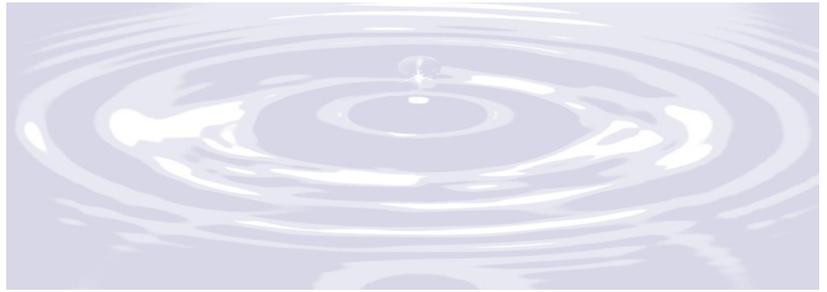


ASB

design group LLC

Civil Engineering
Traffic Engineering
Architecture
Landscape Design & Construction

363 Boston Street, Route 1
Topsfield, MA. 01983
978-500-8419
thadberry2@verizon.net



Operation and Maintenance and Plan - Construction Phase and Post Construction

Tax Map 26

Route 129 - Lowell Street

Reading MA. 01867

PREPARED FOR:

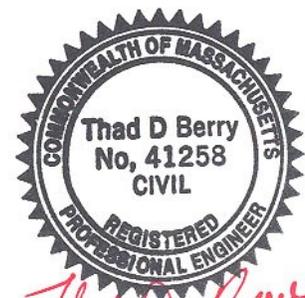
Jamieson Properties LLC

627 Main Street
Suite 1
Reading MA. 01867

PREPARED BY:

ASB design group, llc

363 Boston Street, Route 1
Topsfield, MA 01983
T- 978-500-8419



Thad D Berry

October 25, 2016

TABLE OF CONTENTS

DESIGN TEAM

Civil Engineer:	ASB design group LLC 363 Boston Street, Route 1 Topsfield, MA. 01983 978 - 500 – 8419
Surveyor:	Donohoe Survey Inc. 363 Boston Street, Route 1 Topsfield, MA. 01983 978 - 500 – 8419
Wetlands:	Wetlands & Land Management Inc. 100 Conifer Hill Drive – Unit #516. Danvers, MA. 01923 978 - 777 - 0004
Attorney:	William F. Crowley 159 Haven Street Reading, MA. 01867 781 - 942 – 2233
Applicant	Jamieson Properties LLC 627 Main Street, Suite 1 Woburn, MA. 01801 781 - 933 - 5783
Owner	Jamieson Properties LLC 627 Main Street, Suite 1 Woburn, MA. 01801 781 - 933 – 5783

Section I

Operation and Maintenance Plan: Construction Phase (Contractors Guide)



Operation and Maintenance – Construction Phase

Contractors Guide

Lyle Estates, Reading Ma. 01867

Construction Sequence

Construction Phase Emergency Contacts

Section II

Operation and Maintenance Plan: Post Construction

Appendix A

Typical Construction Phase Example Inspection Form

Typical Post Construction Phase Example Inspection Form

Homeowners Rain Garden/LID Brochure

Figure 1 – Homeowners Rain Garden/LID and BMP 1 Location Guide

Operation and Maintenance Plan – Construction Phase

Operation and Maintenance – Construction Phase

Contractors Guide

Lyle Estates, Reading Ma. 01867

OPERATION & MAINTENANCE PLAN: CONSTRUCTION PHASE

MA DEP STORMWATER REPORT STANDARDS 4 & 8

RESPONSIBILITY: CONTRACTOR

STATEMENT OF INTENT:

This operation and maintenance plan (O&M) identifies inspection and maintenance requirements for the proposed project. The plan addresses requirements contained in the stormwater management policy developed by the Massachusetts Department of Environmental Protection (MADEP) and Coastal Zone Management (CZM).

The erosion and sedimentation control program to be implemented for the project is intended to prevent impacts to existing wetlands, existing roadways, and surrounding sites during construction. The program incorporates the Best Management Practices (BMPs) as specified in the guidelines developed by MADEP and the Environmental Protection Agency, and complies with the requirements of the National Pollution Discharge Elimination System (NPDES) General Permit for stormwater discharges for construction activities. This does not preclude any requirements for additional controls identified in these drawings or support documents or any other appropriate techniques to limit erosion and sedimentation off the site. Also, any measures deemed necessary by the city / town planning board, conservation commission, zoning board, or the city/town's representative shall be part of the erosion control plans and this operation and maintenance plan. All responsibility for implementing the operation and maintenance plan during the construction phase of this project shall be borne by the contractor and/or the contractor's representative.

Every effort has been made to provide a comprehensive Operation and Maintenance (O&M) plan for this project. All measures and guidelines presented within this plan are considered to be the minimum efforts required to achieve the intent of the erosion and sedimentation control program and minimize off-site impacts. Should any omissions or inconsistencies arise in the plan, the contractor and/or contractor's representative, applicant/owner, and governing officials are expected to use reasonable and experienced judgment in the field relative to evaluating and implementing measures based on the intent of this plan.

Please note that not all of the items outlined in this plan may be applicable to this project. *It is the contractor's responsibility to become acquainted with the project by (at the minimum) reviewing the entire document along with the associated plans, details, Conditions of Approvals, Order of Conditions and conduct a site walk prior to the start of construction.*



Operation and Maintenance – Construction Phase

Contractors Guide

Lyle Estates, Reading Ma. 01867

PROJECT IDENTIFICATION

Project Name: Lyle Estates

Project Location: Tax Map 26 Lot 157
370 Lowell Street
Reading, Massachusetts 01867

Applicant: Jamieson Properties

Applicant Address: 627 Main Street
Suite 1
Woburn, Massachusetts 01801

Owner: Same as Applicant

Owner Address: Same as Applicant

Prior to start of construction, the project identification (MADEP Number) be posted on site with copy of order of conditions and all contractor and local emergency contact information.

DESIGN TEAM

Civil Engineer: ASB Design Group, LLC
363 Boston Street
Topsfield, MA 01983
978-500-8419

Surveyor: Donohoe Survey, Inc.
363 Boston Street, Route 1
Topsfield, MA. 01983
978-887-6161

Wetlands: Wetland and Land Management Inc.
100 Conifer Hill Drive
Unit 516
Danvers, MA 01923
978-777-004

Contractor shall also post on-site all phone numbers for the applicant/owner and/or their representative, design team, and the city/town officials and/or their representative.

Operation and Maintenance – Construction Phase

Contractors Guide

Lyle Estates, Reading Ma. 01867

DOCUMENTS:

Prior to construction, contractor shall confirm that no additional documents or drawings have been issued, revised, or needed to be implemented for the construction phase.

-Subdivision Plans- Sheets C1-C10

By: ASB Design Group, LLC

Date: 10.14.2016

-Project Design Report

By: ASB Design Group, LLC

Date: 10.10.2016

-Notice of Intent

By: Wetland and Land Management Inc.

Date: 10.14.2016

- Town of Reading Conditions of Approvals

Planning Board
Conservation Commission
Zoning Board of Appeals

Date: **T.B.D.**

Date: **T.B.D.**

Date: **T.B.D.**

-NPDES General Permit

Date: **T.B.D.**

Contractor is responsible filing and obtaining the NPDES General Permit prior to start of construction unless otherwise directed.

TEMPORARY OPERATION AND MAINTENANCE ITEMS:

(Construction Phase)

Note 1: See SWPP details (Stormwater Pollution Prevention Details) for proposed individual BMP measures to be implemented.

Note 2: All sediment will be disposed of on-site, if applicable, or at an off-site location in accordance with all applicable local, state, and federal regulations.

CONSTRUCTION SEQUENCE:

Prior to construction the contractor shall develop and submit all proposed construction sequencing and traffic management plans (TMP's) for review and approval by the Town of Reading. The contractor is responsible for providing plans and documents concerning any revisions to the construction sequence and/or TMP's 72 hours prior to implementation for review and approval.

Operation and Maintenance – Construction Phase

Contractors Guide

Lyle Estates, Reading Ma. 01867

SWPPP IMPLEMENTATION:

Contractor shall install all erosion control measures as required for each construction area for inspection prior to the start of construction. Contractor shall identify an individual who will be responsible for compliance with SWPPP and daily inspections. SWPPP and supporting documents shall be kept on site at all times.

MATERIAL STOCKPILE AREA:

Contractor shall locate an area for material storage and stockpiling. This area should be within the general construction area (where no additional clearing or grubbing will be required). This area, at a minimum, should be surrounded by a single row of hay bales, siltation fencing, and/or erosion control sacks. Where required, this area may need to be surrounded by fencing that can be secured at the end of the work day. Contractor shall monitor all erosion activities within the stockpile area and remove and repair siltation devices as required.

CONSTRUCTION ENTRANCE:

Contractor shall place a construction entrance (a temporary stone-stabilization pad located at (points of vehicular ingress and egress from the construction site and/or staging area onto public roads - see SWPPP plan/details*). The entrance should be maintained in a condition that will prevent the tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone. Inspect entrance/exit pad and sediment disposal area weekly and after heavy rains or use. Remove mud and sediment tracked or washed onto public roadways immediately. Complete replacement of pad may be required if the pad becomes completely clogged. If washing facilities are used, the sediment traps should be cleaned out as often as necessary to ensure adequate storage and trapping efficiency occurs. Vegetative filter strips should be maintained to insure a vigorous stand of vegetation at all times. Repair broken pavement immediately.

SILTATION FENCING:

Place siltation fencing as may be required as part of the SWPP Plan (see SWPPP Plan/Details). Inspect silt fencing immediately after each rainfall and at least daily during prolonged rainfall. Remove sediment deposits promptly to provide adequate storage volume. Avoid undermining fence during cleaning. Repair fabric tears, decompositions, or failures immediately. Contractor shall have extra rolls of siltation fencing on-site for repair purposes. Remove silt fence when site has been stabilized and all sediment deposits removed.

STRAW OR HAY BALE BARRIERS:

Place hay bale barriers as may be required as part of the SWPP Plan (see SWPPP Plan/Details). Inspect hay bale barriers immediately after each rainfall and at least daily during prolonged rainfall. Remove sediment deposits promptly to provide adequate storage volume. Avoid undermining during cleaning. Repair decompositions and failures immediately.

Operation and Maintenance – Construction Phase

Contractors Guide

Lyle Estates, Reading Ma. 01867

Contractor shall have extra bales on-site for repair purposes. Remove hay bale barriers when site has been stabilized and all sediment deposits removed.

EROSION CONTROL SOCK:

Place erosion control sock as may be required as part of the SWPP Plan (see SWPPP Plan/Details). Inspect erosion control sock immediately after each rainfall and at least daily during prolonged rainfall. Remove sediment deposits promptly to provide adequate storage volume. Avoid undermining during cleaning. Repair decompositions and failures immediately.

INLET PROTECTION - CATCH BASINS:

Total catch basins (CB inlets) on-site: **3**

Contractor shall provide proper inlet protection for all existing and proposed catch basins that will be impacted by construction.

Place inlet protection as may be required as part of the SWPP Plan (see SWPPP Plan/Details). All trapping devices and structures that protect CB inlets should be inspected after every rain storm. Sediment should be removed when sediment has reached a maximum of one-half the depth to the top of the protection device. (See Drainage Systems)

SEDIMENTATION CHAMBER:

Total sedimentation chambers on-site: **1**

Inspect sedimentation chambers on a weekly basis or after each rainfall event. Clean and remove sediment when it reached a depth of 18". (See Drainage Systems)

STREET SWEEPING:

Paved areas shall be swept throughout construction so as to prevent excess sediment from flowing to the proposed drainage system. Maintain inlet protection (catch basins) until final pavement surface has been placed and all disturbed areas have been accepted as stabilized.

SIDEWALK AND TEMPORARY PEDESTRIAN ACCESS SWEEPINGS:

All sidewalks and temporary pedestrian access ways shall be swept throughout construction to prevent excess sediment from accumulating. Maintain inlet protection (catch basins) until final pavement surface has been placed and all disturbed areas have been accepted as stabilized.

CONCRETE WASHOUT AREA:

The contractor is to provide a designated area on-site to be the concrete wash out area. All washout of concrete trucks and the cleaning of concrete tools and equipment must be done in

Operation and Maintenance – Construction Phase

Contractors Guide

Lyle Estates, Reading Ma. 01867

this area. The concrete washout area must provide necessary treatment and meet all applicable local, state, and federal laws and regulations.

DRAINAGE SYSTEMS:

At the completion of the construction phase and the stabilization of the construction area, all catch basins, drainage pipes, and BMP's shall be cleaned of all debris and sediment. Sediment shall be disposed of off-site in accordance with all local, state, and federal regulations.

SOLID WASTE:

The project site and surrounding areas shall be kept clear of debris and garbage. Temporary on-site receptacle(s) shall be provided and by the contractor and shall be disposed of off-site at an approved waste facility.

HAZARDOUS AND MIXED WASTE:

Store, treat, and/or dispose of hazardous or mixed wastes in accordance with all applicable laws and regulations. Do not bury construction waste, sanitary waste, or trash on-site.

Perform all washout of concrete trucks and the cleaning of concrete tools and equipment in a designated area on-site that provides necessary treatment and meets all applicable laws and regulations.

Stormwater discharges shall not cause or contribute to a violation of the water quality standard for pH in the receiving water. Temporary BMP's shall be used to prevent or treat contamination of stormwater runoff by pH modifying sources. These sources include, but are not limited to, bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, and concrete pumping and mixer washout waters. Construction sites with significant concrete work shall adjust the pH of stormwater as necessary to prevent violations of water quality standards.

SPILL CONTROL AND RESPONSE:

The contractor will maintain equipment and storage containers and/or perform repairs or modifications as necessary to prevent spills.

In the event of a spill, immediately notify the resident construction inspector who will contact emergency response. The contractor shall be responsible for remediation of any spill.

Store all fuels, lubricants, chemical storage, material stockpiles, and other potential pollutants in a designated area on-site. Provide secondary containment and controls as necessary including berming lined with an impervious material, covering, or other appropriate measures.

Operation and Maintenance – Construction Phase

Contractors Guide

Lyle Estates, Reading Ma. 01867

PROHIBITION OF ILLICIT DISCHARGES:

MADEP Stormwater Report Standard 10:

There shall be no illegal discharges of any material from this site to the proposed drainage and/or sewerage systems.

SANITIZING FACILITIES:

Contractor shall provide/or assure adequate onsite sanitary facilities for all workers in accordance with all federal, state, local requirements and board of health.

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION "FILE NUMBER":

When the proposed project has been issued an "Order of Conditions" by the local conservation commission, the contractor shall display the ma-dep "File Number" at the site on a sign not less than two (2) square feet or more than three (3) square feet bearing the words "MA-DEP File Number"

REPORTS AND INSPECTIONS:

Contractor shall keep on-site all records of inspections, reports, and repairs throughout construction. Contractor shall coordinate with local, state, and federal agencies with regard to weekly issuance of said reports or inspections. All records will become part of the final as-built plans when requested. See Typical Construction Phase Example Inspection Form.

The contractor is responsible for ensuring that all persons responsible for the implementation, inspections, and reporting on this O&M shall be appropriately trained and familiar with this and all other O&M related items on-site.

APPROVAL:

Contractor shall coordinate with all local, state and federal agencies involved with the construction phase for final approval at the completion of work. At a minimum, all disturbed areas shall be stabilized, debris and sediment removed and disposed of, and BMP's stabilized, planted, and functioning. All drainage systems must be cleared of debris and sediment. At a minimum, the binder pavement course must be in-place. All temporary erosion control devices shall be removed and disposed of off-site unless otherwise directed. As-built plans must be completed and accepted by applicable authorities, as required. If the project requires a Notice of Intent, the contractor and applicant/owner shall request a certificate of compliance from the local city or town conservation commission.

Operation and Maintenance – Construction Phase

Contractors Guide

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Upon final approval, responsibility for the permanent operation and maintenance will become responsibility of the final owner(s) and the city/town (if applicable). See Section II for Operation and Maintenance Post Construction.

- Contractor shall prepare stormwater pollution prevention plan in accordance with all local, state, and federal requirements as part of the NPDES general permit.

MA DEP STORMWATER REPORT STANDARDS 4, 8 & 9
RESPONSIBILITY: CONTRACTOR

CONSTRUCTION SEQUENCING

The construction for this project will occur in the following general sequence:

Erosion Control:

- Install perimeter erosion control barriers as shown on the SWPPP plan and SWPPP details, and as described in the project data report.
- Have installation inspected and approved by city/town engineering department and/or conservation commission representative prior to the start of construction.
- Place DEP file number at the roadway entrance to the construction site.

Roadway and site construction (also see sheets C8 for SWPPP).

The following construction sequence is an example. The final construction sequence shall be provided to the Town of Reading Engineering Department, Planning Board and Conservation Commission for review and approval prior to construction.

1. Post DEP sign in visible location. Install all erosion control, including construction entrance. See Sheet C8. Keep copy of NPDES General Permit and Order of Conditions on site.
2. Coordinate final architectural drawings and engineering site plans prior to construction and/or the purchase of any materials for the site. Contractor shall phase all construction activities so as to minimize disruption to ongoing business and/or home owners. Provide proper pedestrian and vehicular signage and maintain ADA compliant access to existing sidewalks.
3. If required install all temporary construction fencing and signage (for vehicular and pedestrian traffic).

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Lyle Estates, Reading Ma. 01867

4. Record and document all construction inspections and field reports.
5. Coordinate all required inspections with the Town of Reading. Provide Town of Reading with a detailed construction and inspection schedule.
6. Have site cleared of trees, brush, and stumps.
7. Saw cut and remove existing pavement as required for utility installation. Dispose of all material in accordance with the federal, state, and local requirements.
8. Cut and cap existing utilities in accordance with the specifications set by each utility provider.
9. Stake roadway, temporary stockpile areas, and bmp's.
10. Install new utilities. Construction drainage and BMP's.
11. Coordinate with Wetlands and Land Management Inc. for knotweed removal and wetland restoration items outlined on Sheet C7
12. Construct proposed roadway landscape walls. Bring site to base grade and have final roadway and landscape areas staked out in the field.
13. Install binder course and install curbing.
14. Loam and seed all grass areas and bmp's 1. Install all final site landscaping.
15. Place finish pavement course.
16. Remove all siltation (clean catch basins and inspect bmp's) from the site.
17. Install final signage and pavement markings.
18. Perform as-built drawing for roadway and BMP 1 construction for submission to the Town of Reading Engineering Department.

Operation and Maintenance – Construction Phase

Contractors Guide

Lyle Estates, Reading Ma. 01867

CONSTRUCTION PHASE EMERGENCY CONTACTS

Contractor:	TBD
Developer:	Jamieson Properties LLC 627 Main Street Woburn, MA 001801 attn: Steve Dodge
Resident site engineer:	TBD
Engineer of record:	asb design group, llc Topsfield ma (978) 500-8419
Town of Reading police	Emergency 911 (781) 944 -1212
Town of Reading Fire and Rescue Dept.	Emergency 911 (781) 944 - 3132
Town of Reading Engineering Department	(781) 942 - 9082

Operation and Maintenance Plan – Post Construction

Operation and Maintenance – Post Construction

Home Owners Guide

Lyle Estates, Reading MA. 01867

OPERATION & MAINTENANCE PLAN: POST CONSTRUCTION

MA DEP STORMWATER REPORT STANDARDS 4 & 8

RESPONSIBILITY: HOMEOWNER AND TOWN OF READING

DESIGN TEAM

See Table of contents.

STATEMENT OF INTENT

This operation and maintenance plan (O&M) identifies the inspection and maintenance requirements for the future homers at Lyle Estates, Reading MA. 01867 (Lots 1-4). The plan addresses requirements contained in the stormwater management policy developed by the Massachusetts Department of Environmental Protection (MADEP) and Coastal Zone Management.

The operation and maintenance program to be implemented by the home owners is intended to prevent impacts to existing wetlands, existing roadways, and surrounding sites after the completion of the construction – Post Construction. The guidelines incorporate best management practices (BMP's) as specified in the guidelines developed by MADEP and the environmental protection agency, and complies with the requirements of the National Pollution Discharge Elimination System (NPDES) General Permit for stormwater discharges for construction activities. This does not preclude any requirements for additional controls identified in these drawings or support documents or any other appropriate techniques to limit erosion and sedimentation off the site. Also, any measures deemed necessary by the Town /town planning board, conservation commission, zoning board, or the Town/town's representative shall be part of operation and maintenance plan.

Every effort has been made to provide a comprehensive O&M plan for the future home owners. All measures and guidelines presented within this plan are considered to be the minimum efforts required to achieve the intent of the stormwater control program and minimize off-site impacts. Should any omissions or inconsistencies arise in the plan, the home owner, and governing officials are expected to use reasonable and experienced judgment in the field relative to evaluating and implementing measures based on the intent of this plan.

PROJECT IDENTIFICATION

Project Name: Lyle Estates

Project Location: Lyle Estates
Route 129 (Lowell Street – Tax Map 26)



Operation and Maintenance – Post Construction

Home Owners Guide

Lyle Estates, Reading MA. 01867

Reading MA. 01832

DOCUMENTS:

Home Owners May Refer to the following Documents:

- | | |
|--|---------------------|
| ▪ As -Built Drawings | DATE: TBD |
| ▪ Town of Reading Zoning Board of Appeals Approval | DATE: TBD |
| ▪ Town of Reading Planning Board Conditions of Approval | DATE: TBD |
| ▪ Town of Reading Conservation Commission Conditions of Approval | DATE: TBD |
| ▪ NPDES General Permit | DATE: TBD |
| ▪ Approved Plan Sheets C1-C10 | DATE: TBD |
| ▪ Figure 1 - Operation and Maintenance Responsibility | DATE: April 9, 2014 |

INTRODUCTION

The purpose of this **Home Owners Operation and Maintenance Guide** (HOOMG) is to provide a comprehensive and cost effective program for implementing the long term maintenance of the Storm Water Facilities referenced in Figure 1 (Operation and Maintenance Responsibility). The HOOMG will identify:

- Lyle Estates Stormwater Home Owner Responsibility
- Town of Reading Stormwater Responsibility
- Stormwater BMP Description
- Maintenance Schedule,
- Maintenance Requirements/Methods,
- Record Keeping,
- Estimated Costs

LYLE ESTATES STORMWATER HOME OWNER RESPONSIBILITY

Figure 1 identifies the type for stormwater facility and its location on each of the Lots (Lots 14,). The Home owner is responsible for the operation and maintenance of the Rain Gardens/LID's within their property. Lots 1 and 4 shall share the maintenance BMP 1. All require maintenance shall be in accordance with this guide.

Operation and Maintenance – Post Construction

Home Owners Guide

Lyle Estates, Reading MA. 01867

TOWN OF READING STORMWATER RESPONSIBILITY

An important component of Stormwater Operation and Maintenance programs is roadway maintenance. This would include street sweeping and catch basin cleaning. These activities will become the responsibility of the Town of Reading at the time of the acceptance of the proposed roadway – Lyle Estates. Until that time the contractor responsible for the roadway construction will maintain the new roadway and catch basin cleaning.

Prior to acceptance of the roadway all catch basins will be cleaned and the street swept. At this time catch basins should be cleaned at a minimum once a year (late spring early summer). Street sweeping should also occur early spring to remove sand that may have been placed during winter snow storms. These activities will be performed by the Town of Reading and in accordance with the Town of Reading Department of Public Works operation and maintenance program.

STORMWATER BMP DESCRIPTION

There are two types of stormwater BMP's being utilized for the Lyle Estates development. They are:

- **Rain Gardens/LID's**

Rain Gardens/LID's are shallow depressions placed within the landscape to trap, detain, retain, infiltrate and slowly release stormwater runoff generated by single family home development. These areas are labeled LID BMP's 1 – 4 on Figure 1. The stormwater generated comes from impervious surfaces (driveways, walkways and patios) as well as lawn and natural vegetated areas.

The stormwater roof runoff will be collected by gutters and directed to below grade stormwater infiltration systems.

Each are proposed to handle and treat the stormwater runoff that is considered to have a low Total Suspended Solids (TSS). High TSS typically occurs with soils that erode due to the lack of vegetation during the construction process and roadway sanding during winter conditions. These types of areas also tend to have higher pollutant level (oils, nutrients).

The Rain Gardens/LID's provides stormwater treatment for excess lawn and garden fertilizers, pesticides, herbicides, yard and animal waste. Also see "*Here is Your Rain*"

Operation and Maintenance – Post Construction

Home Owners Guide

Lyle Estates, Reading MA. 01867

Garden Guide” prepared by ASB design group LLC (See Appendix A).

▪ **Best Management Practice Stormwater Treatment Systems for Roadways (BMP’s)**

Best Management Practice Stormwater Treatment Systems for Roadways are stormwater treatment facilities that are intended to trap, detain, retain, infiltrate and slowly release stormwater runoff generated by roadway and/or parking areas or larger site developments. These areas are labeled BMP 1 on Figure 1. The stormwater runoff is generated from the impervious surfaces (roadways, sidewalks, parking lots) as well as lawn and naturally vegetated areas.

They are intended to handle and treat the stormwater that has a higher TSS and pollutant level (oils, nutrients). These areas typically contain larger impervious surfaces such as roadways and parking lots or areas that need to be treated and controlled during the construction process. The BMP’s provides stormwater treatment for these areas as well as decreasing the Peak Rate of Stormwater Runoff that will leave the site as a result of the development. The increase in the peak rate of stormwater runoff is associated with the increase in impervious surfaces – roadway, buildings, parking areas, walkways, driveways etc.

MAINTENANCE SCHEDULE – HOMEOWNER

Maintenance of the stormwater facilities should occur in the spring (when weather conditions allow) and late fall of each year (after the leaves fall).

MAINTENANCE REQUIREMENTS/METHODS – HOMEOWNER

LID BMP’s are comprised of plantings, mulching and grass with or without a slow release outlet. In the spring season maintenance would include:

- Weeding of planting beds as needed.
- Refreshing of the mulch (wood mulch or landscape stone). If mulch is used, then the homeowner may apply a new layer of mulch. This should not be more than ½” in depth. The homeowner may elect to forgo the additional mulch and simply cultivated the existing planting areas during the weeding process. Both methods are acceptable.

Were landscape stone is used the homeowner may refresh as maybe needed (typically every 3 to 4 years). Here again this should not be more than ½” in depth. The homeowner may elect to forgo the additional stone and simply cultivated the existing stone in the planting areas during the weeding process

- The home owner can aerate lawn areas using core aerator with times (1 x per year, fall) to promote a healthier grass growing environment.

Operation and Maintenance – Post Construction

Home Owners Guide

Lyle Estates, Reading MA. 01867

- Apply fertilizers as may be required.
- Mow the grass on a weekly basis in the spring and then on an as needed basis during the summer and fall months. Do not cut fine lawn grass shorter than 2½". Mulch grass in place or collect for composting.
- If applicable clear the low flow outlet of leaves and weeds to prevent blockage.
- Store, treat, and/or dispose of all hazardous or mixed wastes in accordance with all applicable laws and regulations. Do not bury waste, sanitary waste, or trash on-site.
- Additional plants can be added to the LID BMP. See "*Your Rain Garden Guide*" and/or talk with your local nursery. Replace plants as necessary to maintain a healthy vegetation within the basin.
- Inspect fine lawn and native grass areas for erosion or gullyng. Top dress, re-grade and re-seed as necessary.
- Keep gutters free of leaves and debris. Clean as may be require. Also keep down spouts from being clogged or crushed at outlet.
- If standing water occurs after 72 hours homer owner should inspect the outlet.

Fall maintenance would include:

- Leaf removal.
- Final lawn mowing and planting bed weeding (if required).

BMP 1 is comprised of a 500-gallon sedimentation tank located within in the concrete splash pad, wetland and upland plantings, grass, infiltration catch basin and a BMP vegetated weir over flow outlet. The spring season maintenance would include:

- Inspection of sedimentation tank. If the sedimentation tank shows signs of sediment (roadway sand from the winter season) remove the sand/sediment. Sediment and sand should be removed from the forbay, composted and/or disposed off-site.
- Mow the grass areas on a weekly basis in the spring and then as need during the summer and fall months. Do not cut fine lawn grass shorter than 2½". Mulch grass in place or collect for composting.
- Clear vegetated weir over flow outlet of leaves and weeds to prevent blockage.
- Clear inlets and outlets of leaves or blockage.
- Inspect fine lawn and native grass areas for erosion or gullyng. Top dress, re-grade and re-seed as necessary.
- If standing water occurs after 72 hours' homer owner should inspect the outlet.

Fall maintenance would include:

- Leaf removal.
- Final lawn mowing.
- Inspect all outlets and clean as maybe required.

Operation and Maintenance – Post Construction

Home Owners Guide

Lyle Estates, Reading MA. 01867

RECORD KEEPING

The homeowner should keep records of all Operation and Maintenance activities. Keep digital pictures and create a summery letter outlining the Operation and Maintenance activities. Submit to the Reading Conservation Commission if required. See appendix A for a sample of a Post Construction Inspection Form.

ESTIMATED COSTS

Costs will depend on the owner's approach. If the home owner chooses to perform the work the following items may be required:

- fertilizers for the lawn
- plants as may be required
- wood/landscape pine bark mulch on infiltration stone,

The homer should expect a yearly expense of between \$300 - \$400 dollars. This cost is for the spring and fall maintenance only.

If the homeowner chooses to use a third party (typically a landscape maintenance firm) they should expect a cost of \$500 - \$750 for spring and fall maintenance. Again this cost is for the spring and fall maintenance only.

Typical Construction Phase Example Inspection Form

Typical Post Construction Phase Example Inspection Form

Homeowners Rian Garden/LID Brochure

**Figure 1 – Homeowners Rian Garden/LID and BMP 1
Location Guide**

EXAMPLE CONSTRUCTION PHASE CHECKLIST/RECORD KEEPING

ASB design group LLC				
NAME OF PROJECT				
MAINTENANCE PROVIDER				
OWNER'S REPRESENTATIVE				
INSPECTOR				
DATE OF INSPECTION				
INSPECTION NUMBER				
INSPECTION ITEMS				
BMP	INSPECTION/ FREQUENCY	CLEANING/REPAIR (YES/NO) - DESCRIPTION	DATE OF CLEANING/REPAIR	PERFORMED BY
CATCH BASIN/INLET PROTECTION	WEEKLY AND AFTER RAIN FALL EVENTS			
EROSION CONTROL BARRIER	WEEKLY AND AFTER RAIN FALL EVENTS			
CONSTRUCTION ENTRANCE	WEEKLY AND AFTER RAIN FALL EVENTS			
MATERIAL STOCK PILE AREA	WEEKLY AND AFTER RAIN FALL EVENTS			
CONCRETE WASH OUT AREA	WEEKLY AND AFTER RAIN FALL EVENTS			
STREET/SITE SWEEPING	WEEKLY AND AFTER RAIN FALL EVENTS			
DUST CONTROL	WEEKLY AND AFTER RAIN FALL EVENTS			
SITE EROSION	WEEKLY AND AFTER RAIN FALL EVENTS			
SLOPE STABILIZATION	WEEKLY AND AFTER RAIN FALL EVENTS			
TEMPORARY SEEDING	WEEKLY AND AFTER RAIN FALL EVENTS			
TEMPORARY SEDIMENTATION POND	WEEKLY AND AFTER RAIN FALL EVENTS			
TRASH/DEBRIS	WEEKLY AND AFTER RAIN FALL EVENTS			
RECOMMENDATIONS OF ADDITIONAL EROSION CONTROL MEASURES				
NOTES				

NOTE:

1. The inspection checklist form shown above is an example. Other inspection items may be required or items shown not required. It is the responsibility of the contractor to provide an "inspection checklist form" based on the design shown on sheets C1-C7 for review and approval prior to construction.
2. It is the responsibility of the contractor to provide the appropriate and regular training for all staff responsible for performing tasks required under the operations and maintenance plan.

EXAMPLE POST CONSTRUCTION (HOMEOWNER) CHECKLIST/RECORD KEEPING

ASB design group LLC				
NAME OF PROJECT				
MAINTENANCE PROVIDER				
OWNER'S REPRESENTATIVE				
INSPECTOR				
DATE OF INSPECTION				
INSPECTION NUMBER				
INSPECTION ITEMS				
BMP	INSPECTION/ FREQUENCY	CLEANING/REPAIR (YES/NO) - DESCRIPTION	DATE OF CLEANING/REPAIR	PERFORMED BY
CATCH BASINS	SPRING - APRIL FALL - NOVEMBER			
BMP PONDS	SPRING - APRIL FALL - NOVEMBER			
BMP INFILTRATION SYSTEMS	SPRING - APRIL FALL - NOVEMBER			
OUTLET STRUCTURES	SPRING - APRIL FALL - NOVEMBER			
RIP RAP	SPRING - APRIL FALL - NOVEMBER			
STREET/SITE SWEEPING	SPRING - APRIL FALL - NOVEMBER			
RAIN GARDENS	SPRING - APRIL FALL - NOVEMBER			
VEGETATED SWALES	SPRING - APRIL FALL - NOVEMBER			
VEGETATED VELOCITY REDUCER	SPRING - APRIL FALL - NOVEMBER			
LEVEL SPREADER	SPRING - APRIL FALL - NOVEMBER			
SITE EROSION - PERMANENT SEEDING	SPRING - APRIL FALL - NOVEMBER			
TRASH/DEBRIS	SPRING - APRIL FALL - NOVEMBER			
RECOMMENDATIONS OF ADDITIONAL EROSION CONTROL MEASURES				
NOTES				

NOTE:

1. The inspection checklist form shown above is an example. Other inspection items may be required or items shown not required. It is the responsibility of the homeowner to prepare an "inspection checklist form" based on Post Construction Operation and Maintenance Plan.

WHAT IS A RAIN GARDEN/LOW IMPACTED DESIGN STORMWATER INFILTRATION SYSTEM

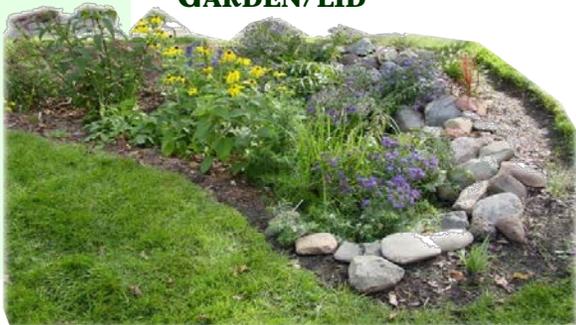
A Rain Garden or Low Impact Design Stormwater Infiltration System (LID) is a shallow depression that allows rain and snowmelt to seep naturally into the ground by capturing runoff from rooftops and driveways. Most importantly, rain gardens or LID's help preserve nearby streams and ponds by reducing the amount of polluted runoff and filtering pollutants.

WHY DO WE NEED A RAIN GARDEN/LID

Stormwater runoff from residential areas often contains excess lawn and garden fertilizers, pesticides and herbicides, oil, yard wastes, sediment and animal wastes which cause water pollution.

Rain gardens fill with stormwater and allow the water to slowly filter into the ground. They also help prevent stream bank erosion and lower the risk of local flooding.

WHAT PLANTS ARE IN OUR RAIN GARDEN/LID



Rain Garden

Highbush Blueberry (*Vaccinium corymbosum*)

Winterberry (*Ilex verticillata*)

River Birch (*Betula nigra*)

Red Osier Dogwood (*Cornus serotina*)

LID Stormwater Infiltration System

Plantings for LID's will vary depending on the LID size, depth and soil conditions.

Consult with your local nursery for appropriate plan selection (See Below)

There is room for more plantings if you desire. We suggest that you choose native, non-invasive species. [See Design Details for LID BMP 1-3 as outlined below.](#)

OTHER VARIETIES THAT ARE ATTRACTIVE AND APPROPRIATE

New England Aster (*Aster novae-angliae*)

Tussock Sedge (*Carex stricta*)

Joe Pye Weed (*Eupatorium maculatum*)*

Turtlehead (*Chelone glabra*)*

Boneset (*Eupatorium*)

Blueflag Iris (*Iris versicolor*)

Soft Rush (*Juncus effuses*)

Switchgrass (*Panicum virgatum*)*

Beebalm (*Monarda*)

Coneflower (*Echinacea*)

Cardinal Flower (*Lobelia cardinalis*)*

Ostrich Fern (*Matteuccia struthiopteris*)*

Sensitive Fern (*Onoclea sensibilis*)

Meadow Sweet (*Spiraea latifolia*)

Steeplebush (*Spiraea tomentosa*)

High Bush Cranberry (*Viburnum trilobum*)

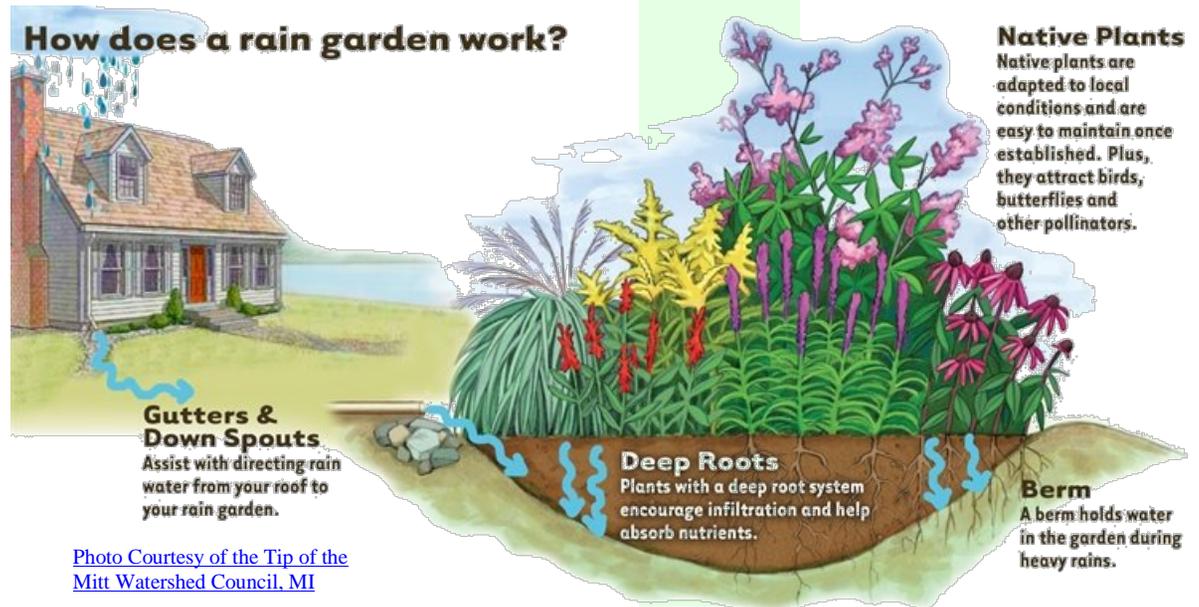


Photo Courtesy of the Tip of the Mitt Watershed Council, MI

WHAT ACTIVITIES SHOULD BE AVOIDED IN A RAIN GARDEN/ LID

Do not fertilize your rain garden/LID. Water runoff carries many nutrients and fertilizes the rain garden regularly. Place the shoveled snow next to the garden so it will be absorbed into the rain garden when it melts instead of shoveling it into the garden. Locate the rain garden away from direct road salt discharge and of course, do not add soil within the rain garden.

WHAT POSSIBLE PROBLEMS MIGHT NEED ATTENTION

If your rain garden/LID overflows, the berm could erode. Fill any erosion on the berm with well-packed soil or sod. A second rain garden can be added down slope if this becomes a problem.

WHAT IS THE PROPER MAINTENANCE OF A RAIN GARDEN/LID

After planting, you will want to pull weeds out of your rain garden until the mature plants crowd them out. For the first year, your rain garden will require monthly weeding during the growing season. It is only necessary to weed one time per year in the following years. Shrubs will need to be pruned annually. It may

be necessary to water several times per week during extreme dry spells.

DESIGN DETAIL LID BMP 1-3

Due to the sandy soils on Lots 2-4 the planting list can be more extensive (always native plants). The sandy soils allow the stormwater runoff to quickly infiltrate into the soils. Also, due to the high infiltration rate for these soils the sites generally do not generate a large quantity of stormwater runoff both in Peak Rate (cubic feet per second) and volume (cubic feet).

For LID BMP's with this type of soil condition plants that can with stand long periods of dry conditions are preferred. Your local nursery will be able to assist you in your plant selection.

The first year a 4" layer of pine bark mulch is placed within the limits of the LID BMP. The homeowner should maintain a 4" depth. This may require having additional mulch be placed from time to time. Each spring aerate the mulch by hand and remove any weeds. At this time check to see if addition mulch is required. This would typically only require about 1/2" of new mulch.

LOTS 2-4, LYLE ESTATES. READING, MA

HERE IS YOUR RAIN GARDEN /LID GUIDE

INSIDE YOU WILL FIND THE ANSWERS TO COMMON QUESTIONS SUCH AS:

- **WHAT IS A RAIN GARDEN/LID**
- **WHAT PLANTS ARE IN OUR RAIN GARDEN/LID**
- **HOW TO MAINTAIN THE RAIN GARDEN/LID**
- **WHY DO WE NEED RAIN GARDENS/LID**



project title:

LYLE ESTATES

prepared for:

JAMIESON PROPERTIES LLC
 627 MAIN STREET, SUITE 1
 WOBURN, MA 01801

revisions

no.	date	description
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plan submission

OPERATION
 AND
 MAINTENANCE
 PLAN

date: 10.25.2016

scale: 1" = 50'

job no: 2012-30

DEP no: TBD

drawing name

HOMEOWNERS
 RAIN GARDEN/
 LID AND
 BMP I
 LOCATION GUIDE

drawing number

FIGURE 1

sheet 1 of 1

