Appendix H

Stormwater Management

FEIS APPENDIX H

PRELIMINARY STORMWATER POLLUTION PREVENTION PLAN-VOLUME I

LAGRANGE TOWN CENTER

ROUTE 55, TODD HILL ROAD & LAUER ROAD
TOWN OF LAGRANGE
DUTCHESS COUNTY, NY

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Town of LaGrange Planning Board

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JMC Project 5106

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I. INTRODUCTION

This report addresses the proposed Stormwater Pollution Prevention Plan (SWPPP) for the LaGrange Town Center project in the Town of LaGrange, Dutchess County, New York. The property is approximately 194 acres and is bounded by Route 55 to the north, Todd Hill Road to the south and Lauer Road to the west (See Figure 1, "Site Location Map"). A portion of the property is located in an agricultural district and some areas are actively farmed.

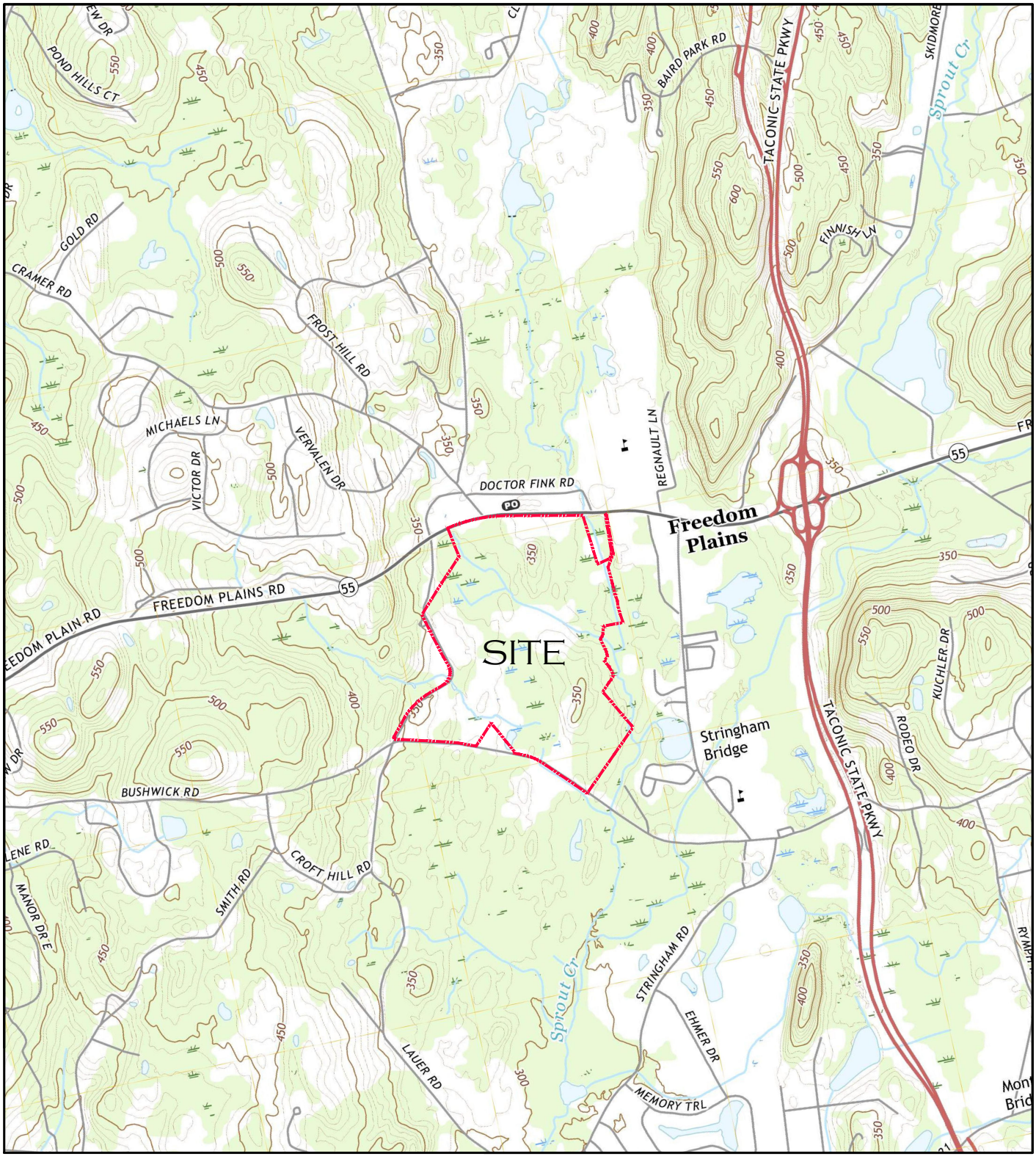
The proposed project is a mixed-use development to consist of approximately 608 residential housing units of varying types, approximately 54,000 square feet of retail space, approximately 38,500 square feet of restaurant space, approximately 32,300 square feet of office/flex space. Proposed accessory uses include two community clubhouses with pools, exercise rooms and meeting spaces, central common green, a system of pocket parks, sidewalks and required parking spaces. The project design is in accordance with the guidelines of the TC-Residential and TC-Business District and will preserve approximately half of the overall site as open space/wetlands and their associated adjacent areas.

The site contains three New York State Department of Environmental Conservation (NYSDEC) wetlands which are also U.S. Army Corps of Engineers (USACOE) and local Town wetlands. The on-site wetlands and associated 100-foot adjacent areas of the wetlands will generally remain undisturbed.

A series of 15 borings and 57 test pits were performed at this site to evaluate the subsurface soil, rock, and groundwater conditions for the proposed development. The Subsurface Soil and Foundation Investigation is provided in Appendix A. According to the soils information obtained from the Dutchess County Soil Survey, the hydrologic soil groups within the site are approximately 13% ‘A’, 51% ‘B’, 10% ‘C’ and 26% ‘D’.

II. SCOPE OF REPORT

The purpose of this study is to examine the potential impacts of the LaGrange Town Center development on the local watershed and to set forth measures deemed necessary to mitigate impacts. This study contains an analysis of the existing drainage conditions within the site's watershed and



LAGRANGE TOWN CENTER

NYS ROUTE 55 & LAUER ROAD — TOWN OF LAGRANGE, NEW YORK

SITE LOCATION MAP

DATE: 06/07/2021 — JMC PROJECT: 5106

FIGURE: 1 — SCALE: 1" = 2,000'

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describes the proposed drainage conditions after development of the project. The site is within the Sprout Creek and Fishkill Creek Basins, which are both in the Lower Hudson River Drainage Basin. Stormwater runoff from the site ultimately enters the Hudson River.

III. METHODOLOGY

Runoff rates were calculated based upon standards set forth by the United States Department of Agriculture, Soil Conservation Service, Technical Release 55, Urban Hydrology For Small Watersheds (TR-55), dated June, 1986. The methodology set forth in TR-55 considers a multitude of characteristics from watershed areas including soil types, soil permeability, vegetative cover, time of concentration, topography, rainfall intensity, and ponding areas, etc.

The 1, 2, 5, 10 and 100 year storm recurrence intervals were reviewed in the design of the Stormwater Pollution Prevention Plan.

Anticipated drainage conditions were analyzed taking into account the rate of runoff which will result from the construction of impervious surfaces associated with the site development including primarily homes, roadways and driveways. Stormwater Management Facilities are proposed to mitigate the increase in stormwater runoff due to the new development.

The following base information and methodology were used for the stormwater management analysis:

Base Data

1. A survey of the property titled "Overall Topographic & Utility Map" was prepared by JMC on February 9, 2006. The drainage area map reflects the existing conditions of the property and surrounding area.

2. The NYSDEC regulated wetlands were delineated by Terrestrial Environmental Specialists, Inc. on July 7th and 8th, 2003, flagged by NYSDEC staff on April 6, 2004 and revalidated on November 4, 2019 by NYSDEC.

3. Properties downstream of the proposed storm drainage facilities were inspected by JMC personnel for the purpose of gathering background data and confirming existing mapping of the watershed areas.

4. U.S.G.S. Quadrangle Map for Pleasant Valley, New York, photorevised 1981.

5. Soil Survey of Duchess County, New York, issued April 9, 2019.

6. A Proposed Drainage Area Map was prepared based upon the Preliminary Grading Plans prepared by JMC.

Design Criteria

1. The United States Department of Agriculture, Soil Conservation Service, Technical Release 55, Urban Hydrology for Small Watersheds (TR-55), dated June, 1986.

2. United States Department of Commerce Weather Bureau Technical Release No. 40 Rainfall Frequency Atlas of the United States.

3. Time of Concentration was calculated using the method described in Chapter 3 of TR-55, Second Edition, June, 1986. Manning's kinematic solution and Table 3-1 was used to determine the travel time of sheet flow with a maximum reach length of overland flow of 150 feet. The 2-year 24-hour precipitation amount of 3.16 inches was used in the equation. The travel time for shallow concentrated flow was computed using the equation of Figure 3-1 in Appendix F of TR-55. Manning's equation was used to determine the travel time for channel reaches.

4. All calculations were performed with the Bentley PondPack Connect Edition.

5. The New York State Stormwater Management Design Manual, dated January 2015.

6. The peak flows for the 1, 2, 5, 10 and 100 year recurrence interval storms were analyzed for the

total watershed areas. The Type III distribution design storm for the 24-hour durations was used and the mass rainfall for each design storm is as follows:

Design Storm	Inches of Rainfall
1 Year	2.62
2 Year	3.16
5 Year	3.95
10 Year	4.68
100 Year	8.25

IV. STORMWATER POLLUTION PREVENTION PLANNING CRITERIA

In order to be eligible for coverage under the NYSDEC SPDES General Permit No. GP-0-20-001 for Stormwater Discharges from Construction Activity, the Stormwater Pollution Prevention Plan (SWPPP) includes stormwater management practices (SMP's) from the publication "New York State Stormwater Management Design Manual," last revised January 2015.

A Stormwater Pollution Prevention Plan has been prepared for this project because it is a construction activity that involves:

- Soil disturbances of one (1) or more acres of land.

The proposed stormwater facilities have been designed such that the quantity and quality of stormwater runoff during and after construction are not adversely altered or are enhanced when compared to pre-development conditions.

Based on the GIS information provided by the website of the New York State Office of Parks, Recreation and Historic Places, the site does not contain, nor is it immediately adjacent to any properties listed on the State or National Register of Historic Places.

The Six Step Process for Stormwater Site Planning and Practice Selection

Stormwater management using green infrastructure is summarized in the six step process described below. The six step process was adhered to when developing this SWPPP. Information is provided in this SWPPP which documents compliance with the required process as follows:

Step 1: Site Planning

Implement planning practices that protect natural resources and utilize the hydrology of the site. Strong consideration must be given to reducing impervious cover to aid in the preservation of natural resources including protecting natural areas, avoiding sensitive areas and minimizing grading and soil disturbance.

Step 2: Determine Water Quality Treatment Volume (WQv)

Determine the required WQv for the site based on the site layout, impervious areas and sub-catchments. This initial calculation of WQv will have to be revised after green infrastructure techniques are applied. The following method has been used to calculate the WQv.

- **90% Rule -** According to the New York State Stormwater Design Manual, Section 4.1, the water quality volume is determined from the 90% rule. The method is based on 90% of the average annual stormwater runoff volume which must be provided due to impervious surfaces. The Water Quality Volume (denoted as the WQv) is designed to improve water quality sizing to capture and treat 90% of the average annual stormwater runoff volume. The WQv is directly related to the amount of impervious cover created at a site. The average rainfall storm depth for 90% of storms in New York State in one year is used to calculate a volume of runoff. The rainfall depth depends on the location of the site within the state. From this depth of rainfall, the required water quality volume is calculated.

Proposed standard SMP's will effectively treat 100% of the 1 year storm for all existing and new impervious areas and the proposed alternative SMP's will also treat 100% of the 1 year storm for

all existing impervious areas which is above and beyond the water quality requirements for Redevelopment Projects.

Step 3: Runoff Reduction Volumes (RRv) by Applying Green Infrastructure Techniques and Standard SMP's

RRv is required for this project since it is a combination of both new development and redevelopment.

Green infrastructure techniques or standard SMP's with RRv capacity can potentially reduce the required WQv by incorporating combinations of green infrastructure techniques and standard SMP's within each drainage area on the site.

Green infrastructure techniques are grouped into two categories:

- Practices resulting in a reduction of contributing area such as preservation/restoration of conservation areas, vegetated channels, etc.
- Practices resulting in a reduction of contributing volume such as green roofs, stormwater planters, and rain gardens.

Apply a combination of green infrastructure techniques and standard SMPs with RRv capacity to provide 100% of the WQv calculated in Step 2. If the RRv calculated in this step is greater than or equal to the WQv in Step 2, the RRv requirement has been met and Step 4 can be skipped. If the RRv provided cannot meet or exceed 100% of the WQv, the project must, at a minimum, reduce a percentage of the runoff from impervious areas to be constructed on the site. The percent reduction is based on the Hydrologic Soil Group(s) (HSG) of the site and is defined as Specific Reduction Factor (S).
The following green infrastructure techniques and practices are provided in the Design Manual:

- **Standard Practices with RRv Capacity**
    - **Stormwater Planter–** A shallow depression that treats stormwater as it flows through a soil matrix and is returned to the storm drain system.
    - **Infiltration Basin –** An infiltration practice that stores the water quality volume in a shallow depression before it is infiltrated it into the ground.

The Minimum RRv capacity required must be provided by green infrastructure techniques to verify that the RRv requirement has been met. The RRv that is provided by the green infrastructure techniques can then be subtracted from the Total Required WQv that must be provided by the SMP's.

Step 4: Determine the minimum RRv Required

The minimum RRv is calculated similar to the WQV. However, it is determined using only the new impervious cover and accounts for the hydrologic soil group present. In no case shall the runoff reduction achieved from the newly constructed impervious area be less than the minimum runoff reduction volume (RRv_{min}).

Step 5: Apply Standard Stormwater Management Practices to Address Remaining Water Quality Volume

Apply the standard SMP's to meet additional water quality volume requirements that cannot be addressed by applying the green infrastructure techniques. The standard SMP's with RRv capacity must be implemented to verify that the RRv requirement has been met.

Infiltration Practices – A series of infiltration basins are designed to capture and infiltrate the runoff for the project. These practices are located in areas where the basin have the acceptable separation to the groundwater and bedrock elevation. The one-year design storm will be infiltrated in the infiltration basin.

Step 6: Apply Volume and Peak Rate Control Practices to Meet Water Quantity Requirements

The Channel Protection Volume (CPv), Overbank Flood Control (Qp) and Extreme Flood Control (Qf) must be met for the plan to be completed. This is accomplished by using practices such as infiltration basins, dry detention basins, etc. to meet water quantity requirements. The following standards must be met:

1. **Stream Channel Protection (CPv)**

- Stream Channel Protection Volume Requirements (CPv) are designed to protect stream channels from erosion. In New York State this goal is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event, remained from runoff reduction. Reduction of runoff for meeting stream channel protection objectives, where site conditions allow, is encouraged and the volume reduction achieved through green infrastructure can be deducted from CPv. Trout waters may be exempted from the 24-hour ED requirement, with only 12 hours of extended detention required to meet this criterion. Detention time may be calculated using either a center of mass method or plug flow calculation method. CPv is not required because reduction of the entire CPv volume is achieved at a site through green infrastructure or infiltration systems.

2. **Overbank Flood (Qp) which is the 10 year storm.**

   Overbank control requires storage to attenuate the post development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates.

The overbank flood control requirement (Qp) does not apply in certain conditions, including:

- The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams.
- A downstream analysis reveals that overbank control is not needed.

3. **Extreme Storm (Qf) which is the 100 year storm.**

100 Year Control requires storage to attenuate the post development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates.

Based on the foregoing, this project is eligible for coverage under NYSDEC SPDES General Permit No. GP-0-20-001.

V. EXISTING CONDITIONS

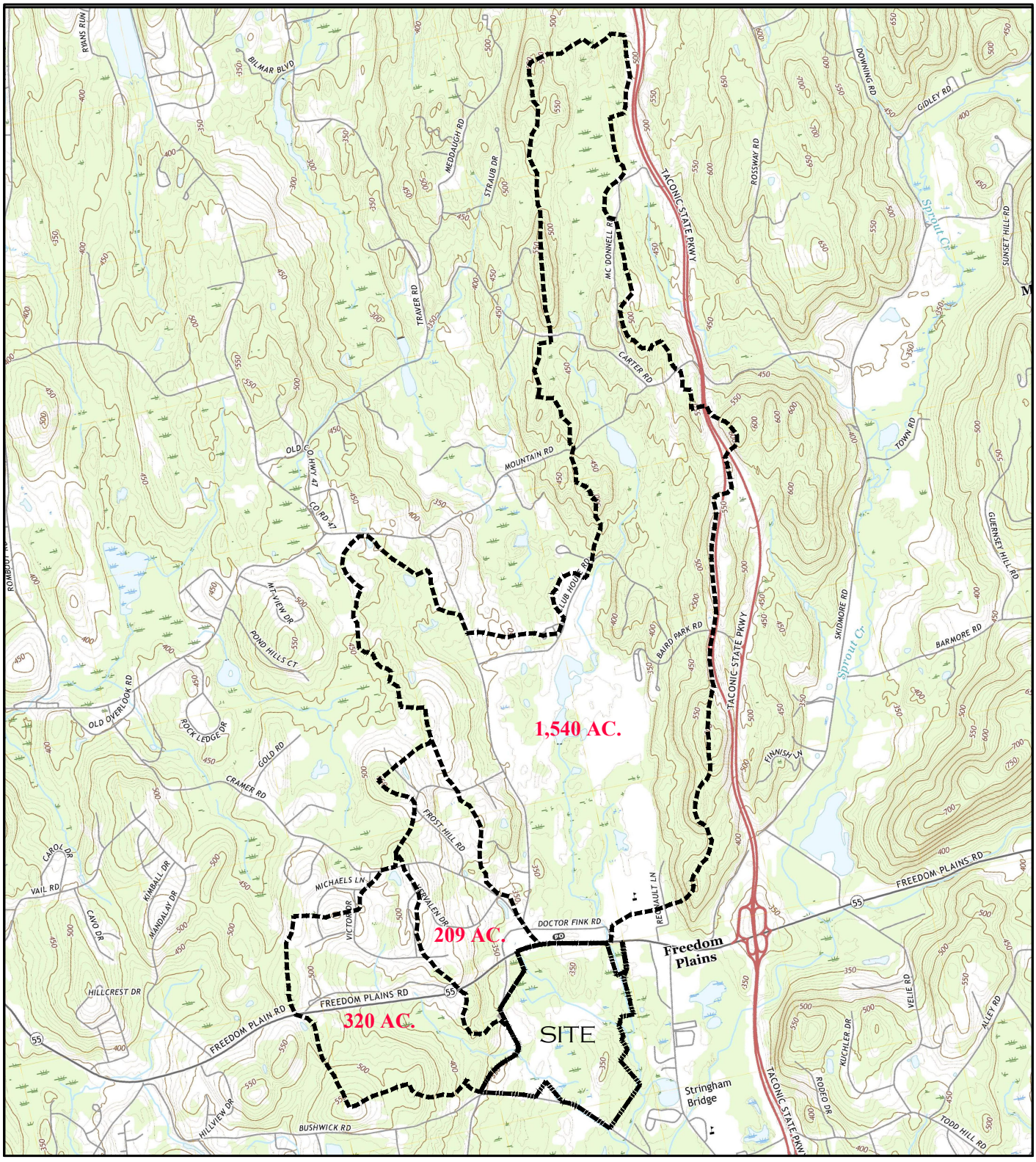
The subject property consists of woods, agricultural land, brush, meadow, developed land and open water, in order of decreasing area. For purposes of hydrologic analysis, the project area was divided into two major drainage basins, Existing Drainage Area 1 (EDA-1) and Existing Drainage Area 2 (EDA-2) which are depicted on Drawing DA-1 "Existing Drainage Area Map", included in Appendix I of this report. A description of the drainage areas is as follows:

EXISTING DRAINAGE AREA 1 (Design Point 1) EDA 1

EDA 1 is the southwestern portion of the site and consists of two sub-drainage areas, EDA 1A and EDA 1B which are eventually conveyed to a single point, referred to as "Design Point 1", which is located at the southeast corner of the site EDA 1 has 0.09 acres of impervious surfaces and a total drainage area of approximately 85 acres.

Existing Drainage Area 1A (EDA 1A) consists of agricultural land, meadow, brush, woods and grass in order of decreasing area. A tributary of the Fly Sprout enters EDA 1A via a 60" x 36" corrugated metal pipe (CMP) under Lauer Road (See Figure 2, "Upstream Watershed Map"). Runoff from the 75.880 acre drainage area flows in a southeasterly direction to a 58" x 40" CMP at Todd Hill Road. The 58" x 40" CMP parallels Todd Hill Road and discharges at Design Point 1 on the south side of Todd Hill Road to a tributary of the Fly Sprout.

Existing Drainage Area 1B (EDA 1B) consists of woods, agricultural land and brush in order of decreasing area. Runoff from the 9.020 acre drainage area flows in a southerly direction to Todd Hill



LAGRANGE TOWN CENTER

NYS ROUTE 55 & LAUER ROAD — TOWN OF LAGRANGE, NEW YORK

UPSTREAM WATERSHED MAP

DATE: 06/07/2021 — JMC PROJECT: 5106

FIGURE: 2 — SCALE: 1" = 3000'

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Road and discharges to Design Point 1.

EXISTING DRAINAGE AREA 2 (Design Point 2) EDA 2

EDA 2 is the northern and eastern portion of the site and consists of three sub-drainage areas, EDA 2A, EDA 2B and EDA 2C, which are eventually conveyed to a single point, referred to as "Design Point 2", which is located to the southeast of the site. EDA 2 has 4.43 acres of impervious surfaces and a total drainage area of approximately 109 acres.

Existing Drainage Area 2A (EDA 2A) is the southeastern portion of the site and consists of woods, brush and agricultural land, in order of decreasing area. Runoff from the 17.030 acre drainage area flows in an easterly direction off-site to the Fly Sprout.

Existing Drainage Area 2B (EDA 2B) is the northwestern portion of the site and consists of agricultural land, brush, woods, meadow, grass and impervious surfaces, in order of decreasing area. Four office buildings and associated parking areas exist at the northwest corner of the drainage area. A tributary of the Fly Sprout enters EDA 2B via a 24" CMP under Route 55. Runoff from the 55.360 acre drainage area flows to the tributary of the Fly Sprout which bisects the drainage area in a southeasterly direction. The tributary exits the site and joins the Fly Sprout at Junction 2.

Existing Drainage Area 2C (EDA 2C) is the northeastern portion of the site and consists of woods, grass, impervious surfaces, brush and meadow, in order of decreasing area. Two office buildings and associated parking areas exist at the northern end of the drainage area. The Fly Sprout enters EDA 2C via a 10 foot wide by 6 foot high arch under Route 55. Runoff from the 36.750 acre drainage area flows in an easterly direction to the Fly Sprout which exits the site and flows in a southerly direction to Design Point 2.

Table 1, "Existing Peak Runoff Rates", lists the existing peak rates of runoff to each design point for the various storm frequencies. Table 2 indicates the runoff rates for each design point.

TABLE 1

EXISTING PEAK RUNOFF RATES

Storm Recurrence Interval	PEAK RATE OF RUNOFF (CFS)	
	Design Point 1	Design Point 2
1 Year	25.82	11.55
2 Year	41.94	21.98
5 Year	68.50	42.20
10 Year	95.69	64.93
100 Year	243.88	205.41

TABLE 2

EXISTING PEAK RUNOFF VOLUMES (Acre-Feet)

Storm Recurrence Interval	Design Point 1	Design Point 2
1 Year	**4.24**	**4.27**
2 Year	**6.46**	**6.70**
5 Year	**10.14**	**10.86**
10 Year	**13.89**	**15.18**
100 Year	**34.81**	**40.19**

VI. PROPOSED CONDITIONS

The proposed mixed-use development will result in an increase in impervious surfaces and changes in pervious surfaces. The increase in impervious surfaces and changes in pervious surfaces will result in a corresponding increase in the peak rate of stormwater runoff. The Stormwater Pollution Prevention Plan has been designed to ensure that the quantity and quality of stormwater runoff during and after development are not substantially altered from pre-development conditions. As a result of its implementation, it is expected that there will be no significant impact on downstream properties, wetlands, ponds and streams.

The proposed drainage areas are depicted on Drawing DA-2 "Proposed Drainage Area Map", included in Appendix I of this report. Under proposed conditions, the project area will still have the same two major drainage areas: Proposed Drainage Area 1 (PDA 1) and Proposed Drainage Area 2 (PDA 2). A description of the drainage areas follows:

Proposed Drainage Area 1 (Design Point 1) PDA 1

PDA 1 consists of seven sub-drainage areas, PDA 1A thru PDA 1F, which are eventually conveyed to Design Point 1. PDA 1 has 21.75 acres of impervious surfaces and a total drainage area of approximately 87.40 acres. These areas will consist of proposed residential housing units, a clubhouse and pool, driveways, roads, sidewalks grass as well as existing brush, woods and meadow. It is proposed to convert the existing agricultural land to meadow. The stormwater runoff from the entire area is collected in catch basins and manholes and conveyed in a system of storm drainage pipes to the proposed stormwater infiltration basin.

Stormwater runoff from each drainage area will be pretreated prior to discharging into the infiltration basin with the use of a Cascade Separator water quality structure. The treated water from the Cascade unit will then be routed to the proposed stormwater infiltration system. Two stormwater planter are proposed for the PDA-1 drainage area, however no credit for runoff reduction volume was not applied for this technique. The planter will provide a 12" of ponding area to treat runoff from 15,000 SF of total roof area from the adjacent residential buildings. The designation, area and proposed stormwater management practices for sub-drainage areas PDA 1A thru PDA 1F are provided on Table 3 below:

TABLE 3

DRAINAGE AREA PDA 1

Drainage Area	Area (Acres)	Pretreatment Unit	Infiltration Basin
PDA 1A	7.920	1A (CS-8)	1A
PDA 1B	1.818	1B (CS-4)	1B
PDA 1C	4.087	1C (CS-8)	1C
PDA 1D	2.588	1D (CS-5)	1D
PDA 1E	5.958	1E (CS-6)	1E
PDA 1F	13.891	1F (CS-8)	1F

Proposed Drainage Area 1G (PDA 1G) is 50.876 acres and consists of the undeveloped portions of PDA 1A and roof and grass areas draining via overland flow to the wetland buffer and riparian

buffer green practice. Level spreaders are proposed where the average contributing slope is greater than 3%.

A riparian buffer is a special type of natural conservation area along a stream or wetland where development is restricted or prohibited. The buffer can provide a stormwater management function if the development plan maintains a minimum of a 25-foot setback buffer from the wetland buffer. In the case of this project, the 100-foot wetlands buffer is maintained. The green practice rule then states that all areas draining via overland flow to the outer edge of the buffer (from up to 150 feet away for pervious surfaces and up to 75 feet away for impervious surfaces) may be subtracted from the water quality volume calculation. In this case, the state recognizes the fact that the wetland buffer provides a treatment for stormwater runoff and thus these contributing areas do not need to be additionally treated.

PROPOSED DRAINAGE AREA 2 (Design Point 2) PDA 2

PDA 2 consists of seven sub-drainage areas, PDA 2A thru PDA 2G, which are eventually conveyed to Design Point 2. PDA 2 has 23.52 acres of impervious surfaces and a total drainage area of approximately 106.89 acres.

Proposed Drainage Area 2A (PDA 2A) is 12.758 acres and is the southeastern portion of the TC-B site and will consist of proposed residential housing units, driveways, roads, sidewalks, and grass as well as existing woods and brush. The stormwater runoff from the entire area is collected in catch basins and manholes and conveyed in a system of storm drainage pipes to the proposed stormwater infiltration basin. Stormwater runoff will be pretreated prior to discharging into the infiltration basin with the use of a Cascade Separator water quality structure. The treated water from the Cascade unit will then be routed to the proposed stormwater infiltration system. Two proposed stormwater planter are proposed for the PDA-2A drainage area, however no credit for runoff reduction volume was not applied for this technique. The planter will provide a 12” of ponding area to treat runoff from 15,000 SF of total roof area from the adjacent residential buildings.

Proposed Drainage Area 2B (PDA 2B) is 6.089 acres and is the northwestern portion of the TC-B site and will consist of proposed residential housing units, commercial buildings, office buildings, parking areas, driveways, roads, sidewalks, and grass as well as existing woods, brush and meadows. Stormwater runoff from the entire area is collected in catch basins and manholes and conveyed in a system of storm drainage pipes to the proposed stormwater infiltration basin. Stormwater runoff will be pretreated prior to discharging into the infiltration basin with the use of a Cascade Separator water quality structure. The treated water from the Cascade unit will then be routed to the proposed stormwater infiltration system. Two proposed stormwater planters are proposed for the PDA-2B drainage area, however no credit for runoff reduction volume was not applied for this technique. The planter will provide a 12" of ponding area to treat runoff from 15,000 SF of total roof area from the adjacent residential buildings.

Proposed Drainage Area 2C (PDA 2C) is 5.009 acres and is the western portion of the TC-B site and will consist of proposed residential housing units, commercial buildings, office buildings, parking areas, driveways, roads, sidewalks, and grass as well as existing woods, brush and meadows. Stormwater runoff from the entire area is collected in catch basins and manholes and conveyed in a system of storm drainage pipes to the proposed stormwater infiltration basin. Stormwater runoff will be pretreated prior to discharging into the infiltration basin with the use of a Cascade Separator water quality structure. The treated water from the Cascade unit will then be routed to the proposed stormwater infiltration system.

Proposed Drainage Area 2D (PDA 2D) is 12.741 acres and is the northeastern portion of the TC-R site and will consist of proposed residential housing units, parking areas, driveways, roads, sidewalks, and grass as well as existing woods, brush and meadows. Stormwater runoff from the entire area is collected in catch basins and manholes and conveyed in a system of storm drainage pipes to the proposed stormwater infiltration basin. Stormwater runoff will be pretreated prior to discharging into the infiltration basin with the use of a Cascade Separator water quality structure. The treated water from the Cascade unit will then be routed to the proposed stormwater infiltration system. Two proposed stormwater planters are proposed for the PDA-1 drainage area, however no credit for runoff reduction volume was not applied for this technique. The planter will provide a 12" of ponding area to treat runoff from 15,000 SF of total roof area from the adjacent residential buildings.

The designation, area, and proposed stormwater management practices for sub-drainage areas PDA

2B-1 thru PDA 2B-5 are provided on Table 5 below:

Proposed Drainage Area 2E (PDA 2E) is 2.605 acres and is the northeastern n of the TC-B site and will consist of the existing restaurant building and redeveloped parking areas and sidewalks. Stormwater runoff from the entire area is collected in catch basins and manholes and conveyed in a system of storm drainage pipes to the proposed Cascade Separator water quality structure to treat runoff prior to discharging into the wetland buffer areas.

Proposed Drainage Area 2F (PDA 2F) is 28.837 acres and consists of the undeveloped portions of PDA 2 located to the west of the TC-B area. The area will consist of slightly disturbed wetland buffer areas and wetlands.

Proposed Drainage Area 2G (PDA 2G) is 38.875 acres and consists of the undeveloped portions of eastern portion of the TC-B and TC-R area and roof and grass areas draining via overland flow to the wetland buffer and the riparian buffer green practice. Level spreaders are proposed where the average contributing slope is greater than 3%.

A riparian buffer is a special type of natural conservation area along a stream or wetland where development is restricted or prohibited. The buffer can provide a stormwater management function if the development plan maintains a minimum of a 25-foot setback buffer from the wetland buffer. In the case of this project, the 100-foot wetlands buffer is maintained. The green practice rule then states that all areas draining via overland flow to the outer edge of the buffer (from up to 150 feet away for pervious surfaces and up to 75 feet away for impervious surfaces) may be subtracted from the water quality volume calculation. In this case, the state recognizes the fact that the wetland buffer provides a treatment for stormwater runoff and thus these contributing areas do not need to be additionally treated. The designation, area and proposed stormwater management practices for sub-drainage areas PDA 2A thru PDA 2G are provided on Table 4 below:

TABLE 4

DRAINAGE AREA PDA 2

Drainage Area	Area (Acres)	Pretreatment Unit	Infiltration Basin
PDA 2A	12.758	2A (CS-8)	2A
PDA 2B	6.089	2B (CS-6)	2B
PDA 2C	5.009	2C (CS-6)	2C
PDA 2D	12.741	2D (CS-8)	2D
PDA 2E	2.605	2E (CS-5)	2E
PDA 2F	28.837	NA	NA
PDA 2G	38.875	NA	NA

The Stormwater Pollution Prevention Plan for the proposed LaGrange Town Center project has been designed to control the rate of runoff from the property both during and after construction to prevent adverse downstream impacts. Table 5, Summary of Design Point 1 Peak Runoff Rates and Table 6, Summary of Design Point 2 Peak Runoff Rates, indicate the existing and proposed peak runoff rates and percent reduction for each storm recurrence interval. Table 7 indicates the runoff volumes for each design point. Table 8 provides the maximum water surface elevation for each of the proposed detention basins.

TABLE 5

SUMMARY OF DESIGN POINT 1 PEAK RUNOFF RATES

Storm Recurrence Interval	PEAK RATE OF RUNOFF (CFS)		% Reduction
	Existing	Proposed	
1 Year	25.82	13.05	49.45
2 Year	41.94	28.32	32.47
5 Year	68.50	54.18	20.90
10 Year	95.69	79.71	16.69
100 Year	243.88	238.18	2.33

TABLE 6

SUMMARY OF DESIGN POINT 2 PEAK RUNOFF RATES

Storm Recurrence Interval	PEAK RATE OF RUNOFF (CFS)		% Reduction
	Existing	Proposed	
1 Year	11.55	1.99	82.77
2 Year	21.95	6.68	69.56
5 Year	42.20	21.00	50.23
10 Year	64.93	38.93	40.04
100 Year	205.41	164.67	19.83

TABLE 7

PROPOSED PEAK RUNOFF VOLUMES (Acre-Feet)

Storm Recurrence Interval	PEAK RUNOFF VOLUMES	
	Design Point 1	Design Point 2
1 Year	1.41	1.98
2 Year	2.95	3.92
5 Year	6.11	7.17
10 Year	9.57	10.45
100 Year	30.84	30.27

TABLE 8

MAXIMUM WATER SURFACE ELEVATIONS (Feet)

Infiltration Basin	100 Year Storm Elevation
1A	313.17
1B	310.86
1C	314.82
1D	322.05
1E	336.99
1F	324.97
2A	314.95
2B	315.40
2C	320.47
2D	323.30

VII. EROSION AND SEDIMENT CONTROL

Development of the proposed project could potentially result in erosion and the transport of sediment during construction. Erosion and sediment controls for the project will be designed to meet or exceed the criteria of the New York State Department of Environmental Conservation SPDES General Permit No GP-0-20-01 for Stormwater Discharges from Construction Activity and Chapter 197 "Stormwater Management and Erosion and Sediment Control" of the Town of LaGrange Code. An Erosion and Sediment Control Management Program will be established for the proposed development, beginning at the start of construction and continuing throughout its course, as outlined in the "New York State Standards and Specifications for Erosion and Sediment Control," dated November 2016. A continuing maintenance program will be implemented for erosion and sediment control after construction. The Applicant will have a qualified professional conduct an assessment of the site prior to the commencement of construction and certify that the appropriate erosion and sediment controls have been adequately installed to ensure overall preparedness of the site for the commencement of construction. In addition, the Operator shall have a qualified professional conduct Construction Duration Inspections at least every seven calendar days.

On-Site Pollution Prevention

Pollution prevention measures, such as temporary riser and anti-vortex devices, are proposed to control litter and construction debris on the site. These devices will be placed at the bottom of the temporary sediment basins where they intercept and collect debris and litter before they can enter the off-site storm system. There will be inlet protection provided for all storm inlets with the use of curb gutter inlet protection and stone and block drop inlet protection, which keep silt, sediment and construction litter and debris out of the on-site stormwater drainage system.

All construction material shall be stored in designated staging areas. Roll-off containers shall be placed on site and all empty containers, construction debris and litter shall be placed in the

containers. The Site Contractor shall have a spill prevention and response plan, as well as materials on site to remediate a spill.

Sequence of Construction

This project will be constructed in three main phases as shown on Drawing PH-1 "Phasing Plan", located in Appendix J. Sub-phasing of construction will be determined at the time the construction plans are finalized. The Applicant may make a request to the Town of LaGrange as the regulated MS4 to disturb more than five (5) acres of soil at any given time during construction of the project. Town staff and consultants will review the request, provide conditions to be implemented during construction with soil disturbance in excess of five acres and make a recommendation to the Planning Board to formally approve the request.

The following describes the Sequence of Construction which shall be followed for each phase of construction of the Project:

1. Install a stabilized construction access for the particular phase. Clear the area to be developed.

2. Install all silt fences.

3. Grub the area for the construction of the temporary sediment basins and strip and stockpile the topsoil. Construct the basins and stabilize the areas disturbed for the construction of the Temporary Sediment Basins in accordance with the Plans.

4. Grub the areas to be constructed under the current phase, which shall be defined as the area of active construction as depicted on Drawing PH-1 "Phasing Plan".

5. Remove and stockpile topsoil from the area under active construction. Install silt fencing around the temporary topsoil stockpile location(s) for erosion control purposes.

6. Proceed with rough grading of the area under active construction, including construction of temporary diversion swales and stone check dams as required to convey stormwater runoff to the temporary sediment basins. Exposed areas shall be stabilized as soon as practicable.

7. Install the storm drainage system consisting of catch basins, manholes and underground storm pipes from the Stormwater Management Basins (Temporary Sediment Basins) through the area of active construction along with the sediment and erosion control devices associated with the storm drainage system (i.e. inlet protection, stone check dams, etc., as shown on the Plans) in order to ensure that runoff from the area will be conveyed to the Temporary Sediment Basins.

8. Install public utilities (gas, electric, telephone, etc.), as required.

9. Begin building and roadway construction including foundations, curb, subbase and base pavement sections.

10. Finish grading, redistribute topsoil and establish vegetation and/or landscaping.

11. Clean pavements and storm drain system of all accumulated sediment in conjunction with the removal of all temporary sediment and erosion control devices. Remove sediment from the temporary sediment basins, excavate to final proposed grades, install basin vegetation and stabilize.

12. Complete site construction in area of active construction. The next phase of construction can begin with Step 1 above, once the area within the current phase is stabilized.

Temporary Control Measures

Throughout the project, temporary control facilities will be implemented to control on-site erosion and sediment transfer. Interceptor swales will be used to direct stormwater runoff to temporary sediment basins for settlement. The stormwater management areas to be constructed as part of this project will serve as temporary sediment basins to remove sediment and pollutants from the

stormwater runoff produced during construction.

Descriptions of the temporary sediment & erosion controls that will be used during the development of the site including silt fence, stabilized construction entrance, seeding, mulching, inlet protection and stone check dams are as follows:

1. Silt Fence is constructed using a geotextile fabric. The fence will be either 18 inches or 30 inches high. The height of the fence can be increased in the event of placing these devices on uncompacted fills or extremely loose undisturbed soils. The fences will not be placed in areas which receive concentrated flows such as ditches, swales and channels nor will the filter fabric material be placed across the entrance to pipes, culverts, spillway structures, sediment traps or basins.

2. Stabilized Construction Access consisting of 1-4 inch stone. The accesses will be a minimum of 50 feet in length by 24 feet in width by 6 inches in depth.

3. Seeding will be used to create a vegetative surface to stabilize disturbed earth until at least 70% of the disturbed area has a perennial vegetative cover. This amount is required to adequately function as a sediment and erosion control facility. Grass lining will also be used to line temporary channels and the surrounding disturbed areas.

4. Mulching is used as an anchor for seeding and disturbed areas to reduce soil loss due to storm events. These areas will be mulched with straw at a rate of 3 tons per acre such that the mulch forms a continuous blanket. Mulch must be placed on all exposed areas within 48 hours.

5. Inlet Protection will be provided for all stormwater inlets with the use of curb gutter inlet protection and stone & block inlet protection structures, which will keep silt, sediment and construction debris out of the storm system.

6. Stone Check Dams will be installed within temporary and permanent swales in the active construction area.

7. Temporary Swales will be installed to intercept sediment laden water and divert it to a sediment trapping device.

8. Temporary Sediment Basins will be installed to intercept sediment laden runoff and to trap and retain the sediment. The sediment basins will be sized to provide a sediment storage volume of 3,600 cubic feet per acre draining to the basin.

Temporary sediment & erosion control measures will be maintained throughout construction. This maintenance will include but not be limited to the following tasks:

1. For dust control purposes, all exposed graded areas will be moistened with water at least twice a day in those areas where soil is exposed and cannot be planted with a temporary cover due to construction operations or the season (December through March).

2. Inspection of erosion and sediment control measures will be performed at the end of each construction day and immediately following each rainfall event. All required repairs will be immediately executed.

3. Sediment deposits will be removed when they reach approximately 1/3 the height of the silt fence. All such sediment will be properly disposed of in fill areas on the site. Fill will be protected following disposal with mulch, temporary and/or permanent vegetation and be completely circumscribed on the downhill side by silt fence.

4. All exposed areas parallel to the slope will be raked during earthwork operations.

5. Following final grading, the disturbed area will be stabilized with a permanent surface treatment (i.e. turfgrass, pavement or sidewalk). During rough grading, areas which are not to be disturbed for fourteen or more days will be stabilized with the temporary seed mixture, as defined on the plans. Piles of dirt in exposed soil areas that will not receive a permanent surface treatment will be seeded.

Concrete Material and Equipment Management

Concrete washouts shall be used to contain concrete and liquids when the chutes of concrete mixers and hoppers of concrete pumps are rinsed out after delivery. The washout facilities consolidate solid for easier disposal and prevent runoff of liquids. The wash water is alkaline and contains high levels of chromium, which can leach into the ground and contaminate groundwater. It can also migrate to a storm drain, which can increase the pH of area waters and harm aquatic life. Solids that are improperly disposed of can clog storm drain pipes and cause flooding. Installing concrete washout facilities not only prevents pollution but also is a matter of good housekeeping at your construction site.

Prefabricated concrete washout containers can be delivered to the site to provide maintenance and disposal of materials. Regular pick-ups of solid and liquid waste materials will be necessary. To prevent leaks on the job site, ensure that prefabricated washout containers are watertight. A self installed concrete washout facility can be utilized although they are much less reliable than prefabricated containers and are prone to leaks. There are many design options for the washout, but they are preferably built below-grade to prevent breaches and reduce the likelihood of runoff. Above-grade structures can also be used if they are sized and constructed correctly and are diligently maintained. One of the most common problems with self-installed concrete washout facilities is that they can leak or be breached as a result of constant use, therefore the contractor shall be sure to use quality materials and inspect the facilities on a daily basis.

Washouts must be sized to handle solids, wash water, and rainfall to prevent overflow. Concrete Washout Systems, Inc. estimates that 7 gallons of wash water are used to wash one truck chute and 50 gallons are used to wash out the hopper of a concrete pump truck.

For larger sites, a below-grade washout should be at least 10 feet wide and sized to contain all liquid and solid waste expected to be generated in between cleanout periods. A minimum of 12-inches of freeboard must be provided. The pit must be lined with plastic sheeting of at least 10-mil thickness without holes or tears to prevent leaching of liquids into the ground. Concrete wash

water should never be placed in a pit that is connected to the storm drain system or that drains to nearby waterways.

An above-grade washout can be constructed at least 10 feet wide by 10 feet long and sized to contain all liquid and solid waste expected to be generated in between cleanout periods. A minimum of 4-inches of freeboard must be provided. The washout structures can be constructed with staked straw bales or sandbags double-or triple lined with plastic sheeting of at least 10-mil thickness without holes or tears.

Concrete washout facilities shall not be located within 50 feet of storm drains, open ditches, or water bodies and should be placed in locations that allow for convenient access for concrete trucks. The contractor shall check all concrete washout facilities daily to determine if they have been filled to 75 percent capacity, which is when materials need to be removed. Both above-and below-ground self-installed washouts should be inspected daily to ensure that plastic linings are intact and sidewalls have not been damaged by construction activities. Prefabricated washout containers should be inspected daily as well as to ensure the container is not leaking or nearing 75 percent capacity. Inspectors should also note whether the facilities are being used regularly. Additional signage for washouts may be needed in more convenient locations if concrete truck operators are not utilizing them.

The washout structures must be drained or covered prior to predicted rainstorms to prevent overflows. Hardened solids either whole or broken must be removed and then they may be reused onsite or hauled away for recycling.

Once materials are removed from the concrete washout, a new structure must be built or excavated, or if the previous structure is still intact, inspect it for signs of weakening or damage and make any necessary repairs. Line the structure with new plastic that is free of holes or tears and replace signage if necessary. It is very important that new plastic be used after every cleaning because pumps and concrete removal equipment can damage the existing liner.

Construction Site Chemical Control

The purpose of this management measure is to prevent the generation of nonpoint source pollution from construction sites due to improper handling and usage of nutrients and toxic substances, and to prevent the movement of toxic substances from the construction site.

Many potential pollutants other than sediment are associated with construction activities. These pollutants include pesticides; fertilizers used for vegetative stabilization; petrochemicals; construction chemicals such as concrete products, sealers, and paints; wash water associated with these products; paper; wood; garbage; and sanitary waste.

Disposal of excess pesticides and pesticide-related wastes should conform to registered label directions for the disposal and storage of pesticides and pesticide containers set forth in applicable Federal, State and local regulations that govern their usage, handling, storage, and disposal.

Pesticides should be disposed of through either a licensed waste management firm or a treatment, storage and disposal (TSD) facility. Containers should be triple-rinsed before disposal, and rinse waters should be reused as product.
Other practices include setting aside a locked storage area, tightly closing lids, storing in a cool, dry place, checking containers periodically for leaks or deterioration, maintaining a list of products in storage, using plastic sheeting to line the storage areas, and notifying neighboring property owners prior to spraying.

When storing petroleum products, follow these guidelines:

- Create a shelter around the area with cover and wind protection;
- Line the storage area with a double layer of plastic sheeting or similar material;
- Create an impervious berm around the perimeter with a capacity of 110 percent greater than that of the largest container;
- Clearly label all products;
- Keep tanks off the ground; and

- Keep lids securely fastened.

Post spill procedure information and have persons trained in spill handling on site or on call at all times. Materials for cleaning up spills should be kept on site and easily available. Spills should be cleaned up immediately and the contaminated material properly disposed of. Maintain and wash equipment and machinery in confined areas specifically designed to control runoff.

Thinners or solvents should not be discharged into sanitary or storm systems when cleaning machinery. Use alternative methods for cleaning larger equipment parts, such as high-pressure, high-temperature water washes, or steam cleaning. Equipment-washing detergents can be used, and wash water may be discharged into sanitary sewers if solids are removed from the solution first. (This practice should be verified with the local sewer authority.) Small parts can be cleaned with degreasing solvents, which can then be reused or recycled.

Solid Waste Management and Portable Sanitary Management

The purpose of this management measure is to prevent the potential for solid waste such as construction debris, trash, etc. from construction sites due to improper handling and storage. Debris and litter should be removed periodically from the BMP's and surrounding areas to prevent clogging of pipes and structures. All construction material shall be stored in designated staging areas. Roll-off containers shall be placed on site and all empty containers, construction debris and litter shall be placed in the containers.

Portable sanitary units may be utilized on-site or bathrooms will be provided within construction trailers. A sanitation removal company will be hired to pump/remove any sanitary waste. In the event that portable sanitary units are used and then cleaned after being emptied, the rinse water may not be disposed of to the storm drain system. It shall be contained for later disposal if it can't be disposed of on-site. Remove paper and trash before cleaning the portable sanitary units. The portable sanitary units shall be located away from the storm drain system if possible. Provide over head cover for wash areas if possible. Maintain spill response material and equipment on site to eliminate the potential for contaminants and wash water from entering the storm drain system.

Permanent Control Measures and Facilities for Long Term Protection

Towards the completion of construction, permanent sediment and erosion control measures will be developed for long term erosion protection. The following permanent control measures and facilities have been proposed to be implemented for the project:

1. Hydrodynamic Water Quality Structure will be used to provide pretreatment of the water quality flow rate for separating sediment, debris, floatables, etc. from the runoff prior to discharge to the SMP's. The Water Quality Structure has been designed to treat up to the required water quality volume and appropriately handle all storm frequencies without the resuspension of solids. The system will provide 80% TSS removal rate for particles having a mean particle size of 125 microns for stormwater runoff.

2. Catch Basins will be used to remove some of the coarse sand and grit sediment before entering the drainage system. Each catch basin will be constructed with an 18 inch deep sump.

3. Seeding of at least 70% perennial vegetative cover will be used to produce a permanent uniform erosion resistant surface. The seeded areas will be mulched with straw at a rate of 2 tons per acre such that the mulch forms a continuous blanket.

4. Stormwater Planters will be used to provide water quality for the collected stormwater via its soil matrix.

Specifications for Soil Restoration

Prior to the final stabilization of the disturbed areas, soil restoration will be required for all vegetated areas to recover the original properties and porosity of the soil. Soil Restoration Requirements are provided on Table 9 below:

Table 9

Soil Restoration Requirements

Type of Soil Disturbance	Soil Restoration Requirement		Comments/Examples
No soil disturbance	Restoration not permitted		Preservation of Natural Features
Minimal soil disturbance	Restoration not required		Clearing and grubbing
Areas where topsoil is stripped only – no change in grade	HSG A&B	HSG C&D	Protect area from any ongoing construction activities
	apply 6 inches of topsoil	Aerate* and apply 6 inches of topsoil	
Areas of cut or fill	HSG A&B	HSG C&D	Clearing and grubbing
	Aerate and apply 6 inches of topsoil	Apply full Soil Restoration**	
Heavy traffic areas on site (especially) in a zone 5-25 feet around buildings but not within a 5 foot perimeter around foundation walls)	Apply full Soil Restoration (decompaction and compost enhancement)		
Areas where Runoff Reduction and/or Infiltration practices are applied	Restoration not required but may be applied to enhance the reduction specified for appropriate practices.		Keep construction equipment from crossing these areas. To protect newly installed practice from any ongoing construction activities construct a single-phase operation fence area.
Redevelopment projects	Soil Restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.		

* Aeration includes the use of machines such as tractor-drawn implements with coulters making a narrow slit in the soil, a roller with many spikes making indentations in the soil, or prongs which function like a mini-subsoiler.

** Per "Deep Ripping and De-compaction, DEC 2008."

During periods of relatively low to moderate subsoil moisture, the disturbed subsoils are returned to rough grade and the following full soil restoration steps applied:

1. Apply 3 inches of compost over subsoil.

2. Till compost into subsoil to a depth of at least 12 inches using a cat-mounted ripper, tractor-mounted disc, or tiller, mixing, and circulating air and compost into subsoils.

3. Rock-pick until uplifted stone/rock materials of four inches and larger size are cleaned off the site.

Specifications for Final Stabilization of Graded Areas

Final stabilization of graded areas consists of the placement of topsoil and installation of landscaping (unless the area is to be paved, or a building is to be constructed in the location). Topsoil is to be spread as soon as grading operations are completed. Topsoil is to be placed to a minimum depth of six inches on all embankments, planting areas and seeding/sod areas. The subgrade is to be scarified to a depth of two inches to provide a bond of the topsoil with the subsoil. Topsoil is to be raked to an even surface and cleared of all debris, roots, stones and other unsatisfactory material.

Planting operations shall be conducted under favorable weather conditions as follows:

- Permanent Lawns - April 15 (provided soil is frost-free and not excessively moist) to May 15; August 15 to October 15.
- Temporary Lawn Seeding - if outside of the time periods noted above, the areas shall be seeded immediately on completion of topsoil operations with annual ryegrass (Italian rye)

at a rate of six pounds per 1,000 square feet. Temporary lawn installation is permitted provided the soil is frost-free and not excessively moist. The permanent lawn is to be installed the next planting season.

On slopes with a grade of 3 horizontal to 1 vertical or greater, and in swales, a geotextile netting or mat shall be installed for stabilization purposes as shown on the Plans. Seeded areas are to be mulched with straw or hay at an application rate of 70-90 pounds per 1,000 s.f. Straw or hay mulch must be spread uniformly and anchored immediately after spreading to prevent wind blowing. Mulches must be inspected periodically and in particular after rainstorms to check for erosion. If erosion is observed, additional mulch must be applied. Netting shall be inspected after rainstorms for dislocation or failure; any damage shall be repaired immediately.

All denuded surfaces which will be exposed for a period of over two months or more shall be temporarily hydroseeded with (a) perennial ryegrass at a rate of 40 lbs per acre (1.0 lb per 1000 square feet); (b) Certified "Aroostook" winter rye (cereal rye) @ 100 lb per acre (2.5 lb/1000 s.f.) to be used in the months of October and November.

Permanent turfgrass cover is to consist of a seed mixture as follows:

(a) Sunny sites

Kentucky Bluegrass	2.0-2.6 pounds/1000 square feet
Perennial Ryegrass	0.6-0.7 pounds/1000 square feet
Fine Fescue	0.4-0.6 pounds/1000 square feet

(b) Shady sites

Kentucky Bluegrass	0.8-1.0 pounds/1000 square feet
Perennial Ryegrass	0.6-0.7 pounds/1000 square feet
Fine Fescue	2.6-3.3 pounds/1000 square feet

All plant materials shall comply with the standards of the American Association Of Nurserymen with respect to height and caliper as described in its publication American Standard for Nursery Stock, latest edition.

Responsible Parties Providing Short- And Long-Term Maintenance

The above noted short term maintenance of the stormwater management practices will be the responsibility of the site contractor. Long-term maintenance will be the responsibility of the commercial property owner(s) and the Homeowner's Association. The short and long term maintenance shall be in accordance with Section 197-19, "Performance guarantee; maintenance guarantee; recordkeeping" of the Town Code.

VIII. STORMWATER QUALITY

Several measures are proposed to improve the quality of the stormwater discharged from the site and reduce the impact on downstream waters, including:

a. Sumps in catch basins
b. Rip Rap Energy Dissipaters
c. Stormwater Planters
d. Hydrodynamic Structures
e. Infiltration Basins

Sumps in catch basins

Each catch basin will have an 18 inch deep sump. This measure will remove coarse sand and grit from the runoff prior to entering the stormwater drainage system, for recovery through regular maintenance by the LaGrange Highway Department in Town roads and the Homeowner’s Association in private roads. The sumps will reduce the sediment transported to the stormwater management practices, thus reducing the maintenance required for these practices.

Rip Rap Energy Dissipaters

At all of the storm drainage pipe discharge points, rip rap pads consisting of angular rock will be placed to control erosion. The length and width of the rip rap pads will be sized in accordance with the method presented in the publication "New York State Standards and Specifications for Erosion and Sediment Control" dated November 2016.

Stormwater Planter

Stormwater Planters are proposed at various locations to collect and infiltrate runoff from portions of the building rooftops. Small drainage areas, less than 15,000 square feet will be collected by gutters and roof drain leaders and discharged into stormwater planters that will infiltrate the smaller storms and then discharge the higher storms through risers/standpipes directly into the underground storm pipes to the proposed stormwater management basins. Stormwater Planters act as small basins that treat stormwater as it flows through plant material and a soil matrix and is discharged to the storm drain system. These practices are depressed below the existing grade, and consist of a reservoir with a depth of 12 inches, grass/landscaping with a layer of mulch, 12 inches of sandy loam topsoil and a sand/gravel layer a minimum of 24 inches wide that extends down to the native soil. Infiltration through these layers will enable removal of pollutants and sediment generated by the rooftop and other small impervious areas.

Hydrodynamic Structures

Hydrodynamic structures will be utilized as pretreatment devices to treat runoff prior to entering an infiltration basin. Hydrodynamic structures move stormwater in a circular manner to accelerate the separation and deposition of primary sediment from the stormwater.

Infiltration Basins will be used to treat the runoff volume generated from the developed area and provide improvement to water quality control. The proposed basins will provide water quality for 90% of the average annual stormwater runoff volume. The water quality volume will be retained and higher storms will be released gradually.

IX. CONCLUSION

This Stormwater Pollution Prevention Plan has been prepared to describe the project's pre and post-development stormwater management improvements and its sediment and erosion control improvements to be utilized during construction. The proposed permanent improvements have been and the interim improvements to be utilized during construction have been designed in accordance with the NYSDEC SPDES General Permit GP-20-001 and the requirements of the Town of LaGrange.

The project employs a variety of practices to enhance stormwater quality and reduce peak rates of runoff associated with the proposed improvements. These measures include Stormwater Planters and Infiltration Basins.

Based on the foregoing, it is our professional opinion that the proposed improvements will provide water quantity and quality enhancements which exceed the requirements of the Town of LaGrange and the NYSDEC.

APPENDIX A

Hydrologic Calculations-Existing Conditions

Calculations available upon request.

APPENDIX B

Hydrologic Calculations-Proposed Conditions

Calculations available upon request.

APPENDIX C

NYSDEC Stormwater Sizing Calculations

WATER QUALITY VOLUME WORKSHEET

JMC Project:	**5106**
Design Point:	**1**

Lagrange Town Center	Drainage Area:	**PDA-1**

Initial Water Quality Treatment Volume

DESCRIPTION	Design Storm	Area	Impervious Area	Percent Impervious	Runoff Coefficient	Total Required WQ Volume
SYMBOL	P	A	I	%I	R_V	WQ_V
VALUE	1.5	36.25	21.75	59.99	0.58994042	**116,456**
UNITS	In	Ac	Ac	%	CF	CF
VALUE	Enhanced Phosphorus Removal (WQ_V = 1-yr Storm Runoff)					

Runoff Reduction Techniques (Area)

DESCRIPTION	Total Area	Impervious Area
SYMBOL	A	I
Conservation of Natural Areas		
Sheetflow to Riparian Buffers or Filter Strips		
Vegetated Swale		
Tree Planting / Tree Pit		
Disconnection of Rooftop Runoff		
Stream Daylighting		
TOTAL		
UNITS	Ac	Ac

Adjusted Water Quality Treatment Volume

DESCRIPTION	Design Storm	Area	Impervious Area	Percent Impervious	Runoff Coefficient	Total Required WQ Volume
SYMBOL	P	A	I	%I	R_V	WQ_V
VALUE	1.5	36.25	21.75	59.99	0.58994042	**116,456**
UNITS	In	Ac	Ac	%	CF	CF
VALUE	Enhanced Phosphorus Removal (WQ_V = 1-yr Storm Runoff)					

Net Water Quality Treatment Volume = Adjusted WQv - Provided RRv

Initial Water Quality Treatment Volume	116,456	CF
Adjusted Water Quality Treatment Volume	116,456	CF
Provided Runoff Reduction Volume	175,169	CF
Net Water Quality Treatment Volume	-58,713	CF

Date Printed: 5/4/2021

WATER QUALITY VOLUME WORKSHEET
FOR REDEVELOPMENT PROJECTS

JMC Project:	**5106**
Design Point:	**2**

Lagrange Town Center	Drainage Area:	**PDA-2**

Initial Water Quality Treatment Volume

DESCRIPTION	Design Storm	Area	Existing Impervious Area	New Impervious Area	Percent Impervious	Runoff Coefficient	Total Required WQ Volume
SYMBOL	P	A	I_E	I_N	%I	R_V	WQ_V
VALUE	1.5	39.20	4.19	19.33	60.00	0.58997245	**125,933**
UNITS	In	Ac	Ac	Ac	%	CF	CF
VALUE	Enhanced Phosphorus Removal (WQ_V = 1-yr Storm Runoff)						

Runoff Reduction Techniques (Area)

DESCRIPTION	Total Area	Impervious Area
SYMBOL	A	I
Conservation of Natural Areas		
Sheetflow to Riparian Buffers or Filter Strips		
Vegetated Swale		
Tree Planting / Tree Pit		
Disconnection of Rooftop Runoff		
Stream Daylighting		
TOTAL		
UNITS	Ac	Ac

Adjusted Water Quality Treatment Volume from Runoff Reduction Techniques

DESCRIPTION	Design Storm	Area	Adjusted Existing Impervious Area	New Impervious Area	Percent Impervious	Runoff Coefficient	Total Required WQ Volume
SYMBOL	P	A	I_{EA}	I_N	%I	R_V	WQ_V
VALUE	1.5	39.20	4.19	19.33	60.00	0.58997245	**125,933**
UNITS	In	Ac	Ac	Ac	%	CF	CF
VALUE	Enhanced Phosphorus Removal (WQ_V = 1-yr Storm Runoff)						

Net Water Quality Treatment Volume = Adjusted WQv - Provided RRv

Initial Water Quality Treatment Volume	125,933	CF
Adjusted Water Quality Treatment Volume	125,933	CF
Provided Runoff Reduction Volume	175,169	CF
Net Water Quality Treatment Volume	-49,236	CF

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RUNOFF REDUCTION VOLUME WORKSHEET

JMC Project:	5106
Design Point:	1

Lagrange Town Center	Drainage Area:	PDA-1

Total Water Quality Treatment Volume

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Initial Water Quality Volume	WQ_V	**116,456**	CF
Adjusted Water Quality Volume	WQ_V	**116,456**	CF

Minimum Runoff Reduction Volume

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Total Area of *new* Impervious Cover	Aic	21.75	Ac
Hydrologic Soil Group (HSG) Specific Reduction Factor	S	0.40	
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.95	CF
Impervious Cover targeted for Runoff Reduction [S x Aic]	Ai	8.70	Ac
TOTAL VOLUME Required [RR_V = (P x R_V x Ai) / 12]	RR_V	**45,003**	CF

Runoff Reduction Techniques (Volume)

GREEN INFRASTRUCTURE PRACTICE / SMP	*SYMBOL*	*VALUE*	*UNITS*
Infiltration Basin 1A	RR_V	36,198	CF
Infiltration Basin 1B	RR_V	8,319	CF
Infiltration Basin 1C	RR_V	18,687	CF
Infiltration Basin 1D	RR_V	11,804	CF
Infiltration Basin 1E	RR_V	27,225	CF
Infiltration Basin 1F	RR_V	63,466	CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
TOTAL	RR_V	**165,699**	CF

Runoff Reduction

Is Total RR_V > Adjusted WQ_V ?	**YES**
Is Total RR_V > Minimum RR_V ?	**YES**

Date Printed: 5/4/2021

RUNOFF REDUCTION VOLUME WORKSHEET

JMC Project:	5106
Design Point:	2

Lagrange Town Center	Drainage Area:	PDA-2

Total Water Quality Treatment Volume

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Initial Water Quality Volume	WQ_V	**110,533**	CF
Adjusted Water Quality Volume	WQ_V	**110,533**	CF

Minimum Runoff Reduction Volume

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Total Area of *new* Impervious Cover	Aic	19.33	Ac
Hydrologic Soil Group (HSG) Specific Reduction Factor	S	0.40	
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.95	CF
Impervious Cover targeted for Runoff Reduction [S x Aic]	Ai	7.73	Ac
TOTAL VOLUME Required [RR_V = (P x R_V x Ai) / 12]	RR_V	**39,996**	CF

Runoff Reduction Techniques (Volume)

GREEN INFRASTRUCTURE PRACTICE / SMP	*SYMBOL*	*VALUE*	*UNITS*
Infiltration Basin 2A	RR_V	62,152	CF
Infiltration Basin 2B	RR_V	29,663	CF
Infiltration Basin 2C	RR_V	24,402	CF
Infiltration Basin 2D	RR_V	58,952	CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
	RR_V		CF
TOTAL	RR_V	**175,169**	CF

Runoff Reduction

Is Total RR_V > Adjusted WQ_V ?	**YES**
Is Total RR_V > Minimum RR_V ?	**YES**

Date Printed: 5/4/2021

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**5106**
Design Point:	**1**
Drainage Area:	**PDA-1A**

Cascade Separation Unit

Rainfall Distribution Type: **III**

Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]		A	B	C
	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	4.75	Ac
Area	A	7.92	Ac
Percent Impervious	%I	59.97	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.59	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**25,434**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	25,434	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.0833	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	0.88	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\,QP)^{½}$]	CN	93.27	
Curve Number	CN	93	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.14	In
Ratio [$R = I_a / P$]	R	0.10	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.52	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.17	
Unit Peak Discharge	q_u	676.72	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**7.41**	cfs

Proposed Device

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**15.0**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**51,070**	CF
Model Designation		CS-8	
Quantity			

Date Printed: 5/4/2021

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**5106**
Design Point:	**1**
Drainage Area:	**PDA-1B**

Cascade Separation Unit

Rainfall Distribution Type: **III**

Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]		A	B	C
	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	1.09	Ac
Area	A	1.81	Ac
Percent Impervious	%I	60.00	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.59	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**5,815**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	5,815	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.0833	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	0.89	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\,QP)^{½}$]	CN	93.27	
Curve Number	CN	93	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.14	In
Ratio [$R = I_a / P$]	R	0.10	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.52	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.17	
Unit Peak Discharge	q_u	676.65	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**1.69**	cfs

Proposed Device

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**2.1**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**7,253**	CF
Model Designation		CS-4	
Quantity			

Date Printed: 5/4/2021

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**5106**
Design Point:	**1**
Drainage Area:	**PDA-1C**

Cascade Separation Unit

Rainfall Distribution Type: **III**

Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]		A	B	C
	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	2.45	Ac
Area	A	4.09	Ac
Percent Impervious	%I	59.96	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.59	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**13,119**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	13,119	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.0833	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	0.88	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\,QP)^{½}$]	CN	93.27	
Curve Number	CN	93	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.14	In
Ratio [$R = I_a / P$]	R	0.10	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.52	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.17	
Unit Peak Discharge	q_u	676.77	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**3.82**	cfs

Proposed Device

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**15.0**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**51,066**	CF
Model Designation		CS-8	
Quantity			

Date Printed: 5/4/2021

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**5106**
Design Point:	**1**
Drainage Area:	**PDA-1D**

Cascade Separation Unit

Rainfall Distribution Type: **III**

Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]		A	B	C
	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	1.55	Ac
Area	A	2.58	Ac
Percent Impervious	%I	60.08	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.59	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**8,298**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	8,298	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.0833	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	0.89	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\,QP)^{½}$]	CN	93.29	
Curve Number	CN	93	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.14	In
Ratio [$R = I_a / P$]	R	0.10	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.52	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.17	
Unit Peak Discharge	q_u	676.41	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**2.42**	cfs

Proposed Device

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**3.5**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**11,922**	CF
Model Designation		CS-5	
Quantity			

Date Printed: 5/4/2021

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**5106**
Design Point:	**1**
Drainage Area:	**PDA-1E**

Cascade Separation Unit

Rainfall Distribution Type: **III**

Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]		A	B	C
	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	3.57	Ac
Area	A	5.95	Ac
Percent Impervious	%I	60.00	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.59	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**19,115**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	19,115	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.0833	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	0.89	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\,QP)^{½}$]	CN	93.27	
Curve Number	CN	93	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.14	In
Ratio [$R = I_a / P$]	R	0.10	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.52	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.17	
Unit Peak Discharge	q_u	676.65	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**5.57**	cfs

Proposed Device

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**7.3**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**24,686**	CF
Model Designation		CS-6	
Quantity			

Date Printed: 5/4/2021

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**5106**
Design Point:	**1**
Drainage Area:	**PDA-1F**

Cascade Separation Unit

Rainfall Distribution Type: **III**

Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]		A	B	C
	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	8.33	Ac
Area	A	13.89	Ac
Percent Impervious	%I	59.97	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.59	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**44,603**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	44,603	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.0833	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	0.88	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\,QP)^{½}$]	CN	93.27	
Curve Number	CN	93	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.14	In
Ratio [$R = I_a / P$]	R	0.10	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.52	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.17	
Unit Peak Discharge	q_u	676.74	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**12.99**	cfs

Proposed Device

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**15.0**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**51,069**	CF
Model Designation		CS-8	
Quantity			

Date Printed: 5/4/2021

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**5106**
Design Point:	**2**
Drainage Area:	**PDA-2A**

Cascade Separation Unit

Rainfall Distribution Type: **III**

		A	B	C
Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	7.65	Ac
Area	A	12.76	Ac
Percent Impervious	%I	59.96	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.59	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**40,962**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	40,962	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.0833	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	0.88	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\,QP)^{½}$]	CN	93.27	
Curve Number	CN	93	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.14	In
Ratio [$R = I_a / P$]	R	0.10	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.52	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.17	
Unit Peak Discharge	q_u	676.76	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**11.93**	cfs

Proposed Device			
DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**15.0**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**51,067**	CF
Model Designation		CS-8	
Quantity			

Date Printed: 5/4/2021

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**5106**
Design Point:	**2**
Drainage Area:	**PDA-2B**

Cascade Separation Unit

Rainfall Distribution Type: **III**

		A	B	C
Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	3.65	Ac
Area	A	6.09	Ac
Percent Impervious	%I	59.93	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.59	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**19,545**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	19,545	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.0833	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	0.88	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\,QP)^{½}$]	CN	93.26	
Curve Number	CN	93	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.14	In
Ratio [$R = I_a / P$]	R	0.10	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.52	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.17	
Unit Peak Discharge	q_u	676.85	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**5.69**	cfs

Proposed Device

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**7.3**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**24,679**	CF
Model Designation		CS-6	
Quantity			

Date Printed: 5/4/2021

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**5106**
Design Point:	**2**
Drainage Area:	**PDA-2C**

Cascade Separation Unit

Rainfall Distribution Type: **III**

		A	B	C
Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	3.01	Ac
Area	A	5.01	Ac
Percent Impervious	%I	59.99	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.59	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**16,090**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	16,090	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.0833	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	0.88	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\,QP)^{½}$]	CN	93.27	
Curve Number	CN	93	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.14	In
Ratio [$R = I_a / P$]	R	0.10	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.52	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.17	
Unit Peak Discharge	q_u	676.67	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**4.69**	cfs

Proposed Device

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**7.3**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**24,686**	CF
Model Designation		CS-6	
Quantity			

Date Printed: 5/4/2021

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**5106**
Design Point:	**2**
Drainage Area:	**PDA-2D**

Cascade Separation Unit

Rainfall Distribution Type: **III**

Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]		A	B	C
	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	7.64	Ac
Area	A	12.74	Ac
Percent Impervious	%I	60.00	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.59	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**40,928**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	40,928	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.0833	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	0.89	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\,QP)^{½}$]	CN	93.27	
Curve Number	CN	93	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.14	In
Ratio [$R = I_a / P$]	R	0.10	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.52	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.17	
Unit Peak Discharge	q_u	676.65	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**11.92**	cfs

Proposed Device

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**15.0**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**51,075**	CF
Model Designation		CS-8	
Quantity			

Date Printed: 5/4/2021

PROPRIETARY PRACTICE WORKSHEET

JMC Project:	**5106**
Design Point:	**2**
Drainage Area:	**PDA-2F**

Cascade Separation Unit

Rainfall Distribution Type: **III**

Coefficients for the equation unit peak [$R = I_a / P$] [$C_i = A \times R^2 + B \times R + C$]		A	B	C
	C_0	-1.774	0.3301	2.4577
	C_1	1.8622	-0.7397	-0.4627
	C_2	-0.0648	0.2276	-0.1932

Site Data for Drainage Area to be Treated by Practice

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Design Storm [90% Rainfall Event Number]	P	1.5	In
Impervious Area	I	1.56	Ac
Area	A	2.61	Ac
Percent Impervious	%I	59.88	%
Runoff Coefficient [0.05 + 0.009 x %I]	R_V	0.59	CF
TOTAL VOLUME Required [$WQ_V = (P \times R_V \times A) / 12$]	WQ_V	**8,354**	CF
Design Storm [1-yr Storm Depth]	P		In
TOTAL VOLUME Required *(TMDL)* [WQ_V = 1-yr Storm Runoff]	WQ_V		CF

Water Quality Peak Flow Calculation

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Volume	WQ_V	8,354	CF
Design Storm [90% Rainfall Event Number] **or** [1-yr Storm Depth]	P	1.5	In
Time of Concentration	t_c	0.0833	Hr
Runoff Volume [$Q = WQ_V / (A \times 3630)$]	Q	0.88	In
Curve Number [$CN = 1000 / (10 + 5P + 10Q - 10 \times (Q^2 + 1.25\,QP)^{½}$]	CN	93.25	
Curve Number	CN	93	
Initial Abstraction [$I_a = 200 / CN - 2$]	I_a	0.14	In
Ratio [$R = I_a / P$]	R	0.10	
$C_0 = A \times R^2 + B \times R + C$	C_0	2.47	
$C_1 = A \times R2 + B \times R + C$	C_1	-0.52	
$C_2 = A \times R2 + B \times R + C$	C_2	-0.17	
Unit Peak Discharge	q_u	677.00	$cfs/mi^2/in$
Peak Discharge [$Q_p = q_u \times A \times Q / 640$]	Q_p	**2.43**	cfs

Proposed Device

DESCRIPTION	*SYMBOL*	*VALUE*	*UNITS*
Water Quality Peak Flow Provided	Q_p	**2.8**	cfs
Water Quality Volume Provided [$WQ_V = 640 \times 3600 \times Q_P / q_u$]	WQ_V	**9,563**	CF
Model Designation		CS-5	
Quantity			

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APPENDIX D

Subsurface Soil and Foundation Investigation

CARLIN • SIMPSON & ASSOCIATES

Consulting Geotechnical and Environmental Engineers

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28 February 2007

Ginsburg Development, LLC
100 Summit Lake Drive
Valhalla, New York 10595

Att: Mr. Kevin Marrinan

Re: Report on Subsurface Soil and Foundation Investigation
Proposed LaGrange Town Center
NY Route 55, Todd Hill Road, & Lauer Road
Town of LaGrange, New York (05-182)

Dear Mr. Marrinan:

In accordance with our proposal dated 22 November 2005 and your subsequent authorization, we have completed a Subsurface Soil and Foundation Investigation for the referenced site. The purpose of this study was to determine the nature and engineering properties of the subsurface soil and the groundwater conditions for the new development, to recommend a practical foundation scheme, to determine the allowable bearing capacity of the site soils, and to determine the soil permeability for the new stormwater management system.

We understand that the planned construction will consist of a large residential subdivision with multiple stormwater management areas and several commercial buildings. Site development will also include new underground utilities and asphalt paved roads and parking lots. To guide us in our study, you have provided us with a site plan that indicates the location of the planned new construction.

Our scope of work for this project included the following:

1. Reviewed the proposed development, the site conditions, the expected soil conditions, and planned this study.

2. Retained General Borings Inc. to advance 15 test borings throughout the subject property.

3. Retained Pecord Excavating & Contracting Corp. to excavate 57 test pits throughout the subject site.

beneath the existing ground surface. These depths correlate with groundwater levels ranging between elevation +305.0 and elevation +337.0. Groundwater was not encountered in the remaining borings or test pits, which extended to depths ranging from 0'6" to 15'0" beneath the surface during this investigation. The groundwater observations are summarized in Table 1 below.

Based on the boring and test pit observations, groundwater at this site will be controlled by the topography and the underlying bedrock surface. In addition, trapped water may be encountered in the silty site soils and/or along the soil/rock interface. Depending on the proposed site grades, groundwater and/or trapped water may be encountered in areas of the site during construction. Proper groundwater control measures will be required in the event that water is encountered in the site excavations.

EVALUATION

At the time of this report, the proposed finished floor elevations were not established and the grading plan was preliminary. The following evaluation is based on the assumption that varying grade changes will be required to construct the new development. Once the grading plan has been finalized, a copy of the plan should be forwarded to our office so that we can review it along with the recommendations in this report. At that time, any changes or additional recommendations can be provided, if required.

We understand that the proposed construction will consist of a large residential subdivision with multiple commercial structures in the northern portion of the site near Route 55. Site development will also include new stormwater management areas, underground utilities, and asphalt paved roads and parking lots. The proposed development may also include retaining walls and/or soil and rock slopes.

The boring and test pit data indicates that the site soils generally consist of a surface layer of topsoil (Stratum 1) throughout most of the site. At the surface in test pits TP-6 and TP-8 is existing fill that consists of loose brown coarse to fine Sand, little Silt, little coarse to fine Gravel with cobbles, boulders, and debris (Stratum 2). The surface layers are underlain by layers of coarse to fine Sand, little (to and) Silt, little (to and) coarse to fine Gravel with occasional cobbles and boulders or Silt, trace (to and) coarse to fine Sand, trace (to little) coarse to fine Gravel (Stratum 3) followed by Shale bedrock (Stratum 4). The groundwater and bedrock observations for each boring and test pit location are summarized in the following table.

TABLE 1

Boring or Test Pit No.	Approximate Ground Surface Elevation	Observed Depth to Groundwater (Elevation)	Observed Depth to Bedrock (Elevation)
B-1	+360.0	NE	10'0" (+350.0)
B-2	+315.5	NE	10'0" (+305.5)
B-3	+343.0	NE	5'0" (+338.0)

Boring or Test Pit No.	Approximate Ground Surface Elevation	Observed Depth to Groundwater (Elevation)	Observed Depth to Bedrock (Elevation)
B-4	+321.6	5'0" (+316.6)	8'0" (+313.6)
B-5	+315.0	3'0" (+312.0)	10'0" (+305.0)
B-6	+319.3	NE	10'0" (+309.3)
B-7	+322.0	NE	10'0" (+312.0)
B-8	+342.0	NE	5'0" (+337.0)
B-9	+330.0	2'0" (+328.0)	9'6" (+320.5)
B-10	+310.0	5'0" (+305.0)	18'6" (+291.5)
B-11	+318.7	5'0" (+313.7)	15'0" (+303.7)
B-12	+330.0	14'0" (+316.0)	19'0" (+311.0)
B-13	+358.0	NE	5'6" (+352.5)
B-14	+360.0	NE	5'0" (+355.0)
B-15	+326.0	NE	9'0" (+317.0)
TP-1	+320.8	0'0" (+320.8)	NE
TP-2	+322.0	5'0" (+317.0)	NE
TP-3	+326.0	4'0" (+322.0)	NE
[redacted]	+326.0	4'0" (+322.0)	8'0" (+318.0)
TP-5	+322.0	NE	NE
TP-6	+324.0	4'0" (+320.0)	NE
[redacted]	+332.6	NE	0'6" (+332.0)
[redacted]	+333.0	NE	7'0" (+326.0)
[redacted]	+334.0	NE	5'0" (+329.0)
[redacted]	+322.0	NE	7'0" (+315.0)
[redacted]	+334.0	NE	4'0" (+330.0)
[redacted]	+330.0	NE	4'0" (+326.0)
TP-13	+314.4	8'0" (+306.4)	NE
[redacted]	+320.0	NE	5'0" (+315.0)
TP-15	+312.0	4'0" (+308.0)	NE
[redacted]	+311.0	5'0" (+306.0)	10'0" (+301.0)
[redacted]	+320.0	5'0" (+315.0)	7'0" (+313.0)
[redacted]	+320.0	5'0" (+315.0)	5'0" (+315.0)
[redacted]	+320.0	NE	2'0" (+318.0)
[redacted]	+350.0	NE	2'0" (+348.0)
[redacted]	+333.7	NE	2'0" (+331.7)
TP-22	+331.3	2'0" (+329.3)	NE
[redacted]	+330.0	3'6" (+326.5)	7'0" (+323.0)
[redacted]	+330.0	2'0" (+328.0)	4'0" (+326.0)
[redacted]	+340.0	NE	5'2" (+334.8)
[redacted]	+345.0	NE	0'2" (+344.8)
TP-27	+342.0	5'0" (+337.0)	NE
TP-28	+336.0	NE	NE
[redacted]	+330.0	NE	1'0" (+329.0)

Boring or Test Pit No.	Approximate Ground Surface Elevation	Observed Depth to Groundwater (Elevation)	Observed Depth to Bedrock (Elevation)
[redacted]	+332.0	NE	4'0" (+328.0)
[redacted]	+332.0	NE	0'9" (+331.2)
TP-32	+328.0	5'6" (+322.5)	NE
[redacted]	+326.0	NE	2'6" (+323.5)
TP-34	+324.0	NE	NE
TP-35	+323.0	NE	NE
TP-36	+321.0	7'0" (+314.0)	NE
[redacted]	+322.0	5'8" (+316.3)	6'0" (+316.0)
TP-38	+319.0	3'0" (+316.0)	NE
[redacted]	+324.0	8'0" (+316.0)	8'6" (+315.5)
TP-40	+319.4	3'0" (+316.4)	NE
[redacted]	+318.0	NE	1'0" (+317.0)
TP-42	+322.0	4'0" (+318.0)	NE
TP-43	+318.0	NE	NE
TP-44	+324.0	NE	NE
[redacted]	+340.0	NE	2'8" (+337.3)
[redacted]	+332.0	NE	1'8" (+330.3)
[redacted]	+330.0	NE	5'6" (+324.5)
[redacted]	+320.0	NE	4'9" (+315.2)
[redacted]	+324.0	NE	2'5" (+321.6)
[redacted]	+324.0	NE	2'0" (+322.0)
TP-51	+312.0	NE	NE
TP-52	+310.6	4'0" (+306.6)	NE
TP-53	+314.0	5'0" (+309.0)	NE
[redacted]	+318.0	NE	1'0" (+317.0)
[redacted]	+324.0	NE	7'0" (+317.0)
TP-56	+344.0	NE	NE
TP-57	+342.0	NE	NE

Note: NE – Not Encountered

Removal of Existing Structure from the New Building and Pavement Areas

Building Area

As part of the site development, the remains of the former farm structures in the southwestern portion of the overall site will be removed. The debris resulting from the demolition of these structures must be completely removed from the new building areas, extending at least ten (10) feet beyond the new building limits. This shall include the complete removal of all foundations, walls, floor slabs, utilities, pavement, and miscellaneous debris. Where the removal of structures or materials extends below the planned foundations and floor slabs, the resulting excavations shall be backfilled with new compacted fill as described below.

Existing utilities, where they are encountered within the planned building areas, should be either abandoned or rerouted around the new structures. Once the utility has been rerouted or abandoned, the section of pipe within the building area should be completely removed. The removal of the pipe must also include any loose fill around the pipe. After the pipe and associated loose backfill have been removed, the resulting trench shall be backfilled with new controlled fill as described below.

New compacted fill placed as backfill in the above excavations shall consist of either the suitable on-site soil or imported sand and gravel containing less than 20% by weight passing a No. 200 sieve. The fill shall be placed in one-foot layers and each layer compacted to at least 95% of its Maximum Modified Dry Density (ASTM D1557). Each layer shall be compacted, tested, and approved prior to placing subsequent layers.

Pavement Areas

In the proposed pavement areas, the existing structures must be completely demolished and the debris removed from the site. The foundations, walls, and footings may remain in place provided they are at least two (2) feet below final grade and do not interfere with the new utilities. The excavation resulting from the removal of the existing structures shall be backfilled using controlled compacted fill. New fill shall consist of either suitable on-site soil or imported sand and gravel placed in one-foot layers and compacted to at least 92% of its Maximum Modified Dry Density (ASTM D1557).

Preparation of Building Areas and Removal of Existing Fill

In order to prepare the areas of the new houses and commercial buildings for construction, all surface materials such as topsoil, surface vegetation, etc. must be completely removed from the building areas, extending at least ten (10) feet beyond the limits of the new structures. Any existing structures or remains of former structures must be completely removed from the planned building areas as described above.

The test pit data indicates that existing fill is present in the areas of TP-6 and TP-8 in the northern portion of the subject site. At these locations, the fill extends to depths of 2'0" and 5'0" below the existing ground surface, respectively. We anticipate that existing fill may be present in other isolated areas of the site as well. The existing fill encountered in the test pits is not an acceptable bearing material for the new foundations or floor slabs. The consistency and density of the fill material is not predictable. Certain areas may contain clean dense soils while other areas may contain loose material and/or debris, as shown by the field data. The existing fill conditions create the possibility of intolerable differential settlements under loading. To eliminate the potential for damaging differential settlements, the existing fill must be completely removed from the proposed building areas and replaced with new compacted fill.

The removal of the existing shall extend down to the virgin soil or to the underlying bedrock. At the bottom of the excavation, the removal of the unsuitable

material shall extend horizontally beyond the building lines a minimum distance of three (3) feet plus a distance equal to the depth of the excavation below the planned finished floor elevation. For example, if the removal of the existing fill extends vertically four (4) feet below the planned finished floor elevation, the excavation must extend horizontally a minimum of 3 plus 4 or 7 feet beyond the new building line.

The removal of the existing fill from the planned building areas shall be performed under the full time inspection of Carlin-Simpson & Associates. The on-site representative from Carlin-Simpson & Associates shall direct the Contractor during this operation to ensure that all of the unsuitable material has been removed from the areas of the proposed building areas.

During the removal of the unsuitable material, the Contractor should segregate the potentially re-usable existing fill material from the non-reusable fill (i.e. debris and topsoil). The on-site representative from Carlin-Simpson & Associates shall evaluate the suitability of the excavated materials for use as compacted fill during the excavation and prior to its re-use. Potentially usable fill should be stockpiled and covered with tarps or plastic sheeting for protection from excess moisture. Any fill material that is or becomes wet must be dried prior to its re-use.

After the surface materials and existing fill have been removed and prior to placement of new fill, the exposed subgrade shall be graded level and proofrolled by several passes of a large vibratory drum roller. The proofrolling operation is necessary to densify the underlying soils. The proofrolling of the subgrade shall be witnessed by Carlin-Simpson & Associates. If any excessive movement is noted during the proofrolling, the soft soil shall be removed and replaced with new compacted fill as described below.

New fill required to replace any unsuitable soil and to achieve final grades shall consist of either suitable on-site soil or imported sand and gravel containing less than 20% by weight passing the No. 200 sieve. The new fill shall be placed in one-foot layers and each layer shall be compacted to at least 95% of its Maximum Modified Dry Density (ASTM D1557). Each layer must be compacted, tested, and approved before placing subsequent layers. The suitability of the existing site soils for reuse as compacted fill is discussed later in this report.

After the installation of compacted fill has been completed to the required subgrade elevation, the virgin soil and new compacted fill may be used to support the proposed foundations and floor slabs.

Rock Removal Within the Building Areas

Highly weathered Shale bedrock was encountered at depths ranging from 0'5" to 15'0" beneath the existing site grades and more competent Shale bedrock was encountered at depths ranging from 0'2" to 19'0" beneath the existing ground surface throughout the subject site. Rock outcropping was also observed in areas. The boring and

test pit data indicates that the bedrock surface is variable and we expect that there will be knobs of harder rock occurring adjacent to zones of highly weathered and fractured rock.

Rock excavation will likely be required in areas for the proposed development. Penetration into the bedrock with excavation equipment will depend of the degree of weathering and fracturing in the rock. The quality of the rock will vary and should improve with depth. To excavate the rock, the top two (2) to five (5) feet of rock may be "rippable" by using large construction equipment. However, we anticipate that the "rippability" of the bedrock will be variable and limited. Based on our observations, harder rock will likely be encountered and blasting and/or the use of hydraulic hammers will be required to excavate the harder, intact bedrock. Additional issues related to blasting are discussed below.

Blasting Issues

In order to develop the site, rock blasting will likely be required in areas to achieve the proposed grades. We expect that varying rock cuts ranging from a few feet to several feet will be required at the subject site.

The bedrock encountered in the borings and test pits at this site consists of Shale. Based on our experience, the in-situ bedrock will range from highly weathered, highly fractured rock to slightly weathered, intact rock. To excavate the rock, the top two (2) to five (5) feet of rock may be "rippable" by using large construction equipment. Blasting will likely be required in order to achieve deeper excavations. Zones of weathered rock may exist deeper than five (5) feet but conditions are expected to be variable. Hard rock will likely be encountered during construction.

The blasting contractor should avoid over-blasting the rock. Over-blasting will disturb the deeper intact rock that will be used as bearing material for the proposed foundations and floor slabs.

The blasting operation must be monitored by a seismologist using a seismograph. The Peak Particle Velocity emanating from any blast will be restricted to 2.0 in/sec. Each blast will be monitored to insure that this criteria is not exceeded. The monitoring results shall be provided to the Blasting Contractor as soon as possible so that the blasting program can be modified if necessary.

Prior to any blasting work being done, a licensed professional engineer shall be retained to perform a detailed pre-blast survey of the existing structures located within 500 feet of the blast area. The pre-blast survey shall be conducted in accordance with the requirements of local authorities. A copy of all reports prepared by the licensed professional engineer shall be submitted to the Town Engineer and the Owner's representative in a timely manner.

Prior to the beginning of blasting, a notice shall be sent to all residential and commercial property owners within a 500 foot radius of the blast area. This notification

shall be given at least 48 hours before blasting takes place. A contact person shall be established and named in this notice to respond to all concerns raised by nearby residents during the blasting phase of this project. The contact person shall respond to any inquiries within 24 hours.

New Building Foundations and Floor Slabs

After the building areas have been prepared as outlined above, the foundations for the new structures may be constructed. According to the boring and test pit data, the foundation bearing material may consist of shale bedrock. The condition of the bedrock will likely vary from completely weathered to moderately weathered.

Since harder rock may be encountered in the foundation excavations, "Special Construction Procedures" must be employed. When continuous wall footings or closely spaced column footings (20 feet or less) bear on dissimilar material (i.e. rock and soil) the potential for differential movement exists. A footing bearing in rock will not move whereas a footing bearing on soil will settle slightly due to the compressive nature of all soils when subjected to new loads. The area between movement and non-movement will develop a (shear) stress point. Cracks in foundations and walls will be the result from such movement. Therefore, the wall or continuous footings must bear either entirely on rock or entirely on soil for any individual building.

Where rock and soil both exist at the bearing elevation in a foundation excavation, the footings must either be lowered to bear entirely on rock, or a minimum of one foot of rock below planned footing bottom must be removed. The over-excavated one foot must then be filled with a granular material containing more than 10% and less than 25% by weight passing a No. 200 sieve placed and compacted to at least 95% of its Maximum Modified Dry Density. This procedure will create a "cushion" atop the rock and reduce the potential for differential movement. For soft, rippable bedrock, this procedure will not be required.

Adjacent column footings greater than 20 feet apart may bear on dissimilar material (i.e. soil and rock). Any individual column footing must bear entirely on the same type bearing material (i.e. all soil or all rock).

If during the excavation for foundations, the transition from soil to rock is gradual (i.e. from medium dense soil to dense weathered rock to very dense rock) over a distance of 15 feet or more, the "Special Construction Procedures" may not be required. This would have to be evaluated in the field on a case-by-case basis by the on-site representative from Carlin-Simpson & Associates at the time of construction.

The new foundations may be designed as shallow spread footings, utilizing a net design bearing pressure of 2.0 TSF. All foundations shall bear on the virgin soil, weathered bedrock, or on new compacted fill approved by Carlin-Simpson & Associates.

All of the exterior footings shall bear at least 42 inches below the finished outside grade for protection from frost. Footings on rock may bear at shallower depths since rock is not frost susceptible. Interior footings may bear just below the floor slab, provided the building is heated in winter. The wall footings shall have a minimum width of 18 inches and column footings, if required, shall have a minimum dimension of 30 inches.

Groundwater was encountered in six (6) of the borings and 23 of the test pits at depths ranging from just below the surface to depths up to 14'0" beneath the existing ground surface. These depths correlate with groundwater levels ranging between elevation +305.0 and elevation +337.0. Based on the boring and test pit data, groundwater may be encountered in areas during construction. In addition, trapped water may be encountered in the silty site soils and/or along the soil/rock interface.

In the event that water has softened the foundation bearing soil, some type of remediation may be required. This determination will be made by Carlin-Simpson & Associates during the excavation process. If the excavation is wet or is exposed to excessive moisture, the foundation excavation shall be lowered a minimum of 12 inches. The bearing soil shall then be covered by a geotextile fabric (Mirafi 500X or equivalent) and a 12-inch layer of ¾-inch crushed stone shall be installed on top of the geotextile fabric. The new footing shall then bear on the crushed stone.

After the footings are installed, fill will be required to backfill these excavations and to raise grades in the building area to the slab subgrade elevation. New fill shall consist of either suitable on-site soil or imported sand and gravel containing less than 20% by weight passing a No. 200 sieve. The fill shall be placed in layers about one foot thick and each layer shall be compacted to at least 92% of its Maximum Modified Dry Density (ASTM D-1557). Fill layers shall be compacted, tested and approved before placing subsequent layers.

The floor slabs may be designed as a slab on grade bearing on the virgin soil, shale bedrock, or new compacted fill. We recommend a Modulus of Subgrade Reaction (k) of 200 pounds per cubic inch (pci) be used for design. A minimum of six (6) inches of crushed stone gravel should be provided beneath the floor slabs for drainage. Where rock is encountered at the floor subgrade elevation, the rock shall be removed to at least 12 inches below the floor slab. A 12-inch layer of crushed stone gravel should be provided between the rock and floor slab for drainage and to act as a cushion on the rock.

Building settlement will be less than ½-inch which is within tolerable limits for these structures.

Seismic Design Considerations

The new buildings shall be designed to resist stress produced by lateral forces computed in accordance with the New York State Building Code. The project site can be classified as Site Class C – Very Dense Soil and Soft Rock Profile. The following values can be used for this project.

Mapped Spectral Response Acceleration for Short Periods, [Fig 1615 (1)]	S_S=0.30g
Mapped Spectral Response Acceleration at 1-Second Period, [Fig 1615 (2)]	S_{S1}=0.085g
Site Coefficient [Table 1615.1.2 (1)]	F_a=1.20
Site Coefficient [Table 1615.1.2 (2)]	F_v=1.70
Max Considered Earthquake Spectral Response for Short Periods [Eq 16-16]	S_{MS}=0.36g
Max Considered Earthquake Spectral Respond at 1-Second Period [Eq 16-17]	S_{M1}=0.14g
Design Spectral Response Acceleration for Short Periods [Eq 16-18]	S_{DS}=0.24g
Design Spectral Response Acceleration for 1-Second Period [Eq 16-19]	S_{D1}=0.10g

Soil and Rock Slopes

We understand that soil and/or rock slopes may be constructed in portions of the referenced site. For slopes constructed in soil, we recommend a slope of 3 horizontal to 1 vertical (3H:1V). The stability of slopes in rock is dependent upon the quality of the rock, jointing in the rock, the strike and dip of the rock, and the groundwater seepage. For planning purposes, a rock slope of 1 horizontal to 8 vertical (1H:8V) may be feasible for this site. However for highly weathered and highly fractured Shale, a rock slope of 1H:1V may be required. In addition, rock slope stabilization measures (i.e. wire mesh netting, rock anchors, etc.) may be required for portions of the site. The extent and design of the stabilization measures will be determined as the slope is excavated.

It will be necessary to evaluate the quality of the bedrock during excavation to determine the required slope. Retaining walls should be used where the proper slopes cannot be achieved. Final slopes must be inspected by a qualified Geotechnical Engineer.

Retaining Walls

We expect that retaining walls may be required in portions of the subject property. The foundations for any new retaining wall may be placed on the virgin soil, Shale bedrock, or on new compacted fill approved by Carlin-Simpson & Associates. New compacted fill shall consist of either suitable on-site soil or imported sand and gravel containing less than 20% by weight passing the No. 200 sieve. The fill shall be placed in 6 to 12 inch layers and compacted to at least 95% of its Maximum Modified Dry Density. The footings or base of the wall can be designed using a net design bearing pressure of 2.0 TSF.

The footings or base of the walls shall bear at least 42 inches below finished grade of the outside face of the walls for protection from frost. To prevent a buildup of hydrostatic pressure behind the walls, a minimum of 12 inches of 3/4-inch to 3/8-inch crushed stone shall be installed directly behind the walls. In addition, a drain shall be installed behind the walls. The drain can be piped into the site stormwater system or extended to daylight beyond the wall areas.

Backfill placed directly behind the retaining walls shall consist of either suitable on-site soil or imported sand and gravel containing less than 20% by weight

passing a No. 200 sieve. Each layer shall be compacted using a hand guided mechanical tamper to 92% of its Maximum Modified Dry Density (ASTM D1557). Excessive compaction adjacent to the retaining walls must be avoided. Layers shall be tested and approved before placing subsequent layers. Large compaction equipment must not be used within ten (10) feet of the new walls to prevent potential damage to the walls.

The soil adjacent to the retaining wall will exert a horizontal pressure against the wall. This pressure is based on the soil density and the Coefficient of Active Earth Pressure (k_a). We estimate the backfill material will have an in place density of about 130 pcf and an angle of internal friction, $\phi = 30^o$. The active earth pressure coefficient, k_a, is 0.33 provided the grade behind the wall is level. Based on these properties, the retained soil will produce an Equivalent Fluid Pressure (EFP) of 43.3 pcf against the retaining wall. If a sloping grade is proposed, the k_a and EFP must be adjusted accordingly.

Pavement

We understand that new asphalt paved roads and parking areas will be constructed as part of the site development. We expect that varying cuts and fills will be required to achieve the planned subgrade elevations in these areas. The densified existing fill (Stratum 2), virgin soil (Stratum 3), shale bedrock (Stratum 4), and new compacted fill may be used to support the new pavement. To prepare the new pavement areas, all existing surface materials (i.e. vegetation, topsoil, etc.) must be completely removed from the planned paved areas.

After all surface materials have been removed, the exposed subgrade that is either at or below the planned subgrade elevation shall be proofrolled with a large vibratory drum roller to densify the underlying soils. The proofrolling operation shall be witnessed by Carlin-Simpson & Associates. If any excessive movement or unsuitable soil is noted during the proofrolling, the soft or unsuitable soil should be removed and replaced with new compacted fill.

Areas where existing fill is encountered shall be compacted in place. Carlin-Simpson & Associates must evaluate these areas for the presence of soft or unsuitable material within the existing fill matrix. Portions of this fill may have to be removed and replaced with new compacted fill. This will be determined by Carlin-Simpson & Associates during construction.

Where new fill is required to achieve final grades, it shall consist of either the suitable on-site soil or imported sand and gravel containing less than 20% by weight passing the No. 200 sieve. The new fill shall be placed in layers up to one foot in thickness and each layer shall be compacted to at least 92% of its Maximum Modified Dry Density. After the planned subgrade has been proofrolled and new compacted fill has been placed as required, the new pavement subbase may be placed on the existing site soils and new compacted fill. A minimum of six (6) inches of dense graded aggregate (DGA) is recommended for the subbase layer for drainage.

We recommend that the following pavement sections be used for the parking lots and roadways. These pavement sections are subject to local township approval.

Light Duty Areas – Parking Lots

1 ½"	Asphalt Top Course	NYSDOT Type 6
2"	Asphalt Base Course	NYSDOT Type 1
6"	Stone Subbase (DGA)	NYSDOT Item 4
	Approved Compacted Subgrade (Minimum CBR = 10)	

Heavy Duty Areas – Roadways

2"	Asphalt Top Course	NYSDOT Type 6
3"	Asphalt Base Course	NYSDOT Type 1
6"	Stone Subbase (DGA)	NYSDOT Item 4
	Approved Compacted Subgrade (Minimum CBR = 10)	

Stormwater Management System

Based on the site plan that was provided to this office, we understand that several stormwater management areas are planned throughout the subject site. The types of systems include subsurface recharge areas, detention basins, and bioretention areas. The bottom elevations of the proposed systems vary with the topography. At the time of this report, only the preliminary invert elevations and grading of the basins have been established. Once the grading plan has been finalized, it should be forwarded to this office so that we can review it along with the recommendations in this report. At that time, any changes or additional recommendations can be provided, if required. We anticipate that varying cuts will be required to construct the proposed systems.

The soil conditions are generally consistent throughout the site. The site soils consist primarily of layers of either coarse to fine Sand, little (to and) Silt, little (to and) coarse to fine Gravel with occasional cobbles and boulders or Silt, trace (to and) coarse to fine Sand, trace (to little) coarse to fine Gravel (Stratum 3) followed by Shale bedrock (Stratum 4). Based on the boring and test pit data, bedrock is expected to be encountered in areas. In addition, groundwater and/or trapped water may be encountered in areas, depending on the proposed site grades. We recommend that the bottom elevations of the proposed basins be at least 2'0" above the observed groundwater levels and at least 2'0" above the observed bedrock surface. The groundwater and bedrock observations for each boring and test pit location are summarized in Table 1 above.

According to the boring and test pit data, the soil likely to be encountered at the bottom of the basins will consist of either coarse to fine Sand, little (to and) Silt, little (to and) coarse to fine Gravel with occasional cobbles and boulders or Silt, trace (to and) coarse to fine Sand, trace (to little) coarse to fine Gravel. Selected samples were tested in our laboratory to determine their expected permeability rate. The virgin Silty Sand or Silty

Gravelly Sand has a permeability rate of 10 inches per hour and the virgin Sandy Silt has a permeability rate of 4.0 inches per hour. The following table summarizes the subsurface material (i.e. Silty Gravelly Sand, Shale, etc.) expected to be encountered at the bottom and the preliminary permeability rate for each of the proposed stormwater management areas.

TABLE 2

Stormwater Area and Type	Proposed Bottom Elevation	Material Expected at Bottom	Preliminary Permeability Rate
Bioretention 1A-1-1	+331	Shale Bedrock	--
Bioretention 1A-1-2	+347	Unknown	--
Bioretention 1A-1-3	+339	Silty Sand	10 in/hr
Pond 1A-1	+330	Shale Bedrock	--
Bioretention 1A-2-1	+321	Shale Bedrock	--
Bioretention 1A-2-2	+321	Shale Bedrock	--
Pond 1A-2	+320	Shale Bedrock	--
Bioretention 1A-3-1	+335	Shale Bedrock	--
Bioretention 1A-3-2	+335	Shale Bedrock	--
Bioretention 1A-3-3	+331	Shale Bedrock	--
Bioretention 1A-3-4	+329	Unknown	--
Bioretention 1A-3-5	+321	Sandy Gravel	10 in/hr
Bioretention 1A-3-6	+319	Sand	10 in/hr
Pond 1A-3	+320	Silty Gravelly Sand	10 in/hr
Bioretention 1A-4-1	+317	Silty Gravelly Sand	10 in/hr
Bioretention 1A-4-2	+317	Silty Gravelly Sand	10 in/hr
Bioretention 1A-4-3	+317	Silty Gravelly Sand	10 in/hr
Bioretention 1A-5-1	+323	Silty Gravelly Sand	10 in/hr
Bioretention 1A-5-2	+325	Silty Gravelly Sand	10 in/hr
Pond 1A-5	+322	Silty Gravelly Sand	10 in/hr
Bioretention 1A-6-1	+313	Shale Bedrock	--
Bioretention 1A-6-2	+325	Silty Gravelly Sand	10 in/hr
Pond 1A-6	+314	Silty Gravelly Sand	10 in/hr
Bioretention 1A-7-1	+311	Possible Shale	--
Bioretention 1A-7-2	+311	Possible Shale	--
Pond 1A-7	+308	Silty Gravelly Sand	10 in/hr
Bioretention 1A-8	+308.5	Silty Gravelly Sand	10 in/hr
Bioretention 2A-1-1	+325	Possible Shale	--
Bioretention 2A-1-2	+323	Possible Shale	--
Pond 2A-1	+322	Possible Shale	--
Bioretention 2A-2-1	Unknown	Shale Bedrock	--
Bioretention 2A-2-2	+324	Unknown	--
Bioretention 2A-2-3	Unknown	Shale Bedrock	--
Bioretention 2A-2-4	Unknown	Shale Bedrock	--
Bioretention 2A-2-5	+320.5	Shale Bedrock	--

Stormwater Area and Type	Proposed Bottom Elevation	Material Expected at Bottom	Preliminary Permeability Rate
Bioretention 2A-2-6	+315	Unknown	--
Bioretention 2A-3-1	+323	Unknown	--
Bioretention 2A-3-2	+323	Shale Bedrock	--
Bioretention 2A-3-3	+322.5	Possible Shale	--
Bioretention 2A-3-4	+318	Possible Shale	--
Pond 2A-3	+316	Possible Shale	--
Subsurface 2B-1	Unknown	Silty Sand or Shale	--
Subsurface 2B-2	Unknown	Sandy Silt or Shale	--
Bioretention 2B-3-1	+319	Sandy Silt	4 in/hr
Bioretention 2B-3-2	+334	Silty Gravelly Sand	10 in/hr
Pond 2B-3	+320	Unknown	--
Bioretention 2B-4-1	+326	Silty Gravelly Sand	10 in/hr
Bioretention 2B-4-2	+317	Silty Gravelly Sand	10 in/hr
Bioretention 2B-5	+317	Sandy Silt	4 in/hr
Bioretention 2B-6	+325	Silty Gravelly Sand	10 in/hr
Pond 2B-6	+324	Silty Gravelly Sand	10 in/hr
Bioretention 2B-7	+333	Silty Gravelly Sand	10 in/hr
Pond 2B-7	+332	Silty Gravelly Sand	10 in/hr
Subsurface 2C-1	Unknown	Unknown	--
Bioretention 2C-2-1	+320.5	Sandy Silt	4 in/hr
Subsurface 2C-2-2	Unknown	Silty Sand or Shale	--
Bioretention 2C-3-1	+311	Silty Gravelly Sand	10 in/hr
Subsurface 2C-3-2	Unknown	Silty Gravelly Sand	10 in/hr
Pond 2C-4	+309	Silty Gravelly Sand	10 in/hr

Additional investigation (i.e. test pits) should be performed in the proposed basin areas where there is currently no data in order to determine the subsurface soil and rock conditions at the individual basin locations. Once the site grading plan has been finalized, it should be forwarded to this office so that we can review it along with the recommendations in this report. At that time, Carlin-Simpson & Associates will determine the extent of the additional investigation.

Utilities

The new utilities can be supported by the existing site soils or new compacted fill. The bottom of all trenches should be cleaned to provide firm support for the pipe. If any soft areas or unsuitable soil conditions are encountered during construction, they must be removed and replaced with new compacted fill. The excavated material may be used as backfill provided it meets the requirements outlined below. Controlled compacted fill shall be placed in one-foot layers and each layer compacted to at least 92% of its Maximum Modified Dry Density. The back fill must be free of topsoil and debris.

Based on the boring and test pit data, weathered shale bedrock will likely be encountered in areas during the excavation for site utilities. If rock is encountered in the utility excavations, it must be removed to at least six (6) inches below planned pipe bottom. The over-excavated six inches shall then be filled with new sandy fill compacted to at least 92% of its Maximum Modified Dry Density.

In the event that water is encountered in the utility trench excavation or if the trench bottom becomes soft due to the inflow of surface water or trapped water, a minimum of six (6) inches of crushed stone shall be placed on the bearing soil to provide a firm base for support of the pipe.

Temporary Construction Excavations

We anticipate that varying cuts will be required in portions of the site. Temporary construction excavations should be conducted in accordance with the most recent OSHA guidelines or applicable federal, state, or local codes. Based on the boring and test pit data, we believe the site soils and rock would have the following classifications as defined by the OSHA guidelines.

Soil/Rock Type	Possible Classification
Existing Fill with Debris	Type "C"
Virgin Silt/Sand/Gravel Soils	Type "B"
Weathered/Fractured Bedrock	Type "A" or "B"
Intact Bedrock	Type "A" or Stable Rock

Further evaluation of the site soil deposits will be required in the field by a qualified person at the time of the excavation to determine which OSHA soil classification should be used. Trapped water encountered during the excavation could destabilize the sides of the excavation. An evaluation of the excavation stability must be performed if water is encountered. Temporary support (i.e. sheeting and shoring) should be used for any excavation that cannot be sloped in accordance with the applicable regulations.

SUITABILITY OF THE ON-SITE SOILS FOR USE AS COMPACTED FILL

The suitability of each soil stratum for use as compacted fill is discussed below.

Stratum 1 Topsoil — Topsoil is not suitable for use as compacted fill. During the stripping operation it may be stockpiled on site for later use in the landscaped areas or removed from the site.

Stratum 2 Fill — The existing fill consists of coarse to fine Sand, little Silt, little coarse to fine Gravel with cobbles, boulders, and debris. The existing fill may only be used for compacted fill at the site if all of the debris has been removed

prior to its placement and the fill remains relatively dry enough for optimum compaction.

Stratum 3 Silty Sand or Sandy Silt — The virgin soils that may be excavated from the cut areas and building excavations consists of either coarse to fine Sand, little (to and) Silt, little (to and) coarse to fine Gravel with occasional cobbles and boulders or Silt, trace (to and) coarse to fine Sand, trace (to little) coarse to fine Gravel. This material is suitable for use as compacted fill at the site provided the soil is free of organic material (i.e. roots, topsoil, etc.) and has not become too wet prior to being placed.

Stratum 4 Shale Bedrock — Excavated rock may also be used as fill material for the building and paved areas. Pieces larger than six (6) inches in diameter may not be used in the compacted fill for the building or in utility trenches. Each layer must be compacted with the use of a large vibratory roller making at least six (6) passes covering the entire area to properly densify the material. Rock fill should not be used where it will interfere with the installation of utilities.

Our laboratory test results indicate that the on-site soils contain a varying percentage of silt (4.7% to 75.4%). In addition, the in-situ moisture content of the site soils ranges from 6.2% to 22.3%, which is at or above the optimum moisture content for these types of soil. If the material becomes too wet, it will pump when compacted and the Contractor will not be able to achieve the required maximum density. In the event that the on-site material is or becomes too wet and cannot be adequately compacted, the soil should be allowed to dry or a drier cleaner fill material must be used.

The in-situ soils will become soft and weave if exposed to excessive moisture and construction traffic. The instability will occur quickly when exposed to these elements and it will be difficult to stabilize the subgrade. We recommend that adequate site drainage be implemented early in the construction schedule and if the subgrade becomes wet, the contractor should limit construction activity until the soil has dried.

GENERAL

The recommendations within this report are preliminary in nature and are not intended for final design and construction. At this time, the new finished floor elevations have not been established and the site grading is preliminary. Once the site grading plan has been finalized, a copy should be forwarded to our office for review. At that time, we will review our recommendations and provide additional recommendations, as needed, to complete the design.

We understand that the proposed construction will consist of a large residential subdivision with some commercial structures in the northern portion of the property. Site development will also include rock removal, new underground utilities,

stormwater management areas, and asphalt paved roads and parking areas. Site development may also include soil and/or rock slopes and retaining walls.

The most economical type of foundation is a shallow spread footing utilizing a net design bearing pressure of 2.0 TSF. The new foundations and floor slabs shall bear on virgin soil, Shale bedrock, or new compacted fill approved by Carlin-Simpson & Associates.

Groundwater was encountered in portions of the site at depths ranging from just below the surface to depths up to 14'0" beneath the existing ground surface. These depths correlate with groundwater levels ranging between elevation +305.0 and elevation +337.0. Based on the boring and test pit observations, groundwater at this site will be controlled by the topography and the underlying bedrock surface. In addition, trapped water may be encountered in the silty site soils and/or along the soil/rock interface. Depending on the proposed site grades, groundwater and/or trapped water may be encountered in areas of the site during construction. Proper groundwater control measures will be required in the event that water is encountered in the site excavations.

In order to preserve continuity in this project, the Owner shall retain the services of Carlin-Simpson & Associates to provide full time Geotechnical-related inspections during construction. This should include the inspection of: 1) the removal of the existing fill from the new building areas; 2) the proofrolling of the subgrade soil prior to placement of compacted fill; 3) the placement and compaction of controlled fill; 4) the excavations for the foundations; and 5) the preparation of the subgrade for the floor slab and pavement areas.

If the conditions encountered during construction vary significantly from those stated in this report, this office should be notified immediately so that further recommendations can be made.

Thank you for letting us assist you on this study. Should you have any questions or comments, please contact this office.

Very truly yours,

CARLIN-SIMPSON& ASSOCIATES

MEREDITH R. ANKE
Project Engineer

ROBERT B. SIMPSON, P.E.

Proposed LaGrange Town Center
LaGrange, NY
(05-182)

21-24 February 2006

TEST PIT LOGS

TP-1	Elevation +320.8		
0-0'3"	TOPSOIL		
0'3"-5'0"	Gray, brown Clayey SILT, trace (-) medium to fine Sand	medium stiff	wet
5'0"-8'0"	Gray coarse to fine SAND, trace (+) Silt, some coarse to fine Gravel, cobbles	loose	wet
	Groundwater @ surface		
TP-2	Elevation +322.0		
0-0'6"	TOPSOIL		
0'6"-5'0"	Gray, brown Clayey SILT, trace medium to fine Sand	medium stiff	wet
5'0"-9'0"	Gray coarse to fine SAND, trace (+) Silt, some coarse to fine Gravel	loose	wet
	Groundwater encountered @ 5'0"	Very Rapid Inflow	
TP-3	Elevation +326.0		
0-1'0"	TOPSOIL		
1'0"-4'0"	Light brown coarse to fine SAND, some (+) Silt, trace (+) medium to fine Gravel	medium dense	moist
4'0"-8'0"	Brown coarse to fine SAND, trace Silt, trace medium to fine Gravel	loose	wet
	Groundwater encountered @ 4'0"	Rapid Inflow	

TP-4	Elevation +326.0		
0-0'6"	TOPSOIL		
0'6"-2'0"	Brown coarse to fine SAND, some Clayey Silt, trace coarse to fine Gravel	medium dense	moist
2'0"-8'0"	Gray green coarse to fine SAND, trace (+) Silt, some coarse to fine Gravel	loose	wet
8'0"	Refusal on bedrock		
	Groundwater encountered @ 4'0"	Rapid Inflow	
TP-5	Elevation +322.0		
0-0'6"	TOPSOIL		
0'6"-2'0"	Light brown SILT, and coarse to fine Sand, some coarse to fine Gravel	medium dense	moist
2'0"- 10'0"	Brown gray coarse to fine SAND, little Silt, some coarse to fine Gravel, cobbles, boulders	medium dense	moist
	No water encountered		

TP 6	Elevation +324.0		
0-2'0"	FILL (Brown coarse to fine SAND, some (-) Silt, some (-) coarse to fine Gravel)	loose	moist
2'0"-6'0"	Gray green, brown Clayey SILT and, coarse to fine coarse to fine Sand, little medium to fine Gravel	medium stiff	moist
6'0"-10'0"	Brown coarse to fine SAND, trace (+) Silt, little medium to fine Gravel	loose	wet
	Groundwater encountered @ 4'0"	rapid inflow	
TP-7	Elevation +332.6		
0-0'6"	TOPSOIL		
0'6"	Refusal on bedrock		
	No water encountered		
TP-8	Elevation +333.0		
0-5'0"	FILL (Brown coarse to fine SAND, little Silt, little coarse to fine Gravel, cobbles, boulders, debris)	loose	moist
5'0"-7'0"	Brown coarse to fine SAND, some Silt, little coarse to fine Gravel	medium dense	moist
7'0"	Refusal on bedrock		
	No water encountered		

TP-9	Elevation +334.0		
0-0'6"	TOPSOIL		
0'6"-5'0"	Brown coarse to fine SAND, little (+) Silt, some coarse to fine Gravel, cobbles	medium dense	moist
5'0"	Refusal on bedrock		
	No water encountered		
TP-10	Elevation +322.0		
0-0'8"	TOPSOIL		
0'8"-7'0"	Brown SILT and, coarse to fine Sand, some (-) medium to fine Gravel	medium dense	moist
7'0"	Refusal on bedrock		
	No water encountered		
TP-11	Elevation +334.0		
0-0'4"	TOPSOIL		
0'4"-3'8"	Brown coarse to fine SAND, some Silt, little (+) coarse to fine Gravel, cobbles	medium dense	moist
3'8" – 4'0"	Weathered Shale		
4'0"	Refusal on bedrock		
	No water encountered		

TP-12	Elevation +330.0		
0-0'6"	TOPSOIL		
0'6"-2'0"	Brown coarse to fine SAND, some Silt, little coarse to fine Gravel	medium dense	moist
2'0"-4'0"	Weathered Shale		
4'0"	Refusal on bedrock		
	No water encountered		
TP-13	Elevation +314.4		
0-0'8"	TOPSOIL		
0'8"-10'0"	Brown coarse to fine SAND, trace Silt, and coarse to fine Gravel, cobbles	medium dense	moist
	Groundwater encountered @ 8'0"	rapid inflow	
TP-14	Elevation +320.0		
0-1'0"	TOPSOIL		
1'0"-4'0"	Brown coarse to fine SAND, some (+) Silt, little (+) coarse to fine Gravel	medium dense	moist
4'0"-5'0"	Weathered Shale		
5'0"	Refusal on bedrock		
	No water encountered		

TP-15	Elevation +312.0		
0-0'8"	TOPSOIL		
0'8"-9'0"	Brown coarse to fine Sand, trace Silt, and coarse to fine Gravel, cobbles	medium dense	moist
	Groundwater encountered @ 4'0"	very rapid inflow	
TP-16	Elevation +311.0		
0-1'0"	TOPSOIL		
1'0"-5'0"	Brown coarse to fine SAND, some (+) Silt, and (-) coarse to fine Gravel	medium dense	moist
5'0"-10'0"	Brown coarse to fine Sand, trace Silt, and coarse to fine Gravel	loose	wet
10'0"	Refusal on bedrock		
	Groundwater encountered @ 5'0"	rapid inflow	
TP-17	Elevation +320.0		
0-0'8"	TOPSOIL		
0'8"-4'0"	Brown gray SILT and (-), coarse to fine Sand, little medium to fine Gravel	medium dense	moist
4'0"-7'0"	Weathered Shale		
7'0"	Refusal on bedrock		
	Groundwater encountered @ 5'0"	rapid inflow	

TP-18	Elevation +320.0		
0-0'6"	TOPSOIL		
0'6"-5'0"	Brown, gray SILT and (-), coarse to fine Sand, little medium to fine Gravel	medium stiff	moist
5'0"-5'8"	Weathered Shale		
5'8"	Refusal on bedrock		
	Groundwater encountered @5'0"	rapid inflow	
TP-19	Elevation +320.0		
0-0'6"	TOPSOIL		
0'6"-2'0"	Brown coarse to fine SAND, some Silt, little coarse to fine Gravel	medium dense	moist
2'0"	Refusal on bedrock		
	No water encountered		
TP-20	Elevation +350.0		
0-0'6"	TOPSOIL		
0'6"-2'0"	Weathered Shale		
2'0"	Refusal on bedrock		
	No water encountered		

TP-21	Elevation +333.7		
0-0'6"	TOPSOIL		
0'6"-2'0"	Brown coarse to fine Sand, and (+) Silt, some medium to fine Gravel	medium dense	moist
2'0"	Refusal on bedrock @		
	No water encountered		
TP-22	Elevation +331.3		
0-1'0"	TOPSOIL		
1'0"-2'0"	Gray, brown SILT and, coarse to fine Sand, some medium to coarse to fine Gravel	medium stiff	moist
2'0"-7'0"	Gray coarse to fine GRAVEL and (-), coarse to fine Sand, trace (+) Silt	loose	wet
	Groundwater encountered @ 2'0"	very rapid inflow	
TP-23	Elevation +330.0		
0-1'0"	TOPSOIL		
1'0"-3'6"	Gray brown SILT, some coarse to fine Sand	medium stiff	moist
3'6"-7'0"	Weathered Shale	dense	wet
7'0"	Refusal on bedrock		
	Groundwater encountered @ 3'6"	rapid inflow	

TP-24	Elevation +330.0		
0-1'0"	TOPSOIL		
1'0"-2'0"	Gray brown SILT, some coarse to fine Sand	medium stiff	moist
2'0"-4'0"	Weathered Shale		
4'0"	Refusal on bedrock		
	Groundwater encountered @ 2'0"	rapid inflow	
TP-25	Elevation +340.0		
0-0'8"	TOPSOIL		
0'8"-2'0"	Brown coarse to fine SAND, some (+) Silt, little coarse to fine Gravel	medium dense	moist
2'0"-5'2"	Weathered Shale		
5'2"	Refusal on bedrock		
	No water encountered		
TP-26	Elevation +345.0		
0-0'2"	TOPSOIL		
0'2"	Refusal on bedrock		
	No water encountered		

TP-27	Elevation +342.0		
0-1'0"	TOPSOIL		
1'0"-9'6"	Brown coarse to fine SAND, and Silt Silt, some (-) coarse to fine Gravel, cobbles, boulders	medium dense	moist
	Groundwater encountered @ 5'0"	slow inflow	
TP-28	Elevation +336.0		
0-1'0"	TOPSOIL		
1'0"-9'6"	Brown coarse to fine SAND, some Silt , little coarse to fine Gravel, cobbles, Boulders	medium dense	moist
	No water encountered		
TP-29	Elevation +330.0		
0-1'0"	TOPSOIL		
1'0"-9'0"	Weathered Shale		
	No water encountered		
TP_30	Elevation +332.0		
0-1'0"	TOPSOIL		
1'0"-4'0"	Brown coarse to fine Sand, some (-) Silt, and coarse to fine Gravel	medium dense	moist
4'0"-6'0"	Bedrock		
6'0"	Refusal on bedrock		
	No water encountered		

TP-31	Elevation +332.0		
0-0'9"	TOPSOIL		
0'9"	Refusal on bedrock		
	No water encountered		
TP-32	Elevation +328.0		
0-1'0"	TOPSOIL		
1'0"-3'0"	Brown coarse to fine SAND, and (-) Silt, and (-) coarse to fine Gravel	medium dense	moist
3'0"-5'6"	Gray coarse to fine GRAVEL and (+) coarse to fine Sand, some (-) Silt, with cobbles	medium dense	moist
5'6"-9'6"	Brown, black coarse to fine SAND, little Silt	medium dense	wet
	Groundwater @ 5'6"	slow inflow	
TP-33	Elevation +326.0		
0-1'0"	TOPSOIL		
1'0"-2'6"	Brown coarse to fine SAND, little Silt, some coarse to fine Gravel	medium dense	moist
2'6"-3'8"	Weathered Shale		
3'8"	Refusal on bedrock No water encountered		

TP-34	Elevation +324.0		
0-1'0"	TOPSOIL		
1'0"-10'0"	Brown coarse to fine SAND, trace (+) Silt, some coarse to fine Gravel, cobbles	medium dense	moist
	No water encountered		
TP-35	Elevation +323.0		
0-1'0"	TOPSOIL		
1'0"-9'8"	Brown coarse to fine GRAVEL and, coarse to fine Sand, trace Silt, with cobbles	medium dense	moist
	No water encountered		
TP-36	Elevation +321.0		
0-1'0"	TOPSOIL		
1'0"-3'4"	Brown SILT and, coarse to fine Sand, trace (+) medium to fine Gravel	medium dense	moist
3'4"-9'10"	Gray coarse to fine SAND, trace (+) Silt, some coarse to fine Gravel, cobbles	medium dense	moist
	Groundwater encountered @ 7'0"	rapid inflow	

TP-37	Elevation +322.0		
0-1'0"	TOPSOIL		
1'0"-3'8"	Brown coarse to fine Sand, some Silt, some coarse to fine Gravel	medium dense	moist
3'8"-5'8"	Gray coarse to fine SAND, trace (+) Silt, some (+) coarse to fine Gravel, cobbles	medium dense	moist
5'8"-6'0"	Weathered Shale		
6'0"	Refusal on bedrock		
	Groundwater encountered @ 5'8"	rapid inflow	
TP-38	Elevation +319.0		
0-1'0"	TOPSOIL		
1'0"-2'0"	Brown coarse to fine SAND, some Silt, some coarse to fine Gravel	medium dense	moist
2'0"-9'8"	Gray coarse to fine GRAVEL some (+), coarse to fine Sand, trace (+) Silt	medium dense	wet
	Groundwater encountered @ 3'0"	rapid inflow	
TP-39	Elevation +324.0		
0-0'10"	TOPSOIL		
0'10"-5'6"	Brown coarse to fine Sand, some Silt, some coarse to fine Gravel, cobbles	medium dense	moist
5'6"-8'6"	Weathered Shale		
8'6"	Refusal on bedrock		
	Groundwater encountered @ 8'0"	slow inflow	

TP-40	Elevation +319.4		
0-1'0"	TOPSOIL		
1'0"-3'6"	Brown SILT some, coarse to fine Sand, little coarse to fine Gravel	medium stiff	moist
3'6"-8'0"	Gray coarse to fine GRAVEL some (+), coarse to fine Sand, trace (+) Silt, cobbles	medium dense	wet
	Groundwater encountered @ 3'0"	rapid inflow	
TP-41	Elevation +318.0		
0-1'0"	TOPSOIL		
1'0"	Refusal on bedrock		
	No water encountered		
TP-42	Elevation +322.0		
0-0'8"	TOPSOIL		
0'8"-2'8"	Brown coarse to fine Sand, and Silt, trace fine Gravel	medium dense	moist
2'8"-5'0"	Gray, black coarse to fine GRAVEL some (+), coarse to fine Sand, little Silt	medium dense	wet
5'0"-7'0"	Gray, brown coarse to fine SAND, little Silt	loose	wet
	Groundwater encountered @ 4'0"	rapid inflow	

TP-43	Elevation +318.0		
0-0'8"	TOPSOIL		
0'8"-3'0"	Brown coarse to fine SAND, some (+) Silt, little coarse to fine Gravel	medium dense	moist
3'0"-9'6"	Gray coarse to fine SAND, little (-) Silt, and coarse to fine Gravel	medium dense	moist
	No water encountered		
TP-44	Elevation +324.0		
0-1'0"	TOPSOIL		
1'0"-9'4"	Brown coarse to fine SAND, some (+) Silt, trace coarse to fine Gravel	medium dense	moist
	No water encountered		
TP-45	Elevation +340.0		
0-0'8"	TOPSOIL		
0'8"-2'8"	Weathered Shale		
2'8"	Refusal on bedrock		
	No water encountered		
TP-46	Elevation +332.0		
0-0'6"	TOPSOIL		
0'6"-1'8"	Weathered Shale		
1'8"	Refusal on bedrock		
	No water encountered		

TP-47	Elevation +330.0		
0-0'8"	TOPSOIL		
0'8"-4'0"	Brown coarse to fine SAND, little (+) Silt, some coarse to fine Gravel, cobbles	medium dense	moist
4'0"-5'6"	Weathered Shale		
5'6"	Refusal on bedrock		
	No water encountered		
TP-48	Elevation +320.0		
0-1'0"	TOPSOIL		
1'0"-3'8"	Brown coarse to fine SAND, some (-) Silt, trace medium to fine Gravel	medium dense	moist
3'8"-4'9"	Weathered Shale		
4'9"	Refusal on bedrock		
	No water encountered		
TP_49	Elevation +324.0		
0-1'0"	TOPSOIL		
1'0"-2'5"	Brown coarse to fine SAND, some Silt, little coarse to fine Gravel	medium dense	moist
2'5"	Refusal on bedrock		
	No water encountered		

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TP-50	Elevation +324.0		
0-1'0"	TOPSOIL		
1'0"-2'0"	Weathered Shale		
2'0"	Refusal on bedrock		
	No water encountered		
TP-51	Elevation +312.0		
0-1'0"	TOPSOIL		
1'0"-8'6"	Brown coarse to fine SAND, little (-) Silt, some coarse to fine Gravel	medium dense	moist
	No water encountered		
TP-52	Elevation +310.6		
0-1'6"	TOPSOIL		
1'6"-6'0"	Brown coarse to fine SAND, little (+) Silt, little coarse to fine Gravel	medium dense	moist
	Groundwater encountered @ 4'0"	rapid inflow	

TP-53	Elevation +314.0		
0-1'2"	TOPSOIL		
1'2"-5'0"	Gray, brown coarse to fine Sand, and Silt, and medium to fine Gravel	medium dense	moist
5'0"-9'0"	Gray coarse to fine GRAVEL some, coarse to fine Sand, trace (+) Silt	loose	wet
	Groundwater @ 5'0"	rapid inflow	
TP-54	Elevation +318.0		
0-1'0"	TOPSOIL		
1'0"	Refusal on bedrock		
	No water encountered		
TP-55	Elevation +324.0		
0-1'0"	TOPSOIL		
1'0"-7'0"	Brown coarse to fine SAND, little Silt, little coarse to fine Gravel, cobbles	medium dense	moist
7'0"	Refusal on bedrock		
	No water encountered		

TP-56	Elevation +344.0		
0-1'0"	TOPSOIL		
1'0"-9'6"	Brown coarse to fine SAND, some (-) Silt, some (+) coarse to fine Gravel	medium dense	moist
	No water encountered		
TP-57	Elevation +342.0		
0-1'0"	TOPSOIL		
1'0"-10'0"	Brown coarse to fine SAND, little Silt, little coarse to fine Gravel, cobbles, boulders	medium dense	moist
	No water encountered		

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-1
Project: Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY		SHEET NO.: 1 of 1
Client: Ginsburg Development, LLC		JOB NUMBER: 05-182
Drilling Contractor: General Borings Inc.		ELEVATION: +360.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS	NQ		START DATE:	15 Feb 06
				DIA.	3 1/4"	1 3/8	1.875"		FINISH DATE:	15 Feb 06
No water encountered				WGHT		140#			DRILLER:	Rick P.
				FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			3		**TOPSOIL** 0'6"	
1		S-1	50/5"		Br cf S, s $, s cf G, weathered Shale	Rec = 6" moist
2						
3					**Brown coarse to fine SAND, some Silt, some coarse to fine Gravel, weathered Shale**	
4						
5						
6		S-2	50/4"		Gr mf G a (+), cf S, l $ (weathered shale)	Rec = 1" moist
7						
8						
9						
10					10'0"	auger refusal @ 10'0"
					Gr SHALE	
11			3 min			
12		Run #1	4 min		**Gray SHALE**	Run #1 10'0"-15'0"
13			5 min			Run = 60"
14			5 min			Rec = 54" % Rec = 54/60 = 90.0%
15			5 min		15'0"	RQD = 4/54 = 7.4%
16					**End of Boring @ 15'0"**	
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-2
Project: Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY		SHEET NO.: 1 of 1
Client: Ginsburg Development, LLC		JOB NUMBER: 05-182
Drilling Contractor: General Borings Inc.		ELEVATION: +315.5

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE:	15 Feb 06
				DIA.	3 1/4"	1 3/8			FINISH DATE:	15 Feb 06
No water encountered				WGHT		140#			DRILLER:	Rick P.
				FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**TOPSOIL** 0'9"	
1		S-1	2		Br cf S, s $, l cf G	Rec = 18"
			5			moist
2			11			
			10		Gr br cf S, l $, l cf G	
3		S-2	12			Rec = 15"
			14		**Gray brown coarse to fine SAND, some**	moist
4			15		**Silt, little coarse to fine Gravel**	
5						
			25		Gr, br cf S, s $, l cf G	
6		S-3	26			Rec = 12"
			29		6'6"	moist
7			100/3"		Weathered Shale	
8					**Weathered SHALE**	
9						
10					10'0"	Auger refusal @ 10'0"
					End of Boring @ 10'0"	
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-3
Project: Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY		SHEET NO.: 1 of 1
Client: Ginsburg Development, LLC		JOB NUMBER: 05-182
Drilling Contractor: General Borings Inc.		ELEVATION: +343.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS	NQ		START DATE:	16 Feb 06
				DIA.	3 1/4"	1 3/8	1 7/8"		FINISH DATE:	16 Feb 06
No water encountered				WGHT		140#			DRILLER:	Rick P.
				FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			3		**TOPSOIL** 0'5"	
1		S-1	7		Gr mf G a (+), cf S, l $ (weathered shale)	Rec = 6"
			12			moist
2			24			
			38		same	
3		S-2	50/4"			Rec = 3"
4					**Gray medium to fine Gravel and (+), coarse to fine Sand, little Silt (weathered shale)**	moist
5					5'0"	auger refusal at 5'0"
					Gr weathered SHALE	
6			3 min			
		Run #1				Run #1
7			4 min		**Gray weathered SHALE**	5'0"-9'0"
						Run = 48"
8			4 min			Rec = 44"
						% Rec = 44/48 = 91.6%
9			5 min		9'0"	RQD = 14/44 = 31.8%
					End of Boring @ 9'0"	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-4
Project: Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY		SHEET NO.: 1 of 1
Client: Ginsburg Development, LLC		JOB NUMBER: 05-182
Drilling Contractor: General Borings Inc.		ELEVATION: +321.6

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE:	16 Feb 06
16 Feb 06		5'0"	HSA	DIA.	3 1/4"	1 3/8			FINISH DATE:	16 Feb 06
				WGHT		140#			DRILLER:	Rick P.
				FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
1		S-1	1 2		Br gr $, t cf S **Brown gray SILT, trace coarse to fine Sand**	Rec = 6" wet
2			4 5		2'0"	
3		S-2	3 7		Gr, br $ s (-), cf S, t (+) cf G	Rec = 14"
4			11 13		**Gray, brown SILT some (-), coarse to fine Sand, trace (+) coarse to fine Gravel**	moist
5					5'0"	
6		S-3	45 50/1"		Br, gr cf S, s $, s cf G 5'6" **Brown, gray coarse to fine SAND, some Silt, some coarse to fine Gravel**	Rec = 6" wet
7						
8					**Weathered SHALE** 8'0"	Auger refusal @ 8'0"
9					**End of Boring @ 8'0"**	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-5

Project:	Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY	SHEET NO.:	1 of 1
Client:	Ginsburg Development, LLC	JOB NUMBER:	05-182
Drilling Contractor:	General Borings Inc.	ELEVATION:	+315.0
GROUNDWATER		DATUM:	

DATE	TIME	DEPTH	CASING		CASING	SAMPLE	CORE	TUBE		
				TYPE	HSA	SS			START DATE:	16 Feb 06
16 Feb 06	1500	3'0"	None	DIA.	3 1/4"	1 3/8			FINISH DATE:	16 Feb 06
				WGHT		140#			DRILLER:	Rick P.
				FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			1		**TOPSOIL**	
1		S-1	2		0'10"	Rec = 12"
			5		Br cf S, s $, s cf G	moist
2			8		**Brown coarse to fine SAND, some** 2'0"	
			6		**Silt, some coarse to fine Gravel**	
3		S-2	8		Br cf S, s $, l cf G	Rec = 18"
			11		**Brown coarse to fine SAND, some**	moist
4			14		**Silt, little coarse to fine Gravel** 4'0"	
5						
			12		Br cf S, s $, l cf G	
6		S-3	14		**Brown coarse to fine SAND, some**	Rec = 20"
			17		**Silt, little coarse to fine Gravel**	moist
7			13		7'0"	
			8		Weathered SHALE	
8		S-4	10			Rec = 3"
			11		**Weathered SHALE**	wet
9			50/3"			
10					10'0"	Auger refusal @ 10'0"
					End of Boring @ 10'0"	
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-6
Project: Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY		SHEET NO.: 1 of 1
Client: Ginsburg Development, LLC		JOB NUMBER: 05-182
Drilling Contractor: General Borings Inc.		ELEVATION: +319.3

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE:	16 Feb 06
				DIA.	3 1/4"	1 3/8			FINISH DATE:	16 Feb 06
No water encountered				WGHT		140#			DRILLER:	Rick P.
				FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			1		TOPSOIL	
1		S-1	2		0'10"	Rec = 12"
			2		Gr, br $, l cf S	moist
2			3			
			3		same	
3		S-2	5		**Gray, brown SILT, little coarse**	Rec = 14"
			7		**to fine Sand**	moist
4			11			
5					5'0"	
		S-3	50/4"		Weathered SHALE	Rec = 2"
6						moist
7						
					Weathered SHALE	
8						
9						
10					10'0"	auger refusal at 10'0"
					End of Boring 2 10'0"	
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-7
Project: Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY		SHEET NO.: 1 of 1
Client: Ginsburg Development, LLC		JOB NUMBER: 05-182
Drilling Contractor: General Borings Inc.		ELEVATION: +322.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE:	16 Feb 06
				DIA.	3 1/4"	1 3/8			FINISH DATE:	16 Feb 06
No water encountered				WGHT		140#			DRILLER:	Rick P.
				FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**TOPSOIL**	
1		S-1	5		0'10"	Rec = 10"
			7		Br cf S, l $, a cf G	moist
2			8			
			10		same	
3		S-2	7		**Brown coarse to fine SAND, little**	Rec = 6"
			7		**Silt, and coarse to fine Gravel**	moist
4			10		4'0"	
5						
		S-3	50/2"		Weathered SHALE	Rec = 1/2"
6						moist
7					**Weathered SHALE**	
8						
9						
10					10'0"	auger refusal at 10'0"
					End of Boring @ 10'0"	
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-8

Project:	Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY	**SHEET NO.:**	1 of 1
Client:	Ginsburg Development, LLC	**JOB NUMBER:**	05-182
Drilling Contractor:	General Borings Inc.	**ELEVATION:**	+342.0
GROUNDWATER		**DATUM:**	
START DATE:	17 Feb 06		
FINISH DATE:	17 Feb 06		
DRILLER:	Rick P.		
INSPECTOR:	FVO		

DATE	TIME	DEPTH	CASING
No water encountered			

	CASING	SAMPLE	CORE	TUBE
TYPE	HSA	SS		
DIA.	3 1/4"	1 3/8		
WGHT		140#		
FALL		30"		

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
1		S-1	50/3"		**TOPSOIL** 0'3"	Rec = 2"
					Weahtered SHALE	moist
2						
3					**Weathered SHALE**	
4						
5					5'0"	Auger refusal @ 5'0"
6			3 min		Gr SHALE	
7		Run #1	4 min			Run #1
8			4 min		**Gray SHALE**	5'0"-10'0" Run = 60" Rec = 56"
9			4 min			% Rec = 56/60 = 93.3% RQD = 0
10			5 min		10'0"	
11					**End of Boring @ 10'0"**	
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-9

Project:	Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY									SHEET NO.:	1 of 1
Client:	Ginsburg Development, LLC									JOB NUMBER:	05-182
Drilling Contractor:	General Borings Inc.									ELEVATION:	+330.0
GROUNDWATER						CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING		TYPE	HSA	SS			START DATE:	17 Feb 06
17 Feb 06	1100	2'0"	HSA		DIA.	3 1/4"	1 3/8			FINISH DATE:	17 Feb 06
					WGHT		140#			DRILLER:	Rick P.
					FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
1		S-1	1 2		**TOPSOIL** 0'10"	Rec = 6"
2			2 3		Br cf S, s $, l cf G	moist
3		S-2	4 6		same	Rec = 12"
4			10 14		**Brown coarse to fine SAND, some Silt, little coarse to fine Gravel**	wet
5						
6		S-3	8 10		Br, gr cf S, s (+) $, l cf G	Rec = 16"
7			19 50/5"		6'6" Weathered SHALE	wet
8					**Weathered SHALE**	
9					9'6"	Auger refusal @ 9'6"
10					**End of Boring @ 9'6"**	
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-10

Project:	Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY	**SHEET NO.:**	1 of 1
Client:	Ginsburg Development, LLC	**JOB NUMBER:**	05-182
Drilling Contractor:	General Borings Inc.	**ELEVATION:**	+310.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE:	17 Feb 06
17 Feb 06		5'0"	HSA	DIA.	3 1/4"	1 3/8			FINISH DATE:	17 Feb 06
				WGHT		140#			DRILLER:	Rick P.
				FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			1		**TOPSOIL**	
1		S-1	2		0'10"	Rec = 6"
			2		Br, gr cf S, l $, l cf G	moist
2			3			
			5		same	
3		S-2	8			Rec = 2"
			12		**Brown, gray coarse to fine SAND,**	moist
4			15		**little Silt, little coarse to fine Gravel**	
5						
			5		same	
6		S-3	10			Rec = 15"
			7			wet
7			9			
			7		same	
8		S-4	8			Rec = 9"
			9			wet
9			13			
10						
			3		same	
11		S-5	5			Rec = 18"
			7			wet
12			8			
13						
14						
15					15'0"	
		S-6	50/1"		Weathered SHALE	Rec = 1/2"
16						
17					**Weathered SHALE**	
18						
					18'6"	Auger refusal @ 18'6"
19					**End of Boring @ 18'6"**	
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-11
Project: Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY		SHEET NO.: 1 of 1
Client: Ginsburg Development, LLC		JOB NUMBER: 05-182
Drilling Contractor: General Borings Inc.		ELEVATION: +318.7

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE:	17 Feb 06
17 Feb 06		5'0"	HSA	DIA.	3 1/4"	1 3/8			FINISH DATE:	17 Feb 06
				WGHT		140#			DRILLER:	Rick P.
				FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			3		**TOPSOIL**	
1		S-1	7		0'10"	Rec = 6"
			50/2"		Br cf S, l (+) $, s (+) cf G	moist
2						
						Cobbles
3						
4					**Brown coarse to fine SAND, little (+) Silt, some coarse to fine Gravel**	
5						
			8		Br cf S, l (+) $, s cf G	
6		S-2	8			Rec = 12"
			9			wet
7			9			
			11		Br cf S, s $, s mf G	
8		S-3	11			Rec = 1"
			11			wet
9			11			
10						
			7		same	
11		S-4	8			No recovery
			11			
12			13			
13					13'0"	
14					**Weathered Shale**	
15					15'0"	auger refusal at 15'0"
					End of Boring @ 15'0"	
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-12

Project:	Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY	SHEET NO.:	1 of 1
Client:	Ginsburg Development, LLC	JOB NUMBER:	05-182
Drilling Contractor:	General Borings Inc.	ELEVATION:	+330.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE:	17 Feb 06
20 Feb 06	0830	14'0"	HSA	DIA.	3 1/4"	1 3/8			FINISH DATE:	20 Feb 06
				WGHT		140#			DRILLER:	Rick P.
				FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sy m	IDENTIFICATION	REMARKS
1		S-1	2 3		**TOPSOIL** 0'10"	Rec = 6"
2			50/5"		Br cf S, s $, s cf G	wet
3					Cobbles, boulders	
4					**Brown coarse to fine Sand, some Silt, some coarse to fine Gravel**	
5						
6		S-2	8 8		Br cf S, s (+) $, s mf G	Rec = 14"
7			17 21			wet
8		S-3	21 19		same	Rec = 10"
9			15 17			wet
10						
11		S-4	7 14		same	Rec = 18"
12			16 46			wet
13					13'0"	
14						
15						
16		S-5	19 27		Weathered SHALE	Rec = 14"
17			38 56		**Weathered SHALE**	wet
18						
19					19'0"	auger refusal at 19'0"
20					**End of Boring @ 19'0"**	
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-13
Project: Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY		SHEET NO.: 1 of 1
Client: Ginsburg Development, LLC		JOB NUMBER: 05-182
Drilling Contractor: General Borings Inc.		ELEVATION: +358.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS	NQ		START DATE:	20 Feb 06
				DIA.	3 1/4"	1 3/8	1 7/8"		FINISH DATE:	20 Feb 06
No water encountered				WGHT		140#			DRILLER:	Rick P.
				FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
1		S-1	13 100/4"		Br cf S, s $, l cf G **Brown coarse to fine SAND, some Silt, little coarse to fine Gravel** 0'10"	Rec = 4" moist
2						
3					Weathered SHALE	
4					**Weathered SHALE**	
5						Auger refusal @ 5'6"
		S-2	100/1"		5'6"	Rec = 1"
6					Gr SHALE	moist
7			4 min			
8		Run #1	4 min		**Gray SHALE**	Run #1 5'6"-10'6"
9			4 min			Run = 60" Rec = 60"
10			4 min			% Rec = 100% RQD = 14/60 = 23.3%
11			4 min		10'6" **End of Boring @ 10'6"**	
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-14
Project: Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY		SHEET NO.: 1 of 1
Client: Ginsburg Development, LLC		JOB NUMBER: 05-182
Drilling Contractor: General Borings Inc.		ELEVATION:

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE:	20 Feb 06
				DIA.	3 1/4"	1 3/8			FINISH DATE:	20 Feb 06
No water encountered				WGHT		140#			DRILLER:	Rick P.
				FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
1		S-1	50/1"		Weathered SHALE	Rec = 1"
2						
3					**Weathered SHALE**	
4						
5					5'0"	Auger refusal @ 5'0"
6			3 min		Gr SHALE	
7		Run #1	4 min			Run #1
8			5 min		**Grav SHALE**	5'0"-10'0" Run = 60"
9			4 min			Rec = 50" % Rec = 50/60 = 83.3%
10			5 min		10'0"	RQD = 0
11					**End of Boring @ 10'0"**	
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN - SIMPSON & ASSOCIATES Sayreville, NJ	TEST BORING LOG	BORING NUMBER B-15

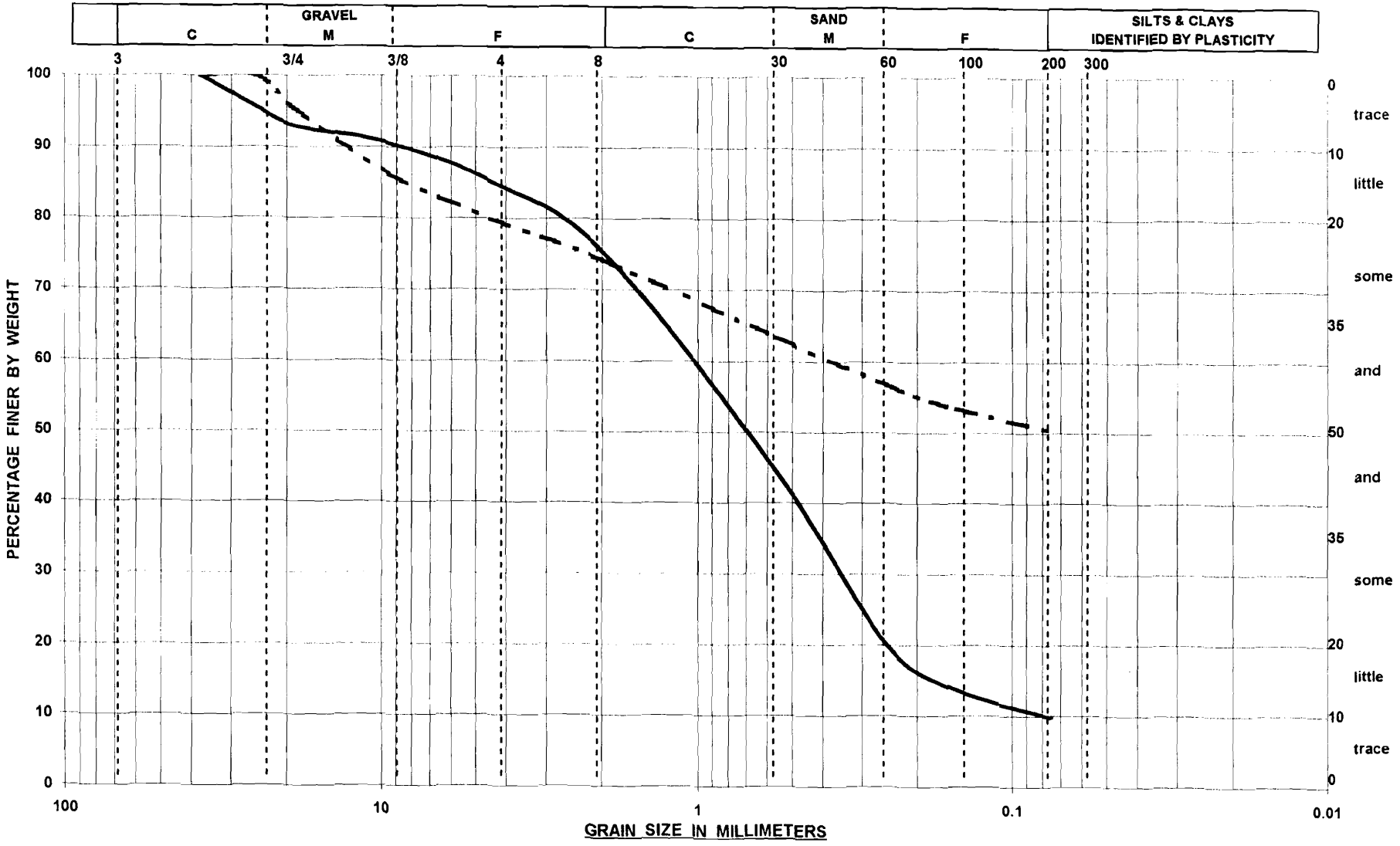
Project:	Proposed LaGrange Town Center, Route 55 and Lauer Rd., LaGrange, NY	SHEET NO.:	1 of 1
Client:	Ginsburg Development, LLC	JOB NUMBER:	05-182
Drilling Contractor:	General Borings Inc.	ELEVATION:	+326.0

GROUNDWATER					CASING	SAMPLE	CORE	TUBE	DATUM:	
DATE	TIME	DEPTH	CASING	TYPE	HSA	SS			START DATE:	20 Feb 06
				DIA.	3 1/4"	1 3/8			FINISH DATE:	20 Feb 06
No water encountered				WGHT		140#			DRILLER:	Rick P.
				FALL		30"			INSPECTOR:	FVO

Depth (ft.)	Casing Blows per Foot	Sample Number	Blows on Sample Spoon per 6"	Sym	IDENTIFICATION	REMARKS
			2		**TOPSOIL**	
1		S-1	1		0'10"	Rec = 18"
			4		Br $ s, cf S, t cf G cobbles	moist
2			9			
3					**Brown SILT some, coarse to fine Sand, trace coarse to fine Gravel, cobbles**	
4						
5						
			5		same	
6		S-2	8			Rec = 18"
			14			moist
7			21			
			20		same	
8		S-3	39			Rec = 12"
			50/2"			moist
9					9'0"	Auger refusal @ 9'0"
					End of Boring @ 9'0"	
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

CARLIN-SIMPSON & ASSOCIATES
SAYREVILLE, NJ 08872

SIEVE ANALYSIS



SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION
———	TP-4	S-1	2'0"-8'0"	Gray green coarse to fine SAND, trace (+) Silt, some (-) coarse to fine Gravel
— -	TP-5	S-1	0'6"-2'0"	Light brown SILT and (+), coarse to fine Sand, some coarse to fine Gravel

PROJECT LaGrange Town Center LaGrange, New York BY LYD DATE 29-Jun-06 JOB NO 05-182

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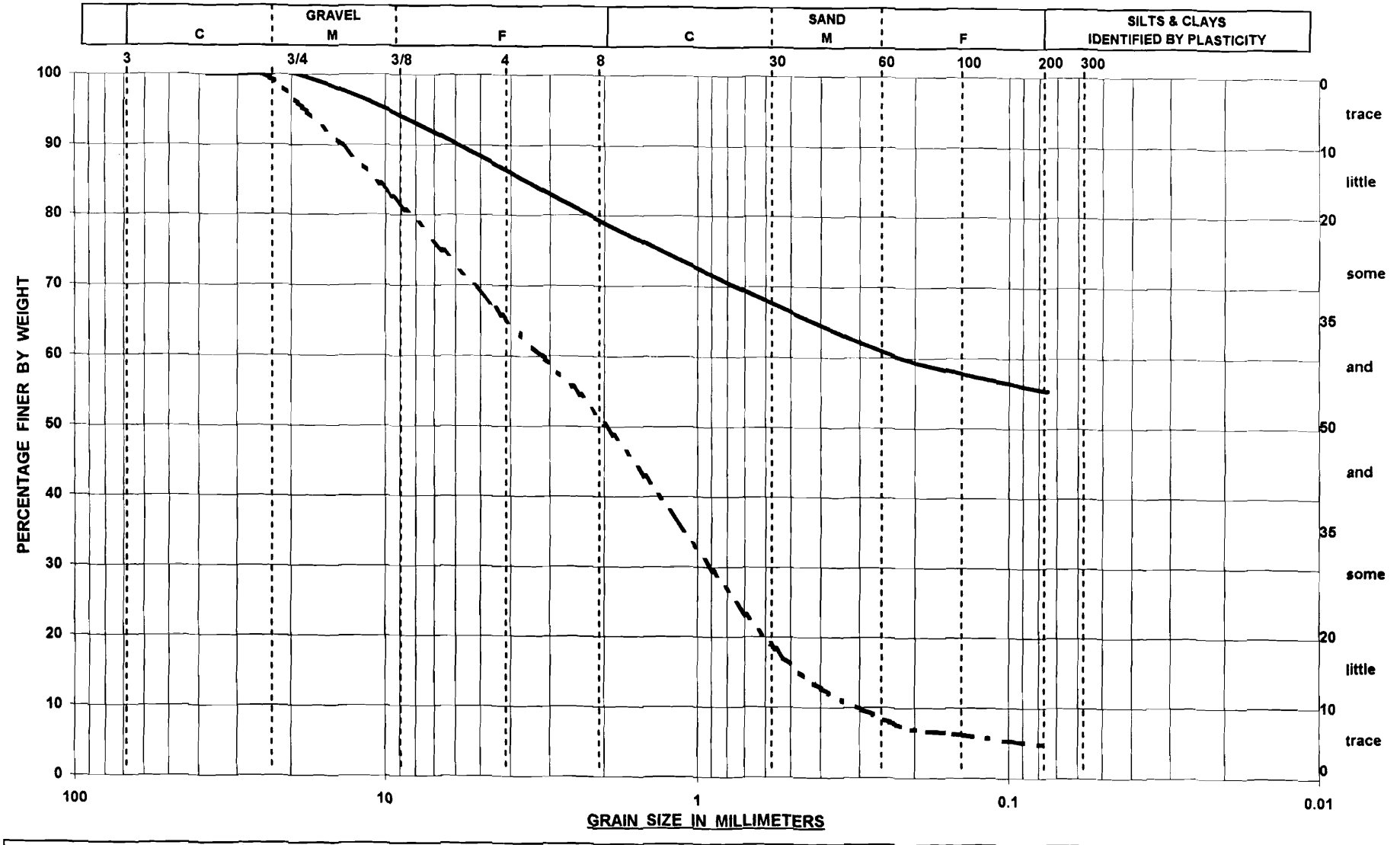
SAYREVILLE, NJ 08872

SIEVE ANALYSIS



SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION
———	TP-10	S-1	0'8"-10'0"	Brown SILT and, coarse to fine Sand, some (-) medium to fine Gravel
— -	TP-13	S-1	0'8"-10'0"	Brown coarse to fine SAND, trace Silt, and (+) coarse to fine Gravel

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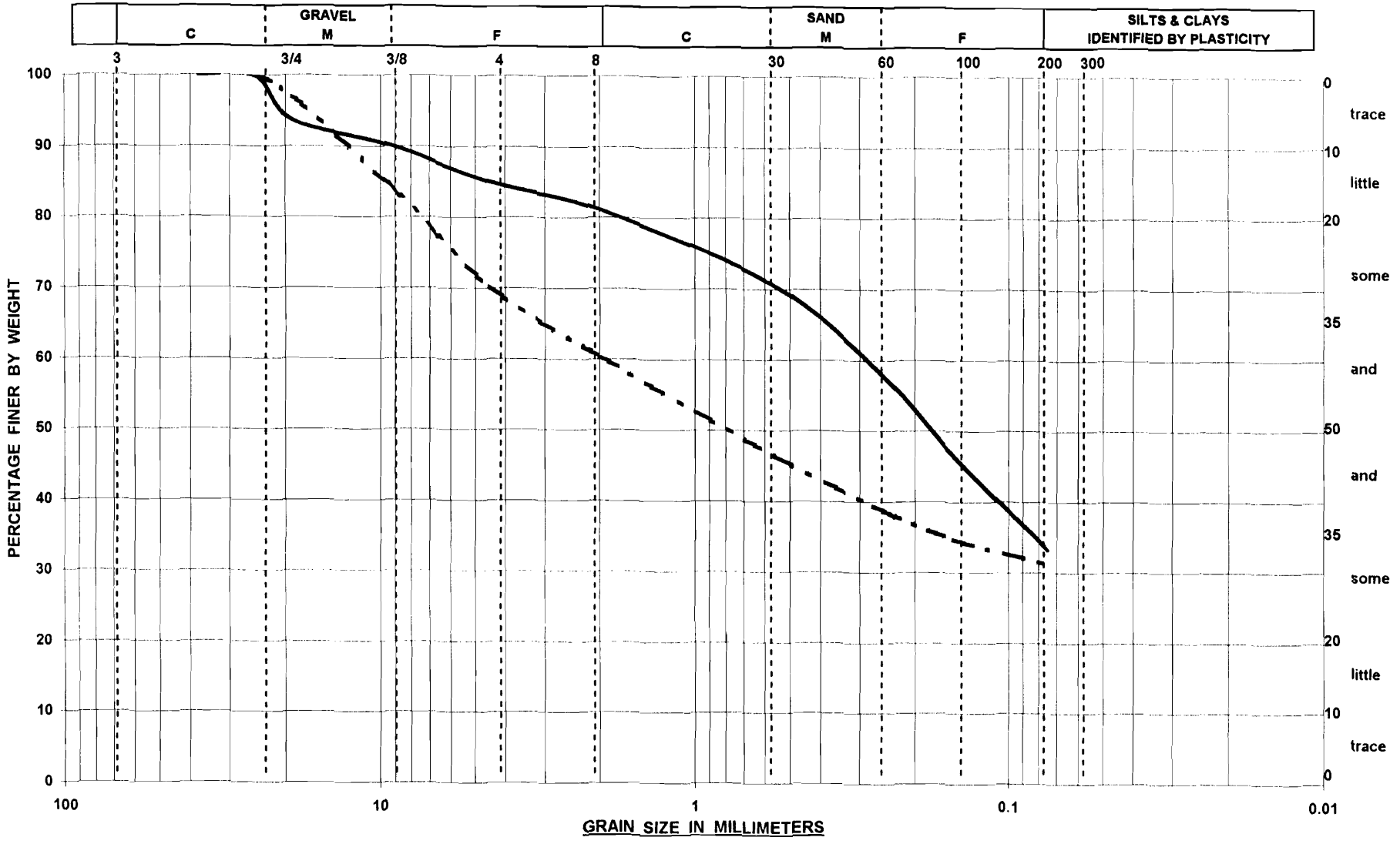
SIEVE ANALYSIS



SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION
———	TP-14	S-1	1'0"-4'0"	Brown coarse to fine SAND, some (+) Silt, little (+) coarse to fine Gravel
— -	TP-16	S-1	1'0"-5'0"	Brown coarse to fine SAND, some (+) Silt, and (-) coarse to fine Gravel

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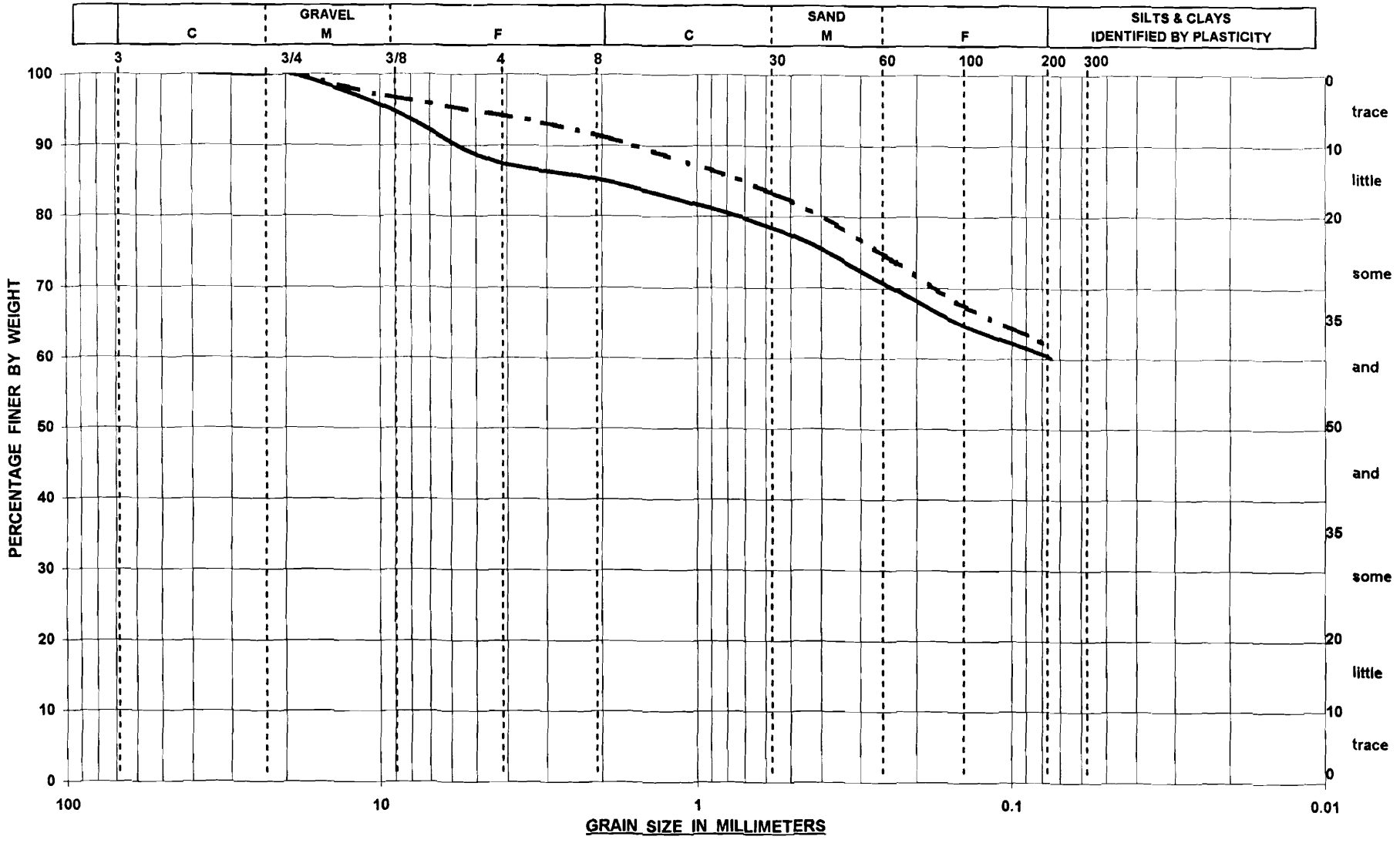
SIEVE ANALYSIS



SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION
———	TP-17	S-1	0'8"-4'0"	Brown SILT and (-), coarse to fine Sand, little medium to fine Gravel
— -	TP-18	S-1	0'6"-5'0"	Brown gray SILT and (-), coarse to fine Sand, trace (+) medium to fine Gravel

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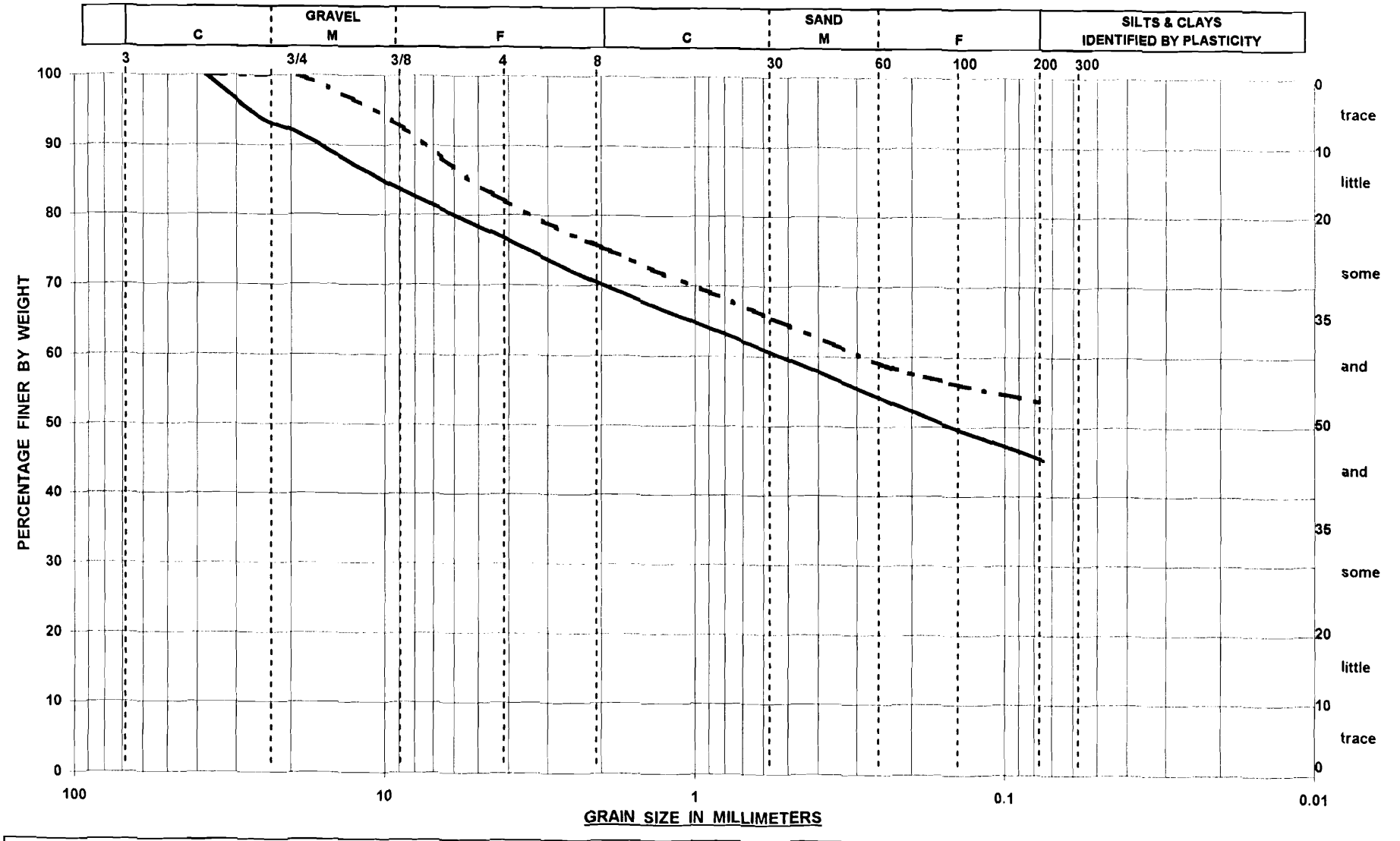
SIEVE ANALYSIS



SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION
———	TP-21	S-1	0'6"-2'0"	Brown coarse to fine SAND, and (+) Silt, some coarse to fine Gravel
— -	TP-22	S-1	1'0"-2'0"	Gray brown SILT and (+), coarse to fine Sand, some (-) medium to fine Gravel

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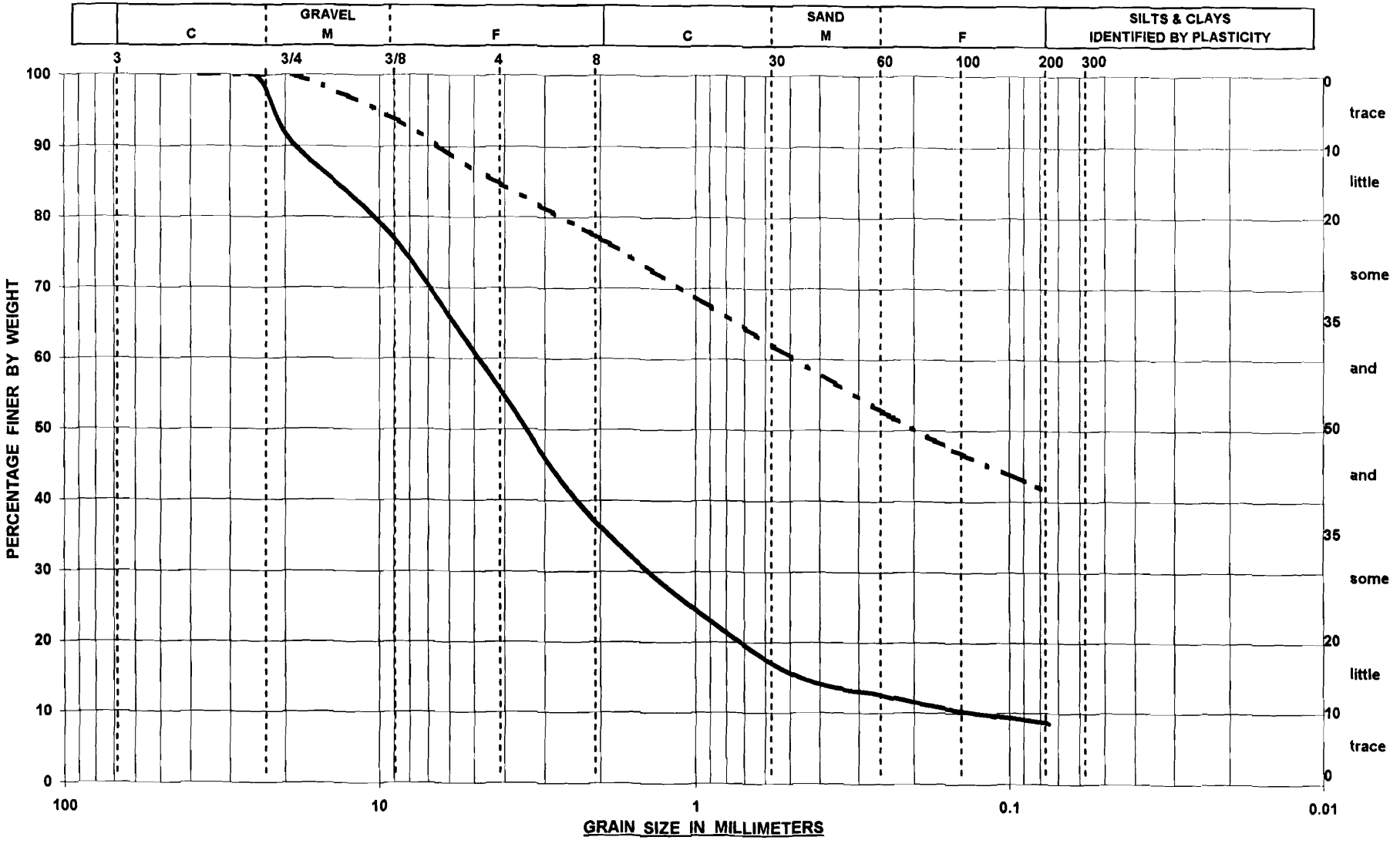
SIEVE ANALYSIS



SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION
———	TP-22	S-2	2'0"-7'0"	Gray coarse to fine GRAVEL and (-), coarse to fine Sand, trace (+) Silt
— -	TP-27	S-1	1'0"-9'6"	Brown coarse to fine SAND, and Silt, some (-) medium to fine Gravel

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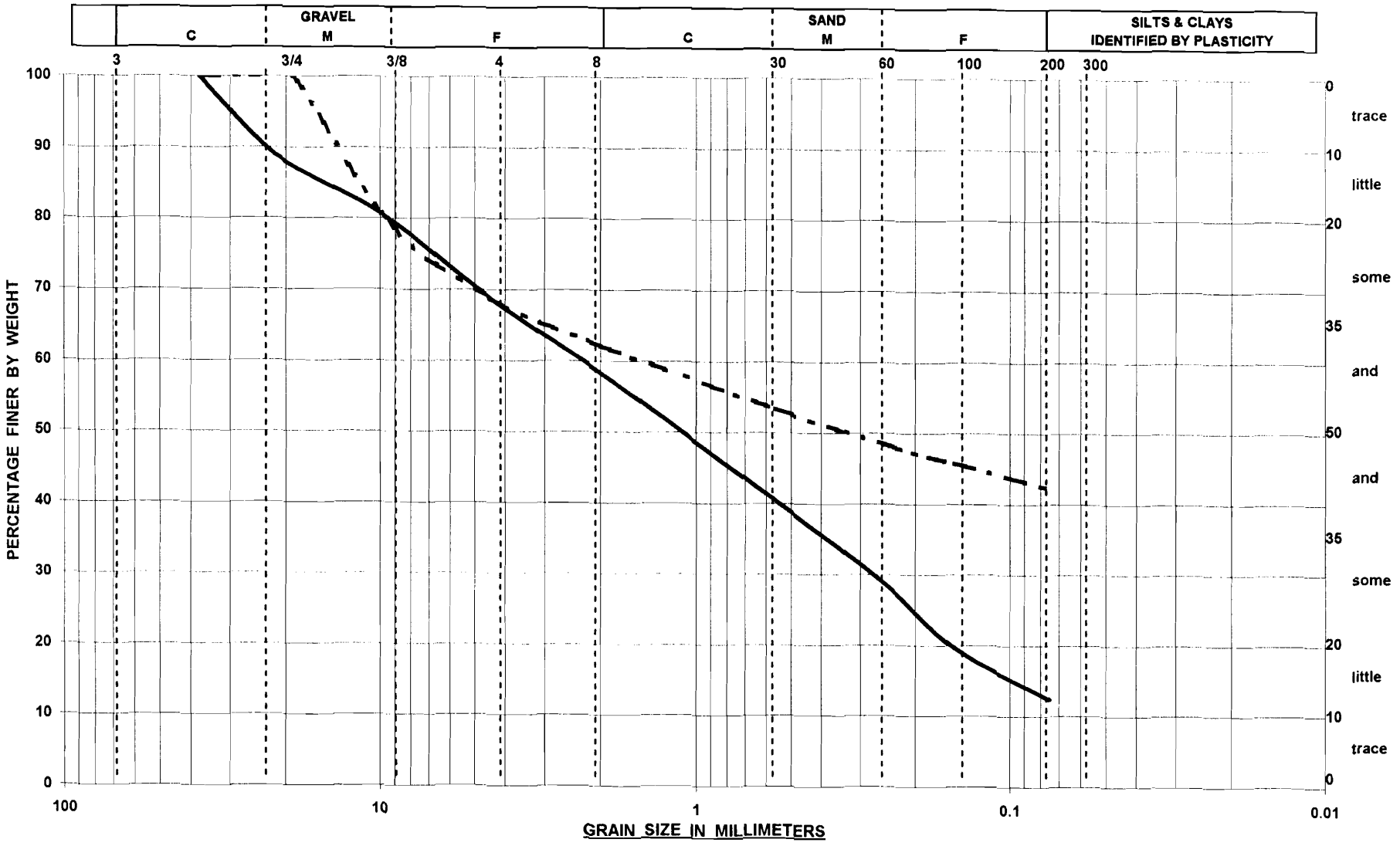
SIEVE ANALYSIS



SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION
———	TP-43	S-1	3'0"-9'6"	Gray coarse to fine SAND, little (-) Silt, and coarse to fine Gravel
— -	TP-53	S-1	1'2"-5'0"	Gray brown coarse to fine SAND, and Silt, and (-) medium to fine Gravel

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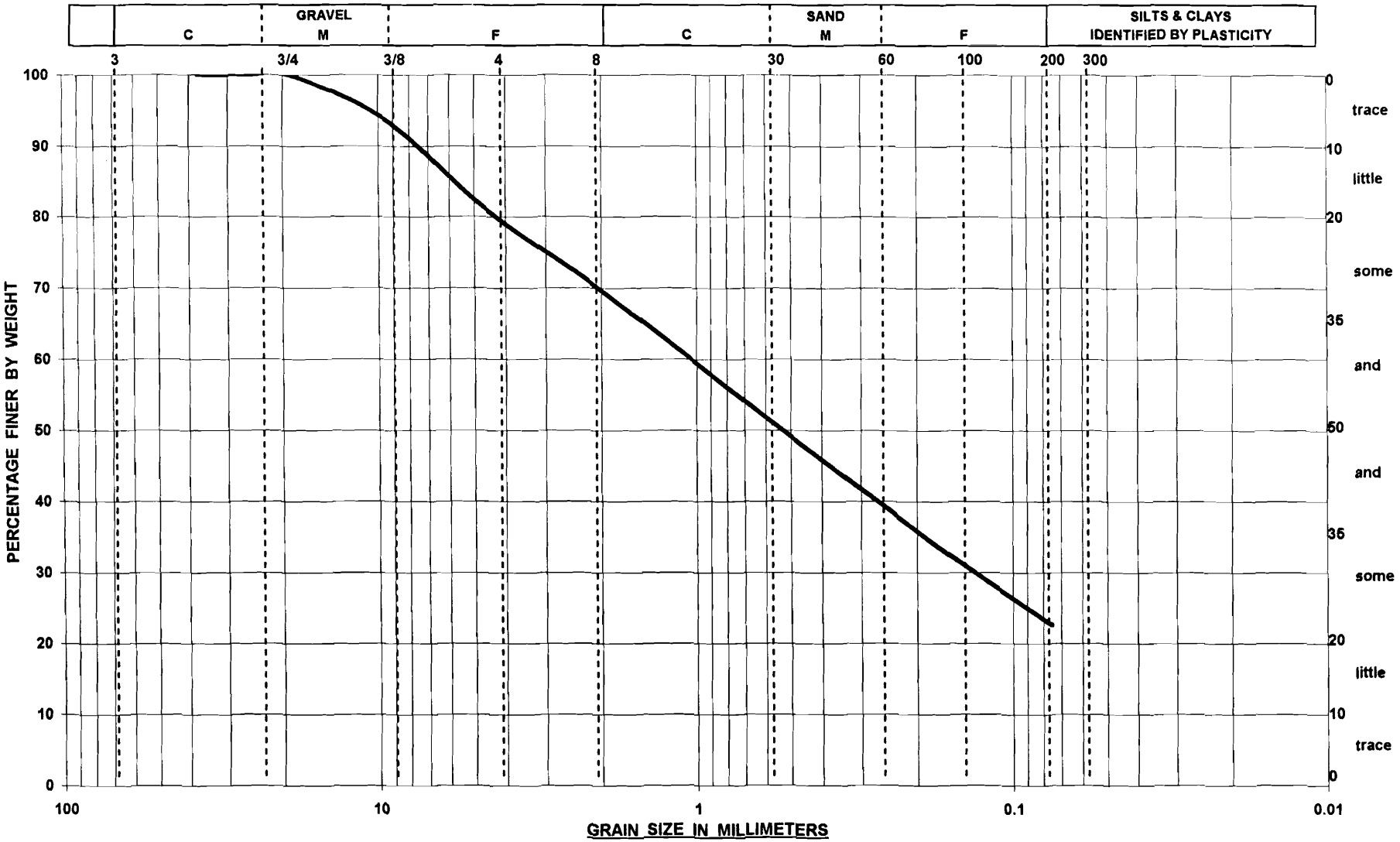
SIEVE ANALYSIS



SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION
———	TP-56	S-1	1'0"-9'6"	Brown coarse to fine Sand, some (-) Silt, some (+) medium to fine Gravel

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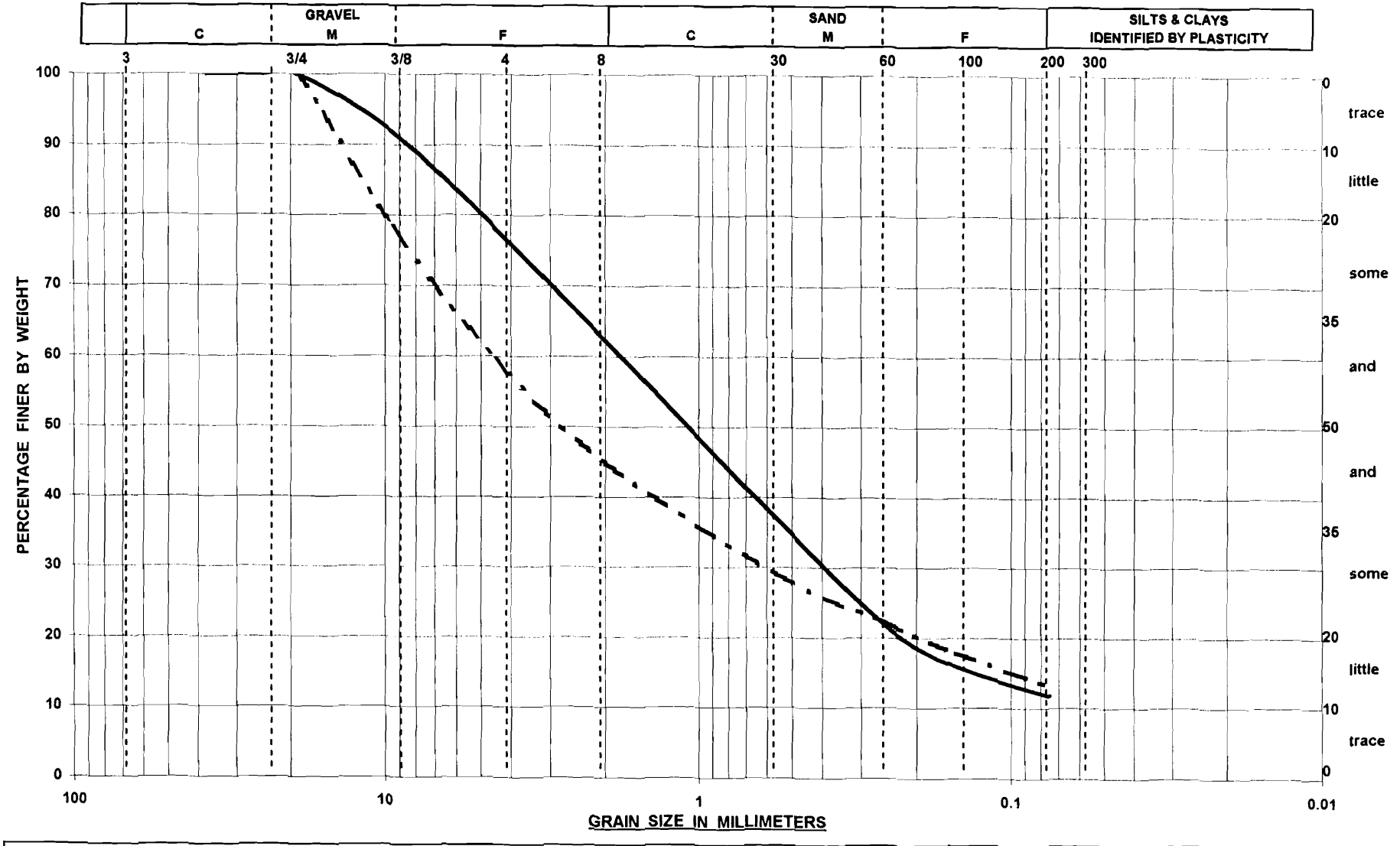
SIEVE ANALYSIS



SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION
———	B-2	S-2	2'0"-4'0"	Gray brown coarse to fine SAND, little (-) Silt, little (+) medium to fine Gravel
— -	B-3	S-1	0'0"-2'0"	Gray medium to fine GRAVEL and, coarse to fine Sand, little Silt

PROJECT LaGrange Town Center LaGrange, NY BY LYD DATE 29-Jun-06 JOB NO 05-182

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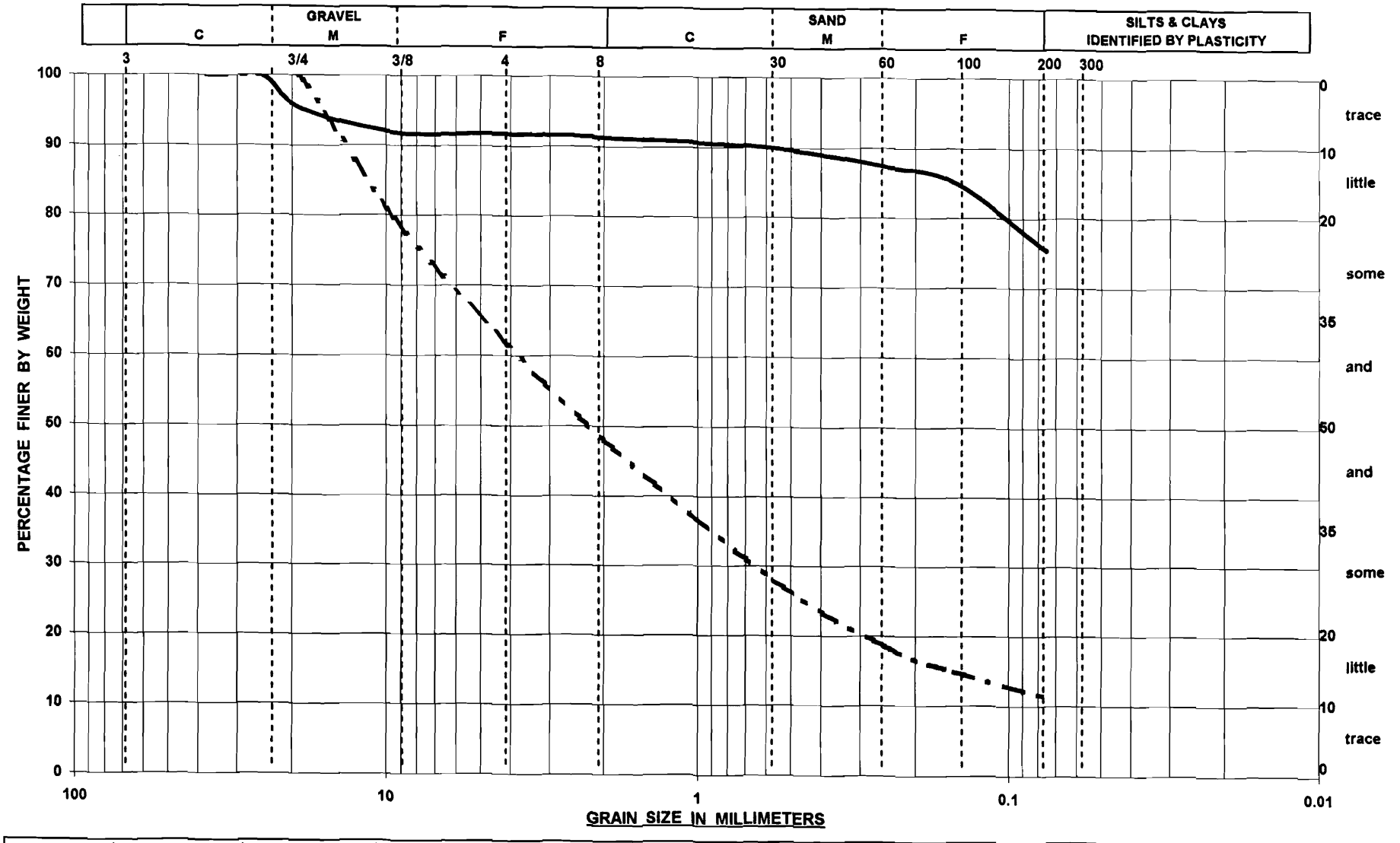
SIEVE ANALYSIS



SYMBOL	BORING	SAMPLE	DEPTH	DESCRIPTION
———	B-4	S-2	2'0"-4'0"	Gray brown SILT some (-), coarse to fine Sand, trace (+) coarse to fine Gravel
— -	B-7	S-1	0'0"-2'0"	Brown medium to fine GRAVEL and (+), coarse to fine Sand, little (-) Silt

PROJECT LaGrange Town Center LaGrange, New York BY LYD DATE 29-Jun-06 JOB NO 05-182

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **1** Replicate (letter)

2. Sample Depth **0'10"-2'0"** Soil Pit/Boring Number **B-5, S-1** Date Collected **16 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**174.19**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**48.30**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**27.7%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **39.63**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **15**
   Temperature of Suspension, °F **74°**

7. Corrected Hydrometer Reading, Grams R1' **15 – 6 + 0.9 = 9.9**

8. Hydrometer Reading, 2 hours, grams, R2' **8**
   Temperature of Suspension, °F **74 °**

9. Corrected Hydrometer Reading, grams, R2' **8 – 6 + 0.9 = 2.9**

10. % sand = (Wt. – R1')/Wt. x 100 = **(39.63 – 9.9)/39.63 x 100 = 75.02%**

11. % clay = R2'/Wt. x 100 = **2.9/39.63 x 100 = 7.32%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **11.85**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **5.00**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **42.2%%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-4**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B Dragovich **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **2** Replicate (letter)

2. Sample Depth **2'-4'** Soil Pit/Boring Number **B-6, S-2** Date Collected **16 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**182.77**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**14.98**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**8.2%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **40.0**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **12**
   Temperature of Suspension, °F **74°**

7. Corrected Hydrometer Reading, Grams R1' **12 – 6 + 0.9 = 6.9**

8. Hydrometer Reading, 2 hours, grams, R2' **7**
   Temperature of Suspension, °F **74 °**

9. Corrected Hydrometer Reading, grams, R2' **7 – 6 + 0.9 = 1.9**

10. % sand = (Wt. – R1')/Wt. x 100 = **(40.0 – 6.9)/40.0 x 100 = 82.7%**

11. % clay = R2'/Wt. x 100 = **1.9/40.0 x 100 = 4.7%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **15.30**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **8.07**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **52.7%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-3**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B. Simpson **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **3** Replicate (letter)

2. Sample Depth **5'0"-6'6"** Soil Pit/Boring Number **B-9, S-3** Date Collected **17 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**200.0**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**82.6**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**41.3%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **39.9**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **8**
   Temperature of Suspension, °F **76°**

7. Corrected Hydrometer Reading, Grams R1' **8 – 6 + 1.2 = 3.2**

8. Hydrometer Reading, 2 hours, grams, R2' **6**
   Temperature of Suspension, °F **76°**

9. Corrected Hydrometer Reading, grams, R2' **6 – 6 + 1.2 = 1.2**

10. % sand = (Wt. – R1')/Wt. x 100 = **(39.9 – 3.2)/39.9 x 100 = 92.0%**

11. % clay = R2'/Wt. x 100 = **1.2/39.9 x 100 = 3.0%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **24.14**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **6.08**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **25.19%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-5**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B. Simpson **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **4** Replicate (letter)

2. Sample Depth **2'-4'** Soil Pit/Boring Number **B-10, S-2** Date Collected **17 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**101.82**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**63.48**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**62.34%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **37.04**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **13**
   Temperature of Suspension, °F **75°**

7. Corrected Hydrometer Reading, Grams R1' **13 – 6 + 1.05 = 8.05**

8. Hydrometer Reading, 2 hours, grams, R2' **7**
   Temperature of Suspension, °F **75°**

9. Corrected Hydrometer Reading, grams, R2' **7 – 6 + 1.05 = 2.05**

10. % sand = (Wt. – R1')/Wt. x 100 = **(37.04 – 8.05)/37.04 x 100 = 78.27%**

11. % clay = R2'/Wt. x 100 = **2.05/37.04 x 100 = 5.5%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **28.60**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **11.84**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **41.4%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-4**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B Simpson **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **5** Replicate (letter)

2. Sample Depth **5'-7'** Soil Pit/Boring Number **B-11, S-2** Date Collected **17 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**302.68**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**188.64**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**62.32%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **39.99**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **11**
   Temperature of Suspension, °F **76°**

7. Corrected Hydrometer Reading, Grams R1' **11 – 6 + 1.2 = 5.2**

8. Hydrometer Reading, 2 hours, grams, R2' **7**
   Temperature of Suspension, °F **76°**

9. Corrected Hydrometer Reading, grams, R2' **7 – 6 + 1.2 = 2.2**

10. % sand = (Wt. – R1')/Wt. x 100 = **(39.99 – 5.2)/39.99 x 100 = 87.0%**

11. % clay = R2'/Wt. x 100 = **2.2/39.99 x 100 = 5.5%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **28.91**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **6.09**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **21.1%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-4**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B. Kingsbury **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **6** Replicate (letter)

2. Sample Depth **5'-7'** Soil Pit/Boring Number **B-12, S-2** Date Collected **17 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**200.0**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**109.88**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**54.9%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **39.75**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **9**
   Temperature of Suspension, °F **76°**

7. Corrected Hydrometer Reading, Grams R1' **9 – 6 + 1.2 = 4.2**

8. Hydrometer Reading, 2 hours, grams, R2' **7**
   Temperature of Suspension, °F **76°**

9. Corrected Hydrometer Reading, grams, R2' **7 – 6 + 1.2 = 2.2**

10. % sand = (Wt. – R1')/Wt. x 100 = **(39.75 – 4.2)/39.75 x 100 = 89.43%**

11. % clay = R2'/Wt. x 100 = **2.2/39.75 x 100 = 5.53%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **26.31**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **7.07**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **26.9%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-5**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2/28/07

Signature of Professional Engineer Calvert B. Simpson **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **7** Replicate (letter)

2. Sample Depth **5'-7'** Soil Pit/Boring Number **B-15, S-2** Date Collected **20 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**200.0**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**27.80**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**13.9%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **39.84**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **8**
   Temperature of Suspension, °F **76°**

7. Corrected Hydrometer Reading, Grams R1' **8 – 6 + 1.2 = 3.2**

8. Hydrometer Reading, 2 hours, grams, R2' **7**
   Temperature of Suspension, °F **76°**

9. Corrected Hydrometer Reading, grams, R2' **7 – 6 + 1.2 = 2.2**

10. % sand = (Wt. – R1')/Wt. x 100 = **(39.84 – 3.2)/39.84 x 100 = 91.97%**

11. % clay = R2'/Wt. x 100 = **3.2/39.84 x 100 = 5.5%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **11.33**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **6.62**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **58.4%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-4**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B. Simpson **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **8** Replicate (letter)

2. Sample Depth **0'3"-5'0"** Soil Pit/Boring Number **TP-1, S-1** Date Collected **21 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**200.0**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**39.28**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**19.6%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **39.73**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **25**
   Temperature of Suspension, °F **74°**

7. Corrected Hydrometer Reading, Grams R1' **25.0 – 6.0 + 0.9 = 19.9**

8. Hydrometer Reading, 2 hours, grams, R2' **10**
   Temperature of Suspension, °F **74°**

9. Corrected Hydrometer Reading, grams, R2' **10 - 6 + 0.9 = 4.9**

10. % sand = (Wt. – R1')/Wt. x 100 = **(39.73 – 19.9)/39.7 x 100 = 49.9%**

11. % clay = R2'/Wt. x 100 = **4.9/39.7 x 100 = 12.3%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **7.84**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **3.01**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **38.4%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-3**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B. Simpson **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **9** Replicate (letter)

2. Sample Depth **1'-5'** Soil Pit/Boring Number **TP-16, S-1** Date Collected **22 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**200.0**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**62.7**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**31.3%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **39.6**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **9**
   Temperature of Suspension, °F **76°**

7. Corrected Hydrometer Reading, Grams R1' **9 – 6 + 1.2 = 4.2**

8. Hydrometer Reading, 2 hours, grams, R2' **6.0**
   Temperature of Suspension, °F **76°**

9. Corrected Hydrometer Reading, grams, R2' **6 - 6 + 1.2 = 1.2**

10. % sand = (Wt. – R1')/Wt. x 100 = **(39.6 – 4.2)/39.6 x 100 = 89.4%**

11. % clay = R2'/Wt. x 100 = **1.2/39.6 x 100 = 3.0%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **17.48**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **4.85**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **27.7%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-4**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B Simpson **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **10** Replicate (letter)

2. Sample Depth **1'0"-3'6"** Soil Pit/Boring Number **TP-23, S-1** Date Collected **22 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**200.0**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**54.8**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**27.4%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **39.8**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **14**
   Temperature of Suspension, °F **76°**

7. Corrected Hydrometer Reading, Grams R1' **14 – 6 + 1.2 = 9.2**

8. Hydrometer Reading, 2 hours, grams, R2' **6**
   Temperature of Suspension, °F **76°**

9. Corrected Hydrometer Reading, grams, R2' **6 - 6 + 1.2 = 1.2**

10. % sand = (Wt. – R1')/Wt. x 100 = **(39.8 – 9.2)/39.8 x 100 = 76.9%**

11. % clay = R2'/Wt. x 100 = **1.2/39.8 x 100 = 3.0%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **15.8**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **6.1**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **38.6%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-4**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B Dempsey **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **11** Replicate (letter)

2. Sample Depth **1'0"-3'6"** Soil Pit/Boring Number **TP-40, S-1** Date Collected **23 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**200.0**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**22.5**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**11.2%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **39.8**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **14**
   Temperature of Suspension, °F **76°**

7. Corrected Hydrometer Reading, Grams R1' **14 – 6 + 1.2 = 9.2**

8. Hydrometer Reading, 2 hours, grams, R2' **8**
   Temperature of Suspension, °F **76°**

9. Corrected Hydrometer Reading, grams, R2' **8 - 6 + 1.2 = 3.2**

10. % sand = (Wt. – R1')/Wt. x 100 = **(39.8 – 9.2)/39.8 x 100 = 76.9%**

11. % clay = R2'/Wt. x 100 = **3.2/39.8 x 100 = 8.0%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **12.5**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **6.8**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **54.4%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-3**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B Simpson **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **12** Replicate (letter)

2. Sample Depth **3'6"-8'0"** Soil Pit/Boring Number **TP-40, S-1** Date Collected **23 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**200.0**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**110.1**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**55.0%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **39.8**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **10**
   Temperature of Suspension, °F **76°**

7. Corrected Hydrometer Reading, Grams R1' **10 – 6 + 1.2 = 5.2**

8. Hydrometer Reading, 2 hours, grams, R2' **7**
   Temperature of Suspension, °F **76°**

9. Corrected Hydrometer Reading, grams, R2' **7-6 + 1.2 = 2.2**

10. % sand = (Wt. – R1')/Wt. x 100 = **(39.8 – 5.2)/39.8 x 100 = 86.9%**

11. % clay = R2'/Wt. x 100 = **2.2/39.8 x 100 = 5.5%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **25.6**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **6.1**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **23.8%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-4**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B. Simpson **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **13** Replicate (letter)

2. Sample Depth **1'0"-9'4"** Soil Pit/Boring Number **TP-44, S-1** Date Collected **24 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**200.0**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**36.4**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**18.2%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **39.8**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **13**
   Temperature of Suspension, °F **76°**

7. Corrected Hydrometer Reading, Grams R1' **13 – 6 + 1.2 = 8.2**

8. Hydrometer Reading, 2 hours, grams, R2' **8**
   Temperature of Suspension, °F **76°**

9. Corrected Hydrometer Reading, grams, R2' **8 - 6 + 1.2 = 3.2**

10. % sand = (Wt. – R1')/Wt. x 100 = **(39.8 – 8.2)/39.8 x 100 = 79.4%**

11. % clay = R2'/Wt. x 100 = **3.2/39.8 x 100 = 8.0%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **12.2**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **6.0**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **49.2%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-4**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B. Simpson **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **14** Replicate (letter)

2. Sample Depth **1'0"-3'8"** Soil Pit/Boring Number **TP-48, S-1** Date Collected **24 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**321.19**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**46.05**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**14.34%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **39.69**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **9**
   Temperature of Suspension, °F **76°**

7. Corrected Hydrometer Reading, Grams R1' **9 – 6 + 1.2 = 4.2**

8. Hydrometer Reading, 2 hours, grams, R2' **7**
   Temperature of Suspension, °F **76°**

9. Corrected Hydrometer Reading, grams, R2' **7 - 6 + 1.2 = 2.2**

10. % sand = (Wt. – R1')/Wt. x 100 = **(39.69 – 4.2)/39.69 x 100 = 89.4%**

11. % clay = R2'/Wt. x 100 = **2.2/39.69 x 100 = 5.5%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **28.71**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **5.10**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **17.8%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-4**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B. Simpson **License #** 33515

SOIL PERMEABILITY CLASS RATING DATA

MUNICIPALITY: **Job No: 05-182**

Form 3c Soil Permeability Class Rating Data **Block** **Lot**

1. Test Number **15** Replicate (letter)

2. Sample Depth **1'0"-8'6"** Soil Pit/Boring Number **TP-51, S-1** Date Collected **24 Feb 07**

3. Coarse Fragment Content:

Total Weight of Sample, W.T., grams	**403.48**
Weight of Material Retained on 2mm sieve, W.C.F., grams	**237.48**
Weight % Coarse Fragment (W.C.F./W.T. x 100)	**58.85%**

4. Oven Dry Weight (24 Hrs., 105°C) of 40 Gram Air Dry Sample, grams, Wt. **39.80**

5. Hydrometer Calibration, Rc **6**

6. Hydrometer Reading – 40 seconds, grams, R1' **14**
   Temperature of Suspension, °F **76°**

7. Corrected Hydrometer Reading, Grams R1' **14 – 6 + 1.2 = 9.2**

8. Hydrometer Reading, 2 hours, grams, R2' **7**
   Temperature of Suspension, °F **76°**

9. Corrected Hydrometer Reading, grams, R2' **7 - 6 + 1.2 = 2.2**

10. % sand = (Wt. – R1')/Wt. x 100 = **(39.80 – 9.2)/39.80 x 100 = 76.9%**

11. % clay = R2'/Wt. x 100 = **2.2/39.80 x 100 = 5.5%**

12. Sieve Analysis
    a. Oven Dry Wt. (2 hrs., 105°C) Total Sand Fraction **16.28**
       (Soil retained in 0.047 mm Sieve) grams
    b. Wt. of Fine Plus Very Fine Sand Fraction **7.12**
       (Sand passing 0.25 mm sieve) grams
    c. % Fine Plus Very Fine Sand (b/a) **43.7%**

13. Soil Morphology (Natural Soil Samples Only)
    Structure of Soil Horizon Tested
    Consistence of Soil Horizon Tested: Dry Moist

14. Soil Permeability Class Rating (Based upon average textural analysis of this replicate and other replicate samples) **K-4**

15. I hereby certify that the information furnished on Form 3c 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 Soil Evaluator _____ **Date** 2-28-07

Signature of Professional Engineer Robert B Thompson **License #** 33515

APPENDIX

Limitations

A. USE OF REPORT BY PRESPECTIVE BIDDERS

This soil and foundation engineering report was prepared for the referenced project by Carlin-Simpson & Associates for design purposes only, and may not be sufficient to prepare an accurate bid. Contractors utilizing the information in the report should do so with the understanding that our scope is limited to design considerations. Prospective bidders should obtain the owner's permission to perform whatever additional explorations they deem necessary to prepare their bid accurately.

B. APPLICABILITY OF REPORT

This report has been prepared in accordance with generally accepted soils and foundation engineering practices for the exclusive use of Ginsburg Development, LLC for the specific application for the design of the proposed structure. No other warranty, expressed or implied, is made.

This report may be referred to in the project specifications for general information purposes only, and it should not be used as the technical specifications for the earth work, as it was prepared for design purposes exclusively.

C. REINTERPRETATION OF RECOMMENDATIONS

Change in Location or Nature of Facilities: In the event that any changes in the nature, design or location of the structure are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

Changed Conditions During Construction: The analyses and recommendations submitted in this report are based in part upon the data obtained from test explorations performed for this study. The nature and extent of variations between the test explorations may not become evident until construction. If subsurface soil, rock or groundwater variations appear during construction, it will be necessary to re-evaluate the recommendations of this report.

Changes in State-of-the-Art: The conclusions and recommendations contained in this report are based upon the applicable standards of our profession at the time this report was prepared.

D. SUBSURFACE INFORMATION

Locations: The location of each test exploration was established in the field by measurement from some known building or topographic feature shown on site plans provided to our office. The ground surface elevations of the explorations were determined from the topographic survey supplied to this office. The locations and elevations of the test explorations should be considered approximated.

Interface of Strata: The stratification lines shown on the individual logs of the subsurface test explorations represent the approximate boundary between soil types, and the transition may be gradual.

Field Logs/Final Log: A field log was prepared for each test exploration by a member of our staff. The field log contains factual information and interpretation of the soil conditions between samples.

Our recommendations are based on the final logs and the information contained therein, and not on the field logs.

The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and tests of the field samples. The final logs are included in this engineering report

Standard method of Sampling: All subsurface explorations proceed to a depth based on soil type and structure and proposed construction. Sampling is performed typically at changes in soil conditions so as to provide a representative view of subsurface conditions.

Water Levels: Water level observations in each test exploration were made for the conditions and times stated on the individual logs. This data was reviewed and interpretations were made for the preparation of this report. It must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other meteorological factors.

Pollution/Contamination: Unless specifically indicated in this report, the scope of our services was limited only to the investigation and the evaluation of the geotechnical engineering aspects of the subsurface soil and groundwater conditions at the referenced site. This report does not include any consideration of potential site pollution or contamination resulting from the presence of chemicals, metals, radioactive elements, etc. unless specifically identified in this report.

Environmental Considerations: Unless specifically indicated in the text of this report, this report does not address environmental considerations which may affect the site development, e.g. wetlands determinations, flora and fauna, etc. The conclusions and recommendations of this report are not intended to supersede any environmental conditions which should be addressed in the overall site planning.

E. CONSTRUCTION OBSERVATIONS

We recommend that Carlin-Simpson & Associates be retained to provide continuous on-site soils engineering services during the earthwork construction and foundation phases of the planned construction. This is to assure that the work is completed in compliance with the design concepts and to allow for design changes in the event that subsurface conditions differ from those anticipated during the planned construction.

GENERAL NOTES:

1. GENERAL LAYOUT WAS OBTAINED FROM A DRAWING THAT WAS PREPARED BY JOHN MEYER CONSULTING, ENTITLED "PRELIMINARY GRADING PLAN", DATED 27 FEBRUARY 2007, DWG NOS. PSP-7 AND PSP-8.

2. BORING AND TEST PIT LOCATIONS WERE LAID OUT IN THE FIELD BY CARLIN-SIMPSON & ASSOCIATES (CSA).

3. BORINGS WERE PERFORMED BY GENERAL BORINGS INC. ON 15-20 FEBRUARY 2006 UNDER THE FULL TIME INSPECTION OF CSA.

4. TEST PITS WERE PERFORMED BY PECORD EXCAVATING AND CONTRACTING CORPORATION ON 21-24 FEBRUARY 2006 UNDER THE FULL TIME INSPECTION OF CSA.

5. LOCATIONS ARE APPROXIMATE.

LEGEND:

- ⊕ – BORING LOCATION
- ⊕ – TEST PIT LOCATION

ROBERT B. SIMPSON, P.E.
PROFESSIONAL ENGINEER

05-1840 (LICENSE NO.) Robert B. Simpson (SIGNATURE) 2/28/07 (DATE)

BORING & TEST PIT LOCATION PLAN

PROPOSED LAGRANGE TOWN CENTER
NY 55, TODD HILL ROAD, & LAUER ROAD
TOWN OF LAGRANGE, NEW YORK

DRAWN: MRA	SCALE: 1" = 200'
CHECKED: RBS	DATE: 27 FEB 07
PROJECT NO.: 05-182	DWG NO.: FIG -1
APPROVED: RBS	

CARLIN-SIMPSON AND ASSOCIATES
61 Main Street
Sayreville, NJ 08872
Consulting Geotechnical and Environmental Engineers

APPENDIX E

Construction Inspection Checklists

Infiltration Basin Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Pre-Construction		
Runoff diverted		
Soil permeability tested		
Groundwater / bedrock depth		
2. Excavation		
Size and location		
Side slopes stable		
Excavation does not compact subsoils		
3. Embankment		
Barrel		
Anti-seep collar or Filter diaphragm		
Fill material		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
4. Final Excavation		
Drainage area stabilized		
Sediment removed from facility		
Basin floor tilled		
Facility stabilized		
5. Final Inspection		
Pretreatment facility in place		
Inlets / outlets		
Contributing watershed stabilized before flow is routed to the factility		

Comments:

Actions to be Taken:

APPENDIX F

Operation, Maintenance and Management Checklists

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project _____
Location: _____
Site Status: _____

Date: _____
Time: _____

Inspector: _____

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6.Pond, toe & chimney drains clear and functioning		
7.Seeps/leaks on downstream face		
8.Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam “As-Built”		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		
Type: Reinforced concrete _____ Corrugated pipe _____ Masonry _____ 1. Low flow orifice obstructed		
2. Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1.Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual , After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4.Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
1. Encroachment on pond, wetland or easement area		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
2. Complaints from residents		
3.Aesthetics a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)		
1. Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants “choked” with sediment		
7. Eutrophication level of the wetland.		
8. Other (specify)		

Comments:

Actions to be Taken:

APPENDIX G

Town of LaGrange Stormwater Pollution Prevention Plan (SWPPP) Application

TOWN OF LAGRANGE

PLANNING, ZONING & BUILDING DEPARTMENT
120 STRINGHAM ROAD
LAGRANGEVILLE, N.Y. 12540
845-452-8562

STORMWATER POLLUTION PREVENTION PLAN (SWPPP) APPLICATION

No landowner or land user may commence a land disturbance or land development activity subject to §197 of the Code of the Town of LaGrange, "Stormwater Management and Erosion & Sediment Control" without receiving prior approval of a Stormwater Pollution Prevention Plan (SWPPP) and/or an Erosion and Sediment Control Plan for the site from the local approval authority.

ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS APPLICATION FORM

Name of Project: _____

Owner/Operator Information:

Name: _____ Contact Person: _____
Mailing Address: _____
City, State, Zip Code: _____
Telephone Number, Fax, E-Mail: _____

Site Information:

Grid No. of Property: _____
Location of Property (If different from above): _____

Project Start Date: _____ Project End Date: _____

Total Area of Site: _____ (acres) Total Estimated Disturbed Area: _____ (acres)

Site Impervious Area: Pre- Development _____ %
Site Impervious Area: Post-Development _____ %

Type of Construction: (i.e. residential, commercial, etc.) _____

Will the construction site's stormwater discharge to: (check all that apply)
_____ Storm drainage system – infiltrates to groundwater
_____ Storm drainage system – discharge to surface water
_____ Directly or indirectly to waterbody _____(Name)
_____ Infiltration to groundwater on-site

SWPPP Submission Requirements:

(Check if provided in submission)

____ Background information about the scope of the project, including location, type and size of project.

____ A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map should show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); wetlands and drainage patterns that could be affected by the construction activity; existing and final slopes; locations of off-site material, waste, borrow or equipment storage areas; and location(s) of the stormwater discharges(s).

_____ A description of the soil(s) present at the site.

_____ A construction phasing plan describing the intended sequence of construction activities, including tree removal, stumping, clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance. Consistent with the New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit GP-0-15-002, no more than five acres of land shall be disturbed at any one time without written approval from the NYSDEC.

_____ A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a pollutant source in stormwater runoff.

_____ A description of construction and waste materials expected to be stored on site with updates as appropriate, and a description of controls to reduce pollutants from these materials including storage practices to minimize exposure of the materials to stormwater, and spill-prevention and response.

_____ Temporary and permanent structural and vegetative measures to be used for soil stabilization, runoff control and erosion and sediment control for each stage of the project, from initial land clearing and grubbing to project closeout.

_____ A site map/construction drawing(s) specifying the location(s), size(s) and length(s) of each erosion and sediment control practice.

_____ Dimensions, material specifications and installation details for all temporary and permanent erosion and sediment control practices, including the site, sizing and supporting calculations of any temporary sediment basins;

_____ Temporary practices that will be converted to permanent control measures.

_____ An implementation schedule for staging temporary erosion and sediment control practices, including the timing of initial placement and duration that each practice should remain in place.

_____ An inspection and maintenance schedule to ensure continuous and effective operation of the erosion and sediment control measures.

_____ The name(s) of the receiving water(s);

_____ The delineation of SWPPP implementation responsibilities for each portion of the site.

_____ A description of structural practices designed to divert flows from exposed soils, store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site to the degree attainable.

_____ Any existing data that describes the stormwater runoff at the site.

Water quality and quantity controls for land development activities:

Land development activities as defined in §197-4 and meeting at least one of the three conditions below, (i.e., Condition A, B or C) shall also include water quantity and water quality controls (post-construction stormwater runoff controls) as set forth below as applicable:

Conditions

1. Condition A: stormwater runoff from land development activities discharging a pollutant of concern to either an impaired water identified on the Department's 303(d) list of impaired water bodies or a total maximum daily load (TMDL) designated watershed for which pollutants in stormwater have been identified as a source of the impairment; or
2. Condition B: stormwater runoff from land development activity disturbing between one and five acres of land during the course of the project, exclusive of the construction of single-family residences and construction activities at agricultural properties; or
3. Condition C: stormwater runoff from land development activities disturbing five or more acres.

SWPPP requirements for land development activities that meet Condition A, B or C, above:
(Check if provided in submission)

_____ All information as noted on Page 2 under SWPPP Submission Requirements.

_____ A description of each post-construction stormwater management practice.

_____ A Site map/construction drawing(s) showing the specific location(s) and size(s) of each post-construction stormwater management practice.

_____ A hydrologic and hydraulic analysis for all structural components of the stormwater management system for the applicable design storms.

_____ A comparison of the post-development stormwater runoff conditions with pre-development conditions. The comparison shall include peak flows for the one (1), ten (10), and one-hundred (100) year storm events.

_____ The dimensions, material specifications and installation details for each post-construction stormwater management practice.

_____ An inspection and maintenance schedule to ensure continuous and effective operation of each post-construction stormwater management practice.

_____ Drainage easements to ensure access to all stormwater management practices at the site for the purpose of inspection, maintenance and repair.

_____ The SWPPP has been prepared by a licensed professional engineer, registered landscape architect, or certified professional, and is signed by the professional preparing the plan, and is certified that the design of all stormwater management practices meet the minimum requirements of §197 of the Code of the Town of LaGrange and NYSDEC SPDES General Permit GP-0-15-002.

Has the SWPPP been prepared in accordance with NYSDEC SPDES General Construction Permit GP-0-15-002 _____ Yes _____ No

Does the SWPPP meet the technical standards of the "New York State Stormwater Design Manual" and the "New York State Standards and Specifications for Erosion and Sediment Control" _____ Yes _____ No

Certification:

"I certify that this document and all attachments and enclosures submitted herewith were prepared at my direction or under my supervision, and I have exercised best efforts to assure that qualified personnel properly gather and evaluate the information submitted. The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. In addition, I certify that the provisions of the approval, including the development and implementation of the SWPPP and Erosion and Sediment Control Plan will be complied with. I acknowledge that I have received and reviewed a copy of §197 of the Code of the Town of LaGrange, "Stormwater Management and Erosion & Sediment Control". I hereby give permission to the Town local approval authority and all designated representatives to enter the property as specified in §197-18.C. I am aware of the enforcement provisions in §197-20, and where notice of non-compliance has been given and not corrected within a time frame as determined by the Stormwater Management Officer (SMO), I authorize the Town to take corrective action as described in §197-20.

Owner/Operator Printed Name	Title
Owner/Operator Signature	Date
Telephone, Fax, E-mail	

Complete this portion if this SWPPP application was prepared by a consultant or someone other than an employee of the site Owner/Operator.

Preparer Printed Name	Firm
Mailing Address	Title
City, State, Zip Code	Telephone Number, Fax, E-mail
Signature of Preparer	Date

(If Applicant is not the landowner, attach a notarized statement authorizing Applicant to act as agent)

PLANNING, ZONING & BUILDING DEPARTMENT USE ONLY

SWPPP Application received by (initials) _____ on (date) _____
SWPPP Application Fee in the amount of $ _____ paid on (date) _____
SWPPP Approved by Stormwater Management Officer (SMO) Signature _____ Date _____

APPENDIX H

Town of LaGrange Fee Schedule-Stormwater

TOWN OF LAGRANGE

120 Stringham Road
LaGrangeville, New York 12540-5507

Administrator of Planning & Public Works
845-452-8562 ~ 845-452 7692 fax ~ wlivigni@lagrangeny.gov

PLANNING & PUBLIC WORKS FEE SCHEDULE

Approved by the Town Board on January 9, 2019

PLANNING:

Pre-application discussion	$200
Residential Site Plan Application Fee	$500 + $100/du + $25/parking space
Residential Site Plan Approval Fee	$500/du + $25/parking space
Residential Amended Site Plan Application Fee	$500 + $100/du + $25/parking space
Residential Amended Site Plan Approval Fee	$500 + $25/parking space
Non-residential Site Plan Application Fee	$500 + $250/acre + $25/parking space
Non-residential Site Plan Approval Fee	$250 + $250/1000 square feet of improvement
Non-residential Amended Site Plan Application Fee	$500 + $25/parking space
Non-residential Amended Site Plan Approval Fee	$250 + $200/1000 square feet of improvement
All Site Plan Reapproval Fee	$250
Subdivision Application Fee	$500 + $500/lot
Subdivision Preliminary Approval Fee	$300/lot
Subdivision Final Approval Fee	$500/lot
Subdivision Reapproval Fee	$50/lot

Lot Line Realignment Application Fee	$300 + $100/lot realigned
Lot Line Realignment Approval Fee	$300
Recreation Fee for Subdivision	$4000/lot
Recreation Fee for Multi-family Site Plan	$1000/bedroom
Inspection Fees	5% of Performance Bond
Escrow - all Applications	Established based on Escrow Policy
Public Hearing Sign Fee	$25 per sign

PUBLIC WORKS:

Post-Planning:

Site Development Construction Permit Fee for all Site Plans	$3/1000 square foot of improvement or minimum Of $100

Water Connection Permit Application Fees:

Residential Single Family Homes:

¾" Meter *Copper (1 – 150')* *Plastic (1' – 100')*	$500
1" Meter *Copper (151' – 300')* *Plastic (101' – 200')*	$705
1 ½" Meter	$785
2" Meter	$1045

Commercial & Non-Single Family Homes:

¾" Meter, if reviewed in house	$575
1" Meter, if reviewed in house	$780
1 ½" Meter, if reviewed in house	$860
2" Meter, if reviewed in house	$1120

Additional "Add-on" Commercial & Non-Single Family Homes Fees, as necessary:

"Non" single family residential over 2" Meter and backflow prevention device	$50 + Town's Engineer Proposal Cost
Additional Inspections by Town's Operators/Town's Engineer for wet taps	$100/inspection
Additional Inspections by Town's Operators/Town's Engineer for meter pits	$50/inspection
Additional Inspections by Town's Operators/ Town's Engineer for systems with fire flow	$100/inspection

Sewer Connection Permit Application Fees:

Single Family Residential Home	$250
Non-Residential Single Family Home	$1000 + Town's Engineer Proposal, if required
Additional Inspection/Review by Town's Operator/Town's Engineer for Connection to sewer main	$100/inspection

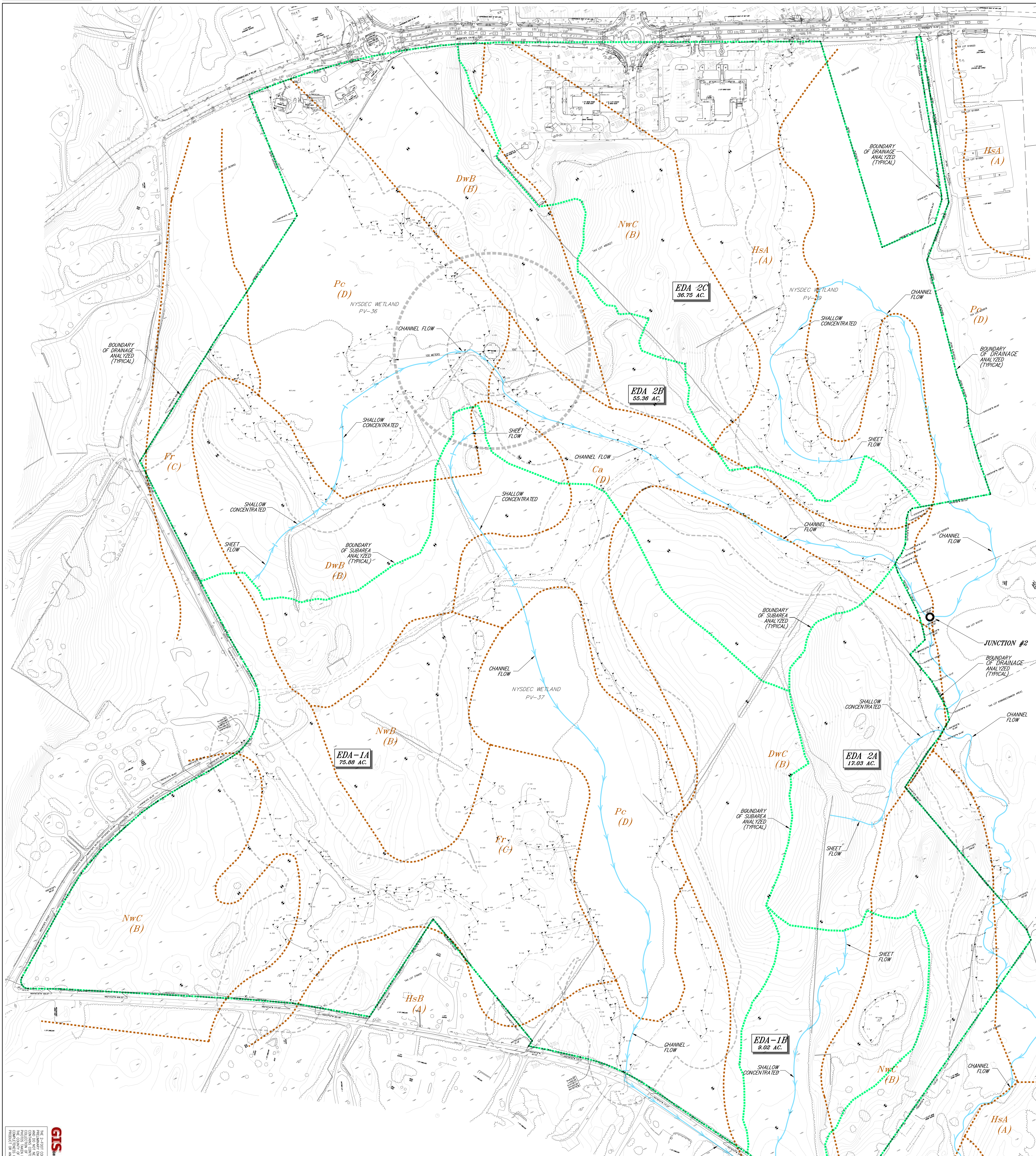
Stormwater Application Fees:

Residential area of disturbance between 1 acre & 5 acres*	$250
Residential area of disturbance greater than 5 acres	$500
Commercial, Industrial & all Non-Residential area of Disturbance equal to or greater than 1 acre	$500
SWPPP Review Escrow	Established based on Escrow Policy
Stormwater Inspection Escrow	Starting balance of $2000 with a minimum Of $500 at all times

APPENDIX I

Drawings

NOT FOR CONSTRUCTION



THE 2-FOOT CONTOURS DEPICTED ON THIS PLAN ARE INTENDED TO BE USED FOR PLANNING & PRELIMINARY ENGINEERING APPLICATIONS. THEY ARE NOT INTENDED TO BE USED IN ENGINEERING DESIGN AND DO NOT NEGATE THE NEED FOR A FIELD SURVEY. THE WESTCHESTER COUNTY GIS DATASET CONTAINS CONTOUR LINES MODELED AT A TWO FOOT INTERVAL. THE SOURCE INFORMATION USED IN THE COLLECTION OF THE DATASET WAS PART OF THE NEW YORK STATE DIGITAL ORTHOIMAGERY PROGRAM; PHOTOS TAKEN IN APRIL 2004. VERTICAL DATUM IS NAVD88. THE COUNTY OF WESTCHESTER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE COMPLETENESS OR ACCURACY OF THE DATA AND ASSUMES NO LIABILITY WHATSOEVER FOR ANY PRODUCT OR ANALYSIS DERIVED FROM OR BASED ON THE DATA.

GIS GEOGRAPHIC INFORMATION SYSTEMS

EXISTING DRAINAGE LEGEND

- EXISTING GRADE
- FLAGGED WETLANDS WITH FLAG NUMBERS
- EXISTING STONE WALL
- WATERSHED BOUNDARY LINE
- LIMIT OF SOIL GROUPS LINE
- FLOW PATH LINE
- DwB (B) — SOIL DESIGNATION AND HYDROLOGIC SOIL GROUP

SOIL TYPE TABLE

DESIGNATION	HYDROLOGIC GROUP	DESCRIPTION
CrC	B	DOWNER–URBAN LAND COMPLEX, 0 TO 5 PERCENT SLOPES
UIC	B	HAMMONTON–URBAN LAND COMPLEX, 0 TO 5 PERCENT SLOPES
UIC	B	HAMMONTON–URBAN LAND COMPLEX, 0 TO 5 PERCENT SLOPES

Drawn: BMS Approved: DL
Scale: 1" = 100'
Date: 12/08/2008
Project No: 5106
5106-DRAINAGE EDA --
Drawing No: DA-1

ANY ALTERATION OF PLANS, SPECIFICATIONS, PLATS AND REPORTS BEARING THE SEAL OF A LICENSED PROFESSIONAL ENGINEER OR LICENSED LAND SURVEYOR IS A VIOLATION OF SECTION 7209 OF THE NEW YORK STATE EDUCATION LAW, EXCEPT AS PROVIDED FOR BY SECTION 7209, SUBSECTION 2.

EXISTING DRAINAGE AREA MAP

LAGRANGE TOWN CENTER
NYS ROUTE 55 & LAUER ROAD
TOWN OF LAGRANGE, NEW YORK

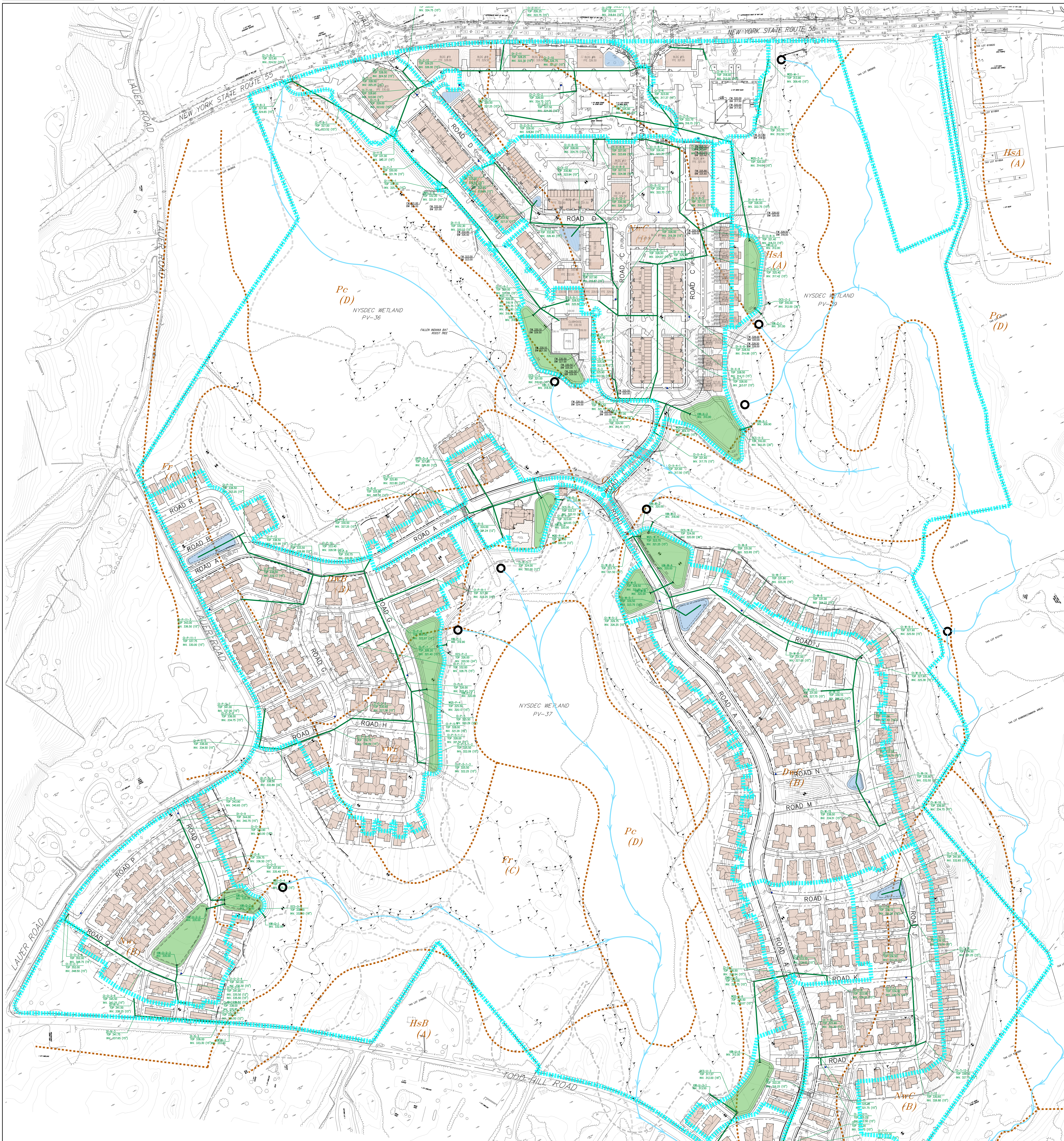
JMC

JMC Planning, Engineering, Landscape Architecture & Land Surveying, PLLC
JMC Site Development Consultants, LLC
John Meyer Consulting, Inc.
120 BEDFORD ROAD • ARMONK, NY 10504
voice 914.273.5225 • fax 914.273.2102
www.jmcpllc.com

APPLICANT:
BRH LAND LLC
6 OLD NORTH PLANK ROAD
NEWBURGH, NEW YORK 12550

No.	Revision	Date	By
1.	RESPOND TO COMPLETENESS COMMENTS	04/07/2009	
2.	FEIS SUBMISSION	06/07/2021	BMS

Previous Editions Obsolete



PROPOSED DRAINAGE LEGEND

- EXISTING GRADE
- PROPOSED FINISHED GRADE
- FLAGGED WETLANDS WITH FLAG NUMBERS
- EXISTING STONE WALL
- WATERSHED BOUNDARY LINE
- LIMIT OF SOIL GROUPS LINE
- FLOW PATH LINE
- PROPOSED BUILDING LINE
- PROPOSED CONCRETE CURB

DwB (B) — SOIL DESIGNATION AND HYDROLOGIC SOIL GROUP

GIS GEOGRAPHIC INFORMATION SYSTEMS

THE 2-FOOT CONTOURS DEPICTED ON THIS PLAN ARE INTENDED TO BE USED FOR PLANNING & PRELIMINARY ENGINEERING APPLICATIONS. THEY ARE NOT INTENDED TO BE USED IN ENGINEERING DESIGN AND DO NOT NEGATE THE NEED FOR A FIELD SURVEY. THE WESTCHESTER COUNTY GIS DATASET CONTAINS CONTOUR LINES MODELED AT A TWO FOOT INTERVAL. THE SOURCE INFORMATION USED IN THE COLLECTION OF THE DATASET WAS PART OF THE NEW YORK STATE DIGITAL ORTHOIMAGERY PROGRAM; PHOTOS TAKEN IN APRIL 2004. VERTICAL DATUM IS NAVD88. THE COUNTY OF WESTCHESTER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE COMPLETENESS OR ACCURACY OF THE DATA AND ASSUMES NO LIABILITY WHATSOEVER FOR ANY PRODUCT OR ANALYSIS DERIVED FROM OR BASED ON THE DATA.

SOIL TYPE TABLE

DESIGNATION	HYDROLOGIC GROUP	DESCRIPTION
CrC	B	DOWNER-URBAN LAND COMPLEX, 0 TO 5 PERCENT SLOPES
UIC	B	HAMMONTON-URBAN LAND COMPLEX, 0 TO 5 PERCENT SLOPES
UIC	B	HAMMONTON-URBAN LAND COMPLEX, 0 TO 5 PERCENT SLOPES

Drawn: BMS Approved: DL
Scale: 1" = 100'
Date: 12/08/2008
Project No: 5106
5106-DRAINAGE PDA --
Drawing No: DA-2

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PROPOSED DRAINAGE AREA MAP

LAGRANGE TOWN CENTER

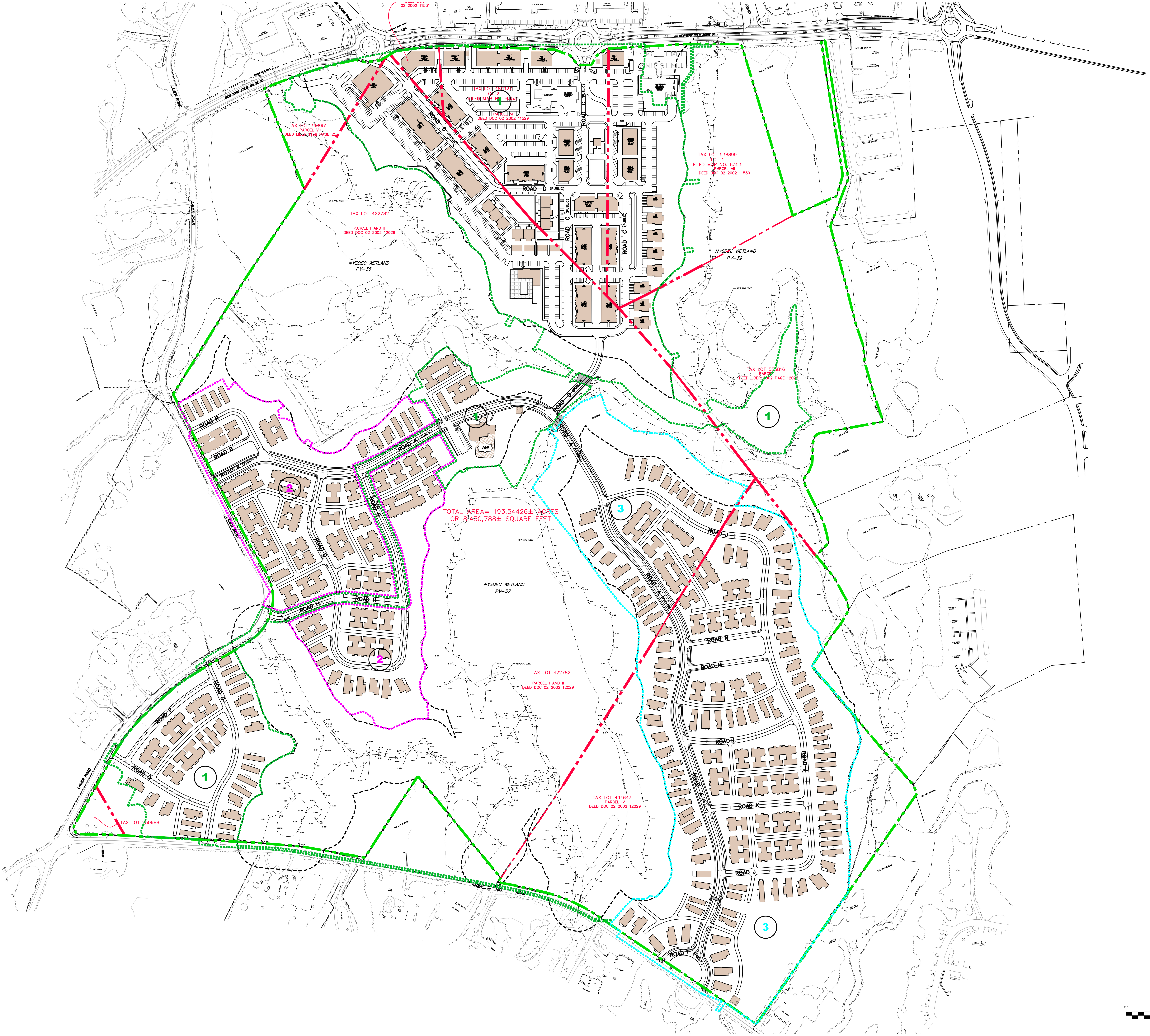
NYS ROUTE 55 & LAUER ROAD
TOWN OF LAGRANGE, NEW YORK

JMC Planning, Engineering, Landscape Architecture & Land Surveying, PLLC
JMC Site Development Consultants, LLC
John Meyer Consulting, Inc.
120 BEDFORD ROAD • ARMONK, NY 10504
voice 914.273.5225 • fax 914.273.2102
www.jmcpllc.com

APPLICANT:
BRH LAND LLC
6 OLD NORTH PLANK ROAD
NEWBURGH, NEW YORK 12550

No.	Revision	Date	By
1.	RESPOND TO COMPLETENESS COMMENTS	04/07/2009	
2.	FEIS SUBMISSION	06/07/2021	BMS

Previous Editions Obsolete



PHASING CHART

PHASE	LAND AREA
1	2,162,951 S.F. (49.65 ACRES)
2	901,529 S.F (20.70 ACRES)
3	1,718,802 S.F. (39.46 ACRES)

No.	Revision	Date	By
1.	RESPOND TO NYSDEC COMMENTS	03/31/2021	JJ
2.	FEIS SUBMISSION	06/07/2021	BMS

Previous Editions Obsolete

APPLICANT:

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www.jmcpllc.com

PROJECT PHASING PLAN

LAGRANGE TOWN CENTER

NYS ROUTE 55 & LAUER ROAD
TOWN OF LAGRANGE, NEW YORK

Drawn: JJ	Approved: AG	
Scale: 1" = 120'		
Date: 07/14/2011		
Project No: 5106		
5106-PHASING	PH-1	PHASE.ls

Drawing No: PH-1

NOT FOR CONSTRUCTION