

## Everything But Round: HOBAS® NC Line Profiles

- 1 | Renovation of Sewer with Large-Diameter HOBAS® Profiles in Bruchsal, DE
- 3 | Egg-shaped HOBAS® NC Profiles Installed by Open Cut in Vidin, BG
- 5 | HOBAS® Supplies NC Industrial Profiles for Paper Plant in Nettingsdorf, AT
- 6 | HOBAS® NC Line: Everything But Round, Anything But Ordinary
- 8 | HOBAS® NC Profiles Installed for Budapest's Main Sewage Collector, HU
- 9 | Sewer Line Brought Back to Life with Non-Circular HOBAS® GRP Profiles, NL
- 10 | HOBAS® Supplies NC Profiles in 12 Varieties to Ville-d'Avray, FR
- 12 | Kite-Shaped HOBAS® Profiles for Renewal of Sewer System in Hößgang, AT

## New NC "Heart" for Historical Sewer Renovation of interceptor sewer with large-diameter HOBAS® Profiles in Bruchsal, DE

Minimal coverage, very restricted working space – the conditions on site made the renovation of a large-diameter interceptor sewer in the German city of Bruchsal a challenging task. HOBAS helped make this extraordinary project a full success.

The combined interceptor sewer located in Werner-von-Siemens Street in the German city of Bruchsal is a central and historical drainage channel. Earliest records date back to 1640 and in 1896, the former moat was upgraded to a man-sized channel with a height of 2 m and a width of 2.70-2.90 m. And the channel not only transported sewage: Telecommunication and electricity providers as well as potable water suppliers also passed their lines through the large profiles.

In 2011, an examination of the old sewer's condition revealed severe cracks and leakage as well as serious structural instabilities on a 175 m long pipe section. Urgent action needed to be taken. Due to the many different cross-sections and the interceptor's poor condition, a rehabilitation through relining was not an option. It was therefore decided to replace the old structure with a new one along the original route. The decision to use GRP as pipe material was quickly made, not least due to traffic-related reasons: The two busy lanes of the interurban Werner-von-Siemens Street had to remain unaffected by all means, and the use of concrete pipes would have demanded a larger trench and heavier lifting equipment, considerably narrowing the traffic space. Furthermore, a gradient of merely 0.6 ‰ and the resulting low flow rate were unquestionably a case for GRP pipes with their smooth inner surface, which helps prevent deposits.



Year of Construction

**2013/2014**

Construction Time

**7 months**

Total Length of Pipe

**180 m**

Diameter

**3000/2000 mm**

Stiffness Class

**SN 10000**

Application

**Sewer renovation**

Installation Method

**Open cut**

Client

**City of Bruchsal**

Contractor

**Michel Bau GmbH &**

**Co. KG**

Advantages

**Custom-tailored special profiles, low wall thickness at high structural capacity, low weight, installation with light and flexible lifting equipment**

In close cooperation with the responsible engineering office, HOBAS Germany worked out a solution involving non-circular GRP profiles with a cross-section of 3000/2000 mm, that considered all necessary structural aspects with regard to the minimal coverage of approximately 300 mm. The project was put out to tender beginning of 2013 and the construction company Michel Bau won the contract. For the entire installation period, the old interceptor was drained and put out of operation. The water was instead redirected through a temporary steel pipe structure which was specially built on support stilts, passing over the two-lane road, walk- and cycle ways as well as private property. Thanks to this solution, it was possible to divide the construction works into merely three sections and thereby increase the cost-efficiency of the construction process considerably.

The restricted working space on site posed a considerable challenge and required a very smooth and constructive cooperation of all parties involved. Furthermore, the sewer channel wall and the foundations of adjacent buildings were partly merged, making the demolition of the old sewer a very delicate task.

In order to build a system that would eventually be capable of handling the required traffic load, the pipes were bedded in liquid soil to a depth of 1.25 m below ground level. Heavy "big bags" were used to prevent buoyancy in this process. In addition, a prefabricated HOBAS Tangential Manhole 3000/2000/1200 mm was installed as intermediate shaft. Finally, the trench was covered with an in-situ concrete slab. Installation works were successfully finished after seven months and the rehabilitated sewer line has been working flawlessly since then.



Interested in a change of perspective? Click **HERE** for an interactive reading experience of this project!



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# HOBAS® NC Line Installed on Danubian Plain

## Egg-shaped profiles installed by open cut for sewer system in Vidin, BG

Within the renovation and expansion of the water supply and sewerage system in the Bulgarian port town Vidin, 5500 m egg-shaped HOBAS NC Line Profiles in a diameter range from 500/750 mm to 1400/2100 mm have been successfully installed in open trench. Their hydraulic properties prove especially beneficial in view of the flat terrain.

The town of Vidin is located at about 35 m above sea level on the Danubian Plain in north-western Bulgaria, close to the Romanian and Serbian borders. Over the past several years, the town's sewer and water supply system had to be modernized and newly built. The reasons for this were manifold: The old sewage system served only 89 % of the population, some of the existing concrete channels had already collapsed and had small diameters which were not capable of handling larger water quantities. Due to the terrain's minimal slope of 0.5 to 1.5 ‰, the main sewers were also frequently blocked, and there was no wastewater treatment plant in the area.

In 2013, the EU-financed project "Rehabilitation and Extension of the Water Supply and Sewerage Systems in Vidin, Bulgaria" with a value of roughly 75 million Euro was initiated to remedy these problems. The project included the construction of a wastewater treatment plant, two sewage pumping stations, a 3 km extension of the existing sewer network, the rehabilitation of 11 km of sewer networks, and 13 km of water supply networks. By these measures, the pollution of the Danube River as well as the risk of ground and surface water contamination should be reduced, and the environmental conditions and water utility infrastructure in Vidin improved.

Year of Construction

**2013/2014**

Total Length of Pipe

**5500 m**

Diameter

**400/600 mm –**

**1400/2100 mm**

Stiffness Class

**SN 10000**

Application

**Sewer line**

Installation Method

**Open cut**

Client

**Municipality of Vidin**

Contractor

**Stanilov EOOD**

Advantages

**Optimum hydraulic**

**properties, leak-tight**

**system, corrosion**

**resistance, long service**

**life, easy installation,**

**post-sales service**



The main challenge for the sewer system expansion was the flat area and low gradient around Vidin. The designers Eco-Engineering LTD and the construction company Stanilov EOOD therefore decided to renew the pipe system by use of egg-shaped profiles with a stiffness of 10000 N/mm<sup>2</sup> and outstanding hydraulic properties, which should ensure an optimal water flow even at low flow rates. Among different suppliers with similar project references, the final decision was made in favor of HOBAS. The company scored not only thanks to a number of successfully implemented projects in Romania: HOBAS NC Line Profiles with their smooth inner surface and small roughness coefficient, as well as the easy installation of the leak tight system, more than fulfilled the given requirements.

HOBAS Experts from Bulgaria and Germany conducted all technical calculations and custom-tailored the profiles to the project specifications. End of 2013, the egg-shaped profiles SN 10000 in a wide range of cross-sections were supplied – 400/600 mm, 500/750 mm, 600/900 mm, 800/1200 mm, 900/1350 mm, 1000/1500 mm, 1200/1800 mm, and 1400/2100 mm. The resulting 5.5 km long NC pipeline was literally “rounded off” with 130 m circular HOBAS Sewer Pipes DN 2000 SN 16000. The installation started at the beginning of 2014 and was successfully completed in April 2015. HOBAS Site Advisors and Engineers provided their full support throughout the installation process.

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# NC Sewer Line for Smurfit Kappa Paper Mill

## HOBAS® supplies NC Industrial Profiles for paper plant in Upper Austria

At the paper factory Smurfit Kappa Nettingsdorf, the old concrete sewer pipeline 800/1200 mm had to be renovated. HOBAS Austria supplied the optimal pipes to meet the very high requirements of this rehabilitation project.

The Smurfit Kappa Group is Europe's leading corrugated packaging company and one of the leading paper-based packaging companies in the world. An inspection of the existing concrete sewer line 800/1200 mm at the Smurfit Kappa paper mill in Nettingsdorf, Upper Austria, in early 2015 revealed severe damages: The sewer had deformed over time due to the very high groundwater table and the industrial wastewater's high operating temperatures (70° C permanent and 90-95° C short-term). It was no longer capable of withstanding the challenging operating conditions and had to be renovated.

The client sought for a quick and safe solution under the condition that the rehabilitation works would be realized during regular plant operations – stopping the production for the time of installation was not an option. Due to the continuous traffic around the plant and the limited storage area on site, the planners decided to realize the project by mean of trenchless relining and with just-in-time deliveries.

HOBAS produced special non-circular egg profiles with a cross-section of 520/910 mm and a wall thickness of 20 mm. A specific, highly durable vinyl ester resin was used in production to meet the very high operating requirements and allow for the requested flow rate. The relining rehabilitation of the 345 m long pipeline started in August 2015 and was finished right on schedule in the course of a few weeks. The client is very satisfied with his decision to work with HOBAS.

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Year of Construction

**2015**

Construction Time

**7 weeks**

Total Length of Pipe

**345 m**

Diameter

**520/910 mm**

Wall Thickness

**20 mm**

Application

**Rehabilitation of industrial sewer line**

Installation Method

**Relining**

Client

**Smurfit Kappa**

**Nettingsdorf**

Contractor

**Felbermayr Bau GmbH &**

**Co KG**

Designer

**ZT Machawetz & Partner,**

**TB Harald Winkler**

Advantages

**Quick and safe installation under challenging conditions; resistance to chemicals, high groundwater pressure and high operating temperatures**



## HOBAS® NC Line – Everything But Round, Anything But Ordinary

Eggs, kites, jaws; elongated and with dry-weather channels, in barely-crawl-through-diameters or man-sized: The non-circular profiles made by HOBAS are real masters of adaptation and can be tailored to virtually every given condition. Here's just a few out of numerous NC forms and designs that HOBAS has successfully produced and implemented over the past years. And there's definitely many more exciting shapes and projects to come!



Click [HERE](#) to learn more about HOBAS NC Line Profiles!





# HOBAS® NC Line for Budapest's Main Sewage Collector – Egg-shaped HOBAS® NC Profiles installed in Hungarian capital

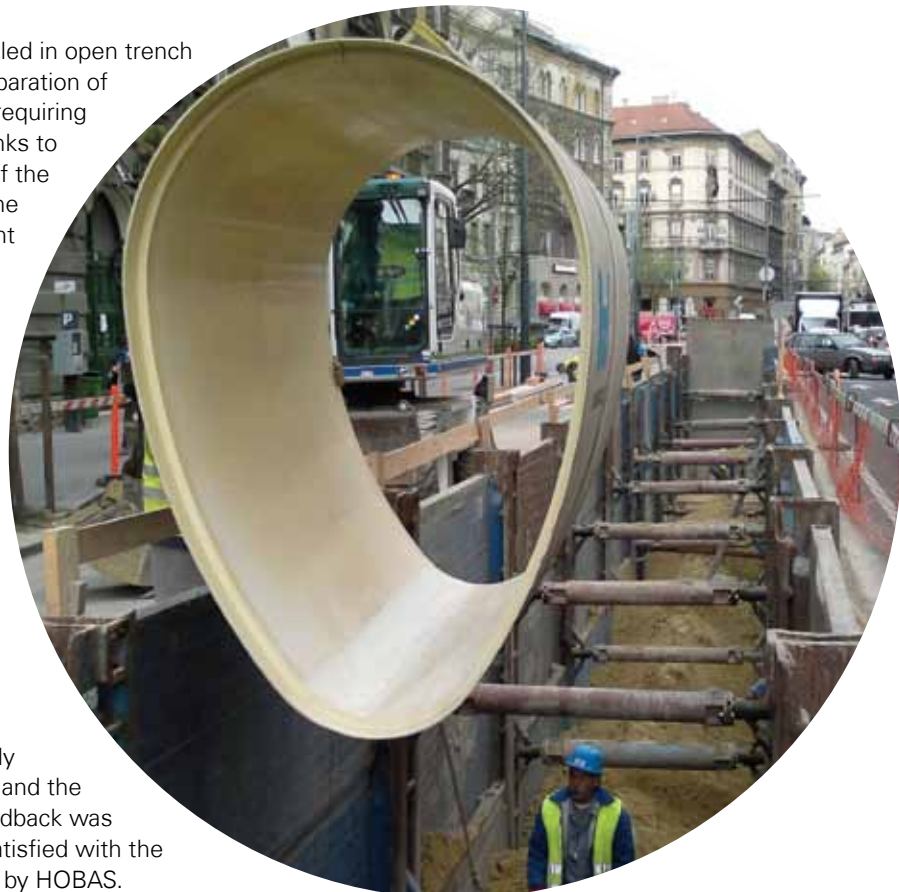
As part of a general modernization of Budapest's sewer and wastewater treatment system, 876 m HOBAS NC Profiles have been successfully installed in open trench to build a new main sewage collector.

As a member of the European Union, Hungary is committed to improving the water quality according to the EU Water Framework Directive. Over the last years, an increasing number of projects serving this purpose have been initiated. One of them concerns the Central Waste Water Treatment Plant in Budapest and the associated sewer system. The most significant parts in this system are the main sewage collectors as they determine the network capacity and safety. One of them was newly built in 2012, with HOBAS NC Line Profiles in the capital's eight district near downtown in Baross Street.

The project preparation and planning had to take account of the heavy traffic volume on the four-lane Baross Street including trucks, busses, and numerous cars. Supported by HOBAS Experts, the designer calculated a necessary wall thickness of 41 mm and a stiffness of 10000 N/m<sup>2</sup> for the 1380/2070 mm HOBAS NC Line Segments. Due to the dense infrastructure and a lack of space, the slope of the pipeline could only be very small. This fact, as well as the irregular quantities of rainwater made the HOBAS NC Profiles an excellent choice: Their hydraulic features and corrosion resistance ensure a safe and steady flow rate at a long operational lifetime.

The sewer line was installed in open trench in 6 m depth with the preparation of the slightly sloping trench requiring precise bedding works. Thanks to the comparably low weight of the 2.35 m long GRP segments, the constructor was able to use light lifting and installation equipment, with the result that only two lanes of the road had to be temporarily closed. On an additional short section in Ór Street at right angles to Baross Street, HOBAS NC Profiles 680/1050 mm as well as two HOBAS Manholes DN 1350 with a DN 1000 reduction were installed. Since there was not enough space on site to store the pipes and shafts, the customer asked for precisely organized deliveries.

The installation was successfully completed after seven months and the constructor's and investor's feedback was very positive: They are highly satisfied with the products and services supplied by HOBAS.



Year of Construction  
**2012**

Construction Time  
**7 months**

Total Length of Pipe  
**876 m**

Diameter  
**1380/2070 mm,  
680/1050 mm**

Stiffness Class  
**SN 10000**

Application  
**Sewer rehabilitation**

Installation Method  
**Open cut**

Client  
**FCSM Zrt.**

Contractor  
**Colas Alterra Zrt**

Advantages  
**Excellent hydraulic  
properties, structural  
strength and durability,  
light weight, corrosion  
resistance, long  
lifetime**



# HOBAS® NC Profiles Rehabilitate Sewer in Northern Netherlands – Sewer line brought back to service with non-circular GRP profiles

When in 2015, an old non-circular concrete sewer had to be rehabilitated in Groningen in the northern part of the Netherlands, HOBAS was brought into play. Within only three weeks and under challenging circumstances, the sewer line was successfully renovated with egg-shaped GRP profiles.

Petrus Campersingel is a highly frequented road in the Dutch city of Groningen. It is used not only by cars but also by heavy traffic. This subjects the pipes and structures underneath to particularly high loads – among others an old egg-shaped concrete sewer with a cross-section of 1200/1800 mm, which was found in need of renovation in 2015.

At first, the contractor considered rehabilitating the 277 m long sewer with a CIPP liner, but the corresponding safety factor revealed by the static calculation was too low. So GRP became the material of choice, and the contractor’s reasons for using egg-shaped HOBAS NC Profiles 1000/1500 mm were manifold: the fully customizable shape and diameter, the resulting possibility to reduce the diameter of the existing egg profile, the necessary strength to withstand the groundwater pressure and traffic loads, and not least the products’ long lifetime.

The construction works involved quite a few challenges – the road traffic had to be maintained between 6 a.m. and 9 p.m., bicycle traffic was even to be maintained around the clock the soil next to the road was quite weak, and the existing shafts were basically inaccessible. However, a good cooperation between all parties involved made it possible to tackle all challenges successfully. The installation of the HOBAS NC Line Profiles was realized from two access pits, one of them in the middle of the pipe route. After the installation of the first part of the pipeline, a GRP shaft with a temporary valve was installed at this access point. The remaining NC profiles were then installed from the second access pit and the pipeline finished by connecting it to an existing concrete shaft. →

Year of Construction  
**2015**

Construction Time  
**3 weeks**

Total Length of Pipe  
**277 m**

Diameter  
**1000/1500 mm**

Application  
**Sewer rehabilitation**

Installation Method  
**Relining**

Client  
**City of Groningen**

Contractor  
**BAM Nelis Aarsleff JV**

Subcontractor  
**Aarsleff Hamburg GmbH**

Advantages  
**Custom-tailored profiles, high structural strength, long lifetime**





During the installation, a visit to the project site was arranged by the city of Groningen together with HOBAS and the contractor BAM. Forty interested clients used the opportunity to experience at first hand how HOBAS NC Line Profiles are installed by relining. The day was a great success and left the visitors positively impressed. Beginning of December 2015, the installation of the 277 m long pipeline was successfully finished after three weeks only. The city of Groningen is very satisfied with the professional implementation of the project and the high quality of the new HOBAS NC Pipeline.

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## Customized Profiles for Sewer Rehabilitation near Paris – HOBAS® supplies NC profiles in 12 varieties to Ville-d'Avray, FR

Year of Construction

**2015**

Construction time

**8 months**

Total Length of Pipe

**1400 m**

Diameter

**1366/736 mm,**

**1564/654 mm,**

**1662/922 mm**

Wall Thickness

**17-19 mm**

Application

**Sewer rehabilitation**

Installation method

**Relining**

Client

**SIAVRM**

Contractor

**Pareng**

Engineering office

**Egis Eau**

Advantages

**Resistance to external loads, just-in-time deliveries, excellent hydraulic properties, full leak-tightness**

Twelve kilometers west of the city center of Paris in the commune of Ville-d'Avray, HOBAS NC Profiles have helped bring the aged and damaged local sewer system sustainably back to life again: 1.4 km of combined waste- and stormwater pipes have been rehabilitated with pipe profiles in 12 different varieties that have been custom-tailored to the project requirements.

The Intercommunal Sewage Board of Vallée du Rû de Marivel (SIAVRM) is responsible for managing and maintaining the wastewater system of seven cities of the western suburb of Paris, among others Versailles, Vélizy-Villacoublay, and Ville-d'Avray. The local sewage and stormwater network had been built over the last century and extended in parallel with the increasing urbanization. Today, large parts of the sewage disposal system are at the end of their service life: Some of the over 50 years old sewers had simply not been built with the adequate strength to withstand nowadays' traffic loads and other mechanical stresses. Two parallel pipelines, both built around the 1960s, that are located along the highly frequented road RD407 were in particularly urgent need for renovation. The requirements of the renovation were to maintain the egg-shaped sewer's flow capacity, avoid any groundwater pollution caused by wastewater infiltration, and prevent ground subsidence.

The overall renovation project stretched over 3.3 km and was split into three phases – one that was to be realized definitely and immediately, and two future ones. The definite phase involved a total pipeline length of 1400 m in Ville d'Avray. The engineering office Egis Eau chose HOBAS NC Profiles for the realization of this project part. HOBAS produced NC profiles in three custom-tailored diameters (1366/736 mm, 1564/654 mm, 1662/922 mm) and four different lengths between 1 and 2.35 m, adding up to 12 different NC profiles. All elements were equipped with anti-slip mats for a safe accessibility and designed with an adequate wall thickness in order to optimally withstand the external traffic loads.

The fact that the two sewers run parallel was a major advantage with regard to the construction works: While the relining rehabilitation was carried out in one sewer, the wastewater flow could easily be redirected to the second one, limiting the pumping costs. As the construction works were to affect the densely populated area as little as possible, the locations of the construction pits were carefully chosen to keep disturbances to a minimum. Furthermore, the subsoil in this area is full of utility and other networks (electricity, gas, etc.) and the contractor Parengé had to adapt the works accordingly.

Since there was not enough space to store the 1.4 km of NC profiles on site, the logistics department of HOBAS France had to work together closely with the contractor Parengé and the factory to organize just-in-time deliveries at intervals of approximately two weeks between June and December 2015. At last, cement grouting was used to fill the annular space between the old and the new pipeline structure. This way, the old structure was stabilized and basically became a new sewer again – with excellent hydraulic properties, corrosion and abrasion resistance, full leak-tightness, and a long lifetime.

During the installation phase, the project team faced another quite unusual hurdle: The Tour de France passed through Ville-d'Avray in July 2015, forcing the workers to lay down their tools for the time of the event and also some time before in order to guarantee the cyclers a 100 % safe passage. Thanks to an excellent coordination of the city council, SIAVRM, and the contractor, the effective loss of project time was still only minimal and the installation was successfully finished after 8 months. The two remaining renovation phases of the local sewer network are planned to be implemented in 2016.



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# HOBAS® NC Line Next to the Danube

## Kite-shaped profiles for renewal of sewer system in Hößgang, AT

In 2014, an examination of the wastewater system in the Austrian village of Hößgang revealed that one old concrete pipeline was in particularly urgent need for renovation. HOBAS helped remedy this problem with a non-circular solution.

The village of Hößgang is located in Lower Austria. Some of the village's sewer lines have been in operation for many decades already and their condition is correspondingly poor – especially that of one concrete sewer, which was found in urgent need of repair in 2014. The contractor decided to realize the renovation with kite-shaped HOBAS NC Line Profiles: The pipes' excellent hydraulic properties, corrosion resistance, and particularly long lifetime made them ideal for tackling the sewer's low depth and achieving the required flow rate.

The difficult ground conditions due to the immediate proximity to the Danube (alluvial soil) and the very narrow access to the site represented a considerable challenge, which the construction company Teerag-Asdag managed successfully. The construction pit was stabilized and secured by means of metal retaining walls. The limited space on site made a precise just-in-time delivery necessary. This requirement was perfectly fulfilled and the HOBAS NC Profiles with a cross-section of 1290/1040 mm installed within one week only.

The construction company and the planner were more than satisfied by the quick and problem-free installation of the HOBAS NC Pipeline and the overall implementation of the project.

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Year of Construction  
**2014**

Construction Time  
**1 week**

Total Length of Pipe  
**74 m**

Diameter  
**1290/1040 mm,**

Application  
**Sewer rehabilitation**

Installation Method  
**Open trench**

Designer  
**IKW - Ingenieurkanzlei für  
Wasserwirtschaft, Umwelt-  
technik und Infrastruktur  
ZT-GmbH**

Contractor  
**Teerag-Asdag AG**

Advantages  
**Quick installation, excel-  
lent hydraulic properties,  
long lifetime, corrosion  
resistance**

