

ADDENDUM #1 JOINT POLLUTANT REDUCTION PLAN

For the

Lebanon County Stormwater Consortium

Including the Municipal Separate Storm Sewer Systems
(MS4s) of:

Annville Township,
the City of Lebanon,
Cleona Borough Authority,
North Cornwall Township,
North Lebanon Township, and
South Lebanon Township

September 30, 2020



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***LEBANON COUNTY STORMWATER CONSORTIUM
ADDENDUM #1 POLLUTANT REDUCTION PLAN
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ADDENDUM #1 POLLUTANT REDUCTION PLAN NARRATIVE
for the
LEBANON COUNTY STORMWATER CONSORTIUM

The Lebanon County Stormwater Consortium (the Consortium) is comprised of six contiguous municipal separate storm sewer systems (MS4s) in central Lebanon County, PA. These MS4s are Annville Township, the City of Lebanon, Cleona Borough Authority, North Cornwall Township, North Lebanon Township, and South Lebanon Township (the participants). These municipalities have joined together through an intergovernmental agreement to develop and implement a joint pollutant reduction plan in accordance with section I.F of the “Pollutant Reduction Plan Instructions” document (PRP Instructions) published by the Pennsylvania Department of Environmental Protection (DEP).

This document serves as an addendum to the first draft of the PRP which was dated May 20, 2019 and approved by DEP in December 2019. The primary purpose of this document is to add 21 Best Management Practice (BMP) projects to the Consortium’s existing list of projects. Included in this document are maps depicting the location of the new proposed BMPs as well as pertinent information and calculations related to the BMPs. This document does not make changes to all sections of the original PRP. It is noted in this document if no changes to a particular section are proposed.

Throughout the PRP and especially within the tables, the names of the participants may be abbreviated. These abbreviations include “Annville” (Annville Township), “City” (the City of Lebanon), “Cleona” (Cleona Borough Authority), “NCT” (North Cornwall Township), “NLT” (North Lebanon Township), and “SLT” (South Lebanon Township).

SECTION A. PUBLIC PARTICIPATION

The collaborating MS4s elected to implement the public participation requirements as a joint effort. A complete copy of the first addendum to the Pollutant Reduction Plan was made available for public review online on website of the Lebanon County Redevelopment Authority, which serves as the administrator for the group. A public notice was published on July 6, 2020 in the Lebanon Daily News, a newspaper of general circulation in all participating municipalities. The public notice is attached in this section. The public comment period began on July 6, 2020 and concluded on August 5, 2020. The Consortium accepted and verbal public comments at a hearing held on July 21, 2020. **No verbal public comments were received.** The Consortium also accepted written public comments for the duration of the public comment period. Written comments were to be directed to the Redevelopment Authority. **No written comments were received, and a verification letter from the Redevelopment Authority is included in this section.**

Commenter #1:

Comment #1A:

Response #1A:

SECTION B. MAP

Mapping updates which show the location and pertinent geographical information of newly proposed BMPs are presented in this addendum. Only the mapping pages which show new information are included. The new proposed BMPs are marked with blue octagonal symbols and are numbered in accordance with the table of BMPs presented in Section E.

SECTION C. POLLUTANTS OF CONCERN

This addendum includes no changes to Section C.

SECTION D. DETERMINE EXISTING LOADING FOR POLLUTANTS OF CONCERN

Table D.1 has been updated to reflect the increase in drainage areas to proposed BMPs. The additional pollutant load reduction requirements associated with these drainage areas have been subtracted from the projected pollutant reductions for each newly proposed BMP in Table E.2. Therefore, the pollutant reduction requirements that were reported in the May 20, 2019 version of the PRP have not changed. These pollutant reduction requirements remain at 649,108 lb TSS/yr in the Snitz Creek-Quittapahilla Creek watershed, 29,499 lb TSS/yr in the Reeds Run-Swatara Creek watershed, 5,487 lb TSS/yr in the Lower Little Swatara Creek watershed, and 10,510 lb TSS/yr is in the Headwaters Tulpehocken Creek watershed.

SECTION E. SELECT BMPs TO ACHIEVE THE MINIMUM REQUIRED REDUCTIONS IN POLLUTANT LOADING

The Consortium has identified 21 additional potential BMP projects in this addendum, bringing the total project pool to 81. These projects are numbered SQ49 through SQ67, RS7, and T5 through T6. Additionally, the scope of project SQ1 was expanded to include a new stream restoration segment downstream of the original segment. These projects are listed in Table E.1: Lebanon County Stormwater Consortium Proposed Projects along with applicable data including an identification number, the participating municipality where the project is located, an estimated cost, the calculated TSS load reduction to be achieved by the project, and a cost per pound of TSS reduced figure. The identification numbers are assigned by watershed, for example, the project identification number SQ1 represents the first project located within the Snitz Creek-Quittapahilla Creek watershed. Combinations of these projects or other projects that materialize within the 5-year permit term will be implemented to meet the required pollutant reductions in each of the applicable HUC-12 watersheds.

In the original PRP, Table II included all projects. In this addendum, only new projects are shown in Table II. The full slate of projects is included in Tables E.1 and E.2.

Table II: New or Modified Proposed Projects for Addendum #1

ID#	Projects
SQ1	Streambank restoration on the Quittapahilla Creek mainstem upstream of the 22nd St bridge (2,500 ft)
SQ49	Basin Retrofit at Redwood Ln
SQ50	Southgate Drive landscape restoration
SQ51	Basin retrofit at Snow Goose
SQ52	Redevelopment at N 11th Ave (basins)
SQ53	Redevelopment at N 11th Ave (impervious area reduction)
SQ54	Stormwater mitigation at Coleman’s Park (regenerative stormwater conveyance)
SQ56	Cumberland St rain gardens
SQ57	Rain garden (B soil) at the LCRA Mifflin St Office
SQ58	Tree planting at Kiner Ave
SQ59	Streambank restoration south of Snitz Creek Park (375 ft)
SQ60	Vegetated swale (C/D soils) at South Hills Park
SQ61	Basin retrofit at Cedar Crest Middle School (landscape rest.)
SQ62	Basin retrofit at Triple M Farms
SQ63	Dry extended detention basin at the NLT Business Park
SQ64	Basin retrofit at 810 Melody Ln
SQ65	Impervious area removal at 1152 and 1154 King St.
SQ66	Rain garden (B soil) at 1309 and 1311 King St.
SQ67	Impervious area removal at 121 E Elm St.
RS7	Elias Avenue swale
T5	Basin retrofit at Pumpkin Ridge
T6	Tree planting at Lenni Lenape Park

The new projects that are proposed in this addendum are of similar types to those proposed in the original PRP. The project types and goals were described in the original PRP and included streambank restoration projects, basin retrofit projects, and new BMP projects. The calculation methodology for these types of BMP projects were adequately described in the original PRP document. As stated before, the additional pollutant load reduction requirements associated with drainage areas to newly proposed BMPs that were not previously in an MS4 sewershed, have been subtracted from the projected pollutant reductions for each newly proposed BMP in Table E.2.

All proposed projects are marked on the MS4 maps with their project identification number on a blue octagonal symbol. The projects can be easily referenced to Tables E.1 and E.2 for additional information and pollutant reduction calculations associated with each project using this identification number.

The total TSS reductions for proposed projects, for each watershed appear in Table III below. The Consortium recognizes that difficulties in obtaining landowner permission to execute projects will likely occur, and for this reason the group wishes to have an excess of projects in planning stages so that backup options are available.

Table III: Reduction Requirements and Proposed Reduction Totals

Watershed	TSS Reduction Requirement (lb/yr)	Total TSS reduction of proposed projects (lb/yr)
Snitz Creek-Quittapahilla Creek	649,108	1,485,798
Reeds Run-Swatara Creek	29,499	48,539
Lower Little Swatara Creek	5,487	7,230
Headwaters Tulpehocken Creek	10,510	44,434

SECTION F. IDENTIFY FUNDING MECHANISMS

This addendum includes no changes to Section F.

SECTION G. IDENTIFY RESPONSIBLE PARTIES FOR OPERATION AND MAINTENANCE (O&M) OF BMPs

This addendum includes no changes to Section G.

SECTION H. INTER-GOVERNMENTAL AGREEMENT

This addendum includes no changes to Section H.

SECTION A
PUBLIC PARTICIPATION

Text of Ad: 07/01/2020

**Public Notice – Lebanon Area
Regional Pollutant Reduction
Plan**

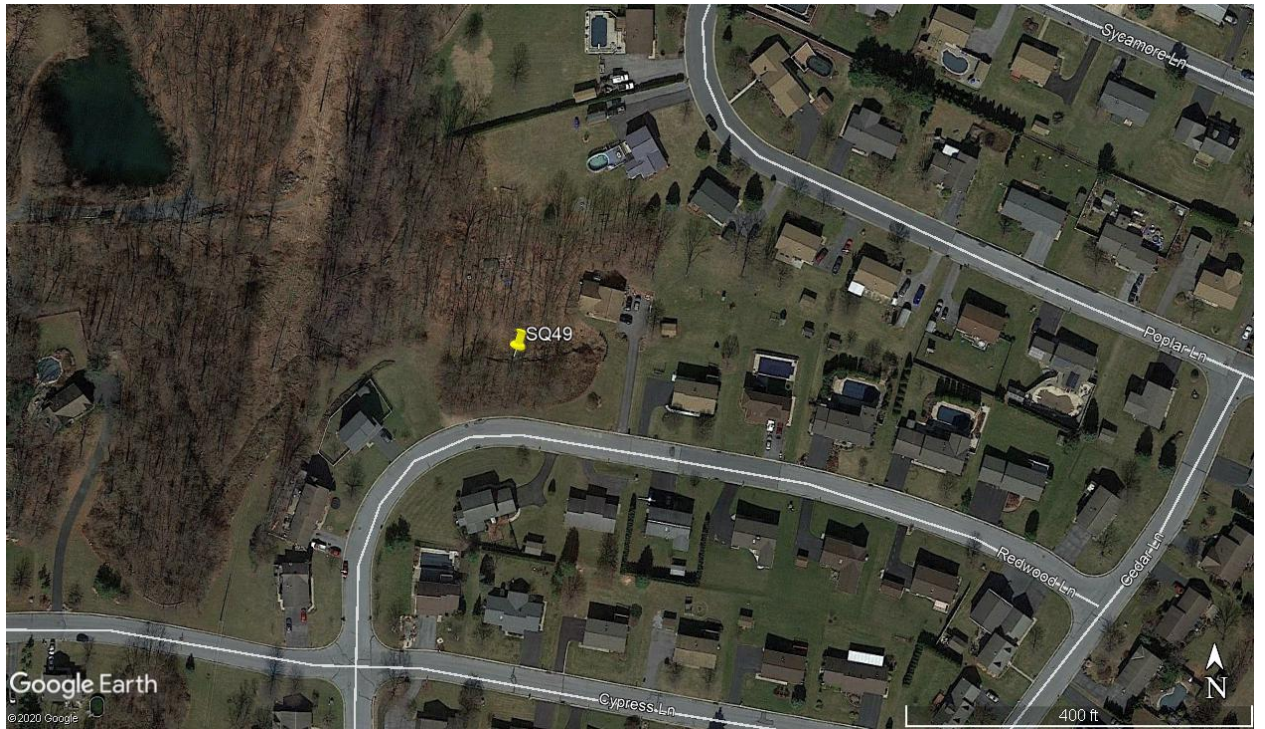
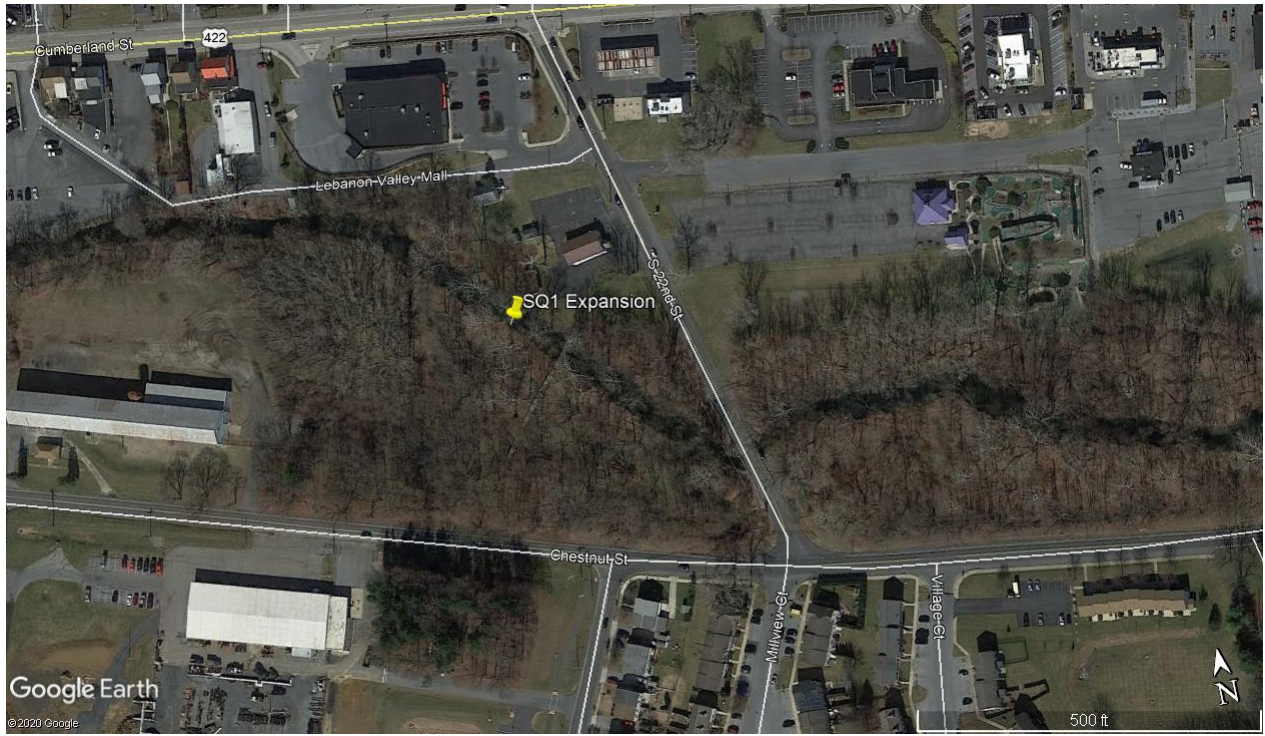
Notice is hereby given that the Lebanon County Stormwater Consortium (Consortium), consisting of Annville Township, City of Lebanon, Cleona Borough, Authority, North Cornwall Township, North Lebanon Township, and South Lebanon Township, has prepared an Addendum to the joint Pollutant Reduction Plan (PRP) to be submitted to the PA Department of Environmental Protection (PADEP) on or before September 30, 2020 as a component of each member municipality's PAG-13 National Pollutant Discharge Elimination System (NPDES) General Permit application for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s).

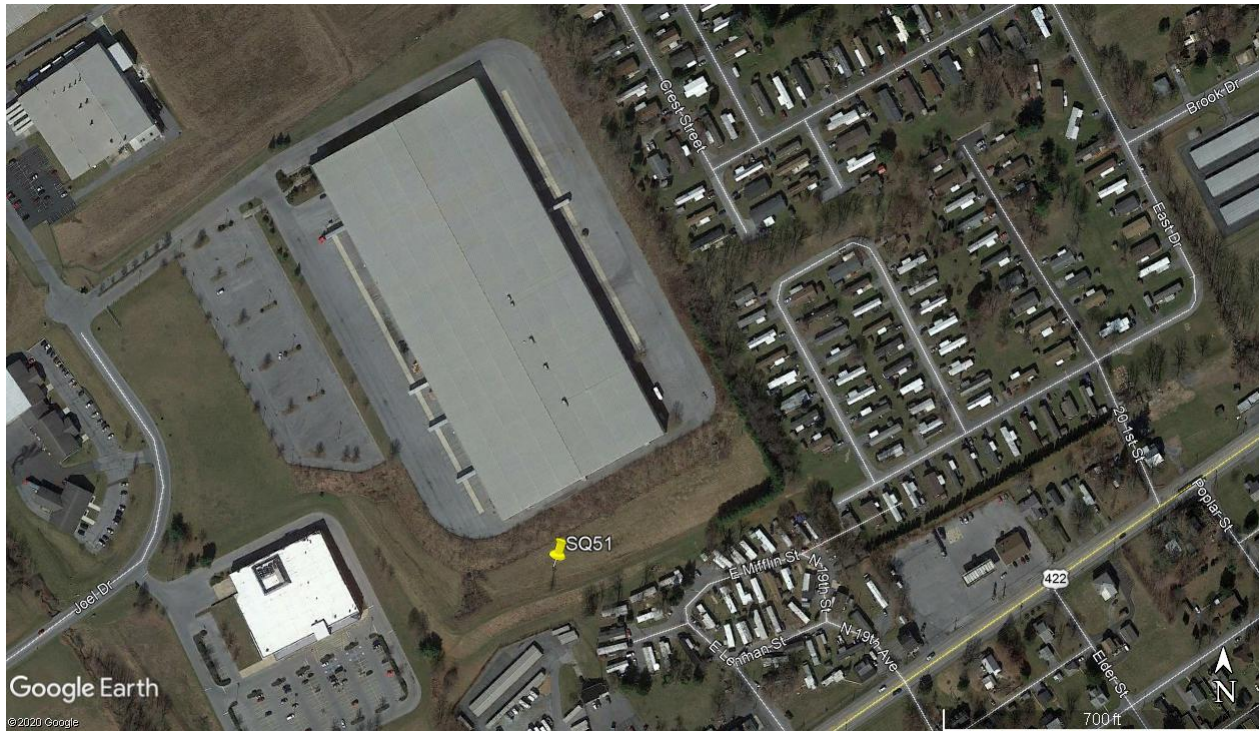
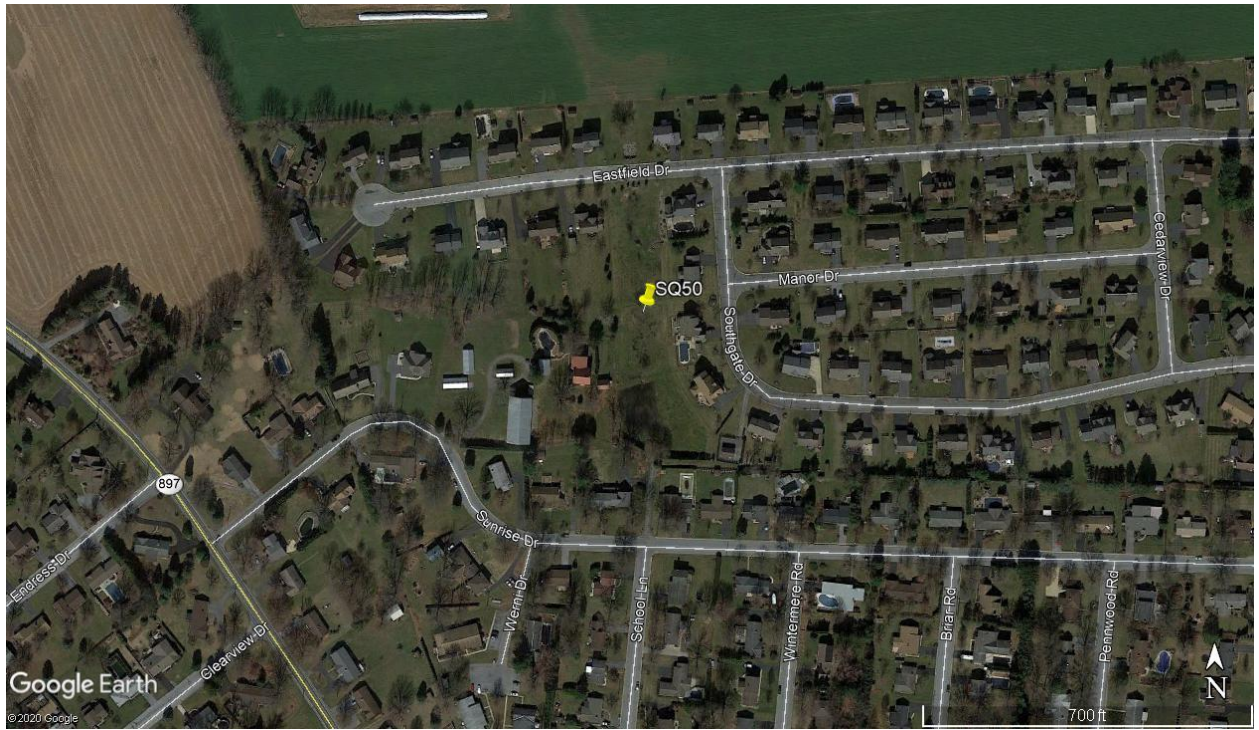
The Addendum to the PRP outlines additional opportunities and locations for Best Management Practice (BMP) projects which will reduce sediment loadings from the Consortium Members' MS4 stormwater discharges to the Snitz Creek-Quittapahilla Creek, Reeds Run-Swatara Creek, Lower Little Swatara Creek, and Headwaters Tulpehocken Creek. A copy of the PRP is available on the Redevelopment Authority's website at www.lebanoncoun tyredevelopment.com.

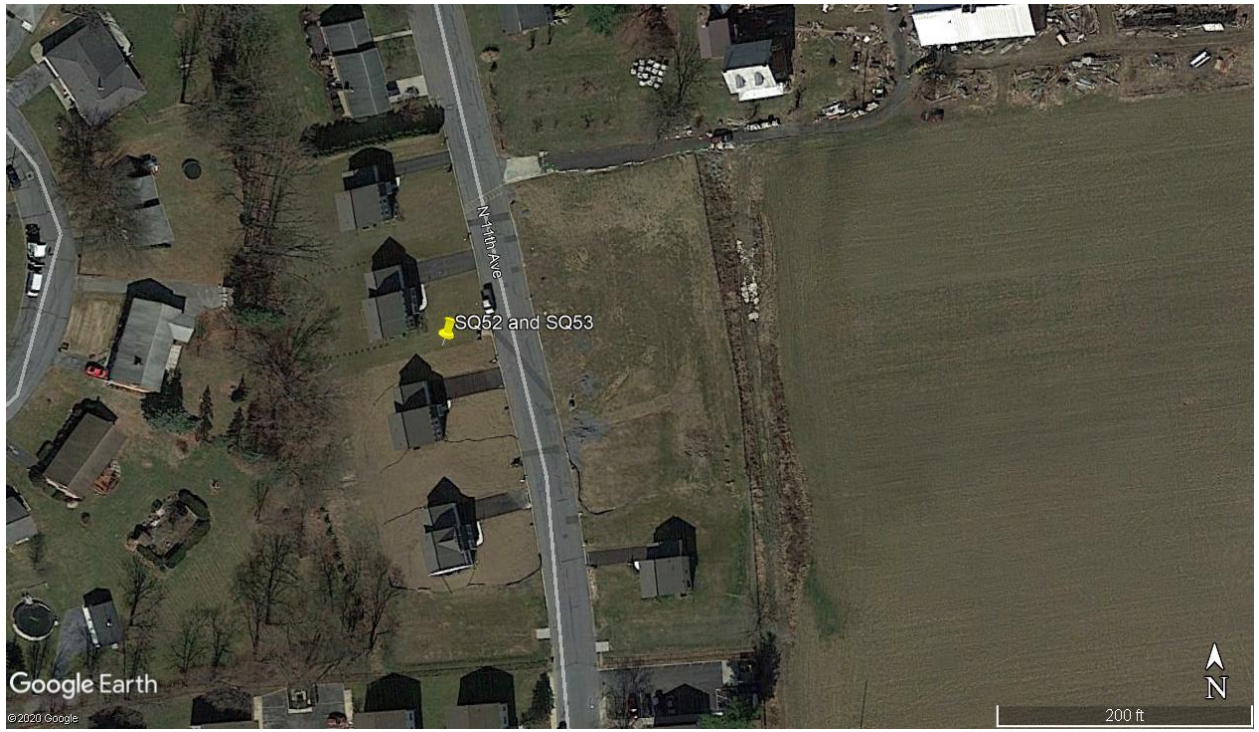
A virtual public meeting to present the draft Addendum to the PRP will be held on July 21, 2020 at 10:00am. Prospective attendees must register with the Redevelopment Authority as Administrator for the Consortium to obtain call-in details. Contact Dan Lyons at dlyons@lcha.com or 717-273-9326 to register. The community is invited to provide verbal comments on the plan at the meeting. In addition, members of the community have an opportunity to review and provide written comment on the plan. There will be a 30-day public comment period from July 6, 2020 – August 5, 2020 in order to allow the members of the public to read the plan and submit written comments on it. Written comments can be submitted electronically to the Redevelopment Authority at ebowman@lebanoncountyredevelopment.com, or to 39 N. 12th Street, Lebanon, PA 17046, attention: Elizabeth Bowman. All comments on the plan must be received by close of business on August 5, 2020.

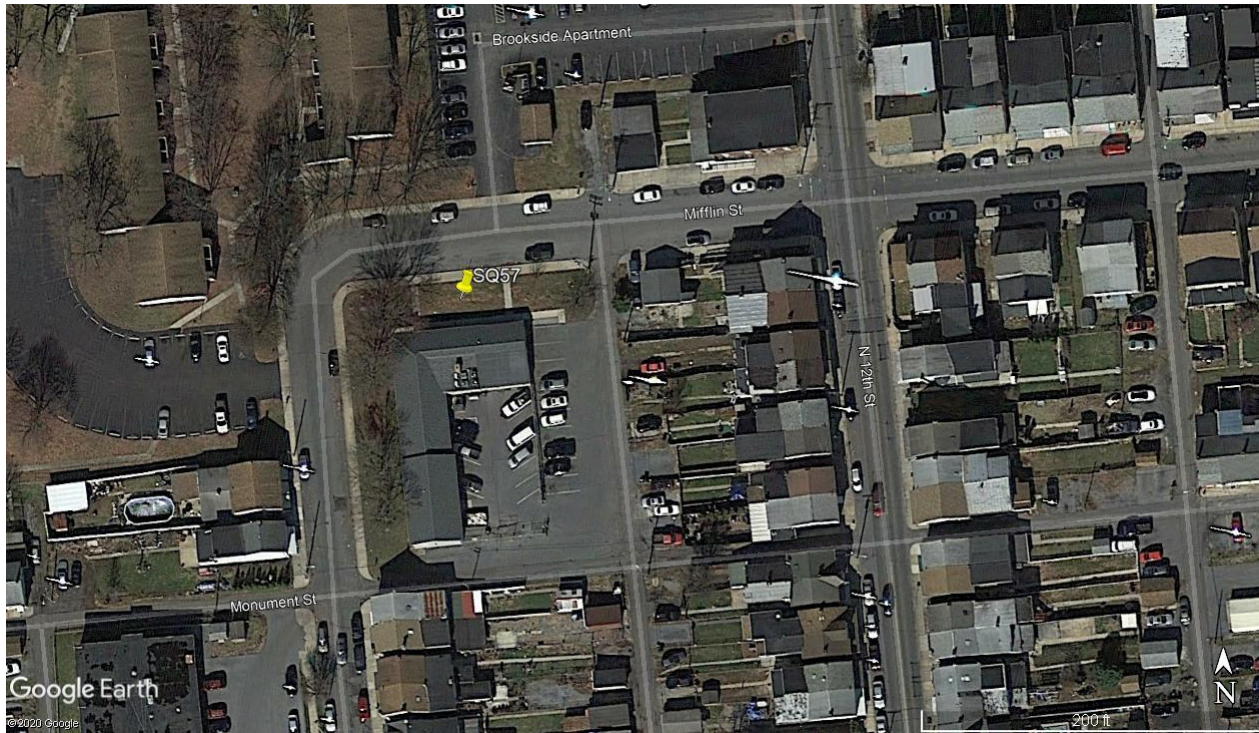
SECTION B

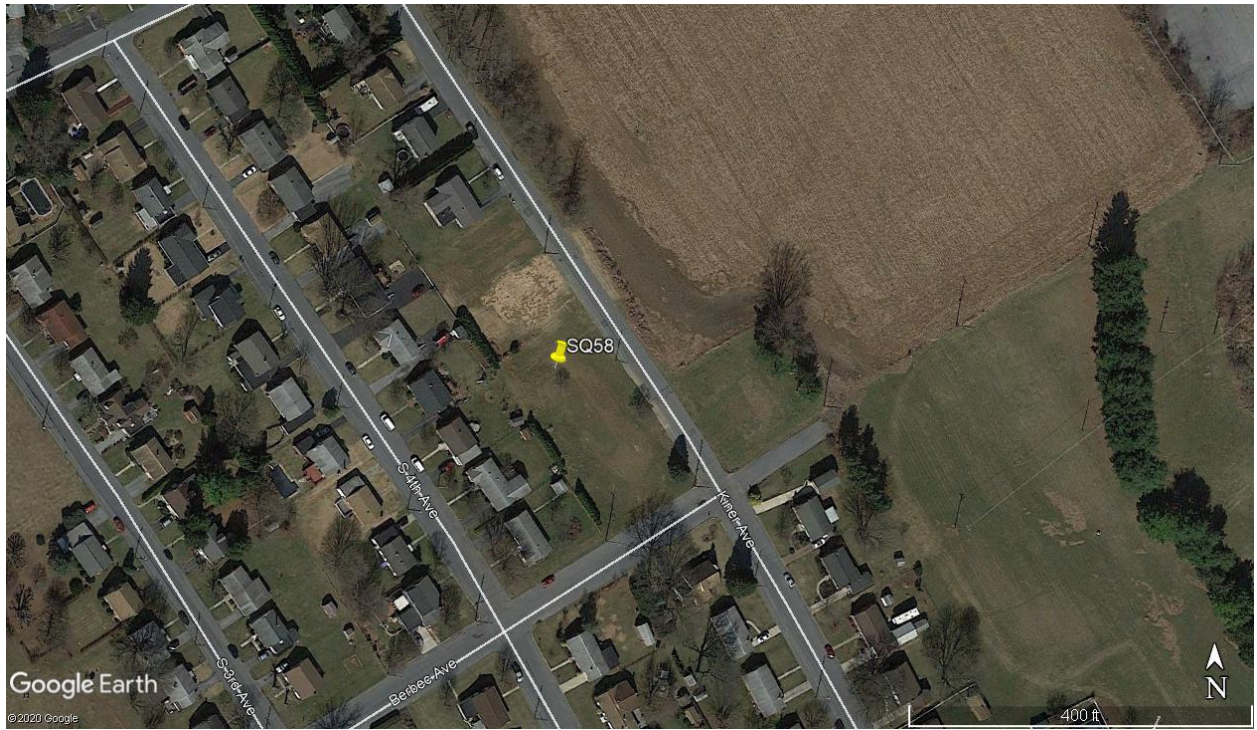
MAP



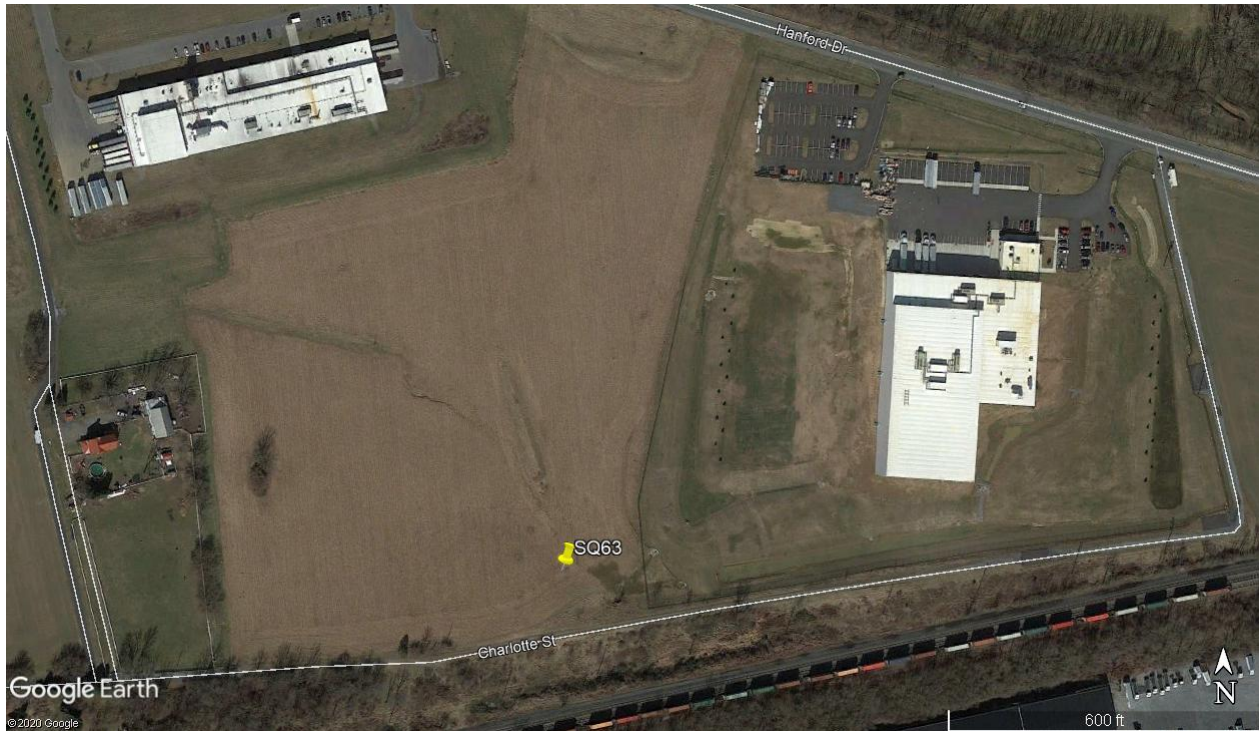
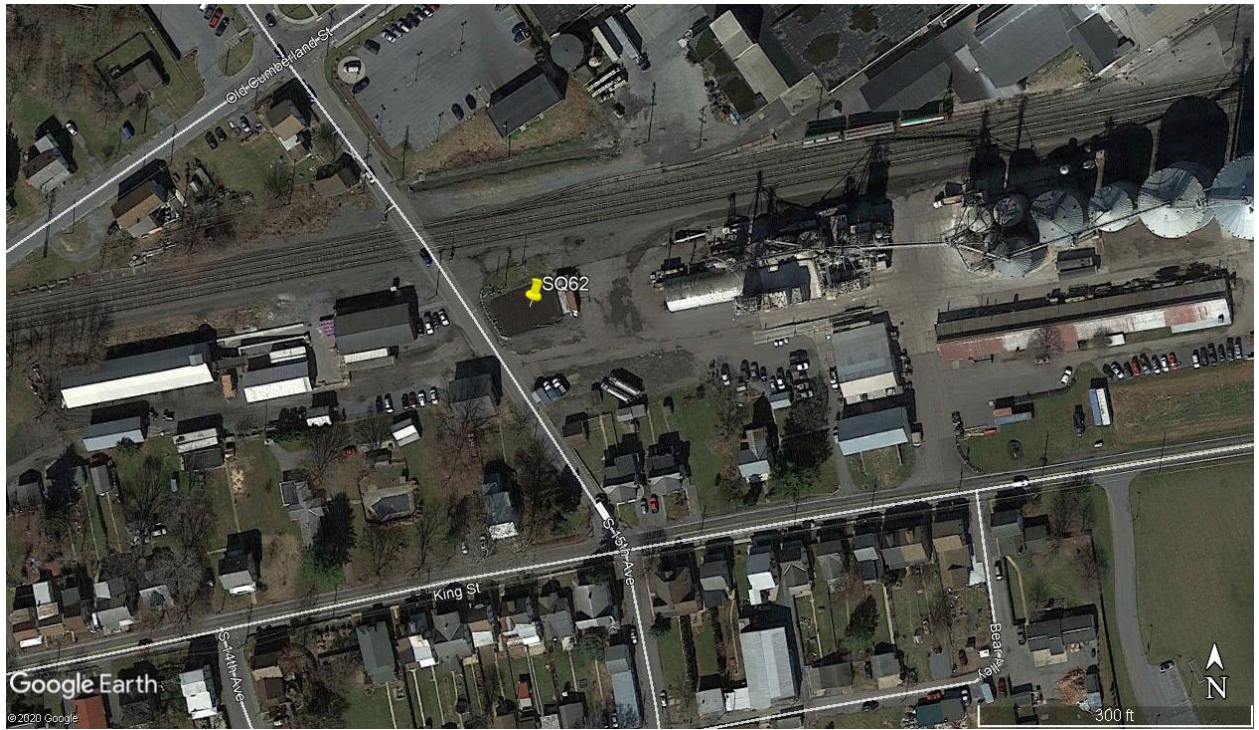


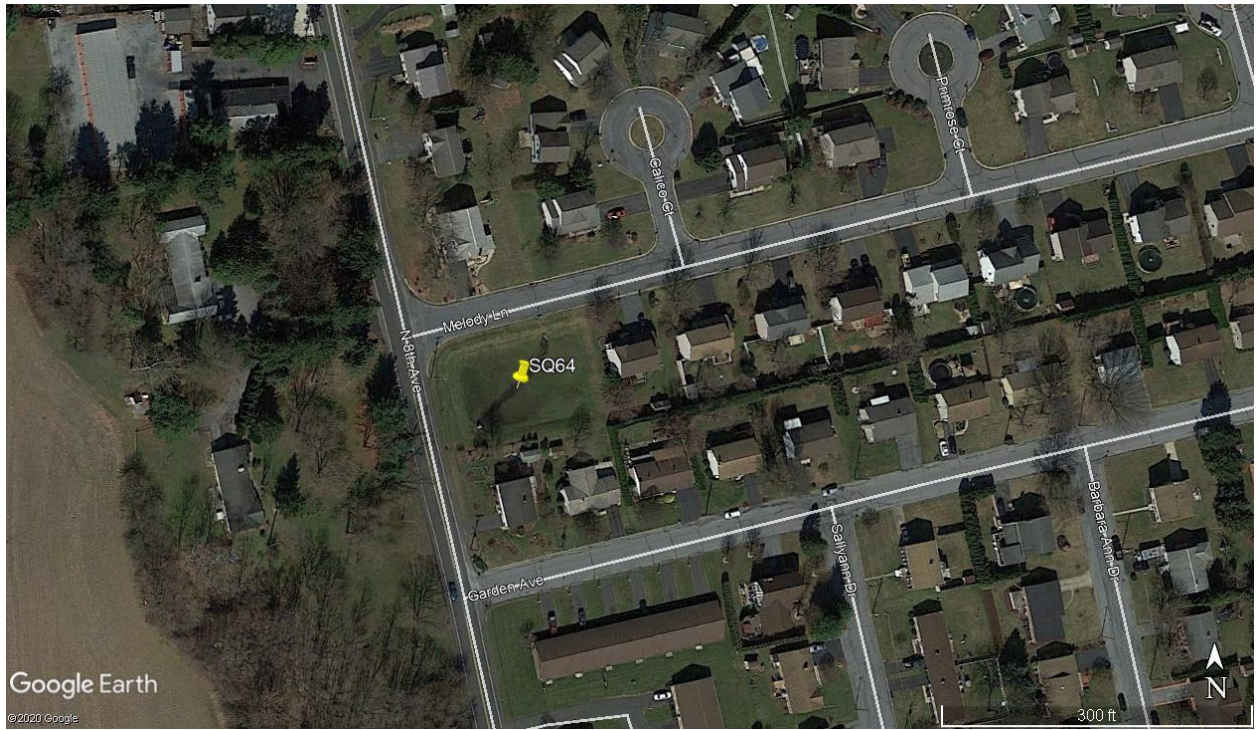


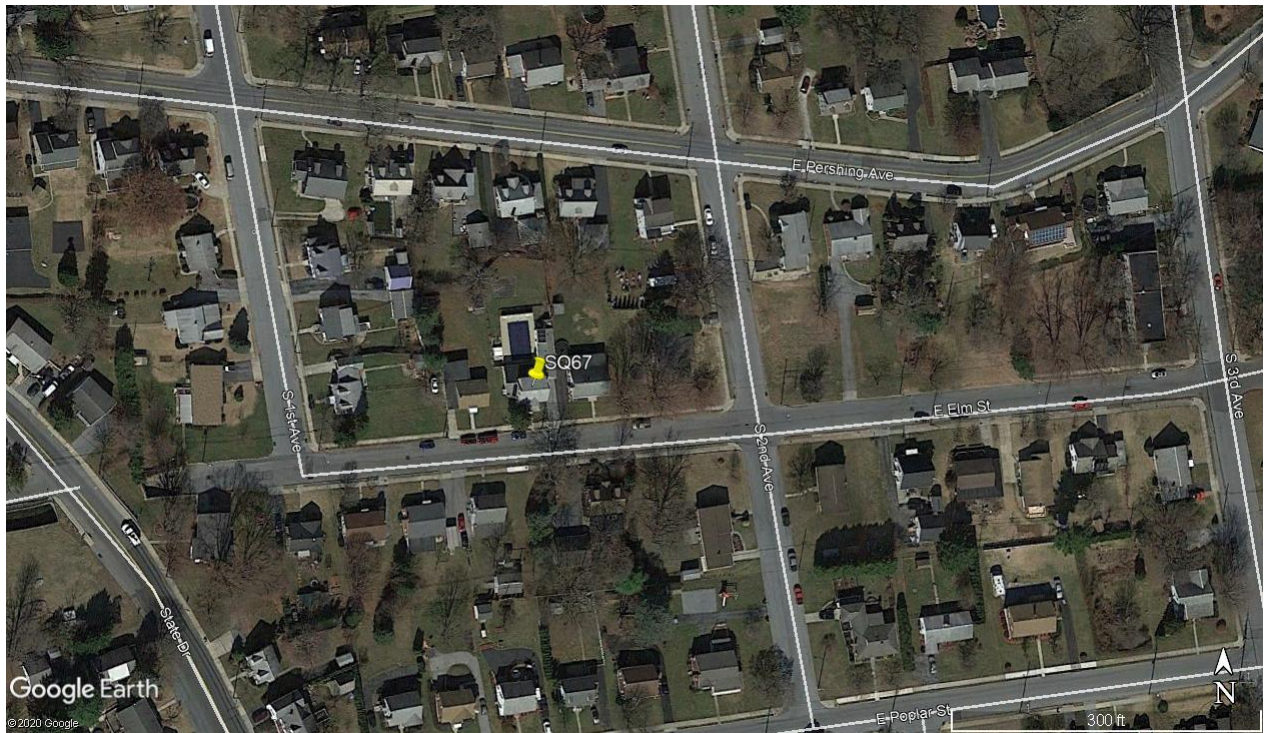
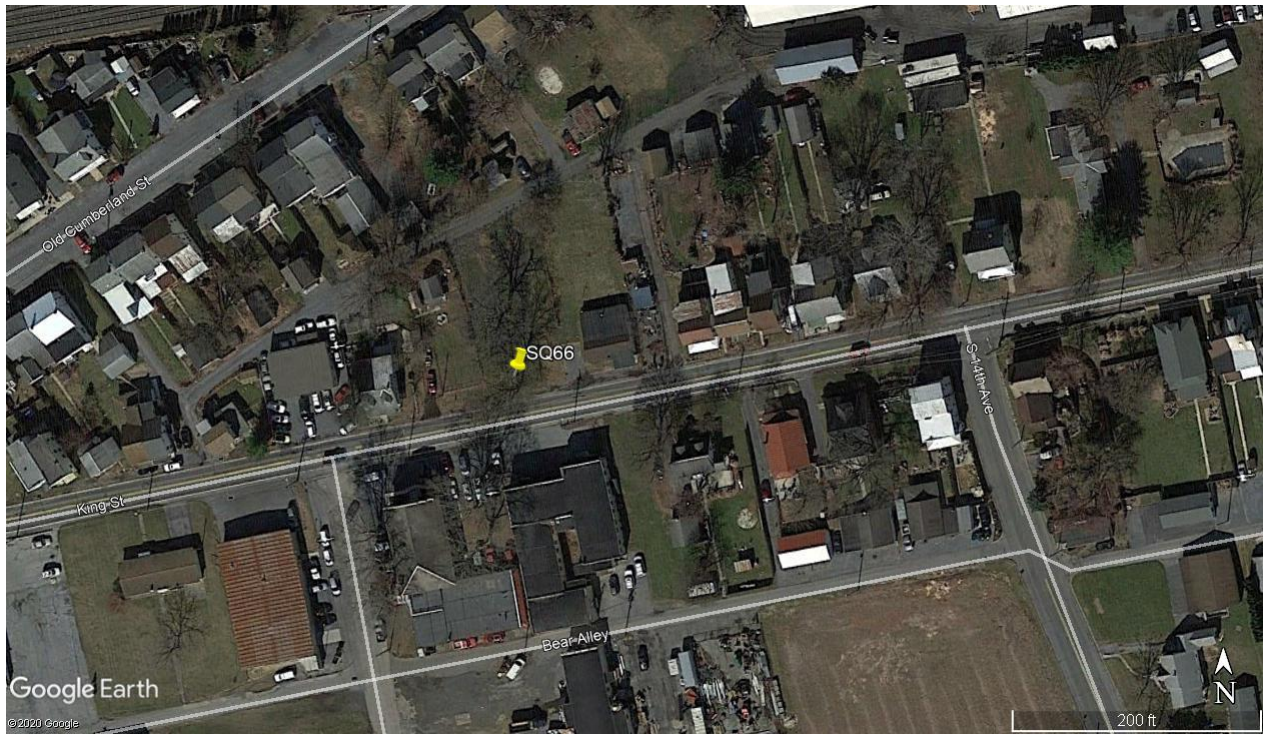


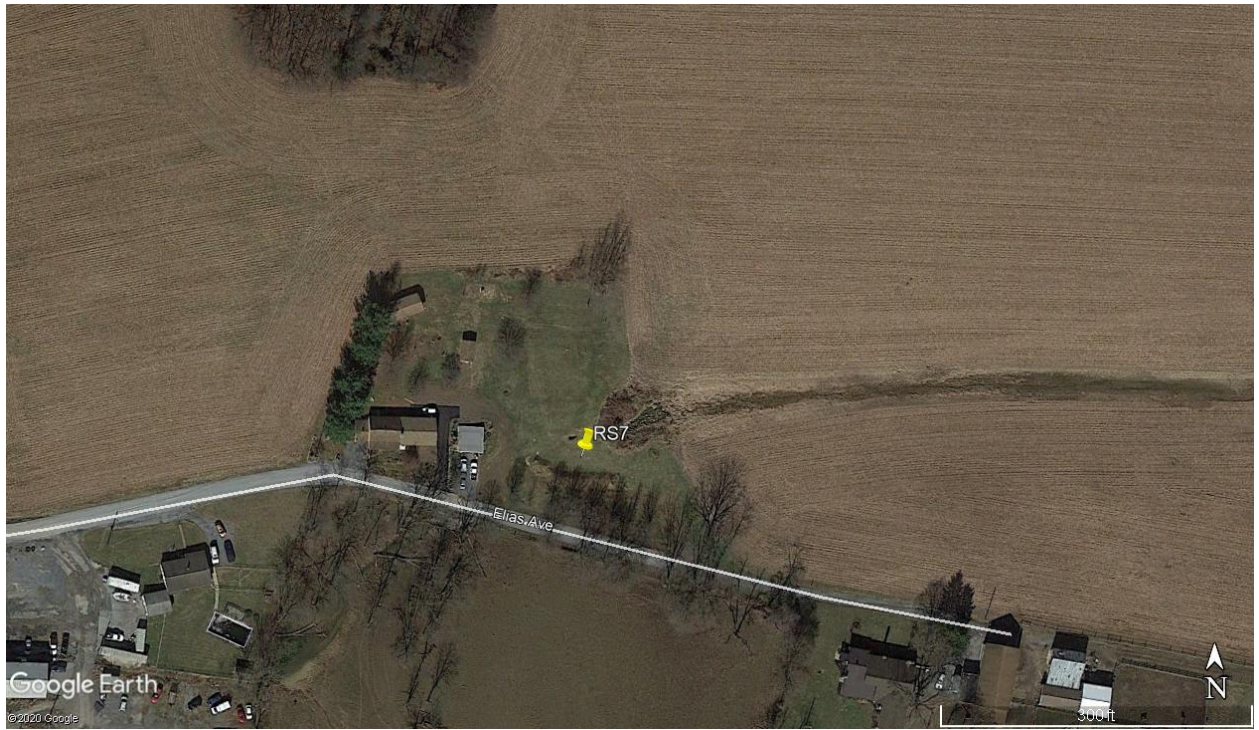














SECTION D

DETERMINE EXISTING LOADING FOR POLLUTANTS OF CONCERN

Existing Pollutant Loading Calculations

Revised September 30, 2020

Loading Rates:	Impervious Developed:	1948.53	lb/ac/yr
	Pervious Developed:	269.81	lb/ac/yr
	Undeveloped:	234.6	lb/ac/yr

Table D.1: Area Distributions

Participant	Area Classification (Map Color)	Water-shed ¹	Total Drainage Area (acres)	Impervious Developed Land (acres)	Pervious Developed Land (acres)	Undeveloped Land (acres)	Total TSS Loading (lb/yr)
Annville Twp.	Total Classified Area (All)	SQ	1040.68	361.08	679.60	0.00	886,932
Annville Twp.	Planning Area (Purple)	SQ	487.56	165.77	321.79	0.00	409,831
Annville Twp.	Proposed BMPs (Blue)	SQ	49.28	16.76	32.52	0.00	41,424
Annville Twp.	State Roads (Gold)	SQ	15.75	12.60	3.15	0.00	25,401
Annville Twp.	Parsed Area (Green)	SQ	488.09	165.95	322.14	0.00	410,276
Annville Twp.	Ag Parsing (Red Hatch)	SQ	0.00	0.00	0.00	0.00	0
City of Lebanon	Total Classified Area (All)	SQ	2665.92	1318.85	1347.07	0.00	2,933,272
City of Lebanon	Planning Area (Purple)	SQ	2303.35	1243.81	1059.54	0.00	2,709,476
City of Lebanon	Proposed BMPs (Blue)	SQ	73.66	5.51	68.15	0.00	29,124
City of Lebanon	State Roads (Gold)	SQ	7.15	5.95	1.20	0.00	11,918
City of Lebanon	Parsed Area (Green)	SQ	281.76	63.58	218.18	0.00	182,755
City of Lebanon	Ag Parsing (Red Hatch)	SQ	0.00	0.00	0.00	0.00	0
Cleona Borough	Total Classified Area (All)	SQ	551.19	127.01	424.18	0.00	361,931
Cleona Borough	Planning Area (Purple)	SQ	346.91	110.17	236.74	0.00	278,544
Cleona Borough	Proposed BMPs (Blue)	SQ	15.33	1.01	14.32	0.00	5,832
Cleona Borough	State Roads (Gold)	SQ	12.73	11.92	0.81	0.00	23,445
Cleona Borough	Parsed Area (Green)	SQ	176.22	3.91	172.31	0.00	54,110
Cleona Borough	Ag Parsing (Red Hatch)	SQ	0.00	0.00	0.00	0.00	0
NCT	Total Classified Area (All)	SQ	3485.17	488.45	2715.48	281.24	1,750,402
NCT	Planning Area (Purple)	SQ	1571.36	317.58	1208.21	45.57	955,492
NCT	Proposed BMPs (Blue)	SQ	343.08	51.16	291.92	0.00	178,450
NCT	State Roads (Gold)	SQ	31.59	21.77	9.82	0.00	45,069
NCT	Parsed Area (Green)	SQ	1183.02	97.94	1085.08	0.00	483,604
NCT	Ag Parsing (Red Hatch)	SQ	356.12	0.00	120.45	235.67	87,787
NLT	Total Classified Area (All)	All	4777.76	724.74	4023.95	29.07	2,504,699
NLT	Planning Area (Purple)	SQ	1134.77	248.52	883.45	2.80	723,269
NLT	Planning Area (Purple)	RS	604.61	93.09	487.55	23.97	318,558
NLT	Planning Area (Purple)	LS	87.11	18.98	68.13	0.00	55,365
NLT	Planning Area (Purple)	T	121.08	20.92	97.86	2.30	67,706
NLT	Proposed BMPs (Blue)	SQ	107.60	40.48	67.12	0.00	96,986
NLT	Proposed BMPs (Blue)	RS	49.20	0.21	48.99	0.00	13,627
NLT	Proposed BMPs (Blue)	LS	0.36	0.09	0.27	0.00	248
NLT	Proposed BMPs (Blue)	T	36.30	25.41	10.89	0.00	52,450
NLT	State Roads (Gold)	SQ	29.98	21.98	8.00	0.00	44,987
NLT	State Roads (Gold)	RS	10.67	7.82	2.85	0.00	16,006
NLT	State Roads (Gold)	LS	2.02	1.48	0.54	0.00	3,030
NLT	State Roads (Gold)	T	3.78	2.77	1.01	0.00	5,670
NLT	Parsed Area (Green)	SQ	1534.83	147.75	1387.08	0.00	662,143
NLT	Parsed Area (Green)	RS	831.20	79.80	751.40	0.00	358,228
NLT	Parsed Area (Green)	LS	1.42	0.14	1.28	0.00	618
NLT	Parsed Area (Green)	T	159.41	15.30	144.11	0.00	68,695
NLT	Ag Parsing (Red Hatch)	SQ	38.88	0.00	38.88	0.00	10,490
NLT	Ag Parsing (Red Hatch)	RS	24.54	0.00	24.54	0.00	6,621
NLT	Ag Parsing (Red Hatch)	LS	0.00	0.00	0.00	0.00	0
NLT	Ag Parsing (Red Hatch)	T	0.00	0.00	0.00	0.00	0
SLT	Total Classified Area (All)	All	6053.51	722.62	4455.36	875.53	2,815,547
SLT	Planning Area (Purple)	SQ	3018.42	543.18	2316.00	159.24	1,720,640
SLT	Planning Area (Purple)	T	92.63	12.45	80.18	0.00	45,893
SLT	Proposed BMPs (Blue)	SQ	61.76	14.89	46.87	0.00	41,660
SLT	Proposed BMPs (Blue)	T	0.00	0.00	0.00	0.00	0
SLT	State Roads (Gold)	SQ	31.97	21.11	10.86	0.00	44,064
SLT	State Roads (Gold)	T	11.72	7.74	3.98	0.00	16,155
SLT	Parsed Area (Green)	SQ	1142.48	83.62	1058.86	0.00	448,627
SLT	Parsed Area (Green)	T	541.86	39.63	502.23	0.00	212,727
SLT	Ag Parsing (Red Hatch)	SQ	972.94	0.00	381.48	591.46	241,684
SLT	Ag Parsing (Red Hatch)	T	179.73	0.00	54.90	124.83	44,098

¹SQ=Snitz Creek-Quittapahilla Creek, RS=Reeds Run-Swatara Creek, LS=Lower Little Swatara Creek, T=Headwaters Tulpehocken Creek

SECTION E

**SELECT BMPs TO ACHIEVE THE MINIMUM REQUIRED REDUCTIONS IN POLLUTANT
LOADING**

Table E.1: Lebanon County Stormwater Consortium Proposed Projects Revised 9/30/2020

ID#	Projects: Snitz Creek-Quittapahilla Creek Watershed	Participant	Map Grid	Cost ¹	TSS Reduction	Cost/lb reduced
SQ1	Streambank restoration on the Quittapahilla Creek mainstem upstream of the 22nd St bridge (2,500 ft)	NCT	A5	\$510,000.00	108,606	4.70
SQ2	Stormwater wetland basin between the Quittapahilla Creek and Chestnut Street	NCT	A5	\$285,000.00	23,221	12.27
SQ3	Streambank restoration on the Quittapahilla Creek mainstem upstream of the Chestnut St bridge (850 ft)	NCT	A4	\$255,000.00	37,565	6.79
SQ4	Streambank restoration on the Quittapahilla Creek mainstem from Chestnut Street to Reigle Auto (1640 ft)	NCT	A4	\$492,000.00	59,526	8.27
SQ5	Stormwater wetland basin south of the Chestnut Street bridge	NCT	A4	\$100,000.00	6,628	15.09
SQ6	Streambank restoration on the Quittapahilla Creek mainstem from Mill Street to Dairy Road (4,510 ft)	Cleona/NCT	B3/B3	\$1,353,000.00	198,645	6.81
SQ7	Streambank restoration on the Brandywine Creek mainstem at Stoever's Dam Park/Mt. Lebanon Cemetery (2,460 ft.)	City	B4	\$738,000.00	107,872	6.84
SQ8	Streambank restoration on the Snitz Creek mainstem in and upstream of Creekside and Fieldcrest (3,290 ft.)	NCT	D6	\$987,000.00	145,775	6.77
SQ9	Streambank restoration on an UNT to the Brandywine Creek between Mechanic Street and Reinhol Street (1,710 ft.)	NLT/City	E7/B2	\$513,000.00	75,603	6.79
SQ10	Streambank restoration on the Quittapahilla Creek mainstem from the Annville Township line to Clift Auto sales (860 ft)	Annville	-	\$258,000.00	37,504	6.88
SQ11	Streambank restoration on the Quittapahilla Creek mainstem from Clift Auto Sales to the Annville Township line (1,800 ft)	Annville	-	\$540,000.00	78,335	6.89
SQ12	Streambank restoration on an UNT to the Quittapahilla Creek between the RR tracks and N. 11th Ave (620 ft)	NLT	G10	\$186,000.00	27,480	6.77
SQ13	Streambank restoration on the Quittapahilla Creek mainstem between Lincoln Avenue and 4th St (1,500 ft)	City	D4	\$588,000.00	67,320	8.73
SQ14	Streambank restoration on the Snitz Creek mainstem along the Hershey property on the Snitz Creek (1,200 ft)	NCT	B4	\$360,000.00	52,688	6.83
SQ15	Riparian Buffer Restoration at Northeast Park	City	B5	\$26,200.00	476	55.01
SQ16	Basin retrofit at the Quentin Circle shopping plaza	NCT	E8	\$22,500.00	16,636	1.35
SQ17	Basin retrofit at Hauck Manufacturing	Cleona	B1	\$15,000.00	10,270	1.46
SQ18	Basin retrofit at Sholley Ave/Kappa Ave	NLT	D7	\$20,000.00	12,901	1.55
SQ19	Basin retrofit east of Tanglewood Court	NCT	E2	\$25,000.00	15,777	1.58
SQ20	Basin retrofit between Catherine Court and Colebrook Road	NCT	D7	\$15,000.00	8,734	1.72
SQ21	Basin retrofit at the Oak Hills northern basin	NCT	B5	\$15,000.00	8,626	1.74
SQ22	Basin retrofit at Horseshoe Circle	SLT	C4	\$40,000.00	20,015	2.00
SQ23	Basin retrofit in Walnut Mill-northwest basin	Cleona	B2	\$15,000.00	6,616	2.27
SQ24	Basin Retrofit at Stone Hedge Court	SLT	F3	\$12,500.00	5,320	2.35
SQ25	Basin retrofit in Walnut Mill-southeast basin	Cleona	C2	\$12,000.00	5,394	2.22
SQ26	Basin retrofit at Hickory Blvd	SLT	E4	\$40,000.00	17,315	2.31
SQ27	Basin retrofit at Bently Court	NCT	D5	\$17,500.00	7,156	2.45
SQ28	Basin Retrofit at Clover Drive	SLT	G5	\$20,000.00	6,664	3.00
SQ29	Basin retrofit east of Millbridge Drive	NCT	C1	\$20,000.00	6,600	3.03
SQ30	Basin retrofit at Comcast	NLT	F11	\$15,000.00	4,558	3.29
SQ31	Basin retrofit at Todd Court	Annville	-	\$17,500.00	4,950	3.54
SQ32	Basin retrofit in Runnymede East	NCT	D4	\$16,000.00	4,365	3.67
SQ33	Basin retrofit at Wal-Mart	NLT	G10	\$75,000.00	10,789	6.95

SQ34	Basin retrofits at the Lebanon Rails Business Park (4 basins)	NLT	G3, G4, H3	\$50,000.00	8,267	6.05
SQ35	Basin retrofit at ManorCare Health Services	NCT	E9	\$35,000.00	5,488	6.38
SQ36	Basin retrofits at Eagle Graphics (2 basins)	Annville	-	\$45,000.00	5,441	8.27
SQ37	Basin retrofits in Creekside (4 basins)	NCT	D6, E6	\$100,000.00	21,407	4.67
SQ38	Stormwater wetland basin at the Quittapahilla Creek headwaters	SLT	C3	\$360,000.00	20,827	17.28
SQ39	Continuing the current weekly street sweeping program for the next 5 years ³	City	All	\$375,000.00	21,325	17.59
SQ40	Stormwater wetland basin and riparian buffer south of Lancaster Street	Annville	-	\$100,000.00	7,437	13.45
SQ41	Bioretention basins at South Hills Park	SLT	F2	\$75,000.00	5,258	14.26
SQ42	Stormwater wetland basin at Optimist Park	City	F11	\$80,000.00	5,020	15.94
SQ43	Bioretention Basins at the Cleona Playground and the Borough Hall	Cleona	B2, B3	\$45,000.00	3,620	12.43
SQ44	Basin Retrofit at the North Cornwall Township Building	NCT	B6	\$20,000.00	586	34.12
SQ45	Increased street sweeping program ³	City	All	\$300,000.00	17,603	17.04
SQ46	Stormwater wetland basin downstream of Lehman Street	City	D1	\$175,000.00	6,772	25.84
SQ47	Basin retrofit/expansion behind Kmart/Lowe's	NCT	F8	\$300,000.00	25,060	11.97
SQ48	Landscape Restoration and Tree Planting at 3 City properties	City	C2, D2, E5	\$61,500.00	11,811	5.21
SQ49	Basin Retrofit at Redwood Ln	NLT	D7	\$55,000.00	8,435	6.52
SQ50	Southgate Drive landscape restoration	SLT	H6	\$3,000.00	287	10.46
SQ51	Basin retrofit at Snow Goose	NLT	F11	Funded by landowner	18,931	N/A
SQ52	Redevelopment at N 11 th Ave (basins)	NLT	F10	Funded by developer	639	N/A
SQ53	Redevelopment at N 11 th Ave (impervious area reduction)	NLT	F10	Funded by developer	823	N/A
SQ54	Stormwater mitigation at Coleman's Park (regenerative stormwater conveyance)	City	B1	\$125,000	11,480	10.89
SQ56	Cumberland St rain gardens	City	C4	\$15,300	507	30.16
SQ57	Rain garden at the LCRA Mifflin St Office	City	B3	\$1,800	60	30.05
SQ58	Tree planting at Kiner Ave	SLT	G3	Funded by ACB	263	N/A
SQ59	Streambank restoration south of Snitz Creek Park (375 ft)	NCT	D5/E5	\$120,000.00	15,410	7.79
SQ60	Vegetated swale (C/D soils) at South Hills Park	SLT	I2	\$25,000.00	8,693	2.88
SQ61	Basin retrofit at Cedar Crest Middle School (landscape rest.)	SLT	J2	\$3,000.00	275	10.90
SQ62	Basin retrofit at Triple M Farms	SLT	D4	\$30,000.00	2,537	11.83
SQ63	Dry extended detention basin at the NLT Business Park	NLT	H4	\$650,000.00	35,771	18.17
SQ64	Basin retrofit at 810 Melody Ln	NLT	F10	\$35,000.00	9,496	3.69
SQ65	Impervious area removal at 1152 and 1154 King St.	SLT	D4	Funded by CDBG	84	N/A
SQ66	Rain garden (B soil) at 1309 and 1311 King St.	SLT	D4	Funded by CDBG	6,107	N/A
SQ67	Impervious area removal at 121 E Elm St.	City	D6	Funded by CDBG	151	N/A

**WATERSHED
TOTAL: 1,485,798 lb/yr**

ID#	Projects: Reeds Run-Swatara Creek Watershed	Municipality	Map Grid	Cost ¹	TSS Reduction	Cost/lb reduced
RS1	Shoreline Stabilization at Lion's Lake (1,285 linear feet)	NLT	E4	\$150,000.00	16,735	2.60
RS2	Basin retrofit at Ebenezer Elementary School	NLT	C6	\$40,000.00	22,642	2.10
RS3	Basin retrofit at Lake Drive/Water Street	NLT	E4	\$12,000.00	3,835	3.29
RS4	Basin retrofit at St. Stephen's Church	NLT	B6	\$10,000.00	2,776	4.04
RS5	Riparian Buffer along an UNT to the Swatara Creek north of East Brookfield Drive	NLT	C4	\$40,000.00	378	6.34
RS6	Rain Garden in open space between Ebenezer and Old Ebenezer Road	NLT	F4	\$20,000.00	1,441	13.88
RS7	Elias Avenue swale	NLT	D2	\$1,471.00	732	2.01

WATERSHED TOTAL: 48,539 lb/yr

ID#	Projects: Lower Little Swatara Creek Watershed	Municipality	Map Grid	Cost ¹	TSS Reduction	Cost/lb reduced
LS1	Bioswale along North Lebanon Township property at North 8th Ave/PA Route 343 ⁴	NLT	C8	\$15,000.00	4,307	7.58
LS2	Basin retrofit at Oakridge Court	NLT	C8	\$12,500.00	2,923	4.74

WATERSHED TOTAL: 7,230 lb/yr

ID#	Projects: Headwaters Tulpehocken Creek Watershed	Municipality	Map Grid	Cost ¹	TSS Reduction	Cost/lb reduced
T1	Basin retrofit at Union Canal Elementary school	NLT	D12	\$50,000.00	10,062	6.19
T2	Basin retrofit east of Cider Lane	NLT	C11	\$16,000.00	3,821	4.52
T3	Roadside swales along N Mine Road and Birch Road	SLT	D7	\$25,000.00	2,779	11.25
T4	Storm Sewer Filter Bags in inlets along Mallard Lane and associated maintenance ⁵	NLT	E11	\$40,000.00	4,826	8.29
T5	Basin retrofit at Pumpkin Ridge	NLT	D13	Funded by landowner	22,868	N/A
T6	Tree planting at Leni Lenape Park	NLT	D11	Funded by CBF	78	N/A

WATERSHED TOTAL: 44,434 lb/yr

Table E.2: Proposed Project Load Reduction Calculations Revised September 30, 2020

Impervious cover loading rate: 1948.53 lb/yr
 Pervious cover loading rate: 269.81 lb/yr

ID#	Projects:	Within An Existing Sewershed(s)		Outside An Existing Sewershed		Proposed Percent TSS Reduction ^a	Proposed Raw TSS Reduction (lb/yr)	Addtl. Required Reduction (lb/yr) ^b	10% of Existing Reduction (lb/yr) ^c	Net TSS Reduction (lb/yr) ^d
		Drainage Area (ac)	Percent Impervious	Drainage Area (ac)	Percent Impervious					
SQ1	Streambank restoration on the Quittapahilla Creek mainstem upstream and downstream of the 22nd St bridge (2,500 ft)	0.0	0.0	35.7	43.9	N/A	112,200	3,594	0	108,606
SQ2	Stormwater wetland basin between the Quittapahilla Creek and Chestnut Street	50.0	29.4	2.3	0.0	60.0	23,284	62	0	23,221
SQ3	Streambank restoration on the Quittapahilla Creek mainstem upstream of the Chestnut St bridge (850 ft)	0.0	0.0	8.7	24.0	N/A	38,148	583	0	37,565
SQ4	Streambank restoration on the Quittapahilla Creek mainstem from Chestnut Street to Dairy Queen (1,340 ft)	0.0	0.0	15.9	6.9	N/A	60,139	613	0	59,526
SQ5	Stormwater wetland basin south of the Chestnut Street bridge	23.6	11.6	5.2	0.0	60.0	7,420	140	651	6,628
SQ6	Streambank restoration on the Quittapahilla Creek mainstem from Mill Street to Dairy Road (4,510 ft)	0.0	0.0	129.1	1.3	N/A	202,409	3,764	0	198,645
SQ7	Streambank restoration on the Brandywine Creek mainstem at Stoever's Dam Park/Mt. Lebanon Cemetery (2,460 ft.)	0.0	0.0	65.4	7.0	N/A	110,405	2,533	0	107,872
SQ8	Streambank restoration on the Snitz Creek mainstem in and upstream of Creekside and Fieldcrest (3,290 ft.)	0.0	0.0	53.4	4.9	N/A	147,655	1,880	0	145,775
SQ9	Streambank restoration on an UNT to the Brandywine Creek between Mechanic Street and Reinhol Street (1,710 ft.)	0.0	0.0	26.4	9.7	N/A	76,745	1,142	0	75,603
SQ10	Streambank restoration on the Quittapahilla Creek mainstem from the Annville Township line to Clift Auto sales (860 ft)	0.0	0.0	13.0	34.0	N/A	38,597	1,093	0	37,504
SQ11	Streambank restoration on the Quittapahilla Creek mainstem from Clift Auto Sales to the Annville Township line (1,800 ft)	0.0	0.0	29.1	34.0	N/A	80,784	2,449	0	78,335
SQ12	Streambank restoration on an UNT to the Quittapahilla Creek between the RR tracks and N. 11th Ave (620 ft)	0.0	0.0	8.3	8.9	N/A	27,826	346	0	27,480
SQ13	Streambank restoration on the Quittapahilla Creek mainstem between Lincoln Avenue and 4th St (1,500 ft)	0.0	0.0	0.0	0.0	N/A	67,320	0	0	67,320
SQ14	Streambank restoration on the Snitz Creek mainstem along the Hershey property on the Snitz Creek (1,200 ft)	0.0	0.0	41.9	0.5	N/A	53,856	1,168	0	52,688
SQ15	Riparian Buffer Restoration at Northeast Park (1.57-acre buffer area)	3.1	2.0	0.0	0.0	50.0	476	0	0	476
SQ16	Basin retrofit at the Quentin Circle shopping plaza (excluding upstream BMPs)	51.6	24.1	0.0	0.0	48.6	16,918	0	282	16,636
SQ17	Basin retrofit at Hauck Manufacturing	15.3	51.7	0.0	0.0	60.0	10,444	0	174	10,270
SQ18	Basin retrofit at Sholley Ave/Kappa Ave	34.2	22.0	0.0	0.0	60.0	13,100	0	199	12,901
SQ19	Basin retrofit east of Tanglewood Court	42.4	12.6	11.6	22.2	60.0	16,727	746	204	15,777
SQ20	Basin retrofit between Catherine Court and Colebrook Road	22.3	23.4	0.0	0.0	60.0	8,882	0	148	8,734
SQ21	Basin retrofit at the Oak Hills northern basin	19.8	48.7	0.0	0.0	40.8	8,772	0	146	8,626
SQ22	Basin retrofit at Horseshoe Circle	47.1	26.9	0.0	0.0	60.0	20,354	0	339	20,015
SQ23	Basin retrofit in Walnut Mill-northwest basin	15.2	27.9	0.0	0.0	60.0	6,728	0	112	6,616
SQ24	Basin Retrofit at Stone Hedge Court	12.5	27.1	0.0	0.0	60.0	5,410	0	90	5,320
SQ25	Basin retrofit in Walnut Mill-southeast basin	11.9	29.6	0.0	0.0	60.0	5,485	0	91	5,394

SQ26	Basin retrofit at Hickory Blvd	39.0	28.7	0.0	0.0	60.0	17,608	0	293	17,315
SQ27	Basin retrofit at Bently Court	19.9	20.2	0.0	0.0	60.0	7,269	0	113	7,156
SQ28	Basin Retrofit at Clover Drive	14.6	30.0	0.0	0.0	60.0	6,777	0	113	6,664
SQ29	Basin retrofit east of Millbridge Drive	17.0	23.2	0.0	0.0	60.0	6,712	0	112	6,600
SQ30	Basin retrofit at Comcast (with downstream BMP)	7.0	47.2	0.0	0.0	62.8	4,679	0	121	4,558
SQ31	Basin retrofit at Todd Court	12.9	37.9	0.0	0.0	43.2	5,034	0	84	4,950
SQ32	Basin retrofit in Runnymede East	11.5	22.3	0.0	0.0	60.0	4,439	0	74	4,365
SQ33	Basin retrofit at Wal-Mart	0.0	0.0	40.7	46.2	36.0	15,292	4,248	255	10,789
SQ34	Basin retrofits at the Lebanon Rails Business Park (4 basins, excluding area pretreated by a swale)	28.7	13.1	0.0	0.0	60.0	8,407	0	140	8,267
SQ35	Basin retrofit at ManorCare Health Services	9.0	45.3	0.0	0.0	60.0	5,581	0	93	5,488
SQ36	Basin retrofits at Eagle Graphics (2 basins)	9.2	43.3	0.0	0.0	60.0	5,498	0	57	5,441
SQ37A	Basin retrofit at Little Pond Lane (considering downstream BMPs)	7.1	28.5	0.0	0.0	67.6	3,584	0	144	3,440
SQ37B	Basin retrofit at Waterside Circle (considering downstream BMPs)	10.3	21.9	0.0	0.0	67.6	4,427	0	178	4,249
SQ37C	Basin retrofit at Cross Creek Court (considering downstream BMPs)	29.5	13.2	0.0	0.0	63.8	9,249	0	236	9,013
SQ37D	Basin retrofit at Hearthiside Lane	13.5	19.1	0.0	0.0	60.0	4,786	0	80	4,706
SQ38	Stormwater wetland basin at the Quittapahilla Creek headwaters	0.0	0.0	61.8	24.1	60.0	24,993	4,165	0	20,827
SQ39	Continuing the current weekly street sweeping program for the next 5 years	121.6	100.0	0.0	0.0	9.0	21,325	0	0	21,325
SQ40	Stormwater wetland basin and riparian buffer south of Lancaster Street	7.9	51.3	1.5	0.0	80.0	7,478	41	0	7,437
SQ41	Bioretention basins at South Hills Park	8.1	27.0	0.0	0.0	90.0	5,258	0	0	5,258
SQ42	Stormwater wetland basin at Optimist Park	21.6	7.0	0.0	0.0	60.0	5,020	0	0	5,020
SQ43	Bioretention Basins at the Cleona Playground and the Borough Hall	3.2	60.0	0.0	0.0	90.0	3,620	0	0	3,620
SQ44	Basin Retrofit at the North Cornwall Township Building	0.5	60.8	0.0	0.0	90.0	592	0	6	586
SQ45	Increased street sweeping program (alleys and parking lots)	100.4	100.0	0.0	0.0	9.0	17,603	0	0	17,603
SQ46	Stormwater wetland basin downstream of Lehman Street	0.0	0.0	13.8	42.4	60.0	8,126	1,354	0	6,772
SQ47	Basin retrofit/expansion behind Kmart/Lowe's	0.0	0.0	31.0	82.2	60.0	30,685	5,114	511	25,060
SQ48A	Basin retrofit at 12th and Cumberland Streets	12.7	73.0	0.0	0.0	60.0	11,349	0	189	11,160
SQ48A	Tree Planting at 12th and Cumberland Streets	0.1	0.0	0.0	0.0	20.0	5	0	0	5
SQ48B	Landscape Restoration at the Greenwaste Recycling Facility Property	1.7	0.0	0.0	0.0	85.0	378	0	0	378
SQ48B	Tree Planting at the Greenwaste Recycling Facility Property	1.1	0.0	0.0	0.0	20.0	60	0	0	60

SQ48C	Landscape Restoration at Jadell Drive	0.8	0.0	0.0	0.0	85.0	188	0	0	188
SQ48C	Tree Planting at Jadell Drive	0.4	0.0	0.0	0.0	20.0	19	0	0	19
SQ49	Basin Retrofit at Redwood Ln	32.2	25.9	0.0	0.0	37.2	8,435	0	0	8,435
SQ50	Southgate Drive landscape restoration	1.3	0.0	0.0	0.0	85.0	287	0	0	287
SQ51	Basin retrofit at Snow Goose	0.0	0.0	26.8	69.8	60.0	23,180	3,863	386	18,931
SQ52	Redevelopment at N 11 th Ave (basins)	2.1	16.4	0.0	0.0	55.0	639	0	0	639
SQ53	Redevelopment at N 11 th Ave (impervious area reduction)	0.5	100.0	0.0	0.0	86.2	823	0	0	823
SQ54	Stormwater mitigation at Coleman's Park (regenerative stormwater conveyance)	36.7	15.0	0.0	0.0	60.0	11,480	0	0	11,480
SQ56	Cumberland St rain gardens	0.3	92.3	0.0	0.0	90.0	507	0	0	507
SQ57	Rain garden (B soil) at the LCRA Mifflin St Office	0.06	50.0	0.0	0.0	90.0	60	0	0	60
SQ58	Tree planting at Kiner Ave	2.8	12.0	0.0	0.0	20.0	263	0	0	263
SQ59	Streambank restoration south of Snitz Creek Park (375 ft)	0.0	0.0	42.2	4.0	N/A	16,830	1,420	0	15,410
SQ60	Vegetated swale (C/D soils) at South Hills Park	54.3	3.0	0.0	0.0	50.0	8,693	0	0	8,693
SQ61	Basin retrofit at Cedar Crest Middle School (landscape rest.)	1.2	0.0	0.0	0.0	85.0	275	0	0	275
SQ62	Basin retrofit at Triple M Farms	2.2	100.0	0.0	0.0	60.0	2,537	0	0	2,537
SQ63	Dry extended detention basin at the NLT Business Park	185.0	30.0	0.0	0.0	25.0	35,771	0	0	35,771
SQ64	Basin retrofit at 810 Melody Ln	30.0	22.9	0.0	0.0	49.2	9,657	0	161	9,496
SQ65	Impervious area removal at 1152 and 1154 King St.	0.05	100.0	0.0	0.0	86.2	84	0	0	84
SQ66	Rain garden (B soil) at 1309 and 1311 King St.	6.2	48.7	0.0	0.0	90.0	6,107	0	0	6,107
SQ67	Impervious area removal at 121 E Elm St.	0.09	100.0	0.0	0.0	86.2	151	0	0	151
RS1	Shoreline Stabilization at Lion's Lake (2,570 linear feet)	0.0	0.0	38.2	8.3	N/A	18,300	1,565	0	16,735
RS2	Basin retrofit at Ebenezer Elementary School	63.1	21.8	0.0	0.0	57.0	22,856	0	214	22,642
RS3	Basin retrofit at Lake Drive/Water Street	10.8	19.7	0.0	0.0	60.0	3,900	0	65	3,835
RS4	Basin retrofit at St. Stephen's Church	5.7	33.0	0.0	0.0	60.0	2,800	0	24	2,776
RS5	Riparian Buffer along an UNT to the Swatara Creek north of East Brookfield Drive (1.4-acre buffer area)	2.8	0.0	0.0	0.0	50.0	378	0	0	378
RS6	Rain Garden in open space between Ebenezer and Old Ebenezer Road	2.2	25.0	0.0	0.0	95.0	1,441	0	0	1,441
RS7	Elias Avenue swale	0.0	0.0	4.0	2.2	70.0	855	122	0	732
LS1	Bioswale along North Lebanon Township property at North 8th Ave/PA Route 343 (assumes project LS2 is not done)	9.3	22.8	0.4	0.3	70.0	4,317	10	0	4,307
LS2	Basin retrofit at Oakridge Court (assumes project LS1 is not done)	7.4	24.1	0.0	0.0	60.0	2,973	0	50	2,923

T1	Basin retrofit at Union Canal Elementary school	32.2	15.5	0.0	0.0	60.0	10,233	0	171	10,062
T2	Basin retrofit east of Cider Lane	11.1	18.6	0.0	0.0	60.0	3,886	0	65	3,821
T3	Roadside swales along N Mine Road and Birch Road	15.0	6.0	0.0	0.0	50.0	2,779	0	0	2,779
T4	Storm Sewer Filter Bags in inlets along Mallard Lane and associated maintenance	7.8	30.0	0.0	0.0	80.0	4,826	0	0	4,826
T5	Basin retrofit at Pumpkin Ridge	0.0	0.0	36.3	70.0	54.6	28,638	5,245	525	22,868
T6	Tree planting at Lenni Lenape Park	1.4	0.0	0.0	0.0	20.0	78	0	0	78

NOTES:

^aFrom DEP's "BMP Effectiveness Values" document

^bNew load reduction requirements are from treating areas outside an existing MS4 sewershed. These areas were not included in the Base Pollutant Loading Calculations and need to be included in the proposed BMP calculation.

^cTen percent of the baseline load reduction claimed by original, unconverted basin in the Existing Pollutant Reduction Calculations. This value was claimed to reduce the baseline load, and must be removed from the proposed reduction calculations so it is not counted twice. For projects SQ5 and SQ16, this column refers to upstream BMPs.

^dNet TSS Reduction = Raw TSS Reduction - Additional Required Reduction - 10% of Existing Claimed Reduction