



FLOOD MITIGATION THROUGH ROAD DESIGN

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Link to Digital Portfolio



Impact

This project will impact urban wellness as reworking the current drain systems will lead to faster flood disbursement and in turn, a faster and safer recovery from natural disasters in urban areas.



Our Idea

We aim to mitigate the effects of urban flooding by enhancing the drainage capacity of roads. This offers two primary benefits. First, it allows more water to exit the city, thereby decreasing the overall level and duration of flooding. Second, it improves the navigability of roads during floods, facilitating evacuations and enabling first responders to conduct rescue operations more efficiently.

Our Design and Feedback

Our prototypes use a variety of grate systems to greatly increase water flow from the streets to the drainage systems while only needing to destroy sections of road and add metal, leading to relatively low carbon emissions and does not require the creation and implementation of new infrastructure or concrete.

Our user gave feedback and constructive criticism which will be implemented to enhance our future iterations and models to reduce flooding. These included reducing the amount of change needed in infrastructure to increase feasibility, as well as considering road stability in real life scenarios when creating our designs.

Citations

Wang, L., Cui, S., Li, Y., Huang, H., Manandhar, B., Nitivattananon, V., Fang, X., & Huang, W. (2022). A review of the flood management: from flood control to flood resilience. *Helion*, 8(11), e11763. <https://doi.org/10.1016/j.heliyon.2022.e11763>

Mustafa, A., Szydłowski, M., Veysipanah, M., & Hameed, H. M. (2023). GIS-based hydrodynamic modeling for urban flood mitigation in fast-growing regions: a case study of Erbil, Kurdistan Region of Iraq. *Scientific Reports*, 13(1). We aim to mitigate the effects of urban flooding by enhancing the drainage capacity of roads. This offers two primary benefits. First, it allows more water to exit the city, thereby decreasing the overall level and duration of flooding. Second, it improves the navigability of roads during floods, facilitating evacuations and enabling first responders to conduct rescue operations more efficiently.

Conclusions and findings. (n.d.). <http://www.disastersrus.org/katrina/senatereport/KatCon.pdf>

Research Question

How might we mitigate urban flooding in a way that is feasible to implement and does not generate excessive greenhouse gas emissions?

Criteria for Success

- Easy to Implement
- Low to No Carbon Emissions
- Structurally Sound

