COASTAL SMART GROWTH

Low Impact Development Case Study

Town *of* Tyngsborough - *Marla Circle Development*

Highlight: *The Marla Circle five-lot subdivision incorporates Low Impact Development storm-water techniques, a 2.4-kilowatt photovoltaic system for each home, paint with low-toxic fumes, prefinished oak flooring, high-performance furnaces and windows, and Energy Star-certified lighting.*

Why Low Impact Development (LID)?

New development built in a conventional manner can exacerbate the existing problem of stormwater runoff. Oil and soot from vehicles, pet waste, trash and litter, sediment and debris from construction sites, and a mix of toxic chemicals all get washed over the surface of roads, buildings, and lawns into conventional storm drain systems and become a major source of pollution in rivers, lakes, and the ocean.

What LID Practices Were Applied?

Transformations Inc. of Townsend, with the services of GeoSyntec Consultants, completed a five-lot subdivision in Tyngsborough that incorporates Low Impact Development practices, as well as green building materials and energy efficient features that are environmentally responsible.

The plan initially began as a *conventional* five-lot development, but the required stormwater practices of the conventional subdivision consumed the buildable area for the fifth lot. The project was redesigned with LID methods that retained all of the water within the road right-of-way, thereby allowing for development of the fifth single family home. The innovative stormwater practices used in the subdivision include a biorentention cell in the cul-de-sac, rain gardens on each individual property, and swales along the uncurbed road right-of-way. Only in extreme storm events is rainwater directed through an overflow to the town's drainage system.

What Are the Benefits of the LID Practices?

The LID practices and innovative stormwater infiltration system within this five-lot subdivision have benefited the developer, residents, town, and the environment. Specific components of the LID practices and their benefits are as follows:

- The LID stormwater system has eliminated the need for a large stormwater detention pond that would have consumed the area for development of the fifth lot.
- The system has retained and treated a majority of the stormwater on site so that it doesn't burden the town's infrastructure or contribute to local and regional water pollution.
- The narrower streets and driveways slow traffic and reduce paved areas and surface runoff.
- The buildings have been located so as to reduce the length of driveways and sewer and utility lines, minimize lot clearing, and thereby lessen disturbance to the land.

What Type of Operation and Maintenance (O&M) Is Required?

The bioretention cell in the cul-de-sac and swales will require periodic removal of sediments for proper filtration function. Since trees and shrubs have been planted within the cul-de-sac, some routine landscape maintenance will also be required. The town's Department of Public Works has taken on responsibility for this maintenance when the road was accepted by the town. Since the rain gardens are located on private property, they will require maintenance by

the individual homeowners, which will include removal of debris and sediment, re-mulching, and maintenance of the vegetation.

Why Energy Efficient?

Much of the energy consumed by the United States is used for our buildings. According to the U.S. Department of Energy, buildings require 39 percent of the energy used in our nation, and residential buildings account for about 20 percent of that use. This energy goes into both the construction (e.g., resource extraction and transportation) and operation (e.g., heating and cooling) of the building.

In the Marla Circle Development in Tygnsborough, solar panels and grass swales add to the homes' energy efficiency and resale value.

Which Energy Efficient Practices Were Applied?

The Marla Circle project incorporates a 2.4-kilowatt photovoltaic system for each home, paint with low-toxic fumes, prefinished oak flooring, high-performance furnaces and windows, and Energy Star-certified lighting. Because of their outstanding contributions to environmental protection and energy efficiency, Transformations received the 2005 Energy Star Builder Achievement Award in the custom house category. Energy Star qualified homes are independently verified to be at least 30% more energy efficient (based on heating, cooling, and hot water energy use) than homes built to the 1993 national Model Energy Code, or 15% more efficient than state energy code, whichever is more rigorous.

What Are the Benefits of Energy Efficiency?

The green buildings use design techniques, materials, and technologies that minimize the impact on the environment, both in their construction and continuing operation. Specifically, these green buildings can:

- Lower both environmental impact and costs by using sustainably harvested or recycled materials durable enough to last generations.
- Avoid the use of toxic materials and decrease indoor pollutants, as well as minimize construction debris.
- Use design and operational systems that reduce energy and water consumption and lower operation and maintenance costs. The payoffs can accrue to both the environment and the owner.
- Result in an overall better product that sells quickly, easily, and without buyer's remorse.

As further incentive to builders, those that complete Energy Star homes are eligible to receive a $2,000 federal tax credit per unit, in addition to other incentives for heating or renewable energy production. Builders also receive free consulting and training for subcontractors as participants of the program. Buyers may also qualify for energy efficient mortgages.

What Was the Project Scope, Timeline, and Budget?

The project from start to finish occurred within a three-year time period. The first year was spent trying to get approvals for the traditional subdivision plan. Once the project was revised with LID practices, the project took less than two years to complete. The sequence of events was as follows:

- The land owner approached Transformations in November of 2002.
- The engineered plans for the roadway and five-lot subdivision were completed, and the project was submitted to the Planning Board by June of 2003.
- The redesign, with the incorporation of the LID practices, occurred in the late fall and early winter of 2003-2004, and approvals were obtained in the spring of 2004.
- Various legal and bank requirements were met and the closing to purchase four of the lots and the road right-of-way occurred on August 13, 2004.
- Within 13 months, the developer built out the roadway, constructed the five houses, and received the fifth Certificate of Occupancy on September 13, 2005.

The custom-built homes were priced from $439,000 to $489,000, bringing total sales to about $2.2 million. Although costs for engineering and the use of low energy and green features may have been initially higher than a conventional subdivision, many of the innovative measures helped offset these costs. Reduced infrastructure costs were achieved with construction of the LID stormwater practices rather than the large detention basin and with a reduction of pavement on the narrower roadway. Tax credits and five separate grants were also given for use of the solar photovoltaics, which helped the developer offset initial costs. The green homes sold quickly, meaning the developer had lower carrying costs and better bottom-line profits.

Were There Any Obstacles or Lessons Learned?

Due to the unfamiliarity of this innovative development scheme to local officials of Tyngsborough, the project required additional review and much iteration before final approvals were granted by the Planning Board. However, the developer saved a great deal of time and money by meeting with the Planning Board to discuss ideas and gage receptivity before investing in engineered plans. Ultimately, a project that is designed to minimize loss of open space or reduce stormwater runoff can greatly reduce concerns by local officials and citizens. Over time, as planning boards become more familiar with these innovative techniques for Low Impact Development and green buildings, it will be easier and more efficient for project proponents to garner local support.

For more information, contact R. Carter Scott, President of Transformations, Inc.
email rcarterscott@msn.com | *phone* 978-597-0542

Production Notes

written by Betsy Rickards | *designed by* Arden Miller | *project manager* Andrea Cooper

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