City of Saskatoon

Public Works Operations Manual

Standard Operating Procedures for Water and Sewer

WS-A215 – Hydrant Replacement

1. Objective:

1.1. To replace the hydrant in a timely and efficient manner, while minimizing disruption in service to the customer.

1.2. To ensure the hydrant replacement meets current standards.

2. Scope:

2.1. The City Of Saskatoon is responsible for servicing and maintaining over 5300 fire hydrants spread throughout the city. The majority of the time hydrant replacement is of such a nature that replacements are pre-planned.

2.2. The hydrant inspection program determines which hydrants to replace.

2.3. Hydrants without breakaway flanges, hit by vehicles may require emergency replacement.

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 338 Asbestos Surfaces and 339 Ventilation Equipment
vi. Section 269(1)(a, b) Requirements Before Confined Space Is Entered

3.2. Traffic Control Manual

3.3. WHMIS

3.4. City of Saskatoon Policy and Procedures for Confined Space Entry (1997)

3.5. City of Saskatoon Policy number A04-011 (B)(4) - Safety Rules and Personal Protective Equipment

3.6. City of Saskatoon Standard Construction Specifications & Drawings, Roadways, Water and Sewer 2000 Edition

3.7. The Environmental Management and Protection Act 2002 and The Water Regulations, 2002

3.8. WS-A01 Water Quality SOP (Current Version)

4. Outstanding Issues:

4.1. Completion of the trainee manual, trainer's tool kit and work method check list

4.2. Completion of WS-A01 Water Quality SOP

4.3. Better collection and recording of information pertinent to replacement.

4.4. Creation of a SOP for Backfilling
4.5. Creation of a Procedure for Primary Watermain Shut Down

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 replacement 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 replacement site.
v. Ensures the Deep Excavation Notification form has been submitted prior to excavation.
vi. Notifies the public of a water outage in the case of a planned replacement.
vii. Requests the sign shop and/or the labourers install appropriate traffic control devices, when required.
viii. Ensures appropriate traffic control devices are in place.
ix. Confirms the de-energizing of any buried utilities and relays the information to the applicable staff, if required.
x. Coordinates and selects the equipment required to successfully complete replacement.
xi. Acquires materials for the replacement.
xii. Ensures all staff follow the regulations for confined space entry.
xiii. Ensures that all shoring equipment is in proper working order and installation is in compliance with all regulations.
xiv. Deploys the crew of operators and labourers to the job site.
xv. Supervises all subordinate staff, while available to do so.
xvi. Identifies hydrant location and size of excavation.
xvii. Determines with the excavator/backhoe operator, the most suitable way to excavate.
xviii. Ensures subordinate staff, are aware of, understand and follow all safety rules and regulations.
xix. Ensures all utilities have been supported as required by their owner's specifications.
xx. Determines the length of hydrant branch to be replaced
xxi. Is aware of other construction/maintenance activities in the immediate vicinity of the replacement site that may be affected by the replacement activities.
xxii. Ensures proper cleaning, disinfection, flushing, sampling and testing methods are adhered to, by monitoring and/or performing them.
xxiii. Ensures replacement meets standards and recommended practices.
xxiv. Ensures backfill standards are met.
xxv. Inspects work area to ensure it is clean, safe and tidy during and at completion of the replacement.
xxvi. Ensures that a plan of the closed valves is submitted to the Valve Supervisor.
xxvii. Ensures that all required forms and documentation are completed and submitted - at the end of 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 replacement 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 the 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. Disinfects tools, equipment and materials before use.
xii. Exposes hydrant and hydrant branch.
xiii. Prepares hydrant and hydrant branch for replacement.
xiv. Plugs the hydrant drainpipe if present.
xv. Replaces hydrant and hydrant branch.
xvi. Ensures hydrant is properly aligned.
xvii. Observes for leaks, following replacement and re-pressurization.
xviii. Installs Cathodic protection.
xix. Mechanically compacts backfill material.
xx. 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. 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. Installs shoring as per manufacturers recommendations.
vi. Ensures tools and crew trailer are clean and in proper working order.
vii. Disinfects tools, equipment and materials before use.
viii. Assembles the required replacement materials.
ix. Passes all required tools and material to the bottom labourer.
x. Observes trench walls for cracking and/or movement of soil that could indicate potential for collapse.
xi. Warns bottom labourer of imminent danger and immediately summons their exit.
xii. Installs hydrant throttle valve.
xiii. Installs hydrant hose or diffuser and directs flows to the storm sewer system if possible.
xiv. Operates the hydrant.
xv. Energizes the watermain.
xvi. Directs the tandem axle truck operator to dump the backfill material.
xvii. Cleans the area around the excavation.

xviii. 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 replacement 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 the 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. Excavates around hydrant.
ix. Assists with shoring installation.
x. Backfills excavation to meet current standards.
xi. Ensures the final grade of the excavation is smooth and level.

7. Inputs:

7.1. Daily work instructions
7.2. Water Service Disruption Report
7.3. Drawings
7.4. Utility Clearances

8. Outputs:

8.1. Replacement of Hydrant
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 out the water and sewer lines and meet the other utility representatives at the replacement 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 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. Before beginning 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 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 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 hydrant 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 the *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. Asphalt and/or concrete must be stripped, separated and hauled to a designated reclamation site.

10.19. Where possible excavate parallel to the hydrant branch. Consider the location of other buried utilities.

10.20. Excavate the area around the hydrant in accordance with the *Occupational Health and Safety Regulations (1996) Section 260 Excavation and Trenching.*

10.21. The labourers must locate and expose (shallow buried) underground utilities by hand.

10.22. 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.*

10.23. Support all buried utilities as required by their owner's specifications.

10.24. The labourers shall inspect shoring before use.

10.25. The Supervisor IV will confirm that the shoring is in proper working order and installation is in accordance with regulations.

10.26. Personnel are kept clear when lifting and lowering shoring and/or materials.

10.27. The shoring is installed with the assistance of the excavator/backhoe in accordance with manufacturer's recommendations and the *Occupational Health and Safety Regulations (1996)Section 261(2) Temporary Protective Structures.*

10.28. Shoring must be placed in excavation in such a manner as not to disturb any buried utilities.

10.29. Shoring must be expanded to support trench walls and endplates installed if required.

10.30. 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.*

10.31. Labourers shall observe the trench walls for signs of collapse throughout the replacement.

10.32. If at any time a bottom labourer is in danger the other labourers must immediately summon their exit from the excavation.

10.33. The labourers will ensure the tools and crew trailer are clean and in proper working order.

10.34. The top labourer will assemble and pass all the required tools and materials to the bottom labourer.

10.35. The labourers will disinfect tools and equipment before use on the hydrant replacement as per as the *WS-A01 Water Quality SOP (Current Version).*

10.36. The hydrant will be replaced according to the Trainee Manual.

10.37. Replace hydrant branch up to 1m (3ft) beyond the face of curb.

10.38. If present the hydrant drainpipe must be plugged.

10.39. The pipe must be thoroughly cleaned.

10.40. The hydrant gasket must be clean and flexible (warm to insure flexibility if required).

10.41. Ensure coupler and pipe ends are aligned.

10.42. Ensure the hydrant stands plumb, the hose nozzles are parallel with the curb and the pumper nozzle is aligned with the hydrant branch.

10.43. Ensure hydrant breakaway flange is at proper grade.

10.44. Hydrants should never be used to throttle water flow and shall be operated only in the fully open position.

10.45. Do not force the hydrant in the opening direction beyond the fully open position.

10.46. Open hydrants quickly and close very slowly.

10.47. Ensure the hydrant is shut off completely

10.48. Compression hydrants must not be over tightened.

10.49. A quickie saw is not recommended on asbestos cement pipes as pipe containing asbestos will create dangerous airborne particles while cutting. *Occupational Health and Safety Regulations (1996) Section 338 Asbestos Surfaces and 339 Ventilation Equipment.*

10.50. A recognized dangerous goods carrier must transport asbestos-cement pipe pieces over 5-kgs, information on handling asbestos can be found with *WHMIS*.

10.51. Install Cathodic Protection as per the Trainee Manual and the *City of Saskatoon Standard Construction Specifications & Drawings, Roadways, Water and Sewer 2000 Edition*10.51. Couplers must be blocked securely.

10.52. The top labourer will install the throttle valve and discharge hose for the hydrant flushing, and operate the hydrant.

10.53. The water line shall be re-energized/filled.

10.54. The Supervisor IV will perform or monitor the performance of the water line flushing and water quality testing in accordance with *The Environmental Management and Protection Act 2002 and The Water Regulations, 2002* .

10.55. The bottom labourer will observe the new replacement for leaks.

10.56. The Supervisor IV will ensure the repair meets all specifications and recommended practices.

10.57. Backfill all buried utilities as required by their owner's specifications and confirm backfill specifications have been met.

10.58. The top labourer will direct the tandem axle truck operator to dump the backfill material.

10.59. The Supervisor IV ensures backfill material meets the requirements in the *City of Saskatoon Standard Construction Specifications & Drawings, Roadways, Water and Sewer 2000 Edition*10.59. Soil and granular material must be compacted to a standard proctor density minimum of 98% and be free from frozen or substandard backfill material.

10.60. Non-shrink backfill must be used beneath concrete or paving stone sidewalks or driveways.

10.61. Pavement cut will be left down if instructed by the Asphalt Supervisor.

10.62. Final grade of all excavations must be smooth and level.

10.63. Driveways, road surfaces and sidewalks must be swept clean.

10.64. The Supervisor IV will inspect the site for cleanliness before leaving the site.
10.65. All unnecessary traffic control devices will be removed from the roadway prior to leaving the site.
10.66. The Supervisor IV will submit a plan of the closed valves to the Valve Supervisor.
10.67. The Supervisor IV will ensure that all the required forms and documentation are complete and submitted - at the end of the day the job is completed.
10.68. The Clearances and Locations Work Group will update the manual and electronic records.

11. Associated Forms:

11.1. Water Service Disruption Report
11.2. Daily Work Report
11.3. Foreman's Job Report
11.4. Worksite – Safety Check Sheet
11.5. Standard Distribution System Flushing and Sampling Form
11.6. Deep Excavation Notification Form
11.7. Confined Space Entry Inspection Form
11.8. Weekend Material Data Sheet
11.9. Work Method Checklist
11.10. Aggregate Tracking Ticket