



Redesigned Storm Water Management System for the Portage Lakefront

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Solving the Problem

Before we could solve the problem, we needed mathematical proof that the problem was the drains. To do this, I went through the INDOT manual on drains and inlets. Through a series of equations and givens based upon the location, I was able to construct a table showing what was happening at each inlet.

Introduction

Problem: Erosion of the sand dunes at the Portage Lakefront.

Cause: The current storm water management system is not capable of handling the peak water flows.

Goal: Evaluate the current system to identify the flaws. Design a new system that is capable of handling the water flow.

The Problem: Erosion Damage to Dunes



1 Erosion of the Dunes

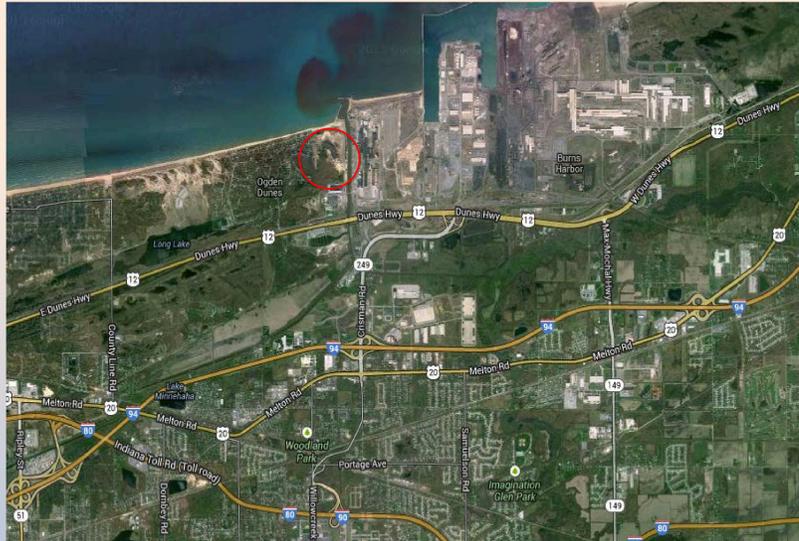


2 Water main exposed by erosion



3 Erosion damage to sidewalk and stairway leading to the waterside boardwalk.

Location



Location of Portage Lakefront

The arrows show the location of inlets to dry wells.

The circles show the areas of greatest concern.

The numbers correspond to the numbers next to the pictures of the problem areas



Existing street drain to dry well.

A dry well is simply a hole in the ground with rocks in the bottom

Dry well capacity diminished by sand inflow in the absence of frequent maintenance

Results

- The spread of the water on the roadway during heavy rainfall could be as much as 10 feet. The allowable spread is 6 feet.
- At some inlets, the amount of water bypassing the inlet could be as much as 1 cubic foot per second
- The drains are not large enough to handle all of the water.

Proposed Solutions

- Insert a ditch drain at the bottom of the hill.
- Construct more inlets passed this ditch drain.
- Several of the inlets will be connected and drain into a field off of the road, rather than a dry well.
- The stairs will be lifted and a new structural support wall will be placed in.
- Rocks will be placed under the stairway to help stabilize and prevent erosion.

Conclusion

- Schoolwork and labs can only show you so much of what an engineer actually does. It was a tremendous experience to actually work with an engineer like Mr. Perez Maldonado. The amount of multitasking and project management that is needed in engineering can only truly be learned through an internship such as the one I had this summer. I truly appreciate the opportunity to be a part of the Glisten organization.

Acknowledgements

EPA region 5 grant and Valparaiso University Chemistry Department gift fund.

