III.D Surface Water and Wetlands

1. Introduction and Principal Conclusions

Surface Waters

A Preliminary Stormwater Pollution Prevention Plan (SWPPP) has been prepared for the proposed project (Appendix D-1).

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. The proposed stormwater improvements will result in reductions of peak rates of runoff from existing conditions for all storms and design points analyzed, resulting in no impacts to off-site properties. All water quality practices, including the enhanced phosphorus removal required because the project is within the NYCDEP watershed, exceed the requirements of the stormwater management practices criteria as outlined in Chapter 6 of the NYS Stormwater Management Design Manual.

The combination of stormwater ponds, swales, and level-spreader discharges provide redundancies to enhance water quality and mitigate stormwater runoff rates from the development areas. The vegetated swales and other overland conveyances of stormwater runoff will result in additional infiltration for runoff reduction and water quality that is not considered in the SWPPP's hydrologic model, resulting in a conservative analysis.

An Erosion and Sediment Control Management Program will be implemented 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 the control of sediment transport and erosion control after construction and throughout the useful life of the project.

The Applicant is to 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, as shown on the Erosion & Sediment Control Plans, have been adequately installed to ensure overall preparedness of the site for the commencement of construction. In addition, the Applicant will have a qualified professional conduct one site inspection at least every seven calendar days and at least two site inspections every seven calendar days when greater than five acres of soil is disturbed at any one time.

Wetlands

Wetland and adjacent area impacts were avoided to the maximum extent practicable in the design of the proposed project, and the project's minimal impacts will be mitigated.

A total of six wetland systems are found on the subject property. Two of these wetlands, described as Wetland 1 and Wetland 3, are locally regulated by the Town of Southeast, while the remaining wetlands are regulated by both the Town of Southeast and the NYSDEC. The remaining wetland systems on the property consist of portions of NYSDEC Freshwater Wetlands LC-18 (Class I wetland) and LC-28 (Class II wetland). All the wetlands on the property are also regulated by the US Army Corps of Engineers (ACOE).

Minor permanent encroachments (0.05 acres) into the wetland would occur only at the existing on-site road crossing (improvements at the Barrett Road wetland crossing between Wetlands 4 and 5); otherwise only minor encroachments into the adjacent areas are proposed, with 2.44 acres of disturbance to NYSDEC wetland buffers (which are also regulated by the Town), and 5.37 acres of disturbance to Town-only regulated

wetland buffers. These include impacts from grading activities for some of the warehouse foundation/platforms and one stormwater management area (just southwest of Barrett Road and Pugsley Road), and from improvements to the site entrance at Route 312. ACOE does not regulate an adjacent area.

Mitigation for the wetland encroachment at the Barrett Road crossing will be provided through restoration of the upper portion of Wetland 4. This area has been overgrown by invasive species which degrade the overall habitat value of the wetland. If left alone, it is likely that these species will continue to spread and will eventually eliminate the native species within this portion of the wetland.

Since the Barrett Road improvements will require disturbance to the wetland and replacement of the culvert, the upper portion of the wetland will be excavated to remove the common reed rhizomes, and the area will be solarized by placing clear plastic over the remaining soils during the growing season. This will result in sterilization of the soil where the invasive species were growing by elimination of the seeds and remaining rhizomes. Following completion of the road reconstruction, the sterilized soils will be replanted with plugs of native sedges and allowed to grow.

The mitigation area will be monitored for a minimum of three years following the restoration work to ensure that invasive species do not become reestablished. The restoration area will be monitored at least three times during the growing season for each of the first three years following installation of the plugs, and monitoring reports, including recommendations for maintenance, will be submitted to the Town and to the NYSDEC.

2. Existing Conditions

a. Location And Description Of Surface Waters and Wetlands

Surface Waters

The entire property drains to the Middle Branch Reservoir. There are three perennial streams on the site, all of which drain in a southerly direction and are tributary to the reservoir (Figure III.D-1). New York State Department of Environmental Conservation (DEC) regulates surface waters under Article 15 of the Environmental Conservation Law (ECL), Protection of Waters. Beaver Brook, which flows along and forms the westerly property line of the site, is a Class C stream, but Class C(TS) standards apply to this watercourse, meaning that any disturbance to the bed or bank of the stream requires permit review and approval from DEC. The other two perennial watercourses are Class C streams, and therefore are not regulated by DEC.

In addition, there are two mapped intermittent watercourses associated with wetlands on the site, as well as four farm ponds, which are also associated with wetlands. Intermittent watercourses are not regulated at the state level, but all watercourses which flow at least six months during the year, and all ponds are regulated by the town of Southeast under Chapter 78, Freshwater Wetlands, of the Town Code.

The entire property is within the New York City watershed, and the New York City Department of Environmental Protection (DEP) also regulates watercourses. A site walk with representatives of DEP was conducted on April 24, 2018 to review site features which would be considered regulated watercourses. In addition to the watercourses described above, DEP has determined that the discharge from a catch basin at the intersection of Barrett Road and Fields Corners Road has formed a defined channel (through erosion of the shoulder) and carries

sufficient flow towards the wetland to be considered an intermittent watercourse.

Wetlands

A total of six wetland systems are found on the subject property (Figure III.D-2). Two of these wetlands, described as Wetland 1 and Wetland 3 below, are locally regulated by the Town of Southeast, while the remaining wetlands are regulated by both the Town of Southeast and the New York State Department of Environmental Conservation (DEC). Portions of DEC Freshwater Wetlands LC-18 (Class I wetland) and LC-28 (Class II wetland) are located on the subject property. All the wetlands on the property are also regulated by the US Army Corps of Engineers (ACOE). The characteristics of the individual wetlands are described below.

Two of the three on-site portions of DEC wetland LC-18 are located in the center of the property (Wetland 4 and Wetland 5), west of Pugsley Road and Fields Corner Road. These two wetlands are hydrologically connected by a culvert beneath Barrett Road. The portion of wetland LC-18 south of Barrett Road (Wetland 4) flows to the south, where it forms a perennial stream channel. The portion of LC-18 to the north of Barrett Road (Wetland 5) contains a farm pond which drains beneath Barrett Road through an existing culvert. However, the remainder of this wetland system drains to the north and is connected to the larger portion of the wetland (total acreage 212± acres) by an intermittent stream which flows under Fields Lane in the Town of Patterson. The third portion of DEC Freshwater Wetland LC-18 on the property is designated as Wetland 2 and is associated with Beaver Brook in the western portion of the site.

The on-site portion of DEC Wetland LC-28 (Wetland 6) is located in the southeast corner of the site, east of Pugsley Road, and north of Route 312. This wetland also continues off-site to the north, and is comprised of approximately 86 acres, including a portion on the eastern side of Interstate 84.

Wetland 1 – Locally Regulated

Wetland 1 is a small (0.3 acre) drainage corridor wetland in the southwest portion of the site, to the south of Barrett Road and west of the power line ROW. It is the northern tip of a narrow, south draining wetland corridor which drains towards the Beaver Brook but is not connected to the stream by means of persistent surface hydrology. The wetland contains an intermittent stream channel which is dry for most of the year, but appears to accommodate surface drainage during wet periods and larger storm events. Significant deposits of sand have been observed in this wetland and appear to be the result of gully erosion along the power line ROW which slopes towards the wetland. The dominant vegetative cover type within the wetland is deciduous wooded swamp. There is also a small farm pond within this wetland surrounded by a fringe of shallow marsh and shrub cover types. Soils are Sun loam which, in places, is covered by recent alluvial deposits. Slopes are steep (>3%). This wetland is a surface expression of the underlying water table but is also sustained in part by stormwater runoff from the power line ROW and shallow, subsurface drainage from the drumlin to the east.

Wetland 2 – Part of DEC Wetland LC-18

Wetland 2 is a semi-closed basin located at the western edge of the site. Approximately six acres of this wetland is on the subject property. The southwest edge of this wetland contains several intermittent outlets which are directly tributary to Beaver Brook, although the wetland itself is not a floodplain wetland associated with the Brook. The wetland extends off-site to the north and is part of DEC wetland LC-18, the majority of which is located to the north and east of the site. The dominant wetland cover type is deciduous wooded swamp. Dominant species include red maple (*Acer rubrum*), spicebush (*Lindera benzoin*) and tussock sedge (*Carex stricta*). Small patches of wet meadow and shrub swamp occur in the wetland as well. Hydric, mineral soils derived from glacial till (Sun loam) are the dominant soil type. The wetland is characterized by gentle slopes (<3%). The major hydrologic inputs are interception of the groundwater table and

surface and shallow subsurface drainage from the system of wetlands, watercourses and waterbodies to the north.

Wetland 3 – Locally Regulated

Wetland 3 is a forested, hillside drainage corridor in the southwest portion of the site. This wetland is the northern portion (8.7 acres on site) of a north-south oriented wetland system which extends off-site to the south. Slopes within the wetland are consistently greater than 3% and the wetland is located at the base of a large drumlin which occupies the central portion of the site. There are no inlets to the wetland, and the primary hydrologic input is shallow subsurface drainage perched above the dense subsoil layer or fragipan associated with the drumlin soils. This subsurface lateral drainage intercepts the upper portion of the wetland soils as seepage due to the relatively flat gradient at the base of the drumlin. The southern portion of the wetland contains an intermittent stream course, as well as a small farm pond with an earth and stone dam in the central portion of the wetland. The vegetative cover type within the wetland is deciduous wooded swamp dominated by red maple, American elm (*Ulmus americana*), spicebush and skunk cabbage (*Symplocarpus foetidus*). Soils within the wetland are Ridgebury loam. Ridgebury soils are hydric, mineral soils derived from glacial till and characterized by a dense substratum or fragipan.

Wetland 4 – Part of DEC Wetland LC-18

Wetland 4 is comprised of approximately 7.2 acres of streamside wetland corridor which lies at the base of the southeast portion of the large drumlin centrally located on the site. This drainage corridor wetland contains a perennial stream course which originates at the farm pond just north of Barrett Road and is tributary to the Middle Branch Reservoir. In contrast to the discontinuous, intermittent surface drainage in the north flow portion of the wetland corridor (Wetland #5), the perennial stream channel contained in the south flow portion is well defined and leaves the site as a narrow, steeply sloping stream channel lacking streamside wetlands. With the exception of Wetland 6, the south flow

portion of this wetland is a more diverse wetland system than the others on the site with regard to habitat and cover type diversity. This wetland corridor contains shrub swamp, deciduous wooded swamp and streamside wetland as dominant cover types or classes and, in addition, contains open water and wet meadow as less dominant cover type subclasses.

Vegetation in the wetland includes red maple *(Acer rubrum)*, American elm *(Ulmus americana)*, and green ash *(Fraxinus pennsylvanica)* trees and saplings, multiflora rose *(Rosa multiflora)*, silky dogwood *(Cornus amomum)*, Japanese barberry *(Berberis thunbergii)*, and spicebush *(Lindera benzoin)* shrubs, Asiatic bittersweet *(Celastrus orbiculata)* and poison ivy *(Toxicodendron radicans)* vines, along with skunk cabbage *(Symplocarpus foetidus)*, tussock sedge *(Carex stricta)*, jewelweed *(Impatiens capensis)*, clearweed *(Pilea pumila)*, goldenrod *(Solidago sp.)*, cinnamon fern *(Osmunda cinnamomea)*, Japanese stilt-grass *(Microstegium vimineum)*, sensitive fern *(Onoclea sensibilis)*, and garlic mustard *(Alliaria petiolata)*. Additional vegetation in the wetter portions of the north end of the wetland includes arrow-leaf tearthumb *(Polygonum sagittatum)*, blue vervain *(Verbena hastata)*, and goldenrod *(Solidago sp.)*. However, the upper portion of this wetland immediately adjacent to Barrett Road has become overgrown with common reed (*Phragmites australis*) and purple loosestrife (*Lythrum salicaria*), both of which are invasive species that reduce the habitat value of the wetland.

Soils are primarily Sun loam. In addition to the direct surface flow from the farm pond north of Barrett Road, the primary sources of hydrologic input are interception of the underlying water table and interception of perched, subsurface, lateral drainage from the surrounding drumlin soils. Slopes within this wetland range from 2-8%.

Wetland 5 – Part of DEC Wetland LC-18

Wetland 5 is about 5 acres in size and is a wetland corridor which lies at the base of the northeast portion of the large drumlin centrally located on the site. The

network of stone walls within the wetland suggest past use as summer pasture. The break between the north flow and the south flow of wetland #5 occurs several hundred feet to the north of the small farm pond on the north side of Barrett Road. As with wetland #3, the primary hydrologic input is shallow subsurface drainage perched above the dense subsoil layer associated with the drumlin soils. There is not a well-defined stream channel within the wetland but, rather, a braided pattern of discontinuous, intermittent stream channels. Slopes within the wetland are gradual (0-3%). A small farm pond with an earth dam is located near the stone wall along the field edge in the northern portion of the property.

Vegetation in the wetland includes red maple, American elm, and green ash trees and saplings, Japanese barberry, high-bush blueberry *(Vaccinium corymbosum)*, spicebush, and some willow *(Salix sp.)* shrubs, Virginia creeper *(Parthenocissus quinquefolia)*, dewberry *(Rubus sp.)*, and poison ivy vines, along with skunk cabbage, tussock sedge (small), Japanese stilt-grass, jewelweed, false nettle *(Boehmeria cylindrica)*, horsetails *(Equisetum sp.)*, cinnamon fern, sensitive fern, hog peanut *(Amphicarpaea bracteata)*, royal fern *(Osmunda regalis)*, bedstraw *(Galium sp.)*, Jack-in-the-pulpit *(Arisaema triphyllum)*, and lady fern *(Athyrium filix-femina)*. Purple loosestrife *(Lythrum salicaria)* and common reed are found in the ponded areas of the wetland.

Soils are Sun loam in the wetter portions and Ridgebury loam along some of the relatively dry wetland fringe areas on the edges of the wetland. Sun loam and Ridgebury loam are both hydric, mineral soils derived from glacial till. Ridgebury soils are characterized by a dense substratum which is not present in the Sun soils. Intermittent surface drainage from this wetland is culverted under Fields Lane at a point near the northern property line.

Wetland 6 – Part of DEC Wetland LC-28

The portion of this wetland on the site covers approximately 36 acres. The wetland system is fed by intermittent streamflow (off-site) from the north and is

drained by a perennial stream course at its southern end which is culverted under Route 312 and is eventually tributary to the Middle Branch Reservoir. On site the wetland is characterized by persistent seasonal ponding in interior portions. It is the only wetland on the site which contains deep organic soils and extensive areas of shallow emergent marsh cover types. The dominant vegetative cover type is deciduous wooded swamp along the wetland perimeter and shallow emergent marsh and shrub swamp cover types interspersed within the interior portions of the wetland.

Soils within the interior portions of the wetland are Catden muck and Palms muck. These soils are very poorly drained and are derived from partially decomposed organic matter. The organic horizons are typically 50-60" over a loamy mineral horizon. Soils within the southwest portion of the wetland are Ridgebury loam in transition between the upland soils surrounding the wetland and the organic soils within the wetter, interior portions of the wetland.

The topography within the wetland is relatively flat (0-3%), with steeply sloping uplands between Pugsely Road and the wetland boundary. There is a hummocky microtopography, especially in interior portions of the wetland. The edge habitat located in the transitional areas between deciduous wooded swamp and marsh or shrub swamp cover types is characterized by a high degree of vertical structure or height class diversity of vegetation, as well as remnant stone walls.

Wetlands – Regulatory Jurisdiction and Adjacent Areas

The on-site wetlands nearest the proposed development are regulated by the Town of Southeast (Chapter 78, Freshwater Wetlands, of the Southeast Town Code), DEC (Article 24 of the NYS Environmental Conservation Law), and the technical criteria in the updated 1987 Army Corps of Engineers (ACOE) Wetland Delineation Manual (TR-Y-87-1). In addition, the DEC regulates a 100-foot adjacent area around wetlands, and the Town regulates wetland buffers that vary between 100 and 200 feet from the wetland, depending on soil drainage class

(hydrological soil grouping or HSG) and slopes. The locally-regulated wetland adjacent area is 166 feet for the subject property. ACOE does not regulate an adjacent area.

b. Existing Drainage Areas, Patterns, Rates And Channels

This site is drained by three perennial streams and two intermittent streams. Along the property line on the west side of the site is Beaver Brook, a tributary of the Middle Branch Croton River. It discharges into the Middle Branch Reservoir. It is a distance of approximately 3,200 feet from the point where Beaver Brook exits the site at the point where the stream enters the Middle Branch Reservoir. The second unnamed stream (NYSDEC Index no. H-31-P44-23-P64-3) originates in a small farm pond located immediately north of the Barrett Road, west of its intersection with Pugsley Road and Fields Road. It is a distance of approximately 3,800 feet from the point where this stream exits the site at the point where the stream enters the Middle Branch Reservoir. A third stream (NYSDEC Index No. H-31-P44-23-P64-4) originates outside the project site in State designated wetlands. It is a distance of approximately 4,800 feet from the point where this stream exits the site to the point where the stream enters the Middle Branch Reservoir.

As discussed in the "Preliminary Stormwater Pollution Prevention Plan" (SWPPP) in Appendix D-1, seven separate drainage areas were identified in existing conditions based on the existing drainage divides at the site (see Drawing DA-1 Existing Drainage Area Map, in the SWPPP). The numbers included in the name of each drainage area correspond to the Design Point/Line they drain towards.

The following is a description of each of the drainage areas analyzed in the existing conditions analysis:

Existing Drainage Area 1 (EDA-1) is 63.47 acres in size and is located on the western portion of the site. This area consists of brush, meadow and woods. Stormwater runoff flows overland toward Local Wetland #1, which is located on the east side of Beaver Brook. The runoff then is conveyed overland towards Beaver Brook, which is tributary to the Middle Branch Croton River. This latter stream conveys flow from Lake Carmel to the Middle Branch Reservoir. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 71 and 39.4 minutes, respectively.

Existing Drainage Area 2 (EDA-2) is 22.36 acres in size and is located on the northeastern portion of the site. This area consists of meadow, brush and woods. Stormwater runoff from this drainage area is conveyed toward and through State Designated Wetland LC-18, which lies approximately 200 to 400 feet west of Fields Corner Road and extends from the northern boundary of the Site southward for over 4,000 feet. The flow from this wetland is then conveyed northward via an existing unnamed stream. Wetland LC-18 is drained by a stream in a southwesterly direction towards Beaver Brook. It is approximately 11,500 feet from the point where the unnamed stream exits the Campus at Fields Corner property to the location where it enters the Middle Branch Reservoir. Over the distance from the northern property line of the site to the reservoir, the watershed near the stream is essentially wooded. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 74 and 20.1 minutes, respectively.

Existing Drainage Area 3 (EDA-3) is 58.53 acres in size and is located on the central section of the site. This area consists of meadow, woods, brush and water features. Stormwater runoff from this drainage area drains to the southern portion of State Designated Wetland LC-18 and is eventually conveyed to the second stream on the property. This stream flows southward through the site discharging into the Middle Branch Reservoir approximately 3,500 feet south of the point where the stream exits the Site. Lands south of the Site from the

property line to the Middle Branch Reservoir are primarily agricultural use. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 72 and 24.0 minutes, respectively.

Existing Drainage Area 4 (EDA-4) is 42.34 acres in size and is located on easternmost portion of the Site. This area consists of brush and Pugsley Road. Stormwater runoff flows overland eastward towards Puglsey Road. It is then conveyed into NYSDEC Regulated Freshwater Wetland LC-28, which lies east of Pugsley Road and north of New York State Route 312, is located within this drainage area. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 70 and 11.9 minutes, respectively.

Existing Drainage Area 5 (EDA-5) is 38.27 acres in size and is located along the southern and central portion of the site. This area consists woods, brush and water features. Stormwater runoff from this drainage area drains to Local Wetland #2. Runoff from this area is then conveyed to an intermittent stream which discharges from an existing farm pond in the southerly portion of the Site. It is approximately 3,000 feet from the point where drainage exits the Property to where it enters the Middle Branch Reservoir. The lands from the property line to the reservoir adjacent to the stream are primarily wooded. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 69 and 20.9 minutes, respectively.

Existing Drainage Area 6 (EDA-6) is 31.03 acres in size and is located west of Drainage Area 5, along the southern property boundary of the site. This area consists of woods, brush and water features. Stormwater discharges into the Middle Branch Reservoir approximately 1,500 feet south of the Site. The lands from the property line to the reservoir adjacent to the stream are also primarily wooded. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 69 and 23.1 minutes, respectively.

Existing Drainage Area 7 (EDA-7) is 19.17 acres in size and is west of Drainage Area 4, along the southern property boundary of the site. This area consists brush. Stormwater from this area flows southward overland off the site. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 70 and 5 minutes, respectively.

The peak rates of runoff from the drainage areas to their design points (DP, which is where all the water from a drainage area flows and discharges from the drainage area), from the drainage areas for each storm are shown in the table below. Each DP number corresponds to the number of the drainage area from which it discharges.

Table III.D-1
Summary of Peak Rates of Runoff in Existing Conditions
(Cubic Feet per Second)

Storm Recurrence Interval	DP-1	DP-2	DP-3	DP-4	DP-5	DP-6	DP-7
1 year	19.33	11.97	24.92	17.85	12.95	10.70	10.39
10 year	74.70	39.85	89.75	70.45	54.21	44.64	39.86
100 year	192.51	96.48	225.63	184.47	145.79	118.97	102.04

3. Future Without the Proposed Project

Surface Waters

There are no known changes to drainage patterns, systems, or rates that are anticipated to occur in the Future Without the proposed project. Reductions in peak rates of runoff would not occur.

Wetlands

Without the proposed project, there would be no 0.05 acre disturbance to NYSDEC wetlands with the improvement to the Barrett Road wetland crossing between Wetlands 4 and 5. Neither would there be restoration of the upper portion of Wetland 4, which in this area has been overgrown by invasive species which degrade the overall habitat value of the wetland. If left alone, it is likely that these species will continue to spread and will eventually eliminate the native species within this portion of the wetland.

4. Anticipated Impacts

a. Filling, Or Alteration Of Wetlands, Watercourses, Waterbodies, And Buffers

Wetland and adjacent area impacts were avoided to the maximum extent practicable in the design of the proposed project. Minor permanent encroachments (0.05 acres) into the wetland would occur only at the existing on-site road crossing (improvements at the Barrett Road wetland crossing between Wetlands 4 and 5); otherwise only minor encroachments into the adjacent areas are proposed (Figure III.D-3), with 2.44 acres of disturbance to NYSDEC wetland buffers (which are also regulated by the Town), and 5.37 acres of disturbance to Town-only regulated wetland buffers. These include impacts from grading activities for some of the warehouse foundation/platforms and one stormwater

management area (just southwest of Barrett Road and Pugsley Road), and from improvements to the site entrance at Route 312.

The Barrett Road crossing of Wetlands 4 and 5 is proposed to be improved and widened to 24 feet which is a reduction from the original proposed width of 30 feet. The road width was reduced in order to minimize impacts to the wetlands. In addition, a retaining wall is proposed for the north side of the crossing to further reduce encroachment into Wetland 5. The remaining road grading (Pugsley Road), parking lots, stormwater management areas (all but the one listed above), and septic areas have been kept outside of the regulated areas.

b. Preliminary Stormwater Pollution Prevention Plan: Demonstrate in Detail The Effectiveness of Stormwater Management Facilities in Mitigating Water Quality Impacts.

The design of the project's stormwater management as discussed in the SWPPP has been in accordance with the following:

- Requirements of the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit No. GP-0-15-002, effective January 29, 2015, last modified November 23, 2016;
- NYS Stormwater Management Design Manual last revised January 2015;
- New York City Department of Environmental Protection Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and its Sources, amended April 4, 2010;
- Chapter 119 "Stormwater Management and Erosion and Sediment Control" of the Town of Southeast Code.

As discussed in the "Preliminary Stormwater Pollution Prevention Plan" (SWPPP) in Appendix D-1, the proposed drainage improvements include stormwater management areas consisting of a forebay, infiltration basin and detention basin

with associated outlet controls, vegetated swales, hydrodynamic separators and subsurface infiltration system. After treatment for water quality and peak rate attenuation, stormwater discharges from stormwater management areas utilizing low velocity level-spreaders or riprapped end section into wetland buffer areas. The combination of stormwater ponds, swales, and level-spreader discharges provide redundant opportunities to enhance water quality and mitigate stormwater runoff rates from the development areas. The vegetated swales and other overland conveyances of stormwater runoff will result in additional infiltration not considered in the SWPPP's hydrologic model, resulting in a conservative analysis.

Since the project is located within the NYCDEP watershed, the required Water Quality Volume is determined using the Enhanced Phosphorus Removal Standard. For enhanced phosphorus removal, the water quality volume is sized for the larger of the 90% storm and 1-year, 24-hour storm event.

Water quality is addressed by use of the following practices, as discussed in the SWPPP:

Infiltration Basin (I-2) - An infiltration practice that stores the water quality volume in a shallow depression, before it is infiltrated it into the ground.

Non Standard/Alternative Stormwater Management Practices (SMP's) to Address Remaining Water Quality Volume (for Redevelopment Projects)

- Hydrodynamic Separators
- Underground Infiltration Systems - A subsurface infiltration system is proposed to treat and retain runoff

All practices exceed the required elements of SMP's criteria as outlined in Chapter 6 of the NYS Stormwater Management Design Manual. A summary of each category is provided below.

1. Feasibility – Ponds are designed based upon unique physical environmental considerations noted in the NYS Stormwater Management Design Manual (NYSSMDM) Table 7.2 "Physical Feasibility Matrix".

2. Conveyance – The design conveys runoff to the designed pond in a manner that is safe, minimizes erosion and disruption to natural drainage channel and promotes filtering and infiltration.

3. Pretreatment – All ponds provide pretreatment in accordance with NYSSMDM design guidelines.

4. Treatment Geometry – The plan provides water quality treatment in accordance with NYSSMDM guidelines noted in Table 6.1 "Water Quality Volume Distributing in Pond Design".

5. Environmental/Landscaping –Extensive landscaping has been provided for each proposed practice to enhance pollutant removal and provide aesthetic enhancement to the property.

6. Maintenance – Maintenance for the environment practices has been provided and is detailed in the SWPPP Report as required. Maintenance access is provided in the design plans.

c. Potential Pollution By Pesticides, Fertilizers, And Sewage Discharge

Use and storage of fertilizers and pesticides will comply with the NYCDEP Watershed regulations. The regulations indicate that the storage or use of pesticides as permitted under state and federal law will not lead, with a reasonable likelihood, to a discharge into the environment which causes degradation of surface water quality or of the water supply. Use of pesticides and fertilizers will

be in conformance with state and federal law as well as with the manufacturers label instructions, by a competent landscaper or other professional. Fertilizer and pesticide use, when applied in accordance with state and federal law as well as with the manufacturer's guidelines, is not anticipated to have an impact on groundwater or surface water resources.

Sewage discharge will be to septic fields with 100% expansion areas associated with each of the proposed warehouse buildings (see full-sized Drawings C-301 through C-305 "Utilities Plan". See Section III.I Utilities" for a detailed discussion.)

d. Changes In Runoff, Drainage Flow Direction And Rate; Off-Site Impacts

In order to determine the post-development rates of runoff generated on-site, the following drainage areas were analyzed in the post-development conditions. These areas are graphically depicted on Drawing DA-2 "Proposed Drainage Area Map" located in the SWPPP (Appendix D-1).

Six separate Design Points (DP-1through DP-6) and one Design Line (DL-7) were identified for comparing peak rates of runoff in existing and proposed conditions. Similarly, separate drainage areas were identified in proposed conditions based on the proposed drainage divides at the site. The numbers included in the name of each drainage area correspond to the Design Point they drain towards.

The following is a description of each of the drainage areas analyzed in the proposed conditions analysis:

Proposed Drainage Area 1A (PDA-1A) is 41.71 acres in size and is located on the western portion of the site. This area mainly includes the undeveloped portion of site that drains towards Design Point 1. It is comprised of woods, landscaped area and meadow area. Similar to EDA-1, stormwater runoff is conveyed toward and through Local Wetland #1, which is located on the east side of Beaver Brook.

The runoff then is conveyed overland towards Beaver Brook, which is tributary to the Middle Branch Croton River. This latter stream conveys flow from Lake Carmel to the Middle Branch Reservoir. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 71 and 10.2 minutes, respectively.

Proposed Drainage Area 1B-1 (PDA-1B-1) is 18.86 acres in size and is located on the western portion of the site. This area includes half of the roof area for Warehouse 3 and 4 and the adjacent parking area, drive isles and landscaped islands and the proposed landbanked parking adjacent to Warehouse 4. This area also includes the area for Forebay, Infiltration Basin and Detention Basin 1B-1 and adjacent lawn area. Stormwater runoff will be collected via catch basins and conveyed to Forebay 1B-1, where 25% of the water quality volume will be pretreated. Stormwater runoff will fill up Forebay 1B-1 and slowly flow over the 25-foot-long spillway at elevation 617.00 into proposed Infiltration Basin 1B-1. Infiltration Basin 1B-1 has been designed to provide water quality volume for the 1-year storm in order to meet Enhanced Phosphorus requirements. This basin has been designed to utilize an infiltration rate of 1in/hr, which is based on preliminary infiltration testing performed by JMC on 5/3/2017. Stormwater runoff from lower storms will be retained and infiltrated into the ground. Runoff from higher storms will enter the 5'X5' riser box at elevation 616.25 and be conveyed via a 24" diameter pipe into Detention Basin 1B-1. Detention Basin 1B-1 will detain the higher storms, attenuating peak flow and slowly releasing flow via a 5'X5' riser box at elevation 604.50 to an 18" diameter outlet pipe to a level spreader. This riser box is comprised of a 4" orifice at elevation 598.00 and a 1 foot long weir at elevation 603.00. Stormwater runoff will then continue to flow overland towards Local Wetland #1. The runoff then is conveyed overland towards Beaver Brook, which is tributary to the Middle Branch Croton River. This latter stream conveys flow from Lake Carmel to the Middle Branch Reservoir. Detention Basin 1B-1 will also have an emergency spillway at elevation 605.00. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 90 and 5 minutes, respectively.

Proposed Drainage Area 1B-2 (PDA-1B-2) is 13.79 acres in size and is located on the western portion of the site. This area half of Warehouse 4 roof area and the adjacent parking area, drive isles and landscaped islands. Additionally, this area includes Forebay, Infiltration Basin and Detention Basin 1B-2. Stormwater runoff will be collected via catch basins and conveyed to Forebay 1B-1, where 25% of the water quality volume will be pretreated. Stormwater runoff will fill up Forebay 1B-2 and slowly flow over the 10' wide spillway at elevation 633.00 into proposed Infiltration Basin 1B-2. Infiltration Basin 1B-2 has been designed to provide water quality volume for the 1-year storm in order to meet Enhanced Phosphorus requirements. This basin has been designed to utilize an infiltration rate of 1in/hr, which is based on preliminary infiltration testing performed by JMC on 5/3/2017. Stormwater runoff from lower storms will be retained and infiltrated into the ground. Runoff from higher storms slowly flow over the 10' wide spillway at elevation 632.50 into proposed Detention Basin 1B-2. Detention Basin 1B-2 will detain the higher storms, attenuating peak flow and slowly releasing flow via a 5'X5' riser box at elevation 632.00. This riser box is comprised of a 4" orifice at elevation 628.00 and a 3-foot-long weir at elevation 628.50. Stormwater runoff will enter the riser box and be conveyed via a 15" pipe to a end section. Stormwater runoff will then continue to flow overland towards an off-site wetland. The runoff then is conveyed overland towards Beaver Brook, which is tributary to the Middle Branch Croton River. This latter stream conveys flow from Lake Carmel to the Middle Branch Reservoir. Detention Basin 1B-2 will also have an emergency spillway at elevation 633.00. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 93 and 7.4 minutes, respectively.

Proposed Drainage Area 2 (PDA-2) is 18.93 acres in size and is located on the northeastern portion of the site. This area consists of meadow, landscaped area, wetland and woods. Stormwater runoff from this drainage area is conveyed toward and through State Designated Wetland LC-18, which lies approximately 200 to 400 feet west of Fields Corner Road and extends from the northern

boundary of the Site southward for over 4,000 feet. The flow from this wetland is then conveyed northward via an existing unnamed stream like EDA-2. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 75 and 15.9 minutes, respectively.

Proposed Drainage Area 3A (PDA-3A) is 41.50 acres in size and is located on central northern section of the site. This area consists of meadow, brush, landscaped area, and woods. Like EDA-3, stormwater runoff from this drainage area drains to the southern portion of State Designated Wetland LC-18 and is eventually conveyed to the second stream on the property. This stream flows southward through the site discharging into the Middle Branch Reservoir approximately 3,500 feet south of the point where the stream exits the Site. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 73 and 20.8 minutes, respectively.

Proposed Drainage Area 3B-1 (PDA-3B-1) is 12.82 acres in size and is located on the western portion of the site. This area includes the roof area for Warehouse 2 and adjacent parking area, drive isles and landscaped islands. Stormwater runoff will be collected via catch basins and conveyed to Forebay 3B-1, where 25% of the water quality volume will be pretreated. Stormwater runoff will fill up Forebay 3B-1 and slowly flow over the 15-foot-long spillway at elevation 644.00 into proposed Infiltration Basin 3B-1. Infiltration Basin 3B-1 has been designed to provide water quality volume for the 1-year storm in order to meet Enhanced Phosphorus requirements. This basin has been designed to utilize an infiltration rate of 2 in/hr, which is based on preliminary infiltration testing performed by JMC on 5/3/2017. Stormwater runoff from lower storms will be retained and infiltrated into the ground. Runoff from higher storms slowly flow over the 10-foot-long spillway at elevation 644.00 into proposed Detention Basin 3B-1. Detention Basin 3B-1 will detain the higher storms, attenuating peak flow and slowly releasing flow via a 5'X5'riser box at elevation 644.00. This riser box is comprised of a 3" orifice at elevation 640.00. Stormwater runoff will enter the riser box and be conveyed

via a 15" pipe to a riprapped end section. It will then continue to flow overland towards to the southern portion of State Designated Wetland LC-18 and is eventually conveyed to the second stream on the property. This stream flows southward through the site discharging into the Middle Branch Reservoir approximately 3,500 feet south of the point where the stream exits the Site. Detention Basin 3B-1 will also have an emergency spillway at elevation 645.00 The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 92 and 7.2 minutes, respectively.

Proposed Drainage Area 3B-2 (PDA-3B-2) is 0.59 acres in size and is comprised of the redeveloped portion on Barrett Road. Stormwater runoff will be collected via catch basins and conveyed through a hydrodynamic water quality separator (Contech CDS 2025-5-C), WQS B-2-3 with a grated top. This hydrodynamic structure will provide the required water quality flow for the 1-year 24-storm event. This structure will treat the collected stormwater runoff prior to being discharged into proposed Detention Basin 3B-1 via a 15" HDPE pipe and riprapped end section. Stormwater runoff will then be discharged with stormwater runoff from PDA-3B-1 as previously discussed. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 98 and 5 minutes, respectively.

Proposed Drainage Area 4A (PDA-4A) is 26.09 acres in size and is located on easternmost portion of the Site. This area consists of brush, lawn and Pugsley Road. Stormwater runoff flows overland eastward towards Pugsley Road and is collected via a vegetative swale. Similar to existing conditions, stormwater runoff will be conveyed east of Pugsley Road via a series of culvert pipes and headwall. Stormwater will continue to flow overland into NYSDEC Regulated Freshwater Wetland LC-28, which lies east of Pugsley Road and north of New York State Route 312, is located within this drainage area. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 75 and 14.33 minutes, respectively.

Proposed Drainage Area 4B (PDA-4B) is 18.94 acres in size and is located on easternmost portion of the Site. This area consists of Warehouse 1 roof area and the associated parking area, drive isle, landscaped isles, and loading area. This area also consists of parking area between Warehouse 1 and Warehouse 2 and Forebay 4B, and Infiltration Basins 4B-A, 4B-B, and 4B-C. Stormwater runoff will be collected via catch basins and conveyed to Forebay 4, where 25% of the water quality volume will be pretreated. Stormwater runoff will fill up Forebay 4B and be released to Infiltration Basins 4B-A, 4B-B, 4B-C via three 5'X5' riser boxes at elevation 620.00 via 2' diameter pipes with riprapped end sections. Infiltration Basin 4A, 4B and 4C have been designed to provide the water quality volume for the 1-year storm in order to meet Enhanced Phosphorus requirements for drainage area PDA-4B. These basins have been designed to utilize an infiltration rate of 1 in/hr, which is based on preliminary infiltration testing performed by JMC on 5/3/2017. Stormwater runoff from lower storms will be retained and infiltrated into the ground. Runoff from higher storms will be released from each infiltration basin via a 5'X5'riser box and a 15" discharge pipe. Stormwater runoff will be discharged into the proposed culvert pipe at the corner of Pugsley Road and Route 312. Stormwater runoff will then be discharged via a headwall into NYSDEC Regulated Freshwater Wetland LC-28, which is east of Pugsley Road and north of New York State Route 312. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 91 and 5 minutes, respectively.

Proposed Drainage Area 4C (PDA-4C) is 1.40 acres in size and consists of the site's driveway entrance from Pugsley Road adjacent to Warehouse 1. This area also includes the adjacent lawn. Stormwater runoff will be collected via drain inlets and conveyed through a hydrodynamic water quality separator (Contech CDS 2025-5-C), WQS O-6 with a grated top for pretreatment. The pretreated runoff will then be conveyed eastward across Puglsey Road into Subsurface Infiltration Chamber System 4C comprised of 56 MC-3500 StormTech chambers. Runoff will first be conveyed through the systems isolator row which will provide additional pretreatment. This system has been sized to provide the water quality volume for

the 1-year storm in order to meet Enhanced Phosphorus requirements. This infiltration system utilizes an infiltration rate of 1in/hr. Stormwater runoff from the lower storms will be infiltrated into the ground and runoff from the higher storms will be released via an outlet control structure comprised of a 6-foot-long weir at elevation 583.75 in Subsurface Detention Chamber System 4C. Subsurface Detention Chamber System 4C consists of 16 MC-3500 StormTech chambers. Stormwater runoff from higher storms will be retained within this system and slowly released via an outlet control structure comprised of a 4" orifice at elevation 576.25 and a 4-foot-long weir at elevation 579.50. Runoff will be discharged via a 15" discharge pipe with a riprapped end section at elevation 570.00. Stormwater runoff will flow overland into NYSDEC Regulated Freshwater Wetland LC-28. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 87 and 5 minutes, respectively.

Proposed Drainage Area 5A (PDA-5A) is 27.23 acres in size and is located on southern central portion of the site. This area consists of woods, brush, lawn and wetland area. This area also includes a pond. Stormwater runoff from this drainage area drains to Local Wetland #2. Runoff from this area is then conveyed to an intermittent stream which discharges from an existing farm pond in the southerly portion of the Site. It is approximately 3,000 feet from the point where drainage exits the Property to where it enters the Middle Branch Reservoir. The lands from the property line to the reservoir adjacent to the stream are primarily wooded. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 69 and 9.4 minutes, respectively.

Proposed Drainage Area 5B (PDA-5B) is 11.90 acres in size and is located central portion of the site. This area consists of half of Warehouse 3 roof area and adjacent drive isle, parking area and landscaped islands. It also includes Forebay 5B, Infiltration 5B and Detention 5B area. Stormwater runoff will be collected via catch basins and conveyed to Forebay 5B, where 25% of the water quality volume will be pretreated. Stormwater runoff will fill up Forebay 5B and enter a 5'X5'

riser box at elevation 616.50 and be conveyed to Infiltration Basin 5B. Infiltration Basin 5B has been designed to provide water quality volume for the 1-year storm in order to meet Enhanced Phosphorus requirements. This basin has been designed to utilize an infiltration rate of 2 in/hr, which is based on preliminary infiltration testing performed by JMC on 5/3/2017. Stormwater runoff from lower storms will be retained and infiltrated into the ground. Runoff from higher storms slowly flow over the 10-foot-long spillway at elevation 604.50 into proposed Detention Basin 5B. Detention Basin 5B will detain the higher storms, attenuating peak flow and slowly releasing flow via a 4'X4' riser box at elevation 604.25. This riser box is comprised of a 4" orifice at elevation 600.00 and a 4-foot-long weir at elevation 602.00. Stormwater runoff will enter the riser box and be conveyed via a 15" pipe to a riprapped end section. It will then drain to Local Wetland #2. Runoff from this area is then conveyed to an intermittent stream which discharges from an existing farm pond in the southerly portion of the Site. Detention Basin 5B also has an emergency spillway at elevation 605.00. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 93 and 6.9 minutes, respectively.

Proposed Drainage Area 5C (PDA-5C) is 2.43 acres in size and is located on the central portion of the site. This area consists of the landbanked parking lot adjacent to Warehouse 3 and the adjacent landscaped area. Stormwater runoff will be collected via catch basins and conveyed to Forebay 5C, where 25% of the water quality volume will be pretreated. Stormwater runoff will fill up Forebay 5C and be released into Infiltration Basin 5C via a 4'X4' riser box at elevation 632.50. Infiltration Basin C has been designed to provide water quality volume for the 1-year storm in order to meet Enhanced Phosphorus requirements. This basin has been designed to utilize an infiltration rate of 2 in/hr, which is based on preliminary infiltration testing performed by JMC on 5/3/2017. Stormwater runoff from lower storms will be retained and infiltrated into the ground. Runoff from higher storms slowly enter a 5'X5' riser box at elevation 620.00 and is discharged into proposed Detention Basin 5C. Infiltration Basin 5C also has an emergency

spillway at elevation 621.00. Detention Basin 5C will detain the higher storms, attenuating peak flow and slowly releasing flow via a 5'X5'riser box at elevation 612.00. This riser box is comprised of a 3" orifice at elevation 610.00 and a 3-foot-long weir at elevation 612.00. Stormwater runoff will enter the riser box and be conveyed via a 15" pipe to a level spreader. It will then drain to Local Wetland #2. Runoff from this area is then conveyed to an intermittent stream which discharges from an existing farm pond in the southerly portion of the Site. Detention Basin 5C also has an emergency spillway at elevation 613.00. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 83 and 5 minutes, respectively.

Proposed Drainage Area 6 (PDA-6) is 29.93 acres in size and is located on southern portion of the site. This area consists of woods, brush and lawn area. Runoff discharges into the Middle Branch Reservoir approximately 1,500 feet south of the Site. The lands from the property line to the reservoir adjacent to the stream are also primarily wooded. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 68 and 17.82 minutes, respectively.

Proposed Drainage Area 7 (PDA-7) is 8.86 acres in size and is west of Drainage Area 4, along the southern property boundary of the site. This area consists brush and lawn. Stormwater from this area flows southward overland off the site. The Curve Number (CN) and Time of Concentration (Tc) for this drainage area are 72 and 7.18 minutes, respectively.

Refer to Drawing DA-2 in the SWPPP (Appendix D-1).

The peak rates of runoff to the design point of each of the analyzed drainage areas for each storm are shown on the table below:

Table III.D-2

Summary of Proposed Peak Rates of Runoff in Proposed Conditions
(Cubic Feet per Second)

Storm Recurrence Interval	DP-1	DP-2	DP-3	DP-4	DP-5	DP-6	DP-7
1 year	11.84	11.83	20.35	17.09	12.87	9.64	5.39
10 year	55.27	37.95	70.40	54.01	53.03	42.80	18.91
100 year	108.30	90.17	174.07	176.45	139.62	117.87	47.32

The reductions in peak rates of runoff from proposed to existing conditions are shown on the table below:

Table III.D-3
Percent Reductions in Peak Rates of Runoff (Existing vs. Proposed Conditions)
(Cubic Feet per Second)

Design Point	Storm Recurrence Frequency (Years)	Existing Peak Runoff Rate (cfs)	Proposed Peak Runoff Rate (cfs)	Percent Reduction (%)
1	1 year	19.33	11.84	38.7
	10 year	74.70	55.27	26.0
	100 year	192.51	108.30	43.7
2	1 year	11.97	11.83	1.2
	10 year	39.85	37.95	4.8
	100 year	96.48	90.17	6.5
3	1 year	24.92	20.35	18.3
	10 year	89.75	70.40	21.6
	100 year	225.63	174.07	22.9
4	1 year	17.85	17.09	4.3
	10 year	70.45	54.01	23.3
	100 year	184.47	176.45	4.3
5	1 year	12.95	12.87	0.6
	10 year	54.21	53.03	2.2
	100 year	145.79	139.62	4.2
6	1 year	10.70	9.64	9.9
	10 year	44.64	42.80	4.1
	100 year	118.97	117.87	0.9
7	1 year	10.39	5.39	48.1
	10 year	39.86	18.91	52.6
	100 year	102.04	47.32	53.6

As demonstrated in Table III.D-3, the proposed stormwater improvements will result in reductions of peak rates of runoff from existing conditions for all storms and design points analyzed, resulting in no off-site impacts from the project.

e. Erosion And Sediment Control Plan

As described in the SWPPP, a potential impact of the proposed development on any soils or slopes will be that of erosion and transport of sediment during construction. An Erosion and Sediment Control Management Program will be implemented 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, and as illustrated on Drawings C-401 through C-405 "Erosion & Sediment Control Plan". A continuing maintenance program will be implemented for the control of sediment transport and erosion control after construction and throughout the useful life of the project. The Paxton soils on the site, with their soil component of fines, will warrant additional sediment and erosion control precautions, which will be set forth in the Final SWPPP to reflect the final design of the project.

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, as shown on the Erosion & Sediment Control Plans, have been adequately installed to ensure overall preparedness of the site for the commencement of construction. In addition, the Applicant will have a qualified professional conduct one site inspection at least every seven calendar days and at least two site inspections every seven calendar days when greater than five acres of soil is disturbed at any one time.

Temporary Control Measures

Temporary control measures and facilities will include silt fences, interceptor swales, stabilized construction entrances, temporary seeding, mulching and sediment traps with temporary riser and anti-vortex devices.

Throughout the construction of the proposed development temporary control facilities will be implemented to control on-site erosion and sediment transfer. Interceptor swales, if required, will be used to direct stormwater runoff to temporary sediment traps for settlement. The sediment traps will 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 and inlet protection 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 Entrance consists of AASHTO No. 1 rock. The rock entrance will be a minimum of 50 feet in length by 20 feet in width by 8 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 after seeding or within 48 hours after seeding is completed.

5. Inlet Protection will be provided for all stormwater basins and 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. Existing structures within existing paved areas will be protected using "Silt Sacks" inside the structures.

6. Erosion Control Matting will be utilized on slopes and within swales, where applicable, to provide stabilization in advance of vegetation being established. Such matting will be biodegradable to facilitate long term growth of vegetation in swales, on slopes and within stormwater management facilities.

7. Sediments Traps will be used with the permanent SMP's until their contributing areas drainage are stabilized. Once stabilized, the temporary risers will be removed and final grading/planting of the basins will be completed for permanent use as Stormwater Management basins.

8. Temporary Sediment Basins will be constructed to intercept sediment laden runoff and trap and retain the sediment. The sediment basins are sized to provide a sediment storage volume of 3,600 cubic feet per acre draining to the basin. The Sediment Basins will be used with the permanent SMP's until their contributing drainage areas are stabilized. Once stabilized, the temporary risers will be removed, permanent outlet control structures will be installed and final grading/planting of the sediment basins will be completed for permanent use as Stormwater Management basins.

9. Temporary Riser and Anti-Vortex Devices- are placed at the bottom of the temporary sediment basins where they intercept and collect debris and litter from the pond before they can enter the off-site storm drainage system.

10. Stone Check Dams are small barriers of crushed stone which will be laid

across the grass swales which are approximately 12 inches high, located at a minimum of two foot of elevation change along the swales so that the crest elevation of the downstream dam is at the same elevation of the toe of the upstream dam.

The contractor is responsible for maintaining the temporary sediment and erosion control measures throughout construction. This maintenance will include, but not be limited to, the following tasks:

1. For dust control purposes, moisten all exposed graded areas 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 shall be performed at the end of each construction day and immediately following each rainfall event. All required repairs shall be immediately executed by the contractor.

3. Sediment deposits shall be removed when they reach approximately ⅓ the height of the silt fence. All such sediment shall be properly disposed of in fill areas on the site, as directed by the Owner's Field Representative. Fill shall be protected following disposal with mulch, temporary and/or permanent vegetation and be completely circumscribed on the downhill side by silt fence.

4. Rake all exposed areas parallel to the slope during earthwork operations.

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

treatment.

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. Vegetated Swales will function to provide additional treatment of stormwater runoff by removal of pollutants and will promote a reduction of peak flows and provide runoff infiltration.

2. 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 1 year storm stormwater runoff volume. The water quality volume will be retained and higher storms will be released gradually.

3. CDS 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 CDS must provide water quality for 75% of existing impervious areas for the 1 year, 24 hour storm in accordance with the requirements of the New York State Department of Conservation (NYSDEC). The CDS 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.

4. Infiltration System (I-2) which is a standard SMP that will be used to treat the runoff volume generated from a portion of the developed area and provide additional water quality and runoff volume reduction. The smaller storms will

be retained and the higher storms will be released gradually. Refer to the Proposed Hydrologic Calculations and Runoff Reduction and Water Quality Volume Sizing Calculations, in Appendices 'B' and 'D'.

The StormTech SC-740 Recharge Chambers are domed shaped fully opened bottom corrugated chambers with perforated side walls. Chambers allow stormwater to be stored within the dome void until it can infiltrate into the ground. They are able to be used for residential, commercial or industrial applications and provide an easy way to treat and dispose of stormwater runoff underground. Water is infiltrated into the ground through the chambers and surrounding crushed stone and will replenish the groundwater as a natural condition.

The Isolator Row is a row of StormTech chambers that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as stormwater rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls allow stormwater to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage access of the adjacent stone and chambers from sediment accumulation.

The Isolator Row is designed to capture the "first flush" and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but includes a high flow weir such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other standard chambers. By treating stormwater prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured.

5. 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.

6. Rip-Rap Energy Dissipaters At discharge points from the stormwater drainage system into the stormwater management basins, rip-rap pads consisting of angular rocks will be placed to dissipate velocity and reduce the risk of erosion. The rip-rap pads will be 10 feet wide by 10 feet long.

7. 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.

5. Mitigation Measures

a. Preliminary Stormwater Pollution Prevention Plan

The design of the project's stormwater management as discussed in the SWPPP has been in accordance with the following:

- Requirements of the New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit No. GP-0-15-002, effective January 29, 2015, last modified November 23, 2016;
- NYS Stormwater Management Design Manual last revised January 2015;
- New York City Department of Environmental Protection Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and its Sources, amended April 4, 2010;
- Chapter 119 "Stormwater Management and Erosion and Sediment Control" of the Town of Southeast Code.

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. As demonstrated in Table III.D-3, above, the proposed stormwater improvements will result in reductions of peak rates of runoff from existing conditions for all storms and design points analyzed. All water quality practices, including the enhanced phosphorus removal required because the project is within the NYCDEP watershed, exceed the requirements of the stormwater management practices criteria as outlined in Chapter 6 of the NYS Stormwater Management Design Manual.

The combination of stormwater ponds, swales, and level-spreader discharges provide redundant opportunities to enhance water quality and mitigate stormwater runoff rates from the development areas. The vegetated swales and other overland conveyances of stormwater runoff will result in additional infiltration for runoff reduction and water quality that is not considered in the SWPPP's hydrologic model, resulting in a conservative analysis.

b. Wetlands And Buffer Impacts Mitigation

Mitigation for the wetland encroachment at the Barrett Road crossing will be provided through restoration of the upper portion of Wetland 4. As seen in the following pictures, this area has been overgrown by invasive species which degrade the overall habitat value of the wetland. If left alone, it is likely that these species will continue to spread and will eventually eliminate the native species within this portion of the wetland.

Since the Barrett Road improvements will require disturbance to the wetland and replacement of the culvert, the upper portion of the wetland will be excavated to remove the common reed rhizomes, and the area will be solarized by placing clear plastic over the remaining soils during the growing season. This will result in

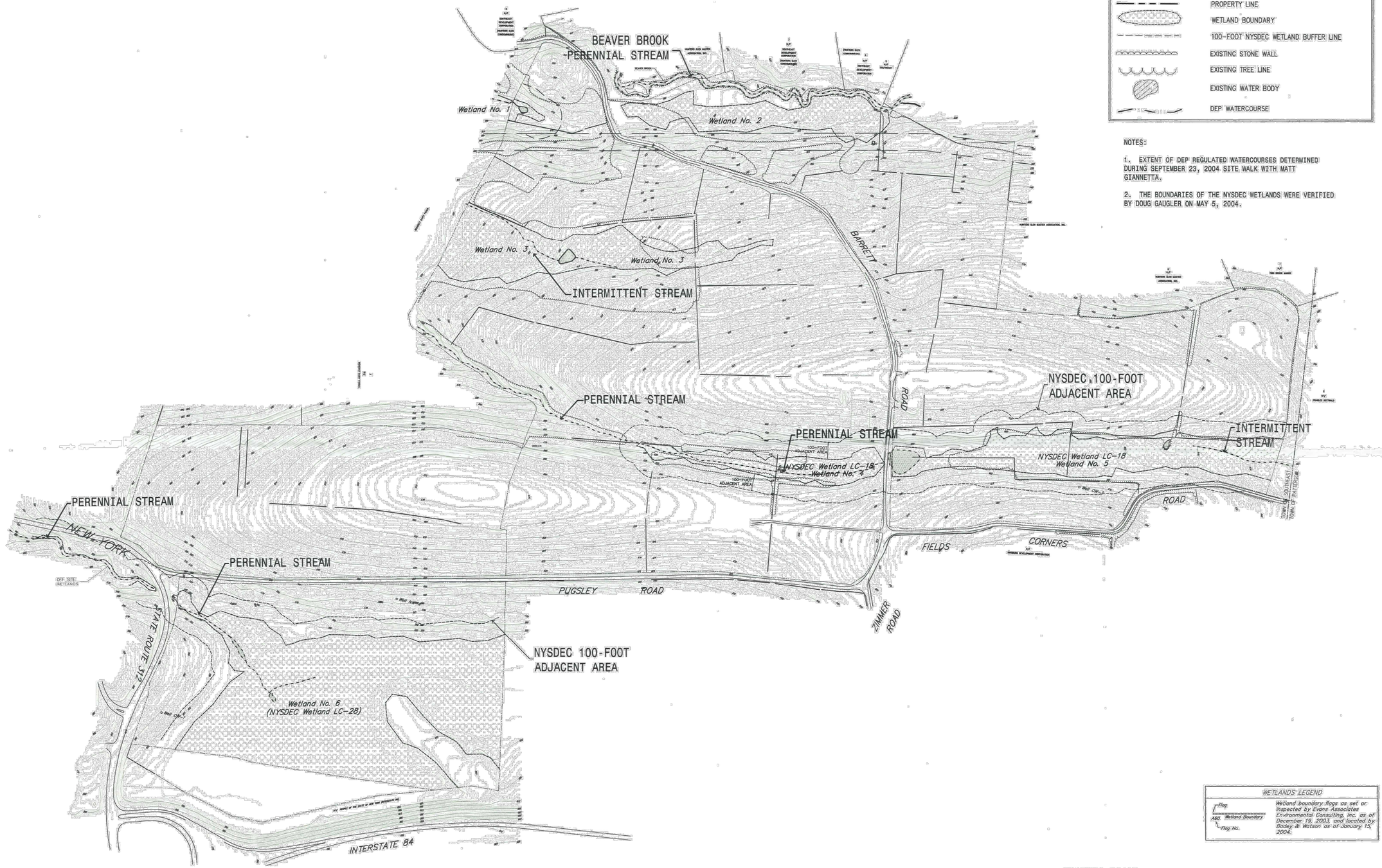
sterilization of the soil where the invasive species were growing by elimination of the seeds and remaining rhizomes. Following completion of the road reconstruction, the sterilized soils will be replanted with plugs of native sedges and allowed to grow.

The mitigation area will be monitored for a minimum of three years following the restoration work to ensure that invasive species do not become reestablished. The restoration area will be monitored at least three times during the growing season for each of the first three years following installation of the plugs, and monitoring reports, including recommendations for maintenance, will be submitted to the Town and to DEC.

Wetland buffer impacts will be mitigated through extensive wetland plantings in the stormwater management basins.

Upper portion of Wetland 4 looking south at Barrett Road crossing in March 2004 (above) and February of 2018 (below), where marsh is obscured by common reed.

Looking north towards Barrett Road crossing from within Wetland 4 at edge of common reed encroachment. Photo taken in August 2017.



LEGEND

- PROPERTY LINE
- WETLAND BOUNDARY
- 100-FOOT NYSDEC WETLAND BUFFER LINE
- EXISTING STONE WALL
- EXISTING TREE LINE
- EXISTING WATER BODY
- DEP WATERCOURSE

NOTES:

1. EXTENT OF DEP REGULATED WATERCOURSES DETERMINED DURING SEPTEMBER 23, 2004 SITE WALK WITH MATT GIANNETTA.

2. THE BOUNDARIES OF THE NYSDEC WETLANDS WERE VERIFIED BY DOUG GAUGLER ON MAY 5, 2004.

WETLANDS LEGEND

Flag
ABC Wetland Boundary
Flag No.

Wetland boundary flags as set or inspected by Evans Associates Environmental Consulting, Inc. as of December 19, 2003, and located by Bibby & Watson as of January 15, 2004.

GRAPHIC SCALE

250 0 125 250 500 1000

(IN FEET)
1 inch = 250 ft.

NORTH

REVISIONS:

NO.	ISSUE	DATE

LAND SURVEYOR:

Surveying & Engineering, P.C.
3083 Route 9
Cold Spring, New York 10516
(877) 314-1568 Toll-Free
(845) 265-4428 (Fax)
(845) 265-3512
(914) 528-1800
(914) 739-3677

ENVIRONMENTAL CONSULTANT:

EVANS ASSOCIATES
ENVIRONMENTAL CONSULTING, INC.
208 Amity Road
East Haven, Connecticut 06524
T: (203) 393-0690
F: (203) 393-0196

DWG. TITLE: NYCDEP WATERCOURSE MAP

PROJECT NAME: CAMPUS AT FIELDS CORNER
Pugsley Road
Town of Southeast, N.Y.

Date:	September 24, 2004
Dwn. by:	ALP
Checked by:	BE
Doc. ID:	Campus_DEP_Watercourses
EAEC Proj. No.:	38
DWG. NO.:	WC-1

FIGURE: III. D - 1

Flag
A&S Wetland Boundary
Flag No.

Wetland boundary flags as set or inspected by Evans Associates Environmental Consulting, Inc. as of December 19, 2004, and located by Badey & Watson as of January 18, 2004. Remarked by Badey & Watson May–June 2017.

TRUE NORTH AT 74°20' WEST LONGITUDE

WETLAND No. 2
(NYSDEC Wetland LC–18)

Property Line

CORPORATION R.O.W.

STATE ELECTRIC & GAS

WETLAND No. 1
(Locally Regulated)

NEW YORK

Property Line

Property Line

BARRETT ROAD

Property Line

WETLAND No. 3
(Locally Regulated)

Parcel "A"

WETLAND No. 4
(NYSDEC Wetland LC–18)

N 522734
E 690202

Parcel "B"

WETLAND No. 5
(NYSDEC Wetland LC–18)

o Well OW–3
N 524440
E 690888

ROAD

Property Line

CORNERS

FIELDS

ZIMMER ROAD

Property Line

Property Line

PUGSLEY ROAD

Property Line

Property Line

NEW YORK

o Well OW–4
N 520765
E 691483

This wetland not staked (May–June 2017)

STATE ROUTE 312

WETLAND No. 6
(NYSDEC Wetland LC–28)

o Well OW–1
N 519601
E 692454

Property Line

Notes:
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3. Underground improvements, if any, are not shown hereon.
4. Unauthorized alteration or addition to a document prepared by a licensed land surveyor is a violation of Section 7209, Subdivision 2 of the New York State Education Law.
5. Property lines are shown hereon in their approximate position based on deeds, maps or other information obtained by these surveyors. This map is NOT a BOUNDARY SURVEY and should NOT be used for title purposes.
6. Revised October 8, 2004. Added coordinates for well positions in New York State Plane Coordinate System, East Zone (NAD27).
7. Revised August 1, 2017 to indicate that stakes were set at each wetland flag position hereon for inspection by Evans Associates Environmental Consulting, Inc. Stakes were set between May 11, 2017 and June 23, 2017.
8. Revised August 10, 2017. Revised wetland labels. Survey not brought to date.

WETLANDS SURVEY
PREPARED FOR
PUTNAM SEABURY PARTNERS, L.P.
SITUATE IN THE
TOWN OF SOUTHEAST
PUTNAM COUNTY
NEW YORK

SCALE 1 inch = 200 feet JANUARY 15, 2004

We hereby certify that the survey shown hereon was completed by us on January 15, 2004 that this map was completed on January 16, 2004.
Revised August 1, 2017. See Note 7.
Revised August 10, 2017. See Note 8.

PRINTED
AUG 10 2017

BADEY & WATSON
Surveying & Engineering, P.C.
by
NEW YORK STATE LICENSED LAND SURVEYOR
LICENSE No. 49789

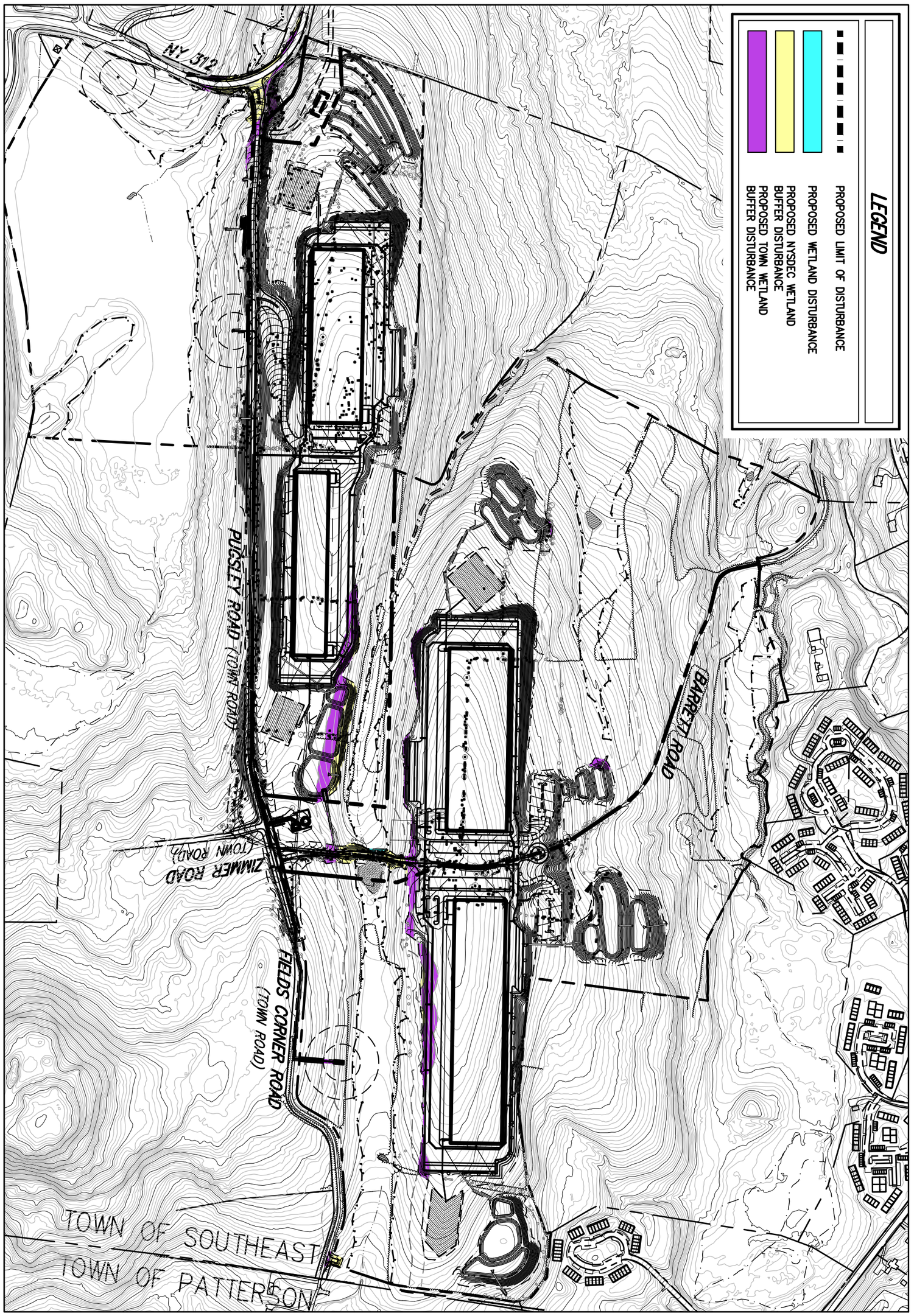
BADEY & WATSON
Surveying & Engineering, P.C.

3063 Route 9
Cold Spring, NY 10516
www.Badey-Watson.com
845.265.9217
845.265.4418 (Fax)
877.3.161593 (Toll Free)

FILE No. 50–914DS

Drawing Name: WL16323_ROA_10A Layout: WETLAND W.O. No. 16323, 23548 Checked by SRM Spell checked by MKH/NTK Drawn by MKH/NTK Closed by XXX On XX–XX–XX 45.–1–4, 5, 8, 12 & 13

FIGURE: III. D - 2



NORTHEAST INTERSTATE LOGISTICS CENTER

NY 312 & PUGSLEY ROAD — TOWN OF SOUTHEAST, NEW YORK

PROPOSED WETLAND / BUFFER DISTURBANCE AREAS

DATE: 06/2018 — JMC PROJECT: 14012

FIGURE: III. D - 3 — SCALE: 1" = 500'

120 BEDFORD RD
ARMONK
NY 10504

(914) 273-5225
fax 273-2102

JMCPLLC.COM

JMC

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14012-S&E.dwg; WETLAND-DIST-DEIS.tab; WET-DIST-PROPOSED.scr