Appendix E – Proposed Stormwater Management System Operation & Maintenance Plan

Proposed
Stormwater Management System
Operation & Maintenance Plan

During Construction

The Contractor shall be responsible for inspection and maintenance during construction.

At all times, siltation fabric fencing and stakes sufficient to construct a sedimentation control barrier a minimum of 50 feet long will be stockpiled on the site in order to repair established barriers which may have been damaged or breached.

An inspection of all erosion control and stormwater management systems shall be conducted by the Contractor at least once a week and during all rain storms until the completion of construction. In case of any noted breach or failure, the Contractor shall immediately make appropriate repairs to any erosion control system and notify the engineer of any problems involving stormwater management systems.

A rain storm shall be defined as all or one of the following:

- Any storm in which rain is predicted to last for twelve consecutive hours or more.
- Any storm for which a flash flood watch or warning is issued.
- Any single storm predicted to have a cumulative rainfall of greater than one-half inch.
- Any storm not meeting the previous three thresholds but which would mark a third consecutive day of measurable rainfall.

The Contractor shall also inspect the erosion control and stormwater management systems at times of significant increase in surface water runoff due to rapid thawing when the risk of failure of erosion control measures is significant.

In such instances as remedial action is necessary, the Contractor shall repair any and all significant deficiencies in erosion control systems within two days.

The Conservation Commission shall be notified of any significant failure of stormwater management systems and erosion and sediment control measures and shall be notified of any release of pollutants to a water body (stream, brook, pond, etc.).

The Contractor shall remove the sediment from behind the fence of the sedimentation control barrier when the accumulated sediment has reached one-half of the original installed height of the barrier.

Post-Construction

***Stormwater Management System Owner*:**

The Owner,

Tofino Associates, Inc.
31 Campus Plaza Road
Hadley, MA 01035

shall own the stormwater management system.

Party Responsible for Operation & Maintenance:

The Owner,

Tofino Associates, Inc.
31 Campus Plaza Road
Hadley, MA 01035

shall operate and maintain the stormwater management system.

Inspection & Maintenance Schedule:

1) Street Sweeping

Street and parking area sweeping shall take place twice annually.

2) Rain Gardens

A rain garden has been incorporated into the stormwater system to remove pollutants within the stormwater runoff. Both the pre-treatment stone diaphragm/sod system and bioretention areas should be inspected monthly for sediment build-up, litter and debris, structural damage and standing water. Inspect soil and repair eroded areas within the bioretention system monthly and re-mulch void areas as needed. Treat diseased vegetation as needed. Remove and replace dead vegetation at least once per year. Remove invasive species as needed to prevent them from spreading into the bioretention area. Replace mulch every year in the early spring. In the winter, it is important to ensure that snow is not plowed into the rain garden as this will cause the runoff to bypass the system without proper treatment.

3) Detention Basin (The following recommendations follow the MADEP Stormwater Policy guidelines.)

Inspections

a. Initial six months of use.
Examine for stabilization and function, including determination of the duration of water standing in the basin, any sediment erosion, excessive compaction of soils, or low spots.

b. Twice per year.
Examine basin for the following: differential settlement, cracking, erosion, leakage, or tree growth on embankments, condition of riprap, sediment accumulation, and health of turf where applicable.

Any adverse conditions noted during any inspections shall be addressed by repair or reconsideration of design components.

Mowing and General Maintenance

Occasional mowing (2 times per year min.) shall be performed on the side slopes and basin bottom where turf is present. Accumulated grass clippings and/or organic matter and trash and debris shall be removed. Any clogged surface areas can be loosened by deep tilling; tilled areas must be immediately revegetated. Tilling may be used in this manner for no more than two consecutive maintenance periods. Thereafter, sediment in the clogged areas shall be removed, liner material replaced, and revegetation established.

Dredging/Sediment Removal

Accumulated sediment shall be removed from the basin at five (5) year intervals, or as required to maintain the function of the stormwater management system as designed. During this process and until the disturbed sediment has settled, the outlet pipe shall be sealed so as to minimize the risk of conveying sediment beyond the basin.

4) Grassed Swales

Swales shall be mowed at least once per growing season to prevent establishment of woody growth and other undesirable plants that inhibit proper performance. Grass vegetation should not be cut shorter than 4". It is important not to engage in excessive mowing operations, as this keeps the grass too short and decreases the efficiency of the vegetation to reduce runoff borne sediments and velocities.

Sediment and debris shall be removed manually at least once per year before the vegetation is adversely impacted.

5) Hooded Catch Basin and/or Drain Manhole with Sump

Oil and water separators should be inspected at least four times per year and cleaned annually or more often if required. Oil and sediments should be removed and disposed of in accordance with local, state and federal guidelines and regulations. In the case of an oil or bulk pollutant release, the system must be cleaned immediately following the spill and the proper authorities notified.

6) Stormwater Treatment Chambers

The Stormwater Treatment System requires minimal routine maintenance; however, it is important that the system be properly inspected and cleaned when necessary in order to function at its best. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit, e.g. heavy winter sanding will cause the grit chamber to fill more quickly, but regular sweeping will slow accumulation. The water quality treatment system shall consist of **Storm***ceptor* or equal treatment chambers. For more detail of how the **Storm***ceptor* should be maintained see the **Storm***ceptor* Owner Manual.

7) Dry Wells

Dry wells basins have been incorporated into the stormwater system for the site to specifically receive roof runoff and, therefore, are not expected to receive large amounts of bulk sediments. Proper maintenance of roof gutters that drain to the system will help to protect the integrity of the infiltration basins. Sediments and debris should be removed and disposed of in accordance with local, state and federal guidelines and regulations.

8) Snow Removal & Management Plan

General

The stormwater management system is designed to accommodate volumes from snow melt. Since plowed snow from paved surface may contain salts, sediment, oils and various pollutants, all snow melt from vehicular areas on the site shall be routed through the drainage system or removed from the site.

Principles

1. The Owner shall provide a copy of this plan and a schedule or vehicle rotation scheme to plowing contractors such that plowing may occur in an efficient manner. This may be altered based on employee schedules or severity or frequency of snow events.

2. No such snow shall be dumped or stockpiled directly into any resource area or within any area such that untreated snow melt may enter a resource area.

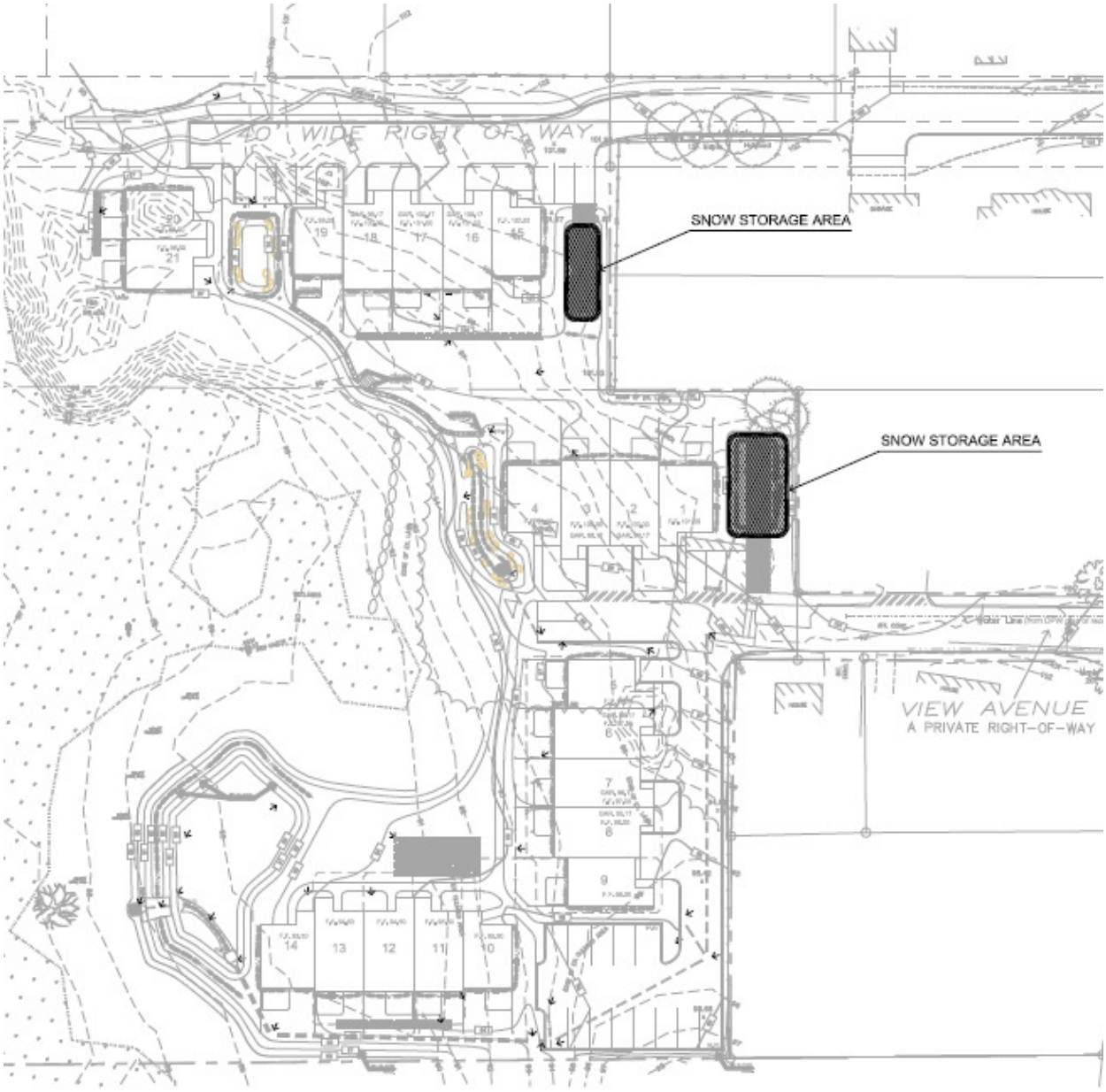
3. Snow removed from the site shall be disposed of such that it or its melt will have no adverse effect on other resource areas.

4. The Owner shall use alternative eco-friendly solutions throughout the site in place of standard de-icing materials.

5. The Conservation Commission and DPW shall be notified where a violation of this plan occurs.

6. See Figure 1 on the following page depicting the snow stockpiling plan.

Figure 1 – Snow Stockpiling Plan



INSPECTION AND MAINTENANCE REPORT FORM

For

North Street Condominiums – Stormwater Infrastructure

Inspection Schedule:
FORM TO BE COMPLETED PER SCHEDULE PRESENTED IN OPERATION & MAINTENANCE PLAN

Inspector:	
Date:	Time:
Inspector's Qualifications:	
Days Since Last Rainfall:	
Amount of Last Rainfall (inches):	

Catch Basins

CB	Is Surface Runoff Being Directed to Catch Basins Properly	Are Sediment Traps Installed at Catch Basin Inlets	Are Catch Basin Outlet Hoods Installed and Working Properly	Depth of Sediment in Basin Sump	Are Any Correction Measures Required
CB#1					
CB#2					
CB#3					

Maintenance Required:

To Be Performed By:	**On or Before:**

STRUCTURAL CONTROLS –CON'T

Stormwater Treatment Chambers

SWTC	Is Surface Runoff Being Directed Through SWTS Properly	Depth of Sediment in Basin Sump	Are Any Correction Measures Required
SWTC #1			

Maintenance Required:

To Be Performed By:	On or Before:

Rain Garden 1

Structure	Is Structure Working Properly	Depth of Sediment in Structure	Are Any Correction Measures Required	Additional Notes
Stone/Grass Pretreatment				
Rain Garden				

Rain Garden 2

Structure	Is Structure Working Properly	Depth of Sediment in Structure	Are Any Correction Measures Required	Additional Notes
Stone/Grass Pretreatment				
Rain Garden				

Maintenance Required:

To Be Performed By:	On or Before:

Surface Stormwater Detention Basin

Is Stormwater Entering Basin Correctly	Is Stormwater Being Detained and Discharged Properly	Depth of Sediment	Is Erosion Stabilization Properly Installed & Maintained	Is There Any Evidence of Erosion Or unintended Flow Patterns	Is Mowing Required

Maintenance Required:

To Be Performed By:	On or Before:

Dry Wells

Structure	Is Structure Working Properly	Are Any Correction Measures Required	Additional Notes
Dry Well 1			
Dry Well 2			
Dry Well 3			
Dry Well 4			
Dry Well 5			
Dry Well 6			

Maintenance Required:

To Be Performed By:	On or Before:

OTHER CONTROLS

List Other Miscellaneous Controls and Observations

Item	Describe Failure/Inadequate Control	Describe Recommended Remedy

Maintenance Required:

To Be Performed By:	On or Before: