Sewer Sense

AROUND THE WORLD: IF IT HAS TO LAST IT BETTER BE CLAY

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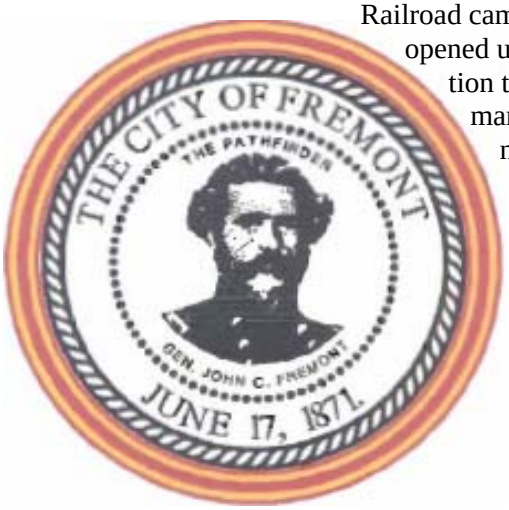
# FREMONT GROWS WITH A PROVEN WINNER

Fremont, Nebraska, a long time user of Vitrified Clay Pipe, recently installed 3 miles of trunk sewer. Clark Boschult, Public Works Director and City Engineer, indicated the sewer was for future residential, commercial and industrial growth.

Fremont's founding was the culmination of a series of fortu-Nate events which pushed the American Republic steadily westward. Fittingly enough, it was named for the man who led the way in that advance. The town was named after the first Republican Presidential Candidate, John C. Fremont.

Fremont, a adventurous pathfinder, had gone down the Platte River past the future site of Fremont with Kit Carson and the Fremont party of explorers late in September 1842.

During the gold rush in 1858, the city of Fremont became known as a gateway to the west. In 1866, the Union Pacific Railroad came to Fremont and opened up rail transportation to the east and the market centers of the nation.




## High Groundwater Table

Bordered by the Platte River, Fremont has a unique topography and geology. Nearly flat, a water table 5 feet below a layer of top soil saturates a deep layer of sand and gravel. Due to the high water, dewatering with 60' deep wells continued throughout the entire project to ensure a dry trench. Sewer invert depts. Ranged from 6' to 19'.

The new sewer provide the extra capacity which allowed an existing residential area to convert from septic systems to a public collection system. The northeast interceptor sewer included 10,000 ft. of 30", 2,000 ft. of 27" and 3,000 ft. of 24" Vitrified Clay Pipe.

More than a year after construction, and prior to introducing flow to the new line, Mr. Boschult stated, ***"the city inspected the downstream manhole and found the VCP line completely dry."*** City officials chose clay pipe due to its inherent long life and tight compression joints.

Editor's note: The University of Houston recently conducted an EPA funded joint integrity test on various pipe materials. Vitrified Clay Pipe, with an ASTM compression joint standard requiring "zero leakage" received top honors.

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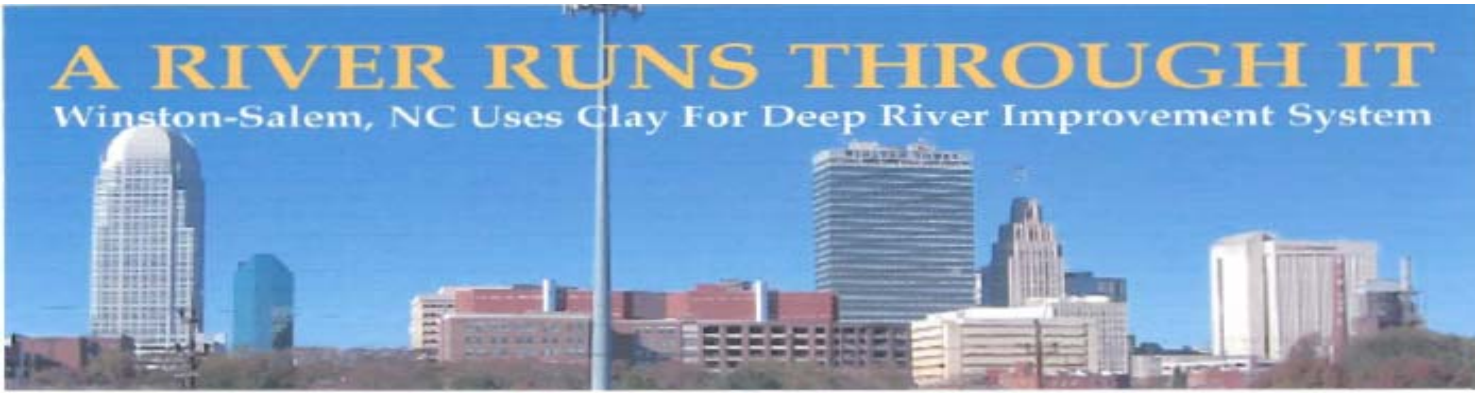


# WET, RUNNING SAND

## No Problem for VCP

These were some of the challenges faced by Jade Ramey Construction when installing the Deep River Sewer System Improvement for the Winston-Salem /Forsyth County Utilities Commission in North Carolina.

The project consisted of 4,100 ft. of 8", 5,500 ft. of 12", 3,300 ft. of 15", and 5,200 ft. of 18" Vitrified Clay Pipe (VC).Winston-Salem requires VCP for all of their sanitary sewers 8"to 18" diameter. Since the State Revolving Fund (SRF) was utilized for funding, the owner was required to take alternate bids on other pipe materials. PVC was included as an alternate material for this purpose. Even though the VCP portion of the bid was 6.5% higher than the PVC bid, the owner chose to pay this premium and go with the VCP. The corrosion resistance and structural integrity of VCP plus the fact that VCP has the longest life expectancy and lowest life cycle cost were important considerations.

In the words of David Doss with the City of Winston-Salem, ***"we have a long and successful history with clay pipe and it has always served as well."***

### Buffer Zones, Highways and Gas line

Numerous unique permitting issues had to be dealt with for this project. Two buffer zones of 30' and 20' were needed since the lines run through the Randleman Lake watershed. An interstate Highway crossing was done by the jack and bore method and three major natural gas lines of 24" – 30" diameter had to be crossed.

The extremely wet conditions required the extensive use of pumps to remove ground water for installation. A majority of the project was in running sand. Despite these difficult conditions, all the pipe easily passed the required air tests. The project was completed well within the 270-day contract time with the contractor averaging 200 ft. per day of pipe installation.

This newly completed project allowed the owner to replace and undersized, existing sewer line and provided needed extra capacity for the future growth of Kernersville, NC from the West Fork of the Deep River to the County line.

# HOW ONE SANITARY DISTRICT TURNED A LIABILITY INTO AN ASSET

## A Pro-Active Asset Management Strategy That Identified and Prioritized The Effort

Stege Sanitary District, located on the East Side of San Francisco Bay, had just completed an I/I reduction program when it became apparent that system overflows were all too frequent. In 1995, the district initiated a new program to reduce overflows and to increase the asset value of the system by adopting a pro-active management and system improvement strategy. Over a five-year period, condition assessments were made to identify those lines which needed immediate repair or replacement. The capital expenditure to rehabilitate those sections not only eliminated the most serious problems but added to the asset value of the system.

## 160 Miles of Vitrified Clay Pipe

This system was almost entirely constructed using clay pipe dating back to about 1913 when the district was formed. Since vitrified clay is an inert pipe material and does not change with time, corrosion was not an issue. Because the lines were constructed of vitrified clay, the age of the line was not a determining factor.

## Overflows More Important than Infiltration

During the period of investigation, the district determined that overflows into sensitive areas were the critical management problem rather than infiltration which is so often the case. The conditions leading to overflows were determined to be (1) insufficient hydraulic capacity and (2) maintenance related restrictions.

**1996-2000** – The district invested a total of $5.8 million to do the improvement work necessary to maintain the collection system and to provide a functionally reliable sewer service to the community.

**2000-2005** – The district continued its video inspection and condition assessment while scheduling corrective measures for the most problematic sections. To date, the district has achieved a 100% reduction in hydraulic capacity related overflows and an 80% reduction in maintenance related overflows.

## Cost Concerns Were Established

After the first five years of inspecting the system and rehabilitating significantly damaged lines, the sanitary district was able to develop a relationship between the cost to repair a line and the amount of damaged that was observed during the inspection process. Using this relationship as an indicator, they were able to either schedule repair and replacement or conduct future inspections as dictated by the condition of the system.

The overall condition of the clay pipe system was so good that the rate of expenditures required to maintain the system could be minimized. This allowed the sanitary district to use a 300 year depreciation schedule.

Stege continues to obtain video information on its lines and enters this information into its database. The analysis of this data by staff ensures that the lines causing the most problems are prioritized for corrective action.

## The Result – Safe, Efficient and Functional Sanitary Sewers

In the near term, sufficient knowledge of system performance has been gained to project a rate of capital expenditures necessary to correct deficiencies that can provide the customer base with a safe, efficient and functional sanitary sewer system.

**COSTS TO RESTORE THE SYSTEM TO SAFE AND FUNCTIONAL SERVICE**

Total cost of Relief Sewers for I/I Control = $10 million or >14% of replacement value = $12.00/ft

Total cost of Collection System condition assessment And related repairs / replacements = $5.8 million Or < 8.0% of replacement value = $7.00 / ft

Annual condition assessment work and related Repair / replacement cost to offset asses degradation (depreciation) = $250.000 / yr

Calculated economic or useful life of the collection System = 300 years.

Stege Sanitary District began with a clay pipe system that was nearly 100 years old and through careful management and targeted restoration, the sanitary sewers are being upgraded to modern standards while, at the same time, increasing asset value.

Write NCPI for a complete reprint of the challenges and solutions reported by the Stege Sanitary Sewer District.