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BUILDER

TOLL BROTHERS AND THE ALL-TERRAIN SEWER CONNECTION

As land gets harder to develop, an innovative sewer system comes into focus.

By [Joseph Harmes](#)

Prospectors once again are exploring the Washoe County hills outside Reno, 26 miles from [Virginia City](#) whose silver-rich Comstock Lode made it Nevada's first legendary boomtown. This time it's home builders tapping a vein of high desert encircling one of the nation's fastest growing metros. Indeed, Reno's self-styled moniker of "Biggest Little City in the World" could become obsolete as increasingly it's a destination for affluent homebuyers and tech companies seeking tax advantages and lifestyle benefits, especially Californians.

Some developers, however, find only money pits when, after pushing all their chips into crapshoot investments like topographically formidable land and onerous gravity sewer infrastructure, go bust before building a house. Even Toll Brothers, Inc. (TBI)--a Fortune 500 company and gold standard among the nation's top 10 home builders--saw its hillside development of Ascente (2,600 to 6,300+ square-foot homes priced from \$1.1 million with views of Mount Rose and the Sierra [Nevada](#) range) idled for a decade by potentially multi-million dollar upfront costs for wastewater disposal.

Ascente (in South [Reno](#) and 37 miles from Lake Tahoe) is "a project that we had been looking at for 10 years, trying to work through the entitlement process and actually get a viable plan together," says Kevin Lamond, vice president of land development services at Toll who has been reviewing civil engineering plans for 23 years. "It's a rocky area" with "hard dig boulders."

The "Home Run" Sewer

The majority of the terrain encompassing the region where Ascente is platted has moderate to steep slope inclinations and a very shallow depth to bedrock, sometimes 18-inches or less. A 2017 study of that area called "the rock too hard" and warned "so much blasting is required that a construction project might well be deemed too expensive and risky from a health and safety perspective" making almost impossible developer requirements to preserve a functioning and fragile ecosystem of native plants and wildlife.

"Early on, it was a gravity sewer design," says Lamond, with "deep sewer runs" and two lift stations estimated in 2017 to cost \$2.25 to \$2.46 million. "Ten years later we actually got this job to go through," says Lamond.

"It wasn't until we introduced our low-pressure (sewer) system to say, 'Hey, maybe we're thinking about this all wrong.' We introduced the project to E/One and they were able to take a look at a sewer study for us. The solution and the idea of going shallower on a low-pressure system was a home run, just the depth that gravity was going to introduce to us that we would have paid a premium on. E/One really made Ascente what it is today."

Environment One Corporation (E/One) of Niskayuna, [New York](#) pioneered All-Terrain Sewers (ATS) in 1969. Its installed base of pressure sewers (aka ATS) is found in over 40 countries and U.S. territories on almost every continent and tasked to

operate in any climatic extreme and geological lay of the land. E/One units serve approximately three million end users daily.

The ATS begins with a grinder pump station inside a tank about the size of a refrigerator that is buried in the ground, its lid easily camouflaged with minor landscaping. The primary component is a 1-hp, semi-positive displacement pump.

The pump blends waste into a fine slurry before its robust torque propels it through small-diameter, inflow-and-infiltration-free pressurized pipe buried just below the frost line (reaching distances of more than two miles or even straight up 185 feet) to an existing gravity sewer as well as a force main or treatment plant. The total dynamic head provides a nearly identical flow rate regardless of the network's contours and fluctuating elevations.

The Great Land Rush

The company's "sewer anywhere" philosophy and ATS technology creates value for land considered subprime or hostile to wastewater infrastructure. For decades, E/One nurtured small and medium-sized developers who, unable to access Grade A land, sought to develop more challenging Plan B tracts with challenges ranging from to rock, sand, gravel, silt and clay to undulating landscapes, wetlands, springs, high water tables and crossings, small lots or multiacre homesites, infill lots, remoteness and long distances to wastewater treatment plants, and, notably, septic tank prohibitions on top-dollar parcels near coastlines, lakes and waterways.

Now, even the nation's largest home builders face the same dilemma as optimal real estate becomes scarcer and they too are thinking outside the box. In one instance, Toll developed a former municipal golf course. Another, Charterfield Landing, was the site of an old civil aviation airport.

"Land is getting harder to find that we can develop," says Lamond. "Traditional farm parcels just aren't as available as they used to be so it's become more of a challenge. (In 2022, the U.S. lost 1.9 million acres of farmland, partly because of urbanization expanding into previously rural areas.) In some respects, you're working with trickier sites than we've otherwise had."

That being the case, "E/One's low-pressure sewers can be a developer's best friend in some respects," says Lamond. "Early into the project you have an opportunity to work with the topography and not fight it. You get more creative "

"E/One fills a niche for us on certain projects where the land may be encumbered or difficult to develop," says Michael Richardson, purchasing manager of Toll's Land Development department. "We're not constrained to a gravity sewer lateral in the street. It allows us to move the home anywhere on the building lot that we choose," adds Richardson who launched his Toll career 30 years ago as a surveyor doing layout for construction.

Calculating Costs

"It's hard to pitch low-pressure sewer against a straight gravity job," says Richardson of innovation versus tradition. "One of the first questions we ask is, are public sewer and public water available? Is the rock right? How much earth do I need to move to make a gravity (sewer)? If the answer is yes, there's rock and two, you need to move, we're not afraid of moving hundreds of thousands of cubic yards of fill to grade a site for a hydraulic grade line for sanitary sewer," says Richardson.

"If I have to do both of those and include a pump station on that project, my brain is immediately going to low-pressure sewer," Richardson says. "If you take out the hydraulic grade line for inverts for sanitary gravity and I can go low-pressure sewer, I'm moving less dirt. I'm not encountering rock. I'm not encountering seasonal high ground water," he adds.

"When we have opportunities to rethink about how we are working with sewer we can start to introduce low-pressure to eliminate those pump stations and make the project that much more valuable," says Lamond. "It opens up the land plan so now you have rows that can possibly be moved around, you have a potential lot that you can gain so there really is a benefit there in addition to that."

Comparing costs, Richardson says, "It's regional but (the ATS) works out to be about 40 percent less (than gravity)."

Enhanced by horizontal directional drilling (HDD), ATS pipe installation in shallow and narrow trenches maneuvers under and around existing utility assets and human-made and environmental obstacles at up to 80-percent of upfront costs and sometimes half of total installed expenses.

And with builders, it's all about cash flow.

"There's significant capex (capital expenditure) to build that (gravity) system that's required before you can move your first homeowner into that community," Richardson adds. "Sometimes that station can't run when the first homeowner moves in because there's not enough minimum daily flow to run the station. So, you have to do a pump and haul operation until you have enough homeowners moved in and connected to the system so they can actually run the centralized gravity sewer pumping station."

"With an E/One system. I don't have that upfront capital cost of that centralized pumping station. I can defer my capex on a schedule that equals my building permit schedule, the number of homes they start in a calendar year and, most importantly, the first homeowner moves in, they can turn that system on, they can run it the first day," says Richardson.

Chuck-in-a-Truck

"TBI first used E/One systems in the [Pennsylvania](#) and New Jersey markets in the 1980's," says Chris Nedwick, E/One's national sales development manager. "It's evolved organically over the years and out of necessity. From there sporadic TBI - E/One installations began popping up in places like [Connecticut](#), [Massachusetts](#), [Maryland](#) and [Delaware](#) and beginning in the late 1990's and into the 2000's more adoption began to take place in the Southeast and Midwest."

Today, Toll Brothers' presence has expanded to 60 markets in 24 states. "A good footprint of those overlap with (E/One) low-pressure sewer systems nationally," says Richardson. Toll currently has the ATS "in design and in the approval process" in Pennsylvania (two projects in the [Philadelphia](#) suburbs), Virginia, New Jersey, Southern [California](#) and "the [Florida](#) market, most notably Palm Beach County. It's a new market for us with low-pressure sewers and E/One."

For several decades Toll installed the ATS progressing cavity pump in some developments and low-pressure systems using centrifugal pumps in others, the latter beset with high failure rates. In the 1990s, E/One was called to replace failing centrifugal pumps in Pennsylvania. A decade later, [New Jersey](#). Often, the manufacturer of the centrifugal pumps was not responsive to the failures.

In [North Carolina](#), says Richardson, "There was no value in that project when Chuck-in-a-truck is dropping a pump-in-a-bucket and our million dollar homes are having sewage flooded into their laundry rooms in their basements. You know it's because the pump's not functioning properly. Chuck-in-a-truck is just simply interested in selling equipment and moving on to his next project."

"It couldn't be further from the truth of what E/One does and their long-term commitment to not just [Toll Brothers](#) but to our mutual customers--the homeowners moving into a product," says Richardson. "The house is served by E/One technology, not Chuck-in-a-truck's pump-in-a-bucket of something I could go down to my local hardware store and buy off the shelf. It's simple. It's rudimentary. It'll do the job. But it's going to break pretty quickly," says Richardson.

"E/One's product is a highly-engineered product from the inventors of the technology. I recognize them as the leader in the industry."

Cost efficiencies are furthered with lower operations and maintenance budgets. The ATS' 14-to-35-year life cycle is the best in the industry and one-third to one-half that of gravity. Its average mean time between service calls is 12 years with no preventive maintenance. Service and repair at Toll developments usually is handled by a national network of E/One distributors.

"Their service technicians are the local knowledge experts in the markets that they serve," says Richardson. "That distribution network--the authorized service and sales centers that are recognized by E/One and trained by E/One--it's very important to us that we introduce those distributor partners to our customers."

"Smart Sewer" Technology

Most of Toll's ATS installations routinely include an additional premium: A "smart sewer" E/One Sentry Advisor alarm panel providing sewer system monitoring and protection which can predict service needs by each pump analyzing its own performance and automatically sending alarm conditions to service personnel via SMS text, phone or e-mail.

"It has self-diagnostic capabilities," says Richardson. "The fact that the smart panel has an auto dialer and I can program it to call when it needs service, that's a huge selling point technology," he adds. "That moment often can happen without the homeowners being home or being aware that there is a problem because the equipment will have automatically dialed the pre-programmed service provider to come out to provide that service. And often, the homeowner will never know that they were there."

Richardson describes his job at Toll in simple terms: "We spend money" with an emphasis on "building a quality project with quality brands that bring value to the project. And E/One's brand is emblematic of our brand. I have an obligation to my customers to create value in their home. There is no value with Chuck-in-a-truck pump-in-a-bucket."

"It's very important to us and to our customers that there's a continued level of service not just with the procurement or fulfillment," Richardson says, "but the long-term commitment to our customers buying homes that are served by E/One products."

"Preferred Vendor" Status

To that end, Toll and E/One signed a Mutual Operational Agreement (MOA) in 2019 designating E/One as a "Preferred Vendor" for TBI which "functions as a memorandum to project management and purchasing employees throughout the national organization stating that they should be doing business only with E/One as it serves their best interests," says Nedwick. Additionally, "E/One helps TBI simplify grading and site plans, maximize lot values and unlocks marginal lands making them ripe for development whereas they would not be otherwise."

"Understanding their technology, understanding our challenges, we're able to look at projects with a different lens than we may have thought of before," says Lamond. "The partnerships that we maintain and support, I think that there's a relationship there that allows us to lean on those partners, a relationship that we can explore opportunities going forward, where we can get advisement on where they are in the market. For the mutual benefit of both Toll and E/One, I think it helps the technology grow. It helps the technology speak for itself and allows the product to do well. As far as the partnership with E/One, I think there's a lot of room to grow here," Lamond says.

The MOA is an executed contract where each side agrees to meet certain criteria and responsibilities. "For our part in the MOA we agree to meeting certain incentives and obligations pertaining to deliveries and application related discounts," says Nedwick. "At the end of each year the business volume is calculated and TBI qualifies for an annual rebate which is the norm for vendors who serve the construction industry--especially with contractual or quasi contractual relationships with national and larger players."

"We're a quick pay. We negotiate hard and we're very competitive and I kind of enjoy that," says Richardson.

Toll maintains Preferred Vendor relationships with more than a dozen other companies "that I manage for the land development department," says Richardson. "We want to control costs and we found that we can keep our costs of improved land down when we manage a process ourselves. I do it with playground sets, shade structures, mailboxes, streetlights." In 2024, Toll added a home solar and storage provider.

Preferred Vendors like E/One, Richardson says, "bring value to the project. The concept of the All-Terrain Sewer allows us to build a premium home with a light touch on the land. I used to call the E/One system an alternative system, but now I say it's the appropriate system."

ABOUT THE AUTHOR

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