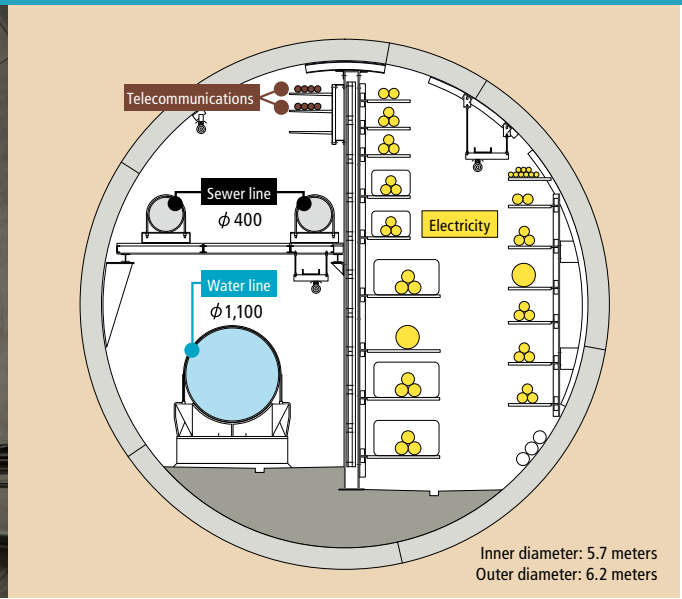


# Creating Timeless Quality

To provide safety, peace of mind, and comfort in structures that will stand the test of time, Kajima taps into the combined strengths of its latest technologies and construction methods to ensure that the abundance of today will still be around for the next generation to enjoy.

Part 1

## Unseen Structures Support Everyday Life



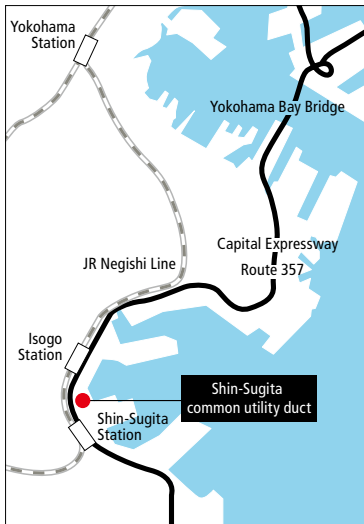
Many structures that support our daily life remain hidden from casual observation even after they have been completed. A common utility duct, for example, is an underground tunnel that carries many different kinds of utility lines, including gas, electricity, water, sewage, and other types of infrastructure that are indispensable to our daily lives. Once a common utility duct has been constructed, it is no longer necessary to excavate the street every time something must be replaced, and the ability to visually inspect water lines and the like greatly simplifies the task of maintenance. Furthermore, if an earthquake or other major disaster occurs, damage can be quickly pinpointed and repaired. Where common utility ducts are in place, a city is much better prepared to deal with emergencies.

### Shin-Sugita Common Utility Duct

To make local infrastructure more resistant to disasters, a 220-kilometer common utility duct is being planned for the Yokohama-Kawasaki area in Kanagawa Prefecture. The Ministry of Land, Infrastructure, Transport and Tourism has awarded a contract for the project, and work is currently in progress in the Shin-Sugita district, located along the coast of Tokyo Bay in Yokohama where the duct is being constructed directly beneath Capital Expressway Route 357. A Kajima joint venture is responsible for a 3.3-kilometer segment of the construction.

The Kajima joint venture proposed tunneling deeper beneath the surface than what had been called for in the basic design, because the shallower land is soft and spongy, while tunneling in a deeper and more stable stratum would minimize the impact of the project upon the Capital Expressway viaduct on the surface and allow for a more earthquake-resistant structure. This proposal received very positive reviews, and the company was awarded a design-build contract.

In order to build a stable lifeline that has a long service life and is highly resistant to disaster, the duct and its ancillary elements have all been designed to last 75 years, which is unprecedented in the industry. The Kajima joint venture is pouring every bit of its know-how into the design and construction of the common utility duct that will provide area residents with safety and peace of mind in the future.



## Project Workflow

### 01 Starting shaft is constructed

A vertical shaft is first dug where the shield tunneling machine will start excavating.

Height restrictions and extraordinary caution is required for the construction conducted directly beneath the Capital Expressway Coastal Viaduct.



### 02 The Shield tunneling machine is lowered into place

The shield tunneling machine is lowered down to the bottom of the shaft, where tunneling will commence.

After a public contest to solicit names for the shield tunneling machine, it was named the "Hammer Shield 636."



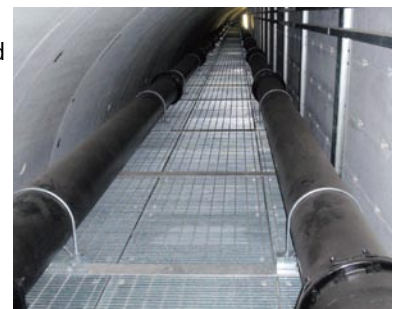
### 03 Tunnel is bored

The shield tunneling machine digs its way forward through the earth, installing tunnel wall segments as it goes. The Hammer Shield 636 also features an automatic segment conveyor system.



### 04 Tunnel interior is built

The central dividing wall and floors are constructed first. Two sewer lines are being installed on the upper level left side as seen from the leading edge of the tunnel. A water line is being installed on the next level down.



### 05 Service shafts are constructed

Shafts will be built through 2011 to provide ventilation in the tunnels and repair and servicing ducts that branch to the surface.

