Stormwater Management Measures
Maintenance Plan & Field Manuals

OPERATION AND MAINTENANCE MANUAL
PREPARED FOR 150 PIERCE STREET, LLC
FOR STORMWATER MANAGEMENT FACILITIES LOCATED ON
LOT 2.02, BLOCK 468.08
FRANKLIN TOWNSHIP
SOMERSET COUNTY, NEW JERSEY
June 24, 2020

Party Responsible for Maintenance:

150 Pierce Street, LLC
1179 Lakewood Farmingdale Road, Howell, NJ 07731
Phone: 732-904-8744

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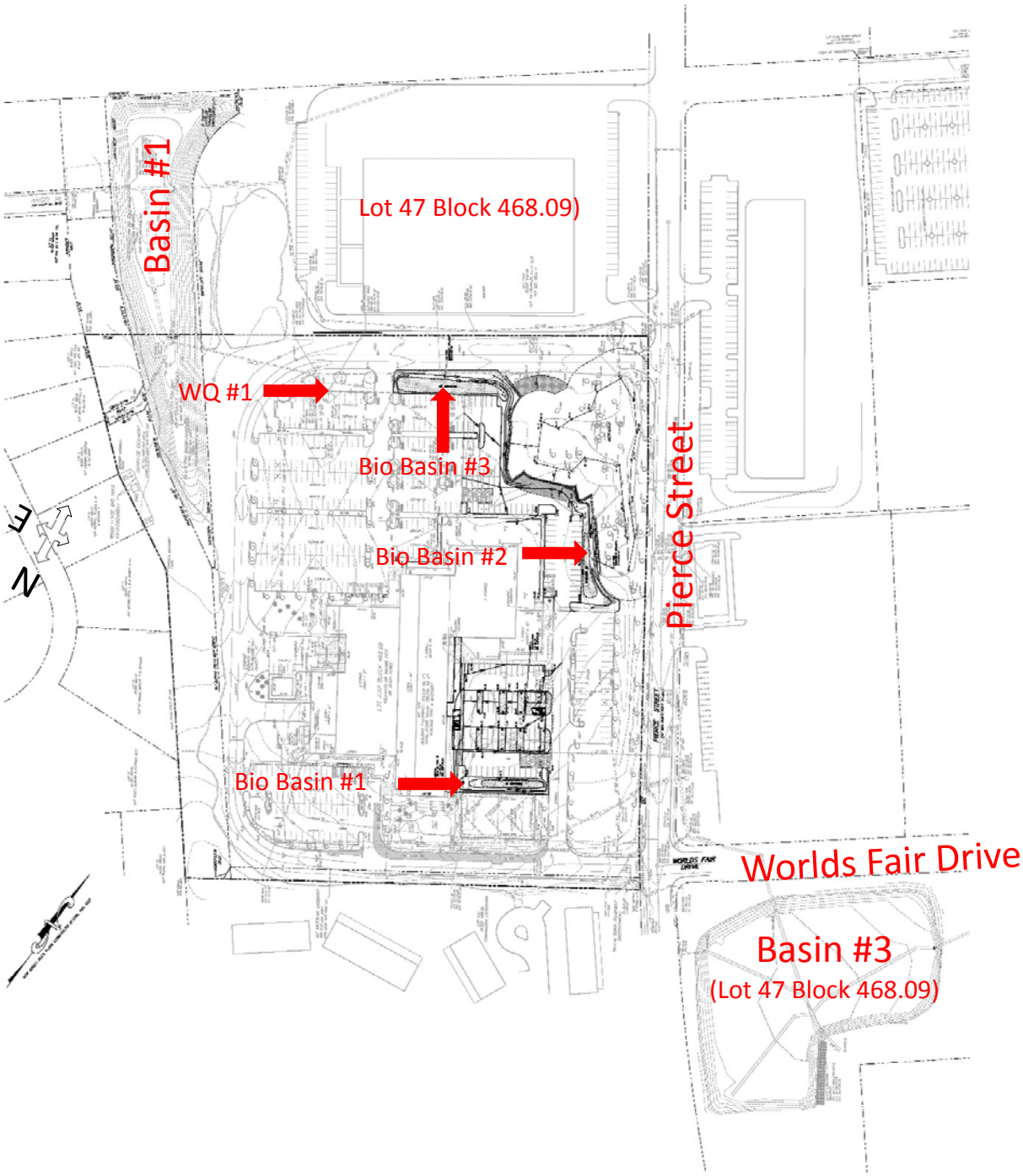
Part I- Maintenance Plan

List of Stormwater Management Measures

The stormwater management measures incorporated into this development are listed below. The corresponding Field Manuals for the stormwater management measures are located in Part II of the Maintenance Plan.

Type of Stormwater Management Measure	BMP No.	Location Description	State Plane Coordinates / Lat., Long.
Bioretetion Basin #1	Bio Basin #1	South of new School Addition Parking Lot	N: 617,300 E: 486,155
Bioretetion Basin #2	Bio Basin #2	East of New Parking Lot	N: 617,640 E: 485,965
Bioretetion Basin #3	Bio Basin #3	North of New Parking Lot	N: 617,665 E: 485,595
Manufactured Treatment Device	WQ #1	North of existing Pharmscript Parking Lot	N: 617,510 E: 485,470
Detention Basin #1	Basin #1	Rear of Lot 2.03, Block 468.08	N: 617,510 E: 485,020
Detention Basin #3	Basin #2	Easterly of intersection of World's Fair Drive and Pierce Street (Lot 47, Block 468.09)	N: 617,425 E: 486,750

Location Map



Description of Stormwater Management Measures

Oil/Water Separator (WQ #1)
Design storm:

- Design Purposes:
    - Provide 50% TSS removal from additional paved area north of building (previous project)
    - Contech CDS Unit

Bioretention Basins #1, #2, #3
Design storm:

- Design Purposes:
    - Provide up to 90% TSS removal for current project
    - Water quality - 1.25 inches in 2 hours
    - 2-year storm (3.34 inches);
    - 10-year storm (4.89 inches);
    - 100-year storm (7.82 inches)
- Dimensions: Variable

Basins #1 & #3
Design storm:

- Design Purposes:
    - Provide extended Water Quality through extended detention and water quantity
    - 1.25 inches in 2 hours
    - 2-year storm (3.34 inches);
    - 10-year storm (4.89 inches);
    - 100-year storm (7.82 inches)
- Variable

More detailed information regarding each specific measure is listed in the attached Field Manual.

Preventative and Corrective Maintenance Action Plan

As per N.J.A.C. 7:8-5.8(b) & (e), preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including, but not limited to, repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of non-vegetated linings.

As per NJDEP BMP Manual Ch. 8 Feb. 2004), maintenance plans should include specific preventative and corrective maintenance tasks such as removal of sediment, trash, and debris; mowing, pruning, and restoration of vegetation; restoration of eroded areas; elimination of mosquito breeding habitats; control of aquatic vegetation; and repair or replacement of damaged or deteriorated components.

As per NJDEP BMP Manual Ch. 8 (Feb. 2004), maintenance plans should include recommended corrective responses to various emergency conditions that may be encountered at the stormwater management measure. It should be noted that if the stormwater management measure includes a Class I or II dam as defined in the NJDEP Dam Safety Standards at N.J.A.C. 7:20, an emergency action plan for the dam is also required. See N.J.A.C. 7:20-1.7(f) for more information.

As per NJDEP BMP Manual Ch. 8 (Feb. 2004), the maintenance plan should address the maintenance of access points to the stormwater management measures in accordance with the following:

- all components of the stormwater management measures must be readily accessible for inspection and maintenance;
- trees, shrubs, and underbrush must be pruned or trimmed as necessary to maintain access to the stormwater management measure via roadways, paths, and ramps, including paths through perimeter vegetation to permanent pools, aquatic benches, and safety ledges to allow for the inspection and control of mosquito breeding; and
- the exact limits of inspection and maintenance easements and rights-of-way should be specified on stormwater management measure plans and included in the maintenance plan.

Preventative Maintenance Actions

Inspection of stormwater facilities is the best form of preventative maintenance. These inspections can be as frequent as after each small storm event or annually. Obviously the frequency of these inspections coincides with the level of maintenance.

The frequency of the preventative maintenance actions listed here is adopted from Chapter 9, BMP Manual of Structural Stormwater Management Measures. Design engineer and responsible party should adjust the frequency of preventative maintenance actions according to the situations of the stormwater management measures in the development.

The owners and/or their successors or assigns shall maintain the facilities located on the subject lot. This includes all inlets, piping and the CDS Unit (WQ #1) located north of the Pharmscript parking lot. All stormwater inlets shall be inspected after each rain storm to remove any debris and or garbage that may have collected on or near each inlet.

The three (3) new bioretention basins have been designed as bioretention basins which is a detention basin with a bottom that consists of a layer of plant material along with plantings within the bottom of the basin. The components serve to provide water quality treatment for the small storms that drain to the basin. During lower storm events, the runoff will enter the basin and drain through the soil media which provides the water quality treatment to separate out sediment and grease/oils from the runoff. The bioretention area will also provide groundwater recharge for the project. The plant material also serves to provide water quality and to trap any potential debris.

The soil media is critical to the function of the bioretention basin and should be inspected a minimum of four (4) times a year and after every storm exceeding one (1") inch of rainfall to ensure that the soils do not become compacted as they will tend to clog and not allow the smaller storms to drain through the media properly.

The upper portion of the of the basins, the side slopes and berm of the basin will be a meadow mix and should only need mowing once or twice during the growing season and be based on site and weather conditions. Unwanted growth should be removed when observed with minimal disruption to the basin slopes. The vegetative cover should be maintained at 85%. If vegetation has more than 50% damage the area should be reestablished in accordance with original specifications. All work should be done without the use of fertilizers or pesticides whenever possible. When starting or restoring vegetation, biweekly inspection of the growth should be performed during the first growing season and until the vegetation is established. Vegetation should be inspected for health, density and diversity a minimum of twice a year during growing and non-growing seasons. To ensure grass vigor, maintain as an upland meadow by cutting no shorter than 3 to 5 inches high.

All small storm events shall drain within 72 hours. If the basin does not drain within that time, further evaluation of the basin structures should be performed. The owners and engineer should inspect the facility and determine appropriate maintenance procedures to restore the proper function.

The site is part of the original Worlds Fair Corporate Major Subdivision which designed and built a series of regional basins for the full buildout of all of the separate lots associated with

the subdivision. There is a current agreement for the maintenance of these basins (see below).

CDS Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided. Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump. Refer to Table 1 for depth from water surface to top of sediment pile for each model size indicating that maintenance is required.

Frequency	**Preventative Maintenance Actions** (list specific preventative maintenance actions and the required frequency)	**Stormwater Measures/ No.** (list specific stormwater management measures pertinent to the Frequency
Monthly	- All grass portions of the basins shall be cut at least once per month during the growing season and all leaves, grass clippings and other debris will be removed as needed with each grass cutting to ensure that the outlet structure remains clean. - Inspect Flush Curb along basins for debris	- Bio Basins #1-#3 - Basins #1 & #3 - Bio Basins #1-#3
Quarterly	Quarterly inspection - (Sediment removal of basin, Inlets, Water Quality Structure - Inspect Plant Media and Vegetation in Basin	- Bio Basins #1-#3 - Basins #1 & #3 - WQ #1 - Bio Basins #1-#3
Semiannual	- Sediment removal of basin, Inlets, Water Quality Structure - Vegetation should be inspected for health, density and diversity a minimum of twice a year during growing and non-growing seasons. To ensure grass vigor, maintain as an upland meadow by cutting no shorter than 3 to 5 inches high. - Remove separator cover. - Remove water and vacuum sediment from sump.	- Bio Basins #1-#3 - Basins #1 & #3 - WQ #1
Annual	- Basin Structural Inspection	- Basins
Biennial	- Review and inspect Plant Media and supplement/replace as needed	- Bio Basins #1-#3
Unscheduled	- Quick inspection after every 1" rain	- Bio Basins #1-#3 - Basins #1 & #3
(Other)	- Specific maintenance schedule for a manufactured treatment device as required by the manufacturer - All leaves and other debris must be removed as needed during the months of October and November and a final clean-up of the basin must be performed during the first two (2) weeks of December.	- WQ #1 - Basins

Corrective Maintenance Actions

Depending on many factors, such as the performance of preventative maintenance actions, weather, or unexpected incidents, corrective maintenance requirements may not be precisely anticipated; however, a list of potential corrective maintenance actions may assist the responsible party in planning and estimating costs in advance.

Potential Corrective Maintenance Actions	Stormwater Management Measures/No.
Corrective maintenance tasks - Repair/replacement of eroded or damaged riprap apron - Repair/replacement of missing or damaged trash racks - Repair/replacement of outlet pipes or orifices - Revegetation of eroded side slope, aquatic bench, marsh, basin bottom, grass swales, etc. - Rake/aerate plant media within bioretention area - Supplement Plant media as needed	- Bio Basins #1-#3 - Basins #1 & #3 -
Cleaning - Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area. In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris. Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.	- WQ #1

Inspection and Logs of All Preventative and Corrective Maintenance

As per N.J.A.C. 7:8-5.8(f), the person responsible for maintenance shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.

As per NJDEP BMP Manual Ch. 8 (Feb, 2004), a maintenance plan shall include a schedule of regular inspections and tasks, and detailed logs of all preventative and corrective maintenance performed on the stormwater management measure, including all maintenance-related work orders. The person with maintenance responsibility must retain and, upon request, make available the maintenance plan and associated logs and other records for review by a public entity with administrative, health, environmental, or safety authority over the site.

Inspection Checklists in the Field Manual for the stormwater management measures on this site include:

- Field Manual for Manufactured Treatment Device (MTD) – WQ #1
- Field Manual for Bioretention System – Basin #1

The logs of all inspections, and both preventative and corrective maintenance performed should be attached in the "**Maintenance Logs and Inspection Records**" section. See Part II of the Maintenance Plan

Maintenance Personnel, Equipment, Tools, and Supplies

As per NJDEP BMP Manual Ch. 8 (Feb. 2004), maintenance plans should include equipment, tools, and supplies necessary to perform the various preventative and corrective maintenance tasks specified in the plan. Sources of specialized, proprietary, and nonstandard equipment, tools, and supplies should also be provided.

This section applies to both maintenance tasks that are performed by in-house personnel or are outsourced. The design engineer has to list the required amount of maintenance personnel, equipment, tools, and supplies necessary to perform the various preventative and corrective maintenance tasks specified in the plan. In addition, the sources of specialized, proprietary, and nonstandard equipment, tools and supplies for specific measures, such as manufactured treatment devices should also be listed.

Maintenance Personnel/Equipment/Tools/Supplies

Personnel/Equipment/Tools Name	Quantity
General maintenance crew	
Clip board, a pencil and the inspection checklist - the inspection checklist is included in the following section.	
Standard 6-foot collapsible ruler.	
Camera - photographs or observed portions of the facilities will provide a measure of performance when comparing past and present maintenance practices or conditions.	
Probe - any stiff light stick or rod with a blunt tip of sufficient strength to penetrate soil. The probe can provide information on conditions below the surface of the dam such as the depth and softness of a saturated area.	
Weed whacker - can be used to clear non-visible areas and to perform routine maintenance on the embankments.	
Shovel – can be used to clear debris in front of outlet structure orifices and grating.	
Flashlight - a flashlight can be used to observe the inside of the Structures and outlet piping.	
Maintenance at the basin may include heavy equipment including the following: 1. Chain saw. 2. Stump grinder 3. Wheelbarrow. 4. Lawnmower 5. Backhoe. 6. Dump truck. 7. Debris / Contaminant Collectors 8. Debris / Contaminant Containers 9. Vacuum Truck or a water-jetting device	
Sources of the following materials should be identified for immediate use if warranted 1. Native, silty sand for filling erosion rills and gullies. 2. Topsoil mixture, fertilizer and seed 3. Large stone rip rap for emergency repairs caused by erosion. 4. Synthetic geofabric netting and stakes to prevent seed and topsoil from blowing.	

Cost Estimate

As per N.J.A.C.7:8-5.8(b), cost estimates of maintenance tasks, including, but not limited to, sediment, trash and debris removal must be included in the maintenance plan. Below is an illustration of a cost breakdown and estimation for maintenance of stormwater management measures. The design engineer should estimate the cost based on the expected maintenance required for each stormwater management measure. The actual costs may vary with factors such as local requirements, equipment, personnel, weather, and maintenance methods.

COST ESTIMATES

Cost Overview

Cost Type	Cost	Details
Cost of sediment, trash, and debris removal		
General cost for routine maintenance (e.g., quarterly maintenance)		Table A
General cost – unscheduled maintenance		Table B
Cost associated with special tasks for specific stormwater measures (e.g., biennial sand replacement for sand filter)		Table C
Total cost		

Table A: General cost for routine maintenance (e.g., quarterly maintenance)

Cost Type	Required Quantity	Unit Price	Cost
Personnel			
Crew	2 Man for Half Day	$60/hr	$240.00
Supervisor	1 Man	$50/hr.	$200.00
Equipment			
Truck	4 Hours	$50/hr	$200.00
Mower	4 Hours	$20/hr	$80.00
Supplies			
Seed	6 bags @ 50 lbs	$170/bag	$1000.00
Subtotal			$1720.00
Overhead			200%
Total Cost			**$3440.00**

Table B: General cost – unscheduled maintenance in a year (e.g., inspection after 1 inch of rain)

Cost Type	Required Quantity	Unit Price	Cost
Personnel			
Crew	1 Man for 1 hour	$30/hr	$30.00
Subtotal			
			$30.00
Overhead			200%
Total Cost			**$60.00**

Table C: Cost associated with special tasks for specific stormwater measures (e.g., biennial plant media replacement)

Cost Type	Required Quantity	Unit Price	Cost
Personnel			
Crew	2 Man for Half Day	$60/hr	$240.00
Supervisor	1 Man	$50/hr.	$200.00
Equipment			
Truck	4 Hours	$50/hr	$200.00
Lightweight backhoe rental	4 Hours	$50/hr	$200.00
Supplies			
Plant Media	300 CY	$6/CY	$1800.00
Subtotal			$2640.00
Overhead			200%
Total Cost			**$5280.00**

Safety Measures and Procedures

As per NJDEP BMP Manual Ch. 8 (Feb. 2004), maintenance plans should include procedures and equipment required to protect the safety of inspection and maintenance personnel.

Safety Regulations and Requirements

While most maintenance work is in open space and primarily related to lawn and yard maintenance, all personnel shall be familiar with all OSHA regulations and Confined-Space Entry regulations.

Training Plan and Records

As per NJDEP BMP Manual Ch. 8 (February 2004), maintenance training begins with a basic description of the purpose and function of the overall stormwater management measure and its major components. Such understanding will enable maintenance personnel to provide more effective component maintenance and more readily detect maintenance-related problems. Depending on the size, character, location, and components of each stormwater management measure, maintenance personnel may also require training in specialized inspection and maintenance tasks and/or the operation and care of specialized maintenance equipment. Training should also be provided in the need for and use of all required safety equipment and procedures.

I. Training Plan

Types of Training

- Mandatory Stormwater Management Basic Training and Field Manual Usage Training for new maintenance crews
- Occupational Safety Training
- Subcontractor training, if applicable

Content of Training

- **Stormwater Management Basic Training**
  - Purposes and Functions of BMPs

    Example Training Material
    - NJDEP Stormwater BMP Manual, Chapter Nine: Structural Stormwater Management Measures
      - Chapter 9.1 Bioretention Systems
      - Chapter 9.6 Manufactured Treatment Devices

More training information is available at NJ Stormwater.org (http://www.nj.gov/dep/stormwater/training.htm)

  - Vegetation Care

    Example Training Material
    - NJDEP Stormwater BMP Manual, Chapter Seven: Landscaping *(provides information on vegetation and landscaping for stormwater management measures)*
    - Other

  - Field Manual Usage Training

    Example Training Material

- Field Manuals attached to this Maintenance Plan
- Other

- Equipment and Tools Operation Training

  Example Training Material
  - Equipment or tool manufacturer's Operation & Maintenance Manual
  - Other

- Occupational Safety Training

  Example Training Material
  - OSHA Training
  - Equipment or tool manufacturer's Operation & Maintenance Manual
  - Other

II. Training Records

Training attendance sheets should be attached by the responsible party after each training.

Annual Evaluation of the Effectiveness of the Plan

As per N.J.A.C. 7:8-5.8(g), the person responsible for maintenance shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.

The responsible party should evaluate the effectiveness of the maintenance plan by comparing the maintenance plan with the actual performance of the maintenance. The items to evaluate may include, but not limited to,

- Whether the inspections have been performed as scheduled;
- Whether the preventive maintenance has been performed as scheduled;
- Whether the frequency of preventative maintenance needs to increase or decrease;
- Whether the planned resources were enough to perform the maintenance;
- Whether the repairs were completed on time;
- Whether the actual cost was consistent with the estimated cost;
- Whether the inspection, maintenance, and repair records have been kept.

If actual performance of those items has been deviated from the maintenance plan, the responsible party should find the causes and implement solutions in a revised maintenance plan.

Annual Evaluation Records

Evaluator(s)	Date of Evaluation	Decision
		__Maintain current version OR __Revise current version - Revision date _____ (also update the last revision date on the cover page) __Requires a new deed recording (also update the last recording information on the cover page)
		__Maintain current version OR __Revise current version - Revision date _____ (also update the last revision date on the cover page) __Requires a new deed recording (also update the last recording information on the cover page)
		__Maintain current version OR __Revise current version - Revision date _____ (also update the last revision date on the cover page) __Requires a new deed recording (also update the last recording information on the cover page)

Documents

Please attach the following:

Transfer Agreement
As per N.J.A.C. 7:8-5.8(b), if the maintenance plan identifies a person other than the developer as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.

Deed
As per N.J.A.C. 7:8-5.8(d), if the person responsible for maintenance is not a public agency, the maintenance plan and any future revisions shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.

As-Built Drawings with Drainage Plans
As per NJDEP BMP Manual Ch. 8 (Feb., 2004), as-built construction plans of the stormwater management measure and copies of pertinent construction documents, such as laboratory test results, permits, and completion certificates should be included in this Maintenance Plan.

Landscaping Plan for the Stormwater Management Measures
As per NJDEP BMP Manual Ch. 8 (Feb., 2004), if there is a Landscaping Plan for the stormwater management measures, it should be included in this Maintenance Plan.

Permeability Test/Infiltration Test Report
As per NJDEP BMP Manual Ch. 8 (Feb., 2004), if a permeability test or infiltration test is required and available, the reports for pre-construction and post-construction testing should be included in this Maintenance Plan.

Soil Boring Logs
As per NJDEP BMP Manual Ch.8 (Feb., 2004), if any soil borings were taken prior to construction, a copy of the soil boring logs should be included in this Maintenance Plan.

Local, State, Federal Permits
As per NJDEP BMP Manual Ch. 8 (Feb., 2004), local, state, or federal permits related to the stormwater management measures for this development should be included in this Maintenance Plan. See Cost Estimate Section of This Maintenance Plan for more information. The requirement to obtain State permits depends on specific circumstances, such as, but not limited to, the specific design of the stormwater management measures, the maintenance actions, the access and disturbance, the disposal methods, the location of disposal, the method to empty a basin, the method to dredge the basin, the pollutants in the basin, the damages to the basin, and the method to repair the basin.

Check Maintenance Guidance in NJDEP Stormwater Management Website for details and links to the relevant permits and program areas (http://www.njstormwater.org).

Safety Regulations and Requirements

As per NJDEP BMP Manual Ch. 8 (Feb., 2004), all local ordinances and state and federal regulations regarding occupational safety should be included in this Maintenance Plan.

Devices/Tools/Equipment Operation and Maintenance Manual and Warranties

As per NJDEP BMP Manual Ch. 8 (Feb., 2004), maintenance, repair, and replacement instructions for specialized, proprietary, and nonstandard equipment, tools, supplies, manufacturers' product instructions, and user manuals should be included in this Maintenance Plan.

Attach Documents Here

Worlds Fair Drainage, Access, Maintenance Easement Agreement for Basins #1 and #3

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SOMERSET COUNTY
91 MAY 31 PM 1:29
R.P. WIDIN CLERK

Prepared By: James J. Scott, Esq.

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DRAINAGE, ACCESS & MAINTENANCE EASEMENT AGREEMENT

This Agreement is being entered into this 31st day of May, 1991, between World's Fair Partners Limited Partnership, a New Jersey limited partnership, having an address at Post Office Box 5850, Somerset, New Jersey 08875-5850 ("Grantor"), and CPC International Inc., a Delaware corporation, having offices at International Plaza, Englewood Cliffs, New Jersey 07632 ("Grantee").

COUNTY OF SOMERSET
CONSIDERATION 40.00
REALTY TRANSFER FEE Exempt
DATE 5/31/91 BY SD

STATEMENTS OF FACT

A. Grantee is the owner of certain land known and designated as Lot 2.02, Block 468.08, Franklin Township, Somerset County, as shown on the map (the "Plat") entitled "Final Plat, Major Subdivision, World's Fair Corporate Center, Lot 2, Block 468.08," prepared by Donald H. Stires Associates, dated December 3, 1990 and last revised on April 25, 1991 and recorded in the Somerset County clerk's office as Map No. 2814 and as more particularly described on Exhibit 1 attached hereto (the "Property").

B. Grantor has transferred title to the Property to Grantee by deed of even date herewith.

C. An existing storm water detention basin is located on the Property and the adjacent Lot 2.03, Block 468.08, which basin is shown on the Plat and as more particularly described on

RECORDED IN DEED BK 1816 PG 623

Exhibit 2 attached hereto ("Basin I"). Grantor is the owner of Lot 2.03, Block 468.08.

D. Grantor owns Lot 43.02, Block 468.09 as shown on the tax map of the township of Franklin, Somerset County, upon which is situated a second storm water detention basin ("Basin II").

E. An existing drainage easement ("Drainage Easement") is situated on the Property as shown on the Plat and more particularly described on Exhibit 3 attached hereto.

F. Grantee desires to discharge storm water from the Property into Basin I and Basin II and Grantor desires to obtain the right to have access to the Property for the purpose of maintaining the Drainage Easement and that portion of Basin I which is situated on the Property.

NOW, THEREFORE, in consideration of the foregoing, the mutual covenants and conditions hereinafter set forth and $10.00 and other good and valuable consideration, the parties hereto, intending to be legally bound hereby, agree as follows:

1. Grantor hereby grants an appurtenant easement and right in perpetuity to Grantee for the purpose of discharging storm water from the Property into Basin I and Basin II (the "Discharge Easement").

2. The Discharge Easement shall permit Grantee to discharge storm water from the Property into Basin I and Basin II to the extent required and contemplated by the site plan approval for the Property granted by the Township of Franklin Planning Board on February 20, 1991, memorialized by a resolution of the

BK1816PG624

Planning Board dated March 6, 1991 and as more particularly set forth on the site plan drawings approved by the Planning Board.

3. Grantee hereby grants to Grantor the right to enter upon that portion of Basin I situated on the Property and the Drainage Easement area as may be necessary for the perpetual maintenance and repair of Basin I and the area of the Drainage Easement. Such access as may be necessary pursuant to this paragraph 3 shall be obtained only from Lot 2.03, Block 468.02 and not from any portion of the Property beyond the perimeter of Basin I provided, however, temporary access to Basin I may be obtained from the road on the Property which intersects Pierce Street if (a) there is an event of emergent hazard to human life or property and (b) the access from Lot 2.03, Block 468.02 is barred by a physical condition which may not be immediately eliminated as an obstruction. Notwithstanding anything in this agreement to the contrary, Grantee shall not take any action which may impair Grantor's access to Basin I from Lot 2.03, Block 468.02, to the extent such access is permitted by this Paragraph 3.

4. Grantor shall maintain Basin I and the Drainage Easement (i) in a neat, orderly, clean and lawn-trimmed condition, (ii) in accordance with the requirements of the Delaware and Raritan Canal Commission ("DRCC"), as more particularly required by that certain Conservation and Maintenance Easement between Grantor and the DRCC dated March 20, 1991 and recorded in the Somerset County Clerk's Office on March 22, 1991 at book

1809, page 798 and (iii) in accordance with any and all applicable laws, statutes, regulations or orders of any governmental or quasi-governmental agency whatsoever having jurisdiction thereover.

5. That portion of Basin I situated on the Property and the Drainage Easement shall not be used for any purpose other than storm water management. Grantor shall not construct any structure in or on that portion of Basin I situated on the Property without prior written approval from Grantee, which approval shall be given or withheld in Grantee's sole and absolute discretion. Grantor may, without Grantee's consent, install underground storm water conduits and pipes within the area of the Drainage Easement for the purpose of connecting Basin I with the storm water management system for development to the southwest of the Property. Grantor shall not take any action, or fail to take any action which would in any way inhibit the use of Basin I or Basin II by Grantee as contemplated herein. Notwithstanding anything in this Agreement to the contrary, upon receipt of (a) all necessary governmental or quasi-governmental permits and approvals and (b) Grantee's written consent, which shall not be unreasonably withheld, Grantor may modify or enlarge Basin I within the existing perimeter of Basin I on the Property or on any portion of Grantor's adjacent Lot 2.03, Block 468.08 upon which the remainder of Basin I is situate.

6. Grantee shall pay Grantor a pro rata share of the cost of maintaining, repairing and replacing Basin I and Basin II (with respect to replacing, only if necessitated or required by

BK1816PG626 4-

a governmental authority so long as such replacement is not so needed because of improvements made at or the development of any portion of the World's Fair Corporate Center). Replacement of infrastructural components in Basin I shall be included within the terms "maintaining and repairing" for the purposes of this agreement. Costs incurred by Grantor for real estate taxes, insurance and electric utility charges may be included in the pro rata share calculation to the extent such costs are specifically attributable to Basin I and Basin II (such as being a separate tax assessment lot or maintaining an insurance policy covering only the Basin(s) area(s)). The pro rata share shall be calculated for each basin based on the proportion to which the acreage of the Property utilizing each basin bears to the acreage of all lands served by each basin. Grantor and Grantee hereby agree that one-half of the acreage of the Property shall be applied each to Basin I and Basin II for the purposes of the foregoing calculation of pro rata share. Grantee's obligation pursuant to this paragraph 6 shall be limited to costs incurred by Grantor for the maintenance, repair and replacement of Basin I and Basin II after the date of this Agreement. Grantee shall not be obligated to pay any costs related to the maintenance, repair or replacement of the Drainage Easement. Grantee shall make payment to Grantor pursuant to this paragraph 6 within thirty (30) days of receipt of an invoice therefor and a detailed cost breakdown indicating all costs associated with the total amount due. Grantee shall pay interest on all payments not made within said thirty (30) day period at a per annum rate equal to the

lesser of (a) the maximum rate permitted by law or (b) the prime rate announced by Midlantic National Bank, N.A. from time to time, plus three (3) percent. Grantee's payment of the amount claimed to be due shall not be construed to be a waiver of Grantee's right to contest the costs included in the invoice or the method of calculating said costs.

7. To the extent now or in the future the development contemplated by the Site Plan requires storm drainage pipes, headwalls, conduits, outlet structures, components or other devices (collectively "Infrastructure") which are not shown on the Site Plan, but are necessary for proper storm water management for said development, or required by any governmental or quasi-governmental agency, Grantee shall be permitted to construct, repair, maintain and replace any element of such Infrastructure in Basin I provided (a) such Infrastructure shall be at Grantee's sole cost and expense and (b) such Infrastructure shall not materially increase the quantity of storm water discharged into Basin I and/or Basin II from the Property beyond that contemplated by the Site Plan. Grantee shall be permitted to repair, maintain and replace any element of the Infrastructure of Basin I or Basin II which is installed by Grantee pursuant to the Site Plan.

8. Grantor shall indemnify, defend and save harmless Grantee against any and all liability, claims, damages, losses, settlements, cleanup expenses, demands, penalties, fines, expenses and costs (including, without limitation, reasonable attorney's fees to enforce this indemnity and otherwise)

("Claims"), arising from the use, maintenance, improvement or existence of Basin I and the Drainage Easement except with respect to any Claims arising from the negligence or intentional misconduct of Grantee. If any action or proceeding is brought against Grantee by reason of such Claim, Grantor, upon notice from Grantee, shall resist and defend such action or proceeding at Grantor's expense and with counsel approved by Grantee, which approval shall not be unreasonably withheld and such approval shall be deemed granted if such counsel is designated by Grantor's insurance carrier. This paragraph 8 shall survive the termination of this Agreement.

9. Nothing contained herein is intended to create, nor shall it be construed as creating, any right in or for the benefit of the general public in the Property, nor shall this instrument be construed as a grant of Basin I, Basin II, the Drainage Easement or the Property for any public purpose.

10. Prior to performing any work in connection with the fulfillment of its obligations and duties hereunder, Grantor shall obtain all permits, approvals and certificates required by any governmental or quasi-governmental entity. Grantee shall cooperate with Grantor and execute such documents, applications or certificates as may be reasonably necessary in connection with applications for such permits, approvals or certificates. Grantor shall not permit any mechanic's notice of intention, building contract, lien claim or encumbrance to be filed against the Property in connection with Grantor's maintenance, repair or replacement of Basin I and the Drainage Easement or fulfillment

of any of Grantor's obligations and duties under this Agreement. Upon demand by Grantee, Grantor shall pay or cause to be bonded or discharged any mechanic's liens or encumbrances filed against the Property as a result of any actions taken by or on behalf of Grantor. If Grantor fails to pay or cause such liens or encumbrances to be bonded or discharged Grantor shall reimburse Grantee for all reasonable costs and expenses incurred by Grantee in removing such liens or encumbrances, including, but not limited to, its legal fees and costs and shall indemnify and hold Grantee harmless in connection with any losses, liabilities, damages suffered by Grantee in connection therewith.

11. Grantor shall give Grantee notice at least two (2) days prior to commencement of any work on the Property in fulfillment of any of Grantor's obligations and duties under this Agreement. Notwithstanding the foregoing, no prior notice shall be required in the event of emergent hazard to human life or property. In the event of such an emergency, Grantor shall promptly notify Grantee thereof. With respect to routine lawn and landscaping maintenance, Grantor's pre-season written notification to Grantee of the person(s) performing such tasks and the frequency with which such tasks are intended to be performed shall be sufficient notification with respect to such tasks, notwithstanding anything in this paragraph 11 to the contrary. Prior to the commencement of any work performed in connection with fulfillment of Grantor's obligations and duties under this Agreement, Grantor shall provide Grantee, along with the notice required pursuant to this paragraph 11, evidence that

there is in full force and effect general public liability insurance, premium paid, naming Grantee as an additional name insured, insuring the Grantee against any liability, commonly insured against and occasioned by any act or omission on or about the Property by Grantor, its agents, servants, employees, licensees, and invitees. Such policy is to be written by an insurance company qualified to do business in the State of New Jersey and shall contain limits of not less than $1,000,000.00 (which amount shall increase over time such that the limit of insurance shall be commercially reasonable at the time) in respect of any one person, in respect of any one accident and in respect of property damage.

12. If Grantor shall default in any of its obligations and duties set forth in this Agreement, Grantee may give Grantor thirty (30) days written notice to cure the specified default. If Grantor shall fail to cure the default within the thirty (30) day period following said notice, or in case the default be of such nature that it cannot be cured within said thirty (30) day period, then if Grantor shall fail within said thirty (30) day period to commence to cure such default and thereafter to diligently pursue completion of said cure, Grantee shall have the right, but not the obligation, to cure such default. To the extent curing a default hereunder requires Grantee to enter upon Lot 2.03, Block 468.08, Grantor hereby grants Grantee such right of entry. Notwithstanding anything in this Agreement to the contrary, in the event of emergent hazard to human life or property, Grantee may act immediately and without prior notice to

cure any default by Grantor hereunder. All costs of Grantee associated with curing such default, together with interest thereon from the date incurred at a per annum rate equal to the lesser of (a) the maximum rate permitted by law, or (b) the prime rate announced by Midlantic National Bank, N.A. from time to time, plus three (3) percent, shall be an obligation of Grantor and Grantor shall promptly pay Grantee within ten (10) days of written notice by Grantee to Grantor of Grantor's portion of said amount incurred to cure such default. Grantee shall indemnify and save harmless Grantor against any and all claims and liabilities due to injury to persons or damage to property adjudged to arise out of Grantee's negligence in exercising its right to cure pursuant to this paragraph 12. Notwithstanding the foregoing, Grantee shall be entitled to any available remedy at law or in equity to enforce the terms of this Agreement, including, but not limited to, the remedy of specific performance.

13. Grantor shall perform all work in connection with its obligations and duties under this Agreement on the Property in a workman-like manner and with a minimum of inconvenience to Grantee, and any damage done to the Property shall be promptly repaired and restored to its condition immediately prior to such damage, at the sole cost and expense of Grantor.

14. The provisions of this Agreement maybe abrogated, modified or amended, in whole or in part, only by document found of record and executed by Grantor and Grantee.

15. This Agreement and the covenants, obligations and duties contained herein shall run with the land and inure to the

benefit of and be binding upon the Grantor and Grantee and their respective successors and assigns.

16. Whenever possible, each provision of this Agreement shall be interpreted in such a manner as to be effective and valid under applicable law, but if any provision of this Agreement shall be prohibited or invalid under applicable law, such provision shall be ineffective to the extent of such prohibition or invalidity without invalidating the remainder of such provision or the remaining provisions of this Agreement.

17. This Agreement shall be governed by, and construed according to, the laws of the State of New Jersey.

18. This writing is intended by the parties as a final expression of their agreement and as a complete and exclusive statement of the terms hereof, all negotiations, considerations and representations between the parties having been incorporated herein.

IN WITNESS WHEREOF, the undersigned have caused this Agreement to be duly executed and delivered by the proper corporate officer or individual on this day and year first above written.

WITNESS:

H. HARDING BROWN

Worlds Fair Partners
Limited Partnership

By _____
Herbert Punia

ATTEST:

Assistant Secretary

CPC INTERNATIONAL INC.,

Lawrence K Hathaway
Vice President

-11-

BK 1816 PG 633

EXHIBIT I

All that certain lot, tract or parcel of land and premise situate, lying and being in the Township of Franklin, County of Somerset, and State of New Jersey, being more particularly described as follows:

Beginning at a point, said point being the intersection of the northwesterly sideline of Worlds Fair Drive (60' Right-of-Way) and the northeasterly sideline of Pierce Street (60' Right-of-Way), and from said point the following 2 courses;

Thence a) along said northeasterly sideline of Pierce Street on a curve to the right, said curve having a radius of two thousand nine hundred seventy and zero hundredths (2970.00') feet, a length along the arc of fifty-six and forty-six hundredths (56.46') feet, a length along the chord of fifty-six and forty-six hundredths (56.46') feet, and a chord bearing of N36°43'00"W to a point of tangency;

Thence b) perpendicular to said northeasterly sideline of Pierce Street S53°49'40"W, a distance of sixty and zero hundredths (60.00') feet to a point, said point being the True Point and Place of Beginning, and running,

Thence 1) along the northwesterly sideline of Pierce Street on a curve to the left, said curve having a radius of three thousand thirty and zero hundredths (3030.00') feet, a length along the arc of one hundred fifty-five and sixty-one hundredths (155.61') feet, a length along the chord of one hundred fifty-five and fifty-nine hundredths (155.59') feet, and a chord bearing of S37°38'37"E to a point;

Thence 2) S53°49'40"W, a distance of seven hundred fifty and thirty-eight hundredths (750.38') feet to a point;

Thence 3) N41°07'20"W, a distance of five hundred eight and sixty hundredths (508.60') feet to a point;

Thence 4) N64°05'00"W, a distance of one hundred seventy-eight and thirty-three hundredths (178.33') feet to a point;

Thence 5) N51°21'50"W, a distance of two hundred thirty-seven and twenty-one hundredths (237.21') feet to a point;

1 of 2

BK 1816 PG 634

Thence 6) N52°29'53"E, a distance of nine hundred thirty and thirty-five hundredths (930.35') feet to a point on the aforementioned northwesterly sideline of Pierce Street;

Thence 7) along said northwesterly sideline S37°30'07"E, a distance of two hundred four and thirty-eight hundredths (204.38') feet to a point of curvature;

Thence 8) continuing along said northwesterly sideline on a curve to the right, said curve having a radius of three thousand nine hundred seventy and zero hundredths (3970.00') feet, a length along the arc of ninety-two and fourteen hundredths (92.14') feet, a length along the chord of ninety-two and thirteen hundredths (92.13') feet, and a chord bearing of S36°50'14"E to a point of tangency;

Thence 9) continuing along said northwesterly sideline S36°10'20"E, a distance of four hundred sixty-two and eighty hundredths (462.80') feet to a point, said point being the True Point and Place of Beginning.

Containing 737,199 square feet or 16.924 acres of land more or less.

The premises described above are shown and designated as Lot 2.02 Block 468.08 on the "Final Plat - Major Subdivision - Worlds Fair Corporate Center - Lot 2 Block 468.08 Franklin Township, Somerset County, New Jersey" prepared by Donald H. Stires Associates, dated December 3, 1990 and last revised April 25, 1991 and filed in the Somerset County Clerk's Office as Map # 2814 .

2 of 2

BK1816PG635

EXHIBIT 2

DETENTION BASIN EASEMENT
PROPOSED LOTS 2.02 and 2.03, BLOCK 468.08
FRANKLIN TOWNSHIP, SOMERSET COUNTY, NEW JERSEY

All that certain lot, tract or parcel of land and premise situate, lying and being in the Township of Franklin, County of Somerset, and State of New Jersey, being more particularly described as follows:

Beginning at a point at the intersection of the easterly projection of the southeasterly sideline of Angel Place (40' right-of-way) with a line located easterly, parallel, and 75' perpendicular distance from the northeasterly line of Lot 22, Block 468.02 as shown on a map entitled "Final Plat Major Subdivision Worlds Fair Corporate Center, Lot 2, Block 468.08" as filed in the Somerset County Clerks Office as map number 2814 and from said point running;

Thence 1) N41°15'20"W, a distance of one hundred ninety and sixty hundredths feet (190.60') to a point in the line of lands belonging now or formerly to Rechler Partnership;

Thence 2) along said line N48°44'40"E, a distance of thirty-nine and zero hundredths feet (39.00') to a point;

Thence 3) continuing along said line N49°25'40"E, a distance of one hundred eighty-one and twenty-one hundredths feet (181.21') to a point;

Thence 4) S40°34'16"E, a distance of thirty-nine and thirty-two hundredths feet (39.32') to a point on a curve;

Thence 5) along a curve to the left, said curve having a radius of one hundred fifty and zero hundredths feet (150.00'), a length along the arc of one hundred seventy and ninety-nine hundredths feet (170.99'), a chord bearing of S08°27'57"E, and a length along the chord of one hundred sixty-one and eighty-eight hundredths feet (161.88') to a point of tangency;

Thence 6) S41°07'20"E, a distance of six hundred eleven and forty-nine hundredths feet (611.49') to a point;

Thence 7) S48°52'40"W, a distance of five and zero hundredths feet (5.00') to a point;

Thence 8) N62°22'30"W, a distance of one hundred ninety-nine and thirty-two hundredths feet (199.32') to a point;

Thence 9) N51°21'50"W, a distance of three hundred fifteen and ninety-six hundredths feet (315.96') to a point;

Thence 10) N40°20'00"W, a distance of one hundred one and forty-seven hundredths feet (101.47') to a point, said point being the Point and Place of Beginning.

Containing 85,863 square feet of 1.971 acres of land more or less.

Dated: 3/29/91

BK1816PG637

EXHIBIT 3

DRAINAGE EASEMENT
LOTS 2.02, BLOCK 468.08
FRANKLIN TOWNSHIP, SOMERSET COUNTY, NEW JERSEY

All that certain lot, tract or parcel of land and premise situate, lying and being in the Township of Franklin, County of Somerset, and State of New Jersey, being more particularly described as follows:

Beginning at a point at the intersection of the termination of the southeasterly sideline of Angel Place (40' right-of-way) with the northeasterly line of Lot 13, Block 468.04 as shown on a map entitled "Final Plat Major Subdiviison World's Fair Corporate Center, Lot 2, Block 468.08" as filed in the Somerset County Clerk's office as map number 2814, and from said point running;

Thence A) along the said northeasterly line of Lot 13, Block 468.04 S40°20'00"E, a distance of one hundred eight and eleven hundredths feet (108.11") to a point;

Thence B) S51°21'50"E, a distance of two hundred twenty-nine and forth-three hundredths feet (229.43') to a point, said point being the True Point and Place of Beginning and from said point running;

Thence 1) N29°21'37"E, a distance of fifty-five and eighty-three hundredths feet (55.83') to a point;

Thence 2) N09°38'23"W, a distance of twenty-nine and eighty-nine hundredths feet (29.89') to a point;

Thence 3) S51°21'50"E, a distance of thirty and five hundredths feet (30.05') to a point;

Thence 4) S09°38'23"E, a distance of fourteen and fifty-five hundredths feet (14.55') to a point;

Thence 5) S29°21'37"W, a distance of sixty-six and seventeen hundredths feet (66.17') to a point;

Thence 6) N51°21'50"W, a distance of twenty and twenty-seven hundredths feet (20.27") to a point, said point being the True Point and Place of Beginning.

Containing 1664 square feet or 0.038 acres of land more or less.

Dated: 3/29/91

R+R

COMMONWEALTH LAND TITLE INS. CO.
392 SPRINGFIELD AVENUE
P.O. BOX 700
SUMMIT, N.J. 07902-0700

F214612

BK 1816 PG 639

STATE OF NEW JERSEY)
)ss.
COUNTY OF ESSEX)

On this 31 day of May, 1991 before me, the subscriber, a notary public or an attorney at law of New Jersey, personally appeared L. K. Hathaway the Vice President of CPC International, Inc., who I am satisfied is the person who has signed the within instrument, and, I having first made known to him the contents thereof, he did acknowledge that he signed, sealed with the corporate seal, and delivered the same as such officer aforesaid and that the within instrument is the voluntary act and deed of such Corporation, made by virtue of the authority of its Board of Directors, for the uses and purposes therein expressed.

Consideration $10.00

JOSEPHINE C. RAGUSA
NOTARY PUBLIC STATE OF NEW JERSEY
MY COMMISSION EXPIRES DEC. 4, 1992

BK1816PG641

DRAINAGE, ACCESS & MAINTENANCE EASEMENT AGREEMENT

WORLD'S FAIR PARTNERS LIMITED PARTNERSHIP,

GRANTOR,

TO

CPC INTERNATIONAL INC.,

GRANTEE.

11572

Record and Return to:

HANNOCH WEISMAN
A Professional Corporation
4 Becker Farm Road
Roseland, New Jersey 07068-3788

Attention: Howard A. Kantrowitz, Esq.

COMMONWEALTH LAND TITLE INS. CO.
392 SPRINGFIELD AVENUE
P.O. BOX 700
SUMMIT, N.J. 07902-0700

F214612

E31=3873 H00056.B0 CA

BK 1816 PG 642

END OF DOCUMENT

$ 52 C/K

DRCC Conservation and Maintenance Agreement for Basins #1 and #3

6117 Deed # 90-1951

RECORDED/FILED
SOMERSET COUNTY
91 MAR 22 PM 12:43
R.P. WIDIN. CLERK

Prepared by: Carol A. Blasi
Deputy Attorney General

DELAWARE AND RARITAN
CANAL COMMISSION

TAW

CONSERVATION AND MAINTENANCE EASEMENT

In consideration for the approval by the Delaware and Raritan Canal Commission of the State of New Jersey, of the storm water management plans for a certain project located within the Delaware and Raritan Canal State Park review zone proposed by WORLDS FAIR PARTNERS LIMITED PARTNERSHIP the owner/contract purchaser (circle one) (hereinafter "the Owner") of the property upon which the project will be located, has granted to the Commission a Conservation and Maintenance Easement to insure that the required storm water management facilities are maintained in accordance with Commission regulations. In relation thereto, the parties agree as follows:

COUNTY OF SOMERSET
CONSIDERATION -0- EXEMPT
REALTY TRANSFER FEE $ 3-22-91
DATE BY

1. WORLDS FAIR PARTNERS LMTD. PARTNERSHIP a corporation/partnership/individual (circle one) of the State of NEW JERSEY, with its principal office/residence (circle one) in the State of NEW JERSEY located at P.O. BOX 5850, SOMERSET, NJ 08875, is the owner/contract purchaser (circle one) of the lands in the Township of FRANKLIN, SOMERSET County, more particularly known as Block(s) 468.08 Lot(s) 2, on the tax map of the FRANKLIN Township/County of SOMERSET which lands are located at PIERCE STREET, SOMERSET, NJ (street address) ("subject property"). In connection with a project proposed to be located on the subject property, Owner has submitted to the Delaware and Raritan Canal Commission its plans for the construction and installation of storm

-1-

RECORDED IN DEED

BK 1809 PG 798

water management facilities upon the premises in order to comply with the Commission's review zone regulations. These plans are contained in certain documents filed with the Commission as more particularly identified in the staff report by the Commission dated 1/17/91, a copy of which report is attached hereto and made a part hereof.

2. On 3/20/91, the Commission approved the above project application, and as a condition of its approval, the Commission required the applicant to insure that the storm water management facilities are maintained in a manner that will provide for their compliance with the standards and criteria enumerated in the Delaware and Raritan Canal State Park review zone regulations then in force.

3. The Owner hereby agrees to properly maintain the storm water management facilities to insure said facilities function in accordance with the Delaware and Raritan Canal State Park review zone regulations in force as of this date and as set forth in the approved engineering plans dated 1/10/91. In the event that the Owner fails to comply in any respect in this obligation, Owner agrees, upon notification from the Commission, that the Commission shall have all of the rights and remedies afforded it by law for the enforcement of this conservation and maintenance easement agreement including the right to specifically enforce the same, and it further agrees that Owner, provided it is not in compliance, will remain liable for the cost of such proceedings as well as the cost and expenses incurred by the Commission relating to any required maintenance of the storm water management facilities performed by the Commission. In this connection, Owner agrees that the

Commission, its agents, servants, and employees, subject to forty-five (45) days' prior written notice to Owner and any lender of record are hereby given access to that portion of the subject property affected by the storm water management facilities for the purpose of cleaning, repairing, and maintaining the approved storm water management facilities to insure these facilities comply with the standards and criteria of the review zone regulations as now in effect and the approved plans. Prior to the commencement of any proceedings to enforce this agreement and prior to incurring any cost or expenses for which the Owner assumes liability, the Commission will give the aforementioned forty-five (45) days notice of Owner and any lender of record, if any, together with an estimate of the costs, of its intention to so proceed or to incur such expenses and will afford the Owner and lender of record, if any, this time as may be extended with approval of the Delaware and Raritan Canal Commission to remedy any defect or deficiency relating to the condition of the storm water management facilities. The Commission shall not unreasonably withhold approval for an extension. Notwithstanding the rights granted herein to the Delaware and Raritan Canal Commission of the State of New Jersey, such rights do not include the right to alter any buildings on the property and to disturb the use thereof other than for the purpose of cleaning, repairing and maintaining the approved storm water management facilities contained thereon to insure their compliance with the standard and criteria of the review zone regulations as in effect on the date that this easement is recorded, and the approved plans.

4. This agreement is binding upon the Owner, its heirs, successors, and assigns; it shall be construed as an easement running with the land and shall be binding upon any person to whom title to the subject property is transferred as well as upon the heirs, successors and assigns of all such persons. Notwithstanding anything contained herein to the contrary, the parties hereto acknowledge and agree that the responsibilities and obligations of the owner as set forth herein are personal to WORLDS FAIR PARTNERS LIMITED PARTNERSHIP, as long as he holds title to the subject property. Upon passage of title from WORLDS FAIR PARTNERS LIMITED PARTNERSHIP, the responsibilities and obligations hereunder shall pass to the then title holder of the subject property.

5. Any written notice to Owner shall be directed to them as follows:

WORLDS FAIR PARTNERS LIMITED PARTNERSHIP
PO BOX 5850
SOMERSET, NEW JERSEY 08875

Any written notice to the Delaware and Raritan Canal Commission of the State of New Jersey shall be directed to them at:

Delaware and Raritan Canal Commission
Prallsville Mill Complex
P.O. Box 539
Stockton, NJ 08559-0539

6. Owner agrees to record this Conservation and Maintenance Easement and provide the Commission with evidence of same.

7. Upon request, the Delaware and Raritan Canal Commission of the State of New Jersey agrees to provide a letter to Owner, or any lender or any party which Owner shall require, indicating whether the Commission, as of the date of said letter, has commended any action under this easement.

IN WITNESS WHEREOF, the applicant has caused these presents to be duly executed and acknowledged, this 4th day of March 1991.

ATTEST:

BY: Sondra Steinberg
Name: Sondra Steinberg
Title: Office Manager

Owner/Contract Purchaser

Name: Joseph Punia, "Worlds Fair Associates
Title: Partner

Executed and acknowledged by the Canal Commission this 20th day of March, 1991.

ATTEST:

BY:

DELAWARE AND RARITAN CANAL COMMISSION OF THE STATE OF NEW JERSEY

James C. Amon
Executive Director

-5-

BK 1809 PG 802

STAFF REPORT

DELAWARE AND RARITAN
CANAL COMMISSION
Prallsville Mills
P.O. Box 539
Stockton, NJ 08559-0539

PLEASE REFER TO DRCC # WHEN SUBMITTING ADDITIONAL DOCUMENTS

DRCC #: 90-1951
DATE: 17 January 1991
PROJECT NAME: Best Foods Technical Center

Applicant: Best Foods - A Dvision of CPC International Inc.
1120 Commerce Ave., P.O. Box 1534, Union, NJ 07083

Engineer: The Austin Company
1001 Durham Ave., South Plainfield, NJ 07080-2303

Project Location:

Road: Pierce St.
Municipality: Franklin Twp. County: Somerset County
Block(s): 468.08 Lots: 2.02

Project Description:

_____Residential	__X__Non-Residential
_____Zone A	__X__Zone B
__X__Major Project	_____Minor Project
__X__Class I	_____Class II

The project consists of one 2-story office-research building with 132,650 sq. ft. on 17 acres with 36+% impervious coverage. There will be one detention basin which will provide for water quality and storm water protection.

Subject to Review for: __X__Drainage _____Visual
_____Traffic Impact _____Stream Corridors

THIS STAFF REPORT IS ISSUED AS A GUIDE TO APPLICANTS IN COMPLYING WITH DRCC REGULATIONS. IT SHALL NOT BE CONSTRUED AS A FORM OF APPROVAL. NO CONSTRUCTION SHALL BEGIN UNTIL A CERTIFICATE OF APPROVAL HAS BEEN ISSUED.

Staff Comments:
Report Dated: Nov. 1990
Plans Dated: 12/3/90 revised 12/17/90 revised 1/10/91

Upon receipt of Municipal Approval, two maintenance agreements with original signatures on both copies, and a list of anyone owning 10% or more in the property, the application will be considered complete and will be submitted to the Commission for their action at the meeting following receipt of the aforementioned material.

BK1809PG803

DELAWARE AND RARITAN
CANAL COMMISSION

STATE OF NEW JERSEY:
: SS
COUNTY OF HUNTERDON:

BE IT REMEMBERED that on this 20th day of March 1991, before me the subscriber, personally appeared James C. Amon, Executive Director of the Delaware and Raritan Canal Commission, who I am satisfied is the person named in and who executed the within instrument, and thereupon he acknowledged that he signed, sealed and delivered the same as his voluntary act and deed, for the purposes therein expressed, and that the full and actual consideration paid for this easement, as such consideration is defined in P.L. 1968, c.49, Sec. 1(c), is for the approval of the Delaware and Raritan Canal Commission of the State of New Jersey, of the storm water management plans for a certain project located within the Delaware and Raritan Canal State Park review zone proposed by the owner.

6117

Carol Blasi
Deputy Attorney General

The Austin Company
1001 Durham Ave
So. Plainfield NJ
07080-2303
Attn Andrew Nagy

30.00 Ch Tw

B22=7405 M00030.00 CA

PRALLSVILLE MILLS P.O. BOX 539 STOCKTON, NJ 08559-0539 609-397-2000 FAX: 609-397-1081

EXECUTIVE DIRECTOR	COMMISSIONERS					
James C. Amon	Benjamin B. Kirkland *Chairman*	Martin D. Jessen *Vice-Chairman*	Donald B. Jones *Treasurer*	Stuart R. Zaikov	Judith A. Yaskin	Winona D. Nash
				R. William Pauley	Frank J. Torpey	

BK 1809 PG 804

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
James J. Florio, *Governor* Judith A. Yaskin, Commissioner

END OF DOCUMENT

Soil Test Results

140 West Main Street
High Bridge, NJ 08829
T: 908.238.0544 F: 908.238.9572

Municipality: Franklin Township Block: 468.08 Lot: 2.02

Soil Log and Interpretation

1 Soil Log #: SL-1 Date of Soil Log: 5/6/2020 Method: Profile Pit
2 Log:

Depth (inches)	Munsell Color Name & Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragments; Structure; Consistence; Mottling Abundance, Size and Contrast
0 - 18"	Topsoil;
18 - 68"	10R 5/8; Silt Loam; 10% Gravel, 25% Cobble, 60% Stone; Common, Medium, Distinct Mottling, 10YR 7/1 in Color, 40-68" in Depth; SAB, Moist, Friable; Machine Refusal @ 68"

3 Ground Water Observations:
____ Seepage Observed - Depth (inches): ____
____ Pit Flooded - Depth (inches): ____ after ____ hours of observation

4 Soil Limiting Zones (Check ALL applicable categories):
✓ Fractured Rock Substratum - Depth to Top: 18"
___ Massive Rock Substratum - Depth to Top: ____
___ Excessively Coarse Horizon - Depth Top to Bottom: ____
___ Excessively Coarse Substratum - Depth to Top: ____
___ Hydraulically Restrictive Horizon - Depth Top to Bottom: ____
___ Hydraulically Restrictive Substratum - Depth to Top: ____
___ Perched Zone of Saturation - Depth Top to Bottom: ____
✓ Regional Zone of Saturation - Depth to Top: 40"

5 I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020
Signature and Seal of Professional Engineer: _____
License #: 24GB04258200 Date: 5/7/2020

E&LP

140 West Main Street
High Bridge, NJ 08829
T: 908.238.0544 F: 908.238.9572

Municipality: Franklin Township Block: 468.08 Lot: 2.02

Soil Log and Interpretation

1 Soil Log #: SL-2 Date of Soil Log: 5/6/2020 Method: Profile Pit
2 Log:

Depth (inches)	Munsell Color Name & Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragments; Structure; Consistence; Mottling Abundance, Size and Contrast
0 - 16"	Topsoil;
16 - 88"	10R 5/8; Silt Loam; 10% Gravel, 25% Cobble, 60% Stone; Few, Medium, Faint Mottling, 10YR 7/1 in Color, 42-88" in Depth; SAB, Moist, Friable; Seepage @ 70"; Machine Refusal @ 88"

3 Ground Water Observations:
- ✓ Seepage Observed - Depth (inches): 70"
- ✓ Pit Flooded - Depth (inches): 65" after 24 hours of observation

4 Soil Limiting Zones (Check ALL applicable categories):
- ✓ Fractured Rock Substratum - Depth to Top: 16"
- ___ Massive Rock Substratum - Depth to Top: ___
- ___ Excessively Coarse Horizon - Depth Top to Bottom: ___
- ___ Excessively Coarse Substratum - Depth to Top: ___
- ___ Hydraulically Restrictive Horizon - Depth Top to Bottom: ___
- ___ Hydraulically Restrictive Substratum - Depth to Top: ___
- ___ Perched Zone of Saturation - Depth Top to Bottom: ___
- ✓ Regional Zone of Saturation - Depth to Top: 42"

5 I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

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License #: 24GB04258200 Date: 5/7/2020

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Municipality: Franklin Township Block: 468.08 Lot: 2.02

Soil Log and Interpretation

1 Soil Log #: SL-3 Date of Soil Log: 5/6/2020 Method: Profile Pit
2 Log:

Depth (inches)	Munsell Color Name & Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragments; Structure; Consistence; Mottling Abundance, Size and Contrast
0 - 12"	Topsoil;
12 - 99"	10R 5/8; Silt Loam; 10% Gravel, 25% Cobble, 60% Stone; Few, Medium, Faint Mottling, 10YR 7/1 in Color, 42-99" in Depth; SAB, Moist, Friable; Seepage @ 72"; Machine Refusal @ 99"

3 Ground Water Observations:
- ✓ Seepage Observed - Depth (inches): 72"
- ✓ Pit Flooded - Depth (inches): 79" after 24 hours of observation

4 Soil Limiting Zones (Check ALL applicable categories):
- ✓ Fractured Rock Substratum - Depth to Top: 12"
- ___ Massive Rock Substratum - Depth to Top: ___
- ___ Excessively Coarse Horizon - Depth Top to Bottom: ___
- ___ Excessively Coarse Substratum - Depth to Top: ___
- ___ Hydraulically Restrictive Horizon - Depth Top to Bottom: ___
- ___ Hydraulically Restrictive Substratum - Depth to Top: ___
- ___ Perched Zone of Saturation - Depth Top to Bottom: ___
- ✓ Regional Zone of Saturation - Depth to Top: 42"

5 I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020
Signature and Seal of Professional Engineer: _____
License #: 24GB04258200 Date: 5/7/2020

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Municipality: Franklin Township Block: 468.08 Lot: 2.02

Soil Log and Interpretation

1 Soil Log #: SL-4 Date of Soil Log: 5/6/2020 Method: Profile Pit
2 Log:

Depth (inches)	Munsell Color Name & Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragments; Structure; Consistence; Mottling Abundance, Size and Contrast
0 - 12"	Topsoil;
12 - 132"	10R 5/8; Silt Loam; 10% Gravel, 25% Cobble, 50% Stone; Many, Medium, Prominent Mottling, 10YR 7/1 in Color, 42-132" in Depth; SAB, Moist, Friable; Seepage @ 76"; Machine Refusal @ 132"

3 Ground Water Observations:
- ✓ Seepage Observed - Depth (inches): 76"
- ____ Pit Flooded - Depth (inches): ____ after ____ hours of observation

4 Soil Limiting Zones (Check ALL applicable categories):
- ✓ Fractured Rock Substratum - Depth to Top: 12"
- ____ Massive Rock Substratum - Depth to Top: ____
- ____ Excessively Coarse Horizon - Depth Top to Bottom: ____
- ____ Excessively Coarse Substratum - Depth to Top: ____
- ____ Hydraulically Restrictive Horizon - Depth Top to Bottom: ____
- ____ Hydraulically Restrictive Substratum - Depth to Top: ____
- ____ Perched Zone of Saturation - Depth Top to Bottom: ____
- ✓ Regional Zone of Saturation - Depth to Top: 42"

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Signature of Site Evaluator: _____ Date: 5/7/2020
Signature and Seal of Professional Engineer: _____
License #: 24GB04258200 Date: 5/7/2020

140 West Main Street
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Municipality: Franklin Township Block: 468.08 Lot: 2.02

Soil Log and Interpretation

1 Soil Log #: SL-5 Date of Soil Log: 5/6/2020 Method: Profile Pit
2 Log:

Depth (inches)	Munsell Color Name & Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragments; Structure; Consistence; Mottling Abundance, Size and Contrast
0 - 14"	Topsoil;
14 - 93"	10R 5/8; Silt Loam; 10% Gravel, 25% Cobble, 60% Stone; Many, Medium, Distinct Mottling, 10YR 7/1 in Color, 24-96" in Depth; SAB, Moist, Friable; Seepage @ 90"; Machine Refusal @ 93"

3 Ground Water Observations:
- ✓ Seepage Observed - Depth (inches): 90"
- ✓ Pit Flooded - Depth (inches): 78" after 24 hours of observation

4 Soil Limiting Zones (Check ALL applicable categories):
- ✓ Fractured Rock Substratum - Depth to Top: 14"
- ___ Massive Rock Substratum - Depth to Top: ___
- ___ Excessively Coarse Horizon - Depth Top to Bottom: ___
- ___ Excessively Coarse Substratum - Depth to Top: ___
- ___ Hydraulically Restrictive Horizon - Depth Top to Bottom: ___
- ___ Hydraulically Restrictive Substratum - Depth to Top: ___
- ___ Perched Zone of Saturation - Depth Top to Bottom: ___
- ✓ Regional Zone of Saturation - Depth to Top: 24"

5 I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020
Signature and Seal of Professional Engineer: _____
License #: 24GB04258200 Date: 5/7/2020

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Municipality: Franklin Township Block: 468.08 Lot: 2.02

Soil Log and Interpretation

1 Soil Log #: SL-6 Date of Soil Log: 5/6/2020 Method: Profile Pit
2 Log:

Depth (inches)	Munsell Color Name & Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragments; Structure; Consistence; Mottling Abundance, Size and Contrast
0 - 14"	Topsoil;
14 - 40"	5YR 4/6; Silty Clay Loam; 10% Gravel, 5% Cobble, 5% Stone; SAB, Moist, Friable;
40 - 94"	10R 5/8; Silt Loam; 10% Gravel, 25% Cobble, 60% Stone; Many, Medium, Distinct Mottling, 10YR 7/1 in Color, 48-94" in Depth; SAB, Moist, Friable; Seepage @ 92"; Machine Refusal @ 94"

3 Ground Water Observations:
✓ Seepage Observed - Depth (inches): 92"
____ Pit Flooded - Depth (inches): ____ after ____ hours of observation

4 Soil Limiting Zones (Check ALL applicable categories):
✓ Fractured Rock Substratum - Depth to Top: 40"
____ Massive Rock Substratum - Depth to Top: ____
____ Excessively Coarse Horizon - Depth Top to Bottom: ____
____ Excessively Coarse Substratum - Depth to Top: ____
____ Hydraulically Restrictive Horizon - Depth Top to Bottom: ____
____ Hydraulically Restrictive Substratum - Depth to Top: ____
____ Perched Zone of Saturation - Depth Top to Bottom: ____
✓ Regional Zone of Saturation - Depth to Top: 48"

5 I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020
Signature and Seal of Professional Engineer: _____
License #: 24GB04258200 Date: 5/7/2020

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Municipality: Franklin Township Block: 468.08 Lot: 2.02

Soil Log and Interpretation

1 Soil Log #: SL-7 Date of Soil Log: 5/6/2020 Method: Profile Pit
2 Log:

Depth (inches)	Munsell Color Name & Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragments; Structure; Consistence; Mottling Abundance, Size and Contrast
0 - 17"	Topsoil;
17 - 93"	10R 5/8; Silt Loam; 10% Gravel, 25% Cobble, 60% Stone; Many, Medium, Distinct Mottling, 10YR 7/1 in Color, 30-93" in Depth; SAB, Moist, Friable; Seepage @ 72"; Machine Refusal @ 93"

3 Ground Water Observations:
- ✓ Seepage Observed - Depth (inches): 72"
- ✓ Pit Flooded - Depth (inches): 75" after 24 hours of observation

4 Soil Limiting Zones (Check ALL applicable categories):
- ✓ Fractured Rock Substratum - Depth to Top: 17"
- ___ Massive Rock Substratum - Depth to Top: ___
- ___ Excessively Coarse Horizon - Depth Top to Bottom: ___
- ___ Excessively Coarse Substratum - Depth to Top: ___
- ___ Hydraulically Restrictive Horizon - Depth Top to Bottom: ___
- ___ Hydraulically Restrictive Substratum - Depth to Top: ___
- ___ Perched Zone of Saturation - Depth Top to Bottom: ___
- ✓ Regional Zone of Saturation - Depth to Top: 30"

5 I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020
Signature and Seal of Professional Engineer: _____
License #: 24GB04258200 Date: 5/7/2020

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Municipality: Franklin Township Block: 468.08 Lot: 2.02

Soil Log and Interpretation

1 Soil Log #: SL-8 Date of Soil Log: 5/6/2020 Method: Profile Pit
2 Log:

Depth (inches)	Munsell Color Name & Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragments; Structure; Consistence; Mottling Abundance, Size and Contrast
0 - 12"	Topsoil;
12 - 54"	5YR 4/6; Silty Clay Loam; 10% Gravel, 5% Cobble, 5% Stone; Many, Medium, Prominent Mottling, 2.5Y 7/6 in Color, 20-54" in Depth; SAB, Moist, Friable;
54 - 108"	10R 5/8; Silt Loam; 10% Gravel, 25% Cobble, 60% Stone; Many, Medium, Distinct Mottling, 10YR 7/1 in Color, 54-108" in Depth; SAB, Moist, Friable; Seepage @ 72"; Machine Refusal @ 108"

3 Ground Water Observations:
✓ Seepage Observed - Depth (inches): 72"
____ Pit Flooded - Depth (inches): ____ after ____ hours of observation

4 Soil Limiting Zones (Check ALL applicable categories):
✓ Fractured Rock Substratum - Depth to Top: 54"
____ Massive Rock Substratum - Depth to Top: ____
____ Excessively Coarse Horizon - Depth Top to Bottom: ____
____ Excessively Coarse Substratum - Depth to Top: ____
____ Hydraulically Restrictive Horizon - Depth Top to Bottom: ____
____ Hydraulically Restrictive Substratum - Depth to Top: ____
____ Perched Zone of Saturation - Depth Top to Bottom: ____
✓ Regional Zone of Saturation - Depth to Top: 20"

5 I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020
Signature and Seal of Professional Engineer: _____
License #: 24GB04258200 Date: 5/7/2020

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Municipality: Franklin Township Block: 468.08 Lot: 2.02

Soil Log and Interpretation

1 Soil Log #: SL-9 Date of Soil Log: 5/6/2020 Method: Profile Pit
2 Log:

Depth (inches)	Munsell Color Name & Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragments; Structure; Consistence; Mottling Abundance, Size and Contrast
0 - 18"	Topsoil;
18 - 98"	10R 5/8; Silt Loam; 10% Gravel, 25% Cobble, 60% Stone; Common, Medium, Distinct Mottling, 10YR 7/1 in Color, 27-98" in Depth; SAB, Moist, Friable; Seepage @ 74"; Machine Refusal @ 98"

3 Ground Water Observations:
- ✓ Seepage Observed - Depth (inches): 74"
- ✓ Pit Flooded - Depth (inches): 92" after 24 hours of observation

4 Soil Limiting Zones (Check ALL applicable categories):
- ✓ Fractured Rock Substratum - Depth to Top: 18"
- ___ Massive Rock Substratum - Depth to Top: ___
- ___ Excessively Coarse Horizon - Depth Top to Bottom: ___
- ___ Excessively Coarse Substratum - Depth to Top: ___
- ___ Hydraulically Restrictive Horizon - Depth Top to Bottom: ___
- ___ Hydraulically Restrictive Substratum - Depth to Top: ___
- ___ Perched Zone of Saturation - Depth Top to Bottom: ___
- ✓ Regional Zone of Saturation - Depth to Top: 27"

5 I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020
Signature and Seal of Professional Engineer: _____
License #: 24GB04258200 Date: 5/7/2020

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Municipality: Franklin Township Block: 468.08 Lot: 2.02

Soil Log and Interpretation

1 Soil Log #: SL-11 Date of Soil Log: 5/6/2020 Method: Profile Pit
2 Log:

Depth (inches)	Munsell Color Name & Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragments; Structure; Consistence; Mottling Abundance, Size and Contrast
0 - 20"	Topsoil;
20 - 108"	10R 5/8; Silt Loam; 10% Gravel, 25% Cobble, 60% Stone; Many, Medium, Distinct Mottling, 10YR 7/1 in Color, 40-108" in Depth; SAB, Moist, Friable; Machine Refusal @ 108"

3 Ground Water Observations:
____ Seepage Observed - Depth (inches): ____
____ Pit Flooded - Depth (inches): ____ after ____ hours of observation

4 Soil Limiting Zones (Check ALL applicable categories):
- ✓ Fractured Rock Substratum - Depth to Top: 20"
- ____ Massive Rock Substratum - Depth to Top: ____
- ____ Excessively Coarse Horizon - Depth Top to Bottom: ____
- ____ Excessively Coarse Substratum - Depth to Top: ____
- ____ Hydraulically Restrictive Horizon - Depth Top to Bottom: ____
- ____ Hydraulically Restrictive Substratum - Depth to Top: ____
- ____ Perched Zone of Saturation - Depth Top to Bottom: ____
- ✓ Regional Zone of Saturation - Depth to Top: 40"

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Signature and Seal of Professional Engineer: _____
License #: 24GB04258200 Date: 5/7/2020

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Municipality: Franklin Township Block: 468.08 Lot: 2.02

Soil Log and Interpretation

1 Soil Log #: SL-12 Date of Soil Log: 5/6/2020 Method: Profile Pit
2 Log:

Depth (inches)	Munsell Color Name & Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragments; Structure; Consistence; Mottling Abundance, Size and Contrast
0 - 14"	Topsoil;
14 - 113"	10R 5/8; Silt Loam; 10% Gravel, 25% Cobble, 55% Stone; Common, Medium, Distinct Mottling, 10YR 7/1 in Color, 22-113" in Depth; SAB, Moist, Friable; Seepage @ 78"; Machine Refusal @ 113"

3 Ground Water Observations:
- ✓ Seepage Observed - Depth (inches): 78"
- ✓ Pit Flooded - Depth (inches): 74" after 24 hours of observation

4 Soil Limiting Zones (Check ALL applicable categories):
- ✓ Fractured Rock Substratum - Depth to Top: 14"
- ___ Massive Rock Substratum - Depth to Top: ___
- ___ Excessively Coarse Horizon - Depth Top to Bottom: ___
- ___ Excessively Coarse Substratum - Depth to Top: ___
- ___ Hydraulically Restrictive Horizon - Depth Top to Bottom: ___
- ___ Hydraulically Restrictive Substratum - Depth to Top: ___
- ___ Perched Zone of Saturation - Depth Top to Bottom: ___
- ✓ Regional Zone of Saturation - Depth to Top: 22"

5 I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020
Signature and Seal of Professional Engineer: _____
License #: 24GB04258200 Date: 5/7/2020

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Municipality: Franklin Township Block: 468.08 Lot: 2.02

Soil Log and Interpretation

1 Soil Log #: SL-13 Date of Soil Log: 5/6/2020 Method: Profile Pit
2 Log:

Depth (inches)	Munsell Color Name & Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragments; Structure; Consistence; Mottling Abundance, Size and Contrast
0 - 18"	Topsoil;
18 - 116"	10R 5/8; Silt Loam; 10% Gravel, 25% Cobble, 55% Stone; Common, Medium, Distinct Mottling, 10YR 7/1 in Color, 26-116" in Depth; SAB, Moist, Friable; Seepage @ 78"; Machine Refusal @ 116"

3 Ground Water Observations:
✓ Seepage Observed - Depth (inches): 78"
____ Pit Flooded - Depth (inches): ____ after ____ hours of observation

4 Soil Limiting Zones (Check ALL applicable categories):
✓ Fractured Rock Substratum - Depth to Top: 18"
____ Massive Rock Substratum - Depth to Top: ____
____ Excessively Coarse Horizon - Depth Top to Bottom: ____
____ Excessively Coarse Substratum - Depth to Top: ____
____ Hydraulically Restrictive Horizon - Depth Top to Bottom: ____
____ Hydraulically Restrictive Substratum - Depth to Top: ____
____ Perched Zone of Saturation - Depth Top to Bottom: ____
✓ Regional Zone of Saturation - Depth to Top: 26"

5 I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020
Signature and Seal of Professional Engineer: _____
License #: 24GB04258200 Date: 5/7/2020

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Municipality: Franklin Township Block: 468.08 Lot: 2.02

Soil Log and Interpretation

1 Soil Log #: SL-14 Date of Soil Log: 5/6/2020 Method: Profile Pit
2 Log:

Depth (inches)	Munsell Color Name & Symbol; Estimated Textural Class; Estimated Volume % Coarse Fragments; Structure; Consistence; Mottling Abundance, Size and Contrast
0 - 20"	Topsoil;
20 - 108"	10R 5/8; Silt Loam; 10% Gravel, 25% Cobble, 55% Stone; Common, Medium, Distinct Mottling, 10YR 7/1 in Color, 32-108" in Depth; SAB, Moist, Friable; Seepage @ 80"; Machine Refusal @ 108"

3 Ground Water Observations:
✓ Seepage Observed - Depth (inches): 80"
____ Pit Flooded - Depth (inches): ____ after ____ hours of observation

4 Soil Limiting Zones (Check ALL applicable categories):
✓ Fractured Rock Substratum - Depth to Top: 20"
____ Massive Rock Substratum - Depth to Top: ____
____ Excessively Coarse Horizon - Depth Top to Bottom: ____
____ Excessively Coarse Substratum - Depth to Top: ____
____ Hydraulically Restrictive Horizon - Depth Top to Bottom: ____
____ Hydraulically Restrictive Substratum - Depth to Top: ____
____ Perched Zone of Saturation - Depth Top to Bottom: ____
✓ Regional Zone of Saturation - Depth to Top: 32"

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Signature of Site Evaluator: _____ Date: 5/7/2020
Signature and Seal of Professional Engineer: _____
License #: 24GB04258200 Date: 5/7/2020

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22 N. 3rd Street | Philadelphia, PA 19106

Municipality: Franklin Twp. **Block:** 468.08 **Lot:** 2.02

Form 3f - Pit-Baling Test Data (2 Pages)

1 Test #: PB-1 Reference Soil Log: SL-2 Date Tested: 5/6/2020

2 Using the reference level established, measure and record the following:

Depth to bottom of pit (ft.), D_{pit}: 7.33

Depth to water level after 2 hr. stabilization period (ft.), D_{water}: 6.42

Depth to impermeable stratum (ft), $D_{stratum}$: 7.33

(If depth is unknown assume it to be 1.5 times the depth of the pit.)

Height of water level above impermeable stratum (ft), $H=D_{stratum}-D_{water}$ = 0.92

Length of time interval (minutes), T: Varies

3 At the interval chosen, record the following data in the table below:

Time of measurement (minutes), t_n

Depth of water level below reference level (inches), d_n

Water surface dimensions (feet), l,w

4 Calculate the following values and enter in the table below:

Water surface area (ft^2), A_n

Water level rise, h_{rise} (Subtract current value of dn from previous value)

Average water surface area (ft^2), A_{av} (Take average of A_n and previous A_n)

Average height of water level above impermeable stratum (feet), h (Take average of d_n and previous value of d_n, convert to feet, and subtract from $D_{stratum}$)

Calculate permeability (in/hr), $K_a=[h_{rise}/T]x[A_{av}/2.27(H^2-h^2)]x60$ min/hr

	t_n	d_n (in)	l (ft)	w (ft)	A_n (ft^2)	h_{rise}(in)	A_{av} (ft^2)	h (ft)	K_a
t_0	0	88.00	0.00	0.00	0.00	-	-	-	-
t_1	10	85.00	2.33	2.67	6.22	3.00	3.11	0.13	29.95
t_2	10	84.00	2.50	2.67	6.68	1.00	6.45	0.29	22.55
t_3	25	82.00	2.67	2.67	7.13	2.00	6.91	0.42	22.01
t_4	25	81.00	3.33	2.67	8.89	1.00	8.01	0.54	15.43
t_5	25	80.00	4.50	2.67	12.02	1.00	10.46	0.62	24.26
t_6									
t_7									
t_8									
t_9									
t_{10}									
t_{11}									
t_{12}									
t_{13}									
t_{14}									

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Municipality: Franklin Twp. **Block:** 468.08 **Lot:** 2.02

Form 3f - Pit-Baling Test Data (2 Pages) - Continued Reference Soil Log SL-2

5 Record the following data:

Final Depth of pit (ft), D_{pit}: 7.33

Depth to impermeable stratum (ft) $D_{stratum}$: 7.33

(If no impermeable stratum is encountered assume $D_{stratum} = D_{pit}$)

Height of standpipe above reference level (ft), h_{pipe}: 0.00

Depth to water level after 24 hour stabilization period (ft), D_{water}: 5.42

(Take measurement from top of standpipe. Subtract h_{pipe})

Height of static water level above impermeable stratum (ft), H: 1.92

($H=D_{stratum}-D_{water}$)

Average height of water level above impermeable stratum (ft), h: 0.63

(Take average of dn from beginning and end of last time interval recorded in section 4, convert this to feet, subtract from $d_{stratum}$)

6 Re-calculation of K using data from section 5 above and from final time interval of section 4:

$K=[h_{rise}/T]x[A_{av}/2.27(H^2-h^2)]x60$ min/hr

=[1.00 / 25] x [10.46 /2.27(3.67 - 0.40)] x60 min/hr= 3.38 in/hr

7 I hereby certify that the information furnished on Form 3f of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020

Signature and Seal of Professional Engineer: _____

License #: 24GB04258200 Date: 5/7/2020

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Municipality: Franklin Twp. **Block:** 468.08 **Lot:** 2.02

Form 3f - Pit-Baling Test Data (2 Pages)

1 Test #: PB-2 Reference Soil Log: SL-3 Date Tested: 5/6/2020

2 Using the reference level established, measure and record the following:

Depth to bottom of pit (ft.), D_{pit}: 8.25

Depth to water level after 2 hr. stabilization period (ft.), D_{water}: 7.42

Depth to impermeable stratum (ft), $D_{stratum}$: 8.25

(If depth is unknown assume it to be 1.5 times the depth of the pit.)

Height of water level above impermeable stratum (ft), $H=D_{stratum}-D_{water}$ = 0.83

Length of time interval (minutes), T: Varies

3 At the interval chosen, record the following data in the table below:

Time of measurement (minutes), t_n

Depth of water level below reference level (inches), d_n

Water surface dimensions (feet), l,w

4 Calculate the following values and enter in the table below:

Water surface area (ft^2), A_n

Water level rise, h_{rise} (Subtract current value of dn from previous value)

Average water surface area (ft^2), A_{av} (Take average of A_n and previous A_n)

Average height of water level above impermeable stratum (feet), h (Take average of d_n and previous value of d_n, convert to feet, and subtract from $D_{stratum}$)

Calculate permeability (in/hr), $K_a=[h_{rise}/T]x[A_{av}/2.27(H^2-h^2)]x60$ min/hr

	t_n	d_n (in)	l (ft)	w (ft)	A_n (ft^2)	h_{rise}(in)	A_{av} (ft^2)	h (ft)	K_a
t_0	0	99.00	0.00	0.00	0.00	-	-	-	-
t_1	10	96.00	1.00	2.67	2.67	3.00	1.34	0.13	15.68
t_2	10	94.00	1.33	2.67	3.55	2.00	3.11	0.33	28.08
t_3	10	93.00	1.67	2.67	4.46	1.00	4.01	0.46	21.95
t_4	15	92.00	2.00	2.67	5.34	1.00	4.90	0.54	21.43
t_5	15	91.00	2.08	2.67	5.55	1.00	5.45	0.63	32.28
t_6									
t_7									
t_8									
t_9									
t_{10}									
t_{11}									
t_{12}									
t_{13}									
t_{14}									

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Municipality: Franklin Twp. **Block:** 468.08 **Lot:** 2.02
Form 3f - Pit-Baling Test Data (2 Pages) - Continued Reference Soil Log SL-3

5 Record the following data:

Final Depth of pit (ft), D_{pit}: 8.25

Depth to impermeable stratum (ft) $D_{stratum}$: 8.25

(If no impermeable stratum is encountered assume $D_{stratum} = D_{pit}$)

Height of standpipe above reference level (ft), h_{pipe}: 0.00

Depth to water level after 24 hour stabilization period (ft), D_{water}: 6.58

(Take measurement from top of standpipe. Subtract h_{pipe})

Height of static water level above impermeable stratum (ft), H: 1.67

($H=D_{stratum}-D_{water}$)

Average height of water level above impermeable stratum (ft), h: 0.63

(Take average of dn from beginning and end of last time interval recorded in section 4, convert this to feet, subtract from $d_{stratum}$)

6 Re-calculation of K using data from section 5 above and from final time interval of section 4:

$K=[h_{rise}/T]x[A_{av}/2.27(H^2-h^2)]x60$ min/hr

=[1.00 / 15] x [5.45 /2.27(2.78 - 0.40)] x60 min/hr= 4.03 in/hr

7 I hereby certify that the information furnished on Form 3f of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020

Signature and Seal of Professional Engineer: _____

License #: 24GB04258200 Date: 5/7/2020

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Form 3f - Pit-Baling Test Data (2 Pages)

1 Test #: PB-3 Reference Soil Log: SL-5 Date Tested: 5/6/2020

2 Using the reference level established, measure and record the following:

Depth to bottom of pit (ft.), D_{pit}: 7.75

Depth to water level after 2 hr. stabilization period (ft.), D_{water}: 7.17

Depth to impermeable stratum (ft), $D_{stratum}$: 7.75

(If depth is unknown assume it to be 1.5 times the depth of the pit.)

Height of water level above impermeable stratum (ft), $H=D_{stratum}-D_{water}$ = 0.58

Length of time interval (minutes), T: 20

3 At the interval chosen, record the following data in the table below:

Time of measurement (minutes), t_n

Depth of water level below reference level (inches), d_n

Water surface dimensions (feet), l,w

4 Calculate the following values and enter in the table below:

Water surface area (ft^2), A_n

Water level rise, h_{rise} (Subtract current value of dn from previous value)

Average water surface area (ft^2), A_{av} (Take average of A_n and previous A_n)

Average height of water level above impermeable stratum (feet), h (Take average of d_n and previous value of d_n, convert to feet, and subtract from $D_{stratum}$)

Calculate permeability (in/hr), $K_a=[h_{rise}/T]x[A_{av}/2.27(H^2-h^2)]x60$ min/hr

	t_n	d_n (in)	l (ft)	w (ft)	A_n (ft^2)	h_{rise}(in)	A_{av} (ft^2)	h (ft)	K_a
t_0	0	93.00	0.00	0.00	0.00	-	-	-	-
t_1	20	90.00	1.00	2.67	2.67	3.00	1.34	0.13	16.43
t_2	20	88.00	1.67	2.67	4.46	2.00	3.57	0.33	40.78
t_3	20	87.00	2.00	2.67	5.34	1.00	4.90	0.46	50.33
t_4	20	86.00	2.50	2.67	6.68	1.00	6.01	0.54	163.17
t_5									
t_6									
t_7									
t_8									
t_9									
t_{10}									
t_{11}									
t_{12}									
t_{13}									
t_{14}									

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Form 3f - Pit-Baling Test Data (2 Pages) - Continued Reference Soil Log SL-5

5 Record the following data:

Final Depth of pit (ft), D_{pit}: 7.75

Depth to impermeable stratum (ft) $D_{stratum}$: 7.75

(If no impermeable stratum is encountered assume $D_{stratum} = D_{pit}$)

Height of standpipe above reference level (ft), h_{pipe}: 0.00

Depth to water level after 24 hour stabilization period (ft), D_{water}: 6.50

(Take measurement from top of standpipe. Subtract h_{pipe})

Height of static water level above impermeable stratum (ft), H: 1.25

($H=D_{stratum}-D_{water}$)

Average height of water level above impermeable stratum (ft), h: 0.54

(Take average of dn from beginning and end of last time interval recorded in section 4, convert this to feet, subtract from $d_{stratum}$)

6 Re-calculation of K using data from section 5 above and from final time interval of section 4:

$K=[h_{rise}/T]x[A_{av}/2.27(H^2-h^2)]x60$ min/hr

=[1.00 / 20] x [6.01 /2.27(1.56 - 0.29)] x60 min/hr= 6.25 in/hr

7 I hereby certify that the information furnished on Form 3f of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020

Signature and Seal of Professional Engineer: _____

License #: 24GB04258200 Date: 5/7/2020

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Municipality: Franklin Twp. **Block:** 468.08 **Lot:** 2.02

Form 3f - Pit-Baling Test Data (2 Pages)

1 Test #: PB-4 Reference Soil Log: SL-7 Date Tested: 5/6/2020

2 Using the reference level established, measure and record the following:

Depth to bottom of pit (ft.), D_{pit}: 7.75

Depth to water level after 2 hr. stabilization period (ft.), D_{water}: 7.17

Depth to impermeable stratum (ft), $D_{stratum}$: 7.75

(If depth is unknown assume it to be 1.5 times the depth of the pit.)

Height of water level above impermeable stratum (ft), $H=D_{stratum}-D_{water}$ = 0.58

Length of time interval (minutes), T: Varies

3 At the interval chosen, record the following data in the table below:

Time of measurement (minutes), t_n

Depth of water level below reference level (inches), d_n

Water surface dimensions (feet), l,w

4 Calculate the following values and enter in the table below:

Water surface area (ft^2), A_n

Water level rise, h_{rise} (Subtract current value of dn from previous value)

Average water surface area (ft^2), A_{av} (Take average of A_n and previous A_n)

Average height of water level above impermeable stratum (feet), h (Take average of d_n and previous value of d_n, convert to feet, and subtract from $D_{stratum}$)

Calculate permeability (in/hr), $K_a=[h_{rise}/T]x[A_{av}/2.27(H^2-h^2)]x60$ min/hr

	t_n	d_n (in)	l (ft)	w (ft)	A_n (ft^2)	h_{rise}(in)	A_{av} (ft^2)	h (ft)	K_a
t_0	0	93.00	0.00	0.00	0.00	-	-	-	-
t_1	15	90.00	1.00	2.67	2.67	3.00	1.34	0.13	21.91
t_2	15	89.00	1.83	2.67	4.89	1.00	3.78	0.29	26.00
t_3	25	88.00	2.17	2.67	5.79	1.00	5.34	0.38	28.82
t_4	25	87.00	2.50	2.67	6.68	1.00	6.24	0.46	51.27
t_5									
t_6									
t_7									
t_8									
t_9									
t_{10}									
t_{11}									
t_{12}									
t_{13}									
t_{14}									

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Municipality: Franklin Twp. **Block:** 468.08 **Lot:** 2.02
Form 3f - Pit-Baling Test Data (2 Pages) - Continued Reference Soil Log SL-7

5 Record the following data:

Final Depth of pit (ft), D_{pit}: 7.75

Depth to impermeable stratum (ft) $D_{stratum}$: 7.75

(If no impermeable stratum is encountered assume $D_{stratum} = D_{pit}$)

Height of standpipe above reference level (ft), h_{pipe}: 0.00

Depth to water level after 24 hour stabilization period (ft), D_{water}: 6.25

(Take measurement from top of standpipe. Subtract h_{pipe})

Height of static water level above impermeable stratum (ft), H: 1.50

($H=D_{stratum}-D_{water}$)

Average height of water level above impermeable stratum (ft), h: 0.46

(Take average of dn from beginning and end of last time interval recorded in section 4, convert this to feet, subtract from $d_{stratum}$)

6 Re-calculation of K using data from section 5 above and from final time interval of section 4:

$K=[h_{rise}/T]x[A_{av}/2.27(H^2-h^2)]x60$ min/hr

=[1.00 / 25] x [6.24 /2.27(2.25 - 0.21)] x60 min/hr= 3.24 in/hr

7 I hereby certify that the information furnished on Form 3f of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020

Signature and Seal of Professional Engineer: _____

License #: 24GB04258200 Date: 5/7/2020

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Municipality: Franklin Twp. **Block:** 468.08 **Lot:** 2.02

Form 3f - Pit-Baling Test Data (2 Pages)

1 Test #: PB-5 Reference Soil Log: SL-9 Date Tested: 5/6/2020

2 Using the reference level established, measure and record the following:

Depth to bottom of pit (ft.), D_{pit}: 8.17

Depth to water level after 2 hr. stabilization period (ft.), D_{water}: 7.83

Depth to impermeable stratum (ft), $D_{stratum}$: 8.17

(If depth is unknown assume it to be 1.5 times the depth of the pit.)

Height of water level above impermeable stratum (ft), $H=D_{stratum}-D_{water}$ = 0.33

Length of time interval (minutes), T: Varies

3 At the interval chosen, record the following data in the table below:

Time of measurement (minutes), t_n

Depth of water level below reference level (inches), d_n

Water surface dimensions (feet), l,w

4 Calculate the following values and enter in the table below:

Water surface area (ft^2), A_n

Water level rise, h_{rise} (Subtract current value of dn from previous value)

Average water surface area (ft^2), A_{av} (Take average of A_n and previous A_n)

Average height of water level above impermeable stratum (feet), h (Take average of d_n and previous value of d_n, convert to feet, and subtract from $D_{stratum}$)

Calculate permeability (in/hr), $K_a=[h_{rise}/T]x[A_{av}/2.27(H^2-h^2)]x60$ min/hr

	t_n	d_n (in)	l (ft)	w (ft)	A_n (ft^2)	h_{rise}(in)	A_{av} (ft^2)	h (ft)	K_a
t_0	0	98.00	0.00	0.00	0.00	-	-	-	-
t_1	20	97.00	0.67	2.67	1.79	1.00	0.90	0.04	10.86
t_2	25	96.00	1.08	2.67	2.88	1.00	2.34	0.12	25.58
t_3	25	95.00	1.17	2.67	3.12	1.00	3.00	0.21	47.33
t_4									
t_5									
t_6									
t_7									
t_8									
t_9									
t_{10}									
t_{11}									
t_{12}									
t_{13}									
t_{14}									

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Municipality: Franklin Twp. **Block:** 468.08 **Lot:** 2.02
Form 3f - Pit-Baling Test Data (2 Pages) - Continued Reference Soil Log SL-9

5 Record the following data:

Final Depth of pit (ft), D_{pit}: 8.67

Depth to impermeable stratum (ft) $D_{stratum}$: 8.67

(If no impermeable stratum is encountered assume $D_{stratum} = D_{pit}$)

Height of standpipe above reference level (ft), h_{pipe}: 0.00

Depth to water level after 24 hour stabilization period (ft), D_{water}: 7.67

(Take measurement from top of standpipe. Subtract h_{pipe})

Height of static water level above impermeable stratum (ft), H: 1.00

($H=D_{stratum}-D_{water}$)

Average height of water level above impermeable stratum (ft), h: 0.71

(Take average of dn from beginning and end of last time interval recorded in section 4, convert this to feet, subtract from $d_{stratum}$)

6 Re-calculation of K using data from section 5 above and from final time interval of section 4:

$K=[h_{rise}/T]x[A_{av}/2.27(H^2-h^2)]x60$ min/hr

=[1.00 / 25] x [3.00 /2.27(1.01 - 0.50)] x60 min/hr= 6.31 in/hr

7 I hereby certify that the information furnished on Form 3f of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator: _____ Date: 5/7/2020

Signature and Seal of Professional Engineer: _____

License #: 24GB04258200 Date: 5/7/2020

Note: Final depth to bottom modified to create 12" rise from true final depth in order to not inflate permeability rate.

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Form 3f - Pit-Baling Test Data (2 Pages)

1 Test #: PB-6 Reference Soil Log: SL-12 Date Tested: 5/6/2020

2 Using the reference level established, measure and record the following:

Depth to bottom of pit (ft.), D_{pit}: 9.42

Depth to water level after 2 hr. stabilization period (ft.), D_{water}: 8.08

Depth to impermeable stratum (ft), $D_{stratum}$: 9.42

(If depth is unknown assume it to be 1.5 times the depth of the pit.)

Height of water level above impermeable stratum (ft), $H=D_{stratum}-D_{water}$ = 1.33

Length of time interval (minutes), T: 10

3 At the interval chosen, record the following data in the table below:

Time of measurement (minutes), t_n

Depth of water level below reference level (inches), d_n

Water surface dimensions (feet), l,w

4 Calculate the following values and enter in the table below:

Water surface area (ft^2), A_n

Water level rise, h_{rise} (Subtract current value of dn from previous value)

Average water surface area (ft^2), A_{av} (Take average of A_n and previous A_n)

Average height of water level above impermeable stratum (feet), h (Take average of d_n and previous value of d_n, convert to feet, and subtract from $D_{stratum}$)

Calculate permeability (in/hr), $K_a=[h_{rise}/T]x[A_{av}/2.27(H^2-h^2)]x60$ min/hr

	t_n	d_n (in)	l (ft)	w (ft)	A_n (ft^2)	h_{rise}(in)	A_{av} (ft^2)	h (ft)	K_a
t_0	0	113.00	0.00	0.00	0.00	-	-	-	-
t_1	10	108.00	2.50	2.67	6.68	5.00	3.34	0.21	25.46
t_2	10	106.00	3.00	2.67	8.01	2.00	7.35	0.50	25.43
t_3	10	104.00	4.00	2.67	10.68	2.00	9.35	0.67	37.19
t_4	10	103.00	4.67	2.67	12.47	1.00	11.58	0.79	26.53
t_5	10	102.00	5.08	2.67	13.56	1.00	13.02	0.87	33.71
t_6									
t_7									
t_8									
t_9									
t_{10}									
t_{11}									
t_{12}									
t_{13}									
t_{14}									

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Municipality: Franklin Twp. **Block:** 468.08 **Lot:** 2.02
Form 3f - Pit-Baling Test Data (2 Pages) - Continued Reference Soil Log SL-9

5 Record the following data:

Final Depth of pit (ft), D_{pit}: 9.42

Depth to impermeable stratum (ft) $D_{stratum}$: 9.42

(If no impermeable stratum is encountered assume $D_{stratum} = D_{pit}$)

Height of standpipe above reference level (ft), h_{pipe}: 0.00

Depth to water level after 24 hour stabilization period (ft), D_{water}: 6.17

(Take measurement from top of standpipe. Subtract h_{pipe})

Height of static water level above impermeable stratum (ft), H: 3.25

($H=D_{stratum}-D_{water}$)

Average height of water level above impermeable stratum (ft), h: 0.88

(Take average of dn from beginning and end of last time interval recorded in section 4, convert this to feet, subtract from $d_{stratum}$)

6 Re-calculation of K using data from section 5 above and from final time interval of section 4:

$K=[h_{rise}/T]x[A_{av}/2.27(H^2-h^2)]x60$ min/hr

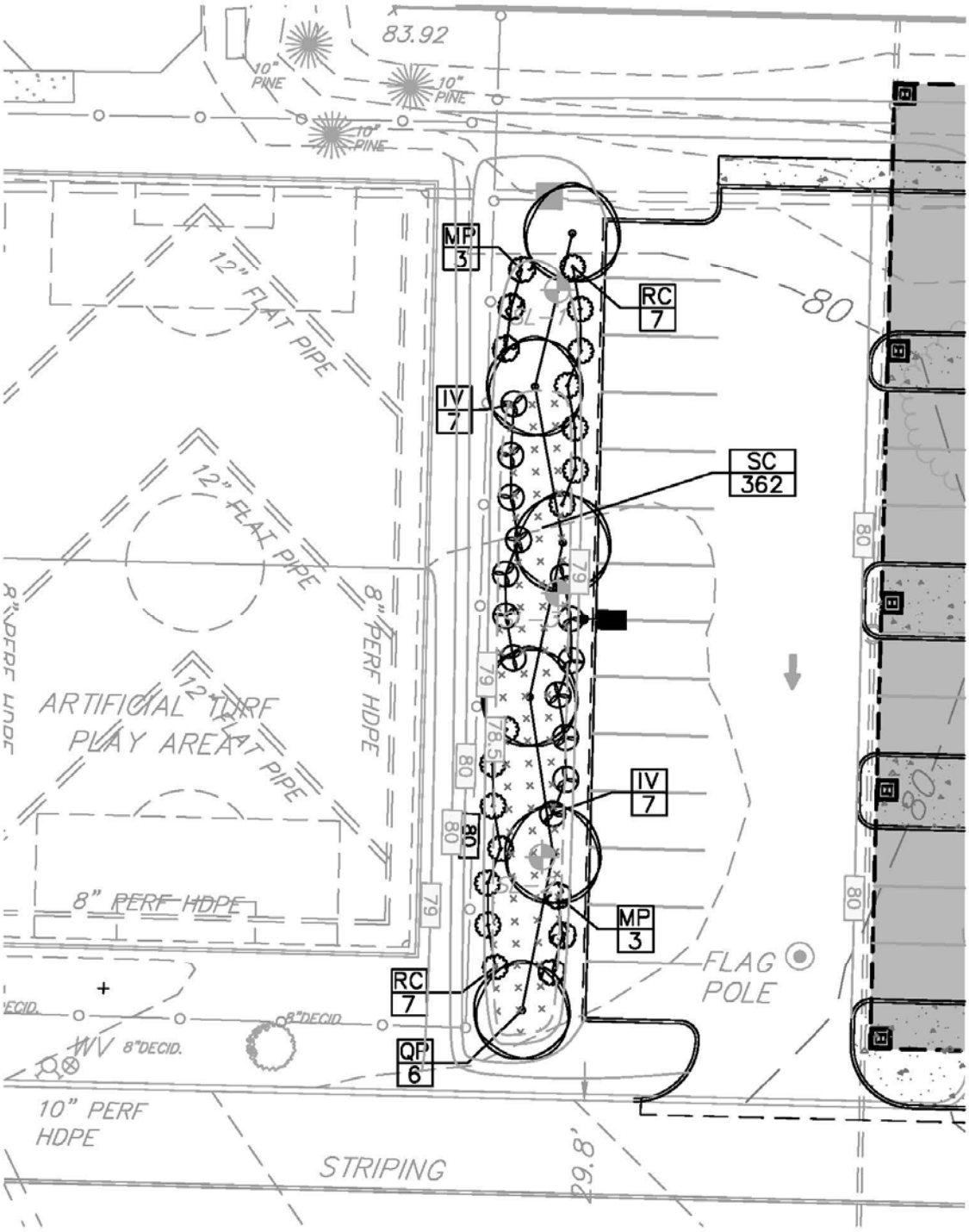
=[1.00 / 10] x [13.02 /2.27(10.56 - 0.77)] x60 min/hr= 3.52 in/hr

7 I hereby certify that the information furnished on Form 3f of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

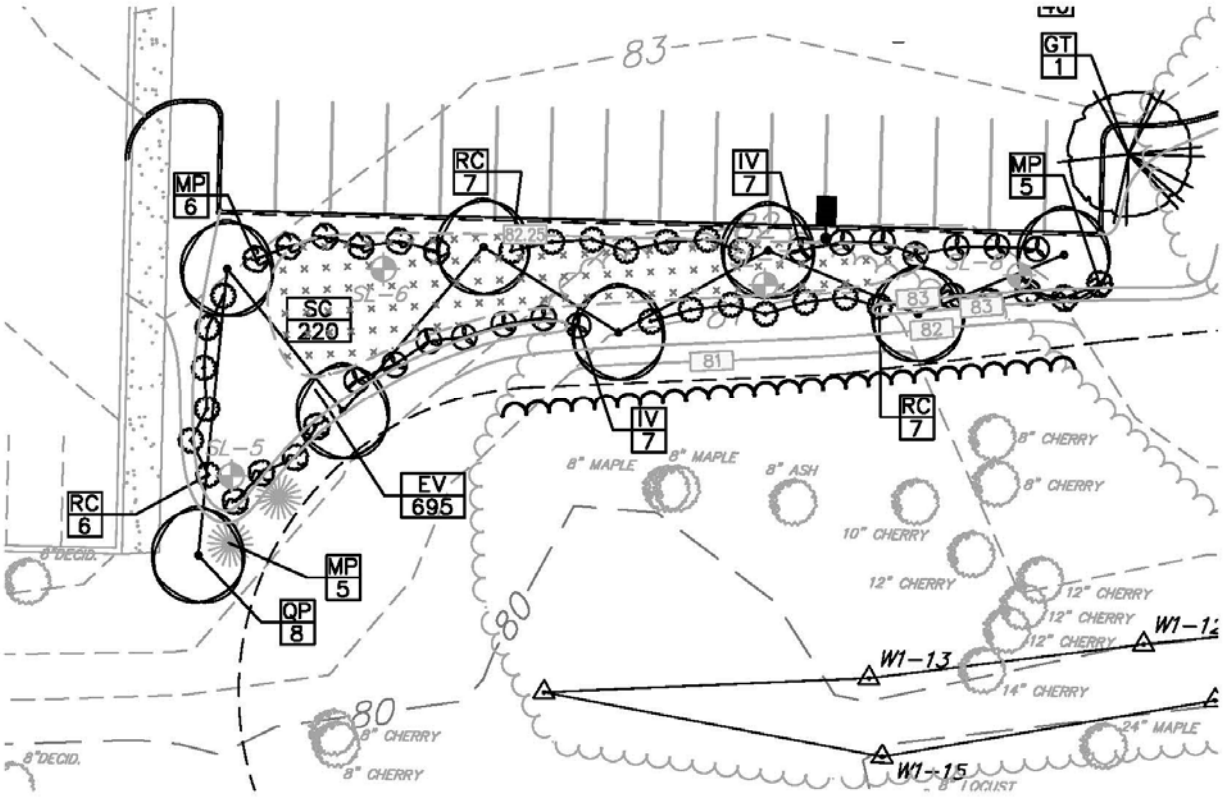
Signature of Site Evaluator: _____ Date: 5/7/2020

Signature and Seal of Professional Engineer: _____

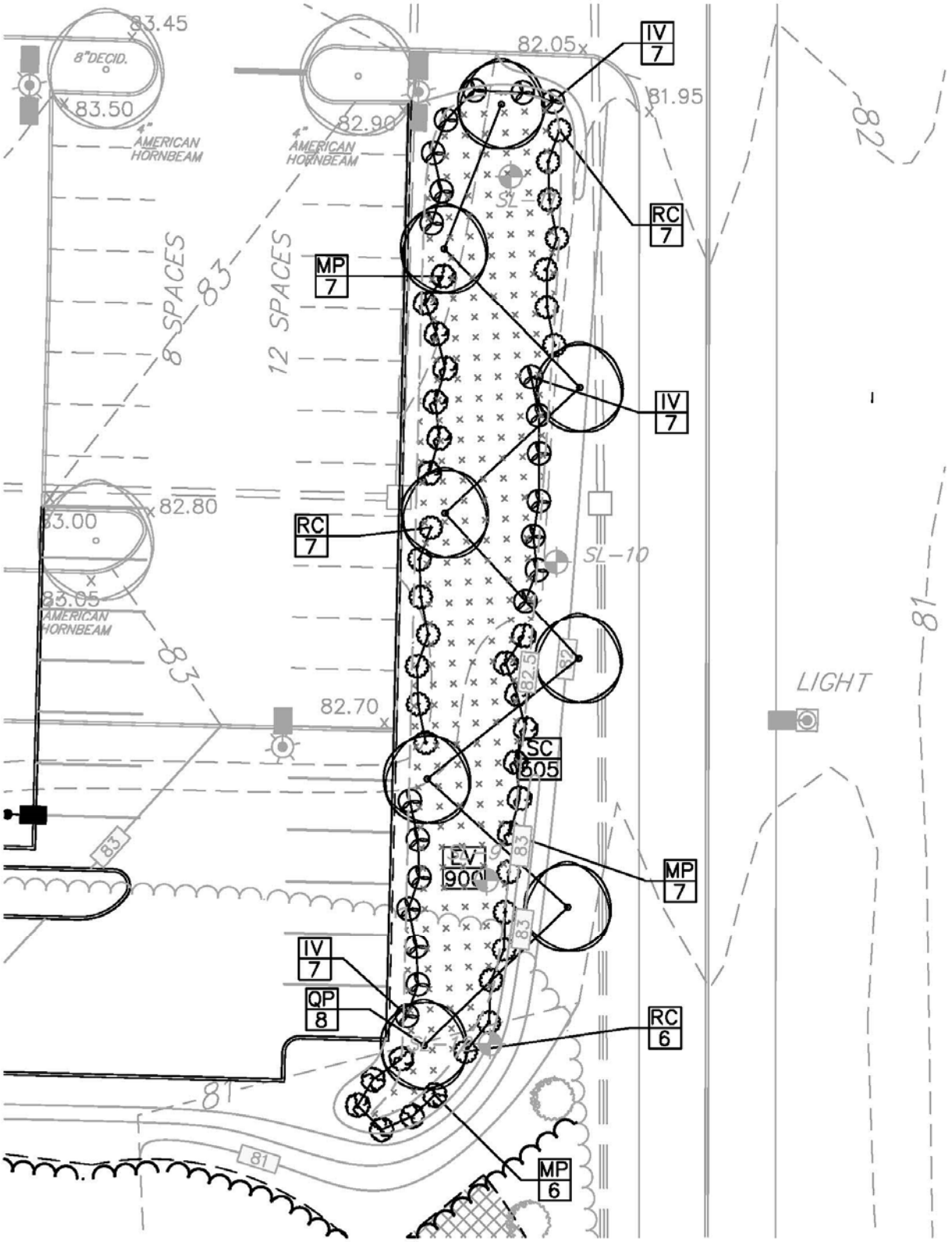
License #: 24GB04258200 Date: 5/7/2020



Bio Basin #1 Landscape Plan



Bio Basin #2 Landscape Plan



Bio Basin #3 Landscape Plan

BIORETENTION BASIN PLANTING SCHEDULE

QTY.	KEY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	REMARKS
49	IV	Ilex verticillata	Winterberry Holly	ns	#2	⊛
42	MP	Morella pensylvanica	Northern Bayberry	ns	#2	⊛
54	RC	Photinia pyrifolia	Red Chokeberry	ns	#2	⊛
22	QP	Quercus palustris	Pin Oak	5-6'	B&B	⊛
1087	SC	Schoenoplectus cyperinus	Woolgrass	2"	plug	⊛ 18" O.C.

⊛ Denotes a native plant.

Part II- Field Manuals

Manufactured Treatment Device (MTD)
Measure WQ#1 on the Location Map

NOTE

This Field Manual is intended to be editable and adjustable in accordance with the design of stormwater management measures, the site conditions, and the special needs of responsible party. The Engineer should supplement information and best management practice to assist the responsible party to perform maintenance.

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MTD Overview

Functionality
A Manufactured Treatment Device (MTD) is a pre-fabricated stormwater treatment structure utilizing settling, filtration, absorptive/adsorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff.

Manufactured treatment devices are intended to capture sediments, metals, hydrocarbons, floatables, and/or other pollutants in stormwater runoff before being conveyed to a storm sewer system, additional stormwater quality treatment measure, or waterbody.

Proper care and attention in the long-term maintenance of the stormwater management measure is critically important to the safety and health of the public.

Type of BMP – (Wet) Stormwater Management Measure

Basic Design Information

Hydrology Design Targets

1. The MTD is designed as an online system.
2. The maximum design storm is (**Water Quality Design Storm** / 2 year storm / 10 year storm / 100 year storm), which corresponds to 7.82 inches of rain in 24 hours.
3. The design total suspended solids removal rate is 50 %.
4. The design drain time is N/A hours.

Hydraulic Design Targets

1. Design parameters

	Water Quality Design Storm	**2-year storm**	**10-year storm**	**100-year storm**
Rainfall Depth (inches)	1.25 inch in 2 hours	3.34 inches in 24 hours	5.01 inches In 24 hours	8.21 inches In 24 hours
Runoff Volume (cubic feet)				
Peak Flow Rate (cfs)	2.23			
Water Surface Elevation (feet)				

Note: The design engineer shall fill out the table in accordance with the design of the MTD. If the item is not applicable, enter **N/A** in the table.

Configuration Targets

1. The name of the MTD is WQ #1, Model CDS 4040-8.
2. The manufacturer of the MTD is Contech Engineered Solutions, Inc..

Basic Operation

The CDS hydrodynamic separator uses swirl concentration and continuous deflective separation to screen, separate and trap trash, debris, sediment, and hydrocarbons from stormwater runoff. At the heart of the CDS system is a unique screening technology used to capture and retain trash and debris. The screen face is louvered so that it is smooth in the downstream direction. The effect created is called "Continuous Deflective Separation." The power of the incoming flow is harnessed to continually shear debris off the screen and to direct trash and sediment toward the center of the separation cylinder. This results in a screen that is self-cleaning and provides 100% removal of floatables and neutrally buoyant material debris 4.7 mm or larger, without blinding. CDS is used to meet trash Total Maximum Daily Load (TMDL) requirements, for stormwater quality control, inlet and outlet pollution control, and as pretreatment for filtration, detention/infiltration, bioretention, rainwater harvesting systems, and a variety of green infrastructure practices.

Critical Maintenance Features

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (e.g. spring and fall) however more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment washdown areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

The visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet and separation screen. The inspection should also quantify the accumulation of hydrocarbons, trash, and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided. Access to the CDS unit is typically achieved through two manhole access covers. One opening allows for inspection and cleanout of the separation chamber (cylinder and screen) and isolated sump. The other allows for inspection and cleanout of sediment captured and retained outside the screen. For deep units, a single manhole access point allows both sump cleanout and access outside the screen.

The CDS system should be cleaned when the level of sediment has reached 75% of capacity in the isolated sump or when an appreciable level of hydrocarbons and trash has accumulated. If absorbent material is used, it should be replaced when significant discoloration has occurred. Performance will not be impacted until 100% of the sump capacity is exceeded however it is recommended that the system be cleaned prior to that for easier removal of sediment. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Particles at the top of the pile typically offer less resistance to the end of the rod than consolidated particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine weather the height of the sediment pile off the bottom of the sump floor exceeds 75% of the total height of isolated sump. Refer to Table 1 for depth from water surface to top of sediment pile for each model size indicating that maintenance is required.

Cleaning

Cleaning of a CDS systems should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole covers and insert the vacuum hose into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The area outside the screen should also be cleaned out if pollutant build-up exists in this area.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill should be cleaned out immediately. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. The screen should be power washed to ensure it is free of trash and debris.

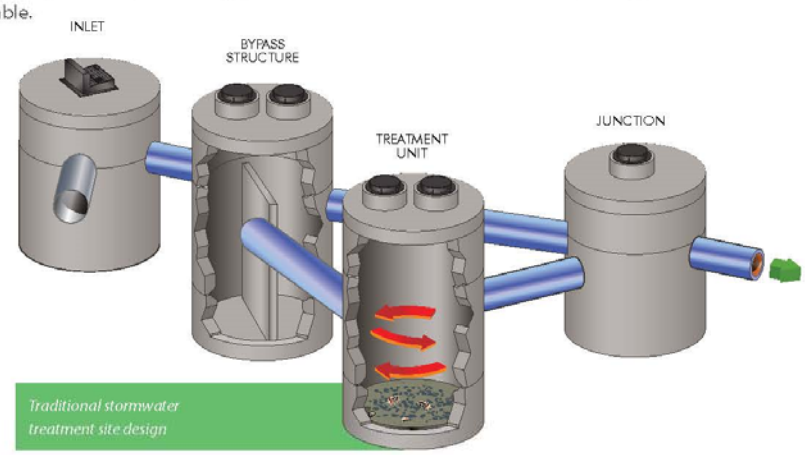
Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and also to ensure that proper safety precautions have been followed. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the CDS system should be done in accordance with local regulations. In many jurisdictions, disposal of the sediments may be handled in the same manner as the disposal of sediments removed from catch basins or deep sump manholes.

Visual Aid for MTD Maintenance

CDS® Design Configuration

Why use traditional stormwater design when ONE system can do it all ...

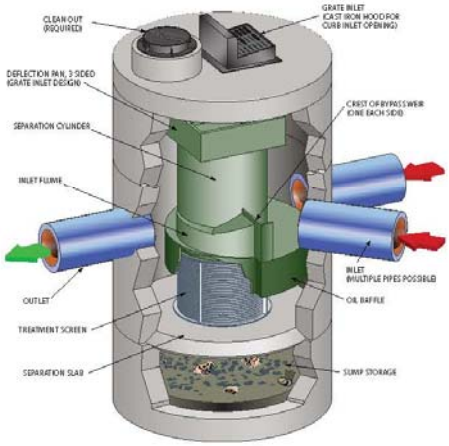
The CDS effectively treats stormwater runoff while reducing the number of structures on your site. Inline, offline, grate inlet, and drop inlet configurations available. Internal and external peak bypass options also available.



A Traditional Stormwater Treatment Site Design would require several structures on your site. With CDS, one system can do it all!

CDS® Advantages

- Grate inlet option available
- Internal bypass weir
- Accepts multiple inlets at a variety of angles
- Advanced hydrodynamic separator
- Captures and retains 100% of floatables and neutrally buoyant debris 4.7 mm or larger
- Indirect screening capability keeps screen from clogging
- Retention of all captured pollutants, even at high flows
- Performance verified by NJCAT, WA Ecology, and ETV Canada



Learn More:
www.ContechES.com/cds

CONTECH ENGINEERED SOLUTIONS

Reference Documents

Documents to be placed in this field manual should include the following:

- As-built Drawings with Drainage Plans
- Operation and Maintenance Manual (provided by the manufacturer)
- MTD Specification Sheet (provided by the manufacturer), if available

Attach Reference Documents Here

Inspection Checklist / Maintenance Actions
MTD

Checklist (circle one)**:** Quarterly / Annual / Monthly / Special Event Inspection

Checklist No. _____ Inspection Date: _____

Date of most recent rain event: _____

Rain Condition (circle one):
Drizzle / Shower / Downpour / Other _____

Ground Condition (circle one):
Dry / Moist / Ponding / Submerged / Snow accumulation

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
A	1		Y__ N__	
	2		Y__ N__	
	3		Y__ N__	
	4		Y__ N__	
	5		Y__ N__	
B	1		Y__ N__	
	2		Y__ N__	
	3		Y__ N__	
	4		Y__ N__	
	5		Y__ N__	
Note:				

Follow Up Items: (Component No. / Inspection Item No.):

_____

Associated Work Orders: # _____, # _____, # _____, # _____, # _____

_____	_____	_____
Inspector Name	**Signature**	**Date**

Report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.

File this checklist in the Maintenance Log after performing maintenance.

Preventative Maintenance Record

Corresponding Checklist No. _____
Component No._____, Inspection Item No._____

Work Logs

Activities	Components	Date Completed

Debris, sediment, and trash are handled (onsite / by _____ (contractor name) to disposal site _____). (See Part I: Maintenance Plan – Disposal Plan Section)

Crew member:_____/_____ **Date:** _____
(name/ signature)

Supervisor:_____/_____ **Date:** _____
(name/ signature)

File this Preventative Maintenance Record in the Maintenance Log after performing maintenance.

Corrective Maintenance Record

1. **Work Order # _____ Date Issued _____**

2. **Issue to be resolved**:

3. The issue was from **Corresponding Checklist No. _____, Component No._____, Inspection Item No.__ _____.**

4. **Required Actions**

Actions	Planned Date	Date Completed

5. **Responsible person(s):**

   _____

6. **Special requirements**
   - Time of the season or weather condition:_____
   - Tools/equipment:_____
   - Subcontractor (name or specific type):_____

Approved by _____/_____ **Date** _____
(name/signature)

Verification of completion by _____/_____ **Date** _____
(name/signature)

File this Corrective Maintenance Record in the Maintenance Log after performing maintenance.

Bioretention Systems
Bio Basins as shown on the Location Map

NOTE

This Field Manual is intended to be editable and adjustable in accordance with the design of stormwater management measures, the site conditions, and the special needs of responsible party. The Engineer should supplement information and best management practice to assist the responsible party to perform maintenance.

Table of Contents

Bioretention System Overview

Functionality
Bioretention systems are used to remove a wide range of pollutants, such as suspended solids, nutrients, metals, hydrocarbons, and bacteria from stormwater runoff. They can also be used to reduce peak runoff rates and increase stormwater infiltration when designed as a multi-stage, multi-function facility.

A bioretention system can be configured as either a bioretention basin or a longer, narrower bioretention swale. In general, a bioretention basin has a flat bottom while a bioretention swale may have sloping bottom. Runoff storage depths above the soil bed surface are typically shallow. The TSS removal rate for bioretention systems is 80 or 90 percent, depending upon the thickness of the soil planting bed and the type of vegetation grown in the bed.

Proper care and attention in the long-term maintenance of the stormwater management measure is critically important to the safety and health of the public.

Type of BMP – Dry Basin / Infiltration
A bioretention system is a type of **dry** basin. Dry basins must fully drain within 72 hours of the most recent rainfall. Standing water in excess of 72 hours is a sign of basin failure. It may also contribute to mosquito breeding and other health and safety issues. The design drain time shall be closely monitored to ensure that potential failure is recognized early.

A bioretention system with infiltration can also be designed for extended detention, in which case it will attenuate peak flows from storms larger than the Water Quality Design Storm.

Basic Design Information for Bio Basin #1

Hydrology Design Targets

1. The bioretention system is designed as an (online) system.
2. The design drain time is 7 hours.
3. Test pits were excavated within the basin bottom on 05/06/2020 and groundwater was observed in the area of the basin. The highest level observed was 75.0.
4. This system is designed drain through the plant media and recharge to groundwater. Larger storms will discharge through a Type "E" inlet at the west end of the basin.

Hydraulic Design Targets

1. Design parameters

	Water Quality Design Storm	**2-year storm**	**10-year storm**	**100-year storm**
Rainfall Depth (inches)	1.25 inch in 2 hours	3.34 inches in 24 hours	5.01 inches In 24 hours	8.21 inches In 24 hours
Runoff Volume (cubic feet)	1,647	2,075	2,174	2,389
Peak Flow Rate (cfs)	0.09	2.94	4.38	7.54
Water Surface Elevation (feet)	79.47	79.65	79.69	79.78

Note: The design engineer shall fill out the table in accordance with the design of the stormwater management measure. If the item is not applicable, enter **N/A** in the table.

2. The emergency spillway is at EL. 79.50 feet (top of grate of inlet).

Basin Configuration Targets

1. Planting Soil Bed
   - The depth of the soil planting bed is 1.5 feet.
   - Mixture of the planting soil consists of 85-95 % of sand. (with no more than 25% of the sands as fine or very fine sands; no more than 15% silt and clay with 2% to 5% clay content). The organic matter shall be within 3 % to 7 %.
   - The pH of the planting soil should be in the range of 5.5 and 6.5.
   - Filter fabric is placed along the sides of the soil planting bed.

- The system is designed with a planting soil permeability rate of 3 inches/hour (pre-construction) and _____ inches/hour (post-construction – tested on (___/___/___.

2. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Water Quality Orifice	Recharge		75.5
Outlet #1	Grate	48″ x 48″	79.50
Outlet #2			
Outlet #3			

3. Vegetation
   - The vegetation type to be used in this bioretention system is (site-tolerant grasses, **terrestrial forested community**). A Landscaping Plan is included in the Reference Documents section of this field manual.

Critical Maintenance Features

1. No heavy equipment on the basin surface.
2. Remove vegetation strictly in accordance with the landscaping plan.
3. Grass clippings shall be collected from the basin and properly disposed.
4. Keep the appearance of the basin aesthetic.

Basic Design Information for Bio Basin #2

Hydrology Design Targets

1. The bioretention system is designed as an (online) system.
2. The design drain time is 7 hours.
3. Test pits were excavated within the basin bottom on 05/06/2020 and groundwater was observed in the area of the basin. The highest level observed was 78.6.
4. This system is designed drain through the plant media and recharge to groundwater. Larger storms will discharge through an emergency spillway at the east side of the basin.

Hydraulic Design Targets

1. Design parameters

	Water Quality Design Storm	**2-year storm**	**10-year storm**	**100-year storm**
Rainfall Depth (inches)	1.25 inch in 2 hours	3.34 inches in 24 hours	5.01 inches In 24 hours	8.21 inches In 24 hours
Runoff Volume (cubic feet)	1,647	1,134	1,211	1,330
Peak Flow Rate (cfs)	0.09	1.99	3.56	6.44
Water Surface Elevation (feet)	82.63	82.81	82.84	82.89

Note: The design engineer shall fill out the table in accordance with the design of the stormwater management measure. If the item is not applicable, enter **N/A** in the table.

2. The emergency spillway is at EL. 82.75 feet.

Basin Configuration Targets

1. Planting Soil Bed
   - The depth of the soil planting bed is 1.5 feet.
   - Mixture of the planting soil consists of 85-95 % of sand. (with no more than 25% of the sands as fine or very fine sands; no more than 15% silt and clay with 2% to 5% clay content). The organic matter shall be within 3 % to 7 %.
   - The pH of the planting soil should be in the range of 5.5 and 6.5.
   - Filter fabric is placed along the sides of the soil planting bed.

- The system is designed with a planting soil permeability rate of 3 inches/hour (pre-construction) and _____ inches/hour (post-construction – tested on (___/___/___.

2. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Water Quality Orifice	Recharge		82.25
Outlet #1	Spillway	50'	82.75
Outlet #2			
Outlet #3			

3. Vegetation
   - The vegetation type to be used in this bioretention system is (site-tolerant grasses, **terrestrial forested community**). A Landscaping Plan should be included in the Reference Documents section of this field manual.

Critical Maintenance Features

1. No heavy equipment on the basin surface.
2. Remove vegetation strictly in accordance with the landscaping plan.
3. Grass clippings shall be collected from the basin and properly disposed.
4. Keep the appearance of the basin aesthetic.

Basic Design Information for Bio Basin #3

Hydrology Design Targets

3. The bioretention system is designed as an (online) system.
4. The design drain time is 1 hour.
5. Test pits were excavated within the basin bottom on 05/06/2020 and groundwater was observed in the area of the basin. The highest level observed was 79.0.
6. This system is designed drain through the plant media and recharge to groundwater. Larger storms will discharge through an emergency spillway at the east side of the basin.

Hydraulic Design Targets

1. Design parameters

	Water Quality Design Storm	**2-year storm**	**10-year storm**	**100-year storm**
Rainfall Depth (inches)	1.25 inch in 2 hours	3.34 inches in 24 hours	5.01 inches In 24 hours	8.21 inches In 24 hours
Runoff Volume (cubic feet)	417	1,052	1,135	1,196
Peak Flow Rate (cfs)	0.26	1.18	3.09	4.60
Water Surface Elevation (feet)	82.6	82.78	82.80	82.82

Note: The design engineer shall fill out the table in accordance with the design of the stormwater management measure. If the item is not applicable, enter **N/A** in the table.

2. The emergency spillway is at EL. 82.75 feet.

Basin Configuration Targets

1. Planting Soil Bed
   - The depth of the soil planting bed is 1.5 feet.
   - Mixture of the planting soil consists of 85-95 % of sand. (with no more than 25% of the sands as fine or very fine sands; no more than 15% silt and clay with 2% to 5% clay content). The organic matter shall be within 3 % to 7 %.
   - The pH of the planting soil should be in the range of 5.5 and 6.5.
   - Filter fabric is placed along the sides of the soil planting bed.

- The system is designed with a planting soil permeability rate of 3 inches/hour (pre-construction) and _____ inches/hour (post-construction – tested on (___/___/___.

2. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Water Quality Orifice	Recharge		82.25
Outlet #1	Spillway	100'	82.75
Outlet #2			
Outlet #3			

3. Vegetation
   - The vegetation type to be used in this bioretention system is (site-tolerant grasses, **terrestrial forested community**). A Landscaping Plan should be included in the Reference Documents section of this field manual.

Critical Maintenance Features

1. No heavy equipment on the basin surface.
2. Remove vegetation strictly in accordance with the landscaping plan.
3. Grass clippings shall be collected from the basin and properly disposed.
4. Keep the appearance of the basin aesthetic.

Basic Design Information for Basin #1

Hydraulic Design

1. Design parameters

	Water Quality Design Storm	2-year storm	10-year storm	100-year storm
Rainfall Depth (inches)	1.25 inch in 2 hours	3.34 inches in 24 hours	5.01 inches In 24 hours	8.21 inches In 24 hours
Runoff Volume (cubic feet)	16,429	117,941	189,163	288,217
Peak Flow Rate (cfs)	0.22	0.68	4.83	46.94
Water Surface Elevation (feet)	70.81	74.25	75.50	76.87

Note: The design engineer shall fill out the table in accordance with the design of the stormwater management measure. If the item is not applicable, enter **N/A** in the table.

2. The emergency spillway is at EL. 77.50 feet.

Basin Configuration

1. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Outlet #1	Circular Orifice	2.5″	68.90
Outlet #2	Rectangular Orifice	9″x24″	74.00
Outlet #3	Rectangular Orifice	60″ x 12″	76.00
Outlet #4	Rectangular Orifice	54″x12″	76.00
Outlet #5	Rectangular Orifice	54″x12″	76.00
Outlet #6	Spillway	75′	77.50

Critical Maintenance Features

1. Grass clippings shall be collected from the basin and properly disposed.
2. Keep the appearance of the basin aesthetic.

Basic Design Information for Basin #3

Hydraulic Design

1. Design parameters

	Water Quality Design Storm	2-year storm	10-year storm	100-year storm
Rainfall Depth (inches)	1.25 inch in 2 hours	3.34 inches in 24 hours	5.01 inches In 24 hours	8.21 inches In 24 hours
Runoff Volume (cubic feet)	16,260	135,293	227,846	444,761
Peak Flow Rate (cfs)	0.28	1.47	7.95	16.68
Water Surface Elevation (feet)	71.01	72.84	73.75	75.76

Note: The design engineer shall fill out the table in accordance with the design of the stormwater management measure. If the item is not applicable, enter **N/A** in the table.

2. The emergency spillway is at EL. 77.50 feet.

Basin Configuration

2. Outlet Information:

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Outlet #1	Circular Orifice	3″	66.50
Outlet #2	Rectangular Orifice	20″x17″	72.50
Outlet #3	Spillway	120′	76.00

Critical Maintenance Features

1. Grass clippings shall be collected from the basin and properly disposed.
2. Keep the appearance of the basin aesthetic.

Visual Aid for Bioretention System Inspection

Reference Documents

Documents to be placed in this field manual should include the following:

- As-built Drawings with Drainage Plans
- Soil Boring Logs
- Permeability Test (Pre-construction)
- Permeability Test (Post-construction)

Attach Reference Documents Here

Inspection Checklist / Maintenance Actions
Bioretention System

Checklist (circle one)**:** Quarterly / Annual / Monthly / Special Event Inspection

Checklist No. _____ **Inspection Date:** _____

Date of most recent rain event: _____

Rain Condition (circle one):
Drizzle / Shower / Downpour / Other _____

Ground Condition (circle one):
Dry / Moist / Ponding / Submerged / Snow accumulation

The inspection items and preventative/corrective maintenance actions listed below represent general requirements. The design engineer and/or responsible party shall adjust the items and actions to better meet the conditions of the site, the specific design targets, and the requirements of regulatory authorities.

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
A Basin Bed	1	Standing water is present after the design drain time The observed drain time is approximately _____ hours.	Y__ N__	Recheck to determine if there is standing water after 72 hours If standing water is present longer than 5 days, report to mosquito commission. Remove any sediment buildup Check the soil permeability Till the soil bed with rotary tiller or disc harrow Replace the planting soil, if necessary Work Order # _____
	2	Excessive sediment, silt, or trash accumulation on basin bed	Y__ N__	Clean pretreatment system Remove silt, sediment, and trash
	3	Erosion or channelization is present	Y__ N__	Check whether the flow bypass or diversion device is clogged Re-grade the infiltration bed Work Order # _____
	4	Animal burrows/rodents are present	Y__ N__	Pest control Work Order # _____
Note:				

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
A Basin Bed	5	Uneven bed	Y__ N__	Use light equipment to resurface the bed Work Order # _____
	6	Evidence of sinkholes or subsidence	Y__ N__	Monitor for sinkhole development
B Vegetation	1	Large spot(s) showing bare soil	Y__ N__	Vegetative cover must be maintained at 85%. Revegetate the entire basin if 50% or more vegetation has been lost. Check Landscaping plan for guidance (if available) Work Order # _____
	2	Invasive plants are present	Y__ N__	Remove the invasive plants and restore the vegetation in accordance with the landscaping plan Work Order # _____
	3	The vegetation in the basin has been mowed or removed	Y__ N__	Revegetate the system in accordance with the vegetation plan Work Order # _____ Note: The vegetation in a bioretention system should **not** be mowed or removed
Note:				

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
C Bioretention System Embankment and Side Slopes	1	Signs of erosion, soil slide or bulges, seeps and wet spots, loss of vegetation, or erosion on the basin slope	Y__ N__	Check for excessive overland runoff flow through the embankment. Check for any sink hole development Direct the overland runoff to the forebay or pretreatment area Restabilize the bank Work Order # _____
	2	Overgrown perimeter vegetation	Y__ N__	Mow the vegetation on the perimeter of the embankment Work Order # _____ Note: Mowing of vegetation should only take place in the area **outside** the basin. Dense vegetation must be maintained in the basin.
D Outlet	1	Trash or debris accumulation more than 20%	Y__ N__	Clean and remove Determine source of trash and address to reduce future maintenance costs or basin failure
	2	Trash rack is damaged or rusted greater than 50% Trash rack is bent, loose, or missing parts	Y__ N__	Repair or replace trash rack Work Order #_____
	3	Outlet components (e.g., orifice plates or weir plate) skewed, misaligned, or missing	Y__ N__	Repair or replace component Work Order #_____
	4	Discharge pipe apron is eroded or scoured	Y__ N__	Restabilize the discharge riprap apron Work Order #_____

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
Note:				
E Emergency Spillway	1	Trees or excessive vegetation present	Y__ N__	Remove trees and roots, and restore berms if necessary Work Order #_____
	2	Damaged structure	Y__ N__	Repair Work Order #_____
F Miscellaneous	1	Fence: broken or eroded parts	Y__ N__	Repair or replace Work Order #_____
	2	Gate: missing gate or lock	Y__ N__	Repair or replace Work Order #_____
	3	Sign/plate: tiled, missing, or faded	Y__ N__	Repair or replace Work Order #_____
	4	Excessive or overgrown vegetation blocking access to the basin	Y__ N__	Clear, trim, or prune the vegetation to allow access for inspection and maintenance Work Order #_____

	For Inspector		For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**	**Result**	**Preventative / Corrective Maintenance Actions**
Note:			

Follow Up Items (Component No. / Inspection Item No.):

_____

Associated Work Orders: # _____, # _____, # _____, # _____, # _____

_____ _____ _____

Inspector Name **Signature** **Date**

Report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.

File this checklist in the Maintenance Log after performing maintenance.

Preventative Maintenance Record

Corresponding Checklist No. _____
Component No._____, Inspection Item No._____

Work Logs

Activities	Components	Date Completed
Sediment/debris removal **Sediment removal should be taken place when the basin is thoroughly dry.**	A1/A2/A3 – Pretreatment	
	B – Basin Bed	
	D – Bioretention System Embankment and Side Slopes	
	E – Outlet	
Vegetation removal	A1/A2/A3 – Pretreatment	
	B – Basin Bed	
	D – Basin Embankment and Side Slopes	
	E – Outlet	
	F – Emergency Spillway	

Vegetation is removed by _____ (type of equipment) with minimum disruption to the remaining vegetation.

All use of fertilizers, pesticides, mechanical treatments, and other means to ensure optimum vegetation health must not compromise the intended purpose of the stormwater management measure. The fertilizer applied is _____ (type), and _____ (quantity per usage) is applied _____ (frequency of use).

Debris, sediment, and trash are handled (onsite / by _____ (contractor name) to disposal site _____). (See Part I: Maintenance Plan – Disposal Plan Section)

Crew member:_____/_____ **Date:** _____
(name/ signature)

Supervisor:_____/_____ **Date:** _____
(name/ signature)

File this Preventative Maintenance Record in the Maintenance Log after performing maintenance.

Corrective Maintenance Record

1. **Work Order #** _____ **Date Issued** _____

2. **Issue to be resolved**:
(e.g., orifice plate is loose and bent)

3. The issue was from **Corresponding Checklist** _____**, Component No.** (e.g., D – Outlet), **Inspection Item No.** (e.g., 2, 3)**.**

4. **Required Actions**

Actions	Planned Date	Date Completed
Install new bolts to fix the orifice plate		
Repair/replace the trash rack		
Restabilize side slope (indicate location)		
Repair riprap apron with 100 cubic yards of aggregate		
Revegetate		
(If there are additional tasks, list them here.)		

5. **Responsible person(s):**
_____

6. **Special requirements**
   - Time of the season or weather condition :_____
   - Tools/equipment:_____
   - Subcontractor (name or specific type):_____

Approved by _____/_____ **Date** _____
(name/signature)

Verification of completion by _____/_____ **Date** _____
(name/signature)

File this Corrective Maintenance Record in the Maintenance Log after performing maintenance.

Maintenance Logs and Inspection Records

As per N.J.A.C. 7:8-5.8(e), preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure(s), including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of non-vegetated linings.

As per N.J.A.C. 7:8-5.8(f), the person responsible for maintenance shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.

The responsible party shall maintain a record of all maintenance actions performed, including:

- Inspection checklists from each performed inspection
- Preventative maintenance logs
- Corrective maintenance logs, including work orders
- Other maintenance records

Stormwater Management Measures Maintenance Plan

Maintenance Logs and Inspection Records

NOTE

This Maintenance Logs and Inspection Records are intended to be editable and adjustable in accordance with the design of stormwater management measures, the site conditions, and the special needs of responsible party. The Engineer should supplement information and best management practice to assist the responsible party to perform maintenance.

Table of Contents

Inspection Checklist Log

1. **The responsible party shall report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.**
2. The maintenance crew should fill out the checklist in the field manual when performing each inspection/maintenance task.
3. After the maintenance task is performed, the checklist should be filed in the Maintenance Plan and recorded in the log below.

Cycle of Inspection	Stormwater Management Measure No.	Checklist No.	Date(s) of Inspection
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1″ rain) MM/DD/YYYY			
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1″ rain) MM/DD/YYYY			
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter)			

Cycle of Inspection	Stormwater Management Measure No.	Checklist No.	Date(s) of Inspection
MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1″ rain) MM/DD/YYYY			
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1″ rain) MM/DD/YYYY			
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1″ rain) MM/DD/YYYY			

Continue the table when necessary.

Attach the Inspection Checklist after each inspection

Preventative Maintenance Log

Maintenance Schedule	Stormwater Management Measure No.	Preventative Maintenance Record No.	Date(s) of Maintenance
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Maintenance work; e.g., after 1″ rain) MM/DD/YYYY			
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1″ rain) MM/DD/YYYY			

Continue the table when necessary.

Attach the Preventative Maintenance Record after each maintenance task performed

Corrective Maintenance Log

Maintenance Schedule	Stormwater Management Measure No.	Corrective Maintenance Record No.	Date(s) of Maintenance
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Maintenance work; e.g., after 1″ rain) MM/DD/YYYY			
(1st Quarter) MM/DD/YYYY			
(2nd Quarter) MM/DD/YYYY			
(3rd Quarter) MM/DD/YYYY			
(4th Quarter) MM/DD/YYYY			
(Unscheduled Inspection; e.g., after 1″ rain) MM/DD/YYYY			

Continue the table when necessary

Attach the Corrective Maintenance Record after each maintenance task performed