WATERSHED WASTEWATER PROTECTION PLAN

Opequon Creek Watershed
Mill Creek Subwatershed
Wastewater Management Study
Berkeley County, West Virginia

Prepared by:

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WORKING FOR THE SUSTAINABILITY OF THE MID-ATLANTIC HIGHLANDS SINCE 1995

Background:

Mill Creek in Berkeley County, a tributary of Opequon Creek, is included on West Virginia's 303(d) list for fecal coliform bacteria impairment. The data used to support this listing was collected by the WV Department of Environmental Protection. A Total Maximum Daily Load (TMDL) study for Opequon Creek and other impaired watersheds in the Potomac Direct Drains area was published in draft form in February 2007. During the development of that document, WVDEP performed additional monitoring to refine impairment listings. As a result, the TMDL listed as impaired the full length of Mill Creek's mainstem and its two tributaries, Torytown Run and Sylvan Run.

Mill Creek runs generally from west to east, with its headwaters on the slopes of North Mountain. The creek bisects three geologic zones, which have a definite impact on onsite wastewater solutions in the region. The first zone, comprised of North Mountain, with a high percentage of shale soils, which is less suitable for onsite systems and farthest from any potential sewers, the second zone in the middle of the Opequon valley has decent soils, more potential for development and more likelihood of being sewered in the near future, and the third zone, east of Interstate 81 which is almost completely sewered already.

There are some pockets of development east of I-81 which are not yet sewered, and reports of failing septic systems in these regions are cause for concern.

TMDL Analysis:

From Appendix 1 of the PDD TMDL:

A-1.2.2 Fecal Coliform Bacteria Nonpoint Sources

Pollutant source tracking by WVDEP personnel identified scattered areas of high population density without access to public sewers in the Opequon Creek watershed. Human sources of fecal coliform bacteria in these areas include sewage discharges from failing septic systems, and possible direct discharges of sewage from residences (straight pipes). An analysis of 911 emergency response addressable structure data combined with WVDEP source tracking information yielded an estimate of 31,767 homes not connected to a publicly owned treatment facility in the Opequon Creek watershed. A septic system failure rate derived from geology and soil type was applied to the number of unsewered homes to calculate nonpoint source fecal coliform loading from failing septic systems. For a more detailed description of failing septic system fecal coliform modeling, please refer to the Potomac Direct Drains watershed TMDL Technical Report. Figure A-1-4 shows the estimated cumulative untreated flow from failing septic systems in each modeled subwatershed.

Grouped by subwatershed within the Mill Creek drainage, the number of houses with septic systems and the estimated failures are:

Mill Creek subwatersheds sorted by NUMBER of septics homes that are failing or seasonally failing

Subwatershed	Stream Name	Stream Code	Estimated Total Unsewered Homes	Estimated homes with complete septic failure	Estimated homes with seasonal septic failure	Total Fail-ures	Failure Percent-age
4099	UNT/Mill Creek RM 9.48	WVP-4-M-4	196	50	34	84	43
4103	Mill Creek	WVP-4-M	149	38	25	63	42
4107	Sylvan Run	WVP-4-M-1	205	31	18	50	24
4100	Mill Creek	WVP-4-M	101	27	18	46	45
4096	Mill Creek	WVP-4-M	204	23	13	36	18
4104	Torytown Run	WVP-4-M-2	142	20	11	31	22
4092	Mill Creek	WVP-4-M	81	19	11	30	37
4094	UNT/Mill Creek	No Code	225	17	11	28	13
4098	Mill Creek	WVP-4-M	65	16	10	26	40
4109	Sylvan Run	WVP-4-M-1	60	11	7	18	31
4101	Mill Creek	WVP-4-M	37	10	7	17	47
4093	Mill Creek	WVP-4-M	31	9	6	15	47
4097	UNT/Mill Creek RM 6.60	WVP-4-M3	33	8	4	12	37
4108	UNT/Sylvan Run	No Code	35	7	4	11	31
4095	Mill Creek	WVP-4-M	98	5	3	9	9
4106	Torytown Run	WVP-4-M-2	17	4	2	6	37
4105	UNT/Torytown Run	No Code	12	3	2	4	37
4102	UNT/Mill Creek RM 11.09	WVP-4-M-6	7	2	1	3	38
				302	188	489	

After reviewing the accumulated data and reports, CVI staff toured the watershed with the watershed group and WV DEP Potomac Basin Coordinator Alana Hartman. The data suggests that fecal contamination is occurring in the headwaters, in the geologic zone most prone to septic failures. There are certainly a number of failing systems in the watershed, as well as systems not yet failing but in need of improvement. Identification of these systems is the key to a repair or replacement program, but in general, the overall functioning of septic systems is best insured with adequate management.

Three of the top four subwatersheds from this list are in this western tier. Thus, the field analysis agrees with the TMDL assessment and makes the western zone the highest priority for repairing or replacing onsite systems.

Any plan for reducing contamination from onsite wastewater sources must include a management component. This component, of course, can then address other needs like inspection and repair. There are many methods and styles of managing onsite systems, from voluntary participation and minimum oversight to treating onsite systems as a utility with full service and monthly bills. It would be the province of the Opequon Creek Project Team to suggest a likely management program and the local residents, or the County Commission, to adopt it legally.

What should be done to provide a carrot and encourage participation in the management program is create a fund from grant monies to assist homeowners with systems repairs and replacements. As an example, the Project Team could secure $100,000 and make $5,000 grants available to any homeowner willing to upgrade or replace a failing or substandard system. Low-interest loans, funded from WV DEPs revolving loan program, could be used to make up the rest of the system repair or replacement costs. A large advantage to this approach is that homeowners are encouraged to self-identify problems and report them. As a part of this program, technical assistance, from an organization like Canaan Valley Institute could be offered for inspecting the selected sites and assisting with determining the proper upgrade or replacement technology.

There are estimated to be 471 failures in the Mill Creek watershed alone. Estimating $5,000 of project money to fix each failure would yield a project budget of roughly $2.5 Million. Of course, 38% of the failures are considered seasonal, but this in itself provides a different problem. Seasonal failures are usually associated with high groundwater tables, so the repair is usually providing additional treatment before the drainfield instead of a new drainfield, which can be substantially more expensive. Also, given the nature of the karst geology underlying sections of the Mill Creek Watershed, there is the possibility of septic systems that are not failing but providing inadequate treatment. The solution to this problem would also be providing additional treatment.

The cost of additional treatment, especially if that treatment provides for nutrient (mostly nitrogen) removal is approximately $12,000 per system. On the positive side, this additional treatment can renovate certain types of drainfield failure, so two fixes can be provided with one intervention, but some new drainfields may be required in addition to advanced treatment.

Also noted on the field visits were several mobile home parks (MHPs) with very small lots, but surrounded by fields. Input from local stakeholders identified these MHPs as having large percentages of failing systems, most likely due to the small lot size. These situations would be best served with cluster systems, where all of the lots would be combined and served by a communal drainfield in good soil surrounding the MHP. Of course, cluster systems, serving many users present an additional level of required management and operation.

The management system should also incorporate an educational component. Again this could be approached in several different ways, from making informational brochures and handouts available, to hosting homeowner workshops or providing technical assistance for inspection and repair work.

Education, management, word-of-mouth and public support are the keys to building a program of healthy onsite wastewater systems. The most probable management style for this watershed is voluntary, with reminders to perform maintenance, financial assistance and education. Thus, it will be a many-avenued system of approach relying on the participation and activity of the local homeowners and support from the Project Team.

A final note on septic system inspections is that the majority of inspections occur during the sale of a property and are requested by the lending institution. Currently, there are no state laws certifying qualified septic system inspectors, so these inspections are usually done by home inspectors. A county regulation to require special certification for the inspections of onsite systems would help immensely in determining the extent and nature of the failing septic system problems in the Opequon Creek watershed. There is a course offered by the WV Bureau of Public Health to train onsite wastewater system inspectors.

Other threats to the watershed, in terms of fecal contamination, occur from agriculture and wildlife. These include not only animals in the stream, but run off from fields fertilized with manure. This report will not cover an assessment of the magnitude of these components, other than to suggest that they be studied and addressed. One activity that might provide insight into the cause of fecal contamination is Bacteria Source Tracking, where fecal samples are further analyzed to determine if they come from a human (wastewater) domestic animal (agricultural) or wild animal (wildlife) source.

Recommendations:

In conclusion, it is our determination that there is a significant source of fecal contamination from failing onsite systems, and that the most at-risk area is the western tier of the watershed. Some of these failures are due to age and neglect, others to poor soils or biological and hydraulic overloading. Repair or replacement of these systems would cost around $5,000 for a new drainfield (space permitting), $5,000 per house (plus any land acquisition costs) for cluster systems, and up to $12,000 for providing additional treatment. One method of providing treatment would be to make available grant funding, perhaps $3,500 for drainfield repairs and $10,000 for additional treatment, to individual homeowners. These homeowners would also be invited to make up the difference with state revolving loans. A project to install 15 new drainfields, provide additional treatment for 15 homes and construct a cluster system for a 10-unit MHP would require approximately $300,000, including project management costs.

Secondly, to deal with the failing onsite systems in the watershed, a management program should be researched and implemented to insure the long-term functioning of all onsite systems as well as the upgrade and replacement of failing or substandard systems. At a minimum, this management entity would remind homeowners when to have their septic tanks pumped, remind them of other maintenance needs, and assist them with finding service providers for alternative systems. Part of this should be provided in an educational campaign

aimed at homeowners and offered through workshops and literature. Hopefully, the management entity would also serve as a grantor of funds for repairs and help to provide technical assistance for upgrades, replacements and new systems.

Finally, it would be a good idea to require inspections of onsite systems during property transfer by certified onsite wastewater inspectors. These requirements would have to be adopted by the County Commission, but the Opequon Creek Project Team could push for their adoption.