

# *HDD - Cartridge Method Pit to Pit Installation*

## **Traditional pipe-strings could not be installed.**

When Dave Peters from Downer Hamilton secured the Vaile/Sloane Streets Sewer Upgrade contract, he began establishing what portions of the project could be installed using traditional open cut methods. However, as tendered, one of the sewer mains was planned to be installed using Horizontal Directional Drilling (HDD) within an easement through private property beneath the foundations of an existing commercial building. The main continued across Sloane Street (State Highway 3) which carries heavy state highway traffic through the town of Te Awamutu. The new main was to connect into an existing manhole outside a busy retail burger franchise in the carriage way of the south bound lane of SH3.

Downer engaged sub-contractor Smythe Contractors of Cambridge to complete the HDD shot. Smythes General Manager Simon Payne and Dave Peters met on site to review the pipeline alignment when an immediate change to the surrounding environment had been discovered. During the tender phase, Smythe proposed to position their drilling equipment at the intersection of SH3 and Rickit Road, this intersection had to remain open at all times. The drill shot was approximately 80m in length and was to connect into a new manhole on Jackson Street, adjacent to SH3. Provision was made during the tender phase to drill to Jackson Street where a vacant section with an old garage was to be used as a pipe-string storage site to support the drill shot.

Once a contract was in-place, upon arrival to Jackson Street they discovered the old garage had been demolished and two new houses had begun to be built, a new concrete block wall had been constructed on the front boundary of the section as well. This change to the surrounding work site prevented a traditional PE pipe-string to be installed, they originally planed to use the vacant section as a lay-down and storage site for fusion services and the pipe-string to occupy.

They decided they would now need a segmented restraint jointed pipe system that could be installed by HDD methods. Smythe's had installed Restrain™ PVC Gravity Sewer Pipe in smaller diameters in the past and believed it could be installed using a technique called "Cartridge Method - Pit to Pit (CMPTP)". A drawing of this techniques is shown below in figure 1, the contractor chose to install 3 metre length DN300 pipes using this methodology.

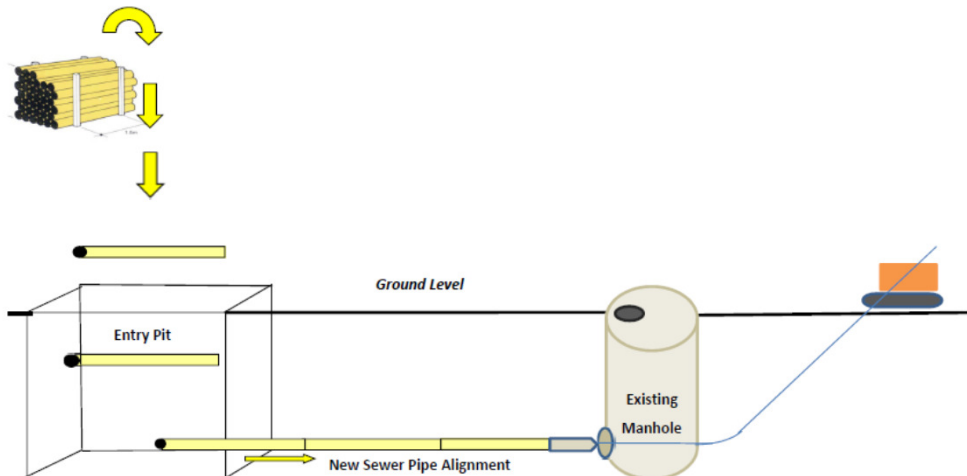


Figure 1. Cartridge Method Pit to Pit



The installation pit was established within Jackson Street, trench shields were used to ensure that the construction team would remain safe at an invert depth of 3.3m.

Once the pre-reamed borehole had been completed they connected the pipe to the back reamer, swivel and the first pipe was in place for an early pull-back to begin the next day.

The following morning a weather bomb had hit the North Island, in Te Awamutu sewers had filled exceeding capacity levels due to excessive rain water infiltrating through old leaking pipe joints. At 6:30am the construction team decided to carry on with the planned pull-back as jointing of Restrain™ PVC pipe can be completed during in wet conditions.

The four man construction team worked in pairs, two prepared and the pre-lubricated 54kg pipes on the road side, then they bagged the pre-lubed pipe ends with plastic rubbish bags, this kept the mud out of the threaded joints while lowering them into the installation pit. Another two workers received the pipes and began jointing pipes simultaneously, within the trench shields. Once the pipe joiners established a methodology while working together the pull-back cycle times decreased, they eventually recorded 5 minutes cycles - from pipe-pull begin, to pipe-pull end.

The last pipe was pulled into position by 1:15pm.



*Drill site looking west from Rickit Road.*



*Existing manhole in the carriage way of SH3*



*Installation platform established in Jackson Street looking east.*



*Entry pit layout – the first pipe is installed the day prior to the pull-back.*



*The last pipe pulled into position showing plastic rubbish bags used to protect threaded joints.*

**Iplex Pipelines NZ Ltd retain the intellectual property rights for Restrain™ pipe; New Zealand Patent No. 561752.**

**Main Contractor**

**Sub Contractor**

**Asset Owner**

**Design Consultant**

**Downer**

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