

## The Natural Givens

Philadelphia is not an accident. William Penn and his team chose its location wisely. They did so by surveying the Delaware River and some of its tributaries without maps of the region's geology or hydrology. Up the Delaware, at present-day Trenton, New Jersey, lies the river's fall line. There, the river drops in a series of rapids making it impossible for large ships to navigate. Down river, Penn selected a spot on higher ground, easy to reach from the sea but beyond the salt line. Fresh water and access assured, the site offered a bonus as the fall line continues west from the Delaware to the Schuylkill near the current Boat House Row. In 1812, this became the location for Philadelphia's pioneering Water Works. The falls of the Schuylkill also became ideal for mills and for forges and helped birth the Industrial Revolution in North America.

The spot selected by William Penn in 1682 was propitious for a city indeed. Cities or landscapes are not natural givens, rather they are cultural constructs. However, the most successful human settlements are those that take advantage of what nature gives but does not destroy the golden goose in the process.

We now have many advantages William Penn did not: maps of geology and hydrology and other physical, biological, and social information. And, these maps are computerized and can be overlaid on each other to display interactions. We can learn from what nature provides and hopefully give back.

So, what does all this mean for the future of the Philadelphia Energy Solutions (PES) refinery site? I have three suggestions.

- First, a thorough ecological survey of the PES site and its surroundings should be conducted with Geographic Information Systems (GIS) technology. At a minimum, this survey should map microclimate, bedrock and surficial geology, surface and ground water, topography, soils, historical and current vegetation, historical and current wildlife, contaminated places, transportation, utilities, and historical land use. As the PES site is likely to be flooded as a result of climate change-induced sea-level rise, possible changes to the Schuylkill shoreline should be mapped. Similarly, possible changes to the salt line (or, salt front) should be noted.

- Second, an analysis of the opportunities and constraints presented by the PES site should be undertaken. Its major assets should be identified as well as challenges. This analysis should include mitigation and adaption measures for sea-level rise. GIS technology will be helpful in this endeavor.

- Third, based on the survey and analysis, several options for the future of the PES site should be developed and explored. These options should emphasize the natural attributes of the site, provide realistic adjustments to sea-level change, and suggest strategies to build the ecosystem services of the site. These options should help create a sustainable vision for the future, that is, one that balances ecological quality, social equity, and economic development.

Imagine William Penn sailing up the Delaware to the Schuylkill over 300 years after his original visit in a new, modern boat called Welcome after the original. Imagine him exploring the flood plain of the Schuylkill equipped with the mounds of information now available about the PES site. What decisions about its future might he make? Might we make equally smart choices as Penn did for locating the City of Philadelphia in the late 17<sup>th</sup> century with only a fraction of the information available today?

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