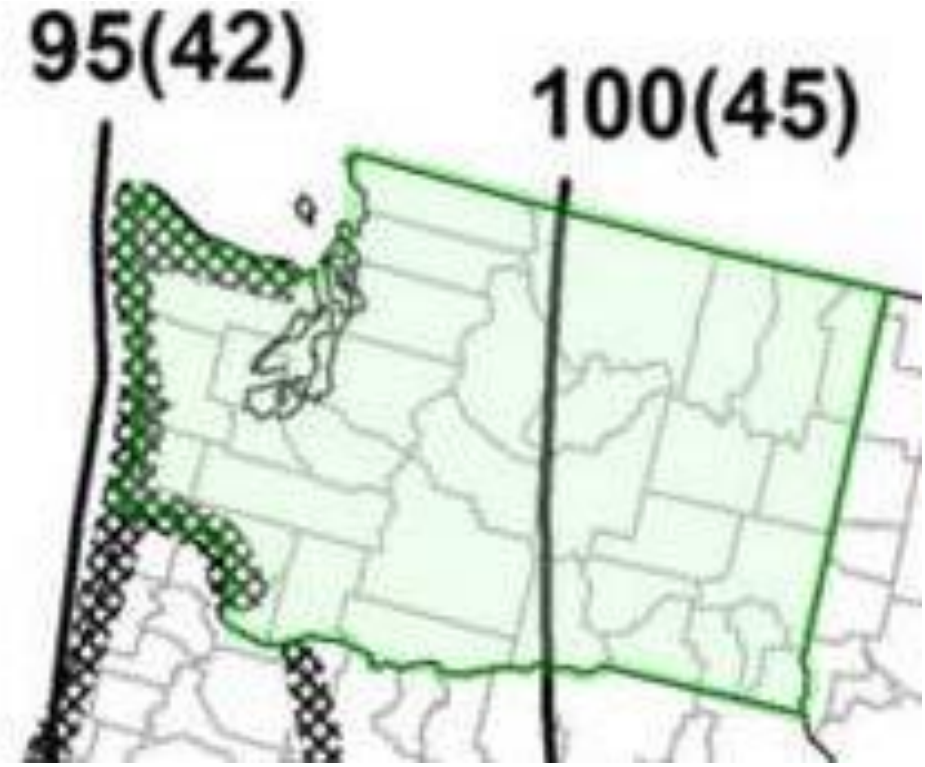

Figure 1 – per ASCE 7-16/22 Figure 26.5-1B

Recently, Colorado, Hawaii, and Kern County, California have commissioned studies that have established specific basic wind speeds and boundaries for SWRs in their jurisdictions. The SWR wind speeds determined by these studies have been included per ASCE 7-22 Sections 26.5.1, 26.5.2, and Figure 26.5-1 as part of the ASCE Wind Design Geodatabase. Based on the results of those studies, the SEAW WEC determined a similar study would be advantageous, and bring clarity to the Washington State SWRs. This would be the first review since the 1982 creation of the SWRs in Washington State.

The SEAW WEC commissioned CPP Wind Engineering Consultants, Inc. of Windsor, Colorado to

perform a study of regional climatic data influencing the Washington State SWRs. The analysis would result in recommendations for wind speeds in the SWRs for Washington State in conformance with the provisions of ASCE 7-16/22. CPP is a nationally recognized wind engineering consultant, has performed similar work for SWRs in Colorado and California, and has been involved in the peer review of the ASCE 7-16/22 wind maps. CPP's final study and report recommendations are included in Appendix A.

IV. RECOMMENDATIONS:

The SEAW Wind Engineering Committee endorses the recommendations in CPP's August 1 report, and advocates for their adoption by the AHJs within the Washington State SWRs. The Wind Engineering Committee also recommends that the Washington State Building Code Council review and adopt CPP's recommendations at the State level, and that the revisions be submitted for approval and inclusion in ASCE 7-28. It is anticipated that inclusion in ASCE 7-28 will be per the Wind Design Geodatabase and Figure 26.5-1 Footnote 6.

Specific recommendations for Washington State developed by CPP and endorsed by the SEAW WEC are:

- An SWR is not warranted along the east portion of the north coast of the Olympic Peninsula, including Jefferson County and the portion of Clallam County east of longitude -124.00. Wind speeds should follow the Risk Category design speeds per the ASCE 7-16/22 ASCE Figure 26.5-1 wind maps.

- An SWR is not warranted along most of the Columbia River, including the counties of Walla Walla, Benton, Klickitat, Skamania, Clark, Cowlitz, and the portion of Wahkiakum County east of longitude -123.33. Wind speeds should follow the Risk Category design speeds per the ASCE 7-16/22 ASCE Figure 26.5-1 wind maps.

- The SWR along the Pacific Coast should be reconfigured as identified in Figure 2 to include the portion of Clallam County west of latitude -124.00, the portions of Jefferson County, Grays Harbor County, and Pacific County within 15 miles of the Pacific coastline, and the portion of Wahkiakum County west of longitude -123.33. Recommended design wind speeds in the revised SWR are presented in Table 1 below.

Table 1 –Recommended SWR Wind Speeds Along Washington's Pacific Coast

Risk Category (MRI)	Basic Ultimate Wind Speed (mph)
I (300 years)	115
II (700 years)	120
III (1700 years)	130
IV (3000 years)	135

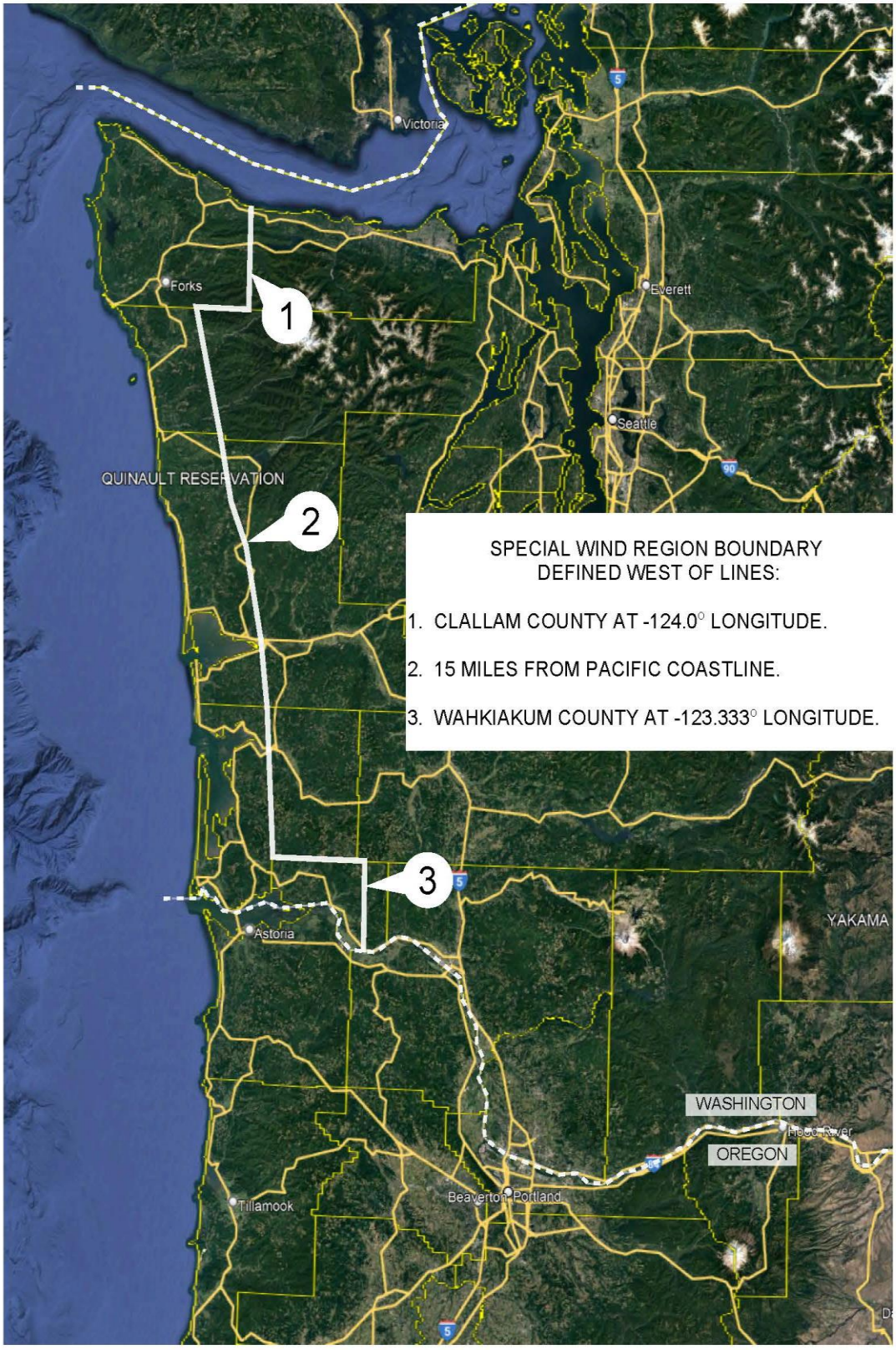

Figure 2 – Recommended Washington State SWR Boundary

APPENDIX A

SPECIAL WIND REGION STUDY
WASHINGTON STATE AND COLUMBIA RIVER

BY CPP, INC.
01 AUGUST 2022