

anatomy of an

# INTERSECTION

THE INFRASTRUCTURE OF  
A TYPICAL STREET CORNER  
IN ALL ITS BLINKING,  
PULSING, GURGLING, AND  
OVERFLOWING COMPLEXITY.

by Zeke Minaya

ILLUSTRATION OBIE AND SALLY DÍAZ



For most of the more than half-century that Gibbs Boat Company has sat on the corner of Montrose and West Gray, Marie Brocato has worked there. For 34 years, the manager of the boat-selling company has looked out the showroom windows and watched as a steady march of development has enveloped the once sleepy intersection.

Few would argue with Brocato's knowledge of the corner, but she readily admits that she has not once wondered, in 34 years, about the pipes buried under foot, the wires and power lines hanging over head, and the traffic signals guiding car and pedestrian traffic. "I don't pay attention to it and nobody does," she said of the surrounding infrastructure. "If everything is running smoothly, no one is going to notice those things." Mark Loethen, City Engineer with Houston's Department of Public Works and Engineering, said that the corner of West Gray and Montrose had infrastructure common to most street corners in any major American city.

"Yeah, this is typical," he said looking up and down the street. "Most major urban cities have this level of complexity."

In fact, Loethen stood under the stinging heat of the noontime sun at West Gray and Montrose precisely because the street corner is so average and, therefore, representative of the roughly 6,400 miles of streets that make up Houston. Across the street from Gibbs, in front of Christy's Donuts, Loethen prepared to take *Cite* on a tour of the intersection.

"The electrical grid is like the nervous system, the water pipes are like the circulatory system, wastewater is like the digestive system," he said. And these intricacies are hidden in plain sight.

**Vasculature** "You see that fire hydrant," Loethen said. "The fact that it's got a green cap on it tells me that there's anywhere from a 12- to 20-inch water line along this section of West Gray."

The Houston fire department crews need to know the size of the waterline they are attaching to, Loethen said, or they run the risk of sucking water lines dry.

Water lines, which are typically about six feet under ground, are as big as 66 inches in diameter and, at times, even larger.

"Our water production plants are on the east side of town because that's where the water is," he said. "But to get it all to the west side we send it through large pipes. Over on the east side we even have an 84-inch pipe." The amount of water that a pipe can move is a function of size and the operating pressure or speed with which the water is driven through the pipe. The faster water is pushed through, the greater the amount of water. But increased pressure also means more wear-and-tear, he said. "I lose pressure over time because of friction," Loethen said.

He pointed to a worn metal disc about half the size of a Frisbee on the ground. "You see this little thing right here," he said. "That means we have a water valve underneath there. By law, nobody is allowed to touch those except the city."

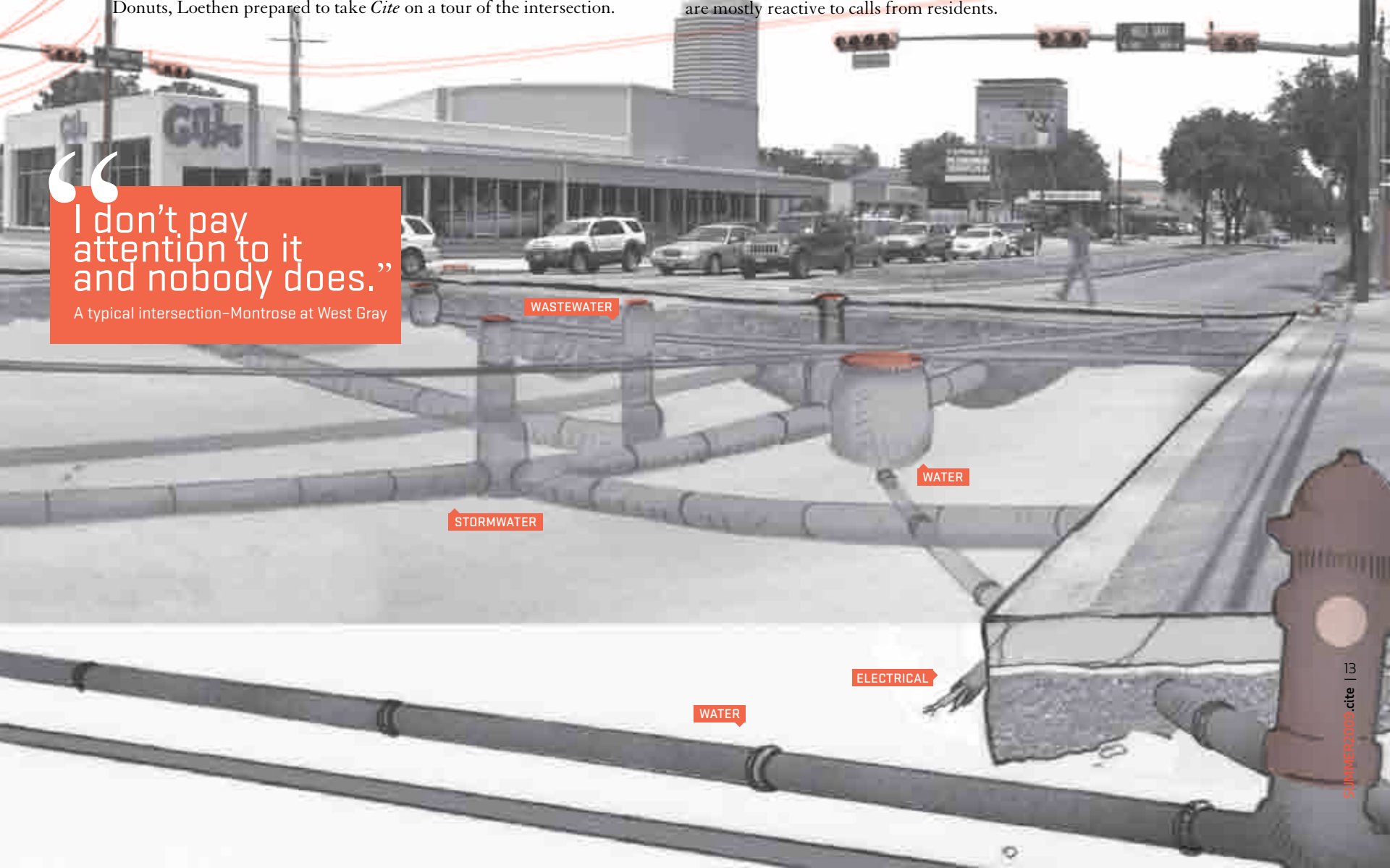
Valves are placed in key locations, he said, to allow repair crews to isolate city blocks and avoid shutting off water to whole neighborhoods.

"We put these things in all major intersections." According to city officials, there are anywhere from 30 to 45 water main breaks a day.

There are programs to rehabilitate a certain small percentage of the city's water lines annually, but with a system as large as Houston's, city crews are mostly reactive to calls from residents.

"I don't pay attention to it and nobody does."

A typical intersection—Montrose at West Gray



**Gastrointestinal** Loethan points to an open slot alongside the curb. “That’s a stormwater inlet,” he said.

If any part of the city infrastructure catches the public’s attention in Houston, it is the storm sewer system. With the heavy rainfall in the city, backed-up storm drains are a common complaint.

“We design our storm sewer system for a two-year storm event,” Loethan said using the statistical jargon meaning that there is a 50-50 chance during any year that the drain pipes in the ground will be exceeded.

The stormwater runs off into the bayous. Looking at the corner of West Gray and Montrose, Loethan said, “if I have to guess, the closest bayou is Buffalo.”

Inlets getting blocked after a storm are “one of the biggest problems we face,” Loethan said. “We have people that blow their grass clipping into the street, it ends up in the storm sewer and the pipe that connects these are probably 18 to 20 inches to start with.”

Loethan said that the city can run cameras through the drain to try and pinpoint problems. But, he said, the size of the city does not allow for a regularly scheduled cleaning program. “We have about 6,000 miles of storm sewer system,” he said. “To inspect that on an annual basis would take a lot of effort, even on a biannual or triennial basis.”

Houston differs from some East Coast cities in having separate waste and stormwater systems, Loethan said. Cities like Chicago and Boston have combined sewers, “meaning that all the water that goes into the storm inlets gets mixed with potty water.”

“Having them separate is a good thing,” he continued. “It allows for both waters to be treated differently. He said that rainwater has distinct pollution issues that range from the errant plastic bag to the oil and grease of automobiles to the dirt and sediment from construction sites.

**Nervous** Continuing the tour, Loethan moved farther above ground and pointed out the extensive wiring that corresponded to the traffic signals. He gestured toward a metal-gray, locker-type box on one of the intersection’s corners. “The cabinet that you see over there is basically a minicomputer, a controller cabinet,” Loethan said.

Some street corners have timed signals, changing the color of the traffic lights after a preordained period. Other signals are activated, reactive to the traffic, Loethan said. “Standard signals go between green, yellow and red at standard time intervals,” Loethan said. “Activated signals are triggered in one of two ways; wires in the pavement and video cameras that detect the flow of traffic.” The traffic light at Montrose and West Gray also has a black, soda-can shaped cylinder nearing the hanging signal. Loethan called this device an Opticon, which detects an infrared pulse coming from emergency vehicles, like police cars and fire department trucks, and changes the traffic signal accordingly.

Loethan ran through notable items of above-ground infrastructure with a rapid-fire delivery. “Sidewalk, pavement, bus shelters, power poles, trees, street signs, street lights and traffic signals,” he rattled off. “There is stuff hanging off the poles,” he continued, “communication, cable TV, high voltage cans.” Streetlights are triggered by solar cells.

“The enemies of infrastructure are the relentlessness of mother nature and the carelessness of man,” Loethan said. The location has seen its share of wind, rain, and heat, as well as car collisions with hydrants and power poles.

Several utilities that the city does not own run underground.

Loethan calls them “dry utilities” and these include gas lines, cable television, telephone, and other telecommunications. Electricity, also outside city authority, sometimes runs underground.

**Sick City?** There is a great deal of popular attention paid to the ethereal qualities of a city, the intangible qualities that make a city *feel* like itself and gives a city its character. More city residents would likely pay attention to a proposed noise ordinance or smoking ban over the placement of a new water line or traffic signal. But this amounts to Cartesian dualism on an urban scale, with residents guarding a city’s soul while neglecting its blood and body.

“Infrastructure creates the quality of life that you enjoy every day,” said Edwin C. Friedrichs, the president of the infrastructure division of Walter P Moore, an engineering consulting firm. And when it comes to infrastructure, Friedrichs said, there is no such thing as benign neglect. “You are going to pay one way or another.”

City of Houston officials, he said, are not giving infrastructure – waste water lines, storm outlets, traffic signs -- the time or money it needs to keep up with growth. “We’re so big, we’re growing so fast and we’re not putting enough money in to infrastructure,” he said. “If you are looking at Houston, its infrastructure is almost all post WWII.” Which means, Friedrichs noted, that much of its water lines are living on borrowed time.

“I’m not saying the public works department is doing a bad job,” Friedrichs said. “They just don’t have enough money.”

In particular, Friedrichs sees the limitations of the storm sewer system as a shortcoming. “We have some of the most intense rainfall, high intensity rainfall... in the world,” he said, adding that design for two-year events “is just not practical.”

Nicole Herzog has been a manager at the Bobbitt Glass Company for 11 years and sits at a desk with a view out into the intersection. Unlike Brocato across the street at the boat dealership, Herzog has paid close attention to the infrastructure there and has a less glowing assessment. A transformer periodically sparks across the street from the Glass Company and a leaking water pipe behind the store caused headaches for weeks before the city made repairs.

Her most heated complaints concern flooding. “When it rains here, the flooding is just, wow,”

Herzog said. “The water from the street reaches the door.”

Alvin Wright, a spokesman for the city’s public works department and senior staff analyst, said that with resources tight, spending has to prioritize for more immediate needs. “If you spend so much money to build a storm system to withstand a weather event that doesn’t happen for another 50 years, is that money well spent?” he asked. That is the kind of question Friedrichs wishes would be put to voters along with a greater effort to educate the average resident on the importance of infrastructure.

Like most residents of major American cities, Houstonians take their city’s infrastructure for granted until there is a problem. “We are seeing flood damage to buildings and cars, causing insurances rates to go higher,” Friedrichs said. “How many times do you drive in Houston and go down streets that are bumpy or riddled with potholes. Mobility is impaired and pollution goes up.” He said that the limitation of infrastructure could stand in the way of the projected population explosion that experts have said awaits Houston in the decades to come.

“Infrastructure is a basic requirement of economic growth,” Friedrichs said. Without improvements, he warned, “people will just stop coming here.”

any part of the city infrastructure catches the public’s attention in Houston, it is the storm sewer system. With the heavy rainfall in the city, backed up storm drains are a common complaint.