

3.2 Surface Water Resources and Stormwater Management

3.2.1 Existing Conditions

As per the adopted Scoping document, this section of the DEIS addresses existing and post-development drainage conditions on and surrounding the Project Site. The PUR portions of the site which will remain mostly unaltered from existing conditions, i.e., the Trolley Barn and the three existing residential buildings on the east side of Buena Vista Avenue, were not included in the drainage analysis. The drainage study and this section of the DEIS focuses on the impacts associated with the construction of the new apartment building on the west side of Buena Vista Avenue.

Within the project vicinity, the closest natural water course or water body to which runoff from the site ultimately drains is the Hudson River which lies approximately 500 feet to the west. The Hudson River has a water quality classification of "SB"¹.

The New York State Department of Environmental Conservation (NYSDEC) has classified streams in New York State according to their specified "best use". This designation is based upon such factors as stream flow, water quality and bordering lands. The designation means that water quality standards must be protected in order to maintain the best use classification, so that surrounding land uses are planned accordingly.

The Saw Mill River is located approximately 400 feet north of the site, parallel to Nepperhan and Dock streets, where it discharges into the Hudson River. In this location, the river is entirely piped underground and is not visible. The Saw Mill is classified as an "SB"² and Class C stream in the vicinity of the site. The proposed Larkin Plaza project, part of the larger Struever, Fidelco Cappelli, LLC redevelopment project, would include the removal of piping and pavement, the daylighting of the Saw Mill River, and the creation of a new public park.

Wetlands are not present on this urban site. Natural or constructed ponds or detention/retention basins are also not present.

Existing (Pre-Development) Drainage Conditions

The total watershed area that is the subject of this analysis is 1.21 acres under both existing and proposed conditions. Stormwater is currently generated by the existing pavement and other impervious surfaces as well as stormwater drainage infrastructure on and adjacent to the site and within Buena Vista Avenue. On-site stormwater emanating from these sources flows to Buena Vista Avenue and is collected by the existing City drainage system. An 18-inch combined sewer/stormwater pipe is located near the centerline of Buena Vista Avenue and it carries combined flow in a northerly direction toward Main Street. The on-site sloping areas to the rear of the properties along the west side of Buena Vista Avenue may direct a limited amount of

¹ As per §701, Classifications-Surface Waters and Groundwaters, of the regulations implementing Article 15, Water Resources, of the NYS Environmental Conservation Law, Class SB are saline surface waters. The best usages of Class SB waters are primary and secondary contact recreation and fishing. These waters shall be suitable for fish, shellfish, and wildlife propagation and survival.

² The best usage of Class C waters is fishing. These waters shall be suitable for fish, shellfish, and wildlife propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.

runoff toward the Metro North railroad right-of-way. According to the project engineer's hydrologic analysis, approximately 80 percent of the site is impervious surface (buildings and pavement) while 20 percent of the site is pervious. Under existing conditions, stormwater from the Project Site is not treated.

Detailed data regarding existing drainage conditions are provided in Appendix E - Stormwater Pollution Prevention Plan ("SWPPP"). The methodology utilized to conduct the stormwater analysis is described in Appendix E. Peak stormwater flow rates for existing conditions under various storm events are summarized in Table 3.2-1, Existing Peak Stormwater Flow Rates.

Table 3.2-1 Existing (Pre-development) Peak Stormwater Flow Rates		
Storm Event	Cubic feet per Second (cfs)	Gallons per Minute (gpm)
1 year	1.94	871
2 year	2.69	1,207
5 year	3.78	1,697
10 year	4.32	1,940
25 year	5.41	2,428
50 year	6.49	2,913
100 year	7.03	3,155

Source: Milone & MacBroom, Inc., July 2010.

Under existing conditions, stormwater is not treated and therefore contains pollutants typical of urban stormwater run-off, including phosphorus, nitrogen, dissolved solids, metals and pathogens including coliform and e. coli. A water quality volume analysis was completed by the project engineer according to the NYS *Stormwater Management Design Manual (2008)*. Sizing for Water Quality volume (WQv) is used to design water quality structures to treat 90 percent of the average annual stormwater run-off volume (Chapter 4 of the Design manual). Water quality volume is directly related to the impervious cover on the site. The water quality volume estimates analyzed the entire site and 100 percent of the post development impervious cover or 1.21 acres. Based upon the analysis 0.12 acre-feet or 38,542 gallons of storage is required to detain the 90 percent rainfall event from disturbed areas.

3.2.2 Potential Impacts

Post-Development Drainage Conditions

With the addition of pavement, excavation and grading for the proposed buildings and parking structure, the entire 1.21 acre site would be disturbed. The stormwater management hydrologic study analyzes a total watershed area of approximately 1.21 acres under both existing and proposed conditions, which includes Block 512, Lots 11, 13, 15, 17, 21, 23 and the frontage sidewalk along the west side of Buena Vista Avenue. Following development, stormwater runoff from the site will be collected by the roof and parking deck inlets and conveyed through an internal piping system to the subsurface storage system located below the parking garage. The contributing drainage area is shown in the SWPPP, Sheet 1 Drainage Area Map. No off-site

stormwater drainage areas contribute to drainage on the project site. The portion of the Project Site that includes the Trolley Barn and the dwellings located on the east side of Buena Vista Avenue will remain largely unaltered and therefore, these areas were not included in the drainage analysis.

The Project proposes to detain stormwater on-site to ensure that pre-development stormwater quality and flow rates will be maintained. Stormwater will be detained in a subsurface stormwater cistern storage system consisting of storage pipes and galleys located under the proposed parking garage. The storage system will have a capacity of approximately 200,000 gallons. The details of the system, including piping elevations, water elevations and approximate volumes for each design storm are provided in the SWPPP (see Appendix B - Hydraulic Analysis Subsurface Stormwater Storage System). These details are also shown graphically in Site Plan drawing GR "Site Plan - Grading and Utilities". The cistern system is designed to be consistent with Chapter 9 - Redevelopment Projects of the NYS *Stormwater Management Design Manual (2008)*. According to the *Design Manual* cisterns provide many stormwater management benefits, including:

- ◆ Cisterns can reduce stormwater run-off volumes and delay and reduce peak run-off flow rates, and,
- ◆ Stored water from cisterns can help reduce water consumption, which ultimately reduces demand on municipal water systems. Water from cisterns can be used for irrigation and other non-potable uses.

Stormwater collected in the cistern system will be utilized to provide up to 30 days of stored irrigation water for the hydroponic garden through the use of a weir system, with a required 46,300 gallons of storage. The portion of the subsurface storage system utilized for the irrigation system has been indicated on sheet GR "Site-Plan-Grading and Utilities". In addition to this 30-day storage capacity, the system will provide sufficient capacity to meet the following criteria:

- 1) storage to mitigate the increase in run-off volume for the 2-year through 100-year storm;
- 2) Water Quality Volume per the NYS Stormwater Management Design manual; and
- 3) additional capacity to allow for increased storage of stormwater during rain events to mitigate the impact of the development on the combined sewer in Buena Vista Avenue.

The storage volumes referenced above are calculated in the SWPPP (see Appendix E) and are summarized as follows:

Rooftop Garden Irrigation Required Storage:	46,300 gallons
Water Quality Volume Required Storage:	38,542 gallons
Offset Proposed Sanitary Sewage Generation:	<u>112,080 gallons</u>
Total Required Storage =	196,922 gallons
Total Volume Provided =	200,000 gallons

The approximately 200,000 gallon capacity system will provide adequate storage for required and designed criteria.

Following on-site storage and treatment, stormwater will be directed to a stormwater lateral force main crossing the sidewalk and Buena Vista Avenue to a new combined sanitary/stormwater sewer manhole in at the eastern side of Buena Vista Avenue. The manhole will intercept the existing 18-inch combined sanitary/stormwater sewer. The new manhole will be constructed by the applicant, in consultation with the City of Yonkers Engineering Department.

Following acceptance of the new infrastructure, the maintenance of all piping and manholes installed in the City right-of-way will be the responsibility of the City of Yonkers. Maintenance of the stormwater storage system below the parking garage will be the responsibility of the applicant/owner.

The stormwater flow rates to the City collection system will be maintained at or below the current flow rates. By maintaining or reducing stormwater run-off rates, the project will minimize any potential impact to Combined Sewer Overflow (CSO) events. Based upon discussions with the City Engineering Department regarding existing infrastructure (meeting held on September 13, 2010), no capacity problems were identified in the project area. In addition to providing the increase in volume storage for the 100-year storm event, the subsurface system will supply 100 percent of the irrigation demand for the hydroponic garden located on the roof of the parking garage. Stormwater will also be stored to offset the anticipated increase in wastewater generation that will be discharged to the combined sewer system.

As described in the project engineer's Stormwater Pollution Prevention Plan (see Appendix E), the proposed development would not adversely impact the quantity or quality of surface water resources flowing from the project site. The stormwater management system is designed to reduce discharge rates from the site for the one (1) through 100-year storm events as required by the NYSDEC. Table 3.2-2 shows the estimated post-development stormwater runoff volumes. As shown in the table, run-off volumes, without proposed treatment, are projected to increase for all storm events.

Table 3.2-2 Post-Development Stormwater Runoff Volume			
Storm Event	Existing (gallons)	Proposed (gallons)	Difference (gallons)
1 year	51,847	73,833	21,985
2 year	71,865	96,476	24,611
5 year	102,057	128,635	26,578
10 year	117,145	145,040	27,895
25 year	148,324	177,528	29,204
50 year	179,824	210,345	30,521
100 year	195,907	226,764	30,857

Source: Milone & MacBroom, Inc., July 2010 revised September, 2010.

The proposed cistern will allow post-development stormwater runoff rates to be maintained below existing flow rates to the existing combined stormwater/sewer system in Buena Vista Avenue. Since the storage system will be designed to capture and detain the 100-year storm, stormwater will be released to the City system via pumps at a controlled rate during off-peak flow periods. An emergency power source will be provided for the stormwater pumps. In addition, the pumping system has been designed to utilize four pumps. The design of the

stormwater storage system is further described in the SWPPP (Appendix E). Therefore, flow rates to the City stormwater system will be reduced compared to existing conditions.

Future Surface Water Quality

Adding pavement and impervious surfaces to the project area has the potential to increase pollutant contributions from stormwater runoff, such as sand, silt, salts, oil and grease. The addition of pavement and stormwater collection systems also has the potential to increase the rate of stormwater flow from the site. These potential impacts are being avoided or mitigated by structural stormwater controls and Best Management Practices, which are discussed below.

Under the post-development condition, approximately 93 percent of the site will be impervious surface (mostly rooftop surfaces and some pavement) and approximately 7 percent will be pervious surface. While the on-site area of impervious surface would increase by 0.16 acres in the post-development condition, all (100 percent) of the stormwater flowing to impervious surface would be captured and treated compared with existing conditions where no stormwater is being detained or treated on-site.

Stormwater from the 1-year through the 100-year storms will be captured and detained in a subsurface cistern storage system. The proposed cistern storage system is designed consistent with Chapter 9 - Redevelopment Projects of the *NYS Stormwater Management Design Manual (2008)*. The project site is considered a redevelopment project given the existing vacant buildings on the site and the approximately 80 percent impervious surface coverage. In addition, the combined sanitary and stormwater collection system in Buena Vista Avenue provides limited options for stormwater discharge.

The Design Manual does not provide specific pollutant removal rates for cistern systems (refer to Section 9.5.2 of the Manual, Alternative Stormwater Management Practices - Cisterns). The cistern system will remove suspended solids and oil and grease through a series of baffles. As indicated above, approximately 40 percent of annual detained stormwater, or up to 69,300 gallons at any one time will be diverted from the City combined stormwater/sewer system and utilized for irrigation of the hydroponic garden. The diversion, treatment and reuse of stormwater from the site will improve stormwater quality over existing conditions.

The Stormwater Pollution Prevention Plan will require review and approval by the City of Yonkers and will need to comply with the requirements of Article XVII - Stormwater Control, of the City of Yonkers Zoning Chapter. Once approved by the City of Yonkers, the applicant will submit a Notice of Intent (NOI) to the NYSDEC for a SPDES General Permit for Stormwater Discharges from Construction Activities (GP 0-10-001). A SPDES General Permit from the NYSDEC is required for the project.

Proposed stormwater management infrastructure is shown on the full size engineering plans provided with this DEIS.

Construction Stormwater Management

Stormwater drainage from the site during construction will be strictly managed to avoid off-site impacts. A key aspect in the maintenance of stormwater quality and the control of soil erosion is the proper sequencing of construction. All structural sediment and erosion control features will be installed prior to grading and earthwork.

Various temporary measures will be used where appropriate to control stormwater flows during construction such as swales, basins, traps and earthen dikes. In addition, the temporary erosion control measures indicated on the full-size Erosion Control Plan will be employed during the construction process to minimize the potential for erosion or sedimentation problems.

The SWPPP provides a detailed erosion control maintenance schedule and checklist (see Table 1) which provides inspection intervals, failure indicators and follow-up procedures for specific erosion control practices. The regular and scheduled inspection of these practices will improve their effectiveness throughout the construction period.

It is expected that the Erosion and Sedimentation Control portion of the Stormwater Pollution Prevention Plan (Appendix E) and the measures described in Section 3.1 will prevent the discharge of uncontrolled pollutants to the stormwater system and downstream waterbodies during the construction process. Maintenance of these practices is critical, and the New York State General Permit for stormwater requires weekly monitoring to ensure that they continue to function as designed. It is likely, however, that there will be occasions when some suspended sediments, particularly the fine colloidal sediments, will pass through the erosion control practices. This may occur during large storm events coinciding with the most intense site excavations. Constant maintenance and observation of the site, and conformance to the phasing and sequencing plan, are the best measures to control and possibly prevent these events.

3.2.3 Mitigation Measures

Stormwater Management

The stormwater control measures described in the project engineer's Stormwater Pollution Prevention Plan are designed to satisfy the NYSDEC requirements for stormwater quality and quantity to minimize the potential for adverse impacts. The proposed plan includes a single subsurface stormwater cistern detention and treatment system, located below the proposed parking structure. The cistern system will detain approximately 200,000 gallons of stormwater, reducing stormwater discharge rates to below existing conditions. These features will allow stormwater collected from the new pavement areas in this portion of the site, and from the parking structure itself, to be treated and diverted to the existing stormwater main in Buena Vista Avenue at controlled rates. Approximately 40 percent of collected annual stormwater will be stored and utilized for irrigation of the roof-top garden. Excess stormwater will be released to the combined City stormwater/ sewer system at controlled rates during off-peak periods, which will reduce peak stormwater flow in Buena Vista Avenue. The diversion, treatment and reuse of stormwater from the site will also improve stormwater quality over existing conditions.

Engineering calculations to support the proposed plan for the stormwater management features are presented in the SWPPP. The SWPPP demonstrates conformance with the New York State *Stormwater Management Design Manual* and project compliance with State requirements for the protection of surface water quality as well as storm protection for downstream areas. The stormwater management facilities have also been designed in compliance with Article XVII Stormwater Control, of the City of Yonkers Zoning Code.

Operation and Maintenance

The subsurface storage system, as well as all stormwater capture facilities will be privately owned and maintained. Maintenance records will be provided to the City of Yonkers engineering

department, as required, to ensure compliance. An operations and maintenance plan has been provided in the SWPPP. A detailed inspection checklist will be developed in cooperation with the storage facility manufacturer, and will be submitted to the City of Yonkers engineering Department for review. Typical details of the system have been provided on the Site Plan detail sheets.

Erosion Control Measures

Erosion control measures are proposed as described in Chapter 3.1 of this DEIS and as shown on the full-size Erosion Control Plan drawing included with the site plan. These plans incorporate stormwater measures necessary to satisfy the NYSDEC and the City of Yonkers requirements to minimize the potential for adverse impacts to downgradient water resources during and following the construction activities.