THE COMPLETE DRAINAGE SERVICE ● CCTV CAMERA SURVEYS ● STRUCTURAL SOFT FELT LINING
REPAIRS WITHOUT EXCAVATIONS ● REFORMING OF PITCH FIBRE PIPES
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NATIONAL ASSOCIATION OF DRAINAGE CONTRACTORS CERTIFIED

For the attention of

DATE

Our reference: 12345

CCTV CAMERA INSPECTION REPORT

Site Location – SAMPLE REPORT

Further to recent instruction, our engineers attended the above site location to carry out a CCTV camera inspection of the drainage and our findings are as follows:

Commence survey from Manhole 8 up branch connection 1. 100mm earthenware pipework. Duty foul water system.

Distance (m)	Observations & Remarks
0.0	Joint
0.1	Circumferential fracture
0.5	Joint, gap between sections and change of pipework diameter and material to 110mm PVC
1.1	Joint and branch connection to Soil & Vent Pipe 1
1.2	Joint
1.5	Offset joint and change of pipework diameter and material to 100mm earthenware
1.9	Joint and radial fracture
2.5	Offset joint, 90° bend upwards and circumferential fracture (on bend) which prevented passage of the camera

Continue survey from Manhole 8 up branch connection 2. 100mm earthenware pipework. Duty foul water system.

0.0	Joint, slight bend to right and debris deposits
0.2	Radial fracture and debris deposits
0.3	Offset joint and debris deposits
0.8	Circumferential fracture, offset joint and debris deposits
1.5	Joint and debris deposits
2.2	Circumferential fracture, offset joint and debris deposits
2.5	Offset joint and debris deposits
3.5	Joint and circumferential fracture
4.1	Offset joint

5.0	90° bend and longitudinal fracture
5.2	Offset joint and bend to level which prevented passage of the camera and outlet of waste gully

Continue survey from Soil & Vent Pipe 1 (via rodding access) downstream. 110mm PVC pipework. Duty foul water system.

0.0	Joint
0.1	Joint
0.5	Joint and bend to level
0.8	Joint
2.7	Joint and branch connection at 12 o'clock (origin unknown)
2.9	Joint
3.1	Joint
3.2	Junction

Continue survey from Manhole 6 up branch connection 2. 100mm earthenware pipework. Duty foul water system.

0.0	Joint
0.2	Circumferential fracture and debris deposits
0.4	Offset joint and debris deposits
0.6	Offset joint and debris deposits
0.9	Longitudinal fracture
1.2	Circumferential fracture, joint, debris deposits and root penetration
1.5	Circumferential fracture, joint, debris deposits and root penetration
1.8	Joint, circumferential fracture, root penetration and debris deposits
2.5	Joint and debris deposits
3.1	Circumferential fracture and debris deposits
3.2	Joint, longitudinal fracture and debris deposits
3.8	Joint, 90° bend upwards and debris deposits
4.2	Joint
4.5	Offset joint, radial fracture, bend to left which prevented passage of the camera and outlet of Waste Gully 10

Continue survey from Manhole 1 up branch connection 2. 100mm earthenware pipework. Duty foul water system.

0.0	Joint
0.4	Joint
1.1	Offset joint and circumferential fracture
1.7	Offset joint, scale deposits and cement intrusion
2.0	Radial fracture
2.4	Offset joint and outlet of Waste Gully 3

Continue survey from Manhole 8 downstream. 100mm earthenware pipework. Duty foul water system.

0.0	Joint

0.4	Offset joint and gap between sections
1.1	Offset joint
1.8	Offset joint, circumferential fracture and root penetration
2.2	Longitudinal fracture until 3.0m
2.4	Joint and multiple fracturing
3.1	Joint and radial fracture
3.7	Offset joint
4.4	Joint and root penetration
5.0	Joint and radial fracture
5.7	Joint
6.3	Joint, radial fracture and root penetration
6.9	Joint and multiple fracturing
7.5	Offset joint and multiple fracturing
8.2	Multiple fracturing and joint
8.6	Circumferential fracture, solidified grease deposits and debris deposits
8.9	Manhole 10

Continue survey from Manhole 6 downstream. 150mm earthenware pipework. Duty foul water system.

0.0	Joint and longitudinal fracture
0.3	Radial fracture
0.6	Joint
1.3	Joint
1.9	Joint
2.3	Offset joint
3.0	Joint
3.7	Joint and scale deposits
4.3	Offset joint
5.0	Offset joint and multiple fracturing until 5.5m
5.5	Offset joint
6.3	Offset joint
6.9	Joint
7.6	Offset joint
8.2	Offset joint
8.8	Offset joint
9.5	Offset joint
10.0	Joint and slight bend to left
10.7	Joint and slight bend to left
11.3	Joint and slight bend to left
12.0	Joint and slight bend to left
12.6	Joint and slight bend to left
13.2	Joint and slight bend to left
13.8	Offset joint and multiple fracturing
14.0	Joint and debris deposits
15.2	Joint and debris deposits
15.6	Longitudinal fracture until 15.9m
15.9	Manhole 7

Continue survey from Manhole 7 downstream. 150mm earthenware pipework. Duty foul water system.

0.0	Joint, radial fracture and longitudinal fracture
0.2	Heavy scale deposits and water holding in pipework which prevented a full view
0.4	Offset joint and scale deposits
1.1	Joint and scale deposits
1.7	Joint
2.3	Offset joint and scale deposits
2.8	Offset joint and scale deposits
3.5	Joint and scale deposits
4.1	Joint, scale deposits and longitudinal fracture
4.8	Joint and scale deposits
5.4	Offset joint, longitudinal fracture and circumferential fracture
6.0	Offset joint
6.6	Offset joint
7.2	Offset joint
7.3	Multiple fracturing
7.6	Multiple fracturing
7.9	Manhole 10

Continue survey from Manhole 6 up branch connection 1. 100mm earthenware pipework. Duty foul water system.

0.0	Joint
0.2	Circumferential fracture
0.6	Offset joint
0.7	Circumferential fracture
0.9	Multiple fracturing and offset joint
1.6	Joint and circumferential fracture
1.8	Joint and circumferential fracture
2.5	Joint
3.1	Joint and multiple fracturing
3.8	Offset joint, multiple fracturing and 90° bend upwards
4.0	Joint, bend to level which prevented passage of the camera and outlet of Waste Gully 9

Continue survey from Manhole 5 up branch connection 2. 100mm earthenware pipework. Duty foul water system.

0.0	Joint
0.1	Multiple fracturing and root penetration
0.2	Offset joint, root penetration and circumferential fracture
0.5	Joint
1.0	Circumferential fracture, joint and root penetration
1.7	Offset joint, scale deposits and cement intrusion
2.3	Offset joint, multiple fracturing and 90° bend upwards
2.9	Offset joint and bend to level which prevented passage of the camera and outlet of Waste Gully 8

Continue survey upstream from excavation on rear surface water main run. 100mm earthenware pipework. Duty surface water system.

0.0	Joint and branch connection at 2 o'clock to Rainwater Gully 11
0.1	Joint and circumferential fracture
0.8	Circumferential fracture x2
0.9	Joint
1.5	Offset joint
2.4	Joint and cement intrusion
2.8	Joint, cement intrusion, longitudinal fracture x2 and root penetration
3.5	Offset joint and cement intrusion
4.2	Joint, cement intrusion and root penetration
4.3	Radial fracture
4.7	Joint, radial fracture and root penetration
5.4	Joint, multiple fracturing and root penetration
5.9	Joint, cement intrusion and radial fracture
6.6	Joint and radial fracture
7.3	Joint, multiple fracturing and root penetration
7.9	Joint and cement intrusion
8.5	Joint, cement intrusion and radial fracture
9.2	Joint, cement intrusion and longitudinal fracture
9.9	Joint, cement intrusion and outlet of Rainwater Gully 28
10.3	Branch connection at 3 o'clock, root penetration and multiple fracturing
10.6	Offset joint, root penetration and multiple fracturing
11.1	Joint and cement intrusion
11.4	Radial fracture
11.8	Joint, cement intrusion and root penetration
12.5	Joint and cement intrusion
13.1	Joint, cement intrusion, root penetration and multiple fracturing
13.6	Joint and radial fracture
14.4	Joint and cement intrusion
14.9	Joint, cement intrusion and circumferential fracture
15.5	Joint, cement intrusion and circumferential fracture
16.1	Joint, cement intrusion and circumferential fracture
16.5	Branch connection at 3 o'clock to Rainwater Gully 7 and circumferential fracture
16.9	Circumferential fracture, joint, cement intrusion and root penetration
17.4	Joint, circumferential fracture and root penetration
18.1	Joint, cement intrusion, circumferential fracture and root penetration
18.7	Joint, cement intrusion, circumferential fracture and root penetration
19.2	Joint, cement intrusion, circumferential fracture and root penetration
19.9	Joint, water holding in pipework which prevented a full view to 20.2m and root penetration
20.2	Offset joint and circumferential fracture
20.5	Branch connection at 3 o'clock to Rainwater Gully 6 and root penetration

20.6	Offset joint, cement intrusion, pipework missing and root penetration
21.0	Joint and water holding in pipework which prevented a full view
21.3	Offset joint, multiple fracturing, root penetration and slight bend to right
21.8	Offset joint, cement intrusion, multiple fracturing and root penetration
22.5	Offset joint, radial fracture, cement intrusion, root penetration and circumferential fracture
23.2	Offset joint, multiple fracturing and root penetration
23.6	Joint, cement intrusion and radial fracture
24.3	Joint
24.7	Offset joint and cement intrusion
25.3	Offset joint
26.1	Offset joint, cement intrusion, radial fracture and root penetration
26.7	Offset joint
27.3	Multiple fracturing, offset joint and root penetration
27.9	Offset joint
28.3	Circumferential fracture
28.7	Offset joint, radial fracture and cement intrusion
29.6	Offset joint, circumferential fracture and root penetration
30.2	Offset joint, circumferential fracture and root penetration
30.3	Multiple fracturing and root penetration
30.5	Offset joint, water holding in pipework which prevented a full view, branch connection at 3 o'clock to Rainwater Gully 5, multiple fracturing and root penetration
31.2	Offset joint, gap between sections, root penetration and bend upwards
31.6	Offset joint
31.9	Rodding eye

Continue survey downstream from surface water excavation. 100mm earthenware pipework. Duty surface water system.

0.0	Joint and cement intrusion
0.1	Joint, cement intrusion and radial fracture
0.3	Joint, cement intrusion, longitudinal fracture and root penetration
0.9	Joint and cement intrusion
1.6	Joint
2.2	Joint, radial fracture and cement intrusion
3.0	Joint and cement intrusion
3.5	Joint and cement intrusion
3.6	Circumferential fracture
4.1	Joint, multiple fracturing and branch connection at 9 o'clock to Rainwater Gully 12
4.9	Joint and cement intrusion
5.0	Radial fracture
5.5	Joint and cement intrusion
6.1	Joint and cement intrusion
6.6	Circumferential fracture, joint and cement intrusion

7.3	Offset joint and cement intrusion
7.9	Joint, cement intrusion and radial fracture
8.6	Joint and cement intrusion
9.2	Offset joint and cement intrusion
9.8	Offset joint, cement intrusion and circumferential fracture
10.5	Joint
11.1	Joint, cement intrusion and radial fracture
11.5	Water holding in pipework which prevented a full view
11.7	Offset joint, cement intrusion and longitudinal fracture
12.5	Joint, cement intrusion and longitudinal fracture
12.6	Circumferential fracture and debris deposits
13.0	Multiple fracturing, pipework collapse and branch connection at 3 o'clock to Rainwater Gully 13
13.1	Pipework missing and hole in pipework which prevented passage of the camera

END OF SURVEY

Conclusions and Recommendations

Further to your instructions, our engineers have commenced works in order to return the drainage system to a watertight and free flowing condition however we have been working from the supplied CCTV survey and site drawing. Unfortunately, the drawing and report have been found to be of poor quality with many errors which has caused our engineers some issues on site however initially we have mainly overcome these and continued with the necessary repairs.

In particular, several of the recommendations state that some of the runs connect to soil and vent pipes which need to be cut open for access in order to install the structural soft felt liners however in practice these run to gullies which require excavations to allow for the lining to take place.

The supplied report also failed to identify that a separate surface water system is present which appears to run parallel to the foul water system at the rear. We have attached our own drawing which shows the correct layout of the foul system together with the locations of the rainwater gullies however there was no access to this system and therefore the majority of the required information was not available at this time. It is clear that considerable further investigations are required in order to ascertain the full condition of the surface water system to enable us to provide full recommendations for remedial works.

In order to assist with the investigation of the rear surface water system (there is also a separate surface water system at the front) our engineers have excavated an access pit over the surface water drain on the junction with Rainwater Gully 11. This allowed our high pressure water jetting crew to carry out cleaning and a further CCTV camera inspection of some of the pipework which revealed severe fracturing throughout and with every junction to the rainwater gullies damaged.

This survey also revealed severely broken pipework downstream of our excavation towards the side boundary and this section is on the verge of collapse. It was also evident that the saturated grass in this area appears to be related to the drains as the wet surface worsened as our engineers carried out water jetting works. Prior to our jetting, the main surface water run was completely blocked which has been causing the majority of rain water to be forced out of the drainage system which will be creating voids in the ground. This is particularly dangerous when occurring around the foundations of the building as the structural integrity of the footings can be undermined.

It was also obvious that no maintenance has been possible since construction which we believe was approximately 100 years ago and therefore the substantial level of defects have been long standing.

Our works have also highlighted major issues where foul water pipes have been connected to the surface water system in several places which is called a misconnection by Thames Water. This is a serious contravention of Building Regulations and these issues require immediate attention.

Additionally, we have discovered that Waste Gully 10 is severely damaged and the water poured into the gully actually leaves the pipework and instead discharges into a large void created by the water loss. This issue could possibly lead to movement of the building and we are also concerned that some of the other 17 rainwater gullies may also be in a similar condition below ground and that serious damage is occurring which could affect the structural stability of the building.

During our works to the foul water system, our engineers noted foul smells in several areas where we have excavated and these were also experienced during the high pressure water jetting. It was evident that the sewage has not been flowing through the system properly and therefore the smells have been escaping through the many defects.

As part of our initial works, considerable high pressure water jetting has been carried out, followed by a further CCTV camera inspection and this has revealed severe damage in the form of broken pipework and multiple fracturing which will be allowing the loss of water into the surrounding ground area and therefore we have provided an estimate for repairs to these sections. There is however a large amount of inaccessible and unsurveyed drainage and therefore our recommendation is to carry out the Phase 2 works detailed below which will include for making access to the surface water system and the follow up CCTV surveys.

The Phase 3 works would be the repairs of the additional known damage now confirmed and as detailed in our report above and Phase 4 would be the repairs resulting from the Phase 2 inspections.

Phase 2

In order to inspect the surface water system we recommend that 13 of the 17 rainwater gullies are excavated and replaced with new PVC roddable versions including all associated pipework and concrete gully surrounds. Please note that two gullies were included in the initial estimate and two others have already been replaced.

Once access is gained, to carry out a further CCTV camera inspection of the pipework downstream to ascertain the condition of the unseen sections and report findings.

Phase 3

1. To carry out concentrated high pressure water jetting (using scale removing equipment) of all affected runs to leave pipework clear and free flowing.

2. To excavate FW Gully 14 including initial section of fractured pipework and replace with new PVC roddable version making all necessary connections.

3. To excavate and remove Waste Gully 15 which is located under the lower part of the adjacent steel stair case and install new gully approximately 300mm to the right which will allow access to the drain running to the manhole to install new gully, making all necessary connections.

4. To excavate Waste Gully 9 (up branch connection 1 in Manhole 6) and replace with new PVC roddable version. Whilst pipework is open, to carry out structural soft felt lining through to manhole using flexi-liner to seal pipework to a watertight condition. Upon completion of lining to reinstate gully, making all necessary connections.

5. To carry out structural soft felt lining from Manhole 1 up branch connection 2 to Waste Gully 3 rest bend to seal pipework to a watertight condition.

6. To carry out structural soft felt lining from Manhole 8 downstream to Manhole 9 to seal pipework to a watertight condition.

7. To carry out structural soft felt lining from Manhole 6 downstream to Manhole 7 to seal pipework to a watertight condition.

8. To carry out structural soft felt lining from Manhole 7 downstream to Manhole 10 to seal pipework to a watertight condition.

9. To excavate Waste Gully 10 (up branch connection 2 in Manhole 6) and replace with new PVC roddable version. Whilst pipework is open, to carry out structural soft felt lining through to manhole using flexi-liner to seal pipework to a watertight condition. Upon completion of lining to reinstate gully, making all necessary connections.

10. To excavate Waste Gully 8 (up branch connection 2 in Manhole 5) and replace with new PVC roddable version. During our recommended excavation and renewal of the pipework including the rest bend, our engineers would also excavate below and remove all saturated and softened earth which would be replaced with a strong dry concrete mix. This would be compacted into the excavated area below the rest bend creating a solid base for the new pipework and the new rest bend would be set in standard concrete on top of this base. Dry mix concrete is used to draw any remaining water out of the surrounding ground and consolidate the whole area.
Whilst pipework is open, to carry out structural soft felt lining through to manhole using flexi-liner to seal pipework to a watertight condition. Upon completion of lining to reinstate gully, making all necessary connections.

11. To excavate at the junctions upstream of the access excavation in the rear garden at 9.9m (to Rainwater Gully 28), 16.5m (to Rainwater Gully 7), 20.5 (to Rainwater Gully 6) and 30.5m (on the junction to Rainwater Gully 5) to expose the pipework.
To remove the above junctions to provide access to the connecting pipework and to also provide working space for the installation of the structural soft felt required.

12. To carry out structural soft felt lining from the access excavation upstream to the rodding access at 31.9m using the excavations to propel the liner into position to seal pipework to a watertight condition.

13. While the above pipework is accessible, to carry out structural soft felt lining from the excavations up the branch connections to Rainwater Gully 5, Rainwater Gully 6, Rainwater Gully 7, Rainwater Gully 28 and Rainwater Gully 11 to seal pipework to a watertight condition.

14. Upon completion of the above lining to reinstate the junctions and backfill the excavations.

15. To utilise the initial excavation (on junction of Rainwater Gully 11) and install new access chamber to provide future access for maintenance and cleaning including cast iron cover and frame.

16. To excavate at the collapsed section at approximately 13.0m downstream of the existing excavation and replace up to 2.0m of pipework including junction, making all necessary connections.
Whilst pipework is open to carry out structural soft felt lining upstream to the existing excavation at 13.0m to seal pipework to a watertight condition.

17. Whilst pipework is open, to carry out structural soft felt lining up branch connection to Rainwater Gully 13 to seal pipework to a watertight condition.

18. To carry out a further survey downstream of the surface water excavation (on branch connection of Rainwater Gully 13) to the boundary to ascertain the condition of the unseen sections and report findings. Please note that we believe further damage has occurred beyond the boundary however this section would be responsibility of Thames Water and we will report our findings to them.

We would be pleased to carry out the above works for the sum of £ plus VAT and we look forward to receiving your further instructions.

We do hope that the above meets with your approval but should you have any queries please do not hesitate to contact us.

PLEASE NOTE 1: ALL REPAIR WORKS CARRIED OUT ARE COVERED BY CERTIFIED ENGINEERS AS PART OF THE NATIONAL ASSOCIATION OF DRAINAGE CONTRACTORS (NADC) SCHEME. THIS ENSURES THAT ANY REMEDIAL WORKS MEET THE HIGHEST INDUSTRY STANDARDS AND CARRY OUR 15-YEAR GUARANTEE AGAINST FAULTY WORKMANSHIP AND MATERIALS. PLEASE BEWARE CONTRACTORS WHO ARE NOT NADC CERTIFIED.

PLEASE NOTE 2:
(A) THE MEASUREMENTS IN OUR REPORTS OR ON OUR RECORDINGS ARE TO BE USED AS A GUIDE LINE ONLY. THE DOTTED LINES SHOWN ON OUR DRAWINGS ARE AN APPROXIMATE ROUTE AND SHOULD NOT BE RELIED UPON. SHOULD CONFIRMATION OF THE ROUTE BE REQUIRED, ELECTRONIC SONDE TRACING WOULD BE NECESSARY.
(B) WE HAVE ALLOWED FOR A THICKNESS OF CONCRETE TO A MAXIMUM OF 150MM AND IF THE ACTUAL DEPTH IS MORE, WE RESERVE THE RIGHT TO REQUEST ADDITIONAL COSTS.
(C) WE WILL UTILISE CAT SCANNING EQUIPMENT PRIOR TO ANY EXCAVATIONS HOWEVER IT IS NOT POSSIBLE TO DETECT POLYMAIN OR SIMILAR PIPEWORK. SHOULD YOU HAVE ACCESS TO ANY SERVICES DRAWINGS, WE WILL REQUIRE A COPY OF THESE PRIOR TO COMMENCEMENT OF WORKS. SHOULD THESE NOT BE PROVIDED AND WE STRIKE A SERVICE PIPE OR CABLE IN THE COURSE OF OUR WORKS, WE RESERVE THE RIGHT TO CHARGE FOR ITS REPAIR.