



PROJECT SUMMARY

Organization:

Paulus, Sokolowski, & Sartor, LLC

Solution:

Civil Site Design

Location:

New Jersey, USA

Project Objective:

- Provide a park-like setting geared to family entertainment and broad-based motorsports education
- Proper sizing of six infiltration basins without impacting the race track
- Piping of a very large open drainage ditch
- Meet regulatory conditions from the FAA and NJDEP

Products used:

PondPack®
StormCAD®
FlowMaster®
HEC-RAS

FAST FACTS

- The stormwater project was required to meet stringent conditions set by the New Jersey Department of Environmental Protection (NJDEP) and the Federal Aviation Administration (FAA)
- Bentley products were chosen for the design of this project because of their ability to perform iterations of a multitude of calculations with greater ease and speed than competitors' software

Bentley's Stormwater Modeling Helps Paulus, Sokolowski, & Sartor, LLC Design Thunderbolt Raceway Motorsports Park's Stormwater Systems

The New Jersey Motorsports Park will be a three-phase multi-faceted complex with a 4.01 mile raceway as its focal point. Phase I, which is essentially about creating a motorsports resort, will have design features and characteristics similar to those of the legendary Virginia International Raceway that opened in southern Virginia in 1957.

PHASE I: CREATION OF A MOTORSPORT RESORT

Engineering of Phase I of the project is complete. Phase I encompasses 507 acres, and will require the movement of approximately 400,000 cubic yards of material as part of the creation of 6 infiltration basins. Stormwater management facilities have been designed and approved by NJDEP in accordance with the Stormwater Management Rule (N.J.A.C. 7:8), following guidelines outlined in the New Jersey Stormwater Best Management Practices (BMP) manual. In addition to the basins, the project employs the use of non-structural stormwater management measures, also known as Low Impact Development (LID) techniques for pre-treatment of stormwater runoff prior to it reaching the basins. Since there is no curbing proposed for the project, impervious areas are disconnected from storm sewers, allowing filtration and removal of pollutants by surface vegetation. Dedicated/deed restricted filter strips of vegetation along the proposed track ensure that these areas will remain as vegetated areas.

The project has received all municipal, county and state approvals. A portion of the property is presently owned by the Delaware River and Bay

Authority (DRBA) as part of Millville Airport (also known as America's First Defense Airport). Sale of this property to New Jersey Motorsports Park requires Federal Aviation Administration (FAA) approval in the form of a Land Release.

PROJECT CHALLENGES

FAA regulations require that all stormwater management basins be designed so as not to attract waterfowl and to drain completely within 48 hours. The biggest challenge was the proper sizing of the 6 infiltration basins without impacting the race track. In addition, in order to be able to construct what will be one of the longest road courses in the United States, it will be necessary to pipe a large drainage ditch which traverses nearly the entire width of property. The drainage ditch conveys 108 acres of runoff from the airport and necessitated 1,760 linear feet of 84" culvert.

SELECTION OF BENTLEY'S STORMWATER PRODUCTS

Bentley products were chosen for the design of this project because of the products' ability to perform iterations of a multitude of calculations with greater ease and speed than competitors' software:

- StormCAD was utilized to size approximately 16,000 linear feet of storm pipe
- The design of six infiltration basins was performed using PondPack
- HEC-RAS and FlowMaster were utilized to design an 84" culvert to pipe an existing drainage ditch

“The program enables the tracking and updating of design information. The coordination between calculation, plan view drawings and profiles is unmatched.”

ABOUT BENTLEY

Bentley Systems, Incorporated is the global leader dedicated to providing comprehensive software solutions for sustaining infrastructure. Architects, engineers, constructors, and owner-operators are indispensable in improving our world and our quality of life; the company's mission is to improve the performance of their projects and of the assets they design, build, and operate. Bentley sustains the infrastructure professions by helping to leverage information technology, learning, best practices, and global collaboration – and by promoting careers devoted to this crucial work.

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The most significant impact came from the use of PondPack. The physical challenges of the site were complicated by the need to satisfy a myriad of sometimes conflicting requirements. The project's stormwater design needed to satisfy the stringent stormwater regulations set by the New Jersey Department of Environmental Protection (NJDEP). Due to the close proximity to the Millville Airport the project also needed to meet the requirements of the Federal Aviation Administration (FAA). The NJDEP and FAA requirements presented an interesting challenge. To meet the groundwater recharge requirement of NJDEP, stormwater needs to remain on site and slowly percolate into the ground. On the contrary the FAA's requirement for stormwater basins is that they must completely drain within 48 hours to deter water fowl from congregating. Detailed infiltration calculations were required for the project to demonstrate that the requirements of both regulatory agencies were met. PondPack enabled these calculations to be performed with ease and efficiency.

Rebecca L. Koze, Project Engineer at Paulus, Sokolowski, & Sartor, LLC, explained: "Throughout the design process I found the Bentley software to be an enormous asset. In particular the ease with which PondPack enabled the infiltration calculations of the six stormwater basins to be preformed is far superior to all the other programs

I have used. StormCAD was utilized in the design of approximately 16,000 linear feet of storm-pipe. The biggest benefit of using StormCAD for storm pipe calculations is the ease with which revisions can be made. Throughout the design process, revisions to the overall project layout were made. By performing the required storm pipe design revisions in StormCAD, a significant amount of time was saved. The program enables the tracking and updating of design information. The coordination between calculation, plan view drawings and profiles is unmatched."

A major aspect of the project design consisted of the piping of an existing drainage ditch; 1,760 linear feet of 84" culvert pipe was designed to accommodate the runoff from approximately 195 acres. PondPack was again utilized to calculate the runoff volume to the ditch.

FlowMaster was then utilized to calculate the culvert size required prior to modeling the ditch in its existing and proposed conditions in HEC-RAS.

NEXT PHASE

It is estimated that project costs for Phase I will be \$40 million and at completion of Phase III will exceed \$100 million. At its completion, the New Jersey Motorsports Park will be a powerful magnet and catalyst for smart growth throughout the Millville and Cumberland County region.



Master plan – Phase 1, 2, and 3.

