

NPDES PHASE II
STORM WATER GENERAL PERMIT
NO. MAR041044

ANNUAL REPORT
May 1, 2006 – April 30, 2007

Lynn Water & Sewer Commission
400 Parkland Avenue
Lynn MA 01905

A. Self Assessment Review of Compliance with Permit Conditions

For the period of May 1, 2006 through April 30, 2007 the Lynn Water & Sewer Commission (Commission) has complied with the General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems # MAR041044 to the best extent practicable by:

1. Continuing to comply with MADEP Regulations and NPDES Permit # MA 0100552 effective March 30, 2007 through March 30, 2012.
2. Continuing to comply with the Second Modified Consent Decree effective June 29, 2001 for the control of combined sewer overflows, and private inflow and infiltration, to the receiving water bodies of the City of Lynn.
3. Continuing to maintain and enforce an effective Industrial Pretreatment Program governing industrial users of the Lynn Water & Sewer Commission sanitary sewer and stormwater systems.
4. Continuing to maintain and enforce current Lynn Water & Sewer Commission rules regulations governing construction site runoff in conjunction with the City of Lynn Planning Board and Conservation Committee.
5. Continuing to review and comment on all new construction or new subdivision site plans while enforcing Lynn Water & Sewer Commission rules and regulations regarding stormwater regulations.
6. Continuing to maintain an effective catch basin cleaning and repair programs.
7. Continuing to maintain and implement effective brook and drain conduit cleaning and repair programs
8. Continuing to require street sweeping on all Lynn Water & Sewer Commission construction projects.
9. Continuing to work with the City of Lynn Department of Public Works to provide a city wide street sweeping program.

B. Self Assessment of Appropriateness of Best Management Practices

The Best Management Practices (BMP's) adopted for the NPDES Phase II Storm Water General Permit with few exceptions are current practices and policies of the Lynn Water & Sewer Commission. New BMP's were instituted primarily for the "Public Education", and "Public Participation" minimum control measures.

The Commission enforces current rules and regulations on a daily basis, and continues to implement BMP's regarding Public Outreach and Public Participation through mailings, newspaper advertisement, and public access cable television to publicize construction schedules, volunteer clean-up activities, special events, etc.

The Commission is satisfied that the continued application of current rules and regulations and selected additional BMP's regarding Storm Water are appropriate at this time.

C. Assessment of Progress Towards Achieving Measurable Goals.

The Commission continues to make progress towards achieving its measurable goals. Under a "Second Modified Consent Decree" agreed to by the Commission and USEPA, MADEP, and other government agencies in early 2001 the Commission is required to eliminate combined sewer overflows (CSO's) at four (4) of its NPDES permitted outfall locations. Compliance with the decree, the elimination of CSO's, remains the Commission's primary goal. In October of 2004 the Commission submitted to a USEPA and MADEP a fifteen (15) year Supplemental Facilities Plan with a scheduled completion date of December 2020. Included in the plan are the design and construction of new sewer and storm water sewer systems, storage conduits, flow control structures, as well as private and public inflow removal programs. As of April 2007 the Commission is awaiting USEPA and MADEP approval of the submitted Supplemental Facilities Plan.

Below is a detailed assessment of the Lynn Water & Sewer Commission's measurable goals for each Control Measure.

1. Public Education and
2. Public Participation:

Public Education and Outreach and Public Participation efforts as set forth in the Lynn Water & Sewer Commission's Notice of Intent have not been met at this time. Work pertaining but not limited to compliance with an MADEP Administrative Consent Order(ACO) issued August 2006, the drafting of I&I removal contracts, water and sewer system improvement projects, metering of unaccounted for water, as well as acceptance of the Commission's Supplemental Facilities Plan by USEPA MADEP for the control of Combined Sewer Overflows (CSO's) at receiving water outfalls to ensure compliance with the Second Modified Consent Decree has taken precedence over the development of Public Education and Public Participation policies for storm water.

3. Illicit Discharge Detection and Elimination

Illicit Discharge Detection and Elimination continues to make steady progress since May 1, 2006.

In October 2006 the Lynn Water & Sewer Commission implemented an Illicit Connection Detection Program. The program utilizes three (3) Commission employees. During periods of dry weather sandbagging and field inspections of manholes and sections of stormwater pipelines are conducted. If flow or standing water is observed samples are collected and analyzed for pH, or the presence of surfactants, to determine if the sample is wastewater or stormwater. Using existing Commission maps the results of each section of stormwater pipeline inspected are recorded. When wastewater in a stormwater pipeline is identified, dye testing of the individual dwellings and buildings along the affected section of the stormwater pipeline are conducted to identify the source of the illicit connection.

The Lynn Water & Sewer Commission currently contracts with National Water Main Cleaning Co. for video inspection and cleaning services of the Commission's sanitary sewer and storm water systems on an as needed basis. These services are available to the Commission for infiltration inspection, and suspected illicit discharge inspection.

The Lynn Water & Sewer Commission continues to enforce its rules and regulations prohibiting illicit discharge. Penalties and fines for illegal, regulated pollutants, and or hazardous discharges are published periodically in the Lynn Daily Item and the Lynn Journal, local newspapers.

A copy is attached as Appendix A.

4. Construction Site Runoff Control

Measurable Goals for Construction Site Runoff Control are met by continuing current practices regarding construction activities and construction sites. The Lynn Water & Sewer Commission in conjunction with the City of Lynn Planning Board, and the Lynn Conservation Commission require strict compliance with individual MADEP Order of Conditions for all construction projects, as well as the City of Lynn General Conditions.

A copy is attached as Appendix B.

5. Post Construction Runoff Control

Measurable goals for Post Construction Runoff Control are being met by continuing current practices regarding construction sites after completion of projects.

The Lynn Water & Sewer Commission continues to require:

- Separate storm water and sanitary sewer systems.
- Biannual street sweeping.
- Annual catch basin cleaning.
- Developers to maintain pre-development runoff conditions.
- Developers must submit drainage plans providing control measures for sub division drainage such as detention ponds, swales, vegetation planting, grass plots etc.
- Maintenance of drainage structures to conform to Lynn Water & Sewer Commission standards.

A copy of the Lynn Water & Sewer Commission Storm Water Operation and Maintenances Requirements for Water Quality Structures and Detention Basins is attached as Appendix C.

6. Municipal Good Housekeeping

Measurable goals for Municipal Good Housekeeping are being met by continuing current practices regarding good housekeeping. The Lynn Water & Sewer Commission continues to require and implement:

- A three (3) times per year street sweeping schedule coordinated by the City of Lynn Department of Public Works
- Annual catch basin cleaning coordinated by the Lynn Water & Sewer Commission Sewer Department
- Regular repair of damaged or degraded catch basins coordinated by the Lynn Water & Sewer Commission Sewer Department
- Regular maintenance of all brooks and drain conduits in the City coordinated by the Lynn Water & Sewer Commission Sewer Department
- Proper disposal of brook and catch basin cleaning debris coordinated by the Lynn Water & Sewer Commission Sewer Department
- High pressure water jetting, snaking, and root control of sanitary sewer and storm water piping on an as needed basis coordinated by the Lynn Water & Sewer Commission Sewer Department.
- Proper maintenance of parks, playgrounds, and open spaces coordinated by the City of Lynn Department of Public Works.

D. Discussion of Activities for Next Reporting Cycle

The Lynn Water & Sewer Commission as previously mentioned is currently designing, building and installing new sanitary sewer and storm water drainage systems to comply with the Second Modified Consent Decree agreed to by the Commission and regulatory agencies on June 29, 2001. Pending USEPA and MADEP approval of the Commission's "Supplemental Facilities Plan" the Commission will begin installation activities and continue through December 31, 2020. Moreover removal of private inflow and infiltration will continue through the same time period.

In the coming year the Lynn Water & Sewer Commission will attempt to meet measurable goals for the Public Education and Public Participation control measures. Many of the stated goals in the Lynn Water & Sewer Commission's Notice of Intent require formal consideration by the Commission Board. In the coming year attempts will be made to set as agenda items storm water initiatives such as:

- Volunteer Stenciling of catch basins.
- Feasibility of a Storm Water Management Panel.
- Public / Municipal Watershed Committees.
- Financing for Storm Water programs.

Efforts will be made to institute employee training programs regarding Storm Water Management.

Efforts will be made to provide Public Information Packets regarding Storm Water Impact on receiving waters.

Efforts will be made to provide the public with good management technique regarding storm water runoff in regards to vehicle washing, waste oils, paint, stain, and strippers, pet wastes, etc.

E. Changes in Identified Best Management Practices or Measurable Goals.

At this time the Lynn Water & Sewer Commission has not changed any Best Management Practices or measurable goals.

F. Reliance on Other Entities for Achieving Measurable Goals

The Lynn Water & Sewer Commission continues to work towards achieving measurable goals with the City of Lynn Department Of Public Works, City of Lynn Health Department, MassHighway, and surrounding communities including Lynnfield, Peabody Revere, Salem, Swampscott, and Saugus.

APPENDIX A



or all your beer and soda bottles and cans
and our double coupons on cigarettes
Open 7 days a week, 6 AM til 10 PM
760 Washington St., Lynn
OPEN 7-DAY



"Doiny"
106 SYLVAN
Open: 8:30-9:00 M-F 8:30-9:00

LYNN WATER AND SEWER COMMISSION NOTICE

Subject: PROPOSED PENALTIES AND FINES FOR VIOLATION OF INDUSTRIAL PRETREATMENT RULES AND REGULATIONS: (per violation per day, each such day constitutes a separate violation)

	PENALTY CHARGES
pH: 0.0-2.0 HAZARDOUS WASTE	\$5,000.00
2.1-3.0	\$4,000.00
3.1-4.0	\$2,500.00
4.1-5.0	\$1,000.00
5.1-5.4	\$ 100.00
5.5-10.0 COMPLIANCE	\$ 100.00
10.1-10.4	\$1,000.00
10.5-11.4	\$2,500.00
11.5-12.4	\$5,000.00
12.5-14.0 HAZARDOUS WASTE	\$ 500.00
REGULATED POLLUTANT METALS INCLUDING CYANIDE: (EXCEEDING PERMIT LIMIT)	\$5,000.00
EXPLOSIVES (gasoline discharges, volatile organics, etc.) SEE R. & R.'S ARTICLE V SECTION 2 a.:	\$ 300.00
OIL & GREASE: (NON PETROLEUM BASED) FOOD SERVICE ESTABLISHMENTS	\$5,000.00
1st OFFENSE	WARNING
2nd OFFENSE	\$ 200.00
3rd OFFENSE	\$ 300.00
4th OFFENSE	\$ 400.00
(etc. etc. OFFENSE X \$100.00)	\$ 400.00
FLOW OBSTRUCTION, * SEE R. & R.'S ARTICLE V SECTION 2 b.:	\$1,000.00 MIN.
.....	\$5,000.00 MAX.
UNTIMELY AND INCOMPLETE REPORTING (B.M.R., C.M.R., etc.):	\$ 100.00
DISCHARGES CAUSING INTERFERENCE, PASSTHROUGH OR RESULTING IN A VIOLATION OF THE COMMISSION N.P.D.E.S. PERMIT:	\$5,000.00

THE ABOVE PENALTIES ARE IN ADDITION TO COSTS FOR DAMAGES TO THE SEWERAGE TREATMENT WORKS (collection system, pumping stations, sewer treatment plant, etc.) CAUSED BY THE VIOLATOR.
*Discharges of the following materials to the sewer or drainage system INCLUDING CATCH BASINS shall be punishable by a fine of NOT LESS THAN \$1,000.00 or more than \$5,000.00 per violation: garbage with particles greater than one-half inch in any dimension, animal guts or tissues, peunch manure, bones, hair, hides or fleshings, entrails, whole blood, feathers, ashes, sluders, sand, spent lime, stone or marble dust, metal, glass, straw, shavings, grass clippings, rags, spent hops, waste paper, wood, plastics, gas, tar, asphalt residues, residues from refining or processing of fuel or lubricating oil; mud, or glass grinding or polishing wastes.

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APPENDIX B

GENERAL CONDITIONS

1. Failure to comply with all conditions stated herein and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. This Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable Federal, State, or local statutes, ordinances, by-laws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
 - (a) the work is a maintenance dredging project as provided for in the Act; or
 - (b) the time for completion has been extended to a specified date more than three years, but less than five years from the date of issuance and both that date and the special circumstances warranting the extended time period are set forth in this Order.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order.
6. Any fill used in connection with this project shall be clean fill, containing no trash, refuse, rubbish or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.
7. No work shall be undertaken until all administrative appeal period from this Order have elapsed or, if such an appeal has been filed, until all proceedings before the Department has been completed.
8. No work shall be undertaken until the Final Order has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In

16. The LCC shall be notified at least forty-eight (48) hours in advance of the date upon which construction activities on the site are to proceed. All site mitigation measures must be in place prior to initiation of construction.
17. Prior to construction, the applicant shall inform the LCC in writing of the name(s), address(es), and business and home telephone numbers of the project supervisor(s) who will be responsible for insuring performance of all sedimentation and erosion control measures, wetlands alteration, and replication aspects of the project.
18. A copy of this Order of Conditions, including all referenced documents and plans, and all other subsequent approvals and directives issued by the LCC, shall be available on-site for inspection or reference while activities regulated by the Order are being performed. Copies of said documents shall be provided to all contractors and subcontractors who shall also be held responsible for compliance with this Order.
19. Issuance of these Conditions does not in any way imply or certify that the site or down-stream areas will not be subject to flooding, storm damage or any other form of damage due to wetness.
20. This Order of Conditions does not relieve the permittee or any other person of the necessity of complying with all other applicable Federal, State, or Local statutes ordinances, By- Laws, or regulations.
21. The applicant assumes all liability arising from his/her construction activities and project performance.
22. The LCC shall be notified in writing prior to start, at mid- point, and completion of work.
23. Prior to the start of work, the edge of bordering vegetated wetland (or the top of bank in areas where there is no BVW) shall be clearly marked in the field by stakes or flags placed at no greater than twenty-five (25) foot intervals. These markers shall be maintained in place throughout construction.
24. A continuous limit of construction barrier shall be established between all construction areas, including proposed replication areas and wetland resource areas. Said barrier shall consist of a staked hay bale dike, siltation fence, and/or orange construction fence.

31. Stripping of vegetation, clearing and grubbing of trees, grading or other solid disturbance shall be done in a manner that will minimize soil erosion. To the extent practical, limited portions of the area should be cleared at one time to allow construction to proceed and the area to stabilize.
32. All debris or excavated material shall be disposed of in a legal manner. No fill, construction materials, or brush shall be stockpiled on-site once construction is completed.
33. All retaining walls (concrete, rip-rap, etc.) over ten (10) feet in height shall be designed by a structural engineer and a letter from the structural engineer stating the wall has been built according to the designed plan shall be presented to the LCC before a Certificate of Compliance is issued.
34. Slope stabilization and sequencing of excavation and fill shall follow the specifications set forth in the above-referenced plans.
35. Whether from on-site or off-site sources, any fill used in connection with this project shall be clean fill as described below:

Clean Acceptable Fill: Must be earthen, permeable material; exclusive of peat; clay; tight till; hardpan; metals; boulders larger than twelve (12) inches in diameter; wood; tree branches; potential leachable hazardous materials (petroleum by-product); or construction debris. These materials must be compactable to 65% of original profile.
36. Hay bales shall be placed down-gradient of work to be performed.
37. Pruning shall be performed only as necessary and slash shall be removed off-site.
38. Trees and debris left from previous work over the years shall be cleaned up in the areas covered under this Order.
39. Where stone or rock fill has been used in areas that are to be seeded, minimum coverage of this fill shall be twelve (12) inches of compacted clear borrow, gravel, or soil, and it shall be topped after grading with not less than four (4) inches of good quality loam.
40. There shall be no stockpiling of soil or other materials within twenty-five (25) feet of any resource area.
41. All demolition debris will be disposed off-site.

LCC upon request. This Condition shall remain in force permanently and shall be recorded as such on the Certificate of Compliance.

51. Used petroleum products from the maintenance of construction equipment and construction debris shall be collected and disposed off-site. No on-site disposal of these items is allowed.
52. No underground fuel tanks shall be allowed in any of the areas referenced in this Order of Conditions. This Condition shall remain in perpetuity and be recorded in the Certificate of Compliance.
53. During and after work on this project, there shall be no discharge or spillage of fuel, oil, or other pollutant into any area of statutory interest.
54. Dust control shall be limited to water -- no salts or other wetting agents shall be used.
55. No sodium based product shall be used during or after construction for the control of ice and snow on paving areas and driveways, and any arrangement for snow removed shall so stipulate. This Condition shall remain in perpetuity and be recorded as such in the Certificate of Compliance.
56. Fertilizers utilized for landscaping and lawn care shall be of the low-nitrogen content variety and shall be used in moderation. Pesticides and herbicides shall not be used on any of the areas referenced in this Order of Conditions within one hundred (100) feet of a wetland resource area.
57. Any changes in the submitted plans, Notice of Intent, or resulting from the aforementioned Conditions must be submitted to the LCC for approval prior to implementation. If, by majority vote, the LCC finds said changes to be significant and/or deviate from the original plans, Notice of Intent or this Order of Conditions to such an extent that the interests of the Wetland Protection Act and By-Law cannot be protected by the Order and would best be served by the issuance of additional Conditions, then the LCC will call for another public hearing within twenty-one (21) days -- at the EXPENSE of the APPLICANT - in order to take testimony from all interested parties. Within twenty-one (21) days of the close of said public hearing, the LCC will issue an amended or new Order of Conditions.
58. Any errors found in the plans or information submitted by the applicant shall be considered as changes, and procedures outlined above for changes shall be followed.

APPENDIX C

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LYNN WATER AND SEWER COMMISSION

**STORMWATER OPERATION
AND MAINTENANCE REQUIREMENTS**

FOR

**WATER QUALITY STRUCTURES AND DETENTION
BASINS**

⊖
MANUAL

**LYNN WATER AND SEWER
COMMISSION
400 PARKLAND AVENUE
LYNN, MASSACHUSETTS 01905**

1.0 INTRODUCTION

This manual provides guidelines for the design, operation, and maintenance of Water Quality Structures and Detention Basins to meet stormwater management requirements for the Lynn Water and Sewer Commission and various regulatory programs. The intent of this manual is to provide the City of Lynn and its residents with designs that prevent untreated discharges to wetlands and waters, preserve hydrologic conditions that meet or improve pre-development conditions, reduce or prevent flooding by managing the peak discharge and volumes of runoff, minimize erosion and sedimentation, reduce suspended solids and other pollutants to improve water quality, provide increased protection of sensitive natural resources, allow for routine maintenance and provide for public safety.

These requirements are in addition to any other Local, State, or Federal regulations. Nothing in these requirements shall be construed to exempt any activity from any other Local, State, or Federal regulation.

This manual may be rescinded, modified, or added to, by the Commission, the Executive Director or Chief Engineer of the Commission, at any time when, in their judgment, such action is in the best interest of the Commission.

2.0 PERSONNEL

The Lynn Water & Sewer Commission, as the owner and operator of the City of Lynn's drainage system, will provide the necessary personnel and will be responsible for the inspection, maintenance and repair as needed to maintain the integrity of the system. The following personnel will be responsible for assessing the drainage systems conditions and authorizing construction and repairs:

Lynn Water & Sewer Commission: Five-member board appointed by the Mayor of Lynn and the Lynn City Council. Authorizes all activities conducted by the Lynn Water & Sewer Commission.

Executive Director: Oversees all Lynn Water & Sewer Commission operations and reports directly to the Commission.

Chief Engineer: Oversees engineering department and daily operations of the water, sewer and drain systems. Reports to the Executive Director and the Commission.

Treasurer: Acts as Chief Procurement Officer. Authorizes all purchasing of equipment and supplies as needed for routine and emergency operation and maintenance. Reports to the Executive Director and the Commission.

Staff Engineer: Oversees the design and construction of water quality structures and detention basins. Reports to the Chief Engineer.

Emergency spillway: An outlet for surplus water.

Erosion: Weathering of soil by running water, wind, or ice.

Extended detention basin: An area surrounded by an embankment, or an excavated pit, designed to temporarily hold stormwater long enough to allow settling of solids and reduce local and downstream flooding.

Energy dissipator: A structure (riprap or concrete apron) that prevents Scouring and slows the flow of water.

Freeboard: The space between the top of an embankment and the highest water elevation expected for the largest design storm stored. The space is required as a safety margin in a pond or basin.

Groundwater: The water contained in interconnection pores located below the water table in an unconfined aquifer or located in a confined aquifer.

Oil and grease separator: Also known as a Water Quality Inlet (WQI).

100-year storm: Precipitation from a storm that occurs with a predicted statistical frequency of once every 100 years over a 24-hour period. This storm has a 1% chance of happening in any one given year. Because this is a statistical storm, it could occur twice in the same year.

Particulates: Sand, silt, or clay soil particles and organic matter found in stormwater.

Pond/wetland system: A two-cell stormwater wetland design with a wet pond in combination with a shallow marsh.

Riprap: A combination of boulders, large stones, and cobbles used to line channels, stabilize banks, filter out sediments, or reduce runoff velocities.

Riser: A vertical pipe extending from the bottom of a pond that is used to control the discharge rate for a specific design storm.

Scouring: The cleaning and digging action of flowing water, especially the downward erosion caused by stream water in sweeping away mud and silt from the streambed and outside bank of a curved channel.

Sediment: Eroded soil and rock material and plant debris, transported and deposited by runoff.

- **The design of the detention basin shall account for gradual accumulation of sediment. On-site disposal areas capable of receiving sediment from a minimum of two cleaning cycles should be reserved. Extra storage (such as sumps) shall be provided near the pond inlet or the lower stage to trap incoming sediments.**
- **Distance between inlets and outlets should be as great as possible to lengthen the flow path and increase detention time. Inlet baffles should be constructed where necessary to prevent short-circuiting.**
- **Detention basins should be wedge-shaped, if possible, narrowest at the inlet and widest at the outlet. A minimum length to width ratio of 3:1 should be used to maximize storm water contact and detention time.**
- **Inflow points shall be designed with energy dissipators to reduce inflow velocity.**
- **Any stream channel immediately below the pond outlet shall be lined with large stone rip-rap and graded to a slope of approximately 0.5% to prevent scouring during large storm events. A layer of filter cloth shall be laid down that conforms to the natural dimensions of the channel, and then anchored with 18-30 inch stone rip-rap. Smaller sized riprap 9-12 inches shall be used if the diameter of the pipe outfall is less than 24 inches.**
- **The inlet shall be designed with a forebay or settling zone to trap coarse sediments.**
- **Catch basins that discharge directly to the detention pond shall be provided with a 4-foot deep sump, a hooded outlet and a water quality inlet structure.**
- **Detention basin side slopes shall be no steeper than 3:1 (h: v) and no flatter than 20:1 (h: v). Detention basin slopes shall be stabilized with low lying ground cover type plantings, geotextile fabric, or other methods before pavement is placed on the roadway.**
- **Detention basin bottoms shall be graded level and sloped to the outlet and provided with a low maintenance low lying ground cover type vegetation free of standing trees, shrubs or saplings and suitable for periodic flooding.**
- **The outlet structure shall be designed to facilitate maintenance. Structures should be accessible to maintenance personnel and equipment during normal and emergency conditions.**
- **The outlet structure shall contain a drain-down valve, which will allow complete draining of the detention basin within 24 hours for emergency purposes or routine maintenance where possible.**

- The detention pond access berm and a 10 foot wide buffer easement shall be deeded over to the Commission.
- Drainage system that discharges directly to the detention pond shall be provided with a water quality inlet structure.
- Reinforced concrete or pipes, barrels and risers shall be utilized for their greater longevity.
- To prevent clogging, trash racks or hoods should be installed on the riser. To facilitate access for maintenance, the riser should be installed within the embankment. Anti-seep collars should be installed on the outlet barrel to prevent seeping losses and pipe failure. The embankment shall be properly compacted. The embankment shall have at least one-foot freeboard above emergency spillway.
- Landscaping abutting a detention basin shall consist of non-leafy, low maintenance type vegetation.
- Houses abutting a detention basin shall have the first floor elevation a minimum of two (2) feet above the pond maximum high water elevation.

5.0 WET RETENTION PONDS

5.1 Site Criteria

- Base flow and/or large contributing drainage areas are necessary to support pool elevations in wet ponds.
- The contributing drainage area to any individual wet pond should be at least 10 acres and the pond surface area at least 1/4 acre. Wet ponds should not be utilized for sites with drainage areas of less than 10 acres unless adequate ground water flow is present.
- For each acre-foot of storage in a wet pond, four acres of drainage area are recommended.
- At a minimum, the volume of the permanent pool should be at least 2.5 times greater than the runoff volume generated by the mean storm.
- Soils, depth to bedrock and depth to water table at the proposed location of the wet pond must be investigated. Site conditions must be suited to the siting of the wet pond: Well drained soils will not support surface water, sites with these soil types will require the use of natural or synthetic lining material. Bedrock close to surface may prevent excavation.

- Wet pond side slopes shall be no steeper than 3:1 (h: v) and no flatter than 20:1 (h: v). Wet pond slopes shall be stabilized with low lying ground cover type plantings, geotextile fabric, or other methods before pavement is placed on the roadway.
- To prevent clogging, trash racks or hoods should be installed on the riser. To facilitate access for maintenance, the riser should be installed within the embankment. Anti-seep collars should be installed on the outlet barrel to prevent seeping losses and pipe failure. The embankment shall be properly compacted. The embankment shall have at least one-foot freeboard above emergency spillway.
- The outlet structure shall be designed to facilitate maintenance. The vital parts of the structures shall be accessible to maintenance personnel and equipment during normal and emergency conditions.
- A bottom drain pipe with a valve and an inverted elbow shall be installed to prevent sedimentation and be sized to completely drain the pond in less than 24 hours.
- Reinforced concrete pipes, barrels and risers shall be utilized for their greater longevity.
- To prevent scour at the outlet the channel, immediately below the pond shall be modified to conform to natural dimensions, and lined with large riprap placed over filter cloth.
- Embankments, or dams, created to store more than 15 acre-feet, or that are more than 6 feet in height, are under the jurisdiction of the state Office of Dam Safety and are also subject to their regulations. Embankments and spillways should be designed in conformance with the state dam safety regulations and criteria. All wet ponds must have emergency spillway capable of bypassing runoff from large storms without damaging the impounding structure.
- An access for maintenance, minimum width of 10 feet and a maximum slope of 12%, must be provided by easement or public or private right-of-way. This access should never cross the emergency spillway, unless the spillway has been designed for that purpose. This access shall be deeded over to the Commission. Access roads shall be constructed with a minimum of 4 inches of crushed stone covered by 6 inches of loam. No structures are to be located within access easements or right-of-way.
- Detention pond shall have a minimum of 1-foot freeboard above maximum high water level for adequate public safety.
- Vegetative buffers around the perimeter of the wet pond are recommended for erosion control, additional sediment and nutrient removal.