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UNDER THE CITY

Microtunneling Work Continues To Upgrade Houston's Sewer System

By Mark Babineck

As former President Bush settles into his new home in Houston this month, he will experience a phenomenon not unusual to many of his fellow Houstonians - construction.

Post Oak Lane, the thoroughfare running adjacent to the street on which he will live on the fringe of Houston's exclusive Tanglewood section, will soon be the home to a new sewer pipe stretching under 4,700 feet of the street. Just a few years ago, that would have meant open-cutting a trench and installing the 48-inch diameter pipe.

Because of the narrow right-of-way and a plethora of other utilities already in place under the road, the only place to install the new sewer by open cut would be to dig right down the center of the thoroughfare - an impossibility since the street is the only way to get onto many of the lanes that enter Tanglewood, including Bush's West Oaks Lane.

Luckily for the City of Houston and the Bushes, open-cutting such projects as these has become a thing of the past with the seemingly daily advances in microtunneling technology.

"Twenty to thirty years ago, we didn't have the progress in technology," said Vishwa Bahl, the city's chief wastewater engineer. "Open-cutting was the best on cost, especially if there are not too many existing lines or cables. But in areas like the Galleria (a major commercial/retail district) and downtown, there's no choice."

While microtunneling's costs have plummeted in the past few years, City of Houston officials ensure the lowest project costs by examining each project separately to determine the most feasible means of construction.

"It has to be justified on a cost analysis basis," Bahl said. "Soil, backfill, pavement, traffic, utilities and right-of-way are all factors. In most cases, (right-of-way) is not very wide."



Despite being known for wide-open spaces, Houston's high density in many areas combined with a large number of existing underground utilities make it a prime location for microtunneling. In fact, the city is No. 1 in the nation, by far, in the use of microtunneling for its utility projects. The city's heavy use of the technology is partially the reason that Houston is also home to the nation's top microtunneling contractor - BRH-Garver Inc.

Garver's top client is the city, though the company handles microtunneling projects worldwide. Vice president Clifford Tubbs, who recently traveled to Bangkok, Thailand, to try to secure a contract to tunnel and microtunnel 200,000 feet of sewer, said the business is getting more dog-eat-dog each day.

"It seems like every day there's someone else (using microtunneling)," Tubbs

said. "We knew competition would eventually come, so we were ready."

Under Mayor Bob Lanier, Houston has placed an emphasis on crime and other public works, cutting back temporarily on much of its wastewater work. The city is BRH-Garver's top client, so the downshift in sewer installation contracts has caused Garver to seek projects such as the Bangkok job even more aggressively.

The city has had to maintain sewer rehabilitation as somewhat of a priority, however, because of a state mandate to take care of its overflow problem by 1997. To make it, contractors will be digging dozens of miles of lines to relieve the current overloaded sewer system. And much of it will be microtunneled.

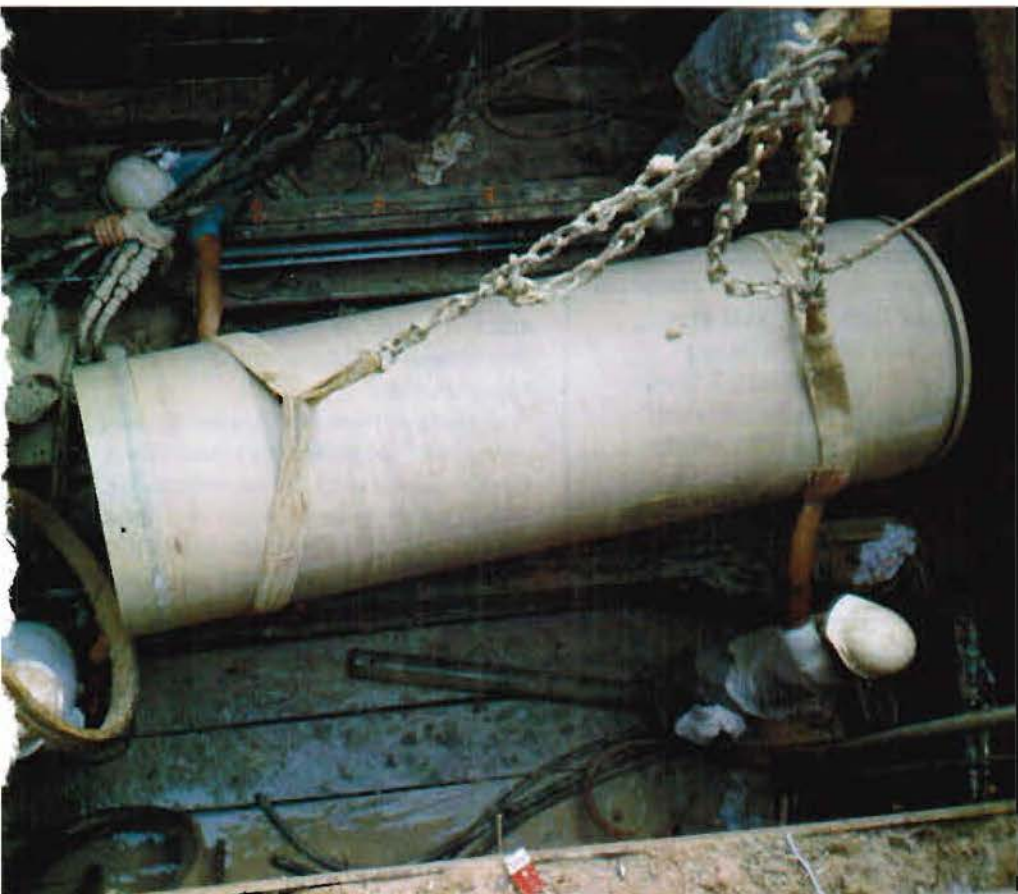
In an effort to make the deadline, city officials must repair or replace various

lines around town. If a line is bad, sometimes it's not cost effective to rehabilitate it by means other than microtunneling. The growth of the city has prompted engineers to design a system that will last at least for 20 years, and new, microtunneled sewer line will play a large role.

diameter line under Westheimer, the challenge was to cause as little blockage as possible, but the state had other ideas.

"We couldn't block off any lanes, at all," Tubbs said, noting that Westheimer also happens to be a farm-to-market state road. "When we dug our shaft, it spilled over into the right lane a little, but we put

BRH-Garver utilizes some of the most expensive equipment available. Tubbs calls the machinery he buys from Lovett the "top of the line." For Garver, the top isn't quite good enough most of the time. Tubbs joked that his company has a reputation for tearing apart equipment they receive and rebuilding it to fit the needs of



(Above left) BRH-Garver Inc. has used machinery to microtunnel the difficult soil conditions found when digging along the Upper Texas Gulf Coast (Below left) Garver technicians monitor the progress of their machinery as it proceeds. The contractor often modifies or rebuilds all of its equipment to fit its specific needs. (Right) After digging a large shaft, BRH-Garver workers lower the equipment into the pit and begin their work. Outside of the entry and exit points, no other excavation work is necessary during the microtunneling technique.

Many lines being replaced are in good shape, but the denser population has rendered them much too small to work effectively anymore. Plus, the very growth that has forced new and larger sewer lines to be built has also resulted in wider and denser thoroughfares around town to handle the massive amount of traffic. In a city where there are nearly as many cars as people, the intrusiveness of construction methods must be taken into account.

In some cases, contractors literally have no choice. Westheimer Road is one of the city's lifelines from downtown to its heavily-populated western suburbs. It is also the main drag for some of Houston's most popular hotels, restaurants and bars. Five lanes run in each direction toward the west side of town, and during rush hours, all are needed.

When BRH-Garver was hired to put down about a mile and a half of large-

steel plates over portions of it so traffic could pass in all the lanes."

Houston made its commitment to microtunneling in 1987, contracting the first urban utility project in Texas to use microtunneling to BRH-Garver when the company replaced the aging sewer system in the affluent River Oaks neighborhood. Garver finished the project ahead of schedule despite literally learning on the job with the help of Japanese and German technicians.

After the project, Garver soon became the king of the hill in the United States, at one time doing more than 80 percent of all microtunneling work in the country. That number has decreased somewhat as the number of competitors and the sheer amount of work have skyrocketed. The company still has the largest U.S. market share and is a recognized pioneer in the techniques.

the job. In Houston, the difficult soil conditions often dictate that the equipment still needs to be modified to handle the job.

"It's called Beaumont Clay," he said. "It runs from Beaumont (a Texas town east of Houston) to here, and it's tough. Most microtunneling equipment is designed for wet sand, because that's what they have for the most part in Europe. They don't have to deal with what we've got here."

The difficult gumbo soil conditions prevalent in Houston are among the reasons Tubbs said he likes to use Lovett tunneling systems. "If we need a part to be upgraded 20 percent, they'll send us something 100 percent better," he said of the Canadian manufacturer.

Houston has installed more than 50,000 feet of large-diameter pipe with microtunneling systems. The trend is continu-

Eventually, most industry personnel expect microtunneling to become less expensive than open-cutting.

ing as other municipalities that have watched Houston since 1987 now use the same technologies in their projects. Costs

continue to fall as technology and competition force the prices down. Eventually, most industry personnel expect micro-


tunneling to become less expensive than open-cutting in most applications.

The Thailand project BRH-Garver is pursuing is a far cry from the Woodway Relief Sewer it's digging adjacent to Tanglewood in Houston. Bangkok is home to some of the world's most congested roadways - open-cutting them would paralyze the city. The project would be among the most massive ever undertaken.

"Bangkok has no sewer system," Tubbs said. "It all runs off into their canals, completely untreated. The project calls for digging the lines and building treatment facilities from scratch."

Tubbs said Bangkok's sanitary system, or lack thereof, is quite simple - it runs off into the canals, which spill into area rivers, making them and areas adjacent to them rancid messes, good only for transportation.

As long as there are crowded areas or earth already permeated by other utilities, there will be a need for microtunneling, which means more business and more competitors for companies like BRH-Garver, and fewer headaches for cities like Houston.



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