



EGUsphere, referee comment RC1
<https://doi.org/10.5194/egusphere-2022-90-RC1>, 2022
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Comment on egusphere-2022-90

Anonymous Referee #1

Referee comment on "An algorithm for deriving the topology of belowground urban stormwater networks" by Taher Chegini and Hong-Yi Li, EGU Sphere,
<https://doi.org/10.5194/egusphere-2022-90-RC1>, 2022

This paper presents a novel algorithm for deriving below-ground urban stormwater networks using graph theory concepts. The paper is well written, well-articulated, and presents application to both urban hydrologic modeling and broad Earth system modeling. Although the manuscript is heavy on the method description, the applicability of the algorithm is clearly illustrated with 4 case studies. I think some shifting of paragraphs are needed to make the paper flow better. I also have some minor comments for the authors to consider.

- It might be helpful to explain what "edge" and "node" mean at the beginning. It was clear later that edge means pipe and node means users but providing some contexts at the beginning would be helpful.
- On page 4, at the beginning, I was confused about line 92-94. It seems counter-intuitive that higher weight results lower weighted BC value. Also, "a higher weight suggests a larger resistance to water flow and thus a lower flow rate." This part also confuses me. If the pipe is made out of the same materials, how will a higher weight lead to larger resistance to water flow? Is it because the length of the pipe is longer? If that's the case, then the pipe should be included because of its importance, right? I think the weighting process needs to be better explained up front to avoid confusion.
- On page 8, bullet point 8, "those components that are unreachable after converting the network to an undirected graph by ignoring edge directions", did you check if these pipes are actually not important edges? How rigorous is this approach?
- I got a lot of questions when I saw Figure 5. For example, I wonder how pipes sizes are assigned based on BC and permissible min/max diameter. I found out that these were explained later in the manuscript. I think some indications directing the readers to the section where these are explained would be helpful.
- On page 11, line 204, "assigning two lanes to those road types not listed in Table 2", why?
- On page 12, line 216, maximum discharge for a pipe when depth of water is flowing at 94% of diameter, not full!
- In table 3, what does the LULC number mean?
- On page 20, in table 6, the last column appeared for the first time without giving any context. It was explained later in the manuscript, but some explanations are needed

when it first appeared.

- On page 25, I don't see any drainage pipes captured for the center of the city. Why is that the case?
- The first sentence in Introduction does not flow well. Please revise.
- Is Figure 1 an original creation or is it obtained from other sources? Please ensure that IP is not infringed.