Appendix D: Phosphorus Reduction Requirement

I. OVERVIEW OF PHOSPHORUS REDUCTION REQUIREMENT

The permittee shall achieve a reduction in phosphorus load in storm water discharging from its DD Site directly or indirectly to the Charles River that is equal to 65% of its DD Site load as calculated in accordance with Attachments 1, 2 and 3 of this Appendix. The requirement to achieve the 65% phosphorus load reduction is referred to in the permit as the permittee's Phosphorus Reduction Requirement. The permittee shall satisfy its Phosphorus Reduction Requirement through one or any combination of the following: implementing enhanced on-site non-structural BMPs; implementing on-site structural BMPs; and participating in a Certified Municipal Phosphorus Program("CMPP") in the municipality in which the DD Site is located or, if the municipality in which the Site is located does not have a CMPP, through participation in a CMPP in a municipality that discharges to the Charles River at a location upstream of the DD Site.

Where a permittee is satisfying its Phosphorus Reduction Requirement through participation in a CMPP, it shall assure that the CMPP is in compliance with any conditions of EPA's approval of the CMPP and any NPDES permit under which it is authorized to discharge and that the CMPP is achieving the phosphorus load reduction for which the permittee is taking credit.

II. PRELIMINARY PHOSPHORUS REDUCTION PLAN

On or before the second anniversary of receipt of authorization to discharge under this permit, the permittee: shall develop a Preliminary Phosphorus Reduction Plan consistent with this Appendix; shall submit the Plan to the municipality in which the DD Site is located, and if the municipality in which the DD Site is located does not have nor has an intention to develop a CMPP, to any other municipality that discharges to the Charles River upstream of the DD Site in whose CMPP the permittee has an interest in participating; and shall certify to EPA, consistent with Section IX of the permit, that it has developed a Preliminary Phosphorus Reduction Plan consistent with this appendix and that it has submitted it to the appropriate municipalities. The Preliminary Phosphorus Reduction Plan shall include a Site Suitability Analysis and an Election of Compliance Mode, as described below:

A. Site Suitability Analysis

The Site Suitability Analysis shall assess the Site's physical suitability to satisfy the Phosphorus Reduction Requirement through the use of enhanced non-structural BMPs and structural BMPs.

(1) DD Site Map

The Site Suitability Analysis shall contain one or more detailed map(s) drawn to scale showing a plan view of the DD Site (scale of 1 inch = no greater than 100 ft) that includes the following information:

a) Identification and location of each impervious area noting its use (e.g., parking lot, access drive, storage area, building, etc);

b) Identification and location of each pervious area noting its use and condition (e.g., landscaped area, unmaintained or natural vegetated area (e.g., wetlands and woodlands), natural recharge area (e.g., surface depressions), areas of bare soil, and other un-vegetated areas;

c) Identification and location of each storm water outfall and receiving water to which the DD Site discharges. The map shall identify any and all locations where storm water runoff from the DD Site discharges to a storm sewer system either by overland runoff or through a direct or indirect connection. Each outfall and/or connection to a separate storm sewer system shall be assigned a logical alphanumeric identification label;

d) Identification and location of each separate storm sewer system entering the DD Site;

e) Identification, location, and connectivity of all storm water drainage system components including manholes, catch basins, drainage piping, and storm water BMPs;

f) Delineation of subdrainage areas for the entire DD Site and for separate storm sewer systems that enter the DD Site. A subdrainage area shall be delineated for each existing BMP, outfall/outlet, location where surface runoff discharges from the DD Site, and where the separate storm sewer systems enter the DD Site. Each subdrainage area shall be assigned a logical alphanumeric identification consistent with the identification of the corresponding BMP, outfall, and/or connection point to a separate storm sewer;

g) Drainage system pipe sizes (orifice size; e.g. diameter for circular pipes), pipe material and shape, and the types and dimensions of all storm water BMPs;

h) Identification and location of process waste-water lines, sanitary sewer systems, and/or on-site sewage disposal systems;

i) Locations and results of all soil testing conducted to evaluate potential for infiltration practices on the DD Site; and

j) Delineation of all of the following resource areas at or near the DD Site: Zone I, II or interim wellhead protection area; Zone A (surface water drinking water supply); bathing beaches; cold water fisheries; outstanding resource waters (including class A public water supplies and their tributaries); active and inactive reservoirs; waters within Areas of Critical Environmental Concern; certified vernal pools; wetlands bordering Class A waters; wetlands bordering Class B waters, and special resource waters, all as defined or determined by DEP.

(2) DD Site Inventory Report

The Site Suitability Analysis shall contain a site inventory report that includes the following

information for the DD Site:

a) The primary uses of the Site and all activities that typically occur on the Site;
b) The total impervious area for each subdrainage area and a breakdown of impervious area by use (e.g., parking lot, roof, access drive, loading area, etc.). The report shall indicate whether any of the impervious areas are used at any time to store materials that may contain phosphorus (e.g., organic litter, mulch, fertilizers, de-icing chemicals);
c) The total pervious area for each subdrainage area and a breakdown by type of pervious area (e.g., landscaped, unmaintained or natural vegetated areas, or non-vegetated areas). The report shall identify the types of pervious areas as either "developed" or as "unmanaged". Developed pervious areas include managed and/or landscaped pervious areas such as lawns and gardens. The report shall indicate whether any of the pervious areas are used at any time to store materials that may contain phosphorus (e.g., organic litter, mulch, fertilizers, and de-icing chemicals).
d) Estimates, with supporting computations, of the annual phosphorus load in storm water discharging from the developed (impervious and pervious) portions of the DD Site. The annual phosphorus load for the developed portions of the DD Site (DD Site Phosphorus Load) shall be used to calculate the Phosphorus Reduction Requirement in pounds and as a percentage relative reduction in annual phosphorus loading for the two levels of storm water phosphorus control specified below. Attachment 1 of this Appendix outlines the appropriate method for estimating the DD Site Phosphorus Load (i.e., annual phosphorus load for the developed portion of the DD Site);
e) Descriptions of all existing storm water BMPs on the DD Site including:

    (i) BMP type;

    (ii) Design standards used including the capacity of the BMP such as water quality volume provided and design storms used for peak flow detention (if applicable);

    (iii) Impervious area and pervious area that drain to each BMP; and

    (iv) Confirmation that the dimensions of the BMPs as shown on the site map and reported above have been verified in the field post BMP construction.

(3) Initial Analysis of Enhanced Non-Structural BMPs
Where a permittee intends to use enhanced non-structural BMPs to satisfy some or all of its Phosphorus Reduction Requirement, the Site Suitability Analysis shall describe those non-structural BMPs and shall estimate and document, consistent with Attachment 2, the phosphorus load reduction expected from each.

The enhanced non-structural BMPs that a permittee may implement are:

a) Enhanced sweeping of impervious roadways and parking areas;
b) Semi-annual catch basin cleaning;
c) Elimination of fertilizers containing phosphorus; and
d) Organic waste and leaf litter collection program.

(4) Initial Analysis of Structural Storm Water BMPs
The Site Suitability Analysis shall:

a) Evaluate the suitability of the DD Site for structural storm water BMPs to achieve the following levels of storm water phosphorus control:

(i) The highest practicable level of storm water phosphorus control for the DD Site with a maximum level of control up to the capture and treatment of runoff that would result in no discharge from one inch of rainfall from all impervious and pervious developed surfaces on the DD Site; and

(ii) A net phosphorus reduction equal to a 65% reduction in annual phosphorus loading from the developed portions (impervious and managed pervious surfaces) of the DD Site.

b) The Site Suitability Analysis shall:

(i) Evaluate physical conditions, site design, and the potential for structural BMPs to promote ground water recharge and infiltration where feasible. This shall include, without limitation, an evaluation of subsurface soil and ground water characteristics of the DD Site to determine the feasibility of using infiltration practices to achieve the two specified levels of phosphorus control.

(ii) Identify combinations of infiltration BMPs that would achieve the two specified levels of storm water phosphorus control. The permittee should be aware that Massachusetts regulates the locations at which infiltration of groundwater is permissible and any relevant conditions for their construction and use.

(iii) To the extent that constraints at the DD Site prevent the use of infiltration BMPs to achieve the two specified levels of storm water phosphorus control, the analysis shall identify and assess non-infiltration structural BMPs that achieve the two specified levels of control. If non-infiltration structural BMPs are needed to achieve part or all of either level of storm water phosphorus control, the Site Suitability Analysis shall identify the site constraints that limit the use of infiltration BMPs and shall specify which of the following site constraints prevent or limit the use of infiltration BMPs:

(a) The DD Site is comprised solely of soils classified as Hydrological Soil Groups C and D, as determined by the National Soil Conservation Service, or of soils with bedrock near the land surface;
(b) The DD Site is a disposal site that requires remediation;

(c) Soils or materials containing hazardous substances have been capped in place at the DD Site;
(d) (d) The DD Site is subject to an Activity and Use Limitation issued by the DEP pursuant to M.G.L. c. 21E and the Massachusetts Contingency Plan, 310 CMR 40.0000, that precludes recharge to the ground water;
(e) A solid waste landfill as defined in 310 CMR 19.000 is located at the DD Site; or
(f) Ground water from the DD Site flows directly to a solid waste landfill or M.G.L. c. 21E site.

(iv) Assess the potential to retrofit any existing structural BMPs on the DD Site as part of the analysis for the two specified levels of storm water phosphorus control.

(v) Identify any areas of the DD Site that are equipped with existing LID techniques or structural storm water BMPs that are capable of capturing and treating runoff that would result from one inch of rainfall from impervious and pervious developed areas on the DD Site. Where the Site Suitability Analysis documents the existence of LID techniques or structural storm water BMPs meeting this standard, the permittee is not required to perform any further analysis of the suitability of these identified areas to accommodate structural storm water BMPs, provided that the permittee meets all the requirements related to the One Inch Storm Water Control provision in Section II C. of Appendix D.

(vi) Identify one or more combination of structural BMPs that would achieve each specified level of storm water phosphorus control. For the 65% reduction level of control, the permittee may include enhanced non-structural storm water BMPs specified in Appendix D Section II A.(3) as part of an overall BMP plan.

(vii) Provide for each specified level of storm water phosphorus control the technical basis for selecting the BMP, including BMP sizing with supporting computations; conceptual designs showing locations and sizes of each BMP on the DD Site; and estimates of reduction in annual storm water phosphorus loading from the developed portions of the DD Site as determined in accordance with Section II A.(5) of Appendix D.

(5) Phosphorus Reduction Estimates

The Site Suitability Analysis shall estimate reductions in annual storm water phosphorus loads from the developed portions of the DD Site for each specified level of storm water phosphorus control. The reductions shall be expressed both in terms of pounds of phosphorus reduced from storm water discharging from the DD Site and as a net relative percent reduction of the DD Site's annual phosphorus load. The permittee shall determine net reductions from structural storm water BMPs in accordance with Attachment 3 and net reductions for enhanced non-structural BMPs in accordance with Attachment 2; alternatively, the permittee may determine reductions for either by conducting long term BMP computer model simulations for the DD Site.

(6) Availability of Site Suitability Analysis:
The permittee shall make the Site Suitability Analysis and accompanying certification and report available on-site and to EPA upon request.

B. Non-binding Election of Compliance Mode
The Preliminary Phosphorus Reduction Plan shall contain a statement of intent describing how the permittee intends to achieve the required DD Site Phosphorus Load Reduction and to what extent it will rely on enhanced non-structural BMPs, structural BMPs and participation in a CMPP or any combination of them.

This statement of intent is not binding on the permittee but may be used by a municipality in developing a CMPP.

C. One Inch Storm Water Control Provision
In lieu of submitting a Site Suitability Analysis (including the Election of Compliance Mode), the permittee may satisfy the requirements of the One Inch Storm Water Control Provision. This provision contains four requirements:

(1) On or before the second anniversary of receipt of authorization to discharge under this permit, the permittee shall design and construct, consistent with the Massachusetts Storm Water Handbook, structural BMPs sufficient to capture and **not discharge** one inch of rainfall for the entire impervious area of the Site. For the purpose of complying with this standard, "not discharging" means that a runoff volume, equal to a minimum depth of one inch over the entire impervious area of the Site, shall be controlled by structural storm water BMPs that will result in ground water recharge and/or evapotranspiration on the Site. Temporary storage of runoff volumes is acceptable, provided the runoff volume is stored for the purpose of ground water recharge or for water reuse at the DD Site (e.g., landscape irrigation) and provided that the stored runoff does not ultimately discharge from the Site.

(2) Within the same timeframe, the permittee shall certify to EPA, consistent with Section IX of the permit, that it has designed and constructed BMPs that satisfy the one inch storm water control standard. The report supporting the certification shall document the maximum amount of runoff volume that will be captured and have no discharge at the Site, expressed in terms of inches of runoff depth over the entire impervious area. The report supporting the certification shall also quantify the corresponding relative reduction in pounds of annual phosphorus load reduced from the DD Site in accordance with the Attachments to this Appendix.

(3) Within the same timeframe, the permittee shall submit its one inch storm water control certification and all supporting documentation to the municipality in which the DD Site is located.

(4) Within the same timeframe, the permittee shall satisfy the requirements of Appendix F relating to illicit discharge detection and elimination and shall submit a certification to EPA, consistent with Section IX of the permit, that it has satisfied the requirements of Appendix F;

and

(5) The permittee shall include in each annual Certification of Compliance thereafter that it is satisfying the baseline requirements of Part III and all operation and maintenance requirements under the permit.

III. REQUIRED ELEMENTS OF FINAL PHOSPHORUS REDUCTION PLAN

On or before the third anniversary of receipt of authorization to discharge under this permit, the permittee: shall develop a Final Phosphorus Reduction Plan consistent with this Appendix; shall submit the Plan to the municipality in which the DD site is located, and, if the municipality in which the DD Site is located does not have a CMPP, to any other municipality that discharges to the Charles River upstream of the DD Site in whose CMPP the permittee has an interest in participating; and shall certify to EPA, consistent with Section IX of the permit, that it has developed a Final Phosphorus Reduction Plan consistent with this Appendix and that it has submitted it to the appropriate municipalities.

The Final Phosphorus Reduction Plan shall state how the permittee proposes to satisfy the Phosphorus Reduction Requirement of this permit as described below.

A. Compliance through BMPs on the DD Site

Where the permitee elects to satisfy some or all of its Phosphorus Reduction Requirement through the use of on-site BMPs, the permittee shall prepare a Final Phosphorus Reduction Plan consistent with the following requirements:

(1) The Plan shall identify the proposed enhanced non-structural BMPs and the type and size of structural storm water BMPs that will be used to satisfy some or all of the Phosphorus Reduction Requirement. Where feasible, the Final Phosphorus Reduction Plan shall incorporate infiltration BMPs. The permittee should consult Massachusetts regulations regarding state requirements relating to subsurface recharge of storm water.

(2) The Plan shall provide estimates of the pounds of annual phosphorus load reduction for each proposed enhanced non-structural and structural BMP determined in accordance with Attachments 1, 2, and 3 of this Appendix.

(3) The Plan shall provide the total estimated reduction in annual phosphorus load from the DD Site in terms of pounds of phosphorus reduced and as a percent reduction of the DD Site phosphorus load. If the total estimated reduction does not satisfy the permittee's Phosphorus Reduction Requirement, the Plan shall provide the DD Site phosphorus reduction shortfall in pounds of phosphorus. The shortfall shall be calculated by subtracting the total estimated reduction in annual phosphorus load by the proposed BMPs for the DD Site from the DD Site 65% phosphorus load reduction.

(4) The Plan shall contain an evaluation of the physical characteristics of the DD Site as they affect the use of both non-structural and structural BMPs for achieving the DD Site phosphorus load reduction. The Plan shall demonstrate the technical feasibility of

implementing the proposed BMPs at the Site. The Plan shall also document that the plan includes infiltration BMPs to the maximum extent feasible.

(5) The Plan shall include an operation and maintenance plan that will satisfy the requirements of Section IV(C) of the permit.

B. Compliance through Participation in a Certified Municipal Phosphorus Program (CMPP)

As an alternative to satisfying the Phosphorus Reduction Requirement solely through implementing BMPs at the DD Site, the permittee may satisfy part or all of that reduction by participating in a CMPP approved by EPA. Where the permittee intends to meet its Phosphorus Reduction Requirement in part or in whole through participation in a CMPP, the permittee's Final Phosphorus Reduction Plan shall contain a binding written agreement between the permittee and a CMPP that the permittee will satisfy all requirements established by the CMPP along with a description of all such requirements. The permittee's Final Phosphorus Reduction Plan shall also contain calculations demonstrating that the permittee's participation in the CMPP Program is sufficient to achieve annual phosphorus load reductions equal to the permittee's Phosphorus Reduction Requirement where no BMPs are implemented on its DD Site, or sufficient to achieve the shortfall calculated in accordance with Section II.A.(3) of Appendix D where the full Phosphorus Reduction Requirement have not be satisfied by BMPs implemented on the DD Site

IV. IMPLEMENTATION OF PHOSPHORUS REDUCTION PLAN

A. Implementation of Enhanced Non-structural BMPs: Where a permittee relies upon enhanced non-structural BMPs to satisfy some or all of its Phosphorus Reduction Requirement it shall identify those BMPs in its Site Suitability Analysis, as provided above. Upon submission of the certification that it has completed its Final Phosphorus Reduction Plan and continuing thereafter, the permittee shall implement all such BMPs on the DD Site.

B. Design Plans and Construction Specifications for Structural Storm Water BMPs: Where a permittee relies upon structural BMPs to satisfy some or all of its Phosphorus Reduction Requirement of this permit, on or before the fourth anniversary of receipt of authorization to discharge under this permit, the permittee shall, through a Storm Water Professional, develop all design plans and construction specifications for each structural BMP identified in the Final Phosphorus Reduction Plan. Within the same timeframe, the permittee shall certify to EPA, consistent with Section IX of the permit, that it has developed all design plans and construction specifications for each structural BMP identified in the Final Phosphorus Reduction Plan.

C. Local, state and federal Permits needed for Construction of Structural Storm Water BMPs: Where a permittee relies upon structural BMPs to satisfy some or all of the Phosphorus Reduction Requirement of this permit, it shall, on or before the fourth anniversary of receipt of authorization to discharge under this permit, obtain all local, state and federal permits needed to implement the Final Phosphorus Reduction Plan and to construct on-site structural BMPs according to the design plans and construction specifications developed pursuant to Appendix D and other requirements of the permit. Within the same timeframe, the permittee shall certify to

EPA, consistent with Section IX of the permit, that it has obtained all local, state and federal permits needed to implement the Final Phosphorus Reduction Plan and to construct on-site structural BMPs according to the design plans and construction specifications developed pursuant to Appendix D and other requirements of the permit.

D. Construction of Structural BMPs: Where a permittee relies upon structural BMPs to satisfy some or all of its Phosphorus Reduction Requirement, it shall, on or before the fifth anniversary of receiving authorization to discharge under this permit, construct the BMPs in accordance with the applicable provisions of DEP's Storm Water Management Standards and all other applicable DEP policies and guidelines including, without limitation, the requirements applicable to the design and construction of LID techniques and storm water BMPs intended to manage storm water runoff from land uses with higher potential pollutant loads, the requirements applicable to the design and construction of storm water BMPs with discharges near or to critical areas, and the requirements applicable to the design and construction of storm water BMPs located in areas with an infiltration rate greater than 2.4 inches per hour. The BMPs shall also be constructed in accordance with any additional directives or guidance provided by EPA.

E. Post-Construction Survey: Where a permittee relies upon the construction of structural BMPs to satisfy some or all of its Phosphorus Reduction Requirement, it shall, on or before the fifth anniversary of receiving authorization to discharge under the permit, conduct a post-construction survey of the constructed BMPs to certify that the BMPs have been constructed in accordance with the final design plans and construction specifications. Within the same timeframe, the permittee shall certify to EPA, consistent with Section IX of the permit, that it has conducted the post-construction survey and that the survey confirms that the permittee has constructed on-site structural BMPs according to the design plans and construction specifications developed pursuant to Appendix D and other requirements of the permit.

F. Participation in CMPP: Where a permittee relies upon participation in a CMPP to satisfy some or all of its Phosphorus Reduction Requirement, it shall:

(1) assure on an annual basis that the CMPP achieves phosphorus reductions in direct and indirect storm water discharges to the Charles River that are consistent with any requirements established by EPA in its approval of the CMPP; and shall assure that the CMPP satisfies all other requirements established by EPA and any NPDES permits.

(2) assure, prior to claiming any credit for phosphorus reductions achieved by the CMPP, that the local government unit forming the CMPP:

a) has notified EPA in writing that it is establishing a CMPP at least 180 days prior to the date the local government unit will commence operation of the program. The notice shall include a detailed summary of the program and certification consistent with Section IX of the permit that the CMPP complies with any requirements established by EPA; and

b) Has established a CMPP that has been approved by EPA under this permit.

(3) satisfy all requirements for participation in the CMPP as established by the CMPP and EPA.

(4) assure that its participation in the CMPP Program is sufficient to achieve annual phosphorus load reductions equal to the reductions it claims and equal to an annualized estimate of the permittee's Phosphorus Reduction Requirement where no BMPs are implemented on its DD Site, or sufficient to achieve the shortfall calculated in accordance with Section II.A.(3) of Appendix D where the full Phosphorus Reduction Requirement have not be satisfied by BMPs implemented on the DD Site

(5) assure that the CMPP submits to EPA certified annual reports on or before the fourth anniversary of permittee's receipt of authorization to discharge under this permit and for each year thereafter. The annual report shall identify all activities the CMPP has undertaken during the previous year including: an accounting of the fees collected, the basis for each fee, a description of non-structural and structural BMPs financed by the fees, the location of all non-structural and structural BMPs implemented by the CMPP, and the level of treatment achieved by the BMPs in terms of pounds of phosphorus load reduced and the runoff volume treated and/or infiltrated by each non-structural and structural BMP and by all BMPs collectively. In determining the level of treatment, the CMPP shall use the methods provided in Attachments 1, 2 and 3 of this Appendix. The annual report shall quantify the CMPP's progress towards achieving the waste load allocations for each municipality involved in the CMPP. The annual report shall also contain a certification that all BMPs implemented by the CMPP have been operated and maintained consistent with the operation and maintenance requirements of this permit.

(6) submit to EPA, consistent with Section IX of the permit, an Annual Certification of Compliance that the permittee has satisfied each of the requirements in Section II E.(1) through (5) of Appendix D.

(7) include in its annual Certification of Compliance a written certification from the CMPP that:

a) the permittee has satisfied the requirements for participation in the CMPP with a description of the permittee's level of participation in the Program. The certification from the CMPP shall also specify the amount of phosphorus load reduction in pounds that corresponds with the permittee's level of participation.
b) the permittee's participation in the CMPP Program has been sufficient to achieve annual phosphorus load reductions equal to the permittee's Phosphorus Reduction Requirement where no BMPs are implemented on its DD Site, or sufficient to achieve the shortfall calculated in accordance with Section II.A.(3) of Appendix D where the full Phosphorus Reduction Requirement has not be satisfied by BMPs implemented on the DD Site

the permittee has satisfied all requirements of the CMPP and that the CMPP has satisfied all requirements of this permit and any other NPDES permit. The CMPP has satisfied all relevant requirements established by EPA, this permit, and any other NPDES permits.