

**NPDES Baseline Impervious Assessment  
Town of Emmitsburg, Frederick County, MD**

General Discharge Permit No. 13-IM-5500

General NPDES No. MDR055500

**REVISED**



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## List of Terms

BMP – Best Management Practice

DEM – Digital Elevation Model

GIS – Geographic Information Systems

LiDAR – Light Detection and Ranging

MDE – Maryland Department of the Environment

MDOT – Maryland Department of Transportation

MS4 – Municipal Separate Storm Sewer System

NPDES – National Pollutant Discharge Elimination System

SHA – (Maryland) State Highway Administration

## Introduction

Greenman-Pedersen, Inc. was tasked with performing a Baseline Impervious Assessment for the Town of Emmitsburg (hereafter “the Town”) to comply with NPDES General Discharge Permit No. 13-IM-5500. The purpose of this assessment was to determine the total impervious area within the Town limits and Town-owned properties, to identify those areas already treated for water quality according to the guidelines stated in the permit, to calculate the twenty percent restoration requirement, and to provide a restoration work plan identifying strategies to meet the required treatment.

The following report was compiled upon completion of the desktop analysis and field confirmations. It contains the methodology, mapping, and findings of the investigation. Electronic files in ESRI geodatabase (\*.gdb) format will be provided to support the conclusions.

## Description of NPDES Permit Area

The Town is located at 77°19’37”W, 39°42’16”N in northern Frederick County approximately one mile from the Pennsylvania border. The Town is located in the Upper Monocacy River (8-dig: 02140303) subwatershed of the Middle Potomac River (6-dig: 021403) watershed and ultimately in the Chesapeake Bay greater watershed.

The study limits included approximately 980 acres within the boundaries of the Town proper and 1,125 acres of land to the west owned by the Town and encompassing a large portion of the drainage area feeding the municipal water supply. Land use within the municipal boundary is primarily low and medium density residential with significant institutional properties and areas of forest and agriculture. Land use within the western Town-owned properties is primarily forest with minimal development or agriculture.

## Methodology

Establishment of existing impervious was achieved primarily through GIS desktop analysis. The Town provided a geodatabase consisting of MS4 features including structures, pipes, outfalls, and BMP facility footprints.

Initial impervious areas were obtained from GIS shapefiles hosted by Frederick County<sup>1</sup>. This data consisted of “Edge of Pavement” that included roads, sidewalks, driveways, parking lots, and other surface impervious, and “Buildings” which consisted of above-ground structures. These data were dated 2005 and so accuracy was checked by comparing to 2016 Maryland Statewide Imagery. Impervious was added or subtracted as necessary but changes were relatively minor. Surface mounted solar panels, turf grass, and playgrounds with mulch surfaces were not included in this analysis.

A hydrologic analysis was performed to determine drainage areas to BMPs and other storm drain infrastructure. Ground surface elevations were determined from the Frederick County LiDAR DEM hosted

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<sup>1</sup> Frederick County Public GIS data: <https://www.frederickcountymd.gov/5969/Download-GIS-Data>

by the MD iMAP GIS data portal<sup>2</sup>. The DEM is an image raster with a meter cell resolution. The raster data was processed using the hydrology tools contained within ESRI ArcMap Spatial Analyst extension<sup>3</sup>.

Through determination of flow direction and accumulation over the raster surface, and integrating the MS4 system data provided by the Town, drainage areas were delineated to points of interest including BMP flow control structures and inlets. In cases where water could flow from the outfall of one facility into another, the upstream facility drainage area was omitted from the downstream facility drainage area if treatment was already provided.

Additionally, drainage areas were delineated for the MDOT SHA storm drain structures located using aerial imagery and/or during field investigation. Drainage areas for BMPs determined through this method were compared to drainage areas delineated on as-builts or construction plans to ensure general agreement but were updated where the hydrologic analysis provided increased precision.

## Results

### IMPERVIOUS ACREAGE

The Town has a total of 162.40 acres of impervious constituting 16.6% of its surface cover. The additional western properties contained 2.34 acres of impervious constituting 0.2% of its surface cover.

*Table 1 - Area and impervious totals*

	Total Area	Total Impervious	Percent Impervious
<b>Emmitsburg Town Boundary</b>	980 ac.	162.40 ac.	16.6%
<b>Additional Town Owned Property</b>	1,125 ac.	2.34 ac.	0.2%
<b>Total</b>	2,105 ac.	164.74 ac.	7.8%

Of this area, 18.00 acres of impervious drain directly into MDOT SHA storm drain inlets or BMPs and have consequently been removed from the impervious total as these are presumed to already be covered under the SHA MS4 permit. This leaves 146.74 acres of impervious covered under the Town's MS4 permit.

Additionally, the newly constructed Seton Center at 226 Lincoln Ave does not appear in the impervious data or on the aerial imagery. Impervious cover was determined from as-builts provided by the Town.

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<sup>2</sup> Maryland iMap LiDAR: <https://imap.maryland.gov/Pages/lidar.aspx>

<sup>3</sup> ESRI website: <https://www.esri.com/en-us/home>

**IMPERVIOUS TREATED BY WATER QUALITY BMPs**

Full quality impervious treatment is provided by 16 BMPs within the study area. These facilities were mostly constructed after the baseline year of 2002 and presumed to be in accordance with the *2000 Maryland Stormwater Design Manual, Volumes I & II* (hereafter Manual)<sup>4</sup> and are therefore considered to provide acceptable water quality treatment according to the MS4 Permit Appendix B Section III Subsection A2. Several additional facilities constructed before this date were determined to provide acceptable treatment as outlined in the Manual.

Prior to the issuance of the Town's Phase II permit, Frederick County, in which the Town is situated, kept all inspection records regarding the BMPs located within the Town. These records have been previously provided to MDE by the County.

Table 2 - BMPs providing full water quality treatment

BMP ID	BMP Name	Date Built	BMP Code	DA (ac.)	Imp (ac.)
FR15BMP000761	Brookfield Subdivision - SWM Pond	2012	FSND	52.58	14.35
FREM16BMP0001	Daughters of Charity - Bioretention	2011	MSWB	0.89	0.79
FR15BMP001048	Emmitsburg Community Park - Filtration Basin	2002	IBAS	0.55	0.30
FR15BMP000857	Emmitsburg East, Lot 6 - Sand Filter	2009	FSND	2.70	1.62
FR15BMP000420	Emmitsburg Volunteer Ambulance - Sand Filter	2010	FSND	2.01	1.51
FR16BMP001264	Homes for America @ Seton Village - WQ #1	2011	MMBR	0.93	0.27
FR16BMP001263	Homes for America @ Seton Village - WQ #2	2011	MMBR	0.44	0.15
FR16BMP001262	Homes for America @ Seton Village - WQ #3	2011	MMBR	0.45	0.13
FR15BMP000776	Mother Seton School Bioretention Facility	2003	FBIO	2.00	1.03
FR15BMP000231	Pembrook Woods - Dry Swales	2004	ODSW	16.08	5.76
FREM18BMP0001	Seton Center - Bioretention Basin	2018	FBIO	1.66	1.02
FR15BMP000348	Silo Hill - Off-Site Biofilter	2002	FBIO	0.49	0.29
FR15BMP000758	Silo Hill, Ph. 1 (Commercial Sleep Inn & Denny's)	2000	WSHW	12.85	3.26
FR15BMP000403	Southgate, Sec. 1 - Shallow Marsh	2009	WSHW	15.95	3.92
FR15BMP001155	St. Joseph's Provincial House - SWM Pond	1995	PWED	5.65	1.92
FR15BMP000832	Waybright Property - Sand Filter	2008	FSND	6.37	3.83
Total				121.60	40.15

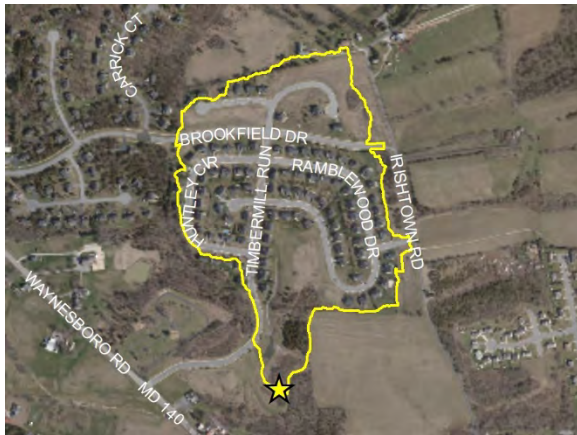
<sup>4</sup>[https://mde.maryland.gov/programs/water/StormwaterManagementProgram/Pages/stormwater\\_design.aspx](https://mde.maryland.gov/programs/water/StormwaterManagementProgram/Pages/stormwater_design.aspx)



## BMP Descriptions

### ***Brookfield Subdivision - SWM Pond (FR15BMP000761)***

The Brookfield subdivision SWM Pond is a 2012 partial retrofit of an existing quantity control pond constructed in 1990. The design of this retrofit consisted of a forebay, infiltration basin, and wet shallow marsh cell draining into the remaining portion of the quantity control pond. This facility has a total drainage area of 52.58 acres and treats the houses, roads, and other impervious of the Brookfield residential subdivision. Treatment is provided for 14.35 acres of impervious.



### ***Daughters of Charity – Bioretention (FREM16BMP0001)***

The Daughters of Charity bioretention was constructed in 2011. The design of this facility consisted of a wet pond with forebays and wetland plantings. This facility has a total drainage area of 0.89 acres and treats a portion of the Provincial House parking lot. Treatment is provided for 0.79 acres of impervious.



***Emmitsburg Community Park - Filtration Basin (FR15BMP001048)***

The Emmitsburg Community Park infiltration basin was constructed in 2002. The design of this facility consisted of a shallow basin with rock filtration berms. The berms are surrounded by flat grass terrain allowing dispersal and absorption of water. This facility has a total drainage area of 0.55 acres and treats a small gravel parking lot in the Emmitsburg Community Park. Treatment is provided for 0.30 acres of impervious.



***Emmitsburg East Industrial Park, Lot 6 Sand Filter (FR15BMP000857)***

The Emmitsburg East Industrial Park Lot 6 sand filter was constructed in 2009. The design of this facility consisted of a 2-section water quality pond with a sand filter and underdrain. This facility has a total drainage area of 2.70 acres and treats an industrial building and parking lot on Lot 6 of Emmitsburg East Industrial Park. Treatment is provided for 1.62 acres of impervious.





***Emmitsburg Volunteer Ambulance - Pond/Sand Filter Facility (FR15BMP000420)***

Emmitsburg Volunteer Ambulance pond and sand filter was constructed in 2010. The design of this facility consisted of a water quality pond with a sand filter and underdrain. This facility has a total drainage area of 2.01 acres and treats the Volunteer Ambulance structure and parking lot. Treatment is provided for 1.51 acres of impervious.



***Homes for America @ Seton Village - WQ #1 (FR16BMP001264)***

The Homes for America @ Seton Village - WQ #1 bioretention was constructed in 2011. The design of this facility consisted of a planted bioretention facility with infiltrative substrate and underdrain. Treatment is supplemented by a small rain garden located near the entrance awning. This facility has a total drainage area of 0.93 acres and treats a cul-de-sac building entrance drop-off and an associated drive with parking of the Seton Village/Provincial House parking lot. Treatment is provided for 0.27 acres of impervious.





***Homes for America @ Seton Village - WQ #2 (FR16BMP001263)***

The Homes for America @ Seton Village - WQ #2 bioretention was constructed in 2011. The design of this facility consisted of a planted bioretention facility with infiltrative substrate and underdrain. This facility has a total drainage area of 0.44 acres and treats a cul-de-sac building entrance drop-off of the Seton Village/Provincial House parking lot. Treatment is provided for 0.15 acres of impervious.



***Homes for America @ Seton Village - WQ #3 (FR16BMP001262)***

The Homes for America @ Seton Village - WQ #3 bioretention was constructed in 2011. The design of this facility consisted of a planted bioretention facility with infiltrative substrate and underdrain. This facility has a total drainage area of 0.45 acres and treats a portion of the Seton Village/Provincial House parking lot. Treatment is provided for 0.13 acres of impervious.



***Mother Seton School Bioretention Facility (FR15BMP000776)***

The Mother Seton School bioretention facility was constructed in 2003. The design of this facility consisted of a planted bioretention facility with infiltrative substrate and underdrain. This facility has a total drainage area of 2.00 acres and treats a small gravel parking lot in the Emmitsburg Community Park. Treatment is provided for 1.03 acres of impervious.



***Pembroke Dry Swales (FR15BMP000231)***

The Pembroke Dry Swales were constructed in 2004. The design consisted of a series of grass swales throughout the Pembroke subdivision. Check dams created with railroad ties embedded in the swales are well maintained and provide flow attenuation and treatment storage. These swales have a total drainage area of 16.08 acres and treat primarily roadway runoff with some contribution from structures in the Pembroke subdivision. Treatment is provided for 5.76 acres of impervious.





***Seton Center - Bioretention Basin (FREM18BMP0001)***

The Seton Center bioretention basin was constructed in 2018. The design of this facility consisted of a forebay and retention basin with an infiltrative substrate. The site is new and did not appear on the impervious maps or aerials, so the impervious area was taken from as-built drawings. This facility has a total drainage area of 1.66 acres and treats the Seton Center structure, access drives, and some parking. A portion of the parking lot is pervious pavement which is not counted in the total impervious area. Treatment is provided for 1.02 acres of impervious.



***Silo Hill Commercial Development - Off-Site Biofilter (FR15BMP000348)***

The Silo Hill off-site bioretention facility was constructed in 2002. The design of this facility consisted of a planted bioretention facility with infiltrative substrate and underdrain. This facility has a total drainage area of 0.49 acres and treats the structure and parking lot of the Emmitsburg office of the United States Postal Service. Treatment is provided for 0.29 acres of impervious.





***Silo Hill, Ph. 1 (Commercial Sleep Inn & Denny's) (FR15BMP000758)***

The Silo Hill Phase 1 shallow marsh was constructed in 2000. The design features a wet shallow marsh with micropools. Although constructed before 2002, the design of this facility provided a permanent wet pond with at least 1" WQv treatment. This facility has a total drainage area of 12.85 acres and treats a series of commercial lots, most of which have not been developed. Treatment is provided for 3.26 acres of impervious.



***Southgate, Sec. 1 - Shallow Marsh (FR15BMP000403)***

The Southgate Section 1 shallow marsh was constructed in 2009. The design of this facility consisted of a wet pond with forebays and wetlands plantings. This facility has a total drainage area of 15.95 acres and treats the roads and structures of the Southgate Section 1 subdivision. Treatment is provided for 3.92 acres of impervious.



***St. Joseph's Provincial House – SWM Pond (FR15BMP001155)***

The St. Joseph's Provincial House SWM pond was constructed in 2011. The design of this facility consisted of a three-lobe extended-detention wet pond. Although constructed before 2002, the design of this facility provided a permanent wet pond with at least 1" WQv treatment. This facility has a total drainage area of 5.65 acres and treats roads, parking, and partial building runoff from the Provincial House. Treatment is provided for 1.92 acres of impervious.



***Waybright Property - Sand Filter (FR15BMP000832)***

The Waybright Property sand filter was constructed in 2008. The design of this facility consisted of a water quality pond with a sand filter with underdrain. This facility has a total drainage area of 6.37 acres and treats an industrial building and parking lot from Emmitsburg Glass. Treatment is provided for 3.83 acres of impervious at the required 1-inch WQv.





## IMPERVIOUS TREATED BY NONSTRUCTURAL PRACTICES

Within the Town boundary impervious cover was 16.6%. Limited areas were determined to be eligible for consideration as nonstructural practices based on the criteria outlined in the Manual. Limitations included lack of sufficient sheetflow distance uninterrupted by other impervious surfaces, steep slopes, and flow concentrating drainage structures such as swales. A few of the areas considered treated by nonstructural practices were:

- Walking paths in the Emmitsburg Community Park with sheet flow to surrounding parkland
- The access drive in the St. Joseph Catholic Church cemetery with sheet flow to cemetery lawn.
- Walking paths on the St. Joseph Ministries and Mother Seton School campus with sheet flow to surrounding lawn.

The potential areas above were evaluated for N-2: Disconnection of Non-Rooftop Runoff based on the MDE Stormwater Manual design criteria and GIS analysis of slope using the Frederick County DEM. Impervious surfaces were considered adequately treated if they demonstrated sheet flow to pervious surface with slope of 5% or less over a length equal to the contributing length. In areas where a contiguous sidewalk passed over a section of terrain at 5-10% slope, these areas were counted if the pervious surface extended at least twice the contributing length and drained to an area with a slope less than 5% to account for potential microtopography variation and error.



Figure 1 - Example of slope analysis results



Within the additional western properties owned by the Town, impervious surfaces made up only 0.2% of land area. Most of these surfaces were driveways or small structures draining to surrounding lawns, fields, and protected forest. Because much of this area is protected for the preservation of the quality of the Town's water source within the MUN-085 Emmitsburg Watershed Natural Resource Park, significant alteration, concentration, or increase in impervious surface is unlikely. Most of the surface cover is forest.

The entire area is zoned either RC-Resource Conservation or A-Agricultural (see Appendix B) limiting development to agricultural, recreational, resource-based, or open space uses. The proportion is approximately 990 ac. or 88% 'RC' and 135 ac. or 12% 'A'. Development on 'RC' is limited to single residences with 10 acre lot size minimum. Development in 'A' is limited to two-family units with lot sizes a minimum of 40,000 sqft to 5 acres depending on use. Because of the small amount of impervious, the restrictive developmental zoning requirements, and the existing forested resources, all impervious surfaces within this area are considered treated by nonstructural practices.

The total impervious area evaluated as treated by nonstructural practices is 4.77 acres with 0.44 acres already considered treated by BMPs. The remaining 4.33 acres is considered treated by nonstructural practices.

*Table 3 - Impervious treated by nonstructural practices*

	<b>Total Impervious Treated by Nonstructural Practices (ac.)</b>	<b>Total Impervious Treated by Nonstructural Practices Only (ac.)</b>
<b>Emmitsburg Town Boundary</b>	2.43	1.99
<b>Additional Town Owned Property</b>	2.34	2.34
<b>Total</b>	4.77	4.33

**IMPERVIOUS DRAINING TO BMPS BUT CONSIDERED UNTREATED**

No water quality treatment was provided by 13 BMPs for which there were records. These BMPs were primarily quantity control structures and mostly built before 2002. Most extended detention ponds (XDED) were constructed with some water quality treatment in mind, but the amount of this treatment could not be verified.

*Table 4 - BMPs providing no water quality treatment*

BMP ID	BMP Name	Date Built	BMP Code	DA (ac.)	Imp (ac.)
FR15BMP000761	Brookfield Subdivision - Flood Pond	1990	XDED	26.24	2.52
FR15BMP000820	Emmitsburg Antique Mall	2000	XDED	2.29	1.36
FR15BMP000592	Emmitsburg Community Park, PH 1 - CPv Pond	2013	XDED	21.09	0.51
FREM15BMP0001	Emmitsburg East Industrial Park Lots 1-6	1996	XDED	10.99	2.40
FR15BMP000119	Emmitsburg Exxon	1997	XDED	0.85	0.40
FR15BMP000043	Emmitsburg McDonalds - ED Basin	1997	XDED	1.35	0.64
FR15BMP000529	Emmitsburg Panes - ED Pond	1996	XDED	2.14	1.45
FR15BMP000033	Lincoln on the Park - ED Pond	1991	XDED	4.66	1.77
FR15BMP000047	Northgate - ED Pond	1994	XDED	17.31	6.07
FR15BMP000088	Seton Place - Infiltration Trench	1992	ITRN	0.30	0.29
FR15BMP000964	Seton Square Center	2001	XDED	4.61	2.26
FR15BMP000993	Silo Hill, OGS	1997	XOGS	1.64	0.93
FR15BMP000539	Silo Hill SWM Pond	2002	XDED	22.22	7.96
FR15BMP000322	Waybright Property - Quantity Control Pond	2008	XDED	17.39	1.31
Total				133.08	29.87

## BMP Descriptions

### ***Brookfield Subdivision - Flood Pond (FR15BMP000761)***

The Brookfield subdivision flood pond was constructed in 1990. The design of this facility consisted of a large dry pond with multi-stage riser. Part of the footprint of the original facility was upgraded to a stormwater management BMP in 2012. This facility has a total drainage area of 26.24 acres and intercepts runoff from a portion of the Brookfield and Pembroke Woods subdivisions and several larger adjacent properties. Total untreated impervious within the drainage area is 2.52 acres.



### ***Emmitsburg Antique Mall (FR15BMP000820)***

The Emmitsburg Antique Mall pond was constructed in 2000. The design of this facility consisted of a dry pond with a grass overflow weir. This facility has a total drainage area of 2.29 acres and intercepts runoff from a portion of the Emmitsburg Antique Mall parking lot, a self-storage facility, and several residential properties. Total untreated impervious within the drainage area is 1.36 acres.





***Emmitsburg Community Park, PH 1 -CPv Pond (FR15BMP000592)***

The Emmitsburg Community Park Phase 1 CPv pond was constructed in 2013. The design of this facility consisted of two wet ponds and an infiltration cell. This facility has a large drainage area of 17.39 acres, but only treats a small amount of park impervious including walking paths and gravel drives. Total untreated impervious within the drainage area is 0.51 acres, but most of this impervious is considered treated by nonstructural practices.



***Emmitsburg East Industrial Park Lots 1-6 (FREM15BMP0001)***

The Emmitsburg Panes extended detention pond #2 was constructed in 1996. The design of this facility consisted of a dry pond with multi-stage riser. This facility has a total drainage area of 10.99 acres and intercepts runoff from an industrial property. Total untreated impervious within the drainage area is 2.40 acres.



***Emmitsburg Exxon (FR15BMP000119)***

The Emmitsburg Exxon extended detention pond was constructed in 1997. The design of this facility consisted of a dry pond with multi-stage riser. This facility has a total drainage area of 0.85 acres and intercepts runoff from the Exxon gas station. Total untreated impervious within the drainage area is 0.40 acres.



***Emmitsburg McDonalds - ED Basin (FR15BMP000043)***

The Emmitsburg McDonald's extended detention pond was constructed in 1997. The design of this facility consisted of a dry pond with multi-stage riser. This facility has a total drainage area of 1.35 acres and intercepts runoff from the McDonald's building and parking lot. Total untreated impervious within the drainage area is 0.64 acres.





***Emmitsburg Panes - ED Pond (FR15BMP000529)***

The Emmitsburg Panes extended detention pond #1 was constructed in 1996. The design of this facility consisted of a dry pond with multi-stage riser. This facility has a total drainage area of 2.14 acres and intercepts runoff from an industrial property. Total untreated impervious within the drainage area is 1.45 acres.



***Lincoln on the Park ED Pond (FR15BMP000033)***

The Lincoln on the Park extended detention pond was constructed in 1991. The design of this facility consisted of a dry pond with multi-stage riser. This facility has a total drainage area of 4.66 acres and intercepts runoff from the Lincoln on the Park apartment complex property and portions of several adjacent residential properties. Total untreated impervious within the drainage area is 1.77 acres.





***Northgate - Extended Detention Pond (FR15BMP000047)***

The Northgate extended detention pond #1 was constructed in 1994. The design of this facility consisted of a dry pond with multi-stage riser. This facility has a total drainage area of 17.31 acres and intercepts runoff from the Northgate subdivision. Total untreated impervious within the drainage area is 6.07 acres.



***Seton Square Center (FR15BMP000964)***

The Seton Square Center extended detention pond was constructed in 2001. The design of this facility consisted of a dry pond with multi-stage riser. This facility has a total drainage area of 4.61 acres and intercepts runoff from the Seton Square Center commercial development. Total untreated impervious within the drainage area is 2.26 acres.



***Silo Hill, OGS (FR15BMP000993)***

The Silo Hill oil-grit separator was constructed in 1997. The design featured a buried multi-cell concrete unit with sediment settling and oil separating cells. This facility has a total drainage area of 1.64 acres with including a shopping plaza and associated parking. Total untreated impervious within the drainage area is 0.93 acres.



***Silo Hill SWM Pond (FR15BMP000539)***

The Silo Hill extended detention pond was constructed in 2002. The design of this facility consisted of a dry pond with multi-stage riser, although the pond appears to be functionally wet. This facility has a total drainage area of 22.22 acres and intercepts runoff from the Silo Hill subdivision. Total untreated impervious within the drainage area is 7.96 acres.





***Emmitsburg East - Quantity Control Pond (FR15BMP000322)***

The Emmitsburg East (Waybright Property) quantity control pond was constructed in 1990. The design of this facility consisted of a large dry pond with a flood level control structure. This facility has a total drainage area of 17.39 acres and intercepts runoff from a small section of US 15 and a section of industrial park. Total untreated impervious within the drainage area is 1.31 acres.



**BMPS COVERED UNDER A SEPARATE NPDES PERMIT**

***Seton Place – Infiltration Trench (FR15BMP000088)***

The Seton Place infiltration trench was constructed in 1992. The design of this facility consisted of an underground infiltration system under the Seton Place parking lot. This facility has a total drainage area of 0.30 acres and intercepts runoff from the Seton Place parking lot. Although the BMP treats the impervious surface within its drainage area, the drainage area lies completely within the drainage area intercepted by SHA storm drain structures and so is omitted from the Town calculations. The total impervious area treated is 0.29 acres.





## Conclusions and Restoration Requirement

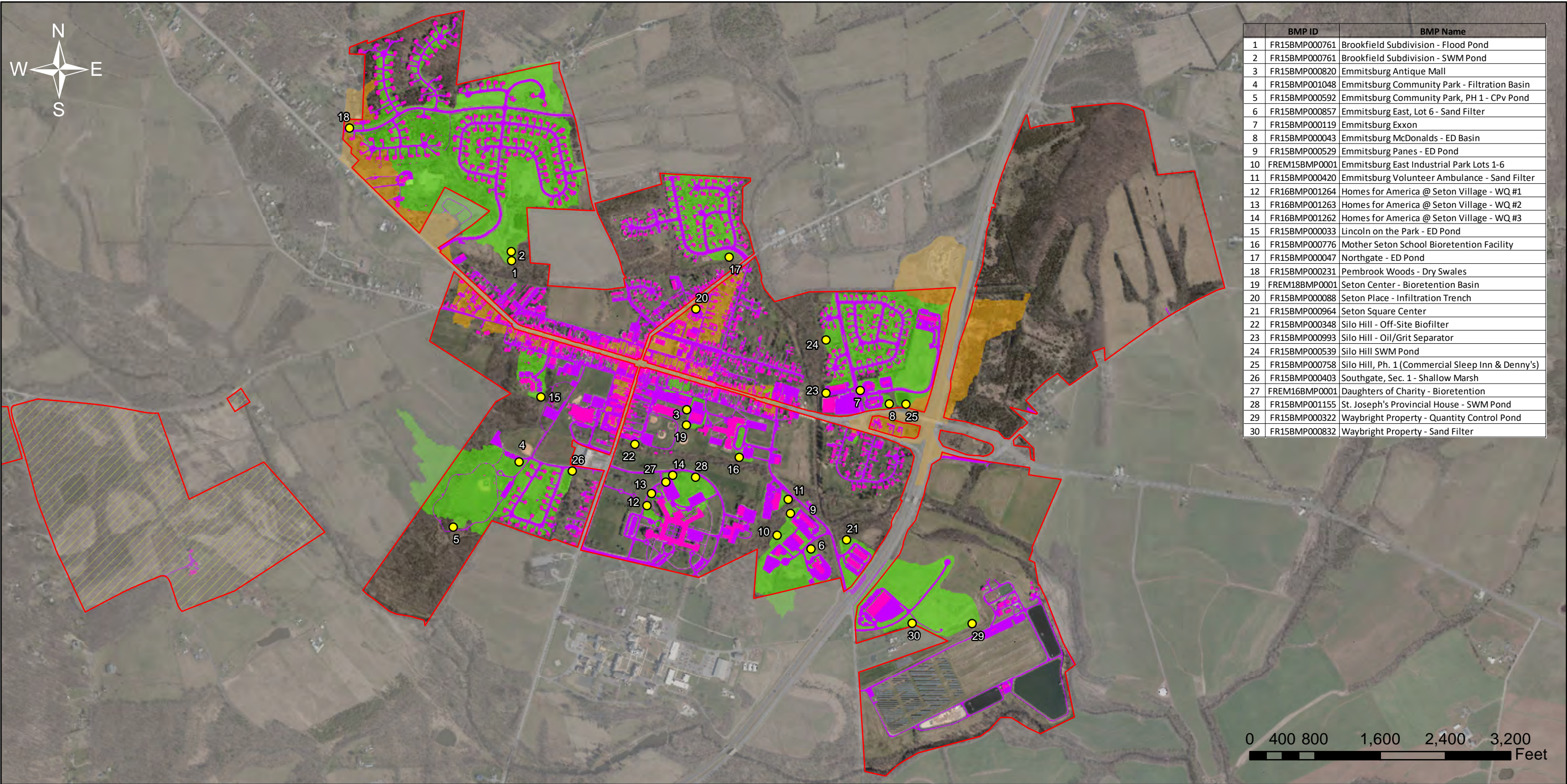
The Town consisted of 164.74 acres of impervious of which 18.00 acres drain to SHA drainage infrastructure and are covered under the SHA MS4 permit. Of the 146.74 acres of impervious determined to be covered by the Emmitsburg MS4 permit, a total of 44.48 acres were considered treated by structural or nonstructural practices. This equals 30.3% of the total permit impervious area. 102.26 acres were considered untreated with 20% of this amounting to 20.45 acres of impervious as the restoration requirement under the MS4 permit.

*Table 5 - Treatment totals and restoration requirement*

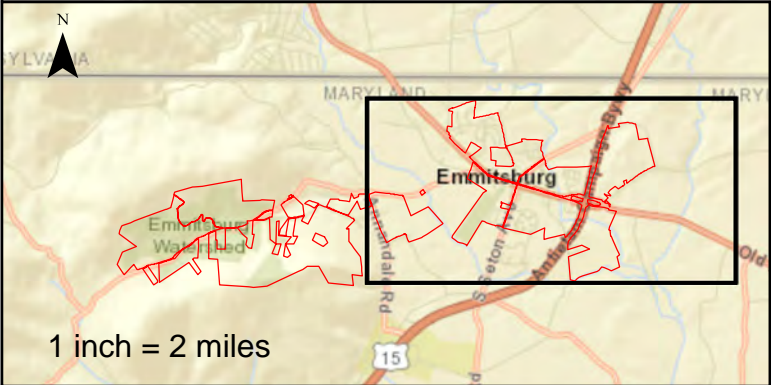
<b>Total Permit Impervious Acres</b>	146.74
<b>Total impervious acres treated by water quality BMPs</b>	40.15
<b>Total impervious acres treated by nonstructural practices</b>	4.33
<b>Total impervious acres untreated</b>	102.26
<b>20% of total untreated area</b>	<b>20.45</b>

## **APPENDIX A: MUNICIPAL BOUNDARY MAP**





	BMP ID	BMP Name
1	FR15BMP000761	Brookfield Subdivision - Flood Pond
2	FR15BMP000761	Brookfield Subdivision - SWM Pond
3	FR15BMP000820	Emmitsburg Antique Mall
4	FR15BMP001048	Emmitsburg Community Park - Filtration Basin
5	FR15BMP000592	Emmitsburg Community Park, PH 1 - CPv Pond
6	FR15BMP000857	Emmitsburg East, Lot 6 - Sand Filter
7	FR15BMP000119	Emmitsburg Exxon
8	FR15BMP000043	Emmitsburg McDonalds - ED Basin
9	FR15BMP000529	Emmitsburg Panes - ED Pond
10	FREM15BMP0001	Emmitsburg East Industrial Park Lots 1-6
11	FR15BMP000420	Emmitsburg Volunteer Ambulance - Sand Filter
12	FR16BMP001264	Homes for America @ Seton Village - WQ #1
13	FR16BMP001263	Homes for America @ Seton Village - WQ #2
14	FR16BMP001262	Homes for America @ Seton Village - WQ #3
15	FR15BMP000033	Lincoln on the Park - ED Pond
16	FR15BMP000776	Mother Seton School Bioretention Facility
17	FR15BMP000047	Northgate - ED Pond
18	FR15BMP000231	Pembrook Woods - Dry Swales
19	FREM18BMP0001	Seton Center - Bioretention Basin
20	FR15BMP000088	Seton Place - Infiltration Trench
21	FR15BMP000964	Seton Square Center
22	FR15BMP000348	Silo Hill - Off-Site Biofilter
23	FR15BMP000993	Silo Hill - Oil/Grit Separator
24	FR15BMP000539	Silo Hill SWM Pond
25	FR15BMP000758	Silo Hill, Ph. 1 (Commercial Sleep Inn & Denny's)
26	FR15BMP000403	Southgate, Sec. 1 - Shallow Marsh
27	FREM16BMP0001	Daughters of Charity - Bioretention
28	FR15BMP001155	St. Joseph's Provincial House - SWM Pond
29	FR15BMP000322	Waybright Property - Quantity Control Pond
30	FR15BMP000832	Waybright Property - Sand Filter



Prepared by:

**GPI**

# Emmitsburg Baseline Impervious Assessment

Municipal Boundary

General Discharge Permit No.  
13-IM-5500  
Frederick County, Maryland

## Legend

- Emmitsburg BMPs

□

Permit Area

■

Impervious (pavement/surface)

■

Impervious (structure)

■

BMP drainage area

■

SHA drainage area
- Zone**

■

A-Agricultural

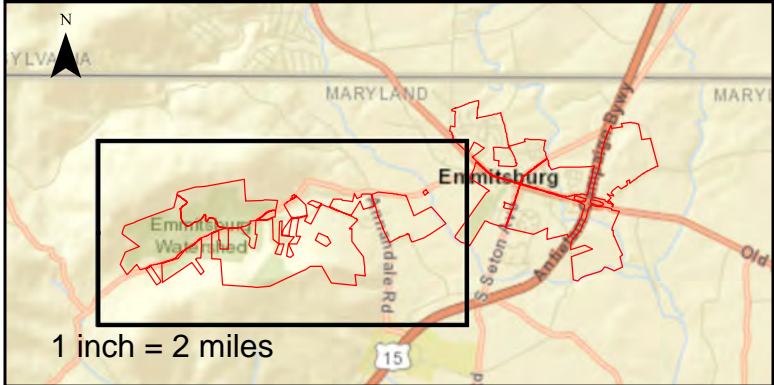
■

RC-Resource Conservation



## **APPENDIX B: ADDITIONAL TOWN OWNED PROPERTY MAP**





Prepared by:

**GPI**

# Emmitsburg Baseline Impervious Assessment

Additional Town Properties

General Discharge Permit No.  
13-IM-5500  
Frederick County, Maryland

## Legend

- |                               |                          |
|-------------------------------|--------------------------|
| Emmitsburg BMPs               | <b>Zone</b>              |
| Permit Area                   | A-Agricultural           |
| Impervious (pavement/surface) | RC-Resource Conservation |
| Impervious (structure)        |                          |
| BMP drainage area             |                          |
| SHA drainage area             |                          |