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EXPANDED ENVIRONMENTAL ASSESSMENT REPORT

PROPOSED MULTI-FAMILY APARTMENTS
1011 Second Avenue
Troy, New York

Rensselaer County, New York

PREPARED FOR:

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1.0 EXECUTIVE SUMMARY

This report is submitted in support of the proposed project which includes a zone change from R-1 to Planned Development to construct three (3) apartment buildings containing a total of 231 apartments on approximately 10 acres of property in the city of Troy.

Under the current R-1 zoning single-family residential home(s) and accessory structure(s), including home occupations, could be constructed as-of-right without any required review or approval from the City of Troy. The as-of-right development of single-family residence(s) would result in clearing and grading of the entire 10 acre site within the City of Troy and would leave roughly one-half acre of greenspace remaining. In addition, the current zoning of single-family residence(s) could require internal roadways and water and sewer mains, which would ultimately be maintained by the City.

The construction of single-family residence(s) would ultimately result in a greater disturbance of the project site than the proposed apartment project in a Planned Development (PD) zone. If the zoning is changed to PD, 25% (2.5) acres of the 10-acre site would be left as undeveloped green space; five (5) times the amount of green space that could be left if single family home(s) are constructed under the existing R-1 zoning.

In addition to the single-family development requiring clearing of the entire property and resulting in only 20% of the green space of the would be available if the proposed development would be pursued, the amenities proposed as part of this application would not be able to be constructed.

The requested zone change would allow development of the project assessed in this report along with the accompanying public amenities. Project amenities for the zone change and apartment proposal include a 1,750 linear foot lighted sidewalk from the northern portion of the property to 126th Street, a 1,360 linear foot multi-use path, public kayak launch, public gazebo and private seasonal docks (the “Project”). An additional, adjacent one (1) acre of land in the

Town of Schaghticoke is proposed to be utilized as part of the Project, but no development is proposed on that parcel.

Mitigation measures proposed to minimize any potential significant adverse environmental impacts associated with the Project include activities specifically undertaken by the applicant to minimize or eliminate potential impacts and project planning that, by its nature, serves as pre-mitigation by design.

To the extent possible, Project impacts have been avoided and/or adequately mitigated. In those instances where avoidance is not possible and there could be impacts, the applicant is working with the associated State Agencies that oversee those resources to ensure that the Project and any associated mitigation is consistent with their adopted policies and procedures.

2.0 INTRODUCTION

The Environmental Design Partnership, LLP (EDP) was retained by Kevin Vandenburgh (project applicant) to complete an Expanded Environmental Assessment Report for a proposed multi-family apartment project at 1011 Second Avenue in the City of Troy, New York.

The proposed project is to develop three (3) apartment buildings containing a total of 231 apartments on approximately 10 acres of property in the city of Troy. Proposed project amenities include a 1,750 linear foot lighted sidewalk from the northern portion of the property to 126th Street, a1,360 linear foot multi-use path, public kayak launch, public gazebo and private seasonal docks (the “Project”). An additional, adjacent one (1) acre of land in the Town of Schaghticoke is proposed to be utilized as part of the Project, but no development is proposed on that parcel.

The purpose of this assessment is to provide additional studies, evaluations and analyses assessing the potential environmental impact of the Project as described in the Full Environmental Assessment Form prepared by M.J. Engineering and Land Surveying, P.C., dated October 2020. A copy of the Full Environmental Assessment is included in Attachment A.

This Expanded Environmental Assessment summarizes the evaluation of each potential Project impact and outlines impact mitigation techniques, where necessary. The potential impacts of a residential apartment project are well defined and the Project has been designed to mitigate all potential impacts, to the greatest extent possible.

3.0 PROJECT SETTING

The property is made up of two (2) tax parcels, one in the City of Troy sized that encompasses approximately 10 acres and one tax parcel within the Town of Schaghticoke that is approximately one (1) acre in size. Both parcels are undeveloped and partially wooded. The Project Location Map is included below.

The Project is bordered to the West by the Hudson River, to the East by Second Avenue, to the North by single-family residences, and to the South by single-family residences.

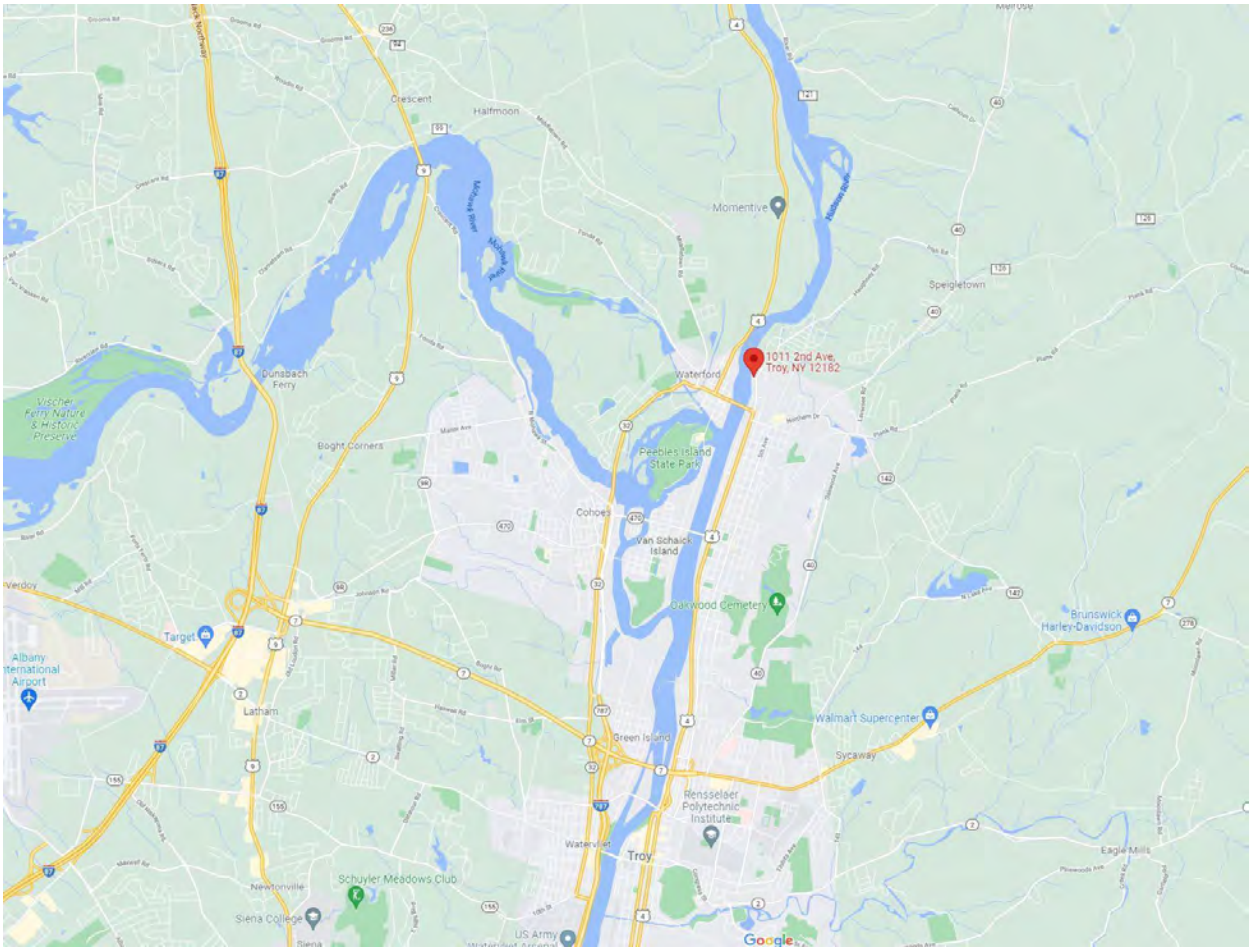


Figure 1 – Site Location Map

Surrounding land uses include single-family residential uses to the north of the parcel in the Town of Schaghticoke along Cedar Lane, and single-family residential uses bordering the parcel to the east and south along Second Avenue in the City of Troy. The property borders the Hudson River to the west.

3.1 Land Use

The property is currently zoned as R-1 residential which allows for the as-of-right development of single-family homes. Based upon a conceptual layout of single-family homes by M.J. Engineering and Land Surveying completed in 2020, approximately 36 single-family homes could be developed on the property under existing City of Troy Zoning provisions.

A single-family residential subdivision would result in a road network that would likely be dedicated to the City of Troy upon completion including municipal infrastructure for water and sanitary sewer mains within the right-of-way. Dedicated roads and water and sanitary sewer infrastructure would likely be owned and maintained by the City of Troy.

The 36 single-family lots would be privately owned and developed and maintained by individual home owners. Clearing and maintenance of the single-family lots would be at the discretion of the individual property owners, rather than a single HOA.

3.2 Water

A large 24-inch water main runs through the property. That water main conveys potable water from the City of Troy to the Village of Waterford.

3.3 Sanitary Sewer

Sanitary sewer and associated combined sewer (stormwater and sanitary) exist on the property. An existing 15-inch gravity sewer main is located along Second Avenue in front of the Project site. This sewer main is a combined sewer that conveys flows to the south along Second Ave and towards the Rensselaer County WWTP located on Water Street in the City of Troy. A sewer study was completed by M.J. Engineering and Land Surveying and is included as Attachment F which concludes that the Project sanitary sewer generation of 24,255 gallons per day is within Rensselaer County's sanitary sewer trunk capacity and the county treatment capacity.

3.4 Flood Elevations

According to the Federal Emergency Management Area (FEMA) Flood Insurance Rate Map (FIRM) panel 3606770001B, dated March 18, 1980, the Project site is located within Zone A11, Zone B and Zone C. The 100-year flood elevation is 35 feet above mean sea level. Greater than 95% of the property is outside of the 100-year flood elevation.

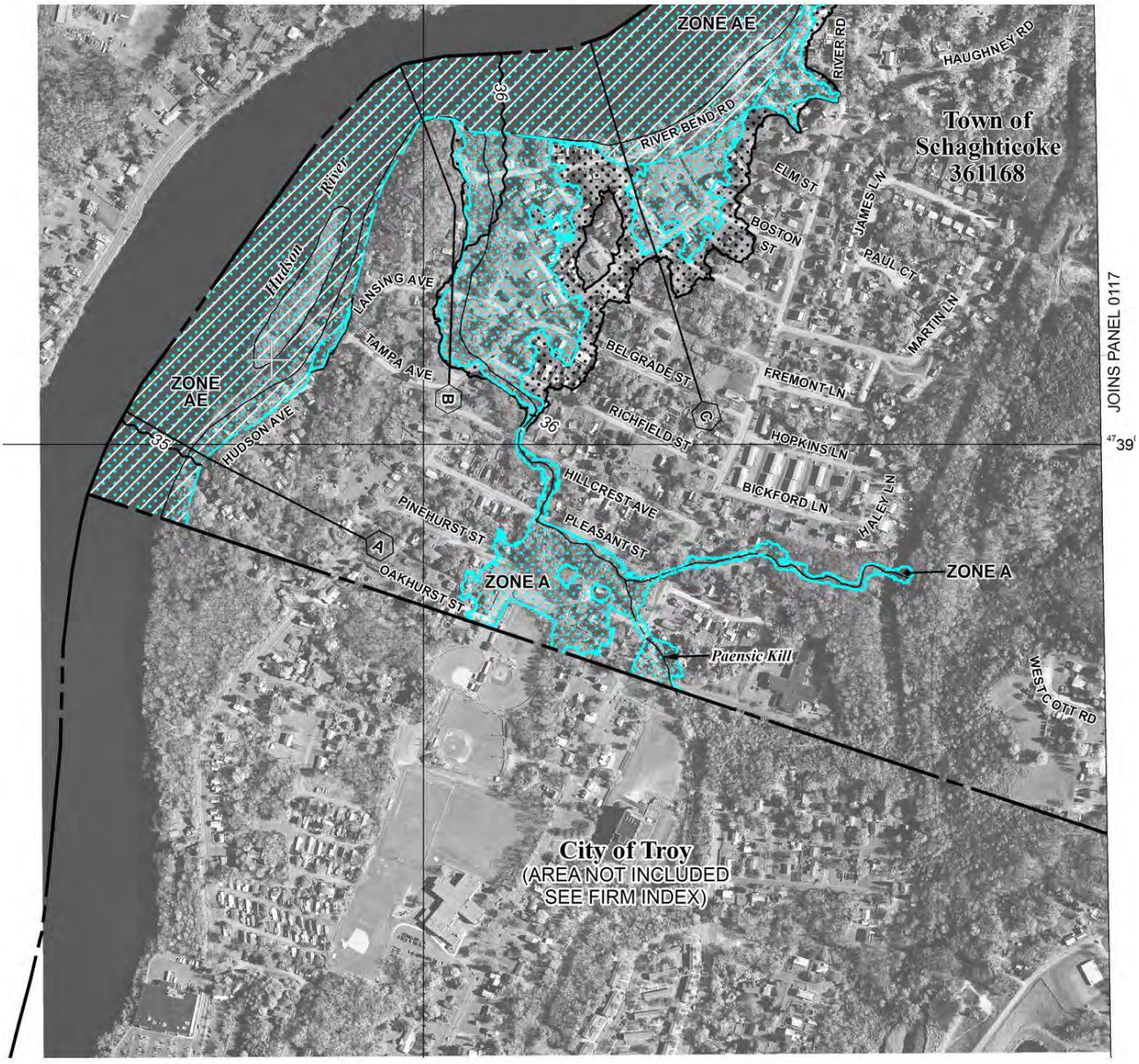


Figure 2 - Image from FEMA mapping of northern portion of property



Figure 3 - Image from FEMA mapping of southern portion of property

3.5 Soils

According to the United State Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Web Soil Survey, the property is underlaid by Nassau-Rock outcrop complex, hilly soil which is described as channery loamy till derived mainly from local slate or shale. It is classified as hydraulic group D and generally encounters bedrock within 15 to 19 inches below grade. Numerous test pits were advanced on the property by Hartgen Archeological Associates (Hartgen) and the owner to assess the subsurface conditions. Those

subsurface investigations indicated that bedrock generally exists within three (3) feet or less of the ground surface throughout the property. The bedrock appears to be shale throughout.

3.6 Bedrock

As noted in Section 2.4 above, bedrock was encountered throughout the Project site during surface investigations at generally three (3) feet or less. The bedrock is very complex and consists of the Cohoes Melange, a 20-kilometer (12.5-mile) wide band of rock that was highly deformed during the Taconic Orogeny. In older literature, the shale of the Hudson Valley is classified as the Normanskill/Canajoharie Formation (Fisher, et al. 1970). More recent research has demonstrated that this shale consists of several formations including the Utica shale and Schenectady Formation shale of the Proto North American plate and the Mount Merino shale associated with the Taconic Arc (Kidd, et al. 1995). It is the Mount Merino shale that contains the green chert identified along the bedrock ridges in the vicinity of the Dickerson Street Site, and therefore, this report refers to the shale as Mount Merino shale within the Cohoes Melange. The Cohoes Melange formed toward the end of the Ordovician Age when the Iapetus Ocean closed. The pressures of the colliding plates caused the deformation of many of the bedrock formations and the juxtaposition of numerous types of bedrock formed in different environments within the Cohoes Melange.

This juxtaposition of bedrock from different sources is evident within the Dickerson Street Site. Most of the bedrock observed within the Dickerson Site consists of Mount Merino formation chert-bearing shale. However, an outcrop of dolomitic sandstone was identified along the southwest ridge in the quarry workshop area. This sandstone was likely formed on the shelf or slope of the Taconic Allochthon and was juxtaposed with the deep water Mount Merino shale during the Taconic Orogeny's deformation and compression of the rocks of the Iapetus Ocean. As a result, rocks formed in very different environments and with different compositions and properties outcrop within 15 meters (50 ft.) of each other within the Cohoes Melange of the Dickerson Street Site.

The Cambrian- and Ordovician-age (570 to 505 and 505 to 436 million years ago) cherts of New York are relatively free of fossils and are generally found in formations of shale and argillite such

as the Normanskill/Canajoharie and Mount Merino formations. Cherts bedded in shale and slate are typically thought to have formed in deep ocean deposits near volcanically active faults between continental plates. Some researchers theorize that these cherts formed directly from volcanic sediments under conditions of high pressure and dynamic temperature and that silica-secreting organisms were not involved (Luedtke 1992). This theory accounts for the lack of fossils in these cherts. The chert-bearing shale in the Project area east of the Hudson River consists of Ordovician-age (505 to 436 million years ago) bedrock. The chert in this bedrock was formed in a deep ocean environment and does not include fossils. The chert within the formation ranges in quality from true chert to siliceous shale, or shale that has a high silica content and has similar properties to chert but is generally softer and grainier.

3.7 Wetlands

There are no mapped wetlands on the property according to the New York State Department of Environmental Conservation (NYSDEC) Environmental Resource Mapper as depicted below.



Figure 4 – NYS Environmental Resource Mapper

The Environmental Design Partnership, LLP (EDP) evaluated the property to complete a wetland assessment as not all wetlands have been mapped by the NYSDEC and/or the United State Army Corps of Engineers (USACE) to assess if wetlands are present.

Based upon EDP's wetland assessment, a small USACE) wetland exists in the far northeast corner of the property, in an area that will not be developed or otherwise disturbed.. That wetland is depicted on the Existing Conditions Plan in Attachment B.

3.8 Surface Water

The Hudson River is located and forms the western property boundary. There are no other streams or surface water bodies on the property.

3.9 Threatened and/or Endangered Species

According to the Information for Planning and Conservation (IPaC) Species List as well as the New York State Department of Natural Resources (NYSDEC) Environmental Assessment Form (EAF) Mapper, no threated or endangered species or critical habitat exist on the Project site.

The property is located within an area of rare plants and/or animals according to the NYSDEC Environmental Resource Mapper for rare dragonflies and/or damselflies that are not listed by New York State as endangered or threatened species. According to the NYSDEC, the sole breeding locations for these species in New York are bog complexes that include areas of black spruce-tamarack bog, highbush blueberry bog thicket, and inland poor fen (New York Natural Heritage Program 2011).

Given that there are no bogs on the existing property, no habitat for any rare species of dragonflies or damselflies exists at the Project site. A site visit conducted by EDP personnel on July 19, 2021 confirmed that no threatened or endangered species inhabit this site.

A copy of relevant correspondence with the United States Department of the Interior, United States Fish and Wildlife Service (USFWS) is included As Attachment C.

3.10 Groundwater

As discussed in Section 3.4 and 3.5 of this report, the soil is generally underlain by shallow bedrock within three feet of the surface. Based upon the numerous test pits advanced on the property, groundwater was not encountered and is anticipated to be located below or within the bedrock.

3.11 Stormwater

Stormwater on the property infiltrates the shallow soils that overlays the bedrock and generally sheet flows to the west towards and into the Hudson River.

3.12 Topography

The Project site has complex topographic relief over the approximately eleven (11) acres. Elevations range from approximately 96 feet in the northern portion of the property to 18 feet along the Hudson River on the western portion of the property as depicted on the Existing Conditions Plan included in Attachment XX. The steepest slopes in excess of 15% exist along the western portion of the property adjacent to the Hudson River.

3.13 Vegetation

The Project is largely wooded except for areas along the existing waterline adjacent to Second Avenue. There are areas of the property that have trash such as tires, bottles and other scrap from being undeveloped over the years. Example pictures of the open and forested areas are included below.



Figure 5 - Photograph of open maintained area looking west from the waterline.



Figure 6 - Photograph of typical vegetated area of property looking northwest towards the Hudson River.

3.14 Traffic

The property is currently undeveloped and does not generate traffic. Second Avenue is a north-south road classified as an urban major collector that extends from 101st Street in the City of Troy to the Town of Schaghticoke Town line. Second Avenue provides two-way travel and has a total width of 24-feet with one travel lane in each direction and no paved shoulders near the Project site. Traffic volume data collected by the New York State Department of Transportation (NYSDOT) shows that Second Avenue serves approximately 3,405 vehicles per day (vpd). A sidewalk on the east side of Second Avenue extends approximately 70-feet south and 40-feet north of Roosevelt Avenue. The posted speed limit on Second Avenue is 30 miles per hour (mph).

There are no existing bus stops located on Second Avenue in the vicinity of the Project site. There are no shoulders provided within the Project area.

3.15 Archeology

The property has been extensively studied for archeological impacts. In 2008, a complete archaeological investigation of that portion of the Project site that was to be disturbed to install the municipal waterline running between Troy and Waterford was completed. A Phase IA/IB/II archeological investigation and site evaluation was completed for the waterline project by Hartgen in June 2008. The study included a Phase IA literature review for the entire water line, Phase IB field reconnaissance in all appropriate locations along the water line, and Phase II site evaluations of two sites: the Dickerson Street Site and the Water Works Precontact Site (USN 09145.000747). Phase IB/II investigation (Hartgen Archeological Associates Inc. 2008) of the Dickerson Street Precontact Site (USN 08340.001736) involved the hand excavation of 166 shovel tests and the mechanical excavation of four trenches totaling 62 meters (207 feet) in length and roughly 1 meter wide. The survey included a mix of 15-meter (50 foot) and 7.5-meter (25 foot) interval shovel tests.

A Phase III study, completed in 2010, focused on a 0.5-acre APE for a staging area for directional drilling below the Hudson River. A second drilling location on the west bank of the

river contained the Waterworks Precontact Site (USN 09145.000747) which was also investigated by a team from Hartgen.

In addition, and more recently a Phase IB/II archeological investigation was conducted by Hartgen in in 2019 and 2020 as part of the environmental review of the Project. The Phase IB/II investigation focused on areas of the property that were not investigated as part of the 2008 though 2010 studies.

Between December 16, 2019 and January 3, 2020, 107 shovel tests were excavated to an average depth of 35 centimeters during the combined Phase IB/II study. 65 of those shovel tests were excavated in a regularly spaced 15-meter grid across the entire study area. These constituted the Phase IB portion of Hartgen's work and guided later site evaluation work. The remainder of the shovel tests were placed to create a 7.5-meter, close interval grid in areas that the initial testing had produced positive tests and were part of the Phase II study of the site. The April 2020 Phase IB/II report by Hartgen is included as Attachment D.

3.16 Existing Visual Character

The visual study area (5 mile radius) is generally centered along the Hudson River and encompasses several Cities and Towns including Troy, Schaghticoke, Waterford, Halfmoon, Green Island, Latham and Cohoes. The Mohawk River is also located within the visual study area. Lands both east and west of the Hudson River slope towards the Hudson River. Lands to the north and South of the Mohawk River generally slope towards the Mohawk River. The lands to the east of the Project area tend to slope up from the Hudson River with greater topographic relief, while lands to the west of the Project area are generally flatter and lower in elevation.

Landforms including waterfalls low-lying floodplain areas, islands, rivers, streams, and uplands exist throughout the visual study area. The visual study area has a diverse mixture of landscapes that vary from dense urban environments with little in the way of vegetation (such as Downtown Troy) to suburban environments extending out from the Cities to more rural landscapes that are heavily forested.

There is large diversity of land use within the visual study area. There are large commercial and industrial buildings located within the dense urban downtown cores of Troy, Cohoes and Waterford. Those dense urban environments have a large network of concentrated streets and buildings. Extending out from the City of Troy, Cohoes and Waterford the land use becomes more suburban with residential housing and commercial/retail uses in areas such as Latham and Halfmoon. Extending past the suburban areas, the visual study area becomes more rural with open and undeveloped areas, especially to the northeast.

The area within the visual study area was reviewed for visually sensitive resources, consistent with the NYSDEC Program Policy for Assessing and Mitigating Visual and Aesthetic Impacts inventory of aesthetic resources listed below.

EDP corresponded with the New York State Office of Parks, Recreation and Historic Preservation (OPRHP concerning the Project. The proposed Project is located adjacent to the State and National Register (NR) listed New York State Barge Canal Historic District (Barge Canal) and will be visible from certain vantage points within the NR listed Waterford Village Historic District.

4.0 PROPOSED DEVELOPMENT

The project applicant proposes to construct three (3) multi-family apartment buildings, associated parking, stormwater management, site amenities and utilities on the eleven (11) acres.

Two of the proposed buildings would have an approximately 18,100 square foot building footprint. The third building would have an approximate building footprint of 24,300 square feet. The buildings are proposed to be four stories in height (approximately 50-foot-tall structures). Parking for the proposed residents would be a mixture of surface parking and underground parking. The proposed building basement elevations for parking would be situated at a minimum of one foot above the base flood elevation.

In addition to the proposed apartment buildings and associated parking, proposed project amenities include a 1,750 linear foot lighted sidewalk from the northern portion of the property to 126th Street, a1,360 linear foot multi-use path, public kayak launch, public gazebo and private seasonal docks (the "Project"). An additional, adjacent one (1) acre of land in the Town of Schaghticoke is proposed to be utilized as part of the Project, but no development is proposed on that parcel. Site Plan Drawings for the proposed development are included in Attachment B.

4.1 Water

The proposed Project will include extending an 8-inch water service off the existing 24-inch ductile iron water main on the upstream side of the meter pit. The 8-inch water service will extend onto the site near the 87-unit apartment building located near the southern entrance of the Project site frontage on 2nd Ave. A water meter pit will be installed just outside of the 2nd Ave right-of way and then the 8-inch water service will split and extend to the north and to the 87 unit building along the Project roads to serve the proposed buildings and then terminate with an end-of line hydrant.

The proposed 8-inch water service will be ductile iron from the connection to the 24-inch main to the water meter pit. After the meter pit the water main will be PVC C-900.

The proposed water distribution system infrastructure will be constructed in accordance with the 10 State Standards, the City of Troy specification and all State Department of Health requirements. The proposed 8-inch water service will be privately owned and maintained. A water engineering narrative is included in Attachment E.

No significant adverse impacts to potable water are anticipated as a result of the Project.

4.2 Sanitary Sewer

The proposed Project site will contain a privately owned and maintained low pressure sewer system. Each apartment building will be serviced by a grinder pump that will convey flows to a low-pressure collection lateral which will discharge to the existing 15-inch gravity main located

along 2nd Avenue. The low pressure sewer laterals and grinder pumps will be privately owned and maintained.

The proposed buildings will be serviced with pre-packaged grinder pumps manufactured by Environment One Corporation (EONE) or approved equals. Each grinder pump station will include a control panel with audible and visual alarm, manual run feature, hour meter, cycle counter, etc. Each grinder pump control panel shall also include an outlet for a backup generator connection to allow for pump out during prolonged power outages. The grinder pumps will be privately owned and maintained. The prepackaged EONE grinder pumps contain preset on/off elevations in the wet wells.

The proposed low-pressure force main systems will consist of 1.25-inch to 2-inch force mains that will collect the discharge from the grinder pumps and convey these flows to the existing 15-inch gravity main location on 2nd Avenue.

The project applicant will be required to contribute to the City of Troy's combined sanitary sewer overflow (CSO) mitigation efforts. City specific CSO mitigation will be coordinated between the project applicant and the City Engineering Department to offset additional proposed flows into the system. As a result, no significant adverse impacts to the sanitary sewer system are anticipated as a result of the Project.

4.3 Flood Elevation

According to the Federal Emergency Management Area (FEMA) Flood Insurance Rate Map (FIRM) panel 3606770001B, dated March 18, 2980, the project site is located within Zone A11, Zone B and Zone C. The 100-year flood elevation is 35 feet above mean sea level.

The proposed apartment buildings and associated surface parking lots would be located outside of and above the existing flood elevations.

No significant adverse impacts from flooding are anticipated as a result of the Project.

4.4 Soils

The proposed Project would remove soils where necessary to provide for buildings, surface parking areas, access drives, utilities and surface improvements such as sidewalks, etc. and to grade the Project as necessary. The primary impact on soils as a result of grading is the potential for erosion within the Project area. This may occur where existing vegetation and their associated root systems are removed. Overburden and soils would be stripped and stockpiled on-site for use in reclamation activities. In an effort to prevent off-site migration of surficial soils, stripping activities would be limited to accommodate proposed grades and appropriate erosion and sediment controls will be utilized in disturbed areas in accordance with the New York State Stormwater Management Design Manual and the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System *SPDES) General Permit for Stormwater Discharges from Construction Activities (GP-0-20-001). A grading plan for the proposed Project is included in Attachment B.

As a result, there are no anticipated significant adverse impacts to soils from the proposed Project.

4.5 Bedrock

Areas of existing bedrock would be removed to accommodate the proposed development. The existing shale is rippable and would be removed as necessary to accommodate the proposed apartment buildings, associated surface parking, access drives utilities and surface improvements such as sidewalks, etc. Removed bedrock would stockpiled and hauled off the property. A grading plan for the proposed Project is included in Attachment B. Bedrock materials such as those encountered at the site are relatively common throughout the state and represent a functionally unlimited resource. As a result, no significant impact to bedrock geology is anticipated from bedrock removal at the site.

4.6 Wetlands

The existing USACE wetland located in the northeastern corner of the property is to remain and would not be impacted by the proposed developed. No significant adverse impacts to wetlands are anticipated as a result of the Project.

4.7 Surface Waters

There are no surface waters located on the property other than the Hudson River that borders the property to the West. The proposed development includes provisions for a public kayak launch and private floating seasonal docks to access the Hudson River.

There are no anticipated significant adverse impacts to surface waters from the proposed Project.

4.8 Threatened and/or Endangered Species

As noted in Section 2.8 of this report, there are no known threatened and/or endangered species located on the property. As such the proposed development would not affect any threatened and/or endangered species.

There are no anticipated significant adverse impacts to threatened and/or endangered species from the proposed Project.

4.9 Groundwater

As noted in Section 3.9 of this report, groundwater was not encountered during previous subsurface investigations of the property. Groundwater is not anticipated to be encountered during the proposed development.

There are no anticipated significant adverse impacts to surface waters from the proposed Project.

4.10 Stormwater

The proposed Project would impact greater than one (1) acre and require coverage under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activities (GP-0-20-001) and preparation of a Stormwater Pollution Prevention Plan in accordance with the NYSDEC requirements. Stormwater management for the proposed development is included in the Project drawings and details included in Attachment B. A Project specific stormwater narrative and SWPPP has been prepared and included in Attachment G.

There are no anticipated significant adverse impacts to stormwater from the proposed Project.

4.11 Topography

The proposed Project would alter the existing topography of the property to accommodate the proposed development. Generally, the middle of the property would be graded to accommodate the proposed apartment buildings, surface parking and site driveways. The western portion of the property would largely remain in its current form. The eastern portion of the property immediately adjacent to Second Avenue would be graded to accommodate a public sidewalk along Second Avenue. A grading plan is included in Attachment B.

There are no anticipated significant adverse impacts to topography from the proposed Project.

4.12 Vegetation

Similar to the proposed topography, existing vegetation would largely be removed within the middle of the property where the proposed apartment buildings, surface parking and access drives are proposed. Careful planning and consideration for the proposed development was given to maintain vegetated buffers from adjacent landowners to the south and east of the development. Approximately 2.25 acres of the property will remain vegetated in its current state. The area between the western property boundary and the Hudson River will also remain vegetated. Additional plantings and earthen berms are proposed as part of the development to enhance vegetated buffers to nearby residents. Planting plans are included in Attachment B. There are no indicated threatened, rare, or endangered plant species.

There are no anticipated significant adverse impacts to vegetation from the proposed Project.

4.13 Traffic

A traffic assessment was completed by Creighton Manning Engineering, LLP (CME) in August 2021 for the proposed development. The traffic assessment involved data collection, a review of existing and future traffic volumes, site distance and traffic operations for the proposed development. The CME Traffic Assessment is included in Attachment H.

According to the traffic assessment, the available intersection and stopping sight distances for vehicles entering/exiting the South Site Access Road meet AASHTO guidelines for the applicable operating speeds on Second Avenue with the exception of a driver looking left to make a left-turn. The available sight distance looking left is five feet short of the recommended AASHTO guideline due to the horizontal curve on Second Avenue. A review of Figure 2C-101 of the NYS Supplement indicates that the sight distance looking left is not critically limited and no mitigation is recommended.

The trip generation indicates that the proposed Project will generate a total of 83 trips during the AM peak hour and 102 trips during the PM peak hour. It is noted that the distribution of travel in and out of the site will result in a maximum increase of approximately 47 new trips on any one approach of the study area intersection. The magnitude of the new vehicle trips generated at the site is less than the NYSDOT and ITE threshold of 100 site generated vehicles on any one intersection approach for needing off-site intersection analysis.

- Second Avenue/Roosevelt Avenue/North Site Access Road: The analysis indicates that the westbound Roosevelt Avenue approach will operate at LOS A/B during the AM and PM peak hours through No-Build conditions and will operate at LOS B during both peak hours after development of the site with an increase in average vehicle delay less than one second. The eastbound North Site Access Road approach will operate at LOS B during both peak hours after full build-out of the residential facility. In addition, the northbound and southbound left-turn movements from Second Avenue will operate at

LOS A during both peak hours through Build conditions. No mitigation is recommended at this intersection.

- Second Avenue/South Site Access Road: The level of service analysis indicates that the eastbound site access road approach and the northbound left turn movement from Second Avenue will operate at LOS A during both peak hours after construction of the proposed residential development.

There are no anticipated significant adverse impacts to traffic from the proposed Project.

4.14 Archeology

In response to the report titled “Phase IB/II Archeological Site Evaluation, 2nd Avenue Troy Planned Development, Troy Starlight Development, 2nd Avenue, City of Troy and Town of Schaghticoke, Rensselaer County, New York” prepared by Hartgen Archeological Associates, Inc. (April 2020), OPRHP has determined that the Dickerson Street Precontact Site 08340.001736) is eligible for inclusion on the National Register of Historic Places.

The OPRHP has recommended that impacts to the site be avoided or minimized to the extent feasible. Any portions of the Dickerson Street Precontact Site that will be impacted by the Project will be subjected to mitigation measures, typically in the form of a Phase III archeological data retrieval study.

In consultation with the New York State Office of Parks, Recreation and Historic Preservation (OPRHP), Department of Environmental Conservation (DEC), and the Stockbridge-Munsee Community (SMC), the applicant will develop a Phase III data retrieval plan (DRP), which will outline the measures to be taken to collect, record, and preserve information about the Dickerson Street Precontact Site.

When a final version of the Phase III DRP has been agreed upon by the consulting parties, the applicant will draft a Letter of Resolution (LOR), which will be executed by the agencies and the applicant, and which will formalize an agreement upon the measures to be taken to resolve the Project’s impacts upon National Register eligible cultural resources.

While there will be impacts to archeological resources as a result of the Project, the applicant is coordinating with the OPRHP and SMC to advance measures to collect, record and preserve information about the Dickerson Street Precontact Site in accordance with established procedures and protocols for these types of impacts.

4.15 Visual Character

An analysis of Project visibility was undertaken to identify those locations within the study area where there is potential for the proposed Project to be seen from ground-level vantage points. This analysis included identifying potentially visible areas on viewshed maps, preparing line of sight cross sections, and verifying visibility in the field. The methodology employed for each of these assessment techniques is described below.

Actual visibility of the proposed Project was evaluated in the field during the summer of 2021 during leaf-on conditions. An EDP employee drove public roads and visited public vantage points within the visual study area to assess points from which the Project could or could not be seen. Photos were taken from numerous representative viewpoints within the study area where the Project is visible.

To show anticipated visual changes associated with the proposed Project, high-resolution computer enhanced image processing was used to create realistic photographic simulations and renderings of the completed Project from each of the selected viewpoints. Photographs of the Project site were taken from several vantage points from which the Project would be most visible. A 3D model of the Project was generated in Google Earth Pro™. Images of the 3D model from the same perspectives as the vantage points were combined with the photographs in Adobe® Photoshop®, resulting in these visual simulations.

Material textures and the suggested exterior color/finish of the bridge were then added to the model. The model was then rendered with a proposed architectural facade to create the output simulation. A visual assessment is included in Attachment I.

The Project will be visible from the Erie Canalway Natural Heritage Corridor and from

vantage points within the NR listed Waterford Village Historic District.; however, the residential character of the proposed development is generally consistent with other nearby projects also visible within this corridor along the Hudson River. The Project is not anticipated to cause detriment to the public enjoyment. The applicant is consulting with the OPRHP to assess the magnitude of visual impact associated with the Erie Canalway Natural Heritage Corridor and Waterford Village Historic District and to mitigate visual impacts, if any, in accordance with the OPRHP requirements.

4.16 Economic and Community Considerations

An Economic and Fiscal Study was prepared by Camoin Associates related to the proposed Project. The construction of the Project is expected to cost a total of $25 million, of which approximately 15% ($3.75 million) will be spent within the City of Troy. Construction of the Project would result in approximately 18 new direct construction jobs generating over $1.6 million in direct new earnings on-site and an additional over $180,000 in indirect and induced earnings in Troy.

The Project would support 25 net new jobs in the city, with over $1 million in associated earnings. These figures are composed of net new jobs resulting from maintenance and operation of the complex and new economic activity from household spending.

Full build-out of the Project will have a net positive fiscal impact on the City of Troy. The net annual fiscal impact of the Project is displayed below.

One Time Fiscal Impact to the City of Troy	
Permitting Fees During Construction	$ 300,000
One Time Net Fiscal Impact	$ 300,000
Annual Net Fiscal Impact to the City of Troy	
Variable Revenue (Table 13)	$ 34,571
Sales Tax Revenue (Table 17)	$ 2,424
Property Tax Revenue (Table 18)	$ 493,620
Variable Costs (Table 12)	$ (236,593)
Annual Net Fiscal Impact	$ 294,023

Source: Camoin Associates

Table 1 – Estimated Annual New Fiscal Impact to Troy

The Camoin Associates study is included as Attachment J.

There are no anticipated significant adverse impacts to traffic from the proposed Project.

5.0 IMPACT ASSESSMENT

Mitigation measures proposed to minimize any potential significant adverse environmental impacts associated with the Project include activities specifically undertaken by the applicant to minimize or eliminate potential impacts and project planning that, by its nature, serves as pre-mitigation by design.

5.1 Water

The proposed apartments are projected to increase the average daily water demand by 0.024 MGD which is only a 0.2% increase for the City of Troy. The toilets, faucets and shower heads will be water saving efficient fixtures to reduce water demands to the extent possible.

5.2 Sanitary Sewer

The theoretical average daily discharge from the proposed Project of 24,255 gpd is within Rensselaer County's sanitary sewer trunk capacity and the county treatment capacity. The toilets, faucets and shower heads will be water saving efficient fixtures to reduce resulting sanitary sewer demands to the extent possible. The project applicant will be required to

contribute to the City of Troy's combined sanitary sewer overflow (CSO) mitigation efforts. City specific CSO mitigation will be coordinated between the project applicant and the City Engineering Department to offset additional proposed flows into the system. Aside from the CSO mitigation discussed above, no additional mitigation is anticipated to be required.

5.3 Flooding

The proposed apartment buildings and associated surface parking has been located on the site to stay out of the 100-year flood elevation. Careful grading and site design was used to minimize impacts to possible floods. Certain site amenities will be located within the 100-year flood elevation including seasonal floating docks, a multi-use path and kayak launch. Those amenities are intended to provide the public access to the Hudson River and will not displace flood waters as they are surface features that follow existing grades. The seasonal floating docks would be removed during the winter months to minimize potential impacts during flooding events and ice jams that typically occur in the winter and early spring months.

Given the site design considerations that have been followed, no additional mitigation is anticipated to be required.

5.4 Soils

To minimize erosion of the limited surficial deposits and soils on-site, soil and erosion control plans were developed. The site will be subject to coverage under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activities (GP-0-20-001) and weekly inspections will be required during construction to ensure that soil and erosion control measures are being followed. Reclamation of on-site soils will be used to the greatest extent possible.

Given the measures that have been developed, no additional mitigation is anticipated to be required.

5.5 Bedrock

Careful planning and site design were used to located the proposed apartment buildings and associated surface features within the property, while maintaining existing visual buffers to the extent possible and maintain building elevations above the 100-year flood elevation. Bedrock removal will only be in areas required to achieve the grading to accommodate the Project. Extraction of bedrock material the removal of an abundant natural resource.

Given the site design considerations that have been followed, no additional mitigation is anticipated to be required.

5.6 Wetlands

Careful planning and site design were used to avoid impacts to the USDACE wetland located in the northeast corner of the property.

Given the avoidance of impacts to the USACE wetland, no additional mitigation is anticipated to be required.

5.7 Surface Waters

There are no surface waters on the property other than the Hudson River that borders the property to the west. Proposed stormwater quality treatment measures have been incorporated into the Project design to enhance the quality of stormwater that ultimately discharges to the Hudson River. In addition, soil and erosion control measures would be incorporated to minimize temporary disturbances to surface water quality during construction.

No additional mitigation is anticipated to be required.

5.8 Threatened and/or Endangered Species

There are no known threatened and/or endangered species located on the property. As such the proposed development would not affect any threatened and/or endangered species and no additional mitigation is anticipated to be required.

5.9 Groundwater

Groundwater was not encountered during previous subsurface investigations of the property. Groundwater is not anticipated to be encountered during the proposed development.

No additional mitigation is anticipated to be required.

5.10 Stormwater

The proposed Project would impact greater than one (1) acre and require coverage under the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activities (GP-0-20-001). To mitigate any stormwater impacts, a Stormwater Pollution Prevention Plan was prepared in accordance with the NYSDEC requirements. The stormwater design for the Project includes quality treatment measures to mitigate and enhance the quality of the stormwater that ultimately discharges to the Hudson River. In addition, weekly stormwater inspections would be required during construction to mitigate any temporary impacts that could result from construction activities.

No additional mitigation is anticipated to be required.

5.11 Topography

The topography of the Project would be slightly altered to accommodate the Project. Steep slopes have been avoided to the greatest extent possible. The Project would provide grading necessary to accommodate vehicular turning movements and access and pedestrian access including required American with Disabilities Act (ADA) provisions for parking and access.

No additional mitigation is anticipated to be required.

5.12 Vegetation

Careful planning and site considerations were used to centrally locate the Project within the property and maintain existing vegetated buffers around the periphery and from adjacent residences to the maximum extent possible. A vegetative buffer was also maintained to the extent possible along the Hudson River. In one area where there is a lack of a vegetated buffer, additional berming and plantings are proposed.

Existing natural vegetation will be left in place to the extent possible. The proposed reclamation measures will ensure that areas are stabilized. Erosion controls, berms and vegetative buffers will also help restrict impacts to vegetation and wildlife by protecting against soil erosion and sedimentation of existing surface waters.

No additional mitigation is anticipated to be required.

5.13 Traffic

Based upon the traffic assessment, selective clearing will be used to mitigate and enhance visual sight distances. During the public engagement meetings that were held by the Applicant, it was apparent that traffic calming along Second Avenue was a concern of the nearby residents. The applicant is proposing to install a sidewalk along Second Avenue that will be lit to enhance pedestrian safety and provide a pedestrian looking environment to slow vehicles through the Project corridor.

No additional mitigation is anticipated to be required.

5.14 Archeology

Archeological areas were avoided to the extent possible and where unavoidable, mitigated to the extent possible to reduce impacts. Any portions of the Dickerson Street Precontact Site that

would be impacted by the Project would be subjected to mitigation measures, typically in the form of a Phase III archeological data retrieval study.

In consultation with the New York State Office of Parks, Recreation and Historic Preservation (OPRHP), Department of Environmental Conservation (DEC), and the Stockbridge-Munsee Community (SMC), the applicant would develop a Phase III data retrieval plan (DRP), which would outline the measures to be taken to collect, record, and preserve information about the Dickerson Street Precontact Site.

When a final version of the Phase III DRP has been agreed upon by the consulting parties, the applicant would draft a Letter of Resolution (LOR), which would be executed by the agencies and the applicant, and which would formalize an agreement upon the measures to be taken to resolve the Project's impacts upon National Register eligible cultural resources.

5.15 Visual Character

The location and elevations of the proposed apartment buildings were carefully considered to maintain elevations above the 100-year flood elevation, maintain existing visual buffers to neighbors and provide a compact development. The resulting proposed site plan maintains the visual character of the single-family residences to the north, east and south by largely screening the Project.

To the west, existing vegetation adjacent to the Hudson River shoreline would remain to provide additional vegetative screening. Given the nature of the topography rising up from the Hudson River to the east, the proposed buildings will be visible from certain locations along the Hudson River. The proposed apartment buildings will be similar in aesthetics and context to other recently constructed apartment projects located along the Hudson River within 1.5 miles of this Project.

The applicant is currently consulting with the OPRHP to review the Project as it relates to historic resources along and across the Hudson River. The applicant will provide additional mitigation measures, if any, as required by the OPRHP.

5.16 Economic and Community Considerations

The Project results in positive annual net revenue for the City of Troy. The internal road network, utilities multi-use path and kayak launch would be maintained by a Home Owners Association (HOA) to minimize impacts to the City of Troy Department of Public Works and Highways.

The Project provides public access to the Hudson River, a public kayak launch and pedestrian sidewalks from the Lansingburgh Town line south to 126th Street.

According to the City's 2018 Comprehensive Plan, "due to the age of the housing stock, the city has struggled with the perception that it does not offer the kind of housing or neighborhoods that the market is seeking." Apartments are in high demand throughout the Capital District as single-family home prices have risen and student debt has escalated creating a difficult financing environment for younger adults seeking to purchase single family home. This proposed Project provides a live and play environment with the access to the Hudson River and associated multi-use path.

The 2018 Comprehensive Plan also recognizes there is a lack of access to the waterfront. This Project proposes to provide public access to the waterfront which is lacking in the Lansingburgh area of Troy. The place-specific strategy for Lansingburgh is to "reconnect Lansingburgh visually and physically to the Hudson River shoreline.

Goal # 1 of the 2018 Comprehensive Plan is to grow the economy and population. This Project provides up to 231 apartments for those seeking to reside and work in Troy.

Goal #2 of the Comprehensive plan includes the "creation of new areas for mixed-use development with a range of housing choices that will support new home ownership and rental options which are needed to keep established neighborhoods healthy." Moreover, it includes "enhancing the relationship between the City's existing and new neighborhoods, the riverfront, and the city's park lands through new connections and linkages and public realm improvements that will connect established neighborhoods to new investment making these areas more attractive places to live within the city and region."

The Comprehensive Plan “encourages a diverse housing stock to meet the needs of Troy’s existing and future population” and “a variety of housing types in terms of housing form, tenure and affordability will be promoted. In particular, townhouses and multi-unit buildings will be encouraged in the neighborhoods.

Goal No. 3 of the 2018 Comprehensive Plan is to invest in mobility, accessibility and transportation. The Project proposes to develop a multi-use path that will be open to the public for additional future recreational connections by others outside of the property boundaries. The Project also proposes a public kayak launch to provide additional recreational opportunities to the public to the Hudson River.

Goal No. 6 of the 2018 Comprehensive Plan is to support compact growth. This Project proposes 231 apartment units in three buildings with on-site and underground parking. Such compact development reduces the impact on the overall environment and leaves additional area for other types of development throughout the city.

Based upon the above, no additional mitigation is anticipated to be required.

ATTACHMENT A

Instructions for Completing Part 1

Part 1 is to be completed by the applicant or project sponsor. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification.

Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information; indicate whether missing information does not exist, or is not reasonably available to the sponsor; and, when possible, generally describe work or studies which would be necessary to update or fully develop that information.

Applicants/sponsors must complete all items in Sections A & B. In Sections C, D & E, most items contain an initial question that must be answered either "Yes" or "No". If the answer to the initial question is "Yes", complete the sub-questions that follow. If the answer to the initial question is "No", proceed to the next question. Section F allows the project sponsor to identify and attach any additional information. Section G requires the name and signature of the applicant or project sponsor to verify that the information contained in Part 1is accurate and complete.

A. Project and Applicant/Sponsor Information.

Name of Action or Project: Second Avenue Apartments		
Project Location (describe, and attach a general location map): Second Avenue and Roosevelt Avenue, City of Troy/ Town of Schaghticoke		
Brief Description of Proposed Action (include purpose or need): The Applicant is proposing to construct 3 (three) multi-family apartment buildings with 220-240 residential units on an existing undeveloped lot within the R-1 Residential zone and HD Pleasantdale (Hamlet). The proposed project consists of two tax parcels, one in the City of Troy sized at 10±AC (SBL 70.64-1-1), and one within the Town of Schaghticoke at 1± AC (SBL 70.56-1-6). The applicant proposes to rezone the property to Planned Development (zone P) to construct 3 (three) multi-family buildings, associated parking, stormwater management, site amenities and utilities. Parking will be accommodated via above and below-grade parking facilities.		
Name of Applicant/Sponsor: Kevin Vandenburgh	Telephone: E-Mail: ktv70@ymail.com	
Address: 430 9th Ave		
City/PO: Troy	State: NY	Zip Code: 12182
Project Contact (if not same as sponsor; give name and title/role):	Telephone: E-Mail:	
Address:		
City/PO:	State:	Zip Code:
Property Owner (if not same as sponsor): Golub Prop of Watervliet Inc	Telephone: E-Mail:	
Address: 501 Duanesburg Rd		
City/PO: Schenectady	State: NY	Zip Code: 12306

B. Government Approvals

B. Government Approvals, Funding, or Sponsorship. ("Funding" includes grants, loans, tax relief, and any other forms of financial assistance.)

Government Entity	If Yes: Identify Agency and Approval(s) Required	Application Date (Actual or projected)
a. City Counsel, Town Board, or Village Board of Trustees ☑Yes ☐No	Troy City Council Town of Schaghticoke	
b. City, Town or Village Planning Board or Commission ☑Yes ☐No	Troy Planning Commission Schaghticoke Planning Board	
c. City, Town or Village Zoning Board of Appeals ☐Yes ☑No		
d. Other local agencies ☑Yes ☐No	Troy Industrial Development Authority	
e. County agencies ☑Yes ☐No	Rens Co DOH	
f. Regional agencies ☐Yes ☑No		
g. State agencies ☑Yes ☐No	NYS OPRHP, NYSDEC, NYSDOT and NYS Canal Corporation	
h. Federal agencies ☑Yes ☐No	ACOE	

i. Coastal Resources.

i. Is the project site within a Coastal Area, or the waterfront area of a Designated Inland Waterway? ☑Yes ☐No

The project is located on the waterfront of the Hudson River

ii. Is the project site located in a community with an approved Local Waterfront Revitalization Program? ☐Yes ☑No

iii. Is the project site within a Coastal Erosion Hazard Area? ☐Yes ☑No

C. Planning and Zoning

C.1. Planning and zoning actions.

Will administrative or legislative adoption, or amendment of a plan, local law, ordinance, rule or regulation be the only approval(s) which must be granted to enable the proposed action to proceed? ☐Yes ☑No

- **If Yes,** complete sections C, F and G.
- **If No,** proceed to question C.2 and complete all remaining sections and questions in Part 1

C.2. Adopted land use plans.

a. Do any municipally- adopted (city, town, village or county) comprehensive land use plan(s) include the site where the proposed action would be located? ☑Yes ☐No

Refer to attached Narrative Report

If Yes, does the comprehensive plan include specific recommendations for the site where the proposed action would be located? ☐Yes ☑No

b. Is the site of the proposed action within any local or regional special planning district (for example: Greenway; Brownfield Opportunity Area (BOA); designated State or Federal heritage area; watershed management plan; or other?) ☑Yes ☐No

If Yes, identify the plan(s):

Remediaton Sites:546031

The Site Record of Remediation Site 546031 is attached herein. The site (200mile length of the Hudson River) has had its work completed, and the potential for exposure to the contaminants are based on fish consumption.

c. Is the proposed action located wholly or partially within an area listed in an adopted municipal open space plan, or an adopted municipal farmland protection plan? ☐Yes ☑No

If Yes, identify the plan(s):

C.3. Zoning

a. Is the site of the proposed action located in a municipality with an adopted zoning law or ordinance. ☑ Yes ☐ No
If Yes, what is the zoning classification(s) including any applicable overlay district?
R-1 (Single Family Residential) zone in the City of Troy. HD Pleasantdale (Hamlet) zone in the Town of Schaghticoke

b. Is the use permitted or allowed by a special or conditional use permit? ☐ Yes ☑ No

c. Is a zoning change requested as part of the proposed action? ☑ Yes ☐ No
If Yes,
i. What is the proposed new zoning for the site? P (Planned Development)

C.4. Existing community services.

a. In what school district is the project site located? Lansingburgh

b. What police or other public protection forces serve the project site?
Troy Police Dept

c. Which fire protection and emergency medical services serve the project site?
Troy Fire Station

d. What parks serve the project site?
Frear Park, Knickerbocker Park, and Powers Park

D. Project Details

D.1. Proposed and Potential Development

a. What is the general nature of the proposed action (e.g., residential, industrial, commercial, recreational; if mixed, include all components)? Residential

b. a. Total acreage of the site of the proposed action? 11.0 acres
b. Total acreage to be physically disturbed? 9+/- acres
c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? 11.0 acres

c. Is the proposed action an expansion of an existing project or use? ☐ Yes ☑ No
i. If Yes, what is the approximate percentage of the proposed expansion and identify the units (e.g., acres, miles, housing units, square feet)? % _____ Units: _____

d. Is the proposed action a subdivision, or does it include a subdivision? ☐ Yes ☑ No
If Yes,
i. Purpose or type of subdivision? (e.g., residential, industrial, commercial; if mixed, specify types)
ii. Is a cluster/conservation layout proposed? ☐ Yes ☐ No
iii. Number of lots proposed? _____
iv. Minimum and maximum proposed lot sizes? Minimum _____ Maximum _____

e. Will the proposed action be constructed in multiple phases? ☐ Yes ☑ No
i. If No, anticipated period of construction: _____ months
ii. If Yes:
- Total number of phases anticipated _____
- Anticipated commencement date of phase 1 (including demolition) _____ month _____ year
- Anticipated completion date of final phase _____ month _____year
- Generally describe connections or relationships among phases, including any contingencies where progress of one phase may determine timing or duration of future phases: _____

f. Does the project include new residential uses? ☑ Yes ☐ No

If Yes, show numbers of units proposed.

	One Family	Two Family	Three Family	Multiple Family (four or more)
Initial Phase				3 buildings (220-240 units)
At completion of all phases				

g. Does the proposed action include new non-residential construction (including expansions)? ☐ Yes ☑ No

If Yes,

i. Total number of structures _____

ii. Dimensions (in feet) of largest proposed structure: _____height; _____width; and _____ length

iii. Approximate extent of building space to be heated or cooled: _____ square feet

h. Does the proposed action include construction or other activities that will result in the impoundment of any liquids, such as creation of a water supply, reservoir, pond, lake, waste lagoon or other storage? ☑ Yes ☐ No

If Yes,

i. Purpose of the impoundment: Temporary detainment of stormwater.

ii. If a water impoundment, the principal source of the water: ☐ Ground water ☐ Surface water streams ☐ Other specify: Temporary detainment of stormwater.

iii. If other than water, identify the type of impounded/contained liquids and their source.

iv. Approximate size of the proposed impoundment. Volume: TBD million gallons; surface area: TBD acres

v. Dimensions of the proposed dam or impounding structure: _____ height; _____ length

vi. Construction method/materials for the proposed dam or impounding structure (e.g., earth fill, rock, wood, concrete): Earth

D.2. Project Operations

a. Does the proposed action include any excavation, mining, or dredging, during construction, operations, or both? (Not including general site preparation, grading or installation of utilities or foundations where all excavated materials will remain onsite) ☑ Yes ☐ No

If Yes:

i .What is the purpose of the excavation or dredging? Exported material may exceed 750CY. Quantities will be verified during engineering

ii. How much material (including rock, earth, sediments, etc.) is proposed to be removed from the site?

- Volume (specify tons or cubic yards): Limited; to be determined during site plan approval.
- Over what duration of time? _____

iii. Describe nature and characteristics of materials to be excavated or dredged, and plans to use, manage or dispose of them. Based on site visits, onsite soils are found to be rippable shale and rock. Excavation can be performed with general construction equipment.

iv. Will there be onsite dewatering or processing of excavated materials? ☐ Yes ☑ No

If yes, describe. _____

v. What is the total area to be dredged or excavated? 6-7 acres

vi. What is the maximum area to be worked at any one time? < 5 acres

vii. What would be the maximum depth of excavation or dredging? 30 feet

viii. Will the excavation require blasting? ☐ Yes ☑ No

ix. Summarize site reclamation goals and plan: Project site contains rippable shale and rock; no blasting is anticipated for the construction of this project.

b. Would the proposed action cause or result in alteration of, increase or decrease in size of, or encroachment into any existing wetland, waterbody, shoreline, beach or adjacent area? ☑ Yes ☐ No

If Yes:

i. Identify the wetland or waterbody which would be affected (by name, water index number, wetland map number or geographic description): Shoreline of the Hudson River

ii. Describe how the proposed action would affect that waterbody or wetland, e.g. excavation, fill, placement of structures, or alteration of channels, banks and shorelines. Indicate extent of activities, alterations and additions in square feet or acres:

_____

_____

_____

_____

iii. Will the proposed action cause or result in disturbance to bottom sediments? ☐ Yes ☐ No

If Yes, describe: _____

iv. Will the proposed action cause or result in the destruction or removal of aquatic vegetation? ☐ Yes ☐ No

If Yes:

- acres of aquatic vegetation proposed to be removed: _____
- expected acreage of aquatic vegetation remaining after project completion: _____
- purpose of proposed removal (e.g. beach clearing, invasive species control, boat access): _____

_____

- proposed method of plant removal: _____
- if chemical/herbicide treatment will be used, specify product(s): _____

v. Describe any proposed reclamation/mitigation following disturbance: _____

_____

c. Will the proposed action use, or create a new demand for water? ☑ Yes ☐ No

If Yes:

i. Total anticipated water usage/demand per day: 39,600+/- gallons/day

ii. Will the proposed action obtain water from an existing public water supply? ☑ Yes ☐ No

If Yes:

- Name of district or service area: City of Troy
- Does the existing public water supply have capacity to serve the proposal? ☑ Yes ☐ No
- Is the project site in the existing district? ☑ Yes ☐ No
- Is expansion of the district needed? ☐ Yes ☑ No
- Do existing lines serve the project site? ☑ Yes ☐ No

iii. Will line extension within an existing district be necessary to supply the project? ☐ Yes ☑ No

If Yes:

- Describe extensions or capacity expansions proposed to serve this project: _____

_____

- Source(s) of supply for the district: _____

iv. Is a new water supply district or service area proposed to be formed to serve the project site? ☐ Yes ☐ No

If, Yes:

- Applicant/sponsor for new district: _____
- Date application submitted or anticipated: _____
- Proposed source(s) of supply for new district: _____

v. If a public water supply will not be used, describe plans to provide water supply for the project: _____

_____

vi. If water supply will be from wells (public or private), what is the maximum pumping capacity: _____ gallons/minute.

d. Will the proposed action generate liquid wastes? ☑ Yes ☐ No

If Yes:

i. Total anticipated liquid waste generation per day: 39,600+/- gallons/day

ii. Nature of liquid wastes to be generated (e.g., sanitary wastewater, industrial; if combination, describe all components and approximate volumes or proportions of each): _____

Sanitary Wastewater

_____

iii. Will the proposed action use any existing public wastewater treatment facilities? ☑ Yes ☐ No

If Yes:

- Name of wastewater treatment plant to be used: Rensselaer County Wastewater Treatment Plant
- Name of district: City of Troy
- Does the existing wastewater treatment plant have capacity to serve the project? ☑ Yes ☐ No
- Is the project site in the existing district? ☑ Yes ☐ No
- Is expansion of the district needed? ☐ Yes ☑ No

- Do existing sewer lines serve the project site? ☑ Yes ☐ No
- Will a line extension within an existing district be necessary to serve the project? ☐ Yes ☑ No

  If Yes:
  - Describe extensions or capacity expansions proposed to serve this project: _____

iv. Will a new wastewater (sewage) treatment district be formed to serve the project site? ☐ Yes ☑ No

If Yes:
- Applicant/sponsor for new district: _____
- Date application submitted or anticipated: _____
- What is the receiving water for the wastewater discharge? _____

v. If public facilities will not be used, describe plans to provide wastewater treatment for the project, including specifying proposed receiving water (name and classification if surface discharge or describe subsurface disposal plans):

_____

vi. Describe any plans or designs to capture, recycle or reuse liquid waste: _____

e. Will the proposed action disturb more than one acre and create stormwater runoff, either from new point sources (i.e. ditches, pipes, swales, curbs, gutters or other concentrated flows of stormwater) or non-point source (i.e. sheet flow) during construction or post construction? ☑ Yes ☐ No

If Yes:

i. How much impervious surface will the project create in relation to total size of project parcel?

_____ Square feet or 4+/- acres (impervious surface)

_____ Square feet or 11 acres (parcel size)

ii. Describe types of new point sources. All point sources (swales, gutters, etc.) will be routed to appropriately sized stormwater management areas.

iii. Where will the stormwater runoff be directed (i.e. on-site stormwater management facility/structures, adjacent properties, groundwater, on-site surface water or off-site surface waters)?

On-site stormwater management facilities will be discharged directly to the Hudson River.

- If to surface waters, identify receiving water bodies or wetlands: Hudson River
- Will stormwater runoff flow to adjacent properties? Stormwater will discharge to the Hudson River ☐ Yes ☑ No

iv. Does the proposed plan minimize impervious surfaces, use pervious materials or collect and re-use stormwater? ☑ Yes ☐ No

f. Does the proposed action include, or will it use on-site, one or more sources of air emissions, including fuel combustion, waste incineration, or other processes or operations? ☐ Yes ☑ No

If Yes, identify:

i. Mobile sources during project operations (e.g., heavy equipment, fleet or delivery vehicles)

ii. Stationary sources during construction (e.g., power generation, structural heating, batch plant, crushers)

iii. Stationary sources during operations (e.g., process emissions, large boilers, electric generation)

g. Will any air emission sources named in D.2.f (above), require a NY State Air Registration, Air Facility Permit, or Federal Clean Air Act Title IV or Title V Permit? ☐ Yes ☑ No

If Yes:

i. Is the project site located in an Air quality non-attainment area? (Area routinely or periodically fails to meet ambient air quality standards for all or some parts of the year) ☐ Yes ☐ No

ii. In addition to emissions as calculated in the application, the project will generate:
- _____Tons/year (short tons) of Carbon Dioxide (CO_2)
- _____Tons/year (short tons) of Nitrous Oxide (N_2O)
- _____Tons/year (short tons) of Perfluorocarbons (PFCs)
- _____Tons/year (short tons) of Sulfur Hexafluoride (SF_6)
- _____Tons/year (short tons) of Carbon Dioxide equivalent of Hydroflourocarbons (HFCs)
- _____Tons/year (short tons) of Hazardous Air Pollutants (HAPs)

h. Will the proposed action generate or emit methane (including, but not limited to, sewage treatment plants, landfills, composting facilities)? ☐Yes ☑No

If Yes:

i. Estimate methane generation in tons/year (metric): _____

ii. Describe any methane capture, control or elimination measures included in project design (e.g., combustion to generate heat or electricity, flaring): _____

_____

i. Will the proposed action result in the release of air pollutants from open-air operations or processes, such as quarry or landfill operations? ☐Yes ☑No

If Yes: Describe operations and nature of emissions (e.g., diesel exhaust, rock particulates/dust):

_____

_____

j. Will the proposed action result in a substantial increase in traffic above present levels or generate substantial new demand for transportation facilities or services? Refer to the attached Narrative Report ☐Yes ☑No

If Yes:

i. When is the peak traffic expected (Check all that apply): ☐ Morning ☐ Evening ☐Weekend ☐ Randomly between hours of _____ to _____.

ii. For commercial activities only, projected number of truck trips/day and type (e.g., semi trailers and dump trucks): _____

_____

iii. Parking spaces: Existing 0 Proposed 353 Net increase/decrease +353

iv. Does the proposed action include any shared use parking? ☐Yes ☑No

v. If the proposed action includes any modification of existing roads, creation of new roads or change in existing access, describe:
All construction roads shall be privately maintained.

vi. Are public/private transportation service(s) or facilities available within ½ mile of the proposed site? ☑Yes ☐No

vii Will the proposed action include access to public transportation or accommodations for use of hybrid, electric or other alternative fueled vehicles? ☐Yes ☑No

viii. Will the proposed action include plans for pedestrian or bicycle accommodations for connections to existing pedestrian or bicycle routes? ☑Yes ☐No

k. Will the proposed action (for commercial or industrial projects only) generate new or additional demand for energy? ☐Yes ☑No

If Yes:

i. Estimate annual electricity demand during operation of the proposed action: _____

_____

ii. Anticipated sources/suppliers of electricity for the project (e.g., on-site combustion, on-site renewable, via grid/local utility, or other):

_____

iii. Will the proposed action require a new, or an upgrade, to an existing substation? ☐Yes ☐No

l. Hours of operation. Answer all items which apply.

i. During Construction:

- Monday - Friday: 7am - 7 pm
- Saturday: 7am - 7 pm
- Sunday: _____
- Holidays: _____

ii. During Operations:

- Monday - Friday: 24 hour (residential)
- Saturday: 24 hour (residential)
- Sunday: 24 hour (residential)
- Holidays: 24 hour (residential)

m. Will the proposed action produce noise that will exceed existing ambient noise levels during construction, operation, or both? ☑ Yes ☐ No

If yes:

i. Provide details including sources, time of day and duration:

Noise is expected to increase during construction, assumed to be between 7AM and 4PM

ii. Will the proposed action remove existing natural barriers that could act as a noise barrier or screen? ☑ Yes ☐ No

Describe: Clearing is proposed.

n. Will the proposed action have outdoor lighting? ☑ Yes ☐ No

If yes:

i. Describe source(s), location(s), height of fixture(s), direction/aim, and proximity to nearest occupied structures:

Lighting shall be proposed to adhere to local and state regulations.

ii. Will proposed action remove existing natural barriers that could act as a light barrier or screen? ☑ Yes ☐ No

Describe: Clearing is proposed.

o. Does the proposed action have the potential to produce odors for more than one hour per day? ☐ Yes ☑ No

If Yes, describe possible sources, potential frequency and duration of odor emissions, and proximity to nearest occupied structures: _____

p. Will the proposed action include any bulk storage of petroleum (combined capacity of over 1,100 gallons) or chemical products 185 gallons in above ground storage or any amount in underground storage? ☐ Yes ☑ No

If Yes:

i. Product(s) to be stored _____

ii. Volume(s) _____ per unit time _____ (e.g., month, year)

iii. Generally, describe the proposed storage facilities: _____

q. Will the proposed action (commercial, industrial and recreational projects only) use pesticides (i.e., herbicides, insecticides) during construction or operation? ☐ Yes ☑ No

If Yes:

i. Describe proposed treatment(s):

ii. Will the proposed action use Integrated Pest Management Practices? ☐ Yes ☐ No

r. Will the proposed action (commercial or industrial projects only) involve or require the management or disposal of solid waste (excluding hazardous materials)? ☐ Yes ☑ No

If Yes:

i. Describe any solid waste(s) to be generated during construction or operation of the facility:

- Construction: _____ tons per _____ (unit of time)
- Operation : _____ tons per _____ (unit of time)

ii. Describe any proposals for on-site minimization, recycling or reuse of materials to avoid disposal as solid waste:

- Construction: _____
- Operation: _____

iii. Proposed disposal methods/facilities for solid waste generated on-site:

- Construction: _____
- Operation: _____

s. Does the proposed action include construction or modification of a solid waste management facility? ☐ Yes ☑ No

If Yes:

i. Type of management or handling of waste proposed for the site (e.g., recycling or transfer station, composting, landfill, or other disposal activities): _____

ii. Anticipated rate of disposal/processing:

- _____ Tons/month, if transfer or other non-combustion/thermal treatment, or
- _____ Tons/hour, if combustion or thermal treatment

iii. If landfill, anticipated site life: _____ years

t. Will the proposed action at the site involve the commercial generation, treatment, storage, or disposal of hazardous waste? ☐ Yes ☑ No

If Yes:

i. Name(s) of all hazardous wastes or constituents to be generated, handled or managed at facility: _____

_____

_____

ii. Generally describe processes or activities involving hazardous wastes or constituents: _____

_____

_____

iii. Specify amount to be handled or generated _____ tons/month

iv. Describe any proposals for on-site minimization, recycling or reuse of hazardous constituents: _____

_____

_____

v. Will any hazardous wastes be disposed at an existing offsite hazardous waste facility? ☐ Yes ☐ No

If Yes: provide name and location of facility: _____

_____

If No: describe proposed management of any hazardous wastes which will not be sent to a hazardous waste facility:

_____

_____

E. Site and Setting of Proposed Action

E.1. Land uses on and surrounding the project site

a. Existing land uses.

i. Check all uses that occur on, adjoining and near the project site.

☐ Urban ☐ Industrial ☐ Commercial ☑ Residential (suburban) ☐ Rural (non-farm)
☑ Forest ☐ Agriculture ☑ Aquatic ☐ Other (specify): _____

ii. If mix of uses, generally describe:

_____

_____

b. Land uses and covertypes on the project site.

Land use or Covertype	Current Acreage	Acreage After Project Completion	Change (Acres +/-)
• Roads, buildings, and other paved or impervious surfaces	0	4+/-	+4+/-
• Forested	7+/-	2.6+/-	-4.4+/-
• Meadows, grasslands or brushlands (non-agricultural, including abandoned agricultural)	4+/-	0	-4+/-
• Agricultural (includes active orchards, field, greenhouse etc.)			
• Surface water features (lakes, ponds, streams, rivers, etc.)			
• Wetlands (freshwater or tidal)			
• Non-vegetated (bare rock, earth or fill)			
• Other Describe: grass		4.4+/-	+4.4+/-

c. Is the project site presently used by members of the community for public recreation? ☐ Yes ☑ No

i. If Yes: explain: _____

d. Are there any facilities serving children, the elderly, people with disabilities (e.g., schools, hospitals, licensed day care centers, or group homes) within 1500 feet of the project site? ☑ Yes ☐ No

If Yes,

i. Identify Facilities:

Turnpike Elementary School, Knickerbacker Middle School, and Lansingburgh High School

e. Does the project site contain an existing dam? ☐ Yes ☑ No

If Yes:

i. Dimensions of the dam and impoundment:

- Dam height: _____ feet
- Dam length: _____ feet
- Surface area: _____ acres
- Volume impounded: _____ gallons OR acre-feet

ii. Dam's existing hazard classification: _____

iii. Provide date and summarize results of last inspection:

_____

f. Has the project site ever been used as a municipal, commercial or industrial solid waste management facility, or does the project site adjoin property which is now, or was at one time, used as a solid waste management facility? ☐ Yes ☑ No

If Yes:

i. Has the facility been formally closed? ☐ Yes ☐ No

- If yes, cite sources/documentation: _____

ii. Describe the location of the project site relative to the boundaries of the solid waste management facility:

_____

iii. Describe any development constraints due to the prior solid waste activities: _____

g. Have hazardous wastes been generated, treated and/or disposed of at the site, or does the project site adjoin property which is now or was at one time used to commercially treat, store and/or dispose of hazardous waste? ☐ Yes ☑ No

If Yes:

i. Describe waste(s) handled and waste management activities, including approximate time when activities occurred:

_____

h. Potential contamination history. Has there been a reported spill at the proposed project site, or have any remedial actions been conducted at or adjacent to the proposed site? ☑ Yes ☐ No

If Yes:

i. Is any portion of the site listed on the NYSDEC Spills Incidents database or Environmental Site Remediation database? Check all that apply: ☑ Yes ☐ No

☐ Yes – Spills Incidents database — Provide DEC ID number(s): _____

☑ Yes – Environmental Site Remediation database — Provide DEC ID number(s): 546031 See attached documents

☐ Neither database

ii. If site has been subject of RCRA corrective activities, describe control measures:

NYSDEC classification 02 (a. the disposal of hazardous waste has been confirmed and the presence of such hazardous waste or its components or breakdown products represents a significant threat to public health or the environment: or b. hazardous waste disposal has not been confirmed, but the site has been listed on the Federal National Priorities List (NPL).

iii. Is the project within 2000 feet of any site in the NYSDEC Environmental Site Remediation database? ☑ Yes ☐ No

If yes, provide DEC ID number(s): 546031, 546053, E546053

iv. If yes to (i), (ii) or (iii) above, describe current status of site(s):

_____

v. Is the project site subject to an institutional control limiting property uses? ☐ Yes ☑ No

- If yes, DEC site ID number: _____
- Describe the type of institutional control (e.g., deed restriction or easement): _____
- Describe any use limitations: _____
- Describe any engineering controls: _____
- Will the project affect the institutional or engineering controls in place? ☐ Yes ☐ No
- Explain: _____

E.2. Natural Resources On or Near Project Site

a. What is the average depth to bedrock on the project site? Average 5+/- feet

b. Are there bedrock outcroppings on the project site? ☑ Yes ☐ No
If Yes, what proportion of the site is comprised of bedrock outcroppings? < 5 %

c. Predominant soil type(s) present on project site:
NrD Nassau Rock outcrop complex — 100 %
_____ — _____ %
_____ — _____ %

d. What is the average depth to the water table on the project site? Average: Assumed 6 feet

e. Drainage status of project site soils:
☑ Well Drained: 100 % of site
☐ Moderately Well Drained: _____ % of site
☐ Poorly Drained _____ % of site

f. Approximate proportion of proposed action site with slopes:
☑ 0-10%: 15 % of site
☑ 10-15%: 30 % of site
☑ 15% or greater: 55 % of site

g. Are there any unique geologic features on the project site? ☐ Yes ☑ No
If Yes, describe: _____

h. Surface water features.

i. Does any portion of the project site contain wetlands or other waterbodies (including streams, rivers, ponds or lakes)? ☑ Yes ☐ No

ii. Do any wetlands or other waterbodies adjoin the project site? ☑ Yes ☐ No

If Yes to either *i* or *ii*, continue. If No, skip to E.2.i.

iii. Are any of the wetlands or waterbodies within or adjoining the project site regulated by any federal, state or local agency? ☑ Yes ☐ No
Hudson River

iv. For each identified regulated wetland and waterbody on the project site, provide the following information:

- Streams: Name _____ Classification _____
- Lakes or Ponds: Name _____ Classification _____
- Wetlands: Name Federal Waters, Federal Waters (Hudson River) Approximate Size _____
- Wetland No. (if regulated by DEC) _____

v. Are any of the above water bodies listed in the most recent compilation of NYS water quality-impaired waterbodies? ☐ Yes ☑ No

If yes, name of impaired water body/bodies and basis for listing as impaired: _____

i. Is the project site in a designated Floodway? ☐ Yes ☑ No

j. Is the project site in the 100-year Floodplain? The project property lies partially within Zone A11 (Elev. 35+/-) ☑ Yes ☐ No

k. Is the project site in the 500-year Floodplain? The project property lies partially within Zone B ☑ Yes ☐ No

l. Is the project site located over, or immediately adjoining, a primary, principal or sole source aquifer? ☑ Yes ☐ No
If Yes:

i. Name of aquifer: Principal Aquifer

m. Identify the predominant wildlife species that occupy or use the project site:
deer small mammals

n. Does the project site contain a designated significant natural community? ☐ Yes ☑ No
If Yes:
i. Describe the habitat/community (composition, function, and basis for designation): _____
ii. Source(s) of description or evaluation: _____
iii. Extent of community/habitat:
- Currently: _____ acres
- Following completion of project as proposed: _____ acres
- Gain or loss (indicate + or -): _____ acres

o. Does project site contain any species of plant or animal that is listed by the federal government or NYS as endangered or threatened, or does it contain any areas identified as habitat for an endangered or threatened species? ☐ Yes ☑ No

If Yes:
i. Species and listing (endangered or threatened): _____

p. Does the project site contain any species of plant or animal that is listed by NYS as rare, or as a species of special concern? ☐ Yes ☑ No

If Yes:
i. Species and listing: _____

q. Is the project site or adjoining area currently used for hunting, trapping, fishing or shell fishing? ☐ Yes ☑ No
If yes, give a brief description of how the proposed action may affect that use: _____

E.3. Designated Public Resources On or Near Project Site

a. Is the project site, or any portion of it, located in a designated agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304? ☐ Yes ☑ No
If Yes, provide county plus district name/number: _____

b. Are agricultural lands consisting of highly productive soils present? ☐ Yes ☑ No
i. If Yes: acreage(s) on project site? _____
ii. Source(s) of soil rating(s): _____

c. Does the project site contain all or part of, or is it substantially contiguous to, a registered National Natural Landmark? ☐ Yes ☑ No
If Yes:
i. Nature of the natural landmark: ☐ Biological Community ☐ Geological Feature
ii. Provide brief description of landmark, including values behind designation and approximate size/extent: _____

d. Is the project site located in or does it adjoin a state listed Critical Environmental Area? ☐ Yes ☑ No
If Yes:
i. CEA name: _____
ii. Basis for designation: _____
iii. Designating agency and date: _____

e. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on the National or State Register of Historic Places, or that has been determined by the Commissioner of the NYS Office of Parks, Recreation and Historic Preservation to be eligible for listing on the State Register of Historic Places? ☑ Yes ☐ No

If Yes:

i. Nature of historic/archaeological resource: ☑ Archaeological Site ☑ Historic Building or District

ii. Name: New York State Barge Canal Historic District Phase IB and II has been performed; see attached report.

iii. Brief description of attributes on which listing is based:

The site contains the Dickerson Street Site, a Middle to Late Archaic quarry with multiple loci. See attached report (April 2020) for further details.

f. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory? ☑ Yes ☐ No

g. Have additional archaeological or historic site(s) or resources been identified on the project site? ☑ Yes ☐ No

If Yes:

i. Describe possible resource(s): Dickerson Street Site; a Middle to Late Archaic quarry with multiple loci.

ii. Basis for identification: Attached PHASE IB/II Archaeological Report by Hartgen Archaeological (April 2020)

h. Is the project site within fives miles of any officially designated and publicly accessible federal, state, or local scenic or aesthetic resource? ☑ Yes ☐ No

If Yes:

i. Identify resource: Peebles Island State Park

ii. Nature of, or basis for, designation (e.g., established highway overlook, state or local park, state historic trail or scenic byway, etc.): NY State park

iii. Distance between project and resource: 1 miles.

i. Is the project site located within a designated river corridor under the Wild, Scenic and Recreational Rivers Program 6 NYCRR 666? ☐ Yes ☑ No

If Yes:

i. Identify the name of the river and its designation:

ii. Is the activity consistent with development restrictions contained in 6NYCRR Part 666? ☐ Yes ☐ No

F. Additional Information

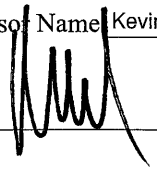
Attach any additional information which may be needed to clarify your project.

If you have identified any adverse impacts which could be associated with your proposal, please describe those impacts plus any measures which you propose to avoid or minimize them.

G. Verification

I certify that the information provided is true to the best of my knowledge.

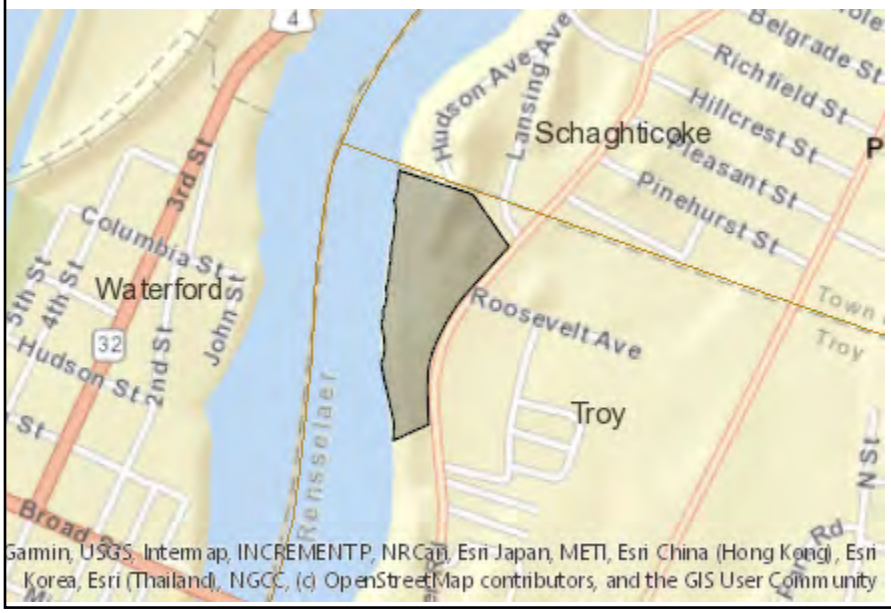
Applicant/Sponsor Name Kevin Vandenburgh Date 05/04/2021

Signature  Title

PRINT FORM

EAF Mapper Summary Report

Friday, January 8, 2021 9:20 AM



Disclaimer: The EAF Mapper is a screening tool intended to assist project sponsors and reviewing agencies in preparing an environmental assessment form (EAF). Not all questions asked in the EAF are answered by the EAF Mapper. Additional information on any EAF question can be obtained by consulting the EAF Workbooks. Although the EAF Mapper provides the most up-to-date digital data available to DEC, you may also need to contact local or other data sources in order to obtain data not provided by the Mapper. Digital data is not a substitute for agency determinations.



B.i.i [Coastal or Waterfront Area]	No
B.i.ii [Local Waterfront Revitalization Area]	No
C.2.b. [Special Planning District]	Yes - Digital mapping data are not available for all Special Planning Districts. Refer to EAF Workbook.
C.2.b. [Special Planning District - Name]	Remediaton Sites:546031
E.1.h [DEC Spills or Remediation Site - Potential Contamination History]	Yes - Digital mapping data for Spills Incidents are not available for this location. Refer to EAF Workbook.
E.1.h.i [DEC Spills or Remediation Site - Listed]	Yes
E.1.h.i [DEC Spills or Remediation Site - Environmental Site Remediation Database]	Yes
E.1.h.i [DEC Spills or Remediation Site - DEC ID Number]	546031
E.1.h.iii [Within 2,000' of DEC Remediation Site]	Yes
E.1.h.iii [Within 2,000' of DEC Remediation Site - DEC ID]	546031, 546053, E546053
E.2.g [Unique Geologic Features]	No
E.2.h.i [Surface Water Features]	Yes
E.2.h.ii [Surface Water Features]	Yes
E.2.h.iii [Surface Water Features]	Yes - Digital mapping information on local and federal wetlands and waterbodies is known to be incomplete. Refer to EAF Workbook.
E.2.h.iv [Surface Water Features - Wetlands Name]	Federal Waters
E.2.h.v [Impaired Water Bodies]	No
E.2.i. [Floodway]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.

E.2.j. [100 Year Floodplain]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.2.k. [500 Year Floodplain]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.2.l. [Aquifers]	Yes
E.2.l. [Aquifer Names]	Principal Aquifer
E.2.n. [Natural Communities]	No
E.2.o. [Endangered or Threatened Species]	No
E.2.p. [Rare Plants or Animals]	No
E.3.a. [Agricultural District]	No
E.3.c. [National Natural Landmark]	No
E.3.d [Critical Environmental Area]	No
E.3.e. [National or State Register of Historic Places or State Eligible Sites]	Yes - Digital mapping data for archaeological site boundaries are not available. Refer to EAF Workbook.
E.3.e.ii [National or State Register of Historic Places or State Eligible Sites - Name]	New York State Barge Canal Historic District
E.3.f. [Archeological Sites]	Yes
E.3.i. [Designated River Corridor]	No

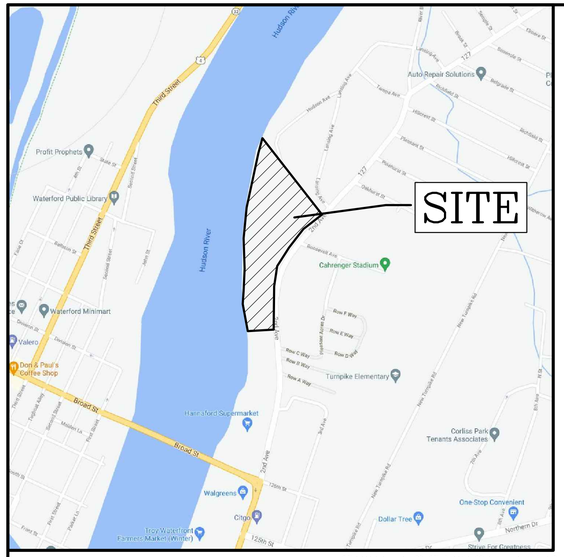
ATTACHMENT B

2ND AVENUE APARTMENTS

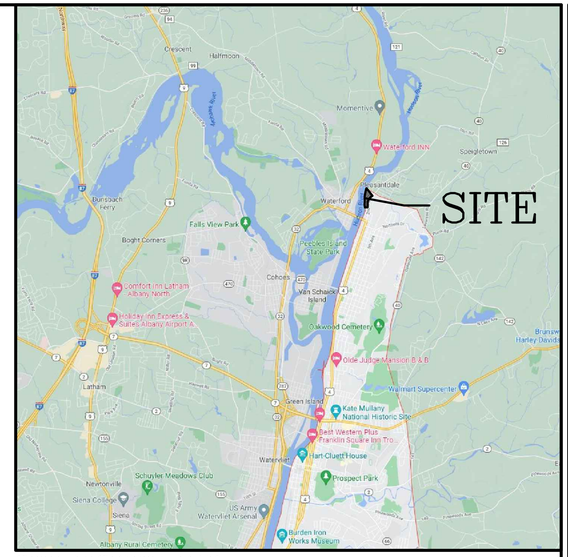
APPLICANT/OWNER:

KEVIN VANDENBURGH

1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
RENSSELAER COUNTY, NEW YORK



SITE LOCATION MAP
SCALE: 1" = 2,000'



SITE VICINITY MAP
SCALE: 1" = 400'

EXISTING SITE STATISTICS:

ZONING	R-1 SINGLE-FAMILY RESIDENTIAL (TROY) HAMLET (SCHAGHTICOKE)
PARCEL AREA	9.93± ACRES (TROY) 1.07± ACRES (SCHAGHTICOKE)
BUILDING AREA	VACANT

SITE STATISTICS AFTER DEVELOPMENT:

ZONING	PLANNED DEVELOPMENT
PARCEL AREA	10.90± ACRES
BUILDING AREA	58,9402± SF (APARTMENTS)
PARKING	321± SPACES (178 UNDERGROUND SPACES & 143 ABOVE GROUND SPACES)
IMPERVIOUS	3.85± ACRES
GREENSPACE	7.05± ACRES
AREA OF DISTURBANCE	7.65 ± ACRES

SHEET INDEX

SHEET NUMBER	SHEET TITLE

NEW YORK STATE DEPARTMENT OF HEALTH

CITY OF TROY PLANNING BOARD

RECORD OF SUBMITTALS	DATE	BY
PRELIMINARY SUBMISSION TO CITY OF TROY	09/30/21	BPO

PLANS PREPARED BY :

ENVIRONMENTAL DESIGN PARTNERSHIP, LLP.
900 Route 146 Clifton Park, New York 12065
(518) 371-7621
edpllp.com

ENVIRONMENTAL DESIGN PARTNERSHIP, LLP.
900 Route 146 Clifton Park, New York 12065
(518) 371-7621
edpllp.com

PROPOSED MULTIFAMILY DEVELOPMENT
SECOND AVE APARTMENTS
KEVIN VANDENBURGH
1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
COUNTY OF RENSSELAER
TAX MAP ID: 70.64-1-1 & 70.56-1-6
SEPTEMBER 29, 2021

DRAWN BY	DBR
CHECK BY	BPO
EDP PROJECT NUMBER	12928

ALTERATION OF THESE DOCUMENTS IN ANY WAY, UNLESS DONE UNDER THE DIRECT SUPERVISION OF A COMPARABLE PROFESSIONAL (I.E.) ENGINEER FOR AN ENGINEER, LANDSCAPE ARCHITECT FOR A LANDSCAPE ARCHITECT OR SURVEYOR FOR A SURVEYOR, IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW AND ALL REGULATIONS AND IS A CLASS "A" MISDEMEANOR.

REVISION	DATE	BY

SCALE:
AS NOTED

NOT FOR CONSTRUCTION

SHEET TITLE:
COVER SHEET

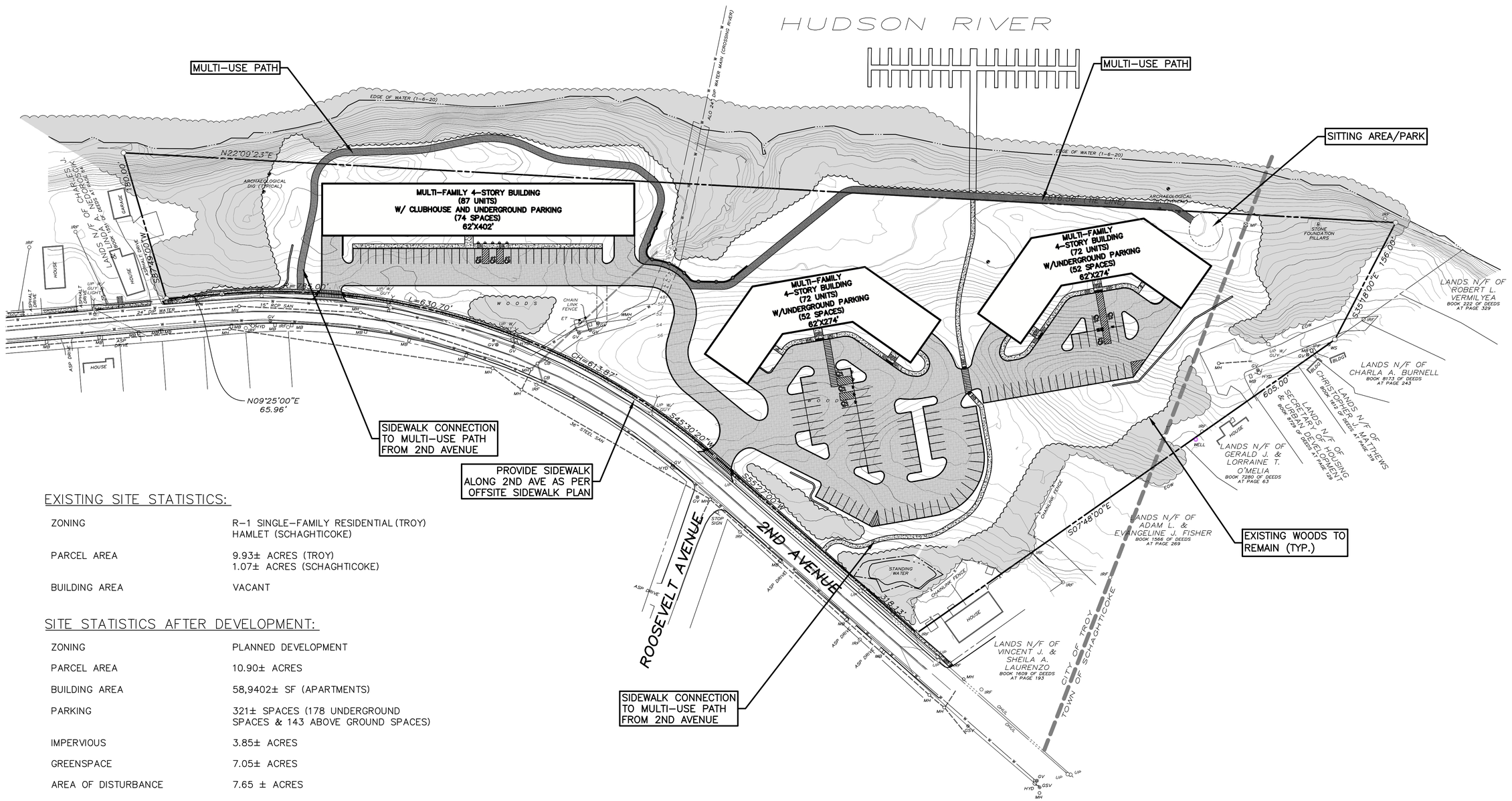
SHEET:
1 of 17

Q:\RENSSELAER\TROY\2nd Avenue\1011 2nd Avenue\05 - dwg\Detailed Plans\SHEETS\00_CS-TROY_ recover.dwg Oct 06, 2021 11:11:24AM BPO

GRAPHIC SCALE

60 50 40 30 20 10 0 30 60 120 240

(IN FEET)
1 INCH = 60 FT.



EXISTING SITE STATISTICS:

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PROPOSED MULTIFAMILY DEVELOPMENT
SECOND AVE APARTMENTS
KEVIN VANDENBURGH

1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
COUNTY OF RENSSELAER

TAX MAP ID:
70.64-1-1 & 70.56-1-6

SEPTEMBER 29, 2021

DRAWN BY	DBR
CHECK BY	BPD
EDP PROJECT NUMBER	12928

NO ALTERATION OF THESE DOCUMENTS IN ANY WAY, UNLESS DONE UNDER THE DIRECT SUPERVISION OF A COMPARABLE PROFESSIONAL (I.E.) ENGINEER FOR AN ENGINEER, LANDSCAPE ARCHITECT FOR A LANDSCAPE ARCHITECT, OR SURVEYOR FOR A SURVEYOR, IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW AND/OR REGULATIONS AND IS A CLASS "A" MISDEMEANOR.

REVISION	DATE	BY

SCALE:
1" = 60'

NOT FOR CONSTRUCTION

SHEET TITLE:
OVERALL SITE PLAN

SHEET:
2 of 17

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SOIL DATA: ⊕ △

THE FOLLOWING TEST PITS WERE PERFORMED ON JUNE 25, 2021 AND WERE OBSERVED BY ENVIRONMENTAL DESIGN PARTNERSHIP, LLP:

TP#1
0" – 3" TOP SOIL
3" – 43" SHALE, LOOSE, RIPPABLE

TP#2
0" – 4" TOP SOIL
4" – 38" SHALE, LOOSE, RIPPABLE

TP#3
0" – 6" TOP SOIL
6" – 37" SHALE, LOOSE, RIPPABLE

TP#4
0" – 12" TOP SOIL, ROOTS
12" – 30" FINE LOAMY SAND, COMPACT FREEABLE
SMALL ROCKS 1–2"

BED ROCK @ 30"

TP#5
0" – 12" TOP SOIL, ROOTS
12" – 34" FINE LOAMY SAND
LOOSE, BROWN

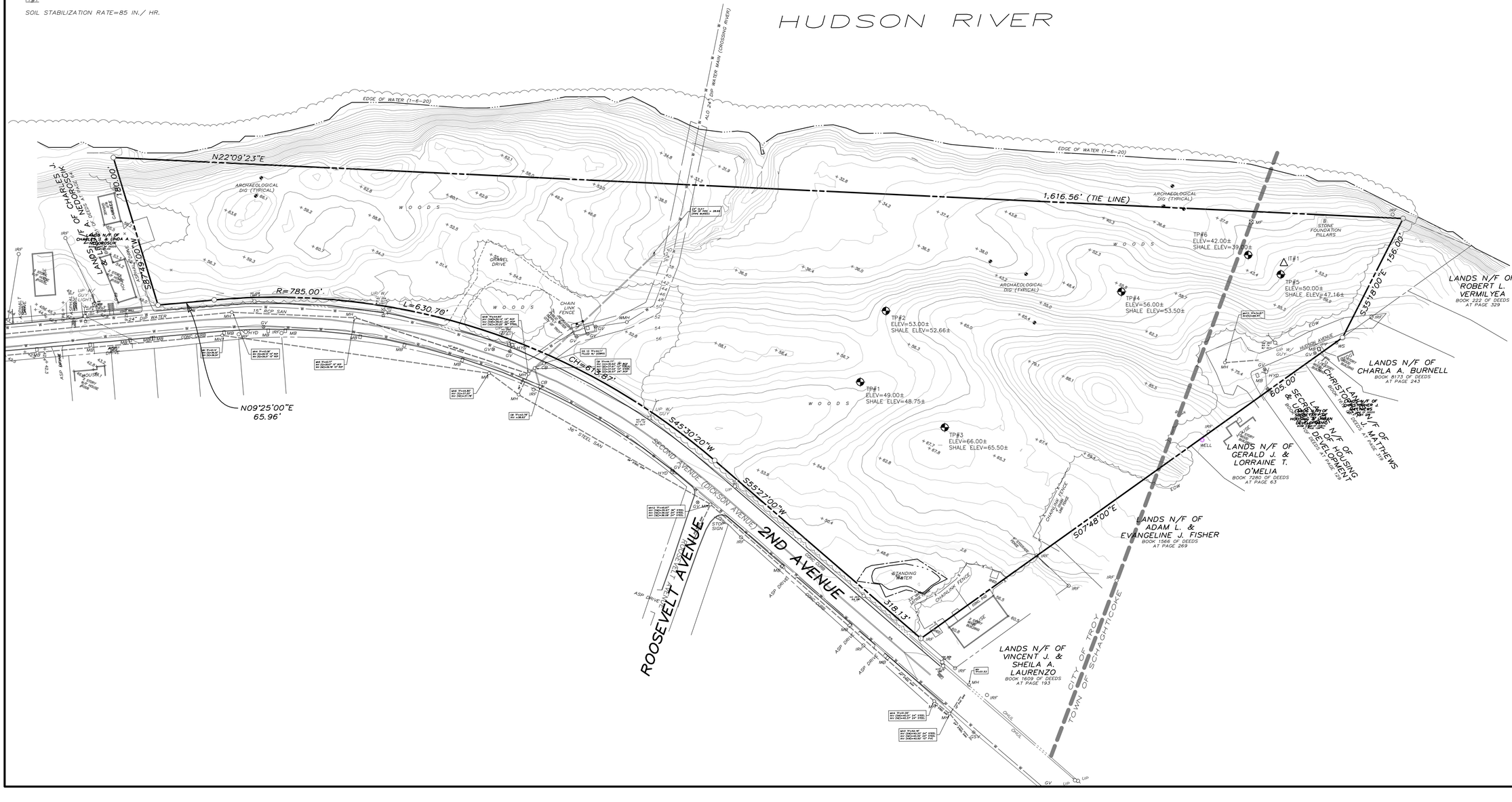
BED ROCK RIPPABLE @ 34"

TP#6
0" – 12" TOP SOIL, ROOTS
12" – 36" FINE LOAMY SAND
SMALL ROCKS, LOOSE
36" – 48" SHALE, LOOSE, RIPPABLE

THE FOLLOWING INFILTRATION TESTS WERE PERFORMED ON JUNE 9, 2021 AND WERE OBSERVED BY ENVIRONMENTAL DESIGN PARTNERSHIP, LLP:

IT#1

SOIL STABILIZATION RATE=85 IN./ HR.



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(518) 371-7621
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PROPOSED MULTIFAMILY DEVELOPMENT
SECOND AVE APARTMENTS
KEVIN VANDENBURGH

1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
COUNTY OF RENSSELAER

TAX MAP ID:
70.64-1-1 & 70.56-1-6

SEPTEMBER 29, 2021

DRAWN BY	DBR
CHECK BY	BPD
EDP PROJECT NUMBER	12928

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REVISION	DATE	BY

SCALE:
1" = 60'

NOT FOR CONSTRUCTION

SHEET TITLE:
EXISTING CONDITIONS

SHEET:
3 of 17

G:\rensselaer\TROY\2nd avenue\1011 2nd avenue\05 - dwg\detailed plans\SHEETS\2E_EC-TROY.dwg Sep 29, 2021 03:07:05PM

GRAPHIC SCALE

30 25 20 15 10 5 0 15 30 120

(IN FEET)
1 INCH = 30 FT.

PAVED MULTI-USE PATH

EDGE OF WATER (1-6-20)

N22°09'23"E

8' (TYP.)

ARCHAEOLOGICAL DIG (TYPICAL)

370±'

MULTI-FAMILY 4-STORY BUILDING
(87 UNITS)
W/ CLUBHOUSE AND UNDERGROUND PARKING
(74 SPACES)
62'X402'

62±'

23 LF RETAINING WALL

ENTRANCE TO UNDERGROUND PARKING. VERIFY WITH ARCHITECT (TYP. BOTH SIDES)

PROVIDE 200 LF RETAINING WALL. REFER TO GRADING PLAN

24'

15'

18'

18'(TYP.)

28'

9'(TYP.)

R=10'

R=5'

R=15'

R=25'

PROVIDE ACCESSIBLE STRIPING, SIGNAGE AND RAMPS

PROVIDE RETAINING WALL WITH WROUGHT IRON FENCE ON TOP

180± FT RETAINING WALL WITH WROUGHT IRON FENCE ON TOP

135'

MULTI-FAMILY 4-STORY BUILDING (72 UNITS) W/UNDERGROUND PARKING (52 SPACES) 62'X274'

84'

98'

72'

20± FT RETAINING WALL

70± FT RETAINING WALL

S55°27'00"W

2ND AVENUE

PROVIDE STRIPED CROSSWALK, TYP.

S87°49'00"W 180.00'

N09°25'00"E 65.96'

PROVIDE STRIPED CROSSWALK, TYP.

PROVIDE SIDEWALK ALONG 2ND AVENUE. REFER TO OFFSITE PLANS.

ASPHALT DRIVE

GARAGE

HOUSE

CHAIN LINK FENCE

W O O D S

SIDEWALK TO MU

SHEET 4
SHEET 5

KEY MAP
N.T.S.

SHEET 4
SHEET 5

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PROPOSED MULTIFAMILY DEVELOPMENT
SECOND AVE APARTMENTS

KEVIN VANDENBURGH

1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
COUNTY OF RENSSELAER

TAX MAP ID:
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REVISION	DATE	BY

SCALE:
1" = 30'

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SHEET TITLE:
SITE PLAN

SHEET:
4 of 17

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GRAPHIC SCALE

30 25 20 15 10 5 0 15 30 120

(IN FEET)
1 INCH = 30 FT.

SHEET 5
SHEET 6

EDGE OF WATER (1-6-20)

8' WIDE PAVED MULTI-USE PATH

1,616.56' (TIE LINE)

ARCHAEOLOGICAL DIG (TYPICAL)

SIDEWALK CONNECTION TO MULTI-USE PATH

180± FT RETAINING WALL WITH WROUGHT IRON FENCE ON TOP

MULTI-FAMILY
4-STORY BUILDING
(72 UNITS)
W/UNDERGROUND PARKING
(52 SPACES)
62'X274'

135'
110'
98'
84'
72'
62'

20± FT RETAINING WALL

ACCESSIBLE SPACES WITH STRIPED AISLES

19± FT RETAINING WALL

185± FT RETAINING WALL

70± FT RETAINING WALL

SIDEWALK CONNECTION TO MULTI-USE PATH

PROVIDE STRIPED CROSSWALK, TYP.

STONE FOUNDATION PILLARS

156.00'

S35°18'00"E

605.00'

S07°48'00"E

S55°27'00"W

S18°13'

LANDS N/F OF CHARLA A. BURNE

LANDS N/F OF CHRISTOPHER J. MATTHEWS

LANDS N/F OF SECRETARY OF HOUSING & URBAN DEVELOPMENT

LANDS N/F OF GERALD J. & LORRAINE T. O'MELIA

LANDS N/F OF ADAM L. & EVANGELINE J. FISHER

ACOE WETLANDS

STANDING WATER

CHAINLINK FENCE

2ND AVENUE

ROOSEVELT AVENUE

KEY MAP
N.T.S.

SHEET 4
SHEET 5

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PROPOSED MULTIFAMILY DEVELOPMENT
SECOND AVE APARTMENTS

KEVIN VANDENBURGH

1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
COUNTY OF RENSSELAER

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REVISION	DATE	BY

SCALE:
1" = 30'

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SHEET TITLE:
SITE PLAN

SHEET:
5 of 17

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GRAPHIC SCALE

30 25 20 15 10 5 0 15 30 120

(IN FEET)
1 INCH = 30 FT.

SHEET 6
SHEET 7

EDGE OF WATER (1-6-20)

FES#5
15" INV=36.50

N22°09'23"E

MULTI-FAMILY 4-STORY BUILDING
(87 UNITS)
W/ CLUBHOUSE AND UNDERGROUND PARKING
(74 SPACES)
62'X402'

STM MH#5
TF=43.44

STORMWATER PLANTER #6

STORMWATER PLANTER #5

CB#31
TF=45.00

CB#32
TF=45.00

CB#33
TF=45.00

CB#34
TF=45.00

CB#25
TF=43.07

STM MH#6
TF=44.07

CB#30
TF=43.03

WQU #5
TF=42.75

CB#27
TF=44.10

CB#23
TF=44.10

CB#24
TF=44.02

STM MH#4
TF=44.00

WQU #4
TF=43.65

E-ONE GRINDER PUMP
TOP LID=46.00

MH8 TF=44.60'
INV (SW)=30.12' 15" RCP
INV (NW)=30.41' 24" RCP
INV (SE)=30.25' 36" STEEL

NG 259
W/ GUY

NG 260
W/ GUY

CHAIN LINK FENCE

WOODS

WQU #3
TF=41.62

STM MH#3
TF=43.47

DS 10 TF=44.11'
FILLED W/ DEBRIS

CB TF=44.11'
INV (A)=30.62' 36" RCP
INV (B)=37.03' 15" RCP
INV (C)=37.03'-05" STEEL
INV (D)=36.62' 24" RCP

CB#29
TF=43.50

CB#28
TF=43.50

MH TF=43.14'
INV (S)=36.32'
INV (N)=36.24'

MH4 TF=43.06'
INV (S)=29.19' 15" RCP
INV (N)=29.21' 15" RCP

MH5 TF=43.77'
INV (S)=29.67' 15" RCP
INV (NE)=29.78' 15" RCP

MH6 TF=44.80'
INV (S)=37.20'
INV (NE)=37.78'

CB TF=43.78'
INV =36.62'

N09°25'00"E
65.96'

S87°49'00"W 198.00'

15" RCP SAN

36" STEEL SAN

24" CLAY
TOP OF PIPE = 28.69
(PIPE BURIED)

FES#3
15" INV=37.00

FES#6
18" INV=36.15

MULTI-FAMILY
4-STORY BUILDING
(72 UNITS)
W/UNDERGROUND PARKING
(52 SPACES)
62'X274'

CB#17
TF=45.00

CB#18
TF=45.00

STORMWATER PLANTER #4

CB#19
TF=45.00

E-ONE GRINDER PUMP
TOP LID=42.00

CB#16
TF=43.02

CB#14
TF=45.55

CB#15
TF=44.02

CB#22
TF=41.25

CB#35
TF=42.16

CB#26
TF=49.02

MH12 TF=
INV (SW)=
INV (NE)=
INV (SE)=

2ND AVENUE

KEY MAP
N.T.S.

GRADING PLAN LEGEND:

- SHALLOW OR DEEP CATCH BASIN
- DOME STANDPIPE OUTLET STRUCTURE
- STORM DRAINAGE MANHOLE
- WATER QUALITY UNIT
- PAVED OR GRASSED SWALE
- FLARED END SECTION WITH RIP-RAP OUTLET
- RIP-RAP OVERFLOW
- × 335.78 SPOT ELEVATION
- 268 PROPOSED CONTOUR LINE
- 266 EXISTING CONTOUR LINE
- SANITARY MANHOLE
- FIRE HYDRANT
- PARKING, TRAFFIC OR STORMWATER MANAGEMENT SIGN WITH LABEL

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PROPOSED MULTIFAMILY DEVELOPMENT

SECOND AVE APARTMENTS

KEVIN VANDENBURGH

1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
COUNTY OF RENSSELAER

TAX MAP ID:
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REVISION	DATE	BY

SCALE:
1" = 30'

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SHEET TITLE:
GRADING PLAN

SHEET:
6 of 17

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GRAPHIC SCALE

30 25 20 15 10 5 0 15 30 120

(IN FEET)
1 INCH = 30 FT.

SHEET 7
SHEET 8

EDGE OF WATER (1-6-20)

1,616.56' (TIE LINE)

24" CLAY
TOP OF PIPE = 28.69
(PIPE BURIED)

FES#3
15" INV=37.00

FES#6
18" INV=36.15

FES#4
18" INV=37.00

FES#7
18" INV=39.00

MULTI-FAMILY
4-STORY BUILDING
(72 UNITS)
W/UNDERGROUND PARKING
(52 SPACES)
62'X274'

MULTI-FAMILY
4-STORY BUILDING
(72 UNITS)
W/UNDERGROUND PARKING
(52 SPACES)
62'X274'

FES#1
12" INV=37.50

CB#25
TF=43.07

STM MH#4
TF=44.00

WQU #4
TF=43.65

STM MH#3
TF=43.47

WQU #3
TF=41.62

CB#17
TF=45.00

CB#18
TF=45.00

STORMWATER
PLANTER #4

STORMWATER
PLANTER #3

CB#19
TF=45.00

CB#13
TF=45.00

WQU #2
TF=42.50

CB#12
TF=42.68

STM MH#2
TF=44.13

E-ONE GRINDER PUMP
TOP LID=42.00

CB#14
TF=45.55

CB#16
TF=43.02

CB#15
TF=44.02

CB#11
TF=45.48

STM MH#1 (6' ID)
TF=43.00

CB#22
TF=41.25

CB#35
TF=42.16

CB#20
TF=46.24

CB#21
TF=45.55

HYDRANT
ASSEMBLY, TYP.

CB#26
TF=49.02

CB#7
TF=45.00

CB#9
TF=45.00

CB#10
TF=45.00

CB#6
TF=43.05

CB#4
TF=44.55

STORMWATER
PLANTER #1

CB#3
TF=43.08

CB#8
TF=45.00

CB#5
TF=43.50

STORMWATER
PLANTER #2

CB#1
TF=44.90

CB#2
TF=43.90

WQU #1
TF=43.40

HYDRANT
ASSEMBLY, TYP.

FM MH#1 (ELCO)
TF=44.60

FES#2
TF=48.74

MH12 TF=45.87
INV (SW)=35.97' 36" STEEL
INV (NE)=36.02' 24" STEEL
INV (SE)=36.08' 24" STEEL

S35°18'00"E 156.00'

S07°48'00"E 605.00'

S35°18'00"E 319.13'

S07°48'00"E 54.63'

54.11'

LANDS N/F O
CHARLA A. BURI
BOOK 8173 OF DEEDS
AT PAGE 243

LANDS N/F OF
CHRISTOPHER J.
MATTHEWS
BOOK 1612 OF DEEDS
AT PAGE 319

LANDS N/F OF
SECRETARY OF
HOUSING & URBAN
DEVELOPMENT
BOOK 8729 OF DEEDS
AT PAGE 129

LANDS N/F OF
GERALD J. & LORRAINE T.
O'MELIA
BOOK 7280 OF DEEDS
AT PAGE 63

LANDS N/F OF
ADAM L. & EVANGELINE J.
FISHER
BOOK 1566 OF DEEDS
AT PAGE 269

STONE
FOUNDATION
PILLARS

NM 26.3
BA 14
W/ GUY

NG 26.3
BA 14

ACOE WETLANDS

STANDING
WATER

CHAINLINK FENCE

HOUSE

WELL

SEVENTH AVENUE

2ND AVENUE

ASP DRIVE

TROY SCHAGHTICOKE

GRADING PLAN LEGEND:

- SHALLOW OR DEEP CATCH BASIN
- DOME STANDPIPE OUTLET STRUCTURE
- STORM DRAINAGE MANHOLE
- WATER QUALITY UNIT
- PAVED OR GRASSED SWALE
- FLARED END SECTION WITH RIP-RAP OUTLET
- RIP-RAP OVERFLOW
- × 335.78 SPOT ELEVATION
- 265 PROPOSED CONTOUR LINE
- EXISTING CONTOUR LINE
- SANITARY MANHOLE
- FIRE HYDRANT
- PARKING, TRAFFIC OR STORMWATER MANAGEMENT SIGN WITH LABEL

KEY MAP
N.T.S.

SHEET 6

SHEET 7

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PROPOSED MULTIFAMILY DEVELOPMENT
SECOND AVE APARTMENTS

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COUNTY OF RENSSELAER

TAX MAP ID:
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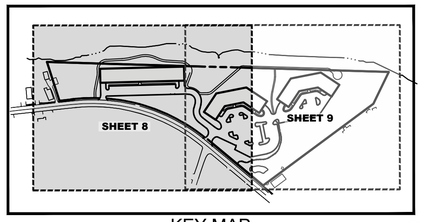
SCALE:
1" = 30'

NOT FOR CONSTRUCTION

SHEET TITLE:
GRADING PLAN

SHEET:
7 of 17

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KEY MAP
N.T.S.

GRAPHIC SCALE
30 25 20 15 10 5 0 15 30 120
(IN FEET)
1 INCH = 30 FT.

SHEET 8
SHEET 9

EDGE OF WATER (1-6-20)

FES#5
15" INV=36.50

MULTI-FAMILY 4-STORY BUILDING
(87 UNITS)
W/ CLUBHOUSE AND UNDERGROUND PARKING
(74 SPACES)
62'X402'

STORMWATER PLANTER #6
ADVANEDGE PIPE
6" PVC SDR 26 BUILDING SEWER @ 1% MIN. SLOPE
STORMWATER PLANTER #5
ADVANEDGE PIPE
STM MH#4
FES#3
15" INV=37.00

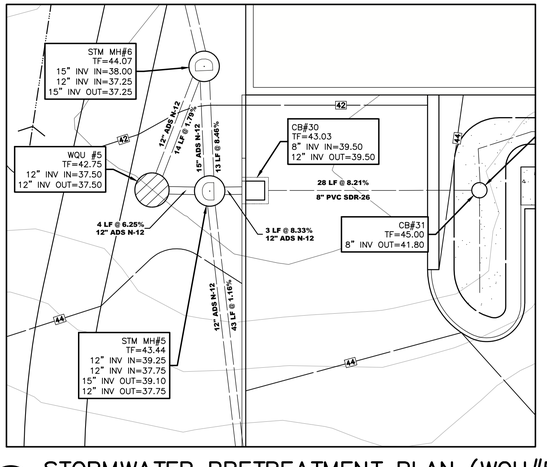
STM MH#6
SEE PRETREATMENT PLAN (WQU#5)
CB#31
CB#32
CB#33
CB#34
CB#25
CB#30
WQU #5
STM MH#5
CB#29
CB#28
CB#27
CB#23
CB#24
WQU #4
SEE PRETREATMENT PLAN (WQU#4)

51 LF @ 1.86% 8" PVC SDR-26
WATER SERVICE PER ARCH
51 LF @ 2.12% 8" PVC SDR-26
12" ADS N-12 70 LF @ 0.71%
12" ADS N-12 25 LF @ 2.31%
8"x8" M.J. TEE W/ VALVE AND THRUST BLOCK
97 LF @ 0.82% 12" ADS N-12
8" PVC C-900 AWWA WATER MAIN
M.J. BEND W/ THRUST BLOCK
M.J. BEND W/ THRUST BLOCK
GRAVEL ACCESS ROAD TO METER PIT
CHAIN LINK FENCE
8" PVC C-900 AWWA WATER MAIN
20 LF @ 1.25% 12" ADS N-12
15" RCP SAN
MH8 TF=44.60' INV (SW)=30.12' 15" RCP INV (NW)=30.41' 24" RCP INV (SE)=30.25' 36" STEEL
NG 259 W/ GUY
NG 260 W/ GUY
DS 10 TF=44.11' FILLED W/ DEBRIS
CB TF=44.77' INV (A)=30.62' 15" RCP INV (B)=37.43' 10" STEEL INV (D)=36.52' 24" RCP
MH TF=43.14' INV (S)=36.32' INV (N)=36.24'
MH4 TF=43.06' INV (S)=29.19' 15" RCP INV (N)=29.21' 15" RCP
MH5 TF=43.77' INV (S)=29.67' 15" RCP INV (N)=29.78' 15" RCP
MH6 TF=44.80' INV (S)=37.20' INV (NE)=37.78'
CB TF=43.78' INV =38.62'
MH12 TF=42.87' INV (SW)=35.97' 36" STEEL INV (NE)=35.02' 24" STEEL INV (SE)=35.08' 24" STEEL
36" STEEL SAN
24" CLAY TOP OF PIPE = 28.69 (PIPE BURIED)
FES#6
18" INV=36.15
STM MH#3
WQU #3
CB#22
STORMWATER PLANTER #4
E-ONE GRINDER PUMP W-SERIES OR APPROVED EQUAL
6" PVC SDR 26 BUILDING SEWER @ 1% MIN. SLOPE
34 LF @ 2.94% 15" ADS N-12
CB#35
52 LF @ 1.44% 15" ADS N-12
1.25" PE 4710 IPS DR-11 LOW PRESSURE SEWER LATERAL
M.J. BEND W/ THRUST BLOCK
2" PE 4710 IPS DR-11 LOW PRESSURE SEWER MAIN
CORE DRILL AND CONNECT TO EXISTING SEWER MANHOLE PER DETAIL. 2" INV IN= 40.50±
2" PE 4710 IPS DR-11 LOW PRESSURE SEWER LATERAL
E-ONE GRINDER PUMP W-SERIES OR APPROVED EQUAL
CORE DRILL AND CONNECT TO EXISTING SEWER MANHOLE PER DETAIL. 1.25" INV IN= 38.65±
APPROXIMATE LOCATION OF EXISTING 24" WATER MAIN. CONNECT WITH ALL STAINLESS STEEL TAPPING SLEEVE WITH VALVE, AND THRUST BLOCK. CONTRACTOR TO CONFIRM SIZE, TYPE, AND LOCATION OF ALL UTILITIES PRIOR TO START OF CONSTRUCTION
PROPOSED METER PIT PER CITY OF TROY STANDARDS
8"x8" M.J. TEE W/ VALVE AND THRUST BLOCK
CURB WALL
HALT
AVE
OF INDA A. IK
ASHLEY T DRIVE
MONROE

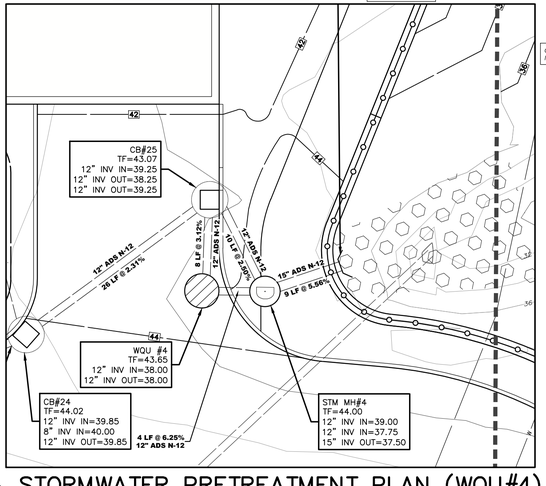
STORM STRUCTURE DATA			
STRUCTURE NAME	RIM ELEVATION	PIPE INVERT IN	PIPE INVERT OUT
CB#23	44.10	8"-40.70 (FROM CB#33)	12"-40.35 (TO CB#24)
CB#24	44.02	12"-39.85 (FROM CB#23) 8"-40.00 (FROM CB#34)	12"-39.85 (TO CB#25)
CB#25	43.07	12"-39.25 (FROM CB#24)	12"-38.25 (TO WQU #4) 12"-39.25 (TO STM MH#4)
CB#27	44.10	8"-40.85 (FROM CB#32)	12"-39.30 (TO CB#28)
CB#28	43.50	12"-38.50 (FROM CB#27)	12"-38.50 (TO CB#29)
CB#29	43.50	12"-38.25 (FROM CB#28)	12"-38.25 (TO STM MH#5)
CB#30	43.03	8"-39.50 (FROM CB#31)	12"-39.50 (TO STM MH#5)
CB#31	45.00		8"-41.80 (TO CB#30)
CB#32	45.00		8"-41.80 (TO CB#27)
CB#33	45.00		8"-41.80 (TO CB#23)
CB#34	45.00		8"-41.00 (TO CB#24)
STM MH#4	44.00	12"-39.00 (FROM CB#25) 12"-37.75 (FROM WQU #4)	15"-37.50 (TO FES#3)
STM MH#5	43.44	12"-39.25 (FROM CB#30) 12"-37.75 (FROM CB#29)	15"-39.10 (TO STM MH#6) 12"-37.75 (TO WQU #5)
STM MH#6	44.07	15"-38.00 (FROM STM MH#5) 12"-37.25 (FROM WQU #5)	15"-37.25 (TO FES#5)
WQU #4	43.65	12"-38.00 (FROM CB#25)	12"-38.00 (TO STM MH#4)
WQU #5	42.75	12"-37.50 (FROM STM MH#5)	12"-37.50 (TO STM MH#6)

UTILITY PLAN LEGEND:

- SHALLOW OR DEEP CATCH BASIN
- STORM DRAINAGE MANHOLE
- WATER QUALITY UNIT
- PAVED OR GRASSED SWALE
- FLARED END SECTION WITH RIP-RAP OUTLET
- RIP-RAP OVERFLOW
- SPOT ELEVATION
- PROPOSED CONTOUR LINE
- EXISTING CONTOUR LINE
- SANITARY MANHOLE
- LOW PRESSURE SEWER SERVICE LATERAL WITH GRINDER PUMP
- SEWER SERVICE LINE
- FIRE HYDRANT
- PROPOSED M.J. BEND
- PROPOSED VALVE
- PROPOSED M.J. TEE
- WATER SERVICE LINE



1/8 STORMWATER PRETREATMENT PLAN (WQU#5)
SCALE: 1" = 10'



2/8 STORMWATER PRETREATMENT PLAN (WQU#4)
SCALE: 1" = 10'

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300 Route 146 Clifton Park, New York 12065
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PROPOSED MULTIFAMILY DEVELOPMENT
SECOND AVE APARTMENTS
KEVIN VANDENBURGH
1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
COUNTY OF RENSSELAER

TAX MAP ID:
70.64-1-1 & 70.56-1-6

SEPTEMBER 29, 2021

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EDP PROJECT NUMBER	12928

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REVISION	DATE	BY

SCALE:
1" = 30'

NOT FOR CONSTRUCTION

SHEET TITLE:
UTILITY PLAN

SHEET:
8 of 17

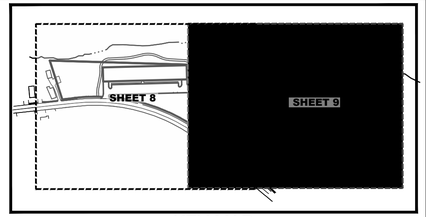
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GRAPHIC SCALE

30 25 20 15 10 5 0 15 30 120

(IN FEET)
1 INCH = 30 FT.

KEY MAP
N.T.S.



SHEET 9
SHEET 10

EDGE OF WATER (1-6-20)

24" CLAY
TOP OF PIPE = 28.69
(PIPE BURIED)

FES#6
18" INV=36.15

FES#3
5" INV=37.00

FES#7
18" INV=39.00

FES#4
18" INV=37.00

FES#1
12" INV=37.50

MULTI-FAMILY
4-STORY BUILDING
(72 UNITS)
W/UNDERGROUND PARKING
(52 SPACES)
62'X274'

MULTI-FAMILY
4-STORY BUILDING
(72 UNITS)
W/UNDERGROUND PARKING
(52 SPACES)
62'X274'

STONE FOUNDATION PILLARS

ADVANEDGE PIPE

STORMWATER PLANTER #1

STORMWATER PLANTER #2

STORMWATER PLANTER #3

STORMWATER PLANTER #4

CB#1 CB#2 CB#3 CB#4 CB#5 CB#6 CB#7 CB#8 CB#9 CB#10 CB#11 CB#12 CB#13 CB#14 CB#15 CB#16 CB#17 CB#18 CB#19 CB#20 CB#21 CB#22 CB#26 CB#35

STM MH#1 (6" ID)
STM MH#2
STM MH#3

WQU #1
WQU #2
WQU #3

E-ONE GRINDER PUMP W-SERIES OR APPROVED EQUAL

6" PVC SDR 26 BUILDING SEWER @ 1% MIN. SLOPE

SEE PRETREATMENT PLAN (WQU#2)

102 LF @ 0.69%
18" ADS N-12

9 LF @ 1.11%
8" PVC SDR-26

41 LF @ 1.22%
18" ADS N-12

39 LF @ 6.67%
12" ADS N-12

32 LF @ 1.09%
15" ADS N-12

53 LF @ 0.57%
12" ADS N-12

9 LF @ 7.78%
8" PVC SDR-26

8 LF @ 6.25%
8" PVC SDR-26

34 LF @ 2.94%
15" ADS N-12

31 LF @ 3.06%
12" ADS N-12

55 LF @ 0.73%
12" ADS N-12

31 LF @ 2.42%
12" ADS N-12

74 LF @ 0.47%
12" ADS N-12

15 LF @ 4.00%
8" PVC SDR-26

2 LF @ 7.50%
12" ADS N-12

12" ADS N-12
35 LF @ 8.57%

12" ADS N-12
29 LF @ 6.90%

52 LF @ 1.44%
15" ADS N-12

12" ADS N-12 76 LF @ 1.25%

155 LF @ 4.77%
12" ADS N-12

8" PVC C-900 AWWA WATER MAIN

2" PE 4710 IPS DR11 LOW PRESSURE SEWER MAIN

1.25" PE 4710 IPS DR-11 LOW PRESSURE SEWER LATERAL

M.J. BEND W/ THRUST BLOCK

8"x8" M.J. TEE W/ VALVE AND THRUST BLOCK

HYDRANT ASSEMBLY

WATER SERVICE PER ARCH

FM MH#1 (ELCO)
TF=44.60
2" INV=38.55
FLOOR ELEV=36.55

FES#2
18" INV=43.50

CHAINLINK FENCE

CORE DRILL AND CONNECT TO EXISTING SEWER MANHOLE PER DETAIL
2" INV IN= 40.50±

2ND AVENUE

ASP DRIVE

STANDING WATER

LANDS N/F OF CHARLA A. BURI
BOOK 8173 OF DEEDS
AT PAGE 243

LANDS N/F OF CHRISTOPHER J. MATTHEWS
BOOK 1612 OF DEEDS
AT PAGE 319

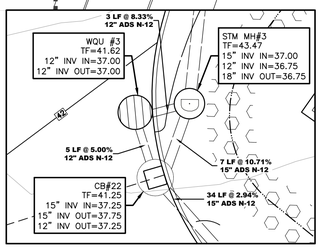
LANDS N/F OF SECRETARY OF HOUSING & URBAN DEVELOPMENT
BOOK 8729 OF DEEDS
AT PAGE 129

HOUSE

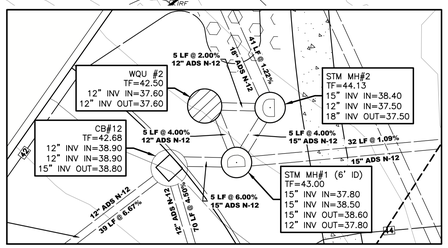
WELL

MH12 TF=
INV (SW)=
INV (NE)=
INV (SE)=

5.87"
5.97" 36" STEEL
6.02" 24" STEEL
5.08" 24" STEEL



1/9 STORMWATER PRETREATMENT PLAN (WQU#3)
SCALE: 1" = 10'



2/9 STORMWATER PRETREATMENT PLAN (WQU#2)
SCALE: 1" = 10'

UTILITY PLAN LEGEND:

- SHALLOW OR DEEP CATCH BASIN
- STORM DRAINAGE MANHOLE
- WATER QUALITY UNIT
- PAVED OR GRASSED SWALE
- FLARED END SECTION WITH RIP-RAP OUTLET
- RIP-RAP OVERFLOW
- × 335.78 SPOT ELEVATION
- 268 PROPOSED CONTOUR LINE
- 268 EXISTING CONTOUR LINE
- S SANITARY MANHOLE
- G.P. LOW PRESSURE SEWER SERVICE LATERAL WITH GRINDER PUMP
- C.O. SEWER SERVICE LINE
- FIRE HYDRANT
- PROPOSED M.J. BEND
- PROPOSED VALVE
- PROPOSED M.J. TEE
- W.S. WATER SERVICE LINE

STORM STRUCTURE DATA

STRUCTURE NAME	RIM ELEVATION	PIPE INVERT IN	PIPE INVERT OUT
CB#1	44.90	12"-40.50 (FROM CB#4)	12"-40.50 (TO CB#2)
CB#2	43.90	12"-40.15 (FROM CB#1) 8"-40.40 (FROM CB#8)	12"-40.15 (TO CB#3)
CB#3	43.08	12"-39.35 (FROM CB#2)	15"-38.15 (TO STM MH#1 (6" ID))
CB#4	44.55	8"-40.80 (FROM CB#7)	12"-40.80 (TO CB#1)
CB#5	43.50	8"-41.00 (FROM CB#10)	12"-40.00 (TO CB#6)
CB#6	43.05	12"-39.30 (FROM CB#5)	12"-38.30 (TO WQU #1)
CB#7	45.00		8"-41.50 (TO CB#4)
CB#8	45.00		8"-41.00 (TO CB#2)
CB#9	45.00		8"-41.80 (TO CB#10)
CB#10	45.00	8"-41.50 (FROM CB#9)	8"-41.50 (TO CB#5)
CB#11	45.48	12"-41.40 (FROM CB#14)	12"-41.40 (TO CB#13)
CB#12	42.68	12"-38.90 (FROM CB#13) 12"-38.90 (FROM CB#21)	15"-38.80 (TO STM MH#1 (6" ID))
CB#13	45.00	12"-41.00 (FROM CB#11)	12"-41.50 (TO CB#12)
CB#14	45.55	8"-41.70 (FROM CB#17)	12"-41.70 (TO CB#11)
CB#15	44.02	8"-40.20 (FROM CB#19)	12"-40.20 (TO CB#16)
CB#16	43.02	12"-39.25 (FROM CB#15) 12"-39.25 (FROM CB#26)	15"-39.00 (TO CB#35)
CB#17	45.00		8"-41.80 (TO CB#14)
CB#18	45.00		8"-42.00 (TO CB#19)
CB#19	45.00	8"-41.50 (FROM CB#18)	8"-41.00 (TO CB#15)
CB#20	46.24		12"-43.00 (TO CB#21)
CB#21	45.55	12"-42.05 (FROM CB#20)	12"-42.05 (TO CB#12)
CB#22	41.25	15"-37.25 (FROM CB#35)	15"-37.75 (TO STM MH#3) 12"-37.25 (TO WQU #3)
CB#26	49.02		12"-45.25 (TO CB#16)
CB#35	42.16	15"-38.25 (FROM CB#16)	15"-38.25 (TO CB#22)
STM MH#1 (6" ID)	43.00	15"-37.80 (FROM CB#3) 15"-38.50 (FROM CB#12)	15"-38.60 (TO STM MH#2) 12"-37.80 (TO WQU #2)
STM MH#2	44.13	15"-38.40 (FROM STM MH#1 (6" ID)) 12"-37.50 (FROM WQU #2)	18"-37.50 (TO FES#4)
STM MH#3	43.47	15"-37.00 (FROM CB#22) 12"-36.75 (FROM WQU #3)	18"-36.75 (TO FES#6)
WQU #1	43.40	12"-38.15 (FROM CB#6)	12"-38.15 (TO FES#1)
WQU #2	42.50	12"-37.60 (FROM STM MH#1 (6" ID))	12"-37.60 (TO STM MH#2)
WQU #3	41.62	12"-37.00 (FROM CB#22)	12"-37.00 (TO STM MH#3)

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COUNTY OF RENSSELAER

TAX MAP ID:
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REVISION	DATE	BY

SCALE:
1" = 30'

NOT FOR CONSTRUCTION

SHEET TITLE:
UTILITY PLAN

SHEET:
9 of 17

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PLANTING NOTES:

1. PLANTING CONTRACTOR SHALL VERIFY FINAL SELECTION OF PLANT MATERIALS WITH THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
2. ALL AREAS OF SITE WHICH ARE DISTURBED AND NOT LANDSCAPED, PAVED, SHALL BE TOPSOILED, SEEDED, AND MULCHED . (MULCH – STRAW, HYDROSEED MIX, OR BIODEGRADABLE NETTING.) MIXTURES TO BE APPLIED SHALL BE DETERMINED BY OWNER'S REPRESENTATIVES. TOPSOIL TO BE 4" MINIMUM.
3. EXISTING VEGETATION SHALL REMAIN UNDISTURBED WITHIN ALL AREAS OF SITE WHICH DO NOT REQUIRE GRADING.
4. ALL PLANTING BEDS TO RECEIVE 3" MINIMUM BARK MULCH WITH FILTER FABRIC WEED CONTROL OR EQUAL.
5. THIS PLAN IS FOR PLANTING PURPOSES ONLY. REFER TO SITE PLAN FOR DETAILED GRADING AND UTILITY INFORMATION.
6. GUARANTEE:
   A. FOR A PERIOD OF TWELVE MONTHS FROM THE DATE THAT THE WORK UNDER CONTRACT IS CERTIFIED AS COMPLETE, THE CONTRACTOR SHALL:
   1. GUARANTEE ALL PLANTS AND SEEDED AREAS UNDER THIS CONTRACT;
   2. REMOVE AND REPLACE DURING THIS GUARANTEE PERIOD, PLANTS WHICH DIE OR ARE IN A BADLY IMPAIRED CONDITION;
   3. REPLANT WITH STOCK OF SAME SIZE AND QUALITY AS ORIGINALLY SPECIFIED;
   4. GUY AND MAINTAIN AS SPECIFIED HEREIN, AT NO ADDITIONAL COST.
   A. REPLACEMENTS MADE WITHIN SIX MONTHS AFTER BEGINNING OF THE "GUARANTEE PERIOD" SHALL NOT EXTEND THE "GUARANTEE PERIOD" OF THESE PARTICULAR PLANTS; THOSE REPLACEMENTS MADE SIX MONTHS OR MORE AFTER THE BEGINNING OF THE "GUARANTEE PERIOD" SHALL BE MAINTAINED AND GUARANTEED FOR A PERIOD OF SIX MONTHS FROM THE TIME OF REPLACEMENT.
7. APPLICABLE STANDARDS: "AMERICAN STANDARD FOR NURSERY STOCK" BY THE AMERICAN ASSOCIATION OF NURSERYMEN AND "STANDARDIZED PLANT NAMES" BY THE AMERICAN JOINT COMMITTEE ON HORTICULTURAL NOMENCLATURE, ARE A PART OF THIS SPECIFICATION. ALL PLANTS SHALL BE NURSERY GROWN, NOT GATHERED IN THE FIELD.

SPECIES NOTE:

PLANTS LISTED IN THE PLANTING SCHEDULE CAN BE SUBSTITUTED FOR SIMILAR SPECIES OF THE SAME SIZE WITH THE APPROVAL OF THE OWNER/DEVELOPER AND/OR PROJECT LANDSCAPE ARCHITECT.

PLANTING BED PREPARATION NOTE:

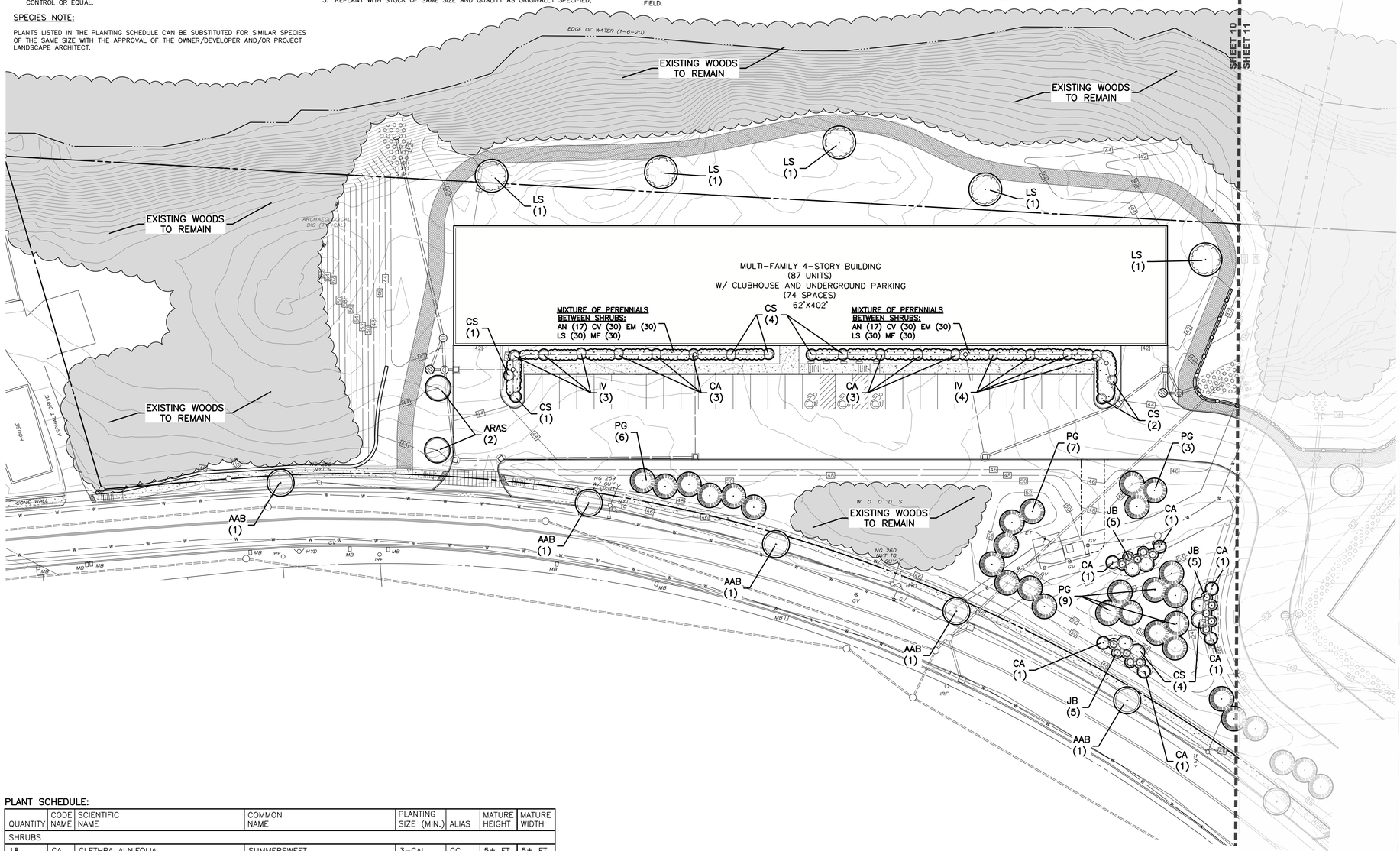
ALL PAVEMENT, AND GRAVEL BASE SHALL BE REMOVED FROM PROPOSED PLANTING BEDS AREAS. COMPACTED SUB BASE MATERIALS SHALL BE DECOMPACTED FOR A DEPTH OF 12". PLANTING BEDS SHALL BE FREE OF ROOTS TILLED TO A DEPTH 12". INCORPORATE 2" OF COMPOST INTO SOIL AND TOP DRESS WITH 3" OF HARDWOOD MULCH.

LAWN SEED MIX:

SEED ALL AREAS WHICH ARE DISTURBED AND NOT LANDSCAPED, PAVED OR OTHERWISE RESTORED WITH GRASS SEED CONTAINING A MINIMUM 20% KENTUCKY BLUE GRASS, 20% FESCUE AND A MAXIMUM OF 20% ANNUAL RYE GRASS. SEED SHALL BE APPLIED AT A RATE OF 7–10 LBS PER 1,000 SF.

TOPSOIL NOTE:

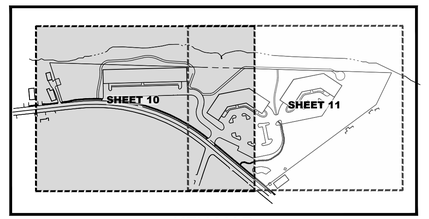
ALL AREAS WHICH ARE DISTURBED AND NOT LANDSCAPED, PAVED OR OTHERWISE RESTORED SHALL RECEIVE A MINIMUM OF 4" OF TOPSOIL. ALL LANDSCAPE BEDS SHALL RECEIVE A MINIMUM OF 12" OF TOPSOIL.
TOP SOIL SHALL HAVE;
2% –20% ORGANIC MATTER
PH OF 6–7.6%
MAXIMUM PARTICLE SIZE 1.5"



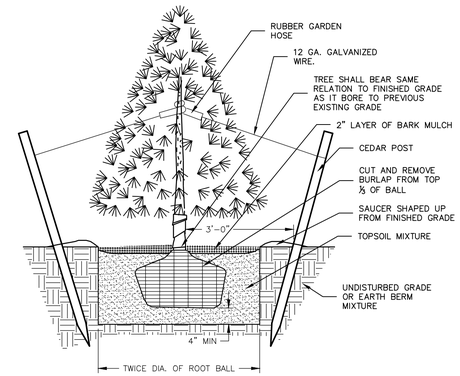
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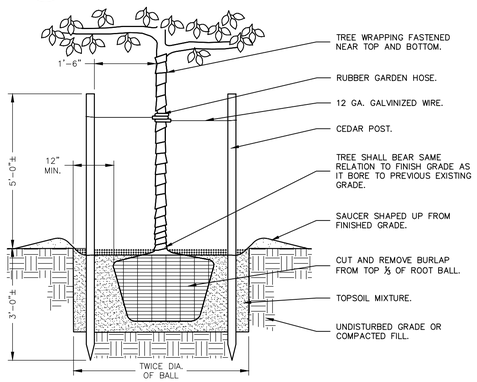
(IN FEET)
1 INCH = 30 FT.



KEY MAP
N.T.S.



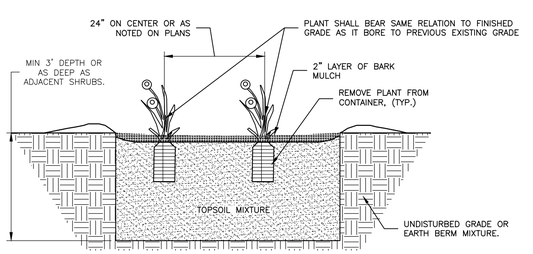
1/10 CONIFEROUS PLANTING
NOT TO SCALE



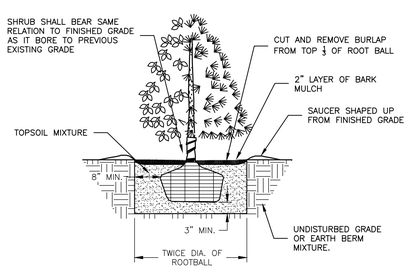
2/10 DECIDUOUS PLANTING
NOT TO SCALE

PLANT SCHEDULE:

QUANTITY	CODE NAME	SCIENTIFIC NAME	COMMON NAME	PLANTING SIZE (MIN.)	ALIAS	MATURE HEIGHT	MATURE WIDTH
SHRUBS							
18	CA	CLETHRA ALNIFOLIA	SUMMERSWEET	3–GAL	CG	5± FT	5± FT
22	CS	CORNUS SERICEA	RED TWIG DOGWOOD	3' HT.	B & B	6± FT	8± FT
6	CR	CORNUS RACEMOSA	GREY DOGWOOD	24" – 30"	CG	10± FT	10± FT
15	IV	ILEX VERTICILLATA	COMMON WINTERBERRY	3–GAL	CG	7± FT	10± FT
15	JB	JUNIPEROUS SQUAMATA 'BLUE STAR'	BLUE STAR JUNIPER	3–GAL	CG	2± FT	3± FT
PERENNIALS							
121	AN	ASTER NOVAE–ANGLIAE	NEW ENGLAND ASTER	1 GAL.	CG	3± FT	2± FT
189	CV	CAREX VULPINOIDEA	FOX SEDGE	1 GAL.	CG	2± FT	2± FT
189	EM	EUPATORIUM MACULATUM	SPOTTED JOE–PYE–WEED	1 GAL.	CG	4± FT	2± FT
179	LS	LOBELIA SIPHATICA	GREAT BLUE LOBELIA	1 GAL.	CG	2± FT	1± FT
189	MF	MONARDA FISTULOSA	WILD BERGAMONT	1 GAL.	CG	2± FT	2± FT
16	RU	RUDBECKIA HIRTA	BLACK–EYED SUSAN	1–GAL	CG	3± FT	2± FT
8	SS	SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	3–GAL	CG	4± FT	2± FT
TREES							
18	ARAS	ACER RUBRUM 'AUTUMN SPIRE'	AUTUMN SPIRE RED MAPLE	2.5" CAL.	B & B	35+ FT	20+ FT
9	AAB	AMELANCHIER 'AUTUMN BRILLIANCE'	AUTUMN BRILLIANCE SERVICEBERRY	2.5" CAL.	B & B	20± FT	15± FT
12	CC	CERCIS CANADENSIS	EASTERN REDBUD	2" CAL.	B & B	25± FT	30± FT
12	LS	LIQUIDAMBAR STYRACIFLUA	SWEETGUM	2.5" CAL.	B & B	50± FT	40± FT
31	PG	PICEA GLAUCA	WHITE SPRUCE	6' HT.	B & B	20± FT	10± FT



3/10 PERENNIAL PLANTING
NOT TO SCALE



4/10 SHRUB PLANTING
NOT TO SCALE

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1" = 30'

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SHEET TITLE:
PLANTING PLAN

SHEET:
10 of 17

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GRAPHIC SCALE
30 25 20 15 10 5 0 15 30 120
(IN FEET)
1 INCH = 30 FT.

SHEET 11
SHEET 12

KAYAK DOCK AND LAUNCH AREA
(SEE OVERALL SITE PLAN)

EDGE OF WATER (1-6-20)

EXISTING WOODS TO REMAIN

ARCHAEOLOGICAL SITE (TYP.)

PARK AREA

STONE FOUNDATION PILLARS

MULTI-FAMILY
4-STORY BUILDING
(72 UNITS)
W/UNDERGROUND PARKING
(52 SPACES)
62'X274'

MIXTURE OF PERENNIALS BETWEEN SHRUBS:
AN (22) CV (30) EM (30)
LS (30) MF (30)

MIXTURE OF PERENNIALS BETWEEN SHRUBS:
AN (16) CV (17) EM (17)
LS (17) MF (17)

MIXTURE OF PERENNIALS BETWEEN SHRUBS:
AN (5) CV (15) EM (15)
LS (15) MF (15)

MIXTURE OF PERENNIALS:
AN (4) CV (6) EM (6)
LS (6) MF (6)

MIXTURE OF PERENNIALS BETWEEN SHRUBS:
AN (20) CV (32) EM (32)
LS (32) MF (32)

MIXTURE OF PERENNIALS BETWEEN SHRUBS:
AN (12) CV (17) EM (17)
LS (17) MF (17)

MIXTURE OF PERENNIALS BETWEEN SHRUBS:
AN (4) CV (6) EM (6)
LS (6) MF (6)

LS (1)
CC (2)
CA (3)
CA (2)
CA (1)
IV (2)
CS (4)
CS (3)
CS (2)
CS (1)
ARAS (2)
PG (3)
AAB (1)
CR (6)
RU (8)
SS (8)

EXISTING WOODS TO REMAIN

2ND AVENUE

SEVENTH AVENUE

ACOE WETLANDS

STANDING WATER

HOUSE

WELL

W O O D S

EOW

IRF

MB

GV

HYD

WS

BLDG

ASP DRIVE

NG 261
NYT 12
W/ GUY

NM 263
BA 14
W/ GUY

NM 264
BA 14

KEY MAP
N.T.S.
SHEET 10
SHEET 11

ENVIRONMENTAL DESIGN PARTNERSHIP, LLP.
300 Route 146 Clifton Park, New York 12065
(518) 371-7821
edpllp.com

PROPOSED MULTIFAMILY DEVELOPMENT
SECOND AVE APARTMENTS
KEVIN VANDENBURGH

1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
COUNTY OF RENSSELAER

TAX MAP ID:
70.64-1-1 & 70.56-1-6

SEPTEMBER 29, 2021

DRAWN BY	DBR
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EDP PROJECT NUMBER	12928

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REVISION	DATE	BY

SCALE:
1" = 30'

NOT FOR CONSTRUCTION

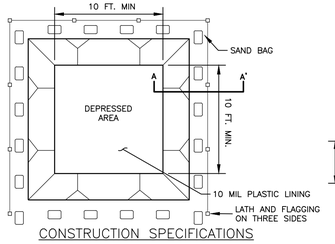
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PLANTING PLAN

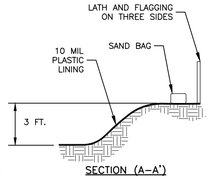
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11 of 17

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SEQUENCE OF CONSTRUCTION ACTIVITIES:

1. CONSTRUCT TEMPORARY CONSTRUCTION EXITS AT LOCATIONS SHOWN.
2. INSTALL PERIMETER SILT FENCES AND TEMPORARY SEDIMENT BASIN IN THE LOCATIONS SHOWN AND OTHER LOCATIONS AS NECESSARY TO STABILIZE THE SITE.
3. BEGIN CLEARING AND GRUBBING OPERATIONS. CLEARING AND GRUBBING SHALL BE DONE ONLY IN AREAS WHERE EARTHWORK WILL BE PERFORMED AND ONLY IN AREAS WHERE BUILDING IS PLANNED TO COMMENCE WITHIN 14 DAYS AFTER CLEARING AND GRUBBING.
4. FREQUENT WATERING OF THE EXCAVATION AND FILL AREAS SHALL BE DONE TO MINIMIZE WIND EROSION.
5. COMMENCE SITE GRADING AND CONSTRUCTION.
6. DISTURBED AREAS OF THE SITE WHERE CONSTRUCTION ACTIVITY HAS CEASED FOR MORE THAN 14 DAYS SHALL BE TEMPORARILY SEEDED AND WATERED.
7. INSTALL PROTECTIVE SILT FENCES / BARRIERS AT THE LOCATIONS OF ALL GRATE INLETS, CURB INLETS, AND AT THE ENDS OF ALL EXPOSED STORM SEWER PIPES.
8. FINALIZE PAVEMENT SUBGRADE PREPARATION.
9. CONSTRUCT ALL CURB AND GUTTER, GUTTER INLETS, AREA INLETS, AND STORM SEWER MANHOLES, AS SHOWN ON THE PLANS. INLET PROTECTION BARRIERS MAY BE REMOVED TEMPORARILY FOR THIS CONSTRUCTION. PLACE REQUIRED RIPRAP AT LOCATIONS SHOWN ON THE PLANS.
10. REMOVE DROP INLET PROTECTION AROUND INLETS AND MANHOLES NO MORE THAN 48 HOURS PRIOR TO PLACING STABILIZED BASE COURSE.
11. INSTALL BASE MATERIAL AS REQUIRED FOR PAVEMENT.
12. CARRY OUT FINAL GRADING AND SEEDING AND PLANTING
13. REMOVE SILT FENCING / STRAW BARRIERS ONLY AFTER ALL PAVING IS COMPLETE AND EXPOSED SURFACES ARE STABILIZED.
14. REMOVE TEMPORARY CONSTRUCTION EXITS ONLY PRIOR TO PAVEMENT CONSTRUCTION IN THESE AREAS (THESE AREAS ARE TO BE PAVED LAST).





SECTION (A–A')

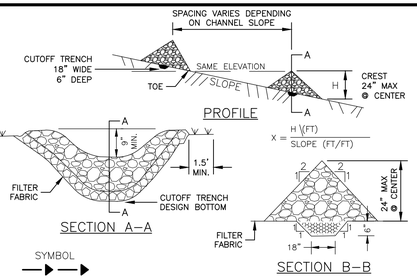
CONSTRUCTION SPECIFICATIONS

1. CONCRETE WASHOUT FACILITY SHALL BE LOCATED A MINIMUM OF FIFTY FEET (50') FROM SENSITIVE AREAS.
2. THE BASIN DIMENSIONS DEPICTED ABOVE ARE REQUIRED MINIMUMS. CONCRETE WASHOUT FACILITY SHALL BE CONSTRUCTED AND MAINTAINED IN SUFFICIENT QUANTITY AND SIZE TO CONTAIN ALL LIQUID AND CONCRETE WASTE ENERATED BY WASHOUT OPERATIONS. (APPROXIMATELY 60 GALLONS OF WASTE AND WATER PER TRUCK).
3. PLASTIC LINING MATERIAL SHALL BE A MINIMUM 10 MIN POLYETHYLENE SHEETING AND SHOULD BE FREE OF HOLES, TEARS, OR OTHER DEFECTS THAT COMPROMISE THE IMPERMEABILITY OF THE MATERIAL.
4. WASHOUT FACILITY MUST BE CLEANED, OR NEW FACILITES MUST BE CONSTRUCTED AND READY FOR USE ONCE THE WASHOUT IS 75% FULL.

MAINTENANCE AND CLEANING

1. DO NOT DISCHARGE LIQUID OR SLURRY TO WATERWAYS, STORM DRAINS OR DIRECTLY ONTO GROUND
2. DO NOT USE SANITARY SEWER WITHOUT LOCAL APPROVAL.
3. PLACE A SECURE NON COLLAPSING, NON–WATER COLLECTING COVER OVER THE FACILITY PRIOR TO PREDICTED WET WEATHER TO PREVENT ACCUMULATION AND OVERFLOW.
4. REMOVE AND DISPOSE OF HARDEN CONCRETE AND RETURN THE STRUCTURE TO A FUNCTIONAL STATE.
5. INSPECT THE WASHOUT FACILITY FOR SIGNS OF WEAKENING OR DAMAGE AND REPAIR AS NESSESARY(RELINE THE STRUCTURE WITH NEW POLY SHEETING AFTER EACH CLEANING).

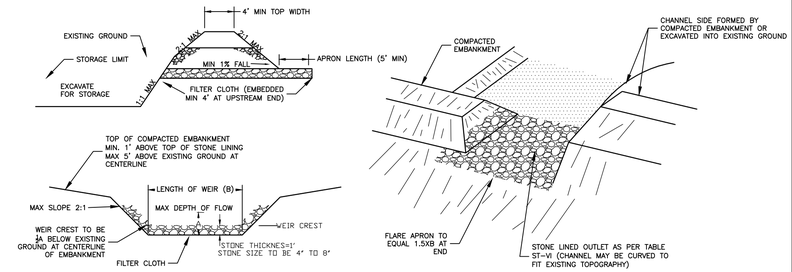
1/12 CONCRETE WASHOUT FACILITY
NOT TO SCALE



CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOW OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LONER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.
6. MAXIMUM DRAINAGE AREA 2 ACRES.

2/12 CHECK DAM
NOT TO SCALE



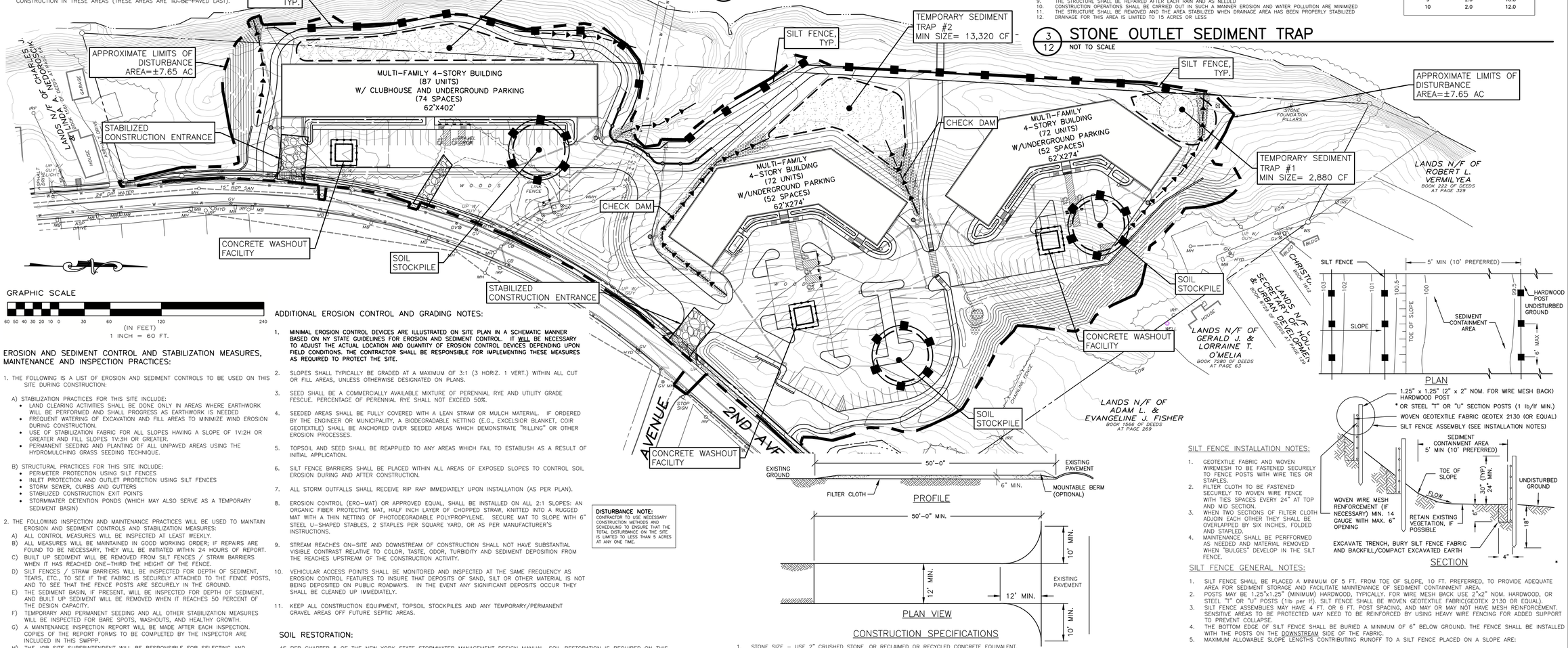
CONSTRUCTION SPECIFICATIONS

1. THE AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER–SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED. MAXIMUM HEIGHT OF EMBANKMENT SHALL BE 5 FEET, MEASURED AT CENTERLINE OF EMBANKMENT.
3. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER, CUT SLOPES 1:1 OR FLATTER
4. EXCAVATION OF THE TOP OF ANY DIKE DIRECTING WATER INTO TRAP MUST EQUAL OR EXCEED THE HEIGHT OF THE EMBANKMENT
5. STORAGE AREA PROVIDED SHALL BE FIGURED BY COMPUTING THE VOLUME AVAILABLE BEHIND THE OUTLET CHANNEL UP TO AN ELEVATION OF ONE (1) FOOT BELOW THE LEVEL WEIR CREST
6. FILTER CLOTH SHALL BE PLACED OVER THE BOTTOM AND SIDES OF THE OUTLET CHANNEL PRIOR TO TO PLACEMENT IN STONE. SECTIONS OF FABRIC MUST OVERLAP AT LEAST 1 FOOT WITH SECTION NEAREST THE ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST 6 INCHES INTO EXISTING GROUND AT ENTRANCE OUTLET CHANNELS
7. STONE USED UN THE OUTLET CHANNEL SHALL BE 4 TO 8 INCH RIP–RAP. TO PROVIDE A FILTERING EFFECT, A LAYER OF FILTER CLOTH SHALL BE EMBEDDED 1–FOOT WITH SECTION NEAREST ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST 6 INCHES INTO EXISTING GROUND AT ENTRANCE OUTLET CHANNEL.
8. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO ½ THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH AN MANNER IT WILL NOT ERODE.
9. THE STRUCTURE SHALL BE REPAIRED AFTER EACH RAIN AND AS NEEDED
10. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER EROSION AND WATER POLLUTION ARE MINIMIZED
11. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN DRAINAGE AREA HAS BEEN PROPERLY STABILIZED
12. DRAINAGE FOR THIS AREA IS LIMITED TO 15 ACRES OR LESS

DESIGN CALCULATIONS (#1, #2, #3)
CONTRIBUTING AREA = 0.8/3.7/1.8 ACRES
MIN SIZE = 3,600 CF/ACRE
MIN SIZE = **2,880 CF/13,320 CF/6,480 CF**

CONTRIBUTING AREA (ACRES)	DEPTH OF CHANNEL, (A) (FT)	LENGTH OF WEIR (B) (FT)
1	1.5	4.0
2	1.5	5.0
3	1.5	6.0
4	1.5	10.0
5	1.5	12.0
6	1.5	14.0
7	1.5	16.0
8	2.0	10.0
9	2.0	10.0
10	2.0	12.0

3/12 STONE OUTLET SEDIMENT TRAP
NOT TO SCALE



ADDITIONAL EROSION CONTROL AND GRADING NOTES:

1. **MINIMAL EROSION CONTROL DEVICES ARE ILLUSTRATED ON SITE PLAN IN A SCHEMATIC MANNER BASED ON NY STATE GUIDELINES FOR EROSION AND SEDIMENT CONTROL. IT WILL BE NECESSARY TO ADJUST THE ACTUAL LOCATION AND QUANTITY OF EROSION CONTROL DEVICES DEPENDING UPON FIELD CONDITIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING THESE MEASURES AS REQUIRED TO PROTECT THE SITE.**
2. SLOPES SHALL TYPICALLY BE GRADED AT A MAXIMUM OF 3:1 (3 HORIZ. 1 VERT.) WITHIN ALL CUT OR FILL AREAS, UNLESS OTHERWISE DESIGNATED ON PLANS.
3. SEED SHALL BE A COMMERCIALLY AVAILABLE MIXTURE OF PERENNIAL RYE AND UTILITY GRADE FESCUE. PERCENTAGE OF PERENNIAL RYE SHALL NOT EXCEED 50%.
4. SEEDED AREAS SHALL BE FULLY COVERED WITH A LEAN STRAW OR MULCH MATERIAL. IF ORDERED BY THE ENGINEER OR MUNICIPALITY, A BIODEGRADABLE NETTING (E.G., EXCELSIOR BLANKET, COIR GEOTEXTILE) SHALL BE ANCHORED OVER SEEDED AREAS WHICH DEMONSTRATE "RILLING" OR OTHER EROSION PROCESSES.
5. TOPSOIL AND SEED SHALL BE REAPPLIED TO ANY AREAS WHICH FAIL TO ESTABLISH AS A RESULT OF INITIAL APPLICATION.
6. SILT FENCE BARRIERS SHALL BE PLACED WITHIN ALL AREAS OF EXPOSED SLOPES TO CONTROL SOIL EROSION DURING AND AFTER CONSTRUCTION.
7. ALL STORM OUTFALLS SHALL RECEIVE RIP RAP IMMEDIATELY UPON INSTALLATION (AS PER PLAN).
8. EROSION CONTROL (ERO–MAT) OR APPROVED EQUAL, SHALL BE INSTALLED ON ALL 2:1 SLOPES: AN ORGANIC FIBER PROTECTIVE MAT, HALF INCH LAYER OF CHOPPED STRAW, KNITTED INTO A RUGGED MAT WITH A THIN NETTING OF PHOTODEGRADABLE POLYPROPYLENE. SECURE MAT TO SLOPE WITH 6" STEEL U–SHAPED STABLES, 2 STAPLES PER SQUARE YARD, OR AS PER MANUFACTURER'S INSTRUCTIONS.
9. STREAM REACHES ON–SITE AND DOWNSTREAM OF CONSTRUCTION SHALL NOT HAVE SUBSTANTIAL VISIBLE CONTRAST RELATIVE TO COLOR, TASTE, ODOR, TURBIDITY AND SEDIMENT DEPOSITION FROM THE REACHES UPSTREAM OF THE CONSTRUCTION ACTIVITY.
10. VEHICULAR ACCESS POINTS SHALL BE MONITORED AND INSPECTED AT THE SAME FREQUENCY AS EROSION CONTROL FEATURES TO INSURE THAT DEPOSITS OF SAND, SILT OR OTHER MATERIAL IS NOT BEING DEPOSITED ON PUBLIC ROADWAYS. IN THE EVENT ANY SIGNIFICANT DEPOSITS OCCUR THEY SHALL BE CLEANED UP IMMEDIATELY.
11. KEEP ALL CONSTRUCTION EQUIPMENT, TOPSOIL STOCKPILES AND ANY TEMPORARY/PERMANENT GRAVEL AREAS OFF FUTURE SEPTIC AREAS.

DISTURBANCE NOTE:
CONTRACTOR TO USE NECESSARY CONSTRUCTION METHODS AND SCHEDULING TO ENSURE THAT THE TOTAL DISTURBANCE ON THE SITE IS LIMITED TO LESS THAN 5 ACRES AT ANY ONE TIME.

SOIL RESTORATION:

AS PER CHAPTER 5 OF THE NEW YORK STATE STORMWATER MANAGEMENT DESIGN MANUAL, SOIL RESTORATION IS REQUIRED ON THIS SITE IN ALL NON–IMPERVIOUS AREAS ONCE FINAL SUBGRADE ELEVATION IS ACHIEVED. IN AREAS OF CUT OR FILL THE SOILS SHALL BE AERATED 6 INCHES OF TOPSOIL SHALL BE APPLIED. IN AREAS OF HEAVY CONSTRUCTION TRAFFIC (ESPECIALLY IN AREAS 5 TO 25 FEET FROM BUILDING, BUT NOT WITHIN 5 FEET OF FOUNDATION WALLS) THE FOLLOWING RESTORATION MUST BE 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 SOIL.
3. ROCK–PICK UNTIL UPLIFTED STONE/ROCK MATERIALS OF 4 INCHES AND LARGER SIZE ARE CLEANED OFF THE SITE.
4. APPLY TOPSOIL TO A DEPTH OF 6 INCHES
5. VEGETATE AS REQUIRED BY APPROVED PLAN.

4/12 STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. STONE SIZE – USE 2" CRUSHED STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – AS EFFECTIVE BUT NOT LESS THAN 50 FEET.
3. THICKNESS – NOT LESS THAN SIX(6) INCHES.
4. WIDTH – TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY–FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. FILTER CLOTH – WILL BE PLACED OVER ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. WASHING – WHEN NECESSARY, WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE THROUGH USE OF SAND BAGS, GRAVEL BOARDS OR OTHER APPROVED METHODS.
8. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DRIPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAY MUST BE REMOVED IMMEDIATELY.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

SILT FENCE INSTALLATION NOTES:

1. GEOTEXTILE FABRIC AND WOVEN WIREMESH TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACES EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES, FOLDED AND STAPLED.
4. MAINTENANCE SHALL BE PERFFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

SILT FENCE GENERAL NOTES:

1. SILT FENCE SHALL BE PLACED A MINIMUM OF 5 FT. FROM TOE OF SLOPE, 10 FT. PREFERRED, TO PROVIDE ADEQUATE AREA FOR SEDIMENT STORAGE AND FACILITATE MAINTENANCE OF SEDIMENT CONTAINMENT AREA.
2. POSTS MAY BE 1.25"x1.25" (MINIMUM) HARDWOOD, TYPICALLY. FOR WIRE MESH BACK USE 2"x2" NOM. HARDWOOD, OR STEEL "T" OR "U" POSTS (1lb per lf). SILT FENCE SHALL BE WOVEN GEOTEXTILE FABRIC(GEOTEX 2130 OR EQUAL).
3. SILT FENCE ASSEMBLIES MAY HAVE 4 FT, OR 6 FT, POST SPACING, AND MAY OR MAY NOT HAVE MESH REINFORCEMENT. SENSITIVE AREAS TO BE PROTECTED MAY NEED TO BE REINFORCED BY USING HEAVY WIRE FENCING FOR ADDED SUPPORT TO PREVENT COLLAPSE.
4. THE BOTTOM EDGE OF SILT FENCE SHALL BE BURIED A MINIMUM OF 6" BELOW GROUND. THE FENCE SHALL BE INSTALLED WITH THE POSTS ON THE DOWNSTREAM SIDE OF THE FABRIC.
5. MAXIMUM ALLOWABLE SLOPE LENGTHS CONTRIBUTING RUNOFF TO A SILT FENCE PLACED ON A SLOPE ARE:

SLOPE STEEPNESS	MAXIMUM LENGTH (ft.)
2:1	25
3:1	50
4:1	75
5:1 OR FLATTER	100

6. MAXIMUM DRAINAGE AREA FOR OVERLAND FLOW TO A SILT FENCE SHALL NOT EXCEED ¼ ACRE PER 100 FEET OF FENCE, WITH MAXIMUM PONDING DEPTH OF 1.5 FEET BEHIND THE FENCE; AND EROSION WOULD OCCUR IN THE FORM OF SHEET EROSION; AND THERE IS NO CONCENTRATION OF WATER FLOWING TO THE BARRIER.
7. MEASURES SHALL BE INSPECTED EVERY SEVEN (7) CALENDAR DAYS, AFTER EACH RAINFALL OF .5" OR MORE WITHIN A 12 HOUR PERIOD, OR DAILY DURING PROLONGED RAINFALL. MEASURES SHALL BE CLEANED AND REPAIRED AS REQUIRED.
8. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION REACHES ONE–THIRD OF THE MEASURE HEIGHT. SEDIMENT SHALL BE DISPOSED OF AS UNSUITABLE MATERIAL.

5/12 SILT FENCE
NOT TO SCALE

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PROPOSED MULTIFAMILY DEVELOPMENT
SECOND AVE APARTMENTS
KEVIN VANDENBURGH
1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
COUNTY OF RENSSELAER

TAX MAP ID: 70.64-1-1 & 70.56-1-6
SEPTEMBER 29, 2021

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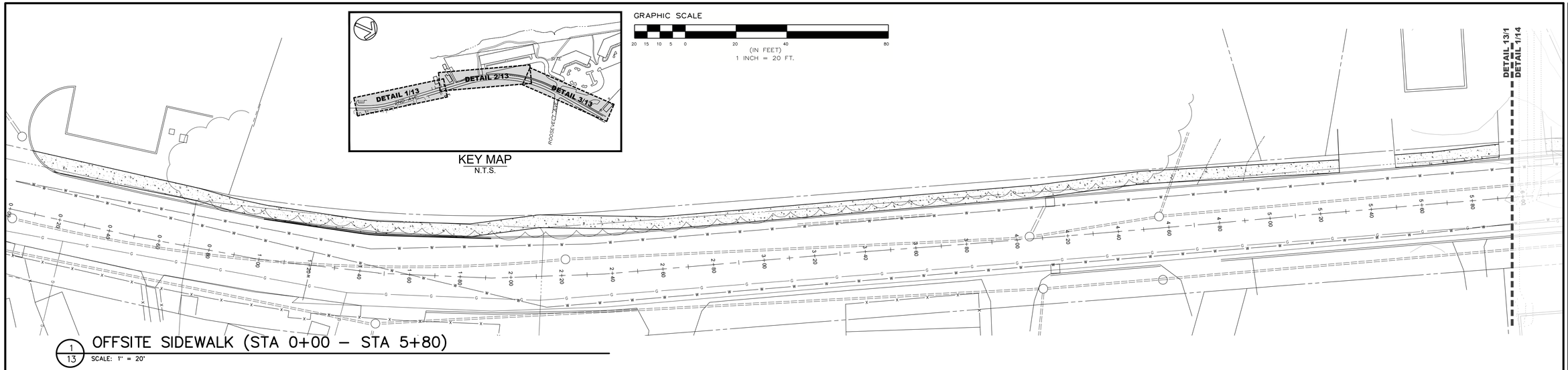
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SHEET TITLE: EROSION AND SEDIMENT CONTROL PLAN

SHEET: 12 of 17

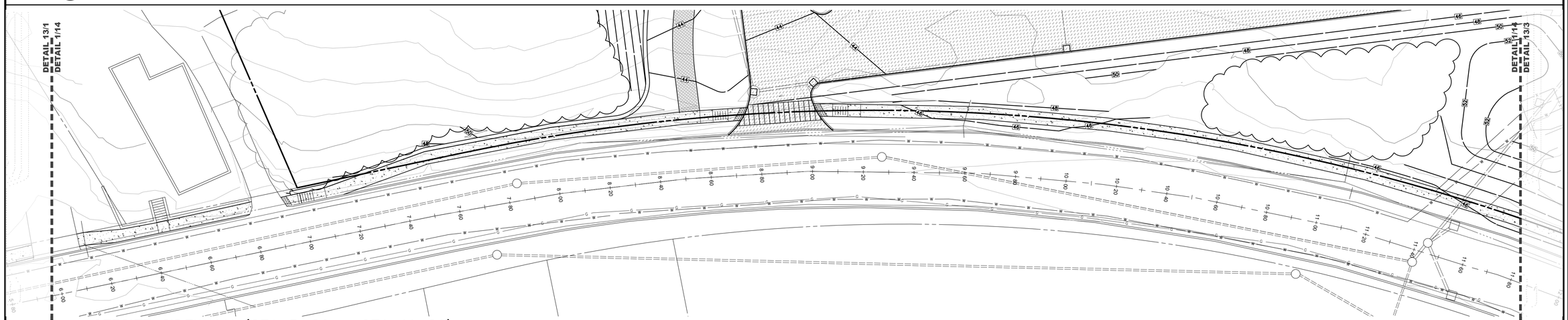
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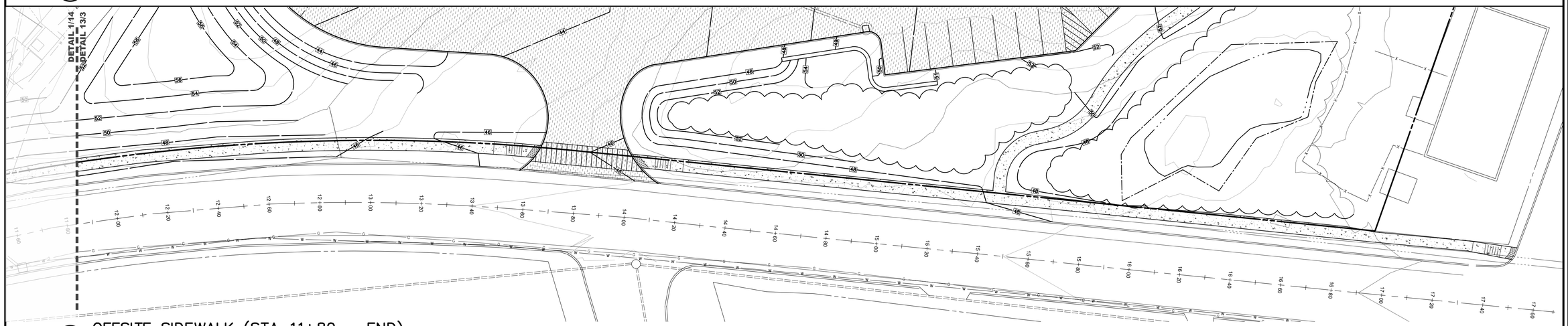
KEY MAP
N.T.S.

GRAPHIC SCALE
20 15 10 5 0 20 40 80
(IN FEET)
1 INCH = 20 FT.

1/13 OFFSITE SIDEWALK (STA 0+00 – STA 5+80)
SCALE: 1" = 20'



2/13 OFFSITE SIDEWALK (STA 5+80 – STA 11+80)
SCALE: 1" = 20'



3/13 OFFSITE SIDEWALK (STA 11+80 – END)
SCALE: 1" = 20'

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REVISION	DATE	BY

SCALE:
AS NOTED

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SHEET TITLE:
OFFSITE SIDEWALK PLAN

SHEET:
13 of 1

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GENERAL NOTES:

THE ENVIRONMENTAL DESIGN PARTNERSHIP IS NOT RESPONSIBLE FOR ANY CONSTRUCTION WORK PERFORMED PRIOR TO FINAL APPROVAL OF ALL PLANS AND SECURING OF ALL PERMITS AND FILING OF ALL MAPS.

CONTRACTOR TO ARRANGE A PRECONSTRUCTION CONFERENCE WITH THE ENVIRONMENTAL DESIGN PARTNERSHIP AND MUNICIPALITY PRIOR TO CONSTRUCTION.

FIELD ADJUSTMENTS MUST BE APPROVED BY THE ENVIRONMENTAL DESIGN PARTNERSHIP AND THE MUNICIPALITY'S ENGINEER PRIOR TO CONSTRUCTION.

CONTRACTOR IS TO VERIFY THAT ALL NECESSARY WORK PERMITS AND EASEMENTS ARE IN PLACE PRIOR TO COMMENCEMENT OF WORK.

THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS AND TAKE ALL SPECIAL TEMPORARY AND PERMANENT PRECAUTIONS NECESSARY TO ENSURE A STABLE AND SECURE JOB.

THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY TOWN, COUNTY OR STATE HIGHWAY CUT PERMITS.

THE CONTRACTOR SHALL SECURE ALL NECESSARY PERMITS AND EASEMENTS PRIOR TO CONSTRUCTION AND BECOME FAMILIAR WITH THE CONDITIONS OF EACH PERMIT.

THE CONTRACTOR SHALL PROTECT AND SUSTAIN IN NORMAL SERVICE ALL EXISTING UTILITIES, STRUCTURES, EQUIPMENT, ROADWAYS, AND DRIVEWAYS.

THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES AND RIGHT-OF-WAY PROPERTY LINES PRIOR TO CONSTRUCTION.

THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES SUCH AS GAS, POWER, TELEPHONE, CABLE TV, WATER, SEWER, ETC. PRIOR TO COMMENCEMENT OF CONSTRUCTION.

AS PER NYS INDUSTRIAL CODE 53: CONTRACTOR TO CALL DIG SAFELY NEW YORK, INC. AT 1-800-962-7962 TO LOCATE BURIED CABLES OR OTHER UNDERGROUND UTILITIES NO LESS THAN TWO OR MORE THAN TEN WORKING DAYS PRIOR TO DIGGING, DRILLING, EXCAVATING, DRIVING POSTS, ETC.

CONTRACTOR MUST VERIFY THE ACCEPTABILITY OF ALL CONSTRUCTION MATERIALS WITH MUNICIPALITY'S ENGINEER PRIOR TO ORDERING.

INSTALLATION AND MATERIAL SPECIFICATIONS FOR STORM SEWER, SANITARY SEWER, WATER SERVICE CONNECTIONS SHALL CONFORM TO THE MUNICIPALITY'S STANDARD DETAILS AND REQUIREMENTS. INSTALLATION PROCEDURES AND MATERIALS MUST BE VERIFIED WITH MUNICIPALITY PRIOR TO CONSTRUCTION.

ANY EXISTING STORM SEWERS AND UNDERGROUND UTILITIES ARE SHOWN IN THEIR RELATIVE POSITION AND FOR INFORMATION ONLY. THE CONTRACTOR SHALL HAVE THEIR EXACT LOCATION CHECKED AT THE SITE BEFORE CONSTRUCTION BEGINS.

CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING PIPE INVERT ELEVATIONS PRIOR TO COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCIES WHICH RESULT MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.

CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, GRADES, PIPE INVERTS AND ELEVATIONS AND REVIEW WITH CONSULTANT BEFORE CONSTRUCTION.

ALL EXCAVATION TO MEET OSHA AND NYS DOT SAFETY REGULATIONS AND STANDARDS.

THE CONTRACTOR SHALL FILL IN, AND RE-EXCAVATE, AS NECESSARY TO RESUME WORK, ANY EXCAVATIONS OR TRENCHES AT LOCATIONS AND AS OFTEN AS MAY BE REQUIRED TO ENSURE PROTECTION OF THE WORK, ANY ADJACENT EXISTING FACILITIES, OR THE PUBLIC.

THE CONTRACTOR SHALL CLEAN UP THE JOB SITE DAILY BEFORE LEAVING THE JOBSITE. ALL RUBBISH MUST BE CLEANED UP AND CONSTRUCTION EQUIPMENT MUST BE PROPERLY TAKEN CARE OF AND STORED AT THE END OF THE DAY.

CONTRACTOR IS RESPONSIBLE FOR TRAFFIC CONTROL AND SAFETY DURING CONSTRUCTION.

THE CONTRACTOR SHALL FURNISH ALL FLAGMEN AND SIGNS, DELINEATORS, BARRIERS, AND DEVICES NECESSARY FOR TRAFFIC CONTROL DURING ANY EARTH-MOVING OPERATION OR OTHER CONSTRUCTION ACTIVITY WHICH INVOLVES PUBLIC HIGHWAYS.

ALL TRAFFIC SIGNS, CONTROL DEVICES AND INFORMATIONAL ITEMS, IF DISTURBED DURING CONSTRUCTION WITHIN CONTRACT LIMIT LINES, SHALL BE RELOCATED AS PER APPROVAL OF MUNICIPALITY.

RESTORATION OF PAVEMENT IS THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR SHALL REPLACE AND RESTORE PAVEMENT WITH MATERIAL TO A CONDITION EQUAL TO OR BETTER THAN PRECONSTRUCTION CONDITIONS. ALL PAVEMENT AND RIGHT-OF-WAY RESTORATION WORK TO BE DONE TO THE SATISFACTION OF THE STATE, COUNTY OR LOCAL MUNICIPAL HIGHWAY DEPARTMENT.

CONTRACTOR SHALL RESTORE ALL LAWNS, DRIVEWAYS, WALKS, WALLS, CURBS, FENCES, ETC. TO A CONDITIONS AT LEAST AS GOOD AS THEY WERE BEFORE BEING DISTURBED.

BOX ALL TREES AND HOUSE ALL SHRUBS AND HEDGES BEFORE PLACING EARTH AGAINST OR NEAR THEM. SHRUBS AND HEDGES THAT MUST BE REMOVED DURING CONSTRUCTION SHALL BE HEALED OR REPLANTED IN AS GOOD A CONDITION AS THEY WERE BEFORE THEIR REMOVAL. ANY DAMAGED ITEMS SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

POSTS, MAILBOXES, ETC. SHALL BE PROTECTED, OR REMOVED AND REPLACED EXACTLY AS THEY WERE BEFORE BEING DISTURBED. DAMAGED ITEMS SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

IT MAY BE NECESSARY TO TIE OR HOLD BACK UTILITY POLES DURING CONSTRUCTION. THIS SHOULD BE ACCOMPLISHED IN COOPERATION WITH UTILITY COMPANIES.

NO WORK, STORAGE OR TRESPASS SHALL BE PERMITTED BEYOND THE BOUNDARIES OF ANY EASEMENTS OR R.O.W. AS SHOWN.

CONTRACTOR TO COMPLY WITH ALL OSHA AND OTHER STATE AND LOCAL SAFETY REQUIREMENTS DURING CONSTRUCTION (PROPER SHORING, ETC.).

SIDE SLOPES GREATER THAN 1:3 WILL REQUIRE GUIDE RAILS (1-FOOT VERTICAL, 3-FOOT HORIZONTAL).

ALL SITE WORK SHALL BE SMOOTHLY AND EVENLY BLENDED INTO EXISTING CONDITIONS. WHERE ACCESS OR WORK OUTSIDE OF PROPERTY BOUNDARY IS NECESSARY, THE PERMISSION OF ADJOINING PROPERTY OWNER MUST FIRST BE OBTAINED.

SITE SURVEYOR TO VERIFY ELEVATIONS OF EXISTING ROAD CENTERLINE AND SHOULDER PRIOR TO COMMENCING WORK. CONTRACTOR IS TO CONFIRM THIS WITH SITE SURVEYOR.

WHERE APPROPRIATE, SITE LAYOUT AND GRADING WORK SHALL BE COMPLETED BY A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR. LANDSCAPE ARCHITECT SHALL APPROVE ALL LAYOUT WORK PRIOR TO CONSTRUCTION.

CONTRACTOR TO NOTIFY ENGINEER AFTER ROUGH GRADING IS COMPLETED. FINISH GRADES TO BE ADJUSTED IN THE FIELD AFTER INITIAL GRADING IS COMPLETED. ALL CHANGES IN PROPOSED GRADES TO BE APPROVED BY OWNER AND ENGINEER.

ALL AREAS OF THE SITE WHICH ARE DISTURBED AND NOT PAVED SHALL BE TOPSOILED AND SEEDED.

ALL PHYSICAL FEATURES INCLUDING SIDEWALKS, CURBING, DECKS, LAMPS, STAIRS, ETC. WITHIN FIVE FEET OF EXTERIOR BUILDING WALLS AND CANOPY OVERHANGS ARE TO BE CONSTRUCTED PER ARCHITECTURAL PLANS. IT IS NOT THE INTENT OF THESE DOCUMENTS TO ADDRESS SUCH DETAILS, WHICH ARE SHOWN ONLY FOR THE PURPOSE OF CONTINUITY BETWEEN THE SITE PLAN AND THE ARCHITECTURAL PLANS.

PROVISIONS FOR STORMWATER COLLECTION AND DRAINAGE PERTAINING TO THE ROOF AND TO PHYSICAL FEATURES WITHIN FIVE FEET OF THE EXTERIOR BUILDING WALLS AND CANOPY OVERHANGS ARE THE RESPONSIBILITY OF THE ARCHITECT.

ALL VERTICAL GRADE CHANGES GREATER THAN 30 INCHES SHALL BE PROVIDED WITH SAFETY BARRIERS AS PER NYS BUILDING CODE (FENCES, RAILINGS, ETC. PER OWNER).

PRELIMINARY PAVEMENT AND SIDEWALK DESIGN SPECIFICATIONS ASSUME EXISTING SUBGRADE CONSISTS OF CLEAN, GRANULAR MATERIAL (SAND & GRAVEL) AND THAT THERE IS NO WATER TABLE INTERFERENCE. PRIOR TO CONSTRUCTION, THE PROJECT OWNER SHALL HAVE THE EXISTING SUBGRADE CONDITIONS EVALUATED BY A GEOTECHNICAL ENGINEER, WHO SHALL DETERMINE FINAL PAVEMENT AND SIDEWALK DESIGN SPECIFICATIONS. THE OWNER ASSUMES ALL RESPONSIBILITY FOR PAVEMENTS AND SIDEWALKS CONSTRUCTED WITHOUT A FINAL DESIGN, SHOULD HE CHOOSE NOT TO HIRE A GEOTECHNICAL ENGINEER.

ROADWAYS AND UNDERGROUND UTILITY FILL AREAS SHALL BE CONTROLLED FILLS PREPARED IN GENERAL ACCORDANCE WITH NYSDOT STANDARD SPECIFICATIONS 203, EXCAVATION AND EMBANKMENT.

FILL AREAS SHALL BE STRIPPED OF SOD, TOPSOIL AND UNSUITABLE MATERIAL AND BE MECHANICALLY COMPACTED TO THE SATISFACTION OF THE ENGINEER IN ACCORDANCE WITH NYSDOT 203-3.03.A.

FILLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH NYSDOT 230-3.03.B, EMBANKMENTS. COMPACTION AND LIFT THICKNESS SHALL BE IN ACCORDANCE WITH NYSDOT 230-3.03.C. UNDERWATER AREAS SHALL BE FILLED WITH SELECT GRANULAR FILL.

CONTROLLED FILL SHALL BE WITH SELECT GRANULAR MATERIAL WITH GRADATION: 100% PASSING 4" SIEVE, 0-70% PASSING #40 AND 0-12% PASSING #200 AND MEET NYSDOT STD SPEC 733-11. FILLS SHALL BE PLACED IN LIFTS NOT TO EXCEED 12" LOOSE THICKNESS AND SHALL BE MECHANICALLY COMPACTED TO 95% MINIMUM OF THE MAXIMUM ASTM SPECIFICATION D1557 DENSITY (MODIFIED PROCTOR). ALL CONTROLLED FILL SHALL BE FREE OF ORGANIC, CLODS AND/OR FROZEN MATERIALS

EMBANKMENT SUBGRADE AREA (TWO FEET BELOW SUBGRADE ELEVATION) SHALL BE CONSTRUCTED IN ACCORDANCE WITH NYSDOT 230-2.02.B., SELECT BORROW AND SELECT FILL, COMPACTED PER 203-3.03.C.

ALL AREAS OF THE SUBGRADE SURFACE WITHIN THE ROADWAY OR OTHER PAVEMENT AREA LIMITS SHALL BE PROOF-ROLLED, WITH UNSTABLE AREAS CORRECTED TO THE SATISFACTION OF THE ENGINEER, PRIOR TO PLACEMENT OF SUBBASE MATERIALS, BOTH EMBANKMENT AND CUT AREAS, IN ACCORDANCE WITH NYSDOT 203-3.03.D & 203-3.02.C.

FILL SPECIFICATIONS ARE CONSIDERED MINIMAL AND ARE SUBJECT TO CHANGE UPON DISCOVERY OF UNFAVORABLE SITE SOIL CONDITIONS AND/OR BY A GEOTECHNICAL ENGINEER RETAINED BY THE OWNER/DEVELOPER.

SPECIFICATIONS FOR STREET/SITE LIGHTING ARE PER TOWN REQUIREMENTS/QUALIFIED PHOTOMETRIC ENGINEER RETAINED BY OWNER.

ALL GRAVITY SANITARY SEWER PIPE AND FITTINGS SHALL BE PVC SDR-26 HEAVY WALL SEWER PER ASTM D3034, 115 PSI MINIMUM PIPE STIFFNESS FOR BURIAL DEPTHS UP TO 20 FEET.

PRIOR TO COMMENCEMENT OF STORM AND/OR SANITARY SEWER CONSTRUCTION, CONTRACTOR IS TO VERIFY BOTH HORIZONTAL AND VERTICAL POSITION OF EXISTING SEWER AT THE CONNECTION POINT.

THE CONTRACTOR IS RESPONSIBLE TO FURNISH AND INSTALL SANITARY MANHOLES SUCH THAT THEY DO NOT INFILTRATE WATER AS DETERMINED BOTH BY VACUUM TESTING IN ACCORDANCE WITH ASTM C1244-05 PRIOR TO BACKFILLING AND VISUALLY THEREAFTER. ALL PIPES SHALL BE PLUGGED, BRACED, AND/OR BLOCKED TO PREVENT IMPLOSION DURING VACUUM TESTING. THE CONTRACTOR SHALL MAKE ALL MATERIAL REPLACEMENTS AND/OR REPAIRS TO ACCOMPLISH THIS.

PRESSURE SEWER MAIN PIPE SHALL BE: PR 200 PSI MIN. WHITE OR GREEN COLORED (NOT BLUE) PVC SDR-21*, PE 4710 DIPS DR-11 (PR 200 PSI) GREEN STRIPE. LOW-PRESSURE SEWER SERVICE PIPE SHALL BE: PR 200 PSI MIN. GASKETED (1-1/2" MIN.) PVC SDR-21*, PE 4710 GREEN-SHELL OR GREEN STRIPE IPS (ASTM D3035) DR-11 OR CTS SDR-9 (ASTM D2737) UPSIZED ½-INCH OR AS NOTED ON THE PLANS. *EXCEPTION: PVC IS NOT ALLOWED TO BE USED ON SARATOGA COUNTY SEWER DISTRICT NO. 1 PERMITTED PROJECTS.

ALL PRESSURE SANITARY SEWER PIPE SHALL BE BURIED WITH TRACER WIRE SECURED TO THE PIPE WITH GORRILLA TAPE. TRACER WIRE SHALL BE 12 AWG, SINGLE CONDUCTOR, HIGH STRENGTH, FLEXIBLE, STRANDED STAINLESS STEEL WITH HMWPE GREEN-COLORED INSULATION SUCH AS #10 AS MANUFACTURED BY KRIS-TECH WIRE CO. MAIN BRANCHES AND SERVICE CONNECTIONS SHALL BE MADE WITHOUT CUTTING THE MAIN WIRE, USING 3-WAY DIRECT-BURY LUGS WITH SILICONE GEL ENCAPSULATOR. SPLICES AT ROLL ENDS SHALL BE MECHANICALLY AND ELECTRICALLY FASTENED BY TYING WIRE IN A KNOT AND CONNECTING EXPOSED CONDUCTORS IN SILICONE GEL TWIST ENCAPSULATORS. DIRECT-BURY TRACER WIRE CONNECTORS SUCH AS DRYCONN CONNECTORS BY COPPERHEAD INDUSTRIES, LLC. TRACER WIRE SHALL BE BROUGHT UP 12" MIN. ABOVE GRADE ON THE OUTSIDE OF ALL GATE & CURB BOXES.

ALL SEWER PIPE SHALL HAVE 6-INCH WIDE, GREEN-COLORED PLASTIC SEWER UTILITY I.D. MARKING TAPE BURIED ON TOP OF THE COMPACTED INITIAL PIPE BACKFILL, 12" MIN. ABOVE THE PIPE.

SANITARY PRESSURE SEWERS, BOTH FORCE MAINS AND SERVICES, SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH WATER MAIN LEAKAGE TESTING STANDARDS, AT MINIMUM 120 PSIG AS MEASURED AT THE LOWEST POINT OF THE LINE(S) BEING TESTED, 150 PSIG WHERE ANY POTABLE WELL IS, OR IS LIKELY TO BE, WITHIN 50 FEET OF FORCE MAIN. AWWA: C600-17, FOR DUCTILE IRON PIPE, MANUAL M23 FOR PVC, AND MANUAL M55 FOR PE.

NEW GRAVITY SANITARY SEWER WORKS SHALL BE CLEANED WITH WATER JET AND VACUUM FLUSHING/COLLECTION EQUIPMENT PRIOR TO CCTV INSPECTION AND REPEATED AS NECESSARY UNTIL CLEAN, WITH ALL SOLIDS REMOVED. ALL DEBRIS SHALL BE VACUUMED OUT DURING FLUSHING OPERATIONS AND DISPOSED OF OFF SITE.

NEW GRAVITY SANITARY SEWER WORKS SHALL BE INSPECTED FOR DEFECTS BY CLOSED-CIRCUIT TELEVISION (CCTV) EQUIPMENT. REPAIRED WORKS SHALL BE RE-CLEANED AND RE-INSPECTED BY CCTV. THREE SETS OF RECORD DIGITAL VIDEO FILES AND WRITTEN INSPECTION REPORTS SHALL BE FURNISHED TO THE ENGINEER.

ALL DISCERNABLE GRAVITY SEWER DIPS (DEVIATIONS FROM CONTINUOUS POSITIVE VERTICAL ALIGNMENT) IN EXCESS OF 1/4"ESTIMATED OR ACTUAL DEPTH AND/OR DIPS GREATER THAN 3-LF IN LENGTH SHALL BE CORRECTED AT NO ADDITIONAL COST TO THE OWNER.

WATER AND SEWER SEPARATION REQUIREMENTS:
MINIMUM 18 INCHES VERTICAL SEPARATION IS REQUIRED BETWEEN WATER MAINS AND ANY EXISTING OR PROPOSED SANITARY AND STORM SEWER AT ALL CROSSINGS, MEASURED OUTSIDE TO OUTSIDE OF PIPES, WITH JOINTS EQUIDISTANT FROM CROSSING POINT, PER NY STATE HEALTH DEPARTMENT REQUIREMENTS. PARALLEL LINES MUST BE SEPARATED A MIN. OF 10 FEET.

WHERE MINIMUM SEPARATIONS CANNOT BE MET, WITH CASE-BY-CASE-APPROVAL FROM NYS DOH:
- NEW SEWERS SHALL BE CONSTRUCTED OF MIN. PR 150 PSI AWWA WATER GRADE MATERIALS AND SHALL BE PRESSURE TESTED TO ENSURE WATER TIGHTNESS.
- LESS THAN 10 FT. SEPARATION ONLY IF WATER MAIN IS LAID IN A SEPARATION TRENCH OR ON AN EARTH SHELF LOCATED ON ONE SIDE OF THE SEWER AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18" ABOVE THE TOP OF THE GRAVITY SEWER.
- WHERE FORCE AND GRAVITY SEWERS PRE-EXIST: THE WATER MAIN SHALL BE INSTALLED WITHIN A PROTECTIVE CASING PIPE, CONSTRUCTED OF MIN. PR 150 PSI AWWA WATER GRADE MATERIALS, AND EXTEND 10 FT. MIN. ON BOTH SIDE OF THE SEWER BEING CROSSED OR, WHERE PARALLEL, TO A POINT WHERE THE LINES ARE SEPARATED BY 10 FT.
- WHERE A WATER MAIN AND/OR WATER WELLS PRE-EXIST AND A FORCE MAIN IS BEING CONSTRUCTED: THE FORCE MAIN SHALL BE INSTALLED WITHIN A PROTECTIVE CASING PIPE, CONSTRUCTED OF MIN. PR 150 PSI AWWA WATER GRADE MATERIALS, AND EXTEND 10 FT. MIN. ON BOTH SIDES OF THE WATER MAIN BEING CROSSED; WHERE PARALLEL, TO A POINT WHERE THE LINES ARE SEPARATED BY 10 FT.; OR TO A POINT WHERE THE ENDS OF THE CASING PIPE ARE 150 FT. MIN. FROM ANY WATER WELL.

CONTRACTOR TO VERIFY THE ELEVATION OF THE EXISTING WATER MAIN, TO AVOID CONFLICTS, PRIOR TO CONSTRUCTING OTHER UTILITIES.

ALL NEW WATER MAIN WORKS ARE TO BE HYDROSTATICALLY TESTED AT 150 PSIG MIN. (AS MEASURED AT THE LOWEST POINT) IN ACCORDANCE WITH AWWA STANDARDS: C600-17 FOR DUCTILE IRON PIPE, MANUAL M23 FOR PVC, AND MANUAL M55 FOR PE. RESULTS TO BE SUBMITTED TO MUNICIPAL ENGINEER. MODIFICATIONS TO EXISTING WORKS SHALL BE VISUALLY TESTED FOR LEAKS UNDER NORMAL WORKING PRESSURE PRIOR TO BACKFILL.

ALL WATER MAIN WORKS SHALL BE DISINFECTED AND BACTERIOLOGICALLY TESTED IN ACCORDANCE WITH AWWA STANDARD C651-14 (SEE DISINFECTION PROCEDURE ON WATER DETAIL SHEET). RESULTS TO BE SUBMITTED TO THE MUNICIPAL ENGINEER.

POTABLE WATER MAIN PIPE TO BE:
- DUCTILE IRON PIPE, CLASS 52 OR 50;
- BLUE-COLORED PVC DR-18 AWWA C-900;
- WHITE OR BLUE-COLORED PVC OR PVCO SDR-21;
- PE 4710 IPS OR DIPS, DR-11 (PR 200 PSI) BLUESTRIPE AWWA C-906

POTABLE WATER SERVICE TUBING TO BE:
- TYPE K COPPER
- PE 4710 BLUE WATER SERVICE TUBING (CTS) ASTM D2737 SDDR-9
- COMMERCIAL SERVICE > 3" DIA.

ALL PLASTIC WATER MAIN AND WATER SERVICE TUBING SHALL BE BURIED WITH TRACER WIRE SECURED TO THE PIPE WITH GORILLA TAPE. BLUE-COLORED #10 BY KRIS-TECH WIRE CO. MAIN BRANCHES AND SERVICE CONNECTIONS SHALL BE MADE WITHOUT CUTTING THE MAIN WIRE, USING 3-WAY DIRECT-BURY LUGS WITH SILICONE GEL ENCAPSULATOR. SPLICES AT ROLL ENDS SHALL BE MECHANICALLY AND ELECTRICALLY FASTENED BY TYING WIRE IN A KNOT AND CONNECTING EXPOSED CONDUCTORS IN SILICONE GEL TWIST ENCAPSULATORS. DIRECT-BURY TRACER WIRE CONNECTORS SUCH AS DRYCONN CONNECTORS BY COPPERHEAD INDUSTRIES, LLC. TRACER WIRE SHALL BE BROUGHT UP 12" MIN. ABOVE GRADE ON THE OUTSIDE OF ALL HYDRANTS, GATE & CURB BOXES.

ALL WATER PIPE SHALL HAVE 6-INCH WIDE, BLUE-COLORED PLASTIC WATER UTILITY I.D. MARKING TAPE BURIED ON TOP OF THE COMPACTED INITIAL PIPE BACKFILL, 12" MIN. ABOVE THE PIPE.

THRUST BLOCKING TO COMPLY WITH THE MUNICIPAL STANDARDS. THRUST BLOCKS TO BE CAST-IN-PLACE CONCRETE MIN. 3,000 PSI (SEE DETAIL).

ALL STORM SEWER PIPE TO BE DUAL WALL HIGH-DENSITY POLYETHYLENE WITH SMOOTH INTERIOR AND ANNULAR CORRUGATED EXTERIOR. PIPE JOINTS ARE TO BE SILT-TIGHT WITH EITHER INTEGRAL BELL & SPIGOT JOINTS WITH RUBBER GASKETS MEETING ASTM F477, SILT-TIGHT PREMIUM BAND COUPLERS WITH RUBBER GASKETS OR STANDARD BAND COUPLERS WRAPPED WITH NON-WOVEN GEOTEXTILE FABRIC 4-FEET WIDE AND OVERLAPPED AT EACH END. WATERTIGHT JOINTS ARE REQUIRED WHERE PE PIPE IS SPECIFIED FOR SMA BASIN INLET PIPE AND FITTINGS.

CATCH BASIN GRATES ARE TO BE BICYCLE SAFE.

THE INFORMATION REPRESENTED WITHIN THESE DOCUMENTS DOES NOT IMPLY ANY CONTRACT WITH, OR OBLIGATION FOR, PERFORMING ANY OR ALL TOWN, COUNTY, OR STATE REQUIRED INSPECTIONS DURING THE COURSE OF CONSTRUCTION OR PURSUANT TO OBTAINING CERTIFICATE OF OCCUPANCY. SUCH INSPECTION SERVICES, IF PERFORMED BY THIS OFFICE, SHALL BE ESTABLISHED BY SEPARATE CONTRACT.

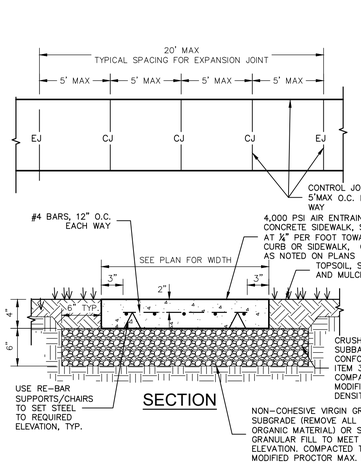
IN THE EVENT THAT THE CONSTRUCTION STAKEOUT AND INSPECTION OF THE WORK IS NOT PERFORMED BY THE ENVIRONMENTAL DESIGN PARTNERSHIP (EDP), EDP WILL NOT BE HELD RESPONSIBLE FOR ANY ERRORS, OMISSIONS, COSTS, EXPENSES OR LIABILITY OF WHATEVER KIND AND NATURE RESULTING FROM FIELD CHANGES AND/OR ERRORS WHICH EDP WOULD OTHERWISE HAVE HAD AN OPPORTUNITY TO CHECK AND CORRECT WERE THEY IN A POSITION TO CONTROL THE PROJECT THROUGH STAKEOUT AND INSPECTION.

CLAIMS MADE AGAINST CONSULTANT FOR SURVEY STAKEOUT ERRORS WILL BE HONORED ONLY IF CONSULTANT IS NOTIFIED FOR VERIFICATION OF THE ERROR IMMEDIATELY UPON DISCOVERY AND BEFORE ANY CONTROL STAKES ARE DISTURBED. IF, AFTER VERIFICATION, IT IS DETERMINED THAT NO STAKEOUT ERROR OCCURRED, THE CLIENT SHALL REIMBURSE THE CONSULTANT FOR ADDITIONAL EXPENSES INCURRED FOR SUCH VERIFICATION.

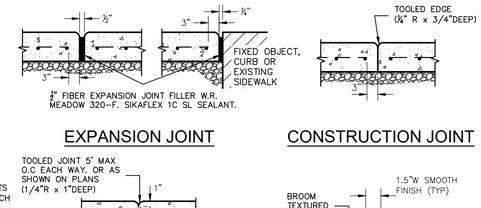
ALL ERRORS, OMISSIONS AND DISCREPANCIES MUST BE BROUGHT TO THE ATTENTION OF THE ENVIRONMENTAL DESIGN PARTNERSHIP IMMEDIATELY UPON DISCOVERY, OTHERWISE, THE ENVIRONMENTAL DESIGN PARTNERSHIP WILL ACCEPT NO RESPONSIBILITY.

INSPECTION SERVICES BY THE ENVIRONMENTAL DESIGN PARTNERSHIP ARE NOT SUPERVISORY. ACCORDINGLY, THE ENVIRONMENTAL DESIGN PARTNERSHIP CAN NEITHER GUARANTEE THE PERFORMANCE OF THE CONSTRUCTION CONTRACTS BY CONTRACTORS NOR ASSUME RESPONSIBILITY FOR THE CONTRACTOR'S FAILURE TO FURNISH AND PERFORM WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

CONTRACTOR SHALL OBTAIN A PERMIT FROM SARATOGA COUNTY SEWER DISTRICT NO. 1 PRIOR TO CONSTRUCTION OF ANY PROPOSED SANITARY SEWER LINES AND FOLLOW ALL PERMIT PROCEDURES DURING CONSTRUCTION.

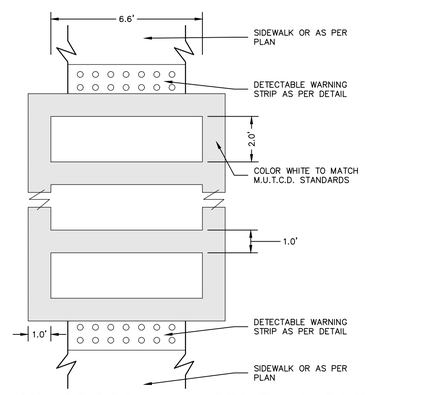


1/14 CONCRETE SIDEWALK
NOT TO SCALE

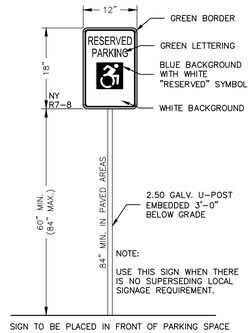


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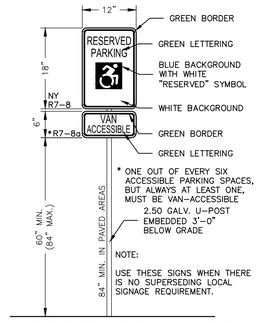
1. ALL CONCRETE SHALL BE CAST-IN-PLACE 4,000 PSI AIR-ENTRAINED PORTLAND CEMENT TYPE A MIX IN ACCORDANCE WITH NYS DOT SPEC. SECTION 501.
2. ALL EXPOSED SURFACED SHALL HAVE A BROOM TEXTURED FINISH & TOOLED EDGES. TOOL SHALL BE PROVIDE MAX 1-1/2" WIDE SMOOTH TROWEL FINISH ON SIDES AND AT JOINT.
3. EXPANSION JOINTS SHALL BE LOCATED A MAXIMUM OF 20' ON CENTER, OR AS INDICATED ON PLANS.
4. JOINTS SHALL NOT BE SAW-CUT.
5. APPLY SONOCRETE KURE-N-SEAL WB COMPOUND WITH FUGITIVE RED-DYE, OR APPROVED EQUAL, WHILE CONCRETE IS STILL DAMP.
6. THIS PRELIMINARY SIDEWALK DESIGN ASSUMES THAT EXISTING SUBGRADE CONDITIONS CONSIST OF CLEAN GRANULAR MATERIAL (SAND & GRAVEL) AND THAT THERE IS NO WATER TABLE INTERFERENCE. PRIOR TO CONSTRUCTION, THE OWNER SHALL VERIFY THE EXISTING SUBGRADE CONDITIONS USING A GEOTECHNICAL ENGINEERING CONSULTANT, TO DETERMINE THE FINAL PAVEMENT DESIGN.



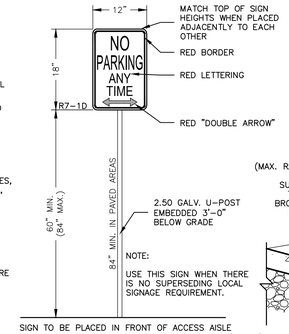
4/14 CROSSWALK STRIPING DETAIL
NOT TO SCALE



SIGN TO BE PLACED IN FRONT OF PARKING SPACE

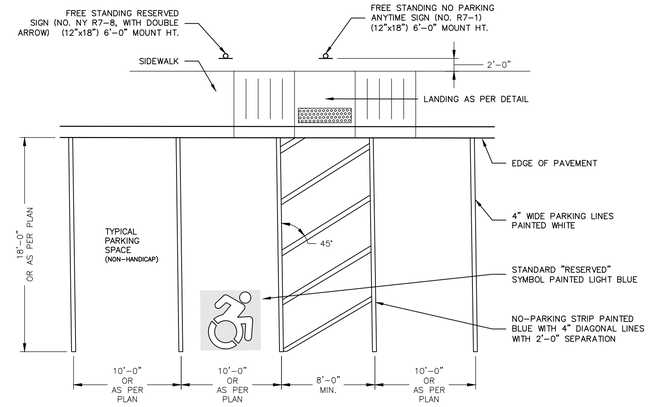


SIGN TO BE PLACED IN FRONT OF PARKING SPACE

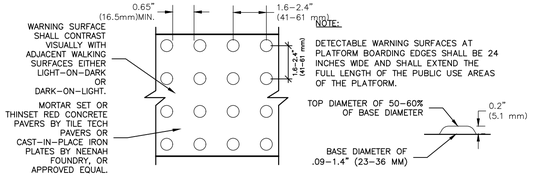


SIGN TO BE PLACED IN FRONT OF ACCESS AISLE
NOTE: AS PER NYS BUILDING CODE STANDARDS (NYSBC)

2/14 ADA ACCESSIBLE PARKING SIGNAGE (NYSBC)
NOT TO SCALE



3/14 PARKING STRIPING AND DIMENSIONING
NOT TO SCALE


0.65" (16.5mm) MIN.
1.6-2.4" (41-61 mm)
NOTE:
WARNING SURFACE SHALL CONTRAST VISUALLY WITH ADJACENT WALKING SURFACES EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT.
DETECTABLE WARNING SURFACES AT PLATFORM BOARDING EDGES SHALL BE 24 INCHES WIDE AND SHALL EXTEND THE FULL

STONE NOTES:

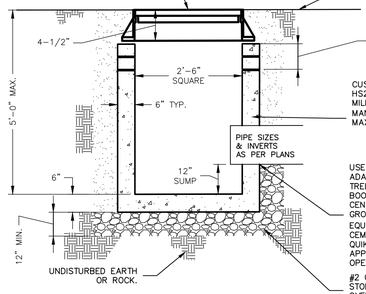
1. ALL STONE SUBBASE AND BEDDING LOCATED IN AREAS TO BE PAVED SHALL BE WRAPPED IN A NON-WOVEN GEOTEXTILE FABRIC ENVELOPE (SUCH AS GEOTEX 451 BY PROPEX OR APPROVED EQUAL).
2. WHERE A SUBGRADE GROUNDWATER CONDITION EXISTS WITH MIGRATING SANDS AND/OR SILTS, ALL STONE SHALL BE WRAPPED AS PER NOTE 1 ABOVE.

AGGREGATE NOTES:

1. ALL STONE SHALL BE CRUSHED-TYPE AND MEET NYS DOT STD. SPECIFICATIONS 703-02, COARSE AGGREGATE.
2. SELECT GRANULAR FILL SHALL MEET NYS DOT STD. SPECIFICATIONS 703-01, FINE AGGREGATE AND 733-11 EXCEPT WITH THE FOLLOWING GRADATION

100%	PASSING 1-1/2" SIEVE
0%-70%	PASSING #40 SIEVE
0%-12%	PASSING #200 SIEVE

CATCH BASIN FRAME & GRATE OR SOLID COVER WHERE SPECIFIED: MODEL R-3561 BY NEENAH FOUNDRY CO. OR CT. NO.'S 5419Z FRAME & 5419M GRATE BY EJIW OR APPROVED EQUAL. MIN. 30" SQUARE OPENING GRATES TO BE BICYCLE SAFE



FINISH GRADE PAVE OR TOPSOIL AND SEED AS SHOWN ON PLAN. SURFACE TO BE GRADED TO PROVIDE POSITIVE DRAINAGE TO GRATE AND AS REQUIRED TO PREVENT SOIL EROSION INTO BASIN.

PRE-CAST CONCRETE GRADE ADJUSTMENT EXTENSIONS AS MANUFACTURED BY FORT MILLER CO., INC., TYPICAL HEIGHT AS REQUIRED, 4" MIN. TO 10" MAX. SEAL ALL JOINTS WITH ¾" MIN. THICKNESS CEMENTITIOUS STRUCTURAL GROUT (8,000 PSI MIN.) SUCH AS QUIKRETE NON-SHRINK, PRECISION (P/N 1585-00) OR APPROVED EQUAL.

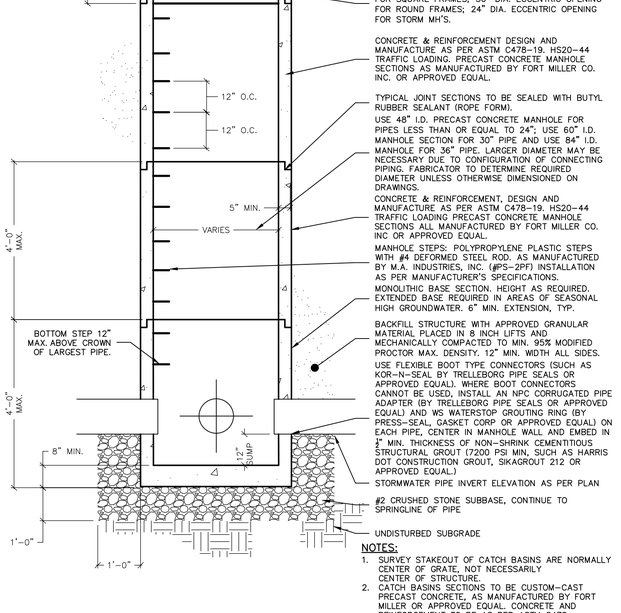
CUSTOM CAST MONOLITHIC REINFORCED CONCRETE CATCH BASIN, HS20-44 TRAFFIC LOADING, TYPICAL, AS MANUFACTURED BY FORT MILLER CO., INC. CONCRETE & REINFORCEMENT, DESIGN AND MANUFACTURE PER ASTM C890/C913. HEIGHT AS REQUIRED, 5'-0" MAX. INSIDE HEIGHT.
EXTENDED MODIFIED MONOLITHIC BASE REQUIRED WHEN USED FOR SMA OUTLET STRUCTURE AND IN AREAS OF HIGH GROUNDWATER. 6" MIN. EXTENSION, TYP.

USE FLEXIBLE BOOT TYPE CONNECTORS WITH CORRUGATED PIPE ADAPTERS (CGA) FOR PE PIPE SUCH AS KOR-N-SEAL BY TRELLEBORG PIPE SEALS OR APPROVED EQUAL, TYP. WHERE BOOT CONNECTORS CANNOT BE USED; INSTALL CGA ON PIPE, CENTERED IN STRUCTURE WALL; CLAMP WS WATERSTOP GROUTING RING (BY PRESS-SEAL GASKET CORP. OR APPROVED EQUAL) ON CGA AND EMBED IN ¾" MIN. THICKNESS NON-SHRINK CEMENTITIOUS STRUCTURAL GROUT (7200 PSI MIN.) SUCH AS, QUIKRETE NON-SHRINK PRECISION GROUT, SIKAGROUT 212, APPROVED EQUAL, OR HYDRAULIC CEMENT. FILL ENTIRE WALL OPENING TO FULL WALL THICKNESS.

#2 CRUSHED STONE SUBBASE, 12" MIN. DEPTH, CONTINUE STONE TO SPRINGLINE OF PIPES. FOR UNSTABLE SUBGRADE, OVER-EXCAVATE AND INSTALL ADDITIONAL STONE AS NECESSARY TO STABILIZE.

1/15 SHALLOW CATCH BASIN

NOT TO SCALE



STANDARD HEAVY DUTY CAST IRON FRAME & GRATE, BY NEENAH FOUNDARY CO. OR APPROVED EQUAL. GRATES TO BE BICYCLE SAFE. FRAME: R-3561 (FOR PAVED AREAS) USE PATTERN NO. R-2558 FOR LAWN AREAS OR WHERE ROUND GRATES ARE REQUIRED. USE NO. R-1556 FRAME & COVER FOR 24" DIA. STORM MH.

USE 30" SQUARE GRADE EXTENSIONS FOR R-3561, OR 30" ROUND I.D. GRADE RINGS FOR R-2558, OR 24" ROUND I.D. GRADE RINGS FOR R-1556. SEAL ALL GRADE EXTENSIONS JOINTS, INCLUDING TOP SLAB AND C.I. FRAME WITH ¾" MIN THICKNESS CEMENTITIOUS STRUCTURAL CONCRETE GROUT (8,000 PSI MIN) SUCH AS QUIKCRETE NON-SHRINK PRECISION GROUT (PRODUCT NO. 1585-00),OR APPROVED EQUAL.

HEAVY DUTY COVER- 30" SQ. ECCENTRIC OPENING FOR SQUARE FRAMES; 30" DIA. ECCENTRIC OPENING FOR ROUND FRAMES; 24" DIA. ECCENTRIC OPENING FOR STORM MH'S.

CONCRETE & REINFORCEMENT DESIGN AND MANUFACTURE AS PER ASTM C478-19. HS20-44 TRAFFIC LOADING. PRECAST CONCRETE MANHOLE SECTIONS AS MANUFACTURED BY FORT MILLER CO. INC. OR APPROVED EQUAL.

TYPICAL JOINT SECTIONS TO BE SEALED WITH BUTYL RUBBER SEALANT (ROPE FORM).

USE 48" I.D. PRECAST CONCRETE MANHOLE FOR PIPES LESS THAN OR EQUAL TO 24"; USE 60" I.D. MANHOLE SECTION FOR 30" PIPE AND USE 84" I.D. MANHOLE FOR 36" PIPE. LARGER DIAMETER MAY BE NECESSARY DUE TO CONFIGURATION OF CONNECTING PIPING. FABRICATOR TO DETERMINE REQUIRED DIAMETER UNLESS OTHERWISE DIMENSIONED ON DRAWINGS.

CONCRETE & REINFORCEMENT, DESIGN AND MANUFACTURE AS PER ASTM C478-19. HS20-44 TRAFFIC LOADING PRECAST CONCRETE MANHOLE SECTIONS ALL MANUFACTURED BY FORT MILLER CO. INC OR APPROVED EQUAL.

MANHOLE STEPS: POLYPROPYLENE PLASTIC STEPS WITH #4 DEFORMED STEEL ROD. AS MANUFACTURED BY M.A. INDUSTRIES, INC. (#PS-2PF) INSTALLATION AS PER MANUFACTURER'S SPECIFICATIONS.

MONOLITHIC BASE SECTION. HEIGHT AS REQUIRED. EXTENDED BASE REQUIRED IN AREAS OF SEASONAL HIGH GROUNDWATER. 6" MIN. EXTENSION, TYP.

BACKFILL STRUCTURE WITH APPROVED GRANULAR MATERIAL PLACED IN 8 INCH LIFTS AND MECHANICALLY COMPACTED TO MIN. 95% MODIFIED PROCTOR MAX. DENSITY. 12" MIN. WIDTH ALL SIDES.

USE FLEXIBLE BOOT TYPE CONNECTORS (SUCH AS KOR-N-SEAL BY TRELLEBORG PIPE SEALS OR APPROVED EQUAL). WHERE BOOT CONNECTORS CANNOT BE USED, INSTALL AN NPC CORRUGATED PIPE ADAPTER (BY TRELLEBORG PIPE SEALS OR APPROVED EQUAL) AND WS WATERSTOP GROUTING RING (BY PRESS-SEAL GASKET CORP OR APPROVED EQUAL) ON EACH PIPE, CENTER IN MANHOLE WALL AND EMBED IN ¾" MIN. THICKNESS OF NON-SHRINK CEMENTITIOUS STRUCTURAL GROUT (7200 PSI MIN, SUCH AS HARRIS DOT CONSTRUCTION GROUT, SIKAGROUT 212 OR APPROVED EQUAL.)

STORMWATER PIPE INVERT ELEVATION AS PER PLAN

#2 CRUSHED STONE SUBBASE, CONTINUE TO SPRINGLINE OF PIPE

UNDISTURBED SUBGRADE

NOTES:

1. SURVEY STAKEOUT OF CATCH BASINS ARE NORMALLY CENTER OF GRATE, NOT NECESSARILY CENTER OF STRUCTURE.
2. CATCH BASINS SECTIONS TO BE CUSTOM-CAST PRECAST CONCRETE, AS MANUFACTURED BY FORT MILLER OR APPROVED EQUAL. CONCRETE AND REINFORCEMENT TO BE AS PER ASTM C478.
3. AGGREGATE AND STONE NOTE DIRECTIVES ON THE SHALLOW CB DETAIL APPLY

STONE NOTES:

1. ALL STONE SUBBASE AND BEDDING LOCATED IN AREAS TO BE PAVED SHALL BE WRAPPED IN A NON-WOVEN GEOTEXTILE FABRIC ENVELOPE (SUCH AS GEOTEX 45- BY PROPEX OR APPROVED EQUAL).
2. WHERE A SUBGRADE GROUNDWATER CONDITION EXISTS WITH MIGRATING SANDS AND/OR SILTS, ALL STONE SHALL BE WRAPPED AS PER NOTE 1 ABOVE.

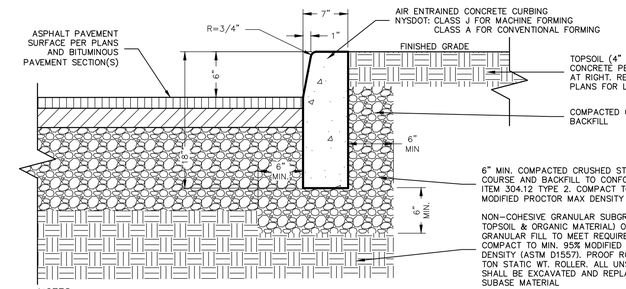
AGGREGATE NOTES:

1. ALL STONE SHALL BE CRUSHED-TYPE AND MEET NYS DOT STD. SPECIFICATIONS 703-02, COARSE AGGREGATE.
2. SELECT GRANULAR FILL SHALL MEET NYS DOT STD. SPECIFICATIONS 703-01, FINE AGGREGATE AND 733-11 EXCEPT WITH THE FOLLOWING GRADATION

100%	PASSING 1-1/2" SIEVE
0%-70%	PASSING #40 SIEVE
0%-12%	PASSING #200 SIEVE

2/15 DEEP CATCH BASIN OR STORM MH

NOT TO SCALE

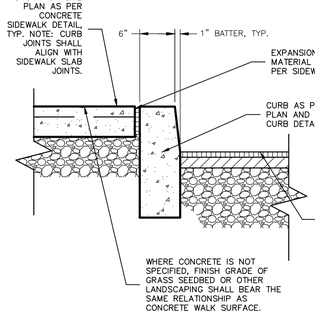


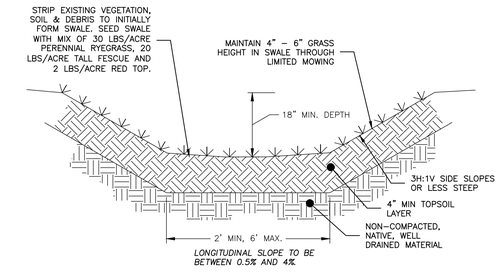
NOTES:

1. FOR CONVENTIONAL FORMING, CAST IN UNIFORM SEGMENTS (20+/- FT.), SEPARATED BY CONSTRUCTION JOINTS CAPABLE OF 1/4" EXPANSION.
2. FOR MACHINE FORMING, FORM OR SAWCUT CONTRACTION JOINTS AT 20FT. MAX. INTERVALS 1/8" TO 1/4" IN WIDTH, 1 1/2" DEEP. SAWCUT WITHIN 8 HRS. OF POUR.
3. CONTRACTOR TO SUBMIT JOINT LAYOUT PLAN FOR APPROVAL PRIOR TO CONSTRUCTION.
4. CURING TO BE DONE USING METHOD A OR B NYSDOT STD. SPECIFICATIONS SEC. 502-3.10.
5. CONSTRUCTION TO MEET NYSDOT SECTION 609 SPECIFICATIONS, ITEM 609.04.
6. THIS PRELIMINARY SIDEWALK DESIGN ASSUMES THAT EXISTING SUBGRADE CONDITIONS CONSIST OF CLEAN GRANULAR MATERIAL (SAND & GRAVEL) AND THAT THERE IS NO WATER TABLE INTERFERENCE. PRIOR TO CONSTRUCTION, THE OWNER SHALL VERIFY THE EXISTING SUBGRADE CONDITIONS USING A GEOTECHNICAL ENGINEERING CONSULTANT, TO DETERMINE THE FINAL PAVEMENT DESIGN.

3/15 CONCRETE CURB

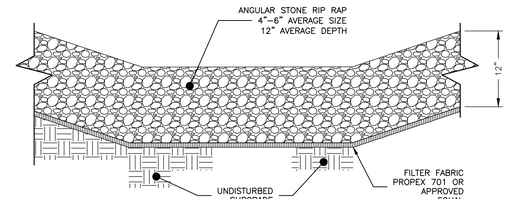
NOT TO SCALE





6/15 VEGETATED SWALE

NOT TO SCALE



7/15 RIP RAP PILOT CHANNEL SECTION DETAIL

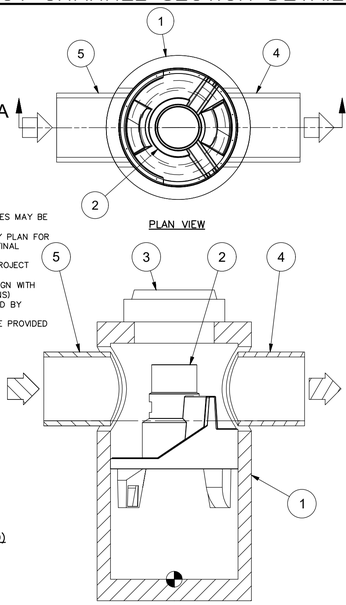
NOT TO SCALE

WQU#1,4,5 PARTS LIST		
ITEM	DESCRIPTION	SIZE
1	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)	36 in
2	INTERNAL COMPONENTS (PRE-INSTALLED)	
3	FRAME AND COVER (ROUND)	30 in
4	OUTLET PIPE (SUPPLIED BY CONTRACTOR)	12 in
5	INLET PIPE (SUPPLIED BY CONTRACTOR)	12 in

WQU#2,3 PARTS LIST		
ITEM	DESCRIPTION	SIZE
1	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)	48 in
2	INTERNAL COMPONENTS (PRE-INSTALLED)	
3	FRAME AND COVER (ROUND)	30 in
4	OUTLET PIPE (SUPPLIED BY CONTRACTOR)	12 in
5	INLET PIPE (SUPPLIED BY CONTRACTOR)	12 in

GENERAL NOTES:

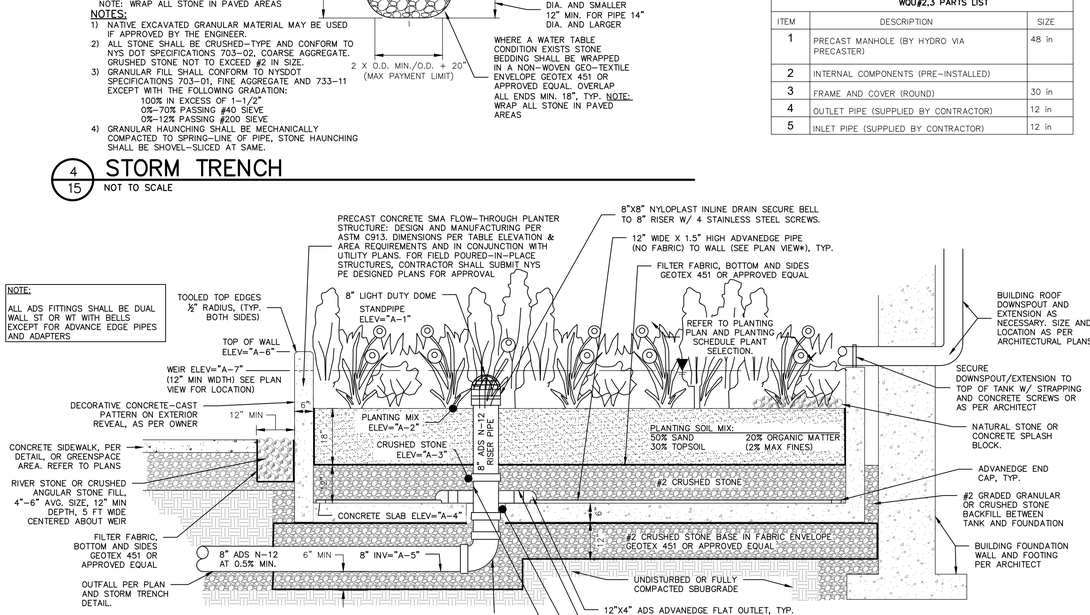
1) GENERAL ARRANGEMENT DRAWINGS ONLY
2) THE DIAMETER OF THE INLET AND OUTLET PIPES MAY BE NO MORE THAN 24"
3) SEE SHEETS 8 - UTILITY PLAN & 9 - UTILITY PLAN FOR INVERT IN AND OUT, BYPASS MANHOLE AND FINAL CONFIGURATION OF WATER QUALITY UNITS
4) MULTIPLE INLET PIPES POSSIBLE (REFER TO PROJECT PLAN)
5) INLET/ OUTLET PIPE ANGLE CAN VARY TO ALIGN WITH DRAINAGE NETWORK (REFER TO PROJECT PLANS)
6) PEAK FLOW RATE AND MINIMUM HEIGHT LIMITED BY AVAILABLE COVER AND PIPE DIAMETER
7) LARGER SEDIMENT STORAGE CAPACITY MAY BE PROVIDED WITH A DEEPER SUMP DEPTH



HYDRO FRAME AND COVER (INCLUDED)
GRADE RINGS BY OTHERS AS REQUIRED

8/15 HYDRO INTERNATIONAL FIRST DEFENDER

NOT TO SCALE



FLOW THROUGH STORMWATER PLANTER ELEVATIONS

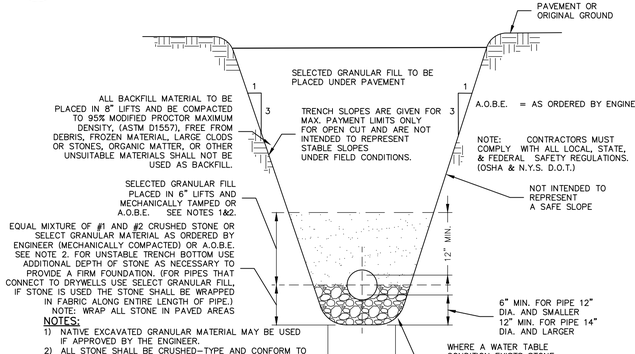
ELEV. I.D.	SP #1	SP #2	SP #3	SP #4	SP #5	SP #6
"A-1"	45.00	45.00	45.00	45.00	45.00	45.00
"A-2"	44.50	44.50	44.50	44.50	44.50	44.50
"A-3"	43.00	43.00	43.00	43.00	43.00	43.00
"A-4"	42.00	42.00	42.00	42.00	42.00	42.00
"A-5"	41.50	41.00	41.80	41.00	41.00	41.80
"A-6"	45.50	45.50	45.50	45.50	45.50	45.50
"A-7"	45.00	45.00	45.00	45.00	45.00	45.00

5/15 STORMWATER PLANTER - FLOW THROUGH

NOT TO SCALE

4/15 STORM TRENCH

NOT TO SCALE



NOTES:

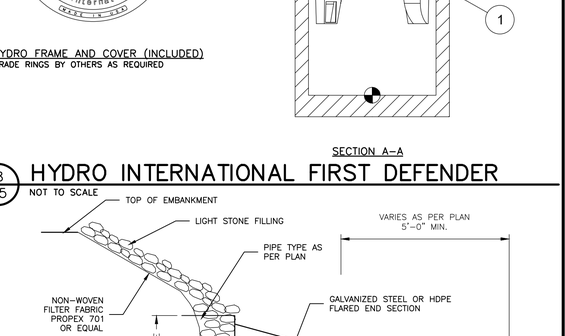
1) NATIVE EXCAVATED GRANULAR MATERIAL MAY BE USED IF APPROVED BY THE ENGINEER.
2) ALL STONE SHALL BE CRUSHED-TYPE AND CONFORM TO NYS DOT SPECIFICATIONS 703-02, COARSE AGGREGATE. GRUSHED STONE NOT TO EXCEED #2 IN SIZE.
3) GRANULAR FILL SHALL CONFORM TO NYSDOT SPECIFICATIONS 703-01, FINE AGGREGATE AND 733-11 EXCEPT WITH THE FOLLOWING GRADATION:
   100% IN EXCESS OF 1-1/2"
   0%-70% PASSING #40 SIEVE
   0%-12% PASSING #200 SIEVE
4) GRANULAR HAUNCHING SHALL BE MECHANICALLY COMPACTED TO SPRING-LINE OF PIPE, STONE HAUNCHING SHALL BE SHOVEL-SLICED AT SAME.

NOTES:

1. ALL FLARED END SECTIONS TO BE ANCHORED PER MANUFACTURERS RECOMMENDATIONS

9/15 FLARED END SECTION

NOT TO SCALE



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PROPOSED MULTIFAMILY DEVELOPMENT
SECOND AVE APARTMENTS
KEVIN VANDENBURGH
1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
COUNTY OF RENSSELAER

TAX MAP ID: 70.64-1-1 & 70.56-1-6
SEPTEMBER 29, 2021

DRAWN BY	DBR
CHECK BY	BPD
EDP PROJECT NUMBER	12928

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REVISION	DATE	BY

SCALE: AS NOTED

NOT FOR CONSTRUCTION

SHEET TITLE: SITE DETAILS

SHEET: 15 of 17

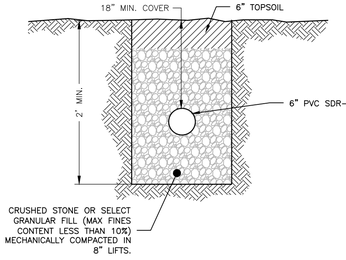
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ELECTRICAL NOTES:

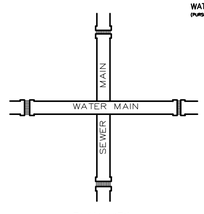
1. CONTRACTOR TO VERIFY LINE VOLTAGE AT THE SITE.
2. ELECTRONIC/ELECTRIC CONTROL PANEL SHALL BE SIMPLEX MODEL AS SUPPLIED BY E-ONE OR APPROVED EQUAL. PANEL OPTIONS SHALL INCLUDE AN AUDIBLE ALARM WITH SILENCE AND VISUAL ALARM LIGHT FOR HIGH WATER CONDITIONS IN THE WET WELL. PANEL TO BE LOCATED IN A CONSPICUOUS LOCATION AS APPROVED BY THE OWNER: OUTSIDE ON SIDE OF BUILDING FACING THE UNIT OR ON AN ANCHORED 6"x6" POST NEAR THE UNIT; INSIDE IN AN UNLOCKED ROOM, BASEMENT, OR STAIRWELL.
3. PUMP STATION AND PUMP(S) SHALL MEET ALL APPLICABLE NEC, STATE AND LOCAL CODES FOR USE IN AN INDIVIDUAL RESIDENTIAL APPLICATION
4. ALL ELECTRICAL WORK TO BE DONE IN FULL COMPLIANCE WITH THE CURRENT EDITION OF THE NATIONAL ELECTRIC CODE AND ALL STATE AND LOCAL CODES.
5. THERE SHALL BE NO ELECTRICAL SPLICES, JUNCTION BOXES, OR CONNECTIONS OF ANY KIND IN THE PUMP TANK.
6. IN THE EVENT THAT THE NEMA 4 CONTROL PANEL IS TO BE LOCATED OUTSIDE, A THERMOSTATTED HEATER SHALL BE PROVIDED TO PREVENT CONDENSATION. ANY CONTROL PANEL OR JUNCTION BOX SHALL BE LOCATED A MINIMUM OF 5 FEET FROM VENT/HATCH OPENINGS.
7. THE NEW YORK BOARD OF FIRE UNDERWRITERS MUST CERTIFY ELECTRICAL EQUIPMENT INSTALLED PURSUANT TO THIS PLAN. A COPY OF THAT CERTIFICATE SHALL BE FURNISHED TO THE ENGINEER OF RECORD AND THE OWNER PRIOR TO ISSUANCE OF FINAL PAYMENT.
8. LEVEL CONTROL SWITCHES SHALL BE INTRINSICALLY SAFE

GRINDER PUMP INSTALLATION NOTES:

1. GRINDER PUMP ON EACH LOT SHALL BE CONSTRUCTED A THE TIME OF ACTUAL BUILDING CONSTRUCTION. A SEPARATE GRINDER PUMP PERMIT IS REQUIRED FOR EACH LOT REQUIRING A GRINDER PUMP.
2.
3. LOCATION AND CONSTRUCTION OF GRINDER PUMPS SHALL BE APPROVED BY REGULATING SEWER AUTHORITY PRIOR TO APPLICATION FOR A BUILDING PERMIT. GENERAL GUIDELINES:
   - GRINDER PUMP SHALL BE LOCATED 10' MAXIMUM FROM HARD SURFACE.
   - BUILDING SERVICE CONNECTION TO GRINDER PUMP SHALL BE GRAVITY LINE ONLY.
   - GRINDER PUMP SHALL BE LOCATED 10' MIN. FROM BUILDING
4. NO BUILDING PERMIT SHALL BE ISSUED PRIOR TO APPROVAL OF THE LOCATION OF THE GRINDER PUMP BY THE SEWER AUTHORITY. WRITTEN APPROVAL BY THE AUTHORITY SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT AT A TIME OF APPLICATION FOR BUILDING PERMIT.
5.
6. ALL GRINDER PUMP UNITS ARE TO BE TESTED AFTER COMPLETION OF ALL GRADING AND LAWN LANDSCAPING. UNITS AND PIPING TO BE TESTED FOR 5 MINUTES AT 120 P.S.I.G.
7. ALL UNITS TO BE FINAL TESTED AFTER ALL SITE IMPROVEMENTS AND LANDSCAPING COMPLETED TO VERIFY THAT NO DAMAGE TO FORCE MAIN OCCURRED DURING CONSTRUCTION. TEST TO INCLUDE THAT PRESSURE IS MAINTAINED BY THE SYSTEM AND MUST BE WITNESSED BY SARATOGA COUNTY SEWER DISTRICT PERSONNEL. THE CONTRACTOR SHALL ESTABLISH FLOW AT THE PROPERTY LINE SHUT OFF UPON GRINDER PUMP START UP AND WHEN THE PUMP IS PLACED IN SERVICE.
8.
9. **GRINDER PUMPS MUST BE AS MANUFACTURED BY BARNES, ENVIRONMENT ONE, OR HYDRO-MATIC. THIS PROJECT'S L.P.S. FORCE MAIN PIPE SIZES ARE DESIGNED FOR EONE GRINDER PUMPS ONLY. USE OF CENTRIFUGAL GRINDER PUMPS WILL REQUIRE LARGER DIAMETER FORCE MAIN PIPE.**
10. SUMP PUMPS SHALL NOT BE CONNECTED TO BUILDING SEWERS UNDER ANY CIRCUMSTANCE.
11. VALVE STEMS FOR THE GRINDER PUMP SYSTEM SHALL REMAIN CLOSED UNTIL THE GRINDER PUMPS ARE PLACED INTO SERVICE.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING FLOW AT THE PROPERTY LINE SHUT OFF, GRINDER PUMP START UP AND WHEN GRINDER IS PLACED INTO SERVICE.
13. **IN ORDER TO PREVENT SEWER BACKUPS DURING POWER OUTAGES EITHER A GENERATOR WITH AUTOMATIC TRANSFER SWITCH SHOULD BE INSTALLED OR A SOLENOID SHUTOFF VALVE FOR THE WATER SUPPLY LINE (WITH MANUAL OVERRIDE) SHOULD BE INSTALLED**



1/16 SANITARY SEWER LATERAL DETAIL
NOT TO SCALE



PLAN VIEW

AT ALL CROSSINGS OF SEWER AND WATER

WATER AND SEWER SEPARATION:
(PURSUANT TO NYS DOH REQUIREMENTS)

PARALLEL INSTALLATIONS: WATER MAINS SHALL LAID AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED GRAVITY (OR FORCE) SANITARY OR STORM SEWER, MEASURED OUTSIDE TO OUTSIDE OF PIPE.

CROSSINGS: WATER MAINS CROSSING SEWERS SHALL BE INSTALLED TO PROVIDE A MINIMUM VERTICAL SEPARATIONS OF 18 INCHES, MEASURED OUTSIDE TO OUTSIDE OF PIPE, WITH A FULL 20 FOOT LENGTH OF WATER MAIN PIPE CENTERED SUCH THAT THE JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING.

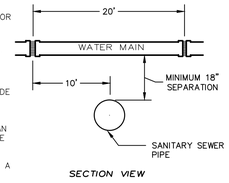
WHERE MINIMUM SEPARATIONS CANNOT BE MET, WITH CASE-BY-CASE APPROVAL FROM NYS DOH:

A. NEW SEWERS SHALL BE CONSTRUCTED OF MINIMUM 150 PSI PRESSURE- RATED AWWA WATER GRADE MATERIALS AND SHALL BE PRESSURE TESTED TO ENSURE WATER TIGHTNESS.

B. INSTALLATIONS CLOSER THAN 10 FOOT SEPARATION ONLY IF WATER MAIN IS LAID IN A SEPERATE TRENCH OR ON AN UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF TEH SEWER AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES ABOVE THE TOP OF THE GRAVITY SEWER.

C. WHERE PRESSURE AND GRAVITY SEWERS PRE-EXIST: THE WATER MAIN SHALL BE INSTALLED WITHIN A PROTECTIVE CASING PIPE, CONSTRUCTED OF A MINIMUM 150 PSI PRESSURE-RATED AWWA WATER GRADE MATERIALS AND EXTEND 10 FT. MIN. ON BOTH SIDES OF THE SEWER BEING CROSSED OR, WHERE PARALLEL, TO A POINT WHERE THE LINES ARE SEPARATED BY 10 FEET.

D. WHERE A WATER MAIN AND/OR WATER WELLS PRE-EXIST AND A FORCE MAIN IS BEING CONSTRUCTED: THE FORCE MAIN SHALL BE INSTALLED WITHIN A PROTECTIVE CASING PIPE, CONSTRUCTED OF A MINIMUM 150 PSI PRESSURE-RATED AWWA WATER GRADE MATERIALS, AND EXTEND 10 FT. MIN. ON BOTH SIDES OF THE WATER MAIN BEING CROSSED; WHERE PARALLEL, TO A POINT WHERE THE LINES ARE SEPARATED BY 10 FEET; OR TO A POINT WHERE THE ENDS OF THE CASING PIPE ARE 150 FEET MIN. FROM ANY WATER LEVEL

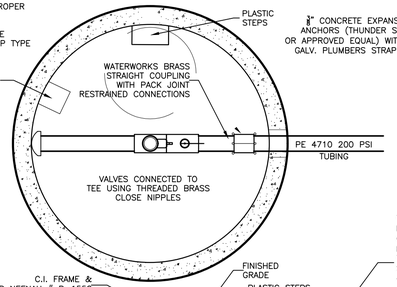


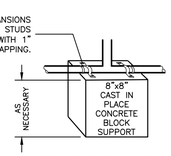
SECTION VIEW

5/16 WATER SEWER SEPARATION NOTES
NOT TO SCALE

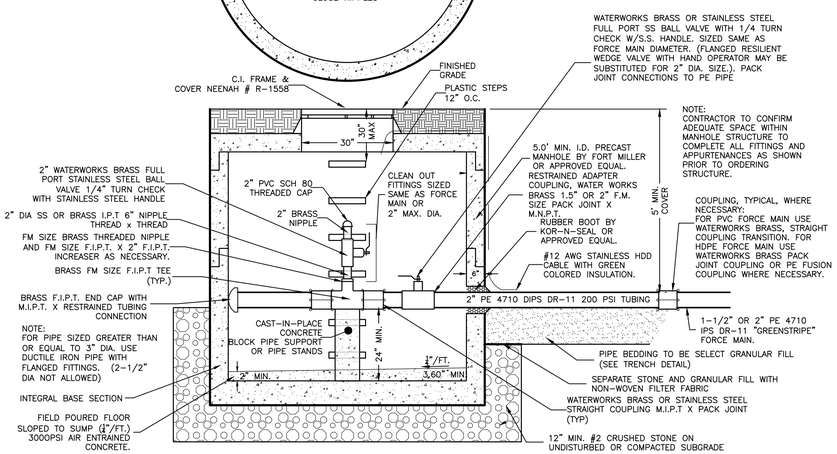
NOTE:
ALL PE FITTING CONNECTIONS SHALL HAVE PROPER SIZED S.S. INSERT STIFFENERS

COMPRESSION TUBING CONNECTIONS SHALL BE RESTRAINED GRIP-RING OR PACK JOINT CLAMP TYPE

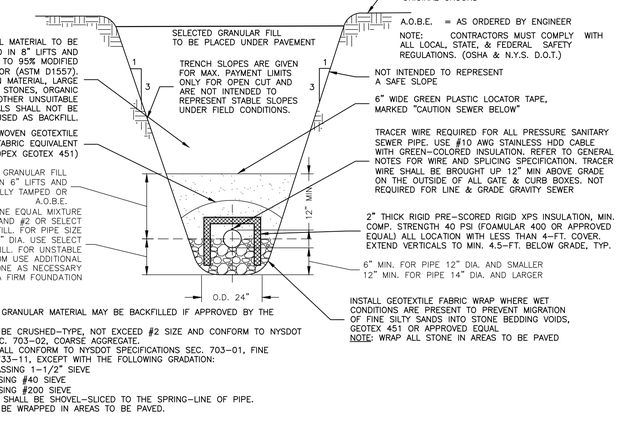




PIPE SECURING DETAIL



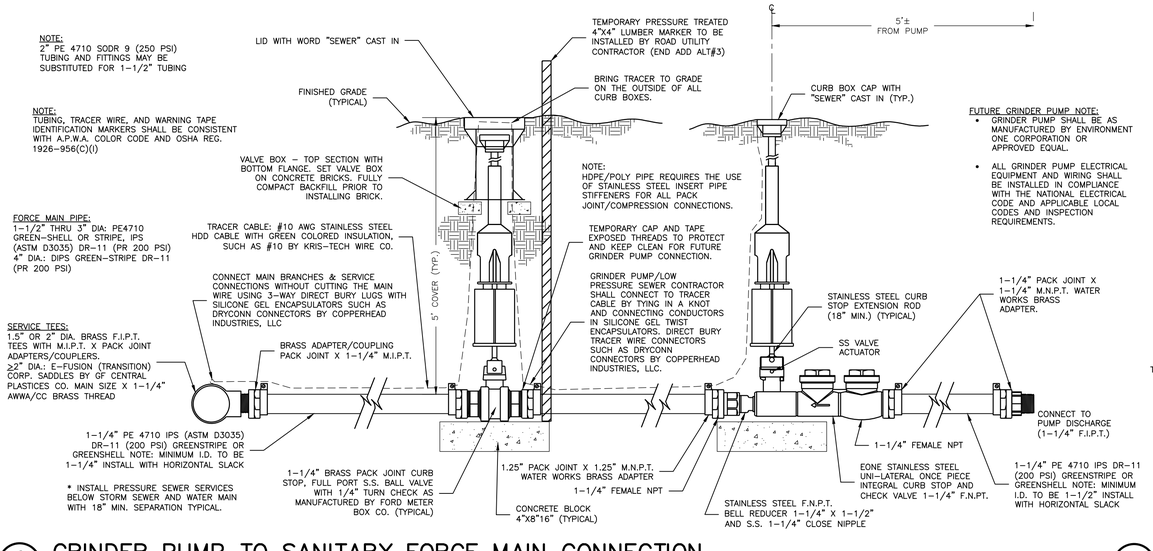
3/16 PRESSURE SEWER END-OF-LINE CLEAN OUT MANHOLE
NOT TO SCALE



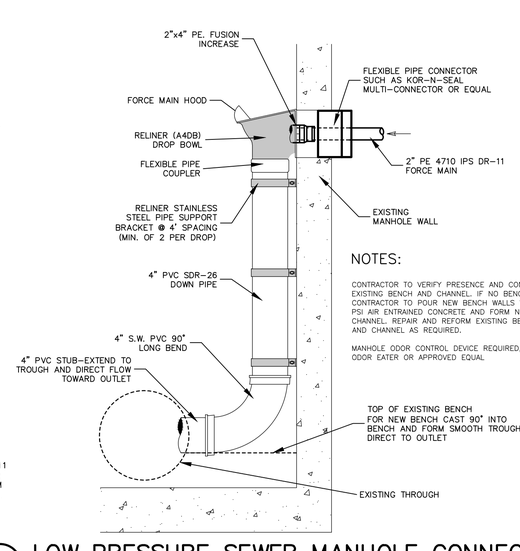
NOTES:

1. NATIVE EXCAVATED GRANULAR MATERIAL MAY BE BACKFILLED IF APPROVED BY THE ENGINEER.
2. ALL STONE SHALL BE CRUSHED-TYPE, NOT EXCEED #2 SIZE AND CONFORM TO NYSDOT SPECIFICATIONS SEC. 703-02, COARSE AGGREGATE.
3. GRANULAR FILL SHALL CONFORM TO NYSDOT SPECIFICATIONS SEC. 703-01, FINE AGGREGATE, AND 733-11, EXCEPT WITH THE FOLLOWING GRADATION:
   100% PASSING 1-1/2" SIEVE
   0%-70% PASSING #40 SIEVE
   0%-12% PASSING #200 SIEVE
4. STONE HAUNCHING SHALL BE SHOVEL-SLICED TO THE SPRING-LINE OF PIPE.
5. ALL STONE SHALL BE WRAPPED IN AREAS TO BE PAVED.

6/16 SANITARY SEWER TRENCH DETAIL
NOT TO SCALE



2/16 GRINDER PUMP TO SANITARY FORCE MAIN CONNECTION
NOT TO SCALE

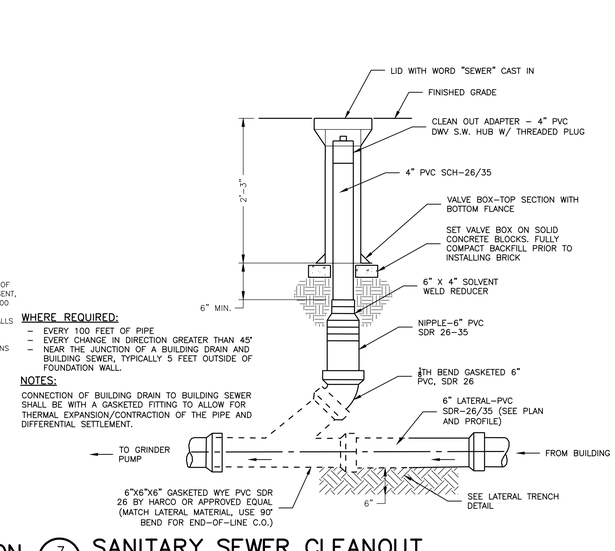


NOTES:

CONTRACTOR TO VERIFY PRESENCE AND CONDITION OF EXISTING BENCH AND CHANNEL. IF NO BENCH PRESENT, CONTRACTOR TO POUR NEW BENCH WALLS WITH 4000 PSI AIR ENTRAINED CONCRETE AND FORM NEW CHANNEL. REPAIR AND REFORM EXISTING BENCH WALLS AND CHANNEL AS REQUIRED.

MANHOLE ODOR CONTROL DEVICE REQUIRED, PARSONS ODOR EATER OR APPROVED EQUAL

4/16 LOW PRESSURE SEWER MANHOLE CONNECTION
NOT TO SCALE



WHERE REQUIRED:

- EVERY 100 FEET OF PIPE
- EVERY CHANGE IN DIRECTION GREATER THAN 45°
- NEAR THE JUNCTION OF A BUILDING DRAIN AND BUILDING SEWER, TYPICALLY 5 FEET OUTSIDE OF FOUNDATION WALL.

NOTES:

CONNECTION OF BUILDING DRAIN TO BUILDING SEWER SHALL BE WITH A GASKETED FITTING TO ALLOW FOR THERMAL EXPANSION/CONTRACTION OF THE PIPE AND DIFFERENTIAL SETTLEMENT.

7/16 SANITARY SEWER CLEANOUT
NOT TO SCALE

ENVIRONMENTAL DESIGN PARTNERSHIP, LLP.
300 Route 146 Clifton Park, New York 12065
(518) 371-7621
edpllp.com

PROPOSED MULTIFAMILY DEVELOPMENT
SECOND AVE APARTMENTS
KEVIN VANDENBURGH

1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
COUNTY OF RENSSELAER

TAX MAP ID:
70.64-1-1 & 70.56-1-6

SEPTEMBER 29, 2021

DRAWN BY	DBR
CHECK BY	BPD
EDP PROJECT NUMBER	12928

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REVISION	DATE	BY

SCALE:
AS NOTED

NOT FOR CONSTRUCTION

SHEET TITLE:
SITE DETAILS

SHEET:
16 of 17

Q:\rensselaer\TROY\2nd avenue\V01 2nd avenueV5 - dwg\Detailed plans\SHEETS\11_DT-TROY.dwg Sep 29, 2021 03:01:14PM

DISINFECTION: ALL POTABLE WATER PIPE SHALL BE DISINFECTED AND BACTERIOLOGICALLY VERIFIED (TESTED) PRIOR TO USE IN ACCORDANCE WITH AWWA C651-14 AS FOLLOWS:

DISINFECTION PROCEDURE:
NEW MAINS SHALL BE DISINFECTED IN ACCORDANCE WITH THE CURRENT AWWA STANDARD FOR DISINFECTING WATER MAINS, ANSI/AWWA C-651-14, SECTION 4.4, CONTINUOUS FEED THE TABLET METHOD IS NOT PERMITTED BY NYSDOH AND SHALL NOT BE USED. THE SLUG METHOD, SECTION 4.5, MAY BE USED WHEN APPROVED BY THE ENGINEER. SPRAY OR SWAB, PER PARAGRAPH 4.11.3.2, WHEN CUTTING INTO OR REPAIRING EXISTING MAINS. REQUIRED STEPS ARE:

1. WORK CLEAN: PREVENT CONTAMINATING MATERIALS FROM ENTERING THE WATER MAIN DURING STORAGE, CONSTRUCTION, OR REPAIR.

2. PREVENT BACKFLOW: PROTECT THE EXISTING DISTRIBUTION SYSTEM FROM ANY BACKFLOW CAUSED BY HYDROSTATIC PRESSURE TESTING AND DISINFECTION PROCEDURES. THE SUPPLY VALVE SHALL BE KEPT CLOSED AT ALL TIMES, EXCEPT DURING FLUSHING AND DISINFECTANT FEED OPERATIONS.

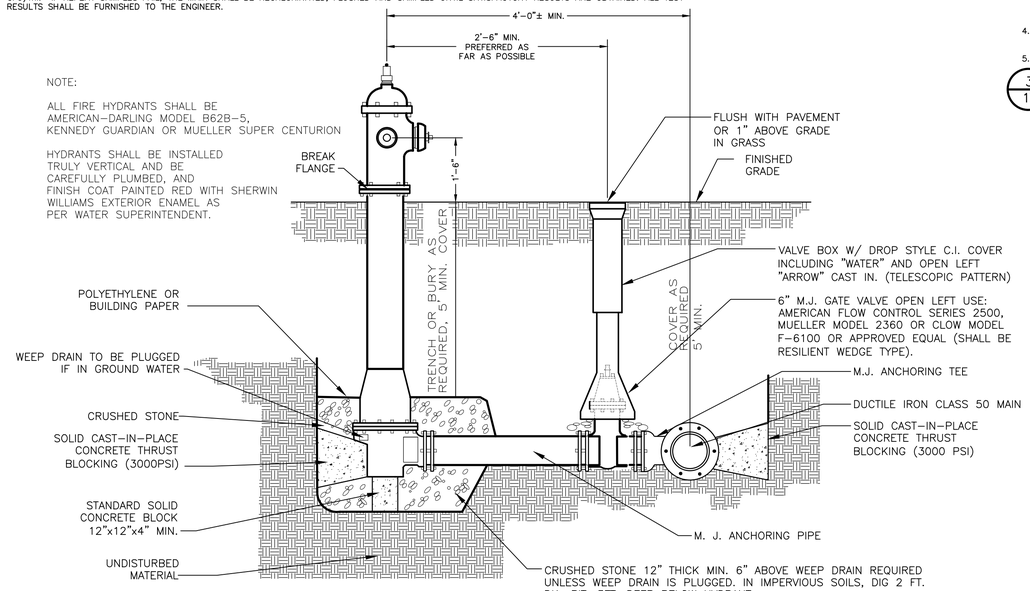
3. PRE-FLUSH:
   A. FILL THE WATER MAIN AND ELIMINATE ALL AIR POCKETS.
   B. FLUSH THE WATER MAIN AT A VELOCITY NOT LESS THAN 3.0 FT/SEC TO REMOVE PARTICULATES.

4. DOSE CHLORINE (CONTINUOUS METHOD):
   A. INSTALL A TEST TAP NOT MORE THAN 10 FT. DOWNSTREAM FROM THE BEGINNING OF THE NEW MAIN.
   B. TO WATER ENTERING THE NEW MAIN, FEED A DOSE OF CHLORINE AT A CONSTANT RATE SUCH THAT THE WATER SHALL HAVE A RESIDUAL NOT LESS THAN 25 MG/L OF FREE CHLORINE. VERIFY CHLORINE CONCENTRATIONS AT ALL HYDRANTS, TAPS, AND SERVICE LATERALS. DOSING SHALL CONTINUE UNTIL HEAVILY CHLORINATED WATER IS CONTINUOUS THROUGHOUT THE NEW MAIN AND ALL VALVES AND HYDRANTS HAVE BEEN OPERATED TO PROVIDE CHLORINE CONTACT.

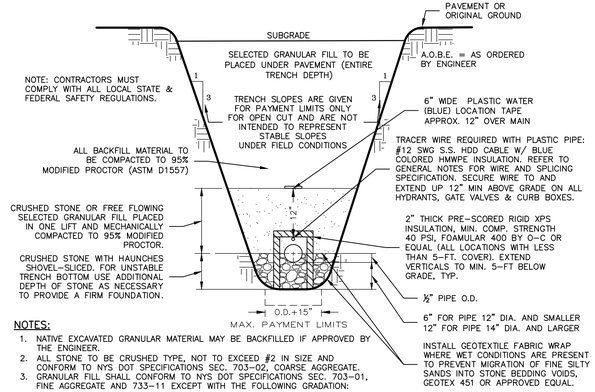
5. CONTACT TIME: AFTER A 24-HOUR MINIMUM RETENTION PERIOD, THE TREATED WATER SHALL HAVE A RESIDUAL OF NOT LESS THAN 10 MG/L OF FREE CHLORINE. VERIFY CHLORINE CONCENTRATIONS AT ALL HYDRANTS, TAPS, AND SERVICE LATERALS. REPEAT STEP 4.B. IF RESIDUAL IS LESS THAN 10 MG/L.

6. FLUSH/ NEUTRALIZE: FLUSH THE HEAVILY CHLORINATED WATER FROM THE MAIN UNTIL A RESIDUAL OF NOT MORE THAN 1.0 MG/L REMAINS. APPLY A NEUTRALIZING CHEMICAL TO ELIMINATE THE RESIDUAL CHLORINE IF THERE IS ANY POSSIBILITY THAT HEAVILY CHLORINATED WATER DISCHARGE WILL CAUSE DAMAGE TO THE ENVIRONMENT.

7. BACTERIOLOGICAL VERIFICATION PER SECTION 5.1: TWO CONSECUTIVE SETS OF ACCEPTABLE SAMPLES, TAKEN FROM THE SAME SAMPLING SITES, A MINIMUM OF 16 HOURS APART, SHALL BE COLLECTED FROM THE NEW WORKS AS FOLLOWS: ONE SET PER 1200 LF OF NEW MAIN PLUS ONE SET FROM THE END-OF-THE-LINE AND ONE SET FROM EACH BRANCH -AT A MINIMUM. EACH SAMPLE SHALL BE TESTED FOR BOTH HPC (HETEROTROPHIC PLATE COUNT) AND TOTAL COLIFORM (TC). THE HPC TEST IS WAIVED FOR THE REPEAT SAMPLES IF THE INITIAL RESULTS ARE LESS THAN 500 CFU/ml. WHEN HPC RESULTS EXCEED 500 CFU/ml, THE WORKS SHALL BE FLUSHED AND SAMPLED UNTIL NO COLIFORM ARE PRESENT AND THE HPC IS LESS THAN 500 CFU/ml. IF REPEAT SAMPLES FAIL, THE MAIN SHALL BE RECHLORINATED, FLUSHED AND SAMPLED UNTIL SATISFACTORY RESULTS ARE OBTAINED. ALL TEST RESULTS SHALL BE FURNISHED TO THE ENGINEER.

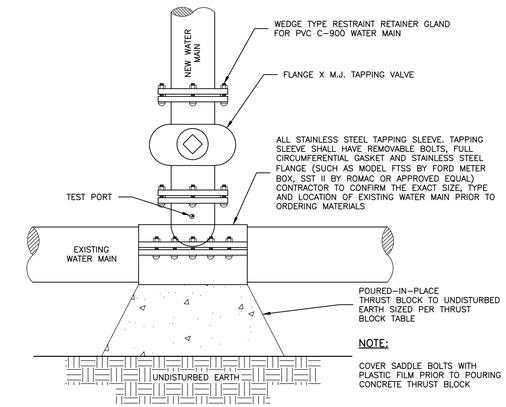


3 / 17 TYPICAL HYDRANT INSTALLATION
NOT TO SCALE

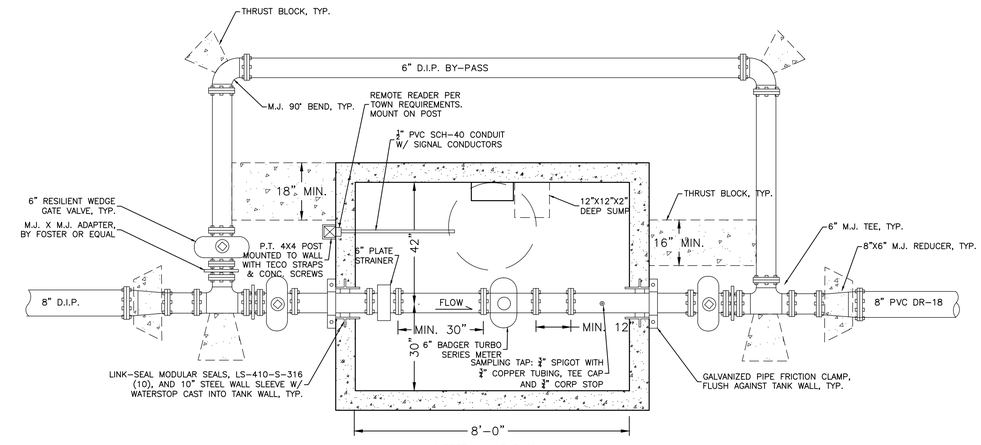


NOTES:
1. NATIVE EXCAVATED GRANULAR MATERIAL MAY BE BACKFILLED IF APPROVED BY THE ENGINEER.
2. ALL STONE TO BE CRUSHED TYPE, NOT TO EXCEED #2 IN SIZE AND CONFORM TO NYS DOT SPECIFICATIONS SEC. 703-02, COARSE AGGREGATE.
3. GRANULAR FILL SHALL CONFORM TO NYS DOT SPECIFICATIONS SEC. 703-01, FINE AGGREGATE AND 733-11 EXCEPT WITH THE FOLLOWING GRADATION:
   0% IN EXCESS OF 1-2"
   0%-70% PASSING #40 SIEVE
   0%-12% PASSING #200 SIEVE
4. GRANULAR HAUNCHING SHALL BE MECHANICALLY COMPACTED TO THE SPRING-LINE OF PIPE, STONE HAUNCHING SHALL BE SHOVEL-SLICED AT SAME.
5. ALL STONE SHALL BE WRAPPED IN AREA TO BE PAVED.

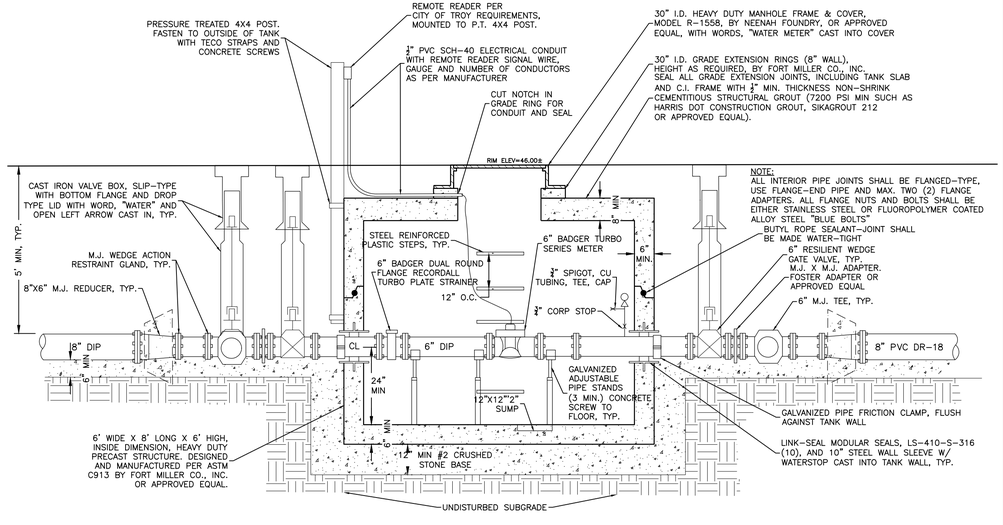
3 / 17 WATER TRENCH DETAIL
NOT TO SCALE



4 / 17 TAPPING SADDLE VALVE
NOT TO SCALE



METER VAULT PLAN



METER VAULT ELEVATION

5 / 17 WATER METER PIT
NOT TO SCALE

REQUIRED AREAS (SQ. FT.) FOR THRUST BLOCKS*					
PIPE SIZE (INCHES)	TEE	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND
4	2.0	2.8	1.5	0.8	0.4
6	4.2	5.9	3.2	1.6	0.8
8	7.2	10.1	5.5	2.8	1.4
10	10.9	15.4	8.3	4.2	2.1
12	15.4	21.8	11.8	6.0	3.0
14	20.6	29.1	15.8	8.0	4.0
16	26.8	37.9	20.5	10.4	5.2
18	33.6	47.5	25.7	13.1	6.6
20	41.2	58.2	31.5	16.1	8.1
24	58.8	83.1	45.0	22.9	11.5
30	90.5	128.0	69.2	35.3	17.7
36	129.6	183.3	99.1	50.5	25.4

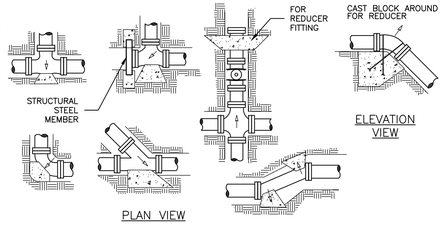
* = FACTOR SAFETY OF 1.5
SOIL BEARING OF 3,000 PSI
225 DESIGN PRESSURE

THRUST REACTIONS - R(LB) PER 100PSI INTERNAL PRESSURE					
PIPE SIZE (INCHES)	TEE	90° BEND	45° BEND	22-1/2° BEND	11-1/4° BEND
4	1,810	2,559	1,385	706	355
6	3,739	5,288	2,862	1,459	733
8	6,433	9,097	4,923	2,510	1,261
10	9,677	13,685	7,406	3,776	1,897
12	13,685	19,353	10,474	5,340	2,683
14	18,385	26,001	14,072	7,174	3,604
16	23,779	33,628	18,199	9,278	4,661
18	29,865	42,235	22,858	11,653	5,855
20	36,644	51,822	28,046	14,298	7,183
24	52,279	73,934	40,013	20,398	10,249
30	80,425	113,738	61,554	31,380	15,766
36	115,209	162,931	88,177	44,952	22,585

THRUST BLOCK DIMENSIONS ON VERTICAL TRENCH WALL ORIGINAL GROUND (FEET)					
PIPE SIZE (INCHES)	TEE	90° BEND	45° BEND	BEND	11-1/4° BEND
4	1.0X2.0	1.0X2.8	0.75X2.0	0.8X1.0	0.4X1.0
6	1.5X2.8	1.5X4.0	1.0X3.2	1.0X1.6	0.8X1.0
8	2.0X3.6	2.0X5.1	1.4X3.9	1.4X2.0	1.0X1.4
10	2.5X4.4	2.5X6.2	1.7X4.9	1.75X2.4	1.25X1.7
12	3.0X5.2	3.0X7.3	2.0X5.8	2.0X3.0	1.5X2.0
14	3.5X5.9	3.5X8.3	2.5X6.3	2.5X3.2	1.75X2.3
16	4.0X6.7	4.0X9.5	2.7X7.6	2.75X3.8	2.0X2.6
18	4.5X7.5	4.5X10.6	3.0X8.6	3.0X4.4	2.2X3.0
20	5.0X8.25	5.0X11.7	3.4X9.3	3.4X4.75	2.5X3.25
24	6.0X9.8	6.0X13.9	4.0X11.25	4.0X5.75	2.8X4.1
30	7.5X12.1	7.5X17.1	5.0X13.8	5.0X7.1	3.0X5.9
36	9.0X14.4	9.0X20.4	6.0X16.5	6.0X8.4	3.3X7.7

THRUST BLOCK NOTES:
1. VALUES FOR TEE APPLY TO TEES, END PLUGS, CAPS, AND TAPPING SLEEVES.
2. REQUIRED BEARING AREAS ARE DUE TO THRUSTS CAUSED BY 150 PSI WORKING PRESSURE PLUS 50% (75 PSI) SURGE ALLOWANCE RESULTING IN 225 PSI TOTAL INTERNAL PRESSURE.
3. REQUIRED BEARING AREAS ARE BASED ON ALLOWABLE SOIL BEARING CAPACITY OF 3000 POUNDS PER SQ. FT. IF OTHER SOIL CONDITIONS ENCOUNTERED, BEARING AREAS MAY BE MODIFIED BY THE WATER SUPERINTENDENT.
4. IN MUCK, PEAT OR RECENTLY PLACED FILL ALL THRUSTS SHALL BE RESISTED BY PILES, OR TIE RODS TO SOLID FOUNDATIONS, OR BY REMOVAL OF SUCH UNSTABLE MATERIAL AND REPLACEMENT WITH BALLAST OF SUFFICIENT STABILITY TO RESIST THE THRUSTS. ALL AS REQUIRED BY THE WATER SUPERINTENDENT.
5. ALL THRUST BLOCKS SHALL BE CAST-IN-PLACE.
6. ALL DUCTILE IRON WATER MAIN SHALL BE ENCASED IN POLYETHYLENE, IF TESTING WARRANTS.

SOIL	BEARING STRENGTH S_B (LB/FT)
MUCK	0
SOFT CLAY	1,000
SILT	1,500
SANDY SILT	3,000
SAND	4,000
SANDY CLAY	6,000
HARD CLAY	9,000



2 / 17 THRUST BLOCKS
NOT TO SCALE

ENVIRONMENTAL DESIGN PARTNERSHIP, LLP.
300 Route 146 Clifton Park, New York 12065
(518) 371-7621
edpllp.com

PROPOSED MULTIFAMILY DEVELOPMENT
SECOND AVE APARTMENTS
KEVIN VANDENBURGH
1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
COUNTY OF RENSSELAER

TAX MAP ID: 70.64-1-1 & 70.56-1-6
SEPTEMBER 29, 2021

DRAWN BY	DBR
CHECK BY	BPD
EDP PROJECT NUMBER	12928

IT IS A VIOLATION OF NEW YORK STATE EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECT SUPERVISION OF A LICENSED PROFESSIONAL ENGINEER, LANDSCAPE ARCHITECT OR LAND SURVEYOR, TO ALTER IN ANY WAY A DOCUMENT BEARING THE SEAL OF A LICENSED PROFESSIONAL ENGINEER, LANDSCAPE ARCHITECT OR LAND SURVEYOR. IT IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW ARTICLE 145 REGULATIONS AND IS A CLASS "A" MISDEMEANOR.

REVISION	DATE	BY

SCALE: AS NOTED

NOT FOR CONSTRUCTION

SHEET TITLE: SITE DETAILS

SHEET: 17 of 17

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ATTACHMENT C

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
Phone: (607) 753-9334 Fax: (607) 753-9699
http://www.fws.gov/northeast/nyfo/es/section7.htm

In Reply Refer To: July 15, 2021
Consultation Code: 05E1NY00-2021-SLI-3422
Event Code: 05E1NY00-2021-E-10494
Project Name: 1011 2nd Avenue

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*). This list can also be used to determine whether listed species may be present for projects without federal agency involvement. New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list.

Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the ESA, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC site at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list. If listed, proposed, or candidate species were identified as potentially occurring in the project area, coordination with our office is encouraged. Information on the steps involved with assessing potential impacts from projects can be found at: http://www.fws.gov/northeast/nyfo/es/section7.htm

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the Services wind

energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the ESA. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
(607) 753-9334

Project Summary

Consultation Code: 05E1NY00-2021-SLI-3422
Event Code: 05E1NY00-2021-E-10494
Project Name: 1011 2nd Avenue
Project Type: DEVELOPMENT
Project Description: Mr. Kevin Vandenburgh is proposing the construction of three (3) multi-family buildings with associated parking lots and public kayak launch on 11.0 ± acres of land. The project is located on 2nd Avenue, City of Troy, New York.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.79332225,-73.67079630021021,14z



Counties: Rensselaer County, New York

Endangered Species Act Species

There is a total of 0 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

ATTACHMENT D

HARTGEN
archeological associates inc

PHASE IB/II ARCHEOLOGICAL SITE EVALUATION

Troy Starlight Development

2nd Avenue
City of Troy and Town of Schaghticoke
Rensselaer County, New York

HAA # 5470-41
OPRHP Not Yet Assigned

Submitted to:
Golub Properties of Watervliet, Inc.
461 Nott Street – MB 617
Schenectady, NY, 12308

Prepared by:
Hartgen Archeological Associates, Inc.

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April 2020

MANAGEMENT SUMMARY

SHPO Project Review Number: *Not Yet Assigned*
Involved State and Federal Agencies: *New York State Department of Environmental Conservation (NYSDEC)*
Phase of Survey: *Phase IB/II*

LOCATION INFORMATION

Municipality: *City of Troy and Town of Schaghticoke*
County: *Rensselaer County*

SURVEY AREA

Length: *1,440 feet (440 meters)*
Width: *560 feet (170 meters)*
Acres: *5.9 acres*

ARCHEOLOGICAL SURVEY OVERVIEW

Number and Interval of Shovel Tests: *65 at a 15 meter (50 foot) interval and 42 at a 7.5 meter (25 foot) interval for a total of 107 tests*
Number and Size of Units: *a total of 8 1x1 meter units*
Areas Raked and Surface Collected: *0.88 acres total with a 1.5 meter transect intervals*

RESULTS OF ARCHEOLOGICAL SURVEY

Number and Name of Precontact Sites Identified: *One - Dickerson Street Precontact Site (USN 08340.001736)*
Number and Name of Historic Sites Identified: *None*
Number and Name of Sites Recommended for Phase III or Avoidance: *One - Dickerson Street Precontact Site (USN 08340.001736)*

RESULTS OF ARCHEOLOGICAL SITE EVALUATION

Site Name and Site Number: *Dickerson Street Precontact Site (USN 08340.001736)*
Cultural Affiliation: *Precontact (Middle and Late Archaic)*
Site Size: *5.37 acres (21,723 m^2)*
Area of Surface Reconnaissance: *0.88 acres total with a 1.5 meter transect interval*
Number of Shovel Tests: *107*
Number of Units Excavated: *8*
Total Area Excavated: *8 square meters*
Number of Sites Recommended Eligible for National Register: *One*

RECOMMENDATIONS

The current APE contains the Dickerson Street Site, a Middle to Late Archaic quarry with multiple loci, representing a full range of extraction and production activities. The site has been determined to be National Register eligible. A Phase III investigation of portions of the site was completed in 2010. The current Study Area includes portions of the site that were not covered by Hartgen's earlier projects. The site has experienced minimal disturbance and demonstrates several criteria for integrity. Avoidance of the defined site area or additional Phase III Data Recovery is recommended.

Report Authors: *Bradley W. Russell, Ph.D.*
Date of Report: *April 16, 2020*

ABSTRACT

Hartgen Archeological Associates, Inc. (Hartgen) conducted a Phase IB/II archeological investigation for the proposed Troy Starlight Development (Project) located in the City of Troy and Town of Schaghticoke, Rensselaer County, New York. The Project requires approvals by New York State Department of Environmental Conservation (NYSDEC). The Project Area is located between 2nd Avenue and the Hudson River (Map 1). It begins north of Row C Way and ends south of Lansing Avenue. It straddles the border of the City of Troy and the Town of Schaghticoke. The development plan for the property has not been finalized. However, in generality, it will involve the construction of multiple unit residential buildings with associated driveways, parking and municipal utility connections. Plans will in part be based on avoidance areas defined by this and previous studies.

The area of potential effects (APE) includes all portions of the property that will be directly altered by the proposed undertaking. The APE encompasses ~9.75 acres total. However, it includes a roughly 4 acre area which was previously subjected to Phase I, II and III investigations and designated the Dickerson Street Precontact Site (USN 08340.001736). The site was determined to contain a mix of quarried outcrops, lithic workshops and camp locations. The survey area for the current study consists of previously undocumented areas within the broader APE and are located to the immediate north and south of the established Dickerson Street Precontact Site, which is believed to extend beyond the previously examined areas. It covers an area of approximately 5.75 acres.

La Porta's model outlines four zones that can be found in ancient quarry sites (La Porta 2000). These consist of Zones I through IV: extraction, milling, ore processing, and workshop zones (2000:12-13). All four of these zones are identifiable at the Dickerson Street Site. Extraction took place at several locations including outcrops located along River Road (presently or in the past), along the east side of a ridge at the southern end of the site and at outcrops present on the west side of ridges in the northern end of the site. These locations show evidence of the removal of material and in several cases contained large extraction hammerstones used in that removal. Milling took place in discrete locations in the southern end of the site, particularly in collection areas 7 and 8, which were marked by dense concentrations of early stage debitage consistent with the separation of useable ores from the surrounding matrix. Some milling activity was also mixed with ore processing in locations such as the workshop area in the southeast corner of the portion of the site investigate in 2008. Other workshop zones, specializing in mid to late stage manufacture of tools, were clustered in the floodplain along the banks of the Hudson.

The Dickerson Street Precontact Site has already been recommended as eligible for the National Register during Hartgen's initial 2008 study of the central portion of the site saying, "It is recommended that the Dickerson Street Site be considered National Register eligible under Criterion D as a site that has yielded or may be likely to yield, information important in history or prehistory." We concur with that recommendation for the whole of the expanded site as defined during the present study.

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PHASE I CULTURAL RESOURCES SURVEY

1 Introduction

Hartgen Archeological Associates, Inc. (Hartgen) conducted a Phase IB/II archeological investigation for the proposed Troy Starlight Development (Project) located in the City of Troy and Town of Schaghticoke, Rensselaer County, New York. The Project requires approvals by New York State Department of Environmental Conservation (NYSDEC).

This investigation was conducted to comply with Section 14.09 of the State Historic Preservation Act and will be reviewed by the New York State Office of Parks, Recreation and Historic Preservation (OPRHP). The investigation was conducted according to the New York Archaeological Council's *Standards for Cultural Resource Investigations and the Curation of Archaeological Collections* (1994), which are endorsed by OPRHP. This report has been prepared according to OPRHP's *State Historic Preservation Office (SHPO) Phase I Archaeological Report Format Requirements* (2005).

The primary objective of this study was to delineate the boundaries of the site(s) so that appropriate avoidance measures can be determined. Our previous work at the Dickerson Street Site concluded:

> The shovel tests demonstrate that, although the artifact density within the Dickerson Street Site fluctuates, the site extends beyond the boundaries of the Study Area to the north and south and is bounded by the Hudson River on the west side. It also originally extended beyond the Study Area to the east, but has since been destroyed by the construction of River Road and likely significantly impacted if not completed destroyed in the vicinity of the houses and other development east of River Road. (Hartgen 2010a:22)

2 Project Information

2.1 Project Location

The Project Area is located between 2nd Avenue and the Hudson River (Map 1). It begins north of Row C Way and ends south of Lansing Avenue. It straddles the Border of the City of Troy and the Town of Schaghticoke.

2.2 Description of the Project

The development plan for the property has not been finalized. However, in generality, it will involve the construction of multiple unit residential buildings with associated driveways, parking and municipal utility connections. Plans will in part be based on avoidance areas defined by this and previous studies.

2.3 Description of the Area of Potential Effects (APE)

The area of potential effects (APE) includes all portions of the property that will be directly altered by the proposed undertaking. The APE encompasses ~9.75 acres total. However, it includes a roughly 4 acre area which was previously subjected to Phase I, II and III investigations and designated the Dickerson Street Precontact Site (USN 08340.001736). The site was determined to contain a mix of quarried outcrops, lithic workshops and camp locations. The survey area for the current study consists of previously undocumented areas within the broader APE and are located to the immediate north and south of the established Dickerson Street Precontact Site, which is believed to extend beyond the previously examined areas. It covers an area of approximately 5.75 acres.

Hartgen's earlier studies of the Dickerson Street Precontact Site (Hartgen Archeological Associates Inc. 2008, 2010a) were completed for the Hudson River PCB Superfund Water Line Project, which was located within

the Village and Town of Waterford and Town of Halfmoon, Saratoga County and the City of Troy, Rensselaer County. The project entailed the installation of a 4.3-mile (7 km) water main to provide the Towns of Waterford and Halfmoon with an alternative water supply during the removal of PCB-bearing sediments from the Hudson River upstream of these towns. A Phase IA/IB/II archeological investigation and site evaluation was completed for the project by HAA in June 2008. The study included a Phase IA literature review for the entire water line, Phase IB field reconnaissance in all appropriate locations along the water line, and Phase II site evaluations of two sites: the Dickerson Street Site and the Water Works Precontact Site (USN 09145.000747). The Phase III study completed in 2010 focused on a 0.5 acre APE for a staging area for directional drilling below the Hudson River. A second drilling location on the west bank of the river contained the Waterworks Precontact Site (USN 09145.000747) which was also investigated by a team from Hartgen (Hartgen Archeological Associates Inc. 2010b).

It should also be noted that a second site simply designated "chert quarries" (USN 08340.001092) in CRIS was initially reported by Karen Hartgen in 1992 as part of the study for the Charles Ellet Apartment Site Project. This should be considered the same as the Dickerson Street Precontact Site and is linked in CRIS although the system contains two distinct USNs and map markers.

According to La Porta's (2000:10-16) model of quarry development, quarries can be divided into various categories based on scale of activity. An "expression" indicates a prospect that may have been tested and demonstrates evidence of extraction during possibly a single episode. A "movement" is a small-scale quarry that may demonstrate division of tasks and specialized tools such as hammerstones. A "motion" is a large scale quarry with variety of quarrying tools and subdivision of tasks evident in the spatial organization of the site. A "trend" is a series of quarries along a strike (the compass direction of a bedded chert formation) (La Porta 2000:12). A group of trends in the same vicinity and within one area of similar geology is a "district." Based on this model, the Dickerson Street Site consists of an extensive movement or a limited motion within a district that extends from Lansingburgh to Pleasantdale.

3 Environmental Background

The environment of an area is significant for determining the sensitivity of the Project Area for archeological resources. Precontact and historic groups often favored level, well-drained areas near wetlands and waterways. Therefore, topography, proximity to wetlands, and soils are examined to determine if there are landforms in the Project Area that are more likely to contain archeological resources. In addition, bedrock formations may contain chert or other resources that may have been quarried by precontact groups. Soil conditions can provide a clue to past climatic conditions, as well as changes in local hydrology.

The development of the regional and local environment is essential to understanding the development of the Dickerson Street Site. In particular, two environmental conditions were most significant in making the site preferable for precontact habitation and use: proximity to the Hudson River and the existence of chert-bearing ridges of shale along the river. The formation of the river bed and topography within the site is primarily the result of the interaction of glaciers and the regional bedrock.

3.1 Present Land Use and Current Conditions

A site visit was conducted by Bradley Russell on December 16, 2019 to observe and photograph existing conditions within the Project Area. The parcel is bounded on the west by the Hudson River (Photo 1) and the east by 2nd Avenue (River Road). The majority of the Study Area remains wooded (Photo 2). A portion located in the previously studied APE contains a mowed lawn and a gravel drive/parking area. The topography is characterized by a series of ridges running north/south parallel to the river. The ridges consist of chert bearing Mount Merino formation shale and Cohoes Melange, with a number of outcrops exposed at the surface (Photo 3). In the southern portion of the property, the river's edge is marked by a sheer, shale cliff face. A relatively level flood plain runs along the river in the northern portion of the Project area. The geomorphology suggests that this portion of the site has been above flood height for several thousand years, allowing it to be a suitable

camp location for Native Americans drawn to the location by the available lithic raw material. Residential properties bound the parcel on its north and south sides resulting in some disturbance and accumulation of litter and other discarded material (Photo 4). The most significant of the disturbance is along the northwestern side of the property where a road bed and parking area have been built resulting in a mix of filling and grading. The northeastern portion of the property contains shallow standing water. Evidence of blasting associated with the construction of 2nd Avenue (River Road) is found in the exposed bedrock along the east side of the Project Area.

3.2 Soils

Soil surveys provide a general characterization of the types and depth of soils that are found in an area. This information is an important factor in determining the appropriate methodology if and when a field study is recommended. Much of the following information was provided by Dr. David DeSimone, who has extensively studied the geomorphology of the upper Hudson Valley and was the consulting geomorphologist for Hartgen's earlier investigations of the Dickerson Street archeological site (Hartgen Archeological Associates Inc. 2010a).

The surficial geology of the Hudson Valley is dominated by landforms and deposits that resulted from continental glaciations which occurred numerous times throughout the Pleistocene Epoch of the last 1.7 million years. The current distribution of glacial sediments is the result of the most recent cycle of glacial advance and retreat of the Hudson-Champlain ice lobe. This ice overrode the region before 25,000 years ago and retreated from the project area approximately 13,700 years ago. As the ice lobe retreated from the Hudson-Champlain lowlands a series of glacial lakes fronted the margin of the glacier. Fine grained lake silt-clay was deposited in the deeper and quiet waters of the lakes while sand was deposited along the wave impacted shores of the lakes. Deltas were deposited by tributary streams emptying into the lakes from the uplands and also from melt-water rivers flowing from beneath the glacier directly into the lakes. Researchers have recognized the importance of major floods of glacial lake discharge that initially came down the Mohawk Valley and formed the Cohoes Falls and other prominent features of our regional landscape (DeSimone, et al. 2008). The exposed bedrock in the project area dates from these flood discharges that stripped the glacial deposits off of the bedrock and defined the present day channels of both the Mohawk and Hudson Rivers.

Soil surveys for Rensselaer County (1988) and Saratoga County (2004) provide a framework for understanding and predicting soils encountered within one meter (3.3 ft) of the ground surface. Soil maps are reasonably reliable in the recognition of "C" horizon or parent material sediment texture. However, these same maps are somewhat unreliable in the interpretation of the origin of the parent material. To provide a context for the different soil types, a review of the mapped soils units, as defined by the soil survey are included below. Following which a more detailed description of the soil development within particular portions of the project area is provided. According to the Natural Resources Conservation Service soil surveys of Rensselaer County (2006 and 2007), soils in the Dickerson Street site consist of the Nassau-Rock outcrop complex, which is comprised of silt loam formed primarily by the disintegration of shale bedrock. Shale is a fissile rock formed in fine silt and clay settling out of deep water. It tends to fracture along thin laminations, resulting in silty loam soils containing large amounts of shale rubble. It is described in detail below in Table 1. The soil description includes the name and symbol, soil horizon and depth, texture and inclusions, slope, drainage characteristics, and the general landform on which they occur (USDA 2006b and 2006c).

Table 1. Soils in Project Area

Symbol	Name	Depth	Textures	Slope	Drainage	Landform
NrD	Nassau-Rock outcrop complex, hilly	0 to 7 inches 7 to 15 inches 15 to 19 inches	very channery silt loam very channery loam unweathered bedrock	25-35%	Somewhat excessively drained	Benches, ridges, till plains

3.3 Bedrock Geology

The bedrock of the Dickerson Street Site and vicinity is very complex and consists of the Cohoes Melange, a 20-kilometer (12.5-mile) wide band of rock that was highly deformed during the Taconic Orogeny. In older literature, the shale of the Hudson Valley is classified as the Normanskill/Canajoharie Formation (Fisher, et al. 1970). More recent research has demonstrated that this shale consists of several formations including the Utica shale and Schenectady Formation shale of the Proto North American plate and the Mount Merino shale associated with the Taconic Arc (Kidd, et al. 1995). It is the Mount Merino shale that contains the green chert identified along the bedrock ridges in the vicinity of the Dickerson Street Site, and therefore, this report refers to the shale as Mount Merino shale within the Cohoes Melange.

The Cohoes Melange formed toward the end of the Ordovician Age when the Iapetus Ocean closed. The pressures of the colliding plates caused the deformation of many of the bedrock formations and the juxtaposition of numerous types of bedrock formed in different environments within the Cohoes Melange. This juxtaposition of bedrock from different sources is evident within the Dickerson Street Site. Most of the bedrock observed within the Dickerson Site consists of Mount Merino formation chert-bearing shale. However, an outcrop of dolomitic sandstone was identified along the southwest ridge in the quarry workshop area. This sandstone was likely formed on the shelf or slop of the Taconic Allochthon and was juxtaposed with the deep water Mount Merino shale during the Taconic Orogeny's deformation and compression of the rocks of the Iapetus Ocean. As a result, rocks formed in very different environments and with different compositions and properties outcrop within 15 meters (50 ft.) of each other within the Cohoes Melange of the Dickerson Street Site.

The Cambrian- and Ordovician-age (570 to 505 and 505 to 436 million years ago) cherts of New York are relatively free of fossils and are generally found in formations of shale and argillite such as the Normanskill/Canajoharie and Mount Merino formations. Cherts bedded in shale and slate are typically thought to have formed in deep ocean deposits near volcanically active faults between continental plates. Some researchers theorize that these cherts formed directly from volcanic sediments under conditions of high pressure and dynamic temperature and that silica-secreting organisms were not involved (Luedtke 1992). This theory accounts for the lack of fossils in these cherts. The chert-bearing shale in the project area east of the Hudson River consists of Ordovician-age (505 to 436 million years ago) bedrock. The chert in this bedrock was formed in a deep ocean environment and does not include fossils. The chert within the formation ranges in quality from true chert to siliceous shale, or shale that has a high silica content and has similar properties to chert but is generally softer and grainier.

3.4 Physiography and Hydrology

Steeply sloped areas are considered largely unsuitable for human occupation. As such, the standards for archeological fieldwork in New York State generally exclude areas with a slope in excess of 12% from archeological testing (NYAC 1994). Exceptions to this rule include steep areas with bedrock outcrops, overhangs, and large boulders that may have been used by precontact people as quarries or rock-shelters. Such areas may still warrant a systematic field examination.

During the early Holocene, the Dickerson Street Site was located within a series of ridges bordered on the west by the Hudson River. These ridges were comprised of Mount Merino shale and other rocks of the Cohoes Melange. The chert within the shale and other types of bedrock such as the dolomite found within the Dickerson Street Site were more resistant to glacial and post glacial erosion, resulting in the preservation of the ridges as the surrounding shale was eroded.

The USDA soil survey of Rensselaer County (2006) does not include the floodplain located within the Dickerson Street Site. This area was likely overlooked and simply grouped with the surrounding Nassau rock outcrop during the soil survey mapping due to its small size. The floodplain was formed during the early to mid-Holocene and consists of a massive deposit of fine sand, very fine sand, silt, and minor clay. The flooding

may have begun during the early Holocene and ceased at least 3,900 years ago based on the finding of a Sylvan Stemmed projectile point (2400 to 1900 B.C.) within the A horizon developed above the massive silt deposit (Funk 1976:250). No evidence of cultural horizons such as A horizon development or artifacts were found deeper than one meter (3.3 ft.) during the archeological investigations, demonstrating that the site was occupied after flooding ceased. The cessation of flooding within the Dickerson Street Site may have been a result of isostatic rebound, which exerted a significant effect upon topographic development until the mid-Holocene and is still evident today in some areas. Though it has not been fully studied, there is evidence that terrain was affected disproportionately and that drainage and alluviation patterns were altered during isostatic rebound.

The location of the Project Area just one kilometer to the north of the confluence of the Hudson and Mohawk Rivers would have placed it at a key transport route for the native peoples of the area, allowing efficient canoe travel to the north, south and west. The waterways would have provided a variety of resources such as fish, waterfowl and beaver. In fact, all three were observed during our work at the site. Combined with the presence of available lithic raw materials, the location has very high Precontact sensitivity.

4 Previous Studies of the Dickerson Street Precontact Site

Phase IB/II investigation (Hartgen Archeological Associates Inc. 2008) of the Dickerson Street Precontact Site (USN 08340.001736) involved the hand excavation of 166 shovel tests and the mechanical excavation of four trenches totaling 62 meters (207 feet) in length and roughly 1 meter wide. The survey included a mix of 15 meter (50 foot) and 7.5 meter (25 foot) interval shovel tests.

Researchers divided the site into five distinct environmental zones (Southwest Ridge, Chert Workshop and Quarry, Floodplain, Northeast Ridge and East Swale) based on the topography and results of shovel tests. The Southwest Ridge contains exposed bedrock outcrops along its east side. Two depressions below the outcrops indicated possible chert extraction near tests 2 and 19. The Chert Quarry and Workshop extended north and east from these outcrops near Second Avenue (River Road). Tests from the area (STPs 1, 25, 27 and 47) produced between 100 and 277 lithic artifacts each. STP 1 contained remains representing several stages in the quarrying and reduction sequence from extraction to the production of preforms. The Floodplain located along the river contained the highest density of materials anywhere in the Project Area. The density was highest close to the shoreline and dropped moving to the east away from the water. The presence of numerous thinning and trim flakes from the area suggest mid to late stage production. The area also contained an abundance of fire-cracked rock indicating the possible presence of undiscovered hearths. The Floodplain was divided into a north and south section by the excavation of a modern sewer ditch draining into the Hudson. The two lowest density areas were the Northeast Ridge and the East Swale (erroneously referred to as the West Swale in the 2008 report text). The Northeast ridge is located east of the Floodplain and north of the Chert Workshop and Quarry. It contained no surface outcrops and was more exposed to the elements than other areas of the site. The East Swale contained some standing water and was likely wet, possibly seasonally inundated in the past accounting for limited finds.

The four backhoe trenches excavated during the investigation were divided between the high density flood plain area and an area of disturbance associated with a deeply buried sewer line running from southeast to northwest across the Study Area. Trenches 1 and 2 were excavated to provide data concerning the stratigraphy of the floodplain and to determine the depth of archeological deposits. Trench 1 revealed that the greatest density of artifacts occurred around the interface between level III, a dark brown, shale rubble colluvium and Level IV, a yellowish brown, silt alluvium. Both were covered by a roughly 50 centimeter deep layer of dark yellowish brown, clay topsoil. Trench 1 produced only 20 Precontact artifacts. There were only a few of each artifact subtype and the artifacts were not in usual proportions, demonstrating that Trench 1 was likely on the periphery of a larger deposit and not in the immediate vicinity of a lithic workstation or significant activity area. Interestingly, most of the debitage consisted of siliceous shale with only two chert artifacts.

784 artifacts were recovered from Trench 2. These included Late Archaic Brewerton and Lamoka projectile points from the Vosburg Complex (3,400 to 2,400 B.C.) and the Sylvan Lake Complex (2,400 to 1,900 B.C.) respectively (later reclassified see below). Most of the artifacts from Trench 2 were recovered from Level 1 topsoil and the very top of Level 2 alluvium, none deeper than 50 centimeters. The datable points were recovered from the interface of the two levels, indicating that the alluvial deposit developed in the early Holocene and that no artifacts would be present below 1 meter depth.

Trenches 3 and 4 were excavated across the route of the 1930's sewer pipeline to determine the boundaries of the associated soil disturbance. Results indicated that the disturbance ranged between 5 (Trench 1) and 9 meters (Trench 2) wide.

In total, the Phase IB work produced 3,990 artifacts suggesting that the site was divided into several distinct functional areas, with quarrying, milling, reduction/preform production and late stage lithic production which was associated with a riverside alluvial floodplain. Diagnostic points indicated that the site dated to the Late Archaic Period with examples of projectile points representing the Vosburg Complex (3,400 to 2,400 B.C.) and the Sylvan Lake Complex (2,400 to 1,900 B.C.). It was shown that the site extended from the River in the west to 2nd Avenue (River Road) in the east. However, it was not possible to define boundaries in the north or south because the deposits extended beyond the Study Area. It was determined that the site was National Register Eligible under Criterion D and was likely to yield information important to history or prehistory and met all seven aspects of integrity. It was recommended that Phase III Data Retrieval be conducted on any areas to be impacted by planned horizontal drilling operation.

Phase III study the Dickerson Street Precontact Site (Hartgen Archeological Associates Inc. 2010a) was restricted to areas that would be directly impacted by the planned horizontal drilling operation. It involved surface collection (following brush removal and surface exposure), the excavation of an additional 87 shovel tests (producing 253 tests total), and the excavation of 20 units. 15 of the units were located within the Phase II APE. With EPA approval, 5 additional tests were located in the area of the previously identified quarry and workshop to further clarify its structure and function. Specialized analysis included thin section analysis to identify raw materials being exploited and compare them to three other local quarry sites. Two projectile points were analyzed for the presence of residues to determine if and how they were used prior to discard. Pollen and phytolith analysis was used to reconstruct past environmental conditional at the site. Finally, samples of fire-cracked rock (FCR) were tested for the presence of organic residues. Taken together with the results of previous studies, a total of 6,721 precontact artifacts were collected from the Dickerson Street Site. Results of the study incorporated findings from all three phases of investigation.

4.1 Artifact Analysis

The thousands of recovered artifacts were analyzed to fully understand the extraction and production processes taking place at the Dickerson Street Site. Classifications for the lithic materials were based on widely accepted approaches (Andrefsky 1998; La Porta 2000, 2006; Odell 1982, 2004; Whittaker 1994) and considerations specific to the Dickerson Street Site. The collection was divided into five main artifact types as shown in Table 2.

Table 2. Artifact Types

Type	Count
chipped stone tool	41
debitage	6,175
fire-cracked rock	481
rough stone tool	21
projectile point	3
Total	**6,721**

The five artifact types were further divided into 25 subtypes. Since the Dickerson Street Site provides the rare opportunity to study the results of the stone tool manufacturing process from start to finish, the subtypes in Table 3 are in the order that they would usually be used or produced during the stone tool production process.

Table 3. Artifact Types and Subtypes

Type	Subtype	Count	Percentage of Type*
rough stone tool	extraction hammerstone	3	14%
	hammerstone	17	81%
	wedge	1	5%
debitage	gangue	554	9%
	shatter	1,707	28%
	block	401	6%
	core	69	1%
	exhausted core	11	0%
	flake	39	1%
	quarry flake	412	7%
	block flake	399	6%
	thinning flake	1,977	32%
	trim	564	9%
	bifacial thinning flake	42	1%
chipped stone tool	retouched block	2	4%
	retouched flake	5	11%
	biface, stage 1	14	31%
	biface, stage 2	6	16%
	biface, stage 3	6	11%
	biface, fragment	7	16%
	scraper	1	2%
projectile point	Sylvan Stemmed	1	2%
	stage 2	1	2%
	untyped	1	2%
fire-cracked rock		481	100%
Total		6,721	
*Projectile points are included with chipped stone tools in percentage calculations			

As with almost all precontact sites, the most common type was debitage, which consists of byproducts of the tool manufacture process consisting primarily of flakes. The second most frequent type was fire-cracked rock. The rarest types were projectile points, followed by rough stone tools and then chipped stone tools.

The combined results produced a detailed picture of quarrying and workshop activities across the study area which was divided into five distinct zones as discussed above. The combined data indicate that the strategically located site was exploited for Mount Merino chert (along with lower quality siliceous shale) and fine grained dolomite during the late Archaic Period. Both materials were quarried, refined and worked into finished tools at a mix of quarry and workshop locations across the site. The thin sections from the collection demonstrate that the site is unique in that it contains bedrock formed at different locations within the Iapetus Ocean that was subsequently brought together during the Taconic Orogeny. Native American quarriers and flintknappers at the site used both the chert of the deep-water Mount Merino shale formation and fine-grained dolomite formed from sandstone of a shallower shelf or slope environment as raw material for stone tool manufacture. Some Onondaga and Helderberg Formations chert was present but likely just from retouch and sharpening of tools made elsewhere. For geographical reasons, it seems likely that Mount Merino quarries in river valleys may have been preferable to Native Americans for their convenience and relative comfort. However, Onondaga

cherts were widely used and it was obvious that precontact people found it important to seek quarries of this material in the mountains.

4.2 Environmental Reconstruction

Pollen, phytolith, and organic residue identifications demonstrate that the environment of the flood plain was significantly different when it was first occupied compared to the modern environment. During the Late Archaic period, the flood plain was likely more open and contained more grasses and shrubs. A greater abundance of wetland vegetation was present. There is evidence of cattail and wild rice in the area at that time. These plants may have flourished wet portions of the floodplain such as the backswamp, where the current was much less than in the river channel. It is likely that these resources would have been used by precontact occupants of the site for food and basketry. Additionally, organic residues found on fire-cracked rock suggest use of pokeweed or other leaves, and tobacco, which may also be a modern contaminant. The fire-cracked rock samples each had residues of deteriorated cellulose from plant processing.

5 Background

The following summarizes the available site information prior to the current Phase IB/II investigations.

Table 4. Summary of archeological site information collected during the Phase I survey

Characteristic	Site information
OPRHP Site No.	08340.001736
Site Name	Dickerson Street Precontact
Description	The Dickerson Street Site is located on the east shore of the Hudson River on a series of ridges of chert-bearing Mount Merino shale and other rocks of the Cohoes Melange. Several precontact chert quarry sites have been identified in the vicinity. The Dickerson Street Site consists of a quarry and workshop area on one of the elevated ridges and a flood plain with evidence of camps. Three bedrock outcrops with two types of lithic ore were present at the site. The lithic ores consisted of chert and a fine crystallized dolomite that demonstrated conchoidal fracture and was worked extensively in the surrounding workshop. Artifacts collected from the workshop consisted of quarry tools such as a wedge and hammerstones. Chert cores and early stage bifaces were also common. Near the workshop was the relatively sheltered floodplain located between two ridges and the Hudson River. Late Archaic projectile points found near the surface indicate that the floodplain was formed over 4,500 years ago, and geomorphological evidence suggests that the precontact occupation occurred almost entirely after the floodplain was formed. In addition to projectile points and other tools, large quantities of debitage and fire-cracked rock were collected from excavations on the floodplain. These artifacts suggest that once cores and flake blanks were produced in the quarry workshop nearby, they were transported to the relatively sheltered camps on the floodplain to be made into finished tools. The Dickerson Street Site provides the opportunity to study the entire process of stone tool production from its initial states in the quarry workshop to the formal states in the floodplain camps.
Date	A Lamoka projectile point diagnostic of the Sylvan Lake Complex of the Late Archaic Period was identified at the site. The site was likely occupied at other times as well.
Function	Quarry, lithic workshop and temporary camp(s)
Size	5.37 Acres (21,723 m^2)
Location	NAD 83, UTM Zone 18, 608696 Easting, 4738688 Northing

6 Archeological Site Evaluation

6.1 Methodology

6.1.1 Shovel Testing

Our initial testing involved a 15 meter regular interval grid across all portions of the study area that were feasible for testing. Certain areas in the northern portion of the study were excluded based on standing water, steep slope or clear disturbance. Tests were excavated at a reduced interval of 7.5 meters (25 ft) within areas shown by the initial testing to contain archeological remains. Results of Phase IB testing indicated three specific areas that we deemed appropriate for close interval shovel testing. The first was on the relatively level flood plain along the Hudson River where initial testing revealed indications of lithic workshop activity. The second location chosen for close interval testing was a level area on top of a ridge showing evidence of extraction activity and later stage lithic tool production. The third area selected produced evidence of a historic midden deposit to the east of the largest ridge within the Study Area. All three of these areas were contained in the northern portion of the Study Area.

Each shovel test was 40 centimeters (16 in) in diameter. All excavated soil was passed through 0.25-inch hardware mesh and examined for both precontact (Native American) and historic artifacts. The stratigraphy of each test was recorded including the depth, Munsell color, soil description, and artifact content (Munsell Color 2000). The location of each shovel test was plotted on the project map. Test excavation was photographed (Photos 5-7).

6.1.2 Surface Collection

Eight areas (0.88 acres in total) were raked to remove dried leaves and light snow where present and a non-systematic sample of surface materials collected from each. Seven of the eight areas were positioned based on the presence of test that were positive for Precontact material and had scatters of surface material. Test Area #5 was selected because it was a slope below a linear shale outcrop with evidence of raw material extraction including a large hammer stone sitting directly on top of the outcrop. The area itself was not shovel tested because the slope made that work impractical and potentially unsafe.

Areas identified for surface collection were raked to remove leaf litter/snow and expose features and artifacts before the fieldwork began. Archeologists lined up at 1.5-meter (5-ft) intervals to walk the plowed areas. Precontact (Native American) artifacts and significant historic artifacts observed on the surface were collected from within numbered collection areas. All surface material was from areas 1-6. Areas 7 and 8 contained dense deposits of quarry flakes, block flakes and large shatter which was not collected. Instead it was cleared and photographed as it was felt that was the best way to characterize the nature of the material present. Each collection area was mapped using a Trimble Geo 7X GPS for inclusion in our maps. Surface collecting fieldwork was photographed (Photos 8-10).

6.1.3 Unit Excavation

Eight 1x1 meter units were excavated, six in the north portion of the Study area and two more in the south. Units #1 through 3 were all located in the floodplain in the north portion of the Study Area in a location with numerous positive shovel tests and abundant surface remains. Units #4 and 6 were located at the base of a slope descending west from the main bedrock outcrop in the north section of the Study Area. Unit #5 was located in a level area extending east from the top of the same bedrock. The area contained multiple positive shovel tests and a surface scatter. Unit #7 was located in a level area below a low ridge running parallel to the Hudson below two blocks of green Mount Merino chert located at the edge of the ridge. Unit #8 was located on top of the ridge on the east side of the chert finds. Both were located close to positive shovel tests containing Precontact materials.

Soil levels were excavated separately, and all excavated soil was passed through 0.25-inch hardware mesh and examined for both precontact (Native American) and historic artifacts. Soil depths, Munsell colors, textures,

artifact content, and other relevant observations were recorded (Munsell Color 2000). Profiles and plan views were drawn when appropriate. The location of each unit was mapped with a Trimble Geo 7X GPS and plotted on the project map. Unit excavation fieldwork and unit wall stratigraphy was mapped and photographed (Figures 1-8).

6.1.4 Artifacts and Laboratory

As general procedure, all precontact (Native American) cultural material identified during the fieldwork are collected. Significant historic artifacts such as glass, ceramics, food remains, hardware, and miscellaneous items are collected. Coal, ash, cinder, brick, and modern materials are noted. Any artifacts collected are placed in paper or plastic bags labeled by provenience and inventoried in a bag list. Bags are numbered in the field and transported to the Hartgen laboratory in the Town of North Greenbush, Rensselaer County, New York, for processing.

Shovel test records and other provenience information were entered into a Microsoft *Access* database (Appendix 1). Artifacts were cleaned and cataloged. Cataloging entailed entering artifact provenience information, counts, weights, and descriptive information into the database (Appendix 2).

6.2 Results

Phase IB archeological field reconnaissance and Phase II site evaluation were conducted between December 16, 2019 and January 3, 2020. The field crew consisted of Thomas Boyd, John Ham, Cynthia Jackson, Jamie Penk and Amy Wilson under the direction of Principal Investigator Bradley Russell, Ph.D.. The weather was a mix of late fall and early winter temperatures and precipitation. When work began, dry leaf litter covered the ground. It was covered in a light layer of snow which melted again toward the end of the work. The leaf litter was raked away to expose the surface for systematic collection. Overall, the weather did not negatively impact visibility, artifact recovery, etc.

A total of 107 shovel tests were excavated to an average depth of 35 centimeters during the combined Phase IB/II study. 65 of those tests were excavated in a regularly spaced 15 meter grid across the entire study area, these constituted the Phase IB portion of our work and guided later site evaluation work described below. The reminder of the shovel tests were placed to create a 7.5 meter, close interval grid in areas that the initial testing had produced positive tests and were part of the Phase II study of the site.

Testing confirmed our initial assumption that deposits related to the Dickerson Street Site extended beyond the previously studied central area of the APE. The clustering of positive tests in several areas suggested the presence of extraction/quarry areas, milling areas where chert ores were liberated from their surrounding shale matrix, and workshop areas where quarried material was crafted into finished tools. The workshop areas appear to have also functioned as temporary camps. Combined with previous Hartgen studies, this new data suggested a rather large, 5.37 acre site with multiple loci each serving distinct functions. See Table 5 for a summary of fieldwork conducted during the present study and Table 6 for a combined summary of all work from this and previous investigations.

Table 5. Summary of Phase II field investigations

Field method	Qty/Area	Rationale	Results
Shovel tests	107 tests	A 15 meter grid (50 foot) grid of shovel tests was utilized to initially characterize the distribution of archeological material within the Study Area. Additional close interval testing was conducted in three areas that were shown to have positive tests during the initial survey. The results of these tests served to guide our later placement of excavation units and surface collection activities.	6 shovel tests were positive for Historic remains. The majority of these tests were located directly to the east of the large ridge located in the north end of the APE. 32 shovel tests were positive for Precontact archeological material. Clustering of positive tests suggested several loci of activity and guided the placement of units.

Field method	Qty/Area	Rationale	Results
Surface collection	8 areas totaling 0.88 acres	Observation of the site conditions suggested that a larger sample of the archeological material present could be efficiently collected by removing the leaf litter and surface collecting areas where positive shovel tests clustered.	Collection produced a significantly expanded sample of the artifacts present at the site.
Units	8	Eight units were excavated to provide a larger sample and to provide more vertical control and a better understanding of the site stratigraphy.	Units provided more detailed information about site stratigraphy and a controlled sample of artifacts present at the site.

The findings of the Phase IB survey indicated that Phase II site evaluation would be appropriate and necessary to define the site's boundaries and chronology. This process involved excavation of the 42 close interval shovel tests described above in locations where the initial testing has produced clusters of precontact tests. That sample was further expanded by raking away leaf litter obscuring the ground surface and systematically walking and surface collecting 8 areas based on positive shovel tests and the presence of observable surface artifact scatters. In total, 0.88 acres were cleared and collected. Based on the results of the combined shovel testing and observation of the surface remains, eight locations were selected for placement of 1 by 1 meter excavation units. Three units (#'s 1-3) were placed in the flood plain running along the Hudson River. Two units (#'s 4 and 6) were placed at the base of a slope below an outcrop of shale and chert that showed evidence of having been quarried. One unit (# 5) was placed on a level area at that top of these outcrop. All six of these were located in the northern portion of the Study area. Two additional units were placed in the southern portion, one (# 8) on top of a low ridge where several large cobbles of green chert (Photo 14) were observed and one (# 7) in a flat area between the ridge and the steep drop off to the Hudson River below.

Table 6. Combined summary of all field investigations

	Site Area	Central (2010)					North (2020)	South (2020)					
		Phase IB/II	Phase III	Total	Area m2	Area ft2	Phase IB/II	Phase IB/II	Total	Area m2	Area ft2	Area Acres	Grand Total
Mechanical Excavation													
Backhoe Trenches		4		4	63	678							4
Hand Excavation													
Shovel Tests		166	87	253			88	19	107				360
Units			20	20	20		6	2	8	8	86		28
Surface Collections													
# of areas		12	32	44			5	3	8	3561	38330	0.88	

6.2.1 Site Boundaries within APE

By combining the results of the current study of the northern and southern portions of the APE and findings from Hartgen's previous investigations within the central portion of the Project Area (Table 6), we have been able to establish boundaries for the broader Precontact site and four distinct loci within it (Maps 3a and 3b). Those four loci reflect distinct activity areas related to extraction of raw material from chert bearing shale outcrops, the processing of the extracted ores to remove and discard unwanted matrix material and workshop areas where the high-graded ores were processed into finished tools. La Porta provides a description of major

task areas that are found within many quarries, especially within motions. These consist of Zones I through IV: extraction, milling, ore processing, and workshop zones (2000:12-13). The 2010 Hartgen study suggested that the Dickerson Street Site is somewhat less spatially segregated that the LaPorta model suggests, combining some milling and ore processing activities into the same areas. The conclusions of the 2010 study on the central area of the APE concluded:

> In contrast to LaPorta's four-zone model, the Dickerson Site could more easily be described in terms of three zones: 1) the zone of extraction where milling also occurred, 2) preliminary workshops where milling, ore processing, and the reduction of ore into manageable cores occurred, and 3) workshops where cores were chipped into finished tools.

However, the addition of the deposits of large early stage waste material encountered in Areas 7 and 8 conform well to LaPorta's Zone II milling area, bringing the site into closer conformity with the model.

- Zone I Extraction - In addition to the extraction zone previously identified along River Road at the southeast corner of the 2010 study area, new extractions areas were identified along the east side of collection area 6 in the south of the APE (Locus 1) and along a linear outcrop located at the top of a ridge running between collection areas 4 and 5 in the north (Locus 3) (Photo 11). While specific outcrops were not observed along the large ridge at the northern boundary. Finds from STPs 53 and 54 indicate the possibility of extraction along the west slope of the ridge. Survey of the ridge, the largest in the study area, was not systematic and was particularly difficult due to the heavy slope and vegetation.

- Zone II Milling - Deposits in surface collection areas 7 and 8 (Photos 12 and 13), located at the southern end of the APE contained almost exclusively large quarry flakes, and shatter consistent with milling of material most likely extracted from the previously identified extraction zone along River Road (much now likely destroyed by road construction, blasting, etc. documented during the 2010 study) and a ridge of usable material located along the eastern edge of collection area 6.

- Zone III Ore Processing Zone – The earlier 2010 study identified artifacts consistent with ore processing activity in what we are now calling Locus 2 (note that Locus 2 boundaries have been drawn to exclude areas of disturbance associated with a graded gravel parking area). The location also contained evidence of some milling activity.

- Zone IV Workshop – The 2010 study identified a workshop/campsite area on the floodplain along the shore of the Hudson (Locus 4). Our research shows that the area extends north along the river and taken together contains two areas that likely represent consecutive occupations at different points during the long use of the site as a quarry.

The survey also revealed the presence of an early 20th century dump immediately to the east of the large ridge at the very north end of the APE. It was revealed in remains recovered from STPs 40, 42, 102 and 104, which contained, among other items, a complete Brownatone hair dye (TPQ 1911) (Photo 15) and Mazola salad bottle (TPQ 1940). No associated features, foundations, etc. were located in the area. The small deposit does not have the potential to provide significant information about the past and did not warrant additional investigation (units or surface collection) beyond close interval tests used to establish its extent.

With regard to the vertical distribution of archeological material, our results conformed to the earlier studies finding that all remains were located in the first meter below the surface. Of the eight units excavated during the present study, none produced artifacts below 80 cm. See below for a more detailed discussion of site stratigraphy.

6.2.2 Site stratigraphy

A total of eight units were excavated and provide our best vertical control and information about site stratigraphy. The stratigraphy varied significantly across the site, particularly between the low lying flood plain

and areas on ridges. Units 1-3 were all located near the river, on the northern floodplain. They were our deepest units. Units 4 and 6 were located at the base of a ridge with a worked shale outcrop. Unit 5 was located on a level area at the top of that outcrop in very shallow soil. Units 7 and 8 were placed in the southern section of the APE immediately below and on top of a bedrock ridge running parallel to a steep drop off down to the Hudson River.

Northern Floodplain

Unit 1 was excavated to a depth of 1 meter in 8 arbitrary levels (Figure 1). It contained three distinct strata. The first was a dark, yellowish brown (10YR 4/4) silt loam organic layer measuring 16 cm deep which contained a mix of modern bottle glass, lithic flakes and fire-cracked rock. He second was an A Horizon of dark, yellowish brown (10YR 5/6) silt loam extending down to approximately 50 cm which contained FCR, lithic flakes and shatter. The subsoil was a light, yellowish brown (10YR 6/4) silt loam containing a small number of lithic flakes (near its top) that was excavated into sterile soil 1 meter below the surface.

Unit 2 was excavated to an average depth of 76 cm in 7 arbitrary levels (Figure 2). It contained two strata sloping down toward the west. The first was a very dark, greyish brown (2.5 YR 3/2) silt loam A Horizon containing a mix of modern material (bottle glass, metal and plastic) and lithic flakes. The subsoil is a light olive brown silt loam containing a biface, lithic flakes, shatter and fire-cracked rock. It was terminated at bedrock.

Unit 3 was excavated to a depth of 70 cm in 5 arbitrary levels (Figure 3). Its stratigraphy was similar to Unit 1 with a dark brown (10YR 3/3) A Horizon roughly 12 cm deep which contained a well preserved, intact Genesee point near the interface with the subsoil which was the same light, yellowish brown (10YR 6/4) silt loam seen before. It contained lithic flakes, shatter, and FCR which decreased in density until sterile soils between 50 and 70 CM led to the end of excavation.

Base of Northern Ridge

Unit 4 was excavated to an average depth of 80 cm in 6 arbitrary levels (Figure 4). Soils contained dense concentrations of fragmentary shale channery that has accumulated at the base of the ridge. The stratigraphy was somewhat more complex than seen along the river floodplain. We encountered 4 distinct strata. The uppermost was a very dark brown (10YR 2/2) silt loam containing historic ceramics, a lithic biface, flakes, a core, shatter and fire-cracked rock. It reached a maximum depth of 40 cm below the surface. Below that was a dark yellowish brown (10YR 4/4) silt loam with a great deal of channery, roughly 15 cm deep. It contained flakes and shatter. The third strata, present in the northeast corner of the units was a very dark brown (10YR 2/2) silt loam with channery with just three flakes. At the base of the unit was a layer of dark greyish brown channery silt loam that contained one flake near the top and became sterile, resulting in unit termination.

Unit 6 was placed farther north along the base of the same ridge as Unit 4 (Figure 6). It was excavated to a depth of 80 cm in 4 arbitrary levels. Three strata were identified. The upper strata contained very dark greyish brown (10YR 3/2) silt loam containing flakes, shatter and bottle glass. It was roughly 40 cm deep. The second strata was also 10YR 3/2 silt loam, with a depth of around 15 cm. But, it had a significant quantity of shale channery present. It contained lithic shatter and a single hammerstone. The lowest strata was a yellowish brown gravelly silt loam. It was sterile throughout leading to the termination of the unit.

Top of Northern Ridge

Unit 5 was a very shallow unit sitting just above a worked section of the exposed bedrock of the northern ridge (Figure 5). A large extraction hammer stone was found sitting at the top of the exposure and a significant surface scatter was present all around the unit's locations. It was excavated to bedrock, an average depth of 11.5 cm, in a single natural level. It consisted of black silt loam and contained lithic flakes and shatter.

Base of Southern Ridge

Unit 7 was placed just to the west of two large cobbles of green chert (Photo 14) visible on the surface of the southern ridge in surface collection area 6 (Figure 7). It was excavated to an average depth of 34.5 cm in two

arbitrary levels. It contained two strata. The first was a very dark brown (10YR 2/2) silt loam with channery with an average depth of around 15 cm. It contained no artifacts. The second strata was a light reddish brown (2.5YR 6/4) silt loam which contained a great deal of channery. It was excavated to sloping bedrock with a maximum depth of 56 cm and was also found to be sterile.

Top of Southern Ridge

Unit 8 was located to the east of the same green chert cobbles mentioned above and was excavated to an average depth of 61.5 cm in 3 arbitrary levels (Figure 8). It contained just a single strata, the same very dark brown (10YR 2/2) silt loam with channery seen at the bottom of the ridge. However, it proved to be heavily disturbed with precontact materials intermingled with historic and modern artifacts. The profile of the excavation showed a block of exposed bedrock which was once likely exposed before the disturbed material was piled up around it. The unit was abandoned once the extensive disturbance was understood. It is probably that the material was bulldozed onto and down the west slope of the ridge during construction of the home south of the APE. Further examination of the green chert cobbles showed them to be sitting on surface the disturbance, loosely imbedded and out of their original context.

6.2.3 Site Chronology

Despite the presence of a significant quantity of fire-cracked rock recovered from the combined projects, no intact hearths or other features were encountered that might have provided datable carbon samples. Therefore, the chronology for the Dickerson Precontact Site is based entirely on four diagnostic projectile points. Hartgen's previous studies varied in their interpretation of the points collected in their 2008 season. The investigators initially reported two Late Archaic points, a Brewerton from the Vosburg Complex (5,000 - 4,000 B.P.) and a Lamoka from the Sylvan Lake Complex (5,500 - 3,500 B.P.). A third untyped point was also recovered. The later 2010 analysis reclassified the first of these as simply an unfinished and therefore not diagnostic stage 2 point while reclassifying the Lamoka as a Late Archaic Sylvan Stemmed point. Therefore they assigned a Late Archaic date to the site, while noting that other occupations were possible. This survey produced three additional diagnostic points (Photo 15), all from Locus 4, the workshop/camp location on the river's northern floodplain. Unit Three produced a Middle Archaic Genesee point (4,900 - 3,800 B.P.) from approximately 20 cm below the surface near the subsoil interface. Surface collections from Area 3 produce two additional specimens not far from Unit three, a Late Archaic to Early Woodland Adena Point (3,500 - 1,300 B.P.) and a Middle Archaic Vosburg point (5,200 - 4,500 B.P.). Consequently, we can say that the deposits represent a multi-component site utilized in the Middle and Late Archaic periods, possibly into the Early Woodland. This may account for two distinct clusters of remains within Locus 4, the workshop/camp portion of the site.

6.2.4 Artifact Analysis

Rather than simply focus on the finds from the current project, it is more direct and more accurately describes the nature of the entire site to look at the combined results of the 2008, 2010 and the current project. All totals are broken down in Table 7 below. Taken together, the data indicate that the site was a quarry site that contains four specific loci of activity reflecting all four zones of quarry activity that were part of the La Porta model, zones of extraction, milling stations, ore processing stations and workshops (La Porta 2000). Diagnostic artifacts indicate that the quarry was in use during the Middle Archaic, Late Archaic and possibly the Early Woodland Period. The site has experienced very limited disturbance and retains key elements of site integrity and the potential to provide valuable information about the past which make it National Register Eligible as indicated in earlier reports and confirmed by this additional investigation.

In order to facilitate comparisons and provide a holistic picture of activities across the entire site, the current study followed the analytical methods and categories employed in the 2010 report. Five main types of artifacts were documented including: rough stone tools, debitage, chipped stone tools, projectile points and fire-cracked

rock. Those were further broken down into a number of subtypes in order to elucidate specific activities taking place across the site.

A total of 8,247 precontact artifacts have been collected from the Dickerson Street Site. As with almost all precontact sites, the most common type was debitage, which consists of byproducts of the tool manufacture process consisting primarily of flakes. The second most frequent type was fire-cracked rock. The rarest types were projectile points, followed by rough stone tools and then chipped stone tools.

Rough Stone Tools

Rough stone tools generally consist of cobbles or other stones made of materials other than chert. They are often selected for their shape, size, and other properties and used with little preparation. Whereas chert artifacts are typically categorized by the way the artifact was prepared before use, rough stone tools are typically categorized by use-wear, such as peck marks and pitting on hammer and anvilstones or polish on rough stone tools used for grinding. Rough stone tools are described first in this analysis because many of the rough stone tools found at the Dickerson Street Site were employed during the extraction of the lithic material from bedrock outcrops or the initial high-grading and reduction of the material into manageable pieces. All but one of the rough stone tools consist of hammerstones, or hard cobbles used as hammers to break lithic material into more manageable pieces. Hammerstones have damage such as pecking or flake scars on the striking surface. The other rough stone tool is a possible wedge used to focus the force of a hammerstone during the process of sizing blocks of ore.

A total of 34 rough stone tools were recovered during all stages of investigation at the Dickerson Street site. Six (18%) of those were large, heavy extraction hammerstones (Photos 17-19) used to dislodge ore and surrounding matrix from the various outcrops being exploited. They were, as would be expected, generally found in the vicinity of rock outcrops. The vast majority (79%) of the rough stone tool collection consisted of the smaller hammerstones (Photos 20-21) used to refine extracted ores and produce finished tools. These hammerstones were generally small enough to be wielded in one hand and were used to refine raw lithic material and during flintknapping. Hammerstones were disproportionately encountered in the workshop areas in the central portion of the site and in workshops in in Locus 4 floodplain. The latter were typically small examples suggesting more refined late stage production activities. A single wedge shaped piece of stone showing use wear was believed to have been used to focus the force of extraction blows and aid in widening cracks in the matrix.

Debitage

Debitage consists of the lithic byproducts of the stone tool production process. Debitage includes a wide variety of artifacts including waste from all stages of stone tool manufacture including extraction, high-grading, initial reduction, and finishing stages. The types of debitage found in an area are often the clearest indicators of the stages of tool production that took there. Following the progression of tool manufacture, this section describes the debitage subtypes produced during the extraction and beneficiation processes, and then the flakes produced during the flintknapping process.

The extraction and beneficiation (early stage) processes produce a large quantity of angular and irregular fragments of chert and surrounding matrix as the lithic material is broken from outcrops, separated from its matrix, and high-graded. The byproducts of these processes have been categorized into subtypes block, gangue, and shatter. The following subtype classifications were used for angular blocks of chert resulting from the initial stages of tool manufacture:

- **Block.** A piece of lithic material generally bounded by joint or cleavage planes, lacking flake scars, and containing at least one blank. A block consists of useable ore removed from an outcrop with no additional processing. In all, 440 blocks were recovered, representing 6% of the site's debitage.
- **Gangue.** A piece of lithic material with a length of four centimeters or greater, a thickness of one centimeter or greater, generally bounded by joint or cleavage planes, lacking flake scars, and not containing any blanks. Gangue consists of unusable ore. Gangue is typically removed from the outcrop to expose and access higher quality ore, or gangue may be attached to higher quality ore upon removal from the outcrops and detached at a later time (LaPorta 2000: Appendix 2-1). 697 pieces of gangue were recorded at the site, representing 9% of the debitage.
- **Shatter.** Small to medium angular pieces of lithic material less than four centimeters in any dimension produced during ore extraction or during bipolar percussion. Gangue denotes material in which the quality is too poor to produce a tool, and shatter consists of material that is too small to make a tool. Shatter was abundant at the site, with a total of 1815 pieces collected, 24% of all debitage.

Taken together these three subtype make up 39% of all debitage at the site, although that number may minimize its total representation as much of this material was simply documented in place through photos during the surface collection activities, particularly in collection areas 7 and 8. At many sites, it is not possible to be certain that each block, gangue, and shatter fragment were culturally generated. However, because of the massive floods from glacial lakes that swept through the valley at the end of the last ice age and carried away the soil and rocks excluding the largest cobbles from the Dickerson Street Site, it is likely that a higher percentage of the blocks, gangue, and shatter at the Dickerson Site is cultural compared to many other quarry sites (DeSimone, et al. 2008).

Flakes are fragments of stone removed from artifacts such as cores (mid stage) and bifaces by percussion or pressure (late stage). This process follows the extraction and high-grading process. Hand hammerstones, antler tines, and other materials are used to remove flakes from a piece strategically to form a tool. Flakes bear conchoidal fractures due to the fracturing properties of microcrystalline quartz. Presence of conchoidal fractures combined with provenience is generally strong evidence that a stone has been culturally modified.

Flakes typically have the following characteristics:

- **Striking platform.** The portion of the flake where force is applied during its removal. The striking platform is often a small flat surface roughly perpendicular to the overall planar surface of the flake.
- **Bulb of percussion.** A rounded protrusion that is often evident below the striking platform on the ventral side of a flake.
- **Flake scars.** Impressions from flake removal left on the material from which flakes were removed. Several types of flakes have flake scars on the dorsal side that resulted from flakes removed before the flake bearing the scars was struck.

Flakes are typically the most common artifacts found at an archeological site. Flakes from the Dickerson Street Site were cataloged within the following four categories. The categories are generally listed in the order that the flakes were created during the stone tool production process:

- **Quarry Flake.** A flake with a striking platform and bulb of percussion with a thickness of one centimeter or greater at the thickest point between the dorsal and ventral side. Quarry flakes are large flakes removed during the process of separating high-quality chert from lower quality material and reducing cores to manageable sizes. 488 quarry flakes were found at the Dickerson Street Site, 6% of the debitage collected (Photos 22-25). Although often quarry flakes are simply waste, several models of stone tool production techniques entail manufacturing bifaces from large flakes. Quarry flakes were typically large enough to make stone tools, and bifaces and cores at the site were formed by removing flakes from the ventral side of quarry flakes.

- **Block Flake.** A flake with a striking platform, bulb of percussion, rippled ventral side, and angular dorsal side lacking, or with few, flake scars. Block flakes are removed early in the process of refining a

core or blank to remove waste material and begin the reduction and thinning process. In all, 607 block flakes were identified at the Dickerson Street Site, 8% of the debitage collected.

- **Thinning Flake.** A flake with a striking platform, bulb of percussion, rippled ventral side, and flake scars on the dorsal side. As the name implies, it is typically removed to thin a chipped stone tool. With a count of 2,511, thinning flakes (Photos 26-28) were the most common artifact type at the Dickerson Street Site representing 33% of the debitage collected. However, this may be somewhat biased by the fact that thinning flakes have very clear attributes, making their identification as cultural more likely.

- **Trim Flake.** A flake equal to or less than 1.5 centimeters (0.6 in) that may have a striking platform and flake scars on the dorsal side. In all, 703 trim flakes (9%) (Photo 29) were collected from the Dickerson Street Site.

Typically, precontact sites that are not in the vicinity of quarries have far greater quantities of thinning and trim flakes than other debitage, such as blocks, shatter, and gangue. This reflects that the primary tool manufacturing at these sites consist of the final production stage and tool kit maintenance. On the contrary, quarry sites often have high quantities of gangue, shatter, blocks and quarry flakes compared to low numbers of smaller flakes from more advance stages of tool production. At the Dickerson Street Site, however, roughly half of the debitage consists of gangue, shatter, blocks, and quarry flakes, which would be anticipated at a quarry site. The other half consists of block flakes, thinning flakes, and trim. This demonstrates that the Dickerson Street Site contains evidence of the entire range of tool production stages from extraction to finishing.

The stone tool production process begins when blocks of chert are removed from outcrops or when chert cobbles are procured from glacial till. Once a block is procured, the flintknapper begins to alter the block by reducing its size, typically by removing flakes. Although such scars can be caused by plowing, the presence of multiple flake scars are strong indicators of intentional activity. Once flakes have been removed from a block of chert it is considered a core.

- **Core.** A multifaceted piece of lithic material with flake scars demonstrating the intention to produce one or more tools, containing at least one blank, and that was previously a block or tested cobble. A core differs from a biface or more advanced tool because it has not been edged or thinned and does not have two discrete faces. A total of 91 cores (Photos 30-31) were collected across the sits suggesting a considerable quantity of production despite the fact that they represent just 1% of the debitage collection.

- **Exhausted Core.** A multifaceted piece of lithic material with flake scars which is less than four centimeters at its greatest dimension. A core fragment has been fractured to the point that it is too small to make most types of tools. 12 exhausted cores were collected during all phases of work at the site.

Chipped Stone Tools

In general, the category of chipped stone tool includes projectile points (arrow, spear, and dart tips), knives, scrapers for wood and hides, and a variety of other subtypes. Chipped stone tools that cannot be identified by purpose because they are in an unfinished state or have an ambiguous form are categorized as bifaces.

A total of 43 **bifaces** (Photos 32-33) were collected from the Dickerson Street Site. These bifaces were separated into four categories including three stages of production and a fourth category for bifaces for which the stage could not be determined. Different published lithic typologies use between three and six stages for biface analysis. Four to five stages are common. Since the initial stage in these models typically consists of a blank, block, core, or flake; this stage was not used for this analysis. Therefore, three stages were adopted, which are similar to the stages proposed by Odell (Odell 1982).

- **Stage 1** consists of edged bifaces, and 22 (16% of the chipped stone tools) of these artifacts were found at the site. Stage 1 bifaces differ from cores because they have an edge that divides the two faces of the artifact. These artifacts typically have a width-to-thickness ratio of 2:1. Interestingly, several Stage 1 bifaces collected had been worked, sometimes significantly, only on one side, with the side retaining a blocky, angular surface.

- **Stage 2** consists of the primary thinning stage. Six Stage 2 bifaces were found at the Dickerson Street Site. These bifaces have been thinned to roughly a 3:1 width-to-thickness ratio. 8 stage 2 bifaces were collected representing 6% of this type.

- **Stage 3** consists of the secondary thinning stage, and these bifaces can be considered finished tools. Six Stage 3 bifaces were found at the Dickerson Street Site. These bifaces have been thinned to a 4:1 width-to-thickness ratio or higher. 6 stage 3 bifaces were recovered accounting for 6% of the chipped stone tools.

Seven fragmentary bifaces that could not be categorized by stage were found. These bifaces were typically fragments of one edge and were lacking a sufficient cross-section to determine the degree of thinning. The decrease in number as we move from stage 1 to 3 potentially reflects the fact that bifaces were manufactured at the Dickerson Street Site and many bifaces were discarded on site after difficulties were encountered during the first stage, whereas later stage bifaces were removed from the site for finishing and use elsewhere.

Projectile Points

Three projectile points were found within the Dickerson Street Site. Although commonly known as "arrowheads," projectile points also consist of spear and atlatl dart heads and hafted knives. Projectile point styles were specific to precontact cultures, and dated projectile point typologies have been developed by archeologists based on the stratigraphic context of different point styles and associated radiocarbon dates.

A total of seven projectile points (7% of the chipped stone tools) were recovered during Hartgen's combined investigations at the Dickerson Street Site. Three of these points were not diagnostic. Two were classified as incomplete Stage 2 points and thus were not assigned a type. A third was fragmentary and a type was unable to be determined. However, the remaining points were all complete and assigned temporally diagnostic types (Photo 16). These included:

- A Late Archaic **Sylvan Stemmed point** (4,300 - 3,500 B.P.) from Trench 2 of the 2008 investigations.

- A Middle Archaic **Genesee point** (4,900 - 3,800 B.P.) from approximately 20 cm below the surface near the subsoil interface of Unit 3 of the present study.

- A Late Archaic to Early Woodland **Adena Point** (3,500 - 1,300 B.P.) recovered during surface collection in Area 3.

- A Middle Archaic **Vosburg point** (5,200 - 4,500 B.P.) also recovered during Area 3 surface collection.

Just one end **scraper** was collected from the ground surface on the floodplain. It was composed of a very dark chert that may have been a local variant, although was not common within the Dickerson Street Site itself.

Retouch consists of any modification of a piece after it has been stuck from its parent. Therefore, cores, bifaces, and tools have retouch. Flakes, which are typically discarded after being struck, do not generally have retouch. However, occasionally flakes were retouched to create various tools. The authors of the 2010 report indicated that they were extremely cautious about classifying edge modification as retouch, erring decidedly on the skeptical side during their Phase III investigation. They classified only 5 artifacts as retouched flakes. We took a different less skeptical approach and classified 71 flakes as retouched (Photos 34-35). That shift in method means that while the 2010 study only considered the category to represent 11% of their chipped stone

tools, our added data drives the number up to 56%. A more detailed study of these expedient tools would be appropriate if additional Phase III investigations were to occur. There was less difference in our classification of retouched blocks, which represented just 9 total from all investigations, however 7 of those were from the present investigation. The retouched blocks (Photo 36) differed from cores because the retouch was small and localized. This suggests that the retouch was intended to produce an expedient tool from the block.

Fire-Cracked Rock

Fire-cracked rock at the site was abundant with a total of 567 pieces recovered across all stages of work at the site. Quartzite and sandstone was present in the collection. However, quartzite was far more common. The presence of this quantity of material suggests that there are likely intact hearths still undiscovered. Accessing these features has the potential to provide carbon that could help refine the site chronology through radiocarbon dating.

Table 7. Combined Artifact Types and Subtypes

Type	Subtype	20028 and 2010 Count	2008 and 2010 Percentage of Type	2020 Count	2020 Percentage of Type	Combined Count	Combined Percentage of Type
rough stone tool	extraction hammerstone	3	14%	3	23%	6	18%
	hammerstone	17	81%	10	77%	27	79%
	wedge	1	5%	0	0%	1	3%
debitage	gangue	554	9%	125	8%	679	9%
	shatter	1,707	28%	108	7%	1815	24%
	block	401	6%	39	3%	440	6%
	core	69	1%	22	1%	91	1%
	exhausted core	11	0%	1	0%	12	0%
	flake	39	1%	260	17%	299	4%
	quarry flake	412	7%	76	5%	488	6%
	block flake	399	6%	208	14%	607	14%
	thinning flake	1,977	32%	534	35%	2511	33%
	trim	564	9%	139	9%	703	9%
	bifacial thinning flake	42	1%	0	0%	42	1%
chipped stone tool	retouched block	2	4%	7	8%	9	7%
	retouched flake	5	11%	71	77%	76	56%
	biface, stage 1	14	31%	8	9%	22	16%
	biface, stage 2	6	16%	2	2%	8	6%
	biface, stage 3	6	11%	0	0%	6	4%
	biface, fragment	7	16%	0	0%	7	5%
	scraper	1	2%	0	0%	1	1%
projectile point	Sylvan Stemmed	1	2%	0	0%	1	1%
	stage 2	1	2%	1	0%	2	1%
	untyped	1	2%	0	0%	1	1%
	Adena	0	0%	1	1%	1	1%
	Genesee	0	0%	1	1%	1	1%
	Vosburg	0	0%	1	1%	1	1%
fire-cracked rock		481	100%	86	100%	567	100%
Total		6,721					
*Projectile points are included with chipped stone tools in percentage							

calculations				

6.2.5 Artifact Distribution

The distributional patterns evident at the Dickerson Street Site allow us to define site boundaries, identify specific loci within the site and describe the specific production activities associated with each locus. Map 3a depicts the distribution of all Precontact artifacts recovered from shovel testing. It incorporates data collected from all stages of Hartgen's investigations at the site. It was the basis for drawing the broad boundaries of the site and its four loci. Overall, the site encompasses 5.37 acres (21,723 m^2) running along the banks of the Hudson River and inland to incorporate several ridges of bedrock that were exploited for lithic raw material. It measures approximately 373 m (1,224 ft) north to south along the river and 84 m (274 ft) east from the banks of the river. The boundaries were drawn to incorporate the highest density of materials encountered. A limited quantity of material extends farther east that the boundaries that we have established. However, any occupation in this areas was brief, leaving a very light footprint that is less likely to provide significant information.

Four distinct loci was established around the densest concentrations within the site boundaries. Locus 1 is located at the southern end of the project APE along a low ridge that was a likely extraction zone based on the presence of a large extraction hammerstone located along its east side. It also incorporates two dense deposits of large gangue, blocks and other waste debris which would have been the result of milling activity. The deposit in Collection Area 7 likely related directly to the ridge extraction zone and the deposit in Collection Area 8 likely relates to material being quarried from outcrops along River Road or destroyed during its construction. Locus 2 incorporates an extraction zone and milling/ore processing area at the southeastern corner of the central section of the site (surveyed in 2008). Locus 3 contains newly identified extraction zones along the east face of two ridges in the northern portion of the site. One large extraction hammerstone with two large spalls missing was located sitting directly on top of the ridge in an area showing clear evidence of quarrying. A scatter of lithic flaked and smaller hammerstones on a flat area above the worked ridge suggests some mid to late stage production in addition to the initial raw material quarrying. Locus 4 is located on the floodplain running from the central through the northern portions of the survey areas. The 2010 study demonstrated that the area was home to small camps where later stage lithic production was taking place. There are two clear clusters of remains within the locus with some fall off in between. This likely represents two independent camps established at different times as we have evidence that the site was in use for a long period of time, both the Middle and Late Archaic Periods and possible beyond. A lower density of remains along the floodplain were not included in the locus. However, they appear to represent similar activity, with fewer remains present. It should be noted that broadly speaking the densities of material were lower for areas surveyed in the present study. It is uncertain if this variation reflected genuine decrease in densities of if our team took a more conservative approach in identifying material as cultural. However, the latter cause seems very likely.

The functions ascribed to these loci were informed by the varying distributions of four categories of material collected during shovel testing (Map 3b). These include: quarry and block flakes, representing early stage processing of extracted ores, thinning flakes representing mid stage processing, trim flakes indicative of late stage processing and fire-cracked rock suggesting the presence of hearths that would be an indicator of campsite locations. Loci 1 and 2 contained the greatest concentrations of early stage material. These concentrations would be even higher if the results of surface collection were incorporated. However, these early stage materials were found in all four loci in lower densities suggesting that in some cases unprocessed raw material was being transported away from the extraction and main milling zones for further processing. Thinning flakes represent shaping of blanks and tools. They were widespread across the site with particular concentrations in the locus 2 workshop are and in the workshop/camps in locus 4. They were rare near the extraction zones in loci 1 and 3, suggesting that high graded ores were being refined into tool forms in other locations. The distribution of trim flakes is more restricted than we have seen for the early and mid-stage processing indicators. These were overwhelmingly concentrated in the workshop/camp areas of locus 4, with some also being found in the locus 2 workshop area. Fire-cracked rock had the most restricted distribution of all, being found almost exclusively in the floodplain area. Although a low density was also located near River Road to the east of where we drew the site boundary, suggesting some light occupation of that area as well.

Interestingly, no FCR was recovered from shovel tests at the north end of locus 4. However, it was not uncommon in the units excavated in that area.

These four indicator classes give us a great deal of insight into the overall organization of activities across the Dickerson Street Site. They make it clear where various stages of quarrying and tool production were taking place. They provide a clear indication of locations where small camps were placed. Additional insights could likely be gained from more detailed examination of the distribution of other artifact classes such as cores and bifaces. However, such analysis would be more appropriate for a Phase III investigation.

7 Interpretation

The Dickerson Street Precontact Site is a quarry that is just one of several located along the east side of the Hudson just north of its confluence with the Mohawk. According to La Porta's (2000:10-16) model of quarry development, quarries can be divided into various categories based on scale of activity. An "expression" indicates a prospect that may have been tested and demonstrates evidence of extraction during possibly a single episode. A "movement" is a small-scale quarry that may demonstrate division of tasks and specialized tools such as hammerstones. A "motion" is a large-scale quarry with variety of quarrying tools and subdivision of tasks evident in the spatial organization of the site. A "trend" is a series of quarries along a strike (the compass direction of a bedded chert formation) (LaPorta 2000:12). A group of trends in the same vicinity and within one area of similar geology is a "district." Based on this model, the Dickerson Street Site consists of an extensive movement or a limited motion within a district that extends from Lansingburgh to Pleasantdale.

La Porta's model outlines four zones that can be found in ancient quarry sites (La Porta 2000). These consist of Zones I through IV: extraction, milling, ore processing, and workshop zones (2000:12-13). All four of these zones are identifiable at the Dickerson Street Site. Extraction took place at several locations including outcrops located along River Road (presently or in the past), along the east side of a ridge at the southern end of the site and at outcrops present on the west side of ridges in the northern end of the site. These locations show evidence of the removal of material and in several cases contained large extraction hammerstones used in that removal. Milling took place in discrete locations in the southern end of the site, particularly in collection areas 7 and 8, which were marked by dense concentrations of early stage debitage consistent with the separation of useable ores from the surrounding matrix. Some milling activity was also mixed with ore processing in locations such as the workshop area in the southeast corner of the portion of the site investigate in 2008. Other workshop zones, specializing in mid to late stage manufacture of tools were clustered in the floodplain along the banks of the Hudson.

The site offered many advantages to local populations. The easily broken shale bedrock containing much of the usable ore was easily worked and contained high quality cherts lacking in inclusions like fossils that can be found in other locations. Glacial activity in the valley exposed outcrops at the surface, making locating and extracting the material relatively convenient. Its location near the confluence of the Hudson and Mohawk rivers, provided for fast and easy transport to the site, which was probably a regular stop of seasonal rounds. The presence of the level and well drained floodplain provided a convenient place to establish camps and their associated comforts. Finally, the river would have provided a range of aquatic resources to people stopping to exploit the valuable lithic resources.

Datable diagnostic artifacts indicate that the site was used as a source of raw materials by native peoples over a long period of time including the Middle and Late Archaic Periods and possibly into the early Woodland Period. Today little chert is visible at the surface, suggesting that the resource may have been exhausted in the Late Archaic or soon thereafter.

Table 8. Summary of archeological site information collected during the Phase I and II studies

Characteristic	Site information	Source of information
OPRHP Site No.	08340.001736	
Site Name	Dickerson Street Precontact Site	
Description	The Dickerson Street Site is located on the east shore of the Hudson River on a series of ridges of chert-bearing Mount Merino shale and other rocks of the Cohoes Melange. Several precontact chert quarry sites have been identified in the vicinity. The Dickerson Street Site consists of a quarry and workshop area on one of the elevated ridges and a flood plain with evidence of camps. Several bedrock outcrops with two types of lithic ore were present at the site. The lithic ores consisted of chert and a fine crystallized dolomite that demonstrated conchoidal fracture and was worked extensively in the surrounding workshop. Artifacts collected from the workshop consisted of quarry tools such as a wedge and hammerstones. Chert cores and early stage bifaces were also common. Near the workshop was the relatively sheltered floodplain located between two ridges and the Hudson River. Late Archaic projectile points found near the surface indicate that the floodplain was formed over 4,500 years ago, and geomorphological evidence suggests that the precontact occupation occurred almost entirely after the floodplain was formed. In addition to projectile points and other tools, large quantities of debitage and fire-cracked rock were collected from excavations on the floodplain. These artifacts suggest that once cores and flake blanks were produced in the quarry workshop nearby, they were transported to the relatively sheltered camps on the floodplain to be made into finished tools. The Dickerson Street Site provides the opportunity to study the entire process of stone tool production from its initial states in the quarry workshop to the formal states in the floodplain camps.	Results of multiple phases of work at the site including an initial Phase IB/II study of the central portion of the site conducted in 2008, a Phase III investigation of the central portion in 2010 and the present combined Phase IB/II study of the north and south sections of the APE. The research combined geomorphology, shovel testing, surface collection, excavation of units and mechanical trenching producing 8,427 artifacts. The collections have been analyses for type and distribution of artifacts. In addition, specialized analyses such as petrographic thin sectioning of samples from this and other nearby quarry sites, protein residue analysis of tools, pollen, phytolith and organic residue analysis of fire-cracked rock have been conducted. The 2010 Phase II placed the site within the broader regional context comparing it to numerous quarry sites in the area such as the Pleasantdale quarry (Brumbach 1987) located just north of the current site. Taken together, these studies provide a detailed picture of the environmental and geologic history of the site, its boundaries, loci within the site, stratigraphy and specific activity areas reflecting various stages of lithic raw material exploitation and tool production.
Date	Middle and Late Archaic	
Function	Quarry, lithic workshop and temporary camps	
Size	5.37 acres (21,723 m^2)	
Location	NAD 83, UTM Zone 18, 608696 Easting, 4738688 Northing	

8 Significance Assessment

The significance of the Dickerson Street Precontact Site is assessed according to the National Park Service's *Guidelines for Registering and Evaluating Archeological Properties* (Little, et al. 2000). The site meets eligibility Criterion D for the National Register and has "yielded, or may be likely to yield, information important in prehistory or history."

The Dickerson Street Precontact Site has already been recommended as eligible for the National Register during Hartgen's initial 2008 study of the central portion of the site saying, "It is recommended that the Dickerson Street Site be considered National Register eligible under Criterion D as a site that has yielded or may be likely to yield, information important in history or prehistory." We concur with that recommendation for the whole of the expanded site as defined during the present study.

8.1 Significant research topics that can be addressed by site

The Dickerson Street Precontact Site (08340.001736) has the potential to yield important information. A set of research questions were devised by the 2008 Hartgen team, some of which has already been addressed in the 2010 Hartgen Phase III Data Recovery for the central portion of the site. However, they still fully apply to the new areas covered in the current study. Those questions included the following:

- **Geomorphology**. Part of the APE is within the floodplain, although this portion of the floodplain may have been a backswamp, or a relatively wet area behind a drier natural levee. Does this portion of the floodplain contain similar artifacts and artifact densities to those found on the levee nearer the river?

- **Intra-Site Spatial Organization**. How was the space within the APE organized? The Phase IB results demonstrate that quarrying was carried out at the bedrock outcrops in the southern portion of the Phase IB study area, lithic workshops were located nearby, and that stone tool finishing took place on the floodplain. The APE is an area between the quarry and the floodplain. How was the APE used and how does is compare to the other zones at the site? Is there spatial patterning within the APE itself?

- **Features**. Are there bedrock outcrops at or near the ground surface within the APE? If so, was the area quarried for chert? Additionally, are there intact subsurface features such as hearths or postmolds located within the APE?

- **Dates**. Is it possible to determine more precise occupation dates within the Middle and Late Archaic period for occupations at the site through radiocarbon dating? Does the site contain diagnostic artifacts from other phases or periods?

- **Artifacts**. What kinds of artifacts are associated with the site, and what does the artifact assemblage indicate about the activities that were carried out within the site?

- **Lithic Sources**. What degree of variation is apparent in the chert available in outcrops in the vicinity of the site? Is this variation reflected in the types of chert used for tool production? Are there tools present at the site that are made from non-local materials? Thin section and trace element analysis will provide information about the source and quality of lithic material found at the site.

- **Lithic Quality**. What is the quality of the types of lithic materials identified at the site? Did precontact people favor one type of local chert over another?

- **Botanical Resources**. What types of botanical resources were exploited by occupants of the site? What were the potential uses of these resources? This information will be obtained by identifying pollen, phytoliths, and macrobotanical remains from soil horizons, feature fill, pottery, and stone tools.

- **Faunal Resources**. What types of faunal resources were exploited by occupants of the site? If so, what do they indicate about the subsistence strategies and diet of the site's occupants? This information will be obtained through identification of faunal bone and application of protein residue analysis and Fourier Transform Infrared Spectroscopy (FTIR) to stone tools.

- **Regional Context**. How does the Dickerson Street Site relate to other sites in the vicinity, including the Pleasantdale Quarry, the Charles Ellet Apartment Site, the Mechanicville Road Site, the Second Street Site, and the Water Works Site? Were any of the sites occupied simultaneously? Were similar

activities performed at each site, or is it possible that several of the sites were used for different purposes, possibly contributing to a broad land-use pattern incorporating multiple sites?

8.2 Integrity

The site retains important aspects of its integrity such as location, design and structure, physical setting, materials, workmanship, historical sense or feeling, and association between data and important research questions (Little, et al. 2000:35-38).

An assessment of the integrity of the site based on the seven aspects of integrity follows:

- **Location, Setting and Feeling**. The site is in its original location and retains almost all of its occupation-period topographic setting, including significant features such as the southwest ridge with extensive views of the Hudson River, the chert quarry with bedrock outcrops and extraction excavations and the floodplain which was likely the primary habitation area.

- **Design**. The presence of several environmental zones and identification of different activities both in different zones and within the same zone contributes to the integrity of design. For example, procurement of chert for stone tool production took place in the quarry, whereas the finishing of tools was completed in camps on the floodplain. Also, there is evidence that the quarry area itself contains different chert workshops demonstrating preferences for different materials and reduction techniques.

- **Materials**. The presence of several sources of raw material for stone tool manufacture near the site contributes to the integrity of materials. The study of the site will facilitate the assessment of preference for different varieties of local cherts and the use of non-local sources such as Onondaga chert, which is also represented in the artifact assemblage from the site.

- **Workmanship**. As the artifacts in Shovel Test 1 demonstrate, the site provides extensive information about the process of stone tool production. It seems likely that the site contains excellent examples of products of the entire process from quarrying to finishing tools.

- **Association**. The site has the potential to provide data to assess a wide variety of research questions, some of which are outlined below.

9 Recommendations

The current APE contains the Dickerson Street Site, a Middle to Late Archaic quarry with multiple loci, representing a full range of extraction and production activities. The site has been determined to be National Register eligible. A Phase III investigation of portions of the site was completed in 2010. The current Study Area includes portions of the site that were not covered by Hartgen's earlier projects. The site has experienced minimal disturbance and demonstrates several criteria for integrity. Avoidance of the defined site area or additional Phase III Data Recovery is recommended.

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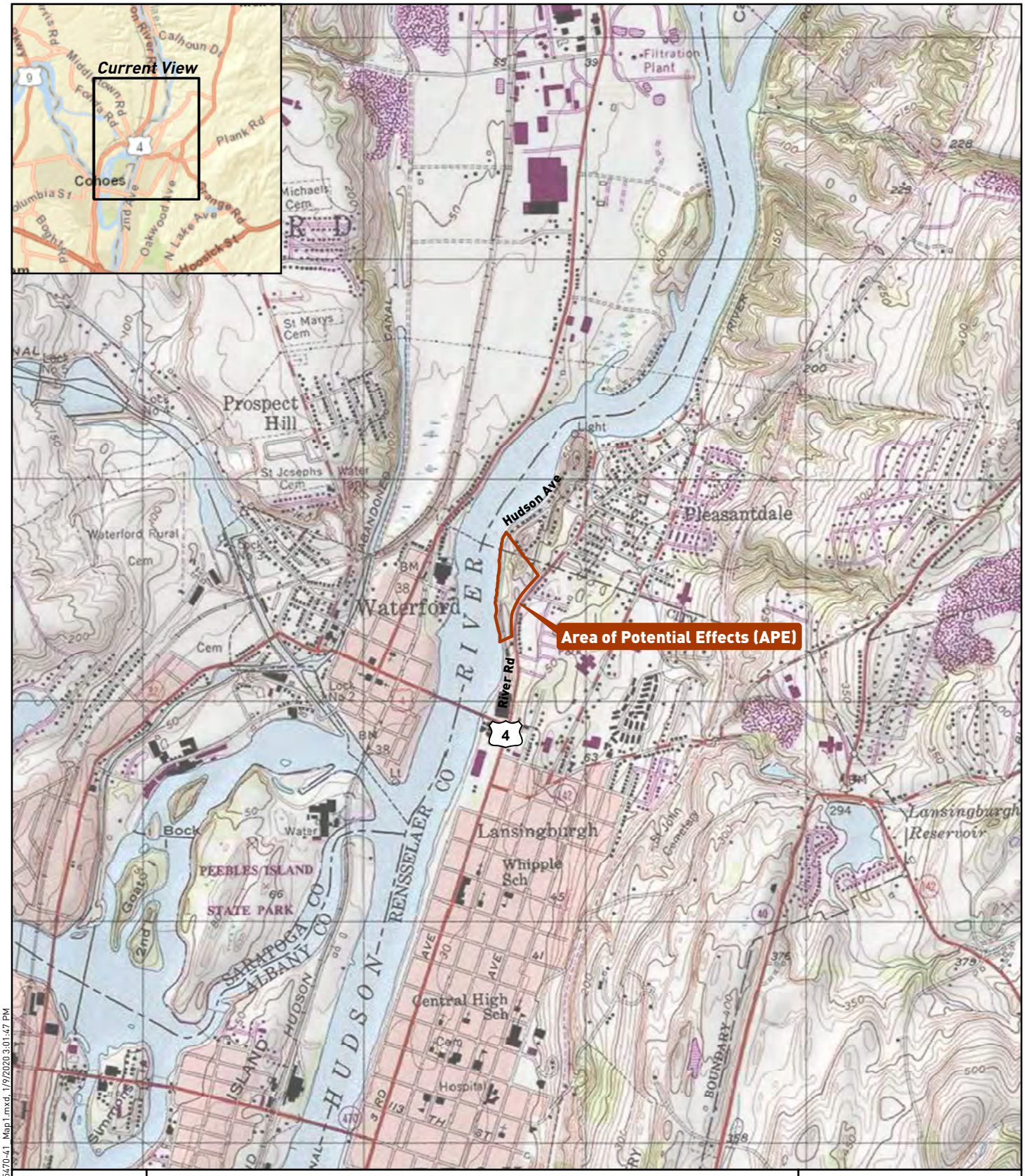
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Maps


Current View
Area of Potential Effects (APE)
Hudson Ave
River Rd
Waterford
Prospect Hill
Pleasantdale
Lansingburgh
Lansingburgh Reservoir
Whipple Sch
Central High Sch
PEEBLES ISLAND STATE PARK
HUDSON
RENSSELAER CO
SARATOGA CO
ALBANY CO
Filtration Plant
St Marys Cem
St Josephs Cem
Waterford Rural Cem
Michaels Cem
Hospital
Cohoes
Calhoun Dr
Plank Rd
Orange Rd
N Lake Ave
Hoosick St
Oakwood Ave
2nd Ave
Middletown Rd
Forts Rd
Boght Rd
Columbia St
1,000 0 1,000 2,000
Feet
300 0 300 600
Meters
Note: Contour interval is 10 feet.
Project Location
GIS Services Accessed 1/9/2020: Environmental Systems Research Institute, Inc., World Street Map; USGS Topo Map Service
HARTGEN archeological associates inc
Map 1
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Shovel Test (ST)
Positive ST (historic)
Positive ST (precontact)
Positive ST (historic, precontact)
Positive ST (historic, other)
2010 ST
Cedar Ave
River Rd
Roosevelt Ave
Hudson Ave
Chert Quarry and Workshop
Worked Outcrop
2010 Dickerson Precontact Site Hudson Railroad PCB Investigation
Meters
Legend
Photo Angle
Unit (U)
Raked Collection Area
Wet
Slope
Disturbed
Study Area
Area of Potential Effects (APE)
50 0 50 100 Feet
15 0 15 30 Meters
Project Map
Environmental Systems Research Institute, Inc., World Imagery Accessed 3/27/2020
HARTGEN archeological associates inc
Map 2
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Legend

- Dickerson Precontact Site Boundary
- Study Area
- Area of Potential Effects (APE)
- Wet
- Slope
- Disturbed

50 0 50 100 Feet

15 0 15 30 Meters

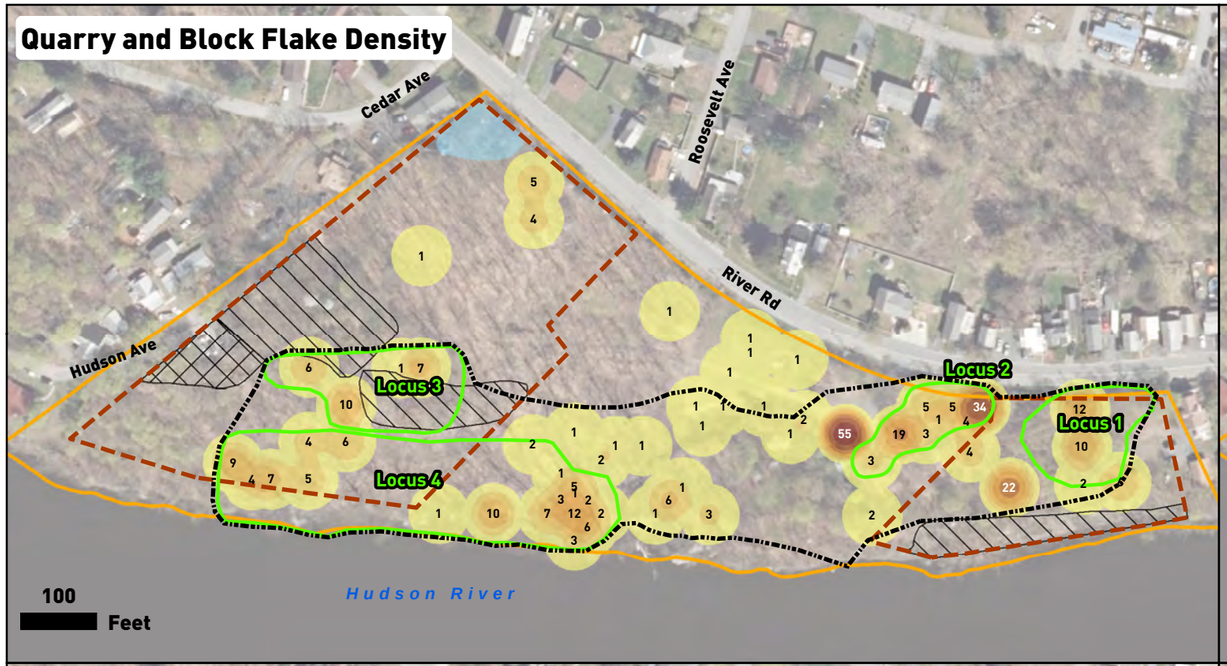
Kernel Density Analysis

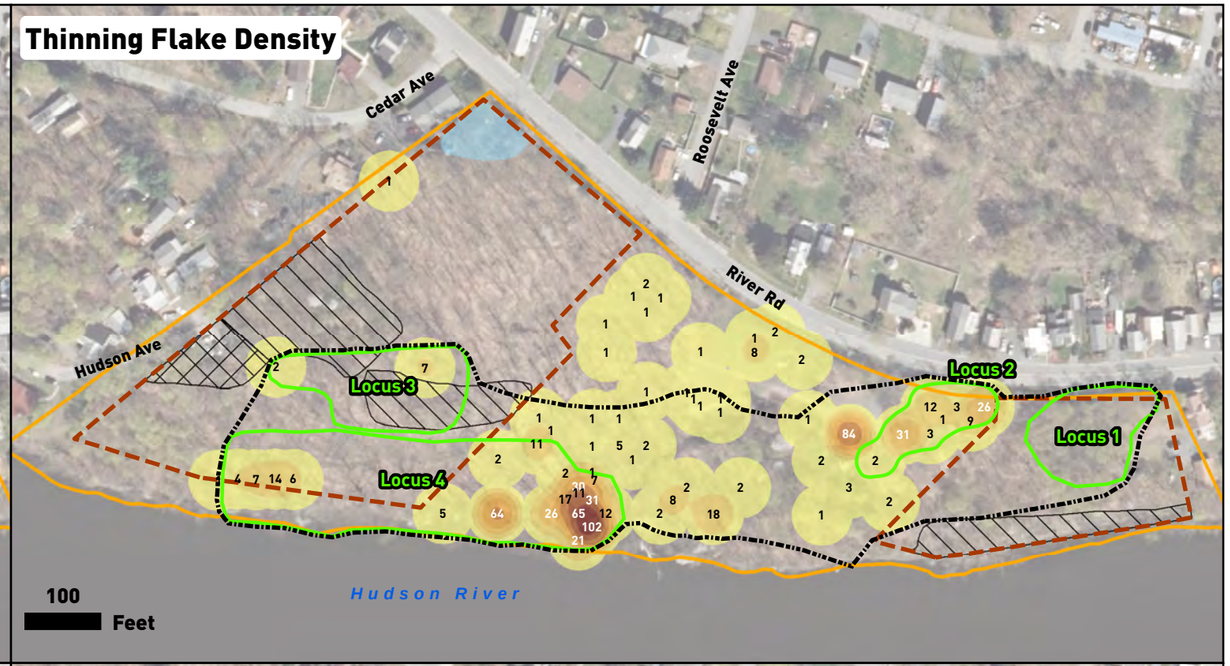
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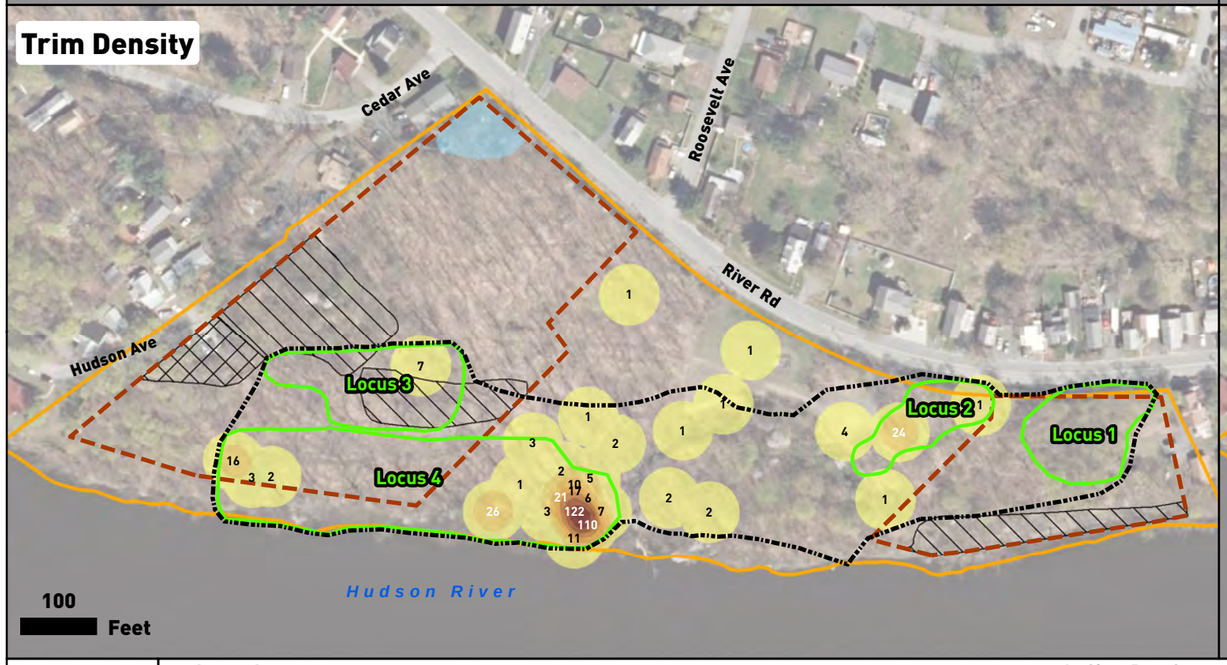
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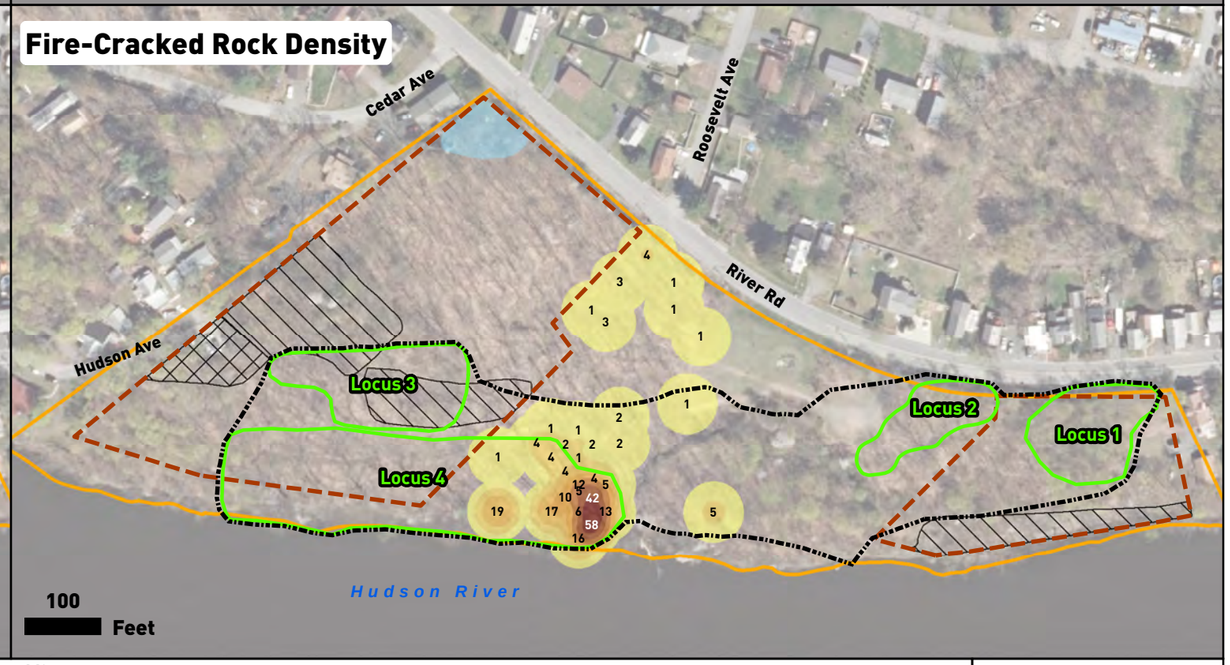
Map 3a

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Legend

- Dickerson Precontact Site Boundary
- Study Area
- Area of Potential Effects (APE)
- Wet
- Disturbed
- Slope

Artifact Density per M²

Low — High

Kernel Density Analysis By Type

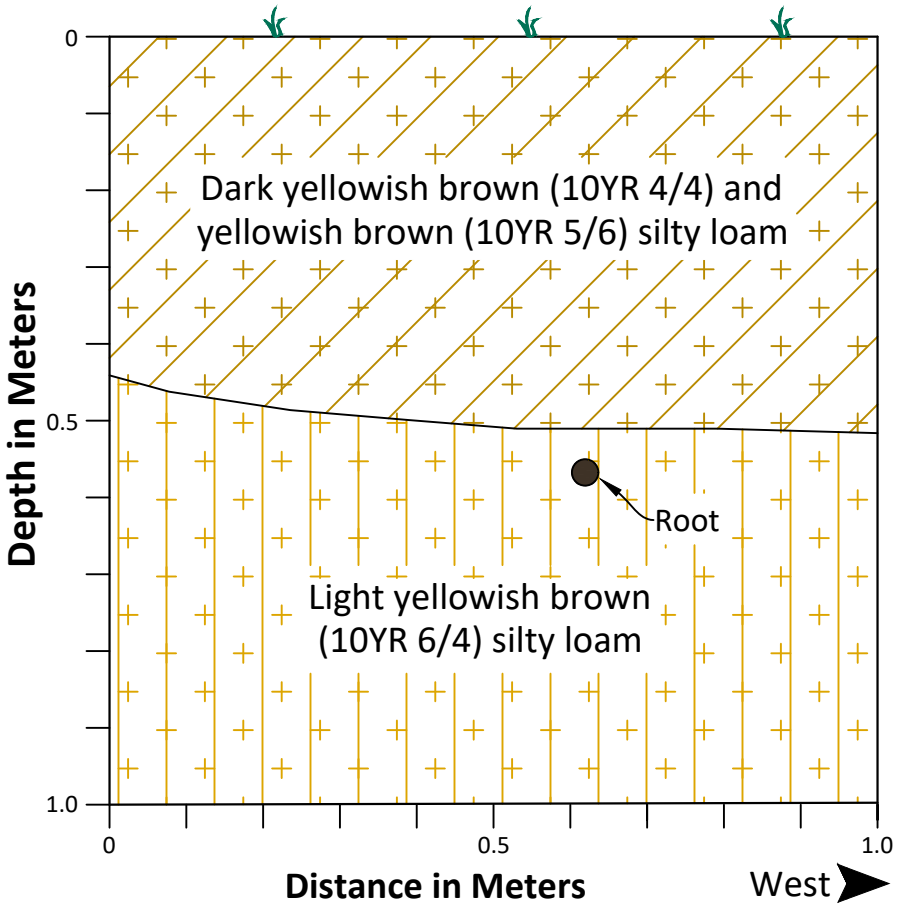
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Map 3b

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Figures

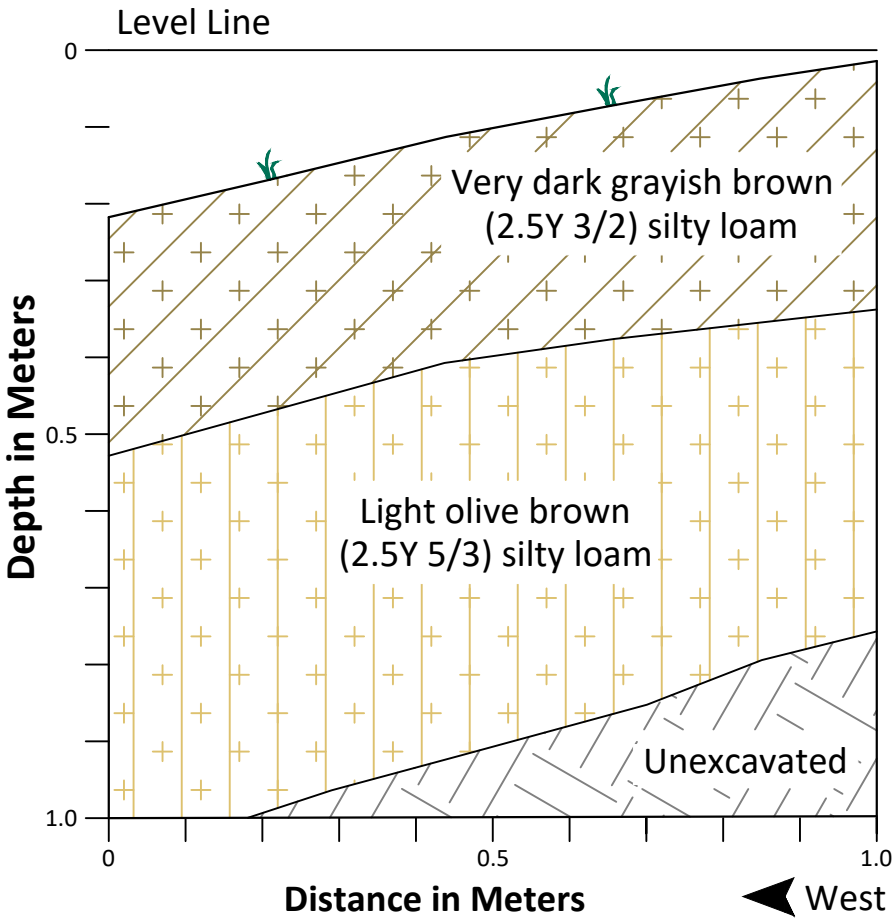




Unit 1, South Wall Profile

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Figure 1

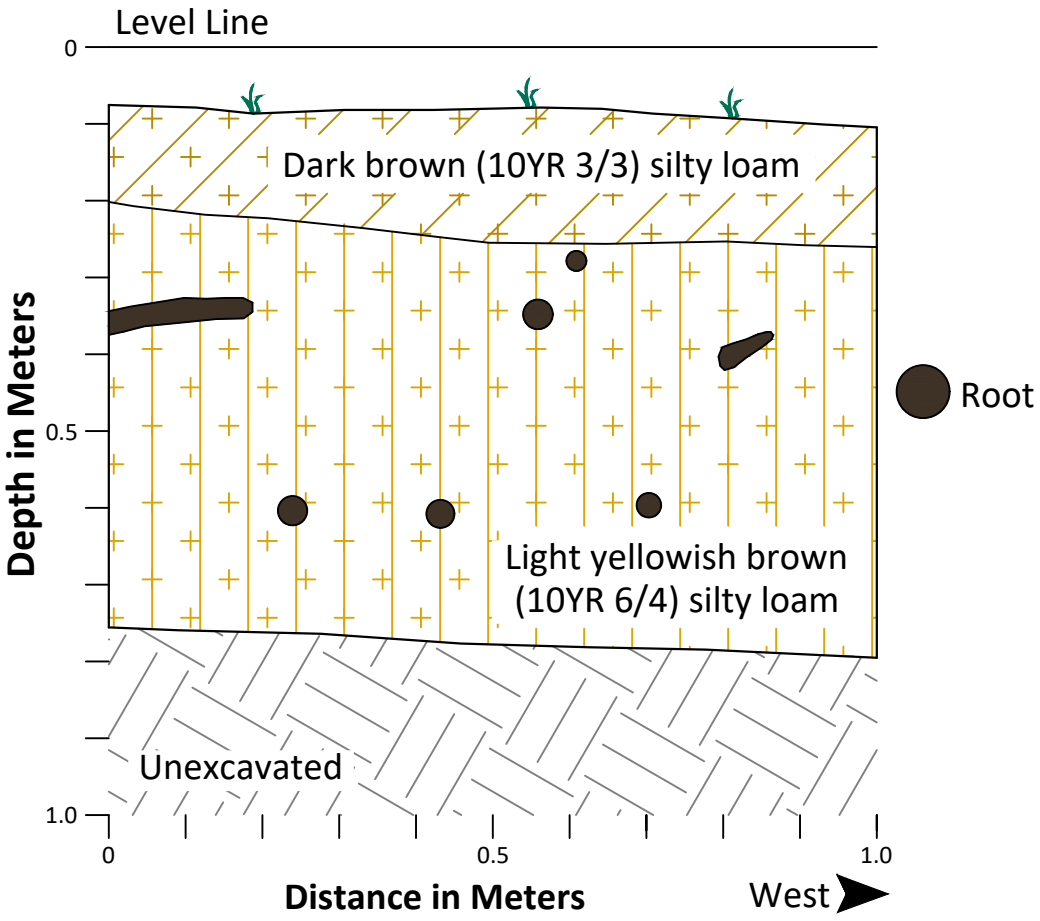




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Unit 2, North Wall Profile

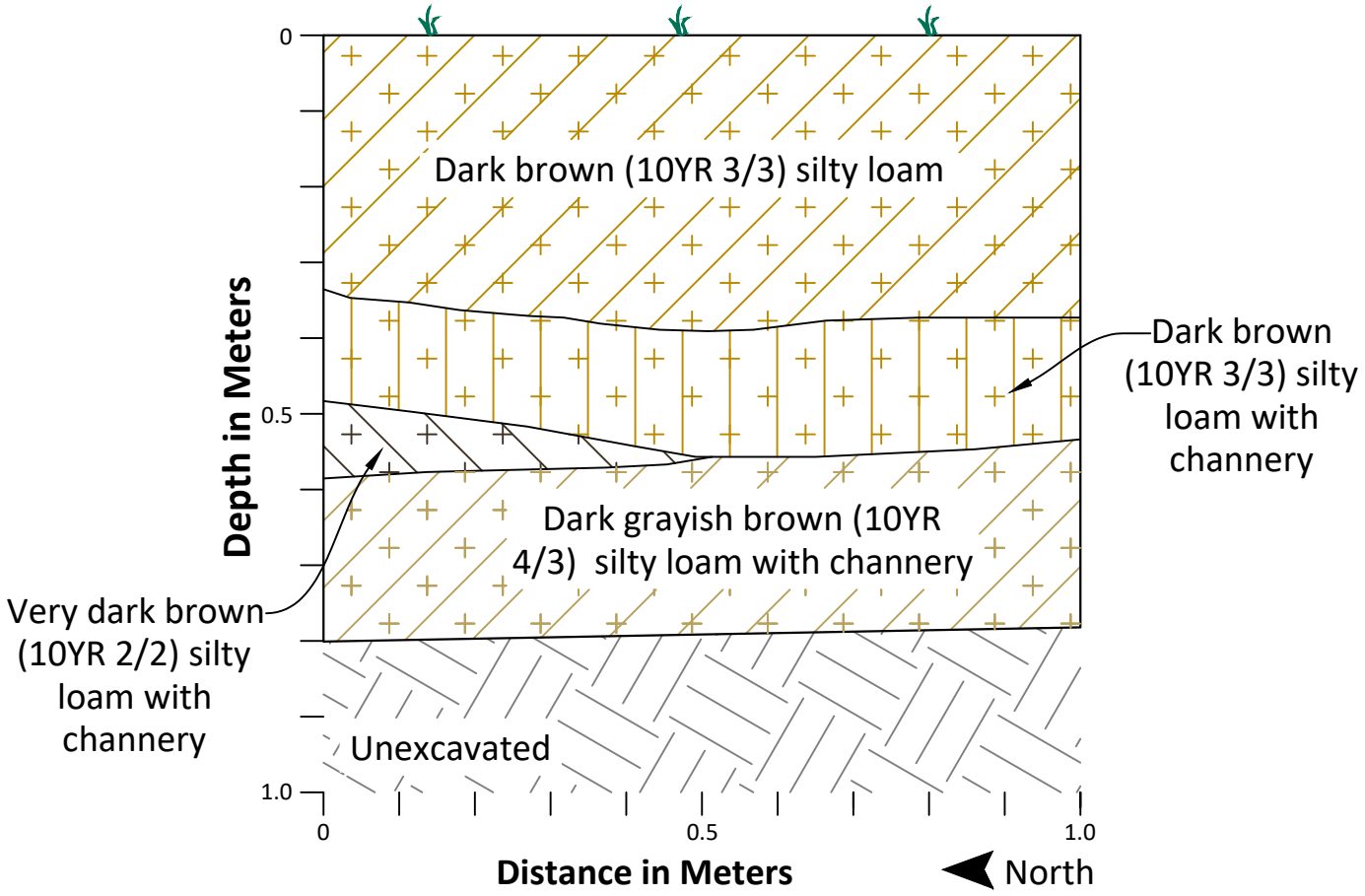
Figure 2



Unit 3, South Wall Profile

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Figure 3

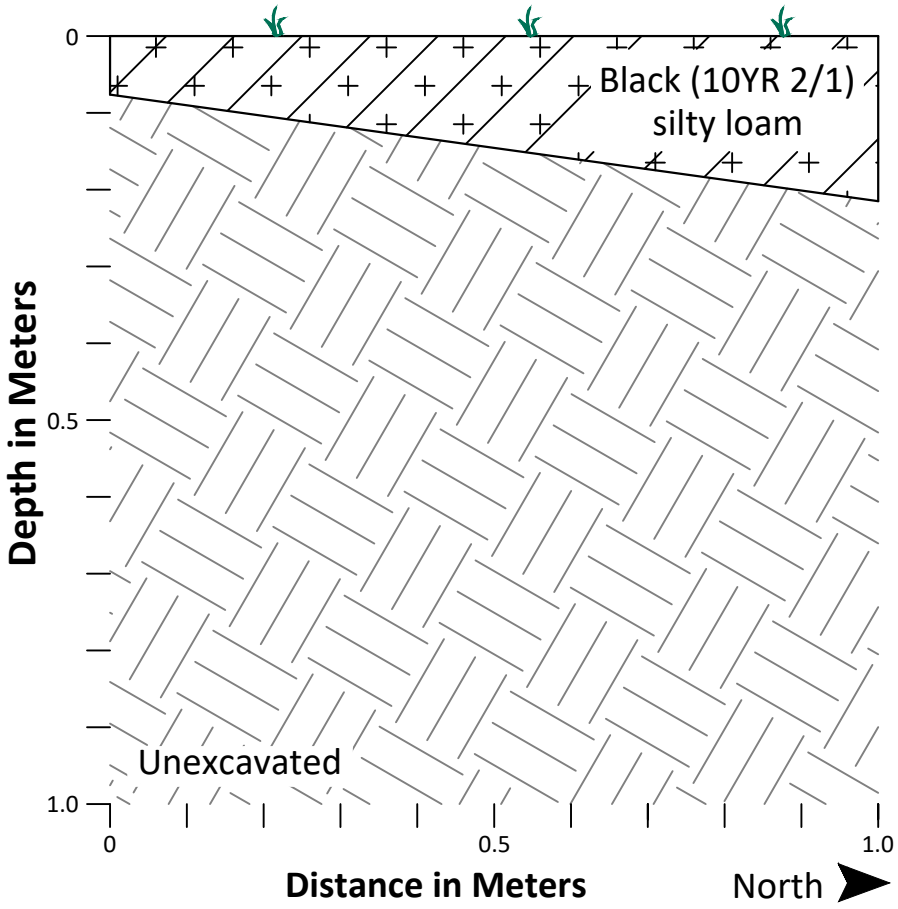




Unit 4, East Wall Profile

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Figure 4

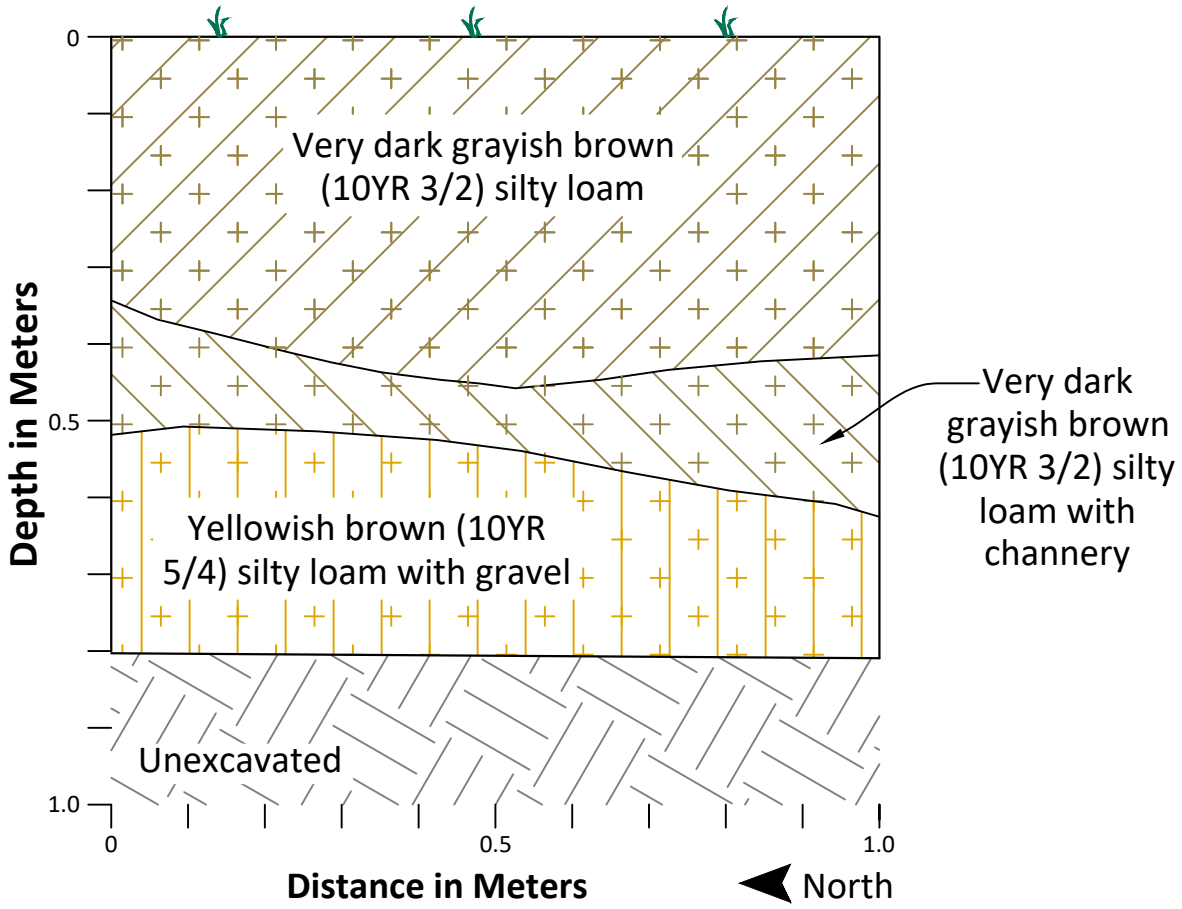




Unit 5, West Wall Profile

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Figure 5

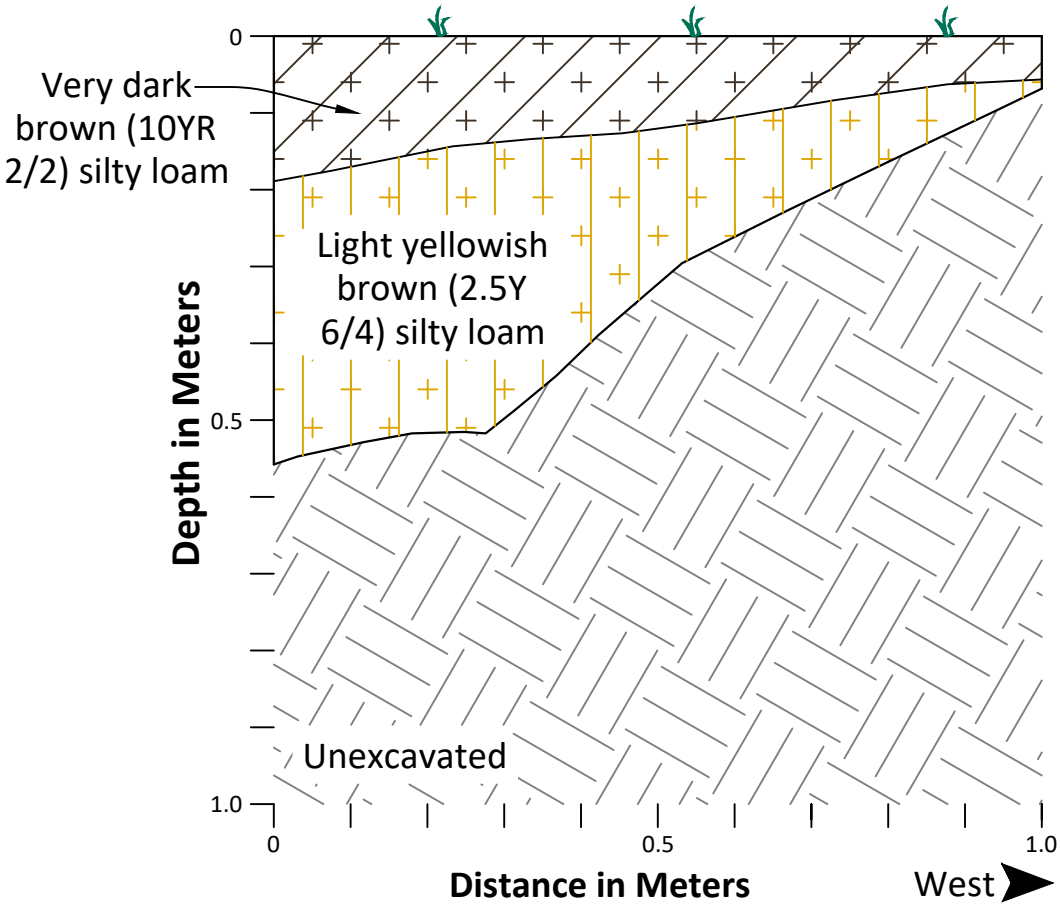




Unit 6, East Wall Profile

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Figure 6

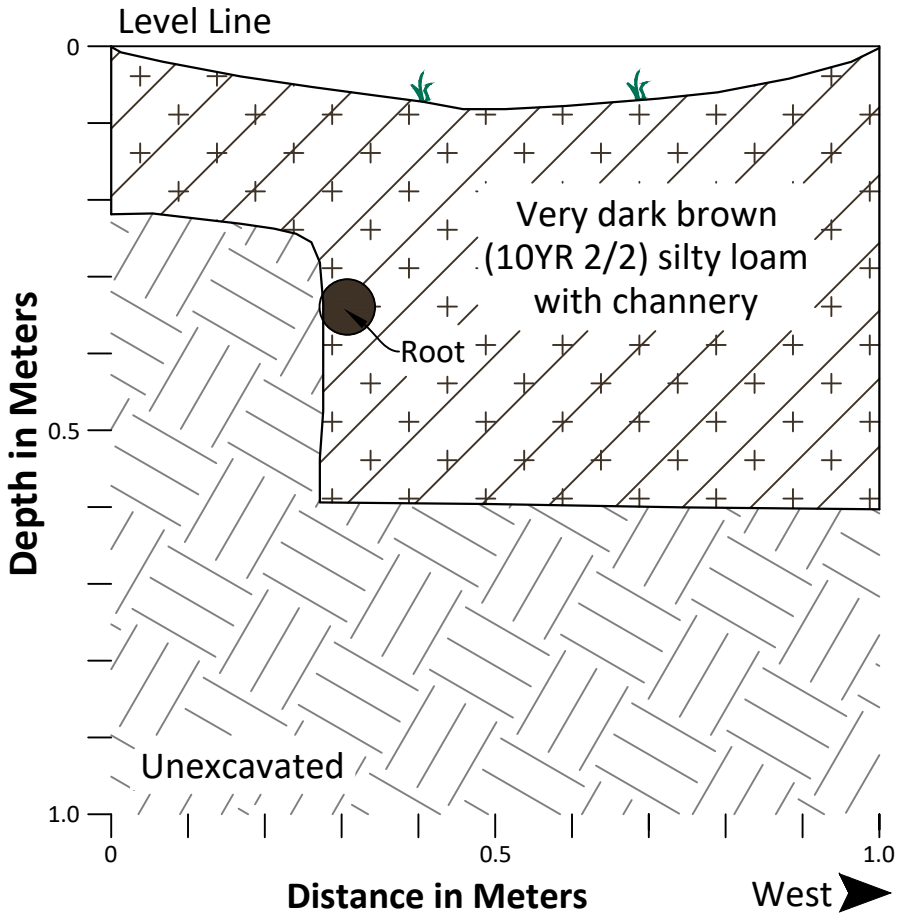




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Unit 7, South Wall Profile

Figure 7





Unit 8, South Wall Profile

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Figure 8

Photographs



Photo 1. View of Hudson River and drop off along the south end of the APE, view south.



Photo 2. Floodplain along the Hudson showing typical wooded condition of much of the APE, view west.



Photo 3. Shale outcrop along the west side of the northern ridge, view south.



Photo 4. Disturbance and modern refuse along the south end of the APE, view north.



Photo 5. Archeologist Cynthia Jackson excavating STP 16.



Photo 6. Archeologist John Ham excavating STP 98.



Photo 7. Archeologist David Wendell excavating STP 8.



Photo 8. Archeologists Amy Wilson (Left) and Cynthia Jackson (right) raking collection area 1 to remove leaf litter.



Photo 9. Archeologists Cynthia Jackson, Amy Wilson and Tom Boyd (Left to right) surveying collection area 3.



Photo 10. Collection Area 5 along slope below worked outcrop after removal of leaf litter.



Photo 11. Worked shale outcrop along the west side of the northern ridge.



Photo 12. Concentration of gangue, blocks and shatter from collection area 7.



Photo 13. Concentration of gangue, blocks and shatter from collection area 8.

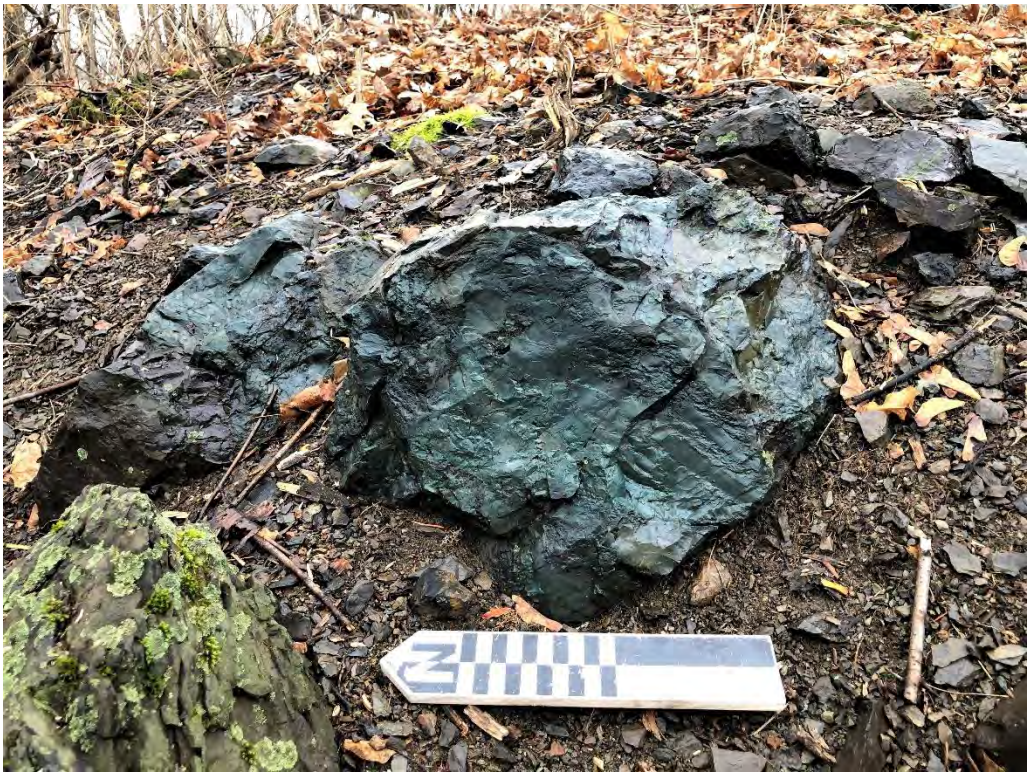


Photo 14. Exposed cobbles of green chert on the west slope of the southern ridge.



Photo 15. Bottle of Brownatone hair dye recovered from small early 20th century dump area to the east of the large ridge at the far north of the APE.



Photo 16. Intact Middle Archaic Genesee (top left) (Bag 71, Item 1.1), Late Archaic Adena (top right) (Bag 75, Item 1.1) and Middle Archaic Vosburg (Bag 77, Item 1.1) projectile points.



Photo 17. Quartzite extraction hammerstone with spalls (Bag 69, Item 1) recovered from the top of the worked shale outcrop on the west side of the northern ridge, immediately above the worked section.



Photo 18. Quartzite extraction hammerstone (Bag 70, Item 1.1) recovered along the east side of the southern ridge.



Photo 19. Fragments of two extraction hammerstones (Bag 41, Item 1 and Bag 81, Item 5). Left example also appears to be fire-cracked.



Photo 20. Hammerstones (Top Row left to right: Bag 39, Item 1 – Bag 60, Item 1 – Bag 62, Item 1 Bottom Row Left to right: Bag 64, Item 1 – Bag 72, Item 1).



Photo 21. Hammerstones (Top Row left to right: Bag 49, Item 1 – Bag 74, Item 1 – Bag 83, Item 1 Bottom Row Left to right: Bag 86, Item 1 – Bag 89, Item 1).



Photo 22. Quarry flakes (Top Row left to right: Bag 1, Item 1.3 – Bag 5, Item 2.2 Bottom Row Left to right: Bag 7, Item 1.3 – Bag 8, Item 1.3).



Photo 23. Quarry flakes (Top Row left to right: Bag 9, Item 2.2 – Bag 10, Item 1.1 Bottom Row Left to right: Bag 12, Item 1.1 – Bag 14, Item 14.2).

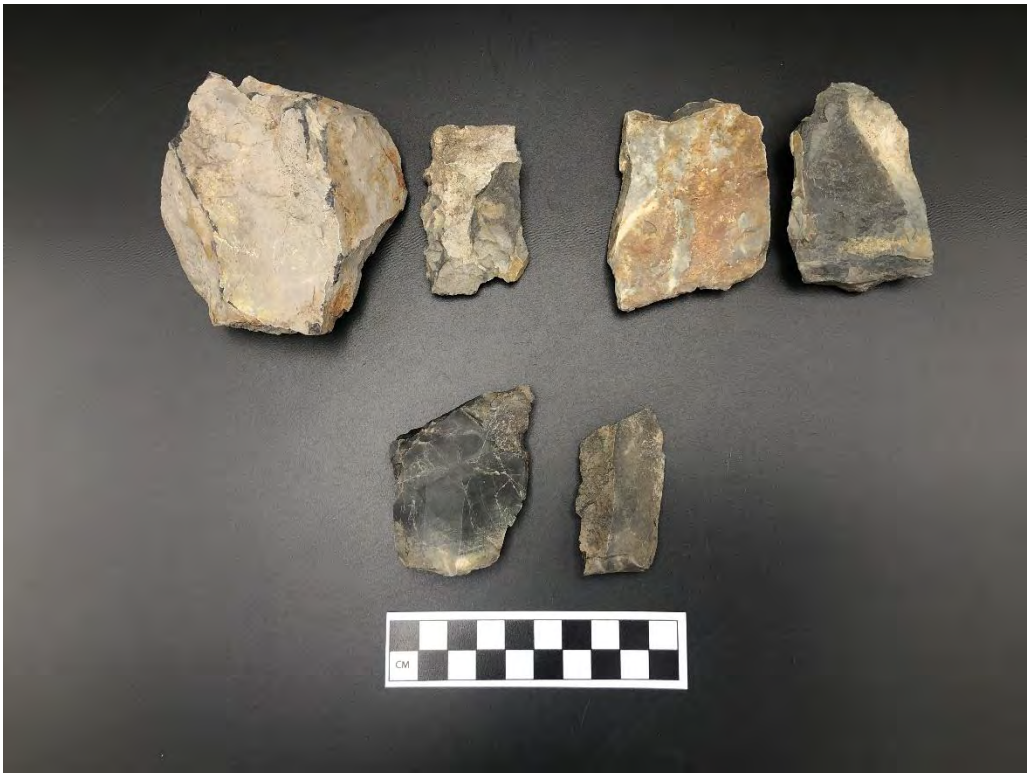


Photo 24. Quarry flakes (Top Row left to right: Bag 81, Item 2 – Bag 81, Item 3.2 Bottom Row Left to right: Bag 81, Item 4.4).



Photo 25. Quarry flake (Bag 86, Item 3.3).



Photo 26. Thinning Flakes (Bag 41, Item 3.4).



Photo 27. Thinning flakes (Bag 48, Item 3.3).



Photo 28. Thinning flakes (Top Row: Bag 50, Item 3.5 Middle Row Bag 50, Item 4.5 Bottom Row: Bag 50, Item 4.6).



Photo 29. Trim flakes (Top Row: Bag 41, Item 3.5 – Bag 42, Item 2.4 Middle Row: Bag 47, Item 2.4 – Bag 48, Item 3.4 Bottom Row: Bag 50, Item 4.7 – Bag 76, Item 6.9).



Photo 30. Cores (Top Row: Bag 18, Item 1.2 – Bag 20, Item 2.1 – Bag 22, Item 2.3 Bottom Row: Bag 33, Item 4.1 – Bag 74, Item 6.3).



Photo 31. Cores (Top Row: Bag 90, Item 2.2 – Bag 90, Item 2.3 Bottom Row: Bag 91, Item 1.1).



Photo 32. Bifaces (Top Row: Bag 36, Item 1 – Bag 39, Item 2 Bottom Row: Bag 48, Item 1 – Bag 62, Item 2).



Photo 33. Bifaces (Top Row: Bag 67, Item 1 – Bag 76, Item 1.2 Bottom Row: Bag 76, Item 3 – Bag 81, Item 1.2).



Photo 34. Retouched flakes (Top Row: Bag 50, Item 1 – Bag 51, Item 1 Bottom Row: Bag 56, Item 1 – Bag 62, Item 2).



Photo 35. Retouched flakes Bifaces (Bag 74, Item 2 and Bag 74, Item 3).



Photo 36. Retouched blocks Bifaces (Top Row: Bag 5, Item 1 – Bag 65, Item 1.1 and Bag 90, Item 1.2).

Appendix 1: Shovel Test Records

547041: Phase II Archeological Investigation, Troy Starlight Development

Shovel Test Records

	Ending Depth (cm)	Level	Soil Type	Soil Inclusions	Munsell Color		Termination Reason
1	23	1	sand loam	roots, rocks	10yr 3/2	very dark grayish brown	impasse (rocks)
2	22	1	silt loam	exfoliating bedrock	10yr 3/2	very dark grayish brown	bedrock
5	27	1	sand loam	roots	2.5y 5/4	light olive brown	
	51	2	sand loam	rocks	10yr 3/3	dark brown	impasse (rocks)
6	19	1	silt loam	roots	10yr 4/3	brown	bedrock
7	19	1	sand loam	roots, rocks	2.5y 5/4	light olive brown	
	32	2	sand loam	rocks	10yr 3/3	dark brown	impasse (rocks)
10	15	1	silt sand	gravel, exfoliating bedrock	10yr 3/2	very dark grayish brown	bedrock
11	18	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	bedrock
12	13	1	silt sand	gravel, roots	10yr 3/2	very dark grayish brown	
	30	2	silt sand loam	gravel	7.5yr 4/4	brown	subsoil
13	27	1	silt loam	exfoliating bedrock	10yr 3/2	very dark grayish brown	
	45	2	silt	exfoliating bedrock	7.5yr 4/4	brown	subsoil
14	24	1	sand loam	gravel, roots	10yr 3/3	dark brown	
	43	2	sand loam	gravel, rocks	10yr 4/3	brown	subsoil
17	16	1	silt loam	exfoliating bedrock, roots	10yr 4/3	brown	bedrock
18	25	1	silt	gravel, exfoliating bedrock, roots	10yr 4/1	dark gray	bedrock
19	25	1	silt	exfoliating bedrock	10yr 2/2	very dark brown	bedrock
20	36	1	silt loam	exfoliating bedrock, roots	10yr 3/3	dark brown	bedrock

547041: Phase II Archeological Investigation, Troy Starlight Development

Shovel Test Records

	Ending Depth (cm)	Level	Soil Type	Soil Inclusions	Munsell Color		Termination Reason
21	19	1	sand loam	gravel, roots, rocks	10yr 3/3	dark brown	
	44	2	sand loam	gravel, shale	10yr 4/3	brown	subsoil
22	32	1	silt	gravel, exfoliating bedrock, roots	10yr 4/1	dark gray	bedrock
23	24	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	
	42	2	silt	exfoliating bedrock	10yr 4/4	dark yellowish brown	subsoil
24	27	1	sand loam	gravel, roots	10yr 3/3	dark brown	
	54	2	sand loam	gravel, rocks	10yr 5/3	brown	subsoil
25	28	1	sand loam	gravel, roots, rocks	10yr 3/3	dark brown	
	43	2	sand loam	gravel, rocks	10yr 5/3	brown	subsoil
26	23	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	
	43	2	silt loam		10yr 4/4	dark yellowish brown	subsoil
27	20	1	silt	gravel, roots	10yr 3/3	dark brown	
	25	2	silt	gravel, exfoliating bedrock, roots	10yr 4/2	dark grayish brown	bedrock
28	17	1	sand loam	gravel, roots	10yr 3/3	dark brown	
	38	2	sand loam	gravel, shale	10yr 5/3	brown	subsoil
29	21	1	sand loam	gravel, roots, rocks	10yr 3/3	dark brown	
	40	2	sand loam	gravel, rocks	10yr 5/3	brown	subsoil
30	20	1	sand loam	gravel, roots	10yr 3/3	dark brown	
	42	2	sand loam	gravel, exfoliating bedrock	10yr 4/3	brown	bedrock
					10yr 5/3	brown	
31	18	1	sand loam	gravel, roots, rocks	10yr 3/3	dark brown	
	39	2	sand loam	exfoliating bedrock	10yr 4/3	brown	bedrock

547041: Phase II Archeological Investigation, Troy Starlight Development

Shovel Test Records

	Ending Depth (cm)	Level	Soil Type	Soil Inclusions	Munsell Color		Termination Reason
32	21	1	sand loam	gravel, roots, rocks	10yr 3/3	dark brown	
	47	2	sand loam	gravel, rocks	10yr 4/3	brown	subsoil
33	18	1	sand loam	gravel, roots	10yr 3/3	dark brown	
	42	2	sand loam	gravel, rocks	10yr 4/3	brown	subsoil
34	25	1	silt	gravel, roots	10yr 3/2	very dark grayish brown	
	38	2	silt	exfoliating bedrock, roots	10yr 5/3	brown	subsoil
35	22	1	silt	gravel, roots	10yr 3/2	very dark grayish brown	
	34	2	silt	exfoliating bedrock, roots	10yr 4/4	dark yellowish brown	subsoil
36	25	1	silt	gravel, roots	10yr 3/2	very dark grayish brown	
	38	2	silt	gravel, exfoliating bedrock	10yr 4/4	dark yellowish brown	subsoil
37	11	1	silt	gravel, roots	10yr 3/1	very dark gray	
	18	2	silt	gravel, exfoliating bedrock	10yr 4/4	dark yellowish brown	bedrock
38	15	1	silt	roots	10yr 3/1	very dark gray	
	28	2	silt	gravel, exfoliating bedrock	10yr 5/3	brown	subsoil
39	28	1	silt	gravel, roots	10yr 3/2	very dark grayish brown	
	42	2	silt	gravel, exfoliating bedrock	10yr 4/4	dark yellowish brown	subsoil
40	30	1	silt	gravel, roots	10yr 3/3	dark brown	impasse (roots)

547041: Phase II Archeological Investigation, Troy Starlight Development

Shovel Test Records

	Ending Depth (cm)	Level	Soil Type	Soil Inclusions	Munsell Color		Termination Reason
41	20	1	silt	gravel, roots	10yr 3/2	very dark grayish brown	
	28	2	silt		10yr 8/1	white	
	49	3	silt	gravel, roots	10yr 3/1	very dark gray	
	59	4	silt	gravel, exfoliating bedrock	10yr 4/4	dark yellowish brown	subsoil
42	44	1	silt loam	roots	10yr 3/3	dark brown	impasse (roots)
43	30	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	
	46	2	silt loam		10yr 4/4	dark yellowish brown	subsoil
44	21	1	silt loam	exfoliating bedrock, roots	10yr 3/3	dark brown	
	43	2	silt loam	exfoliating bedrock	7.5yr 4/4	brown	subsoil
45	33	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	impasse (roots)
46	42	1	silt loam	exfoliating bedrock, roots	10yr 2/2	very dark brown	impasse (roots)
47	33	1	silt loam	roots	10yr 3/2	very dark grayish brown	impasse (roots)
48	34	1	sand loam	gravel, roots	10yr 3/3	dark brown	
	49	2	sand loam	gravel	10yr 4/4	dark yellowish brown	subsoil
49	30	1	sand loam	gravel, roots, rocks	10yr 3/3	dark brown	
	46	2	sand loam	gravel, rocks	10yr 4/4	dark yellowish brown	subsoil
50	17	1	sand loam	gravel, roots, rocks	10yr 3/3	dark brown	
	42	2	sand loam	gravel, rocks	10yr 4/4	dark yellowish brown	subsoil
51	21	1	sand loam	gravel, roots, rocks	10yr 3/3	dark brown	
	24	2	sand loam	gravel, roots	10yr 4/3	brown	impasse (roots)

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Shovel Test Records

	Ending Depth (cm)	Level	Soil Type	Soil Inclusions	Munsell Color		Termination Reason
52	39	1	silt	gravel, roots	10yr 3/3	dark brown	
	47	2	silt	exfoliating bedrock, roots	10yr 5/3	brown	subsoil
53	23	1	silt	gravel, roots	10yr 3/2	very dark grayish brown	impasse (rocks)
56	12	1	silt	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	bedrock
57	26	1	silt	gravel, roots	10yr 3/2	very dark grayish brown	
	38	2	silt	exfoliating bedrock	10yr 4/4	dark yellowish brown	subsoil
58	10	1	silt	gravel, roots	10yr 3/2	very dark grayish brown	impasse (roots)
60	10	1	silt	roots	10yr 2/2	very dark brown	
	41	2	loam clay		10yr 4/6	dark yellowish brown	subsoil
61	12	1	silt	gravel, exfoliating bedrock, roots	10yr 2/2	very dark brown	
	42	2	loam clay	cobbles	10yr 4/6	dark yellowish brown	subsoil
62	11	1	silt	cobbles, roots	10yr 2/2	very dark brown	
	25	2	loam clay	exfoliating bedrock	10yr 4/6	dark yellowish brown	impasse (rocks)
63	8	1	silt	exfoliating bedrock	10yr 2/2	very dark brown	impasse (rocks)
64	19	1	silt	exfoliating bedrock	10yr 2/2	very dark brown	
	40	2	loam clay	exfoliating bedrock	10yr 4/6	dark yellowish brown	subsoil
65	10	1	silt	exfoliating bedrock, roots	10yr 2/2	very dark brown	
	35	2	loam clay	exfoliating bedrock	10yr 4/6	dark yellowish brown	subsoil
66	22	1	silt	exfoliating bedrock, roots	10yr 3/1	very dark gray	
	32	2	silt	exfoliating bedrock, roots	10yr 5/3	brown	subsoil

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Shovel Test Records

	Ending Depth (cm)	Level	Soil Type	Soil Inclusions	Munsell Color		Termination Reason
67	22	1	sand loam	gravel, roots, rocks	10yr 3/3	dark brown	
	39	2	sand loam	gravel, exfoliating bedrock, rocks	10yr 4/3	brown	subsoil
68	37	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	bedrock
69	22	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	
	34	2	silt loam	exfoliating bedrock, roots	10yr 4/4	dark yellowish brown	subsoil
74	27	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	
	43	2	silt loam	exfoliating bedrock, roots	7.5yr 4/4	brown	subsoil
75	35	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	bedrock
76	51	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	bedrock
77	29	1	sand loam	gravel, roots, rocks	10yr 3/3	dark brown	impasse (rocks)
78	13	1	sand loam	gravel, roots, rocks	10yr 3/2	very dark grayish brown	
	27	2	sand loam	gravel, exfoliating bedrock	2.5y 3/3	dark olive brown	bedrock
86	25	1	silt	gravel, cobbles, roots	10yr 3/2	very dark grayish brown	
	36	2	silt	gravel, cobbles	10yr 4/4	dark yellowish brown	subsoil
87	32	1	silt	gravel, exfoliating bedrock, roots	10yr 3/3	dark brown	bedrock
96	13	1	silt	gravel, exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	bedrock

547041: Phase II Archeological Investigation, Troy Starlight Development

Shovel Test Records

	Ending Depth (cm)	Level	Soil Type	Soil Inclusions	Munsell Color		Termination Reason
99	18	1	silt	exfoliating bedrock, roots, gravel	10yr 3/2	very dark grayish brown	
	36	2	silt	exfoliating bedrock	10yr 4/4	dark yellowish brown	subsoil
102	36	1	silt loam	roots	10yr 3/3	dark brown	impasse (roots)
103	39	1	sand loam	gravel, exfoliating bedrock, rocks	10yr 3/3	dark brown	bedrock
104	10	1	silt sand	gravel, roots	10yr 5/2	grayish brown	
	20	2	silt		10yr 7/1	light gray	
	50	3	silt	roots	10yr 3/2	very dark grayish brown	
	65	4	silt	gravel	10yr 4/4	dark yellowish brown	subsoil
105	29	1	silt	gravel, roots	10yr 3/2	very dark grayish brown	
	42	2	silt	gravel, exfoliating bedrock	10yr 4/4	dark yellowish brown	subsoil
106	47	1	sand loam	gravel, roots	10yr 3/3	dark brown	bedrock
107	32	1	sand loam	gravel, rocks	10yr 3/3	dark brown	bedrock

547041: Phase II Archeological Investigation, Troy Starlight Development

Shovel Test Records

	Ending Depth (cm)	Level	Soil Type	Soil Inclusions	Munsell Color		Termination Reason
1							
70	20	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	bedrock
71	25	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	
	34	2	silt loam	exfoliating bedrock, roots	7.5yr 4/4	brown	bedrock
81	26	1	silt sand loam	roots, rocks	10yr 3/4	dark yellowish brown	
	43	2	silt loam	rocks	2.5y 5/4	light olive brown	subsoil
82	23	1	silt sand loam	roots, rocks	10yr 3/3	dark brown	
	39	2	silt loam	rocks	2.5y 5/3	light olive brown	subsoil
84	26	1	sand loam	roots, rocks	10yr 3/3	dark brown	
	60	2	silt loam	roots, rocks	10yr 5/3	brown	subsoil
85	28	1	silt	gravel, cobbles, roots	10yr 3/2	very dark grayish brown	
	35	2	silt	gravel, cobbles, roots	10yr 4/4	dark yellowish brown	impasse (rocks)
88	29	1	silt loam	gravel, rocks	10yr 3/3	dark brown	
	42	2	silt loam	gravel	10yr 5/4	yellowish brown	subsoil
89	28	1	sand loam	gravel, rocks	10yr 3/3	dark brown	
	43	2	silt loam	rocks	10yr 5/4	yellowish brown	subsoil
90	37	1	sand loam	gravel, rocks	10yr 3/3	dark brown	
	51	2	sand loam	gravel, rocks	10yr 5/4	yellowish brown	subsoil
91	31	1	silt loam	gravel, roots	10yr 3/3	dark brown	
	49	2	silt loam	gravel, roots	10yr 5/4	yellowish brown	subsoil
94	40	1	sand loam	gravel, roots, rocks	10yr 3/3	dark brown	
	48	2	silt loam	rocks	10yr 5/3	brown	subsoil
95	21	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	
	32	2	silt loam	exfoliating bedrock, roots	10yr 4/4	dark yellowish brown	subsoil

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Shovel Test Records

	Ending Depth (cm)	Level	Soil Type	Soil Inclusions	Munsell Color		Termination Reason
2							
72	12	1	silt loam	exfoliating bedrock, roots	10yr 2/2	very dark brown	bedrock
73	27	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	bedrock
79	32	1	sand loam	gravel, roots, rocks	10yr 3/3	dark brown	
	47	2	sand loam	gravel, rocks	10yr 4/6	dark yellowish brown	subsoil
80	23	1	sand loam	gravel, roots, rocks	10yr 3/3	dark brown	
	42	2	sand loam	gravel, rocks	10yr 4/4	dark yellowish brown	subsoil
83	33	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	
	55	2	silt		10yr 6/4	light yellowish brown	subsoil
92	23	1	silt	gravel, roots	10yr 3/2	very dark grayish brown	impasse (roots)
93	21	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	
	32	2	silt loam	exfoliating bedrock, roots	7.5yr 4/4	brown	bedrock

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Shovel Test Records

	Ending Depth (cm)	Level	Soil Type	Soil Inclusions	Munsell Color		Termination Reason
4							
54	12	1	silt	gravel, exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	bedrock
55	11	1	silt	gravel, exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	bedrock
97	37	1	sand loam	gravel, exfoliating bedrock, rocks	10yr 3/3	dark brown	bedrock
98	22	1	silt	gravel, cobbles, roots	10yr 3/3	dark brown	bedrock
100	42	1	sand loam	gravel, exfoliating bedrock, roots, rocks	10yr 3/2	very dark grayish brown	bedrock
101	20	1	silt	gravel, roots, cobbles	10yr 3/3	dark brown	bedrock
5							
59	13	1	silt	roots	10yr 2/2	very dark brown	
	34	2	clay loam	exfoliating bedrock	10yr 4/6	dark yellowish brown	subsoil
6							
8	32	1	silt loam	exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	bedrock
9	20	1	sand loam	gravel, roots, rocks	10yr 3/2	very dark grayish brown	
	45	2	sand loam	gravel, rocks	10yr 4/3	brown	subsoil
15	23	1	silt sand	gravel, exfoliating bedrock, roots	10yr 3/2	very dark grayish brown	bedrock
16	17	1	sand loam	gravel, roots	10yr 3/3	dark brown	
	41	2	sand loam	gravel, rocks	10yr 4/3	brown	subsoil
8							
3	43	1	sand loam	roots, rocks	10yr 3/2	very dark grayish brown	impasse (rocks)
4	34	1	silt loam	exfoliating bedrock, roots	10yr 4/2	dark grayish brown	bedrock

Appendix 2: Artifact Inventory

547041: Phase II Archeological Investigation, Troy Starlight Development

Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
STP 3	1		1	1	6	debitage	chert	308.8
				1.1	*1*	*debitage, block, chert*		*63.1*
				1.2	*3*	*debitage, gangue, chert*		*86.6*
				1.3	*1*	*debitage, quarry flake, chert*		*102.1*
				1.4	*1*	*debitage, block flake, chert*		*57.0*
STP 4	1		2	1	9	debitage	shale	674.8
				1.1	*9*	*debitage, gangue, shale*		*674.8*
STP 5	2		3	1	1	debitage	shale	146.9
				1.1	*1*	*debitage, block, shale*		*146.9*
STP 5	2		3	2	6	debitage	shale	243.2
				2.1	*6*	*debitage, gangue, shale*		*243.2*
STP 7	2		4	1	3	debitage	siliceous shale	199.1
				1.1	*3*	*debitage, gangue, siliceous shale*		*199.1*
STP 7	2		4	2	9	debitage	shale	345.8
				2.1	*9*	*debitage, gangue, shale*		*345.8*
STP 8	1		5	1	1	chipped stone tool	shale	164.7
				1.1	*1*	*chipped stone tool, retouched block, shale*		*164.7*
STP 8	1		5	2	10	debitage	shale	363.1
				2.1	*7*	*debitage, gangue, shale*		*311.4*
				2.2	*3*	*debitage, quarry flake, shale*		*51.7*
STP 9	2		6	1	2	chipped stone tool	chert	194.2
				1.1	*2*	*chipped stone tool, retouched flake, chert*		*194.2*
STP 9	2		6	2	1	debitage	chert	93.3
				2.1	*1*	*debitage, block, chert, green*		*93.3*
STP 9	2		6	3	4	debitage	shale	169.2
				3.1	*4*	*debitage, gangue, shale*		*169.2*

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
STP 11	1		7	1	4	debitage	chert	219.3
				1.1	*2*	*debitage, block, chert*		*136.2*
				1.2	*1*	*debitage, shatter, chert*		*18.7*
				1.3	*1*	*debitage, quarry flake, chert*		*64.4*
STP 14	2		8	1	11	debitage	shale	116.6
				1.1	*2*	*debitage, gangue, shale*		*30.6*
				1.2	*1*	*debitage, shatter, shale*		*1.5*
				1.3	*2*	*debitage, quarry flake, shale*		*50.1*
				1.4	*4*	*debitage, block flake, shale*		*28.5*
				1.5	*2*	*debitage, flake, shale*		*5.9*
STP 16	2		9	1	2	debitage	shale	23.9
				1.1	*2*	*debitage, gangue, shale*		*23.9*
STP 16	2		9	2	2	debitage	chert	24.3
				2.1	*1*	*debitage, gangue, chert*		*10.0*
				2.2	*1*	*debitage, quarry flake, chert*		*14.3*
STP 17	1		10	1	2	debitage	chert	440.1
				1.1	*1*	*debitage, quarry flake, chert, green, large, appears detached from core*		*414.9*
				1.2	*1*	*debitage, block flake, chert, green*		*25.2*
STP 17	1		10	2	2	debitage	shale	40.0
				2.1	*1*	*debitage, gangue, shale, green*		*29.3*
				2.2	*1*	*debitage, block flake, shale*		*10.7*
STP 19	1		11	1	1	bottle	glass	4.7
				1.1	*1*	*bottle, glass, green*		*4.7*
STP 19	1		11	2	2	window	glass	8.2
				2.1	*2*	*window, glass, colorless*		*8.2*
STP 19	1		11	3	1	nail	iron alloy	5.8
				3.1	*1*	*nail, complete, iron alloy, cut, bent*		*5.8*
STP 19	1		11	4	1	staple	iron alloy	1.2
				4.1	*1*	*staple, complete, iron alloy*		*1.2*

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
STP 19	1		11	5	1	coin	zinc alloy	2.3
				5.1	*1*	*coin, US one-cent, complete, zinc alloy, Diam 1.9 cm, TPQ 1983*		*2.3*
STP 19	1		11	6	2	bottle closure	iron alloy	4.5
				6.1	*2*	*bottle closure, cap, nearly complete, iron alloy*		*4.5*
STP 21	1		12	1	5	debitage	shale	129.6
				1.1	*2*	*debitage, quarry flake, shale*		*113.0*
				1.2	*3*	*debitage, flake, shale*		*16.6*
STP 25	1		13	1	2	debitage	shale	42.6
				1.1	*1*	*debitage, gangue, shale*		*29.4*
				1.2	*1*	*debitage, gangue, shale, green*		*13.2*
STP 25	1		13	2	1	debitage	chert	3.6
				2.1	*1*	*debitage, thinning flake, chert, green, cortex on platform*		*3.6*
STP 31	1		14	1	3	debitage	shale	67.7
				1.1	*2*	*debitage, quarry flake, shale*		*59.5*
				1.2	*1*	*debitage, flake, shale*		*8.2*
STP 31	1		14	2	1	debitage	chert	10.6
				2.1	*1*	*debitage, quarry flake, chert*		*10.6*
STP 39	1		15	1	1	debitage	shale	14.9
				1.1	*1*	*debitage, gangue, shale*		*14.9*
STP 39	1		15	2	1	debitage	chert	8.9
				2.1	*1*	*debitage, block flake, chert*		*8.9*
STP 40	1		16	1	1	chipped stone tool	chert	8.7
				1.1	*1*	*chipped stone tool, retouched flake, chert*		*8.7*
STP 40	1		16	2	1	brick	brick	7.8
				2.1	*1*	*brick, brick, fragment, nondimensional*		*7.8*
STP 40	1		16	3	1	nail	iron alloy	3.0
				3.1	*1*	*nail, iron alloy, wire*		*3.0*

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
STP 40	1		16	4	6	unidentified	cast iron	714.2
				4.1	*6*	*unidentified, cast iron, flat and curved fragments*		*714.2*
STP 40	1		16	5	2	unidentified	sandstone	34.7
				5.1	*2*	*unidentified, sandstone, iron-stained, with longitudinal divet*		*34.7*
STP 42	1		17	1	1	electrical insulator	ceramic	25.4
				1.1	*1*	*electrical insulator, ceramic, "/...24-S"*		*25.4*
STP 42	1		17	2	1	vessel	glass	8.0
				2.1	*1*	*vessel, glass, ribbed, colorless*		*8.0*
STP 42	1		17	3	1	bottle	glass	91.6
				3.1	*1*	*bottle, pharmaceutical, complete, glass, embossed, amber, machine made, Illinois Glass Co., "BROWNATONE /KENTONE PHARMACAL Co./COVINGTON, KY.", L 11.8, Diam 4.3 cm, TPQ 1911*		*91.6*
STP 51	1		18	1	2	debitage	chert	111.8
				1.1	*1*	*debitage, block, chert*		*28.5*
				1.2	*1*	*debitage, core, chert, multidirectional*		*83.3*
STP 52	1		19	1	2	debitage	chert	9.1
				1.1	*1*	*debitage, thinning flake, chert*		*4.9*
				1.2	*1*	*debitage, flake, chert*		*4.2*
STP 53	1		20	1	1	debitage	shale	32.3
				1.1	*1*	*debitage, gangue, shale*		*32.3*
STP 53	1		20	2	6	debitage	chert	432.0
				2.1	*1*	*debitage, core, chert, multidirectional*		*332.8*
				2.2	*4*	*debitage, block flake, chert*		*88.9*
				2.3	*1*	*debitage, flake, chert*		*10.3*
STP 55	1		21	1	7	debitage	chert	67.6
				1.1	*2*	*debitage, block flake, chert, green*		*31.8*
				1.2	*4*	*debitage, thinning flake, chert*		*35.3*
				1.3	*1*	*debitage, trim flake, chert*		*0.5*

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
STP 59	2		22	1	1	debitage	shale	43.2
				1.1	*1*	*debitage, gangue, shale*		*43.2*
STP 59	2		22	2	10	debitage	chert	536.3
				2.1	*2*	*debitage, block, chert*		*173.9*
				2.2	*1*	*debitage, gangue, chert*		*34.7*
				2.3	*1*	*debitage, core, chert, multidirectional*		*177.9*
				2.4	*4*	*debitage, block flake, chert*		*68.8*
				2.5	*2*	*debitage, flake, chert*		*81.0*
STP 61	1		23	1	1	whiteware	refined earthenware	2.9
				1.1	*1*	*whiteware, flatware, rim, refined earthenware, undecorated*		*2.9*
STP 71	1		33	1	1	debitage	chert	27.8
				1.1	*1*	*debitage, core, chert, multidirectional*		*27.8*
STP 72	1		24	1	4	debitage	chert	71.0
				1.1	*1*	*debitage, gangue, chert*		*52.4*
				1.2	*2*	*debitage, block flake, chert, burned*		*15.5*
				1.3	*1*	*debitage, flake, chert, burned*		*3.1*
STP 73	1		25	1	6	debitage	chert	119.1
				1.1	*1*	*debitage, block, chert*		*99.6*
				1.2	*2*	*debitage, block flake, chert, burned*		*13.0*
				1.3	*3*	*debitage, flake, chert, burned*		*6.5*
STP 77	1		26	1	2	debitage	chert	144.1
				1.1	*2*	*debitage, block, chert*		*144.1*
STP 80	1		27	1	1	debitage	shale	32.5
				1.1	*1*	*debitage, gangue, shale*		*32.5*
STP 80	1		27	2	5	debitage	chert	192.9
				2.1	*1*	*debitage, block, chert*		*150.4*
				2.2	*2*	*debitage, block flake, chert*		*33.9*
				2.3	*2*	*debitage, flake, chert*		*8.6*

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
STP 81	1		28	1	2	debitage	siliceous shale	3.4
				1.1	*2*	*debitage, trim flake, siliceous shale*		*3.4*
STP 81	1		28	2	7	debitage	chert	41.8
				2.1	*1*	*debitage, block, chert*		*22.2*
				2.2	*1*	*debitage, block flake, chert*		*8.9*
				2.3	*2*	*debitage, thinning flake, chert, green*		*6.9*
				2.4	*2*	*debitage, thinning flake, chert*		*2.7*
				2.5	*1*	*debitage, flake, chert, appears burned*		*1.1*
STP 82	1		29	1	4	debitage	chert	18.6
				1.1	*3*	*debitage, thinning flake, chert*		*14.0*
				1.2	*1*	*debitage, shatter, chert*		*4.6*
STP 83	1		30	1	6	debitage	chert	314.5
				1.1	*2*	*debitage, block, chert*		*297.6*
				1.2	*2*	*debitage, shatter, chert*		*3.2*
				1.3	*1*	*debitage, thinning flake, chert*		*1.1*
				1.4	*1*	*debitage, flake, chert, green*		*12.6*
STP 84	2		31	1	1	chipped stone tool	chert	8.0
				1.1	*1*	*chipped stone tool, retouched flake, chert, gray*		*8.0*
STP 84	2		31	2	3	debitage	siliceous shale	6.2
				2.1	*1*	*debitage, trim flake, siliceous shale*		*0.5*
				2.2	*1*	*debitage, thinning flake, siliceous shale*		*2.2*
				2.3	*1*	*debitage, flake, siliceous shale*		*3.5*
STP 84	2		31	3	4	debitage	chert	15.4
				3.1	*1*	*debitage, shatter, chert*		*2.9*
				3.2	*1*	*debitage, block flake, chert*		*5.2*
				3.3	*2*	*debitage, thinning flake, chert*		*7.3*
STP 84	2		31	4	3	debitage	shale	10.6
				4.1	*2*	*debitage, shatter, shale*		*4.6*
				4.2	*1*	*debitage, flake, shale*		*6.0*
STP 85	1		32	1	1	debitage	chert	3.2

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
				1.1	*1*	*debitage, thinning flake, chert, gray*		*3.2*
STP 89	2		34	1	1	chipped stone tool	chert	20.6
				1.1	*1*	*chipped stone tool, retouched flake, chert*		*20.6*
STP 89	2		34	2	7	debitage	chert	209.8
				2.1	*2*	*debitage, core, chert, multidirectional*		*186.0*
				2.2	*1*	*debitage, block flake, chert*		*15.8*
				2.3	*2*	*debitage, trim flake, chert, green*		*0.5*
				2.4	*1*	*debitage, trim flake, chert*		*0.2*
				2.5	*1*	*debitage, flake, chert, gray, burned*		*7.3*
STP 89	2		34	3	2	debitage	shale	22.0
				3.1	*1*	*debitage, block flake, shale*		*21.4*
				3.2	*1*	*debitage, trim flake, shale*		*0.6*
STP 94	1		35	1	1	mineral sample	quartzite	209.5
STP 94	1		35	2	1	chipped stone tool	chert	48.6
				2.1	*1*	*chipped stone tool, retouched flake, chert, green*		*48.6*
STP 97	1		36	1	1	chipped stone tool	chert	105.8
				1.1	*1*	*chipped stone tool, biface, stage 1, complete, chert, green, L 6.9, W 5.4, T 2.4 cm*		*105.8*
STP 97	1		36	2	1	debitage	chert	6.1
				2.1	*1*	*debitage, block flake, chert, green*		*6.1*
STP 102	1		37	1	2	bottle	glass	87.7
				1.1	*1*	*bottle, oval-shaped, base, glass, ribbed, colorless, machine made, Hazel-Atlas Glass Co., 1923-1982, poss. ketchup, TPQ 1923*		*59.4*
				1.2	*1*	*bottle, finish, glass, colorless, machine made, threaded*		*28.3*
STP 104	2		38	1	1	bottle	glass and iron	88.7
				1.1	*1*	*bottle, pharmaceutical, complete, glass, embossed, brown, lipping-tooled, rectangular, with cap and liquid contents, "6201 1/2/30 S 811" on base, L 9.2, W 4.0, T 2.5 cm*		*88.7*
STP 104	2		38	2	3	bottle	glass	491.3

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
				2.1	*1*	*bottle, pharmaceutical, complete, glass, embossed, brown, machine made, Owens-Illinois Glass Co., threaded finish, L 9.1, W 4.8, T 3.0 cm, TPQ 1929*		*79.3*
				2.2	*1*	*bottle, pharmaceutical, nearly complete, glass, embossed, colorless, machine made, The Knox Glass Bottle Co., finish partially missing, "3iv", 1917-1920s, TPQ 1917*		*129.9*
				2.3	*1*	*bottle, condiment, complete, glass, molded decoration, colorless, machine made, Owens-Illinois Glass Co., Duraglas, Mazola Oil Company, "MAZOLA/REG. U.S. PAT. OFF./Salad Oil", threaded finish, for corn oil, round bottle, L 18.0, Diam 6.5 cm, TPQ 1940*		*282.1*
STP 104	2		38	3	1	faunal bone	bone	16.9
				3.1	*1*	*faunal bone, mammal, long bone, bone, sawn*		*16.9*
U 1	1		39	1	1	rough stone tool	quartzite	250.2
				1.1	*1*	*rough stone tool, hammerstone, complete, quartzite*		*250.2*
U 1	1		39	2	3	chipped stone tool	chert	125.2
				2.1	*1*	*chipped stone tool, biface, stage 1, complete, chert*		*51.8*
				2.2	*1*	*chipped stone tool, biface, stage 1, complete, chert, green*		*48.2*
				2.3	*1*	*chipped stone tool, retouched flake, chert*		*25.2*
U 1	1		39	3	4	debitage	siliceous shale	114.3
				3.1	*2*	*debitage, gangue, siliceous shale*		*112.0*
				3.2	*1*	*debitage, trim flake, siliceous shale*		*0.7*
				3.3	*1*	*debitage, flake, siliceous shale*		*1.6*
U 1	1		39	4	50	debitage	chert	1,519.9
				4.1	*1*	*debitage, block, chert*		*589.7*
				4.2	*13*	*debitage, gangue, chert*		*794.5*
				4.3	*6*	*debitage, shatter, chert*		*31.6*
				4.4	*6*	*debitage, block flake, chert*		*67.1*
				4.5	*18*	*debitage, thinning flake, chert*		*29.9*
				4.6	*4*	*debitage, trim flake, chert*		*0.7*
				4.7	*2*	*debitage, flake, chert*		*6.4*
U 1	1		39	5	22	debitage	shale	81.6
				5.1	*5*	*debitage, shatter, shale*		*31.5*
				5.2	*4*	*debitage, block flake, shale*		*25.4*
				5.3	*4*	*debitage, thinning flake, shale*		*7.0*
				5.4	*9*	*debitage, flake, shale*		*17.7*
U 1	1		39	6	2	fire-cracked rock	sandstone	118.0
U 1	1		39	7	5	fire-cracked rock	quartzite	422.7
U 1	1		39	8	6	bottle	glass	120.2

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
				8.1	*1*	*bottle, oval-shaped, base, glass, embossed, colorless, machine made, Owens-Illinois Glass Co., TPQ 1929*		*72.0*
				8.2	*1*	*bottle, finish, glass, colorless, machine made*		*36.0*
				8.3	*3*	*bottle, body, glass, colorless*		*7.0*
				8.4	*1*	*bottle, glass, brown, mold made*		*5.2*
U 1	1		39	9	1	window	glass	14.0
				9.1	*1*	*window, glass, pale aqua*		*14.0*
U 1	1		39	10	1	shoe/shoe part	leather	25.7
				10.1	*1*	*shoe/shoe part, sole, nearly complete, leather, left shoe, likely child, W 6.8, T 0.3 cm*		*25.7*
Stratum 2								
U 1	2		40	1	8	chipped stone tool	chert	300.0
				1.1	*1*	*chipped stone tool, retouched block, chert*		*91.6*
				1.2	*1*	*chipped stone tool, retouched flake, chert, green*		*14.9*
				1.3	*6*	*chipped stone tool, retouched flake, chert*		*193.5*
U 1	2		40	2	81	debitage	chert	187.9
				2.1	*1*	*debitage, gangue, chert*		*8.0*
				2.2	*1*	*debitage, shatter, chert, green*		*23.0*
				2.3	*2*	*debitage, shatter, chert*		*3.9*
				2.4	*6*	*debitage, block flake, chert*		*44.5*
				2.5	*43*	*debitage, thinning flake, chert*		*96.1*
				2.6	*23*	*debitage, trim flake, chert*		*6.8*
				2.7	*5*	*debitage, flake, chert*		*5.6*
U 1	2		40	3	3	debitage	quartzite	3.6
				3.1	*2*	*debitage, trim flake, quartzite*		*0.8*
				3.2	*1*	*debitage, flake, quartzite*		*2.8*
U 1	2		40	4	46	debitage	shale	538.0
				4.1	*5*	*debitage, gangue, shale*		*274.3*
				4.2	*6*	*debitage, shatter, shale*		*70.1*
				4.3	*6*	*debitage, block flake, shale*		*81.5*
				4.4	*12*	*debitage, thinning flake, shale*		*22.5*
				4.5	*7*	*debitage, trim flake, shale*		*3.7*
				4.6	*10*	*debitage, flake, shale*		*85.9*
U 1	2		40	5	6	debitage	siliceous shale	116.8
				5.1	*2*	*debitage, shatter, siliceous shale*		*104.5*
				5.2	*4*	*debitage, thinning flake, siliceous shale*		*12.3*
U 1	2		40	6	1	fire-cracked rock	chert	42.5

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
U 1	2		40	7	7	fire-cracked rock	sandstone	598.3
U 1	2		40	8	2	fire-cracked rock	quartzite	434.2
Stratum 2								
U 1	3		41	1	12	debitage	shale	123.5
				1.1	*1*	*debitage, gangue, shale*		*19.3*
				1.2	*2*	*debitage, shatter, shale*		*70.3*
				1.3	*1*	*debitage, block flake, shale*		*15.1*
				1.4	*2*	*debitage, trim flake, shale*		*0.5*
				1.5	*6*	*debitage, flake, shale*		*18.3*
U 1	3		41	2	3	debitage	siliceous shale	12.3
				2.1	*1*	*debitage, gangue, siliceous shale, red*		*9.8*
				2.2	*1*	*debitage, thinning flake, siliceous shale*		*1.8*
				2.3	*1*	*debitage, trim flake, siliceous shale*		*0.7*
U 1	3		41	3	39	debitage	chert	192.3
				3.1	*1*	*debitage, block, chert*		*104.2*
				3.2	*1*	*debitage, shatter, chert*		*31.5*
				3.3	*2*	*debitage, thinning flake, chert, gray*		*5.6*
				3.4	*26*	*debitage, thinning flake, chert*		*47.7*
				3.5	*7*	*debitage, trim flake, chert*		*1.9*
				3.6	*2*	*debitage, flake, chert*		*1.4*
U 1	3		41	4	1	debitage	quartzite	31.6
				4.1	*1*	*debitage, quarry flake, quartzite, cortex*		*31.6*
U 1	3		41	5	4	fire-cracked rock	quartzite	112.6
Stratum 2								
U 1	4		42	1	3	debitage	shale	59.2
				1.1	*1*	*debitage, gangue, shale*		*58.0*
				1.2	*2*	*debitage, flake, shale*		*1.2*
U 1	4		42	2	20	debitage	chert	36.1
				2.1	*1*	*debitage, block flake, chert, gray*		*14.8*
				2.2	*11*	*debitage, thinning flake, chert*		*14.0*
				2.3	*1*	*debitage, thinning flake, chert, gray*		*1.1*
				2.4	*5*	*debitage, trim flake, chert*		*1.9*
				2.5	*2*	*debitage, flake, chert*		*4.3*

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
Stratum 2								
U 1	5		43	1	21	debitage	chert	26.2
				1.1	*2*	*debitage, shatter, chert*		*0.7*
				1.2	*1*	*debitage, block flake, chert*		*4.7*
				1.3	*9*	*debitage, thinning flake, chert*		*16.0*
				1.4	*1*	*debitage, thinning flake, chert, green*		*1.2*
				1.5	*7*	*debitage, trim flake, chert*		*2.0*
				1.6	*1*	*debitage, flake, chert*		*1.6*
U 1	5		43	2	8	debitage	shale	91.0
				2.1	*2*	*debitage, gangue, shale*		*70.0*
				2.2	*1*	*debitage, shatter, shale*		*6.3*
				2.3	*2*	*debitage, block flake, shale*		*6.4*
				2.4	*3*	*debitage, flake, shale*		*8.3*
U 1	5		43	3	1	fire-cracked rock	quartzite	58.5
U 1	5		43	4	1	fire-cracked rock	sandstone	4.9
U 1	5		43	5	1	charcoal	charcoal	3.8
Stratum 2								
U 1	6		44	1	3	debitage	chert	9.5
				1.1	*1*	*debitage, block flake, chert*		*6.3*
				1.2	*2*	*debitage, thinning flake, chert*		*3.2*
U 1	6		44	2	5	debitage	shale	17.8
				2.1	*1*	*debitage, shatter, shale, burned*		*5.5*
				2.2	*1*	*debitage, shatter, shale*		*6.6*
				2.3	*3*	*debitage, thinning flake, shale*		*5.7*
U 1	6		44	3	1	fire-cracked rock	sandstone	92.4
U 1	7		93	1	1	debitage	chert	1.0
				1.1	*1*	*debitage, thinning flake, chert*		*1.0*
Stratum 1								
U 2	1		45	1	7	debitage	shale	96.5

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
				1.1	*2*	*debitage, shatter, shale*		*29.0*
				1.2	*1*	*debitage, core, complete, shale, multidirectional*		*63.1*
				1.3	*4*	*debitage, flake, shale*		*4.4*
U 2	1		45	2	1	debitage	siliceous shale	1.3
				2.1	*1*	*debitage, thinning flake, siliceous shale*		*1.3*
U 2	1		45	3	2	debitage	chert	2.0
				3.1	*1*	*debitage, thinning flake, chert*		*1.4*
				3.2	*1*	*debitage, trim flake, chert*		*0.6*
U 2	1		45	4	1	unidentified	sandstone	25.6
U 2	1		45	5	1	mineral sample	sandstone	64.1
U 2	1		45	6	2	bottle	glass	22.2
				6.1	*2*	*bottle, glass, colorless, mold made*		*22.2*
U 2	1		45	7	1	nail	iron alloy	4.3
				7.1	*1*	*nail, iron alloy, cut*		*4.3*
U 2	2		46	1	12	debitage	chert	15.3
				1.1	*10*	*debitage, thinning flake, chert*		*14.8*
				1.2	*2*	*debitage, trim flake, chert*		*0.5*
U 2	2		46	2	3	debitage	siliceous shale	8.8
				2.1	*2*	*debitage, block flake, siliceous shale*		*7.1*
				2.2	*1*	*debitage, thinning flake, siliceous shale*		*1.7*
U 2	2		46	3	4	debitage	shale	6.9
				3.1	*1*	*debitage, shatter, shale*		*4.3*
				3.2	*2*	*debitage, thinning flake, shale*		*1.6*
				3.3	*1*	*debitage, flake, shale*		*1.0*
U 2	2		46	4	1	fire-cracked rock	sandstone	3.8
U 2	3		47	1	10	debitage	shale	43.9
				1.1	*1*	*debitage, block, shale*		*32.5*
				1.2	*2*	*debitage, block flake, shale*		*4.5*
				1.3	*2*	*debitage, thinning flake, shale*		*1.8*
				1.4	*5*	*debitage, flake, shale*		*5.1*
U 2	3		47	2	23	debitage	chert	30.0

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
				2.1	*1*	*debitage, block flake, chert*		*8.7*
				2.2	*7*	*debitage, thinning flake, chert*		*12.3*
				2.3	*2*	*debitage, thinning flake, chert, gray*		*3.7*
				2.4	*10*	*debitage, trim flake, chert*		*3.5*
				2.5	*1*	*debitage, trim flake, chert, green*		*0.2*
				2.6	*2*	*debitage, flake, chert*		*1.6*
U 2	4		48	1	1	chipped stone tool	siliceous shale	18.2
				1.1	*1*	*chipped stone tool, biface, stage 2, complete, siliceous shale, L 7.1, W 2.6, T 0.9 cm*		*18.2*
U 2	4		48	2	1	chipped stone tool	chert	16.6
				2.1	*1*	*chipped stone tool, retouched flake, chert*		*16.6*
U 2	4		48	3	37	debitage	chert	66.0
				3.1	*3*	*debitage, shatter, chert*		*22.3*
				3.2	*1*	*debitage, thinning flake, chert, green*		*1.0*
				3.3	*20*	*debitage, thinning flake, chert*		*38.3*
				3.4	*10*	*debitage, trim flake, chert*		*3.4*
				3.5	*1*	*debitage, trim flake, chert, orange*		*0.2*
				3.6	*2*	*debitage, flake, chert*		*0.8*
U 2	4		48	4	3	debitage	siliceous shale	6.7
				4.1	*3*	*debitage, thinning flake, siliceous shale*		*6.7*
U 2	4		48	5	4	debitage	shale	5.9
				5.1	*4*	*debitage, flake, shale*		*5.9*
U 2	4		48	6	6	fire-cracked rock	quartzite	305.4
U 2	4		48	7	1	fire-cracked rock	sandstone	56.8
U 2	4		48	8	1	mineral sample	quartzite	216.8
U 2	6		53	1	3	debitage	chert	3.3
				1.1	*1*	*debitage, block flake, chert*		*2.7*
				1.2	*1*	*debitage, thinning flake, chert*		*0.4*
				1.3	*1*	*debitage, trim flake, chert*		*0.2*
U 2	6		53	2	2	debitage	shale	6.2
				2.1	*2*	*debitage, thinning flake, shale*		*6.2*

Stratum 1

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
U 3	1		49	1	2	rough stone tool	quartzite	1,642.4
				1.1	*1*	*rough stone tool, hammerstone, complete,*	*quartzite*	*277.4*
				1.2	*1*	*rough stone tool, extraction hammerstone,*	*quartzite, fragment, fire-cracked*	*1,365.0*
U 3	1		49	2	2	chipped stone tool	chert	45.5
				2.1	*2*	*chipped stone tool, retouched flake, chert*		*45.5*
U 3	1		49	3	1	chipped stone tool	shale	164.0
				3.1	*1*	*chipped stone tool, retouched block, shale*		*164.0*
U 3	1		49	4	1	chipped stone tool	siliceous shale	5.8
				4.1	*1*	*chipped stone tool, retouched flake, siliceous shale*		*5.8*
U 3	1		49	5	6	debitage	siliceous shale	25.8
				5.1	*3*	*debitage, thinning flake, siliceous shale*		*10.6*
				5.2	*3*	*debitage, flake, siliceous shale*		*15.2*
U 3	1		49	6	25	debitage	chert	409.0
				6.1	*1*	*debitage, core, complete, chert, gray, multidirectional*		*265.9*
				6.2	*1*	*debitage, core, complete, chert, multidirectional*		*50.8*
				6.3	*1*	*debitage, shatter, chert*		*25.6*
				6.4	*1*	*debitage, block flake, chert*		*3.5*
				6.5	*1*	*debitage, thinning flake, chert, cortex*		*3.2*
				6.6	*16*	*debitage, thinning flake, chert*		*52.1*
				6.7	*2*	*debitage, trim flake, chert*		*0.7*
				6.8	*2*	*debitage, flake, chert*		*7.2*
U 3	1		49	7	48	debitage	shale	346.7
				7.1	*4*	*debitage, gangue, shale*		*186.6*
				7.2	*3*	*debitage, shatter, shale*		*18.2*
				7.3	*26*	*debitage, thinning flake, shale*		*102.8*
				7.4	*15*	*debitage, flake, shale*		*39.1*
U 3	1		49	8	6	fire-cracked rock	sandstone	581.9
U 3	1		49	9	6	fire-cracked rock	quartzite	518.0
U 3	1		49	10	1	bottle	glass	9.4
				10.1	*1*	*bottle, glass, pale aqua*		*9.4*
Stratum 2								
U 3	2		50	1	4	chipped stone tool	chert	47.1
				1.1	*4*	*chipped stone tool, retouched flake, chert*		*47.1*

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
U 3	2		50	2	6	debitage	shale	31.9
				2.1	*2*	*debitage, shatter, shale*		*21.3*
				2.2	*1*	*debitage, block flake, shale*		*5.7*
				2.3	*1*	*debitage, thinning flake, shale*		*2.3*
				2.4	*2*	*debitage, flake, shale*		*2.6*
U 3	2		50	3	13	debitage	siliceous shale	175.2
				3.1	*1*	*debitage, block, siliceous shale*		*68.2*
				3.2	*1*	*debitage, gangue, siliceous shale*		*46.0*
				3.3	*1*	*debitage, shatter, siliceous shale*		*20.1*
				3.4	*1*	*debitage, block flake, siliceous shale*		*31.7*
				3.5	*5*	*debitage, thinning flake, siliceous shale*		*6.6*
				3.6	*4*	*debitage, flake, siliceous shale*		*2.6*
U 3	2		50	4	57	debitage	chert	661.5
				4.1	*2*	*debitage, block, chert, appear burned*		*274.2*
				4.2	*1*	*debitage, block, chert*		*77.1*
				4.3	*1*	*debitage, gangue, chert, appears burned*		*44.8*
				4.4	*10*	*debitage, block flake, chert*		*154.9*
				4.5	*28*	*debitage, thinning flake, chert*		*80.8*
				4.6	*4*	*debitage, thinning flake, chert, green*		*17.5*
				4.7	*8*	*debitage, trim flake, chert*		*3.1*
				4.8	*3*	*debitage, flake, chert*		*9.1*
U 3	2		50	5	1	fire-cracked rock	sandstone	40.6
U 3	2		50	6	8	fire-cracked rock	quartzite	285.1
Stratum 2								
U 3	3		51	1	1	chipped stone tool	chert	39.1
				1.1	*1*	*chipped stone tool, retouched flake, chert, heavily patinated*		*39.1*
U 3	3		51	2	1	debitage	quartz	19.9
				2.1	*1*	*debitage, block flake, quartz*		*19.9*
U 3	3		51	3	1	debitage	shale	0.5
				3.1	*1*	*debitage, flake, shale*		*0.5*
U 3	3		51	4	5	debitage	siliceous shale	23.6
				4.1	*1*	*debitage, block flake, siliceous shale*		*13.3*
				4.2	*3*	*debitage, thinning flake, siliceous shale*		*7.6*
				4.3	*1*	*debitage, flake, siliceous shale*		*2.7*

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
U 3	3		51	5	9	debitage	chert	87.7
				5.1	*2*	*debitage, shatter, chert*		*24.4*
				5.2	*1*	*debitage, block flake, chert, cortex*		*15.2*
				5.3	*3*	*debitage, block flake, chert, green*		*40.9*
				5.4	*3*	*debitage, thinning flake, chert*		*7.2*
U 3	3		51	6	1	fire-cracked rock	quartzite	176.5
U 3	3		51	7	2	fire-cracked rock	sandstone	371.5
Stratum 2								
U 3	4		52	1	11	debitage	chert	9.0
				1.1	*6*	*debitage, thinning flake, chert*		*6.6*
				1.2	*3*	*debitage, trim flake, chert*		*0.9*
				1.3	*1*	*debitage, trim flake, chert, green*		*0.2*
				1.4	*1*	*debitage, flake, chert*		*1.3*
U 3	4		52	2	2	debitage	shale	2.6
				2.1	*2*	*debitage, flake, shale*		*2.6*
Interface, 20cm BS, 24cm W & 26cm N of SE corner								
U 3	1		71	1	1	projectile point	chert	25.9
				1.1	*1*	*projectile point, Genesee, complete, chert, stemmed, straight base, stem has parallel sides, stem width = 2.0cm, L 8.5, W 3.3, T 1.1 cm*		*25.9*
U 4	1		54	1	1	chipped stone tool	chert	9.1
				1.1	*1*	*chipped stone tool, retouched flake, chert, green*		*9.1*
U 4	1		54	2	46	debitage	chert	557.1
				2.1	*1*	*debitage, block, chert*		*245.4*
				2.2	*1*	*debitage, core, complete, chert, multidirectional*		*69.6*
				2.3	*2*	*debitage, block flake, chert*		*18.9*
				2.4	*8*	*debitage, block flake, chert, green*		*135.7*
				2.5	*16*	*debitage, thinning flake, chert*		*19.1*
				2.6	*6*	*debitage, thinning flake, chert, green*		*16.7*
				2.7	*5*	*debitage, shatter, chert, green*		*24.1*
				2.8	*7*	*debitage, flake, chert, green*		*27.6*
U 4	1		54	3	50	debitage	shale	450.4

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
				3.1	*1*	*debitage, quarry flake, shale, green*		*112.2*
				3.2	*2*	*debitage, shatter, shale*		*19.1*
				3.3	*1*	*debitage, shatter, shale, orange*		*11.2*
				3.4	*5*	*debitage, shatter, shale, green*		*37.8*
				3.5	*9*	*debitage, block flake, shale, green*		*151.1*
				3.6	*1*	*debitage, thinning flake, shale*		*4.1*
				3.7	*7*	*debitage, flake, shale*		*15.8*
				3.8	*24*	*debitage, flake, shale, green*		*99.1*
U 4	1		54	4	1	fire-cracked rock	quartzite	11.1
U 4	1		54	5	1	porcelain	porcelain	10.3
				5.1	*1*	*porcelain, unidentified, rim, porcelain, glazed, brown*		*10.3*
U 4	1		54	6	1	shell	shell	4.5
				6.1	*1*	*shell, clam, shell*		*4.5*
U 4	2		55	1	10	debitage	chert	248.6
				1.1	*1*	*debitage, core, complete, chert, multidirectional*		*223.0*
				1.2	*1*	*debitage, thinning flake, chert, green*		*2.6*
				1.3	*6*	*debitage, thinning flake, chert*		*20.1*
				1.4	*2*	*debitage, flake, chert*		*2.9*
U 4	2		55	2	5	debitage	shale	28.6
				2.1	*1*	*debitage, gangue, shale*		*19.0*
				2.2	*1*	*debitage, flake, shale, green*		*5.1*
				2.3	*3*	*debitage, flake, shale*		*4.5*
U 4	2		55	3	1	debitage	quartzite	53.7
				3.1	*1*	*debitage, block flake, quartzite*		*53.7*
U 4	2		55	4	1	fire-cracked rock	quartzite	113.9
Stratum 1								
U 4	3		56	1	1	chipped stone tool	chert	13.0
				1.1	*1*	*chipped stone tool, retouched flake, chert*		*13.0*
U 4	3		56	2	3	debitage	chert	6.3
				2.1	*2*	*debitage, thinning flake, chert*		*2.9*
				2.2	*1*	*debitage, flake, chert*		*3.4*
U 4	3		56	3	3	debitage	shale	30.0

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
				3.1	*1*	*debitage, gangue, shale*		*23.3*
				3.2	*2*	*debitage, flake, shale*		*6.7*
Stratum 1								
U 4	4		57	1	3	debitage	chert	12.6
				1.1	*1*	*debitage, thinning flake, chert, green*		*7.2*
				1.2	*2*	*debitage, thinning flake, chert*		*5.4*
U 4	4		57	2	2	debitage	shale	5.2
				2.1	*1*	*debitage, shatter, shale*		*2.9*
				2.2	*1*	*debitage, flake, shale*		*2.3*
U 4	5		58	1	2	debitage	chert	2.5
				1.1	*2*	*debitage, thinning flake, chert*		*2.5*
U 4	5		58	2	8	debitage	shale	57.1
				2.1	*4*	*debitage, block flake, shale*		*39.1*
				2.2	*4*	*debitage, flake, shale*		*18.0*
U 4	6		59	1	1	debitage	chert	8.2
				1.1	*1*	*debitage, thinning flake, chert*		*8.2*
Stratum 1								
U 5	1		61	1	1	chipped stone tool	chert	1.7
				1.1	*1*	*chipped stone tool, retouched flake, chert*		*1.7*
U 5	1		61	2	142	debitage	chert	2,858.9
				2.1	*4*	*debitage, block, chert, green*		*690.8*
				2.2	*25*	*debitage, gangue, chert, green*		*868.7*
				2.3	*19*	*debitage, shatter, chert, green*		*83.8*
				2.4	*1*	*debitage, core, complete, chert, multidirectional*		*171.9*
				2.5	*13*	*debitage, quarry flake, chert, green*		*530.2*
				2.6	*4*	*debitage, block flake, chert, green*		*36.6*
				2.7	*3*	*debitage, block flake, chert, gray*		*21.5*
				2.8	*18*	*debitage, thinning flake, chert, green*		*57.1*
				2.9	*2*	*debitage, trim flake, chert, green*		*1.0*
				2.10	*2*	*debitage, trim flake, chert*		*1.1*
				2.11	*5*	*debitage, flake, chert, gray*		*21.0*
				2.12	*46*	*debitage, flake, chert, green*		*375.2*

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
U 6	1		62	1	1	rough stone tool	quartzite	161.9
				1.1	*1*	*rough stone tool, hammerstone, complete, quartzite, L 6.6, W 4.9, T 3.7 cm*		*161.9*
U 6	1		62	2	2	chipped stone tool	chert	23.5
				2.1	*1*	*chipped stone tool, biface, stage 2, distal fragment, chert, W 3.0, T 1.0 cm*		*12.2*
				2.2	*1*	*chipped stone tool, retouched flake, chert*		*11.3*
U 6	1		62	3	1	debitage	siliceous shale	18.4
				3.1	*1*	*debitage, block flake, siliceous shale*		*18.4*
U 6	1		62	4	2	debitage	chert	44.3
				4.1	*1*	*debitage, core, chert, multidirectional, fragment, cortex*		*44.2*
				4.2	*1*	*debitage, trim flake, chert*		*0.1*
U 6	1		62	5	6	debitage	shale	40.8
				5.1	*2*	*debitage, shatter, shale*		*8.2*
				5.2	*4*	*debitage, block flake, shale*		*32.6*
U 6	1		62	6	2	shell	shell	10.8
				6.1	*2*	*shell, clam, shell*		*10.8*
U 6	2		63	1	1	chipped stone tool	chert	1.6
				1.1	*1*	*chipped stone tool, retouched flake, chert*		*1.6*
U 6	2		63	2	2	debitage	chert	1.1
				2.1	*1*	*debitage, thinning flake, chert*		*0.7*
				2.2	*1*	*debitage, trim flake, chert*		*0.4*
U 6	2		63	3	9	debitage	shale	154.5
				3.1	*4*	*debitage, shatter, shale*		*91.9*
				3.2	*4*	*debitage, block flake, shale*		*51.4*
				3.3	*1*	*debitage, flake, shale*		*11.2*
U 6	3		64	1	1	rough stone tool	sandstone	101.1
				1.1	*1*	*rough stone tool, hammerstone, nearly complete, sandstone, spall missing, L 6.2, W 4.2, T 3.3 cm*		*101.1*
U 6	3		64	2	1	debitage	siliceous shale	5.6
				2.1	*1*	*debitage, flake, siliceous shale*		*5.6*
U 6	3		64	3	2	debitage	shale	7.8
				3.1	*2*	*debitage, flake, shale*		*7.8*

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
U 7	1		65	1	2	chipped stone tool	chert	233.5
				1.1	*1*	*chipped stone tool, retouched block, chert*		*206.0*
				1.2	*1*	*chipped stone tool, retouched flake, chert, green*		*27.5*
U 7	1		65	2	4	debitage	shale	10.3
				2.1	*4*	*debitage, flake, shale*		*10.3*
U 7	1		65	3	10	debitage	chert	36.6
				3.1	*2*	*debitage, shatter, chert, green*		*10.7*
				3.2	*2*	*debitage, shatter, chert*		*6.6*
				3.3	*3*	*debitage, block flake, chert, green*		*15.5*
				3.4	*1*	*debitage, thinning flake, chert, green*		*0.8*
				3.5	*1*	*debitage, flake, chert, green*		*1.2*
				3.6	*1*	*debitage, flake, chert*		*1.8*
Stratum 1								
U 8	1		66	1	3	chipped stone tool	chert	150.0
				1.1	*1*	*chipped stone tool, retouched flake, chert, green, cortex, large*		*137.9*
				1.2	*1*	*chipped stone tool, retouched flake, chert, green*		*4.3*
				1.3	*1*	*chipped stone tool, retouched flake, chert, cortex*		*7.8*
U 8	1		66	2	1	unidentified	glass	25.2
				2.1	*1*	*unidentified, glass, ribbed, colorless, mold made, thick, electrical insulator?*		*25.2*
U 8	1		66	3	1	nail	iron alloy	9.8
				3.1	*1*	*nail, complete, iron alloy, wire*		*9.8*
U 8	1		66	4	1	wire	iron alloy	9.9
				4.1	*1*	*wire, iron alloy, twisted*		*9.9*
U 8	1		66	5	1	hinge	iron alloy	49.9
				5.1	*1*	*hinge, flag, complete, iron alloy, 3-leaf bi-fold, L 8.8, W 3.4 cm*		*49.9*
U 8	1		66	6	2	tile	asbestos	14.3
				6.1	*2*	*tile, asbestos, fragment*		*14.3*
Stratum 1								
U 8	2		67	1	2	chipped stone tool	chert	44.7
				1.1	*1*	*chipped stone tool, biface, stage 1, chert, green*		*36.4*
				1.2	*1*	*chipped stone tool, retouched flake, chert*		*8.3*

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Artifact Inventory

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
U 8	2		67	2	3	debitage	shale	28.9
				2.1	*1*	*debitage, thinning flake, shale*		*5.8*
				2.2	*1*	*debitage, flake, shale*		*5.1*
				2.3	*1*	*debitage, flake, shale, green*		*18.0*
U 8	2		67	3	1	debitage	chert	9.9
				3.1	*1*	*debitage, shatter, chert, green*		*9.9*
U 8	2		67	4	1	unidentified	quartzite	163.5
				4.1	*1*	*unidentified, spall, quartzite, poss. flake*		*163.5*
U 8	2		67	5	1	bottle	glass	8.3
				5.1	*1*	*bottle, oval-shaped, base, glass, embossed, colorless, mold made, "...& S"*		*8.3*
U 8	2		67	6	1	nail	iron alloy	4.6
				6.1	*1*	*nail, complete, iron alloy, wire*		*4.6*
U 8	2		67	7	1	screw	iron alloy	5.5
				7.1	*1*	*screw, complete, iron alloy*		*5.5*
U 8	2		67	8	2	asphalt	asphalt	1.7
U 8	2		67	9	1	unidentified	plastic and metal	1.7
				9.1	*1*	*unidentified, plastic and metal, plastic rod with two steel staples*		*1.7*
Stratum 1								
U 8	3		68	1	1	debitage	chert	8.5
				1.1	*1*	*debitage, block flake, chert*		*8.5*
U 8	3		68	2	2	debitage	shale	22.5
				2.1	*2*	*debitage, block flake, shale*		*22.5*
U 8	3		68	3	1	bottle	glass	10.7
				3.1	*1*	*bottle, base, glass, embossed, brown, machine made, Owens-Illinois Glass Co., TPQ 1954*		*10.7*
U 8	3		68	4	3	tile	asbestos	66.1
				4.1	*3*	*tile, asbestos, fragment*		*66.1*
U 8	3		68	5	1	wire	iron alloy	255.2
				5.1	*1*	*wire, iron alloy, coiled*		*255.2*

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Artifact Inventory, Area 1

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
4m SW of Unit 3								
SC			87	1	1	fire-cracked rock	quartzite	467.6
1m N of Unit 1								
SC 2			72	1	1	rough stone tool	quartzite	775.0
				1.1	*1*	*rough stone tool, hammerstone, complete, quartzite, L 9.7, W 8.6, T 6.3 cm*		*775.0*
1m W of Unit 1								
SC 2			73	1	1	fire-cracked rock	quartzite	440.7
10m SE of STP 82								
SC 10			74	1	1	rough stone tool	quartzite	177.5
				1.1	*1*	*rough stone tool, hammerstone, quartzite, fragment*		*177.5*
SC 10			74	2	8	chipped stone tool	chert	155.4
				2.1	*8*	*chipped stone tool, retouched flake, chert*		*155.4*
SC 10			74	3	1	chipped stone tool	siliceous shale	30.7
				3.1	*1*	*chipped stone tool, retouched flake, siliceous shale*		*30.7*
SC 10			74	4	5	debitage	siliceous shale	223.0
				4.1	*2*	*debitage, block, siliceous shale*		*194.1*
				4.2	*1*	*debitage, block flake, siliceous shale*		*18.0*
				4.3	*1*	*debitage, thinning flake, siliceous shale*		*7.5*
				4.4	*1*	*debitage, thinning flake, siliceous shale, green*		*3.4*
SC 10			74	5	16	debitage	shale	126.3
				5.1	*1*	*debitage, gangue, shale*		*75.9*
				5.2	*9*	*debitage, thinning flake, shale*		*33.3*
				5.3	*6*	*debitage, flake, shale*		*17.1*
SC 10			74	6	45	debitage	chert	689.9
				6.1	*1*	*debitage, block, chert, appears burned*		*93.4*
				6.2	*1*	*debitage, shatter, chert*		*5.3*
				6.3	*1*	*debitage, core, chert, multidirectional*		*111.9*
				6.4	*1*	*debitage, quarry flake, chert*		*42.8*
				6.5	*17*	*debitage, block flake, chert*		*291.6*
				6.6	*1*	*debitage, thinning flake, chert, green*		*5.4*
				6.7	*1*	*debitage, thinning flake, chert, cortex*		*4.1*
				6.8	*22*	*debitage, thinning flake, chert*		*135.4*

547041: Phase II Archeological Investigation, Troy Starlight Development

Artifact Inventory, Area 1

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
SC 10			74	7	3	fire-cracked rock	quartzite	271.3
SC 10			74	8	1	unidentified	quartzite	35.1
				8.1	*1*	*unidentified, quartzite, possible flake*		*35.1*
SC 10			74	9	1	unidentified	cast iron	5.2
				9.1	*1*	*unidentified, cast iron, molded decoration, with two pins, possible part of adornment, L 6.7, W 1.1, T 0.2 cm*		*5.2*

547041: Phase II Archeological Investigation, Troy Starlight Development

Artifact Inventory, Area 2

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
SC 17			81	1	2	chipped stone tool	chert	186.7
				1.1	*1*	*chipped stone tool, retouched block, chert*		*113.6*
				1.2	*1*	*chipped stone tool, biface, stage 1, complete, chert, green*		*73.1*
SC 17			81	2	2	debitage	siliceous shale	374.9
				2.1	*1*	*debitage, core, siliceous shale, multidirectional*		*341.3*
				2.2	*1*	*debitage, quarry flake, siliceous shale, appears burned*		*33.6*
SC 17			81	3	3	debitage	shale	265.9
				3.1	*1*	*debitage, gangue, shale*		*117.5*
				3.2	*2*	*debitage, quarry flake, shale*		*148.4*
SC 17			81	4	13	debitage	chert	568.5
				4.1	*2*	*debitage, gangue, chert*		*187.4*
				4.2	*1*	*debitage, core, chert, multidirectional*		*139.9*
				4.3	*1*	*debitage, core, chert, multidirectional, fragment*		*58.2*
				4.4	*2*	*debitage, quarry flake, chert*		*94.8*
				4.5	*2*	*debitage, block flake, chert*		*45.5*
				4.6	*4*	*debitage, thinning flake, chert*		*35.3*
				4.7	*1*	*debitage, thinning flake, chert, gray*		*7.4*
SC 17			81	5	1	rough stone tool	quartzite	342.4
				5.1	*1*	*rough stone tool, extraction hammerstone, spall, quartzite*		*342.4*
SC 17			81	6	3	fire-cracked rock	sandstone	434.8
SC 18			82	1	1	debitage	chert	22.9
				1.1	*1*	*debitage, block flake, chert*		*22.9*
SC 18			82	2	1	debitage	shale	13.7
				2.1	*1*	*debitage, flake, shale*		*13.7*
SC 18			82	3	1	debitage	siliceous shale	76.6
				3.1	*1*	*debitage, block, siliceous shale*		*76.6*
SC 18			82	4	3	fire-cracked rock	quartzite	678.3
				4.1	*1*	*fire-cracked rock, quartzite, poss. hammerstone*		*468.9*
				4.2	*2*	*fire-cracked rock, quartzite*		*209.4*
SC 19			83	1	1	rough stone tool	quartzite	207.1
				1.1	*1*	*rough stone tool, hammerstone, complete, quartzite, L 7.1, W 5.4, T 3.8 cm*		*207.1*

547041: Phase II Archeological Investigation, Troy Starlight Development

Artifact Inventory, Area 2

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
SC 19			83	2	1	chipped stone tool	chert	19.1
				2.1	*1*	*chipped stone tool, retouched flake, chert*		*19.1*
SC 19			83	3	1	debitage	shale	29.9
				3.1	*1*	*debitage, block, shale, green*		*29.9*
SC 19			83	4	3	debitage	chert	52.1
				4.1	*2*	*debitage, block flake, chert*		*48.5*
				4.2	*1*	*debitage, thinning flake, chert*		*3.6*

547041: Phase II Archeological Investigation, Troy Starlight Development

Artifact Inventory, Area 3

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
SC 11			75	1	1	projectile point	chert	14.9
				1.1	*1*	*projectile point, Adena, complete, chert, stemmed, convex base, L 6.7, W 2.8, T 0.8 cm*		*14.9*
SC 12			76	1	4	chipped stone tool	chert	136.9
				1.1	*3*	*chipped stone tool, retouched flake, chert*		*69.8*
				1.2	*1*	*chipped stone tool, biface, stage 1, complete, chert*		*67.1*
SC 12			76	2	8	debitage	shale	13.2
				2.1	*1*	*debitage, shatter, shale*		*1.9*
				2.2	*6*	*debitage, thinning flake, shale*		*10.5*
				2.3	*1*	*debitage, flake, shale*		*0.8*
SC 12			76	3	1	chipped stone tool	siliceous shale	95.6
				3.1	*1*	*chipped stone tool, biface, stage 1, complete, siliceous shale, gray*		*95.6*
SC 12			76	4	1	debitage	chalcedony	0.4
				4.1	*1*	*debitage, trim flake, chalcedony*		*0.4*
SC 12			76	5	9	debitage	siliceous shale	76.6
				5.1	*1*	*debitage, shatter, siliceous shale*		*9.7*
				5.2	*1*	*debitage, block flake, siliceous shale*		*25.9*
				5.3	*6*	*debitage, thinning flake, siliceous shale*		*40.7*
				5.4	*1*	*debitage, trim flake, siliceous shale*		*0.3*
SC 12			76	6	84	debitage	chert	608.5
				6.1	*1*	*debitage, block, chert*		*41.4*
				6.2	*1*	*debitage, shatter, chert*		*17.6*
				6.3	*2*	*debitage, quarry flake, chert*		*123.9*
				6.4	*9*	*debitage, block flake, chert*		*166.3*
				6.5	*4*	*debitage, block flake, chert, gray*		*71.2*
				6.6	*37*	*debitage, thinning flake, chert*		*141.5*
				6.7	*1*	*debitage, thinning flake, chert, green*		*16.5*
				6.8	*4*	*debitage, thinning flake, chert, gray*		*9.8*
				6.9	*15*	*debitage, trim flake, chert*		*5.4*
				6.10	*2*	*debitage, trim flake, chert, green*		*0.7*
				6.11	*8*	*debitage, flake, chert*		*14.2*
SC 12			76	7	1	fire-cracked rock	sandstone	3.0
SC 12			76	8	1	shell	shell	6.6
				8.1	*1*	*shell, clam, shell*		*6.6*

547041: Phase II Archeological Investigation, Troy Starlight Development

Artifact Inventory, Area 3

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
SC 12			76	9	1	wood	wood	0.1
SC 12			86	1	1	rough stone tool	quartzite	313.0
				1.1	*1*	*rough stone tool, hammerstone, complete, quartzite*		*313.0*
SC 12			86	2	2	debitage	shale	447.5
				2.1	*1*	*debitage, block, shale, appears fire-cracked*		*374.2*
				2.2	*1*	*debitage, block flake, shale*		*73.3*
SC 12			86	3	5	debitage	chert	3,559.4
				3.1	*2*	*debitage, block, chert*		*3,011.0*
				3.2	*1*	*debitage, gangue, chert*		*119.9*
				3.3	*1*	*debitage, quarry flake, chert*		*331.7*
				3.4	*1*	*debitage, quarry flake, chert, green*		*96.8*
SC 12			86	4	3	fire-cracked rock	quartzite	513.9
SC 12			86	5	4	fire-cracked rock	sandstone	689.0
SC 12			86	6	1	unidentified	quartzite	466.6
				6.1	*1*	*unidentified, quartzite, appears to be fire-cracked cobble*		*466.6*
SC 12			86	7	1	unidentified	sandstone	127.7
				7.1	*1*	*unidentified, sandstone, oblong with fractures, appears to have quartz interior, L 8.1, W 4.5, T 2.1 cm*		*127.7*
SC 13			77	1	1	projectile point	siliceous shale	4.7
				1.1	*1*	*projectile point, Vosburg, complete, siliceous shale, corner-notched, concave base, L 4.0, W 2.2, T 0.4 cm*		*4.7*
SC 13			77	2	2	chipped stone tool	chert	18.5
				2.1	*1*	*chipped stone tool, retouched flake, chert, gray*		*7.3*
				2.2	*1*	*chipped stone tool, retouched flake, chert*		*11.2*
SC 13			77	3	9	debitage	chert	53.7
				3.1	*1*	*debitage, shatter, chert, gray*		*1.9*
				3.2	*1*	*debitage, shatter, chert*		*1.9*
				3.3	*2*	*debitage, block flake, chert*		*26.2*
				3.4	*1*	*debitage, thinning flake, chert, cortex*		*18.0*
				3.5	*4*	*debitage, thinning flake, chert*		*5.7*
SC 13			77	4	2	fire-cracked rock	quartzite	259.6

Slope Near STP 81

547041: Phase II Archeological Investigation, Troy Starlight Development

Artifact Inventory, Area 3

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
SC 14			78	1	2	debitage	shale	397.1
				1.1	*1*	*debitage, block, shale, burned*		*396.2*
				1.2	*1*	*debitage, thinning flake, shale, green*		*0.9*
SC 14			78	2	4	debitage	siliceous shale	10.5
				2.1	*1*	*debitage, block flake, siliceous shale*		*4.9*
				2.2	*1*	*debitage, thinning flake, siliceous shale, gray*		*4.1*
				2.3	*1*	*debitage, thinning flake, siliceous shale, green*		*1.2*
				2.4	*1*	*debitage, trim flake, siliceous shale, gray*		*0.3*
SC 14			78	3	17	debitage	chert	33.0
				3.1	*1*	*debitage, block flake, chert*		*1.6*
				3.2	*9*	*debitage, thinning flake, chert*		*16.4*
				3.3	*4*	*debitage, thinning flake, chert, green*		*12.0*
				3.4	*1*	*debitage, trim flake, chert*		*0.2*
				3.5	*2*	*debitage, flake, chert*		*2.8*
SC 14			78	4	1	fire-cracked rock	sandstone	116.3
SC 14			78	5	5	fire-cracked rock	quartzite	554.4
SC 15			79	1	2	chipped stone tool	chert	158.4
				1.1	*2*	*chipped stone tool, retouched flake, chert*		*158.4*
SC 15			79	2	12	debitage	chert	50.5
				2.1	*1*	*debitage, shatter, chert*		*0.5*
				2.2	*2*	*debitage, block flake, chert*		*37.5*
				2.3	*1*	*debitage, thinning flake, chert, green*		*6.5*
				2.4	*5*	*debitage, thinning flake, chert*		*4.5*
				2.5	*3*	*debitage, trim flake, chert*		*1.5*
Shoreline - Below Unit 2								
SC 16			80	1	2	chipped stone tool	chert	31.9
				1.1	*2*	*chipped stone tool, retouched flake, chert*		*31.9*
SC 16			80	2	1	debitage	siliceous shale	7.1
				2.1	*1*	*debitage, block flake, siliceous shale*		*7.1*

547041: Phase II Archeological Investigation, Troy Starlight Development

Artifact Inventory, Area 4

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
Unit 5								
SC			60	1	1	rough stone tool	quartzite	535.7
				1.1	*1*	*rough stone tool, hammerstone, complete, quartzite*		*535.7*
5m N of STP 97 & 2m SE of Unit 5								
SC			89	1	1	rough stone tool	quartzite	362.8
				1.1	*1*	*rough stone tool, hammerstone, complete, quartzite, very battered, L 7.1, W 6.2, T 5.5 cm*		*362.8*
W of Unit 5								
SC			90	1	2	chipped stone tool	chert	289.8
				1.1	*1*	*chipped stone tool, retouched flake, chert, green*		*159.0*
				1.2	*1*	*chipped stone tool, retouched block, chert, green*		*130.8*
SC			90	2	20	debitage	chert	1,351.0
				2.1	*6*	*debitage, gangue, chert, green*		*236.5*
				2.2	*1*	*debitage, exhausted core, chert, green, multidirectional*		*62.4*
				2.3	*2*	*debitage, core, chert, green, multidirectional*		*309.4*
				2.4	*9*	*debitage, quarry flake, chert, green*		*699.0*
				2.5	*2*	*debitage, block flake, chert, green*		*43.7*
On top of worked outcrop, near STP 54								
SC 1			69	1	1	rough stone tool	quartzite	2,305.0
				1.1	*1*	*rough stone tool, extraction hammerstone, complete, quartzite, L 16.5, W 12.7, T 7.4 cm*		*2,305.0*
SC 21			85	1	18	chipped stone tool	chert	664.8
				1.1	*1*	*chipped stone tool, biface, stage 1, complete, chert, green*		*141.9*
				1.3	*1*	*chipped stone tool, retouched block, chert*		*100.5*
				1.4	*15*	*chipped stone tool, retouched flake, chert, green*		*415.2*
				1.5	*1*	*chipped stone tool, retouched flake, chert*		*7.2*
SC 21			85	2	115	debitage	chert	1,940.5

547041: Phase II Archeological Investigation, Troy Starlight Development

Artifact Inventory, Area 4

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
				2.1	*3*	*debitage, shatter, chert, green*		*60.4*
				2.2	*26*	*debitage, quarry flake, chert, green*		*1,302.7*
				2.3	*29*	*debitage, block flake, chert, green*		*344.7*
				2.4	*47*	*debitage, thinning flake, chert, green*		*197.9*
				2.5	*1*	*debitage, thinning flake, chert*		*2.3*
				2.6	*1*	*debitage, trim flake, chert, green*		*0.9*
				2.7	*1*	*debitage, trim flake, chert*		*0.4*
				2.8	*7*	*debitage, flake, chert, green*		*31.2*
SC 21			85	3	10	debitage	shale	169.6
				3.1	*2*	*debitage, quarry flake, shale, green*		*125.8*
				3.2	*4*	*debitage, block flake, shale, green*		*32.2*
				3.3	*1*	*debitage, thinning flake, shale, green*		*6.0*
				3.4	*3*	*debitage, flake, shale, green*		*5.6*
SC 21			85	4	1	projectile point	chert	8.9
				4.1	*1*	*projectile point, biface, stage 2, tip, chert, green*		*8.9*

547041: Phase II Archeological Investigation, Troy Starlight Development

Artifact Inventory, Area 5

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
SC			88	1	1	chipped stone tool	chert	9.3
				1.1	*1*	*chipped stone tool, retouched flake, chert, green*		*9.3*
SC			88	2	1	debitage	chert	238.4
				2.1	*1*	*debitage, core, chert, green*		*238.4*
SC			88	3	1	fire-cracked rock	quartzite	311.5

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Artifact Inventory, Area 6

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
1m W of Unit 8								
SC			91	1	4	debitage	chert	1,614.1
				1.1	*1*	*debitage, block, chert, green, with shale on exterior*		*477.7*
				1.2	*1*	*debitage, shatter, chert, green, cortex*		*11.4*
				1.3	*2*	*debitage, core, chert, green, with shale on exterior*		*1,125.0*
3m N of Unit 7								
SC			92	1	1	mineral sample	pumice	252.7
Above Rock Outcrop								
SC 22			84	1	1	chipped stone tool	chert	8.0
				1.1	*1*	*chipped stone tool, retouched flake, chert, green, used for scraping*		*8.0*
SC 22			84	2	1	debitage	shale	675.0
				2.1	*1*	*debitage, block, shale, green, high-quality chert interior visible*		*675.0*

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Artifact Inventory, Area 7

Provenience	Level	Feature	Bag	Item	Count	Artifact Description	Material	Weight (g)
SC 23			70	1	1	rough stone tool	quartzite	8,105.0
				1.1	*1*	*rough stone tool, extraction hammerstone, complete, quartzite*		*8,105.0*

Appendix 3: Preliminary Site Plan



THE ALTERATION OF THIS MATERIAL IN ANY WAY, UNLESS DONE UNDER THE DIRECTION OF A COMPARABLE PROFESSIONAL, (I.E.) ARCHITECT FOR AN ARCHITECT, ENGINEER FOR AN ENGINEER OR LANDSCAPE ARCHITECT FOR A LANDSCAPE ARCHITECT, IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW AND/OR REGULATIONS AND IS A CLASS "A" MISDEMEANOR.

SUBMITTAL / REVISIONS

No.	DATE	DESCRIPTION	BY	REVIEWED BY:	DATE

PROJ. MANAGER:	JWE
CHIEF DESIGNER:	JWE
DESIGNED BY:	JWE
DRAWN BY:	JWE
CHECKED BY:	-

SEAL

DRAFT

Engineering and Land Surveying, P.C.
1533 Crescent Road - Clifton Park, NY 12065

TROY-2ND AVE

CONCEPT PLAN

KEVIN VANDENBURGH

CITY OF TROY AND TOWN OF SCHAGHTICOKE NEW YORK

SCALE:	1" = 50'
CONTRACT No.:	-
MJ PROJ. No.:	972.44
DATE:	FEBRUARY 2020

C-1

ATTACHMENT E

ENVIRONMENTAL DESIGN
PARTNERSHIP, LLP.
Shaping the physical environment

900 Route 146 Clifton Park, NY 12065
(P) 518.371.7621 edpllp.com

WATER SERVICE NARRATIVE

PROPOSED 2nd AVENUE MUTI-FAMILY RESIDENTIAL PLANNED DEVELOPMENT

CITY OF TROY

PREPARED BY:

The Environmental Design Partnership, LLP
900 Route 146
Clifton Park, NY 12065

September 2021

1.0 INTRODUCTION

Kevin Vandenburgh is proposing a residential development of approximately 11+/- acres on 2nd Avenue in the City of Troy. The residential development is anticipated to include 231 apartments, in 3 buildings.

The project parcel is located on the west side of 2nd Avenue, between 2nd Avenue and the Hudson River.

The project site is located within the City of Troy Water District.

The City of Troy currently owns and operates a 24-inch water main located on 2nd Avenue. Water service will be provided via the extension of an 8" water main throughout the site from the existing water main along 2nd Avenue. The proposed water main will not impact any potential Waters of the United States (WOTUS) on the project site.

The following narrative provides information related to anticipated water consumption associated with the proposed project and background information relative to the existing City of Troy water system serving this area.

Sewer service will be provided via a low-pressure force main connection into an existing 15-inch sanitary gravity main located along 2nd Avenue. Stormwater will be managed on-site in accordance with the New York State Stormwater Management Design Manual and the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities (GP-0-20-001). Separate engineering narratives have been prepared for the proposed sewer service and the proposed stormwater management.

2.0 WATER CONSUMPTION DESIGN PARAMETERS

The anticipated water consumption has been calculated using a combination of historical water data from similar projects, census data with Ten State Standards typical hydraulic loading rates and the New York State Department of Environmental Conservation (NYSDEC) Typical Hydraulic Loading Rates.

2.1 Apartments

The proposed development will consist of 231 apartments units with an average of one and a half bedrooms each (50% of the units will be one bedroom and 50% of the units will be two bedroom). Based on water data from previous apartment projects that EDP has worked on throughout the Capital District (See Appendix A), the median daily water usage for apartments is on the order of 57 gallons per day per bedroom, with the maximum being on the order of 60 gallons per day per bedroom. Based on the water data, a conservative usage rate of 70 gallons per day per bedroom has been used for the design of this project site.

- Proposed number of apartment units = 231
- Proposed number of bedrooms = 346.5
- Design flow rate = 70 gallons per bedroom per day
- Apartment Average Daily Flow = 70*346.5 = 24,255 gpd

2.2 Total Water Consumption Estimate

The total water consumption for the project is anticipated to be on the order of 24,255 gpd with a maximum day demand on the order of 48,510 gpd (two times the average daily flow)

3.0 DISTRIBUTION SYSTEM

The City of Troy existing water distribution infrastructure includes a 24-inch ductile iron water main that extends from 2nd Ave, through the project site, and to the Village of Waterford. There is an existing pump station and water meter pit that convey water to the Village of Waterford located on the project site.

The proposed project will include extending an 8-inch water service off the existing 24-inch ductile iron water main on the upstream side of the meter pit. The 8-inch water service will extend onto the site near the 87-unit apartment building located near the southern entrance of the project site frontage on 2nd Ave. A water meter pit will be installed just outside of the 2nd Ave right-of way and then the 8-inch water service will split and extend to the north and to the 87 unit building along the project roads to serve the proposed buildings and then terminate with an end-of line hydrant.

The proposed 8-inch water service will be ductile iron from the connection to the 24-inch main to the water meter pit. After the meter pit the water main will be PVC C-900.

The proposed water distribution system infrastructure will be constructed in accordance with the 10 State Standards, the City of Troy specification and all State Department of Health requirements. The proposed 8-inch water service will be privately owned and maintained.

4.0 CAPACITY OF DISTRIBUTION SYSTEM

The City of Troy's water source is currently the Tomhannock Reservioir which is a surface water body with a colume on the order of 12.3 billion gallons when full. The water is treated at the John P. Buckley Water Treatment Plant and then pumped into the water distribution system. The City of Troy also provides water to the City of Rensselaer, Towns of East Greenbush, North Greenbush, Brunswick, Schaghticoke, Poestenkill, and Halfmoon and Villages of Menands and Waterford.

Based on the 2020 water data, the City of Troy water produced 6.05 billion Gallons for an average of 16.5 Million Gallons per Day.

The proposed project will increase the average daily demand by 0.024 MGD which is only a 0.2% increase. Therefore, the proposed project is well within the treatment and conveyance capacity of the City of Troy water system.

5.0 OPERATING PRESSURE & FIRE PROTECTION

Hydrant flow tests have not yet been performed in the vicinity of the project site and will be performed prior to final water system pressure & fire protection design.

It is assumed the existing water infrastructure in the vicinity of the project site has adequate pressure and flow to support the proposed development based on the size of the existing main and existing water data in the city of troy.

6.0 SERVICE METERING

A meter pit is proposed to be installed directly outside of the Second Ave Right-of-Way to measure water consumption. The meter pit is to be installed per the City of Troy standards to ensure compatibility.

7.0 SUMMARY

The proposed residential development will include the extension of the water main throughout the project to service the proposed apartments. It is anticipated that the proposed development will result in an average daily water demand on the order of 24,255 gallons per day.

All construction and design will be in conformance with the City of Troy and the Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers publication "Recommended Standards for Water Works".

Prepared by:



Nicholas Zeglen, P.E.

The Environmental Design Partnership, LLP

Figure 1: Site Location Map



ENVIRONMENTAL DESIGN PARTNERSHIP, LLP.
Shaping the physical environment

Appendix A:

Historical Water Data

APARTMENT COMPLEX NAME	LOCATION	TOTAL UNITS CONSTRUCTED	% OCCUPANCY	TOTAL UNITS OCCUPIED	AVG BEDROOMS PER UNIT	TOTAL BEDROOMS	TOTAL WATER USAGE (GALLONS)	PERIOD OF TIME (DAYS)	AVERGAE FLOW RATE (GALLONS PER DAY)	AVERAGE FLOW RATE PER BEDROOM (GPD/BR)	WATER DATA REFERANCE
LEXINGTON HILLS PHASE 1	COHOES, NY	138	100.00%	138	1.6	221	3,436,900	273	12,589	**57**	WATER BILLING DATA FROM 11-1-18 TO 8-1-19
KENSINGTON AT HALFMOON	HALFMOON, NY	200	78.50%	157	1.7	264	1,341,660	92	14,583	**56**	WATER DATA FROM 7-23-16 TO 10-22-16
NET ZERO VILLAGE	ROTTERDAM, NY	180	100.00%	180	1.3	232	--	--	13,500	**59**	WATER DATA FROM OWNER
NORTHBROOK APARTMENT COMPLEX	QUEENSBURY, NY	128	100.00%	128	2.0	256	3,750,000	365	10,274	**41**	WATER USAGE DATA FROM 3-17-01 TO 3-25-03

MIN =	41	GPD/BR
MAX =	59	GPD/BR
AVG =	53.25	GPD/BR
MEDIAN =	56.5	GPD/BR
FOR DESIGN USE	**70**	**GPD/BR**

ATTACHMENT F

ENVIRONMENTAL DESIGN
PARTNERSHIP, LLP.
Shaping the physical environment

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SEWER NARRATIVE

PROPOSED 2nd AVENUE MULTI-FAMILY RESIDENTIAL PLANNED DEVELOPMENT

CITY OF TROY

PREPARED BY:

The Environmental Design Partnership, LLP
900 Route 146
Clifton Park, NY 12065

September 2021

1.0 PROJECT DESCRIPTION

Kevin Vandenburgh is proposing a residential development of approximately 11+/- acres on 2nd Avenue in the City of. Troy. The proposed planned development is anticipated to include up to 231 apartment units in 3 buildings.

The project parcel is located on the west side of 2nd Avenue, between 2nd Avenue and the Hudson River.

Sanitary Sewer Service shall be provided via a connection to the Rensselaer County Sewer District collection system. An existing 15-inch gravity sewer main is located along 2nd Avenue in front of the project site. This sewer main is a combined sewer that conveys flows to the south along 2nd Ave and towards the Rensselaer County WWTP located on Water Street in the City of Troy.

Water Service shall be provided by a lateral connection within the proposed development to the City of Troy 24-inch ductile iron water main on 2nd Avenue. Upon completion of construction, the lateral will remain privately owned.

Stormwater will be managed on-site in accordance with the New York State Stormwater Management Design Manual and the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activities (GP-0-20-001). Separate engineering narratives have been prepared for the proposed utilities and the proposed stormwater management.

This narrative presents a review of the design concepts and parameters for the sanitary collection system and the water distribution system for the proposed development.

2.0 EXISTING SITE CONDITIONS

The project site is currently undeveloped and consists of wooded areas and an open field and grass area. The topography on the site consists of gentle to steep slopes with slopes exceeding 15% in areas of the project site. The elevations on the site generally range from 95 to 20 feet above sea level. The proposed finished floor elevations range from 46 to 106 feet above sea level.

Soils on the site consist predominantly of Nassau-Rock outcrop complex, hilly which is described by the United State Department of Agriculture (USDA) National Resources Conservation Services (NRCS) as silty loam within the top0 to 3 feet and unweathered bedrock below the silty loam. The bedrock is generally comprised of rippable and broken shale. Depth to groundwater is greater than six feet below grade.

No wetland areas exist on site. No wetland disturbance is proposed during construction.

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According to the Federal Emergency Management Area (FEMA) Flood Insurance Rate Map (FIRM) panel 3606770001B, dated March 18, 2980, the project site is located within Zone A11, Zone B and Zone C. The 100-year flood elevation is 35 feet above mean sea level. Approximately 95 percent of the project site is located five (5) feet above the 100-year flood elevation. Runoff from the project site flows westerly towards the Hudson River.

3.0 SANITARY SEWER

The proposed project will be served by a low-pressure force main system with grinder pumps to be located onsite that will connect to the existing 15-inch gravity sewer main system located on 2nd Avenue. The existing 15-inch gravity main is owned and maintained by Rensselaer County Sewer District. Upon completion of the project, the low-pressure forcemains and grinder pumps will remain privately owned.

The existing 15-inch gravity main currently conveys flows to a larger sewer trunk line which ultimately conveys sanitary sewer to the Rensselaer County Wastewater Treatment Plant.

3.1 WASTEWATER DESIGN FLOWS

Per Section 11.243a. of the "Recommended Standards for Wastewater Facilities 2014 Edition" (10 State Standards) the sizing of wastewater facilities receiving flows shall be based on an average of 100 gpd per capita unless water usage data or other justification for a better estimate flow is provided. The wastewater design flows for the proposed project have been estimated using both the 100 gpd per capita and water usage data.

3.1.1 Design Flow per Capita

Per data from the US Census Bureau there is an estimates 2.25 people per household in the City of Troy, NY. Using this data and the total housing units, 231 apartments, the design flow was calculated as follow:

- Proposed number of Dwelling Units = 231
- Persons per Household = 2.25 (per census data)
- Total Population = 231 x 2.25 = 520 people
- Design Flow Rate = 100 gallons per day per capita
- Average Daily Flow Rate = 100 x 520 = 52,000 gallons per day.
- Peaking Factor = 4
- Peak Hourly Flow Rate = 145 gpm

3.1.2 Design Flow from Water Data

The proposed development contains 231 apartments units with an average of two bedrooms each. Based on water data from previous apartment projects that EDP has worked on

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throughout the Capital District (See Appendix A for locations an flow data), the median daily water usage for these apartments is on the order of 57 gallons per day per bedroom, with the maximum being on the order of 60 gallons per day per bedroom. Based on the historical water data, a conservative usage rate of 70 gallons per day per bedroom has been used for the design of this project site. The following is a summary of the design calculations for the estimated wastewater design flows associated with the proposed apartments:

- Proposed number of apartment units = 231
- Proposed number of bedrooms per unit = 1.5
- Total Number of bedrooms = 231 x 1.5 = 346.5
- Average Daily Flow = 346.5 x 70 gal/day/bedroom = 24,255 gpd
- Peaking Factor = 4
- Peak Houly Flow Rate = 67 gpm

The peak flow rate using the water data is significantly lower (about 78 gpm) than the design flow using the 100 gallons per day per capita. However, since the water data was used from apartment projects that have similar styles and tenant demographics as proposed for this project, the flow rates calculated using the water data were determined to be more accurate and therefore are used to design the low-pressure system.

3.2 PROPOSED SEWER INFRASTRUCTURE

The proposed project site will contain a privately owned and maintained low pressure sewer system. Each apartment building will be serviced by a grinder pump that will convey flows to a low-pressure collection lateral which will discharge to the existing 15-inch gravity main located along 2nd Avenue. The low pressure sewer laterals and grinder pumps will be privately owned and maintained.

3.2.1 Grinder Pumps

The proposed buildings will be serviced with pre-packaged grinder pumps manufactured by Environment One Corporation (EONE) or approved equals. The EONE grinder pumps servicing the buildings will be as listed in the following table.

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Table 1: Grinder Pump Summary

Building Type	Avg daily Flow	EONE Pump Model	Pump Station Capacity	Avg. Pump Rate
72 Unit Apartment Bldg.	7,560 gpd	W Series 72" Fiberglass (quadplex)	10,500 gpd	22 gpm
87 Unit Apartment Bldg.	9,135 gpd	W Series 72" Fiberglass (quadplex)	10,500 gpd	22 gpm

Each grinder pump station will include a control panel with audible and visual alarm, manual run feature, hour meter, cycle counter, etc. Each grinder pump control panel shall also include an outlet for a backup generator connection to allow for pump out during prolonged power outages. The grinder pumps will be privately owned and maintained.

The prepackaged EONE grinder pumps contain preset on/off elevations in the wet wells. The following table depicts the wet well capacities and holding times for quadplex grinder pumps:

Table 2: Grinder Pump Wet Well Capacities

Pump Station Type	Wet Well Pump Volume	Average Inflow Rate	Average Holding Time
Quadplex (72" Fiberglass)	49 gallons	6.3 gpm	8 minutes

The anticipated holding times are less than the 30-minute maximum required by Ten State Standards to prevent the wastewater from going septic.

3.2.2 Low Pressure Force Mains

The proposed low-pressure force main systems will consist of 1.25-inch to 2-inch force mains that will collect the discharge from the grinder pumps and convey these flows to the existing 15-inch gravity main location on 2nd Avenue. A design model of the EONE low pressure system has been performed using EONE Design Assistant software.

The EONE Design Assistant software takes into account the force main lengths and sizes as well as the maximum number of grinder pumps that will operate simultaneously. The results of the modeling are as follows:

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Table 3: EONE Modeling Results

Max Number of Pump Operating Simultaneously	6 (Per EONE Design Manual)
Peak Discharge from Project Site	86 gpm
Max Grinder Pump TDH	16 ft

The Max Grinder Pump TDH of 16 ft is well below the maximum TDH of 185 ft for EONE Grinder Pumps.

4.0 Capacity of Receiving Sewers

MJ Engineering and Land Surveying, P.C. (MJELS) completed a Sewer Report in October 2019 for the existing sewer flow rates to the Rensselaer County sewer trunk line on 2nd Avenue between Roosevelt Avenue and Row B Way. The MJELS report is attached as Appendix E. The receiving sewer system is a combined sewer overflow as is much of the sewer infrastructure within the City of Troy. The MJELS report concluded that during dry weather events, the existing 18-inch sewer main is capable of accepting an additional 1,900 bedrooms which exceeds this projects bedroom count. The MJELS report concludes that a stormwater analysis for the a 1-year storm event contributing areas should be performed to determine the extent of dedicated storm sewer disconnection as part of CSO mitigation improvement to the system.

5.0 SUMMARY

Sanitary sewer service will be provided within the Project Site via an on-site low-pressure collection system conveying sanitary waste to the existing 15-inch gravity main located along the Second Ave. The existing 15-inch gravity main currently conveys flows to a larger sewer trunk line which ultimately conveys sanitary sewer to the Rensselaer County Wastewater Treatment Plant.

The theoretical average daily discharge from the proposed project of 24,255 gpd is well within Rensselaer County's sanitary sewer trunk capacity and the county treatment capacity. All construction and design will be in conformance with the City of Troy and the Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers publication "Recommended Standards for Water Works".

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Prepared by:



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Environmental Design Partnership, LLP

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Figure 1: Site Location Map

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Appendix A:

Historical Water Data

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APARTMENT COMPLEX NAME	LOCATION	TOTAL UNITS CONSTRUCTED	% OCCUPANCY	TOTAL UNITS OCCUPIED	AVG BEDROOMS PER UNIT	TOTAL BEDROOMS	TOTAL WATER USAGE (GALLONS)	PERIOD OF TIME (DAYS)	AVERGAE FLOW RATE (GALLONS PER DAY)	AVERAGE FLOW RATE PER BEDROOM (GPD/BR)	WATER DATA REFERANCE
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MIN =	41	GPD/BR
MAX =	59	GPD/BR
AVG =	53.25	GPD/BR
MEDIAN =	56.5	GPD/BR
FOR DESIGN USE	**70**	**GPD/BR**

Appendix B:

EONE Design Assistant Report

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Environment One Corporation

Pressure Sewer Preliminary Cost and Design Analysis For 2nd Ave Troy

Prepared For:

Tel:
Fax:
Prepared By:
September 29, 2021

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS

Prepared By:

2nd Ave Troy

September 29, 2021

Zone Number	Connects to Zone	Number of Pumps in Zone	Accum Pumps in Zone	Gals/day per Pump	Max Flow Per Pump (gpm)	Max Sim Ops	Max Flow (GPM)	Pipe Size (inches)	Max Velocity (FPS)	Length of Main this Zone	Friction Loss Factor (ft/100 ft)	Friction Loss This Zone	Accum Fric Loss (feet)	Max Main Elevation	Minimum Pump Elevation	Static Head (feet)	Total Dynamic Head (ft)
This spreadsheet was calculated using pipe diameters for: SDR11HDPE											Friction loss calculations were based on a Constant for inside roughness "C" of: 150						
1.00	1.00	8	8	1890	14.25	3	42.74	2.00	4.62	400.00	4.07	16.27	16.27	36.00	36.00	0.00	16.27
2.00	2.00	4	4	2284	14.27	3	42.82	3.00	2.13	180.00	0.62	1.11	1.11	38.00	29.70	8.30	9.41

Two 72 unit apartment zone

One 87 unit apartment zone

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One.

PRELIMINARY PRESSURE SEWER - ACCUMULATED RETENTION TIME (HR)

Prepared By:

2nd Ave Troy

September 29, 2021

Zone Number	Connects to Zone	Accumulated Total of Pumps this Zone	Pipe Size (inches)	Gallons per 100 lineal feet	Length of Zone	Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (Hr)	Accumulated Retention Time (Hr)
This spreadsheet was calculated using pipe diameters for: SDR11HDPE								Gals per Day per Dwelling		200
1.00	1.00	8	2.00	15.40	400.00	61.61	15,120	245.41	0.10	0.10
2.00	2.00	4	3.00	33.47	180.00	60.24	9,136	151.66	0.16	0.16

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One

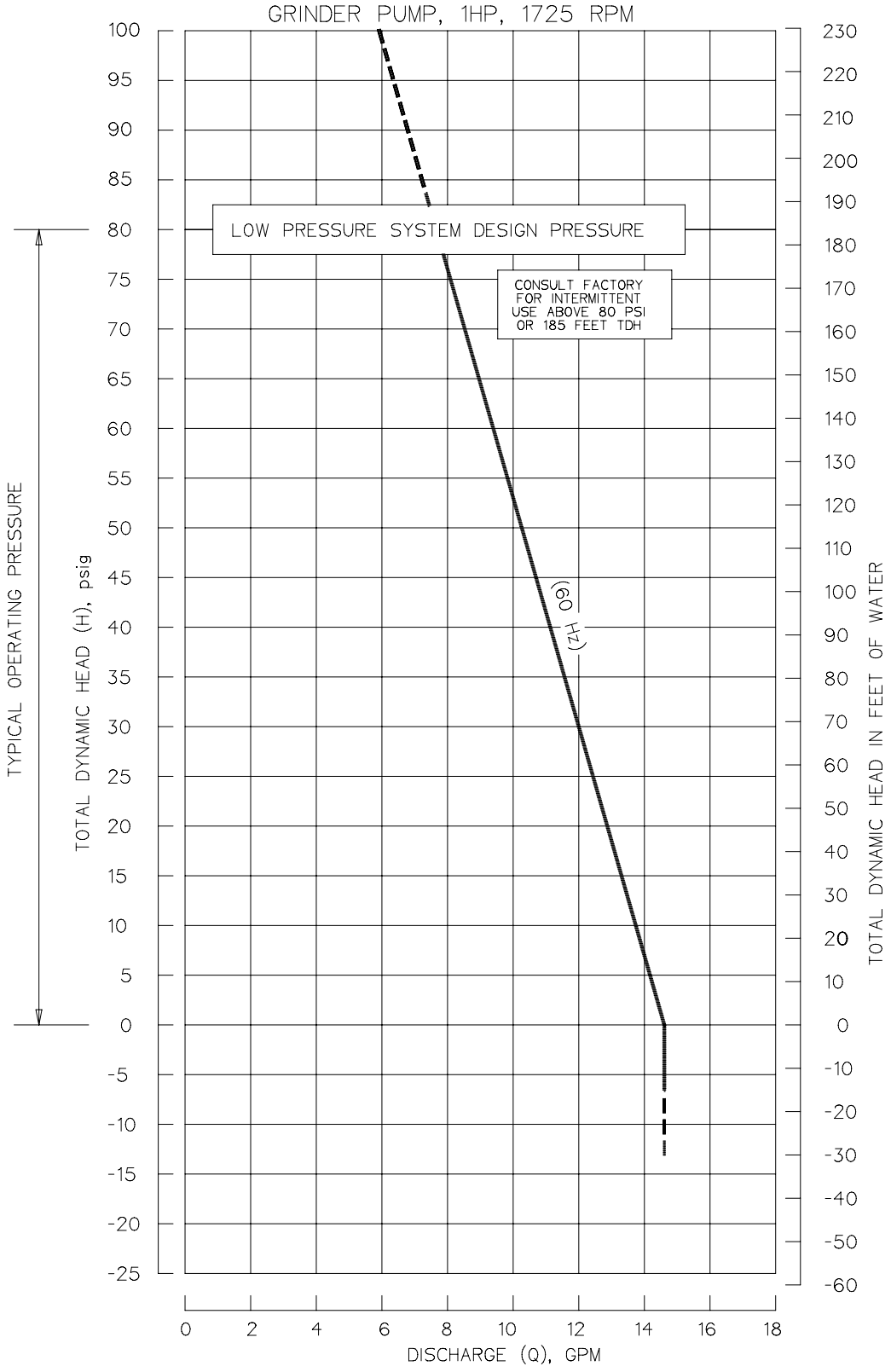
Appendix C:

EONE Grinder Pump Curve

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Figure 1

Grinder Pump Performance Characteristics



Appendix D:

2019 Sewer Report by MJ Engineering and Land Surveying, P.C.

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Sewer Report

for

Rensselaer County Sewer

City of Troy
Rensselaer County, New York

October 19, 2019

Prepared by:

Engineering and
Land Surveying, P.C.

1533 Crescent Road
Clifton Park, NY 12065
Tel: 518-371-0799
Fax: 518-371-0822

SEWER REPORT
for
RENSSELAER COUNTY SEWER
CITY OF TROY, RENSSELAER COUNTY, NY

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1.3 Study Area 1
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2.2 Wet-Weather 2
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Exhibit C – One Week Sample Data From Flow Meter with 18-inch Truck Sewer 4
Exhibit D – 24-inch Overflow Data, Graphs and Precipatation 5

L:\PROJECTS\MJ972 LAND DEVELOPMENT\972.42 TROY (2ND AVE -GOLUB PARCEL)\TRUCK SEWER REPORT 10.18.19.DOCX

1.0 INTRODUCTION

1.1 Project Description

This Engineering Report describes the existing sewer flow rates to the Rensselaer County sewer trunk line on 2nd Ave between Roosevelt Ave and Row B Way. Flow meters were installed within the existing 18-inch sewer pipe and 24-inch overflow pipe in this area to determine dry and wet weather flow conditions of the existing system.

1.2 Existing Sewer

The existing county truck sewer between Roosevelt Ave and Row B Way on 2nd Ave consists of an 18-inch RCP sewer and a 24-inch VCP overflow pipe. This Combined Sewer Overflow (CSO) system receives sewer effluent for the north end of Troy, Brunswick and Schaghticoke communities.

1.3 Study Area

A flow meter was installed down stream of manhole 00100 (on 2nd Ave within the 18-inch truck sewer) and on the overflow pipe downstream of manhole 10463 that directs sewer effluent to the river during rainfall events. See Exhibit 1 for location Map of study area. The flow meters were installed from 8/21/19 until 9/30/19 (40-days) to determine the flow characteristics of the system. Data was collected for every 5 minutes within both pipes. The data collect included velocity, gallons per minute and depth of flow within the system.

1.4 Truck Sewer

Based upon the data the average daily flow rate was 143 gpm and had and average depth of 5.36-inches within the 18-inch truck sewer pipe. Typical sewer peak flow rates between 8:30 am to 10 am ranged from 110 to 175 gpm within the system while between 8 pm and 10 pm the sewer system it appears to experience the largest sewer flow rates. Between 8 pm and 10 pm the flow within the sewer ranged from 100 to 350 gpm within the system. Charts within Exhibit B demonstrate daily averages of flow rates within the system over the 40-day study period and a sample of 1-week data is in Exhibit C

1.5 Overflow

The sewer overflow meter received recorded flow on the following dates:
8/21 between 4:40pm to 8:45 pm,
9/2 between 4 pm and 4:30 pm

Per U.S Climate Data 1.85 inches precipitation occurred on August 21 & 22, 2019 and 0.78 inches occurred in on September 2 & 3, 2019. Most of the precipitation over September 2 & 3 ,2019 occurred on September 3 according to records. As isolated thunderstorms over the summer typically happen in late afternoon and can vastly vary from location to location and most likely a thunderstorm on 9/2 caused the overflow meter to record data. Reviewing the flow meter data on 9/2/19 at 3:50 pm the depth of flow was 5.6-inches and a flow rate of 168 gpm within the 18-inch truck sewer. By 4:40 pm the depth of flow recedes to 10.6-inches and a flow rate of 700 gpm. Then around 6 pm the flows are near normal levels. This again supports that an isolate thunderstorm occurred on 9/2/19 in the late afternoon.

See Exhibit D for precipitation data, flow data and illustration graphs.

2.0 CONCLUSIONS

2.1 Dry-Weather

The existing 18-inches truck sewer depth of flow varies between 5 inches and 7-inches or 130 gpm to 300 gpm on average. During dry weather the existing 18-inch truck sewer has additional capacity. Assuming keeping the depth of flow within the 18-inch pipe below 12-inches there is another capacity flow an additional flow of about 600 gpm. Using a peaking factor of 4, and using 600 gpm of allowed flow, it would result in approximately 1,900 bedrooms (assuming 110 gpd) that could be added to the existing system.

2.2 Wet-Weather

Reviewing the data on both the 18-inch truck sewer, 24-inch overflow and precipitation, the overflow is activated based upon small amounts of rainfall. This is mostly due to the large watershed in which stormwater runoff is collected by the CSO system. Any new sewer flows to the CSO system should be offset by removing CSO connections within the watershed. A simple stormwater runoff analysis for the 1-year storm event contributing area verses peak runoff to proposed peak sewer rates should be preformed to determine number of catch basin that need to be disconnected from the CSO system.

3.0 EXHIBITS

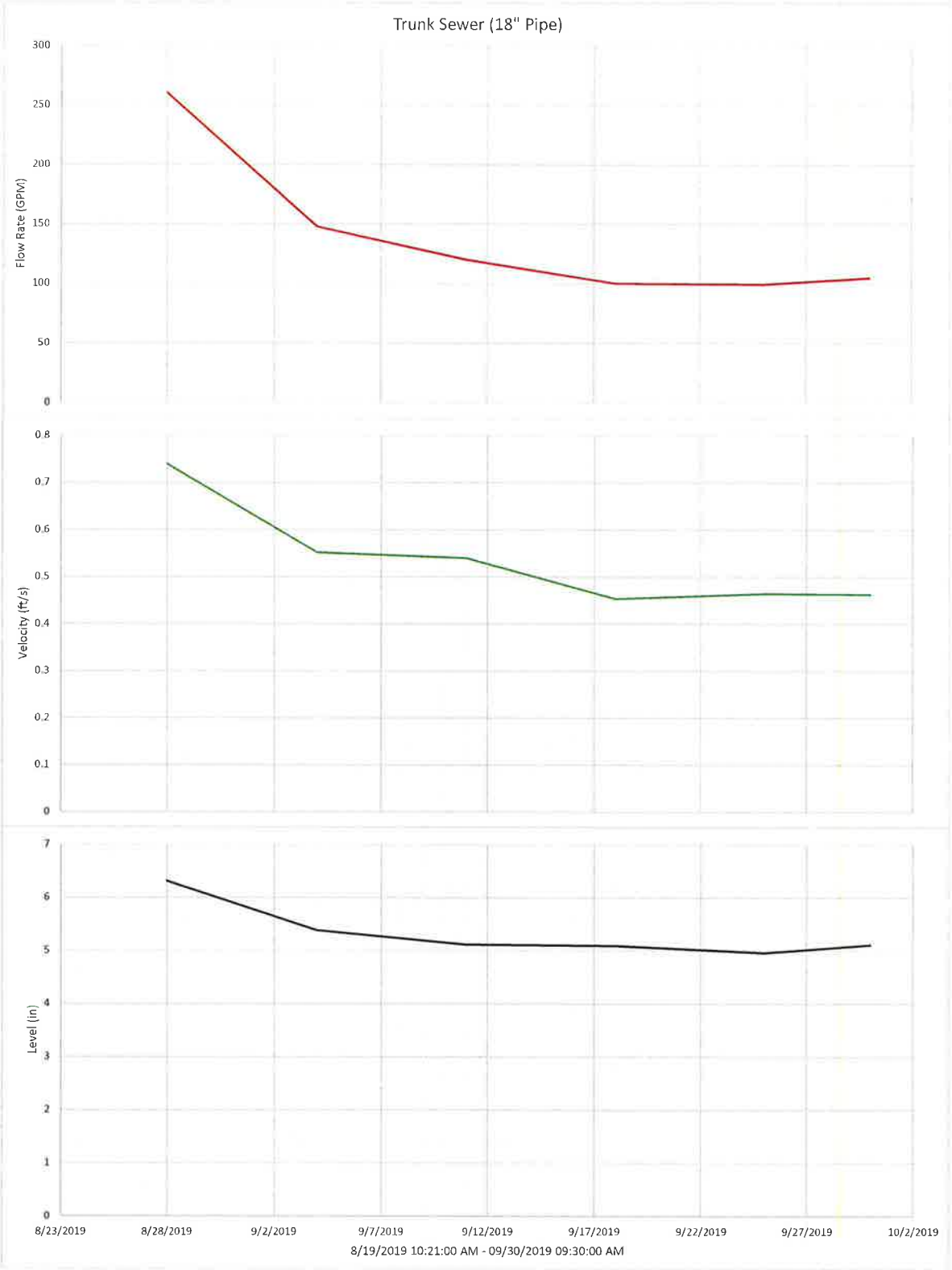
Exhibit A – Study Area Map

City of Troy

123rd Street to City Line



Exhibit B – 18-inch Truck Sewer Flow Meter Graphs


Trunk Sewer (18" Pipe)
Flow Rate (GPM)
300
250
200
150
100
50
0
Velocity (ft/s)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Level (in)
7
6
5
4
3
2
1
0
8/23/2019
8/28/2019
9/2/2019
9/7/2019
9/12/2019
9/17/2019
9/22/2019
9/27/2019
10/2/2019
8/19/2019 10:21:00 AM - 09/30/2019 09:30:00 AM

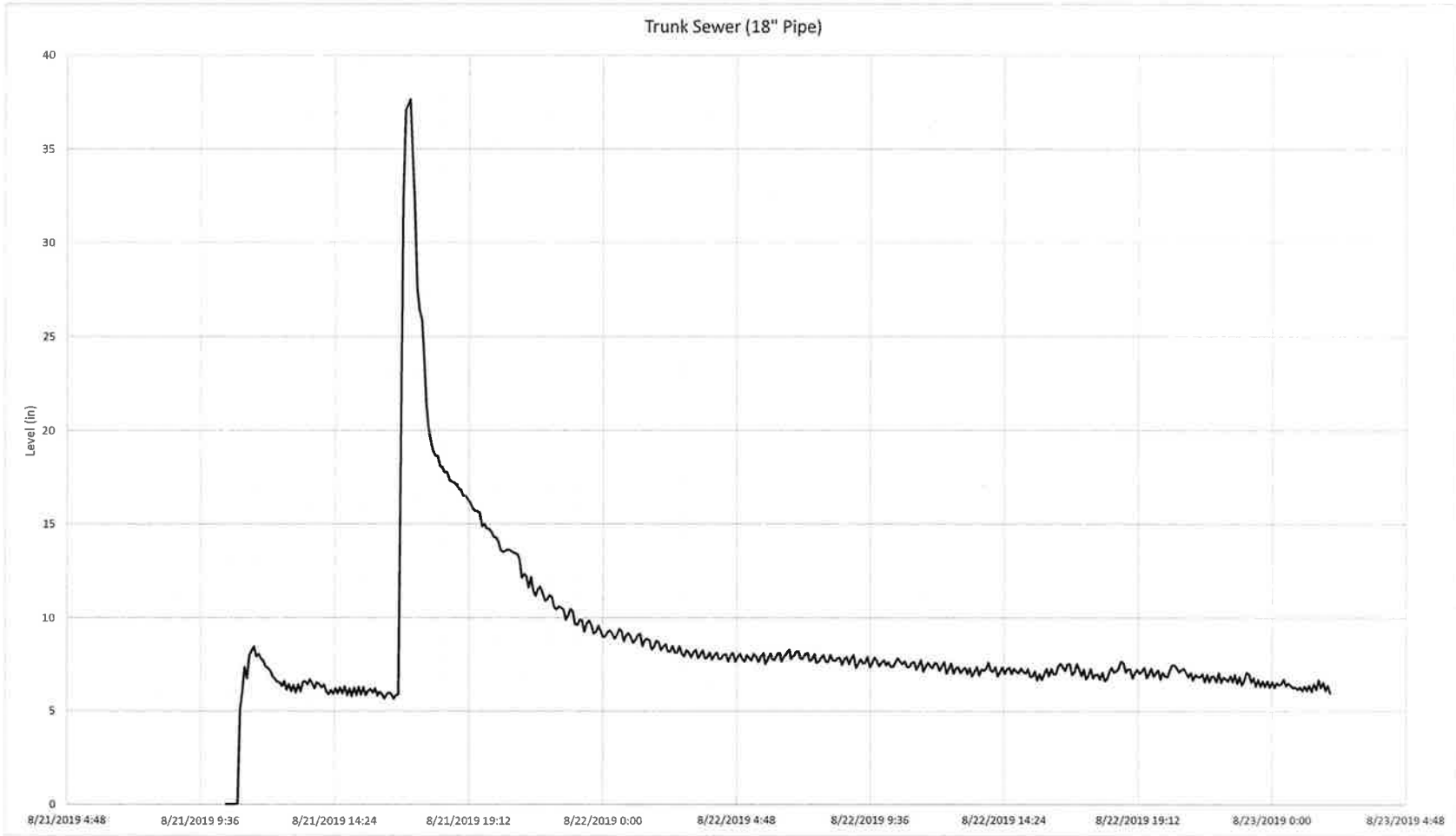

Trunk Sewer (18" Pipe)
Level (in)
40
35
30
25
20
15
10
5
0
8/21/2019 4:48
8/21/2019 9:36
8/21/2019 14:24
8/21/2019 19:12
8/22/2019 0:00
8/22/2019 4:48
8/22/2019 9:36
8/22/2019 14:24
8/22/2019 19:12
8/23/2019 0:00
8/23/2019 4:48

Exhibit C – One Week Sample Data From Flow Meter with 18-inch Truck Sewer

Site Name	Troy Sewer Line		
Isco Quantity	Level	Velocity	Flow Rate
Label	Level	Velocity	Flow Rate
Units	in	ft/s	gpm
Resolution	0.1	0.1	0.1
Significant Digits	0	0	0
8/21/2019 10:20	0.012	0.188	0
8/21/2019 10:25	-0.012	0	0
8/21/2019 10:30	0.017	0	0
8/21/2019 10:35	0.009	0	0
8/21/2019 10:40	0.023	0	0
8/21/2019 10:45	0.026	0	0
8/21/2019 10:50	0.022	0	0
8/21/2019 10:55	0.034	0	0
8/21/2019 11:00	5.053	0.41	120.729
8/21/2019 11:05	6.024	0.826	227.818
8/21/2019 11:10	7.342	1.007	368.254
8/21/2019 11:15	6.738	0.976	316.661
8/21/2019 11:20	7.987	1.194	490.31
8/21/2019 11:25	8.223	1.201	515.91
8/21/2019 11:30	8.443	1.185	524.654
8/21/2019 11:35	7.909	1.102	446.241
8/21/2019 11:40	8.045	1.167	484.019
8/21/2019 11:45	7.779	1.144	453.047
8/21/2019 11:50	7.681	1.096	426.426
8/21/2019 11:55	7.364	1.024	375.861
8/21/2019 12:00	7.277	1.073	387.378
8/21/2019 12:05	7.14	1.048	368.615
8/21/2019 12:10	6.86	1.02	339.364
8/21/2019 12:15	6.693	0.997	320.442
8/21/2019 12:20	6.537	0.9	279.956
8/21/2019 12:25	6.527	0.942	292.295
8/21/2019 12:30	6.319	0.931	276.07
8/21/2019 12:35	6.596	0.882	277.774
8/21/2019 12:40	6.124	0.842	238.896
8/21/2019 12:45	6.431	0.917	278.817
8/21/2019 12:50	6.046	0.82	228.56
8/21/2019 12:55	6.386	0.934	280.987
8/21/2019 13:00	5.975	0.837	229.268
8/21/2019 13:05	6.415	0.862	261.049
8/21/2019 13:10	6.034	0.854	237.231
8/21/2019 13:15	6.552	0.935	291.821
8/21/2019 13:20	6.579	0.937	294.044
8/21/2019 13:25	6.409	0.884	267.452
8/21/2019 13:30	6.686	0.925	296.726
8/21/2019 13:35	6.462	0.854	261.339
8/21/2019 13:40	6.198	0.852	245.763
8/21/2019 13:45	6.522	0.925	286.691
8/21/2019 13:50	6.434	0.923	280.566
8/21/2019 13:55	6.246	0.912	266.022
8/21/2019 14:00	6.398	0.878	264.862
8/21/2019 14:05	6.051	0.792	220.835
8/21/2019 14:10	5.874	0.813	217.583
8/21/2019 14:15	6.123	0.843	239.113
8/21/2019 14:20	5.904	0.775	208.917
8/21/2019 14:25	6.213	0.819	237.189
8/21/2019 14:30	5.931	0.829	224.707
8/21/2019 14:35	6.263	0.88	257.585

8/21/2019 14:40	5.928	0.773	209.371
8/21/2019 14:45	6.319	0.877	259.937
8/21/2019 14:50	5.825	0.743	196.328
8/21/2019 14:55	6.206	0.854	246.8
8/21/2019 15:00	5.785	0.721	188.886
8/21/2019 15:05	6.242	0.866	252.549
8/21/2019 15:10	5.827	0.774	204.695
8/21/2019 15:15	6.278	0.839	246.552
8/21/2019 15:20	5.867	0.775	206.887
8/21/2019 15:25	6.265	0.883	258.703
8/21/2019 15:30	5.826	0.79	208.92
8/21/2019 15:35	6.073	0.776	217.649
8/21/2019 15:40	6.162	0.849	242.896
8/21/2019 15:45	5.958	0.794	216.782
8/21/2019 15:50	6.216	0.908	263.04
8/21/2019 15:55	5.811	0.764	201.317
8/21/2019 16:00	6.013	0.801	221.429
8/21/2019 16:05	5.887	0.77	206.55
8/21/2019 16:10	5.656	0.716	181.602
8/21/2019 16:15	5.877	0.827	221.32
8/21/2019 16:20	5.987	0.793	217.908
8/21/2019 16:25	5.897	0.785	211.155
8/21/2019 16:30	5.641	0.749	189.327
8/21/2019 16:35	5.844	0.799	212.179
8/21/2019 16:40	5.87	0.787	210.273
8/21/2019 16:45	18.986	1.976	2363.52
8/21/2019 16:50	32.207	1.734	2445.34
8/21/2019 16:55	37.107	1.821	2567.61
8/21/2019 17:00	37.367	1.836	2589.01
8/21/2019 17:05	37.651	1.851	2610.58
8/21/2019 17:10	34.734	1.867	2632.34
8/21/2019 17:15	31.981	1.882	2654.27
8/21/2019 17:20	27.545	1.898	2676.39
8/21/2019 17:25	26.378	6.084	8578.74
8/21/2019 17:30	25.936	5.252	7405.7
8/21/2019 17:35	23.931	4.613	6502.8
8/21/2019 17:40	21.306	1.958	2590.12
8/21/2019 17:45	20.102	1.975	2491.3
8/21/2019 17:50	19.437	2.804	3430.18
8/21/2019 17:55	18.926	2.516	3000.77
8/21/2019 18:00	18.664	2.547	2996.41
8/21/2019 18:05	18.626	2.638	3097.65
8/21/2019 18:10	18.113	2.711	3095.11
8/21/2019 18:15	18.027	2.386	2710.89
8/21/2019 18:20	17.764	2.233	2499.18
8/21/2019 18:25	17.774	2.037	2280.88
8/21/2019 18:30	17.369	2.494	2725.85
8/21/2019 18:35	17.278	2.558	2779.94
8/21/2019 18:40	17.223	2.371	2568.21
8/21/2019 18:45	17.128	2.266	2439.4
8/21/2019 18:50	16.913	2.145	2278.33
8/21/2019 18:55	16.813	2.081	2195.85
8/21/2019 19:00	16.506	2.274	2351.05
8/21/2019 19:05	16.496	2.036	2103.6
8/21/2019 19:10	16.289	2.01	2048.46
8/21/2019 19:15	16.116	1.993	2006.86
8/21/2019 19:20	15.814	1.766	1740.3
8/21/2019 19:25	15.707	1.917	1874.09
8/21/2019 19:30	15.686	1.83	1786.62

8/21/2019 19:35	15.584	1.846	1788.51
8/21/2019 19:40	14.866	1.52	1394.51
8/21/2019 19:45	15.005	1.731	1605.19
8/21/2019 19:50	14.74	1.703	1546.61
8/21/2019 19:55	14.737	1.454	1320.5
8/21/2019 20:00	14.566	1.661	1487.59
8/21/2019 20:05	14.286	1.599	1399.11
8/21/2019 20:10	14.258	1.546	1349.38
8/21/2019 20:15	14.021	1.508	1290.52
8/21/2019 20:20	13.564	1.445	1187.02
8/21/2019 20:25	13.474	1.398	1139.79
8/21/2019 20:30	13.539	1.365	1118.86
8/21/2019 20:35	13.608	1.312	1081.96
8/21/2019 20:40	13.574	1.357	1116.4
8/21/2019 20:45	13.485	1.383	1128.51
8/21/2019 20:50	13.418	1.347	1092.1
8/21/2019 20:55	13.38	1.331	1075.75
8/21/2019 21:00	13.114	1.29	1016.64
8/21/2019 21:05	12.116	1.229	877.302
8/21/2019 21:10	12.31	1.32	960.865
8/21/2019 21:15	12.186	1.279	919.784
8/21/2019 21:20	11.585	1.315	886.11
8/21/2019 21:25	12.15	1.308	936.508
8/21/2019 21:30	11.419	1.184	783.417
8/21/2019 21:35	11.143	1.229	787.543
8/21/2019 21:40	11.492	1.241	827.598
8/21/2019 21:45	11.646	0.967	655.92
8/21/2019 21:50	11.302	1.291	842.79
8/21/2019 21:55	10.88	1.275	792.232
8/21/2019 22:00	10.959	1.284	805.215
8/21/2019 22:05	11.181	1.288	829.227
8/21/2019 22:10	11.089	1.406	895.792
8/21/2019 22:15	10.528	1.253	745.836
8/21/2019 22:20	10.424	1.158	680.319
8/21/2019 22:25	10.585	1.385	830.261
8/21/2019 22:30	10.497	1.245	738.122
8/21/2019 22:35	10.412	1.208	708.714
8/21/2019 22:40	9.862	1.241	677.328
8/21/2019 22:45	10.111	1.175	663.172
8/21/2019 22:50	10.447	1.126	663.098
8/21/2019 22:55	10.304	1.262	729.896
8/21/2019 23:00	9.641	1.264	669.646
8/21/2019 23:05	9.596	1.205	634.133
8/21/2019 23:10	9.881	1.193	653.23
8/21/2019 23:15	9.85	1.233	671.843
8/21/2019 23:20	9.241	1.3	650.502
8/21/2019 23:25	9.664	1.301	691.417
8/21/2019 23:30	9.822	1.167	633.625
8/21/2019 23:35	9.563	1.178	617.386
8/21/2019 23:40	9.135	1.33	655.435
8/21/2019 23:45	9.216	1.217	607.042
8/21/2019 23:50	9.551	1.334	697.716
8/21/2019 23:55	9.275	1.112	559.518
8/22/2019 0:00	8.949	1.221	585.401
8/22/2019 0:05	8.981	1.325	638.099
8/22/2019 0:10	9.216	1.142	569.722
8/22/2019 0:15	9.299	1.2	605.781
8/22/2019 0:20	9.144	1.26	621.658
8/22/2019 0:25	8.838	1.148	541.014

8/22/2019 0:30	9.064	1.344	655.263
8/22/2019 0:35	9.385	1.073	548.237
8/22/2019 0:40	9.252	1.128	565.289
8/22/2019 0:45	8.713	1.272	588.217
8/22/2019 0:50	9.038	1.308	635.415
8/22/2019 0:55	9.145	1.198	591.406
8/22/2019 1:00	8.938	1.125	538.274
8/22/2019 1:05	8.63	1.275	581.974
8/22/2019 1:10	8.789	1.322	618.53
8/22/2019 1:15	9.055	1.26	613.413
8/22/2019 1:20	9.115	1.228	603.305
8/22/2019 1:25	8.459	1.208	536.547
8/22/2019 1:30	8.788	1.3	607.847
8/22/2019 1:35	8.861	1.274	602.592
8/22/2019 1:40	8.765	1.215	566.33
8/22/2019 1:45	8.268	1.233	530.744
8/22/2019 1:50	8.412	1.352	595.723
8/22/2019 1:55	8.743	1.182	548.929
8/22/2019 2:00	8.669	1.125	516.659
8/22/2019 2:05	8.25	1.158	497.026
8/22/2019 2:10	8.42	1.247	550.067
8/22/2019 2:15	8.561	1.349	608.911
8/22/2019 2:20	8.168	1.294	547.593
8/22/2019 2:25	8.182	1.183	501.918
8/22/2019 2:30	8.475	1.273	566.713
8/22/2019 2:35	8.104	1.249	523.049
8/22/2019 2:40	8.116	1.228	515.282
8/22/2019 2:45	8.465	1.304	579.533
8/22/2019 2:50	8.047	1.329	551.304
8/22/2019 2:55	7.908	1.194	483.344
8/22/2019 3:00	8.252	1.331	571.525
8/22/2019 3:05	8.088	1.304	544.677
8/22/2019 3:10	7.858	1.228	493.003
8/22/2019 3:15	8.127	1.253	526.682
8/22/2019 3:20	8.26	1.308	562.007
8/22/2019 3:25	7.806	1.2	477.206
8/22/2019 3:30	8.009	1.279	526.904
8/22/2019 3:35	8.232	1.214	519.53
8/22/2019 3:40	7.79	1.237	490.637
8/22/2019 3:45	7.848	1.172	469.869
8/22/2019 3:50	8.119	1.151	483.125
8/22/2019 3:55	7.733	1.224	480.62
8/22/2019 4:00	7.964	1.115	456.1
8/22/2019 4:05	8.119	1.255	527.082
8/22/2019 4:10	7.759	1.095	431.84
8/22/2019 4:15	7.8	1.179	468.483
8/22/2019 4:20	7.987	1.259	516.9
8/22/2019 4:25	8.035	1.206	499.311
8/22/2019 4:30	7.628	1.127	434.289
8/22/2019 4:35	7.948	1.182	482.147
8/22/2019 4:40	8.1	1.198	501.409
8/22/2019 4:45	7.615	1.139	437.748
8/22/2019 4:50	7.862	1.179	473.729
8/22/2019 4:55	8.054	1.145	475.28
8/22/2019 5:00	7.779	1.078	426.802
8/22/2019 5:05	7.618	1.171	450.336
8/22/2019 5:10	7.983	1.234	506.341
8/22/2019 5:15	7.811	1.3	517.659
8/22/2019 5:20	7.684	1.023	398.397

8/22/2019 5:25	8.053	1.022	424.314
8/22/2019 5:30	7.89	1.16	468.169
8/22/2019 5:35	7.591	1.126	430.981
8/22/2019 5:40	7.909	1.148	464.995
8/22/2019 5:45	8.104	1.14	477.509
8/22/2019 5:50	7.502	1.111	418.498
8/22/2019 5:55	7.748	1.1	432.983
8/22/2019 6:00	8.075	1.135	472.935
8/22/2019 6:05	7.751	1.297	510.941
8/22/2019 6:10	7.717	1.117	437.541
8/22/2019 6:15	8.076	1.207	503.211
8/22/2019 6:20	8.119	1.171	491.761
8/22/2019 6:25	7.63	1.121	432.077
8/22/2019 6:30	7.91	1.214	491.583
8/22/2019 6:35	8.12	1.205	506.188
8/22/2019 6:40	8.276	1.263	544.183
8/22/2019 6:45	7.771	1.157	457.245
8/22/2019 6:50	7.931	1.081	439.53
8/22/2019 6:55	8.178	1.197	507.406
8/22/2019 7:00	8.176	1.222	518.117
8/22/2019 7:05	7.802	1.11	441.183
8/22/2019 7:10	7.757	1.016	400.698
8/22/2019 7:15	8.07	1.139	474.115
8/22/2019 7:20	8.108	1.14	477.534
8/22/2019 7:25	7.66	1.017	394.301
8/22/2019 7:30	7.731	1.09	427.895
8/22/2019 7:35	8.03	1.047	432.935
8/22/2019 7:40	7.556	1.05	399.568
8/22/2019 7:45	7.624	1.065	410.141
8/22/2019 7:50	7.825	1.161	463.528
8/22/2019 7:55	7.989	1.11	455.889
8/22/2019 8:00	7.63	1.094	421.866
8/22/2019 8:05	7.602	1.108	424.908
8/22/2019 8:10	7.998	0.981	403.308
8/22/2019 8:15	7.7	1.157	451.811
8/22/2019 8:20	7.663	1.123	435.322
8/22/2019 8:25	7.823	1.041	415.534
8/22/2019 8:30	7.83	1.213	484.615
8/22/2019 8:35	7.445	1.096	408.446
8/22/2019 8:40	7.746	1.066	419.544
8/22/2019 8:45	7.884	1.095	441.552
8/22/2019 8:50	7.488	1.11	417.047
8/22/2019 8:55	7.766	1.064	420.495
8/22/2019 9:00	7.992	1.186	487.287
8/22/2019 9:05	7.288	1.082	391.503
8/22/2019 9:10	7.522	1.034	390.753
8/22/2019 9:15	7.754	1.194	470.535
8/22/2019 9:20	7.534	1.09	412.729
8/22/2019 9:25	7.565	1.064	405.334
8/22/2019 9:30	7.874	1.07	430.706
8/22/2019 9:35	7.316	1.058	384.972
8/22/2019 9:40	7.544	1.019	386.844
8/22/2019 9:45	7.856	1.121	449.708
8/22/2019 9:50	7.665	1.079	418.643
8/22/2019 9:55	7.38	1.051	387.022
8/22/2019 10:00	7.572	1.221	465.639
8/22/2019 10:05	7.711	1.041	407.217
8/22/2019 10:10	7.436	1.065	396.355
8/22/2019 10:15	7.601	1.094	419.524

8/22/2019 10:20	7.348	1.062	388.769
8/22/2019 10:25	7.349	1.015	371.364
8/22/2019 10:30	7.583	1.045	399.259
8/22/2019 10:35	7.814	1.153	459.312
8/22/2019 10:40	7.633	1.116	430.389
8/22/2019 10:45	7.487	1.089	408.984
8/22/2019 10:50	7.65	1.167	451.338
8/22/2019 10:55	7.333	1.062	387.44
8/22/2019 11:00	7.339	1.12	409.279
8/22/2019 11:05	7.557	1.015	386.224
8/22/2019 11:10	7.623	1.025	394.483
8/22/2019 11:15	7.187	0.929	329.588
8/22/2019 11:20	7.427	1.082	401.906
8/22/2019 11:25	7.715	1.06	415.049
8/22/2019 11:30	7.082	0.97	337.145
8/22/2019 11:35	7.345	1.03	376.662
8/22/2019 11:40	7.574	0.96	366.379
8/22/2019 11:45	7.375	1.085	399.076
8/22/2019 11:50	7.275	1.015	366.145
8/22/2019 11:55	7.58	1.068	407.927
8/22/2019 12:00	7.501	1.025	386.011
8/22/2019 12:05	7.127	0.994	348.68
8/22/2019 12:10	7.383	0.997	367.319
8/22/2019 12:15	7.6	1.024	392.438
8/22/2019 12:20	6.991	1.027	350.706
8/22/2019 12:25	7.241	1.006	360.787
8/22/2019 12:30	7.533	1.062	402.313
8/22/2019 12:35	6.985	1.091	372.232
8/22/2019 12:40	7.275	1.005	362.556
8/22/2019 12:45	7.329	1.002	365.369
8/22/2019 12:50	7.011	1.042	357.092
8/22/2019 12:55	7.187	1.001	355.075
8/22/2019 13:00	7.302	1.038	376.647
8/22/2019 13:05	6.966	1	339.811
8/22/2019 13:10	7.275	1.026	370.24
8/22/2019 13:15	6.835	1.014	335.74
8/22/2019 13:20	7.075	1.002	347.779
8/22/2019 13:25	7.348	1.116	408.512
8/22/2019 13:30	6.884	0.999	333.9
8/22/2019 13:35	7.206	1.018	362.437
8/22/2019 13:40	7.147	1.065	374.999
8/22/2019 13:45	7.243	1.027	368.317
8/22/2019 13:50	7.588	1.006	384.747
8/22/2019 13:55	7.156	1.024	361.338
8/22/2019 14:00	7.097	0.979	341.418
8/22/2019 14:05	7.337	1.079	394.18
8/22/2019 14:10	6.847	0.984	326.344
8/22/2019 14:15	7.062	0.969	335.554
8/22/2019 14:20	7.333	1.01	368.703
8/22/2019 14:25	6.977	0.924	314.498
8/22/2019 14:30	7.236	1.019	365.234
8/22/2019 14:35	7.305	1.022	370.987
8/22/2019 14:40	6.964	1.012	343.724
8/22/2019 14:45	7.255	1.011	363.527
8/22/2019 14:50	7.089	0.97	337.876
8/22/2019 14:55	7.014	0.993	340.812
8/22/2019 15:00	7.267	1.031	371.617
8/22/2019 15:05	7.082	0.994	345.462
8/22/2019 15:10	6.994	1.003	342.698

8/22/2019 15:15	7.234	1.017	364.311
8/22/2019 15:20	6.809	0.98	322.459
8/22/2019 15:25	6.844	0.959	317.91
8/22/2019 15:30	7.11	1.04	363.604
8/22/2019 15:35	6.626	0.992	314.527
8/22/2019 15:40	6.96	0.983	333.717
8/22/2019 15:45	6.653	0.881	280.889
8/22/2019 15:50	6.941	0.979	330.964
8/22/2019 15:55	7.248	1.017	365.111
8/22/2019 16:00	6.852	0.934	310.14
8/22/2019 16:05	7.245	1.013	363.365
8/22/2019 16:10	6.958	0.931	315.954
8/22/2019 16:15	6.955	0.996	337.656
8/22/2019 16:20	7.36	0.975	357.612
8/22/2019 16:25	7.523	1.044	394.571
8/22/2019 16:30	7.313	1.048	380.848
8/22/2019 16:35	7.138	0.965	339.367
8/22/2019 16:40	7.489	1.041	390.96
8/22/2019 16:45	7.508	1.027	387.056
8/22/2019 16:50	6.912	1.006	338.215
8/22/2019 16:55	7.071	0.958	332.465
8/22/2019 17:00	7.504	1.023	385.449
8/22/2019 17:05	7.233	1.024	366.775
8/22/2019 17:10	6.861	0.894	297.329
8/22/2019 17:15	7.213	1.034	368.718
8/22/2019 17:20	6.685	0.995	319.319
8/22/2019 17:25	6.878	0.979	326.723
8/22/2019 17:30	7.239	1.103	395.395
8/22/2019 17:35	6.74	0.887	287.753
8/22/2019 17:40	6.931	1.039	350.704
8/22/2019 17:45	6.943	0.879	297.399
8/22/2019 17:50	6.683	0.958	307.1
8/22/2019 17:55	7.046	0.984	339.853
8/22/2019 18:00	6.592	0.992	312.177
8/22/2019 18:05	6.701	0.936	301.316
8/22/2019 18:10	7.056	1	346.041
8/22/2019 18:15	7.314	0.926	336.828
8/22/2019 18:20	7.053	1.004	347.089
8/22/2019 18:25	7.108	1.027	358.871
8/22/2019 18:30	7.266	0.998	359.484
8/22/2019 18:35	7.65	1.069	413.438
8/22/2019 18:40	7.558	0.973	370.377
8/22/2019 18:45	7.057	0.975	337.495
8/22/2019 18:50	7.229	1.009	361.067
8/22/2019 18:55	7.21	0.952	339.19
8/22/2019 19:00	6.744	0.962	312.323
8/22/2019 19:05	7.03	0.887	305.218
8/22/2019 19:10	7.207	1.049	373.657
8/22/2019 19:15	6.986	0.998	340.629
8/22/2019 19:20	7.098	0.992	346.113
8/22/2019 19:25	7.305	0.994	360.847
8/22/2019 19:30	6.753	0.982	319.54
8/22/2019 19:35	6.969	0.94	319.445
8/22/2019 19:40	7.267	1.013	365.147
8/22/2019 19:45	6.84	0.934	309.518
8/22/2019 19:50	6.996	0.98	334.968
8/22/2019 19:55	7.176	0.935	331.076
8/22/2019 20:00	6.668	0.887	283.744
8/22/2019 20:05	7.047	0.958	330.664

8/22/2019 20:10	6.85	0.954	316.621
8/22/2019 20:15	6.804	0.979	321.911
8/22/2019 20:20	7.197	1.012	359.763
8/22/2019 20:25	7.449	1.034	385.684
8/22/2019 20:30	7.431	1.047	389.134
8/22/2019 20:35	7.275	1.01	364.515
8/22/2019 20:40	7.057	0.988	341.988
8/22/2019 20:45	7.196	1.009	358.746
8/22/2019 20:50	7.248	1.075	386.13
8/22/2019 20:55	7.032	0.988	340.202
8/22/2019 21:00	6.803	0.951	312.74
8/22/2019 21:05	7.029	1.005	345.87
8/22/2019 21:10	6.636	0.891	283.078
8/22/2019 21:15	6.931	0.934	315.054
8/22/2019 21:20	6.804	0.938	308.553
8/22/2019 21:25	6.807	0.966	317.774
8/22/2019 21:30	6.978	1.028	350.115
8/22/2019 21:35	6.541	0.962	299.445
8/22/2019 21:40	6.934	0.991	334.581
8/22/2019 21:45	6.545	0.933	290.458
8/22/2019 21:50	6.845	0.994	329.544
8/22/2019 21:55	6.843	0.826	273.932
8/22/2019 22:00	6.542	0.891	277.391
8/22/2019 22:05	7.022	0.991	340.686
8/22/2019 22:10	6.515	0.95	294.067
8/22/2019 22:15	6.785	0.939	307.555
8/22/2019 22:20	6.695	1.004	322.787
8/22/2019 22:25	6.572	0.863	270.372
8/22/2019 22:30	6.87	0.963	320.799
8/22/2019 22:35	6.546	0.885	275.664
8/22/2019 22:40	6.934	0.961	324.343
8/22/2019 22:45	6.459	0.889	271.969
8/22/2019 22:50	6.819	0.899	296.481
8/22/2019 22:55	6.375	0.88	264.051
8/22/2019 23:00	6.646	0.931	296.219
8/22/2019 23:05	7.045	0.948	327.275
8/22/2019 23:10	6.959	1.004	340.855
8/22/2019 23:15	6.523	0.953	295.421
8/22/2019 23:20	6.775	0.878	286.962
8/22/2019 23:25	6.304	0.854	252.315
8/22/2019 23:30	6.667	0.95	303.586
8/22/2019 23:35	6.303	0.905	267.424
8/22/2019 23:40	6.594	0.939	295.542
8/22/2019 23:45	6.296	0.88	259.514
8/22/2019 23:50	6.596	0.902	284.142
8/22/2019 23:55	6.255	0.877	256.497
8/23/2019 0:00	6.553	0.91	283.993
8/23/2019 0:05	6.236	0.835	242.936
8/23/2019 0:10	6.5	0.911	280.925
8/23/2019 0:15	6.383	0.885	266.218
8/23/2019 0:20	6.448	0.88	268.39
8/23/2019 0:25	6.68	0.937	300.294
8/23/2019 0:30	6.325	0.898	266.555
8/23/2019 0:35	6.482	0.907	278.754
8/23/2019 0:40	6.365	0.899	269.413
8/23/2019 0:45	6.226	0.896	260.065
8/23/2019 0:50	6.276	0.904	265.633
8/23/2019 0:55	6.135	0.9	255.872
8/23/2019 1:00	6.273	0.891	261.383

8/23/2019 1:05	6.069	0.869	243.501
8/23/2019 1:10	6.327	0.846	251.164
8/23/2019 1:15	6.077	0.844	236.936
8/23/2019 1:20	6.37	0.983	294.725
8/23/2019 1:25	6.036	0.831	231.083
8/23/2019 1:30	6.454	0.897	274.098
8/23/2019 1:35	6.147	0.842	240.152
8/23/2019 1:40	6.662	0.969	309.273
8/23/2019 1:45	6.23	0.923	268.239
8/23/2019 1:50	6.527	0.851	263.953
8/23/2019 1:55	6.083	0.839	235.749
8/23/2019 2:00	6.365	0.886	265.47
8/23/2019 2:05	5.951	0.862	234.937
8/23/2019 2:10	5.97	0.851	233.011
8/23/2019 2:15	6.085	0.854	240.046
8/23/2019 2:20	5.887	0.826	221.636
8/23/2019 2:25	6.095	0.887	249.991
8/23/2019 2:30	5.788	0.78	204.235
8/23/2019 2:35	6.151	0.911	260.079
8/23/2019 2:40	5.846	0.772	205.114
8/23/2019 2:45	6.216	0.843	244.141
8/23/2019 2:50	5.854	0.878	233.918
8/23/2019 2:55	6.237	0.93	270.681
8/23/2019 3:00	5.901	0.831	223.66
8/23/2019 3:05	6.335	0.877	260.979
8/23/2019 3:10	6.047	0.879	244.98
8/23/2019 3:15	6.214	0.845	244.72
8/23/2019 3:20	6.112	0.78	220.6
8/23/2019 3:25	6.378	0.875	262.732
8/23/2019 3:30	5.975	0.791	216.658
8/23/2019 3:35	6.042	0.812	226.016
8/23/2019 3:40	6.105	0.869	245.42
8/23/2019 3:45	5.833	0.744	197.168
8/23/2019 3:50	6.229	0.826	240.083
8/23/2019 3:55	5.874	0.802	214.66
8/23/2019 4:00	6.297	0.878	259.048
8/23/2019 4:05	5.86	0.853	227.313
8/23/2019 4:10	6.3	0.891	262.994
8/23/2019 4:15	5.92	0.854	231.124
8/23/2019 4:20	6.177	0.812	233.056
8/23/2019 4:25	5.973	0.844	231.121
8/23/2019 4:30	5.96	0.83	226.708
8/23/2019 4:35	6.038	0.826	229.755
8/23/2019 4:40	5.86	0.804	214.45
8/23/2019 4:45	6.114	0.851	240.916
8/23/2019 4:50	5.755	0.764	198.528
8/23/2019 4:55	6.215	0.807	233.906
8/23/2019 5:00	5.845	0.782	207.652
8/23/2019 5:05	6.148	0.836	238.472
8/23/2019 5:10	5.964	0.851	232.654
8/23/2019 5:15	6.3	0.843	248.738
8/23/2019 5:20	5.928	0.805	218.275
8/23/2019 5:25	6.239	0.916	266.625
8/23/2019 5:30	6.013	0.835	230.924
8/23/2019 5:35	6.26	0.872	255.008
8/23/2019 5:40	6.051	0.82	228.783
8/23/2019 5:45	6.166	0.883	253.085
8/23/2019 5:50	6.124	0.72	204.298
8/23/2019 5:55	6.2	0.923	266.395

8/23/2019 6:00	6.093	0.865	243.751
8/23/2019 6:05	6.092	0.814	229.277
8/23/2019 6:10	6.218	0.868	251.571
8/23/2019 6:15	6.444	0.854	260.232
8/23/2019 6:20	6.103	0.821	231.939
8/23/2019 6:25	6.469	0.862	264.036
8/23/2019 6:30	6.13	0.878	249.359
8/23/2019 6:35	6.58	0.914	286.695
8/23/2019 6:40	6.202	0.867	250.512
8/23/2019 6:45	6.537	0.892	277.307
8/23/2019 6:50	6.164	0.855	244.852
8/23/2019 6:55	6.281	0.82	240.964
8/23/2019 7:00	6.642	0.908	288.76
8/23/2019 7:05	6.263	0.875	256.231
8/23/2019 7:10	6.561	0.93	290.729
8/23/2019 7:15	6.107	0.824	232.893
8/23/2019 7:20	6.569	0.923	289.011
8/23/2019 7:25	6.127	0.857	243.321
8/23/2019 7:30	6.505	0.973	300.465
8/23/2019 7:35	6.53	0.917	284.718
8/23/2019 7:40	6.388	0.932	280.716
8/23/2019 7:45	6.525	0.923	286.369
8/23/2019 7:50	6.188	0.847	243.746
8/23/2019 7:55	6.561	0.854	266.773
8/23/2019 8:00	6.097	0.842	237.286
8/23/2019 8:05	6.381	0.82	246.638
8/23/2019 8:10	6.266	0.778	228.045
8/23/2019 8:15	6.197	0.826	238.395
8/23/2019 8:20	6.614	0.911	288.117
8/23/2019 8:25	6.054	0.861	240.204
8/23/2019 8:30	6.413	0.886	268.3
8/23/2019 8:35	6.194	0.815	234.996
8/23/2019 8:40	6.422	0.89	269.845
8/23/2019 8:45	6.47	0.926	283.838
8/23/2019 8:50	6.385	0.954	286.885
8/23/2019 8:55	6.702	0.993	319.671
8/23/2019 9:00	6.224	0.851	247.159
8/23/2019 9:05	6.544	0.905	281.889
8/23/2019 9:10	6.042	0.846	235.63
8/23/2019 9:15	6.54	0.851	264.691
8/23/2019 9:20	5.992	0.843	231.956
8/23/2019 9:25	6.348	0.857	255.91
8/23/2019 9:30	6.452	0.914	279.179
8/23/2019 9:35	6.156	0.82	234.519
8/23/2019 9:40	6.492	0.818	251.969
8/23/2019 9:45	6.21	0.854	247.001
8/23/2019 9:50	6.751	0.872	283.785
8/23/2019 9:55	6.5	0.94	289.889
8/23/2019 10:00	6.478	0.81	248.567
8/23/2019 10:05	6.551	0.873	272.386
8/23/2019 10:10	6.362	0.857	256.504
8/23/2019 10:15	6.6	0.925	291.462
8/23/2019 10:20	6.301	0.878	259.237
8/23/2019 10:25	6.498	0.879	271.054
8/23/2019 10:30	6.037	0.817	227.263
8/23/2019 10:35	6.467	0.862	264.024
8/23/2019 10:40	6.157	0.844	241.218
8/23/2019 10:45	6.457	0.914	279.461
8/23/2019 10:50	6.051	0.809	225.598

8/23/2019 10:55	6.373	0.873	262.021
8/23/2019 11:00	6.033	0.749	207.979
8/23/2019 11:05	6.413	0.871	263.758
8/23/2019 11:10	6.131	0.874	248.336
8/23/2019 11:15	6.255	0.779	227.657
8/23/2019 11:20	5.851	0.779	207.31
8/23/2019 11:25	6.434	0.897	272.67
8/23/2019 11:30	6.306	0.805	238.022
8/23/2019 11:35	6.254	0.897	262.152
8/23/2019 11:40	6.196	0.838	241.645
8/23/2019 11:45	6.177	0.838	240.565
8/23/2019 11:50	6.471	0.833	255.462
8/23/2019 11:55	6.019	0.845	234.111
8/23/2019 12:00	6.283	0.877	257.826
8/23/2019 12:05	5.913	0.746	201.457
8/23/2019 12:10	6.36	0.907	271.423
8/23/2019 12:15	5.942	0.786	213.748
8/23/2019 12:20	6.241	0.873	254.363
8/23/2019 12:25	5.981	0.765	209.955
8/23/2019 12:30	6.336	0.875	260.475
8/23/2019 12:35	6.055	0.774	216.207
8/23/2019 12:40	6.417	0.879	266.376
8/23/2019 12:45	6.021	0.761	210.853
8/23/2019 12:50	6.142	0.867	246.872
8/23/2019 12:55	5.909	0.833	224.574
8/23/2019 13:00	6.068	0.809	226.576
8/23/2019 13:05	6.051	0.807	225.025
8/23/2019 13:10	6.032	0.729	202.471
8/23/2019 13:15	6.336	0.891	265.058
8/23/2019 13:20	6.06	0.833	232.761
8/23/2019 13:25	6.427	0.868	263.622
8/23/2019 13:30	6.135	0.81	230.462
8/23/2019 13:35	6.447	0.864	263.574
8/23/2019 13:40	6.27	0.826	242.244
8/23/2019 13:45	6.63	0.894	283.407
8/23/2019 13:50	6.262	0.875	256.127
8/23/2019 13:55	6.437	0.863	262.518
8/23/2019 14:00	6.008	0.8	220.89
8/23/2019 14:05	6.325	0.89	264.153
8/23/2019 14:10	5.936	0.766	207.854
8/23/2019 14:15	6.476	0.84	257.753
8/23/2019 14:20	5.987	0.806	221.64
8/23/2019 14:25	6.322	0.873	259.102
8/23/2019 14:30	6.014	0.799	221.102
8/23/2019 14:35	6.442	0.925	281.918
8/23/2019 14:40	6.197	0.806	232.433
8/23/2019 14:45	6.447	0.819	249.776
8/23/2019 14:50	6.18	0.843	242.232
8/23/2019 14:55	6.431	0.842	256.015
8/23/2019 15:00	6.022	0.78	216.078
8/23/2019 15:05	6.361	0.86	257.423
8/23/2019 15:10	5.998	0.813	224.044
8/23/2019 15:15	6.192	0.838	241.468
8/23/2019 15:20	5.932	0.749	203.102
8/23/2019 15:25	6.287	0.79	232.695
8/23/2019 15:30	6.207	0.816	236.059
8/23/2019 15:35	6.202	0.777	224.27
8/23/2019 15:40	6.515	0.805	249.038
8/23/2019 15:45	5.965	0.782	213.854

8/23/2019 15:50	6.288	0.877	258.123
8/23/2019 15:55	5.82	0.763	201.419
8/23/2019 16:00	6.185	0.808	232.614
8/23/2019 16:05	5.841	0.745	197.782
8/23/2019 16:10	6.318	0.807	239.332
8/23/2019 16:15	5.872	0.711	190.104
8/23/2019 16:20	6.189	0.836	240.808
8/23/2019 16:25	6.024	0.73	202.407
8/23/2019 16:30	6.424	0.765	232.199
8/23/2019 16:35	5.983	0.802	220.185
8/23/2019 16:40	6.46	0.929	284.2
8/23/2019 16:45	6.15	0.817	233.226
8/23/2019 16:50	6.516	0.877	271.332
8/23/2019 16:55	6.169	0.814	233.187
8/23/2019 17:00	6.477	0.895	274.573
8/23/2019 17:05	6.383	0.866	260.608
8/23/2019 17:10	6.395	0.828	249.577
8/23/2019 17:15	6.322	0.872	258.798
8/23/2019 17:20	6.436	0.85	258.619
8/23/2019 17:25	6.244	0.84	245.033
8/23/2019 17:30	6.44	0.862	262.461
8/23/2019 17:35	6.323	0.84	249.404
8/23/2019 17:40	6.601	0.858	270.376
8/23/2019 17:45	6.343	0.8	238.373
8/23/2019 17:50	6.589	0.86	270.364
8/23/2019 17:55	6.106	0.762	215.45
8/23/2019 18:00	6.316	0.789	233.8
8/23/2019 18:05	6.035	0.691	192.177
8/23/2019 18:10	6.453	0.827	252.522
8/23/2019 18:15	6.001	0.714	196.822
8/23/2019 18:20	6.551	0.876	273.32
8/23/2019 18:25	6.207	0.787	227.605
8/23/2019 18:30	6.543	0.801	249.333
8/23/2019 18:35	6.122	0.843	239.099
8/23/2019 18:40	6.582	0.881	276.648
8/23/2019 18:45	6.319	0.826	244.896
8/23/2019 18:50	6.298	0.803	236.966
8/23/2019 18:55	6.178	0.772	221.863
8/23/2019 19:00	6.283	0.817	240.408
8/23/2019 19:05	6.287	0.762	224.342
8/23/2019 19:10	6.483	0.862	264.815
8/23/2019 19:15	6.609	0.846	267.188
8/23/2019 19:20	6.201	0.73	210.849
8/23/2019 19:25	6.624	0.769	243.523
8/23/2019 19:30	6.141	0.753	214.462
8/23/2019 19:35	6.46	0.701	214.262
8/23/2019 19:40	6.11	0.724	204.839
8/23/2019 19:45	6.32	0.806	239.182
8/23/2019 19:50	6.149	0.787	224.488
8/23/2019 19:55	6.527	0.87	270.1
8/23/2019 20:00	6.047	0.763	212.635
8/23/2019 20:05	6.423	0.781	237.074
8/23/2019 20:10	5.963	0.747	204.266
8/23/2019 20:15	6.168	0.827	236.951
8/23/2019 20:20	6.119	0.795	225.367
8/23/2019 20:25	6.355	0.777	232.252
8/23/2019 20:30	6.096	0.787	221.807
8/23/2019 20:35	6.155	0.758	216.615
8/23/2019 20:40	6.199	0.805	232.477

8/23/2019 20:45	6.511	0.881	272.51
8/23/2019 20:50	6.158	0.82	234.554
8/23/2019 20:55	6.323	0.852	252.926
8/23/2019 21:00	6.074	0.75	210.328
8/23/2019 21:05	6.351	0.854	254.928
8/23/2019 21:10	6.168	0.802	229.861
8/23/2019 21:15	6.136	0.807	229.542
8/23/2019 21:20	5.919	0.759	205.162
8/23/2019 21:25	6.229	0.834	242.279
8/23/2019 21:30	6.004	0.748	206.316
8/23/2019 21:35	6.366	0.813	243.482
8/23/2019 21:40	6.041	0.77	214.417
8/23/2019 21:45	6.431	0.81	246.204
8/23/2019 21:50	6.008	0.736	203.226
8/23/2019 21:55	6.42	0.799	242.314
8/23/2019 22:00	5.946	0.717	195.251
8/23/2019 22:05	6.293	0.811	239.139
8/23/2019 22:10	5.911	0.673	181.696
8/23/2019 22:15	6.253	0.823	240.458
8/23/2019 22:20	5.804	0.656	172.672
8/23/2019 22:25	6.26	0.798	233.487
8/23/2019 22:30	5.879	0.643	172.189
8/23/2019 22:35	6.309	0.781	231.119
8/23/2019 22:40	5.879	0.72	192.766
8/23/2019 22:45	6.391	0.797	240.102
8/23/2019 22:50	5.899	0.712	191.481
8/23/2019 22:55	6.306	0.761	225.027
8/23/2019 23:00	5.961	0.699	190.948
8/23/2019 23:05	6.206	0.784	226.581
8/23/2019 23:10	5.909	0.731	197.338
8/23/2019 23:15	6.221	0.733	212.486
8/23/2019 23:20	5.942	0.658	178.948
8/23/2019 23:25	6.02	0.734	203.189
8/23/2019 23:30	6.01	0.788	217.832
8/23/2019 23:35	5.755	0.688	178.726
8/23/2019 23:40	5.971	0.665	182.031
8/23/2019 23:45	5.641	0.65	164.224
8/23/2019 23:50	6.106	0.779	220.065
8/23/2019 23:55	5.789	0.657	172.073
8/24/2019 0:00	6.003	0.749	206.554
8/24/2019 0:05	5.925	0.731	197.957
8/24/2019 0:10	5.721	0.66	170.205
8/24/2019 0:15	6.058	0.753	210.339
8/24/2019 0:20	5.974	0.707	193.829
8/24/2019 0:25	5.622	0.613	154.231
8/24/2019 0:30	6.022	0.779	215.927
8/24/2019 0:35	5.787	0.716	187.591
8/24/2019 0:40	5.601	0.628	157.175
8/24/2019 0:45	6.016	0.698	193.28
8/24/2019 0:50	5.673	0.581	148.006
8/24/2019 0:55	5.729	0.625	161.515
8/24/2019 1:00	5.839	0.699	185.44
8/24/2019 1:05	5.599	0.629	157.26
8/24/2019 1:10	6.047	0.812	226.316
8/24/2019 1:15	5.585	0.568	141.558
8/24/2019 1:20	5.487	0.588	142.759
8/24/2019 1:25	5.811	0.709	186.907
8/24/2019 1:30	5.541	0.609	150.064
8/24/2019 1:35	5.984	0.721	197.862

8/24/2019 1:40	5.604	0.625	156.548
8/24/2019 1:45	5.751	0.674	174.986
8/24/2019 1:50	5.727	0.633	163.483
8/24/2019 1:55	5.504	0.607	148.159
8/24/2019 2:00	5.982	0.755	207.109
8/24/2019 2:05	5.596	0.643	160.514
8/24/2019 2:10	5.428	0.669	159.955
8/24/2019 2:15	5.809	0.717	188.759
8/24/2019 2:20	5.482	0.614	148.905
8/24/2019 2:25	5.378	0.632	149.23
8/24/2019 2:30	5.905	0.702	189.149
8/24/2019 2:35	5.529	0.602	147.891
8/24/2019 2:40	5.427	0.659	157.619
8/24/2019 2:45	5.909	0.768	207.064
8/24/2019 2:50	5.52	0.63	154.292
8/24/2019 2:55	5.939	0.751	203.983
8/24/2019 3:00	5.656	0.673	170.566
8/24/2019 3:05	5.931	0.722	195.692
8/24/2019 3:10	5.62	0.602	151.284
8/24/2019 3:15	5.343	0.582	136.167
8/24/2019 3:20	5.828	0.716	189.318
8/24/2019 3:25	5.465	0.589	142.212
8/24/2019 3:30	5.33	0.601	140.105
8/24/2019 3:35	5.772	0.693	180.78
8/24/2019 3:40	5.494	0.602	146.603
8/24/2019 3:45	5.629	0.664	167.293
8/24/2019 3:50	5.661	0.638	162.042
8/24/2019 3:55	5.433	0.604	144.809
8/24/2019 4:00	5.77	0.737	192.35
8/24/2019 4:05	5.648	0.626	158.318
8/24/2019 4:10	5.441	0.6	144.137
8/24/2019 4:15	5.962	0.751	205.136
8/24/2019 4:20	5.668	0.676	172.022
8/24/2019 4:25	5.441	0.657	157.678
8/24/2019 4:30	5.949	0.773	210.637
8/24/2019 4:35	5.578	0.668	166.184
8/24/2019 4:40	5.437	0.625	149.953
8/24/2019 4:45	5.914	0.81	218.817
8/24/2019 4:50	5.562	0.621	153.7
8/24/2019 4:55	5.423	0.612	146.192
8/24/2019 5:00	5.882	0.746	200.011
8/24/2019 5:05	5.539	0.612	150.634
8/24/2019 5:10	5.42	0.621	148.348
8/24/2019 5:15	5.877	0.747	200.01
8/24/2019 5:20	5.552	0.62	153.25
8/24/2019 5:25	5.424	0.594	142.064
8/24/2019 5:30	5.924	0.703	190.348
8/24/2019 5:35	5.57	0.654	162.365
8/24/2019 5:40	5.491	0.626	152.162
8/24/2019 5:45	5.99	0.713	196.151
8/24/2019 5:50	5.694	0.664	169.975
8/24/2019 5:55	5.516	0.621	151.916
8/24/2019 6:00	6.058	0.746	208.598
8/24/2019 6:05	5.657	0.662	167.807
8/24/2019 6:10	5.486	0.618	150.076
8/24/2019 6:15	5.877	0.665	177.993
8/24/2019 6:20	5.561	0.631	156.206
8/24/2019 6:25	5.543	0.624	153.697
8/24/2019 6:30	5.863	0.649	173.221

8/24/2019 6:35	5.621	0.627	157.62
8/24/2019 6:40	6.081	0.786	220.801
8/24/2019 6:45	5.792	0.684	179.344
8/24/2019 6:50	5.711	0.645	165.831
8/24/2019 6:55	5.85	0.642	170.79
8/24/2019 7:00	5.603	0.668	167.229
8/24/2019 7:05	6.102	0.787	222.093
8/24/2019 7:10	5.704	0.676	173.594
8/24/2019 7:15	5.595	0.611	152.595
8/24/2019 7:20	5.996	0.723	199.021
8/24/2019 7:25	5.644	0.611	154.535
8/24/2019 7:30	6.032	0.74	205.487
8/24/2019 7:35	5.821	0.721	190.349
8/24/2019 7:40	5.591	0.649	161.852
8/24/2019 7:45	5.995	0.724	199.417
8/24/2019 7:50	5.672	0.628	159.785
8/24/2019 7:55	6.142	0.73	208.086
8/24/2019 8:00	5.798	0.681	178.839
8/24/2019 8:05	6.159	0.843	241.122
8/24/2019 8:10	5.909	0.69	186.241
8/24/2019 8:15	5.75	0.67	173.881
8/24/2019 8:20	6.016	0.696	192.504
8/24/2019 8:25	5.752	0.649	168.442
8/24/2019 8:30	6.208	0.8	231.278
8/24/2019 8:35	5.907	0.74	199.548
8/24/2019 8:40	6.05	0.774	215.919
8/24/2019 8:45	6.197	0.777	224.217
8/24/2019 8:50	6.03	0.747	207.361
8/24/2019 8:55	6.261	0.795	232.577
8/24/2019 9:00	5.816	0.69	182.034
8/24/2019 9:05	6.132	0.836	237.756
8/24/2019 9:10	5.794	0.661	173.565
8/24/2019 9:15	6.23	0.832	241.749
8/24/2019 9:20	5.792	0.68	178.355
8/24/2019 9:25	6.294	0.778	229.506
8/24/2019 9:30	6.005	0.741	204.534
8/24/2019 9:35	6.512	0.778	240.516
8/24/2019 9:40	6.007	0.736	203.166
8/24/2019 9:45	6.366	0.859	257.225
8/24/2019 9:50	6.113	0.77	217.933
8/24/2019 9:55	6.213	0.799	231.302
8/24/2019 10:00	6.295	0.762	224.632
8/24/2019 10:05	6.005	0.761	209.913
8/24/2019 10:10	6.292	0.827	243.672
8/24/2019 10:15	5.731	0.714	184.396
8/24/2019 10:20	6.193	0.791	227.838
8/24/2019 10:25	5.863	0.712	189.882
8/24/2019 10:30	6.192	0.776	223.506
8/24/2019 10:35	5.771	0.738	192.493
8/24/2019 10:40	6.058	0.78	217.972
8/24/2019 10:45	6.116	0.777	220.134
8/24/2019 10:50	5.897	0.678	182.507
8/24/2019 10:55	6.132	0.761	216.236
8/24/2019 11:00	5.996	0.774	213.254
8/24/2019 11:05	6.24	0.815	237.488
8/24/2019 11:10	5.775	0.692	180.827
8/24/2019 11:15	6.311	0.773	228.833
8/24/2019 11:20	6.09	0.747	210.217
8/24/2019 11:25	6.395	0.86	259.275

8/24/2019 11:30	6.029	0.747	207.315
8/24/2019 11:35	6.349	0.784	233.881
8/24/2019 11:40	5.856	0.717	191.055
8/24/2019 11:45	6.116	0.789	223.529
8/24/2019 11:50	6.369	0.811	243.131
8/24/2019 11:55	5.936	0.77	208.96
8/24/2019 12:00	6.293	0.815	240.186
8/24/2019 12:05	5.951	0.783	213.382
8/24/2019 12:10	6.387	0.876	263.599
8/24/2019 12:15	5.923	0.692	187.21
8/24/2019 12:20	6.07	0.708	198.455
8/24/2019 12:25	6.079	0.798	224.176
8/24/2019 12:30	6.002	0.707	195.03
8/24/2019 12:35	6.131	0.738	209.667
8/24/2019 12:40	6	0.719	198.187
8/24/2019 12:45	5.865	0.776	207.127
8/24/2019 12:50	6.034	0.741	205.895
8/24/2019 12:55	5.779	0.729	190.478
8/24/2019 13:00	6.242	0.749	218.331
8/24/2019 13:05	5.867	0.71	189.698
8/24/2019 13:10	6.093	0.717	201.867
8/24/2019 13:15	5.621	0.625	157.172
8/24/2019 13:20	6.055	0.757	211.503
8/24/2019 13:25	5.673	0.605	153.993
8/24/2019 13:30	6.194	0.804	231.842
8/24/2019 13:35	5.757	0.627	162.973
8/24/2019 13:40	5.944	0.747	203.133
8/24/2019 13:45	5.748	0.653	169.453
8/24/2019 13:50	6.037	0.722	200.88
8/24/2019 13:55	5.678	0.656	167.329
8/24/2019 14:00	6.016	0.725	200.735
8/24/2019 14:05	5.653	0.686	173.954
8/24/2019 14:10	5.979	0.709	194.6
8/24/2019 14:15	5.657	0.615	156.064
8/24/2019 14:20	6.071	0.756	212.01
8/24/2019 14:25	5.68	0.657	167.532
8/24/2019 14:30	5.974	0.712	195.213
8/24/2019 14:35	5.565	0.566	140.295
8/24/2019 14:40	6.02	0.729	201.831
8/24/2019 14:45	5.649	0.576	145.686
8/24/2019 14:50	5.756	0.689	179.109
8/24/2019 14:55	5.883	0.707	189.523
8/24/2019 15:00	5.654	0.66	167.366
8/24/2019 15:05	6.09	0.717	201.781
8/24/2019 15:10	5.753	0.681	176.889
8/24/2019 15:15	6.209	0.786	227.288
8/24/2019 15:20	5.641	0.632	159.732
8/24/2019 15:25	6.132	0.766	217.797
8/24/2019 15:30	5.702	0.63	161.662
8/24/2019 15:35	6.102	0.716	202.072
8/24/2019 15:40	5.631	0.652	164.406
8/24/2019 15:45	5.99	0.739	203.196
8/24/2019 15:50	5.778	0.647	169.101
8/24/2019 15:55	5.818	0.722	190.449
8/24/2019 16:00	5.845	0.624	165.887
8/24/2019 16:05	5.618	0.648	162.687
8/24/2019 16:10	6.085	0.743	208.869
8/24/2019 16:15	5.607	0.675	169.055
8/24/2019 16:20	5.966	0.714	195.36

8/24/2019 16:25	5.88	0.71	190.337
8/24/2019 16:30	6.338	0.843	251.165
8/24/2019 16:35	5.934	0.686	186.279
8/24/2019 16:40	6.187	0.75	215.773
8/24/2019 16:45	5.783	0.629	164.545
8/24/2019 16:50	5.947	0.705	192.042
8/24/2019 16:55	5.899	0.663	178.559
8/24/2019 17:00	5.717	0.63	162.079
8/24/2019 17:05	6.032	0.684	189.833
8/24/2019 17:10	5.692	0.629	161.026
8/24/2019 17:15	6.068	0.698	195.526
8/24/2019 17:20	5.664	0.64	162.745
8/24/2019 17:25	6.143	0.762	217.111
8/24/2019 17:30	5.67	0.642	163.408
8/24/2019 17:35	5.926	0.641	173.662
8/24/2019 17:40	5.813	0.626	165.107
8/24/2019 17:45	6.005	0.748	206.542
8/24/2019 17:50	5.776	0.625	163.173
8/24/2019 17:55	5.815	0.614	161.853
8/24/2019 18:00	5.809	0.639	168.367
8/24/2019 18:05	5.585	0.616	153.38
8/24/2019 18:10	5.823	0.721	190.577
8/24/2019 18:15	5.572	0.589	146.325
8/24/2019 18:20	5.967	0.73	199.534
8/24/2019 18:25	5.625	0.59	148.41
8/24/2019 18:30	6.14	0.752	214.017
8/24/2019 18:35	5.777	0.604	157.875
8/24/2019 18:40	5.966	0.699	191.215
8/24/2019 18:45	5.937	0.662	179.721
8/24/2019 18:50	5.672	0.589	150.019
8/24/2019 18:55	6.028	0.651	180.531
8/24/2019 19:00	5.66	0.591	150.024
8/24/2019 19:05	6.065	0.728	203.658
8/24/2019 19:10	5.735	0.662	171.116
8/24/2019 19:15	6.149	0.718	204.809
8/24/2019 19:20	5.728	0.591	152.446
8/24/2019 19:25	6.145	0.753	214.562
8/24/2019 19:30	5.817	0.646	170.399
8/24/2019 19:35	5.894	0.653	175.525
8/24/2019 19:40	5.92	0.656	177.521
8/24/2019 19:45	5.733	0.65	167.914
8/24/2019 19:50	6.123	0.733	207.779
8/24/2019 19:55	5.769	0.651	169.897
8/24/2019 20:00	6.185	0.782	225.056
8/24/2019 20:05	5.724	0.606	156.304
8/24/2019 20:10	6.136	0.736	209.507
8/24/2019 20:15	5.746	0.648	168.072
8/24/2019 20:20	6.224	0.788	228.67
8/24/2019 20:25	5.955	0.703	191.814
8/24/2019 20:30	6.268	0.81	237.376
8/24/2019 20:35	5.987	0.729	200.385
8/24/2019 20:40	5.842	0.629	167.047
8/24/2019 20:45	6.06	0.699	195.409
8/24/2019 20:50	5.761	0.644	167.573
8/24/2019 20:55	6.014	0.663	183.292
8/24/2019 21:00	5.623	0.664	166.873
8/24/2019 21:05	6.036	0.763	211.991
8/24/2019 21:10	5.55	0.652	161.071
8/24/2019 21:15	6.044	0.694	193.342

8/24/2019 21:20	5.687	0.648	165.52
8/24/2019 21:25	5.734	0.624	161.27
8/24/2019 21:30	5.786	0.661	173.205
8/24/2019 21:35	5.581	0.63	156.757
8/24/2019 21:40	6.025	0.701	194.311
8/24/2019 21:45	5.61	0.632	158.456
8/24/2019 21:50	5.997	0.709	195.402
8/24/2019 21:55	5.567	0.661	163.822
8/24/2019 22:00	5.791	0.667	174.969
8/24/2019 22:05	5.79	0.633	165.873
8/24/2019 22:10	5.552	0.645	159.338
8/24/2019 22:15	5.906	0.685	184.784
8/24/2019 22:20	5.545	0.615	151.513
8/24/2019 22:25	6.058	0.717	200.35
8/24/2019 22:30	5.732	0.635	164.127
8/24/2019 22:35	5.792	0.649	170.232
8/24/2019 22:40	5.84	0.637	169.134
8/24/2019 22:45	5.605	0.656	164.195
8/24/2019 22:50	6.015	0.708	195.918
8/24/2019 22:55	5.551	0.538	132.895
8/24/2019 23:00	5.738	0.669	173.155
8/24/2019 23:05	5.838	0.625	165.871
8/24/2019 23:10	5.585	0.674	167.908
8/24/2019 23:15	5.956	0.754	205.707
8/24/2019 23:20	5.603	0.619	154.809
8/24/2019 23:25	5.943	0.69	187.784
8/24/2019 23:30	5.698	0.591	151.339
8/24/2019 23:35	5.497	0.623	151.746
8/24/2019 23:40	5.993	0.678	186.572
8/24/2019 23:45	5.648	0.671	169.875
8/24/2019 23:50	5.525	0.684	167.742
8/24/2019 23:55	5.896	0.688	185.1
8/25/2019 0:00	5.504	0.589	143.792
8/25/2019 0:05	5.299	0.628	145.25
8/25/2019 0:10	5.758	0.681	176.987
8/25/2019 0:15	5.588	0.597	148.902
8/25/2019 0:20	5.335	0.589	137.37
8/25/2019 0:25	5.767	0.64	166.941
8/25/2019 0:30	5.482	0.677	164.192
8/25/2019 0:35	5.363	0.627	147.49
8/25/2019 0:40	5.824	0.724	191.394
8/25/2019 0:45	5.439	0.674	161.782
8/25/2019 0:50	5.528	0.605	148.576
8/25/2019 0:55	5.609	0.583	146.226
8/25/2019 1:00	5.357	0.62	145.525
8/25/2019 1:05	5.816	0.641	169.019
8/25/2019 1:10	5.5	0.659	160.588
8/25/2019 1:15	5.388	0.626	148.198
8/25/2019 1:20	5.783	0.697	182.423
8/25/2019 1:25	5.427	0.621	148.586
8/25/2019 1:30	5.457	0.628	151.429
8/25/2019 1:35	5.537	0.577	141.933
8/25/2019 1:40	5.214	0.594	134.211
8/25/2019 1:45	5.627	0.655	164.825
8/25/2019 1:50	5.259	0.558	127.57
8/25/2019 1:55	5.102	0.583	127.709
8/25/2019 2:00	5.601	0.617	154.342
8/25/2019 2:05	5.231	0.556	126.156
8/25/2019 2:10	5.111	0.527	115.694

8/25/2019 2:15	5.557	0.656	162.272
8/25/2019 2:20	5.324	0.62	144.224
8/25/2019 2:25	5.133	0.534	118.021
8/25/2019 2:30	5.043	0.594	128.039
8/25/2019 2:35	5.496	0.606	147.645
8/25/2019 2:40	5.198	0.584	131.443
8/25/2019 2:45	5.087	0.55	120.051
8/25/2019 2:50	5.475	0.618	149.6
8/25/2019 2:55	5.157	0.591	131.41
8/25/2019 3:00	5.067	0.601	130.476
8/25/2019 3:05	5.583	0.653	162.639
8/25/2019 3:10	5.262	0.59	134.997
8/25/2019 3:15	5.083	0.542	118.169
8/25/2019 3:20	5.099	0.621	135.863
8/25/2019 3:25	5.55	0.613	151.343
8/25/2019 3:30	5.226	0.598	135.526
8/25/2019 3:35	5.068	0.576	125.039
8/25/2019 3:40	5.587	0.629	156.705
8/25/2019 3:45	5.243	0.59	134.25
8/25/2019 3:50	5.08	0.564	122.738
8/25/2019 3:55	5.358	0.618	145.182
8/25/2019 4:00	5.351	0.634	148.645
8/25/2019 4:05	5.146	0.598	132.601
8/25/2019 4:10	5.08	0.543	118.291
8/25/2019 4:15	5.586	0.614	152.88
8/25/2019 4:20	5.222	0.624	141.326
8/25/2019 4:25	5.121	0.581	127.965
8/25/2019 4:30	5.27	0.593	135.947
8/25/2019 4:35	5.363	0.594	139.707
8/25/2019 4:40	5.137	0.601	132.891
8/25/2019 4:45	5.077	0.566	123.137
8/25/2019 4:50	5.521	0.659	161.605
8/25/2019 4:55	5.253	0.582	133
8/25/2019 5:00	5.086	0.584	127.248
8/25/2019 5:05	5.047	0.557	120.111
8/25/2019 5:10	5.487	0.635	154.339
8/25/2019 5:15	5.16	0.58	129.093
8/25/2019 5:20	5.043	0.564	121.579
8/25/2019 5:25	5.018	0.581	124.255
8/25/2019 5:30	5.437	0.673	161.447
8/25/2019 5:35	5.265	0.58	132.776
8/25/2019 5:40	5.211	0.575	129.707
8/25/2019 5:45	5.411	0.615	146.446
8/25/2019 5:50	5.435	0.617	147.859
8/25/2019 5:55	5.233	0.601	136.435
8/25/2019 6:00	5.175	0.613	136.959
8/25/2019 6:05	5.684	0.616	157.346
8/25/2019 6:10	5.352	0.607	142.421
8/25/2019 6:15	5.223	0.629	142.586
8/25/2019 6:20	5.666	0.631	160.345
8/25/2019 6:25	5.301	0.613	141.706
8/25/2019 6:30	5.143	0.595	131.878
8/25/2019 6:35	5.127	0.588	129.717
8/25/2019 6:40	5.632	0.668	168.512
8/25/2019 6:45	5.301	0.594	137.442
8/25/2019 6:50	5.177	0.578	129.352
8/25/2019 6:55	5.746	0.68	176.438
8/25/2019 7:00	5.388	0.633	149.883
8/25/2019 7:05	5.252	0.583	133.011

8/25/2019 7:10	5.786	0.733	192.052
8/25/2019 7:15	5.483	0.616	149.572
8/25/2019 7:20	5.299	0.613	141.666
8/25/2019 7:25	5.762	0.661	172.14
8/25/2019 7:30	5.401	0.639	151.744
8/25/2019 7:35	5.793	0.691	181.314
8/25/2019 7:40	5.589	0.619	154.25
8/25/2019 7:45	5.327	0.611	142.342
8/25/2019 7:50	5.782	0.648	169.442
8/25/2019 7:55	5.433	0.617	147.78
8/25/2019 8:00	5.851	0.645	171.718
8/25/2019 8:05	5.499	0.577	140.517
8/25/2019 8:10	5.592	0.657	163.996
8/25/2019 8:15	5.714	0.672	172.978
8/25/2019 8:20	5.43	0.684	163.597
8/25/2019 8:25	5.883	0.722	193.478
8/25/2019 8:30	5.529	0.622	152.804
8/25/2019 8:35	6.008	0.686	189.573
8/25/2019 8:40	5.691	0.734	187.789
8/25/2019 8:45	5.845	0.747	198.309
8/25/2019 8:50	5.838	0.721	191.174
8/25/2019 8:55	5.707	0.627	161.176
8/25/2019 9:00	5.924	0.673	182.131
8/25/2019 9:05	5.836	0.707	187.46
8/25/2019 9:10	6.19	0.772	222.274
8/25/2019 9:15	6.101	0.719	202.81
8/25/2019 9:20	6.032	0.703	195.299
8/25/2019 9:25	5.977	0.721	197.549
8/25/2019 9:30	6.114	0.777	219.977
8/25/2019 9:35	5.908	0.778	209.723
8/25/2019 9:40	6.148	0.719	205.257
8/25/2019 9:45	5.853	0.666	177.198
8/25/2019 9:50	6.015	0.699	193.261
8/25/2019 9:55	5.707	0.654	167.844
8/25/2019 10:00	6.023	0.699	193.69
8/25/2019 10:05	5.689	0.61	155.95
8/25/2019 10:10	6.047	0.709	197.71
8/25/2019 10:15	5.596	0.613	153.125
8/25/2019 10:20	5.969	0.685	187.382
8/25/2019 10:25	5.632	0.591	148.947
8/25/2019 10:30	6.08	0.647	181.646
8/25/2019 10:35	5.752	0.632	164.19
8/25/2019 10:40	6.03	0.747	207.446
8/25/2019 10:45	5.766	0.668	174.031
8/25/2019 10:50	6.008	0.686	189.352
8/25/2019 10:55	6.043	0.739	205.67
8/25/2019 11:00	5.848	0.707	188.005
8/25/2019 11:05	6.112	0.726	205.397
8/25/2019 11:10	5.76	0.647	168.411
8/25/2019 11:15	6.073	0.698	195.838
8/25/2019 11:20	5.872	0.622	166.33
8/25/2019 11:25	5.652	0.71	179.865
8/25/2019 11:30	5.884	0.704	188.751
8/25/2019 11:35	5.694	0.617	157.88
8/25/2019 11:40	5.909	0.671	181.092
8/25/2019 11:45	5.905	0.676	182.171
8/25/2019 11:50	5.861	0.582	155.277
8/25/2019 11:55	6.13	0.752	213.608
8/25/2019 12:00	5.894	0.673	180.979

8/25/2019 12:05	6.318	0.788	233.491
8/25/2019 12:10	5.851	0.624	166.003
8/25/2019 12:15	6.279	0.752	220.913
8/25/2019 12:20	6.094	0.745	210.034
8/25/2019 12:25	6.092	0.678	190.901
8/25/2019 12:30	6.259	0.699	204.483
8/25/2019 12:35	5.931	0.743	201.412
8/25/2019 12:40	6.537	0.76	236.227
8/25/2019 12:45	6.082	0.69	193.846
8/25/2019 12:50	6.392	0.824	248.418
8/25/2019 12:55	6.104	0.749	211.667
8/25/2019 13:00	6.453	0.722	220.527
8/25/2019 13:05	6.043	0.706	196.547
8/25/2019 13:10	6.312	0.754	223.222
8/25/2019 13:15	6.042	0.716	199.384
8/25/2019 13:20	6.656	0.816	260.061
8/25/2019 13:25	6.14	0.687	195.641
8/25/2019 13:30	6.288	0.694	204.229
8/25/2019 13:35	5.921	0.726	196.37
8/25/2019 13:40	6.297	0.785	231.475
8/25/2019 13:45	5.95	0.678	184.682
8/25/2019 13:50	6.263	0.784	229.444
8/25/2019 13:55	6.228	0.725	210.652
8/25/2019 14:00	5.913	0.682	184.133
8/25/2019 14:05	6.168	0.704	201.751
8/25/2019 14:10	5.807	0.717	188.593
8/25/2019 14:15	6.267	0.775	226.988
8/25/2019 14:20	5.879	0.702	188.118
8/25/2019 14:25	5.939	0.648	176.167
8/25/2019 14:30	5.93	0.689	186.75
8/25/2019 14:35	5.663	0.661	168.018
8/25/2019 14:40	5.941	0.669	182.02
8/25/2019 14:45	5.787	0.62	162.35
8/25/2019 14:50	6.007	0.669	184.778
8/25/2019 14:55	5.638	0.667	168.377
8/25/2019 15:00	5.925	0.701	189.835
8/25/2019 15:05	5.598	0.589	147.227
8/25/2019 15:10	5.775	0.659	172.088
8/25/2019 15:15	5.427	0.606	144.905
8/25/2019 15:20	5.918	0.746	201.637
8/25/2019 15:25	5.533	0.646	158.844
8/25/2019 15:30	5.977	0.716	196.203
8/25/2019 15:35	5.647	0.701	177.312
8/25/2019 15:40	6.137	0.778	221.347
8/25/2019 15:45	5.625	0.642	161.424
8/25/2019 15:50	6.011	0.667	184.236
8/25/2019 15:55	5.642	0.628	158.768
8/25/2019 16:00	5.635	0.561	141.627
8/25/2019 16:05	5.698	0.599	153.59
8/25/2019 16:10	5.393	0.669	158.693
8/25/2019 16:15	5.814	0.622	163.926
8/25/2019 16:20	5.569	0.622	154.424
8/25/2019 16:25	5.365	0.612	144.023
8/25/2019 16:30	5.772	0.605	157.998
8/25/2019 16:35	5.467	0.623	150.524
8/25/2019 16:40	5.864	0.693	185.021
8/25/2019 16:45	5.642	0.626	158.162
8/25/2019 16:50	5.409	0.58	138.136
8/25/2019 16:55	5.731	0.637	164.643

8/25/2019 17:00	5.452	0.631	151.998
8/25/2019 17:05	5.732	0.686	177.228
8/25/2019 17:10	5.365	0.606	142.692
8/25/2019 17:15	5.826	0.677	179.069
8/25/2019 17:20	5.466	0.571	137.924
8/25/2019 17:25	5.614	0.696	174.639
8/25/2019 17:30	5.704	0.615	157.783
8/25/2019 17:35	5.473	0.599	145.051
8/25/2019 17:40	5.911	0.638	172.193
8/25/2019 17:45	5.578	0.637	158.307
8/25/2019 17:50	5.938	0.633	172.044
8/25/2019 17:55	5.707	0.665	170.823
8/25/2019 18:00	6.108	0.761	215.215
8/25/2019 18:05	5.688	0.615	157.33
8/25/2019 18:10	5.497	0.657	160.082
8/25/2019 18:15	5.989	0.633	174.013
8/25/2019 18:20	5.58	0.605	150.576
8/25/2019 18:25	6.041	0.657	182.92
8/25/2019 18:30	5.773	0.669	174.649
8/25/2019 18:35	6.226	0.782	226.969
8/25/2019 18:40	5.758	0.666	173.313
8/25/2019 18:45	5.879	0.665	178.129
8/25/2019 18:50	5.759	0.668	173.89
8/25/2019 18:55	5.371	0.564	132.951
8/25/2019 19:00	5.393	0.592	140.337
8/25/2019 19:05	5.649	0.616	155.922
8/25/2019 19:10	5.523	0.631	154.668
8/25/2019 19:15	5.913	0.65	175.465
8/25/2019 19:20	5.75	0.634	164.579
8/25/2019 19:25	5.964	0.658	179.949
8/25/2019 19:30	5.649	0.704	178.318
8/25/2019 19:35	6.06	0.669	187.03
8/25/2019 19:40	5.714	0.642	165.121
8/25/2019 19:45	5.974	0.672	184.017
8/25/2019 19:50	5.662	0.581	147.439
8/25/2019 19:55	6.168	0.707	202.715
8/25/2019 20:00	5.799	0.69	181.351
8/25/2019 20:05	6.08	0.709	199.02
8/25/2019 20:10	5.86	0.663	176.707
8/25/2019 20:15	6.185	0.686	197.279
8/25/2019 20:20	5.655	0.59	149.46
8/25/2019 20:25	5.988	0.654	179.684
8/25/2019 20:30	5.835	0.656	173.8
8/25/2019 20:35	5.921	0.725	196.232
8/25/2019 20:40	5.846	0.638	169.492
8/25/2019 20:45	5.701	0.624	160.062
8/25/2019 20:50	5.986	0.64	175.968
8/25/2019 20:55	5.683	0.606	154.594
8/25/2019 21:00	6.062	0.635	177.621
8/25/2019 21:05	5.67	0.64	162.994
8/25/2019 21:10	6.18	0.784	225.447
8/25/2019 21:15	5.776	0.658	171.854
8/25/2019 21:20	5.551	0.632	156.013
8/25/2019 21:25	5.881	0.675	180.889
8/25/2019 21:30	5.529	0.644	158.246
8/25/2019 21:35	5.828	0.636	168.419
8/25/2019 21:40	5.659	0.621	157.569
8/25/2019 21:45	5.469	0.576	139.194
8/25/2019 21:50	5.812	0.648	170.647

8/25/2019 21:55	5.4	0.532	126.41
8/25/2019 22:00	5.817	0.655	172.773
8/25/2019 22:05	5.516	0.563	137.725
8/25/2019 22:10	5.342	0.602	140.792
8/25/2019 22:15	5.751	0.582	151.169
8/25/2019 22:20	5.458	0.601	144.988
8/25/2019 22:25	5.986	0.646	177.355
8/25/2019 22:30	5.629	0.652	164.225
8/25/2019 22:35	5.436	0.61	146.288
8/25/2019 22:40	5.801	0.593	155.833
8/25/2019 22:45	5.394	0.559	132.6
8/25/2019 22:50	5.538	0.603	148.502
8/25/2019 22:55	5.588	0.63	157.11
8/25/2019 23:00	5.372	0.572	134.873
8/25/2019 23:05	5.738	0.602	155.889
8/25/2019 23:10	5.56	0.599	148.173
8/25/2019 23:15	5.32	0.578	134.417
8/25/2019 23:20	5.739	0.574	148.722
8/25/2019 23:25	5.406	0.546	129.769
8/25/2019 23:30	5.295	0.566	130.593
8/25/2019 23:35	5.578	0.571	142.013
8/25/2019 23:40	5.247	0.575	131.167
8/25/2019 23:45	5.605	0.613	153.441
8/25/2019 23:50	5.466	0.597	144.141
8/25/2019 23:55	5.21	0.572	129.009
8/26/2019 0:00	5.479	0.583	141.43
8/26/2019 0:05	5.43	0.595	142.355
8/26/2019 0:10	5.204	0.578	130.196
8/26/2019 0:15	5.592	0.611	152.468
8/26/2019 0:20	5.351	0.58	135.872
8/26/2019 0:25	5.117	0.529	116.294
8/26/2019 0:30	5.377	0.544	128.519
8/26/2019 0:35	5.422	0.58	138.475
8/26/2019 0:40	5.224	0.526	119.117
8/26/2019 0:45	5.147	0.512	113.524
8/26/2019 0:50	5.343	0.553	129.324
8/26/2019 0:55	5.426	0.541	129.277
8/26/2019 1:00	5.183	0.497	111.303
8/26/2019 1:05	5.132	0.499	110.284
8/26/2019 1:10	5.389	0.564	133.459
8/26/2019 1:15	5.444	0.623	149.6
8/26/2019 1:20	5.128	0.51	112.627
8/26/2019 1:25	4.974	0.469	99.08
8/26/2019 1:30	5.145	0.552	122.33
8/26/2019 1:35	5.316	0.573	133.053
8/26/2019 1:40	5.017	0.465	99.532
8/26/2019 1:45	4.972	0.486	102.533
8/26/2019 1:50	4.947	0.472	98.834
8/26/2019 1:55	5.306	0.557	128.89
8/26/2019 2:00	5.051	0.491	106.083
8/26/2019 2:05	5.028	0.468	100.506
8/26/2019 2:10	4.96	0.47	98.807
8/26/2019 2:15	5.362	0.548	128.86
8/26/2019 2:20	5.091	0.539	117.778
8/26/2019 2:25	4.992	0.475	100.824
8/26/2019 2:30	4.985	0.479	101.429
8/26/2019 2:35	5.428	0.573	137.162
8/26/2019 2:40	5.072	0.566	122.884
8/26/2019 2:45	4.955	0.49	103.035

8/26/2019 2:50	4.892	0.446	92.097
8/26/2019 2:55	5.38	0.54	127.551
8/26/2019 3:00	5.055	0.53	114.49
8/26/2019 3:05	4.995	0.468	99.469
8/26/2019 3:10	4.934	0.491	102.599
8/26/2019 3:15	5.402	0.563	133.758
8/26/2019 3:20	5.079	0.504	109.707
8/26/2019 3:25	4.928	0.483	100.653
8/26/2019 3:30	4.897	0.464	95.956
8/26/2019 3:35	5.416	0.566	134.894
8/26/2019 3:40	5.106	0.528	115.673
8/26/2019 3:45	4.912	0.45	93.452
8/26/2019 3:50	4.87	0.481	98.507
8/26/2019 3:55	5.363	0.567	133.292
8/26/2019 4:00	5.074	0.546	118.721
8/26/2019 4:05	4.937	0.495	103.369
8/26/2019 4:10	4.89	0.456	93.924
8/26/2019 4:15	5.351	0.56	131.232
8/26/2019 4:20	5.161	0.554	123.424
8/26/2019 4:25	4.983	0.497	105.32
8/26/2019 4:30	4.931	0.482	100.547
8/26/2019 4:35	5.293	0.53	122.344
8/26/2019 4:40	5.001	0.535	113.952
8/26/2019 4:45	4.91	0.514	106.476
8/26/2019 4:50	4.912	0.476	98.716
8/26/2019 4:55	5.3	0.559	129.145
8/26/2019 5:00	5.029	0.503	107.861
8/26/2019 5:05	4.943	0.477	99.782
8/26/2019 5:10	5.5	0.608	148.266
8/26/2019 5:15	5.192	0.557	125.126
8/26/2019 5:20	4.998	0.527	112.041
8/26/2019 5:25	4.946	0.527	110.364
8/26/2019 5:30	5.435	0.571	136.816
8/26/2019 5:35	5.192	0.54	121.287
8/26/2019 5:40	5.007	0.478	101.86
8/26/2019 5:45	4.989	0.492	104.291
8/26/2019 5:50	5.504	0.591	144.31
8/26/2019 5:55	5.213	0.555	125.467
8/26/2019 6:00	5.061	0.541	117.132
8/26/2019 6:05	5.361	0.538	126.344
8/26/2019 6:10	5.374	0.546	128.903
8/26/2019 6:15	5.135	0.572	126.486
8/26/2019 6:20	5.171	0.529	118.142
8/26/2019 6:25	5.462	0.544	131.389
8/26/2019 6:30	5.261	0.567	129.753
8/26/2019 6:35	5.724	0.632	162.977
8/26/2019 6:40	5.531	0.604	148.519
8/26/2019 6:45	5.41	0.6	142.78
8/26/2019 6:50	5.809	0.645	169.893
8/26/2019 6:55	5.34	0.565	132.167
8/26/2019 7:00	5.682	0.616	157.279
8/26/2019 7:05	5.399	0.559	132.694
8/26/2019 7:10	5.59	0.593	147.927
8/26/2019 7:15	5.571	0.646	160.247
8/26/2019 7:20	5.385	0.562	133.023
8/26/2019 7:25	5.6	0.564	141.016
8/26/2019 7:30	5.422	0.587	140.288
8/26/2019 7:35	6.005	0.699	192.945
8/26/2019 7:40	5.629	0.646	162.787

8/26/2019 7:45	5.85	0.62	164.831
8/26/2019 7:50	5.467	0.582	140.594
8/26/2019 7:55	5.68	0.592	151.118
8/26/2019 8:00	5.515	0.553	135.364
8/26/2019 8:05	5.756	0.656	170.655
8/26/2019 8:10	5.555	0.586	144.777
8/26/2019 8:15	5.85	0.64	170.293
8/26/2019 8:20	5.567	0.624	154.793
8/26/2019 8:25	5.395	0.58	137.597
8/26/2019 8:30	5.635	0.588	148.43
8/26/2019 8:35	5.334	0.531	124.008
8/26/2019 8:40	5.686	0.592	151.22
8/26/2019 8:45	5.306	0.543	125.87
8/26/2019 8:50	5.177	0.586	130.966
8/26/2019 8:55	5.689	0.561	143.537
8/26/2019 9:00	5.384	0.584	138.033
8/26/2019 9:05	5.561	0.578	143.21
8/26/2019 9:10	5.637	0.648	163.558
8/26/2019 9:15	5.352	0.593	139.08
8/26/2019 9:20	5.897	0.64	172.157
8/26/2019 9:25	5.57	0.617	153.106
8/26/2019 9:30	5.463	0.582	140.548
8/26/2019 9:35	5.979	0.68	186.485
8/26/2019 9:40	5.51	0.559	136.689
8/26/2019 9:45	5.17	0.519	115.84
8/26/2019 9:50	5.651	0.561	142.141
8/26/2019 9:55	5.401	0.555	131.839
8/26/2019 10:00	5.831	0.594	157.408
8/26/2019 10:05	5.527	0.579	142.025
8/26/2019 10:10	5.614	0.575	144.194
8/26/2019 10:15	5.737	0.583	150.914
8/26/2019 10:20	5.506	0.606	147.937
8/26/2019 10:25	6.005	0.649	179.115
8/26/2019 10:30	5.766	0.655	170.649
8/26/2019 10:35	5.522	0.625	153.227
8/26/2019 10:40	5.896	0.629	169.114
8/26/2019 10:45	5.562	0.628	155.483
8/26/2019 10:50	6.084	0.605	170.021
8/26/2019 10:55	5.707	0.695	178.618
8/26/2019 11:00	5.746	0.618	160.311
8/26/2019 11:05	5.962	0.603	164.669
8/26/2019 11:10	5.574	0.646	160.447
8/26/2019 11:15	5.612	0.565	141.749
8/26/2019 11:20	5.92	0.692	187.131
8/26/2019 11:25	5.625	0.608	153.074
8/26/2019 11:30	5.949	0.661	179.928
8/26/2019 11:35	5.528	0.594	145.915
8/26/2019 11:40	5.893	0.59	158.623
8/26/2019 11:45	5.647	0.602	152.382
8/26/2019 11:50	5.349	0.562	131.7
8/26/2019 11:55	5.799	0.677	177.873
8/26/2019 12:00	5.481	0.597	144.744
8/26/2019 12:05	5.224	0.524	118.699
8/26/2019 12:10	5.789	0.632	165.644
8/26/2019 12:15	5.516	0.613	150.048
8/26/2019 12:20	5.327	0.612	142.646
8/26/2019 12:25	5.768	0.589	153.532
8/26/2019 12:30	5.465	0.566	136.75
8/26/2019 12:35	5.288	0.548	126.398

8/26/2019 12:40	5.787	0.644	168.713
8/26/2019 12:45	5.482	0.563	136.47
8/26/2019 12:50	5.249	0.513	116.928
8/26/2019 12:55	5.837	0.593	157.363
8/26/2019 13:00	5.539	0.634	156.103
8/26/2019 13:05	5.702	0.605	155.174
8/26/2019 13:10	5.691	0.646	165.307
8/26/2019 13:15	5.432	0.577	138.212
8/26/2019 13:20	5.861	0.635	169.287
8/26/2019 13:25	5.594	0.606	151.283
8/26/2019 13:30	5.465	0.598	144.351
8/26/2019 13:35	5.847	0.627	166.634
8/26/2019 13:40	5.471	0.567	137.091
8/26/2019 13:45	5.455	0.613	147.675
8/26/2019 13:50	5.752	0.626	162.471
8/26/2019 13:55	5.39	0.561	132.934
8/26/2019 14:00	5.259	0.515	117.703
8/26/2019 14:05	5.789	0.633	165.907
8/26/2019 14:10	5.463	0.574	138.606
8/26/2019 14:15	5.454	0.545	131.339
8/26/2019 14:20	5.601	0.557	139.382
8/26/2019 14:25	5.357	0.564	132.527
8/26/2019 14:30	5.551	0.568	140.236
8/26/2019 14:35	5.552	0.597	147.392
8/26/2019 14:40	5.384	0.539	127.512
8/26/2019 14:45	5.384	0.58	137.135
8/26/2019 14:50	5.642	0.62	156.732
8/26/2019 14:55	5.536	0.624	153.489
8/26/2019 15:00	5.469	0.516	124.742
8/26/2019 15:05	5.916	0.647	174.752
8/26/2019 15:10	5.517	0.546	133.712
8/26/2019 15:15	5.299	0.521	120.54
8/26/2019 15:20	5.74	0.564	146.063
8/26/2019 15:25	5.464	0.595	143.688
8/26/2019 15:30	5.287	0.531	122.379
8/26/2019 15:35	5.707	0.516	132.626
8/26/2019 15:40	5.359	0.568	133.475
8/26/2019 15:45	5.341	0.522	121.954
8/26/2019 15:50	5.706	0.579	148.694
8/26/2019 15:55	5.335	0.539	125.866
8/26/2019 16:00	5.231	0.532	120.841
8/26/2019 16:05	5.768	0.646	168.519
8/26/2019 16:10	5.403	0.551	130.825
8/26/2019 16:15	5.299	0.52	120.222
8/26/2019 16:20	5.815	0.592	156.234
8/26/2019 16:25	5.568	0.569	141.034
8/26/2019 16:30	5.428	0.549	131.445
8/26/2019 16:35	5.902	0.59	158.908
8/26/2019 16:40	5.559	0.638	157.799
8/26/2019 16:45	6.012	0.703	194.311
8/26/2019 16:50	5.722	0.547	141.001
8/26/2019 16:55	5.515	0.598	146.203
8/26/2019 17:00	5.752	0.655	170.052
8/26/2019 17:05	5.54	0.586	144.374
8/26/2019 17:10	5.784	0.575	150.548
8/26/2019 17:15	5.406	0.609	144.966
8/26/2019 17:20	5.893	0.63	169.279
8/26/2019 17:25	5.611	0.623	156.211
8/26/2019 17:30	5.954	0.672	183.139

8/26/2019 17:35	5.639	0.622	157.042
8/26/2019 17:40	5.855	0.582	154.951
8/26/2019 17:45	5.806	0.64	168.532
8/26/2019 17:50	5.554	0.64	158.069
8/26/2019 17:55	5.83	0.609	161.254
8/26/2019 18:00	5.503	0.602	146.788
8/26/2019 18:05	5.829	0.577	152.722
8/26/2019 18:10	5.44	0.572	137.301
8/26/2019 18:15	5.488	0.595	144.578
8/26/2019 18:20	5.62	0.584	146.775
8/26/2019 18:25	5.311	0.5	115.966
8/26/2019 18:30	5.514	0.574	140.509
8/26/2019 18:35	5.655	0.62	157.303
8/26/2019 18:40	5.334	0.543	126.745
8/26/2019 18:45	5.733	0.585	151.205
8/26/2019 18:50	5.499	0.567	138.168
8/26/2019 18:55	5.995	0.64	176.177
8/26/2019 19:00	5.685	0.593	151.412
8/26/2019 19:05	5.485	0.565	137.235
8/26/2019 19:10	5.891	0.67	179.993
8/26/2019 19:15	5.594	0.596	148.879
8/26/2019 19:20	5.733	0.617	159.52
8/26/2019 19:25	5.83	0.616	162.925
8/26/2019 19:30	5.548	0.593	146.224
8/26/2019 19:35	5.89	0.594	159.665
8/26/2019 19:40	5.459	0.553	133.282
8/26/2019 19:45	5.894	0.63	169.442
8/26/2019 19:50	5.661	0.612	155.336
8/26/2019 19:55	5.491	0.58	140.959
8/26/2019 20:00	5.952	0.651	177.528
8/26/2019 20:05	5.665	0.684	173.883
8/26/2019 20:10	6.107	0.704	198.859
8/26/2019 20:15	5.938	0.656	178.288
8/26/2019 20:20	5.649	0.572	144.721
8/26/2019 20:25	6.089	0.652	183.379
8/26/2019 20:30	5.628	0.647	162.927
8/26/2019 20:35	5.961	0.583	159.132
8/26/2019 20:40	5.557	0.579	143.26
8/26/2019 20:45	5.511	0.6	146.752
8/26/2019 20:50	5.808	0.64	168.529
8/26/2019 20:55	5.562	0.598	148.061
8/26/2019 21:00	5.992	0.643	176.83
8/26/2019 21:05	5.494	0.61	148.503
8/26/2019 21:10	5.928	0.652	176.777
8/26/2019 21:15	5.525	0.555	136.122
8/26/2019 21:20	5.726	0.637	164.291
8/26/2019 21:25	5.575	0.547	135.859
8/26/2019 21:30	5.652	0.593	150.148
8/26/2019 21:35	5.83	0.586	155.206
8/26/2019 21:40	5.539	0.539	132.618
8/26/2019 21:45	5.893	0.649	174.385
8/26/2019 21:50	5.609	0.613	153.52
8/26/2019 21:55	5.392	0.524	124.223
8/26/2019 22:00	5.885	0.706	189.429
8/26/2019 22:05	5.506	0.565	137.868
8/26/2019 22:10	5.397	0.551	130.809
8/26/2019 22:15	5.737	0.638	165.202
8/26/2019 22:20	5.395	0.579	137.356
8/26/2019 22:25	5.353	0.567	133.082

8/26/2019 22:30	5.706	0.595	152.799
8/26/2019 22:35	5.38	0.573	135.258
8/26/2019 22:40	5.752	0.612	158.948
8/26/2019 22:45	5.488	0.521	126.702
8/26/2019 22:50	5.407	0.579	137.692
8/26/2019 22:55	5.855	0.654	174.045
8/26/2019 23:00	5.467	0.542	130.976
8/26/2019 23:05	5.258	0.59	134.96
8/26/2019 23:10	5.74	0.595	154.072
8/26/2019 23:15	5.515	0.54	132.197
8/26/2019 23:20	5.352	0.595	139.509
8/26/2019 23:25	5.378	0.56	132.261
8/26/2019 23:30	5.665	0.604	153.474
8/26/2019 23:35	5.436	0.574	137.551
8/26/2019 23:40	5.344	0.506	118.32
8/26/2019 23:45	5.717	0.572	147.273
8/26/2019 23:50	5.418	0.583	139.108
8/26/2019 23:55	5.292	0.534	123.133
8/27/2019 0:00	5.681	0.561	143.183
8/27/2019 0:05	5.279	0.563	129.431
8/27/2019 0:10	5.069	0.495	107.314
8/27/2019 0:15	5.409	0.55	130.925
8/27/2019 0:20	5.245	0.519	118.16
8/27/2019 0:25	5.101	0.51	111.563
8/27/2019 0:30	5.095	0.461	100.83
8/27/2019 0:35	5.495	0.552	134.32
8/27/2019 0:40	5.121	0.508	111.799
8/27/2019 0:45	4.961	0.446	93.809
8/27/2019 0:50	5.343	0.525	122.874
8/27/2019 0:55	5.187	0.471	105.741
8/27/2019 1:00	4.943	0.461	96.52
8/27/2019 1:05	4.881	0.455	93.621
8/27/2019 1:10	5.36	0.536	125.928
8/27/2019 1:15	5.04	0.494	106.403
8/27/2019 1:20	4.92	0.483	100.552
8/27/2019 1:25	4.881	0.443	91.203
8/27/2019 1:30	5.289	0.523	120.625
8/27/2019 1:35	5.167	0.516	115.125
8/27/2019 1:40	4.958	0.487	102.398
8/27/2019 1:45	4.87	0.473	96.904
8/27/2019 1:50	5.372	0.534	125.958
8/27/2019 1:55	5.039	0.488	104.995
8/27/2019 2:00	4.885	0.488	100.402
8/27/2019 2:05	4.842	0.474	96.366
8/27/2019 2:10	5.218	0.51	115.413
8/27/2019 2:15	5.074	0.457	99.383
8/27/2019 2:20	4.94	0.463	96.754
8/27/2019 2:25	4.88	0.48	98.609
8/27/2019 2:30	4.873	0.438	89.849
8/27/2019 2:35	5.364	0.549	129.234
8/27/2019 2:40	5.056	0.468	101.117
8/27/2019 2:45	4.962	0.47	98.951
8/27/2019 2:50	4.921	0.434	90.301
8/27/2019 2:55	5.302	0.571	132.154
8/27/2019 3:00	5.143	0.489	108.296
8/27/2019 3:05	4.943	0.449	94.032
8/27/2019 3:10	4.851	0.454	92.628
8/27/2019 3:15	5.305	0.516	119.427
8/27/2019 3:20	5.067	0.495	107.439

8/27/2019 3:25	4.899	0.429	88.723
8/27/2019 3:30	4.805	0.421	84.704
8/27/2019 3:35	5.016	0.5	106.957
8/27/2019 3:40	5.122	0.515	113.558
8/27/2019 3:45	4.88	0.444	91.23
8/27/2019 3:50	4.816	0.434	87.477
8/27/2019 3:55	5.25	0.503	114.872
8/27/2019 4:00	5.078	0.483	104.997
8/27/2019 4:05	4.89	0.451	92.934
8/27/2019 4:10	5.143	0.491	108.815
8/27/2019 4:15	5.101	0.5	109.484
8/27/2019 4:20	4.894	0.444	91.667
8/27/2019 4:25	4.844	0.425	86.389
8/27/2019 4:30	5.342	0.543	126.93
8/27/2019 4:35	5.05	0.489	105.443
8/27/2019 4:40	4.851	0.436	88.976
8/27/2019 4:45	4.803	0.436	87.537
8/27/2019 4:50	5.333	0.522	121.846
8/27/2019 4:55	4.947	0.438	91.911
8/27/2019 5:00	4.828	0.425	86.051
8/27/2019 5:05	5.255	0.534	122.067
8/27/2019 5:10	5.118	0.505	111.153
8/27/2019 5:15	4.915	0.466	96.828
8/27/2019 5:20	5.207	0.545	122.829
8/27/2019 5:25	5.236	0.567	128.88
8/27/2019 5:30	4.946	0.469	98.325
8/27/2019 5:35	4.911	0.446	92.526
8/27/2019 5:40	5.346	0.61	142.859
8/27/2019 5:45	4.972	0.488	103.002
8/27/2019 5:50	4.912	0.49	101.597
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8/27/2019 6:00	5.139	0.498	110.127
8/27/2019 6:05	5.121	0.574	126.421
8/27/2019 6:10	5.43	0.527	126.126
8/27/2019 6:15	5.065	0.451	97.722
8/27/2019 6:20	5.555	0.588	145.359
8/27/2019 6:25	5.17	0.513	114.626
8/27/2019 6:30	5.1	0.471	103.129
8/27/2019 6:35	5.37	0.505	119.008
8/27/2019 6:40	5.089	0.491	107.102
8/27/2019 6:45	5.558	0.528	130.559
8/27/2019 6:50	5.263	0.529	121.084
8/27/2019 6:55	5.503	0.572	139.519
8/27/2019 7:00	5.479	0.569	137.992
8/27/2019 7:05	5.716	0.623	160.258
8/27/2019 7:10	5.509	0.565	137.984
8/27/2019 7:15	5.743	0.558	144.703
8/27/2019 7:20	5.68	0.57	145.523
8/27/2019 7:25	5.807	0.607	159.716
8/27/2019 7:30	5.694	0.57	145.992
8/27/2019 7:35	5.413	0.56	133.471
8/27/2019 7:40	5.757	0.525	136.512
8/27/2019 7:45	5.529	0.58	142.39
8/27/2019 7:50	5.236	0.539	122.528
8/27/2019 7:55	5.657	0.579	146.993
8/27/2019 8:00	5.338	0.526	122.853
8/27/2019 8:05	5.586	0.564	140.429
8/27/2019 8:10	5.636	0.56	141.297
8/27/2019 8:15	5.453	0.618	148.77

8/27/2019 8:20	5.708	0.555	142.517
8/27/2019 8:25	5.388	0.507	119.909
8/27/2019 8:30	5.815	0.623	164.364
8/27/2019 8:35	5.557	0.524	129.471
8/27/2019 8:40	5.248	0.502	114.52
8/27/2019 8:45	5.71	0.593	152.535
8/27/2019 8:50	5.339	0.523	122.228
8/27/2019 8:55	5.247	0.504	114.907
8/27/2019 9:00	5.836	0.579	153.574
8/27/2019 9:05	5.459	0.516	124.369
8/27/2019 9:10	5.353	0.597	140.116
8/27/2019 9:15	5.81	0.572	150.681
8/27/2019 9:20	5.521	0.533	130.53
8/27/2019 9:25	5.446	0.531	127.552
8/27/2019 9:30	5.762	0.593	154.466
8/27/2019 9:35	5.463	0.555	133.9
8/27/2019 9:40	5.648	0.549	138.949
8/27/2019 9:45	5.785	0.621	162.451
8/27/2019 9:50	5.449	0.504	121.239
8/27/2019 9:55	5.322	0.5	116.296
8/27/2019 10:00	5.663	0.54	137.215
8/27/2019 10:05	5.403	0.508	120.632
8/27/2019 10:10	5.818	0.587	154.844
8/27/2019 10:15	5.762	0.589	153.266
8/27/2019 10:20	5.395	0.554	131.368
8/27/2019 10:25	5.748	0.604	156.777
8/27/2019 10:30	5.594	0.587	146.566
8/27/2019 10:35	5.41	0.544	129.595
8/27/2019 10:40	5.948	0.605	164.84
8/27/2019 10:45	5.611	0.606	151.956
8/27/2019 10:50	5.337	0.521	121.677
8/27/2019 10:55	5.764	0.57	148.611
8/27/2019 11:00	5.451	0.544	130.858
8/27/2019 11:05	5.402	0.552	131.212
8/27/2019 11:10	5.91	0.709	191.191
8/27/2019 11:15	5.59	0.6	149.531
8/27/2019 11:20	5.294	0.542	125.056
8/27/2019 11:25	5.791	0.534	139.963
8/27/2019 11:30	5.598	0.557	139.237
8/27/2019 11:35	5.483	0.558	135.484
8/27/2019 11:40	5.749	0.594	154.22
8/27/2019 11:45	5.633	0.554	139.66
8/27/2019 11:50	5.381	0.488	115.422
8/27/2019 11:55	5.807	0.597	157.092
8/27/2019 12:00	5.599	0.552	137.863
8/27/2019 12:05	5.316	0.494	114.62
8/27/2019 12:10	5.409	0.556	132.42
8/27/2019 12:15	5.646	0.56	141.755
8/27/2019 12:20	5.364	0.487	114.502
8/27/2019 12:25	5.315	0.537	124.744
8/27/2019 12:30	5.649	0.537	135.982
8/27/2019 12:35	5.345	0.54	126.461
8/27/2019 12:40	5.892	0.594	159.682
8/27/2019 12:45	5.615	0.564	141.593
8/27/2019 12:50	5.417	0.531	126.663
8/27/2019 12:55	5.87	0.581	155.222
8/27/2019 13:00	5.566	0.602	149.313
8/27/2019 13:05	5.83	0.591	156.351
8/27/2019 13:10	5.468	0.584	141.217

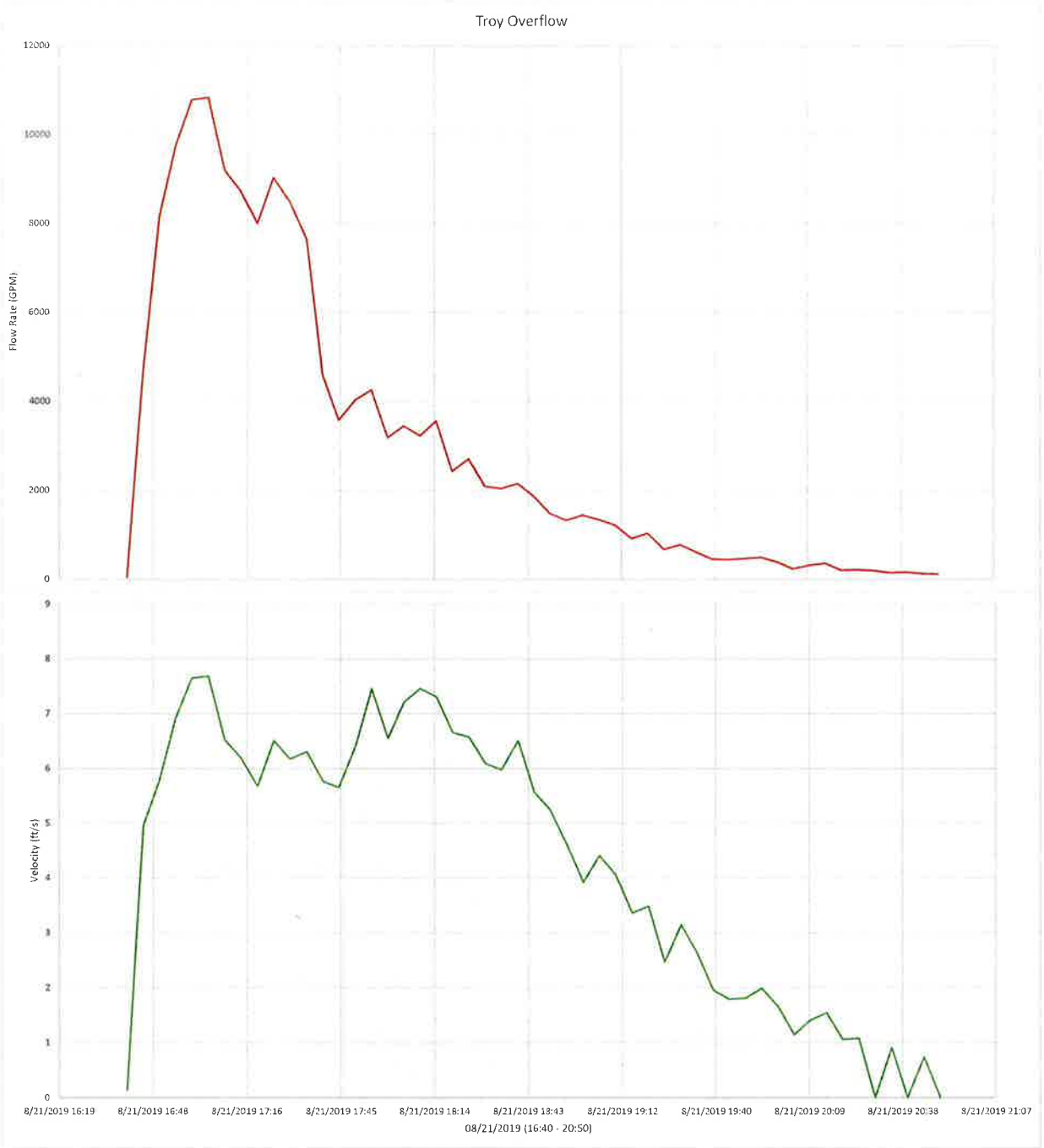
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8/27/2019 13:40	5.429	0.543	130.024
8/27/2019 13:45	5.691	0.588	150.399
8/27/2019 13:50	5.68	0.541	138.025
8/27/2019 13:55	5.455	0.56	134.972
8/27/2019 14:00	5.793	0.548	143.729
8/27/2019 14:05	5.504	0.528	128.906
8/27/2019 14:10	5.302	0.524	121.349
8/27/2019 14:15	5.758	0.565	146.937
8/27/2019 14:20	5.353	0.513	120.214
8/27/2019 14:25	5.272	0.518	118.769
8/27/2019 14:30	5.581	0.514	127.83
8/27/2019 14:35	5.322	0.519	120.668
8/27/2019 14:40	5.423	0.54	129.077
8/27/2019 14:45	5.522	0.517	126.722
8/27/2019 14:50	5.23	0.459	104.24
8/27/2019 14:55	5.202	0.486	109.411
8/27/2019 15:00	5.79	0.532	139.476
8/27/2019 15:05	5.603	0.541	135.489
8/27/2019 15:10	5.367	0.504	118.577
8/27/2019 15:15	5.864	0.593	158.14
8/27/2019 15:20	5.393	0.51	120.863
8/27/2019 15:25	5.194	0.458	102.893
8/27/2019 15:30	5.681	0.595	151.821
8/27/2019 15:35	5.393	0.561	132.88
8/27/2019 15:40	5.248	0.527	120.24
8/27/2019 15:45	5.308	0.488	113.159
8/27/2019 15:50	5.764	0.56	145.994
8/27/2019 15:55	5.422	0.512	122.365
8/27/2019 16:00	5.254	0.481	109.834
8/27/2019 16:05	5.708	0.619	159.034
8/27/2019 16:10	5.34	0.521	121.692
8/27/2019 16:15	5.159	0.456	101.481
8/27/2019 16:20	5.726	0.612	158.045
8/27/2019 16:25	5.372	0.559	131.691
8/27/2019 16:30	5.224	0.462	104.597
8/27/2019 16:35	5.79	0.579	151.665
8/27/2019 16:40	5.397	0.525	124.63
8/27/2019 16:45	5.154	0.454	100.825
8/27/2019 16:50	5.406	0.521	123.935
8/27/2019 16:55	5.531	0.501	123.085
8/27/2019 17:00	5.361	0.505	118.713
8/27/2019 17:05	5.769	0.588	153.283
8/27/2019 17:10	5.504	0.54	131.752
8/27/2019 17:15	5.384	0.464	109.652
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8/27/2019 17:25	5.438	0.536	128.504
8/27/2019 17:30	5.346	0.539	126.26
8/27/2019 17:35	5.813	0.604	159.319
8/27/2019 17:40	5.411	0.485	115.413
8/27/2019 17:45	5.251	0.472	107.813
8/27/2019 17:50	5.766	0.594	154.888
8/27/2019 17:55	5.387	0.483	114.2
8/27/2019 18:00	5.319	0.514	119.449
8/27/2019 18:05	5.678	0.559	142.551

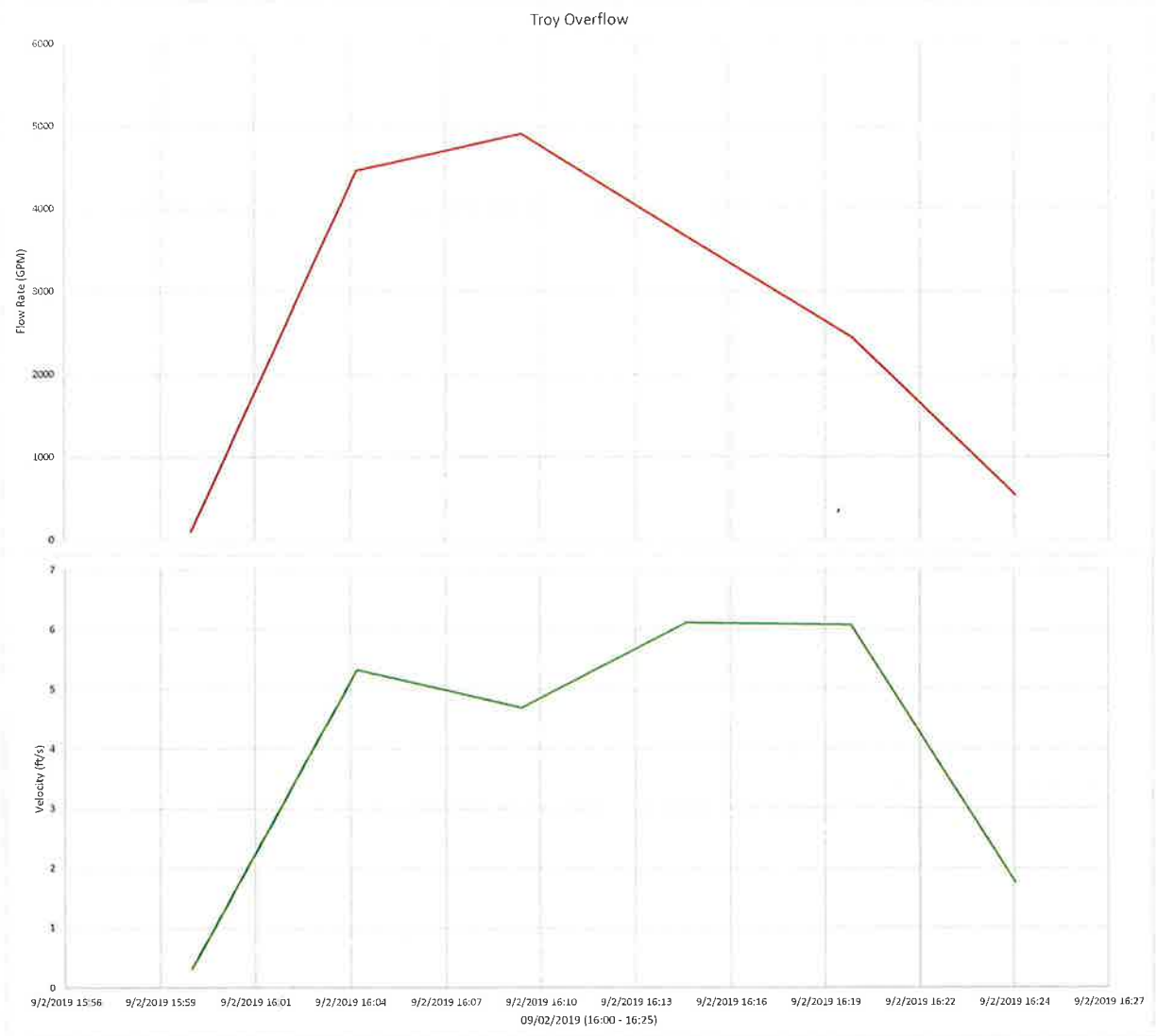
8/27/2019 18:10	5.435	0.524	125.582
8/27/2019 18:15	5.888	0.561	150.509
8/27/2019 18:20	5.586	0.53	131.951
8/27/2019 18:25	5.494	0.551	134.097
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8/27/2019 18:40	5.414	0.522	124.314
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8/27/2019 18:55	5.893	0.634	170.336
8/27/2019 19:00	5.621	0.583	146.63
8/27/2019 19:05	5.494	0.514	125.005
8/27/2019 19:10	5.778	0.516	134.78
8/27/2019 19:15	5.48	0.507	122.919
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8/27/2019 19:25	5.745	0.527	136.65
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8/27/2019 19:40	5.602	0.543	135.894
8/27/2019 19:45	6.036	0.6	166.813
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8/27/2019 20:00	5.52	0.511	125.228
8/27/2019 20:05	5.938	0.594	161.437
8/27/2019 20:10	5.628	0.607	152.799
8/27/2019 20:15	5.414	0.496	118.267
8/27/2019 20:20	5.785	0.556	145.642
8/27/2019 20:25	5.46	0.547	131.858
8/27/2019 20:30	5.923	0.565	153.073
8/27/2019 20:35	5.501	0.56	136.519
8/27/2019 20:40	5.93	0.557	150.952
8/27/2019 20:45	5.491	0.539	131.135
8/27/2019 20:50	5.723	0.591	152.512
8/27/2019 20:55	5.611	0.548	137.307
8/27/2019 21:00	5.677	0.541	137.926
8/27/2019 21:05	5.645	0.582	147.071
8/27/2019 21:10	5.386	0.502	118.696
8/27/2019 21:15	5.972	0.607	166.321
8/27/2019 21:20	5.544	0.567	139.83
8/27/2019 21:25	6.017	0.582	160.99
8/27/2019 21:30	5.488	0.517	125.516
8/27/2019 21:35	5.262	0.483	110.655
8/27/2019 21:40	5.684	0.545	139.229
8/27/2019 21:45	5.515	0.575	140.565
8/27/2019 21:50	5.661	0.557	141.52
8/27/2019 21:55	5.837	0.582	154.414
8/27/2019 22:00	5.459	0.528	127.406
8/27/2019 22:05	5.947	0.61	166.029
8/27/2019 22:10	5.573	0.525	130.323
8/27/2019 22:15	5.399	0.545	129.453
8/27/2019 22:20	5.832	0.543	143.892
8/27/2019 22:25	5.419	0.497	118.596
8/27/2019 22:30	5.467	0.525	126.832
8/27/2019 22:35	5.623	0.57	143.5
8/27/2019 22:40	5.276	0.505	116.059
8/27/2019 22:45	5.678	0.588	149.867
8/27/2019 22:50	5.47	0.578	139.897
8/27/2019 22:55	5.25	0.48	109.503
8/27/2019 23:00	5.493	0.534	129.888

8/27/2019 23:05	5.409	0.558	132.884
8/27/2019 23:10	5.162	0.505	112.545
8/27/2019 23:15	5.554	0.572	141.285
8/27/2019 23:20	5.382	0.53	125.183
8/27/2019 23:25	5.181	0.474	106.097
8/27/2019 23:30	5.125	0.485	106.874
8/27/2019 23:35	5.599	0.549	137.286
8/27/2019 23:40	5.195	0.501	112.663
8/27/2019 23:45	5.01	0.441	94.217
8/27/2019 23:50	5.442	0.491	117.985
8/27/2019 23:55	5.201	0.514	115.799
8/28/2019 0:00	5.053	0.465	100.431
8/28/2019 0:05	4.959	0.417	87.703
8/28/2019 0:10	5.278	0.523	120.325
8/28/2019 0:15	5.209	0.462	104.355
8/28/2019 0:20	4.971	0.419	88.451
8/28/2019 0:25	4.912	0.422	87.547
8/28/2019 0:30	5.216	0.48	108.593
8/28/2019 0:35	5.329	0.494	115.242
8/28/2019 0:40	5.109	0.465	102.037
8/28/2019 0:45	5.029	0.432	92.615
8/28/2019 0:50	5.554	0.528	130.439
8/28/2019 0:55	5.147	0.46	102.01
8/28/2019 1:00	4.95	0.435	91.338
8/28/2019 1:05	5.466	0.496	119.797
8/28/2019 1:10	5.118	0.444	97.769
8/28/2019 1:15	4.946	0.439	92.085
8/28/2019 1:20	4.966	0.475	100.146
8/28/2019 1:25	5.236	0.505	114.728
8/28/2019 1:30	4.954	0.412	86.529
8/28/2019 1:35	4.872	0.412	84.399
8/28/2019 1:40	5.218	0.454	102.77
8/28/2019 1:45	5.221	0.481	108.861
8/28/2019 1:50	4.961	0.425	89.403
8/28/2019 1:55	4.847	0.423	86.184
8/28/2019 2:00	5.31	0.472	109.398
8/28/2019 2:05	5.123	0.476	104.761
8/28/2019 2:10	4.985	0.44	93.19
8/28/2019 2:15	4.894	0.4	82.535
8/28/2019 2:20	4.83	0.398	80.726
8/28/2019 2:25	5.296	0.533	123.139
8/28/2019 2:30	5.04	0.433	93.304
8/28/2019 2:35	4.846	0.412	83.829
8/28/2019 2:40	4.786	0.414	82.73
8/28/2019 2:45	4.742	0.392	77.286
8/28/2019 2:50	4.797	0.413	82.861
8/28/2019 2:55	5.194	0.484	108.736
8/28/2019 3:00	4.903	0.423	87.547
8/28/2019 3:05	4.77	0.397	78.936
8/28/2019 3:10	4.746	0.387	76.358
8/28/2019 3:15	4.765	0.372	73.847
8/28/2019 3:20	5.224	0.458	103.695
8/28/2019 3:25	4.901	0.45	93.03
8/28/2019 3:30	4.751	0.401	79.347
8/28/2019 3:35	4.735	0.397	78.073
8/28/2019 3:40	4.72	0.409	80.149
8/28/2019 3:45	5.317	0.502	116.542
8/28/2019 3:50	4.98	0.443	93.731
8/28/2019 3:55	4.856	0.4	81.673

8/28/2019 4:00	4.837	0.404	82.029
8/28/2019 4:05	4.834	0.413	83.78
8/28/2019 4:10	5.31	0.502	116.424
8/28/2019 4:15	4.95	0.431	90.327
8/28/2019 4:20	4.783	0.404	80.777
8/28/2019 4:25	4.726	0.393	77.154
8/28/2019 4:30	5.212	0.514	116.036
8/28/2019 4:35	4.997	0.468	99.454
8/28/2019 4:40	4.796	0.429	86.021
8/28/2019 4:45	4.718	0.387	75.885
8/28/2019 4:50	4.706	0.39	76.119
8/28/2019 4:55	5.167	0.5	111.569
8/28/2019 5:00	4.878	0.425	87.328
8/28/2019 5:05	4.787	0.423	84.692
8/28/2019 5:10	4.757	0.415	82.315
8/28/2019 5:15	5.331	0.535	124.726
8/28/2019 5:20	4.999	0.433	92.042
8/28/2019 5:25	4.907	0.436	90.405
8/28/2019 5:30	4.887	0.427	87.961
8/28/2019 5:35	5.381	0.512	120.87
8/28/2019 5:40	5.073	0.461	100.158
8/28/2019 5:45	4.88	0.436	89.646
8/28/2019 5:50	4.895	0.419	86.579
8/28/2019 5:55	5.477	0.519	125.752
8/28/2019 6:00	5.115	0.458	100.679
8/28/2019 6:05	4.906	0.427	88.377
8/28/2019 6:10	5.448	0.532	127.919
8/28/2019 6:15	5.194	0.492	110.56
8/28/2019 6:20	4.95	0.432	90.528
8/28/2019 6:25	5.497	0.548	133.546
8/28/2019 6:30	5.136	0.436	96.355
8/28/2019 6:35	5.003	0.441	93.827
8/28/2019 6:40	5.67	0.564	143.656
8/28/2019 6:45	5.312	0.46	106.823
8/28/2019 6:50	5.147	0.44	97.498
8/28/2019 6:55	5.665	0.514	130.729
8/28/2019 7:00	5.303	0.472	109.285
8/28/2019 7:05	5.496	0.558	135.76
8/28/2019 7:10	5.442	0.491	117.819
8/28/2019 7:15	5.224	0.541	122.635
8/28/2019 7:20	5.79	0.6	157.336
8/28/2019 7:25	5.407	0.501	119.261
8/28/2019 7:30	5.443	0.55	132.153
8/28/2019 7:35	5.582	0.534	132.807
8/28/2019 7:40	5.361	0.503	118.261
8/28/2019 7:45	5.903	0.529	142.499
8/28/2019 7:50	5.58	0.49	121.921
8/28/2019 7:55	5.734	0.611	157.869
8/28/2019 8:00	5.54	0.51	125.479
8/28/2019 8:05	5.222	0.488	110.478
8/28/2019 8:10	5.368	0.507	119.325
8/28/2019 8:15	5.541	0.507	124.945
8/28/2019 8:20	5.247	0.495	112.742
8/28/2019 8:25	5.301	0.492	113.866
8/28/2019 8:30	5.583	0.544	135.459
8/28/2019 8:35	5.305	0.511	118.323
8/28/2019 8:40	5.787	0.551	144.302
8/28/2019 8:45	5.728	0.594	153.253
8/28/2019 8:50	5.455	0.51	122.81

Exhibit D – 24-inch Overflow Data, Graphs and Precipatation


Troy Overflow
Flow Rate (GPM)
12000
10000
8000
6000
4000
2000
0
Velocity (ft/s)
9
8
7
6
5
4
3
2
1
0
8/21/2019 16:19
8/21/2019 16:48
8/21/2019 17:16
8/21/2019 17:45
8/21/2019 18:14
8/21/2019 18:43
8/21/2019 19:12
8/21/2019 19:40
8/21/2019 20:09
8/21/2019 20:38
8/21/2019 21:07
08/21/2019 (16:40 - 20:50)


Troy Overflow
Flow Rate (GPM)
6000
5000
4000
3000
2000
1000
0
Velocity (ft/s)
7
6
5
4
3
2
1
0
9/2/2019 15:56
9/2/2019 15:59
9/2/2019 16:01
9/2/2019 16:04
9/2/2019 16:07
9/2/2019 16:10
9/2/2019 16:13
9/2/2019 16:16
9/2/2019 16:19
9/2/2019 16:22
9/2/2019 16:24
9/2/2019 16:27
09/02/2019 (16:00 - 16:25)

Select year: August

Weather history Troy august 2019

Day	High (°F)	Low (°F)	Precip. (inch)	Snow (inch)	Snow depth (inch)
1 aug 2019	-	-	0.11	0.00	0.00
2 aug 2019	-	-	0.00	0.00	0.00
3 aug 2019	-	-	0.00	0.00	0.00
4 aug 2019	-	-	0.30	0.00	0.00
5 aug 2019	-	-	0.00	0.00	0.00
6 aug 2019	-	-	0.00	0.00	0.00
7 aug 2019	-	-	0.31	0.00	0.00
8 aug 2019	-	-	0.26	0.00	0.00
9 aug 2019	-	-	0.20	0.00	0.00
10 aug 2019	-	-	0.00	0.00	0.00
11 aug 2019	-	-	0.02	0.00	0.00
12 aug 2019	-	-	0.00	0.00	0.00
13 aug 2019	-	-	0.00	0.00	0.00
14 aug 2019	-	-	0.43	0.00	0.00
15 aug 2019	-	-	-	-	-
16 aug 2019	-	-	-	-	-
17 aug 2019	-	-	-	-	-
18 aug 2019	-	-	-	-	-
19 aug 2019	-	-	1.13	0.00	0.00
20 aug 2019	-	-	0.00	0.00	0.00
21 aug 2019	-	-	-	-	-
22 aug 2019	-	-	1.85	0.00	0.00
23 aug 2019	-	-	0.00	0.00	0.00
24 aug 2019	-	-	0.00	0.00	0.00
25 aug 2019	-	-	0.00	0.00	0.00

Past weather Troy - august 2019

Average high temperature:	- °F (normal: 82°F)
Average low temperature:	- °F (normal: 61°F)
Average temperature:	- °F (normal: 71°F)
Total Precipitation:	4.7 inch (normal: 4.13 inch)
Total snowfall:	0 inch
Highest max temperature:	- °F
Lowest max temperature:	- °F
Highest min temperature:	- °F
Lowest min temperature:	- °F



Day	High (°F)	Low (°F)	Precip. (inch)	Snow (inch)	Snow depth (inch)
26 aug 2019	-	-	0.00	0.00	0.00
27 aug 2019	-	-	0.00	0.00	0.00
28 aug 2019	-	-	0.00	0.00	0.00
29 aug 2019	-	-	0.09	0.00	0.00
30 aug 2019	-	-	0.00	0.00	0.00
31 aug 2019	-	-	0.00	0.00	0.00

T = Trace

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Temperature - Precipitation - Sunshine - Snowfall

US Climate Data on

Home United States New York Enter a location

Monthly Daily History Geo & Map

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Select year: Select month:

Weather history Troy september 2019

Day	High (°F)	Low (°F)	Precip. (inch)	Snow (inch)	Snow depth (inch)
1 sep 2019	-	-	0.00	0.00	0.00
2 sep 2019	-	-	0.05	0.00	0.00
3 sep 2019	-	-	0.73	0.00	0.00
4 sep 2019	-	-	0.00	0.00	0.00
5 sep 2019	-	-	-	-	-
6 sep 2019	-	-	0.00	0.00	0.00
7 sep 2019	-	-	0.00	0.00	0.00
8 sep 2019	-	-	0.00	0.00	0.00
9 sep 2019	-	-	-	-	-
10 sep 2019	-	-	0.00	0.00	0.00
11 sep 2019	-	-	0.00	0.00	0.00
12 sep 2019	-	-	0.00	0.00	0.00
13 sep 2019	-	-	0.03	0.00	0.00
14 sep 2019	-	-	0.00	0.00	0.00
15 sep 2019	-	-	-	-	-
16 sep 2019	-	-	0.00	0.00	0.00
17 sep 2019	-	-	0.00	0.00	0.00
18 sep 2019	-	-	0.00	0.00	0.00
19 sep 2019	-	-	0.00	0.00	0.00
20 sep 2019	-	-	0.00	0.00	0.00
21 sep 2019	-	-	0.00	0.00	0.00
22 sep 2019	-	-	0.00	0.00	0.00
23 sep 2019	-	-	0.00	0.00	0.00
24 sep 2019	-	-	3.00	0.00	0.00
25 sep 2019	-	-	-	-	-

Past weather Troy - september 2019

Average high temperature:	- °F (normal: 74°F)
Average low temperature:	- °F (normal: 52°F)
Average temperature:	- °F (normal: 63°F)
Total Precipitation:	3.81 inch (normal: 3.5 inch)
Total snowfall:	0 inch
Highest max temperature:	- °F
Lowest max temperature:	- °F
Highest min temperature:	- °F
Lowest min temperature:	- °F





Site Name	Troy Overflow		
Isco Quantity	Flow Rate	Velocity	Level
Label	Flow Rate	Velocity	Level
Units	gpm	ft/s	in
Resolution	0.1	0.1	0.1
Significant Digits	0	0	0
8/21/2019 9:50			-0.008
8/21/2019 10:00	0	0	-0.008
8/21/2019 10:05	0	0	-0.04
8/21/2019 10:10	0	0	-0.074
8/21/2019 10:15	0	0	-0.039
8/21/2019 10:20	0	0	-0.024
8/21/2019 10:25	0	0	-0.016
8/21/2019 10:30	0	0	-0.005
8/21/2019 10:35	-0.011	-0.043	0.06
8/21/2019 10:40	-0.01	-0.043	0.057
8/21/2019 10:45	-0.005	-0.029	0.044
8/21/2019 10:50	-0.005	-0.024	0.009
8/21/2019 10:55	-0.008	-0.034	0.047
8/21/2019 11:00	0	0	-0.005
8/21/2019 11:05	0	0	-0.059
8/21/2019 11:10	-0.008	-0.043	0.048
8/21/2019 11:15	-5.391	0	3.87
8/21/2019 11:20	-6.029	0	3.74
8/21/2019 11:25	-6.092	0	3.764
8/21/2019 11:30	-5.968	0	3.711
8/21/2019 11:35	-5.893	0	3.679
8/21/2019 11:40	-5.65	0	3.574
8/21/2019 11:45	-5.565	0	3.537
8/21/2019 11:50	-5.359	0	3.446
8/21/2019 11:55	-5.177	0	3.365
8/21/2019 12:00	-4.968	0	3.271
8/21/2019 12:05	-4.717	0	3.157
8/21/2019 12:10	-4.502	0	3.057
8/21/2019 12:15	-4.336	0	2.979
8/21/2019 12:20	-4.131	0	2.882
8/21/2019 12:25	-4.034	0	2.835
8/21/2019 12:30	-3.96	0	2.8
8/21/2019 12:35	-3.925	0	2.783
8/21/2019 12:40	-3.923	0	2.782
8/21/2019 12:45	-3.909	0	2.775
8/21/2019 12:50	-3.907	0	2.774
8/21/2019 12:55	-3.91	0	2.776
8/21/2019 13:00	-3.905	0	2.773
8/21/2019 13:05	-3.911	0	2.776
8/21/2019 13:10	-3.914	0	2.778

8/21/2019 13:15	-3.914	0	2.778
8/21/2019 13:20	-3.911	0	2.776
8/21/2019 13:25	-3.904	0	2.773
8/21/2019 13:30	-3.9	0	2.771
8/21/2019 13:35	-3.91	0	2.775
8/21/2019 13:40	-3.893	0	2.767
8/21/2019 13:45	-3.904	0	2.773
8/21/2019 13:50	-3.865	0	2.754
8/21/2019 13:55	-3.882	0	2.762
8/21/2019 14:00	-3.885	0	2.763
8/21/2019 14:05	-3.881	0	2.762
8/21/2019 14:10	-3.878	0	2.76
8/21/2019 14:15	-3.893	0	2.767
8/21/2019 14:20	-3.892	0	2.767
8/21/2019 14:25	-3.904	0	2.773
8/21/2019 14:30	-3.896	0	2.769
8/21/2019 14:35	-3.887	0	2.765
8/21/2019 14:40	-3.885	0	2.764
8/21/2019 14:45	-3.893	0	2.767
8/21/2019 14:50	-3.886	0	2.764
8/21/2019 14:55	-3.899	0	2.77
8/21/2019 15:00	-3.895	0	2.768
8/21/2019 15:05	-3.895	0	2.768
8/21/2019 15:10	-3.891	0	2.766
8/21/2019 15:15	-3.893	0	2.768
8/21/2019 15:20	-3.883	0	2.762
8/21/2019 15:25	-3.892	0	2.767
8/21/2019 15:30	-3.89	0	2.766
8/21/2019 15:35	-3.897	0	2.769
8/21/2019 15:40	-3.89	0	2.766
8/21/2019 15:45	-3.916	0	2.779
8/21/2019 15:50	-3.906	0	2.774
8/21/2019 15:55	-3.888	0	2.765
8/21/2019 16:00	-3.885	0	2.764
8/21/2019 16:05	-3.916	0	2.779
8/21/2019 16:10	-3.909	0	2.775
8/21/2019 16:15	-3.899	0	2.771
8/21/2019 16:20	-3.904	0	2.773
8/21/2019 16:25	-3.905	0	2.773
8/21/2019 16:30	-3.936	0	2.788
8/21/2019 16:35	-3.962	0	2.801
8/21/2019 16:40	47.107	0.142	6.832
8/21/2019 16:45	4716.3	4.954	15.345
8/21/2019 16:50	8154.83	5.783	29.116
8/21/2019 16:55	9745.96	6.912	30.055
8/21/2019 17:00	10781.8	7.646	31.004
8/21/2019 17:05	10832.4	7.682	31.873

8/21/2019 17:10	9202.17	6.526	28.713
8/21/2019 17:15	8729.5	6.191	27.729
8/21/2019 17:20	8002.34	5.675	24.835
8/21/2019 17:25	9027.61	6.507	22.917
8/21/2019 17:30	8494.82	6.172	22.586
8/21/2019 17:35	7636.4	6.304	19.236
8/21/2019 17:40	4620.16	5.767	13.287
8/21/2019 17:45	3572.95	5.654	11.022
8/21/2019 17:50	4036.25	6.407	10.996
8/21/2019 17:55	4257.05	7.458	10.198
8/21/2019 18:00	3188.75	6.554	9.049
8/21/2019 18:05	3442.54	7.216	8.919
8/21/2019 18:10	3228.07	7.457	8.303
8/21/2019 18:15	3559.83	7.305	9.06
8/21/2019 18:20	2431.62	6.66	7.336
8/21/2019 18:25	2708.19	6.572	8.009
8/21/2019 18:30	2091.78	6.088	7.021
8/21/2019 18:35	2042.28	5.98	6.992
8/21/2019 18:40	2151.59	6.506	6.831
8/21/2019 18:45	1864.72	5.562	6.899
8/21/2019 18:50	1489.46	5.244	6.129
8/21/2019 18:55	1333.83	4.621	6.199
8/21/2019 19:00	1440.73	3.924	7.365
8/21/2019 19:05	1344.54	4.41	6.446
8/21/2019 19:10	1224.39	4.058	6.398
8/21/2019 19:15	923.478	3.365	5.981
8/21/2019 19:20	1039.34	3.485	6.345
8/21/2019 19:25	681.748	2.472	6.001
8/21/2019 19:30	780.65	3.15	5.565
8/21/2019 19:35	617.49	2.633	5.353
8/21/2019 19:40	460.248	1.956	5.366
8/21/2019 19:45	447.21	1.793	5.591
8/21/2019 19:50	469.033	1.812	5.739
8/21/2019 19:55	495.841	1.993	5.579
8/21/2019 20:00	398.096	1.662	5.433
8/21/2019 20:05	237.911	1.149	4.905
8/21/2019 20:10	318.264	1.411	5.207
8/21/2019 20:15	362.431	1.547	5.349
8/21/2019 20:20	208.672	1.059	4.739
8/21/2019 20:25	215.555	1.083	4.77
8/21/2019 20:30	198.382	0	4.501
8/21/2019 20:35	154.671	0.911	4.27
8/21/2019 20:40	168.225	0	4.527
8/21/2019 20:45	131.466	0.74	4.409
8/21/2019 20:50	123.811	0	4.229
8/21/2019 20:55	123.548	0	4.222
8/21/2019 21:00	105.92	0	3.795

8/21/2019 21:05	54.274	0	2.4

ATTACHMENT G

Stormwater Management Narrative

2ND AVENUE MULTI-FAMILY RESIDENCES

1011 2ND AVENUE

City of Troy

Rensselaer County, New York

Applicant:

Kevin Vandenburgh

September 2021

Prepared By:

The Environmental Design Partnership, LLP

900 Route 146

Clifton Park, NY 12065

1.0 Introduction

Kevin Vandenburgh is proposing a multi-family residential development on two (2) existing parcels of land totaling approximately 11 acres located on the west side of Second Ave adjacent to the intersection with Roosevelt Ave, in the City of Troy, New York. The proposed site development includes the construction of three (3) multi-family four story apartment buildings, as well as associated underground parking, ground level parking, a pedestrian walking path, and travel surfaces. The total area of proposed disturbance is approximately 7.65 acres and 3.85 acres of impervious area will be added to the site.

A stormwater management system has been designed to provide pollutant removal, reduce channel erosion, prevent overbank flooding, and safely control extreme flood events in accordance with the NYS Stormwater Management Design Manual (Design Manual). The proposed stormwater management system for the project will include multiple green infrastructure techniques such as stormwater planters, and vegetated swales in order to meet and exceed the required minimum runoff reduction. As well as the use of hydrodynamic vortex separator units to provide pretreatment of the stormwater runoff on the project site.

This narrative presents a review of the design concepts and parameters of the stormwater management system for the proposed townhouse development. The purpose of the stormwater management narrative is to assure that changes in the surface runoff characteristics, as a result of the proposed construction, will not adversely impact adjacent or downstream properties. On-site stormwater management will be implemented in accordance with the NYS Stormwater Management Design Manual to accommodate both additional stormwater runoff and to provide water quality treatment according to the green infrastructure standards.

2.0 Existing Conditions

The project site is currently undeveloped and consists of wooded areas and an open field and grass area. The topography on the site consists of gentle to steep slopes with slopes exceeding 15% in areas of the project site. The elevations on the site generally range from 95 to 20 feet above sea level.

Soils on the site consist predominantly of Nassau-Rock outcrop complex, hilly which is described by the United State Department of Agriculture (USDA) National Resources Conservation Services (NRCS) as silty loam within the top 0 to 3 feet and unweathered bedrock below the silty loam. The bedrock is generally comprised of rippable and broken shale. Depth to groundwater is greater than six feet below grade.

No wetland areas exist on site. No wetland disturbance is proposed during construction.

According to the Federal Emergency Management Area (FEMA) Flood Insurance Rate Map (FIRM) panel 3606770001B, dated March 18, 2980, the project site is located within Zone A11, Zone B and Zone C. The 100-year flood elevation is 35 feet above mean sea level.

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Approximately 95 percent of the project site is located five (5) feet above the 100-year flood elevation. Runoff from the project site flows westerly towards the Hudson River.

2.1 Soil and Groundwater Conditions

The USDA Natural Resources Conservation Service Soil Survey identifies the soils on the site to be Nassau-Rock outcrop complex. The Soil Survey identifies this soil type as having a very slow infiltration rate and classified as Hydrologic Soil Group (HSG) "D".

Test pits were performed by The Environmental Design Partnership LLP on June 25, 2021. The soil encountered in the test pit locations indicated top soil to depths of 0 to 12 inches and a shallow layer of fine loamy sand, followed by rippable shale and bedrock varying from 3 to 36 inches below existing grade.

3.0 Predevelopment Stormwater Analysis

The existing hydrologic conditions, in the area to be disturbed as a result of the proposed construction, were analyzed using Applied Microcomputer Systems' "HydroCAD" computer modeling program. The HydroCAD stormwater modeling program employs the United States Department of Agriculture's Soil Conservation Service (SCS) Technical Release 20 (TR-20) method for stormwater analysis. Using this modeling technique, the site is divided into "subcatchments" that represent specific areas contributing stormwater runoff to an existing, or proposed drainage feature. The subcatchments typically flow through "reaches" (i.e., swales, channels, or pipes) that convey the stormwater to storm basins or discharge areas.

A hydrologic model of the existing site was prepared using the **Hydrocad** program. Three (3) subcatchments were used to represent the existing drainage condition, see Figure 2.

The existing parameters of topography, vegetation, slope and soil type are all incorporated into the predevelopment model.

Table 1 presents a summary of the pre-development stormwater peak discharge for the 1 year, 10 year and 100-year design storm events at the respective Design Points. As will be discussed in subsequent sections, the post development stormwater discharge rate has been limited to the predevelopment discharge rate for the 1-year, 10-year, and 100-year storm events.

Table 1: Pre-Development Runoff Rates

STORM EVENT	OFF1
1-Year (2.24")	7.48
10-Year (3.77")	23.03
100-Year (6.37")	54.23

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The pre-development Curve Number (CN) for the existing impervious, wooded and grassy areas was established as 98, 79 and 80, respectively. The HydroCAD model results for the pre-development conditions are included within Attachment B.

4.0 Stormwater Management Planning and Practice Selection

The site layout and stormwater design for this project was completed while taking into consideration the potential impacts on the existing site and downstream hydrology. The slopes, soil classification and topography throughout the site primarily conveys runoff down the knolls/high points and towards the large drainage corridor in the center of the site which drains to the Hudson River. The site stormwater design was intended to replicate the predevelopment conditions as much as possible and proposed stormwater devices that will capture and treat the runoff at various areas of the site where runoff is concentrated. Various measures were taken to help ensure that the post-development hydrology of the site will closely resemble the pre-development hydrology. These measures include soil restoration, parking reduction, and building reduction.

Building footprint reduction was implemented by the use of multiple floor apartment buildings in order to reduce the impervious footprint on site. Imperviousness on site was also reduced through parking reduction with garage parking spaces located underground below the first floor of the apartment buildings. This allows for a smaller parking footprint on site while still achieving parking requirements. Efficient parking lanes were also implemented into the design. This also allowed the site to meet parking requirements while keeping the impervious area to a minimum.

Soil restoration has been called for throughout the site in accordance with Chapter 5 of the NYSDEC Stormwater Management Design Manual. The soils on the site are classified as HSG D and need aeration and topsoil in areas of cut or fill. In high traffic areas that are to remain pervious, the soils shall be fully restored by tilling compost into the sub-soils prior to applying topsoil and vegetating. By applying these methods to the soils on the site, the original properties and porosity of the soils will be recovered, which will allow for an improvement in the soil infiltration as well as lawn and landscaping sustainability.

Stormwater management on the site is designed to incorporate filtration practices through stormwater planters and vegetated swales. Stormwater planters and vegetated swales are considered a Green Infrastructure SMP with RRv Capacity by the NYSDEC Stormwater Design Manual. The proposed stormwater design also incorporates the use of hydrodynamic vortex separator units to provide pretreatment of the stormwater runoff on the project site. By using a combination of filtration practices that are located relatively close to the source of runoff, the post-development hydrology will more closely match the pre-development hydrology.

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5.0 Post-Development Stormwater Analysis

The post-development conditions, in the area to be disturbed as a result of the proposed construction, were analyzed using Applied Microcomputer Systems' "HydroCAD" computer modeling program.

A hydrologic model of the area to be disturbed as a result of the proposed development, was analyzed using the HydroCAD program. Twenty-five (25) subcatchments were used to represent the post development drainage conditions of the site. Site improvements to the property will include the construction of three (3) multi-family four story apartment buildings, as well as associated underground parking, ground level parking, a pedestrian walking path, and travel surfaces. Also included, as permanent elements of the development, are connections to municipal water and sewer and on-site stormwater management. Stormwater management practices have been designed to provide treatment, filtration, and attenuation of stormwater runoff from the proposed impervious surfaces on the site.

Stormwater runoff from the site will be managed with stormwater planters, a closed drainage system with pretreatment devices, and various green infrastructure techniques. Runoff from the rooftops will be collected and directed to stormwater planters which will provide filtration and treatment of the runoff. The planters have been designed with underdrains and overflow structures which will convey excess flows to the respective catch basins, where runoff will be conveyed to the closed drainage and pretreatment system on the project site. Runoff from the surrounding pavement and grassy areas will sheet flow either into a stormwater collection catch basin or into vegetated swales.

A post-development Curve Number (CN) of 98 was assigned to all impervious surface within the proposed site. A post-development CN of 80 was assigned to all new grassed areas directly contributing to the proposed stormwater devices. The weighted CN for the post-development conditions for the site is 86. The HydroCAD model results for the post-development conditions are included within Attachment B.

5.1 NYS Unified Stormwater Sizing Criteria

The proposed post-development site conditions were analyzed using Applied Microcomputer Systems' "HydroCAD" computer modeling program, the results have been included with this report. A technical description of the HydroCAD stormwater modeling program was provided in a previous section.

The area to be disturbed as a result of the proposed development was modeled under the post-development conditions using twenty-five (25) subcatchment areas (Figure 3) routed into the stormwater management areas. The contributing area of each stormwater management area is

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identified on Figure 3. The post-development stormwater management system has been designed based on the Unified Stormwater Sizing Criteria as described in the following sections.

5.1.1 Water Quality (WQ_v)

In general, small storm events and the initial runoff from larger storm events are an environmental concern as this stormwater runoff typically contains roadway pollutants and thermal energy stored by the asphalt. In accordance with the NYS Stormwater Management Design Manual, this initial runoff is designated as the Water Quality Volume (WQ_v) and special attention is given to this volume of runoff to meet water quality objectives.

The water quality storage volume, WQ_v, is calculated as follows:

$$WQ_v = \frac{P \times R_v \times A}{12}$$

Where: WQ_v = water quality volume (acre-feet)

P = 90% rainfall event number

R_v = 0.05+0.009(I), where I is percent impervious cover

A = site area (acres), impervious area used with I = 100%

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Table 2: Required Water Quality Volume

SUB I.D.	AREA (SF)	I (SF)	I (%)	Rv	WQv (cu-ft)	WQv Provided (cu-ft)	SMA I.D.
1S	227,434	0	0%	0.05	1,042	OFF	-
2S	19,232	4,653	24%	0.27	472	OFF	-
3S	25,969	25,969	100%	0.95	2,261	OFF	-
4S	12,073	12,073	100%	0.95	1,051	1,160	SP6
5S	12,073	12,073	100%	0.95	1,051	1,692	SP5
6S	8,624	8,624	100%	0.95	751	870	SP4
7S	8,624	8,624	100%	0.95	751	1,231	SP3
8S	9,375	9,375	100%	0.95	816	1,359	SP2
9S	8,698	8,698	100%	0.95	757	1,147	SP1
10S	42,596	0	0%	0.05	195	1,815	2P
11S	21,467	9,099	42%	0.43	849	OFF	-
12S	9,133	6,498	71%	0.69	578	578	WQU#1
13S	11,142	11,142	100%	0.95	970	970	WQU#2
14S	3,565	3,565	100%	0.95	310	310	WQU#2
15S	3,662	3,053	83%	0.80	269	269	WUQ#2
16S	10,897	7,409	68%	0.66	661	661	WQU#2
17S	4,314	4,314	100%	0.95	376	376	WQU#2
18S	8,128	6,512	80%	0.77	574	574	WQU#2
19S	12,498	6,057	48%	0.49	557	557	WQU#3
20S	11,405	10,905	96%	0.91	952	952	WQU#3
21S	11,565	6,693	58%	0.57	605	605	WQU#3
22S	13,663	5,287	39%	0.40	499	499	WQU#3
23S	25,137	9,720	39%	0.40	917	917	WQU#4
24S	8,860	4,446	50%	0.50	407	407	WQU#5
25S	6,623	4,953	75%	0.72	439	439	WQU#5

The proposed design for the project site incorporates the "treatment train" concept to provide pretreatment of the stormwater runoff prior to discharge off the project site. The proposed treatment train includes the use of advanced hydrodynamic vortex separator units, and discharge to swales on the project site.

The pretreatment for impervious pavement on the site uses five hydrodynamic vortex separators, First Defense by Hydro International, designed to fully treat the contributing WQv. The First Defense has been verified by US EPA Environmental Technology Verification Program for Water Quality Protection. A summary of the design parameters and site-specific information for the proposed First Defense devices is presented in **Table 3** as well as in Attachment C. The units have been designed to provide treatment of paved surfaces for runoff associated with the

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contributing Water Quality flow rate. Peak flows associated with events that exceed the 1-year storm will be conveyed through a by-pass around the units.

Table 3: Summary of First Defense Design Parameters

Unit I.D.	Total Area (ft^2)	Impervious Area (ft^2)	Green Area (ft^2)	Unit Size	Peak Treatment flow rate (cfs)	WQv Storm Rate to unit (cfs)	100 Year Storm Flow Rate to Unit (cfs)
1	9,133	6498	2,635	3 ft	0.84	0.40	3.10
2	41,708	35,995	5,713	4 ft	1.50	1.34	15.5
3	49,131	28,942	10,189	4 ft	1.5	1.0	10.34
4	25,137	9,720	15,417	3 ft	0.84	0.40	3.47
5	15,483	9,399	6,084	3 ft	0.84	0.62	3.65

5.1.2 Runoff Reduction Volume (RRv)

The NYSSMDM specifies that the runoff shall be reduced by 100% of the site WQv using green infrastructure techniques and standard SMPs with RRv capacity unless, due to existing site constraints, the 100% reduction is not possible. If 100% RRv cannot be achieved than a minimum RRv based on the soil type and impervious area is calculated. Soil conditions, the presence of shale and bedrock, as well as existing slopes on the proposed project site do not allow 100% RRv capacity. Therefore, minimum RRv for the proposed project site has been calculated:

$$RRv_{min} = \frac{P * \bar{R}_v * Aic * S}{12}$$

where: RRV_{min} = minimum runoff reduction volume required from impervious area (acre-feet)

P= 90% Rainfall in New York State

R_v = 0.05+0.009(I) where I is 100% impervious

A_{ic} = Total area of new impervious cover

S = Hydrologic Soil Group (HSG) Specific Reduction Factor (*S*)

- HSG D = 0.20

The minimum RRV calculated for the project site is on the order of **0.07 ac-ft** (2,921 cu-ft).

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5.1.3 Green Infrastructure Practices

Runoff from a portion of the northern most parking area will be conveyed to a vegetated swale. prior to flowing to existing drainage corridors. This will allow for the infiltration and filtering of the runoff before entering the Hudson River. Overall, the total runoff reduction from vegetated swale is equivalent to approximately **116 cf**.

The proposed apartment buildings will generate runoff that will be conveyed via gutters to proposed stormwater planters on the project site. These planters have been designed to provide filtration, pollutant treatment and removal, and groundwater recharge. The design manual allows for a minimum RRv Capacity of 40% of the contributing water quality volume. The runoff reduction from Stormwater Planters located on the project site is on the order of **4,290 cf**. Attachment A contains WQv and RRv calculations for this Green Infrastructure practice.

Many of the green infrastructure practices recommended in the NYS Stormwater Management Design Manual were not applied to the stormwater management design on this site due to either site restrictions or the use of more feasible green infrastructure of standard SMP techniques in place of more restrictive and/or maintenance intensive practices. The following table discusses why the unused green infrastructure practices were not feasible.

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Table 4: Non-Feasible Green Infrastructure Practices

Green Infrastructure Practice	Reason use is not feasible
Conservation of Natural Areas	Existing natural areas on site will be conserved to the greatest extent possible, however the contribution to the RRV reduction is minimal.
Sheet flow to Riparian Buffers or Filter Strips	Slopes and soils on site are not conducive for buffers or vegetated filter strips
Tree Planting/Tree Pit	Trees will be saved on the site as possible to conserve the natural areas. Trees will also be planted to maintain a buffer from the roadway to the proposed site, though the resulting runoff reduction value for adding additional trees is minimal.
Disconnection of Rooftop Runoff	Many of the rooftop areas which would be accounted for in Rooftop Disconnection are accounted for in the stormwater planter calculation.
Stream Daylighting	No culverted/piped streams exist on the site or in the site perimeter.
Green Roofs	Green roofs are less favorable because they are more difficult to maintain. The majority of the rooftop runoff will be conveyed to bioretention areas. The proposed stormwater management methods are more financially feasible and require less maintenance than green roofs. Additionally, the proposed rooftops will be sloped; green roofs require flat rooftops.
Porous Pavement	Porous Pavement has not been proposed on this site due to poor soil conditions.
Rain Barrels/Cisterns	The proposed rooftops have been designed to drain towards catch basins or towards bioretention areas. Rain Barrels/Cisterns would require greater maintenance compared to the methods currently implemented for runoff reduction, they also would require a way to use the collected stormwater between events.

Table 5: Runoff Reduction Volume Summary

Runoff Reduction Technique	RRv (cf)
Vegetated Swale	116
Stormwater Planter	4,290
Total Site Runoff Reduction	**4,406**
Min Required Runoff Reduction	**2,291**

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5.2.1 Channel Protection (Cp_v)

In accordance with the NYS Stormwater Management Design Manual, stream channel protection, designed to protect stream channels from erosion, is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event. The Cp_v requirement does not apply in certain conditions, including the following:

- The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams.

The project site discharges directly to the Hudson River, which is a fifth order (fifth downstream) or larger stream, therefore the Cp_v requirement does not apply.

5.2.2 Overbank Flood (Q_p)

Overbank Flood Control Criteria has been established to limit the frequency and magnitude of out-of-bank flooding generated through changes in runoff characteristics as a result of increased impervious surface area. The Q_p requirement does not apply in certain conditions, including the following:

- The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams.

The project site discharges directly to the Hudson River, which is a fifth order (fifth downstream) or larger stream, therefore the Q_p requirement does not apply.

5.2.3 Extreme Storm (Q_f)

In accordance with the NYS Stormwater Management Design Manual, the stormwater management system must attenuate the post development 100-year, 24-hour peak discharge rate to the predevelopment rate while providing safe passage of this storm event. The Extreme Storm (Q_f) requirement does not apply in certain conditions, including the following:

- The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams.

The project site discharges directly to the Hudson River, which is a fifth order (fifth downstream) or larger stream, therefore the Q_f requirement does not apply.

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6.0 Summary

Development of the proposed property will change the stormwater drainage characteristics of the site; impervious area will be added and the site will be re-graded to support the proposed improvements. Changes to the stormwater drainage characteristics of the site have been evaluated in accordance with the NYS Stormwater Management Design Manual. The proposed stormwater management system has been designed to comply with the recommendations in the Design Manual related to water quality, runoff reduction, channel protection, overbank flood control and extreme flood control for new development projects.

The proposed stormwater management system has been designed to attenuate and treat the stormwater runoff generated from the contributing areas for storm events up to and including the 100-year design storm event. The proposed stormwater management design includes multiple green infrastructure techniques such as stormwater planters, and vegetated swales in order to meet and exceed the required minimum runoff reduction. As well as the use of hydrodynamic vortex separator units to provide pretreatment of the stormwater runoff on the project site. Channel protection, overbank flood, and extreme storm criteria are not a concern and the NYS Stormwater Management Design Manual states that this criteria does not apply when discharging to a fifth order or larger stream, which the Hudson River is categorized as.

Through the implementation of acceptable stormwater management practices, recommended by the NYS Stormwater Management Design Manual, the proposed project will not adversely affect adjacent or downstream properties.

Prepared by:

The Environmental Design Partnership, LLP



Nicholas Zeglen, P.E.

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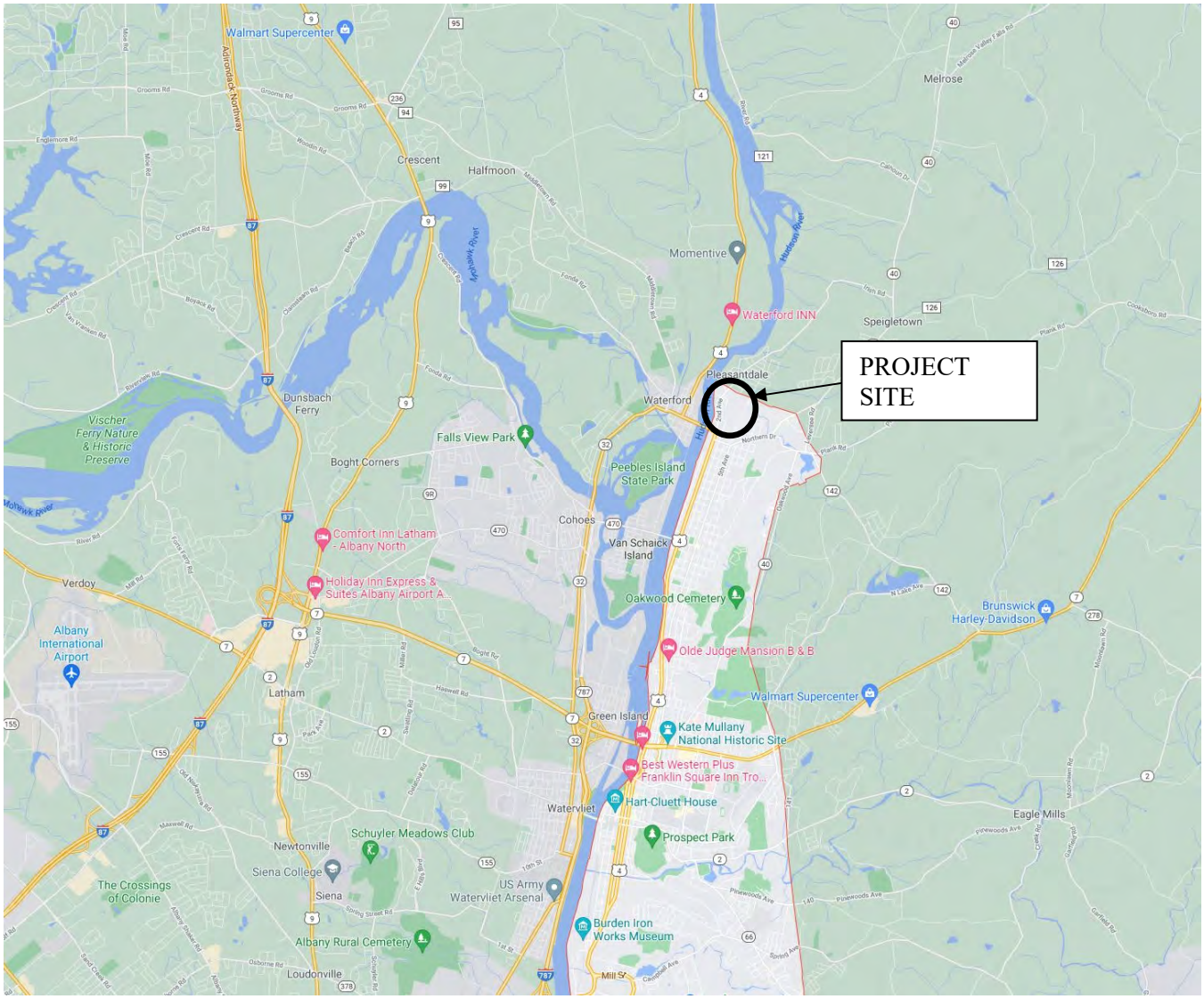
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Figures

1. Site Location map
2. Site Soils Data
3. Pre-Development Drainage Map
4. Post-Development Drainage Map

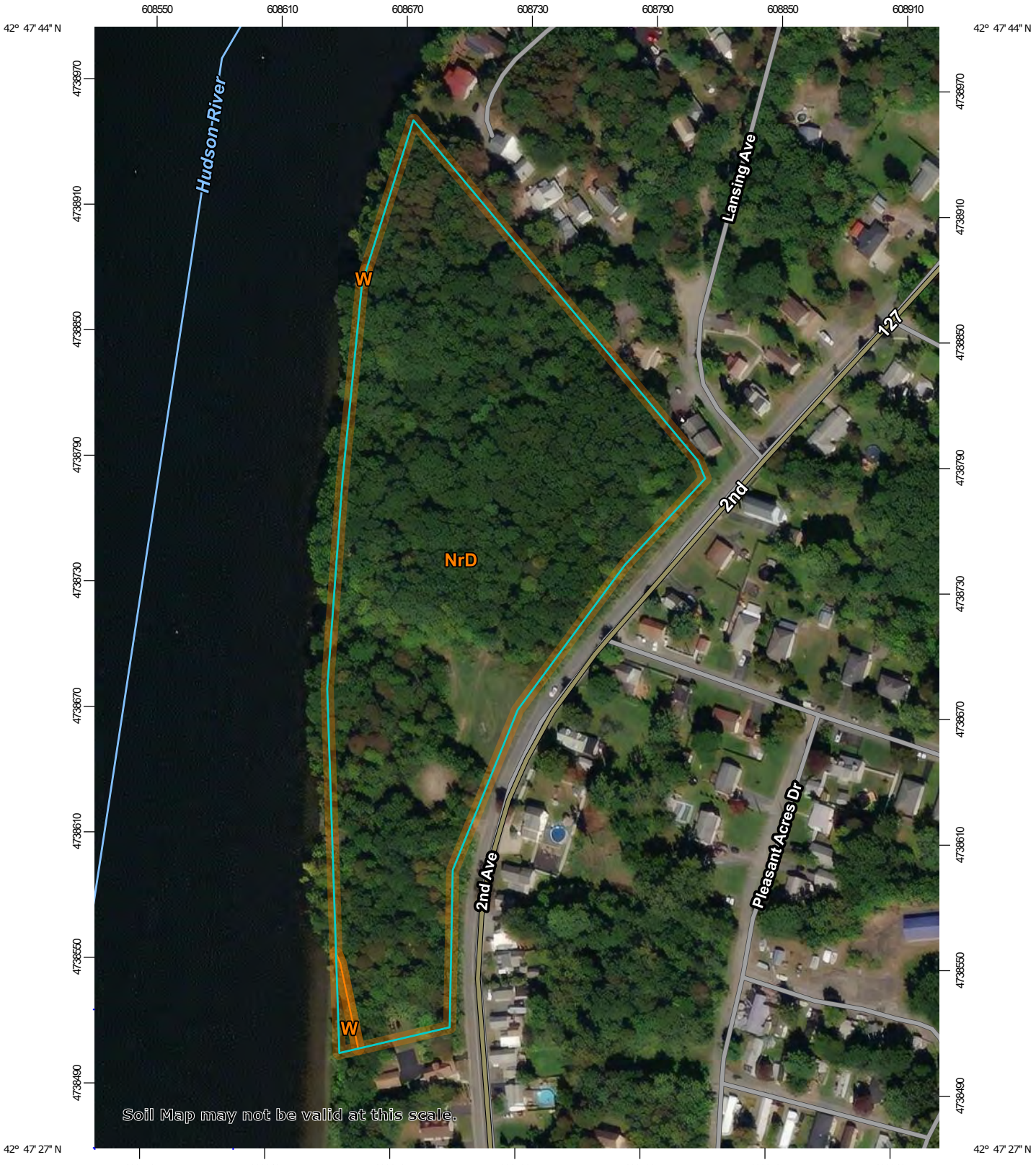
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Figure 1: Site Location Map



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Soil Map—Rensselaer County, New York
(soil mapping)



Map Scale: 1:2,610 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 35 70 140 210

Feet
0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rensselaer County, New York
Survey Area Data: Version 17, Jun 11, 2020

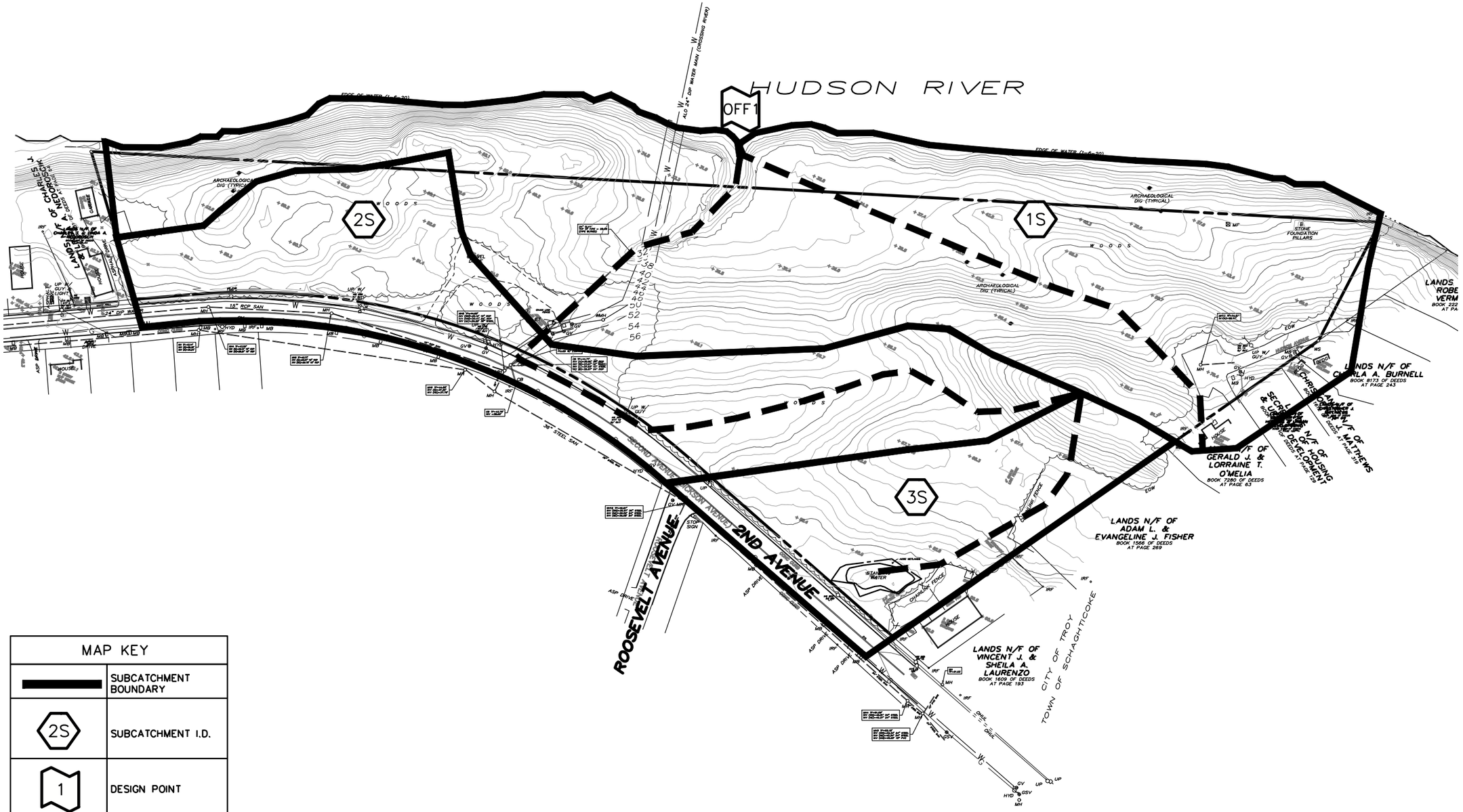
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 1, 2014—Sep 22, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
NrD	Nassau-Rock outcrop complex, hilly	10.0	99.4%
W	Water	0.1	0.6%
Totals for Area of Interest		**10.1**	**100.0%**



MAP KEY	
▬▬	SUBCATCHMENT BOUNDARY
2S	SUBCATCHMENT I.D.
1	DESIGN POINT
4P	STORMWATER DEVICE
- - → - -	TC PATH

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2ND AVENUE APARTMENTS

1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
RENSSELAER COUNTY, NEW YORK

TAX MAP. No. 70.64-1-1 & 10.56-1-6
AUGUST 2021

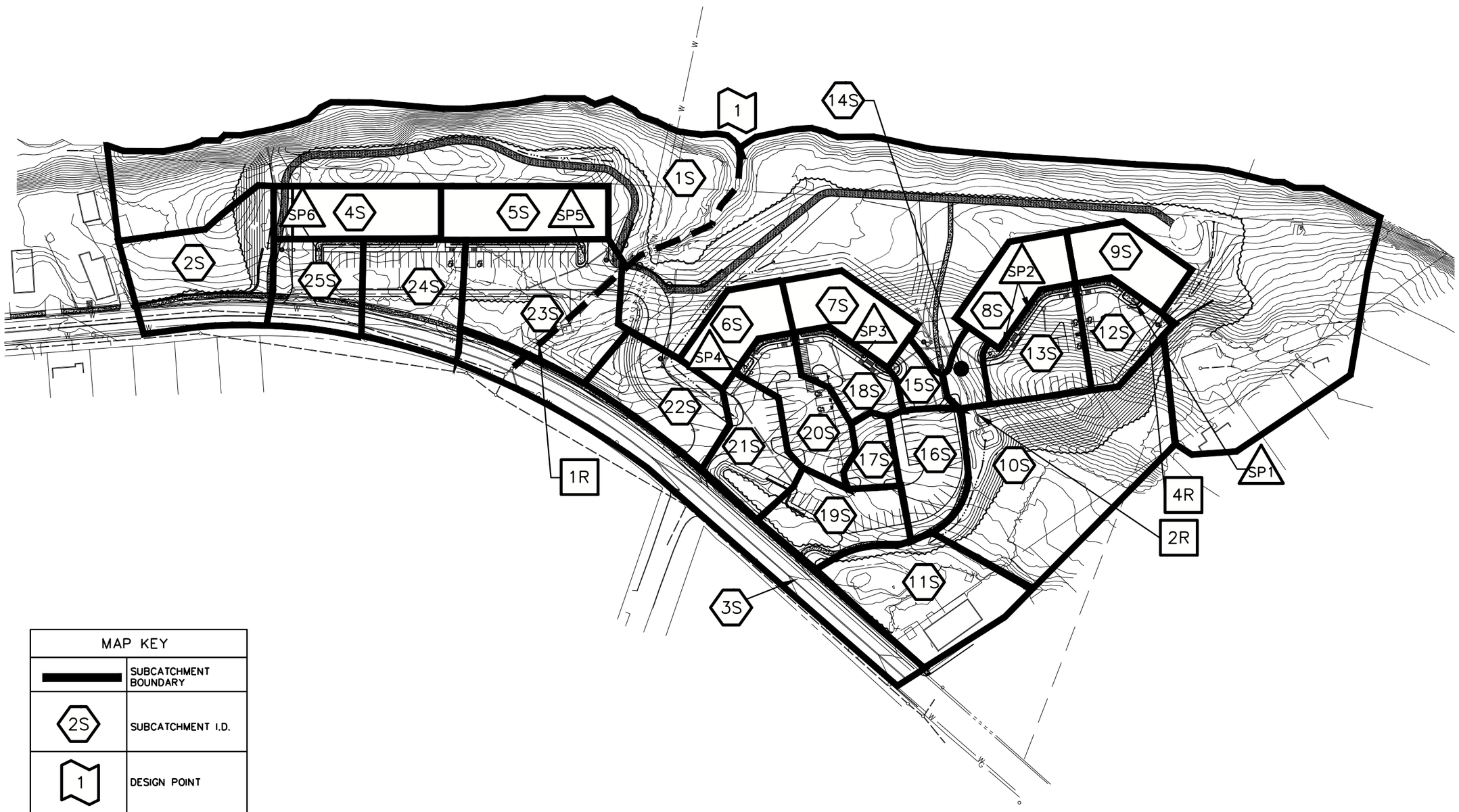
REVISION	DATE	BY

SCALE: 1" = 120'

SHEET TITLE: PREDEVELOPMENT

SHEET NO. FIGURE 3

Q:\RENSSELAER\TROY\2nd Avenue\1011 2nd Avenue\05 - dwg\Detailed Plans\FIGURES\STORMWATER.dwg Sep 27, 2021 05:15:50PM,



MAP KEY	
	SUBCATCHMENT BOUNDARY
2S	SUBCATCHMENT I.D.
1	DESIGN POINT
4P	STORMWATER DEVICE
	TC PATH

edp
ENVIRONMENTAL DESIGN PARTNERSHIP, LLP.
900 Route 146 Clifton Park, New York 12065
(518) 371-7621 edpllp.com

2ND AVENUE APARTMENTS

1011 2ND AVENUE
CITY OF TROY AND TOWN OF SCHAGHTICOKE
RENSSELAER COUNTY, NEW YORK

TAX MAP. No. 70.64-1-1 & 10.56-1-6
AUGUST 2021

REVISION	DATE	BY

SCALE: 1" = 120'

SHEET TITLE: POSTDEVELOPMENT

SHEET NO. FIGURE 4

Q:\RENSSELAER\TROY\2nd Avenue\1011 2nd Avenue\05 - dwg\Detailed Plans\FIGURES\STORMWATER.dwg Sep 27, 2021 05:15:52PM,

Attachment A

Water Quality Calculation

Runoff Reduction Calculation

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e-mail: info@edpllp.com

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Water Quality Volume (WQv) Calculations

Project: 2ND AVE TROY DEVELOPMENT

Date: 9/27/2021

SUB I.D.	AREA (SF)	I (SF)	I (%)	Rv	WQv (cu-ft)	WQv Provided (cu-ft)	SMA I.D.
1S	227,434	0	0%	0.05	1,042	OFF	-
2S	19,232	4,653	24%	0.27	472	OFF	-
3S	25,969	25,969	100%	0.95	2,261	OFF	-
4S	12,073	12,073	100%	0.95	1,051	1,160	SP6
5S	12,073	12,073	100%	0.95	1,051	1,692	SP5
6S	8,624	8,624	100%	0.95	751	870	SP4
7S	8,624	8,624	100%	0.95	751	1,231	SP3
8S	9,375	9,375	100%	0.95	816	1,359	SP2
9S	8,698	8,698	100%	0.95	757	1,147	SP1
10S	42,596	0	0%	0.05	195	1,815	2P
11S	21,467	9,099	42%	0.43	849	OFF	-
12S	9,133	6,498	71%	0.69	578	578	WQU#1
13S	11,142	11,142	100%	0.95	970	970	WQU#2
14S	3,565	3,565	100%	0.95	310	310	WQU#2
15S	3,662	3,053	83%	0.80	269	269	WUQ#2
16S	10,897	7,409	68%	0.66	661	661	WQU#2
17S	4,314	4,314	100%	0.95	376	376	WQU#2
18S	8,128	6,512	80%	0.77	574	574	WQU#2
19S	12,498	6,057	48%	0.49	557	557	WQU#3
20S	11,405	10,905	96%	0.91	952	952	WQU#3
21S	11,565	6,693	58%	0.57	605	605	WQU#3
22S	13,663	5,287	39%	0.40	499	499	WQU#3
23S	25,137	9,720	39%	0.40	917	917	WQU#4
24S	8,860	4,446	50%	0.50	407	407	WQU#5
25S	6,623	4,953	75%	0.72	439	439	WQU#5
Totals	**536,757**	**189,742**			**18,114**	**17,388**	

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Runoff Reduction Volume (RRv) Calculations

Project: 2ND AVE TROY DEVELOPMENT

Date: 9/27/2021

Total Site Area =	12.34	acres	P =	1.1	in
Imp=	35.45	%	WQv =	18,184	cf
Rv =	0.37				

Minimum Reduction

Aic (ac)	S	Ai (ac)	Rv*	RRv (ac-ft)	Min Reduction (RRv) (cf)
3.85	0.2	0.77	0.95	0.07	2,921

Green Infrastructure

Vegetated Swale

I.D.	Contributing WQv (cf)	Length (ft)	Slope (%)	Bottom Width (ft)	WQV Flow Rate (cfs)	10-yr Flow Rate (fps)	Reduction
4R	578	112	2.68	3	1	2.25	116

Stormwater Planters

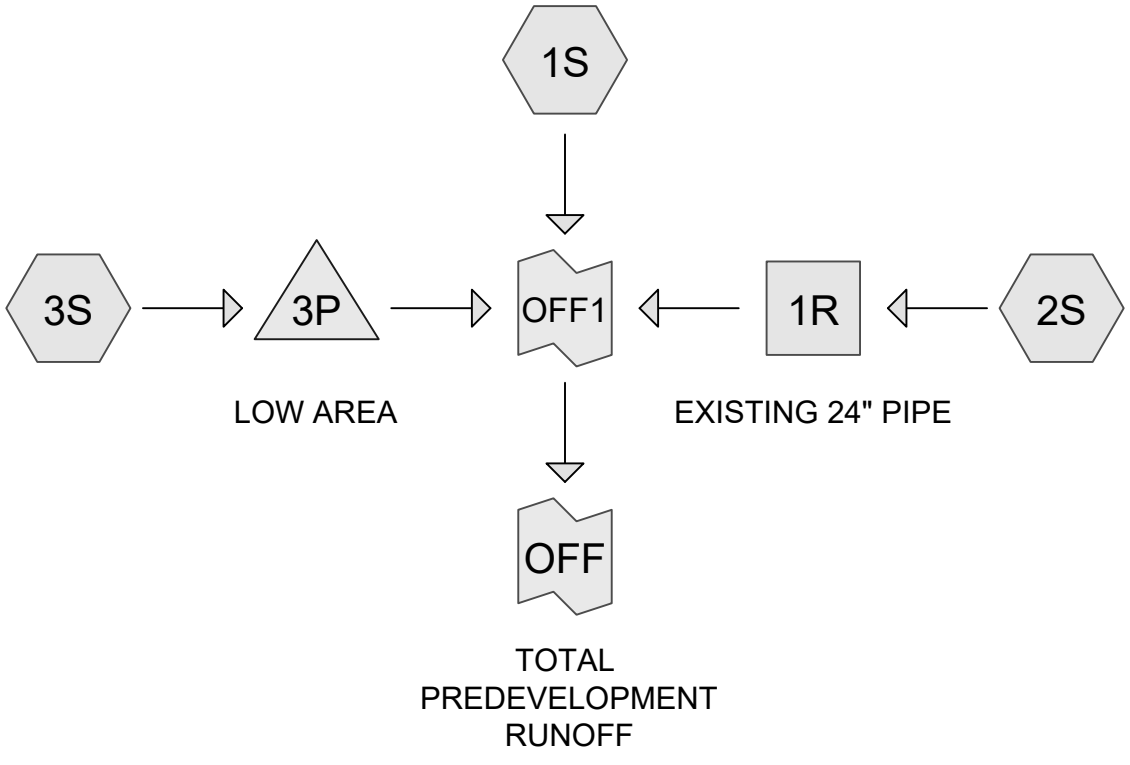
I.D.	WQv (cf)	Filter Depth (ft)	k (ft/day	Pond Depth (ft)	Design Time	Area Required (sf)	Area Proposed (sf)	RRv
SP1	757	2.5	0.5	0.5	3	421	528	634
SP2	816	2.5	0.5	0.5	3	453	525	630
SP3	751	2.5	0.5	0.5	3	417	469	563
SP4	751	2.5	0.5	0.5	3	417	657	751
SP5	1,051	2.5	0.5	0.5	3	584	727	872
SP6	1,051	2.5	0.5	0.5	3	584	700	840

Reduction from Green Infrastructure = **4,406** cf

Attachment B

Stormwater Modeling Calculations

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Subcat Reach Pond Link

Routing Diagram for PREDEVELOPMENT
Prepared by EDP, Printed 9/27/2021
HydroCAD® 10.10-3a s/n 11387 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 YR	Type II 24-hr		Default	24.00	1	2.24	2
2	10 YR	Type II 24-hr		Default	24.00	1	3.77	2
3	100 YR	Type II 24-hr		Default	24.00	1	6.37	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
40,978	84	50-75% Grass cover, Fair, HSG D (1S)
21,393	80	>75% Grass cover, Good, HSG D (2S, 3S)
31,742	98	Paved roads w/curbs & sewers, HSG D (2S, 3S)
442,481	79	Woods, Fair, HSG D (1S, 2S, 3S)
536,594	**81**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
536,594	HSG D	1S, 2S, 3S
0	Other	
536,594		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	0	40,978	0	40,978	50-75% Grass cover, Fair
0	0	0	21,393	0	21,393	>75% Grass cover, Good
0	0	0	31,742	0	31,742	Paved roads w/curbs & sewers
0	0	0	442,481	0	442,481	Woods, Fair
0	**0**	**0**	**536,594**	**0**	**536,594**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1R	30.57	28.69	192.0	0.0098	0.013	24.0	0.0	0.0

Time span=0.00-200.00 hrs, dt=0.05 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=312,442 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=680' Tc=15.9 min CN=80 Runoff=6.11 cfs 18,592 cf

Subcatchment2S: Runoff Area=145,983 sf 14.50% Impervious Runoff Depth=0.81"
Tc=0.0 min CN=82 Runoff=5.62 cfs 9,874 cf

Subcatchment3S: Runoff Area=78,169 sf 13.53% Impervious Runoff Depth=0.81"
Flow Length=350' Slope=0.2200 '/' Tc=11.1 min CN=82 Runoff=2.10 cfs 5,287 cf

Reach 1R: EXISTING 24" PIPE Avg. Flow Depth=0.67' Max Vel=5.88 fps Inflow=5.62 cfs 9,874 cf
24.0" Round Pipe n=0.013 L=192.0' S=0.0098 '/' Capacity=22.39 cfs Outflow=5.22 cfs 9,874 cf

Pond 3P: LOW AREA Peak Elev=47.51' Storage=3,405 cf Inflow=2.10 cfs 5,287 cf
Outflow=0.10 cfs 1,919 cf

Link OFF: TOTAL PREDEVELOPMENT RUNOFF Inflow=7.48 cfs 30,385 cf
Primary=7.48 cfs 30,385 cf

Link OFF1: Inflow=7.48 cfs 30,385 cf
Primary=7.48 cfs 30,385 cf

Total Runoff Area = 536,594 sf Runoff Volume = 33,753 cf Average Runoff Depth = 0.75"
94.08% Pervious = 504,852 sf 5.92% Impervious = 31,742 sf

Summary for Subcatchment 1S:

Runoff = 6.11 cfs @ 12.09 hrs, Volume= 18,592 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
271,464	79	Woods, Fair, HSG D
40,978	84	50-75% Grass cover, Fair, HSG D
312,442	80	Weighted Average
312,442		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1800	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
5.8	580	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.9	680	Total			

Summary for Subcatchment 2S:

Runoff = 5.62 cfs @ 11.90 hrs, Volume= 9,874 cf, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
114,307	79	Woods, Fair, HSG D
21,166	98	Paved roads w/curbs & sewers, HSG D
10,510	80	>75% Grass cover, Good, HSG D
145,983	82	Weighted Average
124,817		85.50% Pervious Area
21,166		14.50% Impervious Area

Summary for Subcatchment 3S:

Runoff = 2.10 cfs @ 12.04 hrs, Volume= 5,287 cf, Depth= 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
56,710	79	Woods, Fair, HSG D
10,883	80	>75% Grass cover, Good, HSG D
10,576	98	Paved roads w/curbs & sewers, HSG D
78,169	82	Weighted Average
67,593		86.47% Pervious Area
10,576		13.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.2200	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
1.8	250	0.2200	2.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	350	Total			

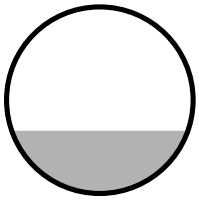
Summary for Reach 1R: EXISTING 24" PIPE

Inflow Area = 145,983 sf, 14.50% Impervious, Inflow Depth = 0.81" for 1 YR event
Inflow = 5.62 cfs @ 11.90 hrs, Volume= 9,874 cf
Outflow = 5.22 cfs @ 11.91 hrs, Volume= 9,874 cf, Atten= 7%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.88 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.86 fps, Avg. Travel Time= 1.7 min

Peak Storage= 178 cf @ 11.90 hrs
Average Depth at Peak Storage= 0.67' , Surface Width= 1.89'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 22.39 cfs

24.0" Round Pipe
n= 0.013 Clay tile
Length= 192.0' Slope= 0.0098 '/'
Inlet Invert= 30.57', Outlet Invert= 28.69'



Summary for Pond 3P: LOW AREA

Inflow Area = 78,169 sf, 13.53% Impervious, Inflow Depth = 0.81" for 1 YR event
Inflow = 2.10 cfs @ 12.04 hrs, Volume= 5,287 cf
Outflow = 0.10 cfs @ 14.05 hrs, Volume= 1,919 cf, Atten= 95%, Lag= 120.6 min
Primary = 0.10 cfs @ 14.05 hrs, Volume= 1,919 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 47.51' @ 14.05 hrs Surf.Area= 4,249 sf Storage= 3,405 cf

Plug-Flow detention time= 358.5 min calculated for 1,919 cf (36% of inflow)
Center-of-Mass det. time= 219.1 min (1,075.6 - 856.5)

Volume	Invert	Avail.Storage	Storage Description
#1	46.00'	5,811 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	265	0	0
48.00	5,546	5,811	5,811

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	**30.0' long x 38.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.07 cfs @ 14.05 hrs HW=47.51' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.25 fps)

Summary for Link OFF: TOTAL PREDEVELOPMENT RUNOFF

Inflow Area = 536,594 sf, 5.92% Impervious, Inflow Depth = 0.68" for 1 YR event
Inflow = 7.48 cfs @ 11.94 hrs, Volume= 30,385 cf
Primary = 7.48 cfs @ 11.94 hrs, Volume= 30,385 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Summary for Link OFF1:

Inflow Area = 536,594 sf, 5.92% Impervious, Inflow Depth = 0.68" for 1 YR event
Inflow = 7.48 cfs @ 11.94 hrs, Volume= 30,385 cf
Primary = 7.48 cfs @ 11.94 hrs, Volume= 30,385 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Time span=0.00-200.00 hrs, dt=0.05 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=312,442 sf 0.00% Impervious Runoff Depth=1.85"
Flow Length=680' Tc=15.9 min CN=80 Runoff=16.57 cfs 48,251 cf

Subcatchment2S: Runoff Area=145,983 sf 14.50% Impervious Runoff Depth=2.01"
Tc=0.0 min CN=82 Runoff=13.69 cfs 24,426 cf

Subcatchment3S: Runoff Area=78,169 sf 13.53% Impervious Runoff Depth=2.01"
Flow Length=350' Slope=0.2200 '/' Tc=11.1 min CN=82 Runoff=5.26 cfs 13,079 cf

Reach 1R: EXISTING 24" PIPE Avg. Flow Depth=1.11' Max Vel=7.44 fps Inflow=13.69 cfs 24,426 cf
24.0" Round Pipe n=0.013 L=192.0' S=0.0098 '/' Capacity=22.39 cfs Outflow=12.98 cfs 24,426 cf

Pond 3P: LOW AREA Peak Elev=47.65' Storage=4,031 cf Inflow=5.26 cfs 13,079 cf
Outflow=4.67 cfs 9,711 cf

Link OFF: TOTAL PREDEVELOPMENT RUNOFF Inflow=23.03 cfs 82,388 cf
Primary=23.03 cfs 82,388 cf

Link OFF1: Inflow=23.03 cfs 82,388 cf
Primary=23.03 cfs 82,388 cf

Total Runoff Area = 536,594 sf Runoff Volume = 85,756 cf Average Runoff Depth = 1.92"
94.08% Pervious = 504,852 sf 5.92% Impervious = 31,742 sf

Summary for Subcatchment 1S:

Runoff = 16.57 cfs @ 12.08 hrs, Volume= 48,251 cf, Depth= 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
271,464	79	Woods, Fair, HSG D
40,978	84	50-75% Grass cover, Fair, HSG D
312,442	80	Weighted Average
312,442		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1800	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
5.8	580	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.9	680	Total			

Summary for Subcatchment 2S:

Runoff = 13.69 cfs @ 11.89 hrs, Volume= 24,426 cf, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
114,307	79	Woods, Fair, HSG D
21,166	98	Paved roads w/curbs & sewers, HSG D
10,510	80	>75% Grass cover, Good, HSG D
145,983	82	Weighted Average
124,817		85.50% Pervious Area
21,166		14.50% Impervious Area

Summary for Subcatchment 3S:

Runoff = 5.26 cfs @ 12.03 hrs, Volume= 13,079 cf, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
56,710	79	Woods, Fair, HSG D
10,883	80	>75% Grass cover, Good, HSG D
10,576	98	Paved roads w/curbs & sewers, HSG D
78,169	82	Weighted Average
67,593		86.47% Pervious Area
10,576		13.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.2200	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
1.8	250	0.2200	2.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	350	Total			

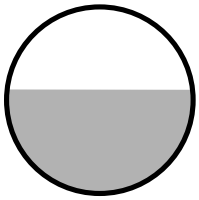
Summary for Reach 1R: EXISTING 24" PIPE

Inflow Area = 145,983 sf, 14.50% Impervious, Inflow Depth = 2.01" for 10 YR event
Inflow = 13.69 cfs @ 11.89 hrs, Volume= 24,426 cf
Outflow = 12.98 cfs @ 11.90 hrs, Volume= 24,426 cf, Atten= 5%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.44 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.24 fps, Avg. Travel Time= 1.4 min

Peak Storage= 345 cf @ 11.90 hrs
Average Depth at Peak Storage= 1.11' , Surface Width= 1.99'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 22.39 cfs

24.0" Round Pipe
n= 0.013 Clay tile
Length= 192.0' Slope= 0.0098 '/'
Inlet Invert= 30.57', Outlet Invert= 28.69'



Summary for Pond 3P: LOW AREA

Inflow Area = 78,169 sf, 13.53% Impervious, Inflow Depth = 2.01" for 10 YR event
Inflow = 5.26 cfs @ 12.03 hrs, Volume= 13,079 cf
Outflow = 4.67 cfs @ 12.09 hrs, Volume= 9,711 cf, Atten= 11%, Lag= 3.5 min
Primary = 4.67 cfs @ 12.09 hrs, Volume= 9,711 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 47.65' @ 12.09 hrs Surf.Area= 4,621 sf Storage= 4,031 cf

Plug-Flow detention time= 148.3 min calculated for 9,711 cf (74% of inflow)
Center-of-Mass det. time= 51.1 min (881.2 - 830.1)

Volume	Invert	Avail.Storage	Storage Description
#1	46.00'	5,811 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	265	0	0
48.00	5,546	5,811	5,811

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	**30.0' long x 38.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.53 cfs @ 12.09 hrs HW=47.65' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 4.53 cfs @ 1.03 fps)

Summary for Link OFF: TOTAL PREDEVELOPMENT RUNOFF

Inflow Area = 536,594 sf, 5.92% Impervious, Inflow Depth = 1.84" for 10 YR event
Inflow = 23.03 cfs @ 12.08 hrs, Volume= 82,388 cf
Primary = 23.03 cfs @ 12.08 hrs, Volume= 82,388 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Summary for Link OFF1:

Inflow Area = 536,594 sf, 5.92% Impervious, Inflow Depth = 1.84" for 10 YR event
Inflow = 23.03 cfs @ 12.08 hrs, Volume= 82,388 cf
Primary = 23.03 cfs @ 12.08 hrs, Volume= 82,388 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Time span=0.00-200.00 hrs, dt=0.05 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=312,442 sf 0.00% Impervious Runoff Depth=4.12"
Flow Length=680' Tc=15.9 min CN=80 Runoff=36.52 cfs 107,186 cf

Subcatchment2S: Runoff Area=145,983 sf 14.50% Impervious Runoff Depth=4.33"
Tc=0.0 min CN=82 Runoff=28.38 cfs 52,661 cf

Subcatchment3S: Runoff Area=78,169 sf 13.53% Impervious Runoff Depth=4.33"
Flow Length=350' Slope=0.2200 '/' Tc=11.1 min CN=82 Runoff=11.09 cfs 28,198 cf

Reach 1R: EXISTING 24" PIPE Avg. Flow Depth=2.00' Max Vel=8.11 fps Inflow=28.38 cfs 52,661 cf
24.0" Round Pipe n=0.013 L=192.0' S=0.0098 '/' Capacity=22.39 cfs Outflow=24.73 cfs 52,661 cf

Pond 3P: LOW AREA Peak Elev=47.76' Storage=4,570 cf Inflow=11.09 cfs 28,198 cf
Outflow=10.86 cfs 24,830 cf

Link OFF: TOTAL PREDEVELOPMENT RUNOFF Inflow=54.23 cfs 184,678 cf
Primary=54.23 cfs 184,678 cf

Link OFF1: Inflow=54.23 cfs 184,678 cf
Primary=54.23 cfs 184,678 cf

Total Runoff Area = 536,594 sf Runoff Volume = 188,046 cf Average Runoff Depth = 4.21"
94.08% Pervious = 504,852 sf 5.92% Impervious = 31,742 sf

Summary for Subcatchment 1S:

Runoff = 36.52 cfs @ 12.08 hrs, Volume= 107,186 cf, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
271,464	79	Woods, Fair, HSG D
40,978	84	50-75% Grass cover, Fair, HSG D
312,442	80	Weighted Average
312,442		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1800	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
5.8	580	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.9	680	Total			

Summary for Subcatchment 2S:

Runoff = 28.38 cfs @ 11.89 hrs, Volume= 52,661 cf, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
114,307	79	Woods, Fair, HSG D
21,166	98	Paved roads w/curbs & sewers, HSG D
10,510	80	>75% Grass cover, Good, HSG D
145,983	82	Weighted Average
124,817		85.50% Pervious Area
21,166		14.50% Impervious Area

Summary for Subcatchment 3S:

Runoff = 11.09 cfs @ 12.03 hrs, Volume= 28,198 cf, Depth= 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
56,710	79	Woods, Fair, HSG D
10,883	80	>75% Grass cover, Good, HSG D
10,576	98	Paved roads w/curbs & sewers, HSG D
78,169	82	Weighted Average
67,593		86.47% Pervious Area
10,576		13.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	100	0.2200	0.18		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
1.8	250	0.2200	2.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	350	Total			

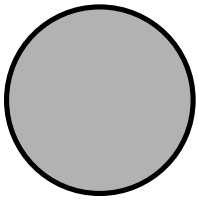
Summary for Reach 1R: EXISTING 24" PIPE

Inflow Area = 145,983 sf, 14.50% Impervious, Inflow Depth = 4.33" for 100 YR event
Inflow = 28.38 cfs @ 11.89 hrs, Volume= 52,661 cf
Outflow = 24.73 cfs @ 11.93 hrs, Volume= 52,661 cf, Atten= 13%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.11 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.66 fps, Avg. Travel Time= 1.2 min

Peak Storage= 604 cf @ 11.91 hrs
Average Depth at Peak Storage= 2.00'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 22.39 cfs

24.0" Round Pipe
n= 0.013 Clay tile
Length= 192.0' Slope= 0.0098 '/'
Inlet Invert= 30.57', Outlet Invert= 28.69'



Summary for Pond 3P: LOW AREA

Inflow Area = 78,169 sf, 13.53% Impervious, Inflow Depth = 4.33" for 100 YR event
Inflow = 11.09 cfs @ 12.03 hrs, Volume= 28,198 cf
Outflow = 10.86 cfs @ 12.05 hrs, Volume= 24,830 cf, Atten= 2%, Lag= 1.3 min
Primary = 10.86 cfs @ 12.05 hrs, Volume= 24,830 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 47.76' @ 12.05 hrs Surf.Area= 4,920 sf Storage= 4,570 cf

Plug-Flow detention time= 87.4 min calculated for 24,824 cf (88% of inflow)
Center-of-Mass det. time= 29.2 min (837.4 - 808.2)

Volume	Invert	Avail.Storage	Storage Description
#1	46.00'	5,811 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	265	0	0
48.00	5,546	5,811	5,811

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	**30.0' long x 38.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=10.80 cfs @ 12.05 hrs HW=47.76' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 10.80 cfs @ 1.37 fps)

Summary for Link OFF: TOTAL PREDEVELOPMENT RUNOFF

Inflow Area = 536,594 sf, 5.92% Impervious, Inflow Depth = 4.13" for 100 YR event
Inflow = 54.23 cfs @ 11.96 hrs, Volume= 184,678 cf
Primary = 54.23 cfs @ 11.96 hrs, Volume= 184,678 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Summary for Link OFF1:

Inflow Area = 536,594 sf, 5.92% Impervious, Inflow Depth = 4.13" for 100 YR event
Inflow = 54.23 cfs @ 11.96 hrs, Volume= 184,678 cf
Primary = 54.23 cfs @ 11.96 hrs, Volume= 184,678 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

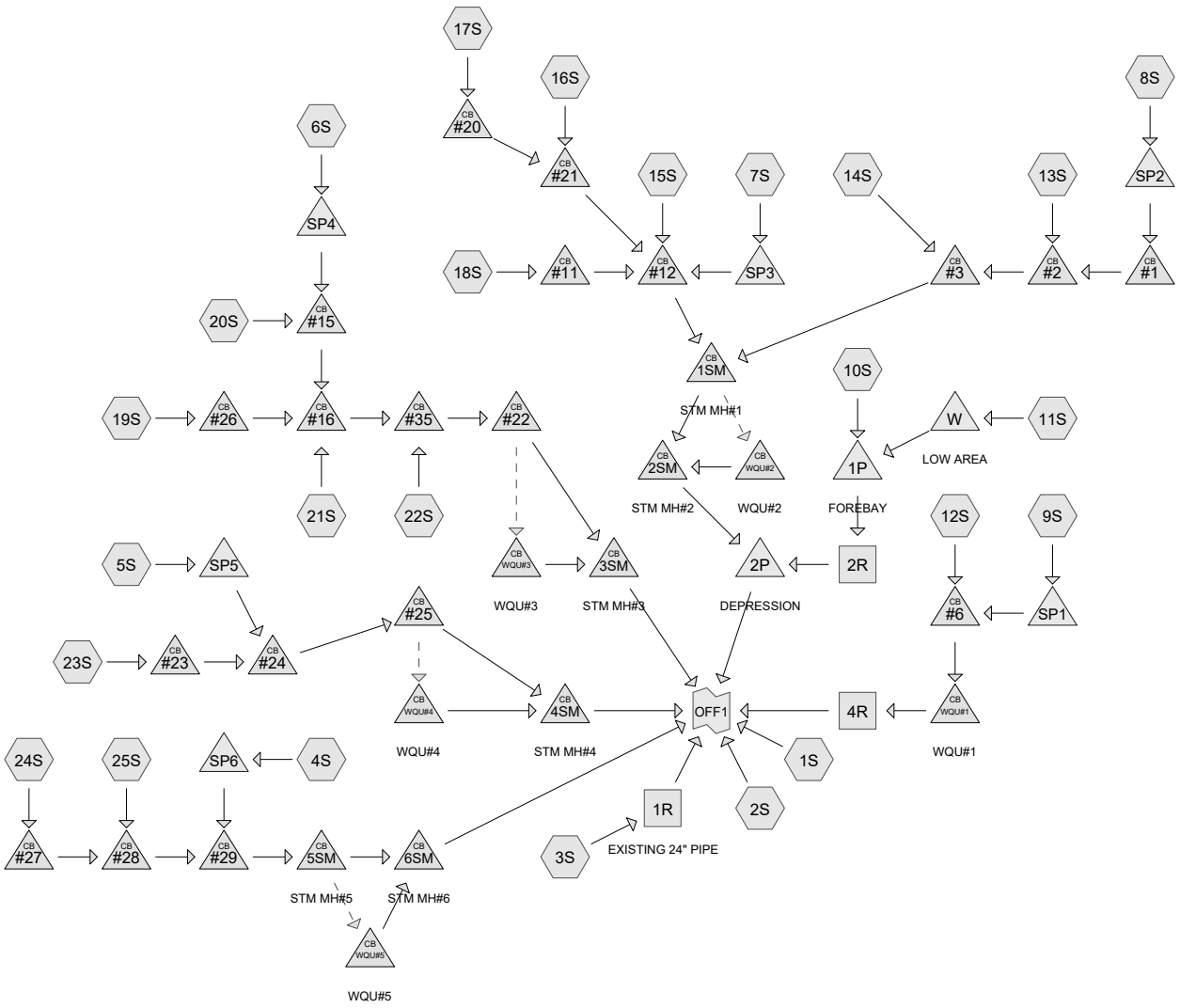
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Subcat Reach Pond Link

Routing Diagram for POSTDEVELOPMENT
Prepared by EDP, Printed 9/27/2021
HydroCAD® 10.10-3a s/n 11387 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1 YR	Type II 24-hr		Default	24.00	1	2.24	2
2	10 YR	Type II 24-hr		Default	24.00	1	3.77	2
3	25 YR	Type II 24-hr		Default	24.00	1	4.64	2
4	100 YR	Type II 24-hr		Default	24.00	1	6.37	2
5	WQv	Type II 24-hr		Default	24.00	1	1.10	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
211,201	80	>75% Grass cover, Good, HSG D (1S, 2S, 10S, 12S, 15S, 16S, 18S, 19S, 20S, 21S, 22S, 23S, 24S, 25S)
90,554	98	Paved parking, HSG D (12S, 13S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 24S, 25S)
30,622	98	Paved roads w/curbs & sewers, HSG D (2S, 3S)
9,099	98	Unconnected pavement, HSG D (11S)
59,467	98	Unconnected roofs, HSG D (4S, 5S, 6S, 7S, 8S, 9S)
115,340	79	Woods, Fair, HSG D (1S, 10S)
8,106	77	Woods, Good, HSG D (2S)
12,368	79	Woods/grass comb., Good, HSG D (11S)
536,757	**86**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
536,757	HSG D	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 24S, 25S
0	Other	
536,757		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	0	211,201	0	211,201	>75% Grass cover, Good
0	0	0	90,554	0	90,554	Paved parking
0	0	0	30,622	0	30,622	Paved roads w/curbs & sewers
0	0	0	9,099	0	9,099	Unconnected pavement
0	0	0	59,467	0	59,467	Unconnected roofs
0	0	0	115,340	0	115,340	Woods, Fair
0	0	0	8,106	0	8,106	Woods, Good
0	0	0	12,368	0	12,368	Woods/grass comb., Good
0	**0**	**0**	**536,757**	**0**	**536,757**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1R	30.57	28.69	192.0	0.0098	0.013	24.0	0.0	0.0
2	2R	43.50	37.00	210.0	0.0310	0.013	18.0	0.0	0.0
3	#1	40.50	40.05	77.0	0.0058	0.013	12.0	0.0	0.0
4	#11	41.40	41.00	55.0	0.0073	0.013	12.0	0.0	0.0
5	#12	38.90	38.00	61.0	0.0148	0.013	18.0	0.0	0.0
6	#15	40.20	40.00	31.0	0.0065	0.013	12.0	0.0	0.0
7	#16	39.00	38.25	56.0	0.0134	0.013	15.0	0.0	0.0
8	#2	40.05	39.35	33.0	0.0212	0.013	12.0	0.0	0.0
9	#20	43.00	42.05	76.0	0.0125	0.013	12.0	0.0	0.0
10	#21	42.05	38.90	70.0	0.0450	0.013	12.0	0.0	0.0
11	#22	37.35	37.00	8.0	0.0438	0.013	15.0	0.0	0.0
12	#22	36.35	36.25	8.3	0.0120	0.013	12.0	0.0	0.0
13	#23	40.35	39.85	70.0	0.0071	0.013	15.0	0.0	0.0
14	#24	39.85	39.25	26.0	0.0231	0.013	12.0	0.0	0.0
15	#25	39.25	39.00	13.0	0.0192	0.013	12.0	0.0	0.0
16	#25	38.25	38.00	12.0	0.0208	0.013	12.0	0.0	0.0
17	#26	43.50	40.00	126.0	0.0278	0.013	12.0	0.0	0.0
18	#27	39.30	38.50	100.0	0.0080	0.013	12.0	0.0	0.0
19	#28	35.55	35.00	36.0	0.0153	0.013	12.0	0.0	0.0
20	#29	38.25	37.75	43.0	0.0116	0.013	12.0	0.0	0.0
21	#3	39.15	38.75	36.0	0.0111	0.013	15.0	0.0	0.0
22	#35	38.25	37.35	34.0	0.0265	0.013	15.0	0.0	0.0
23	#6	38.30	38.15	9.8	0.0153	0.013	12.0	0.0	0.0
24	1P	43.50	39.00	168.0	0.0268	0.013	18.0	0.0	0.0
25	1SM	38.60	38.40	11.0	0.0182	0.013	15.0	0.0	0.0
26	1SM	37.80	37.60	8.6	0.0233	0.013	12.0	0.0	0.0
27	2SM	37.50	37.00	92.0	0.0054	0.013	18.0	0.0	0.0
28	3SM	36.00	35.00	118.0	0.0085	0.013	18.0	0.0	0.0
29	4SM	37.50	37.00	10.5	0.0476	0.013	15.0	0.0	0.0
30	5SM	39.10	38.00	16.0	0.0688	0.013	15.0	0.0	0.0
31	5SM	37.75	37.50	6.3	0.0397	0.013	12.0	0.0	0.0
32	6SM	37.25	36.50	86.0	0.0087	0.013	15.0	0.0	0.0
33	SP1	42.00	39.75	10.0	0.2250	0.013	8.0	0.0	0.0
34	SP2	42.00	40.15	10.0	0.1850	0.013	8.0	0.0	0.0
35	SP3	42.00	40.15	10.0	0.1850	0.013	8.0	0.0	0.0
36	SP4	42.00	40.15	10.0	0.1850	0.013	8.0	0.0	0.0
37	SP5	42.00	40.15	10.0	0.1850	0.013	8.0	0.0	0.0
38	SP6	42.00	40.15	10.0	0.1850	0.013	8.0	0.0	0.0
39	WQU#1	38.15	37.80	11.0	0.0318	0.013	12.0	0.0	0.0
40	WQU#2	37.60	37.50	6.5	0.0154	0.013	12.0	0.0	0.0
41	WQU#3	36.25	36.00	10.0	0.0250	0.013	12.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
42	WQU#4	38.00	37.75	7.0	0.0357	0.013	12.0	0.0	0.0
43	WQU#5	37.50	37.25	17.0	0.0147	0.013	12.0	0.0	0.0

Time span=0.00-200.00 hrs, dt=0.05 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=227,434 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=680' Tc=15.9 min CN=80 Runoff=4.45 cfs 13,533 cf

Subcatchment2S: Runoff Area=19,232 sf 24.19% Impervious Runoff Depth=0.86"
Tc=0.0 min CN=83 Runoff=0.79 cfs 1,384 cf

Subcatchment3S: Runoff Area=25,969 sf 100.00% Impervious Runoff Depth=2.01"
Flow Length=383' Tc=6.0 min CN=98 Runoff=1.81 cfs 4,355 cf

Subcatchment4S: Runoff Area=12,073 sf 100.00% Impervious Runoff Depth=2.01"
Tc=0.0 min CN=98 Runoff=0.98 cfs 2,025 cf

Subcatchment5S: Runoff Area=12,073 sf 100.00% Impervious Runoff Depth=2.01"
Tc=0.0 min CN=98 Runoff=0.98 cfs 2,025 cf

Subcatchment6S: Runoff Area=8,624 sf 100.00% Impervious Runoff Depth=2.01"
Tc=0.0 min CN=98 Runoff=0.70 cfs 1,446 cf

Subcatchment7S: Runoff Area=8,624 sf 100.00% Impervious Runoff Depth=2.01"
Tc=0.0 min CN=98 Runoff=0.70 cfs 1,446 cf

Subcatchment8S: Runoff Area=9,375 sf 100.00% Impervious Runoff Depth=2.01"
Tc=0.0 min CN=98 Runoff=0.76 cfs 1,572 cf

Subcatchment9S: Runoff Area=8,698 sf 100.00% Impervious Runoff Depth=2.01"
Flow Length=63' Slope=0.0500 '/' Tc=6.0 min CN=98 Runoff=0.61 cfs 1,459 cf

Subcatchment10S: Runoff Area=42,596 sf 0.00% Impervious Runoff Depth=0.71"
Flow Length=383' Tc=6.0 min CN=80 Runoff=1.20 cfs 2,535 cf

Subcatchment11S: Runoff Area=21,467 sf 42.39% Impervious Runoff Depth=1.10"
Flow Length=383' Tc=6.0 min CN=87 Runoff=0.93 cfs 1,962 cf

Subcatchment12S: Runoff Area=9,133 sf 71.15% Impervious Runoff Depth=1.54"
Tc=0.0 min CN=93 Runoff=0.63 cfs 1,169 cf

Subcatchment13S: Runoff Area=11,142 sf 100.00% Impervious Runoff Depth=2.01"
Tc=0.0 min CN=98 Runoff=0.90 cfs 1,869 cf

Subcatchment14S: Runoff Area=3,565 sf 100.00% Impervious Runoff Depth=2.01"
Tc=0.0 min CN=98 Runoff=0.29 cfs 598 cf

Subcatchment15S: Runoff Area=3,662 sf 83.37% Impervious Runoff Depth=1.71"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=95 Runoff=0.23 cfs 523 cf

Subcatchment16S: Runoff Area=10,897 sf 67.99% Impervious Runoff Depth=1.45"
Flow Length=155' Slope=0.0200 '/' Tc=6.0 min CN=92 Runoff=0.61 cfs 1,320 cf

Subcatchment17S: Runoff Area=4,314 sf 100.00% Impervious Runoff Depth=2.01"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=98 Runoff=0.30 cfs 723 cf

Subcatchment18S: Runoff Area=8,128 sf 80.12% Impervious Runoff Depth=1.62"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=94 Runoff=0.50 cfs 1,099 cf

Subcatchment19S: Runoff Area=12,498 sf 48.46% Impervious Runoff Depth=1.23"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=89 Runoff=0.60 cfs 1,281 cf

Subcatchment20S: Runoff Area=11,405 sf 95.62% Impervious Runoff Depth=1.91"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=97 Runoff=0.78 cfs 1,813 cf

Subcatchment21S: Runoff Area=11,565 sf 57.87% Impervious Runoff Depth=1.30"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=90 Runoff=0.59 cfs 1,254 cf

Subcatchment22S: Runoff Area=13,663 sf 38.70% Impervious Runoff Depth=1.10"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=87 Runoff=0.59 cfs 1,249 cf

Subcatchment23S: Runoff Area=25,137 sf 38.67% Impervious Runoff Depth=1.10"
Flow Length=130' Tc=24.5 min CN=87 Runoff=0.62 cfs 2,298 cf

Subcatchment24S: Runoff Area=8,860 sf 50.18% Impervious Runoff Depth=1.23"
Flow Length=130' Tc=6.0 min CN=89 Runoff=0.43 cfs 908 cf

Subcatchment25S: Runoff Area=6,623 sf 74.78% Impervious Runoff Depth=1.54"
Flow Length=50' Slope=0.0200 '/' Tc=6.0 min CN=93 Runoff=0.39 cfs 848 cf

Reach 1R: EXISTING 24" PIPE Avg. Flow Depth=0.38' Max Vel=4.23 fps Inflow=1.81 cfs 4,355 cf
24.0" Round Pipe n=0.013 L=192.0' S=0.0098 '/' Capacity=22.39 cfs Outflow=1.76 cfs 4,355 cf

Reach 2R: Avg. Flow Depth=0.26' Max Vel=5.84 fps Inflow=1.17 cfs 2,535 cf
18.0" Round Pipe n=0.013 L=210.0' S=0.0310 '/' Capacity=18.48 cfs Outflow=1.13 cfs 2,535 cf

Reach 4R: Avg. Flow Depth=0.13' Max Vel=2.16 fps Inflow=1.02 cfs 2,628 cf
n=0.035 L=112.0' S=0.0446 '/' Capacity=177.26 cfs Outflow=0.97 cfs 2,628 cf

Pond #1: Peak Elev=40.98' Inflow=0.67 cfs 1,572 cf
12.0" Round Culvert n=0.013 L=77.0' S=0.0058 '/' Outflow=0.67 cfs 1,572 cf

Pond #11: Peak Elev=41.80' Inflow=0.50 cfs 1,099 cf
12.0" Round Culvert n=0.013 L=55.0' S=0.0073 '/' Outflow=0.50 cfs 1,099 cf

Pond #12: Peak Elev=39.68' Inflow=2.19 cfs 5,112 cf
18.0" Round Culvert n=0.013 L=61.0' S=0.0148 '/' Outflow=2.19 cfs 5,112 cf

Pond #15: Peak Elev=40.94' Inflow=1.34 cfs 3,259 cf
12.0" Round Culvert n=0.013 L=31.0' S=0.0065 '/' Outflow=1.34 cfs 3,259 cf

Pond #16: Peak Elev=39.92' Inflow=2.49 cfs 5,794 cf
15.0" Round Culvert n=0.013 L=56.0' S=0.0134 '/' Outflow=2.49 cfs 5,794 cf

Pond #2: Peak Elev=40.83' Inflow=1.56 cfs 3,441 cf
12.0" Round Culvert n=0.013 L=33.0' S=0.0212 '/' Outflow=1.56 cfs 3,441 cf

Pond #20: Peak Elev=43.31' Inflow=0.30 cfs 723 cf
12.0" Round Culvert n=0.013 L=76.0' S=0.0125 '/' Outflow=0.30 cfs 723 cf

Pond #21: Peak Elev=42.61' Inflow=0.91 cfs 2,044 cf
12.0" Round Culvert n=0.013 L=70.0' S=0.0450 '/' Outflow=0.91 cfs 2,044 cf

Pond #22: Peak Elev=37.67' Inflow=3.07 cfs 7,043 cf
Primary=0.37 cfs 118 cf Secondary=2.70 cfs 6,925 cf Outflow=3.07 cfs 7,043 cf

Pond #23: Peak Elev=40.77' Inflow=0.62 cfs 2,298 cf
15.0" Round Culvert n=0.013 L=70.0' S=0.0071 '/' Outflow=0.62 cfs 2,298 cf

Pond #24: Peak Elev=40.45' Inflow=1.02 cfs 4,322 cf
12.0" Round Culvert n=0.013 L=26.0' S=0.0231 '/' Outflow=1.02 cfs 4,322 cf

Pond #25: Peak Elev=38.85' Inflow=1.02 cfs 4,322 cf
Primary=0.00 cfs 0 cf Secondary=1.02 cfs 4,322 cf Outflow=1.02 cfs 4,322 cf

Pond #26: Peak Elev=43.94' Inflow=0.60 cfs 1,281 cf
12.0" Round Culvert n=0.013 L=126.0' S=0.0278 '/' Outflow=0.60 cfs 1,281 cf

Pond #27: Peak Elev=39.67' Inflow=0.43 cfs 908 cf
12.0" Round Culvert n=0.013 L=100.0' S=0.0080 '/' Outflow=0.43 cfs 908 cf

Pond #28: Peak Elev=36.08' Inflow=0.82 cfs 1,756 cf
12.0" Round Culvert n=0.013 L=36.0' S=0.0153 '/' Outflow=0.82 cfs 1,756 cf

Pond #29: Peak Elev=39.04' Inflow=1.59 cfs 3,781 cf
12.0" Round Culvert n=0.013 L=43.0' S=0.0116 '/' Outflow=1.59 cfs 3,781 cf

Pond #3: Peak Elev=39.91' Inflow=1.84 cfs 4,039 cf
15.0" Round Culvert n=0.013 L=36.0' S=0.0111 '/' Outflow=1.84 cfs 4,039 cf

Pond #35: Peak Elev=39.31' Inflow=3.07 cfs 7,043 cf
15.0" Round Culvert n=0.013 L=34.0' S=0.0265 '/' Outflow=3.07 cfs 7,043 cf

Pond #6: Peak Elev=38.90' Inflow=1.02 cfs 2,628 cf
12.0" Round Culvert n=0.013 L=9.8' S=0.0153 '/' Outflow=1.02 cfs 2,628 cf

Pond 1P: FOREBAY Peak Elev=43.99' Storage=78 cf Inflow=1.20 cfs 2,535 cf
Outflow=1.17 cfs 2,535 cf

Pond 1SM: STM MH#1 Peak Elev=39.15' Inflow=3.77 cfs 9,150 cf
Primary=1.02 cfs 487 cf Secondary=2.75 cfs 8,663 cf Outflow=3.77 cfs 9,150 cf

Pond 2P: DEPRESSION Peak Elev=33.80' Storage=6,434 cf Inflow=4.46 cfs 11,685 cf
Outflow=0.77 cfs 6,112 cf

Pond 2SM: STM MH#2 Peak Elev=38.60' Inflow=3.77 cfs 9,150 cf
18.0" Round Culvert n=0.013 L=92.0' S=0.0054 '/' Outflow=3.77 cfs 9,150 cf

Pond 3SM: STM MH#3 Peak Elev=36.95' Inflow=3.07 cfs 7,043 cf
18.0" Round Culvert n=0.013 L=118.0' S=0.0085 '/' Outflow=3.07 cfs 7,043 cf

Pond 4SM: STM MH#4 Peak Elev=38.05' Inflow=1.02 cfs 4,322 cf
15.0" Round Culvert n=0.013 L=10.5' S=0.0476 '/' Outflow=1.02 cfs 4,322 cf

Pond 5SM: STM MH#5 Peak Elev=38.54' Inflow=1.59 cfs 3,781 cf
Primary=0.00 cfs 0 cf Secondary=1.59 cfs 3,781 cf Outflow=1.59 cfs 3,781 cf

Pond 6SM: STM MH#6 Peak Elev=37.95' Inflow=1.59 cfs 3,781 cf
15.0" Round Culvert n=0.013 L=86.0' S=0.0087 '/' Outflow=1.59 cfs 3,781 cf

Pond SP1: Peak Elev=42.52' Storage=111 cf Inflow=0.61 cfs 1,459 cf
Outflow=0.57 cfs 1,459 cf

Pond SP2: Peak Elev=42.59' Storage=123 cf Inflow=0.76 cfs 1,572 cf
Outflow=0.67 cfs 1,572 cf

Pond SP3: Peak Elev=42.56' Storage=105 cf Inflow=0.70 cfs 1,446 cf
Outflow=0.63 cfs 1,446 cf

Pond SP4: Peak Elev=42.57' Storage=77 cf Inflow=0.70 cfs 1,446 cf
Outflow=0.64 cfs 1,446 cf

Pond SP5: Peak Elev=42.70' Storage=202 cf Inflow=0.98 cfs 2,025 cf
Outflow=0.80 cfs 2,025 cf

Pond SP6: Peak Elev=42.70' Storage=196 cf Inflow=0.98 cfs 2,025 cf
Outflow=0.81 cfs 2,025 cf

Pond W: LOW AREA Peak Elev=47.12' Storage=1,962 cf Inflow=0.93 cfs 1,962 cf
Outflow=0.00 cfs 0 cf

Pond WQU#1: WQU#1 Peak Elev=38.75' Inflow=1.02 cfs 2,628 cf
12.0" Round Culvert n=0.013 L=11.0' S=0.0318 '/' Outflow=1.02 cfs 2,628 cf

Pond WQU#2: WQU#2 Peak Elev=38.95' Inflow=2.75 cfs 8,663 cf
12.0" Round Culvert n=0.013 L=6.5' S=0.0154 '/' Outflow=2.75 cfs 8,663 cf

Pond WQU#3: WQU#3 Peak Elev=37.57' Inflow=2.70 cfs 6,925 cf
12.0" Round Culvert n=0.013 L=10.0' S=0.0250 '/' Outflow=2.70 cfs 6,925 cf

Pond WQU#4: WQU#4 Peak Elev=38.60' Inflow=1.02 cfs 4,322 cf
12.0" Round Culvert n=0.013 L=7.0' S=0.0357 '/' Outflow=1.02 cfs 4,322 cf

Pond WQU#5: WQU#5 Peak Elev=38.29' Inflow=1.59 cfs 3,781 cf
12.0" Round Culvert n=0.013 L=17.0' S=0.0147 '/' Outflow=1.59 cfs 3,781 cf

Link OFF1: Inflow=11.14 cfs 43,159 cf
Primary=11.14 cfs 43,159 cf

Total Runoff Area = 536,757 sf Runoff Volume = 50,693 cf Average Runoff Depth = 1.13"
64.65% Pervious = 347,015 sf 35.35% Impervious = 189,742 sf

Summary for Subcatchment 1S:

Runoff = 4.45 cfs @ 12.09 hrs, Volume= 13,533 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
97,354	79	Woods, Fair, HSG D
130,080	80	>75% Grass cover, Good, HSG D
227,434	80	Weighted Average
227,434		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1800	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
5.8	580	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.9	680	Total			

Summary for Subcatchment 2S:

Runoff = 0.79 cfs @ 11.90 hrs, Volume= 1,384 cf, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
8,106	77	Woods, Good, HSG D
4,653	98	Paved roads w/curbs & sewers, HSG D
6,473	80	>75% Grass cover, Good, HSG D
19,232	83	Weighted Average
14,579		75.81% Pervious Area
4,653		24.19% Impervious Area

Summary for Subcatchment 3S:

Runoff = 1.81 cfs @ 11.96 hrs, Volume= 4,355 cf, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
25,969	98	Paved roads w/curbs & sewers, HSG D
25,969		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0060	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.9	283	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.1	383	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 4S:

Runoff = 0.98 cfs @ 11.89 hrs, Volume= 2,025 cf, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
12,073	98	Unconnected roofs, HSG D
12,073		100.00% Impervious Area
12,073		100.00% Unconnected

Summary for Subcatchment 5S:

Runoff = 0.98 cfs @ 11.89 hrs, Volume= 2,025 cf, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
12,073	98	Unconnected roofs, HSG D
12,073		100.00% Impervious Area
12,073		100.00% Unconnected

Summary for Subcatchment 6S:

Runoff = 0.70 cfs @ 11.89 hrs, Volume= 1,446 cf, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
8,624	98	Unconnected roofs, HSG D
8,624		100.00% Impervious Area
8,624		100.00% Unconnected

Summary for Subcatchment 7S:

Runoff = 0.70 cfs @ 11.89 hrs, Volume= 1,446 cf, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
8,624	98	Unconnected roofs, HSG D
8,624		100.00% Impervious Area
8,624		100.00% Unconnected

Summary for Subcatchment 8S:

Runoff = 0.76 cfs @ 11.89 hrs, Volume= 1,572 cf, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
9,375	98	Unconnected roofs, HSG D
9,375		100.00% Impervious Area
9,375		100.00% Unconnected

Summary for Subcatchment 9S:

Runoff = 0.61 cfs @ 11.96 hrs, Volume= 1,459 cf, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
8,698	98	Unconnected roofs, HSG D
8,698		100.00% Impervious Area
8,698		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	63	0.0500	1.60		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.7	63	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 10S:

Runoff = 1.20 cfs @ 11.98 hrs, Volume= 2,535 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
17,986	79	Woods, Fair, HSG D
24,610	80	>75% Grass cover, Good, HSG D
42,596	80	Weighted Average
42,596		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0060	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.9	283	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.1	383	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 11S:

Runoff = 0.93 cfs @ 11.97 hrs, Volume= 1,962 cf, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
12,368	79	Woods/grass comb., Good, HSG D
9,099	98	Unconnected pavement, HSG D
21,467	87	Weighted Average
12,368		57.61% Pervious Area
9,099		42.39% Impervious Area
9,099		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0060	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.9	283	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.1	383	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 12S:

Runoff = 0.63 cfs @ 11.89 hrs, Volume= 1,169 cf, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
6,498	98	Paved parking, HSG D
2,635	80	>75% Grass cover, Good, HSG D
9,133	93	Weighted Average
2,635		28.85% Pervious Area
6,498		71.15% Impervious Area

Summary for Subcatchment 13S:

Runoff = 0.90 cfs @ 11.89 hrs, Volume= 1,869 cf, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
11,142	98	Paved parking, HSG D
11,142		100.00% Impervious Area

Summary for Subcatchment 14S:

Runoff = 0.29 cfs @ 11.89 hrs, Volume= 598 cf, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
3,565	98	Paved parking, HSG D
3,565		100.00% Impervious Area

Summary for Subcatchment 15S:

Runoff = 0.23 cfs @ 11.96 hrs, Volume= 523 cf, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
3,053	98	Paved parking, HSG D
609	80	>75% Grass cover, Good, HSG D
3,662	95	Weighted Average
609		16.63% Pervious Area
3,053		83.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 16S:

Runoff = 0.61 cfs @ 11.97 hrs, Volume= 1,320 cf, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
7,409	98	Paved parking, HSG D
3,488	80	>75% Grass cover, Good, HSG D
10,897	92	Weighted Average
3,488		32.01% Pervious Area
7,409		67.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.22		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.3	55	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	155	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 17S:

Runoff = 0.30 cfs @ 11.96 hrs, Volume= 723 cf, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
4,314	98	Paved parking, HSG D
4,314		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 18S:

Runoff = 0.50 cfs @ 11.97 hrs, Volume= 1,099 cf, Depth= 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
6,512	98	Paved parking, HSG D
1,616	80	>75% Grass cover, Good, HSG D
8,128	94	Weighted Average
1,616		19.88% Pervious Area
6,512		80.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 19S:

Runoff = 0.60 cfs @ 11.97 hrs, Volume= 1,281 cf, Depth= 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
6,057	98	Paved parking, HSG D
6,441	80	>75% Grass cover, Good, HSG D
12,498	89	Weighted Average
6,441		51.54% Pervious Area
6,057		48.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 20S:

Runoff = 0.78 cfs @ 11.96 hrs, Volume= 1,813 cf, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
10,905	98	Paved parking, HSG D
500	80	>75% Grass cover, Good, HSG D
11,405	97	Weighted Average
500		4.38% Pervious Area
10,905		95.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 21S:

Runoff = 0.59 cfs @ 11.97 hrs, Volume= 1,254 cf, Depth= 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
6,693	98	Paved parking, HSG D
4,872	80	>75% Grass cover, Good, HSG D
11,565	90	Weighted Average
4,872		42.13% Pervious Area
6,693		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 22S:

Runoff = 0.59 cfs @ 11.97 hrs, Volume= 1,249 cf, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
5,287	98	Paved parking, HSG D
8,376	80	>75% Grass cover, Good, HSG D
13,663	87	Weighted Average
8,376		61.30% Pervious Area
5,287		38.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 23S:

Runoff = 0.62 cfs @ 12.18 hrs, Volume= 2,298 cf, Depth= 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
9,720	98	Paved parking, HSG D
15,417	80	>75% Grass cover, Good, HSG D
25,137	87	Weighted Average
15,417		61.33% Pervious Area
9,720		38.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.3	100	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
0.2	30	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.5	130	Total			

Summary for Subcatchment 24S:

Runoff = 0.43 cfs @ 11.97 hrs, Volume= 908 cf, Depth= 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
4,446	98	Paved parking, HSG D
4,414	80	>75% Grass cover, Good, HSG D
8,860	89	Weighted Average
4,414		49.82% Pervious Area
4,446		50.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.22		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.2	30	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	130	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 25S:

Runoff = 0.39 cfs @ 11.97 hrs, Volume= 848 cf, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 1 YR Rainfall=2.24"

Area (sf)	CN	Description
4,953	98	Paved parking, HSG D
1,670	80	>75% Grass cover, Good, HSG D
6,623	93	Weighted Average
1,670		25.22% Pervious Area
4,953		74.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0200	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.8	50	Total, Increased to minimum Tc = 6.0 min			

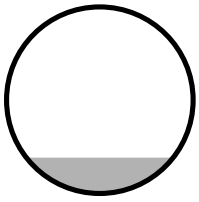
Summary for Reach 1R: EXISTING 24" PIPE

Inflow Area = 25,969 sf,100.00% Impervious, Inflow Depth = 2.01" for 1 YR event
Inflow = 1.81 cfs @ 11.96 hrs, Volume= 4,355 cf
Outflow = 1.76 cfs @ 11.98 hrs, Volume= 4,355 cf, Atten= 3%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.23 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.23 fps, Avg. Travel Time= 2.6 min

Peak Storage= 81 cf @ 11.97 hrs
Average Depth at Peak Storage= 0.38' , Surface Width= 1.57'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 22.39 cfs

24.0" Round Pipe
n= 0.013 Clay tile
Length= 192.0' Slope= 0.0098 '/'
Inlet Invert= 30.57', Outlet Invert= 28.69'



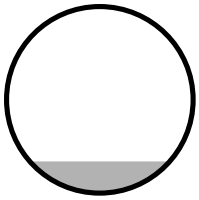
Summary for Reach 2R:

Inflow Area = 64,063 sf, 14.20% Impervious, Inflow Depth = 0.47" for 1 YR event
Inflow = 1.17 cfs @ 12.00 hrs, Volume= 2,535 cf
Outflow = 1.13 cfs @ 12.01 hrs, Volume= 2,535 cf, Atten= 4%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.84 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.98 fps, Avg. Travel Time= 1.8 min

Peak Storage= 42 cf @ 12.00 hrs
Average Depth at Peak Storage= 0.26' , Surface Width= 1.13'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.48 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 210.0' Slope= 0.0310 '/'
Inlet Invert= 43.50', Outlet Invert= 37.00'



Summary for Reach 4R:

Inflow Area = 17,831 sf, 85.22% Impervious, Inflow Depth = 1.77" for 1 YR event
Inflow = 1.02 cfs @ 11.91 hrs, Volume= 2,628 cf
Outflow = 0.97 cfs @ 11.94 hrs, Volume= 2,628 cf, Atten= 5%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.16 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.69 fps, Avg. Travel Time= 2.7 min

Peak Storage= 51 cf @ 11.92 hrs
Average Depth at Peak Storage= 0.13' , Surface Width= 3.81'
Bank-Full Depth= 2.00' Flow Area= 18.0 sf, Capacity= 177.26 cfs

3.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 15.00'
Length= 112.0' Slope= 0.0446 '/'
Inlet Invert= 44.00', Outlet Invert= 39.00'



‡

Summary for Pond #1:

Inflow Area = 9,375 sf,100.00% Impervious, Inflow Depth = 2.01" for 1 YR event
Inflow = 0.67 cfs @ 11.91 hrs, Volume= 1,572 cf
Outflow = 0.67 cfs @ 11.91 hrs, Volume= 1,572 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.67 cfs @ 11.91 hrs, Volume= 1,572 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.98' @ 11.91 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.50'	**12.0" Round Culvert** L= 77.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 40.50' / 40.05' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.65 cfs @ 11.91 hrs HW=40.97' (Free Discharge)
1=Culvert (Barrel Controls 0.65 cfs @ 2.64 fps)

Summary for Pond #11:

Inflow Area = 8,128 sf, 80.12% Impervious, Inflow Depth = 1.62" for 1 YR event
Inflow = 0.50 cfs @ 11.97 hrs, Volume= 1,099 cf
Outflow = 0.50 cfs @ 11.97 hrs, Volume= 1,099 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.50 cfs @ 11.97 hrs, Volume= 1,099 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 41.80' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	41.40'	**12.0" Round Culvert** L= 55.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 41.40' / 41.00' S= 0.0073 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.48 cfs @ 11.97 hrs HW=41.79' (Free Discharge)
1=Culvert (Inlet Controls 0.48 cfs @ 1.69 fps)

Summary for Pond #12:

Inflow Area = 35,625 sf, 83.96% Impervious, Inflow Depth = 1.72" for 1 YR event
Inflow = 2.19 cfs @ 11.95 hrs, Volume= 5,112 cf
Outflow = 2.19 cfs @ 11.95 hrs, Volume= 5,112 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.19 cfs @ 11.95 hrs, Volume= 5,112 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.68' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.90'	**18.0" Round Culvert** L= 61.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.90' / 38.00' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.18 cfs @ 11.95 hrs HW=39.67' (Free Discharge)
1=Culvert (Inlet Controls 2.18 cfs @ 2.37 fps)

Summary for Pond #15:

Inflow Area = 20,029 sf, 97.50% Impervious, Inflow Depth = 1.95" for 1 YR event
Inflow = 1.34 cfs @ 11.93 hrs, Volume= 3,259 cf
Outflow = 1.34 cfs @ 11.93 hrs, Volume= 3,259 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.34 cfs @ 11.93 hrs, Volume= 3,259 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Peak Elev= 40.94' @ 11.93 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.20'	**12.0" Round Culvert**
			L= 31.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 40.20' / 40.00' S= 0.0065 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.30 cfs @ 11.93 hrs HW=40.93' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.30 cfs @ 2.96 fps)

Summary for Pond #16:

Inflow Area = 44,092 sf, 73.21% Impervious, Inflow Depth = 1.58" for 1 YR event
Inflow = 2.49 cfs @ 11.95 hrs, Volume= 5,794 cf
Outflow = 2.49 cfs @ 11.95 hrs, Volume= 5,794 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.49 cfs @ 11.95 hrs, Volume= 5,794 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.92' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.00'	**15.0" Round Culvert**
			L= 56.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 39.00' / 38.25' S= 0.0134 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.48 cfs @ 11.95 hrs HW=39.92' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 2.48 cfs @ 2.57 fps)

Summary for Pond #2:

Inflow Area = 20,517 sf,100.00% Impervious, Inflow Depth = 2.01" for 1 YR event
Inflow = 1.56 cfs @ 11.89 hrs, Volume= 3,441 cf
Outflow = 1.56 cfs @ 11.89 hrs, Volume= 3,441 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 11.89 hrs, Volume= 3,441 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.83' @ 11.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.05'	**12.0" Round Culvert**
			L= 33.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 40.05' / 39.35' S= 0.0212 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.52 cfs @ 11.89 hrs HW=40.82' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 1.52 cfs @ 2.36 fps)

Summary for Pond #20:

Inflow Area = 4,314 sf,100.00% Impervious, Inflow Depth = 2.01" for 1 YR event
Inflow = 0.30 cfs @ 11.96 hrs, Volume= 723 cf
Outflow = 0.30 cfs @ 11.96 hrs, Volume= 723 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.30 cfs @ 11.96 hrs, Volume= 723 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 43.31' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	43.00'	**12.0" Round Culvert** L= 76.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 43.00' / 42.05' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.29 cfs @ 11.96 hrs HW=43.30' (Free Discharge)
1=Culvert (Inlet Controls 0.29 cfs @ 1.48 fps)

Summary for Pond #21:

Inflow Area = 15,211 sf, 77.07% Impervious, Inflow Depth = 1.61" for 1 YR event
Inflow = 0.91 cfs @ 11.97 hrs, Volume= 2,044 cf
Outflow = 0.91 cfs @ 11.97 hrs, Volume= 2,044 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.91 cfs @ 11.97 hrs, Volume= 2,044 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.61' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	42.05'	**12.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.05' / 38.90' S= 0.0450 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.89 cfs @ 11.97 hrs HW=42.60' (Free Discharge)
1=Culvert (Inlet Controls 0.89 cfs @ 2.00 fps)

Summary for Pond #22:

Inflow Area = 57,755 sf, 65.04% Impervious, Inflow Depth = 1.46" for 1 YR event
Inflow = 3.07 cfs @ 11.95 hrs, Volume= 7,043 cf
Outflow = 3.07 cfs @ 11.95 hrs, Volume= 7,043 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.37 cfs @ 11.95 hrs, Volume= 118 cf
Secondary = 2.70 cfs @ 11.95 hrs, Volume= 6,925 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 37.67' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.35'	**15.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.35' / 37.00' S= 0.0438 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	36.35'	**12.0" Round Culvert** L= 8.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.35' / 36.25' S= 0.0120 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.35 cfs @ 11.95 hrs HW=37.66' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.35 cfs @ 1.49 fps)

Secondary OutFlow Max=2.68 cfs @ 11.95 hrs HW=37.66' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 2.68 cfs @ 3.41 fps)

Summary for Pond #23:

Inflow Area = 25,137 sf, 38.67% Impervious, Inflow Depth = 1.10" for 1 YR event
Inflow = 0.62 cfs @ 12.18 hrs, Volume= 2,298 cf
Outflow = 0.62 cfs @ 12.18 hrs, Volume= 2,298 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.62 cfs @ 12.18 hrs, Volume= 2,298 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.77' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.35'	**15.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 40.35' / 39.85' S= 0.0071 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.61 cfs @ 12.18 hrs HW=40.76' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.61 cfs @ 1.73 fps)

Summary for Pond #24:

Inflow Area = 37,210 sf, 58.57% Impervious, Inflow Depth = 1.39" for 1 YR event
Inflow = 1.02 cfs @ 11.94 hrs, Volume= 4,322 cf
Outflow = 1.02 cfs @ 11.94 hrs, Volume= 4,322 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.02 cfs @ 11.94 hrs, Volume= 4,322 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.45' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.85'	**12.0" Round Culvert** L= 26.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.85' / 39.25' S= 0.0231 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.01 cfs @ 11.94 hrs HW=40.44' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.01 cfs @ 2.07 fps)

Summary for Pond #25:

Inflow Area = 37,210 sf, 58.57% Impervious, Inflow Depth = 1.39" for 1 YR event
Inflow = 1.02 cfs @ 11.94 hrs, Volume= 4,322 cf
Outflow = 1.02 cfs @ 11.94 hrs, Volume= 4,322 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 1.02 cfs @ 11.94 hrs, Volume= 4,322 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.85' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.25'	**12.0" Round Culvert** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.25' / 39.00' S= 0.0192 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	38.25'	**12.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.25' / 38.00' S= 0.0208 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=38.25' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=1.01 cfs @ 11.94 hrs HW=38.84' (Free Discharge)
└**2=Culvert** (Inlet Controls 1.01 cfs @ 2.07 fps)

Summary for Pond #26:

Inflow Area = 12,498 sf, 48.46% Impervious, Inflow Depth = 1.23" for 1 YR event
Inflow = 0.60 cfs @ 11.97 hrs, Volume= 1,281 cf
Outflow = 0.60 cfs @ 11.97 hrs, Volume= 1,281 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.60 cfs @ 11.97 hrs, Volume= 1,281 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 43.94' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	43.50'	**12.0" Round Culvert** L= 126.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 43.50' / 40.00' S= 0.0278 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.58 cfs @ 11.97 hrs HW=43.94' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.58 cfs @ 1.78 fps)

Summary for Pond #27:

Inflow Area = 8,860 sf, 50.18% Impervious, Inflow Depth = 1.23" for 1 YR event
Inflow = 0.43 cfs @ 11.97 hrs, Volume= 908 cf
Outflow = 0.43 cfs @ 11.97 hrs, Volume= 908 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 11.97 hrs, Volume= 908 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.67' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.30'	**12.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.30' / 38.50' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.41 cfs @ 11.97 hrs HW=39.66' (Free Discharge)
1=Culvert (Inlet Controls 0.41 cfs @ 1.62 fps)

Summary for Pond #28:

Inflow Area = 15,483 sf, 60.71% Impervious, Inflow Depth = 1.36" for 1 YR event
Inflow = 0.82 cfs @ 11.97 hrs, Volume= 1,756 cf
Outflow = 0.82 cfs @ 11.97 hrs, Volume= 1,756 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.82 cfs @ 11.97 hrs, Volume= 1,756 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 36.08' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	35.55'	**12.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 35.55' / 35.00' S= 0.0153 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.79 cfs @ 11.97 hrs HW=36.07' (Free Discharge)
1=Culvert (Inlet Controls 0.79 cfs @ 1.93 fps)

Summary for Pond #29:

Inflow Area = 27,556 sf, 77.92% Impervious, Inflow Depth = 1.65" for 1 YR event
Inflow = 1.59 cfs @ 11.94 hrs, Volume= 3,781 cf
Outflow = 1.59 cfs @ 11.94 hrs, Volume= 3,781 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.59 cfs @ 11.94 hrs, Volume= 3,781 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.04' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.25'	**12.0" Round Culvert** L= 43.0' CPP, projecting, no headwall, Ke= 0.900

Inlet / Outlet Invert= 38.25' / 37.75' S= 0.0116 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.57 cfs @ 11.94 hrs HW=39.03' (Free Discharge)
1=Culvert (Inlet Controls 1.57 cfs @ 2.38 fps)

Summary for Pond #3:

Inflow Area = 24,082 sf,100.00% Impervious, Inflow Depth = 2.01" for 1 YR event
Inflow = 1.84 cfs @ 11.89 hrs, Volume= 4,039 cf
Outflow = 1.84 cfs @ 11.89 hrs, Volume= 4,039 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.84 cfs @ 11.89 hrs, Volume= 4,039 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.91' @ 11.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.15'	**15.0" Round Culvert**
			L= 36.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 39.15' / 38.75' S= 0.0111 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.80 cfs @ 11.89 hrs HW=39.90' (Free Discharge)
1=Culvert (Inlet Controls 1.80 cfs @ 2.33 fps)

Summary for Pond #35:

Inflow Area = 57,755 sf, 65.04% Impervious, Inflow Depth = 1.46" for 1 YR event
Inflow = 3.07 cfs @ 11.95 hrs, Volume= 7,043 cf
Outflow = 3.07 cfs @ 11.95 hrs, Volume= 7,043 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.07 cfs @ 11.95 hrs, Volume= 7,043 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.31' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.25'	**15.0" Round Culvert**
			L= 34.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 38.25' / 37.35' S= 0.0265 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.04 cfs @ 11.95 hrs HW=39.30' (Free Discharge)
1=Culvert (Inlet Controls 3.04 cfs @ 2.76 fps)

Summary for Pond #6:

Inflow Area = 17,831 sf, 85.22% Impervious, Inflow Depth = 1.77" for 1 YR event
Inflow = 1.02 cfs @ 11.91 hrs, Volume= 2,628 cf
Outflow = 1.02 cfs @ 11.91 hrs, Volume= 2,628 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.02 cfs @ 11.91 hrs, Volume= 2,628 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.90' @ 11.91 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.30'	**12.0" Round Culvert** L= 9.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.30' / 38.15' S= 0.0153 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.00 cfs @ 11.91 hrs HW=38.90' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.00 cfs @ 2.93 fps)

Summary for Pond 1P: FOREBAY

Inflow Area = 64,063 sf, 14.20% Impervious, Inflow Depth = 0.47" for 1 YR event
Inflow = 1.20 cfs @ 11.98 hrs, Volume= 2,535 cf
Outflow = 1.17 cfs @ 12.00 hrs, Volume= 2,535 cf, Atten= 2%, Lag= 0.9 min
Primary = 1.17 cfs @ 12.00 hrs, Volume= 2,535 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 43.99' @ 12.00 hrs Surf.Area= 273 sf Storage= 78 cf

Plug-Flow detention time= 2.0 min calculated for 2,534 cf (100% of inflow)
Center-of-Mass det. time= 2.0 min (861.8 - 859.8)

Volume	Invert	Avail.Storage	Storage Description
#1	43.50'	2,260 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.50	50	0	0
44.00	280	83	83
46.00	500	780	863
47.50	770	953	1,815
48.00	1,010	445	2,260

Device	Routing	Invert	Outlet Devices
#1	Primary	43.50'	**18.0" Round Culvert** L= 168.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 43.50' / 39.00' S= 0.0268 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	47.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.16 cfs @ 12.00 hrs HW=43.98' (Free Discharge)
├**1=Culvert** (Inlet Controls 1.16 cfs @ 2.36 fps)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 1SM: STM MH#1

Inflow Area = 59,707 sf, 90.43% Impervious, Inflow Depth = 1.84" for 1 YR event
Inflow = 3.77 cfs @ 11.91 hrs, Volume= 9,150 cf
Outflow = 3.77 cfs @ 11.91 hrs, Volume= 9,150 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.02 cfs @ 11.91 hrs, Volume= 487 cf
Secondary = 2.75 cfs @ 11.91 hrs, Volume= 8,663 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.15' @ 11.91 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.60'	**15.0" Round Culvert** L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.60' / 38.40' S= 0.0182 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	37.80'	**12.0" Round Culvert** L= 8.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.80' / 37.60' S= 0.0233 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.96 cfs @ 11.91 hrs HW=39.13' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.96 cfs @ 1.95 fps)

Secondary OutFlow Max=2.71 cfs @ 11.91 hrs HW=39.13' (Free Discharge)
└**2=Culvert** (Inlet Controls 2.71 cfs @ 3.45 fps)

Summary for Pond 2P: DEPRESSION

Inflow Area = 123,770 sf, 50.98% Impervious, Inflow Depth = 1.13" for 1 YR event
Inflow = 4.46 cfs @ 11.93 hrs, Volume= 11,685 cf
Outflow = 0.77 cfs @ 12.21 hrs, Volume= 6,112 cf, Atten= 83%, Lag= 16.9 min
Primary = 0.77 cfs @ 12.21 hrs, Volume= 6,112 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 33.80' @ 12.21 hrs Surf.Area= 8,980 sf Storage= 6,434 cf

Plug-Flow detention time= 269.7 min calculated for 6,111 cf (52% of inflow)
Center-of-Mass det. time= 147.1 min (940.4 - 793.3)

Volume	Invert	Avail.Storage	Storage Description
#1	33.00'	8,374 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
33.00	7,351	0	0
33.75	8,657	6,003	6,003
34.00	10,310	2,371	8,374

Device	Routing	Invert	Outlet Devices
#1	Primary	33.70'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.77 cfs @ 12.21 hrs HW=33.80' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.77 cfs @ 0.78 fps)

Summary for Pond 2SM: STM MH#2

Inflow Area = 59,707 sf, 90.43% Impervious, Inflow Depth = 1.84" for 1 YR event
Inflow = 3.77 cfs @ 11.91 hrs, Volume= 9,150 cf
Outflow = 3.77 cfs @ 11.91 hrs, Volume= 9,150 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.77 cfs @ 11.91 hrs, Volume= 9,150 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.60' @ 11.91 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**18.0" Round Culvert** L= 92.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.50' / 37.00' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.67 cfs @ 11.91 hrs HW=38.58' (Free Discharge)
1=Culvert (Barrel Controls 3.67 cfs @ 3.77 fps)

Summary for Pond 3SM: STM MH#3

Inflow Area = 57,755 sf, 65.04% Impervious, Inflow Depth = 1.46" for 1 YR event
Inflow = 3.07 cfs @ 11.95 hrs, Volume= 7,043 cf
Outflow = 3.07 cfs @ 11.95 hrs, Volume= 7,043 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.07 cfs @ 11.95 hrs, Volume= 7,043 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 36.95' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	36.00'	**18.0" Round Culvert** L= 118.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.00' / 35.00' S= 0.0085 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=3.04 cfs @ 11.95 hrs HW=36.94' (Free Discharge)
1=Culvert (Inlet Controls 3.04 cfs @ 2.61 fps)

Summary for Pond 4SM: STM MH#4

Inflow Area = 37,210 sf, 58.57% Impervious, Inflow Depth = 1.39" for 1 YR event
Inflow = 1.02 cfs @ 11.94 hrs, Volume= 4,322 cf
Outflow = 1.02 cfs @ 11.94 hrs, Volume= 4,322 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.02 cfs @ 11.94 hrs, Volume= 4,322 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.05' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**15.0" Round Culvert**
			L= 10.5' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 37.50' / 37.00' S= 0.0476 '/' Cc= 0.900
			n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=1.01 cfs @ 11.94 hrs HW=38.04' (Free Discharge)
1=Culvert (Inlet Controls 1.01 cfs @ 1.98 fps)

Summary for Pond 5SM: STM MH#5

Inflow Area = 27,556 sf, 77.92% Impervious, Inflow Depth = 1.65" for 1 YR event
Inflow = 1.59 cfs @ 11.94 hrs, Volume= 3,781 cf
Outflow = 1.59 cfs @ 11.94 hrs, Volume= 3,781 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 1.59 cfs @ 11.94 hrs, Volume= 3,781 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.54' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.10'	**15.0" Round Culvert**
			L= 16.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 39.10' / 38.00' S= 0.0688 '/' Cc= 0.900
			n= 0.013, Flow Area= 1.23 sf
#2	Secondary	37.75'	**12.0" Round Culvert**
			L= 6.3' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 37.75' / 37.50' S= 0.0397 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=37.75' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=1.57 cfs @ 11.94 hrs HW=38.53' (Free Discharge)
2=Culvert (Inlet Controls 1.57 cfs @ 2.38 fps)

Summary for Pond 6SM: STM MH#6

Inflow Area = 27,556 sf, 77.92% Impervious, Inflow Depth = 1.65" for 1 YR event
Inflow = 1.59 cfs @ 11.94 hrs, Volume= 3,781 cf
Outflow = 1.59 cfs @ 11.94 hrs, Volume= 3,781 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.59 cfs @ 11.94 hrs, Volume= 3,781 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 37.95' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.25'	**15.0" Round Culvert**

L= 86.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 37.25' / 36.50' S= 0.0087 '/' Cc= 0.900
n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=1.57 cfs @ 11.94 hrs HW=37.94' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.57 cfs @ 2.24 fps)

Summary for Pond SP1:

Inflow Area = 8,698 sf,100.00% Impervious, Inflow Depth = 2.01" for 1 YR event
Inflow = 0.61 cfs @ 11.96 hrs, Volume= 1,459 cf
Outflow = 0.57 cfs @ 11.99 hrs, Volume= 1,459 cf, Atten= 6%, Lag= 1.9 min
Primary = 0.57 cfs @ 11.99 hrs, Volume= 1,459 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.52' @ 11.99 hrs Surf.Area= 528 sf Storage= 111 cf

Plug-Flow detention time= 11.8 min calculated for 1,458 cf (100% of inflow)
Center-of-Mass det. time= 11.8 min (772.7 - 760.8)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	778 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	158 cf	**SOIL (Prismatic)**Listed below (Recalc) 792 cf Overall x 20.0% Voids
#3	42.00'	211 cf	**STONE (Prismatic)**Listed below (Recalc) 528 cf Overall x 40.0% Voids
		1,147 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	310	0	0
45.00	528	210	210
46.00	608	568	778

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	528	0	0
44.50	528	792	792

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	528	0	0
43.00	528	528	528

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 39.75' S= 0.2250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.56 cfs @ 11.99 hrs HW=42.52' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.56 cfs @ 1.93 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP2:

Inflow Area = 9,375 sf,100.00% Impervious, Inflow Depth = 2.01" for 1 YR event
Inflow = 0.76 cfs @ 11.89 hrs, Volume= 1,572 cf
Outflow = 0.67 cfs @ 11.91 hrs, Volume= 1,572 cf, Atten= 12%, Lag= 1.4 min
Primary = 0.67 cfs @ 11.91 hrs, Volume= 1,572 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.59' @ 11.91 hrs Surf.Area= 525 sf Storage= 123 cf

Plug-Flow detention time= 11.3 min calculated for 1,572 cf (100% of inflow)
Center-of-Mass det. time= 11.4 min (766.6 - 755.3)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	991 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	158 cf	**SOIL (Prismatic)**Listed below (Recalc) 788 cf Overall x 20.0% Voids
#3	42.00'	210 cf	**STONE (Prismatic)**Listed below (Recalc) 525 cf Overall x 40.0% Voids
		1,359 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	273	0	0
45.00	525	200	200
46.00	1,058	792	991

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	525	0	0
44.50	525	788	788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	525	0	0
43.00	525	525	525

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.66 cfs @ 11.91 hrs HW=42.58' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.66 cfs @ 2.04 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP3:

Inflow Area = 8,624 sf,100.00% Impervious, Inflow Depth = 2.01" for 1 YR event
Inflow = 0.70 cfs @ 11.89 hrs, Volume= 1,446 cf
Outflow = 0.63 cfs @ 11.91 hrs, Volume= 1,446 cf, Atten= 10%, Lag= 1.2 min
Primary = 0.63 cfs @ 11.91 hrs, Volume= 1,446 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.56' @ 11.91 hrs Surf.Area= 469 sf Storage= 105 cf

Plug-Flow detention time= 10.5 min calculated for 1,446 cf (100% of inflow)
Center-of-Mass det. time= 10.5 min (765.8 - 755.3)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	903 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	141 cf	**SOIL (Prismatic)**Listed below (Recalc) 704 cf Overall x 20.0% Voids
#3	42.00'	188 cf	**STONE (Prismatic)**Listed below (Recalc) 469 cf Overall x 40.0% Voids
		1,231 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	228	0	0
45.00	469	174	174
46.00	988	729	903

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	469	0	0
44.50	469	704	704

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	469	0	0
43.00	469	469	469

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.61 cfs @ 11.91 hrs HW=42.55' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.61 cfs @ 1.99 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP4:

Inflow Area = 8,624 sf,100.00% Impervious, Inflow Depth = 2.01" for 1 YR event
Inflow = 0.70 cfs @ 11.89 hrs, Volume= 1,446 cf
Outflow = 0.64 cfs @ 11.90 hrs, Volume= 1,446 cf, Atten= 8%, Lag= 0.9 min
Primary = 0.64 cfs @ 11.90 hrs, Volume= 1,446 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.57' @ 11.90 hrs Surf.Area= 339 sf Storage= 77 cf

Plug-Flow detention time= 7.6 min calculated for 1,446 cf (100% of inflow)
Center-of-Mass det. time= 7.6 min (762.9 - 755.3)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	633 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	102 cf	**SOIL (Prismatic)**Listed below (Recalc) 509 cf Overall x 20.0% Voids
#3	42.00'	136 cf	**STONE (Prismatic)**Listed below (Recalc) 339 cf Overall x 40.0% Voids
		870 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	200	0	0
45.00	339	135	135
46.00	657	498	633

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	339	0	0
44.50	339	509	509

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	339	0	0
43.00	339	339	339

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.64 cfs @ 11.90 hrs HW=42.57' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.64 cfs @ 2.02 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP5:

Inflow Area = 12,073 sf,100.00% Impervious, Inflow Depth = 2.01" for 1 YR event
Inflow = 0.98 cfs @ 11.89 hrs, Volume= 2,025 cf
Outflow = 0.80 cfs @ 11.92 hrs, Volume= 2,025 cf, Atten= 18%, Lag= 2.1 min
Primary = 0.80 cfs @ 11.92 hrs, Volume= 2,025 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.70' @ 11.92 hrs Surf.Area= 727 sf Storage= 202 cf

Plug-Flow detention time= 14.0 min calculated for 2,024 cf (100% of inflow)
Center-of-Mass det. time= 14.1 min (769.4 - 755.3)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	1,183 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	218 cf	**SOIL (Prismatic)**Listed below (Recalc) 1,091 cf Overall x 20.0% Voids
#3	42.00'	291 cf	**STONE (Prismatic)**Listed below (Recalc) 727 cf Overall x 40.0% Voids
		1,692 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	368	0	0
45.00	727	274	274
46.00	1,092	910	1,183

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	727	0	0
44.50	727	1,091	1,091

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	727	0	0
43.00	727	727	727

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.78 cfs @ 11.92 hrs HW=42.68' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.78 cfs @ 2.24 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP6:

Inflow Area = 12,073 sf,100.00% Impervious, Inflow Depth = 2.01" for 1 YR event
Inflow = 0.98 cfs @ 11.89 hrs, Volume= 2,025 cf
Outflow = 0.81 cfs @ 11.92 hrs, Volume= 2,025 cf, Atten= 18%, Lag= 2.1 min
Primary = 0.81 cfs @ 11.92 hrs, Volume= 2,025 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.70' @ 11.92 hrs Surf.Area= 700 sf Storage= 196 cf

Plug-Flow detention time= 13.6 min calculated for 2,024 cf (100% of inflow)
Center-of-Mass det. time= 13.7 min (768.9 - 755.3)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	670 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	210 cf	**SOIL (Prismatic)**Listed below (Recalc) 1,050 cf Overall x 20.0% Voids
#3	42.00'	280 cf	**STONE (Prismatic)**Listed below (Recalc) 700 cf Overall x 40.0% Voids
		1,160 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	161	0	0
45.00	622	196	196
45.50	1,274	474	670

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	700	0	0
44.50	700	1,050	1,050

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	700	0	0
43.00	700	700	700

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.79 cfs @ 11.92 hrs HW=42.68' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.79 cfs @ 2.25 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond W: LOW AREA

Inflow Area = 21,467 sf, 42.39% Impervious, Inflow Depth = 1.10" for 1 YR event
Inflow = 0.93 cfs @ 11.97 hrs, Volume= 1,962 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 47.12' @ 24.40 hrs Surf.Area= 3,230 sf Storage= 1,962 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	46.00'	5,811 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	265	0	0
48.00	5,546	5,811	5,811

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	**30.0' long x 38.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=46.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond WQU#1: WQU#1

Inflow Area = 17,831 sf, 85.22% Impervious, Inflow Depth = 1.77" for 1 YR event
Inflow = 1.02 cfs @ 11.91 hrs, Volume= 2,628 cf
Outflow = 1.02 cfs @ 11.91 hrs, Volume= 2,628 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.02 cfs @ 11.91 hrs, Volume= 2,628 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.75' @ 11.91 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.15'	**12.0" Round Culvert** L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.15' / 37.80' S= 0.0318 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.00 cfs @ 11.91 hrs HW=38.74' (Free Discharge)
1=Culvert (Inlet Controls 1.00 cfs @ 2.07 fps)

Summary for Pond WQU#2: WQU#2

Inflow	=	2.75 cfs @	11.91 hrs, Volume=	8,663 cf
Outflow	=	2.75 cfs @	11.91 hrs, Volume=	8,663 cf, Atten= 0%, Lag= 0.0 min
Primary	=	2.75 cfs @	11.91 hrs, Volume=	8,663 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.95' @ 11.91 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.60'	**12.0" Round Culvert** L= 6.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.60' / 37.50' S= 0.0154 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.71 cfs @ 11.91 hrs HW=38.93' (Free Discharge)
1=Culvert (Inlet Controls 2.71 cfs @ 3.45 fps)

Summary for Pond WQU#3: WQU#3

Inflow	=	2.70 cfs @	11.95 hrs, Volume=	6,925 cf
Outflow	=	2.70 cfs @	11.95 hrs, Volume=	6,925 cf, Atten= 0%, Lag= 0.0 min
Primary	=	2.70 cfs @	11.95 hrs, Volume=	6,925 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 37.57' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	36.25'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.25' / 36.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.68 cfs @ 11.95 hrs HW=37.56' (Free Discharge)
1=Culvert (Inlet Controls 2.68 cfs @ 3.41 fps)

Summary for Pond WQU#4: WQU#4

Inflow	=	1.02 cfs @	11.94 hrs, Volume=	4,322 cf
Outflow	=	1.02 cfs @	11.94 hrs, Volume=	4,322 cf, Atten= 0%, Lag= 0.0 min
Primary	=	1.02 cfs @	11.94 hrs, Volume=	4,322 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.60' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.00'	**12.0" Round Culvert**

L= 7.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 38.00' / 37.75' S= 0.0357 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.01 cfs @ 11.94 hrs HW=38.59' (Free Discharge)
1=Culvert (Inlet Controls 1.01 cfs @ 2.07 fps)

Summary for Pond WQU#5: WQU#5

Inflow	=	1.59 cfs @	11.94 hrs,	Volume=	3,781 cf
Outflow	=	1.59 cfs @	11.94 hrs,	Volume=	3,781 cf, Atten= 0%, Lag= 0.0 min
Primary	=	1.59 cfs @	11.94 hrs,	Volume=	3,781 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.29' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**12.0" Round Culvert**
			L= 17.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 37.50' / 37.25' S= 0.0147 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.57 cfs @ 11.94 hrs HW=38.28' (Free Discharge)
1=Culvert (Inlet Controls 1.57 cfs @ 2.38 fps)

Summary for Link OFF1:

Inflow Area =		536,757 sf, 35.35% Impervious,		Inflow Depth =	0.96" for 1 YR event
Inflow	=	11.14 cfs @	11.97 hrs,	Volume=	43,159 cf
Primary	=	11.14 cfs @	11.97 hrs,	Volume=	43,159 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Time span=0.00-200.00 hrs, dt=0.05 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=227,434 sf 0.00% Impervious Runoff Depth=1.85"
Flow Length=680' Tc=15.9 min CN=80 Runoff=12.06 cfs 35,123 cf

Subcatchment2S: Runoff Area=19,232 sf 24.19% Impervious Runoff Depth=2.09"
Tc=0.0 min CN=83 Runoff=1.87 cfs 3,346 cf

Subcatchment3S: Runoff Area=25,969 sf 100.00% Impervious Runoff Depth=3.54"
Flow Length=383' Tc=6.0 min CN=98 Runoff=3.10 cfs 7,652 cf

Subcatchment4S: Runoff Area=12,073 sf 100.00% Impervious Runoff Depth=3.54"
Tc=0.0 min CN=98 Runoff=1.67 cfs 3,557 cf

Subcatchment5S: Runoff Area=12,073 sf 100.00% Impervious Runoff Depth=3.54"
Tc=0.0 min CN=98 Runoff=1.67 cfs 3,557 cf

Subcatchment6S: Runoff Area=8,624 sf 100.00% Impervious Runoff Depth=3.54"
Tc=0.0 min CN=98 Runoff=1.19 cfs 2,541 cf

Subcatchment7S: Runoff Area=8,624 sf 100.00% Impervious Runoff Depth=3.54"
Tc=0.0 min CN=98 Runoff=1.19 cfs 2,541 cf

Subcatchment8S: Runoff Area=9,375 sf 100.00% Impervious Runoff Depth=3.54"
Tc=0.0 min CN=98 Runoff=1.29 cfs 2,762 cf

Subcatchment9S: Runoff Area=8,698 sf 100.00% Impervious Runoff Depth=3.54"
Flow Length=63' Slope=0.0500 '/' Tc=6.0 min CN=98 Runoff=1.04 cfs 2,563 cf

Subcatchment10S: Runoff Area=42,596 sf 0.00% Impervious Runoff Depth=1.85"
Flow Length=383' Tc=6.0 min CN=80 Runoff=3.12 cfs 6,578 cf

Subcatchment11S: Runoff Area=21,467 sf 42.39% Impervious Runoff Depth=2.43"
Flow Length=383' Tc=6.0 min CN=87 Runoff=2.01 cfs 4,341 cf

Subcatchment12S: Runoff Area=9,133 sf 71.15% Impervious Runoff Depth=3.00"
Tc=0.0 min CN=93 Runoff=1.17 cfs 2,280 cf

Subcatchment13S: Runoff Area=11,142 sf 100.00% Impervious Runoff Depth=3.54"
Tc=0.0 min CN=98 Runoff=1.54 cfs 3,283 cf

Subcatchment14S: Runoff Area=3,565 sf 100.00% Impervious Runoff Depth=3.54"
Tc=0.0 min CN=98 Runoff=0.49 cfs 1,050 cf

Subcatchment15S: Runoff Area=3,662 sf 83.37% Impervious Runoff Depth=3.20"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=95 Runoff=0.42 cfs 978 cf

Subcatchment16S: Runoff Area=10,897 sf 67.99% Impervious Runoff Depth=2.90"
Flow Length=155' Slope=0.0200 '/' Tc=6.0 min CN=92 Runoff=1.17 cfs 2,630 cf

Subcatchment17S: Runoff Area=4,314 sf 100.00% Impervious Runoff Depth=3.54"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=98 Runoff=0.51 cfs 1,271 cf

Subcatchment18S: Runoff Area=8,128 sf 80.12% Impervious Runoff Depth=3.10"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=94 Runoff=0.91 cfs 2,099 cf

Subcatchment19S: Runoff Area=12,498 sf 48.46% Impervious Runoff Depth=2.61"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=89 Runoff=1.24 cfs 2,716 cf

Subcatchment20S: Runoff Area=11,405 sf 95.62% Impervious Runoff Depth=3.42"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=97 Runoff=1.35 cfs 3,253 cf

Subcatchment21S: Runoff Area=11,565 sf 57.87% Impervious Runoff Depth=2.70"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=90 Runoff=1.18 cfs 2,604 cf

Subcatchment22S: Runoff Area=13,663 sf 38.70% Impervious Runoff Depth=2.43"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=87 Runoff=1.28 cfs 2,763 cf

Subcatchment23S: Runoff Area=25,137 sf 38.67% Impervious Runoff Depth=2.43"
Flow Length=130' Tc=24.5 min CN=87 Runoff=1.37 cfs 5,083 cf

Subcatchment24S: Runoff Area=8,860 sf 50.18% Impervious Runoff Depth=2.61"
Flow Length=130' Tc=6.0 min CN=89 Runoff=0.88 cfs 1,925 cf

Subcatchment25S: Runoff Area=6,623 sf 74.78% Impervious Runoff Depth=3.00"
Flow Length=50' Slope=0.0200 '/' Tc=6.0 min CN=93 Runoff=0.73 cfs 1,654 cf

Reach 1R: EXISTING 24" PIPE Avg. Flow Depth=0.50' Max Vel=4.96 fps Inflow=3.10 cfs 7,652 cf
24.0" Round Pipe n=0.013 L=192.0' S=0.0098 '/' Capacity=22.39 cfs Outflow=3.03 cfs 7,652 cf

Reach 2R: Avg. Flow Depth=0.42' Max Vel=7.76 fps Inflow=3.11 cfs 7,551 cf
18.0" Round Pipe n=0.013 L=210.0' S=0.0310 '/' Capacity=18.48 cfs Outflow=3.04 cfs 7,551 cf

Reach 4R: Avg. Flow Depth=0.19' Max Vel=2.65 fps Inflow=1.84 cfs 4,843 cf
n=0.035 L=112.0' S=0.0446 '/' Capacity=177.26 cfs Outflow=1.74 cfs 4,843 cf

Pond #1: Peak Elev=41.12' Inflow=1.07 cfs 2,762 cf
12.0" Round Culvert n=0.013 L=77.0' S=0.0058 '/' Outflow=1.07 cfs 2,762 cf

Pond #11: Peak Elev=41.96' Inflow=0.91 cfs 2,099 cf
12.0" Round Culvert n=0.013 L=55.0' S=0.0073 '/' Outflow=0.91 cfs 2,099 cf

Pond #12: Peak Elev=40.01' Inflow=3.96 cfs 9,519 cf
18.0" Round Culvert n=0.013 L=61.0' S=0.0148 '/' Outflow=3.96 cfs 9,519 cf

Pond #15: Peak Elev=41.30' Inflow=2.32 cfs 5,794 cf
12.0" Round Culvert n=0.013 L=31.0' S=0.0065 '/' Outflow=2.32 cfs 5,794 cf

Pond #16: Peak Elev=40.64' Inflow=4.70 cfs 11,114 cf
15.0" Round Culvert n=0.013 L=56.0' S=0.0134 '/' Outflow=4.70 cfs 11,114 cf

Pond #2: Peak Elev=41.29' Inflow=2.57 cfs 6,045 cf
12.0" Round Culvert n=0.013 L=33.0' S=0.0212 '/' Outflow=2.57 cfs 6,045 cf

Pond #20: Peak Elev=43.41' Inflow=0.51 cfs 1,271 cf
12.0" Round Culvert n=0.013 L=76.0' S=0.0125 '/' Outflow=0.51 cfs 1,271 cf

Pond #21: Peak Elev=42.87' Inflow=1.69 cfs 3,901 cf
12.0" Round Culvert n=0.013 L=70.0' S=0.0450 '/' Outflow=1.69 cfs 3,901 cf

Pond #22: Peak Elev=38.25' Inflow=5.96 cfs 13,877 cf
Primary=2.43 cfs 1,317 cf Secondary=3.54 cfs 12,560 cf Outflow=5.96 cfs 13,877 cf

Pond #23: Peak Elev=40.99' Inflow=1.37 cfs 5,083 cf
15.0" Round Culvert n=0.013 L=70.0' S=0.0071 '/' Outflow=1.37 cfs 5,083 cf

Pond #24: Peak Elev=40.75' Inflow=1.90 cfs 8,640 cf
12.0" Round Culvert n=0.013 L=26.0' S=0.0231 '/' Outflow=1.90 cfs 8,640 cf

Pond #25: Peak Elev=39.15' Inflow=1.90 cfs 8,640 cf
Primary=0.00 cfs 0 cf Secondary=1.90 cfs 8,640 cf Outflow=1.90 cfs 8,640 cf

Pond #26: Peak Elev=44.17' Inflow=1.24 cfs 2,716 cf
12.0" Round Culvert n=0.013 L=126.0' S=0.0278 '/' Outflow=1.24 cfs 2,716 cf

Pond #27: Peak Elev=39.85' Inflow=0.88 cfs 1,925 cf
12.0" Round Culvert n=0.013 L=100.0' S=0.0080 '/' Outflow=0.88 cfs 1,925 cf

Pond #28: Peak Elev=36.35' Inflow=1.61 cfs 3,579 cf
12.0" Round Culvert n=0.013 L=36.0' S=0.0153 '/' Outflow=1.61 cfs 3,579 cf

Pond #29: Peak Elev=39.70' Inflow=2.91 cfs 7,136 cf
12.0" Round Culvert n=0.013 L=43.0' S=0.0116 '/' Outflow=2.91 cfs 7,136 cf

Pond #3: Peak Elev=40.21' Inflow=3.06 cfs 7,096 cf
15.0" Round Culvert n=0.013 L=36.0' S=0.0111 '/' Outflow=3.06 cfs 7,096 cf

Pond #35: Peak Elev=40.51' Inflow=5.96 cfs 13,877 cf
15.0" Round Culvert n=0.013 L=34.0' S=0.0265 '/' Outflow=5.96 cfs 13,877 cf

Pond #6: Peak Elev=39.18' Inflow=1.84 cfs 4,843 cf
12.0" Round Culvert n=0.013 L=9.8' S=0.0153 '/' Outflow=1.84 cfs 4,843 cf

Pond 1P: FOREBAY Peak Elev=44.33' Storage=181 cf Inflow=3.12 cfs 7,551 cf
Outflow=3.11 cfs 7,551 cf

Pond 1SM: STM MH#1 Peak Elev=39.65' Inflow=6.51 cfs 16,614 cf
Primary=3.04 cfs 2,054 cf Secondary=3.47 cfs 14,560 cf Outflow=6.51 cfs 16,614 cf

Pond 2P: DEPRESSION Peak Elev=34.18' Storage=8,374 cf Inflow=8.84 cfs 24,165 cf
Outflow=8.67 cfs 18,593 cf

Pond 2SM: STM MH#2 Peak Elev=39.18' Inflow=6.51 cfs 16,614 cf
18.0" Round Culvert n=0.013 L=92.0' S=0.0054 '/' Outflow=6.51 cfs 16,614 cf

Pond 3SM: STM MH#3 Peak Elev=37.54' Inflow=5.96 cfs 13,877 cf
18.0" Round Culvert n=0.013 L=118.0' S=0.0085 '/' Outflow=5.96 cfs 13,877 cf

Pond 4SM: STM MH#4 Peak Elev=38.28' Inflow=1.90 cfs 8,640 cf
15.0" Round Culvert n=0.013 L=10.5' S=0.0476 '/' Outflow=1.90 cfs 8,640 cf

Pond 5SM: STM MH#5 Peak Elev=39.18' Inflow=2.91 cfs 7,136 cf
Primary=0.03 cfs 5 cf Secondary=2.88 cfs 7,132 cf Outflow=2.91 cfs 7,136 cf

Pond 6SM: STM MH#6 Peak Elev=38.27' Inflow=2.91 cfs 7,136 cf
15.0" Round Culvert n=0.013 L=86.0' S=0.0087 '/' Outflow=2.91 cfs 7,136 cf

Pond SP1: Peak Elev=42.83' Storage=175 cf Inflow=1.04 cfs 2,563 cf
Outflow=0.93 cfs 2,563 cf

Pond SP2: Peak Elev=42.98' Storage=206 cf Inflow=1.29 cfs 2,762 cf
Outflow=1.07 cfs 2,762 cf

Pond SP3: Peak Elev=42.91' Storage=171 cf Inflow=1.19 cfs 2,541 cf
Outflow=1.01 cfs 2,541 cf

Pond SP4: Peak Elev=42.95' Storage=129 cf Inflow=1.19 cfs 2,541 cf
Outflow=1.05 cfs 2,541 cf

Pond SP5: Peak Elev=43.36' Storage=343 cf Inflow=1.67 cfs 3,557 cf
Outflow=1.35 cfs 3,557 cf

Pond SP6: Peak Elev=43.37' Storage=332 cf Inflow=1.67 cfs 3,557 cf
Outflow=1.36 cfs 3,557 cf

Pond W: LOW AREA Peak Elev=47.50' Storage=3,387 cf Inflow=2.01 cfs 4,341 cf
Outflow=0.05 cfs 973 cf

Pond WQU#1: WQU#1 Peak Elev=39.03' Inflow=1.84 cfs 4,843 cf
12.0" Round Culvert n=0.013 L=11.0' S=0.0318 '/' Outflow=1.84 cfs 4,843 cf

Pond WQU#2: WQU#2 Peak Elev=39.45' Inflow=3.47 cfs 14,560 cf
12.0" Round Culvert n=0.013 L=6.5' S=0.0154 '/' Outflow=3.47 cfs 14,560 cf

Pond WQU#3: WQU#3 Peak Elev=38.15' Inflow=3.54 cfs 12,560 cf
12.0" Round Culvert n=0.013 L=10.0' S=0.0250 '/' Outflow=3.54 cfs 12,560 cf

Pond WQU#4: WQU#4 Peak Elev=38.90' Inflow=1.90 cfs 8,640 cf
12.0" Round Culvert n=0.013 L=7.0' S=0.0357 '/' Outflow=1.90 cfs 8,640 cf

Pond WQU#5: WQU#5 Peak Elev=38.93' Inflow=2.88 cfs 7,132 cf
12.0" Round Culvert n=0.013 L=17.0' S=0.0147 '/' Outflow=2.88 cfs 7,132 cf

Link OFF1: Inflow=32.57 cfs 99,210 cf
Primary=32.57 cfs 99,210 cf

Total Runoff Area = 536,757 sf Runoff Volume = 108,151 cf Average Runoff Depth = 2.42"
64.65% Pervious = 347,015 sf 35.35% Impervious = 189,742 sf

Summary for Subcatchment 1S:

Runoff = 12.06 cfs @ 12.08 hrs, Volume= 35,123 cf, Depth= 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
97,354	79	Woods, Fair, HSG D
130,080	80	>75% Grass cover, Good, HSG D
227,434	80	Weighted Average
227,434		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1800	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
5.8	580	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.9	680	Total			

Summary for Subcatchment 2S:

Runoff = 1.87 cfs @ 11.89 hrs, Volume= 3,346 cf, Depth= 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
8,106	77	Woods, Good, HSG D
4,653	98	Paved roads w/curbs & sewers, HSG D
6,473	80	>75% Grass cover, Good, HSG D
19,232	83	Weighted Average
14,579		75.81% Pervious Area
4,653		24.19% Impervious Area

Summary for Subcatchment 3S:

Runoff = 3.10 cfs @ 11.96 hrs, Volume= 7,652 cf, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
25,969	98	Paved roads w/curbs & sewers, HSG D
25,969		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0060	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.9	283	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.1	383	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 4S:

Runoff = 1.67 cfs @ 11.89 hrs, Volume= 3,557 cf, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
12,073	98	Unconnected roofs, HSG D
12,073		100.00% Impervious Area
12,073		100.00% Unconnected

Summary for Subcatchment 5S:

Runoff = 1.67 cfs @ 11.89 hrs, Volume= 3,557 cf, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
12,073	98	Unconnected roofs, HSG D
12,073		100.00% Impervious Area
12,073		100.00% Unconnected

Summary for Subcatchment 6S:

Runoff = 1.19 cfs @ 11.89 hrs, Volume= 2,541 cf, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
8,624	98	Unconnected roofs, HSG D
8,624		100.00% Impervious Area
8,624		100.00% Unconnected

Summary for Subcatchment 7S:

Runoff = 1.19 cfs @ 11.89 hrs, Volume= 2,541 cf, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
8,624	98	Unconnected roofs, HSG D
8,624		100.00% Impervious Area
8,624		100.00% Unconnected

Summary for Subcatchment 8S:

Runoff = 1.29 cfs @ 11.89 hrs, Volume= 2,762 cf, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
9,375	98	Unconnected roofs, HSG D
9,375		100.00% Impervious Area
9,375		100.00% Unconnected

Summary for Subcatchment 9S:

Runoff = 1.04 cfs @ 11.96 hrs, Volume= 2,563 cf, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
8,698	98	Unconnected roofs, HSG D
8,698		100.00% Impervious Area
8,698		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	63	0.0500	1.60		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.7	63	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 10S:

Runoff = 3.12 cfs @ 11.97 hrs, Volume= 6,578 cf, Depth= 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
17,986	79	Woods, Fair, HSG D
24,610	80	>75% Grass cover, Good, HSG D
42,596	80	Weighted Average
42,596		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0060	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.9	283	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.1	383	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 11S:

Runoff = 2.01 cfs @ 11.97 hrs, Volume= 4,341 cf, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
12,368	79	Woods/grass comb., Good, HSG D
9,099	98	Unconnected pavement, HSG D
21,467	87	Weighted Average
12,368		57.61% Pervious Area
9,099		42.39% Impervious Area
9,099		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0060	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.9	283	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.1	383	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 12S:

Runoff = 1.17 cfs @ 11.89 hrs, Volume= 2,280 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
6,498	98	Paved parking, HSG D
2,635	80	>75% Grass cover, Good, HSG D
9,133	93	Weighted Average
2,635		28.85% Pervious Area
6,498		71.15% Impervious Area

Summary for Subcatchment 13S:

Runoff = 1.54 cfs @ 11.89 hrs, Volume= 3,283 cf, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
11,142	98	Paved parking, HSG D
11,142		100.00% Impervious Area

Summary for Subcatchment 14S:

Runoff = 0.49 cfs @ 11.89 hrs, Volume= 1,050 cf, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
3,565	98	Paved parking, HSG D
3,565		100.00% Impervious Area

Summary for Subcatchment 15S:

Runoff = 0.42 cfs @ 11.96 hrs, Volume= 978 cf, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
3,053	98	Paved parking, HSG D
609	80	>75% Grass cover, Good, HSG D
3,662	95	Weighted Average
609		16.63% Pervious Area
3,053		83.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 16S:

Runoff = 1.17 cfs @ 11.96 hrs, Volume= 2,630 cf, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
7,409	98	Paved parking, HSG D
3,488	80	>75% Grass cover, Good, HSG D
10,897	92	Weighted Average
3,488		32.01% Pervious Area
7,409		67.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.22		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.3	55	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	155	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 17S:

Runoff = 0.51 cfs @ 11.96 hrs, Volume= 1,271 cf, Depth= 3.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
4,314	98	Paved parking, HSG D
4,314		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 18S:

Runoff = 0.91 cfs @ 11.96 hrs, Volume= 2,099 cf, Depth= 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
6,512	98	Paved parking, HSG D
1,616	80	>75% Grass cover, Good, HSG D
8,128	94	Weighted Average
1,616		19.88% Pervious Area
6,512		80.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 19S:

Runoff = 1.24 cfs @ 11.97 hrs, Volume= 2,716 cf, Depth= 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
6,057	98	Paved parking, HSG D
6,441	80	>75% Grass cover, Good, HSG D
12,498	89	Weighted Average
6,441		51.54% Pervious Area
6,057		48.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 20S:

Runoff = 1.35 cfs @ 11.96 hrs, Volume= 3,253 cf, Depth= 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
10,905	98	Paved parking, HSG D
500	80	>75% Grass cover, Good, HSG D
11,405	97	Weighted Average
500		4.38% Pervious Area
10,905		95.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 21S:

Runoff = 1.18 cfs @ 11.97 hrs, Volume= 2,604 cf, Depth= 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
6,693	98	Paved parking, HSG D
4,872	80	>75% Grass cover, Good, HSG D
11,565	90	Weighted Average
4,872		42.13% Pervious Area
6,693		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 22S:

Runoff = 1.28 cfs @ 11.97 hrs, Volume= 2,763 cf, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
5,287	98	Paved parking, HSG D
8,376	80	>75% Grass cover, Good, HSG D
13,663	87	Weighted Average
8,376		61.30% Pervious Area
5,287		38.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 23S:

Runoff = 1.37 cfs @ 12.17 hrs, Volume= 5,083 cf, Depth= 2.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
9,720	98	Paved parking, HSG D
15,417	80	>75% Grass cover, Good, HSG D
25,137	87	Weighted Average
15,417		61.33% Pervious Area
9,720		38.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.3	100	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
0.2	30	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.5	130	Total			

Summary for Subcatchment 24S:

Runoff = 0.88 cfs @ 11.97 hrs, Volume= 1,925 cf, Depth= 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
4,446	98	Paved parking, HSG D
4,414	80	>75% Grass cover, Good, HSG D
8,860	89	Weighted Average
4,414		49.82% Pervious Area
4,446		50.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.22		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.2	30	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	130	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 25S:

Runoff = 0.73 cfs @ 11.96 hrs, Volume= 1,654 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 10 YR Rainfall=3.77"

Area (sf)	CN	Description
4,953	98	Paved parking, HSG D
1,670	80	>75% Grass cover, Good, HSG D
6,623	93	Weighted Average
1,670		25.22% Pervious Area
4,953		74.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0200	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.8	50	Total, Increased to minimum Tc = 6.0 min			

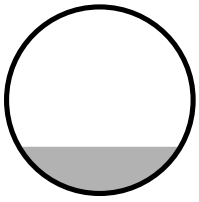
Summary for Reach 1R: EXISTING 24" PIPE

Inflow Area = 25,969 sf,100.00% Impervious, Inflow Depth = 3.54" for 10 YR event
Inflow = 3.10 cfs @ 11.96 hrs, Volume= 7,652 cf
Outflow = 3.03 cfs @ 11.98 hrs, Volume= 7,652 cf, Atten= 2%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.96 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 2.2 min

Peak Storage= 118 cf @ 11.97 hrs
Average Depth at Peak Storage= 0.50' , Surface Width= 1.73'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 22.39 cfs

24.0" Round Pipe
n= 0.013 Clay tile
Length= 192.0' Slope= 0.0098 '/'
Inlet Invert= 30.57', Outlet Invert= 28.69'



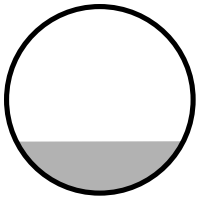
Summary for Reach 2R:

Inflow Area = 64,063 sf, 14.20% Impervious, Inflow Depth = 1.41" for 10 YR event
Inflow = 3.11 cfs @ 11.99 hrs, Volume= 7,551 cf
Outflow = 3.04 cfs @ 12.00 hrs, Volume= 7,551 cf, Atten= 2%, Lag= 0.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.76 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.59 fps, Avg. Travel Time= 1.4 min

Peak Storage= 84 cf @ 11.99 hrs
Average Depth at Peak Storage= 0.42' , Surface Width= 1.34'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.48 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 210.0' Slope= 0.0310 '/'
Inlet Invert= 43.50', Outlet Invert= 37.00'



Summary for Reach 4R:

Inflow Area = 17,831 sf, 85.22% Impervious, Inflow Depth = 3.26" for 10 YR event
Inflow = 1.84 cfs @ 11.90 hrs, Volume= 4,843 cf
Outflow = 1.74 cfs @ 11.92 hrs, Volume= 4,843 cf, Atten= 5%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.65 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 0.73 fps, Avg. Travel Time= 2.6 min

Peak Storage= 76 cf @ 11.91 hrs
Average Depth at Peak Storage= 0.19' , Surface Width= 4.14'
Bank-Full Depth= 2.00' Flow Area= 18.0 sf, Capacity= 177.26 cfs

3.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 15.00'
Length= 112.0' Slope= 0.0446 '/'
Inlet Invert= 44.00', Outlet Invert= 39.00'



‡

Summary for Pond #1:

Inflow Area = 9,375 sf,100.00% Impervious, Inflow Depth = 3.54" for 10 YR event
Inflow = 1.07 cfs @ 11.92 hrs, Volume= 2,762 cf
Outflow = 1.07 cfs @ 11.92 hrs, Volume= 2,762 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.07 cfs @ 11.92 hrs, Volume= 2,762 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 41.12' @ 11.92 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.50'	**12.0" Round Culvert** L= 77.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 40.50' / 40.05' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.04 cfs @ 11.92 hrs HW=41.12' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.04 cfs @ 2.94 fps)

Summary for Pond #11:

Inflow Area = 8,128 sf, 80.12% Impervious, Inflow Depth = 3.10" for 10 YR event
Inflow = 0.91 cfs @ 11.96 hrs, Volume= 2,099 cf
Outflow = 0.91 cfs @ 11.96 hrs, Volume= 2,099 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.91 cfs @ 11.96 hrs, Volume= 2,099 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 41.96' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	41.40'	**12.0" Round Culvert** L= 55.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 41.40' / 41.00' S= 0.0073 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.89 cfs @ 11.96 hrs HW=41.95' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.89 cfs @ 2.00 fps)

Summary for Pond #12:

Inflow Area = 35,625 sf, 83.96% Impervious, Inflow Depth = 3.21" for 10 YR event
Inflow = 3.96 cfs @ 11.95 hrs, Volume= 9,519 cf
Outflow = 3.96 cfs @ 11.95 hrs, Volume= 9,519 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.96 cfs @ 11.95 hrs, Volume= 9,519 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.01' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.90'	**18.0" Round Culvert** L= 61.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.90' / 38.00' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.94 cfs @ 11.95 hrs HW=40.01' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.94 cfs @ 2.83 fps)

Summary for Pond #15:

Inflow Area = 20,029 sf, 97.50% Impervious, Inflow Depth = 3.47" for 10 YR event
Inflow = 2.32 cfs @ 11.94 hrs, Volume= 5,794 cf
Outflow = 2.32 cfs @ 11.94 hrs, Volume= 5,794 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.32 cfs @ 11.94 hrs, Volume= 5,794 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Peak Elev= 41.30' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.20'	**12.0" Round Culvert**
			L= 31.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 40.20' / 40.00' S= 0.0065 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.26 cfs @ 11.94 hrs HW=41.27' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 2.26 cfs @ 2.88 fps)

Summary for Pond #16:

Inflow Area = 44,092 sf, 73.21% Impervious, Inflow Depth = 3.02" for 10 YR event
Inflow = 4.70 cfs @ 11.95 hrs, Volume= 11,114 cf
Outflow = 4.70 cfs @ 11.95 hrs, Volume= 11,114 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.70 cfs @ 11.95 hrs, Volume= 11,114 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.64' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.00'	**15.0" Round Culvert**
			L= 56.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 39.00' / 38.25' S= 0.0134 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.68 cfs @ 11.95 hrs HW=40.63' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 4.68 cfs @ 3.82 fps)

Summary for Pond #2:

Inflow Area = 20,517 sf,100.00% Impervious, Inflow Depth = 3.54" for 10 YR event
Inflow = 2.57 cfs @ 11.89 hrs, Volume= 6,045 cf
Outflow = 2.57 cfs @ 11.89 hrs, Volume= 6,045 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.57 cfs @ 11.89 hrs, Volume= 6,045 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 41.29' @ 11.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.05'	**12.0" Round Culvert**
			L= 33.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 40.05' / 39.35' S= 0.0212 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.52 cfs @ 11.89 hrs HW=41.26' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 2.52 cfs @ 3.21 fps)

Summary for Pond #20:

Inflow Area = 4,314 sf,100.00% Impervious, Inflow Depth = 3.54" for 10 YR event
Inflow = 0.51 cfs @ 11.96 hrs, Volume= 1,271 cf
Outflow = 0.51 cfs @ 11.96 hrs, Volume= 1,271 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.51 cfs @ 11.96 hrs, Volume= 1,271 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 43.41' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	43.00'	**12.0" Round Culvert** L= 76.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 43.00' / 42.05' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.50 cfs @ 11.96 hrs HW=43.40' (Free Discharge)
1=Culvert (Inlet Controls 0.50 cfs @ 1.70 fps)

Summary for Pond #21:

Inflow Area = 15,211 sf, 77.07% Impervious, Inflow Depth = 3.08" for 10 YR event
Inflow = 1.69 cfs @ 11.96 hrs, Volume= 3,901 cf
Outflow = 1.69 cfs @ 11.96 hrs, Volume= 3,901 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.69 cfs @ 11.96 hrs, Volume= 3,901 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.87' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	42.05'	**12.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.05' / 38.90' S= 0.0450 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.64 cfs @ 11.96 hrs HW=42.86' (Free Discharge)
1=Culvert (Inlet Controls 1.64 cfs @ 2.42 fps)

Summary for Pond #22:

Inflow Area = 57,755 sf, 65.04% Impervious, Inflow Depth = 2.88" for 10 YR event
Inflow = 5.96 cfs @ 11.95 hrs, Volume= 13,877 cf
Outflow = 5.96 cfs @ 11.95 hrs, Volume= 13,877 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.43 cfs @ 11.95 hrs, Volume= 1,317 cf
Secondary = 3.54 cfs @ 11.95 hrs, Volume= 12,560 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.25' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.35'	**15.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.35' / 37.00' S= 0.0438 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	36.35'	**12.0" Round Culvert** L= 8.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.35' / 36.25' S= 0.0120 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.37 cfs @ 11.95 hrs HW=38.24' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.37 cfs @ 2.54 fps)

Secondary OutFlow Max=3.52 cfs @ 11.95 hrs HW=38.24' (Free Discharge)
└**2=Culvert** (Inlet Controls 3.52 cfs @ 4.48 fps)

Summary for Pond #23:

Inflow Area = 25,137 sf, 38.67% Impervious, Inflow Depth = 2.43" for 10 YR event
Inflow = 1.37 cfs @ 12.17 hrs, Volume= 5,083 cf
Outflow = 1.37 cfs @ 12.17 hrs, Volume= 5,083 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.37 cfs @ 12.17 hrs, Volume= 5,083 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.99' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.35'	**15.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 40.35' / 39.85' S= 0.0071 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.36 cfs @ 12.17 hrs HW=40.99' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.36 cfs @ 2.15 fps)

Summary for Pond #24:

Inflow Area = 37,210 sf, 58.57% Impervious, Inflow Depth = 2.79" for 10 YR event
Inflow = 1.90 cfs @ 11.95 hrs, Volume= 8,640 cf
Outflow = 1.90 cfs @ 11.95 hrs, Volume= 8,640 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.90 cfs @ 11.95 hrs, Volume= 8,640 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.75' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.85'	**12.0" Round Culvert** L= 26.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.85' / 39.25' S= 0.0231 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.90 cfs @ 11.95 hrs HW=40.75' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.90 cfs @ 2.55 fps)

Summary for Pond #25:

Inflow Area = 37,210 sf, 58.57% Impervious, Inflow Depth = 2.79" for 10 YR event
Inflow = 1.90 cfs @ 11.95 hrs, Volume= 8,640 cf
Outflow = 1.90 cfs @ 11.95 hrs, Volume= 8,640 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 1.90 cfs @ 11.95 hrs, Volume= 8,640 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.15' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.25'	**12.0" Round Culvert** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.25' / 39.00' S= 0.0192 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	38.25'	**12.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.25' / 38.00' S= 0.0208 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=38.25' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=1.90 cfs @ 11.95 hrs HW=39.15' (Free Discharge)
└**2=Culvert** (Inlet Controls 1.90 cfs @ 2.55 fps)

Summary for Pond #26:

Inflow Area = 12,498 sf, 48.46% Impervious, Inflow Depth = 2.61" for 10 YR event
Inflow = 1.24 cfs @ 11.97 hrs, Volume= 2,716 cf
Outflow = 1.24 cfs @ 11.97 hrs, Volume= 2,716 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.24 cfs @ 11.97 hrs, Volume= 2,716 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 44.17' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	43.50'	**12.0" Round Culvert** L= 126.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 43.50' / 40.00' S= 0.0278 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.21 cfs @ 11.97 hrs HW=44.16' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.21 cfs @ 2.19 fps)

Summary for Pond #27:

Inflow Area = 8,860 sf, 50.18% Impervious, Inflow Depth = 2.61" for 10 YR event
Inflow = 0.88 cfs @ 11.97 hrs, Volume= 1,925 cf
Outflow = 0.88 cfs @ 11.97 hrs, Volume= 1,925 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.88 cfs @ 11.97 hrs, Volume= 1,925 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.85' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.30'	**12.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.30' / 38.50' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.86 cfs @ 11.97 hrs HW=39.84' (Free Discharge)
1=Culvert (Inlet Controls 0.86 cfs @ 1.98 fps)

Summary for Pond #28:

Inflow Area = 15,483 sf, 60.71% Impervious, Inflow Depth = 2.77" for 10 YR event
Inflow = 1.61 cfs @ 11.97 hrs, Volume= 3,579 cf
Outflow = 1.61 cfs @ 11.97 hrs, Volume= 3,579 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.61 cfs @ 11.97 hrs, Volume= 3,579 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 36.35' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	35.55'	**12.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 35.55' / 35.00' S= 0.0153 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.57 cfs @ 11.97 hrs HW=36.33' (Free Discharge)
1=Culvert (Inlet Controls 1.57 cfs @ 2.38 fps)

Summary for Pond #29:

Inflow Area = 27,556 sf, 77.92% Impervious, Inflow Depth = 3.11" for 10 YR event
Inflow = 2.91 cfs @ 11.95 hrs, Volume= 7,136 cf
Outflow = 2.91 cfs @ 11.95 hrs, Volume= 7,136 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.91 cfs @ 11.95 hrs, Volume= 7,136 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.70' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.25'	**12.0" Round Culvert** L= 43.0' CPP, projecting, no headwall, Ke= 0.900

Inlet / Outlet Invert= 38.25' / 37.75' S= 0.0116 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.89 cfs @ 11.95 hrs HW=39.68' (Free Discharge)
1=Culvert (Inlet Controls 2.89 cfs @ 3.67 fps)

Summary for Pond #3:

Inflow Area = 24,082 sf,100.00% Impervious, Inflow Depth = 3.54" for 10 YR event
Inflow = 3.06 cfs @ 11.89 hrs, Volume= 7,096 cf
Outflow = 3.06 cfs @ 11.89 hrs, Volume= 7,096 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.06 cfs @ 11.89 hrs, Volume= 7,096 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.21' @ 11.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.15'	**15.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.15' / 38.75' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.98 cfs @ 11.89 hrs HW=40.19' (Free Discharge)
1=Culvert (Inlet Controls 2.98 cfs @ 2.74 fps)

Summary for Pond #35:

Inflow Area = 57,755 sf, 65.04% Impervious, Inflow Depth = 2.88" for 10 YR event
Inflow = 5.96 cfs @ 11.95 hrs, Volume= 13,877 cf
Outflow = 5.96 cfs @ 11.95 hrs, Volume= 13,877 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.96 cfs @ 11.95 hrs, Volume= 13,877 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.51' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.25'	**15.0" Round Culvert** L= 34.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.25' / 37.35' S= 0.0265 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=5.90 cfs @ 11.95 hrs HW=40.47' (Free Discharge)
1=Culvert (Inlet Controls 5.90 cfs @ 4.81 fps)

Summary for Pond #6:

Inflow Area = 17,831 sf, 85.22% Impervious, Inflow Depth = 3.26" for 10 YR event
Inflow = 1.84 cfs @ 11.90 hrs, Volume= 4,843 cf
Outflow = 1.84 cfs @ 11.90 hrs, Volume= 4,843 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.84 cfs @ 11.90 hrs, Volume= 4,843 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.18' @ 11.90 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.30'	**12.0" Round Culvert** L= 9.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.30' / 38.15' S= 0.0153 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.82 cfs @ 11.90 hrs HW=39.18' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.82 cfs @ 3.32 fps)

Summary for Pond 1P: FOREBAY

Inflow Area = 64,063 sf, 14.20% Impervious, Inflow Depth = 1.41" for 10 YR event
Inflow = 3.12 cfs @ 11.97 hrs, Volume= 7,551 cf
Outflow = 3.11 cfs @ 11.99 hrs, Volume= 7,551 cf, Atten= 0%, Lag= 0.9 min
Primary = 3.11 cfs @ 11.99 hrs, Volume= 7,551 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 44.33' @ 11.99 hrs Surf.Area= 316 sf Storage= 181 cf

Plug-Flow detention time= 1.5 min calculated for 7,549 cf (100% of inflow)
Center-of-Mass det. time= 1.5 min (869.7 - 868.2)

Volume	Invert	Avail.Storage	Storage Description
#1	43.50'	2,260 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.50	50	0	0
44.00	280	83	83
46.00	500	780	863
47.50	770	953	1,815
48.00	1,010	445	2,260

Device	Routing	Invert	Outlet Devices
#1	Primary	43.50'	**18.0" Round Culvert** L= 168.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 43.50' / 39.00' S= 0.0268 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	47.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=3.01 cfs @ 11.99 hrs HW=44.31' (Free Discharge)
├**1=Culvert** (Inlet Controls 3.01 cfs @ 3.07 fps)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 1SM: STM MH#1

Inflow Area = 59,707 sf, 90.43% Impervious, Inflow Depth = 3.34" for 10 YR event
Inflow = 6.51 cfs @ 11.92 hrs, Volume= 16,614 cf
Outflow = 6.51 cfs @ 11.92 hrs, Volume= 16,614 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.04 cfs @ 11.92 hrs, Volume= 2,054 cf
Secondary = 3.47 cfs @ 11.92 hrs, Volume= 14,560 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.65' @ 11.92 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.60'	**15.0" Round Culvert** L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.60' / 38.40' S= 0.0182 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	37.80'	**12.0" Round Culvert** L= 8.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.80' / 37.60' S= 0.0233 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=2.91 cfs @ 11.92 hrs HW=39.62' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.91 cfs @ 2.72 fps)

Secondary OutFlow Max=3.43 cfs @ 11.92 hrs HW=39.62' (Free Discharge)
└**2=Culvert** (Inlet Controls 3.43 cfs @ 4.37 fps)

Summary for Pond 2P: DEPRESSION

Inflow Area = 123,770 sf, 50.98% Impervious, Inflow Depth = 2.34" for 10 YR event
Inflow = 8.84 cfs @ 11.94 hrs, Volume= 24,165 cf
Outflow = 8.67 cfs @ 11.98 hrs, Volume= 18,593 cf, Atten= 2%, Lag= 2.1 min
Primary = 8.67 cfs @ 11.98 hrs, Volume= 18,593 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 34.18' @ 11.98 hrs Surf.Area= 10,310 sf Storage= 8,374 cf

Plug-Flow detention time= 174.9 min calculated for 18,588 cf (77% of inflow)
Center-of-Mass det. time= 78.5 min (873.3 - 794.8)

Volume	Invert	Avail.Storage	Storage Description
#1	33.00'	8,374 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
33.00	7,351	0	0
33.75	8,657	6,003	6,003
34.00	10,310	2,371	8,374

Device	Routing	Invert	Outlet Devices
#1	Primary	33.70'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=8.18 cfs @ 11.98 hrs HW=34.16' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 8.18 cfs @ 1.77 fps)

Summary for Pond 2SM: STM MH#2

Inflow Area = 59,707 sf, 90.43% Impervious, Inflow Depth = 3.34" for 10 YR event
Inflow = 6.51 cfs @ 11.92 hrs, Volume= 16,614 cf
Outflow = 6.51 cfs @ 11.92 hrs, Volume= 16,614 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.51 cfs @ 11.92 hrs, Volume= 16,614 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.18' @ 11.92 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**18.0" Round Culvert** L= 92.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.50' / 37.00' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=6.35 cfs @ 11.92 hrs HW=39.14' (Free Discharge)
1=Culvert (Inlet Controls 6.35 cfs @ 3.59 fps)

Summary for Pond 3SM: STM MH#3

Inflow Area = 57,755 sf, 65.04% Impervious, Inflow Depth = 2.88" for 10 YR event
Inflow = 5.96 cfs @ 11.95 hrs, Volume= 13,877 cf
Outflow = 5.96 cfs @ 11.95 hrs, Volume= 13,877 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.96 cfs @ 11.95 hrs, Volume= 13,877 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 37.54' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	36.00'	**18.0" Round Culvert** L= 118.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.00' / 35.00' S= 0.0085 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=5.90 cfs @ 11.95 hrs HW=37.52' (Free Discharge)
1=Culvert (Inlet Controls 5.90 cfs @ 3.34 fps)

Summary for Pond 4SM: STM MH#4

Inflow Area = 37,210 sf, 58.57% Impervious, Inflow Depth = 2.79" for 10 YR event
Inflow = 1.90 cfs @ 11.95 hrs, Volume= 8,640 cf
Outflow = 1.90 cfs @ 11.95 hrs, Volume= 8,640 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.90 cfs @ 11.95 hrs, Volume= 8,640 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.28' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**15.0" Round Culvert** L= 10.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.50' / 37.00' S= 0.0476 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=1.90 cfs @ 11.95 hrs HW=38.28' (Free Discharge)
1=Culvert (Inlet Controls 1.90 cfs @ 2.37 fps)

Summary for Pond 5SM: STM MH#5

Inflow Area = 27,556 sf, 77.92% Impervious, Inflow Depth = 3.11" for 10 YR event
Inflow = 2.91 cfs @ 11.95 hrs, Volume= 7,136 cf
Outflow = 2.91 cfs @ 11.95 hrs, Volume= 7,136 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.03 cfs @ 11.95 hrs, Volume= 5 cf
Secondary = 2.88 cfs @ 11.95 hrs, Volume= 7,132 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.18' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.10'	**15.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.10' / 38.00' S= 0.0688 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	37.75'	**12.0" Round Culvert** L= 6.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.75' / 37.50' S= 0.0397 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.03 cfs @ 11.95 hrs HW=39.18' (Free Discharge)
1=Culvert (Inlet Controls 0.03 cfs @ 0.76 fps)

Secondary OutFlow Max=2.86 cfs @ 11.95 hrs HW=39.17' (Free Discharge)
2=Culvert (Inlet Controls 2.86 cfs @ 3.64 fps)

Summary for Pond 6SM: STM MH#6

Inflow Area = 27,556 sf, 77.92% Impervious, Inflow Depth = 3.11" for 10 YR event
Inflow = 2.91 cfs @ 11.95 hrs, Volume= 7,136 cf
Outflow = 2.91 cfs @ 11.95 hrs, Volume= 7,136 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.91 cfs @ 11.95 hrs, Volume= 7,136 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.27' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.25'	**15.0" Round Culvert**

L= 86.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 37.25' / 36.50' S= 0.0087 '/' Cc= 0.900
n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=2.88 cfs @ 11.95 hrs HW=38.26' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.88 cfs @ 2.71 fps)

Summary for Pond SP1:

Inflow Area = 8,698 sf,100.00% Impervious, Inflow Depth = 3.54" for 10 YR event
Inflow = 1.04 cfs @ 11.96 hrs, Volume= 2,563 cf
Outflow = 0.93 cfs @ 12.00 hrs, Volume= 2,563 cf, Atten= 10%, Lag= 2.3 min
Primary = 0.93 cfs @ 12.00 hrs, Volume= 2,563 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.83' @ 12.00 hrs Surf.Area= 528 sf Storage= 175 cf

Plug-Flow detention time= 9.5 min calculated for 2,563 cf (100% of inflow)
Center-of-Mass det. time= 9.5 min (758.6 - 749.1)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	778 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	158 cf	**SOIL (Prismatic)**Listed below (Recalc) 792 cf Overall x 20.0% Voids
#3	42.00'	211 cf	**STONE (Prismatic)**Listed below (Recalc) 528 cf Overall x 40.0% Voids
		1,147 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	310	0	0
45.00	528	210	210
46.00	608	568	778

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	528	0	0
44.50	528	792	792

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	528	0	0
43.00	528	528	528

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 39.75' S= 0.2250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.93 cfs @ 12.00 hrs HW=42.83' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.93 cfs @ 2.67 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP2:

Inflow Area = 9,375 sf,100.00% Impervious, Inflow Depth = 3.54" for 10 YR event
Inflow = 1.29 cfs @ 11.89 hrs, Volume= 2,762 cf
Outflow = 1.07 cfs @ 11.92 hrs, Volume= 2,762 cf, Atten= 17%, Lag= 2.0 min
Primary = 1.07 cfs @ 11.92 hrs, Volume= 2,762 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.98' @ 11.92 hrs Surf.Area= 525 sf Storage= 206 cf

Plug-Flow detention time= 9.1 min calculated for 2,762 cf (100% of inflow)
Center-of-Mass det. time= 9.1 min (752.7 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	991 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	158 cf	**SOIL (Prismatic)**Listed below (Recalc) 788 cf Overall x 20.0% Voids
#3	42.00'	210 cf	**STONE (Prismatic)**Listed below (Recalc) 525 cf Overall x 40.0% Voids
		1,359 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	273	0	0
45.00	525	200	200
46.00	1,058	792	991

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	525	0	0
44.50	525	788	788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	525	0	0
43.00	525	525	525

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.04 cfs @ 11.92 hrs HW=42.95' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.04 cfs @ 2.99 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP3:

Inflow Area = 8,624 sf,100.00% Impervious, Inflow Depth = 3.54" for 10 YR event
Inflow = 1.19 cfs @ 11.89 hrs, Volume= 2,541 cf
Outflow = 1.01 cfs @ 11.92 hrs, Volume= 2,541 cf, Atten= 15%, Lag= 1.8 min
Primary = 1.01 cfs @ 11.92 hrs, Volume= 2,541 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.91' @ 11.92 hrs Surf.Area= 469 sf Storage= 171 cf

Plug-Flow detention time= 8.4 min calculated for 2,540 cf (100% of inflow)
Center-of-Mass det. time= 8.4 min (752.0 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	903 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	141 cf	**SOIL (Prismatic)**Listed below (Recalc) 704 cf Overall x 20.0% Voids
#3	42.00'	188 cf	**STONE (Prismatic)**Listed below (Recalc) 469 cf Overall x 40.0% Voids
		1,231 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	228	0	0
45.00	469	174	174
46.00	988	729	903

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	469	0	0
44.50	469	704	704

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	469	0	0
43.00	469	469	469

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.99 cfs @ 11.92 hrs HW=42.89' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.99 cfs @ 2.83 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP4:

Inflow Area = 8,624 sf,100.00% Impervious, Inflow Depth = 3.54" for 10 YR event
Inflow = 1.19 cfs @ 11.89 hrs, Volume= 2,541 cf
Outflow = 1.05 cfs @ 11.91 hrs, Volume= 2,541 cf, Atten= 12%, Lag= 1.4 min
Primary = 1.05 cfs @ 11.91 hrs, Volume= 2,541 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.95' @ 11.91 hrs Surf.Area= 339 sf Storage= 129 cf

Plug-Flow detention time= 6.1 min calculated for 2,540 cf (100% of inflow)
Center-of-Mass det. time= 6.1 min (749.7 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	633 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	102 cf	**SOIL (Prismatic)**Listed below (Recalc) 509 cf Overall x 20.0% Voids
#3	42.00'	136 cf	**STONE (Prismatic)**Listed below (Recalc) 339 cf Overall x 40.0% Voids
		870 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	200	0	0
45.00	339	135	135
46.00	657	498	633

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	339	0	0
44.50	339	509	509

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	339	0	0
43.00	339	339	339

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.03 cfs @ 11.91 hrs HW=42.93' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.03 cfs @ 2.94 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP5:

Inflow Area = 12,073 sf,100.00% Impervious, Inflow Depth = 3.54" for 10 YR event
Inflow = 1.67 cfs @ 11.89 hrs, Volume= 3,557 cf
Outflow = 1.35 cfs @ 11.93 hrs, Volume= 3,557 cf, Atten= 19%, Lag= 2.4 min
Primary = 1.35 cfs @ 11.93 hrs, Volume= 3,557 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 43.36' @ 11.93 hrs Surf.Area= 1,454 sf Storage= 343 cf

Plug-Flow detention time= 11.4 min calculated for 3,556 cf (100% of inflow)
Center-of-Mass det. time= 11.4 min (755.0 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	1,183 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	218 cf	**SOIL (Prismatic)**Listed below (Recalc) 1,091 cf Overall x 20.0% Voids
#3	42.00'	291 cf	**STONE (Prismatic)**Listed below (Recalc) 727 cf Overall x 40.0% Voids
		1,692 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	368	0	0
45.00	727	274	274
46.00	1,092	910	1,183

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	727	0	0
44.50	727	1,091	1,091

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	727	0	0
43.00	727	727	727

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.30 cfs @ 11.93 hrs HW=43.30' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.30 cfs @ 3.74 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP6:

Inflow Area = 12,073 sf,100.00% Impervious, Inflow Depth = 3.54" for 10 YR event
Inflow = 1.67 cfs @ 11.89 hrs, Volume= 3,557 cf
Outflow = 1.36 cfs @ 11.93 hrs, Volume= 3,557 cf, Atten= 18%, Lag= 2.3 min
Primary = 1.36 cfs @ 11.93 hrs, Volume= 3,557 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 43.37' @ 11.93 hrs Surf.Area= 1,400 sf Storage= 332 cf

Plug-Flow detention time= 11.0 min calculated for 3,556 cf (100% of inflow)
Center-of-Mass det. time= 11.1 min (754.6 - 743.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	670 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	210 cf	**SOIL (Prismatic)**Listed below (Recalc) 1,050 cf Overall x 20.0% Voids
#3	42.00'	280 cf	**STONE (Prismatic)**Listed below (Recalc) 700 cf Overall x 40.0% Voids
		1,160 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	161	0	0
45.00	622	196	196
45.50	1,274	474	670

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	700	0	0
44.50	700	1,050	1,050

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	700	0	0
43.00	700	700	700

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.31 cfs @ 11.93 hrs HW=43.31' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 1.31 cfs @ 3.77 fps)
└—**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond W: LOW AREA

Inflow Area = 21,467 sf, 42.39% Impervious, Inflow Depth = 2.43" for 10 YR event
Inflow = 2.01 cfs @ 11.97 hrs, Volume= 4,341 cf
Outflow = 0.05 cfs @ 15.04 hrs, Volume= 973 cf, Atten= 97%, Lag= 184.4 min
Primary = 0.05 cfs @ 15.04 hrs, Volume= 973 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 47.50' @ 15.04 hrs Surf.Area= 4,237 sf Storage= 3,387 cf

Plug-Flow detention time= 451.2 min calculated for 973 cf (22% of inflow)
Center-of-Mass det. time= 307.6 min (1,116.6 - 809.0)

Volume	Invert	Avail.Storage	Storage Description
#1	46.00'	5,811 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	265	0	0
48.00	5,546	5,811	5,811

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	**30.0' long x 38.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.02 cfs @ 15.04 hrs HW=47.50' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.18 fps)

Summary for Pond WQU#1: WQU#1

Inflow Area = 17,831 sf, 85.22% Impervious, Inflow Depth = 3.26" for 10 YR event
Inflow = 1.84 cfs @ 11.90 hrs, Volume= 4,843 cf
Outflow = 1.84 cfs @ 11.90 hrs, Volume= 4,843 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.84 cfs @ 11.90 hrs, Volume= 4,843 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.03' @ 11.90 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.15'	**12.0" Round Culvert** L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.15' / 37.80' S= 0.0318 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.82 cfs @ 11.90 hrs HW=39.02' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.82 cfs @ 2.51 fps)

Summary for Pond WQU#2: WQU#2

Inflow	=	3.47 cfs @	11.92 hrs, Volume=	14,560 cf	
Outflow	=	3.47 cfs @	11.92 hrs, Volume=	14,560 cf,	Atten= 0%, Lag= 0.0 min
Primary	=	3.47 cfs @	11.92 hrs, Volume=	14,560 cf	

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.45' @ 11.92 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.60'	**12.0" Round Culvert** L= 6.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.60' / 37.50' S= 0.0154 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.43 cfs @ 11.92 hrs HW=39.42' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.43 cfs @ 4.37 fps)

Summary for Pond WQU#3: WQU#3

Inflow	=	3.54 cfs @	11.95 hrs, Volume=	12,560 cf	
Outflow	=	3.54 cfs @	11.95 hrs, Volume=	12,560 cf,	Atten= 0%, Lag= 0.0 min
Primary	=	3.54 cfs @	11.95 hrs, Volume=	12,560 cf	

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.15' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	36.25'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.25' / 36.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.52 cfs @ 11.95 hrs HW=38.14' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.52 cfs @ 4.48 fps)

Summary for Pond WQU#4: WQU#4

Inflow	=	1.90 cfs @	11.95 hrs, Volume=	8,640 cf	
Outflow	=	1.90 cfs @	11.95 hrs, Volume=	8,640 cf,	Atten= 0%, Lag= 0.0 min
Primary	=	1.90 cfs @	11.95 hrs, Volume=	8,640 cf	

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.90' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.00'	**12.0" Round Culvert**

L= 7.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 38.00' / 37.75' S= 0.0357 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.90 cfs @ 11.95 hrs HW=38.90' (Free Discharge)
1=Culvert (Inlet Controls 1.90 cfs @ 2.55 fps)

Summary for Pond WQU#5: WQU#5

Inflow	=	2.88 cfs @	11.95 hrs, Volume=	7,132 cf	
Outflow	=	2.88 cfs @	11.95 hrs, Volume=	7,132 cf,	Atten= 0%, Lag= 0.0 min
Primary	=	2.88 cfs @	11.95 hrs, Volume=	7,132 cf	

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.93' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**12.0" Round Culvert**
			L= 17.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 37.50' / 37.25' S= 0.0147 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.86 cfs @ 11.95 hrs HW=38.92' (Free Discharge)
1=Culvert (Inlet Controls 2.86 cfs @ 3.64 fps)

Summary for Link OFF1:

Inflow Area =		536,757 sf,	35.35% Impervious,	Inflow Depth =	2.22" for 10 YR event
Inflow	=	32.57 cfs @	11.98 hrs, Volume=	99,210 cf	
Primary	=	32.57 cfs @	11.98 hrs, Volume=	99,210 cf,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Time span=0.00-200.00 hrs, dt=0.05 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=227,434 sf 0.00% Impervious Runoff Depth=4.12"
Flow Length=680' Tc=15.9 min CN=80 Runoff=26.58 cfs 78,023 cf

Subcatchment2S: Runoff Area=19,232 sf 24.19% Impervious Runoff Depth=4.44"
Tc=0.0 min CN=83 Runoff=3.81 cfs 7,109 cf

Subcatchment3S: Runoff Area=25,969 sf 100.00% Impervious Runoff Depth=6.13"
Flow Length=383' Tc=6.0 min CN=98 Runoff=5.27 cfs 13,269 cf

Subcatchment4S: Runoff Area=12,073 sf 100.00% Impervious Runoff Depth=6.13"
Tc=0.0 min CN=98 Runoff=2.83 cfs 6,169 cf

Subcatchment5S: Runoff Area=12,073 sf 100.00% Impervious Runoff Depth=6.13"
Tc=0.0 min CN=98 Runoff=2.83 cfs 6,169 cf

Subcatchment6S: Runoff Area=8,624 sf 100.00% Impervious Runoff Depth=6.13"
Tc=0.0 min CN=98 Runoff=2.02 cfs 4,406 cf

Subcatchment7S: Runoff Area=8,624 sf 100.00% Impervious Runoff Depth=6.13"
Tc=0.0 min CN=98 Runoff=2.02 cfs 4,406 cf

Subcatchment8S: Runoff Area=9,375 sf 100.00% Impervious Runoff Depth=6.13"
Tc=0.0 min CN=98 Runoff=2.20 cfs 4,790 cf

Subcatchment9S: Runoff Area=8,698 sf 100.00% Impervious Runoff Depth=6.13"
Flow Length=63' Slope=0.0500 '/' Tc=6.0 min CN=98 Runoff=1.76 cfs 4,444 cf

Subcatchment10S: Runoff Area=42,596 sf 0.00% Impervious Runoff Depth=4.12"
Flow Length=383' Tc=6.0 min CN=80 Runoff=6.77 cfs 14,613 cf

Subcatchment11S: Runoff Area=21,467 sf 42.39% Impervious Runoff Depth=4.87"
Flow Length=383' Tc=6.0 min CN=87 Runoff=3.89 cfs 8,716 cf

Subcatchment12S: Runoff Area=9,133 sf 71.15% Impervious Runoff Depth=5.55"
Tc=0.0 min CN=93 Runoff=2.07 cfs 4,223 cf

Subcatchment13S: Runoff Area=11,142 sf 100.00% Impervious Runoff Depth=6.13"
Tc=0.0 min CN=98 Runoff=2.61 cfs 5,693 cf

Subcatchment14S: Runoff Area=3,565 sf 100.00% Impervious Runoff Depth=6.13"
Tc=0.0 min CN=98 Runoff=0.84 cfs 1,822 cf

Subcatchment15S: Runoff Area=3,662 sf 83.37% Impervious Runoff Depth=5.78"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=95 Runoff=0.73 cfs 1,764 cf

Subcatchment16S: Runoff Area=10,897 sf 67.99% Impervious Runoff Depth=5.43"
Flow Length=155' Slope=0.0200 '/' Tc=6.0 min CN=92 Runoff=2.11 cfs 4,934 cf

Subcatchment17S: Runoff Area=4,314 sf 100.00% Impervious Runoff Depth=6.13"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=98 Runoff=0.88 cfs 2,204 cf

Subcatchment18S: Runoff Area=8,128 sf 80.12% Impervious Runoff Depth=5.66"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=94 Runoff=1.61 cfs 3,836 cf

Subcatchment19S: Runoff Area=12,498 sf 48.46% Impervious Runoff Depth=5.09"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=89 Runoff=2.34 cfs 5,306 cf

Subcatchment20S: Runoff Area=11,405 sf 95.62% Impervious Runoff Depth=6.01"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=97 Runoff=2.30 cfs 5,715 cf

Subcatchment21S: Runoff Area=11,565 sf 57.87% Impervious Runoff Depth=5.21"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=90 Runoff=2.19 cfs 5,018 cf

Subcatchment22S: Runoff Area=13,663 sf 38.70% Impervious Runoff Depth=4.87"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=87 Runoff=2.48 cfs 5,547 cf

Subcatchment23S: Runoff Area=25,137 sf 38.67% Impervious Runoff Depth=4.87"
Flow Length=130' Tc=24.5 min CN=87 Runoff=2.70 cfs 10,206 cf

Subcatchment24S: Runoff Area=8,860 sf 50.18% Impervious Runoff Depth=5.09"
Flow Length=130' Tc=6.0 min CN=89 Runoff=1.66 cfs 3,761 cf

Subcatchment25S: Runoff Area=6,623 sf 74.78% Impervious Runoff Depth=5.55"
Flow Length=50' Slope=0.0200 '/' Tc=6.0 min CN=93 Runoff=1.30 cfs 3,062 cf

Reach 1R: EXISTING 24" PIPE Avg. Flow Depth=0.66' Max Vel=5.77 fps Inflow=5.27 cfs 13,269 cf
24.0" Round Pipe n=0.013 L=192.0' S=0.0098 '/' Capacity=22.39 cfs Outflow=5.16 cfs 13,269 cf

Reach 2R: Avg. Flow Depth=0.72' Max Vel=10.18 fps Inflow=8.46 cfs 19,961 cf
18.0" Round Pipe n=0.013 L=210.0' S=0.0310 '/' Capacity=18.48 cfs Outflow=8.46 cfs 19,961 cf

Reach 4R: Avg. Flow Depth=0.26' Max Vel=3.16 fps Inflow=3.10 cfs 8,667 cf
n=0.035 L=112.0' S=0.0446 '/' Capacity=177.26 cfs Outflow=2.98 cfs 8,667 cf

Pond #1: Peak Elev=41.39' Inflow=1.85 cfs 4,790 cf
12.0" Round Culvert n=0.013 L=77.0' S=0.0058 '/' Outflow=1.85 cfs 4,790 cf

Pond #11: Peak Elev=42.20' Inflow=1.61 cfs 3,836 cf
12.0" Round Culvert n=0.013 L=55.0' S=0.0073 '/' Outflow=1.61 cfs 3,836 cf

Pond #12: Peak Elev=40.71' Inflow=6.92 cfs 17,144 cf
18.0" Round Culvert n=0.013 L=61.0' S=0.0148 '/' Outflow=6.92 cfs 17,144 cf

Pond #15: Peak Elev=42.45' Inflow=3.96 cfs 10,122 cf
12.0" Round Culvert n=0.013 L=31.0' S=0.0065 '/' Outflow=3.96 cfs 10,122 cf

Pond #16: Peak Elev=42.87' Inflow=8.40 cfs 20,446 cf
15.0" Round Culvert n=0.013 L=56.0' S=0.0134 '/' Outflow=8.40 cfs 20,446 cf

Pond #2: Peak Elev=42.72' Inflow=4.40 cfs 10,483 cf
12.0" Round Culvert n=0.013 L=33.0' S=0.0212 '/' Outflow=4.40 cfs 10,483 cf

Pond #20: Peak Elev=43.55' Inflow=0.88 cfs 2,204 cf
12.0" Round Culvert n=0.013 L=76.0' S=0.0125 '/' Outflow=0.88 cfs 2,204 cf

Pond #21: Peak Elev=43.55' Inflow=2.99 cfs 7,138 cf
12.0" Round Culvert n=0.013 L=70.0' S=0.0450 '/' Outflow=2.99 cfs 7,138 cf

Pond #22: Peak Elev=39.59' Inflow=10.86 cfs 25,993 cf
Primary=5.92 cfs 4,376 cf Secondary=4.94 cfs 21,617 cf Outflow=10.86 cfs 25,993 cf

Pond #23: Peak Elev=41.32' Inflow=2.70 cfs 10,206 cf
15.0" Round Culvert n=0.013 L=70.0' S=0.0071 '/' Outflow=2.70 cfs 10,206 cf

Pond #24: Peak Elev=41.70' Inflow=3.47 cfs 16,374 cf
12.0" Round Culvert n=0.013 L=26.0' S=0.0231 '/' Outflow=3.47 cfs 16,374 cf

Pond #25: Peak Elev=39.68' Inflow=3.47 cfs 16,374 cf
Primary=0.58 cfs 569 cf Secondary=2.89 cfs 15,806 cf Outflow=3.47 cfs 16,374 cf

Pond #26: Peak Elev=44.61' Inflow=2.34 cfs 5,306 cf
12.0" Round Culvert n=0.013 L=126.0' S=0.0278 '/' Outflow=2.34 cfs 5,306 cf

Pond #27: Peak Elev=40.11' Inflow=1.66 cfs 3,761 cf
12.0" Round Culvert n=0.013 L=100.0' S=0.0080 '/' Outflow=1.66 cfs 3,761 cf

Pond #28: Peak Elev=37.03' Inflow=2.95 cfs 6,823 cf
12.0" Round Culvert n=0.013 L=36.0' S=0.0153 '/' Outflow=2.95 cfs 6,823 cf

Pond #29: Peak Elev=41.57' Inflow=5.02 cfs 12,992 cf
12.0" Round Culvert n=0.013 L=43.0' S=0.0116 '/' Outflow=5.02 cfs 12,992 cf

Pond #3: Peak Elev=41.03' Inflow=5.24 cfs 12,305 cf
15.0" Round Culvert n=0.013 L=36.0' S=0.0111 '/' Outflow=5.24 cfs 12,305 cf

Pond #35: Peak Elev=44.29' Inflow=10.86 cfs 25,993 cf
15.0" Round Culvert n=0.013 L=34.0' S=0.0265 '/' Outflow=10.86 cfs 25,993 cf

Pond #6: Peak Elev=39.88' Inflow=3.10 cfs 8,667 cf
12.0" Round Culvert n=0.013 L=9.8' S=0.0153 '/' Outflow=3.10 cfs 8,667 cf

Pond 1P: FOREBAY Peak Elev=45.23' Storage=511 cf Inflow=9.34 cfs 19,961 cf
Outflow=8.46 cfs 19,961 cf

Pond 1SM: STM MH#1 Peak Elev=41.07' Inflow=11.32 cfs 29,449 cf
Primary=6.35 cfs 5,350 cf Secondary=4.97 cfs 24,099 cf Outflow=11.32 cfs 29,449 cf

Pond 2P: DEPRESSION Peak Elev=34.43' Storage=8,374 cf Inflow=16.79 cfs 49,410 cf
Outflow=16.73 cfs 43,837 cf

Pond 2SM: STM MH#2 Peak Elev=41.08' Inflow=11.32 cfs 29,449 cf
18.0" Round Culvert n=0.013 L=92.0' S=0.0054 '/' Outflow=11.32 cfs 29,449 cf

Pond 3SM: STM MH#3 Peak Elev=39.36' Inflow=10.86 cfs 25,993 cf
18.0" Round Culvert n=0.013 L=118.0' S=0.0085 '/' Outflow=10.86 cfs 25,993 cf

Pond 4SM: STM MH#4 Peak Elev=38.67' Inflow=3.47 cfs 16,374 cf
15.0" Round Culvert n=0.013 L=10.5' S=0.0476 '/' Outflow=3.47 cfs 16,374 cf

Pond 5SM: STM MH#5 Peak Elev=39.74' Inflow=5.02 cfs 12,992 cf
Primary=1.37 cfs 642 cf Secondary=3.65 cfs 12,351 cf Outflow=5.02 cfs 12,992 cf

Pond 6SM: STM MH#6 Peak Elev=39.03' Inflow=5.02 cfs 12,992 cf
15.0" Round Culvert n=0.013 L=86.0' S=0.0087 '/' Outflow=5.02 cfs 12,992 cf

Pond SP1: Peak Elev=43.80' Storage=295 cf Inflow=1.76 cfs 4,444 cf
Outflow=1.60 cfs 4,444 cf

Pond SP2: Peak Elev=44.27' Storage=343 cf Inflow=2.20 cfs 4,790 cf
Outflow=1.85 cfs 4,790 cf

Pond SP3: Peak Elev=44.05' Storage=286 cf Inflow=2.02 cfs 4,406 cf
Outflow=1.74 cfs 4,406 cf

Pond SP4: Peak Elev=44.18' Storage=216 cf Inflow=2.02 cfs 4,406 cf
Outflow=1.80 cfs 4,406 cf

Pond SP5: Peak Elev=44.77' Storage=635 cf Inflow=2.83 cfs 6,169 cf
Outflow=2.07 cfs 6,169 cf

Pond SP6: Peak Elev=44.88' Storage=617 cf Inflow=2.83 cfs 6,169 cf
Outflow=2.12 cfs 6,169 cf

Pond W: LOW AREA Peak Elev=47.61' Storage=3,866 cf Inflow=3.89 cfs 8,716 cf
Outflow=3.08 cfs 5,348 cf

Pond WQU#1: WQU#1 Peak Elev=39.73' Inflow=3.10 cfs 8,667 cf
12.0" Round Culvert n=0.013 L=11.0' S=0.0318 '/' Outflow=3.10 cfs 8,667 cf

Pond WQU#2: WQU#2 Peak Elev=40.87' Inflow=4.97 cfs 24,099 cf
12.0" Round Culvert n=0.013 L=6.5' S=0.0154 '/' Outflow=4.97 cfs 24,099 cf

Pond WQU#3: WQU#3 Peak Elev=39.49' Inflow=4.94 cfs 21,617 cf
12.0" Round Culvert n=0.013 L=10.0' S=0.0250 '/' Outflow=4.94 cfs 21,617 cf

Pond WQU#4: WQU#4 Peak Elev=39.43' Inflow=2.89 cfs 15,806 cf
12.0" Round Culvert n=0.013 L=7.0' S=0.0357 '/' Outflow=2.89 cfs 15,806 cf

Pond WQU#5: WQU#5 Peak Elev=39.49' Inflow=3.65 cfs 12,351 cf
12.0" Round Culvert n=0.013 L=17.0' S=0.0147 '/' Outflow=3.65 cfs 12,351 cf

Link OFF1: Inflow=63.84 cfs 206,266 cf
Primary=63.84 cfs 206,266 cf

Total Runoff Area = 536,757 sf Runoff Volume = 215,206 cf Average Runoff Depth = 4.81"
64.65% Pervious = 347,015 sf 35.35% Impervious = 189,742 sf

Summary for Subcatchment 1S:

Runoff = 26.58 cfs @ 12.08 hrs, Volume= 78,023 cf, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
97,354	79	Woods, Fair, HSG D
130,080	80	>75% Grass cover, Good, HSG D
227,434	80	Weighted Average
227,434		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1800	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
5.8	580	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.9	680	Total			

Summary for Subcatchment 2S:

Runoff = 3.81 cfs @ 11.89 hrs, Volume= 7,109 cf, Depth= 4.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
8,106	77	Woods, Good, HSG D
4,653	98	Paved roads w/curbs & sewers, HSG D
6,473	80	>75% Grass cover, Good, HSG D
19,232	83	Weighted Average
14,579		75.81% Pervious Area
4,653		24.19% Impervious Area

Summary for Subcatchment 3S:

Runoff = 5.27 cfs @ 11.96 hrs, Volume= 13,269 cf, Depth= 6.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
25,969	98	Paved roads w/curbs & sewers, HSG D
25,969		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0060	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.9	283	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.1	383	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 4S:

Runoff = 2.83 cfs @ 11.89 hrs, Volume= 6,169 cf, Depth= 6.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
12,073	98	Unconnected roofs, HSG D
12,073		100.00% Impervious Area
12,073		100.00% Unconnected

Summary for Subcatchment 5S:

Runoff = 2.83 cfs @ 11.89 hrs, Volume= 6,169 cf, Depth= 6.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
12,073	98	Unconnected roofs, HSG D
12,073		100.00% Impervious Area
12,073		100.00% Unconnected

Summary for Subcatchment 6S:

Runoff = 2.02 cfs @ 11.89 hrs, Volume= 4,406 cf, Depth= 6.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
8,624	98	Unconnected roofs, HSG D
8,624		100.00% Impervious Area
8,624		100.00% Unconnected

Summary for Subcatchment 7S:

Runoff = 2.02 cfs @ 11.89 hrs, Volume= 4,406 cf, Depth= 6.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
8,624	98	Unconnected roofs, HSG D
8,624		100.00% Impervious Area
8,624		100.00% Unconnected

Summary for Subcatchment 8S:

Runoff = 2.20 cfs @ 11.89 hrs, Volume= 4,790 cf, Depth= 6.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
9,375	98	Unconnected roofs, HSG D
9,375		100.00% Impervious Area
9,375		100.00% Unconnected

Summary for Subcatchment 9S:

Runoff = 1.76 cfs @ 11.96 hrs, Volume= 4,444 cf, Depth= 6.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
8,698	98	Unconnected roofs, HSG D
8,698		100.00% Impervious Area
8,698		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	63	0.0500	1.60		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.7	63	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 10S:

Runoff = 6.77 cfs @ 11.97 hrs, Volume= 14,613 cf, Depth= 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
17,986	79	Woods, Fair, HSG D
24,610	80	>75% Grass cover, Good, HSG D
42,596	80	Weighted Average
42,596		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0060	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.9	283	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.1	383	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 11S:

Runoff = 3.89 cfs @ 11.96 hrs, Volume= 8,716 cf, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
12,368	79	Woods/grass comb., Good, HSG D
9,099	98	Unconnected pavement, HSG D
21,467	87	Weighted Average
12,368		57.61% Pervious Area
9,099		42.39% Impervious Area
9,099		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0060	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.9	283	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.1	383	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 12S:

Runoff = 2.07 cfs @ 11.89 hrs, Volume= 4,223 cf, Depth= 5.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
6,498	98	Paved parking, HSG D
2,635	80	>75% Grass cover, Good, HSG D
9,133	93	Weighted Average
2,635		28.85% Pervious Area
6,498		71.15% Impervious Area

Summary for Subcatchment 13S:

Runoff = 2.61 cfs @ 11.89 hrs, Volume= 5,693 cf, Depth= 6.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
11,142	98	Paved parking, HSG D
11,142		100.00% Impervious Area

Summary for Subcatchment 14S:

Runoff = 0.84 cfs @ 11.89 hrs, Volume= 1,822 cf, Depth= 6.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
3,565	98	Paved parking, HSG D
3,565		100.00% Impervious Area

Summary for Subcatchment 15S:

Runoff = 0.73 cfs @ 11.96 hrs, Volume= 1,764 cf, Depth= 5.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
3,053	98	Paved parking, HSG D
609	80	>75% Grass cover, Good, HSG D
3,662	95	Weighted Average
609		16.63% Pervious Area
3,053		83.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 16S:

Runoff = 2.11 cfs @ 11.96 hrs, Volume= 4,934 cf, Depth= 5.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
7,409	98	Paved parking, HSG D
3,488	80	>75% Grass cover, Good, HSG D
10,897	92	Weighted Average
3,488		32.01% Pervious Area
7,409		67.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.22		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.3	55	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	155	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 17S:

Runoff = 0.88 cfs @ 11.96 hrs, Volume= 2,204 cf, Depth= 6.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
4,314	98	Paved parking, HSG D
4,314		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 18S:

Runoff = 1.61 cfs @ 11.96 hrs, Volume= 3,836 cf, Depth= 5.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
6,512	98	Paved parking, HSG D
1,616	80	>75% Grass cover, Good, HSG D
8,128	94	Weighted Average
1,616		19.88% Pervious Area
6,512		80.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 19S:

Runoff = 2.34 cfs @ 11.96 hrs, Volume= 5,306 cf, Depth= 5.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
6,057	98	Paved parking, HSG D
6,441	80	>75% Grass cover, Good, HSG D
12,498	89	Weighted Average
6,441		51.54% Pervious Area
6,057		48.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 20S:

Runoff = 2.30 cfs @ 11.96 hrs, Volume= 5,715 cf, Depth= 6.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
10,905	98	Paved parking, HSG D
500	80	>75% Grass cover, Good, HSG D
11,405	97	Weighted Average
500		4.38% Pervious Area
10,905		95.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 21S:

Runoff = 2.19 cfs @ 11.96 hrs, Volume= 5,018 cf, Depth= 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
6,693	98	Paved parking, HSG D
4,872	80	>75% Grass cover, Good, HSG D
11,565	90	Weighted Average
4,872		42.13% Pervious Area
6,693		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 22S:

Runoff = 2.48 cfs @ 11.96 hrs, Volume= 5,547 cf, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
5,287	98	Paved parking, HSG D
8,376	80	>75% Grass cover, Good, HSG D
13,663	87	Weighted Average
8,376		61.30% Pervious Area
5,287		38.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 23S:

Runoff = 2.70 cfs @ 12.17 hrs, Volume= 10,206 cf, Depth= 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
9,720	98	Paved parking, HSG D
15,417	80	>75% Grass cover, Good, HSG D
25,137	87	Weighted Average
15,417		61.33% Pervious Area
9,720		38.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.3	100	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
0.2	30	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.5	130	Total			

Summary for Subcatchment 24S:

Runoff = 1.66 cfs @ 11.96 hrs, Volume= 3,761 cf, Depth= 5.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
4,446	98	Paved parking, HSG D
4,414	80	>75% Grass cover, Good, HSG D
8,860	89	Weighted Average
4,414		49.82% Pervious Area
4,446		50.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.22		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.2	30	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	130	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 25S:

Runoff = 1.30 cfs @ 11.96 hrs, Volume= 3,062 cf, Depth= 5.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr 100 YR Rainfall=6.37"

Area (sf)	CN	Description
4,953	98	Paved parking, HSG D
1,670	80	>75% Grass cover, Good, HSG D
6,623	93	Weighted Average
1,670		25.22% Pervious Area
4,953		74.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0200	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.8	50	Total, Increased to minimum Tc = 6.0 min			

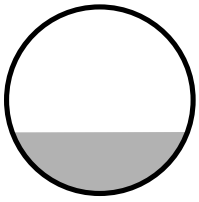
Summary for Reach 1R: EXISTING 24" PIPE

Inflow Area = 25,969 sf,100.00% Impervious, Inflow Depth = 6.13" for 100 YR event
Inflow = 5.27 cfs @ 11.96 hrs, Volume= 13,269 cf
Outflow = 5.16 cfs @ 11.98 hrs, Volume= 13,269 cf, Atten= 2%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.77 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.71 fps, Avg. Travel Time= 1.9 min

Peak Storage= 172 cf @ 11.97 hrs
Average Depth at Peak Storage= 0.66' , Surface Width= 1.88'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 22.39 cfs

24.0" Round Pipe
n= 0.013 Clay tile
Length= 192.0' Slope= 0.0098 '/'
Inlet Invert= 30.57', Outlet Invert= 28.69'



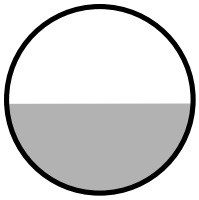
Summary for Reach 2R:

Inflow Area = 64,063 sf, 14.20% Impervious, Inflow Depth = 3.74" for 100 YR event
Inflow = 8.46 cfs @ 12.02 hrs, Volume= 19,961 cf
Outflow = 8.46 cfs @ 12.03 hrs, Volume= 19,961 cf, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.18 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.12 fps, Avg. Travel Time= 1.1 min

Peak Storage= 176 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.72' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.48 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 210.0' Slope= 0.0310 '/'
Inlet Invert= 43.50', Outlet Invert= 37.00'



Summary for Reach 4R:

Inflow Area = 17,831 sf, 85.22% Impervious, Inflow Depth = 5.83" for 100 YR event
Inflow = 3.10 cfs @ 11.90 hrs, Volume= 8,667 cf
Outflow = 2.98 cfs @ 11.92 hrs, Volume= 8,667 cf, Atten= 4%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.16 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.80 fps, Avg. Travel Time= 2.3 min

Peak Storage= 108 cf @ 11.91 hrs
Average Depth at Peak Storage= 0.26' , Surface Width= 4.54'
Bank-Full Depth= 2.00' Flow Area= 18.0 sf, Capacity= 177.26 cfs

3.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 15.00'
Length= 112.0' Slope= 0.0446 '/'
Inlet Invert= 44.00', Outlet Invert= 39.00'



‡

Summary for Pond #1:

Inflow Area = 9,375 sf,100.00% Impervious, Inflow Depth = 6.13" for 100 YR event
Inflow = 1.85 cfs @ 11.92 hrs, Volume= 4,790 cf
Outflow = 1.85 cfs @ 11.92 hrs, Volume= 4,790 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.85 cfs @ 11.92 hrs, Volume= 4,790 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 41.39' @ 11.92 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.50'	**12.0" Round Culvert**
			L= 77.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 40.50' / 40.05' S= 0.0058 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.81 cfs @ 11.92 hrs HW=41.37' (Free Discharge)
└**1=Culvert** (Barrel Controls 1.81 cfs @ 3.32 fps)

Summary for Pond #11:

Inflow Area = 8,128 sf, 80.12% Impervious, Inflow Depth = 5.66" for 100 YR event
Inflow = 1.61 cfs @ 11.96 hrs, Volume= 3,836 cf
Outflow = 1.61 cfs @ 11.96 hrs, Volume= 3,836 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.61 cfs @ 11.96 hrs, Volume= 3,836 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.20' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	41.40'	**12.0" Round Culvert** L= 55.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 41.40' / 41.00' S= 0.0073 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.57 cfs @ 11.96 hrs HW=42.18' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.57 cfs @ 2.38 fps)

Summary for Pond #12:

Inflow Area = 35,625 sf, 83.96% Impervious, Inflow Depth = 5.77" for 100 YR event
Inflow = 6.92 cfs @ 11.95 hrs, Volume= 17,144 cf
Outflow = 6.92 cfs @ 11.95 hrs, Volume= 17,144 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.92 cfs @ 11.95 hrs, Volume= 17,144 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.71' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.90'	**18.0" Round Culvert** L= 61.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.90' / 38.00' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.92 cfs @ 11.95 hrs HW=40.71' (Free Discharge)
└**1=Culvert** (Inlet Controls 6.92 cfs @ 3.92 fps)

Summary for Pond #15:

Inflow Area = 20,029 sf, 97.50% Impervious, Inflow Depth = 6.06" for 100 YR event
Inflow = 3.96 cfs @ 11.94 hrs, Volume= 10,122 cf
Outflow = 3.96 cfs @ 11.94 hrs, Volume= 10,122 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.96 cfs @ 11.94 hrs, Volume= 10,122 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Peak Elev= 42.45' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.20'	**12.0" Round Culvert** L= 31.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 40.20' / 40.00' S= 0.0065 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.85 cfs @ 11.94 hrs HW=42.36' (Free Discharge)
1=Culvert (Inlet Controls 3.85 cfs @ 4.90 fps)

Summary for Pond #16:

Inflow Area = 44,092 sf, 73.21% Impervious, Inflow Depth = 5.56" for 100 YR event
Inflow = 8.40 cfs @ 11.95 hrs, Volume= 20,446 cf
Outflow = 8.40 cfs @ 11.95 hrs, Volume= 20,446 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.40 cfs @ 11.95 hrs, Volume= 20,446 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.87' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.00'	**15.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.00' / 38.25' S= 0.0134 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=8.39 cfs @ 11.95 hrs HW=42.86' (Free Discharge)
1=Culvert (Inlet Controls 8.39 cfs @ 6.84 fps)

Summary for Pond #2:

Inflow Area = 20,517 sf,100.00% Impervious, Inflow Depth = 6.13" for 100 YR event
Inflow = 4.40 cfs @ 11.89 hrs, Volume= 10,483 cf
Outflow = 4.40 cfs @ 11.89 hrs, Volume= 10,483 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.40 cfs @ 11.89 hrs, Volume= 10,483 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.72' @ 11.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.05'	**12.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 40.05' / 39.35' S= 0.0212 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.32 cfs @ 11.89 hrs HW=42.64' (Free Discharge)
1=Culvert (Inlet Controls 4.32 cfs @ 5.50 fps)

Summary for Pond #20:

Inflow Area = 4,314 sf,100.00% Impervious, Inflow Depth = 6.13" for 100 YR event
Inflow = 0.88 cfs @ 11.96 hrs, Volume= 2,204 cf
Outflow = 0.88 cfs @ 11.96 hrs, Volume= 2,204 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.88 cfs @ 11.96 hrs, Volume= 2,204 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 43.55' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	43.00'	**12.0" Round Culvert** L= 76.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 43.00' / 42.05' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.85 cfs @ 11.96 hrs HW=43.54' (Free Discharge)
1=Culvert (Inlet Controls 0.85 cfs @ 1.98 fps)

Summary for Pond #21:

Inflow Area = 15,211 sf, 77.07% Impervious, Inflow Depth = 5.63" for 100 YR event
Inflow = 2.99 cfs @ 11.96 hrs, Volume= 7,138 cf
Outflow = 2.99 cfs @ 11.96 hrs, Volume= 7,138 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.99 cfs @ 11.96 hrs, Volume= 7,138 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 43.55' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	42.05'	**12.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.05' / 38.90' S= 0.0450 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.92 cfs @ 11.96 hrs HW=43.50' (Free Discharge)
1=Culvert (Inlet Controls 2.92 cfs @ 3.71 fps)

Summary for Pond #22:

Inflow Area = 57,755 sf, 65.04% Impervious, Inflow Depth = 5.40" for 100 YR event
Inflow = 10.86 cfs @ 11.95 hrs, Volume= 25,993 cf
Outflow = 10.86 cfs @ 11.95 hrs, Volume= 25,993 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.92 cfs @ 11.95 hrs, Volume= 4,376 cf
Secondary = 4.94 cfs @ 11.95 hrs, Volume= 21,617 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.59' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.35'	**15.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.35' / 37.00' S= 0.0438 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	36.35'	**12.0" Round Culvert** L= 8.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.35' / 36.25' S= 0.0120 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=5.86 cfs @ 11.95 hrs HW=39.55' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 5.86 cfs @ 4.77 fps)

Secondary OutFlow Max=4.91 cfs @ 11.95 hrs HW=39.55' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 4.91 cfs @ 6.25 fps)

Summary for Pond #23:

Inflow Area = 25,137 sf, 38.67% Impervious, Inflow Depth = 4.87" for 100 YR event
Inflow = 2.70 cfs @ 12.17 hrs, Volume= 10,206 cf
Outflow = 2.70 cfs @ 12.17 hrs, Volume= 10,206 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.70 cfs @ 12.17 hrs, Volume= 10,206 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 41.32' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.35'	**15.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 40.35' / 39.85' S= 0.0071 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.67 cfs @ 12.17 hrs HW=41.31' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 2.67 cfs @ 2.64 fps)

Summary for Pond #24:

Inflow Area = 37,210 sf, 58.57% Impervious, Inflow Depth = 5.28" for 100 YR event
Inflow = 3.47 cfs @ 11.99 hrs, Volume= 16,374 cf
Outflow = 3.47 cfs @ 11.99 hrs, Volume= 16,374 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.47 cfs @ 11.99 hrs, Volume= 16,374 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 41.70' @ 11.99 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.85'	**12.0" Round Culvert** L= 26.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.85' / 39.25' S= 0.0231 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.44 cfs @ 11.99 hrs HW=41.68' (Free Discharge)
1=Culvert (Inlet Controls 3.44 cfs @ 4.38 fps)

Summary for Pond #25:

Inflow Area = 37,210 sf, 58.57% Impervious, Inflow Depth = 5.28" for 100 YR event
Inflow = 3.47 cfs @ 11.99 hrs, Volume= 16,374 cf
Outflow = 3.47 cfs @ 11.99 hrs, Volume= 16,374 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.58 cfs @ 11.99 hrs, Volume= 569 cf
Secondary = 2.89 cfs @ 11.99 hrs, Volume= 15,806 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.68' @ 11.99 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.25'	**12.0" Round Culvert** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.25' / 39.00' S= 0.0192 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	38.25'	**12.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.25' / 38.00' S= 0.0208 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.56 cfs @ 11.99 hrs HW=39.68' (Free Discharge)
1=Culvert (Inlet Controls 0.56 cfs @ 1.76 fps)

Secondary OutFlow Max=2.87 cfs @ 11.99 hrs HW=39.68' (Free Discharge)
2=Culvert (Inlet Controls 2.87 cfs @ 3.66 fps)

Summary for Pond #26:

Inflow Area = 12,498 sf, 48.46% Impervious, Inflow Depth = 5.09" for 100 YR event
Inflow = 2.34 cfs @ 11.96 hrs, Volume= 5,306 cf
Outflow = 2.34 cfs @ 11.96 hrs, Volume= 5,306 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.34 cfs @ 11.96 hrs, Volume= 5,306 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 44.61' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	43.50'	**12.0" Round Culvert** L= 126.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 43.50' / 40.00' S= 0.0278 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.27 cfs @ 11.96 hrs HW=44.58' (Free Discharge)
1=Culvert (Inlet Controls 2.27 cfs @ 2.90 fps)

Summary for Pond #27:

Inflow Area = 8,860 sf, 50.18% Impervious, Inflow Depth = 5.09" for 100 YR event
Inflow = 1.66 cfs @ 11.96 hrs, Volume= 3,761 cf
Outflow = 1.66 cfs @ 11.96 hrs, Volume= 3,761 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.66 cfs @ 11.96 hrs, Volume= 3,761 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.11' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.30'	**12.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.30' / 38.50' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.61 cfs @ 11.96 hrs HW=40.10' (Free Discharge)
1=Culvert (Inlet Controls 1.61 cfs @ 2.40 fps)

Summary for Pond #28:

Inflow Area = 15,483 sf, 60.71% Impervious, Inflow Depth = 5.29" for 100 YR event
Inflow = 2.95 cfs @ 11.96 hrs, Volume= 6,823 cf
Outflow = 2.95 cfs @ 11.96 hrs, Volume= 6,823 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.95 cfs @ 11.96 hrs, Volume= 6,823 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 37.03' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	35.55'	**12.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 35.55' / 35.00' S= 0.0153 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.88 cfs @ 11.96 hrs HW=36.98' (Free Discharge)
1=Culvert (Inlet Controls 2.88 cfs @ 3.67 fps)

Summary for Pond #29:

Inflow Area = 27,556 sf, 77.92% Impervious, Inflow Depth = 5.66" for 100 YR event
Inflow = 5.02 cfs @ 11.95 hrs, Volume= 12,992 cf
Outflow = 5.02 cfs @ 11.95 hrs, Volume= 12,992 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.02 cfs @ 11.95 hrs, Volume= 12,992 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 41.57' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.25'	**12.0" Round Culvert** L= 43.0' CPP, projecting, no headwall, Ke= 0.900

Inlet / Outlet Invert= 38.25' / 37.75' S= 0.0116 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.99 cfs @ 11.95 hrs HW=41.54' (Free Discharge)
1=Culvert (Inlet Controls 4.99 cfs @ 6.35 fps)

Summary for Pond #3:

Inflow Area = 24,082 sf,100.00% Impervious, Inflow Depth = 6.13" for 100 YR event
Inflow = 5.24 cfs @ 11.89 hrs, Volume= 12,305 cf
Outflow = 5.24 cfs @ 11.89 hrs, Volume= 12,305 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.24 cfs @ 11.89 hrs, Volume= 12,305 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 41.03' @ 11.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.15'	**15.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.15' / 38.75' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=5.11 cfs @ 11.89 hrs HW=40.97' (Free Discharge)
1=Culvert (Inlet Controls 5.11 cfs @ 4.16 fps)

Summary for Pond #35:

Inflow Area = 57,755 sf, 65.04% Impervious, Inflow Depth = 5.40" for 100 YR event
Inflow = 10.86 cfs @ 11.95 hrs, Volume= 25,993 cf
Outflow = 10.86 cfs @ 11.95 hrs, Volume= 25,993 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.86 cfs @ 11.95 hrs, Volume= 25,993 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 44.29' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.25'	**15.0" Round Culvert** L= 34.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.25' / 37.35' S= 0.0265 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=10.77 cfs @ 11.95 hrs HW=44.20' (Free Discharge)
1=Culvert (Inlet Controls 10.77 cfs @ 8.77 fps)

Summary for Pond #6:

Inflow Area = 17,831 sf, 85.22% Impervious, Inflow Depth = 5.83" for 100 YR event
Inflow = 3.10 cfs @ 11.90 hrs, Volume= 8,667 cf
Outflow = 3.10 cfs @ 11.90 hrs, Volume= 8,667 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.10 cfs @ 11.90 hrs, Volume= 8,667 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.88' @ 11.90 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.30'	**12.0" Round Culvert** L= 9.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.30' / 38.15' S= 0.0153 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=3.09 cfs @ 11.90 hrs HW=39.87' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.09 cfs @ 3.93 fps)

Summary for Pond 1P: FOREBAY

Inflow Area = 64,063 sf, 14.20% Impervious, Inflow Depth = 3.74" for 100 YR event
Inflow = 9.34 cfs @ 12.00 hrs, Volume= 19,961 cf
Outflow = 8.46 cfs @ 12.02 hrs, Volume= 19,961 cf, Atten= 9%, Lag= 1.4 min
Primary = 8.46 cfs @ 12.02 hrs, Volume= 19,961 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 45.23' @ 12.02 hrs Surf.Area= 416 sf Storage= 511 cf

Plug-Flow detention time= 1.7 min calculated for 19,961 cf (100% of inflow)
Center-of-Mass det. time= 1.3 min (827.3 - 826.1)

Volume	Invert	Avail.Storage	Storage Description
#1	43.50'	2,260 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.50	50	0	0
44.00	280	83	83
46.00	500	780	863
47.50	770	953	1,815
48.00	1,010	445	2,260

Device	Routing	Invert	Outlet Devices
#1	Primary	43.50'	**18.0" Round Culvert** L= 168.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 43.50' / 39.00' S= 0.0268 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	47.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=8.22 cfs @ 12.02 hrs HW=45.18' (Free Discharge)
├**1=Culvert** (Inlet Controls 8.22 cfs @ 4.65 fps)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 1SM: STM MH#1

Inflow Area = 59,707 sf, 90.43% Impervious, Inflow Depth = 5.92" for 100 YR event
Inflow = 11.32 cfs @ 11.92 hrs, Volume= 29,449 cf
Outflow = 11.32 cfs @ 11.92 hrs, Volume= 29,449 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.35 cfs @ 11.92 hrs, Volume= 5,350 cf
Secondary = 4.97 cfs @ 11.92 hrs, Volume= 24,099 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 41.07' @ 11.92 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.60'	**15.0" Round Culvert** L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.60' / 38.40' S= 0.0182 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	37.80'	**12.0" Round Culvert** L= 8.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.80' / 37.60' S= 0.0233 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=6.15 cfs @ 11.92 hrs HW=40.97' (Free Discharge)
└**1=Culvert** (Inlet Controls 6.15 cfs @ 5.02 fps)

Secondary OutFlow Max=4.88 cfs @ 11.92 hrs HW=40.97' (Free Discharge)
└**2=Culvert** (Inlet Controls 4.88 cfs @ 6.21 fps)

Summary for Pond 2P: DEPRESSION

Inflow Area = 123,770 sf, 50.98% Impervious, Inflow Depth = 4.79" for 100 YR event
Inflow = 16.79 cfs @ 11.95 hrs, Volume= 49,410 cf
Outflow = 16.73 cfs @ 11.95 hrs, Volume= 43,837 cf, Atten= 0%, Lag= 0.0 min
Primary = 16.73 cfs @ 11.95 hrs, Volume= 43,837 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 34.43' @ 11.95 hrs Surf.Area= 10,310 sf Storage= 8,374 cf

Plug-Flow detention time= 109.7 min calculated for 43,827 cf (89% of inflow)
Center-of-Mass det. time= 52.1 min (833.0 - 780.8)

Volume	Invert	Avail.Storage	Storage Description
#1	33.00'	8,374 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
33.00	7,351	0	0
33.75	8,657	6,003	6,003
34.00	10,310	2,371	8,374

Device	Routing	Invert	Outlet Devices
#1	Primary	33.70'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=16.72 cfs @ 11.95 hrs HW=34.43' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 16.72 cfs @ 2.30 fps)

Summary for Pond 2SM: STM MH#2

Inflow Area = 59,707 sf, 90.43% Impervious, Inflow Depth = 5.92" for 100 YR event
Inflow = 11.32 cfs @ 11.92 hrs, Volume= 29,449 cf
Outflow = 11.32 cfs @ 11.92 hrs, Volume= 29,449 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.32 cfs @ 11.92 hrs, Volume= 29,449 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 41.08' @ 11.92 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**18.0" Round Culvert** L= 92.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.50' / 37.00' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=11.03 cfs @ 11.92 hrs HW=40.95' (Free Discharge)
1=Culvert (Inlet Controls 11.03 cfs @ 6.24 fps)

Summary for Pond 3SM: STM MH#3

Inflow Area = 57,755 sf, 65.04% Impervious, Inflow Depth = 5.40" for 100 YR event
Inflow = 10.86 cfs @ 11.95 hrs, Volume= 25,993 cf
Outflow = 10.86 cfs @ 11.95 hrs, Volume= 25,993 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.86 cfs @ 11.95 hrs, Volume= 25,993 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.36' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	36.00'	**18.0" Round Culvert** L= 118.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.00' / 35.00' S= 0.0085 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=10.77 cfs @ 11.95 hrs HW=39.32' (Free Discharge)
1=Culvert (Inlet Controls 10.77 cfs @ 6.09 fps)

Summary for Pond 4SM: STM MH#4

Inflow Area = 37,210 sf, 58.57% Impervious, Inflow Depth = 5.28" for 100 YR event
Inflow = 3.47 cfs @ 11.99 hrs, Volume= 16,374 cf
Outflow = 3.47 cfs @ 11.99 hrs, Volume= 16,374 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.47 cfs @ 11.99 hrs, Volume= 16,374 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.67' @ 11.99 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**15.0" Round Culvert**
			L= 10.5' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 37.50' / 37.00' S= 0.0476 '/' Cc= 0.900
			n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=3.44 cfs @ 11.99 hrs HW=38.66' (Free Discharge)
1=Culvert (Inlet Controls 3.44 cfs @ 2.89 fps)

Summary for Pond 5SM: STM MH#5

Inflow Area = 27,556 sf, 77.92% Impervious, Inflow Depth = 5.66" for 100 YR event
Inflow = 5.02 cfs @ 11.95 hrs, Volume= 12,992 cf
Outflow = 5.02 cfs @ 11.95 hrs, Volume= 12,992 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.37 cfs @ 11.95 hrs, Volume= 642 cf
Secondary = 3.65 cfs @ 11.95 hrs, Volume= 12,351 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.74' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.10'	**15.0" Round Culvert**
			L= 16.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 39.10' / 38.00' S= 0.0688 '/' Cc= 0.900
			n= 0.013, Flow Area= 1.23 sf
#2	Secondary	37.75'	**12.0" Round Culvert**
			L= 6.3' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 37.75' / 37.50' S= 0.0397 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.35 cfs @ 11.95 hrs HW=39.74' (Free Discharge)
1=Culvert (Inlet Controls 1.35 cfs @ 2.14 fps)

Secondary OutFlow Max=3.64 cfs @ 11.95 hrs HW=39.74' (Free Discharge)
2=Culvert (Inlet Controls 3.64 cfs @ 4.63 fps)

Summary for Pond 6SM: STM MH#6

Inflow Area = 27,556 sf, 77.92% Impervious, Inflow Depth = 5.66" for 100 YR event
Inflow = 5.02 cfs @ 11.95 hrs, Volume= 12,992 cf
Outflow = 5.02 cfs @ 11.95 hrs, Volume= 12,992 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.02 cfs @ 11.95 hrs, Volume= 12,992 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.03' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.25'	**15.0" Round Culvert**

L= 86.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 37.25' / 36.50' S= 0.0087 '/' Cc= 0.900
n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=4.99 cfs @ 11.95 hrs HW=39.02' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.99 cfs @ 4.07 fps)

Summary for Pond SP1:

Inflow Area = 8,698 sf,100.00% Impervious, Inflow Depth = 6.13" for 100 YR event
Inflow = 1.76 cfs @ 11.96 hrs, Volume= 4,444 cf
Outflow = 1.60 cfs @ 12.00 hrs, Volume= 4,444 cf, Atten= 9%, Lag= 2.2 min
Primary = 1.60 cfs @ 12.00 hrs, Volume= 4,444 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 43.80' @ 12.00 hrs Surf.Area= 1,056 sf Storage= 295 cf

Plug-Flow detention time= 7.7 min calculated for 4,443 cf (100% of inflow)
Center-of-Mass det. time= 7.7 min (747.8 - 740.1)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	778 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	158 cf	**SOIL (Prismatic)**Listed below (Recalc) 792 cf Overall x 20.0% Voids
#3	42.00'	211 cf	**STONE (Prismatic)**Listed below (Recalc) 528 cf Overall x 40.0% Voids
		1,147 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	310	0	0
45.00	528	210	210
46.00	608	568	778

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	528	0	0
44.50	528	792	792

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	528	0	0
43.00	528	528	528

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 39.75' S= 0.2250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.60 cfs @ 12.00 hrs HW=43.79' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.60 cfs @ 4.58 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP2:

Inflow Area = 9,375 sf,100.00% Impervious, Inflow Depth = 6.13" for 100 YR event
Inflow = 2.20 cfs @ 11.89 hrs, Volume= 4,790 cf
Outflow = 1.85 cfs @ 11.92 hrs, Volume= 4,790 cf, Atten= 16%, Lag= 1.9 min
Primary = 1.85 cfs @ 11.92 hrs, Volume= 4,790 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 44.27' @ 11.92 hrs Surf.Area= 1,050 sf Storage= 343 cf

Plug-Flow detention time= 7.5 min calculated for 4,790 cf (100% of inflow)
Center-of-Mass det. time= 7.4 min (742.0 - 734.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	991 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	158 cf	**SOIL (Prismatic)**Listed below (Recalc) 788 cf Overall x 20.0% Voids
#3	42.00'	210 cf	**STONE (Prismatic)**Listed below (Recalc) 525 cf Overall x 40.0% Voids
		1,359 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	273	0	0
45.00	525	200	200
46.00	1,058	792	991

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	525	0	0
44.50	525	788	788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	525	0	0
43.00	525	525	525

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.81 cfs @ 11.92 hrs HW=44.18' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.81 cfs @ 5.17 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP3:

Inflow Area = 8,624 sf,100.00% Impervious, Inflow Depth = 6.13" for 100 YR event
Inflow = 2.02 cfs @ 11.89 hrs, Volume= 4,406 cf
Outflow = 1.74 cfs @ 11.91 hrs, Volume= 4,406 cf, Atten= 14%, Lag= 1.7 min
Primary = 1.74 cfs @ 11.91 hrs, Volume= 4,406 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 44.05' @ 11.91 hrs Surf.Area= 938 sf Storage= 286 cf

Plug-Flow detention time= 6.8 min calculated for 4,405 cf (100% of inflow)
Center-of-Mass det. time= 6.9 min (741.4 - 734.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	903 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	141 cf	**SOIL (Prismatic)**Listed below (Recalc) 704 cf Overall x 20.0% Voids
#3	42.00'	188 cf	**STONE (Prismatic)**Listed below (Recalc) 469 cf Overall x 40.0% Voids
		1,231 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	228	0	0
45.00	469	174	174
46.00	988	729	903

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	469	0	0
44.50	469	704	704

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	469	0	0
43.00	469	469	469

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.70 cfs @ 11.91 hrs HW=43.97' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.70 cfs @ 4.87 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP4:

Inflow Area = 8,624 sf,100.00% Impervious, Inflow Depth = 6.13" for 100 YR event
Inflow = 2.02 cfs @ 11.89 hrs, Volume= 4,406 cf
Outflow = 1.80 cfs @ 11.91 hrs, Volume= 4,406 cf, Atten= 11%, Lag= 1.2 min
Primary = 1.80 cfs @ 11.91 hrs, Volume= 4,406 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 44.18' @ 11.91 hrs Surf.Area= 678 sf Storage= 216 cf

Plug-Flow detention time= 4.9 min calculated for 4,405 cf (100% of inflow)
Center-of-Mass det. time= 5.0 min (739.5 - 734.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	633 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	102 cf	**SOIL (Prismatic)**Listed below (Recalc) 509 cf Overall x 20.0% Voids
#3	42.00'	136 cf	**STONE (Prismatic)**Listed below (Recalc) 339 cf Overall x 40.0% Voids
		870 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	200	0	0
45.00	339	135	135
46.00	657	498	633

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	339	0	0
44.50	339	509	509

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	339	0	0
43.00	339	339	339

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.78 cfs @ 11.91 hrs HW=44.12' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.78 cfs @ 5.09 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP5:

Inflow Area = 12,073 sf,100.00% Impervious, Inflow Depth = 6.13" for 100 YR event
Inflow = 2.83 cfs @ 11.89 hrs, Volume= 6,169 cf
Outflow = 2.07 cfs @ 11.93 hrs, Volume= 6,169 cf, Atten= 27%, Lag= 2.6 min
Primary = 2.07 cfs @ 11.93 hrs, Volume= 6,169 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 44.77' @ 11.93 hrs Surf.Area= 2,017 sf Storage= 635 cf

Plug-Flow detention time= 9.5 min calculated for 6,169 cf (100% of inflow)
Center-of-Mass det. time= 9.4 min (743.9 - 734.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	1,183 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	218 cf	**SOIL (Prismatic)**Listed below (Recalc) 1,091 cf Overall x 20.0% Voids
#3	42.00'	291 cf	**STONE (Prismatic)**Listed below (Recalc) 727 cf Overall x 40.0% Voids
		1,692 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	368	0	0
45.00	727	274	274
46.00	1,092	910	1,183

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	727	0	0
44.50	727	1,091	1,091

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	727	0	0
43.00	727	727	727

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.04 cfs @ 11.93 hrs HW=44.70' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.04 cfs @ 5.85 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP6:

Inflow Area = 12,073 sf,100.00% Impervious, Inflow Depth = 6.13" for 100 YR event
Inflow = 2.83 cfs @ 11.89 hrs, Volume= 6,169 cf
Outflow = 2.12 cfs @ 11.93 hrs, Volume= 6,169 cf, Atten= 25%, Lag= 2.5 min
Primary = 2.12 cfs @ 11.93 hrs, Volume= 6,169 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 44.88' @ 11.93 hrs Surf.Area= 1,910 sf Storage= 617 cf

Plug-Flow detention time= 9.0 min calculated for 6,167 cf (100% of inflow)
Center-of-Mass det. time= 9.1 min (743.6 - 734.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	670 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	210 cf	**SOIL (Prismatic)**Listed below (Recalc) 1,050 cf Overall x 20.0% Voids
#3	42.00'	280 cf	**STONE (Prismatic)**Listed below (Recalc) 700 cf Overall x 40.0% Voids
		1,160 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	161	0	0
45.00	622	196	196
45.50	1,274	474	670

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	700	0	0
44.50	700	1,050	1,050

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	700	0	0
43.00	700	700	700

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.08 cfs @ 11.93 hrs HW=44.79' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.08 cfs @ 5.95 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond W: LOW AREA

Inflow Area = 21,467 sf, 42.39% Impervious, Inflow Depth = 4.87" for 100 YR event
Inflow = 3.89 cfs @ 11.96 hrs, Volume= 8,716 cf
Outflow = 3.08 cfs @ 12.03 hrs, Volume= 5,348 cf, Atten= 21%, Lag= 3.6 min
Primary = 3.08 cfs @ 12.03 hrs, Volume= 5,348 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 47.61' @ 12.03 hrs Surf.Area= 4,526 sf Storage= 3,866 cf

Plug-Flow detention time= 188.4 min calculated for 5,348 cf (61% of inflow)
Center-of-Mass det. time= 84.2 min (873.6 - 789.4)

Volume	Invert	Avail.Storage	Storage Description
#1	46.00'	5,811 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	265	0	0
48.00	5,546	5,811	5,811

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	**30.0' long x 38.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.94 cfs @ 12.03 hrs HW=47.61' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 2.94 cfs @ 0.89 fps)

Summary for Pond WQU#1: WQU#1

Inflow Area = 17,831 sf, 85.22% Impervious, Inflow Depth = 5.83" for 100 YR event
Inflow = 3.10 cfs @ 11.90 hrs, Volume= 8,667 cf
Outflow = 3.10 cfs @ 11.90 hrs, Volume= 8,667 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.10 cfs @ 11.90 hrs, Volume= 8,667 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.73' @ 11.90 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.15'	**12.0" Round Culvert** L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.15' / 37.80' S= 0.0318 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.09 cfs @ 11.90 hrs HW=39.72' (Free Discharge)
└**1=Culvert** (Inlet Controls 3.09 cfs @ 3.93 fps)

Summary for Pond WQU#2: WQU#2

Inflow	=	4.97 cfs @	11.92 hrs,	Volume=	24,099 cf
Outflow	=	4.97 cfs @	11.92 hrs,	Volume=	24,099 cf, Atten= 0%, Lag= 0.0 min
Primary	=	4.97 cfs @	11.92 hrs,	Volume=	24,099 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.87' @ 11.92 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.60'	**12.0" Round Culvert** L= 6.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.60' / 37.50' S= 0.0154 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.88 cfs @ 11.92 hrs HW=40.77' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.88 cfs @ 6.21 fps)

Summary for Pond WQU#3: WQU#3

Inflow	=	4.94 cfs @	11.95 hrs,	Volume=	21,617 cf
Outflow	=	4.94 cfs @	11.95 hrs,	Volume=	21,617 cf, Atten= 0%, Lag= 0.0 min
Primary	=	4.94 cfs @	11.95 hrs,	Volume=	21,617 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.49' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	36.25'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.25' / 36.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.91 cfs @ 11.95 hrs HW=39.45' (Free Discharge)
└**1=Culvert** (Inlet Controls 4.91 cfs @ 6.25 fps)

Summary for Pond WQU#4: WQU#4

Inflow	=	2.89 cfs @	11.99 hrs,	Volume=	15,806 cf
Outflow	=	2.89 cfs @	11.99 hrs,	Volume=	15,806 cf, Atten= 0%, Lag= 0.0 min
Primary	=	2.89 cfs @	11.99 hrs,	Volume=	15,806 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.43' @ 11.99 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.00'	**12.0" Round Culvert**

L= 7.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 38.00' / 37.75' S= 0.0357 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.87 cfs @ 11.99 hrs HW=39.43' (Free Discharge)
1=Culvert (Inlet Controls 2.87 cfs @ 3.66 fps)

Summary for Pond WQU#5: WQU#5

Inflow	=	3.65 cfs @	11.95 hrs, Volume=	12,351 cf	
Outflow	=	3.65 cfs @	11.95 hrs, Volume=	12,351 cf,	Atten= 0%, Lag= 0.0 min
Primary	=	3.65 cfs @	11.95 hrs, Volume=	12,351 cf	

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.49' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**12.0" Round Culvert**
			L= 17.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 37.50' / 37.25' S= 0.0147 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.64 cfs @ 11.95 hrs HW=39.49' (Free Discharge)
1=Culvert (Inlet Controls 3.64 cfs @ 4.63 fps)

Summary for Link OFF1:

Inflow Area =		536,757 sf,	35.35% Impervious,	Inflow Depth =	4.61" for 100 YR event
Inflow	=	63.84 cfs @	11.98 hrs, Volume=	206,266 cf	
Primary	=	63.84 cfs @	11.98 hrs, Volume=	206,266 cf,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Time span=0.00-200.00 hrs, dt=0.05 hrs, 4001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Runoff Area=227,434 sf 0.00% Impervious Runoff Depth=0.12"
Flow Length=680' Tc=15.9 min CN=80 Runoff=0.41 cfs 2,201 cf

Subcatchment2S: Runoff Area=19,232 sf 24.19% Impervious Runoff Depth=0.17"
Tc=0.0 min CN=83 Runoff=0.14 cfs 279 cf

Subcatchment3S: Runoff Area=25,969 sf 100.00% Impervious Runoff Depth=0.89"
Flow Length=383' Tc=6.0 min CN=98 Runoff=0.84 cfs 1,922 cf

Subcatchment4S: Runoff Area=12,073 sf 100.00% Impervious Runoff Depth=0.89"
Tc=0.0 min CN=98 Runoff=0.46 cfs 893 cf

Subcatchment5S: Runoff Area=12,073 sf 100.00% Impervious Runoff Depth=0.89"
Tc=0.0 min CN=98 Runoff=0.46 cfs 893 cf

Subcatchment6S: Runoff Area=8,624 sf 100.00% Impervious Runoff Depth=0.89"
Tc=0.0 min CN=98 Runoff=0.33 cfs 638 cf

Subcatchment7S: Runoff Area=8,624 sf 100.00% Impervious Runoff Depth=0.89"
Tc=0.0 min CN=98 Runoff=0.33 cfs 638 cf

Subcatchment8S: Runoff Area=9,375 sf 100.00% Impervious Runoff Depth=0.89"
Tc=0.0 min CN=98 Runoff=0.35 cfs 694 cf

Subcatchment9S: Runoff Area=8,698 sf 100.00% Impervious Runoff Depth=0.89"
Flow Length=63' Slope=0.0500 '/' Tc=6.0 min CN=98 Runoff=0.28 cfs 644 cf

Subcatchment10S: Runoff Area=42,596 sf 0.00% Impervious Runoff Depth=0.12"
Flow Length=383' Tc=6.0 min CN=80 Runoff=0.13 cfs 412 cf

Subcatchment11S: Runoff Area=21,467 sf 42.39% Impervious Runoff Depth=0.28"
Flow Length=383' Tc=6.0 min CN=87 Runoff=0.23 cfs 500 cf

Subcatchment12S: Runoff Area=9,133 sf 71.15% Impervious Runoff Depth=0.53"
Tc=0.0 min CN=93 Runoff=0.23 cfs 403 cf

Subcatchment13S: Runoff Area=11,142 sf 100.00% Impervious Runoff Depth=0.89"
Tc=0.0 min CN=98 Runoff=0.42 cfs 825 cf

Subcatchment14S: Runoff Area=3,565 sf 100.00% Impervious Runoff Depth=0.89"
Tc=0.0 min CN=98 Runoff=0.13 cfs 264 cf

Subcatchment15S: Runoff Area=3,662 sf 83.37% Impervious Runoff Depth=0.65"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=95 Runoff=0.09 cfs 199 cf

Subcatchment16S: Runoff Area=10,897 sf 67.99% Impervious Runoff Depth=0.48"
Flow Length=155' Slope=0.0200 '/' Tc=6.0 min CN=92 Runoff=0.21 cfs 434 cf

Subcatchment17S: Runoff Area=4,314 sf 100.00% Impervious Runoff Depth=0.89"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=98 Runoff=0.14 cfs 319 cf

Subcatchment18S: Runoff Area=8,128 sf 80.12% Impervious Runoff Depth=0.59"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=94 Runoff=0.19 cfs 398 cf

Subcatchment19S: Runoff Area=12,498 sf 48.46% Impervious Runoff Depth=0.35"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=89 Runoff=0.17 cfs 363 cf

Subcatchment20S: Runoff Area=11,405 sf 95.62% Impervious Runoff Depth=0.80"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=97 Runoff=0.34 cfs 760 cf

Subcatchment21S: Runoff Area=11,565 sf 57.87% Impervious Runoff Depth=0.39"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=90 Runoff=0.18 cfs 373 cf

Subcatchment22S: Runoff Area=13,663 sf 38.70% Impervious Runoff Depth=0.28"
Flow Length=88' Slope=0.0080 '/' Tc=6.0 min CN=87 Runoff=0.15 cfs 318 cf

Subcatchment23S: Runoff Area=25,137 sf 38.67% Impervious Runoff Depth=0.28"
Flow Length=130' Tc=24.5 min CN=87 Runoff=0.14 cfs 586 cf

Subcatchment24S: Runoff Area=8,860 sf 50.18% Impervious Runoff Depth=0.35"
Flow Length=130' Tc=6.0 min CN=89 Runoff=0.12 cfs 257 cf

Subcatchment25S: Runoff Area=6,623 sf 74.78% Impervious Runoff Depth=0.53"
Flow Length=50' Slope=0.0200 '/' Tc=6.0 min CN=93 Runoff=0.14 cfs 292 cf

Reach 1R: EXISTING 24" PIPE Avg. Flow Depth=0.26' Max Vel=3.38 fps Inflow=0.84 cfs 1,922 cf
24.0" Round Pipe n=0.013 L=192.0' S=0.0098 '/' Capacity=22.39 cfs Outflow=0.81 cfs 1,922 cf

Reach 2R: Avg. Flow Depth=0.09' Max Vel=2.96 fps Inflow=0.12 cfs 412 cf
18.0" Round Pipe n=0.013 L=210.0' S=0.0310 '/' Capacity=18.48 cfs Outflow=0.11 cfs 412 cf

Reach 4R: Avg. Flow Depth=0.08' Max Vel=1.55 fps Inflow=0.40 cfs 1,047 cf
n=0.035 L=112.0' S=0.0446 '/' Capacity=177.26 cfs Outflow=0.38 cfs 1,047 cf

Pond #1: Peak Elev=40.81' Inflow=0.31 cfs 694 cf
12.0" Round Culvert n=0.013 L=77.0' S=0.0058 '/' Outflow=0.31 cfs 694 cf

Pond #11: Peak Elev=41.64' Inflow=0.19 cfs 398 cf
12.0" Round Culvert n=0.013 L=55.0' S=0.0073 '/' Outflow=0.19 cfs 398 cf

Pond #12: Peak Elev=39.37' Inflow=0.88 cfs 1,987 cf
18.0" Round Culvert n=0.013 L=61.0' S=0.0148 '/' Outflow=0.88 cfs 1,987 cf

Pond #15: Peak Elev=40.66' Inflow=0.61 cfs 1,398 cf
12.0" Round Culvert n=0.013 L=31.0' S=0.0065 '/' Outflow=0.61 cfs 1,398 cf

Pond #16: Peak Elev=39.52' Inflow=0.93 cfs 2,134 cf
15.0" Round Culvert n=0.013 L=56.0' S=0.0134 '/' Outflow=0.93 cfs 2,134 cf

Pond #2: Peak Elev=40.54' Inflow=0.72 cfs 1,518 cf
12.0" Round Culvert n=0.013 L=33.0' S=0.0212 '/' Outflow=0.72 cfs 1,518 cf

Pond #20: Peak Elev=43.20' Inflow=0.14 cfs 319 cf
12.0" Round Culvert n=0.013 L=76.0' S=0.0125 '/' Outflow=0.14 cfs 319 cf

Pond #21: Peak Elev=42.38' Inflow=0.35 cfs 753 cf
12.0" Round Culvert n=0.013 L=70.0' S=0.0450 '/' Outflow=0.35 cfs 753 cf

Pond #22: Peak Elev=37.00' Inflow=1.06 cfs 2,453 cf
Primary=0.00 cfs 0 cf Secondary=1.06 cfs 2,453 cf Outflow=1.06 cfs 2,453 cf

Pond #23: Peak Elev=40.54' Inflow=0.14 cfs 586 cf
15.0" Round Culvert n=0.013 L=70.0' S=0.0071 '/' Outflow=0.14 cfs 586 cf

Pond #24: Peak Elev=40.21' Inflow=0.40 cfs 1,479 cf
12.0" Round Culvert n=0.013 L=26.0' S=0.0231 '/' Outflow=0.40 cfs 1,479 cf

Pond #25: Peak Elev=38.61' Inflow=0.40 cfs 1,479 cf
Primary=0.00 cfs 0 cf Secondary=0.40 cfs 1,479 cf Outflow=0.40 cfs 1,479 cf

Pond #26: Peak Elev=43.73' Inflow=0.17 cfs 363 cf
12.0" Round Culvert n=0.013 L=126.0' S=0.0278 '/' Outflow=0.17 cfs 363 cf

Pond #27: Peak Elev=39.49' Inflow=0.12 cfs 257 cf
12.0" Round Culvert n=0.013 L=100.0' S=0.0080 '/' Outflow=0.12 cfs 257 cf

Pond #28: Peak Elev=35.83' Inflow=0.26 cfs 549 cf
12.0" Round Culvert n=0.013 L=36.0' S=0.0153 '/' Outflow=0.26 cfs 549 cf

Pond #29: Peak Elev=38.70' Inflow=0.62 cfs 1,443 cf
12.0" Round Culvert n=0.013 L=43.0' S=0.0116 '/' Outflow=0.62 cfs 1,443 cf

Pond #3: Peak Elev=39.64' Inflow=0.85 cfs 1,782 cf
15.0" Round Culvert n=0.013 L=36.0' S=0.0111 '/' Outflow=0.85 cfs 1,782 cf

Pond #35: Peak Elev=38.81' Inflow=1.06 cfs 2,453 cf
15.0" Round Culvert n=0.013 L=34.0' S=0.0265 '/' Outflow=1.06 cfs 2,453 cf

Pond #6: Peak Elev=38.65' Inflow=0.40 cfs 1,047 cf
12.0" Round Culvert n=0.013 L=9.8' S=0.0153 '/' Outflow=0.40 cfs 1,047 cf

Pond 1P: FOREBAY Peak Elev=43.65' Storage=12 cf Inflow=0.13 cfs 412 cf
Outflow=0.12 cfs 412 cf

Pond 1SM: STM MH#1 Peak Elev=38.60' Inflow=1.61 cfs 3,770 cf
Primary=0.00 cfs 0 cf Secondary=1.61 cfs 3,770 cf Outflow=1.61 cfs 3,770 cf

Pond 2P: DEPRESSION Peak Elev=33.53' Storage=4,182 cf Inflow=1.61 cfs 4,182 cf
Outflow=0.00 cfs 0 cf

Pond 2SM: STM MH#2 Peak Elev=38.17' Inflow=1.61 cfs 3,770 cf
18.0" Round Culvert n=0.013 L=92.0' S=0.0054 '/' Outflow=1.61 cfs 3,770 cf

Pond 3SM: STM MH#3 Peak Elev=36.52' Inflow=1.06 cfs 2,453 cf
18.0" Round Culvert n=0.013 L=118.0' S=0.0085 '/' Outflow=1.06 cfs 2,453 cf

Pond 4SM: STM MH#4 Peak Elev=37.83' Inflow=0.40 cfs 1,479 cf
15.0" Round Culvert n=0.013 L=10.5' S=0.0476 '/' Outflow=0.40 cfs 1,479 cf

Pond 5SM: STM MH#5 Peak Elev=38.20' Inflow=0.62 cfs 1,443 cf
Primary=0.00 cfs 0 cf Secondary=0.62 cfs 1,443 cf Outflow=0.62 cfs 1,443 cf

Pond 6SM: STM MH#6 Peak Elev=37.66' Inflow=0.62 cfs 1,443 cf
15.0" Round Culvert n=0.013 L=86.0' S=0.0087 '/' Outflow=0.62 cfs 1,443 cf

Pond SP1: Peak Elev=42.32' Storage=69 cf Inflow=0.28 cfs 644 cf
Outflow=0.26 cfs 644 cf

Pond SP2: Peak Elev=42.36' Storage=75 cf Inflow=0.35 cfs 694 cf
Outflow=0.31 cfs 694 cf

Pond SP3: Peak Elev=42.34' Storage=64 cf Inflow=0.33 cfs 638 cf
Outflow=0.29 cfs 638 cf

Pond SP4: Peak Elev=42.35' Storage=48 cf Inflow=0.33 cfs 638 cf
Outflow=0.30 cfs 638 cf

Pond SP5: Peak Elev=42.40' Storage=117 cf Inflow=0.46 cfs 893 cf
Outflow=0.38 cfs 893 cf

Pond SP6: Peak Elev=42.41' Storage=114 cf Inflow=0.46 cfs 893 cf
Outflow=0.38 cfs 893 cf

Pond W: LOW AREA Peak Elev=46.52' Storage=500 cf Inflow=0.23 cfs 500 cf
Outflow=0.00 cfs 0 cf

Pond WQU#1: WQU#1 Peak Elev=38.50' Inflow=0.40 cfs 1,047 cf
12.0" Round Culvert n=0.013 L=11.0' S=0.0318 '/' Outflow=0.40 cfs 1,047 cf

Pond WQU#2: WQU#2 Peak Elev=38.44' Inflow=1.61 cfs 3,770 cf
12.0" Round Culvert n=0.013 L=6.5' S=0.0154 '/' Outflow=1.61 cfs 3,770 cf

Pond WQU#3: WQU#3 Peak Elev=36.86' Inflow=1.06 cfs 2,453 cf
12.0" Round Culvert n=0.013 L=10.0' S=0.0250 '/' Outflow=1.06 cfs 2,453 cf

Pond WQU#4: WQU#4 Peak Elev=38.36' Inflow=0.40 cfs 1,479 cf
12.0" Round Culvert n=0.013 L=7.0' S=0.0357 '/' Outflow=0.40 cfs 1,479 cf

Pond WQU#5: WQU#5 Peak Elev=37.95' Inflow=0.62 cfs 1,443 cf
12.0" Round Culvert n=0.013 L=17.0' S=0.0147 '/' Outflow=0.62 cfs 1,443 cf

Link OFF1: Inflow=3.34 cfs 10,823 cf
Primary=3.34 cfs 10,823 cf

Total Runoff Area = 536,757 sf Runoff Volume = 15,505 cf Average Runoff Depth = 0.35"
64.65% Pervious = 347,015 sf 35.35% Impervious = 189,742 sf

Summary for Subcatchment 1S:

Runoff = 0.41 cfs @ 12.14 hrs, Volume= 2,201 cf, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
97,354	79	Woods, Fair, HSG D
130,080	80	>75% Grass cover, Good, HSG D
227,434	80	Weighted Average
227,434		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1800	0.17		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
5.8	580	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.9	680	Total			

Summary for Subcatchment 2S:

Runoff = 0.14 cfs @ 11.91 hrs, Volume= 279 cf, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
8,106	77	Woods, Good, HSG D
4,653	98	Paved roads w/curbs & sewers, HSG D
6,473	80	>75% Grass cover, Good, HSG D
19,232	83	Weighted Average
14,579		75.81% Pervious Area
4,653		24.19% Impervious Area

Summary for Subcatchment 3S:

Runoff = 0.84 cfs @ 11.96 hrs, Volume= 1,922 cf, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
25,969	98	Paved roads w/curbs & sewers, HSG D
25,969		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0060	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.9	283	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.1	383	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 4S:

Runoff = 0.46 cfs @ 11.89 hrs, Volume= 893 cf, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
12,073	98	Unconnected roofs, HSG D
12,073		100.00% Impervious Area
12,073		100.00% Unconnected

Summary for Subcatchment 5S:

Runoff = 0.46 cfs @ 11.89 hrs, Volume= 893 cf, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
12,073	98	Unconnected roofs, HSG D
12,073		100.00% Impervious Area
12,073		100.00% Unconnected

Summary for Subcatchment 6S:

Runoff = 0.33 cfs @ 11.89 hrs, Volume= 638 cf, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
8,624	98	Unconnected roofs, HSG D
8,624		100.00% Impervious Area
8,624		100.00% Unconnected

Summary for Subcatchment 7S:

Runoff = 0.33 cfs @ 11.89 hrs, Volume= 638 cf, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
8,624	98	Unconnected roofs, HSG D
8,624		100.00% Impervious Area
8,624		100.00% Unconnected

Summary for Subcatchment 8S:

Runoff = 0.35 cfs @ 11.89 hrs, Volume= 694 cf, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
9,375	98	Unconnected roofs, HSG D
9,375		100.00% Impervious Area
9,375		100.00% Unconnected

Summary for Subcatchment 9S:

Runoff = 0.28 cfs @ 11.96 hrs, Volume= 644 cf, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
8,698	98	Unconnected roofs, HSG D
8,698		100.00% Impervious Area
8,698		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	63	0.0500	1.60		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.7	63	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 10S:

Runoff = 0.13 cfs @ 12.01 hrs, Volume= 412 cf, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
17,986	79	Woods, Fair, HSG D
24,610	80	>75% Grass cover, Good, HSG D
42,596	80	Weighted Average
42,596		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0060	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.9	283	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.1	383	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 11S:

Runoff = 0.23 cfs @ 11.98 hrs, Volume= 500 cf, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
12,368	79	Woods/grass comb., Good, HSG D
9,099	98	Unconnected pavement, HSG D
21,467	87	Weighted Average
12,368		57.61% Pervious Area
9,099		42.39% Impervious Area
9,099		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0060	0.75		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.9	283	0.0280	2.51		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
4.1	383	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 12S:

Runoff = 0.23 cfs @ 11.89 hrs, Volume= 403 cf, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
6,498	98	Paved parking, HSG D
2,635	80	>75% Grass cover, Good, HSG D
9,133	93	Weighted Average
2,635		28.85% Pervious Area
6,498		71.15% Impervious Area

Summary for Subcatchment 13S:

Runoff = 0.42 cfs @ 11.89 hrs, Volume= 825 cf, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
11,142	98	Paved parking, HSG D
11,142		100.00% Impervious Area

Summary for Subcatchment 14S:

Runoff = 0.13 cfs @ 11.89 hrs, Volume= 264 cf, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
3,565	98	Paved parking, HSG D
3,565		100.00% Impervious Area

Summary for Subcatchment 15S:

Runoff = 0.09 cfs @ 11.97 hrs, Volume= 199 cf, Depth= 0.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
3,053	98	Paved parking, HSG D
609	80	>75% Grass cover, Good, HSG D
3,662	95	Weighted Average
609		16.63% Pervious Area
3,053		83.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 16S:

Runoff = 0.21 cfs @ 11.98 hrs, Volume= 434 cf, Depth= 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
7,409	98	Paved parking, HSG D
3,488	80	>75% Grass cover, Good, HSG D
10,897	92	Weighted Average
3,488		32.01% Pervious Area
7,409		67.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.22		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.3	55	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.7	155	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 17S:

Runoff = 0.14 cfs @ 11.96 hrs, Volume= 319 cf, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
4,314	98	Paved parking, HSG D
4,314		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 18S:

Runoff = 0.19 cfs @ 11.97 hrs, Volume= 398 cf, Depth= 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
6,512	98	Paved parking, HSG D
1,616	80	>75% Grass cover, Good, HSG D
8,128	94	Weighted Average
1,616		19.88% Pervious Area
6,512		80.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 19S:

Runoff = 0.17 cfs @ 11.98 hrs, Volume= 363 cf, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
6,057	98	Paved parking, HSG D
6,441	80	>75% Grass cover, Good, HSG D
12,498	89	Weighted Average
6,441		51.54% Pervious Area
6,057		48.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 20S:

Runoff = 0.34 cfs @ 11.97 hrs, Volume= 760 cf, Depth= 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
10,905	98	Paved parking, HSG D
500	80	>75% Grass cover, Good, HSG D
11,405	97	Weighted Average
500		4.38% Pervious Area
10,905		95.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 21S:

Runoff = 0.18 cfs @ 11.98 hrs, Volume= 373 cf, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
6,693	98	Paved parking, HSG D
4,872	80	>75% Grass cover, Good, HSG D
11,565	90	Weighted Average
4,872		42.13% Pervious Area
6,693		57.87% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 22S:

Runoff = 0.15 cfs @ 11.98 hrs, Volume= 318 cf, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
5,287	98	Paved parking, HSG D
8,376	80	>75% Grass cover, Good, HSG D
13,663	87	Weighted Average
8,376		61.30% Pervious Area
5,287		38.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	88	0.0080	0.82		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
1.8	88	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 23S:

Runoff = 0.14 cfs @ 12.21 hrs, Volume= 586 cf, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
9,720	98	Paved parking, HSG D
15,417	80	>75% Grass cover, Good, HSG D
25,137	87	Weighted Average
15,417		61.33% Pervious Area
9,720		38.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.3	100	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.50"
0.2	30	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
24.5	130	Total			

Summary for Subcatchment 24S:

Runoff = 0.12 cfs @ 11.98 hrs, Volume= 257 cf, Depth= 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
4,446	98	Paved parking, HSG D
4,414	80	>75% Grass cover, Good, HSG D
8,860	89	Weighted Average
4,414		49.82% Pervious Area
4,446		50.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.22		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.2	30	0.0100	2.03		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
1.6	130	Total, Increased to minimum Tc = 6.0 min			

Summary for Subcatchment 25S:

Runoff = 0.14 cfs @ 11.97 hrs, Volume= 292 cf, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Type II 24-hr WQv Rainfall=1.10"

Area (sf)	CN	Description
4,953	98	Paved parking, HSG D
1,670	80	>75% Grass cover, Good, HSG D
6,623	93	Weighted Average
1,670		25.22% Pervious Area
4,953		74.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	50	0.0200	1.06		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.8	50	Total, Increased to minimum Tc = 6.0 min			

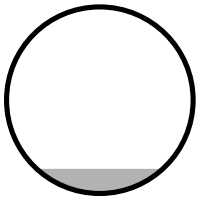
Summary for Reach 1R: EXISTING 24" PIPE

Inflow Area = 25,969 sf,100.00% Impervious, Inflow Depth = 0.89" for WQv event
Inflow = 0.84 cfs @ 11.96 hrs, Volume= 1,922 cf
Outflow = 0.81 cfs @ 11.99 hrs, Volume= 1,922 cf, Atten= 4%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.38 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.00 fps, Avg. Travel Time= 3.2 min

Peak Storage= 47 cf @ 11.98 hrs
Average Depth at Peak Storage= 0.26' , Surface Width= 1.36'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 22.39 cfs

24.0" Round Pipe
n= 0.013 Clay tile
Length= 192.0' Slope= 0.0098 '/'
Inlet Invert= 30.57', Outlet Invert= 28.69'



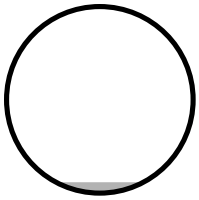
Summary for Reach 2R:

Inflow Area = 64,063 sf, 14.20% Impervious, Inflow Depth = 0.08" for WQv event
Inflow = 0.12 cfs @ 12.03 hrs, Volume= 412 cf
Outflow = 0.11 cfs @ 12.07 hrs, Volume= 412 cf, Atten= 7%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.96 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 2.7 min

Peak Storage= 9 cf @ 12.05 hrs
Average Depth at Peak Storage= 0.09' , Surface Width= 0.70'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.48 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 210.0' Slope= 0.0310 '/'
Inlet Invert= 43.50', Outlet Invert= 37.00'



Summary for Reach 4R:

Inflow Area = 17,831 sf, 85.22% Impervious, Inflow Depth = 0.70" for WQv event
Inflow = 0.40 cfs @ 11.92 hrs, Volume= 1,047 cf
Outflow = 0.38 cfs @ 11.96 hrs, Volume= 1,047 cf, Atten= 5%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.55 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 0.67 fps, Avg. Travel Time= 2.8 min

Peak Storage= 28 cf @ 11.94 hrs
Average Depth at Peak Storage= 0.08' , Surface Width= 3.46'
Bank-Full Depth= 2.00' Flow Area= 18.0 sf, Capacity= 177.26 cfs

3.00' x 2.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 3.0 '/' Top Width= 15.00'
Length= 112.0' Slope= 0.0446 '/'
Inlet Invert= 44.00', Outlet Invert= 39.00'



‡

Summary for Pond #1:

Inflow Area = 9,375 sf,100.00% Impervious, Inflow Depth = 0.89" for WQv event
Inflow = 0.31 cfs @ 11.92 hrs, Volume= 694 cf
Outflow = 0.31 cfs @ 11.92 hrs, Volume= 694 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.31 cfs @ 11.92 hrs, Volume= 694 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.81' @ 11.92 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.50'	**12.0" Round Culvert** L= 77.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 40.50' / 40.05' S= 0.0058 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.30 cfs @ 11.92 hrs HW=40.81' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.30 cfs @ 2.16 fps)

Summary for Pond #11:

Inflow Area = 8,128 sf, 80.12% Impervious, Inflow Depth = 0.59" for WQv event
Inflow = 0.19 cfs @ 11.97 hrs, Volume= 398 cf
Outflow = 0.19 cfs @ 11.97 hrs, Volume= 398 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.19 cfs @ 11.97 hrs, Volume= 398 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 41.64' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	41.40'	**12.0" Round Culvert** L= 55.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 41.40' / 41.00' S= 0.0073 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.18 cfs @ 11.97 hrs HW=41.63' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.18 cfs @ 1.30 fps)

Summary for Pond #12:

Inflow Area = 35,625 sf, 83.96% Impervious, Inflow Depth = 0.67" for WQv event
Inflow = 0.88 cfs @ 11.95 hrs, Volume= 1,987 cf
Outflow = 0.88 cfs @ 11.95 hrs, Volume= 1,987 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.88 cfs @ 11.95 hrs, Volume= 1,987 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.37' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.90'	**18.0" Round Culvert** L= 61.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.90' / 38.00' S= 0.0148 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.87 cfs @ 11.95 hrs HW=39.37' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.87 cfs @ 1.84 fps)

Summary for Pond #15:

Inflow Area = 20,029 sf, 97.50% Impervious, Inflow Depth = 0.84" for WQv event
Inflow = 0.61 cfs @ 11.94 hrs, Volume= 1,398 cf
Outflow = 0.61 cfs @ 11.94 hrs, Volume= 1,398 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.61 cfs @ 11.94 hrs, Volume= 1,398 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

Peak Elev= 40.66' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.20'	**12.0" Round Culvert** L= 31.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 40.20' / 40.00' S= 0.0065 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.59 cfs @ 11.94 hrs HW=40.66' (Free Discharge)
1=Culvert (Barrel Controls 0.59 cfs @ 2.48 fps)

Summary for Pond #16:

Inflow Area = 44,092 sf, 73.21% Impervious, Inflow Depth = 0.58" for WQv event
Inflow = 0.93 cfs @ 11.95 hrs, Volume= 2,134 cf
Outflow = 0.93 cfs @ 11.95 hrs, Volume= 2,134 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.93 cfs @ 11.95 hrs, Volume= 2,134 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.52' @ 11.95 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.00'	**15.0" Round Culvert** L= 56.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.00' / 38.25' S= 0.0134 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.92 cfs @ 11.95 hrs HW=39.52' (Free Discharge)
1=Culvert (Inlet Controls 0.92 cfs @ 1.93 fps)

Summary for Pond #2:

Inflow Area = 20,517 sf,100.00% Impervious, Inflow Depth = 0.89" for WQv event
Inflow = 0.72 cfs @ 11.90 hrs, Volume= 1,518 cf
Outflow = 0.72 cfs @ 11.90 hrs, Volume= 1,518 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.72 cfs @ 11.90 hrs, Volume= 1,518 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.54' @ 11.90 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.05'	**12.0" Round Culvert** L= 33.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 40.05' / 39.35' S= 0.0212 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.71 cfs @ 11.90 hrs HW=40.53' (Free Discharge)
1=Culvert (Inlet Controls 0.71 cfs @ 1.87 fps)

Summary for Pond #20:

Inflow Area = 4,314 sf,100.00% Impervious, Inflow Depth = 0.89" for WQv event
Inflow = 0.14 cfs @ 11.96 hrs, Volume= 319 cf
Outflow = 0.14 cfs @ 11.96 hrs, Volume= 319 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.14 cfs @ 11.96 hrs, Volume= 319 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 43.20' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	43.00'	**12.0" Round Culvert** L= 76.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 43.00' / 42.05' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.14 cfs @ 11.96 hrs HW=43.20' (Free Discharge)
1=Culvert (Inlet Controls 0.14 cfs @ 1.21 fps)

Summary for Pond #21:

Inflow Area = 15,211 sf, 77.07% Impervious, Inflow Depth = 0.59" for WQv event
Inflow = 0.35 cfs @ 11.97 hrs, Volume= 753 cf
Outflow = 0.35 cfs @ 11.97 hrs, Volume= 753 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.35 cfs @ 11.97 hrs, Volume= 753 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.38' @ 11.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	42.05'	**12.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.05' / 38.90' S= 0.0450 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.33 cfs @ 11.97 hrs HW=42.37' (Free Discharge)
1=Culvert (Inlet Controls 0.33 cfs @ 1.53 fps)

Summary for Pond #22:

Inflow Area = 57,755 sf, 65.04% Impervious, Inflow Depth = 0.51" for WQv event
Inflow = 1.06 cfs @ 11.96 hrs, Volume= 2,453 cf
Outflow = 1.06 cfs @ 11.96 hrs, Volume= 2,453 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 1.06 cfs @ 11.96 hrs, Volume= 2,453 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 37.00' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.35'	**15.0" Round Culvert** L= 8.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.35' / 37.00' S= 0.0438 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	36.35'	**12.0" Round Culvert** L= 8.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.35' / 36.25' S= 0.0120 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=36.35' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=1.05 cfs @ 11.96 hrs HW=36.99' (Free Discharge)
2=Culvert (Barrel Controls 1.05 cfs @ 2.78 fps)

Summary for Pond #23:

Inflow Area = 25,137 sf, 38.67% Impervious, Inflow Depth = 0.28" for WQv event
Inflow = 0.14 cfs @ 12.21 hrs, Volume= 586 cf
Outflow = 0.14 cfs @ 12.21 hrs, Volume= 586 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.14 cfs @ 12.21 hrs, Volume= 586 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.54' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	40.35'	**15.0" Round Culvert** L= 70.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 40.35' / 39.85' S= 0.0071 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.14 cfs @ 12.21 hrs HW=40.54' (Free Discharge)
1=Culvert (Inlet Controls 0.14 cfs @ 1.17 fps)

Summary for Pond #24:

Inflow Area = 37,210 sf, 58.57% Impervious, Inflow Depth = 0.48" for WQv event
Inflow = 0.40 cfs @ 11.93 hrs, Volume= 1,479 cf
Outflow = 0.40 cfs @ 11.93 hrs, Volume= 1,479 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 11.93 hrs, Volume= 1,479 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 40.21' @ 11.93 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.85'	**12.0" Round Culvert** L= 26.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.85' / 39.25' S= 0.0231 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.39 cfs @ 11.93 hrs HW=40.20' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.39 cfs @ 1.59 fps)

Summary for Pond #25:

Inflow Area = 37,210 sf, 58.57% Impervious, Inflow Depth = 0.48" for WQv event
Inflow = 0.40 cfs @ 11.93 hrs, Volume= 1,479 cf
Outflow = 0.40 cfs @ 11.93 hrs, Volume= 1,479 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.40 cfs @ 11.93 hrs, Volume= 1,479 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.61' @ 11.93 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.25'	**12.0" Round Culvert** L= 13.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.25' / 39.00' S= 0.0192 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	38.25'	**12.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.25' / 38.00' S= 0.0208 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=38.25' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=0.39 cfs @ 11.93 hrs HW=38.60' (Free Discharge)
└**2=Culvert** (Inlet Controls 0.39 cfs @ 1.59 fps)

Summary for Pond #26:

Inflow Area = 12,498 sf, 48.46% Impervious, Inflow Depth = 0.35" for WQv event
Inflow = 0.17 cfs @ 11.98 hrs, Volume= 363 cf
Outflow = 0.17 cfs @ 11.98 hrs, Volume= 363 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.17 cfs @ 11.98 hrs, Volume= 363 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 43.73' @ 11.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	43.50'	**12.0" Round Culvert** L= 126.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 43.50' / 40.00' S= 0.0278 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.16 cfs @ 11.98 hrs HW=43.72' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.16 cfs @ 1.27 fps)

Summary for Pond #27:

Inflow Area = 8,860 sf, 50.18% Impervious, Inflow Depth = 0.35" for WQv event
Inflow = 0.12 cfs @ 11.98 hrs, Volume= 257 cf
Outflow = 0.12 cfs @ 11.98 hrs, Volume= 257 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.12 cfs @ 11.98 hrs, Volume= 257 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.49' @ 11.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.30'	**12.0" Round Culvert** L= 100.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.30' / 38.50' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.12 cfs @ 11.98 hrs HW=39.49' (Free Discharge)
1=Culvert (Inlet Controls 0.12 cfs @ 1.16 fps)

Summary for Pond #28:

Inflow Area = 15,483 sf, 60.71% Impervious, Inflow Depth = 0.43" for WQv event
Inflow = 0.26 cfs @ 11.98 hrs, Volume= 549 cf
Outflow = 0.26 cfs @ 11.98 hrs, Volume= 549 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.26 cfs @ 11.98 hrs, Volume= 549 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 35.83' @ 11.98 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	35.55'	**12.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 35.55' / 35.00' S= 0.0153 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.25 cfs @ 11.98 hrs HW=35.83' (Free Discharge)
1=Culvert (Inlet Controls 0.25 cfs @ 1.41 fps)

Summary for Pond #29:

Inflow Area = 27,556 sf, 77.92% Impervious, Inflow Depth = 0.63" for WQv event
Inflow = 0.62 cfs @ 11.94 hrs, Volume= 1,443 cf
Outflow = 0.62 cfs @ 11.94 hrs, Volume= 1,443 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.62 cfs @ 11.94 hrs, Volume= 1,443 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.70' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.25'	**12.0" Round Culvert** L= 43.0' CPP, projecting, no headwall, Ke= 0.900

Inlet / Outlet Invert= 38.25' / 37.75' S= 0.0116 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.60 cfs @ 11.94 hrs HW=38.69' (Free Discharge)
1=Culvert (Inlet Controls 0.60 cfs @ 1.79 fps)

Summary for Pond #3:

Inflow Area = 24,082 sf,100.00% Impervious, Inflow Depth = 0.89" for WQv event
Inflow = 0.85 cfs @ 11.89 hrs, Volume= 1,782 cf
Outflow = 0.85 cfs @ 11.89 hrs, Volume= 1,782 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.85 cfs @ 11.89 hrs, Volume= 1,782 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 39.64' @ 11.89 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.15'	**15.0" Round Culvert** L= 36.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 39.15' / 38.75' S= 0.0111 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.83 cfs @ 11.89 hrs HW=39.64' (Free Discharge)
1=Culvert (Inlet Controls 0.83 cfs @ 1.88 fps)

Summary for Pond #35:

Inflow Area = 57,755 sf, 65.04% Impervious, Inflow Depth = 0.51" for WQv event
Inflow = 1.06 cfs @ 11.96 hrs, Volume= 2,453 cf
Outflow = 1.06 cfs @ 11.96 hrs, Volume= 2,453 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.06 cfs @ 11.96 hrs, Volume= 2,453 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.81' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.25'	**15.0" Round Culvert** L= 34.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.25' / 37.35' S= 0.0265 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.05 cfs @ 11.96 hrs HW=38.80' (Free Discharge)
1=Culvert (Inlet Controls 1.05 cfs @ 2.00 fps)

Summary for Pond #6:

Inflow Area = 17,831 sf, 85.22% Impervious, Inflow Depth = 0.70" for WQv event
Inflow = 0.40 cfs @ 11.92 hrs, Volume= 1,047 cf
Outflow = 0.40 cfs @ 11.92 hrs, Volume= 1,047 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 11.92 hrs, Volume= 1,047 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.65' @ 11.92 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.30'	**12.0" Round Culvert** L= 9.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.30' / 38.15' S= 0.0153 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.39 cfs @ 11.92 hrs HW=38.65' (Free Discharge)
1=Culvert (Inlet Controls 0.39 cfs @ 1.59 fps)

Summary for Pond 1P: FOREBAY

Inflow Area = 64,063 sf, 14.20% Impervious, Inflow Depth = 0.08" for WQv event
Inflow = 0.13 cfs @ 12.01 hrs, Volume= 412 cf
Outflow = 0.12 cfs @ 12.03 hrs, Volume= 412 cf, Atten= 9%, Lag= 1.7 min
Primary = 0.12 cfs @ 12.03 hrs, Volume= 412 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 43.65' @ 12.03 hrs Surf.Area= 118 sf Storage= 12 cf

Plug-Flow detention time= 3.5 min calculated for 412 cf (100% of inflow)
Center-of-Mass det. time= 3.4 min (936.6 - 933.2)

Volume	Invert	Avail.Storage	Storage Description
#1	43.50'	2,260 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.50	50	0	0
44.00	280	83	83
46.00	500	780	863
47.50	770	953	1,815
48.00	1,010	445	2,260

Device	Routing	Invert	Outlet Devices
#1	Primary	43.50'	**18.0" Round Culvert** L= 168.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 43.50' / 39.00' S= 0.0268 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Primary	47.50'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.11 cfs @ 12.03 hrs HW=43.64' (Free Discharge)
1=Culvert (Inlet Controls 0.11 cfs @ 1.29 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 1SM: STM MH#1

Inflow Area = 59,707 sf, 90.43% Impervious, Inflow Depth = 0.76" for WQv event
Inflow = 1.61 cfs @ 11.91 hrs, Volume= 3,770 cf
Outflow = 1.61 cfs @ 11.91 hrs, Volume= 3,770 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 1.61 cfs @ 11.91 hrs, Volume= 3,770 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.60' @ 11.91 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.60'	**15.0" Round Culvert** L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.60' / 38.40' S= 0.0182 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	37.80'	**12.0" Round Culvert** L= 8.6' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.80' / 37.60' S= 0.0233 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=37.80' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)

Secondary OutFlow Max=1.57 cfs @ 11.91 hrs HW=38.58' (Free Discharge)
└**2=Culvert** (Inlet Controls 1.57 cfs @ 2.38 fps)

Summary for Pond 2P: DEPRESSION

Inflow Area = 123,770 sf, 50.98% Impervious, Inflow Depth = 0.41" for WQv event
Inflow = 1.61 cfs @ 11.92 hrs, Volume= 4,182 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 33.53' @ 37.40 hrs Surf.Area= 8,283 sf Storage= 4,182 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	33.00'	8,374 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
33.00	7,351	0	0
33.75	8,657	6,003	6,003
34.00	10,310	2,371	8,374

Device	Routing	Invert	Outlet Devices
#1	Primary	33.70'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=33.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond 2SM: STM MH#2

Inflow Area = 59,707 sf, 90.43% Impervious, Inflow Depth = 0.76" for WQv event
Inflow = 1.61 cfs @ 11.91 hrs, Volume= 3,770 cf
Outflow = 1.61 cfs @ 11.91 hrs, Volume= 3,770 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.61 cfs @ 11.91 hrs, Volume= 3,770 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.17' @ 11.91 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**18.0" Round Culvert** L= 92.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.50' / 37.00' S= 0.0054 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.57 cfs @ 11.91 hrs HW=38.16' (Free Discharge)
1=Culvert (Barrel Controls 1.57 cfs @ 3.10 fps)

Summary for Pond 3SM: STM MH#3

Inflow Area = 57,755 sf, 65.04% Impervious, Inflow Depth = 0.51" for WQv event
Inflow = 1.06 cfs @ 11.96 hrs, Volume= 2,453 cf
Outflow = 1.06 cfs @ 11.96 hrs, Volume= 2,453 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.06 cfs @ 11.96 hrs, Volume= 2,453 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 36.52' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	36.00'	**18.0" Round Culvert** L= 118.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.00' / 35.00' S= 0.0085 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.05 cfs @ 11.96 hrs HW=36.52' (Free Discharge)
1=Culvert (Inlet Controls 1.05 cfs @ 1.93 fps)

Summary for Pond 4SM: STM MH#4

Inflow Area = 37,210 sf, 58.57% Impervious, Inflow Depth = 0.48" for WQv event
Inflow = 0.40 cfs @ 11.93 hrs, Volume= 1,479 cf
Outflow = 0.40 cfs @ 11.93 hrs, Volume= 1,479 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 11.93 hrs, Volume= 1,479 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 37.83' @ 11.93 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**15.0" Round Culvert**
			L= 10.5' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 37.50' / 37.00' S= 0.0476 '/' Cc= 0.900
			n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.39 cfs @ 11.93 hrs HW=37.83' (Free Discharge)
1=Culvert (Inlet Controls 0.39 cfs @ 1.54 fps)

Summary for Pond 5SM: STM MH#5

Inflow Area = 27,556 sf, 77.92% Impervious, Inflow Depth = 0.63" for WQv event
Inflow = 0.62 cfs @ 11.94 hrs, Volume= 1,443 cf
Outflow = 0.62 cfs @ 11.94 hrs, Volume= 1,443 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Secondary = 0.62 cfs @ 11.94 hrs, Volume= 1,443 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.20' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	39.10'	**15.0" Round Culvert**
			L= 16.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 39.10' / 38.00' S= 0.0688 '/' Cc= 0.900
			n= 0.013, Flow Area= 1.23 sf
#2	Secondary	37.75'	**12.0" Round Culvert**
			L= 6.3' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 37.75' / 37.50' S= 0.0397 '/' Cc= 0.900
			n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=37.75' (Free Discharge)
1=Culvert (Controls 0.00 cfs)

Secondary OutFlow Max=0.60 cfs @ 11.94 hrs HW=38.19' (Free Discharge)
2=Culvert (Inlet Controls 0.60 cfs @ 1.79 fps)

Summary for Pond 6SM: STM MH#6

Inflow Area = 27,556 sf, 77.92% Impervious, Inflow Depth = 0.63" for WQv event
Inflow = 0.62 cfs @ 11.94 hrs, Volume= 1,443 cf
Outflow = 0.62 cfs @ 11.94 hrs, Volume= 1,443 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.62 cfs @ 11.94 hrs, Volume= 1,443 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 37.66' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.25'	**15.0" Round Culvert**

L= 86.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 37.25' / 36.50' S= 0.0087 '/' Cc= 0.900
n= 0.013, Flow Area= 1.23 sf

Primary OutFlow Max=0.60 cfs @ 11.94 hrs HW=37.66' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.60 cfs @ 1.72 fps)

Summary for Pond SP1:

Inflow Area = 8,698 sf,100.00% Impervious, Inflow Depth = 0.89" for WQv event
Inflow = 0.28 cfs @ 11.96 hrs, Volume= 644 cf
Outflow = 0.26 cfs @ 12.00 hrs, Volume= 644 cf, Atten= 8%, Lag= 2.2 min
Primary = 0.26 cfs @ 12.00 hrs, Volume= 644 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.32' @ 12.00 hrs Surf.Area= 528 sf Storage= 69 cf

Plug-Flow detention time= 15.5 min calculated for 644 cf (100% of inflow)
Center-of-Mass det. time= 15.6 min (797.0 - 781.5)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	778 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	158 cf	**SOIL (Prismatic)**Listed below (Recalc) 792 cf Overall x 20.0% Voids
#3	42.00'	211 cf	**STONE (Prismatic)**Listed below (Recalc) 528 cf Overall x 40.0% Voids
		1,147 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	310	0	0
45.00	528	210	210
46.00	608	568	778

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	528	0	0
44.50	528	792	792

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	528	0	0
43.00	528	528	528

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 39.75' S= 0.2250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.26 cfs @ 12.00 hrs HW=42.32' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.26 cfs @ 1.53 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP2:

Inflow Area = 9,375 sf,100.00% Impervious, Inflow Depth = 0.89" for WQv event
Inflow = 0.35 cfs @ 11.89 hrs, Volume= 694 cf
Outflow = 0.31 cfs @ 11.92 hrs, Volume= 694 cf, Atten= 13%, Lag= 1.6 min
Primary = 0.31 cfs @ 11.92 hrs, Volume= 694 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.36' @ 11.92 hrs Surf.Area= 525 sf Storage= 75 cf

Plug-Flow detention time= 15.0 min calculated for 694 cf (100% of inflow)
Center-of-Mass det. time= 15.1 min (791.0 - 775.9)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	991 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	158 cf	**SOIL (Prismatic)**Listed below (Recalc) 788 cf Overall x 20.0% Voids
#3	42.00'	210 cf	**STONE (Prismatic)**Listed below (Recalc) 525 cf Overall x 40.0% Voids
		1,359 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	273	0	0
45.00	525	200	200
46.00	1,058	792	991

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	525	0	0
44.50	525	788	788

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	525	0	0
43.00	525	525	525

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.30 cfs @ 11.92 hrs HW=42.35' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.30 cfs @ 1.59 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP3:

Inflow Area = 8,624 sf,100.00% Impervious, Inflow Depth = 0.89" for WQv event
Inflow = 0.33 cfs @ 11.89 hrs, Volume= 638 cf
Outflow = 0.29 cfs @ 11.91 hrs, Volume= 638 cf, Atten= 12%, Lag= 1.5 min
Primary = 0.29 cfs @ 11.91 hrs, Volume= 638 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.34' @ 11.91 hrs Surf.Area= 469 sf Storage= 64 cf

Plug-Flow detention time= 13.8 min calculated for 638 cf (100% of inflow)
Center-of-Mass det. time= 13.8 min (789.7 - 775.9)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	903 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	141 cf	**SOIL (Prismatic)**Listed below (Recalc) 704 cf Overall x 20.0% Voids
#3	42.00'	188 cf	**STONE (Prismatic)**Listed below (Recalc) 469 cf Overall x 40.0% Voids
		1,231 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	228	0	0
45.00	469	174	174
46.00	988	729	903

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	469	0	0
44.50	469	704	704

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	469	0	0
43.00	469	469	469

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.28 cfs @ 11.91 hrs HW=42.34' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.28 cfs @ 1.56 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP4:

Inflow Area = 8,624 sf,100.00% Impervious, Inflow Depth = 0.89" for WQv event
Inflow = 0.33 cfs @ 11.89 hrs, Volume= 638 cf
Outflow = 0.30 cfs @ 11.91 hrs, Volume= 638 cf, Atten= 9%, Lag= 1.1 min
Primary = 0.30 cfs @ 11.91 hrs, Volume= 638 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.35' @ 11.91 hrs Surf.Area= 339 sf Storage= 48 cf

Plug-Flow detention time= 9.9 min calculated for 638 cf (100% of inflow)
Center-of-Mass det. time= 10.0 min (785.9 - 775.9)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	633 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	102 cf	**SOIL (Prismatic)**Listed below (Recalc) 509 cf Overall x 20.0% Voids
#3	42.00'	136 cf	**STONE (Prismatic)**Listed below (Recalc) 339 cf Overall x 40.0% Voids
		870 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	200	0	0
45.00	339	135	135
46.00	657	498	633

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	339	0	0
44.50	339	509	509

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	339	0	0
43.00	339	339	339

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.29 cfs @ 11.91 hrs HW=42.35' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.29 cfs @ 1.58 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP5:

Inflow Area = 12,073 sf,100.00% Impervious, Inflow Depth = 0.89" for WQv event
Inflow = 0.46 cfs @ 11.89 hrs, Volume= 893 cf
Outflow = 0.38 cfs @ 11.92 hrs, Volume= 893 cf, Atten= 17%, Lag= 2.1 min
Primary = 0.38 cfs @ 11.92 hrs, Volume= 893 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.40' @ 11.92 hrs Surf.Area= 727 sf Storage= 117 cf

Plug-Flow detention time= 19.1 min calculated for 893 cf (100% of inflow)
Center-of-Mass det. time= 19.1 min (795.0 - 775.9)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	1,183 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	218 cf	**SOIL (Prismatic)**Listed below (Recalc) 1,091 cf Overall x 20.0% Voids
#3	42.00'	291 cf	**STONE (Prismatic)**Listed below (Recalc) 727 cf Overall x 40.0% Voids
		1,692 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	368	0	0
45.00	727	274	274
46.00	1,092	910	1,183

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	727	0	0
44.50	727	1,091	1,091

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	727	0	0
43.00	727	727	727

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.37 cfs @ 11.92 hrs HW=42.40' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.37 cfs @ 1.69 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond SP6:

Inflow Area = 12,073 sf,100.00% Impervious, Inflow Depth = 0.89" for WQv event
Inflow = 0.46 cfs @ 11.89 hrs, Volume= 893 cf
Outflow = 0.38 cfs @ 11.92 hrs, Volume= 893 cf, Atten= 16%, Lag= 2.0 min
Primary = 0.38 cfs @ 11.92 hrs, Volume= 893 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 42.41' @ 11.92 hrs Surf.Area= 700 sf Storage= 114 cf

Plug-Flow detention time= 18.8 min calculated for 893 cf (100% of inflow)
Center-of-Mass det. time= 18.9 min (794.7 - 775.9)

Volume	Invert	Avail.Storage	Storage Description
#1	44.50'	670 cf	**POND (Prismatic)**Listed below (Recalc)
#2	43.00'	210 cf	**SOIL (Prismatic)**Listed below (Recalc) 1,050 cf Overall x 20.0% Voids
#3	42.00'	280 cf	**STONE (Prismatic)**Listed below (Recalc) 700 cf Overall x 40.0% Voids
		1,160 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
44.50	161	0	0
45.00	622	196	196
45.50	1,274	474	670

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
43.00	700	0	0
44.50	700	1,050	1,050

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
42.00	700	0	0
43.00	700	700	700

Device	Routing	Invert	Outlet Devices
#1	Primary	42.00'	**8.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 42.00' / 40.15' S= 0.1850 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Primary	45.00'	**1.0" Horiz. Orifice/Grate X 65.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.37 cfs @ 11.92 hrs HW=42.40' (Free Discharge)
└**1=Culvert** (Inlet Controls 0.37 cfs @ 1.70 fps)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond W: LOW AREA

Inflow Area = 21,467 sf, 42.39% Impervious, Inflow Depth = 0.28" for WQv event
Inflow = 0.23 cfs @ 11.98 hrs, Volume= 500 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 46.52' @ 24.40 hrs Surf.Area= 1,647 sf Storage= 500 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	46.00'	5,811 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
46.00	265	0	0
48.00	5,546	5,811	5,811

Device	Routing	Invert	Outlet Devices
#1	Primary	47.50'	**30.0' long x 38.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=46.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond WQU#1: WQU#1

Inflow Area = 17,831 sf, 85.22% Impervious, Inflow Depth = 0.70" for WQv event
Inflow = 0.40 cfs @ 11.92 hrs, Volume= 1,047 cf
Outflow = 0.40 cfs @ 11.92 hrs, Volume= 1,047 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 11.92 hrs, Volume= 1,047 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.50' @ 11.92 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.15'	**12.0" Round Culvert** L= 11.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 38.15' / 37.80' S= 0.0318 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.39 cfs @ 11.92 hrs HW=38.50' (Free Discharge)
↑**1=Culvert** (Inlet Controls 0.39 cfs @ 1.59 fps)

Summary for Pond WQU#2: WQU#2

Inflow	=	1.61 cfs @	11.91 hrs, Volume=	3,770 cf
Outflow	=	1.61 cfs @	11.91 hrs, Volume=	3,770 cf, Atten= 0%, Lag= 0.0 min
Primary	=	1.61 cfs @	11.91 hrs, Volume=	3,770 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.44' @ 11.91 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.60'	**12.0" Round Culvert** L= 6.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 37.60' / 37.50' S= 0.0154 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.57 cfs @ 11.91 hrs HW=38.42' (Free Discharge)
↑**1=Culvert** (Barrel Controls 1.57 cfs @ 3.08 fps)

Summary for Pond WQU#3: WQU#3

Inflow	=	1.06 cfs @	11.96 hrs, Volume=	2,453 cf
Outflow	=	1.06 cfs @	11.96 hrs, Volume=	2,453 cf, Atten= 0%, Lag= 0.0 min
Primary	=	1.06 cfs @	11.96 hrs, Volume=	2,453 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 36.86' @ 11.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	36.25'	**12.0" Round Culvert** L= 10.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 36.25' / 36.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.05 cfs @ 11.96 hrs HW=36.86' (Free Discharge)
↑**1=Culvert** (Inlet Controls 1.05 cfs @ 2.10 fps)

Summary for Pond WQU#4: WQU#4

Inflow	=	0.40 cfs @	11.93 hrs, Volume=	1,479 cf
Outflow	=	0.40 cfs @	11.93 hrs, Volume=	1,479 cf, Atten= 0%, Lag= 0.0 min
Primary	=	0.40 cfs @	11.93 hrs, Volume=	1,479 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 38.36' @ 11.93 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	38.00'	**12.0" Round Culvert**

L= 7.0' CPP, projecting, no headwall, Ke= 0.900
Inlet / Outlet Invert= 38.00' / 37.75' S= 0.0357 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.39 cfs @ 11.93 hrs HW=38.35' (Free Discharge)
1=Culvert (Inlet Controls 0.39 cfs @ 1.59 fps)

Summary for Pond WQU#5: WQU#5

Inflow	=	0.62 cfs @	11.94 hrs, Volume=	1,443 cf
Outflow	=	0.62 cfs @	11.94 hrs, Volume=	1,443 cf, Atten= 0%, Lag= 0.0 min
Primary	=	0.62 cfs @	11.94 hrs, Volume=	1,443 cf

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs
Peak Elev= 37.95' @ 11.94 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	37.50'	**12.0" Round Culvert**
			L= 17.0' CPP, projecting, no headwall, Ke= 0.900
			Inlet / Outlet Invert= 37.50' / 37.25' S= 0.0147 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.60 cfs @ 11.94 hrs HW=37.94' (Free Discharge)
1=Culvert (Inlet Controls 0.60 cfs @ 1.79 fps)

Summary for Link OFF1:

Inflow Area =		536,757 sf, 35.35% Impervious,		Inflow Depth = 0.24" for WQv event
Inflow	=	3.34 cfs @	11.96 hrs, Volume=	10,823 cf
Primary	=	3.34 cfs @	11.96 hrs, Volume=	10,823 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-200.00 hrs, dt= 0.05 hrs

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Attachment C

First Defense High Capacity Design Data

900 Route 146, Clifton Park, New York 12065
phone (518) 371-7621
e-mail: info@edpllp.com

FIRST DEFENSE® HIGH CAPACITY DESIGN SUMMARY

PROJECT INFORMATION

Reference	WQU#1
Site	2ND Ave Troy
Designer	Nick Zeglen
Date	9/23/2021 2:19 PM

DESIGN INPUTS

Regulatory Agency	NYSDEC, NY
Water Quality Flow Rate (cfs)	0.4

DESIGN OUTPUTS

Product	3-ft DIAMETER FIRST DEFENSE HIGH CAPACITY
Unit Reference	FD-3HC

* Approved for use in NYSDEC, NY

UNIT WEIGHTS AND DIMENSIONS

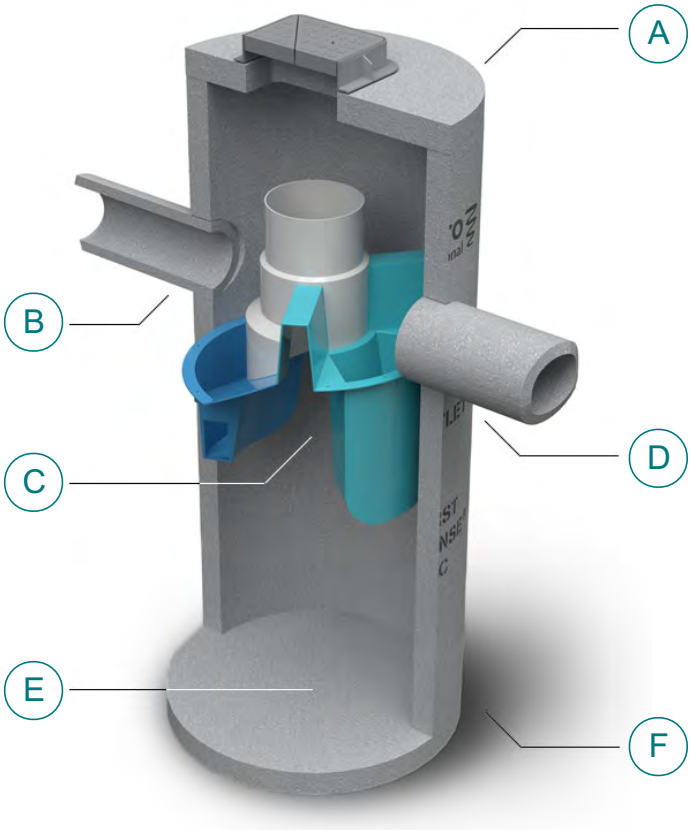
(A) Unit Size (ft)	3.00
(B) Inlet Pipe Size (in)	12
(D) Outlet Pipe Size (in)	12
(F) Unit Depth (ft)	6.24
Inlet Invert Height (ft)	38.15
Outlet Invert Height (ft)	38.15

PERFORMANCE AND HYDRAULICS

Max. Treatment Flow-Rate (cfs)	0.84
Hydraulic Capacity Flow-Rate (cfs)	4
Typical Operating Headloss (in)	
Maximum Headloss (in)	

STORAGE

(C) Oil Storage Capacity (gal)	125
(E) Min.Sediment Storage Capacity (yd^3)	0.4



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FIRST DEFENSE® HIGH CAPACITY DESIGN SUMMARY

Hydro International

PROJECT INFORMATION

Reference	WQU#2
Site	2ND Ave Troy
Designer	Nick Zeglen
Date	9/23/2021 3:05 PM

DESIGN INPUTS

Regulatory Agency	NYSDEC, NY
Water Quality Flow Rate (cfs)	1.34

DESIGN OUTPUTS

Product	4-ft DIAMETER FIRST DEFENSE HIGH CAPACITY
Unit Reference	FD-4HC

* Approved for use in NYSDEC, NY

UNIT WEIGHTS AND DIMENSIONS

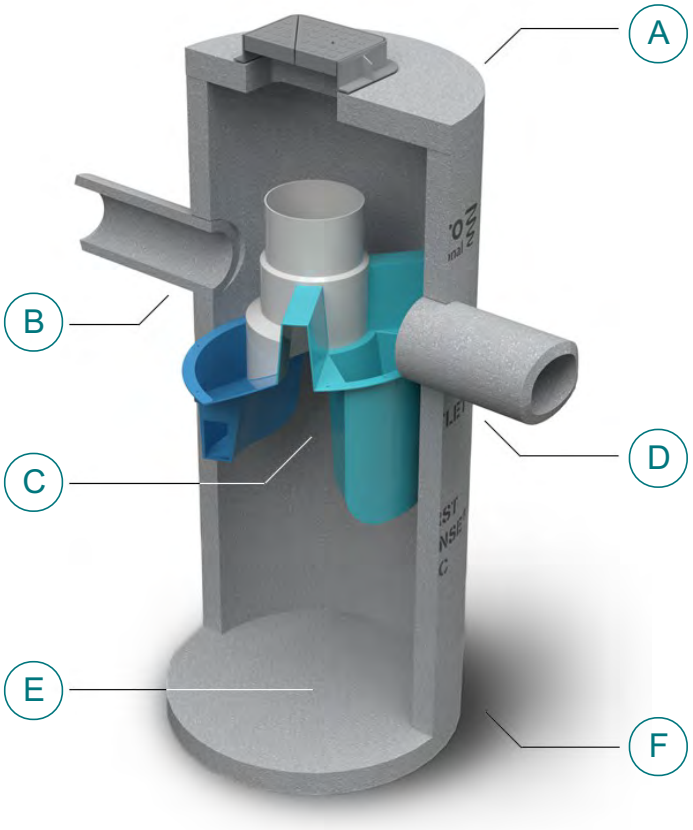
(A) Unit Size (ft)	4.00
(B) Inlet Pipe Size (in)	12
(D) Outlet Pipe Size (in)	12
(F) Unit Depth (ft)	8.00
Inlet Invert Height (ft)	37.60
Outlet Invert Height (ft)	37.60

PERFORMANCE AND HYDRAULICS

Max. Treatment Flow-Rate (cfs)	1.5
Hydraulic Capacity Flow-Rate (cfs)	15.5
Typical Operating Headloss (in)	
Maximum Headloss (in)	

STORAGE

(C) Oil Storage Capacity (gal)	191
(E) Min.Sediment Storage Capacity (yd³)	0.7



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FIRST DEFENSE® HIGH CAPACITY DESIGN SUMMARY

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PROJECT INFORMATION

Reference	WQU#3
Site	2ND Ave Troy
Designer	Nick Zeglen
Date	9/23/2021 3:27 PM

DESIGN INPUTS

Regulatory Agency	NYSDEC, NY
Water Quality Flow Rate (cfs)	1

DESIGN OUTPUTS

Product	4-ft DIAMETER FIRST DEFENSE HIGH CAPACITY
Unit Reference	FD-4HC

* Approved for use in NYSDEC, NY

UNIT WEIGHTS AND DIMENSIONS

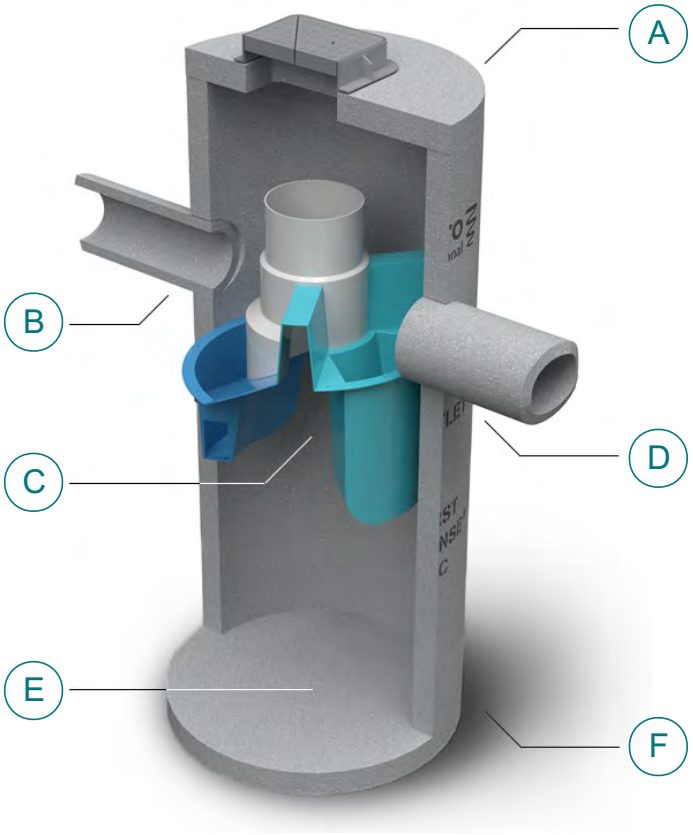
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(B) Inlet Pipe Size (in)	12
(D) Outlet Pipe Size (in)	12
(F) Unit Depth (ft)	8.00
Inlet Invert Height (ft)	4.97
Outlet Invert Height (ft)	36.25

PERFORMANCE AND HYDRAULICS

Max. Treatment Flow-Rate (cfs)	1.5
Hydraulic Capacity Flow-Rate (cfs)	10.34
Typical Operating Headloss (in)	
Maximum Headloss (in)	

STORAGE

(C) Oil Storage Capacity (gal)	191
(E) Min.Sediment Storage Capacity (yd^3)	0.7



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FIRST DEFENSE® HIGH CAPACITY DESIGN SUMMARY

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PROJECT INFORMATION

Reference	WQU#4
Site	2ND Ave Troy
Designer	Nick Zeglen
Date	9/23/2021 4:31 PM

DESIGN INPUTS

Regulatory Agency	NYSDEC, NY
Water Quality Flow Rate (cfs)	0.4

DESIGN OUTPUTS

Product	3-ft DIAMETER FIRST DEFENSE HIGH CAPACITY
Unit Reference	FD-3HC

* Approved for use in NYSDEC, NY

UNIT WEIGHTS AND DIMENSIONS

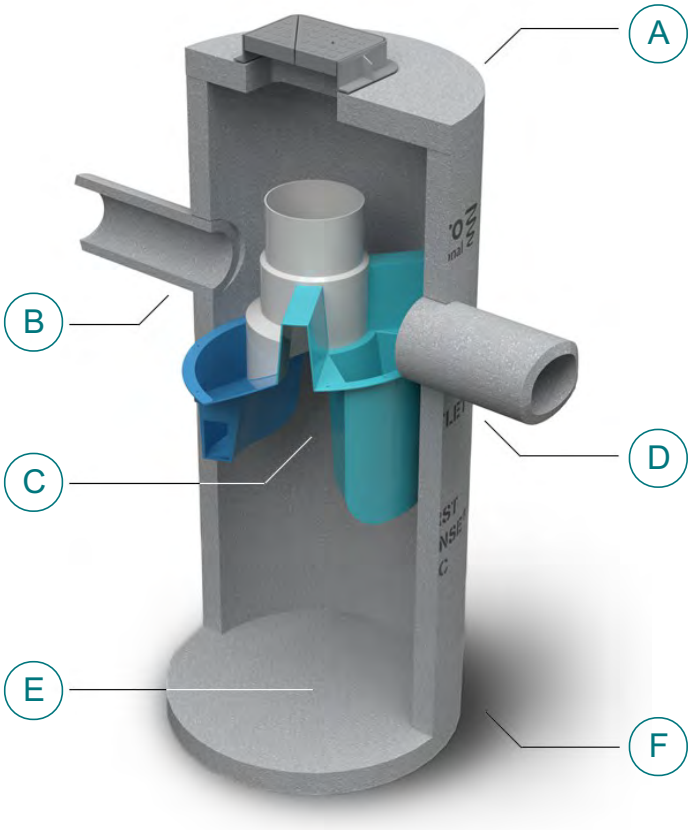
(A) Unit Size (ft)	3.00
(B) Inlet Pipe Size (in)	12
(D) Outlet Pipe Size (in)	12
(F) Unit Depth (ft)	6.24
Inlet Invert Height (ft)	3.71
Outlet Invert Height (ft)	38.00

PERFORMANCE AND HYDRAULICS

Max. Treatment Flow-Rate (cfs)	0.84
Hydraulic Capacity Flow-Rate (cfs)	3.5
Typical Operating Headloss (in)	
Maximum Headloss (in)	

STORAGE

(C) Oil Storage Capacity (gal)	125
(E) Min.Sediment Storage Capacity (yd^3)	0.4



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FIRST DEFENSE® HIGH CAPACITY DESIGN SUMMARY

Hydro International

PROJECT INFORMATION

Reference	WQU#5
Site	2ND Ave Troy
Designer	Nick Zeglen
Date	9/23/2021 5:33 PM

DESIGN INPUTS

Regulatory Agency	NYSDEC, NY
Water Quality Flow Rate (cfs)	0.62

DESIGN OUTPUTS

Product	3-ft DIAMETER FIRST DEFENSE HIGH CAPACITY
Unit Reference	FD-3HC

* Approved for use in NYSDEC, NY

UNIT WEIGHTS AND DIMENSIONS

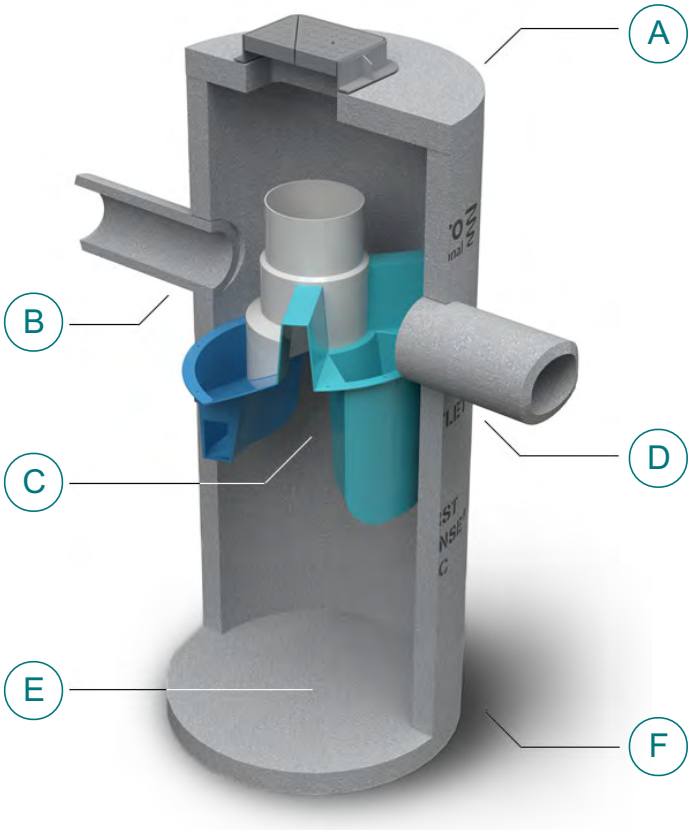
(A) Unit Size (ft)	3.00
(B) Inlet Pipe Size (in)	12
(D) Outlet Pipe Size (in)	12
(F) Unit Depth (ft)	6.24
Inlet Invert Height (ft)	3.71
Outlet Invert Height (ft)	37.50

PERFORMANCE AND HYDRAULICS

Max. Treatment Flow-Rate (cfs)	0.84
Hydraulic Capacity Flow-Rate (cfs)	5
Typical Operating Headloss (in)	
Maximum Headloss (in)	

STORAGE

(C) Oil Storage Capacity (gal)	125
(E) Min.Sediment Storage Capacity (yd^3)	0.4



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STORMWATER POLLUTION PREVENTION PLAN for CONSTRUCTION ACTIVITIES at

2nd AVENUE MULTI-FAMILY RESDIENCES CITY OF TROY, NY

Prepared for

KEVIN VANDENBURGH

Prepared by
The Environmental Design Partnership, LLP
900 Route 146
Clifton Park, NY 12065
Telephone: (518) 371-7621

SEPTEMBER 2021

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SECTION 1

Written Stormwater Pollution Prevention Plan

I. SCOPE

A. **PURPOSE:** KEVIN VANDENBURGH intends to implement the appropriate Stormwater Pollution Prevention Plan measures in accordance with the SPDES general permit governing stormwater discharges during construction, and in accordance with erosion control practices. This section provides a descriptive explanation of the means by which KEVIN VENADENBURGH will comply with the National Stormwater Pollution Prevention Program.

B. **NPDES GENERAL PERMITS FOR STORMWATER DISCHARGE FROM CONSTRUCTION SITES:** Regulations promulgated by the New York State Department of Environmental Conservation (NYSDEC) regulate the discharge of storm water from construction activities on sites where one (1) or more acres of soil is disturbed. One of the ways to comply with these regulations for affected sites is to request coverage under the General Permit for Construction Activities. (Copy enclosed herewith) In order to be authorized to discharge under the General Permit, a Stormwater Pollution Prevention Plan (SWPPP) for the site must be prepared in accordance with all applicable requirements of this permit and followed during the construction activities. If the construction activity is **not** subject to the requirements of a regulated, traditional land use control MS4 a Notice of Intent (NOI) form must be completed and received by the New York State Department of Environmental Conservation at least 5-days prior to any earth-disturbing activities. If the construction activity is subject to the requirements of a regulated, traditional land use control MS4, then the owner/operator must have its SWPPP reviewed and accepted by the MS4 prior to submitting the NOI to the Department. The owner/operator shall have the "MS4 SWPPP Acceptance" form signed and then submit that form along with the NOI to the Department.

C. **RESPONSIBILITIES OF CONTRACTOR REGARDING THE GENERAL PERMIT:** The CONTRACTOR shall manage the discharge of stormwater from the site in accordance with the SPDES General Permit for Construction Activities conditions and the following provisions of this section of the specifications. The CONTRACTOR shall be responsible for conducting the stormwater management practices in accordance with the permit. The CONTRACTOR shall be responsible for providing qualified inspectors to conduct the inspections required by the SWPPP. The CONTRACTOR shall be responsible for any enforcement action taken or imposed by federal, state, or local agencies, including the cost of fines, construction delays, and remedial actions resulting from the CONTRACTOR'S failure to comply with the permit provisions. It shall be the responsibility of the CONTRACTOR to make any changes to the SWPPP necessary when the CONTRACTOR or any of his subcontractors elects to use borrow or fill or material storage sites, either contiguous to or remote from the construction site, when such sites are used solely for this construction site. Such sites are considered to be part of the construction site covered by the permit and this SWPPP. Off-site borrow, fill, or material storage sites which are used for multiple construction projects are not subject to this requirement, unless specifically required by state or local jurisdictional entity regulations. The CONTRACTOR should consider this requirement in negotiating with earthwork subcontractors, since the choice of an off-site borrow, fill, or material storage site may impact their duty to implement, make changes to, and perform inspections required by the SWPPP for the site.

D. **NOTICE OF INTENT:** The NOI Permittee petitions the New York State Department of Environmental Conservation for the stormwater discharges during construction at this site to be covered by the SPDES General Permit for Construction Activity for the State of New York. A Notice of Intent (NOI) (using the form required by the NYSDEC) to be covered under this permit is hereby filed. An Erosion and Sediment Control Plan has been prepared and is attached herewith.

E. **CONTRACTOR RESPONSIBILITIES**: The SWPPP and associated Erosion and Sediment Control Plans represent the **MINIMUM** erosion and sediment control measures that will be required to protect the site during construction. KEVIN VANDENBURGH and the CONTRACTOR understand that additional erosion and sediment control measures will be necessary during construction. It will be the responsibility of the CONTRACTOR to implement additional erosion and sediment control measures as necessary to protect the site

during construction. KEVIN VANDENBURGH and the CONTRACTOR shall designate a Project Manager prior to commencing construction. The Project Manager will ensure that all construction managers and sub-contractors are appropriately assigned and understand the importance of the following topics:

- Erosion and Sedimentation Control for Water Quality Protection
- Implementation of the Erosion and Sedimentation Control Plan
- The Importance to Proper Installation of Erosion and Sedimentation Control Measures
- Regular Inspection by qualified personnel of Erosion and Sedimentation Control Measures
- Diligent Maintenance of Erosion and Sedimentation Control Measures
- Contemporaneous preparation of accurate and complete records regarding inspection and maintenance of Erosion and Sedimentation Control Measures
- Record Keeping for Inspections and Maintenance activities

F. **REQUIREMENTS FOR THE CONTRACTOR AND SUBCONTRACTOR(S):** The *SWPPP Ledger* shall provide a "Contractor's Certification Log" **(Form 2)**, identifying the Company Name, Business Address and Telephone Number along with the Responsible Person for the CONTRACTOR and all subcontractors' who will implement the measures identified in the SWPPP. Each of the entities identified on **Form 2** shall sign a "Contractor's Certification" **(Form 3)**, verifying they have been instructed and fully understand the requirements of the New York State Department of Environmental Conservation and SWPPP. **This certification must be signed, by a fully qualified individual on behalf of each entity, prior to the beginning of any construction activities and shall be filed in the project's *SWPPP* Ledger.**

Additionally, the "Trained Contractor" must be identified on Form 3 and his/her credentials should be kept on-site in the SWPPP ledger.

G. **STORMWATER POLLUTION PREVENTION PROGRAM LOCATION REQUIREMENTS:** The *SWPPP Ledger* is meant to be a working document that shall be maintained at the site of the Construction Activities at all times throughout the project, shall be readily available upon request by the NOI Permittee's personnel or New York State Department of Environmental Conservation or any other agency with regulatory authority over stormwater issues, and shall be kept on-site until the site complies with the Final Stabilization section of this document. Refer to Part VII., F., Duty to Provide Information, of the General Permit for additional public viewing requirements.

H. **SWPPP LEDGER:** The SWPPP Ledger shall be a 3-ring Binder, tabbed and indexed for the following sections:

SECTION 1:
- **Written SWPPP**

SECTION 2:
- **Site Map and General Location Map**
- **Erosion and Sediment Control Plan(s)**

SECTION 3:
- **New York State Notice of Intent**
- **New York State NOI Acknowledgement Letter**
- **New York State MS4 SWPPP Acceptance Form**

SECTION 4:

- **New York State SPDES General Permit**

SECTION 5:

- **NOI Permittee's Certification (Form 1)**
- **Contractor's/Subcontractor's Certification Log (Form 2)**
- **Contractor's Certification for each contractor listed on Form 2 (Form 3)**
- **Inspection Report (Form 4)**
- **Modification Report (Form 5)**
- **Record of Stabilization and Construction Activities Report (Form 6)**
- **Record of Temporary Erosion and Sediment Control Practices (Form 6A)**
- **Project Rainfall Log (Form 7)**
- **Final Stabilization/Termination Checklist (Form 8)**

SECTION 6:

- **Supplemental Information**
  – Stormwater Management Design Narrative

SECTION 7:

- **Completed Inspection Forms**

The Project Manager must review and evaluate for compliance the *SWPPP Ledger* at each Project Review meeting. All Inspection and Maintenance Forms (*Forms 4 - 7*) will be initialed by the Project Manager at each reporting interval.

I. **INSPECTIONS AND RECORD KEEPING:** Inspections are required at least weekly by a "Qualified Inspector". Sites that have a waiver to disturb greater than five (5) acres require two (2) inspections every seven (7) days with at least two (2) days between inspections. Inspections shall continue until the site complies with the "Final Stabilization" section of this document and a Notice of Termination (NOT) has been filed with the NYSDEC. Each inspection must be followed up by a report documenting the inspector's findings and request the required maintenance and/or repair for the erosion and sedimentation control measures. The inspector shall notify the Project Manager within one day of the inspection of any deficiencies. Within one day of this notification the Project Manager must commence with corrective measures. It is imperative that the Project Manager documents the Inspection and Maintenance of all erosion and sedimentation control measures as soon as possible after the inspection and/or maintenance is completed. These records are used to prove that the required inspection and maintenance were performed and shall be placed in the *SWPPP Ledger*. In addition to inspection and maintenance reports, records should be kept of the Construction Activities that occur on the site. The Project Sponsor shall retain copies of the SWPPP, all reports and data for a minimum of five (5) years after the project is complete. The following list identifies the **required** Inspection and Maintenance documentation that must be maintained by the Project Manager under this SWPPP.

- **Form 4 Inspection Report for SWPPP**
- **Form 5 Requested Changes to the SWPPP (Modification Report)**
- **Form 6 Record of Stabilization and Construction Activities**
- **Form 6A Record of Temporary Erosion and Sediment Control Practices**
- **Form 7 Project Rainfall Log**

J. **SWPPP MODIFICATIONS:** The inspection report should also identify if any revisions to the SWPPP are warranted due to unexpected conditions. The SWPPP is meant to be a dynamic working guide that is to be kept current and amended whenever the design, construction, operation, or maintenance of the site changes in a way which significantly affects the potential for the discharge of pollutants or when the plan proves to be ineffective in eliminating or significantly minimizing pollutant discharges. Any such changes to the SWPPP must be made in writing on the Modification Report Form **(Form 5)** within 7 days of the date such modification or amendment is made. The CONTRACTOR'S failure to monitor or report deficiencies to the NOI Permittee will

result in the CONTRACTOR being liable for fines and construction delays resulting from any federal, state, or local agency enforcement action.

K. **FINAL STABILIZATION AND TERMINATION OF PERMIT COVERAGE:** The site will be considered finally stabilized when all soil disturbing activities have been completed and a uniform perennial vegetative cover for the unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures have been established and the development area no longer discharges stormwater associated with construction activities and a Notice of Termination (NOT) form filed by the NOI Permittee with the New York State Department of Environmental Conservation. This filing terminates coverage under the General Permit and terminates the CONTRACTOR'S responsibility to implement the SWPPP. Requirements of the SWPPP, including periodic inspections, must be continued until the NOT is filed.

II. SITE DESCRIPTION

A. PROJECT NAME AND LOCATION

The 2ND AVENUE MULTI-FAMILY RESIDENCE project site is geographically situated at Latitude N 42° 47' 36", Longitude W 73° 40' 14" in the CITY of TROY, RENSSELAER COUNTY, NEW YORK. The site is located on the west side of 2nd Avenue, south of the intersection with LANSING AVENUE and 2ND AVENUE. The project site is comprised of 11 +/- acres of land. The overall disturbance area is 7.65 acres. The project is bounded on the west by the Hudson River, east by 2nd Avenue, north and south by PRIVATE PROPERTY. Access to the project will be from 2nd Avenue. The entire parcel will remain privately owned and maintained. Approximately 3.85 acres of impervious surfaces, including travel surfaces and buildings will be constructed. Reclamation of disturbed areas will be conducted on an ongoing basis as construction progresses.

B. NOI PERMITTEE'S NAME AND ADDRESS

KEVING VANDENBURGH
430 9TH Avenue
Troy, NY 12182

C. PROJECT DESCRIPTION

This project will involve the construction of a Residential Planned Development District (PDD), consisting of 231 apartments. The entrance roads will be from 2nd Avenue, as approved by the City of Troy. Also included, as permanent elements of the development are connections to municipal sewer and water service and on-site stormwater management. The estimated time for completion of the construction project is approximately one (1) year. Soil disturbing activities will include:

1. Construction of stabilized construction access points
2. Clearing and grubbing
3. Installation of storm sewer pipes and inlets
4. Construction of sediment basins and stormwater detention ponds
5. Construction of utilities on site
6. Construction of curbs, roadways, and residential buildings and travel surfaces
7. Construction of landscaped areas
8. Final grading

D. RUNOFF COEFFICIENT, SOILS, AND RAINFALL INFORMATION

The predevelopment Curve Number (CN) for green areas was determined to be 80. Soils within the project area consist of NrD soils which are defined as somewhat excessive drained soils with bedrock at depths generally less than 3 feet below grade. The soil group falls in the hydrologic soil group D, as described by the Soil Conservation Service. The post development CN for disturbed green areas is 80 and the weighted CN for the post-development contributing area of the closed drainage system is 81. A CN of 98 was used for all post-development impervious surface areas. A detailed description of the soil and groundwater conditions is presented in the Stormwater Management Report, included in Section 6: Supplemental Information of the SWPPP.

The site is in Rensselaer County, which receives an average of 36 to 44 inches of rainfall annually with the highest amounts of rainfall received in the months of May and June.

E. NAME OF RECEIVING WATERS

Drainage will be directed via on-site stormwater catch basins and pipes through a series of stormwater management areas (stormwater ponds) with emergency overflow swales directed to existing drainage corridor to the west (described in the Stormwater Management Report). The drainage corridor is connected to the Hudson River. A detailed description of the overall drainage area is presented in the Stormwater Management Report, included in Section 6: Supplemental Information of the SWPPP.

F. INDIAN COUNTRY LANDS

The site had extensive archeological investigation completed and was generally used a quarry by Native Americans to shape tools given the easily broken shale exposed and near the surface. Portions of the site that will be disturbed within archeological defined areas will have undergo a Phase III data recovery by qualified archeologists,

G. ENDANGERED OR THREATENED SPECIES

A review of the New York State Department of Environmental Conservation's (NYSDEC) Environmental Resource Mapper (http://www.dec.ny.gov/imsmaps/ERM/viewer.htm) indicated rare plants, rare animals or significant natural communities are located on-site. A letter has been directed to NYSDEC New York Natural Heritage Program requesting they provide us with a determination as to whether the proposed activity is likely to result in the take or taking of any species listed as endangered or threatened in 6 NYCRR Part 182.

H. HISTORIC PLACES

A review of the New York State Historic Preservation Office (OPRHP) Geographic Information System Mapper (http://www.oprhp.state.ny.us/nr/main.asp) indicated that the site is located in an archeologically sensitive area. An archeological consulting firm is engaged by the applicant to address the archeological investigations and subsequent Phase II data recovery efforts on the project site in accordance with SHPO requirements.

III. CONTROLS

A. EROSION AND SEDIMENT CONTROLS

The following section describes the anticipated Erosion and Sediment Controls required for use during construction of the proposed site. These controls represent the **MINIMUM** erosion and sediment control measures that will be required to protect the site during construction. **Additional erosion and sediment control measures will be necessary during construction.** It will be the responsibility of the NOI permittee to

authorize the CONTRACTOR to implement all additional erosion and sediment control measures necessary to protect the site during construction.

1. Stabilization practices include (but not limited to):
   a) Land clearing activities shall be done only in areas where earthwork will be performed and shall progress as earthwork is needed
   b) Frequent watering of excavation and fill areas to minimize wind erosion during construction.
   c) Use of stabilization fabric for all slopes having a slope of 1V:3H or greater.
   d) Seeding and planting of all unpaved areas
      - Temporary seedings should be made within 24 hours of construction or disturbance. If not, the soil must be scarified prior to seeding.
      - Broadcasting or hydroseeding may be used as seeding methods.
      - Seeding mixtures should be as follows
        a) Ryegrass (annual or perennial) applied at 30 lbs. per acre (0.7 lbs./1000 sq. ft.)
        b) Certified "Aroostook" winter rye (cereal rye) applied at 100 lbs. per acre (2.5 lbs./1000 sq. ft.) *Winter rye shall be used if seeding in October/November.
   e) Topsoiling
      - Scarify all compact, slowly permeable, medium and fine textured subsoil areas. Scarify at approximately right angles to the slope direction in soil areas that are steeper than 5 percent.
      - Remove refuse, woody plant parts, stones over 3 inches in diameter, and other liter.
      - Topsoil material shall have at least 2 percent by weight of fine textured stable organic material, and no greater than 6 percent.
      - Topsoil shall have no less than 20 percent fine textured material (passing the No. 200 sieve) and not more than 15 percent clay.
      - Topsoil shall not be placed when it is partly frozen, muddy, or on frozen slopes or over ice, snow, or standing water.
   f) Mulching
      - For grass / legume establishment apply straw mulch applied at 2 ton/acre (90 lbs./1000 sq. ft.) and anchor with wood fiber mulch (hydromulch) at 500-750 lbs./acre (11 – 17 lbs./1000 sq. ft.)
   g) Protecting Vegetation During Construction
      - Limit soil placement over existing tree and shrub roots to a maximum of 3 inches.
      - Use retaining walls and terraces to protect roots of trees and shrubs when grades are lowered. Lowered grades should start no closer than the dripline of the tree.
      - Avoid trenching within the dripline of the tree.
      - Construction limits should be identified and clearly marked to exclude equipment.

2. Structural practices include (but not limited to):

   a) Inlet protection and outlet protection using silt fences
      - See detail on Erosion and Sediment Control Plans
   b) Perimeter protection using silt fences
   c) Sediment basin(s)
   d) Stabilized construction exit points
      - Aggregate size shall be 2 inch stone or reclaimed / recycled concrete equivalent
      - Thickness shall be not less than 6 inches
      - Width to be the full width of the access point, but not less than 12 ft
      - Length shall be as required, but not less than 50 ft.
      - Filter cloth shall be applied over the entire area to be covered with aggregate
      - The entrance shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way.

e) Storm sewer, curbs and gutters
f) Stormwater detention ponds (which may also serve as a temporary sediment basin)
g) Water Bar
   - Used where runoff protection is needed to prevent erosion on access roads or other narrow slopping areas (generally less than 100 ft in width).
   - Water bars shall cross at approximately 60 degrees with stable outlets.
   - Constructed with a minimum height of 18 inches from the channel bottom to the ridge top.
   - Horizontal spacing shall be 125 ft for slopes less than 5 percent, 100 ft for slopes between 5 and 10 percent, 75 ft for slopes between 10 and 20 percent, and 50 ft for slopes between 20 and 35 percent.
h) Straw Bale Dike
   - Straw bale dikes have an estimated design life of three months.
   - Shall only be used where no other practice is feasible
i) Stone Check Dam
   - Use graded stone 2 to 15 inches in size
   - Sediment accumulated behind the check dam shall be removed as needed to allow drainage through the check dam and prevent large flows from carrying sediment over the dam.

3. Sequence of Major Activities

The CONTRACTOR will be responsible for implementing erosion and sediment control measures outlined in the SWPPP and any additional erosion and sediment control measures required to stabilize the site. The CONTRACTOR may designate these tasks to certain subcontractors as appropriate, but the ultimate responsibility for implementing these controls and ensuring their proper functioning remains with the CONTRACTOR. The order of activities will be as follows (refer to Stormwater Pollution Prevention Plan Sheet contained in this SWPPP for additional details):

a) Construct temporary construction exits at locations shown on the SWPPP plan sheet.

b) Install perimeter silt fences and stormwater ponds. Stormwater ponds are to be used as temporary sediment basins during construction.

c) Begin clearing and grubbing operations. Clearing and grubbing shall be done only in areas where earthwork will be performed and only in areas where building is planned to commence within 7 days after clearing and grubbing. Clearing and grubbing operations shall be limited so that no more than 5 acres of disturbed soil exists at any one time without prior written approval from the NYS DEC.

d) Frequent watering of the excavation and fill areas shall be done to minimize wind erosion.

e) Commence site grading and new building construction.

f) Disturbed areas of the site where construction activity has ceased for more than 7 days should be temporarily seeded and watered.

g) Install protective silt fences at all grate inlets, curb inlets, and at the ends of all exposed storm sewer pipes.

h) Finalize pavement subgrade preparation.

i) Construct all curb and gutter, gutter inlets, area inlets, and storm sewer manholes, as shown on the plans. Place required riprap at locations shown on the plans.

j) Remove silt fences around inlets and manholes no more than 48 hours prior to placing stabilized base course.

k) Install base material as required for pavement.

l) Carry out final grading and seeding and planting, including stormwater management basins.

m) Remove silt fencing only after all paving is complete and exposed surfaces are stabilized.

n) Remove temporary construction exits only prior to pavement construction in these areas (These areas are to be paved last).

4. Stormwater Management

The proposed stormwater management system was designed by The Environmental Design Partnership, Clifton Park, NY. The following paragraphs summarize the stormwater management measures to be incorporated on the site to control pollutants in stormwater discharges after construction is completed. A copy of the Stormwater Management Report is enclosed under Section 6 – Supplemental Information.

The project stormwater design consists of stormwater planters and vegetated swales to provide green infrastructure, and five hydrodynamic vortrax separators, First Defense by Hydro International. The stormwater devices provide pretreatment of the water quality volume prior to discharge into the Hudson River.

5. Post-Construction Maintenance of the Stormwater Management System

Post construction maintenance and protection of the Stormwater Management System shall be performed in accordance with Section VI. LONG TERM OPERATION AND MAINTENANCE PROCEDURES of the SWPPP.

B. OTHER CONTROLS

1. Waste Disposal

All waste materials will be collected and stored in a securely lidded metal dumpster rented from a local waste management company which must be a solid waste management company licensed to do business in New York State. The dumpster will comply with all local and state solid waste management regulations.

All trash and construction debris from the site will be deposited in the dumpster. The dumpster will be emptied as often as necessary, and the trash will be hauled to a landfill approved by New York State and the local government authority. No construction waste materials will be buried on site. All personnel will be instructed regarding the correct procedures for waste disposal. Notices stating these practices will be posted in the job site construction office trailer, and the job site superintendent will be responsible for seeing that these procedures are followed.

2. Sanitary Waste

All sanitary waste will be collected from the portable units a minimum of two times per week by a licensed portable facility provider in complete compliance with local and state regulations.

3. Off-Site Vehicle Tracking

A stabilized construction exit will be provided to help reduce vehicle tracking of sediments. The paved streets adjacent to the site entrance will be inspected daily and swept as necessary to remove any excess mud, dirt, or rock tracked from the site. Dump trucks hauling material from the construction site will be covered with a tarpaulin. The job site superintendent will be responsible for seeing that these procedures are followed.

4. Concrete Waste From Concrete Trucks

a) Emptying of excess concrete and/or washout from concrete delivery trucks will be allowed on the job site, but only in either (1) specifically designated diked areas which have been prepared to prevent contact between the concrete and/or washout and stormwater which will be discharged from the site or (2) in locations where waste concrete can be poured into forms to make riprap or other useful concrete products.

b) The hardened residue from the concrete washout diked areas will be disposed of in accordance with the procedures given in the Spill Prevention Control and Countermeasures (SPCC) Plan and in accordance with applicable state and federal regulations. The job site superintendent will be responsible for seeing that these procedures are followed.

5. Hazardous Substances and Hazardous Waste

a) All hazardous waste materials will be disposed of by the CONTRACTOR in the manner specified by local, state, and/or federal regulations and by the manufacturer of such products. Site personnel will be instructed in these practices by the job site superintendent, who will also be responsible for seeing that these practices are followed. Material Safety Data Sheets (MSDS's) for each substance with hazardous properties that is used on the job site will be obtained and used for the proper management of potential wastes that may result from these products. An MSDS will be posted in the immediate area where such product is stored and/or used and another copy of each MSDS will be maintained in the SWPPP file at the job site construction trailer office. Each employee who must handle a substance with hazardous properties will be instructed on the use of MSDS sheets and the specific information in the applicable MSDS for the product he/she is using, particularly regarding spill control techniques.

b) The CONTRACTOR will implement the Spill Prevention Control and Countermeasures (SPCC) Plan found within this SWPPP and will train all personnel in the proper cleanup and handling of spilled materials. No spilled hazardous materials or hazardous wastes will be allowed to come in contact with stormwater discharges. If such contact occurs, the stormwater discharge will be contained on site until appropriate measures in compliance with state and federal regulations are taken to dispose of such contaminated stormwater. It shall be the responsibility of the job site superintendent to properly train all personnel in the use of the SPCC plan.

c) Any spills of hazardous materials which are in quantities in excess of Reportable Quantities as defined by EPA regulations shall be immediately reported to the EPA National Response Center 1-800-424-8802.

d) In order to minimize the potential for a spill of hazardous materials to come into contact with stormwater, the following steps will be implemented:

- All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, cleaning solvents, additives for soil stabilization, concrete curing compounds and additives, etc.) will be stored in a secure location, under cover, when not in use. All such materials shall have secondary containment to prevent contamination of soil and runoff.

- The minimum practical quantity of all such materials will be kept on the job site.

- A spill control and containment kit (containing, for example, absorbent such as kitty litter or sawdust, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided at the storage site.

- All of the product in a container will be used before the container is disposed of. All such containers will be triple-rinsed with water prior to disposal. The rinse water used in these containers will be disposed of in a manner in compliance with state and federal regulations and will not be allowed to mix with stormwater discharges.

- All products will be stored in and used from the original container with the original product label.

- All products will be used in strict compliance with instructions on the product label.

- The disposal of excess or used products will be in strict compliance with instructions on the product label.

6. Contaminated Soils

a) Any contaminated soils (resulting from spills of materials with hazardous properties) which may result from construction activities will be contained and cleaned up immediately in accordance with the procedures given in the Spill Prevention Control and Countermeasures (SPCC) Plan and in accordance with applicable state and federal regulations.

b) The job site superintendent will be responsible for seeing that these procedures are followed.

IV. COMPLIANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS

A. The CONTRACTOR will obtain copies of any and all local and state regulations that are applicable to stormwater management, erosion control, and pollution minimization at this job site and will comply fully with such regulations. The CONTRACTOR will submit written evidence of such compliance if requested by any agent of a regulatory body. The CONTRACTOR will comply with all conditions of the New York State Department of Environmental Conservation SPDES General Permit for Construction Activities, including the conditions related to maintaining the SWPPP and evidence of compliance with the SWPPP at the job site and allowing regulatory personnel access to the job site and to records in order to determine compliance.

V. MAINTENANCE/INSPECTION PROCEDURES DURING CONSTRUCTION

A. Erosion and Sediment Control and Stabilization Measures Maintenance and Inspection Practices

1. The following is a list of erosion and sediment controls to be used on this site during construction practice.

a) Stabilization practices for this site include:
- Land clearing activities shall be done only in areas where earthwork will be performed and shall progress as earthwork is needed
- Frequent watering of excavation and fill areas to minimize wind erosion during construction.
- Use of stabilization fabric for all slopes having a slope of 1V:3H or greater.
- Permanent seeding and planting of all unpaved areas using the hydromulching grass seeding technique.

b) Structural practices for this site include:
- Perimeter protection using silt fences
- Inlet protection and outlet protection using silt fences
- Storm sewer, curbs and gutters
- Stabilized construction exit points
- Stormwater detention ponds (which may also serve as a temporary sediment basin)

2. The following inspection and maintenance practices will be used to maintain erosion and sediment controls and stabilization measures.

    a) All control measures will be inspected once every seven (7) days at a minimum. Sites that have a waiver to disturb greater than five (5) acres require two (2) inspections every seven (7) days with at least two (2) days between inspections.
    b) All measures will be maintained in good working order; if repairs are found to be necessary, they will be initiated within 24 hours of report.
    c) Built up sediment will be removed from silt fence when it has reached one-third the height of the fence.
    d) Silt fences will be inspected for depth of sediment, tears, etc., to see if the fabric is securely attached to the fence posts, and to see that the fence posts are securely in the ground.
    e) The sediment basins will be inspected for depth of sediment and built up sediment will be removed when it reaches 50 percent of the capacity.
    f) Temporary and permanent seeding and all other stabilization measures will be inspected for bare spots, washouts, and healthy growth.
    g) A maintenance inspection report will be made after each inspection. Copies of the report forms to be completed by the inspector are included in this SWPPP.
    h) The job site superintendent will be responsible for selecting and training the individuals who will be responsible for these inspections, maintenance and repair activities, and filling out inspection and maintenance reports.
    i) Personnel selected for the inspection and maintenance responsibilities will receive appropriate instruction from the job site superintendent. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls that are used onsite in good working order. They will also be trained in the completion of, initiation of actions required by, and the filing of the inspection forms. Documentation of this personnel training will be kept on site with the SWPPP.
    j) Disturbed areas and material storage areas will be inspected for evidence of or potential for pollutants entering stormwater systems.
    k) Report to the NYS Department of Environmental Conservation within 24 hours any noncompliance with the SWPPP that will endanger public health or the environment. Follow up with a written report within 5 days of the noncompliance event.

B. Inspection and Maintenance Report Forms

Once installation of any required or optional erosion control device or measure has been implemented, weekly inspections of each measure shall be performed by the CONTRACTOR'S inspection personnel. The Inspection and Maintenance Reports found in this SWPPP shall be used by the inspectors to inventory and report the condition of each measure to assist in maintaining the erosion and sediment control measures in good working order.

These report forms shall become an integral part of the SWPPP and shall be made readily accessible to governmental inspection officials, the NOI Permittee's Engineer, and the NOI Permittee for review upon request during visits to the project site. In addition, copies of the reports shall be provided to any of these persons, upon request, via mail or facsimile transmission. Inspection and maintenance report forms are to be maintained by the NOI Permittee for five years following the final stabilization of the site.

C. Other Record-Keeping Requirements

The CONTRACTOR shall keep the following records related to construction activities at the site:
- Dates when major grading activities occur and the areas that were graded
- Dates and details concerning the installation of structural controls
- Dates when construction activities cease in an area
- Dates when areas are stabilized, either temporarily or permanently
- Dates of rainfall and the amount of rainfall

- Dates and descriptions of the character and amount of any spills of hazardous materials
- Records of reports filed with regulatory agencies if reportable quantities of hazardous materials spilled

D. Winter Operations

The following is a list of erosion and sediment controls and inspection and maintenance practices for winter operations for this site.

a) **Prior to November 1st of any given year all exposed soil areas must be covered with:**
   - Mulch
   - Seed and mulch
   - Geotextile
   - Erosion control matting
   - Rock or
   - Other approved mulch to prevent soil from eroding

b) Install sediment barriers (silt fence or drop inlet protection) at ALL necessary perimeter and sensitive locations BEFORE SOIL FREEZES.

c) Slopes and Stockpiles:
   - Protect slopes and stockpiles with anchored straw or mulch, rolled erosion control product or other durable covering.
   - Sediment barrier must be installed around piles and at slope toes to prevent soil transport from the pile or slope.
   - Stabilize exposed areas BEFORE snow covers them.

d) All entrance/exit locations must be properly stabilized and maintained to accommodate snow management.

e) Inspections:
   - If soil disturbance is COMPLETELY suspended AND site is PROPERLY STABILIZED, qualified inspection frequency may be reduced with written notification to NYSDEC or MS4.
   - Confirmation must be received from NYSDEC prior to reducing inspection frequency.
   - Monthly inspections must be performed at a minimum.
   - Sediment control measures should be checked after rain or snowmelt events.
   - Regular inspections must resume by March 15th.

VI. LONG TERM OPERATION AND MAINTENANCE PROCEDURES

The proposed DUTCH MEADOWS LANE project will be PRIVATELY OWNED and the operation and maintenance requirements will be the responsibility of the private owner.

The entire Stormwater Management System shall be inspected on a yearly basis to ensure that the system operates in the manner originally intended. Specific components of the system shall require additional attention as described below.

1. Wet Extended Detention Pond (Micropool Extended Detention Pond)
   a. Ponds shall be inspected annually and following major storm events to ensure the system operates in the manner originally intended. The inspection should include, but not be limited to, the following components; all outlet orifices, embankment, emergency spillway, drain, accumulation of sediment, and general erosion control measures.
   b. Special attention should be provided to ensure the low flow outlet orifice continues to function properly with the base Pond elevation maintained at the elevation of the low flow outlet orifice.

c. Re-grading and re-vegetation shall be performed as necessary and rip-rap shall be replaced as necessary.
d. Embankments shall be mowed a minimum of twice per year to discourage woody growth and control weeds.
e. Debris and litter shall be removed from basins during regular mowing operations or more frequently as necessary.
f. Accumulated sediment shall be removed from the wet pond area when 10 percent of the pond capacity has been lost due to sedimentation or at a minimum of every 10 to 20 years.
g. Accumulated sediment in the forebay shall occur every five to six years or after 50% of the total forebay capacity has been filled.

2. Open Channels
   a. Open channels shall be inspected annually and following major storm events to ensure the system operates in the manner originally intended.
   b. Removal of sediment build-up within the bottom of the channel or filter strip shall be required when 25% of the channel volume has been exceeded.
   c. Dry Swales shall be mowed to maintain a grass height of 4" to 6".

3. Closed Drainage System
   a. Catch basins and pipes shall be inspected annually and following major storm events to ensure the system operates in the manner originally intended.
   b. Catch basin sumps should be cleaned at least once per year in addition to the annual sweeping and cleaning of the roadway surface.

STORMWATER POLLUTION PREVENTION PLAN
SUMMARY OF EROSION AND SEDIMENT CONTROL AND STABILIZATION MEASURES
MAINTENANCE/INSPECTION PROCEDURES

☐ All control measures will be inspected at least once every seven (7) days. Sites that have a waiver to disturb greater than five (5) acres require two (2) inspections every seven (7) days with at least two (2) days between inspections.

☐ All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report.

☐ Built-up sediment will be removed from silt fences when it has reached one-third the height of the fence.

☐ Silt fences will be inspected for depth of sediment, tears, to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.

☐ Sediment basins, if present, will be inspected for depth of sediment, and built-up sediment will be removed when it reaches 50% of the design capacity or at the end of the job.

☐ Diversion dikes, if present, will be inspected and any breaches promptly repaired.

☐ Temporary and permanent seeding and planting and other stabilization measures will be inspected for bare spots, washouts, and healthy growth.

☐ A maintenance inspection report will be made after each inspection. Copies of the report forms to be used are included in this SWPPP.

☐ The site job superintendent will select the individuals who will be responsible for inspections, maintenance and repair activities, and filling out the inspection and maintenance reports.

☐ Personnel selected for inspection and maintenance responsibilities will receive training from the site job superintendent. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used onsite in good working order.

☐ Disturbed areas and materials storage areas will be inspected for evidence of or potential for pollutants entering stormwater systems.

☐ Report to The Department of Environmental Conservation within 24 hours any noncompliance with the SWPPP that will endanger public health or the environment. Follow up with a written report within 5 days of the noncompliance event.

STORMWATER POLLUTION PREVENTION PLAN

CONSTRUCTION/IMPLEMENTATION CHECKLIST

1. Maintain Records (Project Manager) of Construction Activities, including:

   ☐ Dates when major grading activities occur

   ☐ Dates when construction activities temporarily cease on a portion of the site

   ☐ Dates when construction activities permanently cease on a portion of the site

   ☐ Dates when stabilization measures are initiated on the site

   ☐ Dates of rainfall and the amount of rainfall

   ☐ Dates and descriptions of the character and amount of any spills of hazardous materials

   ☐ Records of reports filed with regulatory agencies if reportable quantities of hazardous materials spilled

2. Prepare Inspection Reports (Qualified Inspector) summarizing:

   ☐ Name of inspector

   ☐ Qualifications of inspector

   ☐ Measures/areas inspected

   ☐ Observed conditions

   ☐ Changes necessary to the SWPPP

3. Report Releases of Reportable Quantities of Oil or Hazardous Materials (Project Manager, if they occur):

   ☐ Notify National Response Center (1-800-424-8802) immediately

   ☐ Notify permitting authority in writing within 14 days

   ☐ Modify the pollution prevention plan to include:

   - the date of release
   - circumstances leading to the release
   - steps taken to prevent reoccurrence of the release

4. Modify Pollution Prevention Plan (per Qualified Inspector) as necessary to:

   ☐ Comply with the minimum permit requirements when notified by The Department of Environmental Conservation that the plan does not comply

   ☐ Address a change in design, construction operation, or maintenance that has an effect on the potential for discharge of pollutants

   ☐ Prevent reoccurrence of reportable quantity releases of a hazardous material or oil

VII. SPILL PREVENTION CONTROL AND COUNTERMEASURES (SPCC) PLAN

A. MATERIALS COVERED

The following materials or substances with known hazardous properties are expected to be present onsite during construction:

Concrete	Cleaning solvents
Detergents	Petroleum based products
Paints	Pesticides
Paint solvents	Acids
Fertilizers	Concrete additives
Soil stabilization additives	

B. MATERIAL MANAGEMENT PRACTICES

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

1. Good Housekeeping

The following good housekeeping practices will be followed onsite during the construction project.

a) An effort will be made to store only enough product required to do the job.

b) All materials stored onsite will be stored in a neat, orderly manner and, if possible, under a roof or other enclosure.

c) Products will be kept in their original containers with the original manufacturer's label in legible condition.

d) Substances will not be mixed with one another unless recommended by the manufacturer.

e) Whenever possible, all of a product will be used up before disposing of the container.

f) Manufacturer's recommendations for proper use and disposal will be followed.

g) The job site superintendent will be responsible for daily inspections to ensure proper use and disposal of materials.

2. Hazardous Products

These practices will be used to reduce the risks associated with hazardous materials.

a) Products will be kept in original containers with the original labels in legible condition.

b) Original labels and material safety data sheets (MSDS's) will be procured and used for each material.

c) If surplus product must be disposed of, manufacturer's or local/state/federal recommended methods for proper disposal will be followed.

d) A spill control and containment kit (containing, for example, absorbent such as kitty litter or sawdust, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided at the storage site.

e) All of the product in a container will be used before the container is disposed of. All such containers will be triple-rinsed with water prior to disposal. The rinse water used in these containers will be disposed of in a manner in compliance with state and federal regulations and will not be allowed to mix with stormwater discharges.

3. Product Specific Practices

The following product specific practices will be followed on the job site.

a) Petroleum Products

All onsite vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled. Any petroleum storage tanks used onsite will have a dike or berm containment structure constructed around it to contain any spills that may occur. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.

b) Fertilizers

Fertilizers will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked in the soil to limit exposure to stormwater. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

c) Paints, Paint Solvents, and Cleaning Solvents

All containers will be tightly sealed and stored when not in use. Excess paint and solvents will not be discharged to the storm sewer system but will be properly disposed of according to manufacturer's instructions or state and federal regulations.

d) Concrete Trucks

Concrete trucks will be allowed to wash out or discharge surplus concrete or drum wash water on the site, but only in either (1) specifically designated diked areas which have been prepared to prevent contact between the concrete and/or washout and stormwater which will be discharged from the site or (2) in locations where waste concrete can be poured into forms to make riprap or other useful concrete products.

The hardened residue from the concrete washout diked areas will be disposed of in the same manner as other non-hazardous construction waste materials or may be broken up and used on site as deemed appropriate by the CONTRACTOR. The job site superintendent will be responsible for seeing that these procedures are followed.

4. Spill Prevention Practices

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup.

a) Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be trained regarding these procedures and the location of the information and cleanup supplies.

b) Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite in spill control and containment kit (containing, for example, absorbent such as kitty litter or sawdust, acid neutralizing powder, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.).

c) All spills will be cleaned up immediately after discovery.

d) The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with the hazardous substances.

e) Spills of toxic or hazardous materials will be reported to the appropriate federal, state, and/or local government agency, regardless of the size of the spill. Spills of amounts that exceed Reportable Quantities of certain substances specifically mentioned in federal regulations (40 CFR 302 list and oil) will be immediately reported to the EPA National Response Center, telephone 1-800-424-8802. Reportable Quantities of some substances which may be used at the job site are as follows:

oil - appearance of a film or sheen on water

pesticides - usually 1 lb.

acids - 5000 lb.

solvents, flammable - 100 lb.

f) The SPCC plan will be adjusted to include measures to prevent this type of spill from recurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included. If the spill exceeds a Reportable Quantity, all federal regulations regarding reports of the incident will be complied with.

g) The job site superintendent will be the spill prevention and cleanup coordinator. He will designate the individuals who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of these personnel will be posted in the material storage area and in the office trailer onsite.

VIII. CONTROL OF ALLOWABLE NON-STORMWATER DISCHARGES

A. Certain types of discharges are allowable under the NYS Department of Environmental Conservation SPDES General Permit for Construction Activity, and it is the intent of this SWPPP to allow such discharges. These types of discharges will be allowed under the conditions that no pollutants will be allowed to come in contact with the water prior to or after its discharge. The control measures, which have been outlined previously in this SWPPP, will be strictly followed to ensure that no contamination of these non-stormwater discharges takes place. The following allowable non-stormwater discharges that may occur from the job site include:

a) Discharges from fire fighting activities

b) Fire hydrant flushings (see note below)

c) Waters used to wash vehicles or control dust in order to minimize offsite sediment tracking

d) Potable water sources such as waterline flushings (see note below), irrigation drainage from watering vegetation, routine exterior building washdown (without detergents present) (See Note below)

e) Pavement washwaters where spills or leaks of hazardous materials have not occurred or detergents have not been used

f) Springs and other uncontaminated groundwater, including dewatering ground water infiltration

g) Foundation or footing drains where no contamination with process materials such as solvents is present

NOTE: CONTRACTOR shall neutralize any super-chlorinated water from water distribution pipes before releasing it into the environment. Neutralization techniques are available from the Operator's Engineer.

IX. CERTIFICATION AND NOTIFICATION

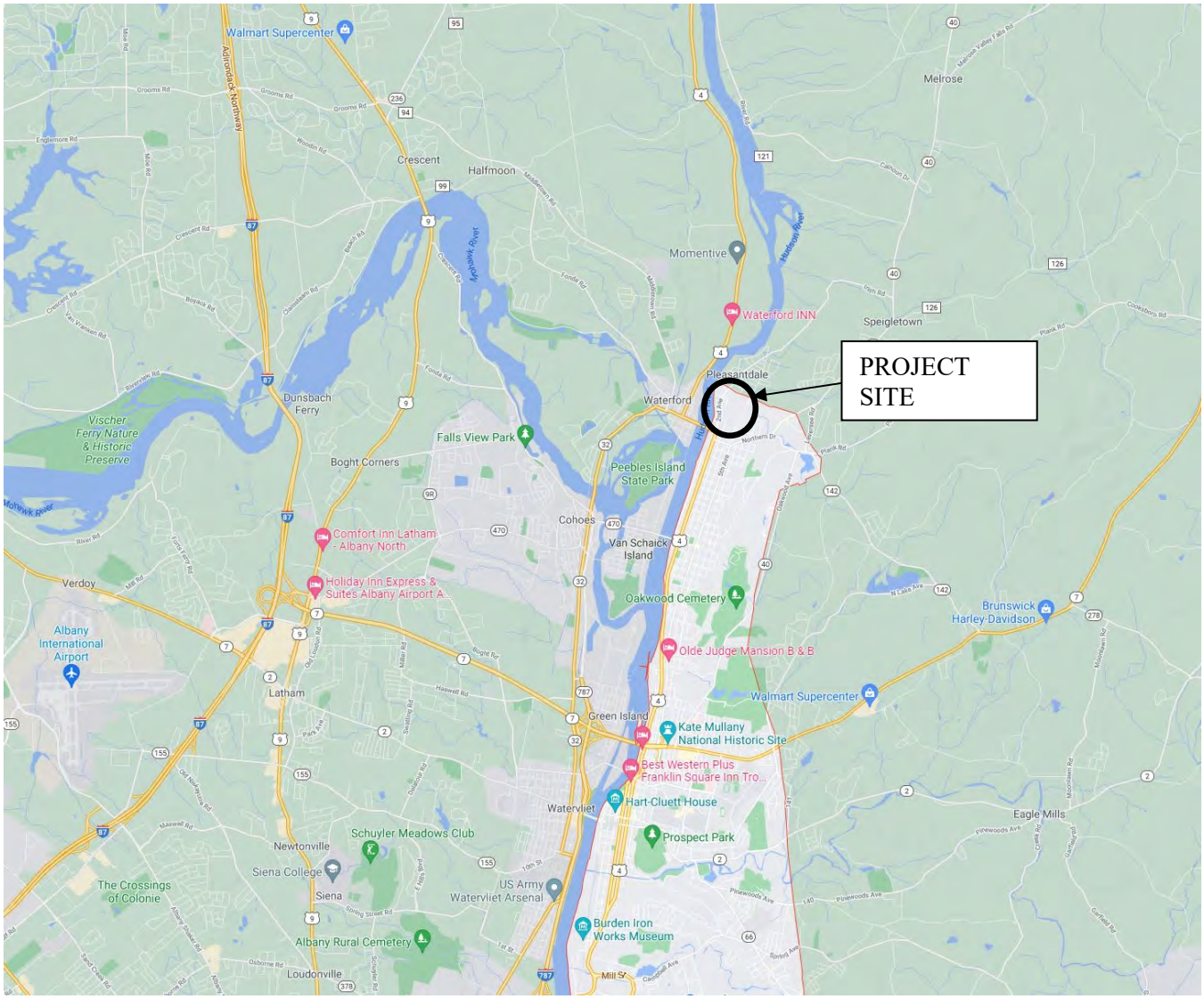
A. The NYS Department of Environmental Conservation requires that certifications of knowledge of the contents of this SWPPP and agreement to follow the SWPPP be made by the NOI Permittee and the CONTRACTOR. The terms of the General Permit also require that each CONTRACTOR sign the SWPPP plan, (Form 3) thereby making them co-permittees and acknowledging their responsibility for certain operational aspects of the plan. These certifications should be signed before the CONTRACTOR begins activities and should be filed with the site's SWPPP at the jobsite. These certifications are provided within this document, see Table of Contents for location.

SECTION 2

Erosion and Sedimentation Control Plan

Site Map and General Location Map

Figure 1: Site Location Map



900 Route 146, Clifton Park, New York 12065
phone (518) 371-7621
e-mail: info@edpllp.com

SECTION 3

Federal, State or Local Notice of Intent (NOI) (Draft)

NYSDEC NOI Acknowledgement Letter (Pending)

NYSDEC MS4 SWPPP Acceptance Form (Pending)

SECTION 4

Federal, State or Local NPDES General Permit

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP- 0-20-001

Issued Pursuant to Article 17, Titles 7, 8 and Article 70

of the Environmental Conservation Law

Effective Date: January 29, 2020

Expiration Date: January 28, 2025

John J. Ferguson

Chief Permit Administrator

1-23-20

Authorized Signature

Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7, 8 and Article 70.

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a *point source* and therefore, pursuant to ECL section 17-0505 and 17-0701, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. The *owner or operator* cannot wait until there is an actual *discharge* from the *construction site* to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

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Part 1. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

B. Effluent Limitations Applicable to Discharges from Construction Activities

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the *Stormwater Pollution Prevention Plan* (“SWPPP”) the reason(s) for the

deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:

   (i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharge*s;

   (ii) Control stormwater *discharge*s, including both peak flowrates and total stormwater volume, to *minimize* channel and *streambank* erosion and scour in the immediate vicinity of the *discharge* points;

   (iii) *Minimize* the amount of soil exposed during *construction activity*;

   (iv) *Minimize* the disturbance of *steep slopes*;

   (v) *Minimize* sediment *discharge*s from the site;

   (vi) Provide and maintain *natural buffer*s around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharge*s, unless *infeasible*;

   (vii) *Minimize* soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted;

   (viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover; and

   (ix) *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged from the site.

b. **Soil Stabilization**. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments

listed in Appendix E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily Ceased*.

c. **Dewatering**. *Discharge*s from *dewatering* activities, including *discharge*s from *dewatering* of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be designed, installed, implemented and maintained to:

(i) *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;

(ii) *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, hazardous and toxic waste, and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and

(iii) Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Prohibited *Discharge*s.** The following *discharge*s are prohibited:

(i) Wastewater from washout of concrete;

(ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

(iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;

(iv) Soaps or solvents used in vehicle and equipment washing; and

(v) Toxic or hazardous substances from a spill or other release.

f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the *performance criteria* in the Design Manual, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

a. Sizing Criteria for New Development

(i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: Construction activities that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to site limitations shall direct runoff from all newly constructed impervious areas to a RR technique or standard SMP with RRv capacity unless infeasible. The specific site limitations that prevent the reduction of 100% of the WQv shall be documented in the SWPPP.

For each impervious area that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered infeasible.

In no case shall the runoff reduction achieved from the newly constructed impervious areas be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume ("Cpv"): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
(2) The site discharges directly to tidal waters, or fifth order or larger streams.

(iv) *Overbank* Flood Control Criteria ("Qp"): Requires storage to attenuate the post-development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
(1) the site discharges directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

(v) Extreme Flood Control Criteria ("Qf"): Requires storage to attenuate the post-development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
(1) the site discharges directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

b. *Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watershed

(i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be

calculated in accordance with the criteria in Section 10.3 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

(v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

c. Sizing Criteria for Redevelopment Activity

(i) Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or

(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or

(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or

(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 – 4 above.

(ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iii) *Overbank* Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site

d. Sizing Criteria for Combination of Redevelopment Activity and New Development

Construction projects that include both New Development and Redevelopment Activity shall provide post-construction stormwater management controls that meet the sizing criteria calculated as an aggregate of the Sizing Criteria in Part I.C.2.a. or b. of this permit for the New Development portion of the project and Part I.C.2.c of this permit for Redevelopment Activity portion of the project.

D. Maintaining Water Quality

The Department expects that compliance with the conditions of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s; including stormwater runoff, snowmelt runoff, and surface runoff and drainage, from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater discharges are authorized by this permit: those listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: "Discharges from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned"; waters to which other components have not been added that are used to control dust in accordance with the SWPPP; and uncontaminated *discharge*s from *construction site* de-watering operations. All non-stormwater discharges must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

F. Activities Which Are Ineligible for Coverage Under This General Permit

All of the following are **not** authorized by this permit:

1. *Discharge*s after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharge*s that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an *endangered or threatened species* unless the *owner or*

operator has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.D.2 of this permit;

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which are undertaken on land with no existing *impervious cover*; and

   c. Which disturb one (1) or more acres of land designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

7. *Construction activities* for linear transportation projects and linear utility projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which are undertaken on land with no existing *impervious cover*; and

   c. Which disturb two (2) or more acres of land designated on the current USDA Soil Survey as Soil Slope Phase "D" (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.D.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:

   a. Documentation that the *construction activity* is not within an archeologically sensitive area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the *construction site* within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the *construction site* within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.

      - 1-5 acres of disturbance - 20 feet
      - 5-20 acres of disturbance - 50 feet
      - 20+ acres of disturbance - 100 feet, or

   b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
      (i) the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or
      (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
      (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
      (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:

(i) No Affect
(ii) No Adverse Affect
(iii) Executed Memorandum of Agreement, or

d. Documentation that:

(i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharge*s from *construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

Part II. PERMIT COVERAGE

A. How to Obtain Coverage

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a regulated, traditional land use control MS4 must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed Notice of Intent (NOI) to the Department to be authorized to discharge under this permit.

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have the SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the “MS4 SWPPP Acceptance” form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department.

3. The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.F. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4* . This exemption does not apply to *construction activities* subject to the New York City Administrative Code.

B. Notice of Intent (NOI) Submittal

1. Prior to December 21, 2020, an owner or operator shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address:

   NOTICE OF INTENT
   NYS DEC, Bureau of Water Permits
   625 Broadway, 4th Floor
   Albany, New York 12233-3505

2. Beginning December 21, 2020 and in accordance with EPA's 2015 NPDES Electronic Reporting Rule (40 CFR Part 127), the *owner or operator* must submit the NOI electronically using the *Department's* online NOI.

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

C. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied all of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (http://www.dec.ny.gov/) for more information,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act ("UPA")* (see 6 NYCRR Part 621), or the equivalent from another New York State agency, have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits

must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

c. the final SWPPP has been prepared, and

d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.C.2 above will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

   a. For *construction activities* that are not subject to the requirements of a *regulated, traditional land use control MS4*:

      (i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or

      (ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has not been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;

      (iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or

(ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.

4. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.C. of this permit.

D. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination ("NOT") has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-20-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, responsible contractor's or subcontractor's certification statement (see Part III.A.6.), and all documentation necessary to demonstrate eligibility with this permit at the *construction site* until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land*

use control MS4, the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:

a. The *owner or operator* shall have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016.

c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The *owner or operator* shall install any additional site-specific practices needed to protect water quality.

e. The *owner or operator* shall include the requirements above in their SWPPP.

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements or consistent with Part VII.K..

5. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

6. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the

regulated, traditional land use control MS4 in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice.

E. Permit Coverage for Discharges Authorized Under GP-0-15-002

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-15-002), an *owner or operator* of *a construction activity* with coverage under GP-0-15-002, as of the effective date of GP- 0-20-001, shall be authorized to *discharge* in accordance with GP- 0-20-001, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-20-001.

F. Change of Owner or Operator

1. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. For *construction activities* subject to the requirements of a *regulated, traditional land use control MS4,* the original *owner or operator* must also notify the MS4, in writing, of the change in ownership at least 30 calendar days prior to the change in ownership.

2. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.B.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

3. Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or*

operator was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP, including construction drawings:

    a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

b. whenever there is a change in design, construction, or operation at the *construction site* that has or could have an effect on the *discharge* of *pollutants*;

c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority; and

d. to document the final construction conditions.

5. The Department may notify the *owner or operator* at any time that the SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.D.4. of this permit.

6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor.* The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

   The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

   "I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with

the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharge*s from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the *construction site*. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

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

b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall 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); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours ; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge*(s);

c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection

schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016;

j. 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 the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the *construction site*; and

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

   Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

   The post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

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

c. A Stormwater Modeling and Analysis Report that includes:
   (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

   (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;

   (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;

   (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

   (v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and

   (vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;

d. Soil testing results and locations (test pits, borings);

e. Infiltration test results, when required; and

f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria,* Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York or protect the public health and safety and/or the environment.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall

begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- New York State Erosion and Sediment Control Certificate Program holder
- Registered Landscape Architect, or
- someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, with the exception of:

   a. the construction of a single family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located

in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.D.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* and all temporary, structural erosion and sediment control measures have been removed*;* and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.B.1 of this permit.

e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization,* all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site*, and all points of *discharge* from the *construction site*.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

a. Date and time of inspection;

b. Name and title of person(s) performing inspection;

c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

d. A description of the condition of the runoff at all points of *discharge* from the *construction site*. This shall include identification of any *discharges* of sediment from the *construction site*. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site* which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;

f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;

g. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

h. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);

k. Identification and status of all corrective actions that were required by previous inspection; and

l. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.D.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.B.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; and all areas of disturbance have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; and all areas disturbed as of the project shutdown date have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.F. of this permit.

d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) required in Part V.A.3. of this permit.

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record,

d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION RECORDS

A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.B.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water

Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

C. Enforcement

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate

The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

G. Other Information

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit , or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

1. All NOIs and NOTs shall be signed as follows:

    a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(i) the chief executive officer of the agency, or

(ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field,

superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any owner or operator authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger in writing that a permit application is required. This notice shall

include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the owner or operator to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from owner or operator receipt of the notification letter, whereby the authorization to discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a *construction site* which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the owner’s or operator's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.

4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

N. Permit Actions

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions

Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with construction activity covered by this permit, the owner or operator of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

R. Other Permits

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

APPENDIX A – Acronyms and Definitions

Acronyms

APO – Agency Preservation Officer
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
Cpv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DOW – Division of Water
EAF – Environmental Assessment Form
ECL - Environmental Conservation Law
EPA – U. S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review
SEQRA - State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

Definitions

All definitions in this section are solely for the purposes of this permit.

Agricultural Building – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

Agricultural Property –means the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" prepared by the Department in cooperation with agencies of New York Nonpoint Source Coordinating Committee (dated June 2007).

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both "sewage" and "stormwater".

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for "*Construction Activity(ies)*" also.

Construction Activity(ies) - means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Construction Site – means the land area where *construction activity(ies)* will occur. See definition for "*Commence (Commencement of) Construction Activities"* and "*Larger Common Plan of Development or Sale" also.*

Dewatering – means the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a *construction site* by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a *construction site* to a separate storm sewer system

and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or *point source*.

Embankment –means an earthen or rock slope that supports a road/highway.

Endangered or Threatened Species – see 6 NYCRR Part 182 of the Department's rules and regulations for definition of terms and requirements.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Equivalent (Equivalence) – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

Groundwater(s) - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Historic Property – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State or National Registers of Historic Places.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term “plan” in “larger common plan of development or sale” is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same “common plan” is not concurrently being disturbed.

Minimize – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State*;*
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a *combined sewer*; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

Natural Buffer –means an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

New Development – means any land disturbance that does not meet the definition of Redevelopment Activity included in this appendix.

New York State Erosion and Sediment Control Certificate Program – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

Nonpoint Source - means any source of water pollution or pollutants which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

Overbank –means flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

Performance Criteria – means the design criteria listed under the "Required Elements" sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf) in Part I.C.2. of the permit.

Point Source - means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be discharged.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq .

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Redevelopment Activity(ies) – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is authorized to discharge under New York State DEC's

SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

Routine Maintenance Activity - means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that stabilizes the transition between the road shoulder and the ditch or *embankment*,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or *embankment*,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

Site limitations – means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), *Overbank* Flood (Qp), and Extreme Flood (Qf).

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Steep Slope – means land area designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%) , or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

Streambank – as used in this permit, means the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

Stormwater Pollution Prevention Plan (SWPPP) – means a project specific report, including construction drawings, that among other things: describes the construction activity(ies), identifies the potential sources of pollution at the *construction site*; describes and shows the stormwater controls that will be used to control the pollutants (i.e. erosion and sediment controls; for many projects, includes post-construction stormwater management controls); and identifies procedures the *owner or operator* will implement to comply with the terms and conditions of the permit. See Part III of the permit for a complete description of the information that must be included in the SWPPP.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and *nonpoint source*s. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for *point source* discharges, load allocations (LAs) for *nonpoint source*s, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed

training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part 621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B – Required SWPPP Components by Project Type

Table 1
Construction Activities that Require the Preparation of a SWPPP That Only Includes Erosion and Sediment Controls

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:

- Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E
- Construction of a barn or other *agricultural building*, silo, stock yard or pen.

The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:

All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects
- Pond construction
- Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an impervious cover
- Cross-country ski trails and walking/hiking trails
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are not part of residential, commercial or institutional development;
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path or walking path.
- Slope stabilization projects
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics

Table 1 (Continued) CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Spoil areas that will be covered with vegetation
- Vegetated open space projects (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) excluding projects that *alter hydrology from pre to post development* conditions,
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions
- Demolition project where vegetation will be established, and no redevelopment is planned
- Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*
- Structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State", excluding projects that involve soil disturbances of greater than five acres and construction activities that include the construction or reconstruction of impervious area
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary impervious areas that will be restored to pre-construction conditions once the construction activity is complete

Table 2
CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family home that disturbs five (5) or more acres of land
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other *agricultural building* (e.g. silo) and structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State” that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW’s, water treatment plants, and water storage tanks
- Office complexes
- Playgrounds that include the construction or reconstruction of impervious area
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surface
- Road construction or reconstruction, including roads constructed as part of the construction activities listed in Table 1

Table 2 (Continued)

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Parking lot construction or reconstruction, including parking lots constructed as part of the construction activities listed in Table 1
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project, wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a residential, commercial or institutional development
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a highway construction or reconstruction project
- All other construction activities that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre to post development* conditions, and are not listed in Table 1

APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- Entire New York City Watershed located east of the Hudson River - Figure 1
- Onondaga Lake Watershed - Figure 2
- Greenwood Lake Watershed -Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson

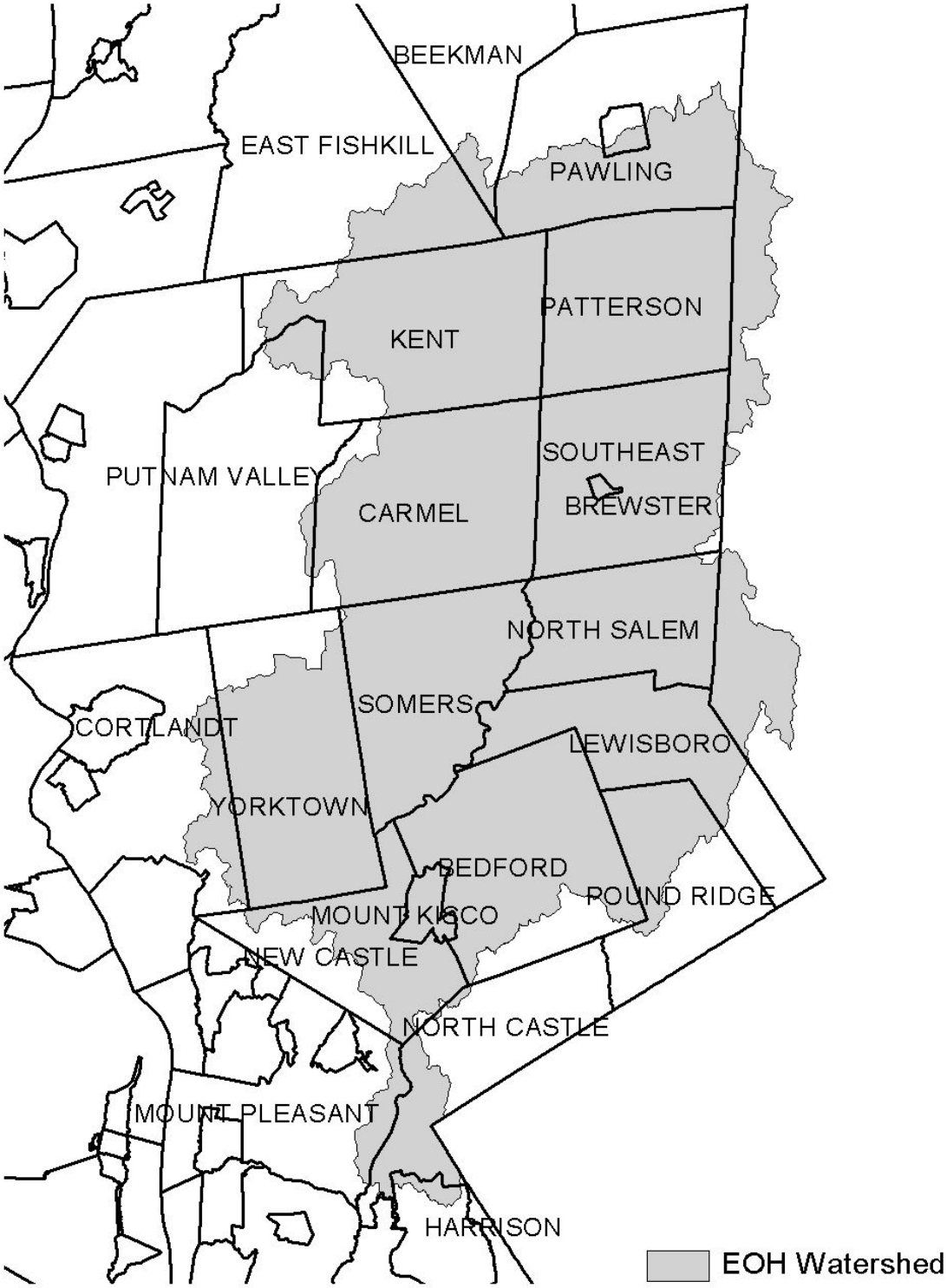


Figure 2 - Onondaga Lake Watershed



Figure 3 - Greenwood Lake Watershed

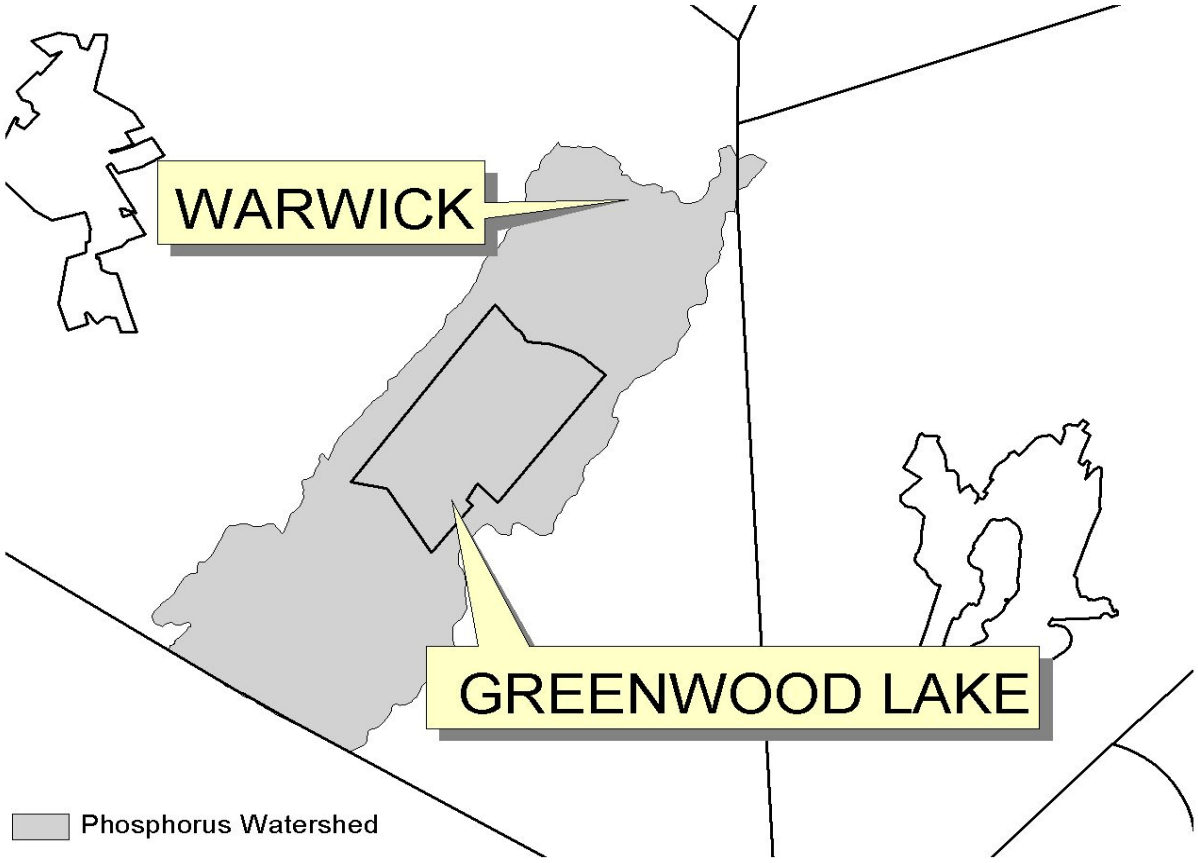


Figure 4 - Oscawana Lake Watershed

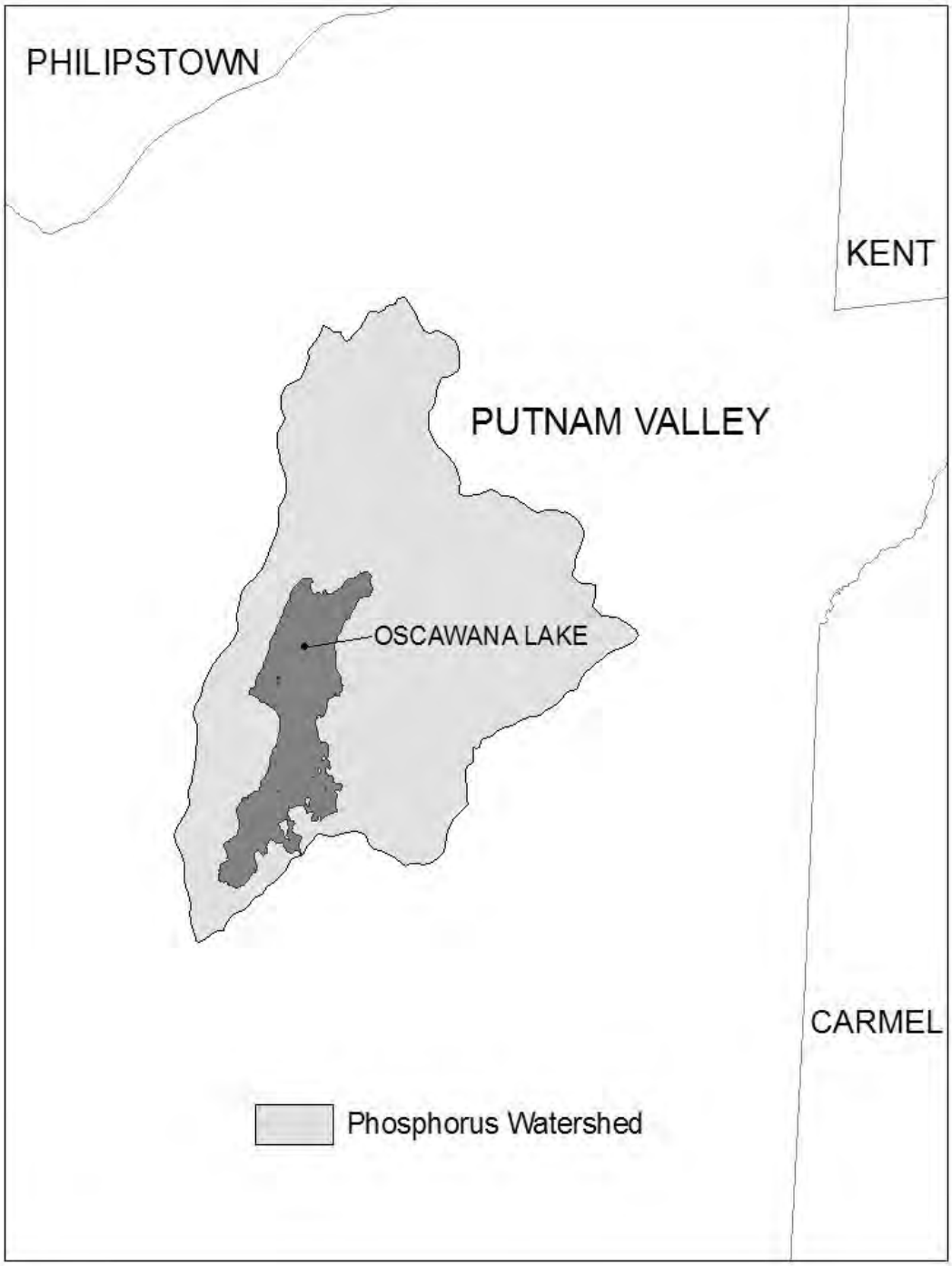
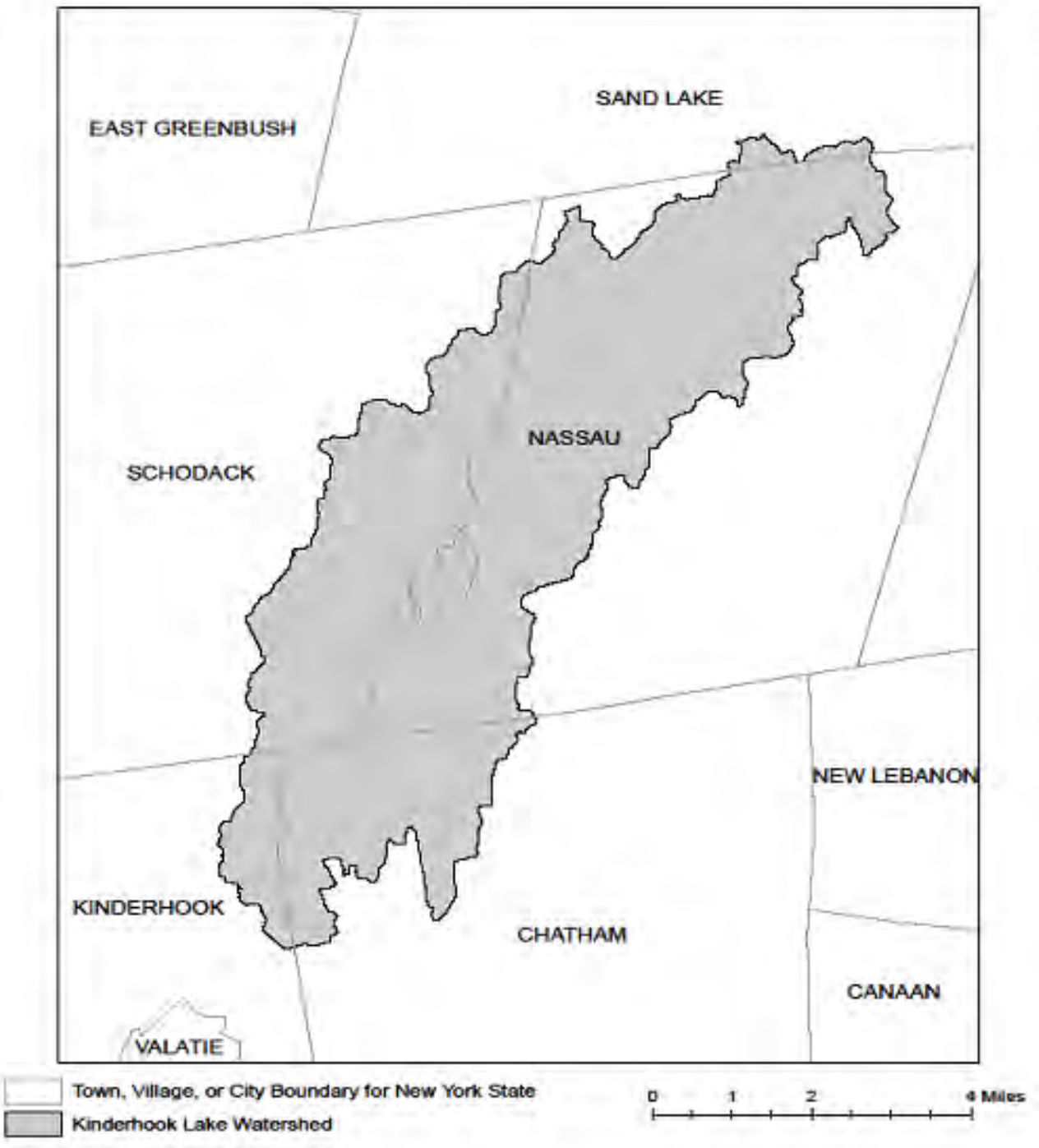


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Watersheds with Lower Disturbance Threshold

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River - See Figure 1 in Appendix C

APPENDIX E – 303(d) Segments Impaired by Construction Related Pollutant(s)

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). The list was developed using "The Final New York State 2016 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy" dated November 2016. *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015.

COUNTY	WATERBODY	POLLUTANT
Albany	Ann Lee (Shakers) Pond, Stump Pond	Nutrients
Albany	Basic Creek Reservoir	Nutrients
Allegany	Amity Lake, Saunders Pond	Nutrients
Bronx	Long Island Sound, Bronx	Nutrients
Bronx	Van Cortlandt Lake	Nutrients
Broome	Fly Pond, Deer Lake, Sky Lake	Nutrients
Broome	Minor Tribs to Lower Susquehanna (north)	Nutrients
Broome	Whitney Point Lake/Reservoir	Nutrients
Cattaraugus	Allegheny River/Reservoir	Nutrients
Cattaraugus	Beaver (Alma) Lake	Nutrients
Cattaraugus	Case Lake	Nutrients
Cattaraugus	Linlyco/Club Pond	Nutrients
Cayuga	Duck Lake	Nutrients
Cayuga	Little Sodus Bay	Nutrients
Chautauqua	Bear Lake	Nutrients
Chautauqua	Chadakoin River and tribs	Nutrients
Chautauqua	Chautauqua Lake, North	Nutrients
Chautauqua	Chautauqua Lake, South	Nutrients
Chautauqua	Findley Lake	Nutrients
Chautauqua	Hulburt/Clymer Pond	Nutrients
Clinton	Great Chazy River, Lower, Main Stem	Silt/Sediment
Clinton	Lake Champlain, Main Lake, Middle	Nutrients
Clinton	Lake Champlain, Main Lake, North	Nutrients
Columbia	Kinderhook Lake	Nutrients
Columbia	Robinson Pond	Nutrients
Cortland	Dean Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Dutchess	Fall Kill and tribs	Nutrients
Dutchess	Hillside Lake	Nutrients
Dutchess	Wappingers Lake	Nutrients
Dutchess	Wappingers Lake	Silt/Sediment
Erie	Beeman Creek and tribs	Nutrients
Erie	Ellicott Creek, Lower, and tribs	Silt/Sediment
Erie	Ellicott Creek, Lower, and tribs	Nutrients
Erie	Green Lake	Nutrients
Erie	Little Sister Creek, Lower, and tribs	Nutrients
Erie	Murder Creek, Lower, and tribs	Nutrients
Erie	Rush Creek and tribs	Nutrients
Erie	Scajaquada Creek, Lower, and tribs	Nutrients
Erie	Scajaquada Creek, Middle, and tribs	Nutrients
Erie	Scajaquada Creek, Upper, and tribs	Nutrients
Erie	South Branch Smoke Cr, Lower, and tribs	Silt/Sediment
Erie	South Branch Smoke Cr, Lower, and tribs	Nutrients
Essex	Lake Champlain, Main Lake, South	Nutrients
Essex	Lake Champlain, South Lake	Nutrients
Essex	Willsboro Bay	Nutrients
Genesee	Bigelow Creek and tribs	Nutrients
Genesee	Black Creek, Middle, and minor tribs	Nutrients
Genesee	Black Creek, Upper, and minor tribs	Nutrients
Genesee	Bowen Brook and tribs	Nutrients
Genesee	LeRoy Reservoir	Nutrients
Genesee	Oak Orchard Cr, Upper, and tribs	Nutrients
Genesee	Tonawanda Creek, Middle, Main Stem	Nutrients
Greene	Schoharie Reservoir	Silt/Sediment
Greene	Sleepy Hollow Lake	Silt/Sediment
Herkimer	Steele Creek tribs	Silt/Sediment
Herkimer	Steele Creek tribs	Nutrients
Jefferson	Moon Lake	Nutrients
Kings	Hendrix Creek	Nutrients
Kings	Prospect Park Lake	Nutrients
Lewis	Mill Creek/South Branch, and tribs	Nutrients
Livingston	Christie Creek and tribs	Nutrients
Livingston	Conesus Lake	Nutrients
Livingston	Mill Creek and minor tribs	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs	Nutrients
Monroe	Buck Pond	Nutrients
Monroe	Cranberry Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Monroe	Lake Ontario Shoreline, Western	Nutrients
Monroe	Long Pond	Nutrients
Monroe	Mill Creek and tribs	Nutrients
Monroe	Mill Creek/Blue Pond Outlet and tribs	Nutrients
Monroe	Minor Tribs to Irondequoit Bay	Nutrients
Monroe	Rochester Embayment - East	Nutrients
Monroe	Rochester Embayment - West	Nutrients
Monroe	Shipbuilders Creek and tribs	Nutrients
Monroe	Thomas Creek/White Brook and tribs	Nutrients
Nassau	Beaver Lake	Nutrients
Nassau	Camaans Pond	Nutrients
Nassau	East Meadow Brook, Upper, and tribs	Silt/Sediment
Nassau	East Rockaway Channel	Nutrients
Nassau	Grant Park Pond	Nutrients
Nassau	Hempstead Bay	Nutrients
Nassau	Hempstead Lake	Nutrients
Nassau	Hewlett Bay	Nutrients
Nassau	Hog Island Channel	Nutrients
Nassau	Long Island Sound, Nassau County Waters	Nutrients
Nassau	Massapequa Creek and tribs	Nutrients
Nassau	Milburn/Parsonage Creeks, Upp, and tribs	Nutrients
Nassau	Reynolds Channel, west	Nutrients
Nassau	Tidal Tribs to Hempstead Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Silt/Sediment
Nassau	Tribs to Smith/Halls Ponds	Nutrients
Nassau	Woodmere Channel	Nutrients
New York	Harlem Meer	Nutrients
New York	The Lake in Central Park	Nutrients
Niagara	Bergholtz Creek and tribs	Nutrients
Niagara	Hyde Park Lake	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Oneida	Ballou, Nail Creeks and tribs	Nutrients
Onondaga	Harbor Brook, Lower, and tribs	Nutrients
Onondaga	Ley Creek and tribs	Nutrients
Onondaga	Minor Tribs to Onondaga Lake	Nutrients
Onondaga	Ninemile Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Middle, and tribs	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Onondaga	Onondaga Lake, northern end	Nutrients
Onondaga	Onondaga Lake, southern end	Nutrients
Ontario	Great Brook and minor tribs	Silt/Sediment
Ontario	Great Brook and minor tribs	Nutrients
Ontario	Hemlock Lake Outlet and minor tribs	Nutrients
Ontario	Honeoye Lake	Nutrients
Orange	Greenwood Lake	Nutrients
Orange	Monhagen Brook and tribs	Nutrients
Orange	Orange Lake	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Oswego	Lake Neatahwanta	Nutrients
Oswego	Pleasant Lake	Nutrients
Putnam	Bog Brook Reservoir	Nutrients
Putnam	Boyd Corners Reservoir	Nutrients
Putnam	Croton Falls Reservoir	Nutrients
Putnam	Diverting Reservoir	Nutrients
Putnam	East Branch Reservoir	Nutrients
Putnam	Lake Carmel	Nutrients
Putnam	Middle Branch Reservoir	Nutrients
Putnam	Oscawana Lake	Nutrients
Putnam	Palmer Lake	Nutrients
Putnam	West Branch Reservoir	Nutrients
Queens	Bergen Basin	Nutrients
Queens	Flushing Creek/Bay	Nutrients
Queens	Jamaica Bay, Eastern, and tribs (Queens)	Nutrients
Queens	Kissena Lake	Nutrients
Queens	Meadow Lake	Nutrients
Queens	Willow Lake	Nutrients
Rensselaer	Nassau Lake	Nutrients
Rensselaer	Snyders Lake	Nutrients
Richmond	Grasmere Lake/Bradys Pond	Nutrients
Rockland	Congers Lake, Swartout Lake	Nutrients
Rockland	Rockland Lake	Nutrients
Saratoga	Ballston Lake	Nutrients
Saratoga	Dwaas Kill and tribs	Silt/Sediment
Saratoga	Dwaas Kill and tribs	Nutrients
Saratoga	Lake Lonely	Nutrients
Saratoga	Round Lake	Nutrients
Saratoga	Tribs to Lake Lonely	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Schenectady	Collins Lake	Nutrients
Schenectady	Duane Lake	Nutrients
Schenectady	Mariaville Lake	Nutrients
Schoharie	Engleville Pond	Nutrients
Schoharie	Summit Lake	Nutrients
Seneca	Reeder Creek and tribs	Nutrients
St.Lawrence	Black Lake Outlet/Black Lake	Nutrients
St.Lawrence	Fish Creek and minor tribs	Nutrients
Steuben	Smith Pond	Nutrients
Suffolk	Agawam Lake	Nutrients
Suffolk	Big/Little Fresh Ponds	Nutrients
Suffolk	Canaan Lake	Silt/Sediment
Suffolk	Canaan Lake	Nutrients
Suffolk	Flanders Bay, West/Lower Sawmill Creek	Nutrients
Suffolk	Fresh Pond	Nutrients
Suffolk	Great South Bay, East	Nutrients
Suffolk	Great South Bay, Middle	Nutrients
Suffolk	Great South Bay, West	Nutrients
Suffolk	Lake Ronkonkoma	Nutrients
Suffolk	Long Island Sound, Suffolk County, West	Nutrients
Suffolk	Mattituck (Marratooka) Pond	Nutrients
Suffolk	Meetinghouse/Terrys Creeks and tribs	Nutrients
Suffolk	Mill and Seven Ponds	Nutrients
Suffolk	Millers Pond	Nutrients
Suffolk	Moriches Bay, East	Nutrients
Suffolk	Moriches Bay, West	Nutrients
Suffolk	Peconic River, Lower, and tidal tribs	Nutrients
Suffolk	Quantuck Bay	Nutrients
Suffolk	Shinnecock Bay and Inlet	Nutrients
Suffolk	Tidal tribs to West Moriches Bay	Nutrients
Sullivan	Bodine, Montgomery Lakes	Nutrients
Sullivan	Davies Lake	Nutrients
Sullivan	Evens Lake	Nutrients
Sullivan	Pleasure Lake	Nutrients
Tompkins	Cayuga Lake, Southern End	Nutrients
Tompkins	Cayuga Lake, Southern End	Silt/Sediment
Tompkins	Owasco Inlet, Upper, and tribs	Nutrients
Ulster	Ashokan Reservoir	Silt/Sediment
Ulster	Esopus Creek, Upper, and minor tribs	Silt/Sediment
Warren	Hague Brook and tribs	Silt/Sediment

303(d) Segments Impaired by Construction Related Pollutant(s)

Warren	Huddle/Finkle Brooks and tribs	Silt/Sediment
Warren	Indian Brook and tribs	Silt/Sediment
Warren	Lake George	Silt/Sediment
Warren	Tribs to L.George, Village of L George	Silt/Sediment
Washington	Cossayuna Lake	Nutrients
Washington	Lake Champlain, South Bay	Nutrients
Washington	Tribs to L.George, East Shore	Silt/Sediment
Washington	Wood Cr/Champlain Canal and minor tribs	Nutrients
Wayne	Port Bay	Nutrients
Westchester	Amawalk Reservoir	Nutrients
Westchester	Blind Brook, Upper, and tribs	Silt/Sediment
Westchester	Cross River Reservoir	Nutrients
Westchester	Lake Katonah	Nutrients
Westchester	Lake Lincolndale	Nutrients
Westchester	Lake Meahagh	Nutrients
Westchester	Lake Mohegan	Nutrients
Westchester	Lake Shenorock	Nutrients
Westchester	Long Island Sound, Westchester (East)	Nutrients
Westchester	Mamaroneck River, Lower	Silt/Sediment
Westchester	Mamaroneck River, Upper, and minor tribs	Silt/Sediment
Westchester	Muscoot/Upper New Croton Reservoir	Nutrients
Westchester	New Croton Reservoir	Nutrients
Westchester	Peach Lake	Nutrients
Westchester	Reservoir No.1 (Lake Isle)	Nutrients
Westchester	Saw Mill River, Lower, and tribs	Nutrients
Westchester	Saw Mill River, Middle, and tribs	Nutrients
Westchester	Sheldrake River and tribs	Silt/Sediment
Westchester	Sheldrake River and tribs	Nutrients
Westchester	Silver Lake	Nutrients
Westchester	Teatown Lake	Nutrients
Westchester	Titicus Reservoir	Nutrients
Westchester	Truesdale Lake	Nutrients
Westchester	Wallace Pond	Nutrients
Wyoming	Java Lake	Nutrients
Wyoming	Silver Lake	Nutrients

APPENDIX F – List of NYS DEC Regional Offices

Region	Covering the following counties:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) Permit Administrators	DIVISION OF WATER (DOW) Water (SPDES) Program
1	Nassau and Suffolk	50 Circle Road Stony Brook, NY 11790 Tel. (631) 444-0365	50 Circle Road Stony Brook, NY 11790-3409 Tel. (631) 444-0405
2	Bronx, Kings, New York, Queens and Richmond	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4997	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4933
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester	21 South Putt Corners Road New Paltz, NY 12561-1696 Tel. (845) 256-3059	100 Hillside Avenue, Suite 1W White Plains, NY 10603 Tel. (914) 428 - 2505
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie	1150 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2069	1130 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2045
5	Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington	1115 State Route 86, Po Box 296 Ray Brook, NY 12977-0296 Tel. (518) 897-1234	232 Golf Course Road Warrensburg, NY 12885-1172 Tel. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROADAVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7070

SECTION 5

Certifications, Forms, Reports, and Daily Logs

STORMWATER POLLUTION PREVENTION PLAN
NOI PERMITTEE'S CERTIFICATION

FORM 1

Construction Site
2nd Avenue Multi-Family Residences
City of Troy, Rensselaer County, New York

STORMWATER POLLUTION PREVENTION PLAN DATED July 2021

NOI PERMITTEE'S CERTIFICATION:

"I certify under penalty of law that this document was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

NOI Permittee's
Designated Project Manager: _____

Signed: _____

Printed Name: _____

Position: _____

Date: _____

STORMWATER POLLUTION PREVENTION PLAN
CONTRACTOR'S CERTIFICATION LOG

FORM 2

Construction Site

2nd Avenue Multi-Family Residences

City of Troy, Rensselaer County, New York

Company Name	
Address	
Contact Name	
Telephone Number	
Cell Phone/Pager	
Scope of Services	
Certification Date	

Company Name	
Address	
Contact Name	
Telephone Number	
Cell Phone/Pager	
Scope of Services	
Certification Date	

Company Name	
Address	
Contact Name	
Telephone Number	
Cell Phone/Pager	
Scope of Services	
Certification Date	

Designated Project Manager_____

STORMWATER POLLUTION PREVENTION PLAN
CONTRACTOR'S/SUBCONTRACTOR'S CERTIFICATION
FORM 3

This form to be completed for each contractor listed on Form 2. Reproduce as needed

Construction Site

2nd Avenue Multi-Family Residences

City of Troy, Rensselaer County, New York

CONSTRUCTION POLLUTION PREVENTION PROGRAM
DATED July 2021

CONTRACTOR'S CERTIFICATION:

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

The Contractor/Subcontractor further understands that the SWPPP and associated Erosion and Sediment Control Plans represent the **MINIMUM** erosion and sediment control measures that will be required to protect the site during construction. Additional erosion and sediment control measures will be necessary during construction. It will be the responsibility of Contractor/Subcontractor to implement all additional erosion and sediment control measures necessary to protect the site during construction.

CONTRACTOR:	**SUB**CONTRACTOR:
Name (Print): _____	Name (Print): _____
Signature: _____	Signature: _____
Date: _____	Date: _____
Title: _____	Title: _____
Company Name: _____	Company Name: _____
Address: _____	Address: _____
_____	_____
Phone: _____	Phone: _____

Elements of SWPPP Contractor/Subcontractor responsible for: _____

Name of Trained Contractor Responsible for SWPPP Implementation: _____

Title of Trained Contractor Responsible for SWPPP Implementation: _____

FORM 4
2ns Avenue Multi-Family Residences
SWPPP # _____
This form to be completed by Contractor's designated inspector at least weekly. Reproduce as needed.

SWPPP INSPECTION REPORTS

Date _____

Weather and Soil Conditions
Weather Conditions: _____
Soil Conditions: Dry [ ] Wet [ ] Saturated [ ] Snow Covered [ ] Frozen [ ]

Maintaining Water Quality

Yes	No	NA	
[ ]	[ ]	[ ]	Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
[ ]	[ ]	[ ]	Is there residue from oil and floating substances, visible oil film, or globules or grease?
[ ]	[ ]	[ ]	All disturbance is within the limits of the approved plans.
[ ]	[ ]	[ ]	Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping
1. General Site Conditions

Yes	No	NA	
[ ]	[ ]	[ ]	Is construction site litter and debris appropriately managed?
[ ]	[ ]	[ ]	Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ]	[ ]	[ ]	Is construction impacting the adjacent property?
[ ]	[ ]	[ ]	Is dust adequately controlled?

2. Temporary Stream Crossing

Yes	No	NA	
[ ]	[ ]	[ ]	Maximum diameter pipes necessary to span creek without dredging are installed.
[ ]	[ ]	[ ]	Installed non-woven geotextile fabric beneath approaches.
[ ]	[ ]	[ ]	Is fill composed of aggregate (no earth or soil)?
[ ]	[ ]	[ ]	Rock on approaches is clean enough to remove mud from vehicles and prevent sediment from entering stream during high flow.

Runoff Control Practices
1. Excavation Dewatering

Yes	No	NA	
[ ]	[ ]	[ ]	Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ]	[ ]	[ ]	Clean water from upstream pool is being pumped to the downstream pool.
[ ]	[ ]	[ ]	Sediment-laden water from work area is being discharged to a silt-trapping device.
[ ]	[ ]	[ ]	Constructed upstream berm with one-foot minimum freeboard.

2. Water Bar

Yes	No	NA	
[ ]	[ ]	[ ]	Installed per plan with vehicle crossings stabilized with gravel.
[ ]	[ ]	[ ]	Outlet located on undisturbed soil or lined with riprap.
[ ]	[ ]	[ ]	Bar height is 12-inch minimum from bottom of channel with minimum base width of 6-foot.

3. Interceptor Dikes and Swales

Yes	No	NA	
[ ]	[ ]	[ ]	Installed per plan with minimum side slopes 1V:3H or flatter.
[ ]	[ ]	[ ]	Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ]	[ ]	[ ]	Sediment-laden runoff directed to sediment trapping structure.

SWPPP INSPECTION REPORT Page 2 of _____
Date _____

4. Stone Check Dam

Yes No NA

[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?

5. Rock Outlet Protection

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No NA

[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] Four inches minimum of topsoil has been applied under permanent seedings.

Sediment Control Practices

1. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence

Yes No NA

[ ] [ ] [ ] Installed on Contour, ten feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried six inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.

Sediment accumulation is _____% of design capacity.

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)

Yes No NA

[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is one acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2" x 4" frame is constructed and structurally sound.
[ ] [ ] [ ] Posts three-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at maximum eight inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.

Sediment accumulation _____% of design capacity.

SWPPP INSPECTION REPORT

Date _____

4. Temporary Sediment Trap

Yes	No	NA	
[ ]	[ ]	[ ]	Outlet structure is constructed per the approved plan or drawing.
[ ]	[ ]	[ ]	Geotextile fabric has been placed beneath rock fill.

Sediment accumulation is _____% of design capacity.

5. Temporary Sediment Basin

Yes	No	NA	
[ ]	[ ]	[ ]	Basin and outlet structure constructed per the approved plan.
[ ]	[ ]	[ ]	Basin side slopes are stabilized with seed/mulch.
[ ]	[ ]	[ ]	Drainage structure flushed and basin surface restored upon removal of sediment basin facility.

Sediment accumulation is _____% of design capacity.

Dust Control Practices

1. Haul Road and Current Work Areas

Yes	No	NA	
[ ]	[ ]	[ ]	Are all traffic surface areas sufficiently treated to prevent fugitive dust?
[ ]	[ ]	[ ]	Are any areas of site's non-traffic and work area experiencing wind erosion?
[ ]	[ ]	[ ]	Are there any disturbed areas in need of temporary seed and mulch to protect surface from wind erosion?
[ ]	[ ]	[ ]	Is watering truck on-site?
[ ]	[ ]	[ ]	Is dust visible in air at any location of the site?

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site-specific design.
Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

Description of condition of runoff at all points of discharge from the construction site. (This shall include identification of discharges of sediment from the construction site. Include discharges from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow.) _____

_____

_____

_____

Description of areas that are disturbed at the time of the inspection and areas that have been stabilized (temporary and/or final) since the last inspection (see Page 5 for Sketch). _____

_____

_____

_____

FORM 4
2ns Avenue Multi-Family Residences
SWPPP # _____
This form to be completed by Contractor's designated inspector at least weekly. Reproduce as needed.

SWPPP INSPECTION REPORT

Date _____

ADDITIONAL COMMENTS*:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ _____
Inspector (print name and title) Date and Time of Inspection

_____ _____
Qualified Professional (print name) Qualified Professional Signature

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

***Attach photographs of practices identified as needing corrective actions.**

NOTE: IN ACCORDANCE WITH PART IV.C.4 OF THE SPDES GENERAL PERMIT (GP-0-15-002), THE QUALIFIED INSPECTOR MUST NOTIFY THE OWNER OR OPERATOR AND APPROPRIATE CONTRACTOR OF ANY CORRECTIVE ACTIONS THAT NEED TO BE TAKEN. THE CONTRACTOR SHALL BEGIN IMPLEMENTING THE CORRECTIVE ACTIONS WITHIN ONE (1) BUSINESS DAY OF THIS NOTIFICATION AND SHALL COMPLETE THE CORRECTIVE ACTIONS IN A REASONABLE TIME FRAME.

STORMWATER POLLUTION PREVENTION PLAN
MODIFICATION REPORT
FORM 5

This form to be used only when Contractor's designated inspector believes changes to the SWPPP and/or Erosion and Sediment control plans is warranted. For example, additional erosion control measures needed or removal of specific control measures can be done without adverse impact. This form must be approved by Designated Project Manager prior to implementation.

Construction Site

2nd Avenue Multi-Family residences

City of Troy, Rensselaer County, New York

CHANGES REQUIRED FOR STORMWATER POLLUTION PREVENTION PLAN

To:	**Designated Project Manager**	**Date:**	
Address:			
Telephone:			
Facsimile:			
Sent Via:	☐ **Facsimile**	☐ **E-mail**	☐ **US Mail**

INSPECTOR: _____ DATE: _____
(Print)

_____
(Signature)

QUALIFICATIONS OF INSPECTOR: _____

CHANGES REQUIRED TO THE STORMWATER POLLUTION PREVENTION PLAN: _____

_____

_____

REASONS FOR CHANGES: _____

_____

_____

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

APPROVED BY DESIGNATED PROJECT MANAGER _____ DATE: _____

STORMWATER POLLUTION PREVENTION PLAN
RECORD OF STABILIZATION AND CONSTRUCTION ACTIVITIES
FORM 6

Construction Site

2nd Avenue Multi-Family Residences

City of Troy, Rensselaer County, New York

A record of dates when major grading activities occur, when construction activities temporarily or permanently cease on a portion of the site, and when stabilization measures are initiated shall be maintained until final site stabilization is achieved and the Notice of Termination is filed. *Reproduce copies of this form as needed.*

MAJOR GRADING, CONSTRUCTION, OR STABILIZATION ACTIVITIES

Description of Activity: _____

Begin Date:_____ Site Contractor: _____

Location: _____

End Date: _____

Description of Activity: _____

Begin Date:_____ Site Contractor: _____

Location: _____

End Date: _____

Description of Activity: _____

Begin Date:_____ Site Contractor: _____

Location: _____

End Date: _____

Description of Activity: _____

Begin Date:_____ Site Contractor: _____

Location: _____

End Date: _____

Description of Activity: _____

Begin Date:_____ Site Contractor: _____

Location: _____

End Date: _____

Description of Activity: _____

Begin Date:_____ Site Contractor: _____

Location: _____

End Date: _____

Designated Project Manager_____

STORMWATER POLLUTION PREVENTION PLAN
RECORD OF TEMPORARY EROSION AND SEDIMENT CONTROL PRACTICES
FORM 6A

Construction Site

2nd Avenue Multi-Family Residences

City of Troy, Rensselaer County, New York

A record of the timing of temporary erosion and sediment control practices to be implemented, including the timing of initial placement and the duration that each practice should remain in place. The record may reflect the actual date of planned installation or the specific construction activity with which it will be associated. The timing of removal may reflect an actual date or the length of time over which the practice will be implemented.

TEMPORARY EROSION AND SEDIMENT CONTROL PRACTICES

Description of Practice: _____

Date/Timing of Initial Placement:_____ Site Contractor: _____

Location: _____

Projected Date/Timing of Removal: _____

Description of Practice: _____

Date/Timing of Initial Placement:_____ Site Contractor: _____

Location: _____

Projected Date/Timing of Removal: _____

Description of Practice: _____

Date/Timing of Initial Placement:_____ Site Contractor: _____

Location: _____

Projected Date/Timing of Removal: _____

Description of Practice: _____

Date/Timing of Initial Placement:_____ Site Contractor: _____

Location: _____

Projected Date/Timing of Removal: _____

Description of Practice: _____

Date/Timing of Initial Placement:_____ Site Contractor: _____

Location: _____

Projected Date/Timing of Removal: _____

Designated Project Manager_____

YEAR 20___ **STORMWATER POLLUTION PREVENTION PLAN** **FORM 7**

PROJECT RAINFALL LOG (to be completed by Contractor)

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Day												
1												
2												
3												
4												
5												
6												
7												
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30												
31												
PM Initials												

STORMWATER POLLUTION PREVENTION PLAN

FINAL STABILIZATION CERTIFICATION /NOTICE OF TERMINATION CHECKLIST

FORM 8

This form is to be completed by Contractor and submitted to Designated Project Manager for approval only afterContractor believes all work regulated by SWPPP is complete.

Construction Site

2nd Avenue Multi-Family Residences

City of Troy, Rensselaer County, New York

1. ☐ **All soil disturbing activities are complete.**

2. ☐ **Temporary Erosion and Sediment Control Measures have been removed or will be removed at the appropriate time.**

3. ☐ **All areas of the Construction Site not otherwise covered by a permanent pavement or structure have been stabilized with a uniform perennial vegetative cover with a density of 85% or equivalent measures have been employed.**

CONTRACTOR'S CERTIFICATION:

"I certify under penalty of law that all storm water discharges associated with industrial activity from the identified project that are authorized by NPDES general permit have been eliminated and that all disturbed areas and soils at the construction site have achieved Final Stabilization and all temporary erosion and sediment control measures have been removed or will be removed at the appropriate time."

Company Name _____

Name (Print) _____

Signature _____

Date _____

APPROVED BY DESIGNATED PROJECT MANAGER_____ DATE: _____

SECTION 6

Supplemental Information

1. **Stormwater Management Narrative – Appendices and Figures Available Upon Request**

2. **NYSDEC Environmental Resource Mapper**

Stormwater Management Narrative

2ND AVENUE MULTI-FAMILY RESIDENCES

1011 2ND AVENUE

City of Troy

Rensselaer County, New York

Applicant:

Kevin Vandenburgh

September 2021

Prepared By:

The Environmental Design Partnership, LLP

900 Route 146

Clifton Park, NY 12065

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Figures

Figure 1 – Site Location Map

Figure 2 – Pre-development Drainage Map

Figure 3 – Post-development Drainage Map

Attachments

Attachment A – WQv Calculations

Attachment B – Stormwater Modeling Calculations

Attachment C – First Defense High Capacity Design Data

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1.0 Introduction

Kevin Vandenburgh is proposing a multi-family residential development on two (2) existing parcels of land totaling approximately 11 acres located on the west side of Second Ave adjacent to the intersection with Roosevelt Ave, in the City of Troy, New York. The proposed site development includes the construction of three (3) multi-family four story apartment buildings, as well as associated underground parking, ground level parking, a pedestrian walking path, and travel surfaces. The total area of proposed disturbance is approximately 7.65 acres and 3.85 acres of impervious area will be added to the site.

A stormwater management system has been designed to provide pollutant removal, reduce channel erosion, prevent overbank flooding, and safely control extreme flood events in accordance with the NYS Stormwater Management Design Manual (Design Manual). The proposed stormwater management system for the project will include multiple green infrastructure techniques such as stormwater planters, and vegetated swales in order to meet and exceed the required minimum runoff reduction. As well as the use of hydrodynamic vortex separator units to provide pretreatment of the stormwater runoff on the project site.

This narrative presents a review of the design concepts and parameters of the stormwater management system for the proposed townhouse development. The purpose of the stormwater management narrative is to assure that changes in the surface runoff characteristics, as a result of the proposed construction, will not adversely impact adjacent or downstream properties. On-site stormwater management will be implemented in accordance with the NYS Stormwater Management Design Manual to accommodate both additional stormwater runoff and to provide water quality treatment according to the green infrastructure standards.

2.0 Existing Conditions

The project site is currently undeveloped and consists of wooded areas and an open field and grass area. The topography on the site consists of gentle to steep slopes with slopes exceeding 15% in areas of the project site. The elevations on the site generally range from 95 to 20 feet above sea level.

Soils on the site consist predominantly of Nassau-Rock outcrop complex, hilly which is described by the United State Department of Agriculture (USDA) National Resources Conservation Services (NRCS) as silty loam within the top 0 to 3 feet and unweathered bedrock below the silty loam. The bedrock is generally comprised of rippable and broken shale. Depth to groundwater is greater than six feet below grade.

No wetland areas exist on site. No wetland disturbance is proposed during construction.

According to the Federal Emergency Management Area (FEMA) Flood Insurance Rate Map (FIRM) panel 3606770001B, dated March 18, 2980, the project site is located within Zone A11, Zone B and Zone C. The 100-year flood elevation is 35 feet above mean sea level.

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Approximately 95 percent of the project site is located five (5) feet above the 100-year flood elevation. Runoff from the project site flows westerly towards the Hudson River.

2.1 Soil and Groundwater Conditions

The USDA Natural Resources Conservation Service Soil Survey identifies the soils on the site to be Nassau-Rock outcrop complex. The Soil Survey identifies this soil type as having a very slow infiltration rate and classified as Hydrologic Soil Group (HSG) "D".

Test pits were performed by The Environmental Design Partnership LLP on June 25, 2021. The soil encountered in the test pit locations indicated top soil to depths of 0 to 12 inches and a shallow layer of fine loamy sand, followed by rippable shale and bedrock varying from 3 to 36 inches below existing grade.

3.0 Predevelopment Stormwater Analysis

The existing hydrologic conditions, in the area to be disturbed as a result of the proposed construction, were analyzed using Applied Microcomputer Systems' "HydroCAD" computer modeling program. The HydroCAD stormwater modeling program employs the United States Department of Agriculture's Soil Conservation Service (SCS) Technical Release 20 (TR-20) method for stormwater analysis. Using this modeling technique, the site is divided into "subcatchments" that represent specific areas contributing stormwater runoff to an existing, or proposed drainage feature. The subcatchments typically flow through "reaches" (i.e., swales, channels, or pipes) that convey the stormwater to storm basins or discharge areas.

A hydrologic model of the existing site was prepared using the **Hydrocad** program. Three (3) subcatchments were used to represent the existing drainage condition, see Figure 2.

The existing parameters of topography, vegetation, slope and soil type are all incorporated into the predevelopment model.

Table 1 presents a summary of the pre-development stormwater peak discharge for the 1 year, 10 year and 100-year design storm events at the respective Design Points. As will be discussed in subsequent sections, the post development stormwater discharge rate has been limited to the predevelopment discharge rate for the 1-year, 10-year, and 100-year storm events.

Table 1: Pre-Development Runoff Rates

STORM EVENT	OFF1
1-Year (2.24")	7.48
10-Year (3.77")	23.03
100-Year (6.37")	54.23

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The pre-development Curve Number (CN) for the existing impervious, wooded and grassy areas was established as 98, 79 and 80, respectively. The HydroCAD model results for the pre-development conditions are included within Attachment B.

4.0 Stormwater Management Planning and Practice Selection

The site layout and stormwater design for this project was completed while taking into consideration the potential impacts on the existing site and downstream hydrology. The slopes, soil classification and topography throughout the site primarily conveys runoff down the knolls/high points and towards the large drainage corridor in the center of the site which drains to the Hudson River. The site stormwater design was intended to replicate the predevelopment conditions as much as possible and proposed stormwater devices that will capture and treat the runoff at various areas of the site where runoff is concentrated. Various measures were taken to help ensure that the post-development hydrology of the site will closely resemble the pre-development hydrology. These measures include soil restoration, parking reduction, and building reduction.

Building footprint reduction was implemented by the use of multiple floor apartment buildings in order to reduce the impervious footprint on site. Imperviousness on site was also reduced through parking reduction with garage parking spaces located underground below the first floor of the apartment buildings. This allows for a smaller parking footprint on site while still achieving parking requirements. Efficient parking lanes were also implemented into the design. This also allowed the site to meet parking requirements while keeping the impervious area to a minimum.

Soil restoration has been called for throughout the site in accordance with Chapter 5 of the NYSDEC Stormwater Management Design Manual. The soils on the site are classified as HSG D and need aeration and topsoil in areas of cut or fill. In high traffic areas that are to remain pervious, the soils shall be fully restored by tilling compost into the sub-soils prior to applying topsoil and vegetating. By applying these methods to the soils on the site, the original properties and porosity of the soils will be recovered, which will allow for an improvement in the soil infiltration as well as lawn and landscaping sustainability.

Stormwater management on the site is designed to incorporate filtration practices through stormwater planters and vegetated swales. Stormwater planters and vegetated swales are considered a Green Infrastructure SMP with RRv Capacity by the NYSDEC Stormwater Design Manual. The proposed stormwater design also incorporates the use of hydrodynamic vortex separator units to provide pretreatment of the stormwater runoff on the project site. By using a combination of filtration practices that are located relatively close to the source of runoff, the post-development hydrology will more closely match the pre-development hydrology.

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5.0 Post-Development Stormwater Analysis

The post-development conditions, in the area to be disturbed as a result of the proposed construction, were analyzed using Applied Microcomputer Systems' "HydroCAD" computer modeling program.

A hydrologic model of the area to be disturbed as a result of the proposed development, was analyzed using the HydroCAD program. Twenty-five (25) subcatchments were used to represent the post development drainage conditions of the site. Site improvements to the property will include the construction of three (3) multi-family four story apartment buildings, as well as associated underground parking, ground level parking, a pedestrian walking path, and travel surfaces. Also included, as permanent elements of the development, are connections to municipal water and sewer and on-site stormwater management. Stormwater management practices have been designed to provide treatment, filtration, and attenuation of stormwater runoff from the proposed impervious surfaces on the site.

Stormwater runoff from the site will be managed with stormwater planters, a closed drainage system with pretreatment devices, and various green infrastructure techniques. Runoff from the rooftops will be collected and directed to stormwater planters which will provide filtration and treatment of the runoff. The planters have been designed with underdrains and overflow structures which will convey excess flows to the respective catch basins, where runoff will be conveyed to the closed drainage and pretreatment system on the project site. Runoff from the surrounding pavement and grassy areas will sheet flow either into a stormwater collection catch basin or into vegetated swales.

A post-development Curve Number (CN) of 98 was assigned to all impervious surface within the proposed site. A post-development CN of 80 was assigned to all new grassed areas directly contributing to the proposed stormwater devices. The weighted CN for the post-development conditions for the site is 86. The HydroCAD model results for the post-development conditions are included within Attachment B.

5.1 NYS Unified Stormwater Sizing Criteria

The proposed post-development site conditions were analyzed using Applied Microcomputer Systems' "HydroCAD" computer modeling program, the results have been included with this report. A technical description of the HydroCAD stormwater modeling program was provided in a previous section.

The area to be disturbed as a result of the proposed development was modeled under the post-development conditions using twenty-five (25) subcatchment areas (Figure 3) routed into the stormwater management areas. The contributing area of each stormwater management area is

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identified on Figure 3. The post-development stormwater management system has been designed based on the Unified Stormwater Sizing Criteria as described in the following sections.

5.1.1 Water Quality (WQ_v)

In general, small storm events and the initial runoff from larger storm events are an environmental concern as this stormwater runoff typically contains roadway pollutants and thermal energy stored by the asphalt. In accordance with the NYS Stormwater Management Design Manual, this initial runoff is designated as the Water Quality Volume (WQ_v) and special attention is given to this volume of runoff to meet water quality objectives.

The water quality storage volume, WQ_v, is calculated as follows:

$$WQ_v = \frac{P \times R_v \times A}{12}$$

Where: WQ_v = water quality volume (acre-feet)

P = 90% rainfall event number

R_v = 0.05+0.009(I), where I is percent impervious cover

A = site area (acres), impervious area used with I = 100%

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Table 2: Required Water Quality Volume

SUB I.D.	AREA (SF)	I (SF)	I (%)	Rv	WQv (cu-ft)	WQv Provided (cu-ft)	SMA I.D.
1S	227,434	0	0%	0.05	1,042	OFF	-
2S	19,232	4,653	24%	0.27	472	OFF	-
3S	25,969	25,969	100%	0.95	2,261	OFF	-
4S	12,073	12,073	100%	0.95	1,051	1,160	SP6
5S	12,073	12,073	100%	0.95	1,051	1,692	SP5
6S	8,624	8,624	100%	0.95	751	870	SP4
7S	8,624	8,624	100%	0.95	751	1,231	SP3
8S	9,375	9,375	100%	0.95	816	1,359	SP2
9S	8,698	8,698	100%	0.95	757	1,147	SP1
10S	42,596	0	0%	0.05	195	1,815	2P
11S	21,467	9,099	42%	0.43	849	OFF	-
12S	9,133	6,498	71%	0.69	578	578	WQU#1
13S	11,142	11,142	100%	0.95	970	970	WQU#2
14S	3,565	3,565	100%	0.95	310	310	WQU#2
15S	3,662	3,053	83%	0.80	269	269	WUQ#2
16S	10,897	7,409	68%	0.66	661	661	WQU#2
17S	4,314	4,314	100%	0.95	376	376	WQU#2
18S	8,128	6,512	80%	0.77	574	574	WQU#2
19S	12,498	6,057	48%	0.49	557	557	WQU#3
20S	11,405	10,905	96%	0.91	952	952	WQU#3
21S	11,565	6,693	58%	0.57	605	605	WQU#3
22S	13,663	5,287	39%	0.40	499	499	WQU#3
23S	25,137	9,720	39%	0.40	917	917	WQU#4
24S	8,860	4,446	50%	0.50	407	407	WQU#5
25S	6,623	4,953	75%	0.72	439	439	WQU#5

The proposed design for the project site incorporates the "treatment train" concept to provide pretreatment of the stormwater runoff prior to discharge off the project site. The proposed treatment train includes the use of advanced hydrodynamic vortex separator units, and discharge to swales on the project site.

The pretreatment for impervious pavement on the site uses five hydrodynamic vortex separators, First Defense by Hydro International, designed to fully treat the contributing WQv. The First Defense has been verified by US EPA Environmental Technology Verification Program for Water Quality Protection. A summary of the design parameters and site-specific information for the proposed First Defense devices is presented in **Table 3** as well as in Attachment C. The units have been designed to provide treatment of paved surfaces for runoff associated with the

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contributing Water Quality flow rate. Peak flows associated with events that exceed the 1-year storm will be conveyed through a by-pass around the units.

Table 3: Summary of First Defense Design Parameters

Unit I.D.	Total Area (ft^2)	Impervious Area (ft^2)	Green Area (ft^2)	Unit Size	Peak Treatment flow rate (cfs)	WQv Storm Rate to unit (cfs)	100 Year Storm Flow Rate to Unit (cfs)
1	9,133	6498	2,635	3 ft	0.84	0.40	3.10
2	41,708	35,995	5,713	4 ft	1.50	1.34	15.5
3	49,131	28,942	10,189	4 ft	1.5	1.0	10.34
4	25,137	9,720	15,417	3 ft	0.84	0.40	3.47
5	15,483	9,399	6,084	3 ft	0.84	0.62	3.65

5.1.2 Runoff Reduction Volume (RRv)

The NYSSMDM specifies that the runoff shall be reduced by 100% of the site WQv using green infrastructure techniques and standard SMPs with RRv capacity unless, due to existing site constraints, the 100% reduction is not possible. If 100% RRv cannot be achieved than a minimum RRv based on the soil type and impervious area is calculated. Soil conditions, the presence of shale and bedrock, as well as existing slopes on the proposed project site do not allow 100% RRv capacity. Therefore, minimum RRv for the proposed project site has been calculated:

$$RRv_{min} = \frac{P * \bar{R}_v * Aic * S}{12}$$

where: RRV_{min} = minimum runoff reduction volume required from impervious area (acre-feet)

P= 90% Rainfall in New York State

R_v = 0.05+0.009(I) where I is 100% impervious

A_{ic} = Total area of new impervious cover

S = Hydrologic Soil Group (HSG) Specific Reduction Factor (*S*)

- HSG D = 0.20

The minimum RRV calculated for the project site is on the order of **0.07 ac-ft** (2,921 cu-ft).

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5.1.3 Green Infrastructure Practices

Runoff from a portion of the northern most parking area will be conveyed to a vegetated swale. prior to flowing to existing drainage corridors. This will allow for the infiltration and filtering of the runoff before entering the Hudson River. Overall, the total runoff reduction from vegetated swale is equivalent to approximately **116 cf**.

The proposed apartment buildings will generate runoff that will be conveyed via gutters to proposed stormwater planters on the project site. These planters have been designed to provide filtration, pollutant treatment and removal, and groundwater recharge. The design manual allows for a minimum RRv Capacity of 40% of the contributing water quality volume. The runoff reduction from Stormwater Planters located on the project site is on the order of **4,290 cf**. Attachment A contains WQv and RRv calculations for this Green Infrastructure practice.

Many of the green infrastructure practices recommended in the NYS Stormwater Management Design Manual were not applied to the stormwater management design on this site due to either site restrictions or the use of more feasible green infrastructure of standard SMP techniques in place of more restrictive and/or maintenance intensive practices. The following table discusses why the unused green infrastructure practices were not feasible.

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Table 4: Non-Feasible Green Infrastructure Practices

Green Infrastructure Practice	Reason use is not feasible
Conservation of Natural Areas	Existing natural areas on site will be conserved to the greatest extent possible, however the contribution to the RRV reduction is minimal.
Sheet flow to Riparian Buffers or Filter Strips	Slopes and soils on site are not conducive for buffers or vegetated filter strips
Tree Planting/Tree Pit	Trees will be saved on the site as possible to conserve the natural areas. Trees will also be planted to maintain a buffer from the roadway to the proposed site, though the resulting runoff reduction value for adding additional trees is minimal.
Disconnection of Rooftop Runoff	Many of the rooftop areas which would be accounted for in Rooftop Disconnection are accounted for in the stormwater planter calculation.
Stream Daylighting	No culverted/piped streams exist on the site or in the site perimeter.
Green Roofs	Green roofs are less favorable because they are more difficult to maintain. The majority of the rooftop runoff will be conveyed to bioretention areas. The proposed stormwater management methods are more financially feasible and require less maintenance than green roofs. Additionally, the proposed rooftops will be sloped; green roofs require flat rooftops.
Porous Pavement	Porous Pavement has not been proposed on this site due to poor soil conditions.
Rain Barrels/Cisterns	The proposed rooftops have been designed to drain towards catch basins or towards bioretention areas. Rain Barrels/Cisterns would require greater maintenance compared to the methods currently implemented for runoff reduction, they also would require a way to use the collected stormwater between events.

Table 5: Runoff Reduction Volume Summary

Runoff Reduction Technique	RRv (cf)
Vegetated Swale	116
Stormwater Planter	4,290
Total Site Runoff Reduction	**4,406**
Min Required Runoff Reduction	**2,291**

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5.2.1 Channel Protection (Cp_v)

In accordance with the NYS Stormwater Management Design Manual, stream channel protection, designed to protect stream channels from erosion, is accomplished by providing 24-hour extended detention of the one-year, 24-hour storm event. The Cp_v requirement does not apply in certain conditions, including the following:

- The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams.

The project site discharges directly to the Hudson River, which is a fifth order (fifth downstream) or larger stream, therefore the Cp_v requirement does not apply.

5.2.2 Overbank Flood (Q_p)

Overbank Flood Control Criteria has been established to limit the frequency and magnitude of out-of-bank flooding generated through changes in runoff characteristics as a result of increased impervious surface area. The Q_p requirement does not apply in certain conditions, including the following:

- The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams.

The project site discharges directly to the Hudson River, which is a fifth order (fifth downstream) or larger stream, therefore the Q_p requirement does not apply.

5.2.3 Extreme Storm (Q_f)

In accordance with the NYS Stormwater Management Design Manual, the stormwater management system must attenuate the post development 100-year, 24-hour peak discharge rate to the predevelopment rate while providing safe passage of this storm event. The Extreme Storm (Q_f) requirement does not apply in certain conditions, including the following:

- The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams.

The project site discharges directly to the Hudson River, which is a fifth order (fifth downstream) or larger stream, therefore the Q_f requirement does not apply.

900 Route 146, Clifton Park, New York 12065
phone (518) 371-7621
e-mail: info@edpllp.com

6.0 Summary

Development of the proposed property will change the stormwater drainage characteristics of the site; impervious area will be added and the site will be re-graded to support the proposed improvements. Changes to the stormwater drainage characteristics of the site have been evaluated in accordance with the NYS Stormwater Management Design Manual. The proposed stormwater management system has been designed to comply with the recommendations in the Design Manual related to water quality, runoff reduction, channel protection, overbank flood control and extreme flood control for new development projects.

The proposed stormwater management system has been designed to attenuate and treat the stormwater runoff generated from the contributing areas for storm events up to and including the 100-year design storm event. The proposed stormwater management design includes multiple green infrastructure techniques such as stormwater planters, and vegetated swales in order to meet and exceed the required minimum runoff reduction. As well as the use of hydrodynamic vortex separator units to provide pretreatment of the stormwater runoff on the project site. Channel protection, overbank flood, and extreme storm criteria are not a concern and the NYS Stormwater Management Design Manual states that this criteria does not apply when discharging to a fifth order or larger stream, which the Hudson River is categorized as.

Through the implementation of acceptable stormwater management practices, recommended by the NYS Stormwater Management Design Manual, the proposed project will not adversely affect adjacent or downstream properties.

Prepared by:

The Environmental Design Partnership, LLP

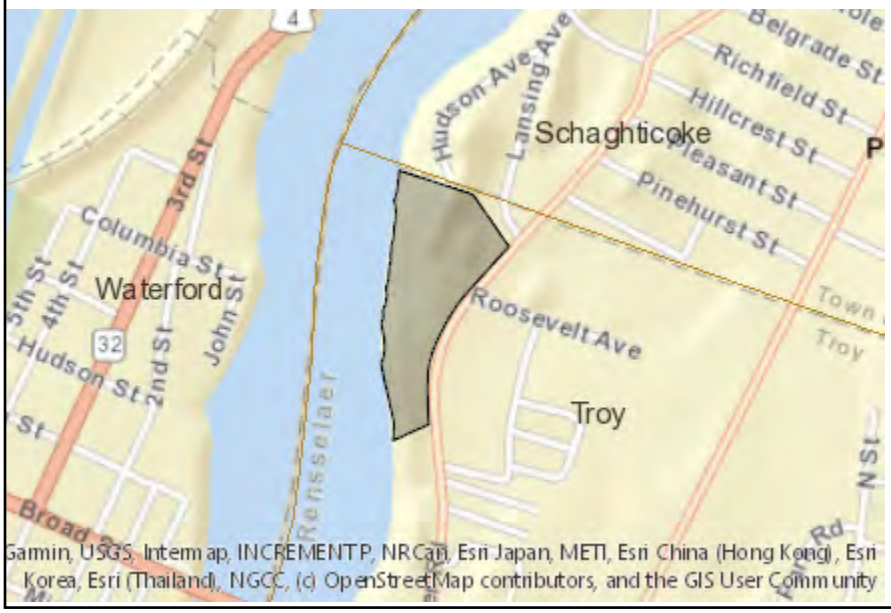


Nicholas Zeglen, P.E.

900 Route 146, Clifton Park, New York 12065
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EAF Mapper Summary Report

Friday, January 8, 2021 9:20 AM



Disclaimer: The EAF Mapper is a screening tool intended to assist project sponsors and reviewing agencies in preparing an environmental assessment form (EAF). Not all questions asked in the EAF are answered by the EAF Mapper. Additional information on any EAF question can be obtained by consulting the EAF Workbooks. Although the EAF Mapper provides the most up-to-date digital data available to DEC, you may also need to contact local or other data sources in order to obtain data not provided by the Mapper. Digital data is not a substitute for agency determinations.



B.i.i [Coastal or Waterfront Area]	No
B.i.ii [Local Waterfront Revitalization Area]	No
C.2.b. [Special Planning District]	Yes - Digital mapping data are not available for all Special Planning Districts. Refer to EAF Workbook.
C.2.b. [Special Planning District - Name]	Remediaton Sites:546031
E.1.h [DEC Spills or Remediation Site - Potential Contamination History]	Yes - Digital mapping data for Spills Incidents are not available for this location. Refer to EAF Workbook.
E.1.h.i [DEC Spills or Remediation Site - Listed]	Yes
E.1.h.i [DEC Spills or Remediation Site - Environmental Site Remediation Database]	Yes
E.1.h.i [DEC Spills or Remediation Site - DEC ID Number]	546031
E.1.h.iii [Within 2,000' of DEC Remediation Site]	Yes
E.1.h.iii [Within 2,000' of DEC Remediation Site - DEC ID]	546031, 546053, E546053
E.2.g [Unique Geologic Features]	No
E.2.h.i [Surface Water Features]	Yes
E.2.h.ii [Surface Water Features]	Yes
E.2.h.iii [Surface Water Features]	Yes - Digital mapping information on local and federal wetlands and waterbodies is known to be incomplete. Refer to EAF Workbook.
E.2.h.iv [Surface Water Features - Wetlands Name]	Federal Waters
E.2.h.v [Impaired Water Bodies]	No
E.2.i. [Floodway]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.

E.2.j. [100 Year Floodplain]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.2.k. [500 Year Floodplain]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.2.l. [Aquifers]	Yes
E.2.l. [Aquifer Names]	Principal Aquifer
E.2.n. [Natural Communities]	No
E.2.o. [Endangered or Threatened Species]	No
E.2.p. [Rare Plants or Animals]	No
E.3.a. [Agricultural District]	No
E.3.c. [National Natural Landmark]	No
E.3.d [Critical Environmental Area]	No
E.3.e. [National or State Register of Historic Places or State Eligible Sites]	Yes - Digital mapping data for archaeological site boundaries are not available. Refer to EAF Workbook.
E.3.e.ii [National or State Register of Historic Places or State Eligible Sites - Name]	New York State Barge Canal Historic District
E.3.f. [Archeological Sites]	Yes
E.3.i. [Designated River Corridor]	No

SECTION 7

Completed Inspection Reports

ATTACHMENT H

August 23, 2021

Mr. Joe Dannible
Environmental Design Partnership, LLP
900 Route 146
Clifton Park, NY 12065

RE: Traffic Assessment, Second Avenue Apartments, City of Troy and Town of Schaghticoke, Rensselaer County, New York; CM Project No. 121-213

Dear Mr. Dannible:

Creighton Manning Engineering, LLP (CM) has completed a traffic assessment for the proposed residential development located on Second Avenue in the City of Troy and the Town of Schaghticoke, NY. The project site is located on the west side of Second Avenue opposite Roosevelt Avenue, as shown on Figure 1. This evaluation is based on the site plan entitled "Concept Plan," prepared by MJ Engineering and Land Surveying, P.C., dated August 2020. The concept plan is included under Attachment A.

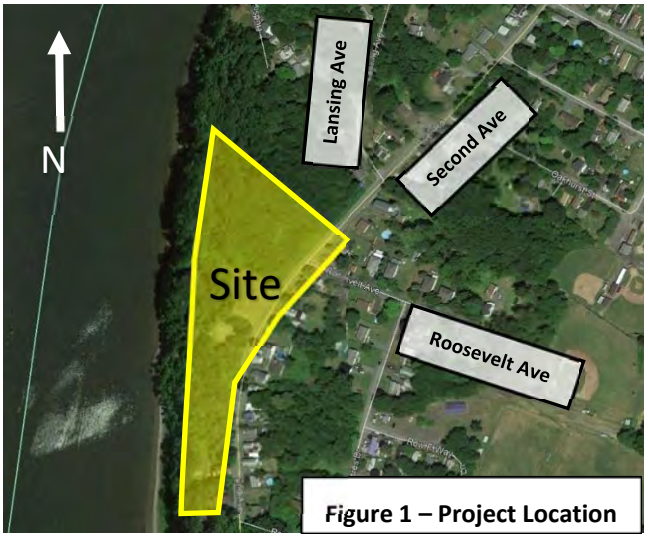


Figure 1 – Project Location

1.0 Project Description

The project development proposes to construct 231 apartment units in three buildings on the west side of Second Avenue. Access to the development will be provided via two new driveways on Second Avenue. The North Site Access Road will be located opposite Roosevelt Avenue while the South Site Access Road will be located approximately 450-feet to the south. It is anticipated that the residential subdivision will be fully constructed and occupied by 2023. The project location is shown in Figure 1.

2.0 Existing Conditions

Roadway Serving the Site

Second Avenue is a north-south road classified as an urban major collector near the project site that extends from 101st Street in the City of Troy to the Town of Schaghticoke town line. Second Avenue provides two-way travel and has a total width of 24-feet with one travel lane in each direction and no paved shoulders near the project site. Traffic volume data collected by the New York State Department of Transportation (NYSDOT) shows that Second Avenue serves approximately 3,405 vehicles per day (vpd). A sidewalk on the east side of Second Avenue extends approximately 70-feet south and 40-feet north of Roosevelt Avenue. The posted speed limit on Second Avenue is 30-mph and the land uses are generally residential adjacent to the proposed site.

Study Area Intersection

The Second Avenue/Roosevelt Avenue intersection is a three-leg intersection operating under stop control on the westbound Roosevelt Avenue approach. All three approaches provide a single lane for shared travel movements. It is noted that Roosevelt Avenue provides access to several residential homes and a small parking lot associated with the *Cahrenger Stadium* baseball field.

Transit, Pedestrians, and Bicyclists

Transit service in the Capital Region is provided by the Capital District Transit Authority (CDTA); however, there are no existing bus stops located on Second Avenue in the vicinity of the project site. As noted above, sidewalks are only provided for a short distance on the east side of Second Avenue near Roosevelt Avenue and there are no shoulders provided in the area.

Data Collection

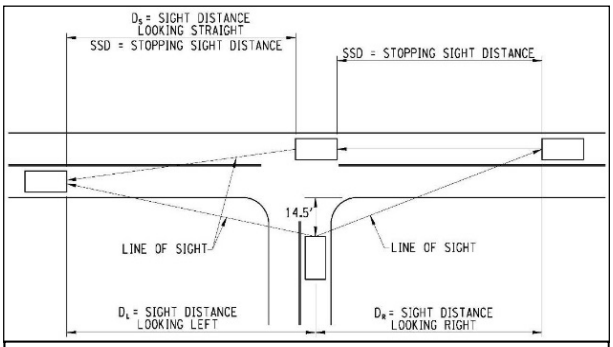
Turning movement counts were conducted at the study area intersection on Wednesday, July 28, 2021 during the afternoon peak (4:00 to 6:00 p.m.) and on Wednesday, August 4, 2021 during the morning peak period (7:00 to 9:00 a.m.). The observed peak hours generally occurred from 8:00 to 9:00 a.m. and 4:15 to 5:15 p.m.

In addition, an automatic traffic recorder (ATR) was installed on Second Avenue near the project roadways from Wednesday, July 28, 2021 to Wednesday, August 4, 2021 to collect volume and speed data near the proposed site. The data indicates that the 85th percentile speed[1] on Second Avenue near the project site was measured to be 42-mph in the northbound direction and 43-mph in the southbound direction.

A comparison to traffic count data collected on Second Avenue by NYSDOT in July 2019 indicates that the recent traffic data collected in August 2021 was much lower than historical conditions. Discussion with the Town of Schaghticoke Code Enforcement Office indicated that Haughney Road has been closed due to a water main break. Second Avenue turns into Haughney Road as it travels north into the Town of Schaghticoke which explains the unusually low traffic volumes on Second Avenue adjacent to the site. In order to account for altered traffic conditions associated with the road closure and impacts related to travel and employment patterns resulting from the COVID-19 pandemic, the August 2021 traffic counts were factored to 2019 conditions based on a review of the NYSDOT traffic count data and a trip generation assessment of single family homes located on Roosevelt Avenue and the mobile homes located in the *Anchor Park* community. The factored 2021 traffic volumes at the study area intersection during the weekday morning and afternoon peak hours are shown on Figure 2-1. The raw turning movement count data is included under Attachment B.

3.0 Sight Distance Evaluation

A sight distance evaluation was completed at the proposed site access road intersections on Second Avenue. The sight distance was measured from the perspective of a vehicle exiting the site access roads and for a vehicle traveling north along Second Avenue and looking straight ahead to turn left into each access road. The available intersection sight distance should provide drivers a sufficient view of the intersecting street to allow passenger cars to enter or exit the intersection without excessively slowing vehicles traveling at or near the operating speed on the intersecting mainline.



Sight Distance Measurements

Stopping sight distance was also measured on Second Avenue at the proposed site access road locations. Stopping sight distance is the length of the roadway ahead that is visible to the driver. The available stopping sight distance on a roadway should be of sufficient length to enable a vehicle traveling at or near the operating speed to stop before reaching a stationary object in its path. The diagram illustrates these sight distance measurements.

The posted speed limit on Second Avenue is 30-mph near the proposed site access roads. As noted above, traffic speed data measurements collected as part of this study show that the 85th percentile speed on Second Avenue is 42-mph in the northbound direction and 43-mph in the southbound direction. The available sight distances shown in Table 1 are compared to the guidelines presented in AASHTO's *A Policy on Geometric Design of Highways and Streets*, 2018 and NYSDOT design guidance (EB 17-007) for the applicable 40-mph operating speed for northbound vehicles and 45-mph operating speed for southbound vehicles on Second Avenue.

[1] The 85th percentile speed is the speed in which 85 percent of drivers were observed driving at or below.

Table 1 – Sight Distance Summary (Feet)

Intersection		Intersection Sight Distance[1]				Stopping Sight Distance[2]	
		Right Turn from Site Access Rd (D_L)	Left Turn from Site Access Road		Left Turn from Second Avenue (D_S)	SSD_{NB}	SSD_{SB}
			Looking Left (D_L)	Looking Right (D_R)			
Second Avenue/ North Site Access Road	Available	>750[3]	>750[3]	400	>900	375	>900
	Recommended	430	500	445	365	305	360
Second Avenue/ South Site Access Road	Available	495	495	860	375	865	400
	Recommended	430	500	445	365	305	360

[1] Intersection sight distance is measured at an eye height and object height of 3.5-ft.
[2] $SSD_{NB, SB}$ = Stopping sight distance measured for a 2-foot object located in the path of northbound/southbound vehicles on Second Avenue
XXX[3] = Sight Distance measured assuming vegetation on the west side of Second Avenue near site access roads are removed

- Second Avenue/North Site Access Road – The available stopping sight distance for vehicles traveling northbound and southbound on Second Avenue, as well as the intersection sight distance for vehicles traveling northbound on Second Avenue looking straight to make a left turn into the site access road meet AASHTO guidelines for the applicable operating speeds. The available intersection sight distance for vehicles exiting the site access road looking left to make a left or right turn onto Second Avenue is blocked due to heavy vegetation on the west side of the road near the proposed access road as shown on Photo #1. It is recommended that vegetation located along the site property frontage be removed and that vegetation located within the right-of-way be cleared to the extent possible in order to maximize sight lines looking left. In addition, the available intersection sight distance looking right to make a left turn exiting the site is less than AASHTO guidelines for the 40-mph operating speed due to the combination of a horizontal curve on Second Avenue (see Photo #2).

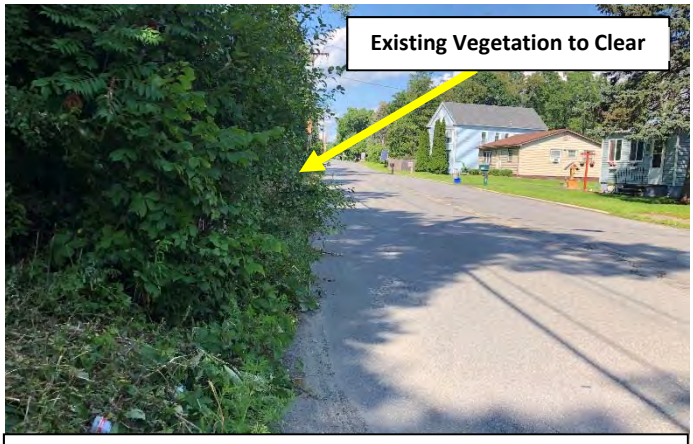
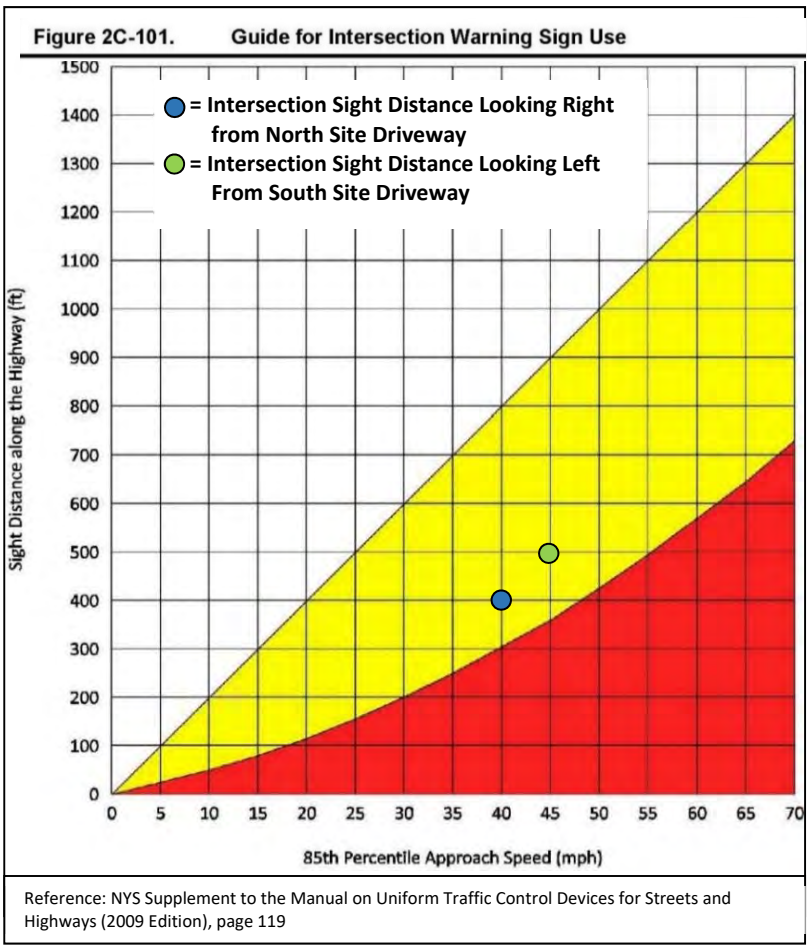


Photo #1 – North Access Road Distance Looking Left



Photo #2 – North Access Road Distance Looking Right

Figure 2C-101 found in the New York State Supplement (NYS Supplement) to the National Manual for Uniform Traffic Control Devices (NMUTCD) provides guidance for the installation of "Intersection Warning" signs as mitigation for sight distance. A review of Figure 2C-101 (see figure to the right) indicates that the available sight distance looking right from the North Site Access Road is less than desirable, but not critically limited for the operating speed and therefore an "Intersection Warning" sign is not recommended.



Reference: NYS Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition), page 119

- The available intersection and stopping sight distances for vehicles entering/exiting the South Site Access Road meet AASHTO guidelines for the applicable operating speeds on Second Avenue with the exception of a driver looking left to make a left-turn. The available sight distance looking left is five feet short of the recommended AASHTO guideline due to the horizontal curve on Second Avenue. A review of Figure 2C-101 of the NYS Supplement indicates that the sight distance looking left is not critically limited and no mitigation is recommended.

It is noted that the sight distance conclusions would still apply if the design speed on Second Avenue was rounded up to 45-mph in both directions. It is recommended that any site signing be placed a minimum of fifteen feet back from the travel way and that the landscaping plan consider sight lines in order to maintain visibility at the site access locations.

4.0 Traffic Assessment

Trip Generation

Trip generation determines the quantity of traffic expected to travel to and from a given site. The Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 10th Edition, is the industry-standard resource for estimating trip generation for proposed land uses based on data collected at sites with similar land uses. Traffic estimates were prepared using Land Use Code (LUC) 221 - Multifamily Housing (Mid-Rise) for the 231 apartment units. The trip generation estimate is summarized in Table 2.

Table 2 – Trip Generation Summary

Data Source	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total
Multifamily Housing (Mid-Rise) – 231 Units	22	61	83	62	40	102

The trip generation summary shown in Table 2 indicates that the proposed project will generate a total of 83 trips during the AM peak hour and 102 trips during the PM peak hour. It is noted that the distribution of travel in and out of the site will result in a maximum increase of approximately 47 new trips on any one approach of the study area intersection. The magnitude of the new vehicle trips generated at the site is less than the NYSDOT and ITE threshold of 100 site generated vehicles on any one intersection approach for needing off-site intersection analysis. This guidance was developed as a tool to identify locations where the magnitude of traffic generated has the potential to impact operations at off site intersections and screen out locations from requiring detailed analysis that do not reach the 100 vehicle threshold; however, the Second Avenue/Roosevelt Avenue intersection was evaluated since a fourth leg is proposed opposite Roosevelt Avenue.

Future Traffic Volumes

To forecast traffic volumes, it is necessary to understand trends in background growth rates, other developments proposed in the area, and the additional traffic generated by the proposed project. The Town of Schaghticoke and City of Troy Planning Departments were contacted to determine if there were any other proposed development projects underway near the project site. Traffic associated with the approved redevelopment of the *Standard Manufacturing Building* into an apartment development was estimated and distributed through the local roadway network.

The proposed project is expected to be fully occupied by 2023. Historical traffic volume data published by NYSDOT, indicates that traffic volume growth in the vicinity of the site has decreased by approximately 0.15 percent per year over the past several years; therefore, a growth of ¼ percent per year from 2021 to 2023 was used to conservatively estimate the background growth in traffic volumes. The 2023 No-Build traffic volumes, representing future traffic volumes in the study area prior to construction of the proposed project, are illustrated on Figure 2-2.

Traffic generated by the project was distributed on the adjacent roadways based on the existing ATR count conducted on Second Avenue during the study periods. The trip distributions for new trips are shown on Figure 3-1 and the trip assignment is shown on Figure 3-2. The site-generated trips were added to the 2023 No-Build traffic volumes, resulting in the 2023 Build traffic volumes as shown on Figure 4-1.

Traffic Operations

Intersection Level of Service (LOS) and capacity analysis relate traffic volumes to the physical characteristics of an intersection. Intersection evaluations were made using the Synchro 11 Software, which automates the procedures contained in the *Highway Capacity Manual.* Table 3 summarize the results of the level of service calculations for the proposed project. The detailed level of service analyses are included under Attachment C.

Table 3 – Level of Service Summary

Intersection		Control	AM Peak Hour			PM Peak Hour		
			2021 Existing	2023 No-Build	2023 Build	2021 Existing	2023 No-Build	2023 Build
Second Avenue/Roosevelt Avenue/North Site Access Road		U						
North Site Access Road EB	LTR		--	--	B (10.1)	--	--	B (10.1)
Roosevelt Avenue WB	LTR		A (9.5)	A (9.6)	B (10.3)	B (10.9)	B (11.0)	B (12.0)
Second Avenue NB	LTR		--	--	A (7.7)	--	--	A (7.6)
Second Avenue SB	LTR		A (7.3)	A (7.4)	A (7.4)	A (7.8)	A (7.8)	A (7.8)
Second Avenue/South Site Access Road		U						
Second Avenue NB	L		--	--	A (7.7)	--	--	A (7.5)
South Site Access Road EB	LR		--	--	A (9.9)	--	--	A (9.8)

U = Unsignalized intersection, L, T, R = Left-turn, Through, and/or Right-turn movements
EB, WB, NB, SB = Eastbound, Westbound, Northbound, and Southbound intersection approaches
X (Y.Y) = Level of service (Average delay in seconds per vehicle)

The impact of the project can be described by comparing the analysis of the No-Build and Build operating conditions. The follow observation are evident from this analysis:

- Second Avenue/Roosevelt Avenue/North Site Access Road: A review of the site plan indicates that the North Site Access Road will be constructed opposite Roosevelt Avenue creating a fourth leg to this intersection. It is recommended that a single lane for entering and exiting traffic be provided and that the eastbound approach operate under stop-sign control. The analysis indicates that the westbound Roosevelt Avenue approach will operate at LOS A/B during the AM and PM peak hours through No-Build conditions and will operate at LOS B during both peak hours after development of the site with an increase in average vehicle delay less than one second. The eastbound North Site Access Road approach will operate at LOS B during both peak hours after full build-out of the residential facility. In addition, the northbound and southbound left-turn movements from Second Avenue will operate at LOS A during both peak hours through Build conditions. No mitigation is recommended at this intersection.

- Second Avenue/South Site Access Road: It is recommended that the South Site Access Road provide a single lane entering and exiting and operate under stop-sign control on the eastbound access road approach. The level of service analysis indicates that the eastbound site access road approach and the northbound left turn movement from Second Avenue will operate at LOS A during both peak hours after construction of the proposed residential development.

Pedestrian Accommodations

A sidewalk will be constructed on the west side of Second Avenue along the site frontage which will connect to the internal pedestrian accommodations being provided by the residential development.

5.0 Conclusions

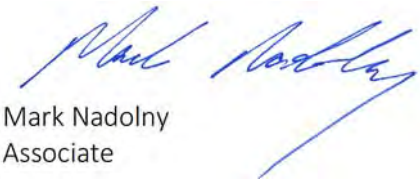
The project development proposes to construct 231 apartment units in three buildings on the west side of Second Avenue. The North Site Access Road will be located opposite Roosevelt Avenue while the South Site Access Road will be located approximately 450-feet to the south. It is anticipated that the residential subdivision will be fully constructed and occupied by 2023. The following conclusions are noted:

- The project is estimated to generate 83 new trips during the AM peak hour and 102 trips during the PM peak hour.
- It is recommended that the North Site Access Road be constructed opposite Roosevelt Avenue creating a fourth leg to this intersection. A single lane for entering and exiting traffic will be provided and the eastbound approach will operate under stop-sign control. The level of service analysis indicates that the unsignalized Second Avenue/Roosevelt Avenue/North Site Access Road intersection will operate at LOS B or better on all approaches after full build-out of the residential development.
- It is also recommended that the South Site Access Road provide a single lane entering and exiting and operate under stop-sign control on the eastbound access road approach. The unsignalized eastbound South Site Access Road approach to Second Avenue will operate at LOS A during both peak hours after development of the project.
- A sidewalk will be constructed on the west side of Second Avenue along the site frontage which will connect to the internal pedestrian accommodations being provided by the residential development.
- The available intersection and stopping sight distances at the North Site Access Road intersection on Second Avenue meet AASHTO guidelines for the operating speed after clearing of vegetation along the site frontage with the exception of the available intersection sight distance looking right to make a left-turn exiting the site. A review of the NMUTCD and NYS Supplement indicates that the available sight distance looking right is not critically limited and the installation of an Intersection Warning sign is not necessary.

- The sight distance analysis indicates that adequate sight lines will be provided at the South Site Access Road intersection on Second Avenue for the applicable operating speeds.
- It is recommended that any site signing be placed a minimum of fifteen feet back from the travel way and that the landscaping plan consider sight lines in order to maintain visibility at the site access locations.

Please feel free to call our office if you have any questions or comments regarding the above assessment.

Respectfully submitted,
Creighton Manning Engineering, LLP



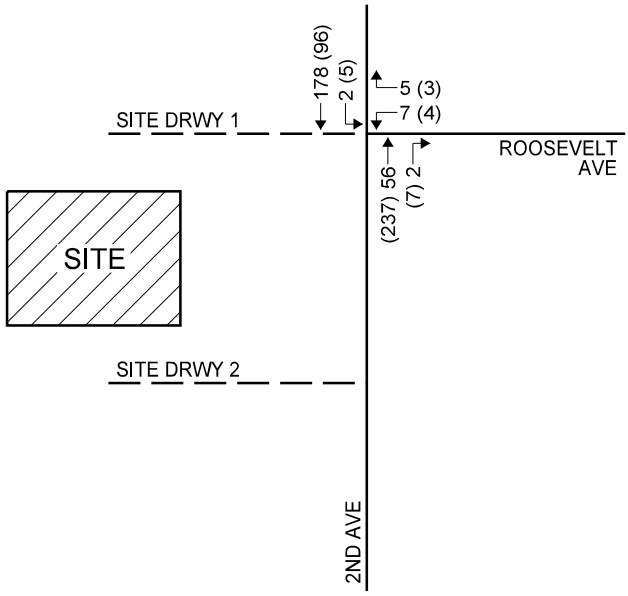
Mark Nadolny
Associate

Attachments

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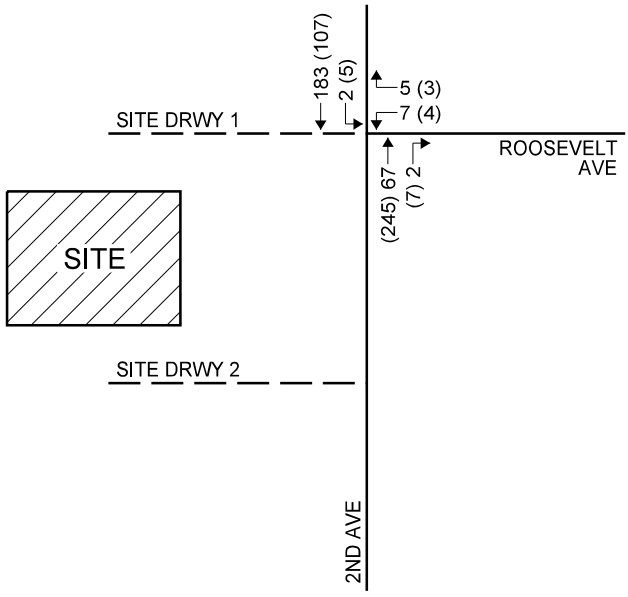
EXISTING 2021



AM PEAK HOUR (PM PEAK HOUR)

②

NO-BUILD 2023



AM PEAK HOUR (PM PEAK HOUR)

TRAFFIC VOLUMES

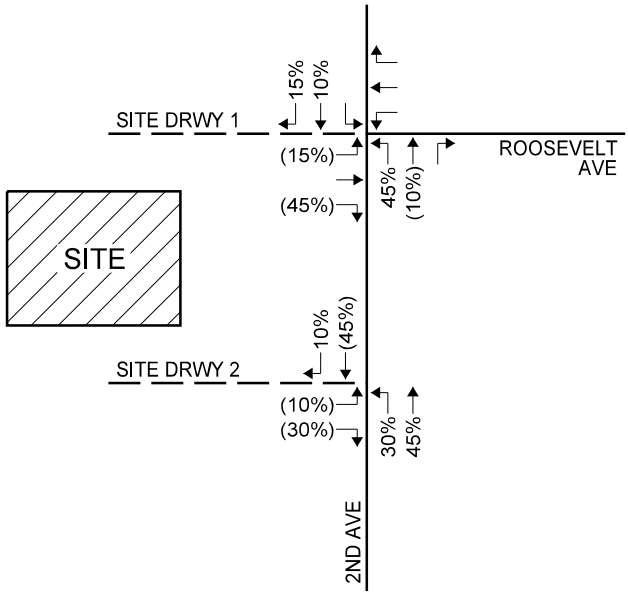
SECOND AVENUE APARTMENTS
CITY OF TROY, NEW YORK

Creighton Manning

PROJECT: 121-213	DATE: 08/2021	FIGURE: 2

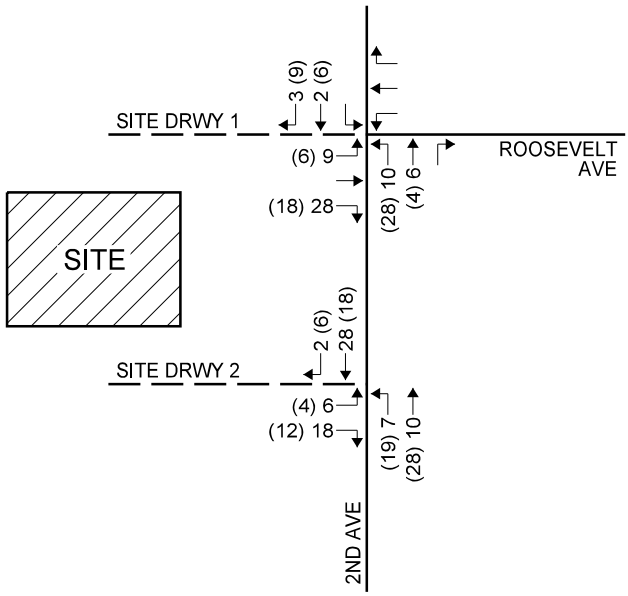
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① TRIP DISTRIBUTION



ENTER (EXIT)

② TRIP ASSIGNMENT



AM PEAK HOUR (PM PEAK HOUR)

TRAFFIC VOLUMES

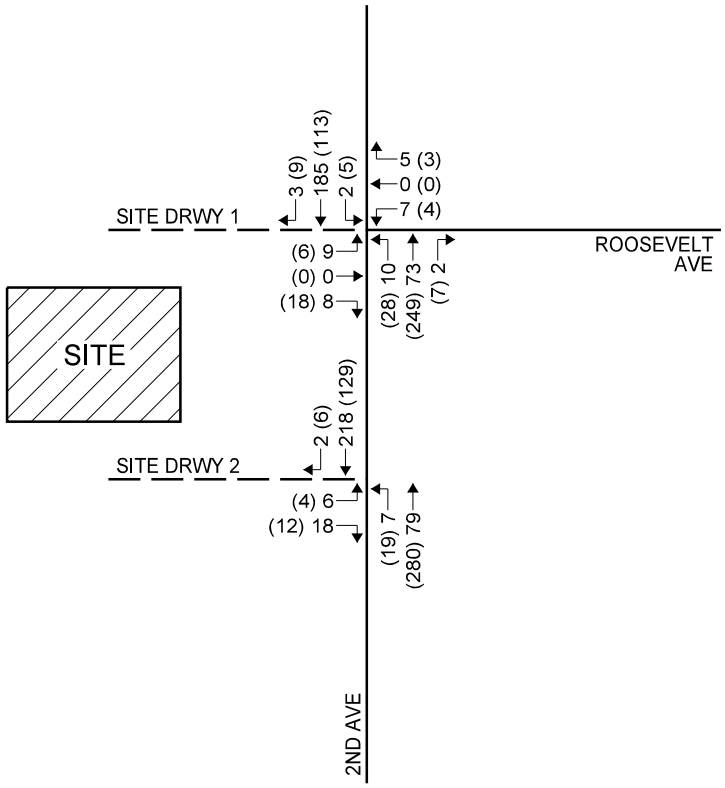
SECOND AVENUE APARTMENTS
CITY OF TROY, NEW YORK

Creighton Manning

PROJECT: 121-213	DATE: 08/2021	FIGURE: 3

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BUILD 2023



AM PEAK HOUR (PM PEAK HOUR)

TRAFFIC VOLUMES

SECOND AVENUE APARTMENTS
CITY OF TROY, NEW YORK

Creighton Manning

PROJECT: 121-213	DATE: 08/2021	FIGURE: 4

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Attachment A
Site Plan

Troy 2nd Avenue Apartments
City of Troy, New York



ZONING MAP

Zoning Legend

ZONE	DEFINITION
B1	Neighborhood Commercial
B2	Community Commercial
B3	Shopping Center Commercial
B4	Central Commercial
B5	Highway Commercial
CON	Conservation
HCD	Hoosick St Commerce District
HPD	Hoosick St Professional District
HWD	Hoosick St Waterfront District
IND	Industrial
INST	Institutional
P	Planned Development
R1	Single Family Residential, Detached
R2	Two Family Residential
R3	Multiple Family Residential, Medium Density
R4	Urban Neighborhood Residential, Medium To High Den
R5	High Rise Residential, High Density
TS	Urban Core
WCD	Waterfront Commercial District
WMD	Waterfront Mixed Use District
WTD	Waterfront Trade District

SITE INFORMATION

	EXISTING ZONING (R-1)	PROPOSED ZONING (PDD)
MINIMUM LOT AREA:	7,200 SF	10± AC (WITHIN CITY OF TROY)
MAXIMUM DENSITY	5.5 UNITS/AC	23 UNITS/AC
MAXIMUM LOT COVERAGE	40%	40%
MAX BUILDING HEIGHT	25 FT	60 FT
SETBACK REQUIREMENTS		
FRONT BLDG. SETBACK:	25' MIN	30' (STREET SIDE)
SIDE BLDG. SETBACK:	10' MIN EACH SIDE	30'
REAR BLDG. SETBACK:	30' MIN	15' (WATER SIDE)
PARKING		
PROPOSED:	1-2 SPACES/UNIT	1.5 SPACES / UNIT GARAGE PARKING: 178 SPACES SURFACE PARKING: 175 SPACES (INCLUDING 12 ADA SPACES)
LAND USE:		MULTI-FAMILY RESIDENTIAL

THE ALTERATION OF THIS MATERIAL IN ANY WAY, UNLESS DONE UNDER THE DIRECTION OF A COMPARABLE PROFESSIONAL, (I.E.) ARCHITECT FOR AN ARCHITECT, ENGINEER FOR AN ENGINEER OR LANDSCAPE ARCHITECT FOR A LANDSCAPE ARCHITECT, IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW AND/OR REGULATIONS AND IS A CLASS "A" MISDEMEANOR.

SUBMITTAL / REVISIONS

No.	DATE	DESCRIPTION	BY	REVIEWED BY:	DATE

PROJ. MANAGER:	JWE
CHIEF DESIGNER:	JWE
DESIGNED BY:	JWE
DRAWN BY:	JWE
CHECKED BY:	-

SEAL

DRAFT

Engineering and Land Surveying, P.C.
1533 Crescent Road - Clifton Park, NY 12065

TROY SECOND AVE

CONCEPT PLAN

KEVIN VANDENBURGH

CITY OF TROY AND TOWN OF SCHAGHTICOKE NEW YORK

SCALE:	1" = 50'
CONTRACT No.:	-
MJ PROJ. No.:	972.44
DATE:	AUGUST 2020

C-1

Attachment B
Traffic Volume Data

Troy 2nd Avenue Apartments
City of Troy, New York

NYSDOT ATR Count Data

Time	Station 142007 - 2nd Ave - 130' North of Row C Way 7/23/2019		
	NB	SB	Combined
12:00:00 AM	13	6	19
1:00:00 AM	4	3	7
2:00:00 AM	5	2	7
3:00:00 AM	2	4	6
4:00:00 AM	4	12	16
5:00:00 AM	8	54	62
6:00:00 AM	29	143	172
7:00:00 AM	58	184	242
8:00:00 AM	64	118	182
9:00:00 AM	67	91	158
10:00:00 AM	90	86	176
11:00:00 AM	93	84	177
12:00:00 PM	110	89	199
1:00:00 PM	122	97	219
2:00:00 PM	119	92	211
3:00:00 PM	212	100	312
4:00:00 PM	236	100	336
5:00:00 PM	243	100	343
6:00:00 PM	165	94	259
7:00:00 PM	120	84	204
8:00:00 PM	114	78	192
9:00:00 PM	71	36	107
10:00:00 PM	47	28	75
11:00:00 PM	32	10	42
Sum:	**2028**	**1695**	**3723**

Project No.: 121-213
Counted By: BP
Location: 2nd Ave - Roosevelt
Comments: AM Peak Hour

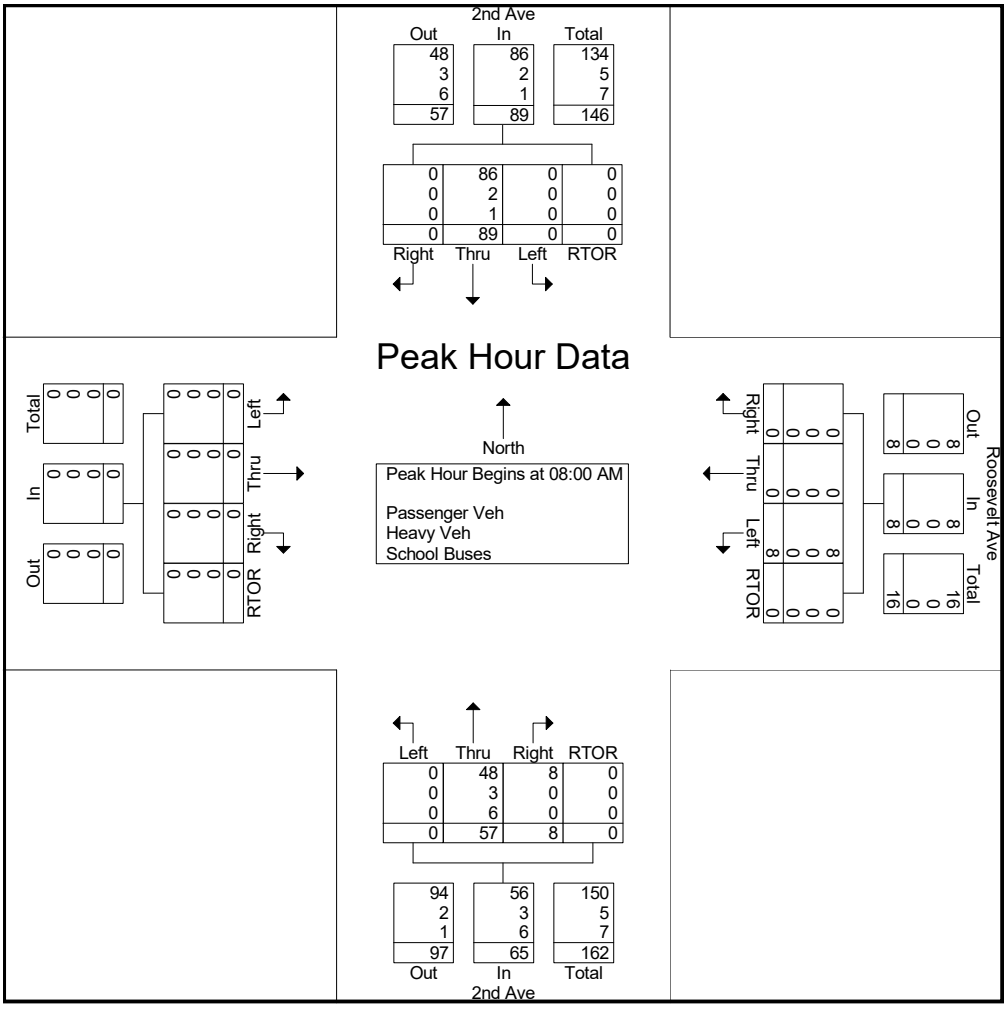
File Name : 20210804_2nd Ave - Roosevelt AM_121213 (real)
Site Code : 12107801
Start Date : 8/4/2021
Page No : 1

Groups Printed- Passenger Veh - Heavy Veh - School Buses

	Eastbound					Roosevelt Ave Westbound					2nd Ave Northbound					2nd Ave Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
07:00 AM	0	0	0	0	0	3	0	0	0	3	0	12	3	0	15	0	19	0	0	19	37
07:15 AM	0	0	0	0	0	2	0	1	0	3	0	10	1	0	11	0	14	0	0	14	28
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	11	0	0	11	0	20	0	0	20	31
07:45 AM	0	0	0	0	0	1	0	0	0	1	0	9	0	0	9	0	21	0	0	21	31
Total	0	0	0	0	0	6	0	1	0	7	0	42	4	0	46	0	74	0	0	74	127
08:00 AM	0	0	0	0	0	2	0	0	0	2	0	14	2	0	16	0	14	0	0	14	32
08:15 AM	0	0	0	0	0	1	0	0	0	1	0	17	3	0	20	0	27	0	0	27	48
08:30 AM	0	0	0	0	0	3	0	0	0	3	0	14	1	0	15	0	27	0	0	27	45
08:45 AM	0	0	0	0	0	2	0	0	0	2	0	12	2	0	14	0	21	0	0	21	37
Total	0	0	0	0	0	8	0	0	0	8	0	57	8	0	65	0	89	0	0	89	162
Grand Total	0	0	0	0	0	14	0	1	0	15	0	99	12	0	111	0	163	0	0	163	289
Apprch %	0	0	0	0		93.3	0	6.7	0		0	89.2	10.8	0		0	100	0	0		
Total %	0	0	0	0	0	4.8	0	0.3	0	5.2	0	34.3	4.2	0	38.4	0	56.4	0	0	56.4	
Passenger Veh	0	0	0	0	0	14	0	1	0	15	0	88	12	0	100	0	159	0	0	159	274
% Passenger Veh	0	0	0	0	0	100	0	100	0	100	0	88.9	100	0	90.1	0	97.5	0	0	97.5	94.8
Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	3	0	0	3	6
% Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	3	0	0	2.7	0	1.8	0	0	1.8	2.1
School Buses	0	0	0	0	0	0	0	0	0	0	0	8	0	0	8	0	1	0	0	1	9
% School Buses	0	0	0	0	0	0	0	0	0	0	0	8.1	0	0	7.2	0	0.6	0	0	0.6	3.1

File Name : 20210804_2nd Ave - Roosevelt AM_121213 (real)
Site Code : 12107801
Start Date : 8/4/2021
Page No : 2

	Eastbound					Roosevelt Ave Westbound					2nd Ave Northbound					2nd Ave Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	0	0	0	0	2	0	0	0	2	0	14	2	0	16	0	14	0	0	14	32
08:15 AM	0	0	0	0	0	1	0	0	0	1	0	**17**	**3**	0	**20**	0	**27**	0	0	**27**	**48**
08:30 AM	0	0	0	0	0	**3**	0	0	0	**3**	0	14	1	0	15	0	27	0	0	27	45
08:45 AM	0	0	0	0	0	2	0	0	0	2	0	12	2	0	14	0	21	0	0	21	37
Total Volume	0	0	0	0	0	8	0	0	0	8	0	57	8	0	65	0	89	0	0	89	162
% App. Total	0	0	0	0		100	0	0	0		0	87.7	12.3	0		0	100	0	0		
PHF	.000	.000	.000	.000	.000	.667	.000	.000	.000	.667	.000	.838	.667	.000	.813	.000	.824	.000	.000	.824	.844
Passenger Veh	0	0	0	0	0	8	0	0	0	8	0	48	8	0	56	0	86	0	0	86	150
% Passenger Veh	0	0	0	0	0	100	0	0	0	100	0	84.2	100	0	86.2	0	96.6	0	0	96.6	92.6
Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	2	0	0	2	5
% Heavy Veh	0	0	0	0	0	0	0	0	0	0	0	5.3	0	0	4.6	0	2.2	0	0	2.2	3.1
School Buses	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	1	0	0	1	7
% School Buses	0	0	0	0	0	0	0	0	0	0	0	10.5	0	0	9.2	0	1.1	0	0	1.1	4.3



Project No.: 120-213
Counted By: MPF
Location: 2nd Ave/Roosevelt Ave
Comments: PM Peak

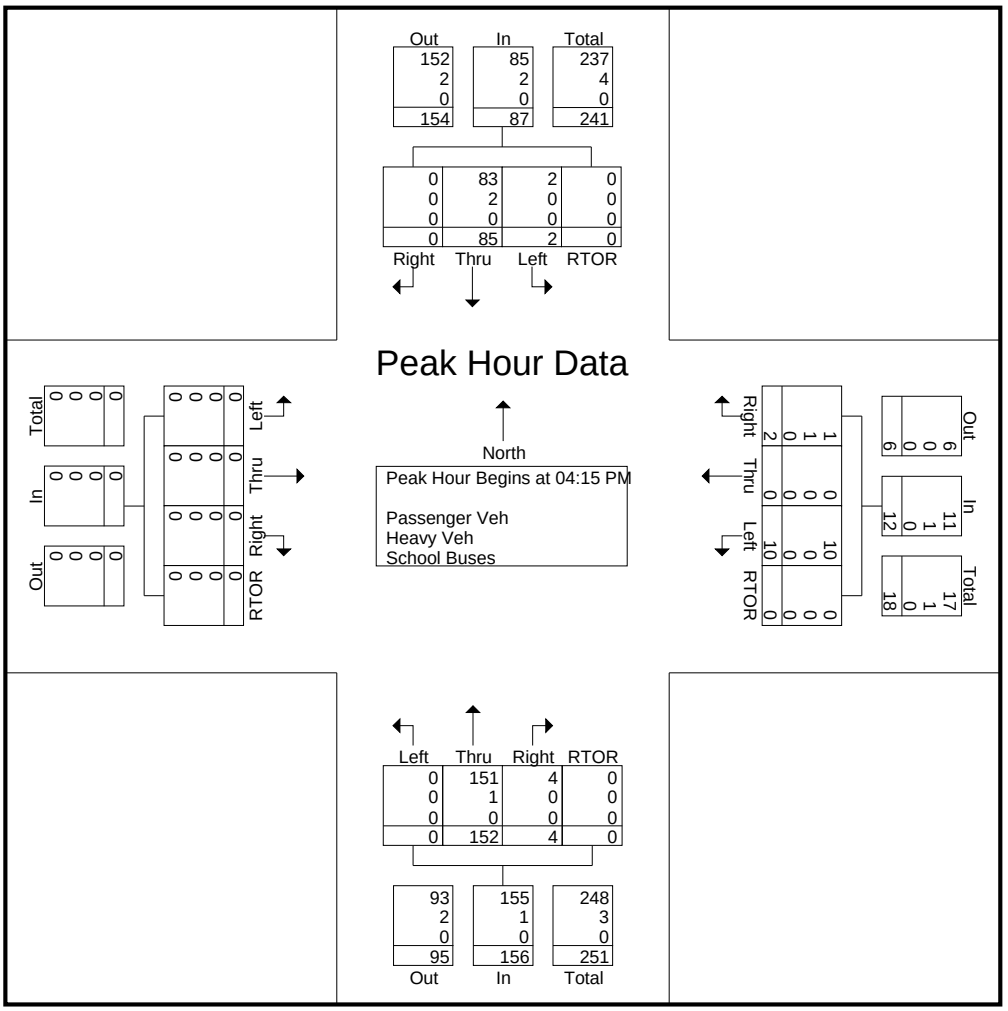
File Name : 20210729_2nd Ave - Roosevelt PM_121213 (real)
Site Code : 12121301
Start Date : 7/28/2021
Page No : 1

Groups Printed- Passenger Veh - Heavy Veh - School Buses

	Eastbound					Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
04:00 PM	0	0	0	0	0	1	0	0	0	1	0	23	5	0	28	0	16	0	0	16	45
04:15 PM	0	0	0	0	0	4	0	1	0	5	0	34	2	0	36	1	14	0	0	15	56
04:30 PM	0	0	0	0	0	2	0	1	0	3	0	37	2	0	39	0	21	0	0	21	63
04:45 PM	0	0	0	0	0	2	0	0	0	2	0	48	0	0	48	1	24	0	0	25	75
Total	0	0	0	0	0	9	0	2	0	11	0	142	9	0	151	2	75	0	0	77	239
05:00 PM	0	0	0	0	0	2	0	0	0	2	0	33	0	0	33	0	26	0	0	26	61
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	30	1	0	31	1	12	0	0	13	44
05:30 PM	0	0	0	0	0	4	0	0	0	4	0	35	1	0	36	0	10	0	0	10	50
05:45 PM	0	0	0	0	0	1	0	0	0	1	0	30	6	0	36	1	16	0	0	17	54
Total	0	0	0	0	0	7	0	0	0	7	0	128	8	0	136	2	64	0	0	66	209
Grand Total	0	0	0	0	0	16	0	2	0	18	0	270	17	0	287	4	139	0	0	143	448
Apprch %	0	0	0	0		88.9	0	11.1	0		0	94.1	5.9	0		2.8	97.2	0	0		
Total %	0	0	0	0	0	3.6	0	0.4	0	4	0	60.3	3.8	0	64.1	0.9	31	0	0	31.9	
Passenger Veh	0	0	0	0	0	16	0	1	0	17	0	267	17	0	284	4	137	0	0	141	442
% Passenger Veh	0	0	0	0	0	100	0	50	0	94.4	0	98.9	100	0	99	100	98.6	0	0	98.6	98.7
Heavy Veh	0	0	0	0	0	0	0	1	0	1	0	3	0	0	3	0	2	0	0	2	6
% Heavy Veh	0	0	0	0	0	0	0	50	0	5.6	0	1.1	0	0	1	0	1.4	0	0	1.4	1.3
School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

File Name : 20210729_2nd Ave - Roosevelt PM_121213 (real)
Site Code : 12121301
Start Date : 7/28/2021
Page No : 2

	Eastbound					Westbound					Northbound					Southbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	0	0	0	0	**4**	0	**1**	0	**5**	0	34	**2**	0	36	**1**	14	0	0	15	56
04:30 PM	0	0	0	0	0	2	0	1	0	3	0	37	2	0	39	0	21	0	0	21	63
04:45 PM	0	0	0	0	0	2	0	0	0	2	0	**48**	0	0	**48**	1	24	0	0	25	**75**
05:00 PM	0	0	0	0	0	2	0	0	0	2	0	33	0	0	33	0	**26**	0	0	**26**	61
Total Volume	0	0	0	0	0	10	0	2	0	12	0	152	4	0	156	2	85	0	0	87	255
% App. Total	0	0	0	0		83.3	0	16.7	0		0	97.4	2.6	0		2.3	97.7	0	0		
PHF	.000	.000	.000	.000	.000	.625	.000	.500	.000	.600	.000	.792	.500	.000	.813	.500	.817	.000	.000	.837	.850
Passenger Veh	0	0	0	0	0	10	0	1	0	11	0	151	4	0	155	2	83	0	0	85	251
% Passenger Veh	0	0	0	0	0	100	0	50.0	0	91.7	0	99.3	100	0	99.4	100	97.6	0	0	97.7	98.4
Heavy Veh	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	0	2	0	0	2	4
% Heavy Veh	0	0	0	0	0	0	0	50.0	0	8.3	0	0.7	0	0	0.6	0	2.4	0	0	2.3	1.6
School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



MetroCount Traffic Executive
Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-118 -- English (ENU)

Datasets:

Site:	**[121-213] 300' South of Roosevelt Ave**
Attribute:	Troy 2nd Ave
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 1
Survey Duration:	12:47 Wednesday, July 28, 2021 => 11:43 Wednesday, August 4, 2021,
Zone:	
File:	121-213 0 2021-08-04 1143.EC1 (Plus)
Identifier:	FZ12WDHB MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default axle (v5.08)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**16:00 Wednesday, July 28, 2021 => 9:00 Wednesday, August 4, 2021 (6.70833)**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	North, South (bound), P = North, Lane = 0-16
Separation:	Headway > 0 sec, Span 0 - 300 ft
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F3)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 17513 / 17580 (99.62%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-118
Site: 121-213.1.2NS
Description: **300' South of Roosevelt Ave**
Filter time: **16:00 Wednesday, July 28, 2021 => 9:00 Wednesday, August 4, 2021**
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1-13) Dir(NS) Sp(5,100) Headway(>0) Span(0 - 300) Lane(0-16)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	8.0	4.0	17.0	9.0	7.0	17.0	16.0	9.0	11.1
0100-0200	7.0	12.0	8.0	8.0	11.0	6.0	9.0	9.2	8.7
0200-0300	4.0	5.0	6.0	2.0	4.0	4.0	3.0	4.2	4.0
0300-0400	9.0	6.0	9.0	7.0	9.0	3.0	3.0	8.0	6.6
0400-0500	22.0	10.0	11.0	13.0	16.0	5.0	7.0	14.4	12.0
0500-0600	44.0	47.0	33.0	36.0	39.0	22.0	14.0	39.8	33.6
0600-0700	76.0	101.0	99.0	106.0	97.0	38.0	30.0	95.8	78.1
0700-0800	126.0	135.0	127.0	98.0	116.0	67.0	57.0	120.4	103.7
0800-0900	**162.0**	**165.0**	161.0	144.0	153.0	126.0	90.0	**157.0**	143.0
0900-1000	126.0	146.0	*	137.0	128.0	174.0	176.0	134.3	147.8
1000-1100	110.0	147.0	*	115.0	135.0	164.0	166.0	126.8	139.5
1100-1200	151.0	130.0	*	**164.0**	**160.0**	**220.0**	**207.0**	151.3	**172.0**
1200-1300	145.0	148.0	*	178.0	190.0	228.0	**252.0**	165.3	190.2
1300-1400	152.0	152.0	*	125.0	151.0	225.0	189.0	145.0	165.7
1400-1500	180.0	156.0	*	180.0	167.0	**234.0**	213.0	170.8	188.3
1500-1600	230.0	193.0	*	169.0	194.0	211.0	165.0	196.5	193.7
1600-1700	226.0	204.0	240.0	203.0	233.0	187.0	131.0	221.2	203.4
1700-1800	**294.0**	**285.0**	232.0	**204.0**	**260.0**	213.0	148.0	**255.0**	**233.7**
1800-1900	209.0	191.0	227.0	176.0	196.0	191.0	128.0	199.8	188.3
1900-2000	223.0	155.0	173.0	108.0	174.0	160.0	104.0	166.6	156.7
2000-2100	152.0	138.0	116.0	78.0	153.0	144.0	74.0	127.4	122.1
2100-2200	81.0	90.0	73.0	69.0	91.0	109.0	72.0	80.8	83.6
2200-2300	72.0	48.0	33.0	32.0	103.0	51.0	44.0	57.6	54.7
2300-2400	20.0	21.0	22.0	12.0	45.0	78.0	28.0	24.0	32.3
Totals									
0700-1900	2111.0	2052.0	*	1893.0	2083.0	2240.0	1922.0	2043.2	2069.3
0600-2200	2643.0	2536.0	*	2254.0	2598.0	2691.0	2202.0	2513.8	2509.9
0600-0000	2735.0	2605.0	*	2298.0	2746.0	2820.0	2274.0	2595.4	2596.9
0000-0000	2829.0	2689.0	*	2373.0	2832.0	2877.0	2326.0	2680.0	2672.9
AM Peak	0800	0800	*	1100	1100	1100	1100		
	162.0	165.0	*	164.0	160.0	220.0	207.0		
PM Peak	1700	1700	*	1700	1700	1400	1200		
	294.0	285.0	*	204.0	260.0	234.0	252.0		

*** - No data.**

MetroCount Traffic Executive
Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-119 -- English (ENU)

Datasets:

Site:	**[121-213] 300' South of Roosevelt Ave**
Attribute:	Troy 2nd Ave
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 1
Survey Duration:	12:47 Wednesday, July 28, 2021 => 11:43 Wednesday, August 4, 2021,
Zone:	
File:	121-213 0 2021-08-04 1143.EC1 (Plus)
Identifier:	FZ12WDHB MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default axle (v5.08)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**16:00 Wednesday, July 28, 2021 => 9:00 Wednesday, August 4, 2021 (6.70833)**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	AB , Lane = 0-16
Separation:	Headway > 0 sec, Span 0 - 300 ft
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F3)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 9280 / 17580 (52.79%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-119
Site: 121-213.1.2NS
Description: **300' South of Roosevelt Ave**
Filter time: **16:00 Wednesday, July 28, 2021 => 9:00 Wednesday, August 4, 2021**
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1-13) Dir(AB) Sp(5,100) Headway(>0) Span(0 - 300) Lane(0-16)

Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
0000-0100	7.0	3.0	12.0	4.0	6.0	10.0	10.0	6.4	7.4
0100-0200	4.0	7.0	5.0	5.0	7.0	4.0	7.0	5.6	5.6
0200-0300	0.0	3.0	4.0	2.0	2.0	4.0	3.0	2.2	2.6
0300-0400	4.0	1.0	3.0	3.0	3.0	1.0	3.0	2.8	2.6
0400-0500	3.0	0.0	1.0	3.0	3.0	1.0	5.0	2.0	2.3
0500-0600	9.0	11.0	2.0	7.0	6.0	8.0	6.0	7.0	7.0
0600-0700	16.0	27.0	21.0	24.0	21.0	13.0	13.0	21.8	19.3
0700-0800	44.0	48.0	46.0	26.0	38.0	25.0	23.0	40.4	35.7
0800-0900	63.0	**76.0**	67.0	60.0	64.0	62.0	44.0	66.0	62.3
0900-1000	61.0	69.0	*	61.0	48.0	87.0	98.0	59.8	70.7
1000-1100	54.0	68.0	*	63.0	68.0	97.0	92.0	63.3	73.7
1100-1200	**79.0**	69.0	*	**84.0**	**86.0**	**121.0**	**114.0**	**79.5**	**92.2**
1200-1300	85.0	74.0	*	88.0	104.0	124.0	**124.0**	87.8	99.8
1300-1400	80.0	79.0	*	72.0	87.0	**128.0**	112.0	79.5	93.0
1400-1500	98.0	90.0	*	96.0	98.0	124.0	92.0	95.5	99.7
1500-1600	159.0	125.0	*	109.0	113.0	114.0	91.0	126.5	118.5
1600-1700	149.0	120.0	155.0	123.0	137.0	108.0	76.0	136.8	124.0
1700-1800	**205.0**	**196.0**	152.0	**129.0**	**164.0**	104.0	90.0	**169.2**	**148.6**
1800-1900	126.0	92.0	135.0	109.0	117.0	99.0	70.0	115.8	106.9
1900-2000	109.0	82.0	91.0	64.0	109.0	98.0	56.0	91.0	87.0
2000-2100	79.0	72.0	77.0	42.0	78.0	70.0	38.0	69.6	65.1
2100-2200	40.0	53.0	42.0	48.0	63.0	65.0	45.0	49.2	50.9
2200-2300	21.0	32.0	20.0	18.0	42.0	28.0	29.0	26.6	27.1
2300-2400	13.0	15.0	17.0	11.0	23.0	22.0	14.0	15.8	16.4
Totals									
0700-1900	1203.0	1106.0	*	1020.0	1124.0	1193.0	1026.0	1120.0	1124.9
0600-2200	1447.0	1340.0	*	1198.0	1395.0	1439.0	1178.0	1351.5	1347.2
0600-0000	1481.0	1387.0	*	1227.0	1460.0	1489.0	1221.0	1393.9	1390.8
0000-0000	1508.0	1412.0	*	1251.0	1487.0	1517.0	1255.0	1419.9	1418.2
AM Peak	1100	0800	*	1100	1100	1100	1100		
	79.0	76.0	*	84.0	86.0	121.0	114.0		
PM Peak	1700	1700	*	1700	1700	1300	1200		
	205.0	196.0	*	129.0	164.0	128.0	124.0		

*** - No data.**

MetroCount Traffic Executive
Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-120 -- English (ENU)

Datasets:

Site:	**[121-213] 300' South of Roosevelt Ave**
Attribute:	Troy 2nd Ave
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 1
Survey Duration:	12:47 Wednesday, July 28, 2021 => 11:43 Wednesday, August 4, 2021,
Zone:	
File:	121-213 0 2021-08-04 1143.EC1 (Plus)
Identifier:	FZ12WDHB MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default axle (v5.08)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**16:00 Wednesday, July 28, 2021 => 9:00 Wednesday, August 4, 2021 (6.70833)**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	BA , Lane = 0-16
Separation:	Headway > 0 sec, Span 0 - 300 ft
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F3)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 8233 / 17580 (46.83%)

Weekly Vehicle Counts (Virtual Week)

VirtWeeklyVehicle-120
Site: 121-213.1.2NS
Description: **300' South of Roosevelt Ave**
Filter time: **16:00 Wednesday, July 28, 2021 => 9:00 Wednesday, August 4, 2021**
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1-13) Dir(BA) Sp(5,100) Headway(>0) Span(0 - 300) Lane(0-16)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Averages 1 - 5	Averages 1 - 7
Hour									
0000-0100	1.0	1.0	5.0	5.0	1.0	7.0	6.0	2.6	3.7
0100-0200	3.0	5.0	3.0	3.0	4.0	2.0	2.0	3.6	3.1
0200-0300	4.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	1.4
0300-0400	5.0	5.0	6.0	4.0	6.0	2.0	0.0	5.2	4.0
0400-0500	19.0	10.0	10.0	10.0	13.0	4.0	2.0	12.4	9.7
0500-0600	35.0	36.0	31.0	29.0	33.0	14.0	8.0	32.8	26.6
0600-0700	60.0	74.0	78.0	82.0	76.0	25.0	17.0	74.0	58.9
0700-0800	82.0	87.0	81.0	72.0	78.0	42.0	34.0	80.0	68.0
0800-0900	**99.0**	**89.0**	94.0	**84.0**	**89.0**	64.0	46.0	**91.0**	**80.7**
0900-1000	65.0	77.0	*	76.0	80.0	87.0	78.0	74.5	77.2
1000-1100	56.0	79.0	*	52.0	67.0	67.0	74.0	63.5	65.8
1100-1200	72.0	61.0	*	80.0	74.0	**99.0**	**93.0**	71.8	79.8
1200-1300	60.0	74.0	*	**90.0**	86.0	104.0	**128.0**	77.5	**90.3**
1300-1400	72.0	73.0	*	53.0	64.0	97.0	77.0	65.5	72.7
1400-1500	82.0	66.0	*	84.0	69.0	**110.0**	121.0	75.3	88.7
1500-1600	71.0	68.0	*	60.0	81.0	97.0	74.0	70.0	75.2
1600-1700	77.0	84.0	85.0	80.0	96.0	79.0	55.0	84.4	79.4
1700-1800	89.0	89.0	80.0	75.0	**96.0**	109.0	58.0	**85.8**	85.1
1800-1900	83.0	**99.0**	92.0	67.0	79.0	92.0	58.0	84.0	81.4
1900-2000	**114.0**	73.0	82.0	44.0	65.0	62.0	48.0	75.6	69.7
2000-2100	73.0	66.0	39.0	36.0	75.0	74.0	36.0	57.8	57.0
2100-2200	41.0	37.0	31.0	21.0	28.0	44.0	27.0	31.6	32.7
2200-2300	51.0	16.0	13.0	14.0	61.0	23.0	15.0	31.0	27.6
2300-2400	7.0	6.0	5.0	1.0	22.0	56.0	14.0	8.2	15.9
Totals									
0700-1900	908.0	946.0	*	873.0	959.0	1047.0	896.0	923.2	944.4
0600-2200	1196.0	1196.0	*	1056.0	1203.0	1252.0	1024.0	1162.2	1162.7
0600-0000	1254.0	1218.0	*	1071.0	1286.0	1331.0	1053.0	1201.4	1206.1
0000-0000	1321.0	1277.0	*	1122.0	1345.0	1360.0	1071.0	1260.0	1254.7
AM Peak	0800	0800	*	0800	0800	1100	1100		
	99.0	89.0	*	84.0	89.0	99.0	93.0		
PM Peak	1900	1800	*	1200	1700	1400	1200		
	114.0	99.0	*	90.0	96.0	110.0	128.0		

*** - No data.**

MetroCount Traffic Executive
Speed Statistics

SpeedStat-111 -- English (ENU)

Datasets:

Site:	**[121-213] 300' South of Roosevelt Ave**
Attribute:	Troy 2nd Ave
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 1
Survey Duration:	12:47 Wednesday, July 28, 2021 => 11:43 Wednesday, August 4, 2021,
Zone:	
File:	121-213 0 2021-08-04 1143.EC1 (Plus)
Identifier:	FZ12WDHB MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default axle (v5.08)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**16:00 Wednesday, July 28, 2021 => 9:00 Wednesday, August 4, 2021 (6.70833)**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	North, South (bound), P = North, Lane = 0-16
Separation:	Headway > 0 sec, Span 0 - 300 ft
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F3)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 17513 / 17580 (99.62%)

Speed Statistics

SpeedStat-111
Site: 121-213.1.2NS
Description: **300' South of Roosevelt Ave**
Filter time: **16:00 Wednesday, July 28, 2021 => 9:00 Wednesday, August 4, 2021**
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1-13) Dir(NS) Sp(5,100) Headway(>0) Span(0 - 300) Lane(0-16)

Vehicles = 17513
Posted speed limit = 30 mph, Exceeding = 16274 (92.93%), Mean Exceeding = 38.33 mph
Maximum = 66.5 mph, **Minimum** = 6.1 mph, **Mean** = 37.5 mph
85% Speed = 42.84 mph, **95% Speed** = 46.42 mph, **Median** = 37.47 mph
10 mph Pace = 32 - 42, **Number in Pace** = 11837 (67.59%)
Variance = 30.48, **Standard Deviation** = 5.52 mph

Speed Bins (Partial days)

Speed	Bin	Below	Above	Energy	vMult	n * vMult
0 - **5**	0 0.000%	0 0.000%	17513 100.0%	0.00	0.00	0.00
5 - **10**	9 0.051%	9 0.051%	17504 99.95%	0.00	0.00	0.00
10 - **15**	25 0.143%	34 0.194%	17479 99.81%	0.00	0.00	0.00
15 - **20**	50 0.286%	84 0.480%	17429 99.52%	0.00	0.00	0.00
20 - **25**	194 1.108%	278 1.587%	17235 98.41%	0.00	0.00	0.00
25 - **30**	961 5.487%	1239 7.075%	16274 92.93%	0.00	0.00	0.00
30 - **35**	4226 24.13%	5465 31.21%	12048 68.79%	0.00	0.00	0.00
35 - **40**	6735 38.46%	12200 69.66%	5313 30.34%	0.00	0.00	0.00
40 - **45**	3930 22.44%	16130 92.10%	1383 7.897%	0.00	0.00	0.00
45 - **50**	1094 6.247%	17224 98.35%	289 1.650%	0.00	0.00	0.00
50 - **55**	246 1.405%	17470 99.75%	43 0.246%	0.00	0.00	0.00
55 - **60**	32 0.183%	17502 99.94%	11 0.063%	0.00	0.00	0.00
60 - **65**	9 0.051%	17511 100.0%	2 0.011%	0.00	0.00	0.00
65 - **70**	2 0.011%	17513 100.0%	0 0.000%	0.00	0.00	0.00
70 - **75**	0 0.000%	17513 100.0%	0 0.000%	0.00	0.00	0.00
75 - **80**	0 0.000%	17513 100.0%	0 0.000%	0.00	0.00	0.00
80 - **85**	0 0.000%	17513 100.0%	0 0.000%	0.00	0.00	0.00
85 - **90**	0 0.000%	17513 100.0%	0 0.000%	0.00	0.00	0.00
90 - **95**	0 0.000%	17513 100.0%	0 0.000%	0.00	0.00	0.00
95 - **100**	0 0.000%	17513 100.0%	0 0.000%	0.00	0.00	0.00

Total Speed Rating = 0.00
Total Moving Energy (Estimated) = 0.00

Speed limit fields (Partial days)

	Limit	Below	Above
0	30 (PSL)	1239 7.1%	16274 92.9%

MetroCount Traffic Executive
Speed Statistics

SpeedStat-112 -- English (ENU)

Datasets:

Site:	**[121-213] 300' South of Roosevelt Ave**
Attribute:	Troy 2nd Ave
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 1
Survey Duration:	12:47 Wednesday, July 28, 2021 => 11:43 Wednesday, August 4, 2021,
Zone:	
File:	121-213 0 2021-08-04 1143.EC1 (Plus)
Identifier:	FZ12WDHB MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default axle (v5.08)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**16:00 Wednesday, July 28, 2021 => 9:00 Wednesday, August 4, 2021 (6.70833)**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	AB , Lane = 0-16
Separation:	Headway > 0 sec, Span 0 - 300 ft
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F3)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 9280 / 17580 (52.79%)

Speed Statistics

SpeedStat-112
Site: 121-213.1.2NS
Description: **300' South of Roosevelt Ave**
Filter time: **16:00 Wednesday, July 28, 2021 => 9:00 Wednesday, August 4, 2021**
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1-13) Dir(AB) Sp(5,100) Headway(>0) Span(0 - 300) Lane(0-16)

Vehicles = 9280
Posted speed limit = 30 mph, Exceeding = 8598 (92.65%), Mean Exceeding = 38.00 mph
Maximum = 66.5 mph, **Minimum** = 6.3 mph, **Mean** = 37.1 mph
85% Speed = 42.28 mph, **95% Speed** = 45.86 mph, **Median** = 37.02 mph
10 mph Pace = 32 - 42, **Number in Pace** = 6444 (69.44%)
Variance = 29.65, **Standard Deviation** = 5.45 mph

Speed Bins (Partial days)

Speed	Bin	Below	Above	Energy	vMult	n * vMult
0 - **5**	0 0.000%	0 0.000%	9280 100.0%	0.00	0.00	0.00
5 - **10**	6 0.065%	6 0.065%	9274 99.94%	0.00	0.00	0.00
10 - **15**	18 0.194%	24 0.259%	9256 99.74%	0.00	0.00	0.00
15 - **20**	25 0.269%	49 0.528%	9231 99.47%	0.00	0.00	0.00
20 - **25**	109 1.175%	158 1.703%	9122 98.30%	0.00	0.00	0.00
25 - **30**	524 5.647%	682 7.349%	8598 92.65%	0.00	0.00	0.00
30 - **35**	2395 25.81%	3077 33.16%	6203 66.84%	0.00	0.00	0.00
35 - **40**	3693 39.80%	6770 72.95%	2510 27.05%	0.00	0.00	0.00
40 - **45**	1901 20.48%	8671 93.44%	609 6.563%	0.00	0.00	0.00
45 - **50**	470 5.065%	9141 98.50%	139 1.498%	0.00	0.00	0.00
50 - **55**	113 1.218%	9254 99.72%	26 0.280%	0.00	0.00	0.00
55 - **60**	20 0.216%	9274 99.94%	6 0.065%	0.00	0.00	0.00
60 - **65**	5 0.054%	9279 100.0%	1 0.011%	0.00	0.00	0.00
65 - **70**	1 0.011%	9280 100.0%	0 0.000%	0.00	0.00	0.00
70 - **75**	0 0.000%	9280 100.0%	0 0.000%	0.00	0.00	0.00
75 - **80**	0 0.000%	9280 100.0%	0 0.000%	0.00	0.00	0.00
80 - **85**	0 0.000%	9280 100.0%	0 0.000%	0.00	0.00	0.00
85 - **90**	0 0.000%	9280 100.0%	0 0.000%	0.00	0.00	0.00
90 - **95**	0 0.000%	9280 100.0%	0 0.000%	0.00	0.00	0.00
95 - **100**	0 0.000%	9280 100.0%	0 0.000%	0.00	0.00	0.00

Total Speed Rating = 0.00
Total Moving Energy (Estimated) = 0.00

Speed limit fields (Partial days)

	Limit	Below	Above
0	30 (PSL)	682 7.3%	8598 92.7%

MetroCount Traffic Executive
Speed Statistics

SpeedStat-113 -- English (ENU)

Datasets:

Site:	**[121-213] 300' South of Roosevelt Ave**
Attribute:	Troy 2nd Ave
Direction:	7 - North bound A>B, South bound B>A. **Lane:** 1
Survey Duration:	12:47 Wednesday, July 28, 2021 => 11:43 Wednesday, August 4, 2021,
Zone:	
File:	121-213 0 2021-08-04 1143.EC1 (Plus)
Identifier:	FZ12WDHB MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default axle (v5.08)
Data type:	Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time:	**16:00 Wednesday, July 28, 2021 => 9:00 Wednesday, August 4, 2021 (6.70833)**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range:	5 - 100 mph.
Direction:	BA , Lane = 0-16
Separation:	Headway > 0 sec, Span 0 - 300 ft
Name:	Default Profile
Scheme:	Vehicle classification (Scheme F3)
Units:	Non metric (ft, mi, ft/s, mph, lb, ton)
In profile:	Vehicles = 8233 / 17580 (46.83%)

Speed Statistics

SpeedStat-113
Site: 121-213.1.2NS
Description: **300' South of Roosevelt Ave**
Filter time: **16:00 Wednesday, July 28, 2021 => 9:00 Wednesday, August 4, 2021**
Scheme: Vehicle classification (Scheme F3)
Filter: Cls(1-13) Dir(BA) Sp(5,100) Headway(>0) Span(0 - 300) Lane(0-16)

Vehicles = 8233
Posted speed limit = 30 mph, Exceeding = 7676 (93.23%), Mean Exceeding = 38.71 mph
Maximum = 65.9 mph, **Minimum** = 6.1 mph, **Mean** = 37.9 mph
85% Speed = 43.40 mph, **95% Speed** = 46.86 mph, **Median** = 37.92 mph
10 mph Pace = 33 - 43, **Number in Pace** = 5427 (65.92%)
Variance = 31.11, **Standard Deviation** = 5.58 mph

Speed Bins (Partial days)

Speed	Bin	Below	Above	Energy	vMult	n * vMult
0 - **5**	0 0.000%	0 0.000%	8233 100.0%	0.00	0.00	0.00
5 - **10**	3 0.036%	3 0.036%	8230 100.0%	0.00	0.00	0.00
10 - **15**	7 0.085%	10 0.121%	8223 99.88%	0.00	0.00	0.00
15 - **20**	25 0.304%	35 0.425%	8198 99.57%	0.00	0.00	0.00
20 - **25**	85 1.032%	120 1.458%	8113 98.54%	0.00	0.00	0.00
25 - **30**	437 5.308%	557 6.765%	7676 93.23%	0.00	0.00	0.00
30 - **35**	1831 22.24%	2388 29.01%	5845 70.99%	0.00	0.00	0.00
35 - **40**	3042 36.95%	5430 65.95%	2803 34.05%	0.00	0.00	0.00
40 - **45**	2029 24.64%	7459 90.60%	774 9.401%	0.00	0.00	0.00
45 - **50**	624 7.579%	8083 98.18%	150 1.822%	0.00	0.00	0.00
50 - **55**	133 1.615%	8216 99.79%	17 0.206%	0.00	0.00	0.00
55 - **60**	12 0.146%	8228 99.94%	5 0.061%	0.00	0.00	0.00
60 - **65**	4 0.049%	8232 100.0%	1 0.012%	0.00	0.00	0.00
65 - **70**	1 0.012%	8233 100.0%	0 0.000%	0.00	0.00	0.00
70 - **75**	0 0.000%	8233 100.0%	0 0.000%	0.00	0.00	0.00
75 - **80**	0 0.000%	8233 100.0%	0 0.000%	0.00	0.00	0.00
80 - **85**	0 0.000%	8233 100.0%	0 0.000%	0.00	0.00	0.00
85 - **90**	0 0.000%	8233 100.0%	0 0.000%	0.00	0.00	0.00
90 - **95**	0 0.000%	8233 100.0%	0 0.000%	0.00	0.00	0.00
95 - **100**	0 0.000%	8233 100.0%	0 0.000%	0.00	0.00	0.00

Total Speed Rating = 0.00
Total Moving Energy (Estimated) = 0.00

Speed limit fields (Partial days)

	Limit	Below	Above
0	30 (PSL)	557 6.8%	7676 93.2%

Attachment C
Level of Service Calculations

Troy 2nd Avenue Apartments
City of Troy, New York

LOS Definitions

The following is an excerpt from the Highway Capacity Manual, 6th Edition (HCM).

Level of Service Criteria for Unsignalized Intersections

Level of service (LOS) for Two-Way Stop-Controlled (TWSC) intersections is determined by the computed or measured control delay. For motor vehicles, LOS is determined for each minor-street movement (or shared movement) as well as major-street left turns by using criteria given in Exhibit 20-2. LOS is not defined for the intersection as a whole or for major-street approaches for three primary reasons: (a) major-street through vehicles are assumed to experience zero delay; (b) the disproportionate number of major-street through vehicles at a typical TWSC intersection skews the weighted average of all movements, resulting in a very low overall average delay for all vehicles; and (c) the resulting low delay can mask important LOS deficiencies for minor movements. LOS F is assigned to the movement if the volume-to-capacity (v/c) ratio for the movement exceeds 1.0, regardless of the control delay.

The LOS criteria for TWSC intersections are somewhat different from the criteria used in Chapter 18 for signalized intersections, primarily because user perceptions differ among transportation facility types. The expectation is that a signalized intersection is designed to carry higher traffic volumes and will present greater delay than an unsignalized intersection. Unsignalized intersections are also associated with more uncertainty for users, as delays are less predictable than they are at signals, which can reduce users' delay tolerance.

The LOS criteria for All-Way Stop-Controlled (AWSC) intersections are given in Exhibit 21-8. LOS F is assigned if the v/c ratio of a lane exceeds 1.0, regardless of the control delay. For assessment of LOS at the approach and intersection levels, LOS is based solely on control delay.

Exhibits 20-2/21-8:
Level-of-Service Criteria for Stop Controlled Intersections

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio	
	v/c ≤ 1.0	v/c ≥ 1.0
10.0	A	F
>10.0 and ≤ 15.0	B	F
>15.0 and ≤ 25.0	C	F
>25.0 and ≤ 35.0	D	F
>35.0 and ≤ 50.0	E	F
>50.0	F	F

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	5	56	2	2	178
Future Vol, veh/h	7	5	56	2	2	178
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	5	0	0	2
Mvmt Flow	8	6	67	2	2	212

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	284	68	0	0	69	0
Stage 1	68	-	-	-	-	-
Stage 2	216	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	710	1001	-	-	1545	-
Stage 1	960	-	-	-	-	-
Stage 2	825	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	709	1001	-	-	1545	-
Mov Cap-2 Maneuver	709	-	-	-	-	-
Stage 1	960	-	-	-	-	-
Stage 2	824	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	807	1545	-
HCM Lane V/C Ratio	-	-	0.018	0.002	-
HCM Control Delay (s)	-	-	9.5	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	5	67	2	2	183
Future Vol, veh/h	7	5	67	2	2	183
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	84	84	84	84	84	84
Heavy Vehicles, %	0	0	5	0	0	2
Mvmt Flow	8	6	80	2	2	218

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	303	81	0	0	82	0
Stage 1	81	-	-	-	-	-
Stage 2	222	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	693	985	-	-	1528	-
Stage 1	947	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	692	985	-	-	1528	-
Mov Cap-2 Maneuver	692	-	-	-	-	-
Stage 1	947	-	-	-	-	-
Stage 2	819	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	790	1528	-
HCM Lane V/C Ratio	-	-	0.018	0.002	-
HCM Control Delay (s)	-	-	9.6	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	9	0	28	7	0	5	10	73	2	2	185	3
Future Vol, veh/h	9	0	28	7	0	5	10	73	2	2	185	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	84	84	84	84	84	84	84	84	84
Heavy Vehicles, %	2	2	2	0	2	0	2	5	0	0	2	2
Mvmt Flow	11	0	33	8	0	6	12	87	2	2	220	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	341	339	222	355	340	88	224	0	0	89	0	0
Stage 1	226	226	-	112	112	-	-	-	-	-	-	-
Stage 2	115	113	-	243	228	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.1	6.52	6.2	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.5	4.018	3.3	2.218	-	-	2.2	-	-
Pot Cap-1 Maneuver	613	582	818	604	582	976	1345	-	-	1519	-	-
Stage 1	777	717	-	898	803	-	-	-	-	-	-	-
Stage 2	890	802	-	765	715	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	604	576	818	574	576	976	1345	-	-	1519	-	-
Mov Cap-2 Maneuver	604	576	-	574	576	-	-	-	-	-	-	-
Stage 1	770	716	-	890	796	-	-	-	-	-	-	-
Stage 2	877	795	-	732	714	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.1	10.3	0.9	0.1
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1345	-	-	753	693	1519	-	-
HCM Lane V/C Ratio	0.009	-	-	0.058	0.021	0.002	-	-
HCM Control Delay (s)	7.7	0	-	10.1	10.3	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	18	7	79	218	2
Future Vol, veh/h	6	18	7	79	218	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	20	8	86	237	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	340	238	239	0	-	0
Stage 1	238	-	-	-	-	-
Stage 2	102	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	656	801	1328	-	-	-
Stage 1	802	-	-	-	-	-
Stage 2	922	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	652	801	1328	-	-	-
Mov Cap-2 Maneuver	652	-	-	-	-	-
Stage 1	797	-	-	-	-	-
Stage 2	922	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.9	0.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1328	-	758	-	-
HCM Lane V/C Ratio	0.006	-	0.034	-	-
HCM Control Delay (s)	7.7	0	9.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	3	237	7	5	96
Future Vol, veh/h	4	3	237	7	5	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	50	1	0	0	2
Mvmt Flow	5	4	279	8	6	113

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	408	283	0	0	287	0
Stage 1	283	-	-	-	-	-
Stage 2	125	-	-	-	-	-
Critical Hdwy	6.4	6.7	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.75	-	-	2.2	-
Pot Cap-1 Maneuver	603	655	-	-	1287	-
Stage 1	770	-	-	-	-	-
Stage 2	906	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	600	655	-	-	1287	-
Mov Cap-2 Maneuver	600	-	-	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	901	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	622	1287	-
HCM Lane V/C Ratio	-	-	0.013	0.005	-
HCM Control Delay (s)	-	-	10.9	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	3	245	7	5	107
Future Vol, veh/h	4	3	245	7	5	107
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	50	1	0	0	2
Mvmt Flow	5	4	288	8	6	126

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	430	292	0	0	296	0
Stage 1	292	-	-	-	-	-
Stage 2	138	-	-	-	-	-
Critical Hdwy	6.4	6.7	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.75	-	-	2.2	-
Pot Cap-1 Maneuver	586	647	-	-	1277	-
Stage 1	762	-	-	-	-	-
Stage 2	894	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	583	647	-	-	1277	-
Mov Cap-2 Maneuver	583	-	-	-	-	-
Stage 1	762	-	-	-	-	-
Stage 2	890	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	609	1277	-
HCM Lane V/C Ratio	-	-	0.014	0.005	-
HCM Control Delay (s)	-	-	11	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	0	18	4	0	3	28	249	7	5	113	9
Future Vol, veh/h	6	0	18	4	0	3	28	249	7	5	113	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	0	2	25	2	1	0	0	2	2
Mvmt Flow	7	0	21	5	0	4	33	293	8	6	133	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	516	518	139	524	519	297	144	0	0	301	0	0
Stage 1	151	151	-	363	363	-	-	-	-	-	-	-
Stage 2	365	367	-	161	156	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.1	6.52	6.45	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.5	4.018	3.525	2.218	-	-	2.2	-	-
Pot Cap-1 Maneuver	470	462	909	467	461	691	1438	-	-	1272	-	-
Stage 1	851	772	-	660	625	-	-	-	-	-	-	-
Stage 2	654	622	-	846	769	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	456	447	909	445	446	691	1438	-	-	1272	-	-
Mov Cap-2 Maneuver	456	447	-	445	446	-	-	-	-	-	-	-
Stage 1	827	768	-	642	608	-	-	-	-	-	-	-
Stage 2	632	605	-	822	765	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.1	12	0.7	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1438	-	-	728	525	1272	-	-
HCM Lane V/C Ratio	0.023	-	-	0.039	0.016	0.005	-	-
HCM Control Delay (s)	7.6	0	-	10.1	12	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	12	19	280	129	6
Future Vol, veh/h	4	12	19	280	129	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	13	21	304	140	7

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	490	144	147	0	-	0
Stage 1	144	-	-	-	-	-
Stage 2	346	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	537	903	1435	-	-	-
Stage 1	883	-	-	-	-	-
Stage 2	716	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	527	903	1435	-	-	-
Mov Cap-2 Maneuver	527	-	-	-	-	-
Stage 1	867	-	-	-	-	-
Stage 2	716	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.8	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1435	-	766	-	-
HCM Lane V/C Ratio	0.014	-	0.023	-	-
HCM Control Delay (s)	7.5	0	9.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

ATTACHMENT I

ENVIRONMENTAL DESIGN PARTNERSHIP, LLP.
Shaping the physical environment

900 Route 146 Clifton Park, NY 12065
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VISUAL IMPACT ASSESSMENT REPORT

PROPOSED MULTI-FAMILY APARTMENTS
1011 2ND Avenue
Troy, New York

Rensselaer County, New York

PREPARED FOR:

Kevin Vandenburgh
430 9th Avenue
Troy, NY

PREPARED BY:

Environmental Design Partnership, LLP
900 Route 146
Clifton Park, NY 12065

October 8, 2021

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1.0 INTRODUCTION

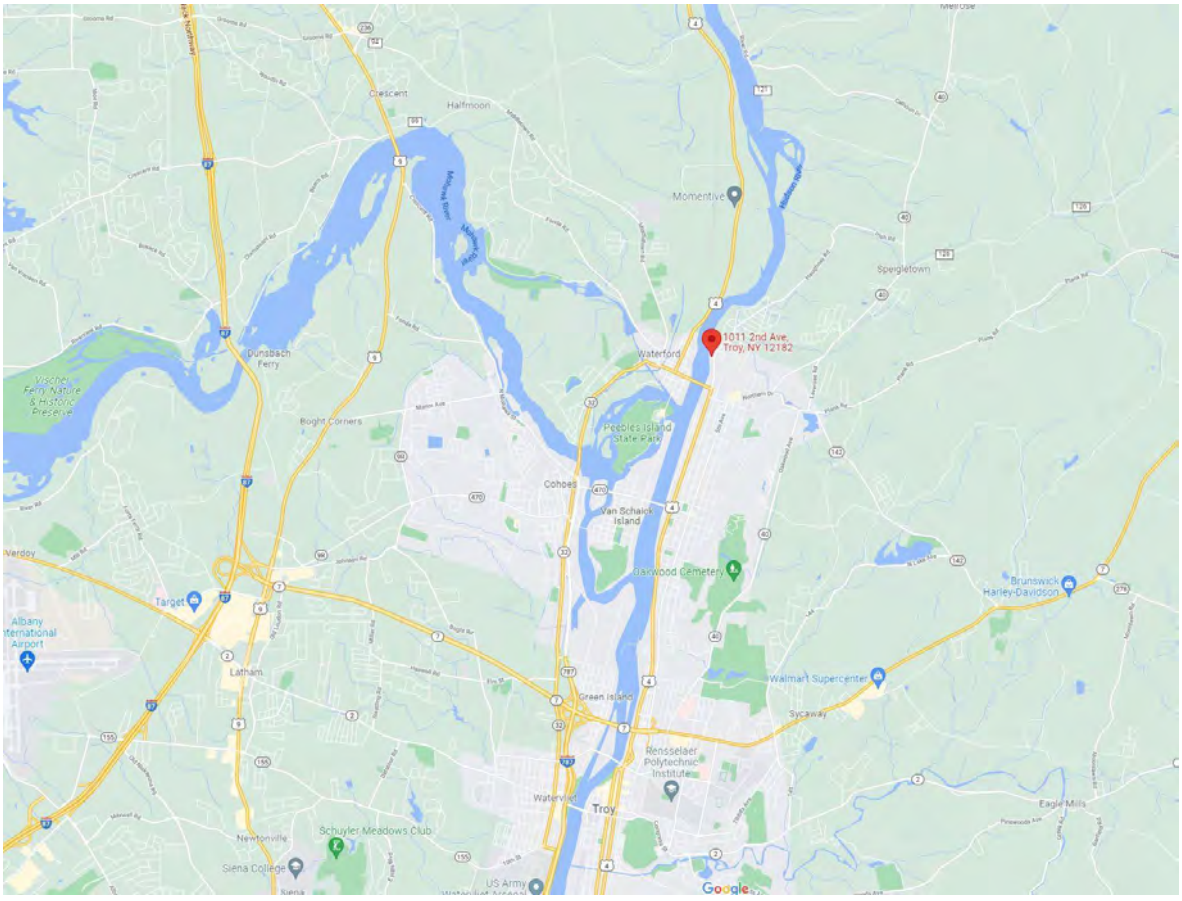
The Environmental Design Partnership, LLP (EDP) was retained by Kevin Vandenburgh (project applicant) to complete a Visual Impact Assessment for a proposed multi-family apartment project the project applicant is proposing at 1011 2nd Avenue in the City of Troy, New York.

The purpose of this assessment is to describe the project, define the visual character of the study area, assess visual receptors and viewer groups, assess the proposed project's visibility from those receptors and assess the visual impacts associated with the proposed project.

2.0 PROJECT DESCRIPTION

2.1 Project Site

The project is located on two (2) tax parcels, one in the City of Troy sized that encompasses approximately 10 acres and one tax parcel within the Town of Schaghticoke that is approximately one (1) acre in size. Both parcels are undeveloped and wooded. The Project Location Map is included below.



Surrounding land uses include single-family residential uses to the north of the parcel in the Town of Schaghticoke along Cedar Lane, and single-family residential uses bordering the parcel to the east and south along 2nd Avenue in the City of Troy. The property borders the Hudson River to the west.

Elevations on the property range from approximately 92 feet above sea level to 18 feet above sea level at the shoreline of the Hudson River. The base flood elevation for the property is 35 feet above sea level.

2.2 Proposed Project

The project applicant proposes to construct three (3) multi-family apartment buildings, associated parking, stormwater management, site amenities and utilities on the eleven (11) acres.

Two of the proposed buildings would have an approximately 18,100 square foot building footprint. The third building would have an approximately building footprint of 24,300 square feet. The buildings are proposed to be four stories in height (approximately 50 foot-tall structures). Parking for the proposed residents would be a mixture of surface parking and underground parking. The proposed building basement elevations would be situated at a minimum of two feet above the base flood elevation.

In addition to the proposed apartment buildings and associated parking, the project proposes approximately 1,600 linear feet of concrete sidewalk from the northern portion of the property south to the northern portion of the Hannaford Parking lot along 2nd Avenue.

The project also proposes concrete sidewalks and a multi-use path within the property, including a public kayak launch and approximately 40 seasonal docks.

To the extent possible, the project proposes to maintain existing trees throughout the property.

3.0 EXISTING VISUAL CHARACTER

The following section describes the existing visual character of the project study area which includes an approximately five-mile radius, consistent with the New York State Department of Environmental Conservation's Program Policy for Assessing and Mitigating Visual and Aesthetic Impacts. The project Study Area is included as Figure 2.

3.1 Physiographic / Visual Setting

3.1.1 Landform and Vegetation

The visual study area is generally centered along the Hudson River and encompasses several Cities and Towns including Troy, Schaghticoke, Waterford, Halfmoon, Green Island, Latham and Cohoes. The Mohawk River is also located within the visual study area. Lands both east and west of the Hudson River slope towards the Hudson River. Lands to the north and South of the Mohawk River generally slope towards the Mohawk River. The lands to the east of the project area tend to slope up from the Hudson River with greater topographic relief, while lands

to the west of the project area are generally flatter and lower in elevation.

Landforms including waterfalls low-lying floodplain areas, islands, rivers, streams, and uplands exist throughout the visual study area. The visual study area has a diverse mixture of landscapes that vary from dense urban environments with little in the way of vegetation (such as Downtown Troy) to suburban environments extending out from the Cities to more rural landscapes that are heavily forested.

3.1.2 Land Use

As described above, there is large diversity of land use within the visual study area. There are large commercial and industrial buildings located within the dense urban downtown cores such as Troy, Cohoes and Waterford. Those dense urban environments have a large network of concentrated streets and buildings. Extending out from the City of Troy, Cohoes and Waterford the land use becomes more suburban with residential housing and commercial/retail uses in areas such as Latham and Halfmoon. Extending past the suburban areas, the visual study area becomes more rural with open and undeveloped areas, especially to the northeast.

3.1.3 Water Features

The Hudson River is located immediately west of the project area and runs in a north-south direction. The Mohawk River empties into the Hudson River southwest of the project area. The Mohawk River runs in a west-east direction. There are several locks located within the visual study area to facilitate marine traffic on the initial reaches of the Mohawk River.

3.2 Landscape Types

Within the visual study area, the following four general landscape types are included.

3.2.1 Urban/Downtown

This landscape is located in several areas of the visual study area. The Cities of Troy and Green Island and the Town of Waterford are urban/downtown areas located within the visual study area. These areas are defined by dense building and street networks in grid like patterns. Due to the dense infrastructure and building layouts, vegetation is less prevalent in these areas and buildings provide visual obstructions.

Given the numerous buildings, views of the project from this landscape type within the visual study area is generally obstructed.

3.2.2 Rural

This landscape primarily makes up the northern eastern portions of the visual study area. The rural landscape is characterized by rural residences and forested areas.

Given the undeveloped and forested nature of this landscape type, views of the proposed project are limited and generally obstructed.

3.2.3 Suburban

The suburban landscape is located between the urban/downtown areas and the rural landscapes. It includes villages and Towns such as Halfmoon, Colonie, Pleasantdale and outer reaches of Waterford. This landscape is characterized by single-family homes roads and associated infrastructure and areas of vegetation.

Select areas, either very close to the proposed project area such as 2nd Avenue or located along the Hudson River, would have partial views of the proposed project.

3.2.4 Water

This landscape includes the Hudson River and Mohawk River within the visual study area including associated floodplain areas and locks.

The proposed project is visible from areas of the Hudson River within the visual study area. The proposed project is visible from small select areas of the Mohawk River within the visual study area.

3.3 Viewer/User Groups

Generally, two (2) types of viewers are anticipated to be present within the visual study area as described below.

3.3.1 Local Residents

Local residents are those that live and work within the visual study area. Local residents would view the surrounding landscapes from their houses, yards or businesses or while traveling on roads.

Except when involved in local travel, residents are likely to be stationary, and have frequent or prolonged views of certain landscape features. Local residents may view the landscape from ground level or elevated viewpoints (typically upper floors/stories of homes). Local residents' sensitivity to visual quality is variable, and may be tempered by the aesthetic character/setting of their neighborhoods or work place. For example, residents with a view of existing commercial facilities may be less sensitive to landscape changes than those with a view of open forest. It is assumed, however, that all local residents are familiar with the local landscape and may be very sensitive to changes in particular views that are important to them.

3.3.2 Boaters

Boaters are those users that are using the water landscapes either on the Hudson River or traveling through the locks on the Mohawk River. Generally, boaters are active viewers as they are in a boat traveling along the river. Visual quality of the scenery will be a important part of the recreational experience for the boaters; however they are less likely than passive viewers to

concentrate on views for a prolonged period of time. As such, the active boater may be less sensitive to visual change. Due to the variety of different viewpoints along the river areas, a wide variety of viewpoints would be available to active boaters.

3.4 Visually Sensitive Resources

The area within the visual study area was reviewed for visually sensitive resources, consistent with the NYSDEC Program Policy for Assessing and Mitigating Visual and Aesthetic Impacts inventory of aesthetic resources listed below.

3.4.1 Historic Resource Listed or Eligible for Inclusion in the State or National Registers of Historic Places

EDP corresponded with the New York State Office of Parks, Recreation and Historic Preservation (OPRHP concerning the project. The proposed project is located adjacent to the State and National Register (NR) listed New York State Barge Canal Historic District (Barge Canal) and will be visible from certain vantage points within the NR listed Waterford Village Historic District.

- Peebles Island Building
- Matton Shipyard
- Northside Historic District
- Harmony Mill Historic District
- Olmstead Street Historic District
- Downtown Cohoes Historic District
- Old Champlain Canal
- Oakwood Cemetary
- Van Schaick House
- Lansingburgh Academy
- Powers Home
- First Methodist Church of Lansingburgh
- Melville, Herman, Residence
- Delaware and Hudson Railroad Freight House
- Dickey, William J., House
- Lackmann, J. Leonard, House
- Lansingburgh Village Burial Ground
- Patten, Jacob H., House

3.4.2 State Parks

Peebles Island State Park is located within the visual study area.

3.4.3 New York State Heritage Areas

The Hudson-Mohawk urban cultural park established by the Cities of Troy, Cohoes, Watervliet, the Villages of Green Island and Water and the Towns of Waterford and Colonie are located within the visual study area.

3.4.4 State Forest Preserve

There are no State Forest Preserves located within the visual study area.

3.4.5 National Wildlife Refuges

There are no National Wildlife Refuges located within the visual study area.

3.4.6 National Natural Landmarks

There are no National Natural landmarks located within the visual study area.

3.4.7 National Park System, Recreation Areas, Seashores, Forests

There are no National Parks, National Recreation Areas, Seashores or Forests located within the visual study area.

3.4.8 Rivers Designated as National or State Wild, Scenic or Recreational

There are no National or State rivers designated as wild, scenic or recreational within the visual study area.

3.4.9 Site, Area, Lake, Reservoir or Highway Designated or Eligible for Designation as Scenic, Including New York State Scenic Highways

There are no known Sites, Areas, lakes, Reservoirs or Highways Designated or Eligible for Designation as Scenic (including New York State Scenic Highways) within the visual study area.

3.4.10 Scenic Areas of Statewide Significance

There are no Scenic Areas of Statewide Significance within the visual study area.

3.4.11 State or Federally Designated Trail, or One Proposed for Designation

There are no known State or Federally Designated Trails within the visual study area.

3.4.12 Adirondack Park Scenic Vistas

The visual study area is not located within the Adirondack Park.

3.4.13 State Natural and Historic Preserve Areas

There are no known State Natural and/or Historic Preserve Areas within the visual study area.

3.4.14 Palisades Park

The visual study area does not include the Palisades Park.

3.4.15 Bond Act Properties Purchased Under Exceptional Scenic Beauty Category

There are no known Bond Act Properties Purchased Under the Exceptional Beauty Category within the visual study area.

3.4.16 National Heritage Areas

The Erie Canalway National Heritage Corridor is located within the visual study area.

3.4.17 Transportation Corridors

Based upon viewshed analyses, discussed further below in this report, the following roads are anticipated to have visibility of the proposed project:

- 2nd Avenue, north of 126th Street;
- 126th Street Bridge; and
- Route 4 (Hudson River Road), north of Waterford.

3.4.17.1 2nd Avenue, North of 126th Street

According to the New York State Department of Transportation (NYSDOT) Traffic Date Viewer, the 2019 AADT is 3,406 with an average speed of 33 mile per hour. The proposed project is anticipated to be visible from portions of 2nd Avenue north of 126th Street.

3.4.17.2 126th Street Bridge

According to the NYSDOT Traffic Data Viewer, the 2019 AADT is 11,363 with an average speed of 28 miles per hour. The proposed project is anticipated to be visible from the 126th Street Bridge.

3.4.17.3 Route 4 (Hudson River Road), North of Waterford

According to the NYSDOT Traffic Data Viewer, the 2019 AADT is 7,424 with an average speed of 42 miles per hour. The proposed project is anticipated to be visible along sections of Route 4 north of Waterford.

Visual simulations of the areas where the proposed project would be visible are included in Section 4.6 of this assessment report.

4.0 VISUAL IMPACT ASSESSMENT METHODOLOGY

The Visual Impact Assessment procedures used for this study are consistent with the methodology developed by the U.S. Department of the Interior, Bureau of Land Management (1980) and the NYSDEC Program Policy for Assessing and Mitigating Visual and Aesthetic Impacts. BLM methodology was selected because it provides specific tools to identify and evaluate visual contrast and to analyze potential visual impacts and apply mitigation techniques to ensure modifications to the landscape are in harmony with their surroundings. The specific techniques used to assess potential project visibility and visual impacts are described in the following section.

4.1 Project Visibility

An analysis of project visibility was undertaken to identify those locations within the study area where there is potential for the proposed project to be seen from ground-level vantage points. This analysis included identifying potentially visible areas on viewshed maps, preparing line of sight cross sections, and verifying visibility in the field. The methodology employed for each of these assessment techniques is described below.

4.2 Viewshed Analysis

Topographic viewshed maps for the study area were prepared using Google Earth Pro™. Multiple viewshed maps were generated as described below.

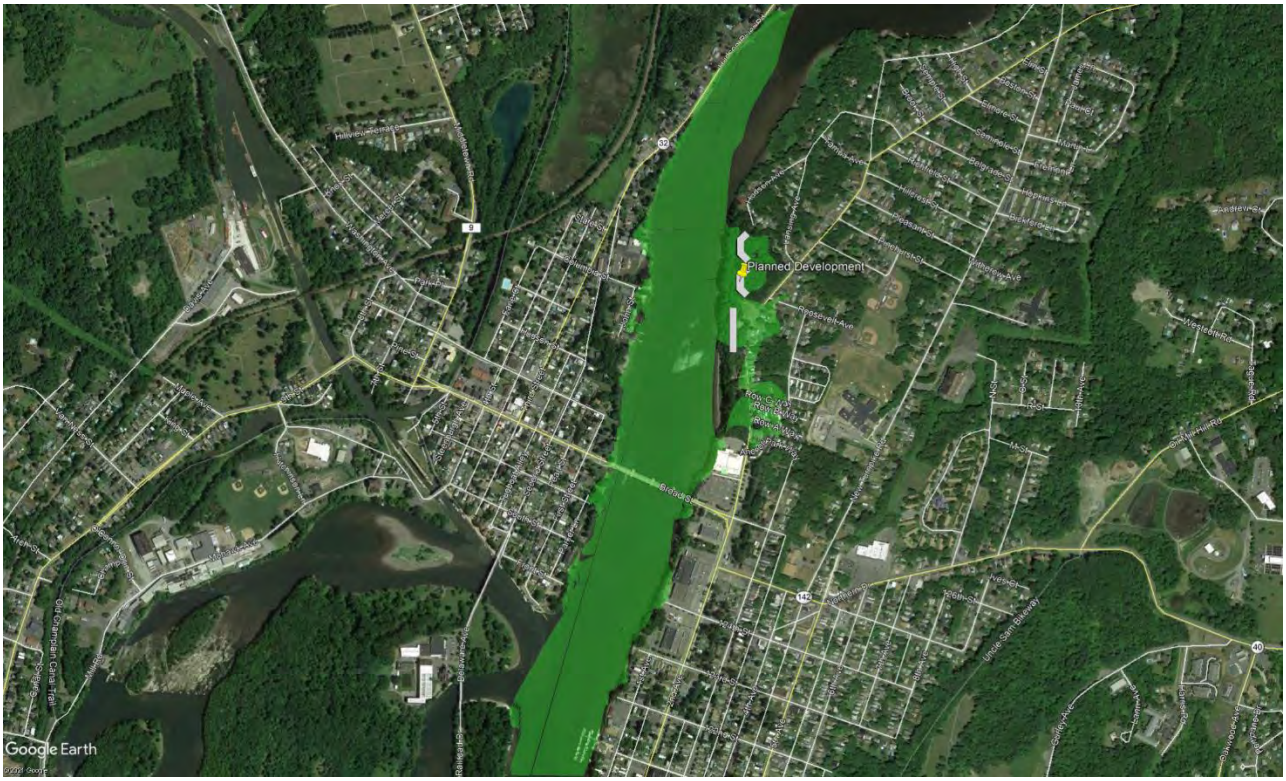
4.2.1 Ground Elevation

This type of elevation data does not contain buildings and trees, only bare terrain. Area from which the simulated project is visible is shaded green.



4.2.2 Viewshed with Trees

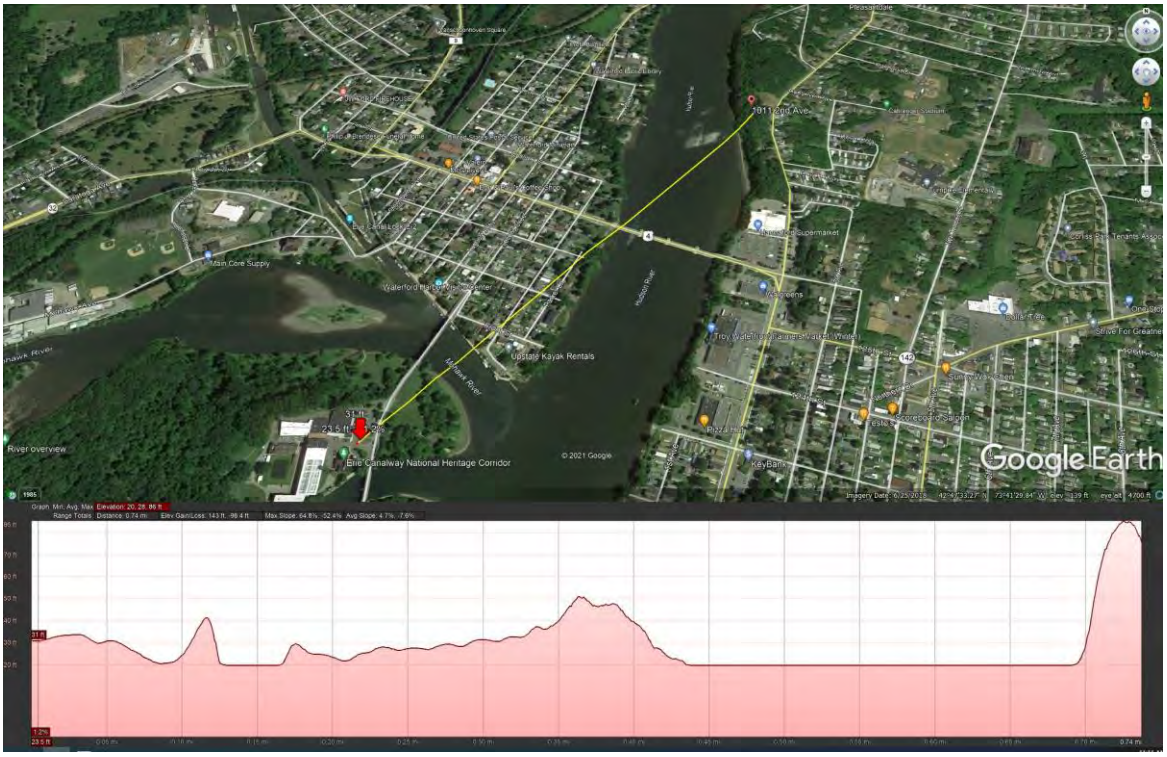
This is the best approximation of the visibility of the project, combining the viewsheds from both trees and ground elevation. Area from which the project is visible is shaded green. The project is visible on and along the Hudson River, portions of 2nd Avenue, portions of Second Street in Waterford, the Broad Street Bridge and portions of Route 4 (Hudson River Road).



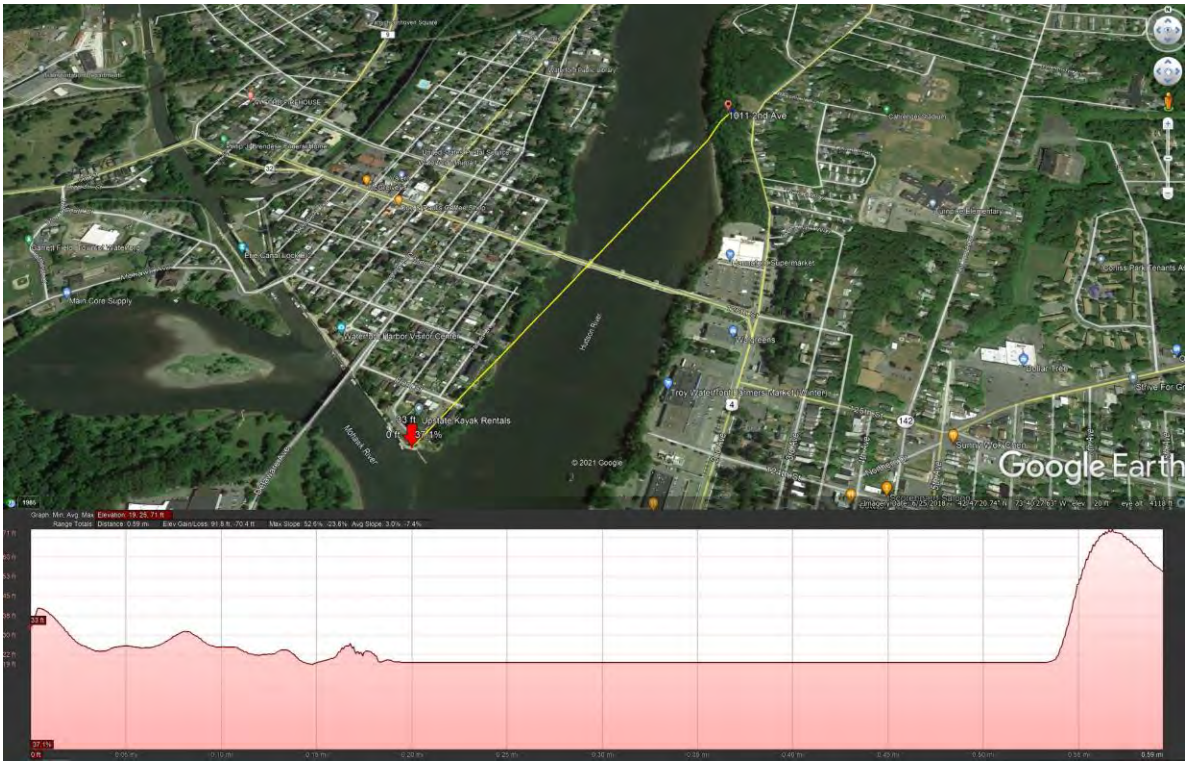
A number of factors can influence project visibility, however, and merely being in the viewshed does not guarantee actual views of the project.

4.3 Cross Section Analysis

To analyze the screening effect of vegetation within the study area, numerous line-of-sight cross sections were cut through the study area from sensitive visual receptor locations. Cross section locations were chosen so as to pass through visually sensitive areas and to provide representative cross-sections through major axes of the project area. The cross sections are based on forest vegetation and topography. Cross sections are included below.



Cross section from Peebles Island State Park



Cross Section from the Waterford Boat Launch at the mouth of the Mohawk River



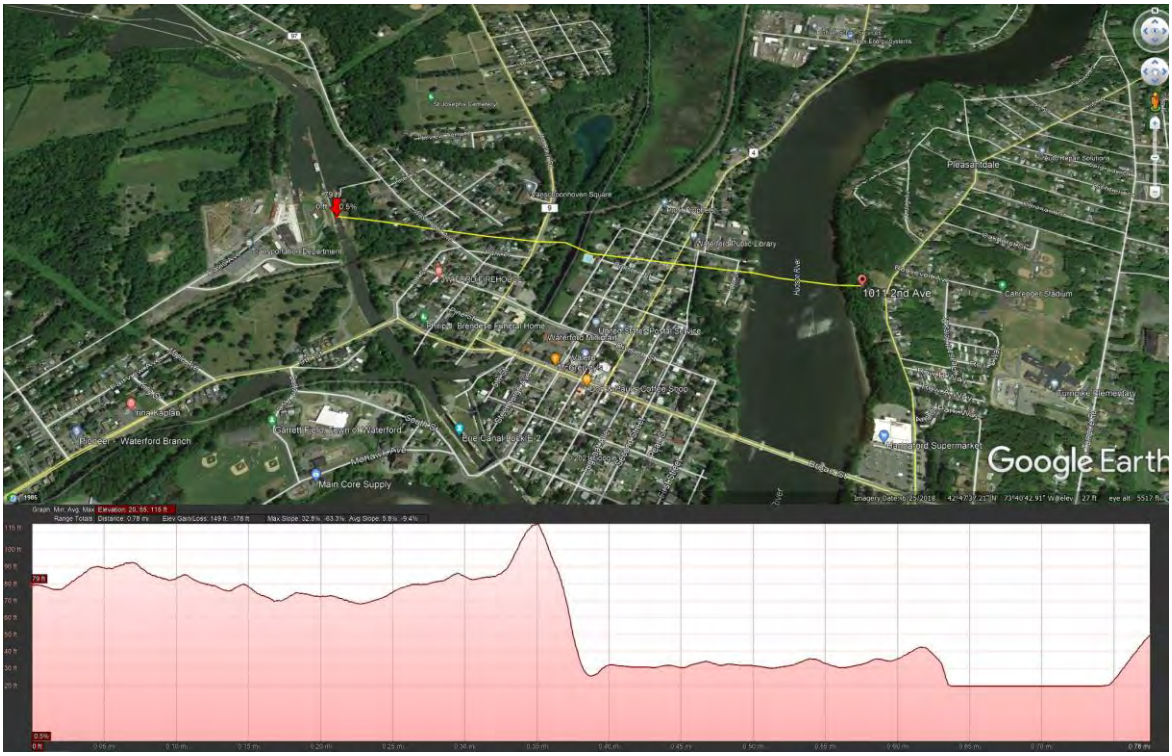
Cross Section from the Matton Shipyard northern building



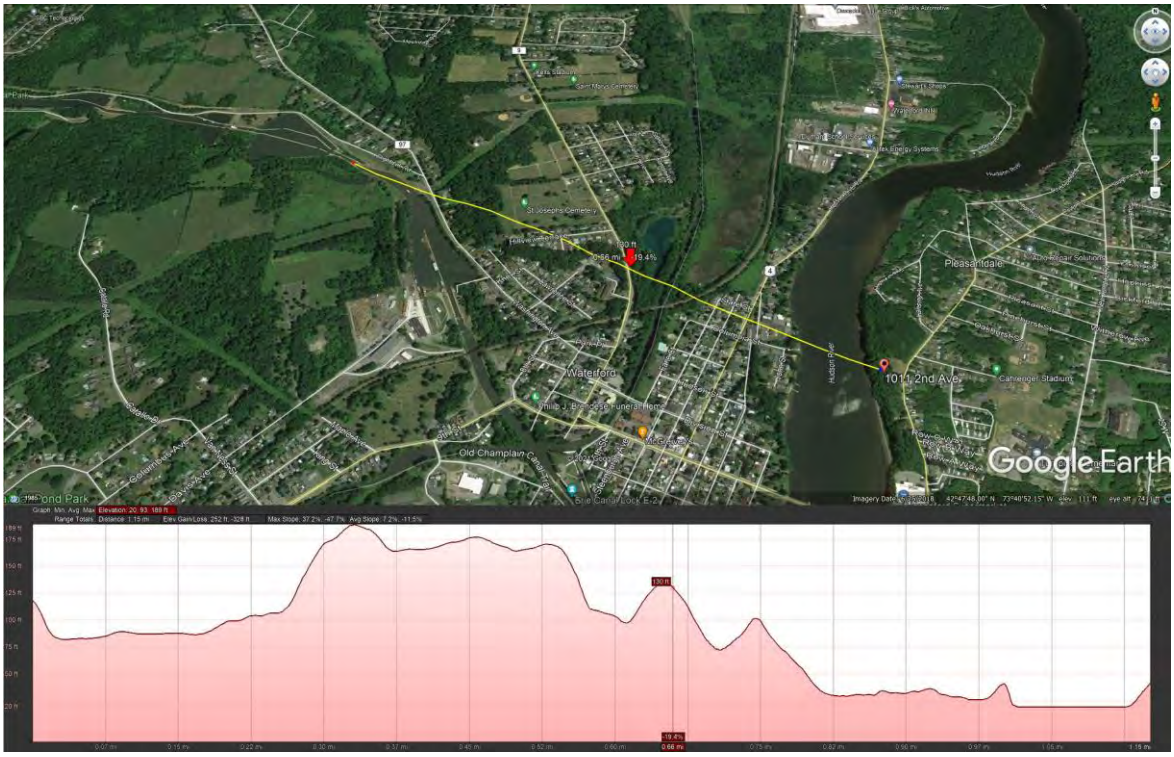
Cross section from the Matton Shipyard southern building



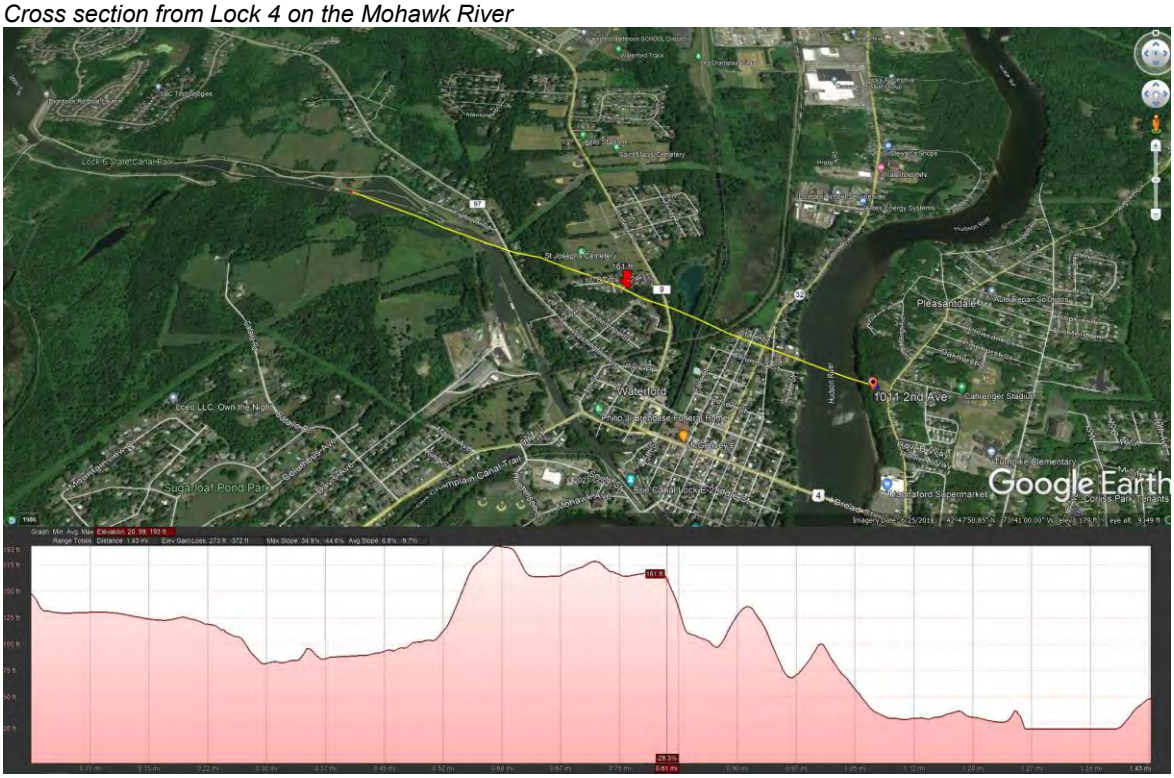
Cross section from Lock 2 on the Mohawk River



Cross section from Lock 3 on the Mohawk River



Cross section from Lock 4 on the Mohawk River



Cross section from Lock 5 on the Mohawk River

4.4 Field Review

Actual visibility of the proposed project was evaluated in the field during the summer of 2021 during leaf-on conditions. An EDP employee drove public roads and visited public vantage points within the visual study area to assess points from which the project could or could not be seen. Photos taken from numerous representative viewpoints within the study area where the project is visible are included in Section 4.6 of the assessment report.

4.5 Project Visual Impact

Beyond evaluating potential project visibility, this assessment also examined the visual impact of the proposed project on the aesthetic resources and viewers within the visual study area. This assessment involved creating computer models of the proposed apartment buildings, selecting representative viewpoints within the study area, and preparing visual simulations of the proposed project. Details of the visual impact assessment procedures are described below.

4.5 Viewpoint Selection

From the photo documentation conducted during field verification, EDP, selected areas where the proposed apartment buildings would be most visible for development of visual simulations. These viewpoints were selected to illustrate typical views of the proposed project that will be available to representative viewer/user groups from sensitive sites within the study area. Location of the selected viewpoints is indicated in Figure XX.

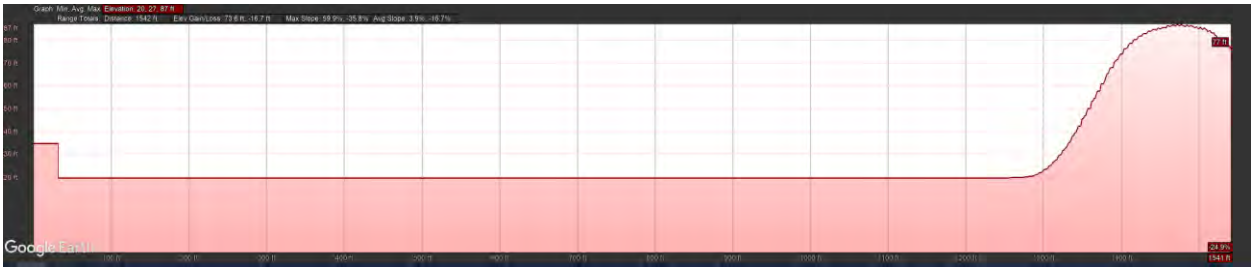
4.6 Visual Simulations

To show anticipated visual changes associated with the proposed project, high-resolution computer enhanced image processing was used to create realistic photographic simulations and renderings of the completed project from each of the selected viewpoints. Photographs of the project site were taken from several vantage points from which the project would be most visible. A 3D model of the project was generated in Google Earth Pro™. Images of the 3D model from the same perspectives as the vantage points were combined with the photographs in Adobe® Photoshop®, resulting in these visual simulations.

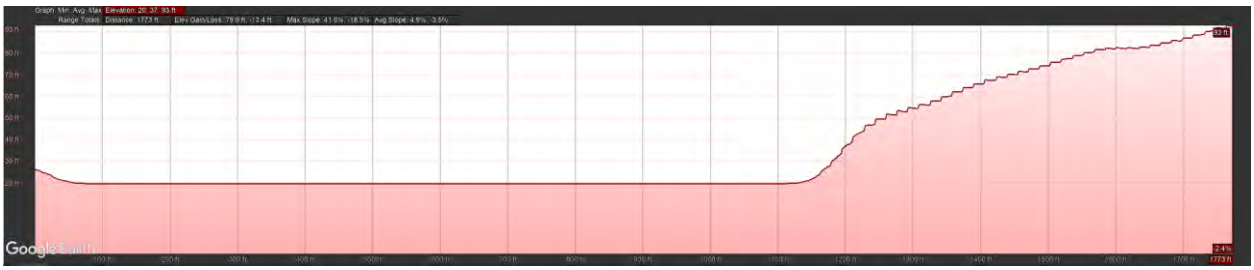
Material textures and the suggested exterior color/finish of the bridge were then added to the model. The model was then rendered with a proposed architectural fascade to create the output simulation.



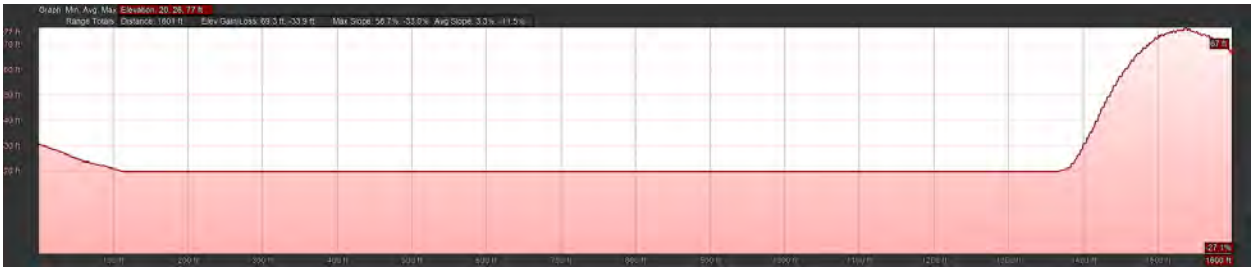
The above vantage points and lines-of-sight were photographed to develop existing and proposed views. Cross sections of the above line-of-sights are included below.



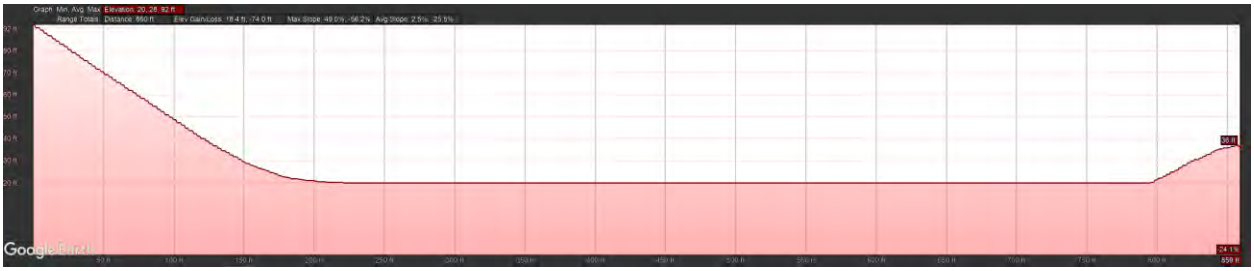
Cross Section from Broad Street Bridge



Cross Section from Route 4 (Hudson River Road)



Cross Section from Soldiers and Sailors Memorial Park



Cross Section from Second Street in Waterford

Existing photographs and visual simulations of the proposed development are included below.



Existing View from Second Street in Waterford looking east



Proposed View from Second Street in Waterford looking east



Existing View from Broad Street Bridge looking north



Proposed View from Broad Street Bridge looking north



Existing View from Route 4 (Hudson River Road) looking south



Proposed View from Route 4 (Hudson River Road) looking south



Existing View from 2nd Avenue looking northwest



Proposed View from 2nd Avenue looking northwest



Existing View from Soldiers and Sailors Memorial Park



Proposed View from Soldiers and Sailors Memorial Park

5.0 VIUSAL IMPACT ASSESSMENT RESULTS

5.1 Project Visibility

Topographic viewshed analysis indicates that the proposed project has the potential to be visible in a small portion of the visual study area. Overlaying the composite viewshed map on the map of visually sensitive sites shows that some of the visually sensitive sites identified in the study area fall within the viewshed, primarily the Barge Canal Historic District, most notably along the Hudson River. In general, the height of surrounding buildings and vegetation severely limits visibility of the proposed project to other sensitive visual receptors. Cross section analysis revealed that along selected lines of sight, vegetation and structures will significantly decrease potential project visibility, when compared to the results of the viewshed analysis. The screening effect of topography is illustrated in each of the cross-sections which confirm a lack of visibility from the other sensitive visual receptors. Field review indicated that actual project visibility is consistent with the viewshed analysis completed.

5.2 Mitigation Measures

Additional vegetative screening and berming is proposed within the open area on 2nd Avenue to mitigate views of the proposed project from the adjacent residents. A phot simulation depicted the proposed mitigation view is included below.



Proposed Mitigation View from 2nd Avenue looking northwest

Additional mitigation measures are not proposed from other visual receptors given the distance of those receptors from the proposed project and the consistency of those viewpoints with the surrounding area.

6.0 VISUAL IMPACT ASSESSMENT SUMMARY

6.1 Project Visibility

Viewshed mapping, cross section analysis, and field verification indicate that the project will be visible from areas immediately along the Hudson River and select road networks that have unobstructed views across the Hudson or are immediately adjacent to the project site. Some visually sensitive resources will be impacted by the project. These largely include boaters using the Hudson River and drivers along sections of the road where the project will be visible. Immediately adjacent neighbors along portions of 2nd Avenue will also have partial views of the proposed development. Drivers along the roadways networks such as Route 4 and the 126th Street Bridge will be at sufficient distance from the proposed project that the views of the proposed project are not anticipated to degrade the viewers experience.

ATTACHMENT J

SUBMITTED TO:

Kevin Vandenburgh

ECONOMIC AND FISCAL IMPACT ANALYSIS

1011 2ND AVENUE

Kevin Vandenburgh

OCTOBER 2021

PREPARED BY:

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ABOUT CAMOIN ASSOCIATES

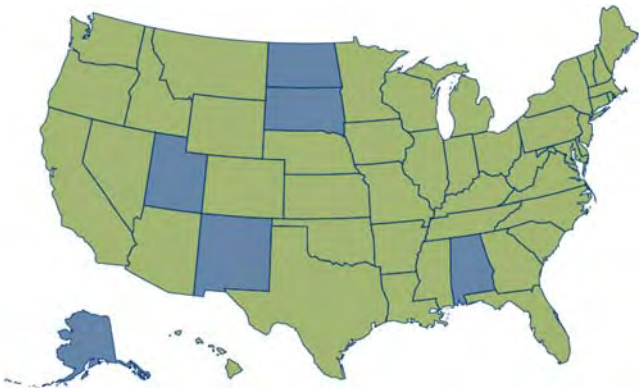
Camoin Associates has provided economic development consulting services to municipalities, economic development agencies, and private enterprises since 1999. Through the services offered, Camoin Associates has served EDOs and local and state governments from Maine to California; corporations and organizations that include Amazon, Lowes Home Improvement, FedEx, Volvo (Nova Bus) and the New York Islanders; as well as private developers proposing projects in excess of $6 billion. Our reputation for detailed, place-specific, and accurate analysis has led to over 1,000 projects in 44 states and garnered attention from national media outlets including Marketplace (NPR), Crain's New York Business, Forbes magazine, The New York Times, and The Wall Street Journal. Additionally, our marketing strategies have helped our clients gain both national and local media coverage for their projects in order to build public support and leverage additional funding. We are based in Saratoga Springs, NY, with regional offices in Richmond, VA; Portland, ME; Boston, MA; and Brattleboro, VT. To learn more about our experience and projects in all of our service lines, please visit our website at www.camoinassociates.com. You can also find us on Twitter @camoinassociate and on Facebook.

THE PROJECT TEAM

Rachel Selsky
Principal

Jessica Tagliafierro
Senior Analyst

James Matonte
Analyst



ABOUT THE STUDY

Camoin Associates was retained by Kevin Vandenburgh to measure the economic contribution and municipal fiscal impact of a 231-unit residential complex in the City of Troy, NY. The goal of this analysis is to provide an assessment of the total economic, employment, and fiscal impact of the full build-out of the residential development on the City of Troy, NY and the Lansingburgh School District.

The primary tool used in this analysis is the input-output model developed by Economic Modeling Specialists Intl. (Emsi). Primary data used in this study was obtained from Kevin Vandenburgh and the City of Troy and includes information about full build-out and expected final assessed value, adopted budget information, and current assessed value information. Additional information on the methodology can be found later in the report.

The economic impacts are presented in four categories: direct impact, indirect impact, induced impact, and total impact. The indirect and induced impacts are commonly referred to as the "multiplier effect."

The fiscal impacts are presented as the net fiscal costs upon full build-out of the residential development, or the total new revenue minus the total new costs to the City and School District.

STUDY INFORMATION

Data Source:
Kevin Vandenburgh and City of Troy website

Geography:
City of Troy, NY

Study Period:
2021

Modeling Tool:
Emsi

DIRECT IMPACTS

Initial round of impacts generated as a result of spending by new households and of new employment generated as a result of annual operation.

INDIRECT IMPACTS

Direct impacts have ripple effects through business to business spending. This spending results from the increase in demand for goods and services by industry sectors in the supply chain.

INDUCED IMPACTS

Impacts that result from the spending by employees and employees of suppliers. Earnings of these employees enter the economy as paychecks are spent on food, clothing, and other goods and services.

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EXECUTIVE SUMMARY

Kevin Vandenburgh is considering developing a 231-unit market-rate apartment building (the Project) at 1011 2nd Avenue in the City of Troy, NY. As part of the permitting and approval process for the Project, there is need for an objective assessment of the economic and fiscal impacts of the Project on the City and any applicable local jurisdictions and special districts. The Project is expected to include a mix of 1- and 2-bedroom units, with rents ranging from $1,500 to $2,000 per month.

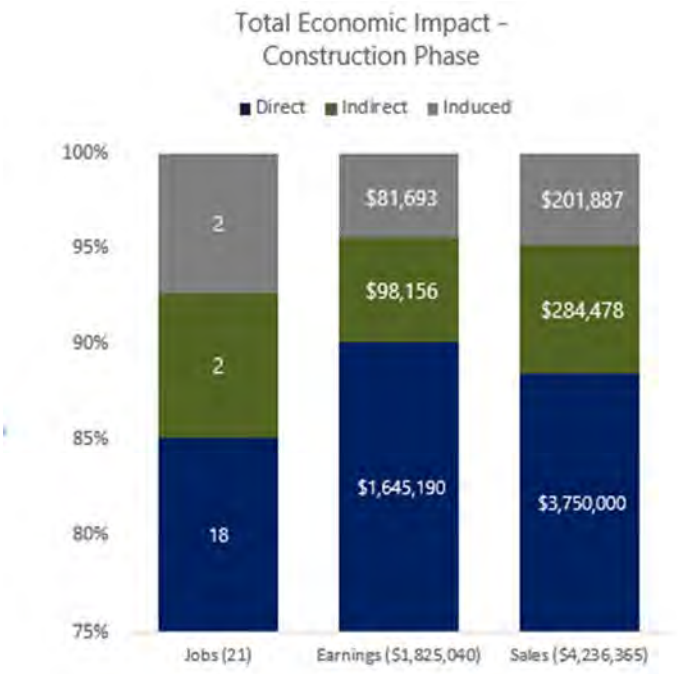
This analysis considers the economic impact of the construction and operation phases, as well as the fiscal impact on the City of Troy and the Lansingburgh Central School District upon full build-out. The following is a summary of the key findings, with more detail provided in the body of the report.

CONSTRUCTION IMPACT

- The construction of the Project is expected to cost a total of $25 million, of which approximately 15% ($3.75 million) will be spent within the City of Troy.
- Construction of the Project would result in approximately 18 new direct construction jobs generating over $1.6 million in direct new earnings on-site and an additional over $180,000 in indirect and induced earnings in Troy. The figure below displays more detail on the economic impact of construction.

ANNUAL IMPACT

- The Project would support 25 net new jobs in the city, with over $1 million in associated earnings. These figures are composed of net new jobs resulting from maintenance and operation of the complex and new economic activity from household spending.





FISCAL IMPACT ON CITY OF TROY

Full build-out of the Project will have a net positive fiscal impact on the City of Troy. The net annual fiscal impact of the Project is displayed in Table 1. The components of the cost and revenue increases are discussed in greater detail within this report, beginning on page 7.

Table 1

One Time Fiscal Impact to the City of Troy	
Permitting Fees During Construction	$ 300,000
One Time Net Fiscal Impact	$ 300,000
Annual Net Fiscal Impact to the City of Troy	
Variable Revenue (Table 13)	$ 34,571
Sales Tax Revenue (Table 17)	$ 2,424
Property Tax Revenue (Table 18)	$ 493,620
Variable Costs (Table 12)	$ (236,593)
Annual Net Fiscal Impact	$ 294,023

Source: Camoin Associates

The City will also receive approximately $300,000 in permitting fees during the initial period of construction.

FISCAL IMPACT ON LANSINGBURGH CENTRAL SCHOOL DISTRICT

Full build-out of the Project is projected to increase the number of school age children attending public school in the City. The introduction of new students into Lansingburgh Central School District will result in new costs for the school district while the property's increased assessed value will generate additional revenue. Table 2 summarizes the annual fiscal impact of full build-out of the Project on the Lansingburgh Central School District.

Table 2

Annual Net Fiscal Impact to the School District	
New Annual Revenue (Table 24)	$446,473
New Annual Costs (Table 23)	$668,230
Net Fiscal Impact	($221,757)

Source: Camoin Associates

INTRODUCTION

Kevin Vandenburgh (Developer) is proposing to build a 231-unit market-rate apartment building (Project) in the City of Troy, NY. As part of the permitting and approval process for the Project, the Developer has commissioned an objective, third-party assessment of the economic and fiscal impacts of the Project on the City and any applicable local jurisdictions and special districts.

Data and information used in this study were gathered from various sources, including:

- Kevin Vandenburgh provided all information regarding full build-out of residential development including number of units, unit type, and rental rates.
- The City of Troy 2021 adopted budget and assessment roll was accessed from the City's website in September 2021.
- City of Troy 2018 Comprehensive Plan was accesses from the City's website in September 2021.
- New York State Education Department School District Report Card: Enrollment information.
- Email communication with the City of Troy Fire Department, the City of Troy Police Department, Lansingburgh Central School District, and the City of Troy economic development department.

ECONOMIC IMPACT ANALYSIS

Estimates of direct economic activity generated upon full build-out were developed and used as the direct inputs for the economic impact model. Camoin Associates uses the input-output model designed by Economic Modeling Specialists, International (Emsi) to calculate total economic impacts. Emsi allows the analyst to input the amount of new direct economic activity (spending or jobs) occurring within the city and uses the direct inputs to estimate the spillover effects that the net new spending or jobs have as these new dollars circulate through the Troy economy. This is captured in the indirect and induced impacts and is commonly referred to as the "multiplier effect." See Attachment A for more information on economic impact analysis.

The Project would have economic impacts on the city's economy because of new permanent jobs on-site and spending by new households within the city.

Key Assumptions:

1. 90% of the 231 units (208 units) are considered to be net new in City of Troy. See Appendix C for more detail on the net new household methodology.
2. Based on proposed rents of $1,500-$2,000 as provided by the Developer, it is assumed that tenants will have annual household incomes of around $70,000.
3. Since 90% of all new housing units created by the Project will be net new, 90% of the economic impacts related to on-site residential operations are therefore also treated as "net new" activity for the purposes of this analysis.
4. Camoin Associates used data from the U.S. Census Bureau's American Community Survey Public Use Microdata Sample (PUMS) to calculate population and school age children multipliers applicable to the new

residential units. PUMS data is available for PUMA geographies (Public Use Microdata Areas), and in this case PUMA 36 01900 Rensselaer County – Troy City was used. This geography encompasses all of Rensselaer County.

Based on data related to the number of households that have moved into 1- and 2-bedroom rental units in Rensselaer County over the last year, multipliers were calculated. Using this Census data, 342 new residents and 41 new school age children will be expected to move to the city because of the Project.

Table 3

Demographic Multipliers, 1- and 2- bedroom Units

	Multiplier	Net New Units	New Residents and SAC
Residents	1.644	208	342
School Age Children	0.198	208	41

Source: Camoin Associates, U.S. Census Bureau American Community Survey Public Use Microdata Sample

5. According to the Developer, between 15-20% of all construction costs will be spent directly within the City of Troy.

CONSTRUCTION PHASE IMPACTS

The Developer estimates that construction will cost approximately $25.0 million and that between 15% and 20% would be sourced from within the City of Troy. Using the lower end of this estimate, the analysis assumes that approximately $3,750,000 will be the direct new construction spending in Troy, as calculated in Table 4.

Table 4

Consruction Phase Spending

Total Construction Cost	$	25,000,000
Percent Sourced from City		15%
Net New Construction Spending	$	3,750,000

Source: Developer, Camoin Associates

Table 5 calculates the impact of this direct new construction spending on the Troy economy. During the period of construction, there will be a total of 21 new jobs in the city, $1.8 million in associated earnings, and over $4.2 million in sales.

Table 5

Economic Impact - Construction Phase

	Jobs		Earnings		Sales
Direct	18	$	1,645,190	$	3,750,000
Indirect	2	$	98,156	$	284,478
Induced	2	$	81,693	$	201,887
Total	21	$	1,825,040	$	4,236,365

Source: Emsi, Camoin Associates

IMPACTS OF NEW HOUSEHOLD SPENDING

NET NEW HOUSEHOLDS

As noted in the Key Assumptions, above, 90% of units will be net new to the city. This means that of the 231 units, 208 will be net new and bring additional economic activity to the local economy that otherwise would not occur. See Appendix C for more detail on this methodology.

Table 6

Net New Housing

Number of Units	Percent Net New	Net New Households
231	90%	208

Source: Camoin Associates, Developer, Esri

SPENDING BY NEW TENANTS

New residents would make purchases in the region, thereby adding dollars to the Troy economy. For this analysis, we researched spending patterns by household income to estimate spending by tenants. Using the standard accepted affordability threshold that housing costs should not exceed 30% of income, it is estimated that tenants will have household incomes of between $60,000 and $80,000 based on estimated rents of $1,500 to $2,000 per month.

Likely spending was estimated using a spending basket from the 2019 Consumer Expenditure Survey, which details household spending in individual consumer categories by income level[1]. Given expected household incomes of around $70,000, households are assumed to fall in the Consumer Expenditure Survey's income bracket of $50,000 -$69,999. Table 7 shows the total spending of households in this range by category. Assumptions about the percent spent in the region for each category were made using demand met in region data from Emsi. The total net new spending in the city was calculated by multiplying the amount spent in each spending category, in the region, by the number of net new households. Total spending in the City of Troy by the 208 net new households is estimated to be $1,748,448.

Troy 2018 Comprehensive Plan Review - Role of the Project in Attracting New Residents to the City of Troy:

The City of Troy 2018 Comprehensive Plan outlines the current housing situation in the City of Troy, including a concern regarding the older housing stock (only 7% was built after 1990), lack of investment by property owners, and high vacancy rates.

Principal 1 of the Comprehensive Plan is titled *Grow the Economy and Population* indicates a desire to increase the population of downtown and encourage a "variety of housing types" and in particular "multi-unit buildings". This project will help to achieve the City's goals of offering a more diverse and modern housing product for tenants.

(Source: City of Troy 2018 Comprehensive Plan https://www.troyny.gov/wp-content/uploads/2019/09/RealizeTroyComprehensivePlanMay2018.pdf)



[1] Source: Bureau of Labor Statistics 2019 Consumer Expenditure Survey

Table 7

Tenant Spending Basket

Category	Annual per Unit Spending Basket	Percent Spent in Region	Amount Spent in Region	Total Spending (208 HH)
Food	$7,396	50%	$3,675	$764,400
Household Furnishings	$1,761	2%	$36	$7,488
Apparel and Services	$1,586	2%	$38	$7,904
Transportation	$10,377	14%	$1,450	$301,600
Health Care	$4,673	42%	$1,942	$403,936
Education	$671	45%	$303	$63,024
Entertainment	$2,401	29%	$688	$143,104
Personal Care	$718	31%	$223	$46,384
Misc.	$877	6%	$51	$10,608
Annual Discretionary Spending	$30,460	28%	$8,407	$1,748,448

Source: Emsi, Camoin Associates, Bureau of Labor Statistics 2019 Consumer Expenditure Survey

Any difference due to rounding.

Using $1,748,448 as the new sales input, Camoin Associates employed Emsi to determine the indirect, induced, and total impact of the net new household spending as a result of the project. Table 8 outlines the findings of this analysis.

Table 8

Economic Impact - Household Spending

	Jobs		Earnings		Sales
Direct	17	$	658,157	$	1,748,448
Indirect	2	$	85,440	$	245,764
Induced	1	$	57,497	$	144,280
Total	20	$	801,094	$	2,138,492

Source: Emsi, Camoin Associates

IMPACTS OF ON-SITE OPERATIONS

The Developer anticipates on-site employment will be 5 employees. Since 90% of the units are net new, this means that 90% of the associated jobs (approximately 4 jobs) will be "net new" for the purposes of measuring economic impact (net new assumption calculated in Table 6, above).

Using these 4 new jobs as the direct input in the Emsi model, Table 9 details the annual impact that the on-site activity will have in the City of Troy in terms of employment, earnings, and sales of goods and services.

Table 9

Economic Impact - On-Site Operations

	Jobs	Earnings	Sales
Direct	4	$ 180,000	$ 645,118
Indirect	1	$ 60,492	$ 172,254
Induced	0	$ 14,745	$ 36,846
Total	5	$ 255,237	$ 854,218

Source: Emsi, Camoin Associates

Note: Model adjusted based on earnings information from Developer.

TOTAL ANNUAL ECONOMIC IMPACT

The annual economic impact of new household spending and on-site operations is displayed in Table 10.

Table 10

Total Annual Economic Impact

	Jobs	Earnings	Sales
Direct	21	$ 838,157	$ 2,393,566
Indirect	3	$ 145,932	$ 418,018
Induced	1	$ 72,242	$ 181,125
Total	25	$ 1,056,331	$ 2,992,710

Source: Emsi, Camoin Associates

FISCAL IMPACT ANALYSIS

In addition to the economic impact of the Project on the local economy (outlined above), there would also be a fiscal impact. The following section of the analysis outlines the impact of the completion of the Project on the local taxing jurisdictions in terms of the cost and/or benefit to municipal budgets.

CITY OF TROY

Camoin Associates reviewed the City of Troy's FY21 adopted budget. Each line item was then assigned to "Fixed" if it would not change due to the Project, "Variable" if it would change in proportion to the overall growth of the city as measured by change in population, or "Special" if it required further analysis. See Attachment B for more information on fiscal impact analyses and Attachment D for more information on these assignments.[2]

The methodology employed is a "Proportional Evaluation Method" that uses the percent change in the local economy that is from the development to determine the impact on local budgets (typically measured by population or assessed value). For example, if the development in Town A increases the town's total population by 1%, then under this method it is assumed that the town's costs and revenues will increase by 1%. This 1% factor is only applied to those costs and revenues likely to be affected by the Project. This is considered an appropriate methodology for an analysis of this scale and type.

FISCAL IMPACT VARIABLES

POPULATION

As the overall population of the city increases, certain department expenses are projected to increase proportionally. To project the increase in population that will result from the Project, the first step is to calculate the number of residents that can be considered "net new" to the city.

Residential demographic multipliers were used to calculate the increase in residents per each net new unit of development. These multipliers vary based on unit type (owned vs. rented) and bedroom count. In total, it is expected that there will be 342 net new residents in the City of Troy upon full buildout and occupation of the Project (see Table 3).

The calculation of new population for the City of Troy is displayed in Table 11. The new residents from the Project will result in a 0.70% increase in population in Troy.

Table 11

Percent Increase in City of Troy Population

Current City of Troy Population	49,154
Net New Population from Project	342
Percent Increase in Population	0.70%

Source: Camoin Associates, US Census, Developer

[2] Note: The City's Fire Department and Police Department were both contacted in September 2021 for input on the impact of the Project on their budget but were unable to estimate the impact on their budget and/or resources. Therefore, both departments were assessed using the Proportional Evaluation Method and it is assumed that their costs will change proportionally with population.

CITY BUDGET – EXPENSES

VARIABLE EXPENSES

There are variable expenses that the city will incur because of additional population and economic activity following full build-out of the Project. Based on the FY21 budget, over $34.0 million in expenses will vary with population. Based on the change in population that will result from the Project, there will be additional costs as calculated in Table 12.

Table 12

Impacts of Change in Population on City Budget (Expenses)		
Costs that Vary with Population	$	34,004,298
Change in Population		0.70%
New Costs	$	236,593

Source: Camoin Associates, Troy FY21 Budget

CITY BUDGET – REVENUES

Full build-out of the Project will generate recurring annual revenue for the City of Troy in the form of new variable revenues (excluding property tax and sales tax revenue).

VARIABLE REVENUE

Like the variable costs to the city that are generated because of increased population, there will also be new variable revenues. Based on the FY21 budget, nearly $5.0 million in revenue varies with population. Upon full build-out of the Project, the City will receive additional revenue as calculated in Table 13.

Table 13

Impacts of Change in Population on City Budget (Revenue)		
Revenues that Vary with Population	$	4,968,750
Change in Population		0.70%
New Revenues	$	34,571

Source: Camoin Associates, Troy FY21 Budget

SALES TAX REVENUE

The new sales and earnings resulting from the new households and commercial activity in the city will generate additional sales tax revenue for the City of Troy. Currently, Rensselaer County has a 4% sales tax, of which a portion is distributed to the City of Troy. Per the New York State Office of Comptroller, the City of Troy receives 19.65% of the first $80,000,000 received and 9% of everything above that[3]. Since the current spending in the County generates at least $80,000,000 in sales tax revenue, any new revenue from the Project will generate a 9% distribution to the City of Troy.

[3] Source: Understanding Local Government Sales Tax in New York State – 2020 Update.

The City will receive sales tax revenue from three different sources: as earnings from the period of construction are spent, as annual on-site operation earnings are spent, and annual household spending.[4] The tables below estimate the amount of new sales tax that the City will receive as a result of full build-out of the Project.

SALES TAX REVENUE – CONSTRUCTION PHASE

The one-time construction phase earnings described by the total economic impact of the construction work (described in Table 5) would lead to additional sales tax revenue for the County and subsequently the City. It is assumed that 50%[5] of the construction phase earnings would be spent within Rensselaer County and that 25% of those purchases would be taxable.

Table 14
One-Time Sales Tax Revenue
Construction Phase

Total New Earnings	$	1,825,040
Amount Spent in County (50%)	$	912,520
Amount Taxable (25%)	$	228,130
County Sales Tax Rate		4.00%
New County Tax Revenue	$	9,125
City of Troy Distribution (9%)	$	821

Source: Camoin Associates, Office of the State Comptroller

As a result of the construction phase employment, the City would receive approximately $821 in new sales tax revenue from the economic impacts of construction.

SALES TAX REVENUE – EMPLOYEE EARNINGS

In addition to sales tax generated by the construction phase, the City would also receive sales tax revenue upon full build-out. The new earnings generated by on-site jobs that will occur as a result of building occupation at the Project (described under Impacts of On-Site Employment) would lead to additional annual sales tax revenue for the County and City. It is assumed that 50% of the earnings would be spent within Rensselaer County and that 25% of those purchases will be taxable. Table 15 displays the annual tax revenue that the County and City will receive.

Table 15
Annual Sales Tax Revenue
On-Site Operations

Total New Earnings	$	255,237
Amount Spent in County (50%)	$	127,618
Amount Taxable (25%)	$	31,905
County Sales Tax Rate		4.00%
New County Tax Revenue	$	1,276
City of Troy Distribution (9%)	$	115

Source: Camoin Associates, Office of the State Comptroller

[4] Inputs for these analyses come from the Economic Impact section of the report.

[5] A retail leakage analysis of Rensselaer County suggests that approximately half of goods and services that employees will be purchasing are available within the county (food, clothing, vehicles, computers, etc.), but there still will be some outside spending on travel and through purchases made online and in neighboring counties. Based on third party proprietary retail spending data, 50% is a reasonable assumption for the amount of in-county spending. (Source: Emsi In-Region Demand Analysis)

SALES TAX REVENUE – NEW HOUSEHOLD SPENDING

Table 16 displays the new sales tax revenue that the City of Troy would receive annually based on in-city spending by new households.

Table 16

Annual Sales Tax Revenue
Household Spending

Total New Spending	$	2,138,492
Amount Taxable (30%)	$	641,548
County Sales Tax Rate		4.00%
New County Tax Revenue	$	25,662
City of Troy Distribution	$	2,310

Source: Camoin Associates, Office of the State Comptroller

Note that the household spending figure has already been adjusted to account for total spending occurring within the city (see table entitled "Tenant Spending Baskets"). Also note that we have used a higher value for "Amount Taxable" as compared to the previous tables (30% rather than 25%) since certain non-taxable items (related to housing expenses) have been removed from the total spending line, this increasing the remaining portion taxable.

TOTAL ANNUAL SALES TAX REVENUE

The total annual sales tax revenue that the City will receive is summarized in Table 17

Table 17

Total Annual Sales Tax Revenue

On-Site Operations (Table 15)	$	114.9
Household Spending (Table 16)	$	2,310
New City Tax Revenue	$	2,424

Source: Camoin Associates

Note: Figures do not total due to rounding.

PROPERTY TAX REVENUE

The Developer estimates that the total tax bill (excluding the school district) upon full build-out will be approximately $500,000. Based on the 2021 tax rates as provided in the most recent tax bill on the property, that means that the assessed value upon full build-out will be approximately $22 million. **Error! Reference source not found.** below calculates the new property tax revenue that will be generated by the Project upon full build-out.

Table 18

New Property Tax Revenue

Property's Assessed Value				
Current Assessed Value				$280,000
Projected Assessed Value Upon Full Build Out				$21,942,173
Tax Rate Per $1,000 of Assessed Value				
Jurisdiction	Rate ($)	Current Property Taxes Paid	Expected Property Taxes Paid	New Property Tax Revenue
County Tax	1.25799	$ 352	$ 27,603	$ 27,251
City Tax	14.88350	$ 4,167	$ 326,576	$ 322,409
NY Mandates	6.05625	$ 1,696	$ 132,887	$ 131,192
Library Tax	0.58944	$ 165	$ 12,934	$ 12,768
Total Tax Bill*	22.7872	$ 6,380	$ 500,000	$ 493,620

Source: Developer 2021 Property Tax Bill, Camoin Associates

*Does not include School District

TOTAL REVENUE

The table below calculates the total new revenue the City will receive annually, upon full build-out of the Project.

Table 19

Total New Revenue to the City of Troy

Variable Revenue	$	34,571
Sales Tax Revenue	$	2,424
Property Tax Revenue	$	493,620
Total New Revenue to the City of Troy	$	530,615

Source: Camoin Associates

NET FISCAL IMPACT

The net fiscal impact of full build-out of the Project on the City of Troy's budget is positive. Upon full build-out, revenues exceed costs by more than $294,000. Additionally, the Project will contribute approximately $300,000 to the City for permitting and inspection fees.

Table 20

One Time Fiscal Impact to the City of Troy		
Permitting Fees During Construction	$	300,000
One Time Net Fiscal Impact	$	300,000
Annual Net Fiscal Impact to the City of Troy		
New Annual Revenue (Table 19)	$	530,615
New Annual Costs (Table 12)	$	236,593
Net Annual Impact	$	294,023

Source: Camoin Associates

LANSINGBURGH CENTRAL SCHOOL DISTRICT

In addition to the fiscal impact on the City of Troy, Camoin Associates calculated the impact of the Project on the Lansingburgh Central School District. To do so, the number of new school children in the district was calculated along with the costs and revenues associated with these children.

FISCAL IMPACT VARIABLE

SCHOOL-AGE CHILDREN

A portion of the new residents will be public school children. A methodology like the one used to calculate new residents was used to calculate new public school-age children (PSAC). Given that 90% of the 231 units (208 units) will be net new, the Average School Age Children Multiplier is applied only to the net new number of units. Table 21 outlines this calculation.

Table 21

Number of School Aged Children Added by Development

Total Net New Household Units	208
Average School Age Children Multiplier	0.198
Total New Public School Aged Children	41

Source: NYS Education Department, Camoin Associates

An assessment of enrollment within the Lansingburgh Central School District was completed to determine capacity for additional students. As shown in Table 22, the school district has seen a decline in enrollment since 2010, and should reasonably be able to accommodate additional students.

Table 22

Lansingburgh CSD Enrollment Analysis

School Year	Enrollment
2019-2020	2110
2018-2019	2238
2017-2018	2253
2016-2017	2267
2015-2016	2234
2014-2015	2282
2013-2014	2327
2012-2013	2299
2011-2012	2397
2010-2011	2382
Change in Enrollment	-272
Percent Decrease	11%

Source: New York State Education Department

LANSINGBURGH CENTRAL SCHOOL DISTRICT – COSTS

According to the Lansingburgh Central School District[6] and information collected from the New York State Education Department, total per pupil costs (including school level expenditures plus transportation costs) are approximately $16,300. The impact of the annual costs to the Lansingburgh Central School District are shown below.

Table 23

Cost Generated from Project on Lansingburgh Central School District	
Total New PSAC	41
Cost Per Student (School Level + Transportation)	$16,298
Total New Cost Upon Full Build Out	$668,230

Source: NYS Education Department, Camoin Associates

LANSINGBURGH CENTRAL SCHOOL DISTRICT – REVENUES

The following table calculates the additional property tax revenue that will be generated as a result of the Project due to increased assessed value of the property. The Lansingburgh Central School District property tax millage rate is $20.61 for every $1,000 assessed value. Given the estimated assessed value of the project of $21,942,173 upon full build-out, the total revenue generated for the district is $452,244. However, the property is currently generating $5,771 in tax revenue for the Lansingburgh Central School District making the net new revenue from the project $446,473. Table 24 illustrates this revenue calculation.

Table 24

Revenue Generated from Project for Lansingburgh Central School District	
Assessed Value of Project	$21,942,173
School Tax Rate ($/1000)	$20.61
Total School Tax Revenue	$452,244
Existing School Tax Revenue on Property	$5,771
Net New School Tax Revenue	$446,473

Source: NYS Education Department, Developer

NET FISCAL IMPACT

Table 25 shows the new costs, revenue, and net fiscal impact to the Lansingburgh Central School District as a result of the development. The net fiscal impact is negative upon full buildout.

Table 25

Annual Net Fiscal Impact to the School District	
New Annual Revenue (Table 24)	$446,473
New Annual Costs (Table 23)	$668,230
Net Fiscal Impact	($221,757)

Source: Camoin Associates

[6] Communication in September 2021 with the Lansingburgh Central School District suggested that an additional 41 students would result in additional costs associated with transportation, student supplies, cafeteria expenses, textbook spending, and technology.

ATTACHMENT A: WHAT IS ECONOMIC IMPACT ANALYSIS?

The purpose of conducting an economic impact study is to ascertain the total cumulative changes in employment, earnings and output in a given economy due to some initial "change in final demand". To understand the meaning of "change in final demand", consider the installation of a new widget manufacturer in Anytown, USA. The widget manufacturer sells $1 million worth of its widgets per year exclusively to consumers in Canada. Therefore, the annual change in final demand in the United States is $1 million because dollars are flowing in from outside the United States and are therefore "new" dollars in the economy.

This change in final demand translates into the first round of buying and selling that occurs in an economy. For example, the widget manufacturer must buy its inputs of production (electricity, steel, etc.), must lease or purchase property and pay its workers. This first round is commonly referred to as the "Direct Effects" of the change in final demand and is the basis of additional rounds of buying and selling described below.

To continue this example, the widget manufacturer's vendors (the supplier of electricity and the supplier of steel) will enjoy additional output (i.e. sales) that will sustain their businesses and cause them to make additional purchases in the economy. The steel producer will need more pig iron and the electric company will purchase additional power from generation entities. In this second round, some of those additional purchases will be made in the US economy and some will "leak out". What remains will cause a third round (with leakage) and a fourth (and so on) in ever-diminishing rounds of industry-to-industry purchases. Finally, the widget manufacturer has employees who will naturally spend their wages. Again, those wages spent will either be for local goods and services or will "leak" out of the economy. The purchases of local goods and services will then stimulate other local economic activity. Together, these effects are referred to as the "Indirect Effects" of the change in final demand.

Therefore, the total economic impact resulting from the new widget manufacturer is the initial $1 million of new money (i.e. Direct Effects) flowing in the US economy, plus the Indirect Effects. The ratio of Total Effects to Direct Effects is called the "multiplier effect" and is often reported as a dollar-of-impact per dollar-of-change. Therefore, a multiplier of 2.4 means that for every dollar ($1) of change in final demand, an additional $1.40 of indirect economic activity occurs for a total of $2.40.

Key information for the reader to retain is that this type of analysis requires rigorous and careful consideration of the geography selected (i.e. how the "local economy" is defined) and the implications of the geography on the computation of the change in final demand. If this analysis wanted to consider the impact of the widget manufacturer on the entire North American continent, it would have to conclude that the change in final demand is zero and therefore the economic impact is zero. This is because the $1 million of widgets being purchased by Canadians is not causing total North American demand to increase by $1 million. Presumably, those Canadian purchasers will have $1 million less to spend on other items and the effects of additional widget production will be cancelled out by a commensurate reduction in the purchases of other goods and services.

Changes in final demand, and therefore Direct Effects, can occur in a number of circumstances. The above example is easiest to understand: the effect of a manufacturer producing locally but selling globally. If, however, 100% of domestic demand for a good is being met by foreign suppliers (say, DVD players being imported into the US from Korea and Japan), locating a manufacturer of DVD players in the US will cause a change in final demand because all of those dollars currently leaving the US economy will instead remain. A situation can be envisioned whereby a producer is serving both local and foreign demand, and an impact analysis would have to be careful in calculating how many "new" dollars the producer would be causing to occur domestically.



ATTACHMENT B: WHAT IS FISCAL IMPACT ANALYSIS?

Fiscal impact analysis is a tool that compares, for a given project or policy change, changes in governmental costs against changes in governmental revenues. For example, a major residential development project in Town A will mean new residents that require new services and facilities such as fire and police protection, libraries, schools, parks, and others. At the same time, Town A will receive new revenues from the project in the form of property tax revenues, local sales tax revenue, and other taxes and fees. A fiscal impact analysis compares the total expected costs to the total expected revenues to determine the net fiscal impact of the proposed development on Town A.

Typical revenues and costs in a fiscal impact analysis include (but are not limited to) the following:

- Property tax
- Sales tax
- Income tax
- Other local taxes
- Water and sewer fees
- One-time construction-related fees
- Impact fees
- Miscellaneous fees
- Increased staffing costs
- Water and sewer and other infrastructure costs
- Road maintenance costs
- Public school costs
- Police and fire protection costs
- New parks and recreation facilities
- Miscellaneous costs

There are several standard methodologies that can be employed in a fiscal impact analysis. The two general approaches to fiscal impact analysis are *average* costing and *marginal* costing:

Average Costing: This method establishes an existing average cost per unit of service. So, for example, to understand new road maintenance costs in Town A, this methodology would calculate the average cost per road-mile in the town currently. This average cost would then be multiplied by the number of new road miles added to the Town because of the development.

- Similar to the average costing approach is the "Proportional Evaluation Method" that uses the proportion of local property the development comprises (typically measured by assessed value.) For example, if the development in Town A increases the town's total assessed value by 1%, then under this method it is assumed that the town's costs and revenues will increase by 1%. This 1% factor is only applied to those costs and revenues likely to be affected by the Project.

Marginal Costing: The marginal approach addresses the Town's *capacity* to deliver services. For example, If Town A does not have the equipment or manpower to maintain the new roads, then additional costs will be incurred to purchase new equipment and hire additional staff. Conversely, a school district may have excess space due to historically declining enrollments, obviating the need to build new schools for an influx of new residents.

- This approach involves case studies and interviews with local officials and experts. It takes a more detailed look at the deficient (or excess) capacity to deliver services by getting more precise estimates of how different government bodies will be affected by a given development.

ATTACHMENT C: CALCULATING NET NEW HOUSEHOLDS

"Net new" households that move into a geography because of the availability of desired housing contribute to that geography's economy in measurable ways. Estimating the number of net new households, the households that would not otherwise live in the geography, is therefore a critical task for an economic and fiscal impact analysis for a project that includes housing. Our housing market research indicates that housing is heavily affected by demand, with households in different demographic groups seeking diverse housing price points and amenities. Our estimates of net new households take into consideration demographic and economic differences among renters, and price points among units offered, identifying the existence and size of a housing gap (where more units are demanded than are available) or surplus (where there is oversupply) in the market segment to be served by the proposed project. Generally, where there is a significant housing gap outside the geography but within a reasonable distance for relocation, a project will draw a larger proportion of net new households into that geography. Each project may therefore have a different expectation for net new households, depending on price point, age restriction if any, and location. The following steps outline our process for calculating net new households. All data is drawn from Esri Business Analyst.

1. Identify where households are likely to come from. We expect that renters for a new project would consider housing within a reasonable driving time from their current location, creating a "renter-shed" for a new project. Households that are within the drive time but outside of the study area are net new.

2. Identify the existing rental housing supply at different price points. Using data from Esri, we identify rental housing units in the study area by price point and calculate the minimum household income expected to be necessary to afford rent by price range.

3. Identify the number of households at different income levels. We analyze households by income group and rental behavior to estimate an "implied number renting" for different income groups.

4. Calculate net housing surplus or gap by price point. Rental housing supply and rental housing demand is compared to calculate a "net gap," indicating excess demand for the project, or a "net surplus." To estimate net new households for a project, the net gap in the study area is compared to the net gap in the drive time.

ATTACHMENT D: CITY OF TROY BUDGET, FY2021

Revenues	2021 Approved Estimates	Note	Variable Amount
Local Sources	$ 45,769,834		
Real Property Taxes			
A-0000-1001-0000 Real Property Taxes	$ 26,054,209		
A-0000-1001-0001 Prorated Tax Collection	$ 32,335		
Subtotal	$ 26,086,544		
A-0000-1081-0000 Payment in Lieu of Taxes	$ 1,050,000		
A-0000-1081-0401 Pymt in Lieu of Taxes Water/Sewer	$ -		
A-0000-1090-0000 Int. & Penalties on Real Prop	$ 770,000		
Subtotal	$ 1,820,000		
Non Property Tax Items			
A-0000-1120-0000 Sales Tax PILOT- County	$ 16,615,000		
A-0000-1130-0000 Utilities Gross Receipts Tax	$ 485,000		
A-0000-1170-0000 Franchises	$ 620,000		
A-0000-1170-0001 Franchises - Settlement	$ 143,290		
Subtotal	$ 17,863,290		
Departmental Income	$ 5,554,446		
General Government			
A-1000-1230-0000 Treasurer's Fees	$ 210,000	Variable	$ 210,000
A-1000-1240-0000 Comptroller's Fees	$ 30,000		
A-1000-1245-0000 Corporation Counsels Fees	$ 32,500		
A-1000-1250-0000 Assessor's Fees	$ 35,000	Variable	$ 35,000
A-1000-1255-0000 Clerk's Fees	$ 11,500	Variable	$ 11,500
A-1000-1260-0000 Civil Service Exam Fees	$ 3,500	Variable	$ 3,500
A-1000-1289-0091 Host Community Agreements	$ 102,446		
Subtotal	$ 424,946		
Public Safety			
A-3000-1520-0000 Police Report Fees	$ 7,000	Variable	$ 7,000
A-3000-1560-0000 Safety Inspection Fees	$ 46,000	Variable	$ 46,000
A-3000-1570-0000 Demolition Fees	$ -		
A-3000-1589-0400 Other Public Safety (Vacant Bldg)	$ 700,000		
Subtotal	$ 753,000		
Health			
A-4000-1603-0000 Vital Statistics Fees	$ 70,000	Variable	$ 70,000
A-4000-1640-0000 Adv Life Support Medical Billing	$ 2,200,000		
A-4000-1689-0000 Hazmat Charges	$ 5,000		
Subtotal	$ 2,275,000		
Transportation			
A-5000-1720-0000 Parking Garage	$ 485,000	Variable	$ 485,000
A-5000-1730-0000 Parking Lots	$ 190,000	Variable	$ 190,000
A-5000-1740-0000 Parking Meters	$ 185,000	Variable	$ 185,000
A-5000-1789-0000 Towing Administrative Fees	$ 100,000	Variable	$ 100,000
Subtotal	$ 960,000		

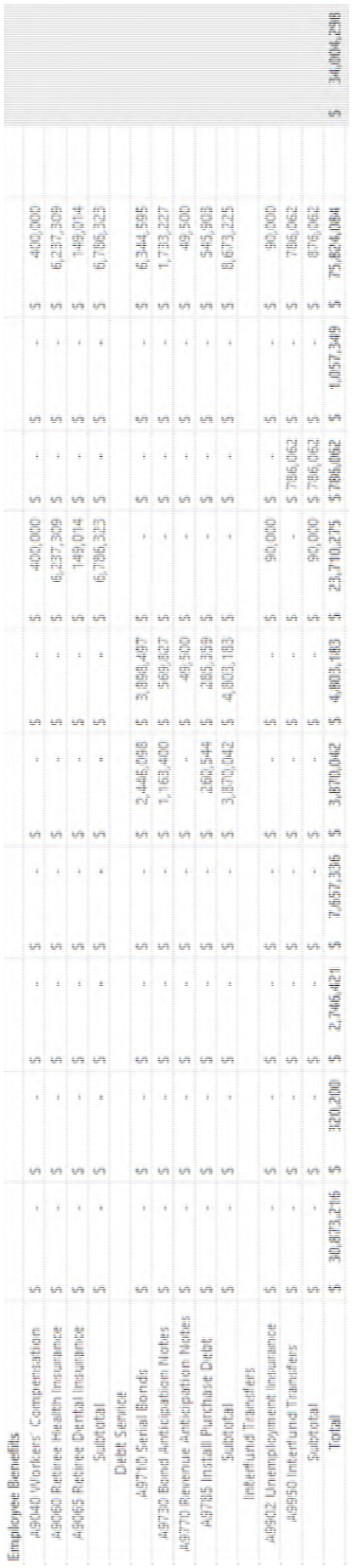
Culture and Recreation			
A-7000-2012-0000 Recreation Concessions	$ 30,000	Variable	$ 30,000
A-7000-2025-0434 Marina - Fuel Charges	$ 30,000	Variable	$ 30,000
A-7000-2025-0435 Marina - Docking Charges	$ 10,000	Variable	$ 10,000
A-7000-2050-0000 Golf Fees	$ 610,000	Variable	$ 610,000
A-7000-2050-0432 Golf Fees - Carts	$ 265,000	Variable	$ 265,000
A-7000-2050-0433 Golf Fees - Merchandise	$ 6,500	Variable	$ 6,500
A-7000-2050-0434 Golf Fees - Gift Cards	$ -		
A-7000-2065-0402 Skating Rink Fees-Knick Ice Rink	$ -		
A-7000-2089-0000 Other Recreation Fees	$ 75,000	Variable	$ 75,000
A-7000-2089-0014 Other Recr Fees-Turkey Trot	$ 15,000	Variable	$ 15,000
A-7000-2089-0503 Special Events Reimbursements	$ 100,000		
Subtotal	$ 1,141,500		
Intergovernmental Charges	$ 347,000		
General Government			
A-1000-2210-0000 General Services IDA	$ 100,000		
A-3000-2210-0000 Reimbursement For SRO	$ 105,000		
A-1000-2220-0000 Civil Service-School District	$ 60,000		
A-1000-2228-0000 Data Processing Services	$ 45,000		
Subtotal	$ 310,000		
Transportation			
A-5000-2300-0000 Transportation Services	$ 37,000		
Subtotal	$ 37,000		
Use of Money and Property	$ 95,750		
A-1000-2401-0000 Interest Earnings on Investments	$ 60,000		
A-1000-2410-0000 Rental of City Owned Real Prop.	$ 35,000		
A-1000-2450-0000 Commissions	$ 750		
Subtotal	$ 95,750		
Licenses and Permits	$ 1,018,250		
Licenses			
A-1000-2501-0000 Business & Occupational Licenses	$ 63,750	Variable	$ 63,750
A-1000-2530-0000 Games of Chance	$ -		
A-1000-2540 Bingo Licenses	$ 2,000	Variable	$ 2,000
A-1000-2543 Amusement Licenses	$ -		
A-1000-2544-0000 Dog Licenses	$ 12,000	Variable	$ 12,000
A-1000-2544-0404 Dog Redemption Fees	$ 8,500	Variable	$ 8,500
Subtotal	$ 86,250		
Permits			
A-3000-2555-0000 Building & Alteration Permits	$ 790,000	Variable	$ 790,000
A-3000-2560-0000 Street Opening Permits	$ 135,000		
A-3000-2565-0000 Plumbing Permits	$ 7,000	Variable	$ 7,000
A-3000-2590-0405 Sign Permits	$ -		
Subtotal	$ 932,000		

Fines and Forfeitures	$	1,701,000		
A-3000-2610-0420 Criminal Fines & Forfeit of Bail	$	16,000	Variable	$ 16,000
A-3000-2610-0421 Parking Fines	$	700,000	Variable	$ 700,000
A-3000-2610-0422 Traffic Fines	$	925,000	Variable	$ 925,000
A-3000-2610-0427 Transportation Law	$	-		
A-3000-2610-0437 Transportation Fines	$	25,000	Variable	$ 25,000
A-3000-2610-0438 Fines - Code Violations	$	35,000	Variable	$ 35,000
Subtotal	$	1,701,000		
Sales of Prop. & Compensation for Loss	$	55,000		
A-1000-2650-0000 Scrap Sales	$	-		
A-1000-2655-0000 Minor Sales	$	35,000		
A-1000-2680-0000 Insurance Recoveries	$	20,000		
A-1000-2690-0000 Zombie Property Recoveries	$	-		
Subtotal	$	55,000		
Miscellaneous	$	1,461,003		
A-1000-2705-0000 Gifts & Donations	$	370,000		
A-1000-2705-0091 Gifts & Donations - Capital Resource Corporation	$	-		
A-1000-2709-0000 Employee Contribution To Health Insurance	$	1,081,003		
A-1000-2770-0000 Other Unclassified Revenue	$	10,000		
A-1000-2770-0522 Current Year Refunds/ Unclassified Revenue	$	-		
A-1000-2770-1103 Reimbursement- DWI Crackdown	$	-		
A-1000-2770-1104 Reimbursement- DWI Enforcement	$	-		
A-1000-2770-1108 Reimbursement- FBI Safe Streets Task Force	$	-		
A-1000-2770-1109 Reimbursement- DEA	$	-		
A-1000-2770-1110 Reimbursement- NYS Homeland Security	$	-		
A-1000-2770-1112 Reimbursement- United States Marshalls	$	-		
A-1000-2770-1114 Reimburseement- CME	$	-		
Subtotal	$	1,461,003		
Interfund Revenues	$	2,985,905		
A-1000-2801-0401 Water Fund - Water Plant	$	646,000		
A-1000-2801-0407 Community Development	$	735,420		
A-1000-2801-0409 Water Fund - Services	$	934,209		
A-1000-2801-0410 Sewer Fund	$	152,209		
A-1000-2801-0411 Garbae:e Fund	$	518,067		
Subtotal	$	2,985,905		
State Aid	$	12,031,249		
General Government				
A-1000-3001-0000 Per Capital Revenue Sharing	$	11,051,516		
A-1000-3005-0000 Mortgage Tax Distribution	$	625,000		
A-1000-3021-0000 Aid to Court Facilities	$	125,000		
Subtotal	$	11,801,516		

Public Safety			
A-3000-3389-0000 Public Safety Other	$ -		
A-3000-3389-0113 Zombie Grant	$ 210,458		
A-3000-3389-0435 FRB Funding	$ -		
A-3000-3389-1106 Child Passenger Safety	$ 900		
A-3000-3389-1107 Police Traffic Services	$ 14,925		
A-3000-3389-1113 NYS Pedestrian Education	$ 3,450		
Subtotal	$ 229,733		
Federal Aid	$ 98,513		
Public Safety			
A-3000-4305-0000 Public Safety - Homeland Security	$ -		
A-3000-4389-0000 Public Safety - Other	$ -		
A-3000-4389-1100 GIVE	$ 98,513		
A-3000-4389-1101 OVW	$ -		
A-3000-4389-1105 JAG	$ -		
A-3000-4960-1100 GIVE	$ -		
Subtotal	$ 98,513		
Interfund Transfers	$ 3,038,187		
A-0000-5031-0000 Other Fund Transfer	$ -		
A-0000-5031-0414 Water Fund	$ 2,100,000		
A-0000-5031-0415 Debt Service Fund	$ 938,187		
Subtotal	$ 3,038,187		
Appropriated Fund Balance	$ 1,667,947		
A-1000-8018-0815 Unmployment Reserve	$ 90,000		
A-1000-8018-0863 Insurance Reserve	$ 350,000		
A-1000-8018-0909 Unassigned Fund Balance	$ 1,227,947		
Subtotal	$ 1,667,947		
Total	**$ 75,824,084**		**$ 4,968,750**

Appropriations	Personnel Services	Equipment and Capital	Material and Supplies	Contractual Services	Principal on Indebtedness	Interest of Indebtedness	Employee Benefit	Interfund Transfers	Contingent Account	Total	Note	Amount
	$ 0	$ 0	$ 0	$ 0	$ 1	$ 1	$ 1	$ 1				
General Governmental Support	$ 3,702,929	$ 33,000	$ 420,800	$ 3,192,397	$ -	$ -	$ 1,796,897	$ -	$ 1,057,349	$ 10,203,372		
Legislative												
A1010 City Council	$ 122,500	$ -	$ 4,100	$ 54,800	$ -	$ -	$ 29,472	$ -	$ -	$ 210,872		
Subtotal	$ 122,500	$ -	$ 4,100	$ 54,800	$ -	$ -	$ 29,472	$ -	$ -	$ 210,872		
Executive												
A1210 Mayor	$ 277,886	$ -	$ 1,000	$ 2,250	$ -	$ -	$ 146,735	$ -	$ -	$ 427,871		
Subtotal	$ 277,886	$ -	$ 1,000	$ 2,250	$ -	$ -	$ 146,735	$ -	$ -	$ 427,871		
Finance												
A 1315 Administration	$ 682,216	$ -	$ 5,000	$ 35,050	$ -	$ -	$ 357,566	$ -	$ -	$ 1,079,832		
A1320 Bureau of Auditor	$ 17,850	$ -	$ -	$ -	$ -	$ -	$ 4,295	$ -	$ -	$ 22,145		
A1325 Bureau of Cash Receipts	$ 171,605	$ -	$ 1,750	$ 31,000	$ -	$ -	$ 55,256	$ -	$ -	$ 259,611		
A1345 Contracts and Procurement	$ 79,776	$ -	$ 1,750	$ 21,200	$ -	$ -	$ 30,995	$ -	$ -	$ 133,721		
A1355 Bureau of Assessments	$ 143,734	$ -	$ 700	$ 202,000	$ -	$ -	$ 69,167	$ -	$ -	$ 415,601		$ 346,434
Subtotal	$ 1,095,181	$ -	$ 9,200	$ 289,250	$ -	$ -	$ 517,279	$ -	$ -	$ 1,910,910		
Staff												
A1410 City Clerk	$ 150,413	$ -	$ 1,250	$ 83,350	$ -	$ -	$ 45,156	$ -	$ -	$ 280,169	Variable	$ 235,013
A1420 Corporation Counsel	$ 291,672	$ -	$ 3,000	$ 581,477	$ -	$ -	$ 171,924	$ -	$ -	$ 1,048,073		
A1430 Personnel & Civil Service	$ 247,902	$ -	$ 600	$ 37,475	$ -	$ -	$ 113,329	$ -	$ -	$ 399,306		
A1440 City Svcs-Engineering	$ 265,341	$ 5,000	$ 8,000	$ 65,030	$ -	$ -	$ 101,283	$ -	$ -	$ 444,654		
A1490 City Svcs-Admin	$ 135,786	$ 3,000	$ 3,500	$ 35,950	$ -	$ -	$ 60,161	$ -	$ -	$ 238,397		
Subtotal	$ 1,091,114	$ 8,000	$ 16,350	$ 803,282	$ -	$ -	$ 491,853	$ -	$ -	$ 2,410,599		
Shared Services												
A1620 DPW-Facility Maintenance	$ 374,987	$ -	$ 44,500	$ 910,000	$ -	$ -	$ 212,083	$ -	$ -	$ 1,541,570		
A1640 DPW-Central Garage	$ 418,519	$ 25,000	$ 313,000	$ 8,500	$ -	$ -	$ 265,285	$ -	$ -	$ 1,030,304		
A 1680 Information Systems	$ 322,742	$ -	$ 32,650	$ 227,538	$ -	$ -	$ 134,190	$ -	$ -	$ 717,120		
Subtotal	$ 1,116,248	$ 25,000	$ 390,150	$ 1,146,038	$ -	$ -	$ 611,558	$ -	$ -	$ 3,288,994		
Special Items												
A 1710 Health/Work Comp	$ -	$ -	$ -	$ 159,049	$ -	$ -	$ -	$ -	$ -	$ 159,049		
A1910 Unallocated Insurance	$ -	$ -	$ -	$ 418,228	$ -	$ -	$ -	$ -	$ -	$ 418,228		
A 1920 Association Dues	$ -	$ -	$ -	$ 15,000	$ -	$ -	$ -	$ -	$ -	$ 15,000		
A1930 Judgments and Claims	$ -	$ -	$ -	$ 250,000	$ -	$ -	$ -	$ -	$ -	$ 250,000		
A1950 Taxes & Asses. on Property	$ -	$ -	$ -	$ 12,500	$ -	$ -	$ -	$ -	$ -	$ 12,500	Variable	$ 12,500
A1990 Contingency Account	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,057,349	$ 1,057,349		
A1995 Troy MAC	$ -	$ -	$ -	$ 42,000	$ -	$ -	$ -	$ -	$ -	$ 42,000		
Subtotal	$ -	$ -	$ -	$ 896,777	$ -	$ -	$ -	$ -	$ 1,057,349	$ 1,954,126		
Public Safety	$ 23,860,962	$ 246,500	$ 1,671,321	$ 2,360,372	$ -	$ -	$ 13,537,250	$ -	$ -	$ 41,676,405		
Law Enforcement												
A3020 911 Services	$ -	$ -	$ -	$ 800,000	$ -	$ -	$ -	$ -	$ -	$ 800,000	Variable	$ 800,000
Subtotal	$ -	$ -	$ -	$ 800,000	$ -	$ -	$ -	$ -	$ -	$ 800,000		

Law Enforcement														
A3120 Public Safety Police	$ 12,503,111	$ 81,000	$ 1,095,833	$ 733,772	$ -	$ -	$ 7,027,075	$ -	$ -	$ 21,440,791	Variable	$ 14,413,716		
Subtotal	$ 12,503,111	$ 81,000	$ 1,095,833	$ 733,772	$ -	$ -	$ 7,027,075	$ -	$ -	$ 21,440,791				
Traffic														
A3310 DPW Traffic Control	$ 219,132	$ 15,000	$ 46,500	$ 85,000	$ -	$ -	$ 112,281	$ -	$ -	$ 477,913	Variable	$ 365,632		
Subtotal	$ 219,132	$ 15,000	$ 46,500	$ 85,000	$ -	$ -	$ 112,281	$ -	$ -	$ 477,913				
Parking														
A3320 DPW Parking	$ 181,014	$ -	$ 7,750	$ 201,050	$ -	$ -	$ 23,597	$ -	$ -	$ 413,411	Variable	$ 389,814		
Subtotal	$ 181,014	$ -	$ 7,750	$ 201,050	$ -	$ -	$ 23,597	$ -	$ -	$ 413,411				
Fire Prevention & Control														
A3410 Public Safety Fire	$ 10,204,100	$ 150,500	$ 513,016	$ 532,100	$ -	$ -	$ 5,990,904	$ -	$ -	$ 17,390,620	Variable	$ 11,399,716		
Subtotal	$ 10,204,100	$ 150,500	$ 513,016	$ 532,100	$ -	$ -	$ 5,990,904	$ -	$ -	$ 17,390,620				
Other Protection														
A3610 Examining Boards	$ 6,000	$ -	$ -	$ -	$ -	$ -	$ 459	$ -	$ -	$ 6,459				
A3620 City Svcs-Code Enforcement	$ 747,605	$ -	$ 8,222	$ 8,450	$ -	$ -	$ 382,934	$ -	$ -	$ 1,147,211	Variable	$ 764,277		
Subtotal	$ 753,605	$ -	$ 8,222	$ 8,450	$ -	$ -	$ 383,393	$ -	$ -	$ 1,153,670				
Health	$ 125,709	$ -	$ 2,700	$ 13,250	$ -	$ -	$ 82,631	$ -	$ -	$ 224,290				
Public Health														
A4020 Vital Statistics/Records Mgt	$ 125,709	$ -	$ 2,700	$ 13,250	$ -	$ -	$ 82,631	$ -	$ -	$ 224,290	Variable	$ 141,659		
Subtotal	$ 125,709	$ -	$ 2,700	$ 13,250	$ -	$ -	$ 82,631	$ -	$ -	$ 224,290				
Transportation	$ 1,335,765	$ 22,000	$ 382,000	$ 1,310,000	$ -	$ -	$ 646,651	$ -	$ -	$ 3,696,416				
Highway														
A5 110 DPW Street Maintenance	$ 1,160,765	$ 4,000	$ 107,000	$ 1,310,000	$ -	$ -	$ 604,547	$ -	$ -	$ 3,186,312	Variable	$ 2,581,765		
A5142 DPW Snow Removal	$ 175,000	$ 18,000	$ 275,000	$ -	$ -	$ -	$ 42,104	$ -	$ -	$ 510,104				
Subtotal	$ 1,335,765	$ 22,000	$ 382,000	$ 1,310,000	$ -	$ -	$ 646,651	$ -	$ -	$ 3,696,416				
Culture & Recreation	$ 1,086,017	$ 18,700	$ 265,000	$ 692,299	$ -	$ -	$ 457,596	$ -	$ -	$ 2,519,612				
Recreation														
A 7020 Recreation - Admin	$ 66,361	$ -	$ 300	$ -	$ -	$ -	$ 42,094	$ -	$ -	$ 108,755	Variable	$ 66,661		
A7110 Recreation - Parks/ Pools	$ 539,449	$ 10,000	$ 69,000	$ 174,200	$ -	$ -	$ 232,783	$ -	$ -	$ 1,025,432	Variable	$ 792,649		
A7140 Recreation - Ice Rinks	$ 80,264	$ -	$ -	$ 31,250	$ -	$ -	$ 30,616	$ -	$ -	$ 142,130	Variable	$ 111,514		
A7180 Recreation - Golf Course	$ 399,943	$ 8,700	$ 195,700	$ 187,649	$ -	$ -	$ 152,103	$ -	$ -	$ 944,295	Variable	$ 792,192		
A 7310 City Svcs-Youth	$ -	$ -	$ -	$ 299,000	$ -	$ -	$ -	$ -	$ -	$ 299,000	Variable	$ 299,000		
Subtotal	$ 1,086,017	$ 18,700	$ 265,000	$ 692,299	$ -	$ -	$ 457,596	$ -	$ -	$ 2,519,612				
Home and Community Services	$ 761,834	$ -	$ 4,600	$ 89,018	$ -	$ -	$ 312,927	$ -	$ -	$ 1,168,379				
General Environment														
A8020 City Svcs-Planning & CD	$ 427,088	$ -	$ 2,400	$ 62,268	$ -	$ -	$ 189,247	$ -	$ -	$ 681,003	Variable	$ 491,756		
A8021 Zoning Board & Planning Comm	$ 20,000	$ -	$ -	$ 2,000	$ -	$ -	$ 4,812	$ -	$ -	$ 26,812				
A8022 Housing/Community Development	$ 314,746	$ -	$ 2,200	$ 24,750	$ -	$ -	$ 118,868	$ -	$ -	$ 460,564				
Subtotal	$ 761,834	$ -	$ 4,600	$ 89,018	$ -	$ -	$ 312,927	$ -	$ -	$ 1,168,379				
Undistributed	$ -	$ -	$ -	$ -	$ 3,870,042	$ 4,803,183	$ 6,876,323	$ 786,062	$ -	$ 16,335,610				





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