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Public Works

Operations & Maintenance Performance Standards

March 27, 2017

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Public Works Maintenance Management Program

Concept

The Public Works Maintenance Management Program (MMP) is based upon setting attainable goals for the inspection and maintenance of various infrastructure asset groups (Namely; Transportation Assets, Wastewater and Stormwater Assets, and Water Distribution Assets) and includes the Operation and Maintenance Performance Standards of each of these assets. Having a planned MMP creates a focus on regular inspection and reporting of the assets. Asset defects are noted and prioritized for repair based upon severity and liability potential and are scheduled for completion in accordance with stated repair timeframes in the Performance Standards.

Each Section of the MMP contains a summary of the O&M Performance Standards (outlining the frequency of focused asset inspections and severity of hazard) for each Asset Group followed by the detailed O&M Performance Standards for each of the Assets in the Group.

Program Development

The MMP has been developed in accordance with similar municipal and Provincial programs, industry standards, and best practices.

The basis for the Transportation Services O&M Performance Standards approach aligns with a provincially mandated regulation for the Ontario municipalities entitled “Minimum Maintenance Standards for Municipal Highways”. The minimum maintenance standards were developed to provide municipalities with a defense against liability from actions arising with regard to levels of care on roads and bridges. A necessary component of the legislation requires that municipalities undertake regular patrolling inspections of the roads to note any asset defects present.

The basis for the Stormwater and Wastewater Collection O&M Performance Standards are industry best practices, the National Guide to Sustainable Municipal Infrastructure (InfraGuide Best Practices), and Environment Canada and the United States Environmental Protection Agency (USEPA) guidelines.

The basis for the Water Distribution O&M Performance Standards are a combination of the Town of Truro’s existing maintenance program, and a set of standards developed by Halifax Water in conjunction with the Municipal Public Works Association of Nova Scotia based on best practices and guidelines developed by the American Water Works Association (AWWA) and the National Guide to the Sustainable Municipal Infrastructure (InfraGuide Best Practices).

Similar to the Transportation Services O&M Performance Standards the Stormwater/Wastewater Collection, and Water Distribution O&M Standards rely on regular inspections to note asset defects but unlike Transportation they are more rigorous and therefore are at less frequent intervals.

Customer Service Requests / Tracking Planned Work

While the program strives to achieve self sufficiency in locating all asset defects, and addressing regular maintenance requirements in a planned, preventative maintenance manner, there will always be calls from the public requesting service or to report a hazardous defect that requires repair. These Customer Service Requests (CSR's), also known as Demand Work or Demand Calls, must be addressed in a prompt, efficient manner, with emphasis on prompt acknowledgement to the client, advising them that their request has been received, recorded, and will be addressed within the specified timeframes.

Customer Service Requests (CSR's), will require (email or telephone) response within Three (3) days of receiving of the request. The client will be advised that the request has been received, the site inspected, and the expected timeframe for repair. All CSR's will be tracked and progress updated through the SysAid Tracking System.

The tracking of planned work, and the retention of work records for all maintenance and emergency work, is best handled by a work order system. In the interim, the SysAid Tracking System will be used to plan scheduled preventative maintenance inspections/tasks and identified infrastructure repairs. The internally generated service requests will be categorized under the "Pending" status and completion times tracked through the follow up dates, which will reflect the work completion timeframes as specified in the performance standards. The status of all service requests will be regularly tracked by management to ensure that assigned requests are being addressed within performance standards' timeframes. When completed work requests are closed, the Solution field will reflect units of work completed for further follow up on output performance to standards and cost/unit of output.

Roadway Patrol

The roadway patrol function is a key component of the MMP, with a primary objective to identify and report asset defects with a hazard potential within the street rights of way. Designated routes with specified inspection frequencies based upon Street Classifications (and traffic volumes) will be patrolled with a holistic approach to the identification of defects for creating work orders for scheduling work on assets maintained by Truro Engineering & Public Works. Over time, and through repeated road patrols of the street network, and addressing the hazard potential defects as they appear, TEPW will be in better position to focus efforts and resources to a greater extent on planned (preventative) maintenance work, which will aid in prolonging the useful life of various asset groups.

Roadway Classification	Arterials	Collectors	Local Collectors Local Industrial	Local Roads
Patrol Frequency	Every 7 days *	Every 7 days	Every 14 days	Every 30 days
Classification Examples	Willow St Queen St	Prince St Glenwood Dr	Park St Polymer Rd	South St Centre St

*- Calendar days

Asset Defect Classifications

Throughout the Transportation Services O&M Performance Standards section, there are references to a number of types of defects, namely:

Emergency – Major defects posing an immediate threat to motorists or pedestrians (ie malfunctioning traffic signals, collapsed infrastructure)

Hazard Potential – Serious asset defects that may pose a threat to motorists or pedestrians, especially if the defect is not noticed by drivers or pedestrians (ie large deep potholes, missing regulatory traffic signs)

Planned Maintenance – Minor defects that while not posing an immediate threat, may deteriorate further to a potential hazard over time if left unaddressed.

Meeting Performance Standard Timelines

While every effort shall be made to complete required works within the timelines specified in the performance standards, it is recognized that timelines may not be achievable under conditions beyond TEPW control. Situations such as major infrastructure failures, unsuitable weather conditions, severe storm conditions and major vehicle accidents, may delay work completion within specified time limits. In those situations, the Manager or Supervisor shall document the conditions and correct the deficiency as soon as practically possible.

Capital Works Considerations

Public Works staff shall reference the Capital Work Projects list when determining maintenance response levels for requested works. While defects classified as "Emergency" or "Hazard Potential" must be addressed from a liability perspective, the degree or method of repair may be modified dependent upon whether the site in question is scheduled for capital reconstruction. Similarly, planned maintenance works may be curtailed pending the Capital work, providing that vehicle and pedestrian safety is not compromised as a result.

Operating Budget Considerations

The enhanced inspection efforts as outlined in this program will generate numerous infrastructure defects, and although priority will be placed on emergency and hazard potential defects for completion, the balance of planned maintenance defect repairs may exceed annual budget capacity.

In an effort to provide effective customer service, any service requests that were not considered for priority repair, should be scheduled for completion during the construction season.

TRANSPORTATION SERVICES OPERATIONS AND MAINTENANCE PERFORMANCE STANDARDS SUMMARY

Activity	Inspection	Repair	Arterials	Collectors	Local Ind/ Collectors	Local Streets
Roadway Patrol	As Indicated	N/A	every 7 days	every 7 days	every 14 days	every 30 days
Sidewalk Maintenance	Annual/Patrol	Hazard ≥ 2cms-Mark/make Safe Repair/Planned Maintenance	14 days 150 days	14 days 150 days	14 days 150 days	14 days 150 days
Private Road Maintenance	Patrol	pothole patching & winter ops				
Shoulder Maintenance	Patrol	Emergency: ≥8cm deep,≥20M long	Mark:1 day Repair: 7 days	Mark: 1 day Repair: 7 days	Mark: 1 day Repair: 14 days	Mark: 1 day Repair: 30 days
		Hazard:≥8cm deep,localized	Mark: 3 days Repair 7 days	Mark: 3 days Repair: 14 days	Mark: 3 days Repair: 30 days	Mark: 3 days Repair: 60 days
		Planned Maint:minor washouts	Before winter	Before winter	Before winter	Before winter
Gravel Streets	Spring/Patrol	Spring grading ,then spot repairs				
Asphalt Patching	Patrol	Emergency:area≥1000cm²,≥ 8 cm	Sign Immediately Repair: 4 days	Sign Immediately Repair: 4 days	Sign within 24 hrs Repair: 7 days	Sign within 24 hrs Repair: 14 days
		Hazard: area≥1000cm², 5- 8cm	Repair: 7 days	Repair: 14 days	Repair: 14 days	Repair: 30 days
		Planned Maint	Before winter	Before winter	Before winter	Before winter
Street Sweeping	Patrol	Spring clean up -all streets & S/W's Sweep dowtown streets monthly Sweep all streets late fall				
Guardrail Maintenenance	Annual/Patrol	Emergency:failed/missing rail	Mark: 3 days Repair: 60 days	Mark: 3 days Repair: 60 days	Mark: 3 days Repair: 60 days	Mark: 3 days Repair: 120 days
		Hazard: Damaged	Repair: 60 days	Repair: 60 days	Repair: 60 days	Repair: 120 days
Bridge Maintenance	Patrol Level1:semiannually Level2:bi-annually					
Sign Maintenance	Annual/Patrol	Primary Reg & Warning signs	1 day	1 day	1 day	1 day
		Other Reg & Warning signs	14 days	21 days	30 days	30 days
		Information & Street Name signs	30 days	30 days	30 days	30 days
Pavement Markings	Patrol	Centrelines & lane lines: annually intersections,Xwalks,arrows -2X/yr				
Traffic Signal Maintenance	Annual/Patrol Conflict - 2X/yr	Primary Defects Other Defects	Immediately 3 days	Immediately 3 days	Immediately 3 days	Immediately 3 days
Street Light Maintenance (Town Owned)	2 X/yr	Repairs within 30 days				

Proposed Transportation Services Operations and Maintenance Performance Standards

Revised – March 18, 2013

Activity –Sidewalk Maintenance

Objectives

Sidewalks allow a safe avenue for pedestrians to traverse alongside a street or roadway ,away from the surface traveled by the motoring public. The objective is to maintain the sidewalks to a standard that will allow safe passage by pedestrians, handicap scooters , and vehicles traversing from the roadway onto private or public property.

Maintenance Standard

An annual inspection and rating program shall be undertaken on the entire sidewalk inventory , noting all defects for repair as warranted .

If a surface discontinuity (vertical offset) on a sidewalk exceeds two (2) centimeters , the minimum standard is to treat the surface discontinuity within fourteen (14) days after becoming aware of the defect. Treating the discontinuity means taking reasonable measures to protect sidewalk users , including making permanent or temporary repairs , alerting users' attention to the discontinuity or preventing access to the area of discontinuity .

Once the site is made safe (spray painting the step may be sufficient) , planned replacement or other permanent repair such as grinding , shall be completed with 150 days of notice.

Should sidewalk slab replacement be considered for any defect repair , the sidewalk rating report should be reviewed to ensure that the sidewalk in question is not scheduled for Capital project replacement within the next 3 years .

Sidewalk median areas of sod , brick pavers , or tree grates/wells should be inspected to ensure any gaps or low spots (capable of causing an ankle twist) should be marked and addressed in the same timeframe as a surface discontinuity.

Safety

In addition to following the safe work procedure for a specific task or equipment operation , ensure the following requirements are met where applicable :

Conduct a work site hazard assessment prior to undertaking the work .

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual .

Record Information

Work Orders – Work order records shall include date(s) of work , hours of staff utilized , hours of equipment used , materials , and units of work output.

Customer Service Requests (Demand)– Call log shall be updated noting inspection date , call back date , action taken , work order number, date completed (or forecast for completion) and inspector responsible .

Activity – Curb and gutter maintenance

Objectives

Curbs are structures placed typically near the edge of a roadway to define the edge of the travelled way and to keep water contained within the roadway until it reaches a storm drainage structure.

The objective is to maintain the structural integrity of the asset by repairing any defects that could pose a safety hazard to pedestrians and motoring public, as well as continued conveyance of runoff from the street's travelled way.

Maintenance Standard

Curbs and gutters are inspected annually coincident with the sidewalk inspection program. Deficiencies noted and prioritized for repair, subject to budget funding availability.

Broken curb sections laying in roadway, or heaved curbing in a driveway would be classed as an emergency. Damaged sections would be cleaned up and removed with one day of the request or observation.

Broken or missing sections of curb in an area where there is potential for flooding of abutters, or the proximity to the sidewalk may pose a trip hazard, shall be inspected and treated within 7days of receiving notice. Treating the defect means taking reasonable measures to protect pedestrians, including making permanent or temporary repairs, alerting users' attention to the discontinuity or preventing access to the area of discontinuity. In the case of missing curb with potential for property flooding, emergency temporary repair of the damaged section shall be completed before the next forecast rain event greater than 30 mms.

Permanent concrete repairs shall be undertaken primarily during regular construction season (April 1to Oct 31), and planned maintenance works (ie those defects not considered emergency or hazardous), shall be completed within 150 days of notice.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable:

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual.

Record Information

Work Orders – Work order records shall include date(s) of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests (Demand) – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.

Activity - Private Road Maintenance

Objectives

Private roads are not owned by the municipality, nor have they been accepted as public streets. However, the Town of Truro provides minimal maintenance to the following streets: ~~Clyke St~~, Dryden Ln, ~~High St~~, McIntyre Lane (also known as Fairview St), McNutt Lane, ~~Mingo Ln~~, and Paradise Lane. and Watson Lane.

Maintenance Standard

Minimal maintenance is limited to minor pothole patching and winter plowing (after all public streets have been plowed.)

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable:

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual.

Record Information

Work Orders – Work order records shall include date(s) of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests (Demand) – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.

Activity – Shoulder Maintenance

Objectives

Shoulder maintenance is undertaken on streets with a rural cross section, to remove pavement shoulder driving hazards, to maintain proper road surface sheet-flow drainage, and to provide lateral support to the road structure.

Maintenance Standard

Repair of wash outs, low shoulders and narrow shoulders of roads with unpaved shoulders by the addition of gravels, recycled asphalt or other approved materials.

A shoulder drop-off is considered to be a low shoulder if drop-off is greater than or equal to 8 cm for a continuous distance of 20 meters or more.

Service Response by Defect Classification

Defect Classification	**Arterials**	**Collectors**	**Local Collectors Local Industrial**	**Local Roads**
Emergency (shoulder drop-off)	1 day to mark[1] 7 days to repair	1 day to mark 7 days to repair	1 day to mark 14 days to repair	1 day to mark 30 days to repair
Hazard Potential [2] (Localized washouts 8cms or greater in depth)	3 days to mark 7 days to repair	3 days to mark 14 days to repair	3 days to mark 30 days to repair	3 days to mark 60 days to repair
Planned Maint.[2] (Minor wash outs , correct shoulder grade from edge of pavement)	Schedule for completion prior to winter and subject to budget finding availability	Schedule for completion prior to winter and subject to budget finding availability	Schedule for completion prior to winter and subject to budget finding availability	Schedule for completion prior to winter and subject to budget finding availability

Notes:

1- Temporary marking may constitute using traffic cones or reflectorized construction barricades.

2-Emergency or potentially hazardous conditions shall be posted with appropriate hazard signage if repairs are unable to be completed within the prescribed service response time.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable:

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual.

Record Information

Work Orders – Work order records shall include date(s) of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests (Demand) – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.

Activity - Gravel Road Grading

Objectives

Road grading restores the roadway surface to improve riding quality and ensure that the roadway drains properly.

Maintenance Standard

Limited to demand response on the minor inventory of gravel roads (Victoria Park, Water treatment plant access road, Railway St)

Annual program to include spring scarification, grading and rolling to re-establish roadway crown. Thereafter, maintenance should be limited to spot grading of potholes and dust control when necessary.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable:

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual.

Record Information

Work Orders – Work order records shall include date(s) of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests (Demand) – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.

Activity - Asphalt Patching

Objectives

Asphalt surfaces are maintained and repaired by placing and compacting hot or cold mix asphalt in surface defects to restore riding quality and prevent moisture intrusion.

Timely asphalt patching reduces traffic hazards to the motoring public, minimizes surface water intrusion into the subgrade, and mitigates further deterioration of the asset.

Maintenance Standard

Paved streets are inspected annually, with noted deficiencies prioritized for repair.

Service requests are inspected and addressed in accordance with the response table below. Winter season demand response shall utilize cold mix asphalt for temporary repair, or recycled hot mix if available.

Defect Classification	Arterials	Collectors	Local Collectors Local Industrial	Local Streets
Emergency Surface area >1000cm², Depth 8 cm	Sign immediately Repair within 4 days	Sign immediately Repair within 4 days	Sign within 24 hours Repair within 7 days	Sign within 24 hours Repair within 14 days
Hazard Potential Surface area . 1000cm², Depth 5-8 cm	Repair with 7 days	Repair within 14 days	Repair within 14 days	Repair within 30 days
Planned Maintenance Potholes & surface irregularities	Repair within construction season [1]	Repair within construction season [1]	Repair within construction season [1]	Repair within construction season [1]

Notes:

1- Planned maintenance asphalt patching shall be undertaken in localized blocks of work based on observed defects from the annual pavement inspection and observed and reported requests. Planned works are undertaken during the construction season when hot mix asphalt is readily available, and operating budget funding is available.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable:

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual.

Record Information

Work Orders – Work order records shall include date(s) of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests (Demand) – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.

Activity - Street Sweeping

Objective

Street sweeping programs are implemented to regularly remove dirt and debris to improve the aesthetics and deter the buildup of materials in the storm sewer systems.

Maintenance Standard

Service provided April to November, with the program commencing with the spring clean-up of all streets.

Thereafter, the program includes monthly sweeping of all downtown streets in the Downtown Urban Core. Throughout the program season, regular road patrols will identify streets requiring sweeping.

All town owned parking lots shall be swept in the spring, and thereafter as required based upon observations and requests received. The spring clean up shall also include the sweeping of sidewalks and medians using sidewalk rotary brooms.

There shall be a final sweeping of all town streets in the fall before the advent of winter, after all leaves have fallen.

Each fall, a leaf pick up program will be organized by the Town, to promote homeowners to bag their leaves, and /or raking leaves to the curb.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable:

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual.

Record Information

Work Orders – Work order records shall include date(s) of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests (Demand) – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.

Activity – Guardrail Maintenance

Objectives

Guardrails are generally provided along roadways to provide vehicular protection from hazardous roadside areas such as structures, bodies of water, rock cuts and elevation drops of more than 3 metres.

The objective of guardrail maintenance is to ensure that the Municipality's inventory of guardrails are maintained in good repair to protect vehicular traffic from roadside hazard potentials.

Maintenance Standard

An annual walking inspection of the guardrail inventory shall be conducted, noting the condition of guardrails and posts, as well as compliance to specifications.

Response to observed or reported deficiencies shall be as follows:

Defect Classification	Arterials	Collectors	Minor Collector Local Industrial	Local Streets
Emergency – guardrail unable to perform as restraint	3 days to mark[1] 60 days to repair	3 days to mark 60 days to repair	3 days to mark 60 days to repair	3 days to mark 120 days to repair
Hazard Potential – Guardrail may be weakened by cracked posts , damaged rails	60 days to repair	60 days to repair	60 days to repair	120 days to repair

Notes –

1-Emergency precautions such as barricades, signs, or drums shall be used to warn the motoring public of the defect.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable:

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual.

Record Information

Work Orders – Work order records shall include date(s) of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests (Demand) – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.

Activity - Bridge Maintenance

Objectives

Regular inspection of bridge infrastructure components, and addressing noted deficiencies to reduce hazardous defects for motorist and pedestrians, as well as extending the life of the asset.

Maintenance Standard

Regular surface inspection, undertaken in conjunction with regular roadway patrols, shall include inspection of approach guard rails, chevron signage, pedestrian walkways, deck overlay, expansion joints, handrails, wheel guards, and other superstructure support members. Maintenance time frames of surface defects are based upon street classifications.

It should be noted that surface components of the bridge, ie, asphalt riding surface, guardrail installations, etc, are to be inspected and addressed in conjunction with their respective maintenance programs.

A level 1 visual bridge inspection (including superstructure and substructure components) shall be undertaken twice annually (normally spring and fall).

A level 2, detailed inspection, shall be undertaken by a structural engineering consultant once every two years.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable:

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual.

Record Information

Work Orders – Work order records shall include date(s) of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Demand – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.

Activity – Sign Maintenance

Objectives

Regulatory and warning signs are installed along the street right of way, in accordance with the Transportation Association of Canada (TAC) Manual of Uniform Traffic Control Devices and the Province of Nova Scotia Traffic Authority Regulations where applicable, to provide safe guidance for pedestrians, cyclists and motorists. Signage maintenance includes new installations, sign post maintenance, and other signs, such as street name signs, community signage, guidance, and destination signage.

The objective of sign maintenance is to ensure that the municipality's inventory of signage is in place, visible and legible to the public.

Maintenance Standard

All regulatory, warning, information, and street name signs will be inspected once a year, and if determined to be illegible, improperly oriented, obscured or missing, will be repaired or replaced in accordance with the timeframes designated below.

All regulatory and warning signs will be inspected once per year to determine if the signs meet retro-reflectivity requirements.

Regulatory or warning signs such as:

Checkerboard;

Curve sign with advisory speed tab;

Do not enter;

Load restricted bridge;

Low bridge;

Low bridge ahead;

One way;

School Zone Speed Limit;

Stop;

Stop Ahead;

Stop Ahead New;

Traffic Signal Ahead, New;

Two –Way Traffic Ahead;

Wrong Way;

Yield;

Yield Ahead;

Yield Ahead, New;

shall be replaced immediately, within 1 day of becoming aware of the defect on any road, regardless of roadway classification.

Demand response for the balance of regulatory and warning signs, per the Traffic Signs Regulations of the Motor Vehicle Act of Nova Scotia shall be as outlined in the following table, which also outlines response times for information and street name signs.

Signage Maintenance Response Timeframes

Roadway Classification	Arterial	Collector	Local Collector Local Industrial	Local streets
Primary Regulatory & Warning Signs	1 day	1 day	1 day	1 day
Other Regulatory & Warning Signs	14 days	21 days	30 days	30 days
Information* and Street Name Signs	30 days	30 days	30 days	30 days

*- Response time for information signs greater than 1 M^2 shall be 60 days if signboard requires replacement.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable:

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual.

Record Information

Work Orders – Work order records shall include date(s) of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests (Demand) – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.

Activity – Pavement Markings

Objective

Pavement markings are traffic control devices that are applied to the municipality's streets in accordance with the Transportation Association of Canada (TAC) Manual of Uniform Traffic Control Devices and the Province of Nova Scotia Traffic Authority Regulations where applicable, to provide safe and orderly movement of pedestrians, cyclists, and vehicular traffic.

The objective shall be to insure that all pavement markings are regularly repainted to ensure they are visible to motorists.

Maintenance Standards

Pavement marking program includes an annual repainting of all centerlines and lane lines, intersection markings, turning arrows, pedestrian crosswalks and stop bars, and twice yearly repainting of all major intersection markings, lane lines, turning arrows, pedestrian crosswalks and stop bars.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable:

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual.

Record Information

Work Orders – Work order records shall include date(s) of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests(Demand) – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.

Activity - Traffic Signal Maintenance

Objectives

The objectives shall be to provide improved safety and mobility by warning and guiding pedestrians, cyclists and vehicular traffic at signalized intersections and pedestrian activated crosswalk lights, by providing regular scheduled and emergency maintenance to maintain the traffic signals and crosswalk signals functionality, and maximize the assets' life cycle.

Maintenance Standard

An annual, detailed inspection of each traffic signal installation and pedestrian activated crosswalk lights (RA-5) shall be conducted, and shall include a physical inspection of all signal heads, pedestrian crossing heads, mounting hardware, traffic poles, pedestrian buttons, and traffic controller cabinet, mounting hardware, standards and base. A detailed electrical inspection of the controller cabinet hardware shall be conducted and recorded annually, as well as the inspection and testing of conflict monitors every 6 months.

In addition to the scheduled annual physical inspection of all traffic signal and pedestrian crosswalk hardware, the regular patrol function is expected to observe, record and report any recent deficiencies.

Maintenance Response

When any of the following defects are observed or reported for a traffic signal location, the maintenance response shall be immediate:

- One or more displays show conflicting signal indications.

- The angle of a traffic control signal or pedestrian control indication has been changed in such a way that the traffic or pedestrian facing it does not have clear visibility of the information conveyed or that it conveys confusing information to traffic or pedestrians facing other directions.

- A phase required to allow a pedestrian or vehicle to safely travel through an intersection fails to occur.

- There are phase or cycle timing errors interfering with the ability of a pedestrian or vehicle to safely travel through an intersection.

- There is a power failure in the traffic control signal system or the pedestrian activated crosswalk lights.

- The traffic control signal system cabinet has been displaced from its proper position.

- There is a failure of any of the traffic control signal or pedestrian activated crosswalk lights support structures.

- A red traffic signal lamp or a pedestrian "Don't Walk" signal is not functioning.

- Traffic signals are flashing when flashing mode is not a part of the normal signal operation.

All other observed or reported traffic control signal or pedestrian activated crosswalk light defects not detailed above, shall be repaired within 3 days of notice.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable:
Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual.

Record Information

Maintenance file(s) should be maintained to all traffic signals and pedestrian crosswalk lights referencing all work orders issued for maintenance. Files should also contain records of all contracted service, annual controller and semi-annual conflict monitor inspection and testing.

Work Orders – Work order records shall include date(s) of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests (Demand) – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.

Activity - Street Light Maintenance

Nova Scotia Power own and provide maintenance requirements to the majority of Truro's street lights. Decorative street lamps owned by the town are serviced by the electrical contractor.

Maintenance Standard

Town owned street lights shall be inspected twice per year. Observed or reported light failures shall be repaired within 30 days of notice.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable:

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual.

Record Information

Work Orders – Work order records shall include date(s) of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests (Demand) – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.

Activity - Snow and Ice Control

On call duty supervisors, utilizing Environment Canada and the Weather Network forecast information, augmented by Truro Police Dept dispatch, will initiate snow and ice control measures commensurate with observed conditions.

Initial response commences with salt application on all streets, with an escalation of resources for plowing called in dependent upon the forecast and observed conditions. Plowing, followed by salting, will continue after storm's end until near bare pavement conditions are achieved.

Generally, sidewalk snow clearing operations do not commence until storm's end, however, in an effort to provide plowed sidewalks for the start of business /school day, plows will be dispatched at 4am to provide interim clearance.

Snow and Ice Control Level of Service Summary

Classification[3]	Arterials	Collectors	Local Collectors Local Industrial	Local Streets	Sidewalks
Primary Objective	Essentially bare pavement	Essentially bare pavement	Essentially bare pavement	Centre bare 2.5M to 5M	Essentially bare pavement
Time to meet primary objective after the end of the storm [1]	6 hours	6 hours	6 hours	12 hours	8 hours
Salting Application [4]	Beginning of the storm and during, as required.	Beginning of the storm and during, as required.	Beginning of the storm and during, as required.	Beginning of the storm , where required and after.	After sidewalks have been plowed
Salt Application Rate (2 lane street))	50 – 250 kg	50 – 250 kg	50 – 250 kg	50 – 250 kg	50 – 250 kg
Plowing Begin plowing when snow accumulation reaches	≤ 5cm	≤ 5cm	≤ 5cm	During storm as required[5]	See note[2]

Notes:

1-Under extreme winter weather conditions such as high winds with blowing snow, post storm temperatures less than - 10° C, or snowfalls exceeding 30 cms, clean up timeframes and primary objectives will not be met.

2-Sidewalk snow clearing shall normally commence in the early morning hours to ensure that sidewalks in areas adjacent to schools, and sidewalks in the downtown business district, have been plowed prior to commencement of the business day.

3- Streets with grades ≥ 8% may shift upwards in classification hierarchy for the purpose of winter level of service treatment.

4- Salting applications may commence prior to the start of a forecast weather event (ie pre-salting) or in response to an abrupt drop in temperature where road surface moisture may freeze (ie black ice).

5-Whereas normally, local streets are not plowed until after the storm has ended, and all arterials and collectors have been plowed, in heavier accumulation storms, interim plowing passes may be made on the local street network to facilitate traffic movement.

Snow Removal

In an effort to enhance pedestrian mobility in the downtown business district, when curbside snowbanks adjacent to the sidewalks reach a height of 50 centimeters, snow removal operations will commence in accordance with the Snow Removal Priority List, noting priorities and removal timeframes.

Snow removal operations may commence before the specified snowbank height is reached if thaw/freeze cycles or freezing rain has created slippery conditions, or in advance of a forecast heavy snowfall, where additional street-side snow storage capacity is required.

Snowbank removal at intersections will be undertaken when obstructed intersection site visibility is confirmed by the Local Traffic Authority or his designate.

SNOW REMOVAL PRIORITY LIST					
Order	**Street**	**From**	**To**	**Rationale**	**Time**
1	**PRINCE ST**	King	Walker	(100% Commercial)	2am-9am
2	**INGLIS PL**	All		(100% Commercial)	2am-9am
3	**COMMERCIAL ST**	All		Commercial Parking Lot	8am
4	**DUKE ST**	Willow	King	narrow with business parking	Daytime
5	**KING ST**	Prince	Duke	narrow with business parking	Daytime
6	**DOMINION ST**	Prince	Duke	narrow with business parking	Daytime
7	**PLEASANT ST**	Prince	Duke	narrow with business parking	Daytime
8	**CHURCH ST**	Prince	Queen	narrow with business parking	Daytime
9	**HAVELOCK ST**	All		narrow with business parking	Daytime
10	**OUTRAM ST**	All		narrow with business parking	Daytime
11	**ESPLANADE**	Walker	Young	narrow with business parking	Daytime
12	**LOGAN ST**	All		narrow business traffic	Daytime
13	**FAULKNER ST**	All		narrow business traffic	Daytime
14	**MUIR ST**	All		narrow business traffic	Daytime
15	**ARLINGTON PL**	All		narrow business traffic	Daytime
16	**LOUISE ST**	All		narrow business traffic	Daytime
17	**REVERE ST**	All		narrow business traffic	Daytime
18	**DUKE ST**	King	Pleasant		Daytime
19	**FORRESTER ST**	All			Daytime
20	**VICTORIA ST**	All			Daytime
21					Daytime
22					Daytime
23					Daytime
24					Daytime
25					Daytime

Parking Lots

The Town of Truro provides plowing and salting (sanding on gravel surfaces) to the parking lots listed on the following table, with priority clearance on parking lots serving the Police and Fire Departments. Plowing will normally commence after the storm when the majority of streets have been cleared, and will normally be scheduled for plowing overnight when the lots are free of vehicles. If during the clean-up operation after a storm, another snowfall event commences, clearance priority reverts to the street network.

Location	No of	Surface	Rating
Farmers Market	2	A	
Havelock	3	A	
Walker	1	A	
East Prince St	1	A	
Old School House on Forrester	1	A	
Police and Fire Station	8		
East of Boys and Girls		A	
Forrester		A	
Police South		A	
Dwy between Police and		A	
Fire north		A	
Driveway east of normal		A	
North of		G	
South of		A	
Library	1	A	
Mattatall Funeral Home	1	A	
Old Junior High School on Victoria	1	A	
Old Civic Building on Prince	1	A	
New Civic Building on prince	1	A	
Old Fire Hall on Young	1	A	
CN Pensioners Club	1	A	
Old Jail on Queen St	1	A	
Corner of Louise St and Prince	1	A	
Revere St	2	A	
Dominion St	1	A	
Sunspun on Prince	1	A	
Tourist Bureau on Commercial	1	A	
Stadium on Lorne St	1	A	
Food Bank on Lorne	1	A	
Roman Catholic Church	1	A	
Douglas St School	1	A	
Victoria Park Pool	1	A	

Kiwanis Pond	2	A	
Robie St		A	
Juniper		G	
Victoria St	2		
Graveyard on Robie	1		
Pleasant St Water Tank	1		
Young St Water Tank	1		
Bulk Water on Lorne	1		
All Pumping Stations	6		
Juniper		G	
Prince St		G	
Brooks Lane		G	
Lower Truro Rd		G	
Willow St		G	
Longworth		G	

Record Information

All snow and ice activities shall be recorded on the storm record sheet.

Salting information from the loader records shall be checked against the salt trucks controller records.

Customer Service Requests (Demand) – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.

STORMWATER / WASTEWATER OPERATION AND MAINTENANCE PERFORMANCE STANDARD SUMMARY					
Activity	**Inspection**	**Preventative Maintenance**	**Cleaning**	**Repair**	**Reinstatement**
Catchbasins &Inlets	Spring & Fall Inspect priority listing prior to forecast rain events	Inspect priority listing prior to forecast rain events	25% of CB sumps annually	frame/cover within 30 days Structural - 120 days	Paving on Arterial immediately Collector- 24 hrs Local Collector- 48 hrs Local - 5 days
Manhole Maintenance	All Stm & San annually		Cleaned with lines	Frame/cover ≥25 mm higher or ≥30mm lower - 30 days Structural -120 days	Paving on Arterial immediately Collector- 24 hrs Local Collector- 48 hrs Local - 5 days
Lateral Maintenance	Laterals in Capital Project paving areas - 1 yr ahead			Immediate repair of failed eligible laterals ≤ 1981	Paving on Arterial immediately Collector- 24 hrs Local Collector- 48 hrs Local - 5 days
Pipe Maintenance	M/H & CCTV Inspection pgms		See Pipe Cleaning	Immediate repair of defects blocking flow Repair structural defects -120 days/budget availability	Paving on Arterial immediately Collector- 24 hrs Local Collector- 48 hrs Local - 5 days
Pipe Cleaning	Follow up M/H inspections In advance of CCTVI	Clean priority listing annually or as required	25% of piped inventory / year Mains in Capital Project paving areas - 1 yr ahead		
CCTV Inspection	10% of piped inventory /yr	Inspect all mains & laterals in Capital Project paving areas	All mains cleaned in advance of CCTV	Observed defects added to Pipe or Lateral repair list	
Pumping Stn Maintenance	Daily inspections Dry Pumps- quarterly Wet Pumps- semi-annually Electrical components and panel- annually	Verify check valves twice/yr	Pump and clean wet wells- semi-annually		
Ditch Maintenance	Inspect inventory annually				
Driveway Culvert Maint.				Collapsing driveway or culvert shall be replaced immediately Requested replacements within 30 days	New culvert installation within 10 days of request
Detention Pond Maint.	Annually inspect in spring Inspect /clear grates & inlets prior to forecast rainfall ≥ 30 mms.	Mow mid-June then monitor			

Proposed Operations and Maintenance Standards - Stormwater and Wastewater Collection

Revised March 17, 2015

Activity – Catch-Basin and Inlet Structure Maintenance

Objectives

To ensure that all catch-basins and inlet structures will convey stormwater effectively, and to reduce debris loading in the stormwater mains by regularly removing accumulated debris from the catch-basin sump. Catch-basins are regularly inspected, with noted structural deficiencies repaired to prolong asset life cycle and ensure the catch-basin will support traffic loading. Inlet structures are regularly inspected to ensure they are structurally sound and that the inlet grates are kept clear of debris to ensure their functionality during storm-flow conditions.

Maintenance Standard

Spring and fall inspection of all catch-basins and inlet structures to determine whether inlet grates are clear, to determine sump cleaning requirements, as well as structural repair requirements. Program cleaning and repairs based upon severity.

The catch-basin cleaning program will focus on basin sump restoration, with cleaning prioritized on debris accumulations approaching the elevation of the outflow pipe. The effectiveness of a catch-basin sump in preventing silt and debris from entering the piped storm system is lessened when the depth of accumulation in the sump is equal to or greater than 1/3 the distance from the base of sump to the invert of the outflow pipe.

Based upon the above noted criteria, approximately 25 % of the catch-basin inventory should be cleaned annually.

Priority list of sensitive inlets are inspected and cleaned prior to forecast significant rainfalls to ensure functionality during rainfall events.

Customer service requests will be investigated and actioned dependent upon the severity of the problem. Catch-basins or inlet structures which are not accommodating regular storm flows adequately will be addressed immediately if there is a risk of nearby property flooding.

Reported catch-basin structures that have been investigated and may be in danger of collapse will be immediately signed or barricaded. Repair work will be scheduled for completion within 30 days of receiving notice. If the damaged catch-basin is located in a driveway entrance and vehicular accessibility may be challenged, the work shall be scheduled for immediate repair.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the □ova Scotia Temporary □ orkplace Traffic Control □ anual.

□nderground or enclosed space work shall comply with □ova Scotia Confined Space □ntry Regulations.

Record Information

Inspection records for all catch-basins and inlet structures shall be maintained, noting date of inspection, and inspector.

□ aintain records of all repairs and cleaning undertaken, including date, location, action taken, and staff involved.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity – Manhole Maintenance

Objectives

To regularly inspect manholes, noting structural defects for repair, to ensure structural integrity for roadway loading and to extend the assets life cycle. To observe flow in each manhole to determine mitigative efforts required to restore normal flow characteristics.

Maintenance Standard

ll storm and wastewater manholes will be inspected annually, and will include a structural assessment, as well as observing flows for possible line cleaning requirements. bserved structural deficiencies and voids permitting groundwater infiltration will be prioritized for remediation, sub ect to budget funding availability.

anhole frame and covers that are 25 mm higher or 30 mm lower than the ad acent pavement will be classified as a defect for priority repair, and shall be repaired within 30 days. Pavement restoration timeframes shall be in accordance with those outlined for permits under the Town s ocal Improvement By- aw.

Reported manhole defects other than structural frame and cover defects shall be inspected, signed or barricaded as warranted, and repaired within 120 days.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the ova Scotia Temporary orkplace Traffic Control anual.

nderground or enclosed space work shall comply with ova Scotia Confined Space ntry Regulations.

Record Information

Inspection records for all manholes shall be maintained, noting location, structural observations, flow conditions, date and inspector.

Repair records shall note the date repaired, action taken, and staff involved.

Records of manhole repairs resulting in reducing groundwater infiltration should also be filed in the Infiltration /Inflow pro□ect files. □henever possible, an estimate of the infiltration entering the manhole □ie bucket test□, as well as a photo, should be completed before the leak is sealed.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity - Building Services (Laterals) Maintenance

Objectives

To provide maintenance services and construct new or replacement laterals as directed by the □ocal Improvement By-□aw.

Maintenance Standard

□ hile the homeowner is generally responsible for the maintenance of their building services, the Town provides a warranty for all building services constructed after 1□□1.

Should the Town receive notice that a building service is not functioning, the trunk main will be checked immediately to ensure that the public collection system is operating properly. If the stoppage is located in a section of lateral for which the town is responsible, the Town will ensure that service is restored as soon as possible.

□ hen constructing a new or replacement lateral, street asphalt restoration timelines shall meet the contractor timeframes as indicated in the Town of Truro □ocal Improvements By-□aw. These timelines are as follows□

□rterial - Immediately

Collector - within 2□hours

□ocal Collector □with □□hours

□ocal □within 5 days

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the □ova Scotia Temporary □ orkplace Traffic Control □ anual.

□nderground or enclosed space work shall comply with □ova Scotia Confined Space □ntry Regulations.

Record Information

Record all information pertaining to the inspection and if required, the nature of the repair work.

Repair records shall note the date repaired, action taken, and staff involved.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity - Pipe Maintenance

Objective

To ensure that the piped stormwater/wastewater collection system is free from structural defects that could impede flow or permit groundwater infiltration into the wastewater collection system.

Maintenance Standard

□aintenance response to repair observed structural defects □through CCT□□that are or could impede flow, and to repair defects allowing groundwater infiltration in the wastewater collection system. These observed defects will be prioritized and repaired sub□ect to budget availability. The cost benefits of trenchless repair technology shall be considered when determining repair techniques to utilize.

Reported system blockages /structural failures, will be addressed immediately to restore system functionality. Street restoration patching shall comply with the permit timeframes as laid out in the Town□s □ocal Improvement By-□aw.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the □ova Scotia Temporary □ orkplace Traffic Control □ anual.

□nderground or enclosed space work shall comply with □ova Scotia Confined Space □ntry Regulations.

Record Information

Repair records shall note the date repaired, action taken, and staff involved.

□ hen any structural repairs are undertaken on previously televised pipe sections, the CCT□ inspection report should be referenced to reflect the repair work completed.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity: Pipe Cleaning

Objective

To ensure that pipes are kept reasonably clean to maintain flow velocities and maintain the piped system□s flow carrying capacity.

Maintenance Standard

□oted problem areas shall receive regular flushing

□ll systems with flow irregularities noted during manhole inspections should be scheduled for cleaning, then re-inspected to determine if flow conditions have improved.

□ll underground pipe systems in streets scheduled for repaving under the Capital work program shall be cleaned in preparation of CCT□ inspection, to determine whether any piping requires structural repair prior to the paving of the street.

□n annual pipeline cleaning program shall be scheduled to clean approximately 25 % of the stormwater /wastewater piped inventory. The program will undertake cleaning by drainage area, starting with the upper reaches and proceeding downstream to the area□s outfall or collector/interceptor connection. Please note that preparatory cleaning for CCT□ inspection in advance of proposed Capital work pro□ects shall form part of the 25 % of piped inventory annual requirement.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the □ova Scotia Temporary □ orkplace Traffic Control □ anual.

□nderground or enclosed space work shall comply with □ova Scotia Confined Space □ntry Regulations.

Record Information

Cleaning records for all pipe sections shall be maintained, noting location, date cleaned, operator names, and any notes on the cleaning undertaken.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity – Closed Circuit Television Inspection (CCTV)

Objective

To monitor pipe condition, noting structural defects for subsequent monitoring/repair dependent upon the degree of deterioration, as well as defects permitting groundwater infiltration to enter the wastewater collection system.

Maintenance Standard

ny piped systems requiring frequent cleaning or exhibiting reduced flow conditions as evidenced through the manhole inspection program, will be televised to determine the nature/extent of the defect causing the flow obstruction.

ll stormwater/wastewater piped systems including laterals in areas scheduled for future capital paving pro ects shall be video inspected to determine the structural condition of the infrastructure.

n annual pipeline CCT program shall be scheduled to televise approximately 10 % of the stormwater/wastewater piped inventory. The program will undertake video inspection of pre-cleaned pipes by drainage area, starting with the upper reaches and proceeding downstream to the area s outfall or collector/interceptor connection. Please note that the Capital pro ect CCT program footage shall form part of the 10% of piped inventory annual requirement.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the ova Scotia Temporary orkplace Traffic Control anual.

nderground or enclosed space work shall comply with ova Scotia Confined Space ntry Regulations.

Record Information

Records for all pipe sections televised shall be maintained, noting location, structural observations, flow conditions, date and inspector. Information on pipe defects shall be maintained in a database for future repair programs.

□ hen any structural repairs are undertaken on televised pipe sections, the CCT□ inspection report should be referenced to reflect the repair work completed.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity - Pumping Station Maintenance

Objectives

Pumping stations/lift stations are utilized to pump wastewater to an adjacent gravity system at a higher elevation, or to convey wastewater a longer distance where gravity flow grades may be insufficient.

The objective of pumping station maintenance is to ensure that all station components, ie pumps, valves, control components, piping etc, are all regularly maintained, such that pumping station malfunctions are minimized.

Maintenance Standard

Pumping stations are inspected daily (7 days/week), with station readings recorded on the pump run sheets.

All stations have mounted trouble lights, and two pumping stations are tied into a SCADA system which has a notification system in the event of a malfunction. Project currently underway to replace the existing SCADA system and expand to connect all pumping stations.

Pumping station wet wells shall be pumped out and cleaned twice yearly.

Above ground pumps will be inspected quarterly for impeller condition and clearances, oil levels and condition.

Submersible pumps will be inspected twice annually for impeller condition and clearances, oil level and condition.

Check valves should be tested for proper operation twice annually.

Schedule annual inspection of electrical motor control equipment panel.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable:

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the Nova Scotia Temporary Workplace Traffic Control Manual.

Underground or enclosed space work shall comply with Nova Scotia Confined Space Entry Regulations.

Record Information

□ aintenance work undertaken at each station is recorded in log books located at each station.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity – Ditch Maintenance

Objective

Roadside ditches collect and convey roadway surface water as well as adjacent land drainage to local receiving waters or a piped storm system.

The maintenance objective is to maintain positive ditch flow at sufficient elevation to collect and convey runoff and to drain the adjacent roadways sub base.

Maintenance Standard

Ditch inventory shall be inspected annually in the spring to determine maintenance priority work for the construction season.

Ditching requests shall be inspected within 5 days of receiving notice, and should rehabilitative works be required, the repairs shall be completed within 30 days of notice.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the ova Scotia Temporary orkplace Traffic Control anual.

Record Information

ork rders ork order records shall include dates of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests emand Calls Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed or forecast for completion and inspector responsible.

Activity - Driveway Culvert Maintenance

Objective

To maintain driveway culvert installation in good condition, such that ditch flow is unimpeded, and the driveway is structurally capable of carrying vehicle loading.

Maintenance Standard

□emand driven □the Town is responsible for the replacement of deteriorated driveway culverts.

Replacement of an existing driveway culvert shall be immediate if the culvert is impeding flow and may collapse. Requested replacements shall be completed within 30 days.

□ request for a new driveway culvert installation shall be completed within 10 business days of the request.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the □ova Scotia Temporary □ orkplace Traffic Control □ anual.

Record Information

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity – Stormwater Detention Pond Maintenance

Objective

To ensure the stormwater detention system continues to function effectively, by providing adequate storage capacity for peak design flows, and thereafter to drain effectively.

Maintenance Standard

□ll detention ponds shall be inspected annually in the spring to ascertain condition. The spring inspection should focus on whether there is evidence of excessive sediment build up, and any evidence of basin or bank erosion. □reas of erosion shall be stabilized, and sediment build up shall be scheduled for removal. Pond inlets, outlet drains grates and overflow spillways shall be inspected and cleaned.

□egetation should be mowed by mid-□une, and monitored for build up through the summer.

□ll detention ponds shall be inspected prior to forecast rain events of more than 30 mms, to ensure that drainage grates are cleared.

Safety

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Record Information

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Water Distribution Operation and Maintenance Performance Standards Summary

Activity	Inspection	Scheduled Maintenance	Repair	Reinstatement
Water Main Repair			Immediate repair to restore service	Paving on arterial immediately Collector - 24 hrs Local Collector - 48 hrs Local - 5 days
System Flushing	turbidity,chlorine residuals and flow rates	Spring and fall system flushing flush booster pump system annually		
Hydrant Maintenance	Check paint condition Sound for system leakage	Cycle hydrants and isolation Valves annually	schedule repair of identified defects Repaint hydrants , 3 to 5 years	
Valve Maintenance	Inspect all valve boxes Sound all valves for leakage	Cycle all valves every 2 yrs	schedule repair of identified defects	
Service Box & Lateral Maint.	Inspect service box, test curb stop & test for leakage	Services in Capital Project Sidewalk/Paving areas 1 year ahead	schedule repair of identified defects	
Pressure Reducing Valve Maintenance	Inspect monthly Record inlet & outlet pressures	Cycle all standby pressure control or relief valves every 3 months		
Air Release Valve Maintenance	Annual inspection of ARV's and ARV chamber		schedule repair if leakage detected	
Water Reservoir Maintenance	Daily water level recording Quaterly - inspect tank exterior and grounds			
Booster Station Maintenance	Inspect station & equipment at least once per week	Test back up generator weekly		

Proposed Water Distribution System Operation and Maintenance Performance Standards

Revised – March 18, 2015

Activity - Water Main Repair

Objectives

Repair water mains in a timely, efficient, and safe manner to minimize customer inconvenience, damage, service interruption, and maintain water quality to the customer.

Performance Standards

Response:

-□ll reported water breaks are investigated by staff as soon as possible.

-□ ater breaks resulting in flooding and damages or posing a hazard to the public will be contained/addressed immediately.

-□ ater breaks will be repaired at the earliest opportunity, considering the severity of leak, water escape, real or potential damages, road condition and location, as determined by supervisory staff.

-□or emergency repairs, staff will respond immediately to the site upon advisement of incident.

Procedure:

-Supervisory staff will determine the manpower and equipment required to undertake the repair works.

-□ ater mains will be traced to determine exact location with appropriate equipment before excavation.

-The supervisor will determine whether to call other utilities □phone, cable, power, gas□ for cable locations prior to excavations.

-□ll work will be conducted in a safe and efficient manner, complying with all appropriate regulations.

-□ ater break repair will be completed upon initiation of the work to minimize customer service interruptions.

-□ ater repairs will be visually checked after pressurization to ensure no leakage is present.

-□ ater break areas will be □re-sounded□to ensure no further leaks exist.

Flushing and Disinfection Practice:

-□ here possible, water mains should remain pressurized until trench water has been removed. Positive system pressure at the leakage point will reduce trench water infiltration into the water system.

-Prior to beginning the repair, supervisory staff will ensure the excavation hole at a water leak site is properly de-watered in a manner that will eliminate the opportunity of infiltration of trench waters into the distribution main.

-□very effort will be made to reduce the infiltration of trench water or trench material into the water main during the repairs.

-□t the time of repair activity, the immediate area of the pipe section will be cleaned and sprayed with a chlorine solution for local disinfection of the water pipe. This is accomplished by swabbing or spraying application of a hypochlorite solution on the exterior of the pipe and if possible, on the interior of the pipe or fittings that may be installed at the site. □ minimum of a 1% hypochlorite solution shall be used in the procedure prior to the completion of the repair.

Flushing:

□ thorough flushing of the distribution main after repairs will be conducted via the nearest uphill fire hydrant. □ydrant flushing will ensure chlorinated water is flushed through the repaired section of main and will allow air venting of the system. □lushing will occur until all air has been extracted and visible discoloration has ceased.

-In the event that significant sections of water line are cut out and replaced, hypochloric swabbing, spray or a calcium hypochlorite granules may be placed in the main for disinfection.

-□dequate main flushing and chlorine residual tests may be required before placing the

repaired section of the system back into service.

Reinstatement:

-□xcavations will be reinstated □paved□as soon as possible after the repair, in accordance with the Town of Truro□s □ocal Improvement By-□aw. The reinstatement timelines under the by-law are as follows□

□rterials□Immediately
Collectors□□ ithin 2□hours
□ocal Collectors□□ ithin □□hours
□ocals□□ ithin 5 days

-□ntil reinstatement is completed, appropriate traffic control signs will be posted at the site for notice to the travelling public.

-Periodic site inspections will be conducted to ensure settlement has not occurred, until such time as the reinstatement works are complete.

-□ ater break sites will be cleared of debris and gravel after the repair and final reinstatement.

Notification:

-The utility should contact any of the agencies affected by the break, which may include□ Police, □ire □epartment, □ eb page, and critical water customers.

-□ here possible, customers directly affected, or the public in general, will be notified by the utility.

Private Property Damages:

-□omeowners experiencing damages from water breaks will be advised to contact their own insurance company. The utility will forward claims of damages to insurance ad□usters for investigation as soon as possible for severe property damage□within 2□ hours for all other private property damages.

Safety:

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the □ova Scotia Temporary □ orkplace Traffic Control □ anual.

Record Information

□ach water break event will be documented on the appropriate form indicating such items as□ date of excavation, size of break, location, condition of pipe, type of repair, materials and equipment used, staff □work order □□, time water off/on, damages and other streets which were affected by the water service interruption.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity - Distribution System Flushing

Objectives

 aintain or improve water quality by removing solid particulates and biofilm buildup in piping network, and verify fire flow capability by distribution system flushing.

Performance Standards

The water distribution system is flushed twice annually with a scheduled spring and fall flushing programs, and includes the following activities

-etermine the most effective flushing sequence, from treatment plant, transmission system and sequential distribution networks.

-stablish and implement, in a timely manner, public notification of flushing procedures, noting timeframes and pressure and discoloration probabilities.

-etermine the specifics of flushing locations

-uration and effect of water discharge in the environment.

-Survey each flushing site to assure suitability for discharge water control.

Implement flushing in a sequence of operation in accordance with established hydrant operation guidelines.

pon completion of flushing, ensure that all system components valves are returned to normal operating condition.

Boosted Systems

or systems with booster pumps, an annual flushing exercise will be used to validate the discharge hydraulic capacity of the station.

Safety:

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the ova Scotia Temporary orkplace Traffic Control anual.

Record Information

□ydrant flushing information records will include date, time location, hydrant number, turbidity □before, during and after flushing□, chlorine residual □before and after□, flow rate estimate and other observations regarding flow, water discharge path, and environmental issues.

Record information will be summarized and filed for reference and system operating validation.

□or booster station system flushing, station inlet and outlet flow rates should be obtained, including booster pump amperage reading.

□ here possible, flow rate information should be monitored and recorded with the flushing information.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity - Hydrant Maintenance

Objectives

nsure fire hydrants are properly maintained and fully operational and accessible at all times.

Performance Standards

ll fire hydrants will be operated and cycled to ensure complete operation and reliability on an annual basis. This procedure shall include

- ully cycling of the fire hydrant to the open position to assess operational performance.
- very hydrant shall be visually inspected, and hydrant caps shall be greased with food grade lubricant.
- The hydrant isolation valve shall be located, inspected and operated annually to ensure operation for fire hydrant maintenance.
- Surrounding growth obstructing hydrant visibility and operation will be cleared.
- ydrants will be pressure tested, drained and sounded for leakage on an annual basis.
- ire hydrants that have internally plugged drain holes will be identified with an indicator symbol on the hydrant.
- ire hydrants that are out of service as a result of damage or the requirement for repairs shall be reported to the ire ept.
- ut of service markers shall be placed on all hydrants that are temporarily out of service.
- ut of service hydrants shall be repaired as soon as possible, and when completed and returned to service, remove the out of service marker and advise the ire ept that the hydrant is now operational.
- ire hydrants shall be repainted every three to five years, or as required.

Periodic Inspection

ire hydrants will be internally inspected on a periodic basis, in accordance with the hydrant manufacturers maintenance recommendations. This process will include removal of the internal operating mechanisms, inspection of seat assembly, and inspection of internal component parts for wear, corrosion, and replacement of worn or defective parts.

Winter Inspection

ydrants located with presence of water in the barrel shall be pumped/purged out, logged on the maintenance records, and re-inspected to ensure no water remains in the hydrant barrel.

ire hydrant locations will be visually inspected after snow events to ensure they are accessible, and where necessary, commence snow clearing operations to ensure access to the fire hydrants.

ll hydrants found or reported frozen, will be thawed using steam thawing equipment as soon as possible.

Safety:

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the ova Scotia Temporary orkplace Traffic Control anual.

Record Information

Record documentation shall include

- ake, model , location , date of inspection , inspectors names ,date of inspection, deficiencies noted, materials used, extensions installed, and hydrant draining capability.

-Pressure note time of day, flow test information

- inter hydrant inspection records to include date inspected, repairs conducted, inventory used, and staff. rozen hydrant documentation will include frozen hydrant location and thaw date.

ork rders ork order records shall include date s of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests emand Calls Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed or forecast for completion and inspector responsible.

Activity - Valve Maintenance

Objectives

□nsure proper maintenance and reliable operation and accessibility of all system valves.

Performance Standards

□ll valves will be accessed and operated once every two years.

□alve will be operated □cycled to pre-determined position□and returned to the normal position. □ormally open valves will be backed off one full turn towards the off position.

□alve box, cap, and upper assembly will be inspected for damage and wear.

□ll valve inspection and maintenance operations shall comply with □STIR Temporary □ orkplace Traffic Control □ anual.

Valve Box Inspection

In a safe and efficient manner, remove valve box cover, inspect valve box for debris and alignment, structural integrity, and insert valve key to ensure operational access is achieved and proper alignment is correct to operate the valve.

Inspect valve box upper sleeve and cap for damage and/or wear.

□nsure valve box upper sleeve and cap are ad□usted to final grade.

□fter valve operation procedure, the operator will sound the valve through the valve key with geophone □like device□for leak noise. □ny noise determined indicating high flow or leakage will be documented for leak detection follow-up in the area.

Exceptions

System isolation valves, or normally closed valves, will not be operated. □alve box inspection will note valve assembly, cap and grade deficiencies.

Isolation valves should have a field demarcation to indicate the normally closed position valve.

Safety:

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the □ova Scotia Temporary □ orkplace Traffic Control □ anual.

Record Information

The valve maintenance card system will include□the date of inspection, operator, notation of all deficiencies, valve identification, valve location, valve style, operating direction, nut style and normal position □open/close□. □ here possible, the documentation of the number of turns from open to closed position should be provided.

Record all information on deficiencies not addressed during initial inspection □debris, grade ad□ustment requirements, and leak information□for planned follow up maintenance thereafter.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity – Service Box & Lateral Maintenance

Objectives

The service box is accessible and the curb stop operational to isolate the water supply to the premise.

Performance Standard

Service Box Inspection Process

□n inspection program for service boxes will include□

-□ocate service box with detection equipment

-□xpose service box lid, access service box and operate the curb stop. □uring this operation activity, the service box will be checked for vertical alignment, access, service box condition, lid and nut condition, and will replace parts as necessary.

-□ hile testing the operation of the service box and curb stop assembly, a sonic test for leakage with geophones or electronic acoustic leak detection equipment on the service lateral will be conducted. The acoustic equipment will be placed on the service key and □sounded□for noise on the service lateral.

Staff will obtain and record swing ties from the building to the service box for transfer to the utility□s permanent record.

Prior to any proposed Capital □ orks program on a street, the utility shall locate and service all service boxes and curb stops. Services shall be checked for leakage and repaired prior to commencement of the Capital pro□ect.

Service Box Maintenance in Non-Paved Areas

Service boxes too low or buried, will be raised to grade by an appropriate method, which may include□

-□n extension installed at the time of inspection

-Raising the telescopic top of the service box assembly.

Service boxes that are too high will be lowered by□

-Carefully lowering the telescopic top.

-Cut off the service box upper section and install a new lid, such that the top of the service box conforms to final grade.

Curb Stop Operation

The curb stop will be checked for operation by turning the service key clock-wise □0 degrees to the fully closed position. This will validate that the service lateral was in the open position. Immediately, the service will be turned counter-clockwise □0 degrees to the fully open position.

The following will then be undertaken□

-The service lateral will be checked for leaks with acoustic equipment after the curb stop operation.

-If leaking, staff will determine whether the leakage is occurring on the public or private side of the curb stop through the curb stop isolation process.

-The curb stop will be fully cycled to ensure operation.

Staff will verify that the service box rod is fully attached to the curb stop, by way of smooth operation.

-Curb stop will be operated to minimize the amount of backflow siphonage during tests.

Service □ateral □eakage Repairs

Public Portion of Service Lateral

The service lateral from the main stop connection at the main, up to and including the curb stop at the property boundary, is considered part of the distribution system. The utility owns this section of service lateral and will conduct the necessary repairs and related reinstatement for a leak in this section of pipe.

Private Portion of Service Lateral

The service lateral from the curb stop at the property boundary to the building is the property owner□s service pipe. The property owner is responsible for the repairs to this portion of the service lateral.

Establishment of Public or Private Service Leak

The determination of whether a leak is on the public or private portion of the service lateral will result from the operation of the curb stop. □eaks that can be isolated on the private owners lateral by turning off the curb stop, will confirm that the leak is within the private portion of the service lateral.

□eaks that cannot be isolated by turning the curb stop to the □off□position will be repaired at the utility□s expense.

Customer Notification

The customer will be notified in the following circumstances□

-□o customer notification will be required during the normal quick operation of the curb stop operation test.

- If a longer turn-off time frame is required, or more frequent service interruptions are necessary, the customer will be notified at the door.

- In the event that there are problems with the curb stop operation, the customer will be notified immediately. Problems occurring during operation and maintenance tests may include such things as service rod and pin problems, leakage, curb stop failure, or other such circumstances.

□ hen repairs have been conducted to the service lateral or curb stop, the utility or customer will flush the service line after maintenance repair procedure through the first internal cold water faucet in the premises.

Service Box Maintenance in Paved Areas

In areas where the service box and curb stop are located under paved surfaces, operations will include the following□

-Service box will be located on paved surface and marked with a small amount of paint.

-Customer will be notified of required works, which may include extension and /or repair. □ standard door knocker advisement may be initially used for customer contact if they are not at home.

-□ time and date of works will be coordinated with the owner, considering priority of repair and customer preference. □or efficient operation and use of resources, a number of curb stop/service box repairs in paved areas may be coordinated for effective use of hydro-vac equipment.

-Paved services will be cut out by pavement saw to minimize excavation and improve the quality of reinstatement.

- herever possible, a hydro-vac truck and soil remover will be used to minimize the excavation and reinstatement activities.

Reinstatement Works

or reinstatement of properties, the following standards will apply

Non-paved Areas

-on-paved areas will be restored to original condition, with suitable replacement sods and materials. The utility will attempt to replace sods with a similar nature, based upon time frame and sod availability.

-Private shrubs and/or trees in the public right of way will be removed for access and repair of utility appurtenances. o replacement of trees, shrubs etc, will be reimbursed in this situation.

Paved Areas

- here paved material must be removed for service box access, the utility will reinstate the paved area with equivalent surface material.

Obstructions

-n private property, trees, retaining walls, gardens, wooden decks, steps, and other obstructions must be removed by the owner.

-bstructions to the operation and maintenance of service boxes on public property will be removed by the utility.

Service Box/Curb Stop on Private Property

In some situations, a service box may be located well within a customer s property. In those situations, the following shall apply.

Commercial Properties

-n commercial sites, the services may be tapped off building service sprinklers. The service box and curb stops in these situations are the owner s responsibility, and the owner is responsible to ensure the service box is exposed at all times.

Residential Properties

-The utility will inspect and conduct operation and maintenance service on the service box and curb stop.

-The utility may consider raising and repairing the service box on private property if repairs are coordinated with the owner, or repair will cut in a new service box/curb stop at the property line.

Safety:

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the □ova Scotia Temporary □ orkplace Traffic Control □ anual.

Record Information

□ll information relative to the water lateral service including location, inspection dates, repairs undertaken, etc, should be recorded on the service record for the lateral.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity – Pressure Reducing Valve Maintenance

Objectives

□nsure all pressure control valves operate reliably and at a constant discharge pressure.

Performance Standard

Pressure reducing valves, altitude valves, and surge release control valves will be maintained and monitored to ensure proper operation and periodically cycled to ensure constant, reliable performance**.**

Site monitoring, inspection and assessment

□or each visit to a pressure control facility, the following inspection and assessment will be recorded and reported□

-Pressure control facilities will be inspected on a minimum monthly basis.

-□ote physical condition of the hatch and latch, ladder condition, other fasteners, power meter condition, sump pump operation, driveway access, manhole condition, etc.

-Staff will ensure that the site is kept clean in appearance and free of debris.

-Physical inspection of the control valves will include the recording of inlet and outlet pressures, PR□ stem height □if available□and inspection of other valve operation and leakage conditions.

-Pressure creep rise □typically between 2□00am and 5□00am□in excess of 5 psi will initiate a maintenance activity for PR□ calibration.

-□ccess to the PR□ facility will comply with □S Confined Space □ntry Regulations.

Pressure Control Valve Maintenance

Scheduled repair and maintenance of pressure control valves will include□

-□ll standby pressure control or relief valves will be fully cycled every three months.

-□lushing of the pilot screen.

-□eedle valve inspection, cleaning and speed ad□ustment, as required.

-Pilot valve inspection for leaking and pressure tracking.

-□isible inspection of pressure control valve for leakage.

-Physical overhaul of the pressure reducing valve component will be conducted if any sign of leakage occurs.

Pressure gauge inspection will ensure accurate readings. □auges will be replaced or calibrated as required to ensure accurate pressure display.

SCADA Monitored Facilities

SC□□□ systems will be used to monitor and track inlet and discharge pressures for all control facilities.

□aily review of SC□□□ information of control sites will include a 2□hour graph of pressures and pressure readings. Pressure anomalies will require a site visit to confirm the problem identified for repair.

Safety:

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the □ova Scotia Temporary □ orkplace Traffic Control □ anual.

Record Information

The following PR□ inspection records will be catalogued for reference and will include□

-Required confined space entry documentation

-Time and date of inspection.

-Inlet and outlet pressure, PR□ stem heights.

-Repair parts used.

-Staff conducting repairs.

-□d□ustments to controls.

-Strainer flushing

-□alve cycling operation and associated information.

-□ther operating inspection items.

-SC□□□ system monitoring information will be stored for further review.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity – Air Release Valve Maintenance

Objectives

□nsure reliable operation and maintenance of air release valves.

Performance Standards

□nnual maintenance activities will include the following items□

-Pre-winter inspection of the □R□ chamber, valves, access and operation confirmation will be conducted.

- □isual inspection of the air release valve, control valve, saddle, nipple and connections for corrosion and reliability.

-□ here applicable, □R□ chamber venting and □birdcage□control will be inspected.

-Increased inspection frequency of air release valves will be based upon historical inspection records and maintenance requirements.

-□isual inspection of air release valves for leakage will indicate □R□ valve maintenance and overhaul requirement.

-□R□ chambers or vaults will be dewatered to ensure valves are not submerged in groundwater.

-□R□ vacuum valves will be repaired /replaced in a timely manner.

-□ir release-vacuum valves will be insulated to prevent freezing in winter conditions. Chamber hatches may be insulated, or other insulation techniques may be applied provided they do not obstruct the release or intake of air to the air release-vacuum valve.

-□ir release-vacuum valves installed in pumping facilities, PR□ chambers and other reservoir standpipes will be included in the □R□ performance maintenance standard.

Safety:

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the □ova Scotia Temporary □ orkplace Traffic Control □ anual.

□nderground or enclosed space work shall comply with □ova Scotia Confined Space □ntry Regulations.

Record Information

□n inspection record for each valve will include the make, model, size, design features, inspection date, conditions, staff, and actions taken.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Activity – Leak Detection

Objectives

To minimize leakage by effective leak detection and repair response.

Performance Standards

System Monitoring

To monitor the water flows in the distribution system for leakage. □eak detection surveys will be initiated when system or district metered area flows indicate higher losses in the distribution network. □eak detection surveys will determine the leak area and the location of the leak for repair.

□ll leak detection surveys will follow a standard protocol of systematic valve and hydrant soundings, noise documentation and leak location marking.

□eak detection surveys will be conducted with electronic leak detection equipment or geophones, for annual or specific area leak detection surveys.

□etailed acoustic leak detection surveys and acoustic noise mapping can be conducted in either daytime or nighttime hours.

□ighttime leak detection however will be preferred in areas where high background noise, traffic, high customer usage, or in areas where safety is improved with nighttime detection.

Metallic Piping Systems-Leak Detection Survey Procedure

The acoustic detection portion of the survey will be conducted in a systematic fashion, by using sounding equipment on hydrants and valves, in a sequential process throughout the water system. □ll hydrants will be acoustically □sounded□ in a leak survey to determine noise presence in the system. □ here noises are detected, the leak noise will be documented on a map with corresponding notes for future follow up.

System valves and service stops will e □sounded□ in areas where hydrant spacing exceeds 150 metres □500 feet□.

Surface leak detection will be conducted in areas where there is an absence of fire hydrants and valves exceeding a 500 foot spacing. Surface detection equipment will be placed above the water main on the surface of the road and sounded every five feet.

Plastic Piping Systems

□or systems of plastic pipe, including P□C and other □poly□ piping systems that are elastic in nature, leak detection practices should include the following procedures□

- P□C must be surface sounded with acoustic leak detection equipment at intervals of five feet.

- Subdivisions, or zones containing P□C water mains may be assessed for leakage by undertaking a □step-test□, in con□unction with master metering, to determine the flows to the area and assess leakage conditions that may exist.

Sounding Procedures

□ll fire hydrants will be sounded with leak detection equipment by contact on the hydrant operating nut.

□alves will be acoustically sounded by placing the detection rod or surface microphone directly on the valve key, placed on the operating valve nut.

Service laterals will be sounded by placing the leak detection equipment sensor on the service key to the curb stop stem or operating nut.

Leak Pinpointing Procedure

□ here a leak zone or area has been determined, surface pinpointing procedures will be conducted over the water main throughout the entire potential leak zone area.

Surface leak detection will include geophones, electronic amplification equipment and hard contact surface microphones. The operator will □sound□ above the water main every two meters or less, within the leak area. □ll valves and services within the leak area will be tested for leak noise.

□ here the loudest sound is determined, leak position will be temporarily marked.

In the area of a pinpointed leak, the water main and services will be traced with pipeline location equipment to ensure the proposed leak location is marked directly above the pipeline. Service lateral locations will be marked on the street.

□inal leak location will be marked after the water line tracing is completed.

Safety:

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the □ova Scotia Temporary □ orkplace Traffic Control □ anual.

Record Information

□ocumentation of system leak noises will be placed on the system map and supporting field report form, indicating presence or absence of leak noise.

□eak location report will include date located, civic number, address, main size, surface marking scheme and other descriptive information.

□oises detected in the field will be further investigated to determine the source of the noise. □oise validation will include the documentation of the noise or outcome from field checks. □or leaks found, description will be provided and a follow up to recheck the leak area after repair is required.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity – Water Reservoir Maintenance

Objectives

□nsure reliable storage, operation, and maintenance of water reservoir facilities.

Performance Standards

Operating Standards – Daily Procedures

□btain daily water levels in tank

□etermine whether daily tank fluctuations and daily balancing is achieved.

Inspect overflow line and discharge area periodically for evidence of water spillage.

Inspect tank for ice buildup, □anuary to □pril, as weather conditions warrant.

Preventative Maintenance

Inspect tank exterior and grounds on a quarterly basis for physical damage, security breech, access, and site cleanliness.

□or steel tanks, inspect and tabulate the corrosion protection system, document impressed current readings, ad□ust levels as required, and document action and readings monthly.

Inspect exterior of tank for structural integrity and exterior paint condition monthly.

Inspect and ad□ust altitude valves and isolation valves annually.

Inspect inside of tank on a five year cycle, or as required to determine paint condition, rust penetration, dept of sediment and condition of sacrificial anodes, if available.

Inspect access ports, dome, cover, and other tank connections annually for structural integrity.

Safety:

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the □ova Scotia Temporary □ orkplace Traffic Control □ anual.

□nderground or enclosed space work shall comply with □ova Scotia Confined Space □ntry Regulations.

Record Information

Inspection and maintenance records for each reservoir tank shall be maintained to document that □□□ performance standards are being regularly achieved.

Record daily tank levels to ensure adequate storage, and document draw down □minimum and maximum levels□.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity – Water Line Thawing

Objectives

Thawing water mains and laterals will be conducted at the earliest opportunity in a safe manner, following □tility procedures.

Performance Standards

Water Mains

□ ater mains will be thawed using the following process□

-□ot water, steam or high pressure water blasting equipment shall only be permitted for thawing of water mains.

-□o electric welders will be used for thawing operations without specific authorization from the □tility.

Investigation

□ ater outages will be investigated to determine the length of frozen water main via hydrants, reported outages and service laterals.

□xcavations and pipe cutting will be used to gain access to the water line for thawing purposes.

□ ater mains will be thawed as soon as possible to restore service to customers.

Notification

The □ire □epartment will be notified of hydrants and mains that are out of service, and will subsequently advised upon restoration of service to the previously reported systems.

Customers affected by the shutdown will be notified by the □tility.

□ ater will be restored as soon as possible, without prior notification to affected customers.

Safety:

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable□

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the □ova Scotia Temporary □ orkplace Traffic Control □ anual.

□nderground or enclosed space work shall comply with □ova Scotia Confined Space □ntry Regulations.

Record Information

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□ Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity – Booster Station Operation & Maintenance

Objectives

nsure booster station and pumping equipment is operational, reliable, and meets all servicing requirements.

Performance Standards

Staff will visit the booster station facility at a minimum of once per week, to conduct equipment inspection, documentation and other preventative maintenance activities. Pump quipment maintenance will be required when a detected change in performance is noted through monitoring of the equipment, flows, pressures, or other onsite inspection results.

Inspection Criteria

ach booster station will be visited at least once per week.

isual inspection will be conducted on the building, site, and equipment to determine damage or maintenance requirements.

Pumping and other equipment will be visually inspected for proper operation.

ll packing and seals will be inspected for leakage.

evels will be checked on all motorized equipment.

A weekly inspection check list will include the following items:

-Transfer switch test to ensure generator /diesel backup operation, with main power turned off.

-Test run diesel equipment.

-Test run fire pump equipment with generator.

-Test run diesel with pumps

-Inspect crank case oil levels and top up as required.

-Check battery electrolyte level.

-Check coolant level and top up as required.

- onitor engine running pressure relief system.

-Check alarm systems.

-Inspect all belts on motorized equipment.

- coustically monitor pumping equipment for smooth operation and noise anomalies.

Quarterly annual inspection will include the following maintenance activities:

- lush pressure and other sensing lines.

- lectrolyte test on generator batteries.

- easure pump current draw.

- easure line voltage to station.

Annual preventative maintenance activities will include:

Replace crank case oil on motorized equipment.

Replace coolant liquids in motorized equipment. nnual diesel engine performance test and check.

Instrument calibration checks.

Cosmetic painting of the facility.

Inspect heating and exhaust systems for safety and performance.

Safety:

In addition to following the safe work procedure for a specific task or equipment operation, ensure the following requirements are met where applicable

Conduct a work site hazard assessment prior to undertaking the work.

Set up the work area and signage in accordance with the ova Scotia Temporary orkplace Traffic Control anual.

nderground or enclosed space work shall comply with ova Scotia Confined Space ntry Regulations.

Record Information

Pump Log Documentation Requirements:

□or each facility visit, documentation will include the following items to be included in a pump log book at the station□

-□ate, time and staff present.

-Pump hours.

-□low totals.

-Inlet and discharge pressures.

-□ echanical ad□ustments, fluid additions.

-□perational problems and remedy documentation.

-Confirmation of daily, weekly, quarterly and annual activities in the log book.

SCADA Booster Station Documentation

SC□□□ systems used to monitor booster station equipment, fire flow equipment and generator/diesels, will be monitored on a daily basis, or as required, to assess booster station performance.

The SC□□□ system logs will store the booster station operation conditions, pump operation, discharge flow rates, inlet and outlet pressures, and other operating parameters and alarm levels relevant to the intended purpose of the facility. The SC□□□ monitoring systems may provide comprehensive review of the booster station performance and indicate any change or anomaly in the system flows, pressures or system operation. Information will be stored electronically for reference as required.

□ ork □rders □□ ork order records shall include date□s□of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests □□emand Calls□□Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed □or forecast for completion□and inspector responsible.

Activity – Water Meter Installation and Maintenance

Objectives

To ensure that all water meters are promptly installed and reading accurately.

Performance Standards

Installations

New residential (5/8") meter installations shall be completed within two days of notification.

Meter Reading

All commercial and residential meters are read every three months.

6 meters (located in chambers) on the water distribution system, are read daily.

Meter Accuracy Inquiries

Normally same day response to inquiry on meter accuracy. Meter checked, internal plumbing assessed for leaks, and water service line sounded for leak presence.

Meter Maintenance/Calibration

Residential meters older than 10 years are replaced when on service calls.

When an inquiry is received from commercial companies with larger meters, recalibration/repair is contracted out.

Record Information

All meter transactions are recorded on forms and filed in customer meter files.

Work Orders – Work order records shall include date(s) of work, hours of staff utilized, hours of equipment used, materials, and units of work output.

Customer Service Requests (Demand Calls) – Call log shall be updated noting inspection date, call back date, action taken, work order number, date completed (or forecast for completion) and inspector responsible.