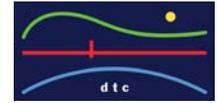


# Case Study: Tower Avenue South Sewer Separation



By: Michael Errickson, PE, DTC Project Engineer



Many neighborhoods located in the city of Hartford, Connecticut are served by combined sewers conveying both sanitary sewage and storm drainage. Significant rainfall events inundate the sewer pipe network resulting in discharges of untreated sewage directly to the Connecticut River.

The owner of the combined sewer network, the Metropolitan District Commission (MDC) is implementing several different techniques to reduce the occurrence of these overflows.

One such method, installing separate sanitary sewer and storm drainage pipes, was applied at the Tower Avenue South CSO Area on Cleveland Avenue and Main Street.

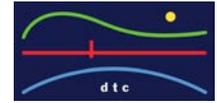
DTC presented several design options to the MDC. The preferred solution involved construction of a new sanitary sewer, converting the existing combined sewer to storm drain for the purpose of collecting private property roof drainage and installation of a new storm drain pipe primarily dedicated to intercepting runoff from the street surface.

The existing combined sewer was relatively deep, approaching 22 feet below grade in some locations. A new 12 inch diameter sanitary sewer was proposed to serve each property along Cleveland Avenue at a similar depth to ensure service laterals could be reconnected at the property line. Depth, proximity to the existing combined sewer and soil conditions presented many challenges that were considered during design.



DTC's geotechnical engineering consultant, Comprehensive Environmental Inc., characterized the subsurface soil conditions as soft, low-plasticity clay and silt. None of the native soil would be suitable for refilling the trench due to compaction concerns. Trench refill with bankrun gravel as an alternative to native clay soil created a new problem. The increased weight of gravel when compared to the native clay soil was expected to induce pipe settlement on the magnitude of 1 to 3 inches.

# Case Study: Tower Avenue South Sewer Separation



Lightweight aggregate fill proved to be the practical solution to resolve soil compaction and pipe settlement concerns. The lightweight aggregate specified for Tower South consisted of expanded shale stone. Cost and constructability concerns were addressed by allowing the contractor the option of mixing lightweight aggregate and bankrun gravel to replicate the weight of clay excavated or installing discrete layers of lightweight aggregate and bankrun gravel. The contractor elected to install discrete layers which varied with pipe depth.

Since the existing vitrified clay combined sewer pipe was scheduled for reuse as a storm drain, DTC's design

required cured in place pipe lining of the existing pipe prior to any excavation in the street. Pipe lining increases the strength of the existing pipe and considerably extends its usable life. Lining early in the sequence of construction reduced the risk of pipe damage during excavation adjacent to the pipe. Installation of steel sheet piling in the deep sanitary sewer trench provided further protection of the existing clay pipe.

Construction is expected to be complete during the summer of 2014.