



April 27, 2018 - Revised

Ms. Shireen Ambush  
Vice President  
Abaris Realty, Inc.  
7811 Montrose Road, Suite 110  
Potomac, MD 20854

**Re: New Mark Commons, Rockville, Maryland  
Site Assessment for Drainage Improvements**

Dear Ms. Ambush:

In accordance with our agreements dated November 7, 2017 and February 9, 2018 please find the results of our assessment for drainage improvements.

We reviewed a limited number of drawings for the property which were made available to us from Abaris Realty. We have attempted to get copies of additional site plans, specifically a clear/detailed topographic plan, for New Mark Commons from the City of Rockville. To date these attempts have been unsuccessful and the provided topographic plan (from Abaris) is of insufficient detail to meet our requirements. Of the drawings provided by Abaris, it is clear that NMC has the beginnings of a Storm Water Management System but it has not been fully implemented. By that, we mean there are storm water inlet/outlets at the parking lots but these typically discharge and rely on an incomplete swale “system” to move the water to the discharge points (i.e. the pond). It is not clear that this system was permitted at the various times that it was constructed or augmented.

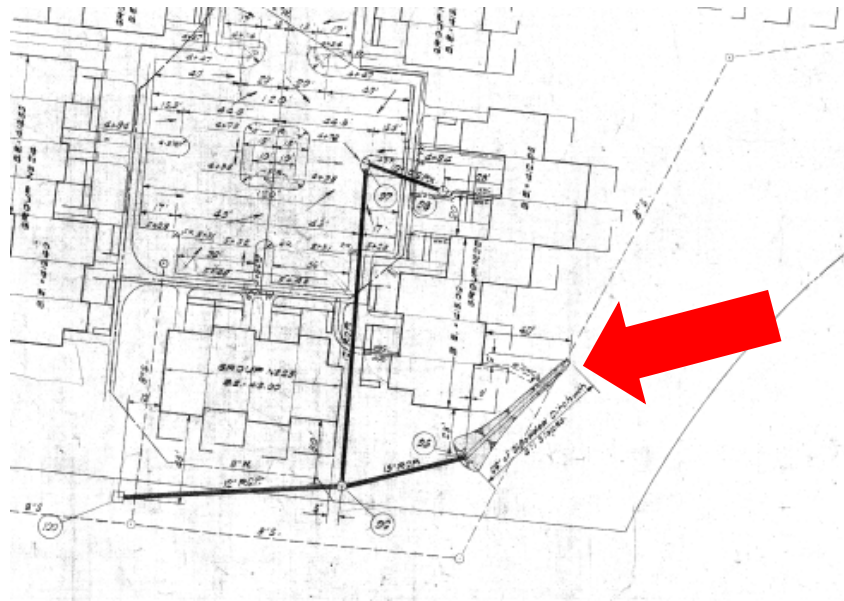


Exhibit 1: Showing incomplete SWM facilities, SWM pipe simply discharges to the ground

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Corporate Office • 1451 Dolley Madison Boulevard • Suite 300 • McLean • Virginia 22101  
Maryland Office • 1821 Endless Ocean Way • Columbia • Maryland 21045  
Phone 703-917-0055 • Fax 703-917.0464 • Email [CSG@csgengineer.com](mailto:CSG@csgengineer.com) • Web [www.csgengineer.com](http://www.csgengineer.com)

We visited the property on three occasions to examine the areas identified by the HOA as areas of concern, as well as much of the balance of the HOA-covered area. One of the days on which we visited the site was during a rain event.

Overall the property is quite steep and heavily wooded. In addition to the storm water devices installed at the time of original construction, the system has grown in a piecemeal fashion in the ensuing years. The original system used a combination of reinforced concrete pipe (RCP) and swales to manage water. By current standards the RCP system is undersized for the slope of the property and the large fraction of impervious surface. It is likely that tree cover has eradicated most or all the grasses that once covered the swales.

Today most stormwater flows over exposed soils, eroding those areas and depositing silt into the pond. The current system is not functioning properly and is not sustainable. To manage the stormwater it is important to slow the flow so that there is less scouring of the channels, and to provide for more infiltration / less runoff.

We contracted with Potomac Aerial Surveys to perform an aerial survey of a portion of New Mark Commons. The surveyed area was the townhouses bounded by New Mark Esplanade and included the areas noted below. We have included a copy (at the end of this report) of the topographic survey with the intended SWM improvement areas highlighted.



Exhibit 2: Location of Aerial Survey

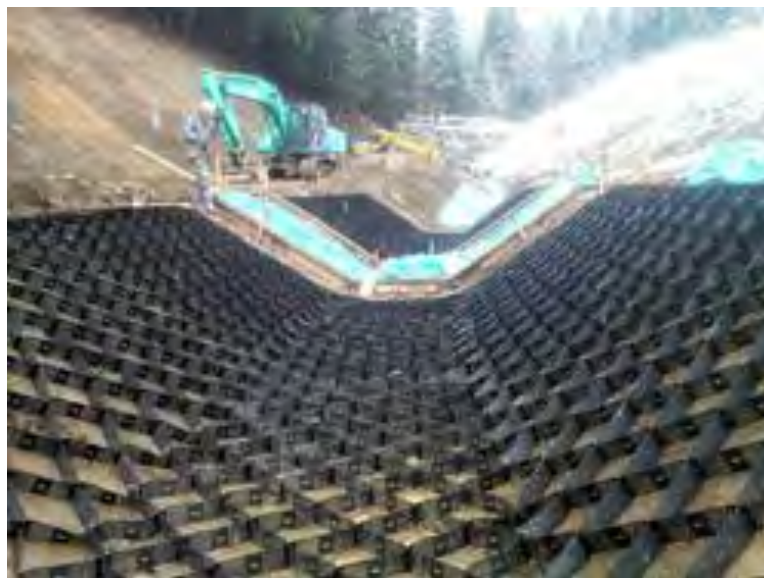
The following sections discuss specific areas of the property reported as concerns:

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**Area #1:** was described as “The rear of 338-342 New Mark Esplanade (NME). The low area where runoff has created several water paths that are exposing tree roots and creating erosion channels”.



**Recommendation:** Have an arborist review all the trees and remove any suspect/questionable trees. Install a retaining wall at the rear of 338 NME to alleviate ongoing erosion. Within the swale, clear out existing dead trees/debris/and saplings. Install GeoWeb (see photograph below). Install two or more stone check dams to slow / detain water in the swale. It is important to slow the water but not hold it long enough to breed mosquitos. Modify the slope of the swale as necessary to ensure that water reaches the pipe that extends beneath the street. This should continue back as far as the bike path.



We have received subsequent information from residents regarding previous engineer recommendations for implementing a dry retention pond near the bike path which “in heavy

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rainfall, water will be diverted to the dry pond for drainage”. The problems with implementing this sort of pond is that ensuring the water properly/actually diverts presents an ongoing maintenance burden. Water will travel the path of least resistance and tends to bypass these sorts of structures as sediment/debris builds up over time. To help mitigate frequent high volumes of water from reaching this area, we would propose the installation of structures called FloWells. The Flowells would be installed at each individual unit and connect to the units’ gutter downspouts. The water from the downspouts is captured and allowed to directly infiltrate into the ground. We have attached a schematic from the manufacturer. After receiving reports that the existing soil has a high clay content, we would recommend testing the soil and/or installing a mockup of a Flo-Well to determine the infiltration capacity of the soil.

Repair of the RCP running beneath the bike path, and the associated concrete end walls, are currently excluded from the scope of work. Should the condition worsen, replacement could be added.

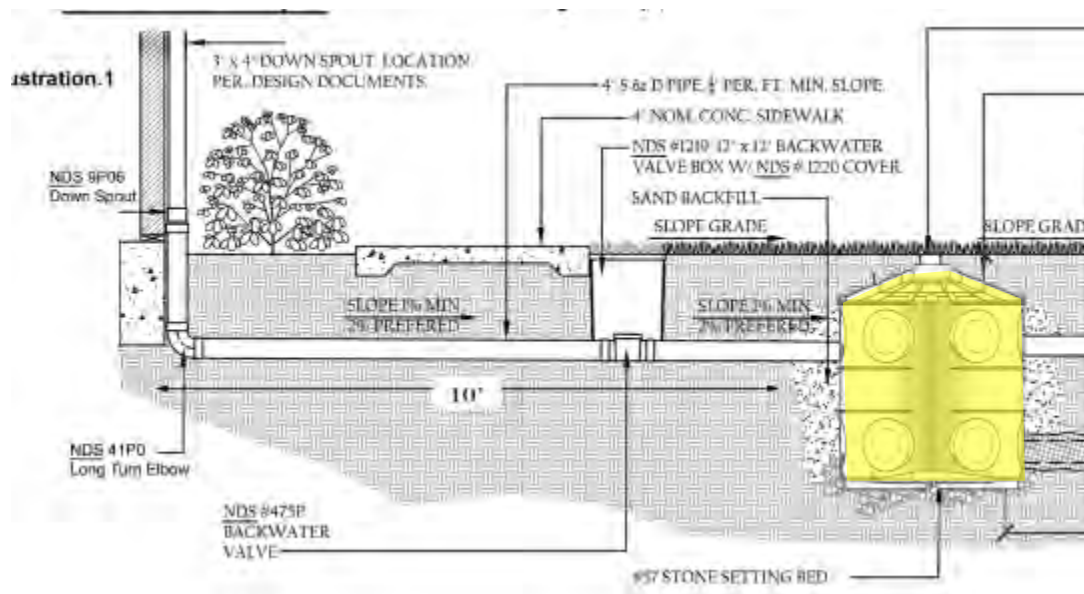


Exhibit 3: Flowell Schematic

**Preliminary Construction Cost Estimate: \$450,000.00**, please note that this cost does not include the “dry pond” or tree removal but does include installing 100 FloWells at various units. Also, this preliminary construction cost estimate includes a 10% contingency but does not include engineering services which are typically 15-20% of the cost of construction.

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**Area #2:** was described as “Contributing to the Area #1 problem is the wooded area on the side of 508 and 516 NME. Runoff from the parking lot has created erosion channels which have impacted the area behind 338-342 NME”



**Recommendation:** Adjacent to 508 NME, we recommend removing the tree at the parking lot SWM outlet. The RCP is likely to be damaged and may require replacement. The swale should be reconfigured to more efficiently collect and retain water. Install GeoWeb in the swale to prevent erosion. Direct water to the existing, rock-lined swales along the bike path. Due to shade from the heavy tree canopy in area, a vegetated swale is likely not feasible. Accordingly, the photograph below depicts GeoWeb with stone.

Adjacent to 516 NME, we recommend a similar scope of work. We recommend creating a swale to capture the water that outfalls at the cut in parking lot curb. The swale would direct water to the existing rock-lined swales along the bike path. Some tree removal will be required to allow for the installation of the new swale.



**Preliminary Construction Cost Estimate: \$100,000.00.** This preliminary construction cost estimate includes a 10% contingency but does not include engineering services which are typically 15-20% of the cost of construction

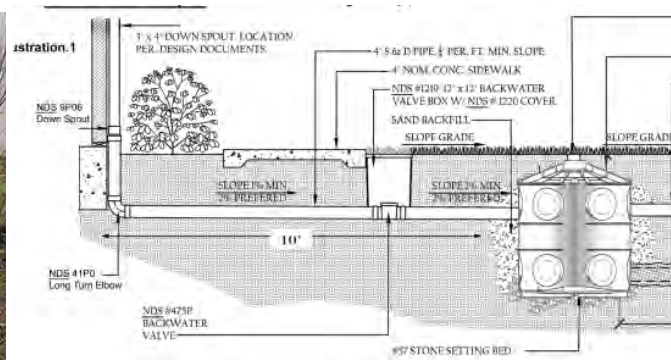
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**Area #3:** was described as “The area behind 300-314 NME, concentrating on the area behind 300-306 NME. Storm water runoff from the area between the bike path and the rear of these homes needs to be mitigated.”



**Recommendation:** The issue is not that water cannot reach the area but rather that it picks up debris and clogs the storm drain grate. We recommend a thorough cleaning/jetting of the SWM in this area and more frequent cleanup of debris (i.e. leaves, sticks, etc.) to help prevent accumulation at the grate. We would also propose implementing Flowells to capture a portion of the runoff from the adjacent roof areas. Alternate items to prevent water from reaching the storm drain can be considered if the problem persists. Foremost among these would be a detention / infiltration basin. An infiltration basin would be designed to collect and infiltrate water over a period of two to three days, but not long enough to allow insect breeding or to require ongoing maintenance such as aeration. The photograph below shows a vegetated infiltration basin which functions by having water-loving plants absorb the collected water. As noted above, the current tree cover would prevent these plants from thriving in a similar structure at New Mark Commons.



**Preliminary Construction Cost Estimate: \$30,000.00**, please note that this construction cost estimate includes jetting and installation of 25 Flowells but does not include the installation of an infiltration pond.

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**Area #4:** was described as “The hill side next to 276 NME requires stabilization, additional planting, and an existing surface drain needs to be repaired.”



**Recommendation:** Due to the steep slope in the area, one surface drain is insufficient to capture the runoff. Accordingly, we recommend that a series of gravel swales be installed to divert water into the existing channel on the boundary line. One of the swales could extend to capture the water to the north of 276 NME. The photograph below is an example of such a swale. The residence 276 NME has been identified, by NMC, specifically as requiring a retaining wall. A retaining wall could be installed, however there are several factors to consider. These include the wall's location on residential versus common area property, tree removal to allow for the wall installation, and below-grade waterproofing of the foundation wall of the residence with re-grading. If there are ongoing concerns related to house-settling, a retaining wall may not be the solution. We recommend resolving those items prior to commencing with installation of a retaining wall.



**Preliminary Construction Cost Estimate: \$25,000.00**, please note that this cost does not include the retaining wall. Also, this preliminary construction cost estimate includes a 10% contingency but does not include engineering services which are typically 15-20% of the cost of construction

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**Area #5** (not on original list): is the stabilization of the swale at the transition to the Fireside Park Apartments, close to 276 NME.

**Recommendation:** This area is likely the worst condition that we observed at New Mark Commons. The area needs to be cleaned of debris and subsequently stabilized. We recommend doing this with gabions and/or large boulders in conjunction with a series of check dams. As this area abuts the adjacent property, it will be necessary to coordinate with the owner for access to make the repairs.

The photograph below shows the use of gabions for stabilizing a stream bank. This particular location at New Mark Commons appears to be routinely subjected to very high volume / high velocity flow. As a result, we are recommending a robust solution. The location is low-visibility, so we are recommending the use of gabions. Gabions are a less aesthetically attractive solution than a segmental retaining wall. They are also a significantly lower cost and accordingly a more suitable product for this location.



**Preliminary Construction Cost Estimate: \$400,000.00.** This preliminary construction cost estimate includes a 10% contingency but does not include engineering services which are typically 15-20% of the cost of construction



**Overall Property Improvements:** We have several general recommendations from the survey which apply to the entire HOA. They are as follows:

- **Roof Drainage** - We recommend that downspouts be modified so that they discharge either to paved surfaces (e.g. parking lots, driveways, etc.) or directly into swales without a drop between the lip of the discharge pipe and the ground level. Discharge piping should be non-corrugated and be equipped with cleanouts. As noted at Area #1, we recommend utilizing FloWells to capture a portion of the roof-runoff and infiltrate it, preventing runoff from reaching the swales. This could be expanded and implemented (phased) on a community wide basis and would capture and infiltrate a portion of the roof drainage.
- **Aeration:** As part of the regular landscaping maintenance on the property, we recommend aeration of the grass surfaces. Aeration loosens compacted soil and make it more amenable to infiltrating water and reducing runoff.
- **Existing Stormwater conveyance piping** - All pipe handling stormwater should be jetted. If it is not possible to see from end to end then the piping should also be video scoped. Savings could be gained from performing a site-wide cleaning as opposed to just the section noted at Area #3.
- **Retaining Wall Survey** - There are a number of timber retaining walls on the property that should be inspected and budgeted for replacement. Several of these are in the vicinity of the curve of pond at the southern end, and around the boundary swale adjacent to the Fireside Apartments. We recommend a site-wide survey of timber retaining walls and development of a plan and schedule for replacement

In conclusion, we observed many locations where stormwater-induced erosion was not called out as priorities by the HOA. We have tried to address these to the extent possible with the recommendations provided above. Resolving these issues will help to preserve the quality of the landscaping and natural habitat that New Mark Commons exemplifies. Implementing these recommendations will sharply reduce the rate of ongoing degradation. However, new areas will emerge as vegetation and patterns of use of the land change. It will be important to continue to monitor the property and address issues as they emerge and before they grow and significance.

We appreciate the opportunity to be of service. If you should have any questions regarding this matter, please do not hesitate to call.

Sincerely,  
**Construction Systems Group, Inc.**

Robert M. Reed, Jr.  
Robert M. Reed, Jr., EIT  
Project Manager

Wayne F. Hosking  
Wayne F. Hosking  
Vice President

Attachments: Annotated Location Map  
Annotated Aerial Survey

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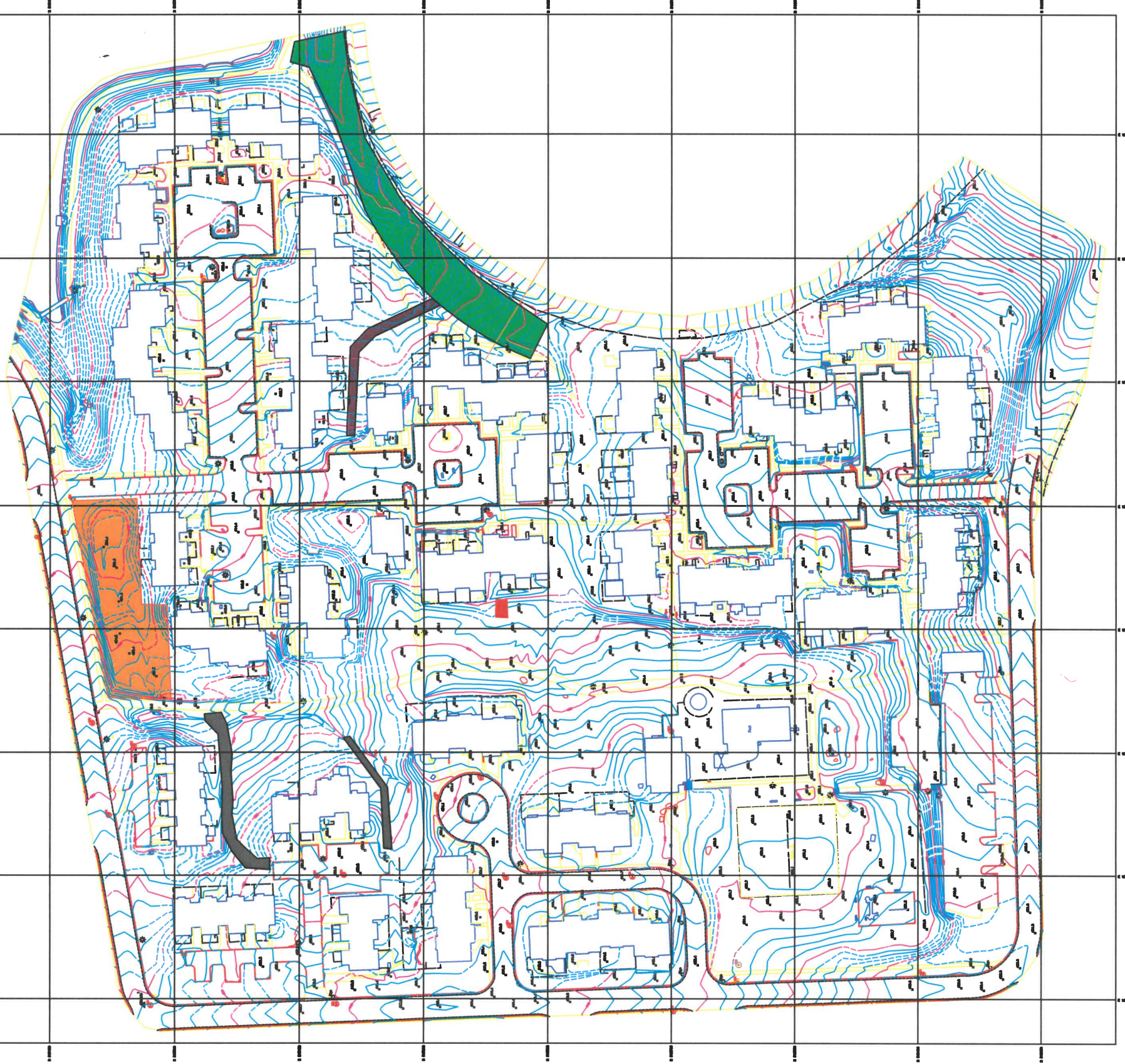


Exhibit 4: Annotated Location Map



LEGEND

- AREA #1
- AREA #2
- AREA #3
- AREA #4
- AREA #5



NEW MARK COMMONS  
ROCKVILLE, MD  
CSG PROJECT #17-154  
APRIL 27, 2018