



City of

Saskatoon

Public Works Operations Manual

Standard Operating Procedures for Water and Sewer

WS-B111 Sewer Main Repair

1. Objective:

- 1.1. To repair the sewer main in a timely and efficient manner, minimizing disruption in service to the customer.
- 1.2. To ensure the sewer main repair meets current standards.

2. Scope:

- 2.1. This procedure applies to the repair of the sewer main at the point of failure as determined by; CCTV (closed circuit television) inspection or measurements determined by Sewer Operations staff.
- 2.2. This procedure applies to sewer main repair of pipes less than 600mm(24inches) in diameter.

3. Reference:

- 3.1. Saskatchewan Department of Labour – Occupational Health and Safety Regulations (1996)
 - i. Section 260 Excavation and Trenching
 - ii. Section 261(2) Temporary Protective Structures
 - iii. Section 87(4)(a, b) Personal Protective Equipment/General Responsibilities
 - iv. Section 259 Locating Underground Pipelines, etc.
 - v. Section 269(1)(a, b) Requirements Before Confined Space Is Entered
- 3.2. Traffic Control Manual
- 3.3. City of Saskatoon Policy and Procedures for Confined Space Entry (1997)
- 3.4. City of Saskatoon Policy number A04-011 (B)(4) - Safety Rules and Personal Protective Equipment
- 3.5. City of Saskatoon Standard Construction Specifications and Drawings Roadways, Water and Sewer, 2000 Edition
- 3.6. WS-A01 Water Quality SOP (Current Version)

4. Outstanding Issues:

- 4.1. Completion of a trainee manual, work-method checklist and trainer's tool kit
- 4.2. Completion of WS-A01 Water Quality SOP
- 4.3. Creation of an SOP for Backfilling
- 4.4. Creation of an SOP for Sewer Trunk Repair (24" and greater)

5. Approvals:

- 5.1. The Clearances and Locations Work Group will acquire approval for underground/overhead utility clearances prior to excavation.

6. Responsibilities:

6.1. Supervisor IV

- i. Ensures the Clearances and Locations Work Group acquire the clearances of all utilities at the repair site.
- ii. Performs a daily circle check on their assigned vehicle and logs results.
- iii. Locates and marks water and sewer lines.
- iv. Meets the other utility representatives at the repair site.
- v. Ensures the Deep Excavation Notification form has been submitted prior to excavation.
- vi. Notifies the public of water outage in the case of a planned repair.
- vii. Notifies the public of restricted water use if required.
- viii. Requests the sign shop and/or the labourers install appropriate traffic control devices, when required.
- ix. Ensures appropriate traffic control devices are in place.
- x. Confirms the de-energizing of any buried utilities and relays the information to the applicable staff, if required.
- xi. Coordinates and selects the equipment required to successfully complete repair.
- xii. Acquires materials for the repair.
- xiii. Ensures that all staff follow the regulations for confined space entry.
- xiv. Ensures that all shoring equipment is in proper working order and installation is in compliance with all regulations.
- xv. Deploys the crew of operators and labourers to the job site.
- xvi. Supervises all subordinate staff, while available to do so.
- xvii. Identifies sewer main location and size of excavation.
- xviii. Coordinates with Sewer Operations, the plugging and/or diverting of the sewer as required.
- xix. Determines with the excavator/backhoe operator, the most suitable way to excavate.
- xx. Ensures subordinate staff, are aware of, understand and follow all safety rules and regulations.
- xxi. Ensures all utilities have been supported as required by their owner's specifications.
- xxii. Determines the length of pipe to be replaced.
- xxiii. Is aware of other construction/maintenance activities in the immediate vicinity that may be affected by the repair activities.
- xxiv. Ensures proper cleaning, disinfection, flushing, sampling and testing methods are adhered to, by monitoring, and/or performing them.
- xxv. Ensures repair meets current standards and recommended practices.
- xxvi. Ensures backfill standards are met.
- xxvii. Inspects work area to ensure it is clean, safe and tidy during and at completion of the repair.
- xxviii. Ensures that the form(s) are completed and submitted the day the job is completed.

6.2. Clearances and Locations Work Group

- i. Acquires clearances for all utilities.
- ii. Locates and marks water and sewer lines.
- iii. Meets other utility representatives at the repair site.
- iv. Notifies railway Roadmasters (CN&CP) in advance of work progress near railroad corridors.
- v. Provides drawings of water and sewer line locations.
- vi. Coordinates the removal of some obstructions.
- vii. Initiates job numbers and location numbers.
- viii. Supplies the Supervisor IV with the required forms.
- ix. Updates manual and electronic records.

6.3. Labourers

6.3.1. Bottom Labourer

- i. Erects appropriate traffic control devices as directed by the Supervisor IV.
- ii. Inspects hydraulic shoring for leaks, pins, bent rails and general condition of pumps, fluid levels and hoses.
- iii. Complies with all safety rules and regulations.
- iv. Works unsupervised if required
- v. Exposes (by hand) all the buried utilities including water and sewer lines (during excavation), after they have been marked.
- vi. Signals and directs the excavator/backhoe operator to the location of the buried water and sewer lines in the final phase of excavation.
- vii. Installs shoring as per manufacturers recommendations.
- viii. Observes trench walls for cracking and/or movement of soil that could indicate potential for collapse.
- ix. Warns other bottom labourers of immediate danger and immediately summons their exit.
- x. Ensures tools and crew trailer are clean and in proper working order.
- xi. Repairs sewer main.
- xii. Mechanically compacts backfill material.
- xiii. Disinfects tools after use.
- xiv. Removes all unnecessary traffic control devices from the roadway prior to leaving the site.

6.3.2. Top Labourer

- i. Erects appropriate traffic control devices as directed by the Supervisor IV.
- ii. Checks hydraulic shoring for leaks, pins, bent rails and general condition of pumps, fluid levels and hoses.
- iii. Complies with all safety rules and regulations.
- iv. Works unsupervised if required
- v. Installs shoring as per manufacturers recommendations.
- vi. Ensures tools and crew trailer are clean and in proper working order.
- vii. Assembles the required repair materials.
- viii. Passes all required tools and materials to bottom labourer
- ix. Observes trench walls for cracking and/or movement of soil that could indicate potential for collapse.
- x. Warns bottom labourer of imminent danger and immediately summons their exit.
- xi. Directs the tandem axle truck operator to dump the backfill material.
- xii. Cleans the area around excavation.
- xiii. Disinfects tools after use.
- xiv. Removes all unnecessary traffic control devices from the roadway prior to leaving the site.

6.4. Tandem Axle Truck Operator

- i. Operates a tandem axle truck.
- ii. Performs daily circle checks before operating trucks and trailers, and logs results.
- iii. Ensures a regular maintenance schedule is adhered to, including daily servicing.
- iv. Ensures trailers are clean and in proper working order.
- v. Works unsupervised if required
- vi. Hauls the emergency water supply, shoring and crew trailers as required.
- vii. Ensures the emergency water supply trailer is taken to the worksite first, and its heating system is turned on if required.
- viii. Notifies Central Dispatch of the location of the emergency water supply trailer.
- ix. Ensures the emergency water supply trailer is completely filled before storing.
- x. Hauls and loads material as required or directed by the Supervisor IV.
- xi. Ensures load counts are logged on the appropriate forms.
- xii. Assists with the repair as directed by the Supervisor IV.

6.5. Excavator/Backhoe Operator.

- i. Operates the excavator/backhoe.
- ii. Performs daily circle check before operating the excavator/backhoe, and logs results.
- iii. Ensures a regular maintenance schedule is adhered to, including daily servicing.
- iv. Works unsupervised if required
- v. Consults with and receives direction from Supervisor IV on the critical steps of the excavation.
- vi. Ensures asphalt and granular material are separated from the sub-grade material to avoid contamination.
- vii. Responds to the direction of the labourer to avoid contacting buried utilities.
- viii. Assists with shoring installation.
- ix. Excavates around the sewer main.
- x. Backfills excavation to meet current standards.
- xi. Ensures the final grade of the excavation is smooth and level.
- xii. Disinfects excavator/backhoe bucket after use.

7. Inputs

- 7.1. Daily work instructions
- 7.2. Sewer and Water Maintenance Memo
- 7.3. Drawings
- 7.4. Utility Clearances

8. Outputs:

- 8.1. Repair of the sewer main
- 8.2. Completion details recorded in the Foreman's Report
- 8.3. Update of information for the inventory database

9. Control Mechanisms:

- 9.1. The Supervisor VI will discuss with the Supervisor IV the latest techniques or materials that may be introduced into this activity from other agencies.

10. Procedure:

- 10.1. The Clearances and Locations Work Group will acquire clearances for all utilities, (Gas, power, water, sewer, phone, cable, etc.) before the excavation begins.
- 10.2. The Clearances and Locations Work Group will provide the required location numbers, job numbers, drawings and forms to the Supervisor IV as well as organize the removal of some site obstructions i.e. trees and utility poles.
- 10.3. The Clearances and Locations Work Group will notify the railway Roadmasters (CN&CP) in advance of work progress near railroad corridors.
- 10.4. All vehicles must be circle checked and the results logged before use.
- 10.5. The Supervisor IV or the Clearances and Locations Work Group representative will mark the water and sewer lines and meet the other utility representatives at the repair site.
- 10.6. The Supervisor IV ensures the Deep Excavation Notification form is submitted prior to excavation.
- 10.7. The Supervisor IV will request that the Sign Shop and/or the labourers install the required traffic control devices and ensure they are installed as per the *Traffic Control Manual*.
- 10.8. Every effort must be made to notify the public affected by a water outage prior to shutting down a water supply line.
- 10.9. The Supervisor IV will ensure that any buried utilities have been de-energized, if required.
- 10.10. The Supervisor IV will coordinate, select, and acquire all required equipment and materials and deploy their crew to the job site.
- 10.11. All staff must follow the *City of Saskatoon Policy and Procedures for Confined Space Entry (1997)*

- 10.12. Before using the equipment, the tandem axle truck and excavator/backhoe operators must perform circle checks, log results, and ensure that the regular maintenance schedule for that piece of equipment has been adhered to.
- 10.13. The tandem axle truck operator will ensure that the trailers are clean and in proper working order and the emergency water supply trailers are completely filled before storing.
- 10.14. The tandem axle truck operator will haul the emergency water supply, shoring and crew trailers - transporting the emergency water supply trailer first, and turning on its heater if required.
- 10.15. The tandem axle truck operator will notify Central Dispatch of the emergency water supply trailer location.
- 10.16. The Supervisor IV will decide on the sewer main location and size of excavation and discuss with the excavator/backhoe operator the best method for excavating.
- 10.17. All staff must wear the personal protective equipment required by both *Occupational Health and Safety Regulations (1996) Section 87(4)(a, b) Personal Protective Equipment/General Responsibilities* and *City of Saskatoon Policy number A04-011 (B)(4) - Safety Rules and Personal Protective Equipment*
- 10.18. The Supervisor IV will coordinate with Sewer Operations, the plugging and/or diverting of the sewer main as required.
- 10.19. Asphalt and/or concrete must be stripped, separated and hauled to a designated reclamation site.
- 10.20. Where possible, excavate parallel with the pipe being repaired. Consider the locations of other buried utilities.
- 10.21. Excavate the area around the sewer main according to the *Occupational Health and Safety Regulations (1996) Section 260 Excavation and Trenching*
- 10.22. The labourers shall locate and expose (shallow buried) underground utilities by hand.
- 10.23. The labourers shall communicate the location of all buried utilities to the excavator/backhoe operator. All staff must follow the *Occupational Health and Safety Regulations (1996) Section 259 Locating Underground Pipelines, etc.*
- 10.24. Support all buried utilities as required by their owner's specifications.
- 10.25. The labourers shall inspect shoring before use.
- 10.26. The Supervisor IV will confirm that the shoring is in proper working order and installation is in accordance with regulations.
- 10.27. Personnel must stay clear when lifting and lowering shoring and/or materials.
- 10.28. The shoring is installed with the assistance of the excavator/backhoe and labourers, in accordance with manufacturer's recommendations and the *Occupational Health and Safety Regulations (1996) Section 261(2) Temporary Protective Structures.*
- 10.29. Shoring must be placed in the excavation in such a manner as not to disturb any buried utilities.
- 10.30. Shoring must be expanded to support trench walls - install endplates as required.
- 10.31. The access/egress ladder must be in place while persons are in the excavation as per *Occupational Health and Safety Regulations (1996) Section 269(1)(a, b) Requirements Before Confined Space Is Entered.*
- 10.32. Labourers shall observe the trench walls for signs of collapse throughout the repair.
- 10.33. If at any time a bottom labourer is in danger, the other labourers must immediately summon their exit from the excavation.
- 10.34. The labourers will ensure the tools and crew trailer are clean and in proper working order.
- 10.35. The top labourer will assemble and pass all the required tools and materials to the bottom labourer.
- 10.36. The sewer main is repaired in accordance with the Trainee Manual.
- 10.37. The Supervisor IV will determine how much pipe to replace.
- 10.38. Ensure the sewer main repair is properly bedded and coupled. (Patching the sewer main is not an acceptable repair).
- 10.39. When reconnecting service connections to the sewer main, service saddles are to be installed.
- 10.40. The Supervisor IV will ensure the repair meets all specifications and recommended practices.
- 10.41. Backfill all buried utilities as required by their owner's specifications, and confirm backfill specifications have been met.
- 10.42. The top labourer will direct the tandem axle truck operator to dump the backfill material.

- 10.43. The Supervisor IV ensures backfill material meets the requirements in the *City of Saskatoon Standard Construction Specifications and Drawings Roadways, Water and Sewer, 2000 Edition*
- 10.44. Soil and granular material must be compacted to a standard proctor density minimum of 98% and be free from frozen or substandard backfill material.
- 10.45. Non-shrink backfill must be used beneath concrete or paving stone sidewalks or driveways.
- 10.46. Pavement cut will be left down if instructed by the Asphalt Supervisor.
- 10.47. Final grade of all excavations must be smooth and level.
- 10.48. All tools and the excavator bucket must be disinfected as per the requirements in the *WS-A01 Water Quality SOP (Current Version)*.
- 10.49. Driveways, road surfaces and sidewalks must be swept clean.
- 10.50. The Supervisor IV will inspect the site for cleanliness before leaving the site.
- 10.51. All unnecessary traffic control devices will be removed from the roadway prior to leaving the site.
- 10.52. The Supervisor IV must ensure that the form(s) are completed and submitted the day the job is completed.
- 10.53. The Clearances and Locations Work Group will update the manual and electronic records.

11. Associated Forms:

- 11.1. Sewer and Water Maintenance Memo
- 11.2. Daily Work Report
- 11.3. Foreman's Job Report
- 11.4. Worksite – Safety Check Sheet
- 11.5. Deep Excavation Notification Form
- 11.6. Weekend Material Data Sheet
- 11.7. Confined Space Entry Inspection Form
- 11.8. Work Method Checklist
- 11.9. Aggregate Tracking Ticket