Claret
CIVIL ENGINEERING LTD

St Botolph's Lane, Bury St Edmunds, Suffolk IP33 2AX.

Web: www.claretce.com | Phone: 01284 333222.

CASE STUDY TEMPLATE – ALL SECTIONS MUST BE COMPLETED

Which Claret Civil Engineering business are you?

IMR WR Alliance - Whitlingham

Which department is this referring to?

Claret Lining Division

Who was the customer (only if you want them to feature in the article)?

Anglian Water

What was the problem?

Following a collapsed sewer in Snape, Suffolk, a long stretch of foul sewer had to be dug down on and replaced by Anglian Water's IMR WR Alliance team, using open cut techniques, under an emergency notice. The route cause was due to pumped flows that was received from Snape and Friston pumping stations. Neither station was dosed to prevent septicity and as a result, the gravity section had over many years of service, suffered extensive attack from H2S (hydrogen sulphide) which had corroded away the original pipe from the flow line upwards, generating large voids above where the crown of the pipe should have been.

The high cost of the emergency works, and potential large-scale replacement resulted in discussions of trenchless solutions and the project was then transferred to the Claret Lining Division. A full CCTV survey of the whole sewer network was completed and had showed that the sofit of the first 870m was missing, generating large voids. From 870 m to the Sewage Treatment Works (STW) the pipe had suffered serious H2S attack and was categorised as condition Grade 5. Three semi-collapses were located and repaired and approximately 50 m of sewer was replaced by open-cut replacement by the IMR WR delivery team. Following this, Claret Lining Division planned to reline 2,600 m of the remaining sewers.

Some 49 manholes were known to exist along the 2.6 km of foul sewer length, which were all surveyed for their condition, making an assessment of degradation due to the H2S attack. It was decided that some manholes would be abandoned by lining through them. It was estimated that 18 manholes would be abandoned.

Similarly, at Yoxford the gravity sewer system had also suffered from severe H2S attack. The sewer system consists of 175 mm and 225 mm diameter asbestos cement sewer pipes.

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Some 868 m of sewer had been previously classified as grade 5 and a CCTV survey of the remaining 1,435 m was completed to determine the extent of deterioration due to the H2S attack.

During the survey a localised collapse was identified. This was repaired under a five-week road closure using open cut techniques. Results from the survey showed that a CIPP lining solution could be applied to the remainder of the sewer, negating the requirement for additional open cut replacement. The final scope of the project was 2,017 m of lining installation.

To reduce disruption to residents as much as possible some 475 m of the lining work was completed under the road closure required for the initial collapse replacement operations. This was welcomed by the highway's authority and no further road closures were necessary.

Having suffered serious H2S attack, two gravity sewer networks in the Anglian Water (AW) region in villages, Snape and Yoxford needed to be replaced or renovated urgently. Serious environmental and wildlife protection concerns, and potentially huge open cut construction costs meant that a trenchless option was prioritised to minimise open cut works in highly sensitive locations.

Gravity sewer rehabilitation and replacement works for Anglian Water in Snape and Yoxford, Suffolk were combined into a single project for cost effectiveness and environmental reasons. Figures comparing open cut replacement and rehabilitation costs showed that there was a 72% cost saving by using trenchless techniques.

The gravity sewer systems consisted of 2,892m of 225 mm and 1,725m of 175 mm diameter asbestos cement sewer pipes.

How was the environment managed?

Environmental management was a significant aspect of these works as the area was a sensitive wildlife region with many protected and rare species that would be seriously disturbed by extensive open cut works.

The area for the various works was in the fenlands and was according to Susan Stone, Conservation Advisor for Suffolk Wildlife Trust, first surveyed by the eminent botanist Francis Simpson in 1973, and more recently by Suffolk Wildlife Trust in 1986. Both surveys showed that in addition to a wide diversity of wetland plants, the meadow also supports large colonies of heath spotted and southern marsh orchids.

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Heath spotted orchid is a rare plant in Suffolk and this site is one of the finest remaining meadows for this species in the county.

Potential wildlife issues:

- ***Damage/loss of wet grassland flora due to trenching and accessing site with machinery***
- ***Damage/compaction/oxidation of peat soils – thereby adversely affecting flora***
- ***Disruption/change to hydrology – thereby adversely affecting flora***
- ***Possible damage to mobile species such as amphibians, wintering waders like snipe, water vole (protected species) depending on timing of work.***

Susan Stone commented: "It is really excellent news that repairs to the sewers will not require any excavations in the meadow so the work should have minimal impact." She continued: "Having spoken to you all (Claret Civil Engineering) and met you on site you obviously have the best interests of the meadow to the fore, and we really appreciate you consulting us on the work at each stage."

The ground also has a very high-water table and the cost of installing ground dewatering operations as well as accessing the sites with the necessary equipment to achieve the required sewer repairs by open cut would have been huge. To mitigate this, the trenchless lining options, available through Claret Lining Division, were deemed to be most appropriate for the protection of the local area, its wildlife, and landscapes, as well as being significantly more cost effective in the prevailing ground conditions.

More specifically, Claret Civil Engineering Ltd also undertook various site-specific mitigation works to ensure the protection of protected wildlife in the area, for example on lining operations a protective plastic surround was installed to prevent wildlife, particularly protected newt species, from entering the working area.

The other major aspect of using lining to complete the works was the significant reduction in carbon footprint by 93% over traditional methods.

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What Innovation was used?

As part of the environmental protection regime linings were installed with environmentally sensitive resins to ensure that no leaching of product into the ground during installation would cause immediate or long term detriment to the surrounding ground or incumbent wildlife.

Also, once lining was completed, grouting was injected to the known voids around the newly lined sewer pipes to ensure that no future ground movement or subsidence would occur that could affect either the local residents and businesses, the landscape and its wildlife or the future operation of the newly lined pipe network.

What was the community impact and how was care given to customers?

The environmental and social impact concerns of this project generated a high level of interest from the Local MP, press, radio, and the general public. Public relations activities were key to the successful delivery of the Snape & Yoxford projects especially with respect to the effect on local business.

With this in mind, the client and Claret Civil Engineering Ltd worked extensively to ensure that wherever possible road closures were used to the fullest extent to prevent additional unnecessary road closure requirements as well as the use of signing and diversion routes that did not impact the businesses of both towns or the everyday lives of their residents.

Information was also provided to ensure that all parties concerned understood the nature of the works and how their implementation mitigated any impact on the local environment and wildlife.

Anglian Water commented on how Claret Civil Engineering Ltd and saying " Claret's Lining divisions collaborative approach and innovative trenchless techniques have been instrumental in delivering this complex project ahead of programme and below budget whilst at the same time protecting the environment and minimising impact to Anglian Water's customers."

How was legislative compliance met?

In compliance with the CDM Regulations 2015, A Construction Stage Health & Safety Plan was developed for all works in association with the sites' main contractor. In addition to

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this, Claret Civil Engineering also developed and submitted a Safe System of Work and Risk Assessment for each element of the project.

All operatives involved in the project were experienced, competent and had undergone the relevant training courses to enable them to carry out the works to a high standard of Health & Safety.

Prior to any works being carried out, the RAMS were all conveyed to the employees by their Site Supervisors.

There were zero accidents, incidents or dangerous occurrences during the project.

All works were audited daily by the Site Supervisor as well as representatives from the Anglian Water.

As with all operations involving Claret Civil Engineering, Health & Safety was treated with utmost importance with the following relevant legislation adhered to during the works:

- *Health & Safety at Work Act 1974*
- *Management of Health & Safety at Work Regulations 1999*
- *Reporting of Injuries, Diseases & Dangerous Occurrences Regulations 1995*
- *Personal Protective Equipment at Work Regulations 1992*
- *Health & Safety (First Aid) Regulations 1981*
- *Control of Substances Hazardous to Health Regulations 2002*
- *Dangerous Substances & Explosive Atmospheres Regulations 2002*
- *Provision & Use of Work Equipment Regulations 1998*
- *Lifting Operations & Lifting Equipment Regulations 1998*
- *Pressure Systems Safety Regulations 2000*
- *Control of Noise at Work Regulations 2005*
- *Manual Handling Operations Regulations 1992*
- *Work at Height Regulations 2005*
- *Health & Safety (Safety Signs & Signals) Regulations 1996*

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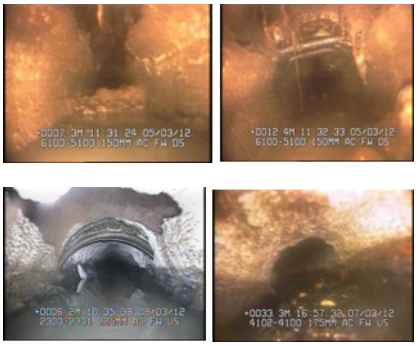
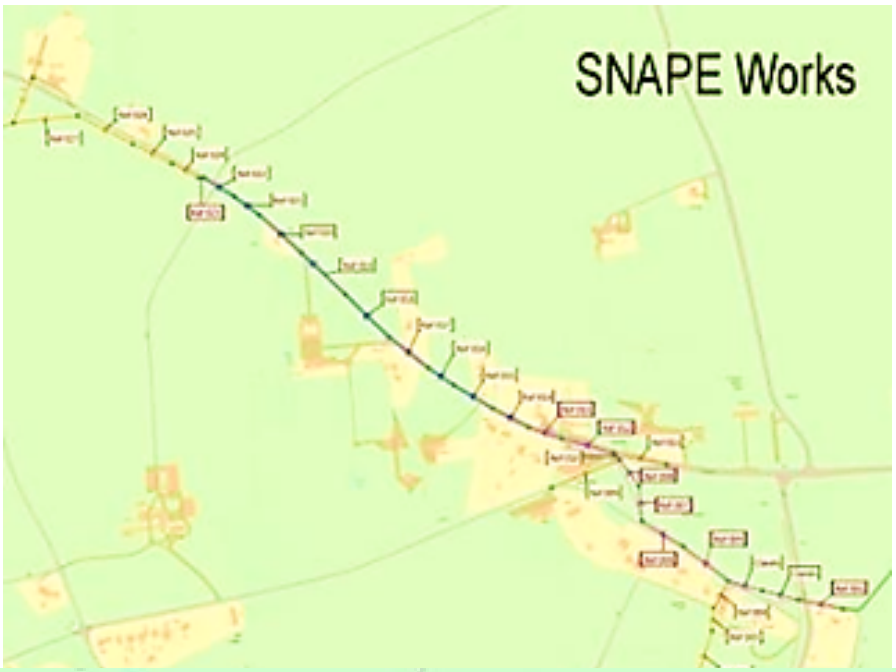
- ***Construction (Design & Management) Regulations 2007***
- ***Health & Safety (Training for Employment) Regulations 1990***
- ***Confined Spaces Regulations 1997***
- ***New Roads and Street Works Act 1991 (NRSWA)***

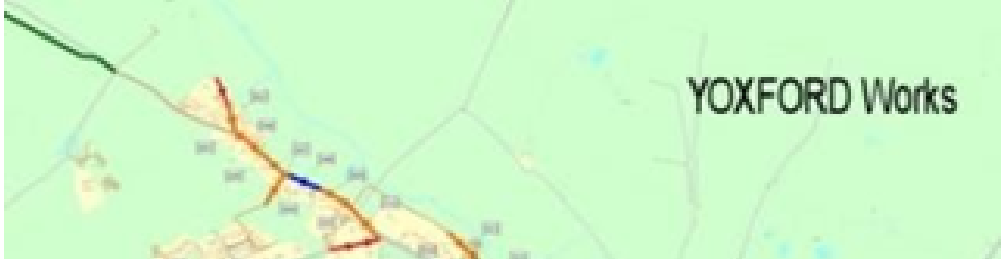
Existing pipe conditions showed significant deteriorated pipe, damage, deterioration, and exposed voids.

CCTV survey examples:



Schematic of the sewer network at Snape:





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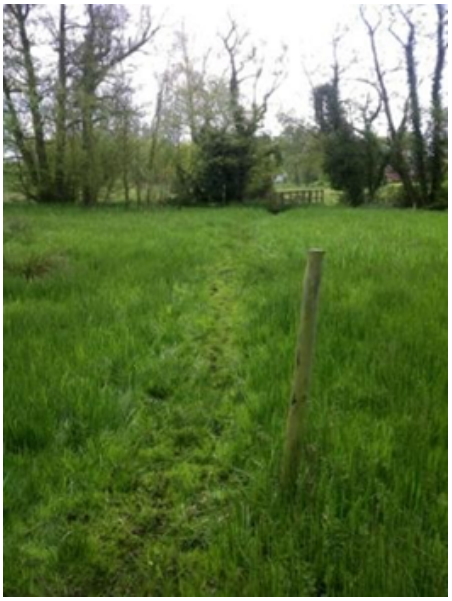
Schematic of the sewer network at Yoxford:

Views along the routes of two of the Snape relining works showing the typical country and ground conditions that were protected using trenchless systems rather than open cut operations:



Claret pride themselves with the knowledge of delivering all aspects of sewer rehabilitation with all known methods of installation and have great understanding of material capabilities. If you require your sewer asset rehabilitating, then please contact our lining division on 01284 333222 or email Scott Weston on sweston@claretce.com

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