APPENDIX C

Field Observations

By M. Richard Nalbandian

Summary of "Highest" and "High" Priority Sites for recommended Stormwater BMPs*

Sub-basin	Highest Priority	High Priority
1B	1_66, 1_67* 1_57 1_44 1_79 1_72, 1_73 1_64, 1_65 1_11, 1_12 1_13	1_37, 1_38, 1_39 1_31, 1_32 1_5, 1_6 1_43 1_74, 1_75 1_76 1_48, 1_49, 1_52 1_63, 1_87 1_29, 1_30 1_23 1_16
2B	2_44, 2_46, 2_47, 2_98 2_99 2_55, 2_56, 2_57, 2_59, 2_63 2_2 2_6, 2_7 2_94 2_11, 2_12, 2_13 2_22 2_96	2_95 2_36 2_86, 2_87, 2_88 2_103 2_8, 2_9 2_69, 2_70 2_18
3B	3_40, 3_41, 3_70 3_43, 3_44, 3_45 3_35 3_8 3_7 3_46, 3_47 3_51, 3_52, 3_53, 3_54, 3_55 3_65	3_24, 3_63 3_15, 3_17 3_30 3_66 3_9, 3_62 3_14
4B	4_27 4_4 4_28 4_7, 4_8, 4_9, 4_11, 4_12 4_17, 4_18 4_24 4_22 4_23	4_14, 4_15 4_20, 4_21

5B	5_25, 5_26, 5_27 5_10, 5_12 5_11 5_7	5_30 5_6 5_29
6B	6_34 6_32, 6_33 6_17, 6_18, 6_19, 6_22, 6_35 6_15 6_9 6_6 6_38	6_26, 6_27 6_24 6_41 6_36 6_8
7B	7_32, 7_34, 7_35, 7_36, 7_38 7_33 7_37 7_21, 7_22, 7_23 7_24 7_25, 7_53 7_27 7_28, 7_29 7_31 7_8 7_10 7_46 7_7 7_50 7_52	7_26 7_30 7_42 7_39, 7_40 7_48, 7_49

* Groups of sites or locations that are in close proximity, are on the same property, or should be considered together for planning and design purposes.

Detail Table

List of 421 observed locations at the seven sub-basins of the Pennypack Creek Watershed

Location	BMP	Comments
SUB-BASIN 1		
1_1	Good e.g.	Good BMP with ~6 ft. high outlet structure. Ephemeral wetland, willows, sedges.
1_2	Good e.g.	Ephemeral wet pond. Cattails.
1_3		Intermittent stream. Piped west of Butternut Dr.
1_4		Little opportunity for additional BMP's in subdivisions of this area (N of Moreland Ave. W of Maple Ave.). Most houses already have disconnected roof drains.
1_5	High Priority	Rapidly eroding ephemeral channels in Horsham Twp's Meetinghouse Road Park. Need check dams to slow erosion, especially directly across the road from school entrance. 2 or 3 mature tulip poplars, 1 beech with badly eroded & exposed roots.
1_6	High Priority	Recommend detention at this location. Dry or extended detention.
1_7		SE of intersection of Norristown Rd. & Old Welsh Rd (PA 63) - Ephemeral wetland. Reeds, sedges.
1_8		New houses under construction. Floodplain and wetlands filled. Intermittent stream (headwaters of Pennypack). Riparian forest cut and cleared. House had ~25 ft. setback, but now has cleared all the way to the edge of the wetland.
1_9	Bad e.g.	Floodplain filled. ~10 ft. high foundation wall of new house, on pad constructed of fill. Fill in floodplain to within 15-20 ft. of channel. Riparian vegetation cleared.
1_10	Priority	Large new dry detention basin for new subdivision. Discharges directly to stream via ~30 ft. pipe. Retrofit to make extended detention. Plant w/native reg.
1_11	Highest Priority	Need BMPs in these headwater areas whether or not Alter Tract is developed, to handle flows from subdivisions SW of Welsh Rd, which have no stormwater management.
1_12	Highest Priority	Same as above
1_13	Highest Priority Good e.g.	Well-developed hardwood swamp. Fed on NW side (along Mann Rd) by headwater of Pennypack, and on SW by groundwater discharge (seeps & springs) at base of slope below cultivated farm fields of the College Settlement of Philadelphia. Some invasive plants, especially along the edges of the swamp.
1_14	H. W. Mark Floyd Obstruction	Creek flows under Witmer Rd in 18 ft. wide x 4 ft. high box culvert. Witmer Rd was topped during Floyd, damaging culvert and road.

1_15	Obstruction	Spillway of College Settlement Day Camp pond dam on College Settlement property ~20 ft. wide. Severe erosion undercutting bank at foot of spillway. Pond has ~1 ft. - 2 ft. of freeboard. Pond enriched, algal growths evident
1_16	High Priority	Several opportunities for BMPs upstream from Camp Pond
1_17		Duckweed in stream. (i.e. enriched)
1_18	Priority	Runoff from cul-de-sac on NW bank directly to creek down ~10 ft. high bank, severe erosion. SE (right) bank forested, but many invasives. Bank should be stabilized.
1_19	Priority	Several small gullies developed in this area. They could be fixed with very modest check dams.
1_20	H. W. Mark Floyd	Floyd ~ 2 ft. above grade at this location, according to homeowner.
1_21	Obstruction	Collapsed old stone bridge effectively forms a dam ~ 20 ft. wide across stream.
1_22		Collapsed weir in stream.
1_23	High Priority	Dry detention basin. Could be retrofitted for extended detention.
1_24	Obstruction	Powerline Right-Of-Way Trail crosses creek over 8 ft. wide X 2 ft. high box culvert.
1_25		Collapsed culvert under Norristown Rd.
1_26	Obstruction	Two 36 in. circular concrete culverts beneath Norristown Rd.
1_27	Priority	Should provide detention here and at location 1 – 28
1_28	Priority Obstruction	Two 5 ft. wide x 3 ft. high elliptical x-section culverts under street immediately upstream from recommended location for detention.
1_29	High Priority	Formerly wet pond. Has been drained and made into a dry detention basin. Should consider restoring it as a wet pond or retrofitting for extended detention.
1_30	High Priority	Former pond. Drained and no longer provides detention. Should be restored.
1_31	High Priority	Pond drained and filled. Should be restored.
1_32	High Priority	Potential location for new pond or stormwater wetland.
1_33	Good e.g.	Dry extended detention basin at SW bend of Sawmill Lane, with new outlet structure, with 6 in. diameter bottom drain, and emergency spillway. Discharges directly into creek.
1_34	Obstruction	Sawmill Lane Bridge over Creek. 20 ft. wide x ~7 ft. high (bottom of bridge 5 ft. above water, water depth estimated at ~2 ft.). Solid bridge parapet 5 ft. high.
1_35	Priority	VFW filled and raised floodplain to build a large asphalt parking lot, which drains directly over the bank into the creek. Banks severely eroded for several hundred feet downstream from bridge. Parking lot should be pulled back from bank to allow room for erosion control and stabilization of bank.

1_36		Wet pond (posted private property). Not able to examine closely but perhaps 1 ft. - 2 ft. of freeboard available for storage.
1_37	High Priority	Newly constructed dry detention basin in Lukens Park (Horsham Twp). Retrofit to make extended detention.
1_38	High Priority	Need BMPs in this segment (upstream from Sawmill Lane)
1_39	High Priority	Could put BMP here (upstream side of culvert beneath access road to Lukens Park.)
1_40		Outfall. Elliptical 4 ft. wide x 3 ft. high.
1_41		Riparian forest in fair condition. Some invasives, moderate bank erosion. Right bank has minimum of 50 ft. buffer.
1_42		Residence/Chiropractor's Office on N side of County Line Rd. Basement flooded by backwater during precipitation events (July '04). Frequently flooded. Bedrock stream bed (abundant minnows). Channel is ~5 ft. to 10 ft. wide, 18 in. deep top of bank to bed.
1_43	High Priority	Possible location for small wet pond off right bank (max 3 ft. deep). Intermittent stream in small municipal park. Stockton Fm. bedrock channel. Immediately upstream from possible pond location is small footbridge.
1_44	Highest Priority	Leary School (Henry & Victoria Ave.'s, NE of County Line Rd. in Warminster Twp). Boggy areas in playing fields NE of school bldg. (built 1955). Could probably store or infiltrate most or all of 100yr - 24hr precipitation on school grounds (~16 acres.) Roof and grounds all drain directly into storm sewers.
1_45		Garden Court Apartments. Roof drains disconnected.
1_46	Priority	Rosemore (Dollarland) Shopping Center. Large parking areas in front (along County Line Rd). Large lawn areas in back and at NW side (between shopping center and above apts.) No stormwater management. Grassed areas poorly drained, soggy, sediments being washed across parking lot at NW end. Standing water in lawn and parking lot there.
1_47	H. W. Mark Allison	Old pond filled with cattails (excellent bird habitat) Dam was breached during storm ~1992-1994, but still partially restricts flow & maintains the abovementioned cattail-filled wetland. Allison topped downstream footbridge ~ 4 ft. above channel.
1_48	High Priority	Add another wet pond downstream from the bridge. Create more storage.
1_49	High Priority	Restore riparian buffers. Create SW wetland.
1_50		Bedrock channel bed. Fairly good floodplain forest. Some invasives where canopy more open.
1_51		Large private recreation bldg under construction, probably in floodplain (the owner says it is not in the floodplain, but probably bases that on old FIRMs or township maps.)

1_52	High Priority	Dry detention basin in new subdivision. Retrofit to make extended detention, or wet pond, ephemeral if necessary.
1_53	Priority	Pond drained and filled. Should be restored.
1_54		Stream perennial. Good floodplain forest. Large sewer in floodplain. Riparian corridor more than 100ft wide.
1_55	High Priority	Important floodplain area at confluence of three branches SE of Marilyn Drive in Horsham Twp. Riparian area, especially on left bank, should be revegetated.
1_56		Bedrock riffles and banks
1_57	Highest Priority	Blair Mill Elementary School. All runoff from the roofs goes to underdrains & discharges directly to creek. Also, all runoff from school grounds discharges to creek. No BMPs, no stormwater management of any kind (~10-15 acres)
1_58	Priority	Large grassed field in floodplain. Establish wet meadows or wetlands
1_59	Priority H. W. Mark Floyd	West Monument Ave Bridge "Reconstructed in 1999" (damaged during Floyd). Downstream left bank riprapped. Should cut and widen instead, create more channel storage. Stream wants more left bank channel.
1_60	H.W. Mark Allison	Allison was ~9 in. over front stoop of 347 W. Monument Rd. i.e. ~1.5 ft. above grade.
1_61	H.W. Mark Allison & Floyd	Backwaters from both Floyd & Allison covered yard of 205 Pine Tree Lane
1_62		Too many specimen trees to widen channel
1_63	High Priority	Cut point back at confluence
1_64	Highest Priority	Hatboro Park. Ample opportunities for riparian and bank restoration and enhanced floodplain and channel storage on both sides of creek. Possibly install J and/or W weirs.
1_65	Highest Priority	Opportunity for widening channel to provide more floodplain and channel storage. Misguided attempts to armor bank.
1_66	Highest Priority	Several detention basins along perimeter of the Blair Mill Apartments have become partially or completely filled with sediments. Filled with young trees of even age. Most of the basins may be enlarged and enhanced. Will need new embankments & outlet structures, All are in varying stages of disrepair
1_67	Highest Priority	BMPs needed throughout apt. complex. None at all. Drainage by drop inlets & storm sewers directly to abovementioned damaged and dysfunctional detention basins. Recommend vegetated swales, biofilters, infiltration trenches
1_68	Priority	Thick floodplain forest. Good canopy, many invasives.
1_69		Blair Mill Park (Horsham Twp.)
1_70	Priority	Well incised channel. Intermittent. Could support ephemeral wet pond or wetland.

1_71		Culvert under decks of houses at intersection of Ivy and Sunnemeade St. Virtually no BMP opportunities in residential area bounded by Evergreen Ave. to W., Madison Ave. to SE, County Line Rd to SW, and Street Rd. to NE. Very old, dense, small lots. Completely built-out. Nor are there opportunities in commercial strip between Evergreen and Old York Rd. between County Line Rd. and Street Rd.
1_72	Highest Priority	Very large dry detention. Should retrofit with smaller outlets to make it into extended detention. May be possible to deepen and make partly ephemeral wetland or pond. Vegetate.
1_73	Highest Priority	Large detention basin. Should also retrofit to make extended detention.
1_74	High Priority	SEPTA R2 Line Station and large, recently expanded parking lot. Older portion (NW, near station) will need resurfacing in near future. Could install permeable paving or subsurface storage or infiltration galleries or beds.
1_75	High Priority	New detention basin for new (SE) portion of SEPTA parking lot. Should be retrofitted to make it extended detention.
1_76	High Priority	Opportunity for BMP. Possible wet pond or ephemeral wetland.
1_77	Priority	~ ½ acre dry detention basin with 42 in. outlet. Retrofit to extended detention (could detain 3 to 4 acre-ft.)
1_78	Priority	Retrofit detention basin with smaller outlet. Make extended detention.
1_79	Highest Priority	Crooked Billet Elementary School. All roof drains directly discharge to storm drains and sewers. 300 ft. x 180 ft. portion of NW playing field could take runoff from roofs and parking areas. Alternatively, when repave parking lots install infiltration galleries or beds beneath them. At least install infiltration trenches along edges of parking lots. SE parking lot especially bad, slopes down to small tributary to creek, with no SW management at all.
1_80		Residents report heavy flows during any significant precipitation from here down to location 1-81.
1_81		Little, if any room for BMPs.
1_82	Priority	SW corner Hardman lane and Street Rd. Small detention basin with 15 in. x 10 in. outlet. Retrofit to make extended detention.
1_83	Good e.g.	Very large new, aerated wet retention basin (~ 3.5 acres). Outflow through riser, presumably piped under Street Rd.
1_84	Good e.g.	Another large wet retention basin (~ 3 acres).
1_85	Good e.g.	Many BMPs in Warminster Park. Large retention basins with new plantings along edges. Need more erosion controls; some tributary swales gullying, but swales leading to SW retention ponds generally well vegetated.

1_86		Former High School site now occupied by large apartment complex. No apparent BMP opportunities (But could not enter to observe).
1_87	High Priority	Good opportunities for widening & providing more floodplain and channel storage. Keep natural channel for low flows. Construct terraced high-flow channel.
SUB-BASIN 2		
2_1	Good e.g.	Broad, grassed floodplain area with playing fields. Valuable floodplain storage. Preserve.
2_2	Highest Priority	Pennypack School. Need BMPs. Roof and parking lot runoff to storm drains and creek. Infiltration beds, galleries, trenches, vegetated swales, biofilters.
2_3	H.W. Mark Allison	Allison reached 3rd step on west side of house at 70 Horsham Rd.
2_4		In Hatboro. Gabion walled ditch through densely built neighborhood.
2_5	Priority Good e.g.	Very important floodplain forest. However, much litter, trash, and flood debris. Invasives. Valuable floodplain storage. Restore native riparian vegetation.
2_6	Highest Priority	BMPs needed over entire site (approx. 20 acres). Roofs and parking lots apparently all drain to detention basin at location 2-7.
2_7	Highest Priority	Detention basin with two 12 in. outlets and standing pool with sedges. Has, perhaps unintentionally, become ephemeral pond or wetland. Drains to railroad ditch. Retrofit to make extended detention.
2_8	High Priority	Detention basin. Make extended detention. Outlet now 15 in. ; make 6 in. -8 in. . Otherwise OK. Has become ephemeral wetland or wet meadow.
2_9	High Priority	Retrofit to extended detention. Outlet now 12 in. .
2_10	Good e.g.	Large SW wetland BMP with good vegetation, reeds, willows.
2_11	Highest Priority	Small lake/large pond with limited freeboard (~ 3 ft. to top of the outlet), but surface area of ~ 2.4 acres so have ~ 7 ac-ft. storage. ~ 10 ft. to top of bank from current water surface, so could retrofit to provide extra storage, if impoundment strong enough.
2_12	Highest Priority	Could construct another wet pond in series between existing ones at locations 2-11 and 2-13. Could store additional 3 to 4 acre-ft. or could construct SW wetland, store less (perhaps 1 to 1.5 ac-ft.), but improve water quality (many water fowl at both locations 2-11 and 2-13).
2_13	Highest Priority	Lake/pond with surface area of ~ 2.5 acres (depth unknown), but ~ 10 ft. of freeboard. Considerable storage potential if impoundment strong enough.

2_14	Priority	Dry detention basin. Stagnant puddles at outlets (good mosquito breeding areas). Approx. 6 ft deep at outlet end/spillway. Outlet A (16-inches diameter) and Outlet B (30-inches diameter) should be retrofitted with smaller outlets to make extended duration. Should introduce some vegetation, especially at outlets, to provide habitat for mosquito predators. Outlets discharge directly to Dresher Rd. storm sewers.
2_15	Priority	
2_16	Priority	2 ft. diameter drain pipe under Rte. 63 (Welsh Rd.). Must install BMP immediately upgradient from this point, especially when property (now vacant and vegetated) is developed.
2_17	Good e.g.	Aerated retention basin. Outlet beneath Route 63.
2_18	High Priority	Detention basin retrofitted with new outlet ~ 16 in. wide at bottom of 3 ft. high riser, overflow at 4 ft. Bottom outlet half blocked by debris. Retrofit outlet to make extended detention. (3½ sides have gabion walls.)
2_19	Good e.g.	Ephemeral wetland area. Should be preserved.
2_20	Highest Priority	Detention basin with 12 in. diameter outlet. 36 in. riser overflow. Retrofit to extended detention.
2_21	Priority	Good location for wet pond or extended detention.
2_22	Highest Priority	Newly built detention basin. Should be made into wet pond if sufficient flow. Already receiving much sediment from new development and construction sites immediately upgradient to west.
2_23	Good e.g.	Aerated retention pond at intersection of Witmer Rd. and Blair Mill Rd. 3 ft. H x 25 ft. W weir. Drops to pass thru box culvert at location 2-25.
2_24	Priority	Gravel lined ditch draining to pond at location 2-23. Could install some small checkdams along its length
2_25	Obstruction	Box culvert under Blair Mill Rd. 20 ft W x 4 ft. H.
2_26	Obstruction	Semicircular arch tunnel (~ 20 ft. diameter) under turnpike ramp.
2_27	Priority	Install wet pond or SW wetland to capture and treat turnpike runoff, which is forming a deltaic deposit at south bank of creek.
2_28	Obstruction	Old York Rd. bridge.
2_29	Obstruction	Semicircular arch tunnel under turnpike ~ 20 ft. diameter.
2_30	H.W. Mark Allison	High water mark of backwater from Allison.
2_31		Inlet boxes on each side of Old Welsh Rd. Perennial or intermediate flow in well defined channel goes into ~ 66 in. diameter pipe under North Hills Rd. at location 2-32.
2_32		Same as above
2_33		Piped.
2_34		Still piped.

2_35	Priority	Stream emerges from ~ 7 ft. wide oval pipe. Severe bank erosion. Possibility for some enhanced channel storage at confluence (location 2-36) and downstream.
2_36	High Priority	
2_37	H.W. Mark Allison	Allison was ~ 3 ft. overbank here.
2_38	Obstruction	10 ft. W culvert x ~ 4 ft. H.
2_39		Whitehall Park.
2_40	Priority Good e.g.	Good patch of riparian forest. However, severe bank erosion, bedrock exposures in bank.
2_41	Priority	Much debris, very severe scour and bank erosion. Possible opportunity for some enhanced floodplain storage.
2_42		Old mill dam breached. Very severe scour and bank erosion. Could restore, but probably better to enhance storage at location 2-41.
2_43	Priority	Large dry detention basin in Crestmont Park doubles as playing field. Could put infiltration bed under it or under other playing fields in park.
2_44	Highest Priority	Willow Grove Mall again. Whole mall should be reengineered. Roofs and parking lots should drain to infiltration beds and galleries beneath parking lots, with biofiltration islands in parking lots.
2_45		Large pipes in and large pipes out. Typical retention basin. Drains via large underground pipes to stream at location 2-48.
2_46	Highest Priority	Shopping center across Route 63 to N. See note for location 2-44.
2_47	Highest Priority	See remarks for locations 2-44 and 2-46.
2_48		Perennial stream emerges from beneath Easton Road.
2_49		Side drainage emerges and flows down concrete-lined channel towards creek.
2_50		Upper Moreland Township Public Works Department, garage, and maintenance building.
2_51	Priority	
2_52	Priority	Little League ball fields well above floodplain. Should install infiltration BMPs along lower (SE) edges of playing fields.
2_53	H. W. Mark Allison Obstruction	Allison H. W. mark ~ 4.5 ft. above grade at top of bank, next to SE end of bridge. (Old bridge was washed out by Allison, after being severely damaged by Floyd and repaired.) New bridge is 20 ft. W x ~7 ft. to 8 ft. H box culvert. Narrow strip of riparian forest broadens upstream (southward) towards location 2-50.
2_54	Obstruction	12 ft. W x 8 ft. H box culvert (built 1923) under railroad embankment. Much flood debris to each side and well above top of culvert.

2_55	Highest Priority	Cold Spring School (=Upper Moreland Primary School) grounds. Many opportunities for BMPs. No SW management. Roofs and parking lots should be drained to infiltration BMPs (beds or galleries) beneath and adjacent to parking lots and playing fields via biofiltration swales. Opportunities should be seized, especially when parking lots or fields are to be resurfaced.
2_56	Highest Priority	Cold Spring School grounds. See remarks for location 2-55.
2_57	Highest Priority	Upper Moreland High School (with Upper Moreland School Administration Building on NE portion of site at location 2-58. Large campus with no SW management, except to drain directly to storm sewers and thence to creek. Same BMP needs and opportunities as for locations 173 and 2-57.
2_58		School administration building
2_59	Highest Priority	See remarks for locations 2-55, 2-56, and 175.
2_60	Obstruction	Box culvert bridge 20 ft. W x 5 ft. H.
2_61	Priority	Old masonry dam (~5 ft. High). Partly breached. Pool filled with debris and sediment. Could be restored and made into small permanent pond with modest storage capacity. (Could also be habitat for biology and ecology class studies at the adjacent schools.)
2_62	Priority	Restore riparian forest from location 2-60 to 2-61.
2_63	Highest Priority	NE 1/3 to ½ of combined school campuses drain to the stream, which exits the site at this location. (Combined school campuses plus school administration total more than 50 acres, and would thus generate nearly 40 acre-feet of runoff from 100 year – 24 hour precipitation event.) BMPs badly needed.
2_64		Private lake. No access, no information. Could not inspect dam or outlet(s).
2_65	H. W. mark Allison Obstruction	Fitzwatertown Rd. bridge over stream is 20 ft. W x 7 ft. H box culvert. Not topped by Allison, but almost. Up to bottom of roadway.
2_66		Two small concrete bridges. No rails or balustrades. Upstream one carries private drive, access barred, could not inspect or measure. Lower one (2-67) topped during even relatively small precipitation events.
2_67		
2_68	Priority	Could enhance floodplain storage here, by widening channel to create small swamp.
2_69	High Priority	Buehler Park (Upper Moreland Township; east of intersection of Rte. 611 and Fitzwatertown Rd.). Intermittent/perennial stream fed at least partly by outfall from Regency Towers Apartments. Downcutting very badly. Road/trail is concentrating flow. Need diverters and check dams. Woods in fair to good condition with mature oaks and tulip poplars.

2_70	High Priority	Should install infiltration BMPs at NW (downhill) edge of parking lots of Regency Towers Apartments, before runoff reaches park, which it now does.
2_71	Priority	Wetland below Pep Boys, between Pep Boys and Turnpike ramp. May be possible to enhance and enlarge it.
2_72	Priority	Possible location for wet pond BMP at SE corner of Hatboro Cemetery.
2_73	Obstruction	Warminster Rd. bridge over main stem of Pennypack. Left span ineffective, totally blocked by sediment.
2_74	Priority	Village Green Apartments. Small tributary flowing NE to SW into main stem of creek is intermittent or perennial.
2_75		Turnpike bridge over Pennypack. Span ~200 ft. or more with 2 sets of piers.
2_76	Good e.g.	Pond
2_77		Large lots with good forest cover.
2_78	H. W. Mark Allison	2945 Morgan Mill Rd. Allison ~ 2 ft. overbank and covered Morgan Mill Rd. (location 2-80).
2_79	H. W. Mark Allison	H.W. Mark Allison
2_80	Obstruction	9 ft. W x 4 ft. H box culvert under Terwood Rd.
2_81	Priority	Perennial channel badly eroded. Restore vegetation; possible candidate for bioengineering.
2_82		Terwood Park (Upper Moreland Township).
2_83	Priority	"Independent Bible Church of Willow Grove". Parking lots in floodplain drain directly to Pennypack. Bioretention and biofiltration BMPs should be installed on creek side. Riparian forest should be preserved and enhanced.
2_84	Priority	"The Willows" at "Willow Grove Day Camp". BMPs needed along tributary flowing NE to SW parallel to Davisville Rd. (and NW of it).
2_85	Priority	Same as above
2_86	High Priority	Possible location for small pond or enhanced wetland at lower end of wet swale (on E side of Davisville Rd.). According to Director of Carson-Simpson Camp the small wetland patch that existed here was jurisdictional, according to DEP.
2_87	High Priority	Carson-Simpson Camp (owned by United Methodist Church) leases land at location 2-88 to Gloria Dei Assisted and Independent Living facility. Approximate total of combined camp and Gloria Dei is 60 acres. Upland forest in good condition. Good mix of young and mature trees with good understory. Land closer to creek, i. e. most if not all of floodplain belongs to PERT. Floodplain forest also generally in good condition, but with some invasives. Excellent floodplain storage. Some opportunities for BMPs on camp, and near buildings and parking lots of Gloria Dei facility.
2_88	High Priority	Gloria Dei.

2_89	Priority	Intermittent tributary. Moderate erosion, but could use some small check dams.
2_90	Priority	
2_91	Priority Good e.g.	Perennial. Bog and wooded swamp.
2_92	Bad e.g.	Mason Mill Park (Upper Moreland Township) 1/3 to ½ acre of floodplain forest has been cleared and filled with construction debris, woodchips, lawn clippings, mulch ~ 8-10 ft. deep, thus decreasing floodplain storage capacity correspondingly.
2_93		Outlet of park pond to creek. Channel downcutting moderately.
2_94	Highest Priority	Upper Moreland School on Orangemans Rd. Desperately need BMPs for roof and parking lot drainage. Can put under playing fields or parking lots. Very large site with no SW management.
2_95	High Priority	Undeveloped hillside drains directly to creek. If remains as field then need biofiltration, bioretention, and other runoff controls. If developed, then BMPs especially needed.
2_96	Highest Priority Good e.g.	Difficult to improve on this largely inadvertent BMP. Young forest and thickly forested swamp in middle of Turnpike Interchange 27. Forest in surprisingly good condition. Large gabion walls to protect mouth of tunnel under turnpike ramp at location 2-26 effectively channelize stream and partially dam it during high flows. Could make low weir between the gabion walls, thereby increasing storage in swamp during high flows by several acre feet.
2_97	Priority	Recommend widening of channel from bend of Mill Rd. to bridge at Old York Rd. to create more channel storage and hydraulic capacity.
2_98	Highest Priority	Willow Grove Mall. If and when resurface parking lots should install infiltration beds or galleries beneath them. (Refer to redevelopment requirements of model ordinance.)
2_99	Highest Priority	Entire Home Depot site (roofs, parking lots) drains directly to stream thru very deep drop inlet boxes and thence across narrow floodplain. Severe erosion and gullying. No SW management, except for inlet boxes. Should at least have extended detention basin at NE corner of parking lot.
2_100	Priority	Land between railroad tracks and stream all owned by Upper Moreland Township (Township Public Works Department facility at location 2-50; War Memorial Park at location 2-51). Thickly forested except for Public Works Department buildings and yard, and much of park. Many invasives, but generally healthy trees. Excellent floodplain storage. However, new parking lot at N end of World War II Memorial Park (location 2-51) is in and immediately above floodplain, and is sloped to drain directly to the stream, with no BMPs, and is uncurbed. Should be curbed and led into bioretention swales and/or infiltration BMPs upgradient from floodplain.

2_101	Priority Good e.g.	Hardwood swamp. Provides much storage. Preserve and enhance if possible.
2_102	Good e.g.	Large industrial park. Generally good SW management practices. Retention ponds, extended detention, etc. (However, much litter and debris in basins and ponds.) Pond at location 2-76 is aerated.
2_103	High Priority	Location for small pond or wetland BMP. (Off NW end of Byberry Rd., NW of Meyer Lane.)
SUB-BASIN 3		
3_1	H. W. Mark Allison	Allison high water mark 1 ft. over vegetable patch of 1745 Bryers Rd. (2nd house in from Davisville Rd. on NE side of street).
3_2	Priority	Nice small wooded park. Riprapped channel. Could install several check dams to increase floodplain storage.
3_3	Good e.g.	Good small forested riparian area above pond (pond very shallow). Pond largely shaded. Few invasives. Very large expanses of lawn mowed to edges of lower pond.
3_4		Small intermittent/perennial tributary.
3_5	Priority Good e.g.	Preserve floodplain forest.
3_6		Little or no room for structural BMPs here.
3_7	Highest Priority	Room here for a large wet retention basin. Davisville Shopping Center parking lots drain directly to Southampton Creek with no SW management.
3_8	Highest Priority	Everett McDonald Elementary School. Roof drains internal. Vast parking lot. No SW management practices at all. Infiltration beds, trenches, galleries, biofiltration, etc. all needed.
3_9	High Priority	Opportunities for bioretention BMPs.
3_10		Tenent High School.
3_11	Good e.g.	Have allowed old field vegetation to establish on slope of hill below school. Good practice.
3_12	Priority	Centennial Junior High School.
3_13	Priority	BMP opportunities (especially infiltration) below football fields and old parking lot. Should disconnect all roof drains at both schools (locations 3-10 and 3-12) and direct runoff into infiltration BMPs or bioretention.
3_14	High Priority	Infiltration and bioretention BMPs should be contoured along side of hill below (east of) Warminster Hospital, along Centennial Rd.

3_15	High Priority	Large wetland (~ ½ to ¾ acre) with trees, cattails, reeds. 42 in. outlet, concrete spillway. Retrofit outlet with ½ circular steel plate, to raise level by as much as 2 ft., create additional 1 to 1.5 acre feet storage for smaller storms. If it is not feasible to lose that much storage for larger storms, then simply decrease size of bottom outlet to make extended detention for larger storms.
3_16	Good e.g.	Dry detention basin, retrofitted from 18 in. outlet to 8 in. diameter with steel plate to make extended detention. Should do the same for location 3-17.
3_17	High Priority	Also dry detention, but with 30 in. outlet. Should retrofit to 8 in. -12 in. outlet.
3_18	Good e.g.	Stormwater wetland next to parking lot of Davisville Church.
3_19	Good e.g.	BMP wetland before pond at location 3-20.
3_20	H.W. Mark Floyd	
3_21	Good e.g.	Wide floodplain. Good floodplain storage.
3_22		Partially collapsed dam. Still retains some storage capacity.
3_23	Obstruction	8 ft. H x 18 ft. W box culvert. Stream armored and riprapped for considerable distance downstream.
3_24	High Priority	Large detention basin (~ 10-12 ft. in depth) with concrete riser and overflow structure; with 10 in. outlet at bottom. Should retrofit to create permanent shallow pond. May have to excavate slightly (perhaps 1-2 ft.) to intersect water table. Could then still be ephemeral pond. Receives runoff from location 3-25.
3_25		Eastern portion of Southampton Estates.
3_26	Priority	Open field below detention basin at location 3-24. Make into wet meadow.
3_27		Dry detention basin. Not a good BMP candidate for retrofit.
3_28		Phragmites in front yards of homes.
3_29	Priority	Detention basin outlet retrofitted with 6 in. aperture steel plate. Could be made into small SW wetland by raising outlet.
3_30	High Priority	Shopping center detention basin of shopping center poorly maintained. Debris clogging outlet. Shopping cart and other trash throughout. Could be made into small SW wetland. Parking lots of Giant Supermarket and Eckerd Drugstore drain to 4 ft. diameter outlet.
3_31	Good e.g.	Culvert 3 ft. H x 5 ft. W retrofitted with 20 in. high steel plate, with 3 in. high gap at bottom to accommodate low flow.
3_32		Poor quality wetlands, but wetlands nevertheless.
3_33	Priority	Dry detention basin. Should retrofit with smaller outlet to make extended detention.
3_34	Priority Good e.g.	Thick floodplain forest between Byberry Rd. and railroad right-of-way.

3_35	Highest Priority	Floodplain meadow of Southampton Creek. Enhance by diverting some flow to create wet meadow or constructed wetland.
3_36	Priority	Open canopy, many invasives, but good floodplain storage. Restore riparian forest.
3_37		On old SEPTA Fox Chase – Newtown railroad right-of-way. (Proposed Pennypack Trail). Old field forest to east of right-of-way.
3_38		Outlet of 3-67
3_39	Good e.g. Obstruction	Masonry culvert under railroad right-of-way. Rectangular, 8 ft. H x 42 in. W. No need for additional BMPs. Effectively detains flows and has helped to create wetlands through upstream stretch at location 3-69. In serious state of disrepair, mouth has many loose masonry blocks. Repair, but do not enlarge.
3_40	Highest Priority	
3_41	Highest Priority	
3_42		Outfall of storm sewer
3_43	Highest Priority	"JMD Materials Co." (Sand and gravel operation). No access. Could not observe.
3_44	Highest Priority	
3_45	Highest Priority	
3_46	Highest Priority	Culvert under old Fox Chase railroad right-of-way can be retrofitted to enhance wetland formation and storage.
3_47	Highest Priority	Detention basins not maintained or poorly maintained, if at all. Filled in with sediments and covered with vegetation, including small trees. Should repair, restore, and retrofit to make extended detention or wetlands.
3_48	Priority	Tract at NW quadrant of New Rd. and County Line Rd. owned by Upper Southampton Township and Bucks County Open Space Program. Should restore riparian forest and get rid of asphalt and gravel paving.
3_49	Obstruction	Box culvert bridge (County Line Rd. over Southampton Creek) 30 ft. W x 7 ft. H.
3_50	Obstruction	~ 30 ft. diameter semicircular arch tunnel under turnpike.
3_51	Highest Priority	Large shallow detention basin (~ 1.5 acre). Could easily be made into constructed wetland. Floor is just above level of floodplain and swamp, so would need minimal excavation (possibly only 2 to 3 ft.) since floor was very muddy and saturated during observation after several days of dry weather.
3_52	Highest Priority	Upper Moreland Township Park. Playing fields and parking lots drain directly to Southampton Creek and tributary with some moderate detention. Should retrofit outlets to create extended detention or even vernal pools within wooded areas.
3_53	Highest Priority	Detention basin slightly smaller than that at location 3-51 (~ 1+ acre) but can be retrofitted to make it extended detention or ephemeral wetland.

3_54	Highest Priority	Upper Moreland Township Park. Playing fields and parking lots drain directly to Southampton Creek and tributary with some moderate detention. Should retrofit outlets to create extended detention or even vernal pools within wooded areas.
3_55	Highest Priority	Detention basin. Retrofit to wetland or pond. Already boggy floor. Need to excavate only 1 to 2 ft. and decrease outlet from 12 in. diameter to 4 in. - 6 in.
3_56	Obstruction Good e.g.	25 ft. W x 7' H box culvert under Turnpike. As with location 3-50, impedance of creek by Turnpike embankment and culvert is partially (or wholly) responsible for creation of floodplain forested swamp.
3_57		PERT land. Thickly forested. Floodplain of small tributary of Southampton Creek.
3_58	Priority	Mason Mill II (Woodmont Properties). Entire property drains directly to floodplain of Southampton Creek. Need infiltration BMPs along edges of parking lots. Retrofit detention basin at location 3-59 into pond or wetland.
3_59	Priority	
3_60	Priority	Storm sewered through entire stretch. According to residents surcharges during any significant precipitation. Sinkholes developing above storm sewer pipes through almost all of residential area.
3_61	Priority	"Navigation Research Area" "Access Prohibited", but could see opportunities for BMPs, because of topographic relief.
3_62	High Priority	Opportunities for infiltration BMPs along south side of playing fields.
3_63	High Priority	Southampton Estates(Retirement and Assisted Living Community). Abundant opportunities for BMPs along an unnamed tributary to Southampton Creek flowing under Street Rd. from locations 3-15 to 3-18. Could install wet ponds, bioretention, infiltration, etc., immediately upgradient or adjacent to stream. All roof and pavement drains from west half of complex are apparently led directly to stream via multiple outlets or by overland flow. Could install infiltration BMPs along edges of parking areas.
3_64	Priority Good e.g.	Significant wooded swamp. Protected by Upper Southampton Township and homeowner who owns ~ 1 acre of it, on N side of end of Charles St.
3_65	Highest Priority	Wide floodplain. Apparently privately owned or simply appropriated(back lots of residences along Charles St. to SE, and Fern Road and Toll Drive to NW). Virtually all mown lawn, with a few scattered large trees. Should restore riparian forest and meanders to increase channel and floodplain storage capacities and to improve water quality.

3_66	High Priority	Slated for development by Joseph Duckworth (Acadia Corp.?), and construction activity has recently commenced (Fall 2004). Reportedly going to be "New Urbanism" type development. Drains directly to Southampton Creek.
3_67	Priority Good e.g.	Wetlands (wooded swamp) from pond westward to railroad right-of-way (inactive SEPTA Fox Chase line). No outlet until right-of-way, where it goes under the active E-W Rail line at location 3-38.
3_68	Priority	Need check dams and bank stabilization through this stretch (W of Heaton Rd.). Severe bank erosion.
3_69	Priority Good e.g.	Well developed floodplain. Mature, healthy upland forest, wooded swamp and wetlands and bogs. Definitely jurisdictional wetlands.
3_70	Highest Priority	Posted by "JDM Materials Corp.". Good, thick, mature forest. Important open space and stormwater storage. Assume is slated for development. (Note stubs of streets at locations 3-40 and 3-41, with only one house on each side, no curbs or cul-de-sacs). If developed, must have stringent requirements for BMPs and protection of wetlands at bottom (N) of slope.
3_71	Priority	Deeply incised channel in perennial or intermittent stream. Channel downcut as much as 6 to 7 feet from outfall at location 3-42. Forest relatively healthy, but with many invasives. Many opportunities for BMPs (check dams, bank stabilization, riparian restoration).
3_72	Priority	Good floodplain storage between locations 3-72 and 3-73. Wooded and shrubby swamp. Banks of main channel of Southampton Creek severely eroded. Downcut up to 6 ft. Bank stabilization needed.
3_73	Priority	
3_74	Priority Good e.g.	Mason Mill I Office Park. Young and mature riparian and floodplain forest. Tulip poplar, ash, and red maple. Many invasives, but otherwise good condition. Many scattered small sloughs provide excellent flood storage capacity. Abundant piles of flood debris, much of it recent (Mid-October, 2004).
SUB-BASIN 4		
4_1	Priority	Peniel Presbyterian Church (shown on USGS quadrangle map as Woodland School) ENE of intersection of Routes 63 and 611. Playing fields could have infiltration BMPs beneath them or along edges. Should lead roof drains and paved areas runoff to BMPs.
4_2	Priority Good e.g.	Heavily wooded hill above Willowbrook Rd. Preserve. (Very steep hill, probably safe from development, but steep slope ordinance should be passed and, if already in effect, enforced.)
4_3		Large lots along County Club Rd. Very good forest cover and canopy.

4_4	Highest Priority	Huntingdon Valley Country Club. Site of breached dam on Terwood Run, within golf course. Excellent location for constructed wetland or pond. Could rebuild dam, but lower in elevation.
4_5		Approx. ¼-acre lots, but relatively good canopy and cover for such small lots.
4_6		Large lots with good forest cover.
4_7	Highest Priority	Good site for constructed wetland or pond.
4_8	Highest Priority	Good site for constructed wetland, or wetland and pond in series.
4_9	Highest Priority	Check dams badly needed. Erosion moderate to severe.
4_10		Dam breached more than 30 years ago. Pond completely filled with sediment and vegetated with grasses and shrubs.
4_11	Highest Priority	Downstream from locations 4-9 and 4-10. Two good sites, for small pond (location 4-11), and SW wetland (location 4-12).
4_12	Highest Priority	
4_13	Priority	“Building Lot for Sale, Quinn and Wilson Realtors." When developed require BMPs and erosion controls, since drains directly to main stem of creek.
4_14	High Priority Obstruction	Good floodplain and wetland storage created by blocking of tributary by railroad embankment of old Fox Chase line. Semicircular masonry arch culvert under railroad at location 4-15 is 6 ft. diameter half circle atop 2 ft. high vertical base. Could use check dams immediately upstream from wetland area at location 4-15 to slow and spread water. Many invasives, but good potential for restoration.
4_15	High Priority	
4_16	Priority Good e.g.	Wetland area, although not as well developed as at location 4-14. No culvert observed, so flow is blocked when it does occur. Wetlands probably ephemeral. Outlet exists, but buried under leaves and debris.
4_17	Highest Priority	Cleared and under development (early January 2005). No erosion controls apparent. Assume there will be a large detention basin at location 4-18, next to Cathedral Rd. Steep site. Badly needs BMPs (infiltration, bioretention, etc.) upslope.
4_18	Highest Priority	
4_19	Priority Obstruction	Masonry culvert as at location 4-14 (shape and size equal). Perennial flow. Retrofit to create wetland on E side of railroad embankment.
4_20	High Priority	Swale and small perennial or intermittent tributary S of Bryn Athyn Cathedral. Moderate to severe bank erosion and downcutting. Ample room to spread water into surrounding rough lawn areas. Should install many check dams along length.
4_21	High Priority	Bryn Athyn Cathedral and grounds, associated buildings, parking lots, etc. BMPs of all kinds needed, but especially infiltration BMPs to catch runoff from roofs, parking lots, etc.

4_22	Highest Priority	Large open field. Assume owned by Academy of New Church, but if not especially ripe for development. If developed, must require BMPs.
4_23	Highest Priority	Large field ripe for development. If to be developed must require BMPs, especially infiltration and bioretention.
4_24	Highest Priority	Development in progress. Cleared and under construction. No erosion and sedimentation (E and S) controls observed. "14 Custom Homes" Moreland Builders, Long and Foster Realtors "Saddlebrook". BMPs doubtful.
4_25		Alden Rd Storm Sewer partially under centerline of high crowned concrete roadway (under downhill (western) portion of the road). Daylights at the intersection with Fetters Mill Road.
4_26		Small Pond. Not much freeboard/storage.
4_27	Highest Priority	Area on Terwood Run slated for restoration of riparian vegetation by PERT. Proposed by CSC for site of constructed wetland in grant applications to William Penn Foundation and PADEP (Growing Greener Program)
4_28	Highest Priority	Good locations for check dams along small tributary to Terwood Run.
4_29	Priority Good e.g.	Thickly forested fringe immediately E of right-of-way of Fox Chase line (proposed Pennypack Trail).
4_30	Good e.g.	Along PERT Creek Trail. Broad floodplain of main stem. Much flood debris and damage, but excellent flood storage capacity in floodplain.
4_31	Good e.g.	Good floodplain storage. Forest generally in good condition, but with some invasives.
4_32	Priority	Larch Rd. off Byberry Rd., E of 2nd St. Pike (Route 232). Moderate to severe erosion, need check dams.
4_33	Priority Bad e.g.	Apartment complex of six buildings closed, boarded up, and fenced off. Built entirely in the floodplain. It should be demolished and the area restored to a natural floodplain.
SUB-BASIN 5		
5_1		Perennial tributary to Huntingdon Valley Creek. Slight to moderate bank erosion. Channel in generally good condition. Little to be done with side drainage because many houses very close to stream.
5_2	Priority	Small detention basin associated with dormitories of Bryn Athyn Academy, i. e. Academy of New Church. Could be retrofitted to make SW wetland or ephemeral pond. Outflow is into open farm field and thence to middle pond at location 5-3, but with no defined channel in field as yet.
5_3		Pond
5_4	Obstruction	Drainage from virtually entire location 5-28 area flows to pond, but only daylights immediately before it. Very large flocks of Canada Geese, with consequent impact on water quality.

5_5	Obstruction	2 culverts under Wheatsheaf Rd., each ~ 5 ft. W x 4 ft. H ovals. Small dam on W side of Wheatsheaf Rd.
5_6	High Priority	~ ¼ acre detention basin with 3 ft. diameter concrete outlet. Should retrofit to make extended detention. (Has approximately 6 ft. of freeboard.)
5_7	Highest Priority	Large open field. If developed must require many BMPs.
5_8	Priority	"3.1 acre estate for sale". If redeveloped must require BMPs.
5_9	Obstruction	Corrugated steel culvert under Byberry Rd. (Huntingdon Valley Creek) 16 ft. W x 10 ft. H. irregular oval.
5_10	Highest Priority	Opportunities for BMPs in perennial or intermittent drainage W and NW of Lower Moreland High School. In fact, driveway to school bus parking lot has impeded flow and created a small wetland, which can be enhanced and enlarged. (Would make a good nature study project for H.S. biology or ecology classes.) Downstream to E of library also has possible opportunities for new BMPs.
5_11	Highest Priority	Huntingdon Valley Creek through golf course. Portions visible from Tomlinson Rd. Severe erosion. No BMPs apparent. Could create some wetlands and other BMPs.
5_12	Highest Priority	Lower Moreland High School Grounds. BMPs badly needed on slopes above (NE of) Red Lion Rd. Parking lots and playing fields should have infiltration and biofiltration and bioretention BMPs. There should be infiltration beds or galleries beneath the parking lots. Would be especially effective since the school and its facilities are on upland sites.
5_13	Obstruction	18 ft. diameter semicircular arch tunnel atop 7 ft. High vertical base walls. Conveys Huntingdon Valley Creek under Huntingdon Pike (a.k.a. "2nd St. Pike," Rte. 232)
5_14	Good e.g.	Outlet of detention basin below playing fields of St. Albert the Great School has been intelligently retrofitted to make it extended detention. Outflow is to stream just above location 5-15.
5_15	Obstruction	40 inch diameter concrete pipe culvert beneath Madison Road.
5_16	Obstruction	Perennial or intermittent stream enters a 48 in. diameter iron pipe beneath Old Welsh Road at location 5-16.
5_17	Priority	In Bethayres. Property of Gloria Dei Church drains to 24 inch diameter outlet. Should retrofit to make extended detention, possibly to 8" to 10" diameter.
5_18		Subdivision of large new houses on small lots all apparently draining to location 5-19.
5_19	Good e.g.	Large dry extended detention basin approximately 10 ft. deep (from top of berm). The outlet was a 2 ft. diameter pipe. It has been retrofitted with a steel plate with a bottom 4 in. high slot low flow outlet, which was completely blocked by litter at the time of the site visit (12/29/04). 18 in. wide x 8 in. high overflow slot cut into a 64 inch high concrete riser with a top grate. It discharges into a small wetland adjacent to the railroad

		embankment (5-20).
5_20		
5_21	Priority	The upper reaches of small tributary need several small check dams.
5_22		This space is too tight to do much in the lower reach of the tributary. Houses are too close. Check dams would probably cause flooding of the adjacent houses.
5_23		The stream is channelized. Masonry walls, but moderate to severe erosion of the banks. Little or no opportunities for check dams. The houses are too close.
5_24		Severe bank erosion and downcutting of channel. However, riparian vegetation still in fairly good condition.
5_25	High Priority Bad e.g.	The Estates at Huntingdon Valley (K. Hovnanian Companies) Approximately 38 to 40 acre residential development. 97 single family homes. The entire site has been cleared and was under construction at the time of the site visit (12/29/04). No erosion and sedimentation control measures observed. Severe erosion of exposed unvegetated soils producing massive amounts of sedimentation. Entire site drains to only two dry detention basins. One at the east corner of the site (5-26) is shown on company's site plan as approximately 220 feet long by ~60 feet wide. It may be too late, but should attempt to require introduction of small BMPs such as bioretention and biofiltration, revegetated swales, rain gardens, etc. throughout site.
5_26	Highest Priority	Detention basin at east corner of site.
5_27	High Priority Bad e.g.	The Estates at Huntingdon Valley (K. Hovnanian Companies). Detention basin along the northwest perimeter of the development along the southeast side of Pine Road is already filling with sediment from rapid erosion of entirely bare construction site. Largest such basin observed in watershed. 600 ft. long by 100 to 120 ft. wide by approx. 10 ft deep at center (depth below top of berm). Should be dredged when development is complete and the house lots are revegetated, and retrofitted to make into extended detention.
5_28		Little to be done in this area. Small lots, densely developed, no significant canopy. Little if any room for BMPs and none observed. Only advantage is that most roof drains are not connected to storm sewers.
5_29	High Priority	Floodplain completely taken over invasives, but still functions hydrologically. Increase storage SW wetland or SW pond.
5_30	High Priority	Island Green Country Club (west of and adjacent to development) at locations 5-26 and 5-27. Many opportunities for BMPs, especially along steep sided perennial or intermittent small stream valley flowing northward through course.

SUB-BASIN 6		
6_1		Old wooden bridge.
6_2	Priority	Severe bank erosion and downcutting of channel. Should install check dams and stabilize banks, using bioengineering if velocities permit.
6_3	Priority	Unnamed tributary. Perennial or intermittent. Severe erosion, channel downcut as much as 5 ft. to 6 ft. Need check dams downstream from house on left bank (S side of George Rd. curve).
6_4	Bad e.g.	Very few if any opportunities for new or retrofit BMPs in this area. Older subdivision with very poor stormwater management practices.
6_5	Bad e.g.	Pond was apparently eliminated to create house pad. Approximately 54 in. culvert under Washington Lane.
6_6	Highest Priority Good e.g.	Good condition, forested floodplain of Robinhood Brook. Important to preserve. Mature beech forest. Posted, but should not be developed.
6_7	Priority	Subdivision with very large houses on poorly vegetated lots. (No BMPs observed).
6_8	High Priority	Channel and banks severely eroded. Narrow floodplain of perennial or intermittent tributary to Meadow Brook. (Young beech tree on the edge of the bank ~ 6 in. in diameter already undercut, indicating severe recent bank erosion.) Flagged lot in floodplain between stream and small wetland. Floodplain should be preserved.
6_9	Highest Priority	Large open, steeply sloping tract N of Valley Road which is probably open for development. Drains directly to Meadow Brook. If and when developed, BMPs should be required. Could be key open space.
6_10	Priority	Posted. "ADM." If developed, require BMPs
6_11	Obstruction	Concrete slab bridge with no curbs, rails, or parapets. Box culvert 11 ft. W x 6 ft. H with stone wing walls.
6_12	Obstruction	Concrete bridge (Valley Road). Box culvert ~ 34 ft. W x ~8 ft. H
6_13		Abington Twp Nature Study Area. ("Karebrook")
6_14	Obstruction	SEPTA Bridge. 9 piers (2 ft. thick, but approximately 3' cross-section presented perpendicular to flow). 10 openings approx. 10 ft. high. Total length 192 ft. Opening at left (east) bank side largely obstructed by sediment and debris.
6_15	Highest Priority	Package sewage treatment plant for Meadowbrook Apts. Discharges directly to creek. If possible, install small treatment wetland before discharge to creek.
6_16	Priority	No apparent stormwater management except from drop inlets & drains(as observed from railroad right of way adjacent to Meadowbrook Apts.). Nor was any apparent in walkthrough of the north side of the apartment complex.

6_17	Highest Priority Bad e.g.	Holy Redeemer Hospital Complex: No stormwater management from hospital buildings or associated structures at all except to drain and discharge directly to an adjacent unnamed tributary to Meadow Brook. Runoff discharges directly from extensive parking lots with no stormwater management controls except drop inlet boxes. Erosion of stream immediately downstream from parking lots markedly worse than that in main channel. Undercut banks 3 to 4 ft. high. 3 ft. deep gullies leading from discharge points of drain pipes from parking lots. 5 to 6 ft. deep gullies directly W-SW from west side of parking garage. 2 ft. diameter new discharge from parking lot directly to creek. Gullies four to five feet deep (with perennial or intermittent flow) downstream from Child Care Center. If it is not possible to retrofit or install BMPs, at least install check dams in the gullies produced by building and parking lot runoff, and energy dissipaters at outlets.
6_18	Highest Priority	Healthy floodplain and some upland forest associated with above tributary to Meadow Brook flowing NE on the west boundary of the Hospital property. Good understory. Fallen large trees are creating natural check dams in a few places. An old masonry dam is still somewhat effective in storing or slowing flows, even though it is breached. There are many boggy areas in the floodplain.
6_19	Highest Priority	Moderate to severe bank erosion and downcutting in several places, but this is somewhat ameliorated by the fact that the channel bottom is bedrock or very close to it along the entire run, so that it cannot downcut much more. The channel will, therefore, widen in response to additional runoff from the hospital, and the floodplain may be able to provide more storage. However, there is still a need to control gullying along the side slopes. Neighboring residences on the west side of the valley are doing no significant damage with respect to erosion or gullying. Natural bedrock dams create some good small riffle and pool sequences.
6_20		Severe downcutting of the channel and undercutting of banks at downstream end of stream.
6_21	Priority	The pond shown on USGS 7.5 min quad no longer exists. Recommend restoration.
6_22	Highest Priority	New unpaved parking lot at the north end of the hospital grounds(~ 200ft from the railroad right of way). Sloped to and discharges directly over steep bank (~25-30 ft high) to patch of scrubby woods adjacent to railroad. Could install infiltration BMPs along perimeter if permitted by large construction debris used for fill to extend parking area northward.

6_23	Obstruction	Semicircular masonry arch tunnel (74 inch diameter arch atop 2 ft high vertical base walls) under railroad in relatively good condition, although wing walls beginning to be undercut, and southeast side of embankment immediately adjacent to culvert has been undercut and eroded ~4 ft, threatening stability of embankment.
6_24	High Priority	May be in private ownership. Should be monitored and BMPs required if to be developed.
6_25		At the north end of Penn State University Ogontz Campus there is an aerated permanent pond. No stormwater storage is available, because there are only a few inches of freeboard. The entire campus has vast parking lots, which were heavily salted at time of site visit in December 2004.
6_26	High Priority	Wet detention basin with some wetland vegetation. Outlet has been retrofitted to 18 in. diameter by steel plate, but could be further reduced to form a better, somewhat more extensive wetland with longer detention times to help treat salt in the runoff from the streets and parking lots. This would decrease stormwater storage capacity very slightly, but would improve the quality of the runoff to the headwater of Meadow Brook. Severe channel erosion upstream from the detention basin to location 6-25. This area needs a series of check dams and bioengineered bank stabilization. The campus is beautifully landscaped, but there is no stormwater management except piping below location 6-26.
6_27	High Priority	Virtually entire campus apparently drains to 48 in. diameter pipe that discharges near the intersection of Cloverly Lane and School lane and then enters a 48 in. diameter culvert under School Lane (6-28).
6_28	Obstruction	Culvert
6_29	Priority	Off Rydal Road. This property has a wooded detention basin approximately 2500 sq. ft. in area, with an average depth of approximately 4 ft. 18 in. The diameter outlet should be reduced to 6 to 8 in. or so, to make it extended detention.
6_30	Priority Good e.g.	Nice patch of woods at the headwaters of small tributary to Meadow Brook along Meadow Brook Road. Remnants of an old pond with masonry walls.
6_31	Priority	Floodplain largely in lawn. Restore riparian vegetation.
6_32	Highest Priority Good e.g.	Open field with sedges and reeds in boggy area near boundary fence of golf course. Preserve natural storage.
6_33	Highest Priority Good e.g.	Golf course (part of Meadowbrook Apartments complex, Korman Suites). Provides very good floodplain and wetland storage. Have preserved much of forested swamp and wetland areas. Must continue to protect and preserve.

6_34	Highest Priority Good e.g.	"Posted and Patrolled" signs along both sides of Fox Chase railroad right-of-way (Proposed Pennypack Trail). Broad floodplain. Thickly forested swamp with standing water and bogs. Imperative to preserve.
6_35	Highest Priority	Holy Redeemer Hospital Complex
6_36	High Priority	Need a series of small check dams, even though the stream is channelized in places. Severe bank erosion and downcutting of the channel.
6_37	Priority	Frog Hollow. Severe bank erosion and downcutting of channel, resulting in accelerated soil creep of side slopes of hollow. However, creep has operated over a long period, since even large trees show evidence, by the curvature of the bases of trunks. Need series of check dams through entire reach from above Washington Lane bridge over Frog Hollow downstream to Rydall Road.
6_38	Highest Priority	Large tract slated for 24 house subdivision. Heavily wooded. This is the route of the sewer, but there are ample opportunities for BMPs both in the stream and adjacent to it. BMPs should be required and erosion and sedimentation controls should be enforced during construction.
6_39		Little opportunities for BMPs. Very steep to precipitous slopes, heavily wooded with many mature beeches. Rock outcrops.
6_40	Priority	Opportunities for BMPs along the southeast perimeter of the lower (northeast) school playing fields, e.g. Infiltration trenches, biofiltration strips. Stream is perennial headwater of Meadow Brook.
6_41	High Priority	Along Valley Road north of the railroad right of way between the railroad and Meadow Brook channel. New subdivision with no stormwater management observed. The only good points are that there are no curbs along the street, and disconnected roof drains. Otherwise all lawn and hardtop drains directly to Meadow Brook.
SUB-BASIN 7		
7_1	Obstruction	Dam approx. 60ft. upstream from old stone bridge at location 7-2, which carried old, replaced portion of Huntingdon Pike.
7_2	Obstruction	Old stone bridge (Old Huntingdon Pike). Four semicircular arches, each approximately 10 ft. high (from stream bed) and approximately 25 ft. wide.
7_3	Obstruction	Fox Chase RR bridge downstream fvrom 7-1 & 7-2.
7_4	Priority	A portion of the golf course also at location 6-33 belonging to Korman Suites Meadowbrook Apts. Much of this portion in floodplain of main stem of Pennypack. Upland portions could use BMPs.

7_5	Good e.g.	Additional opportunities for BMPs probably precluded by large new houses built on former golf course. However, there is a fairly large created wetland area that effectively stores and treats runoff from the subdivision, whether intentional or not.
7_6	Obstruction	Inlet from above stormwater wetland (location 7-5) to storm sewer.
7_7	Highest Priority	Rydall School (west side of Huntingdon Pike). Extensive parking areas present opportunities, especially for infiltration BMPs beneath parking lots and along the southwest edge of access road.
7_8	Highest Priority	Crosswicks Wildlife Sanctuary. Important headwater area of Harpers Run, which flows through Lorimer Park to discharge into main stem of Pennypack.Maybe opportunities to create extra habitat w/ sw Mgt wetlands.
7_9	Obstruction	Stream channelized on the west side of Huntingdon Pike. Eroded channel on the east side of the pike. Box culvert ~5 ft. high X 8 ft. wide.
7_10	Highest Priority	Large tract. Probably Manor Junior College property. Mostly meadow with some forest. Important to require BMPs if developed in any way, since it is in the headwaters of Harpers Run, which flows through Lorimer Park at its confluence with the Pennypack.
7_11	Priority	Scott Park (Abington Twp). Small neighborhood park. Possibly could install a small rain garden as a demo project.
7_12		5ft. diameter pipe
7_13		Thence to location 7-13 where it is still channelized with gabion walls through a cut in the old Fox Chase railroad embankment into Lorimer Park, where a more or less natural channel begins
7_14	Priority	
7_15	Priority	GROTTO/SHRINE
7_16	Priority	Perennial or intermittent small tributary to Rockledge Branch. Severely eroded at confluence with Rockledge Branch. Need check dams.
7_17		Harpers Run piped under Irvin Road and Mary Ave. to location 7-18.
7_18		Harpers Run daylights
7_19	Obstruction	15 ft. wide x 14 ft. high concrete culvert with concrete floor under railroad embankment conveys Harpers Run into Lorimer Park.
7_20		Butler Tract (reportedly owned by Abington Twp., but maintained and operated by Philadelphia as part of the Fox Chase Farm).

7_21	Highest Priority	Spring fed perennial stream on Butler Tract portion of Fox Chase Farm. Need many check dams along entire stretch and in tributary side drainages, because of severe downcutting and bank erosion caused by heavy runoff from farm fields and pastures directly upgradient. Can create additional habitat and storage, e.g., vernal pools and other small wetlands in side drainage swales and adjacent to main channel. Would relieve much of the erosion pressure on lower portion of Harpers Run in Lorimer Park.
7_22	Highest Priority	
7_23	Highest Priority	
7_24	Highest Priority	Actually just southeast of Philadelphia corporate boundary, but the southeast portion (by far the majority) of the Butler Tract/Fox Chase Farm property drains to this small tributary or directly to main stem of the Pennypack along this stretch (7-55)
7_25	Highest Priority	Cow pasture is apparently currently or very recently in use. Abundant cow manure evident. Pasture fence only a few feet from the bank of the stream, with sparse or no riparian vegetation fringing it. Fence should be moved back and riparian buffers should be restored.
7_26	High Priority	Dam breached, pond shown on USGS quad now empty. Should clean up abundant debris (empty drums, etc.) and install low dam (2 to 3 ft. high) or weir to establish wet pond or wetland.
7_27	Highest Priority Bad e.g.	Ugly new detention basin, already filling with sediment because there are no erosion controls in subdivision still under construction (December 30, 2004), "Walnut Hill" ("14 Carriage Homes and 14 Single Family Homes"). Subdivision entered off Huntingdon Pike. Uncontrolled high frequency storm flows (large inlet, large outlet conventional design) responsible for severe erosion immediately downstream from outlet at location 7-28. It should be retrofitted to make it an extended detention, install energy dissipaters at outlet, and remove accumulated sediments when construction is finished. Should also require stabilization of banks and restoration of riparian vegetation immediately downstream from outlet.
7_28	Highest Priority	Severe bank erosion, 8ft. high cut banks. need to stabilize and revegetate.
7_29	Highest Priority	More severe bank erosion. Also, channel downcut 4 to 5 ft. in many places. Need check dams and bank stabilization and revegetation.
7_30	High Priority Obstruction	Culvert partially blocked by debris and litter. The blockage has effectively created a small wetland area. Should preserve and enhance it by retrofitting the culvert to decrease the outlet size. Mature forest from 7-30 to 7-32 in generally good condition, with fairly good understory. Invasives mostly along banks.

7_31	Highest Priority	Posted property along this stretch of unnamed tributary to Pennypack. However, if possible a conservation easement should be obtained. Many check dams should be created from brush, logs, and stone as appropriate in the side drainages, and swales leading to them. Severe bank erosion and downcutting of channel slowed only by rocky substrate. New houses south of the stream discharge runoff directly over the edges of their building pads. Severe gullying is already evident (12/30/04). Mature beeches and other trees being undercut and toppled. Mature forest in generally good condition, with fairly good understory. Invasives mostly along banks of stream.
7_32	Highest Priority Obstruction	The stream enters a 4 ft. diameter concrete pipe culvert under Fox Chase railroad embankment, thence directly to the main stem of the creek. Retrofit to make extended detention or permanent wetland.
7_33	Highest Priority	Property of the "Sisters of the Holy Redeemer Provincialate." Posted. If slated for development of any kind, but especially if for residential development, should require BMPs of all types. All the perennial or intermittent side drainages from this property are conveyed beneath the railroad embankment at locations 7-34, 7-35, 7-36, 7-37, and 7-38. They discharge over steep banks directly to the main stem of the creek, or emerge in the side of the embankment at elevations above the creek bank, causing severe erosion.
7_34	Highest Priority Obstruction	The culvert under the railroad right of way should be retrofitted to retard the flows and create wetlands. (See note for location 7-33)
7_35	Highest Priority Obstruction	The culvert under the railroad right of way should be retrofitted to retard the flows and create wetlands. (See note for location 7-33)
7_36	Highest Priority Obstruction	The culvert under the railroad right of way should be retrofitted to retard the flows and create wetlands. (See note for location 7-33)
7_37	Highest Priority Obstruction	The culvert under the railroad right of way should be retrofitted to retard the flows and create wetlands. (See note for location 7-33)
7_38	Highest Priority Obstruction	The culvert under the railroad right of way should be retrofitted to retard the flows and create wetlands. (See note for location 7-33)
7_39	High Priority Obstruction	Galvanized steel culvert under hiking trail (5.5 ft. W x 4 ft. H oval). Should install check dams upstream from culvert to inhibit downcutting and bank erosion.
7_40	High Priority	Gullying from runoff from the residential area upgradient. The park trail up the hillside needs more runoff and erosion controls. There are some new controls, but some are badly designed or misplaced.

7_41	H.W. Mark Floyd	Highwater mark of Floyd (9/16/99). 7ft above the retaining wall/top of bank.
7_42	High Priority	Detention basin with 7 in. wide x 20 in . high slotted outlet to 12 in. diameter pipe. Possibly could retrofit with higher riser.
7_43	Priority Good e.g.	Small wetland area with emergent vegetation, reeds, etc.
7_44		Gabion walled channel entire length from Montgomery Ave. along Shady Lane to Rockledge Ave., (rectangular channel 5 ft. wide x 30 in. - 36 in. deep, with gabion walls, concrete bottom.) where it enters 5ft. diameter pipe at location 7-12.
7_45		
7_46	Highest Priority	What was apparently an old quarry 7-15 has been made into a grotto/shrine behind (north west of) the Administration Building of Medical Mission Sisters. Overall, this property is performing many valuable stormwater management functions, but could even be further enhanced. E.g. BMPs in swales, infiltration BMPs associated with parking lots, etc. If property is developed in whole or in part, BMPs should be required.
7_47		Rockledge Branch channelized.
7_48	High Priority	Need check dams along drainage ditch/swale adjacent to east side of Fox Chase railroad right of way
7_49	High Priority	Check dams also needed on west side of right of way. Very severe erosion
7_50	Highest Priority	Healthy floodplain forest. Lorimer Park well maintained in this area, but much severe bank erosion. Stabilize and restore banks.
7_51	Priority Good e.g.	Good floodplain forest. Boggy and wetland areas adjacent to the main stem of the creek.
7_52	Highest Priority	Need check dams from Harpers Run upstream along Walnut Hill Branch to Old Mill Ford Rd.
7_53	Highest Priority	Pastures of Fox Chase Farm (7-23) to within 25 ft. to 50 ft. of bank of main stem of creek with less than 6 ft. to maximum of 25 ft. of riparian fringe in generally poor condition. As with 7-25 should move fence back, and restore riparian buffer.

Note: H.W. Mark = High Water Mark