

Research Proposal

Safety of Fill and Subgrade as Hydraulic Storage

Problem Title. Can fill areas, highway subgrades, and roadsides be used for stormwater storage without presenting significant risk to highways?

Problem Statement. In areas where right-of-way is not available or affordable, stormwater storage in the highway subgrade starts to become economically feasible. Wet vaults have been used for that purpose for many years, but wet vaults have no infiltration capacity. Many parking lots are being constructed with pervious subgrades that can store runoff either for infiltration or detention. Some have wondered if highways can be constructed with similar pervious subgrades, but are concerned that long-term subgrade saturation may affect the structural stability of the subgrade.

An associated question that could be addressed by this proposal:

If subgrade stormwater storage is technically feasible, is it also cost-effective relative to watershed-based flow mitigation?

Literature Search. This is a relatively new research area. Pervious pavements have been used in many states and all designs include detailed subgrade preparations to accommodate long-term saturation and provide storage for infiltrated runoff. It is likely that there are limitations on slope/soil types that are needed to prevent subgrade failures. These limitations need to be quantified for highway planning purposes.

Research Methods. Use WSDOT's participation in NCHRP project 25-26 to promote an evaluation of geotechnical concerns relative to subgrade saturation. This project is fully funded and subgrade saturation concerns were identified in the project's scope of work. Review applicable technical literature for relevant developments.

Partnering Opportunities. Few, if any at the local level. Nationally there are opportunities through NCHRP 25-26.

Estimate of Costs and Research Duration. Estimated costs have not been developed, but are expected to be between \$50,000 and \$100,000.

Urgency, Payoff Potential, and Implementation. Potential cost savings for flow control facilities are substantial if subgrade storage is determined to be feasible.

Research Proposer

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Research Monitor (to be assigned, as needed, by the research program administrator)

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