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Interactive comment on "Design and analysis of a spatially heterogeneous wake" *by* Alayna Farrell et al.

Anonymous Referee #2

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The submitted manuscript outlines a modification to the FLORIS package to allow for heterogeneous "freestream" flow conditions at each turbine in the wind farm, i.e. heterogeneous wind speed, direction, and turbulence intensity at each turbine location if no turbines were present. Improving wake models in heterogeneous flow, where wake model assumptions break down, is critical for the design and controls communities, and therefore the subject matter is of relevance to this journal. While this referee recognizes the challenge of formulating consistent engineering models which satisfy key conservation equations, I have some concerns about the derivation of the heterogeneous wake model which should be revisited and articulated by the authors, as this would establish confidence that the newly proposed method could be applied in a general model setting. Further, the test problem shown lacks enough detail to be

replicated by readers and must be significantly expanded in detail and in explanation, as there are occurrences of model success and failure. Since I believe this model has the potential to be useful to the community, but the manuscript submitted should be modified significantly, I recommend a major revision.

Please also note the supplement to this comment:
https://www.wind-energ-sci-discuss.net/wes-2020-57/wes-2020-57-RC2-supplement.pdf

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