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Standard Land Use Characteristics and Pollutant Sources

Contents

Standard Land Use Development Characteristics

Detailed land use characteristics were available from several older and current stormwater research projects. The site survey information was organized and presented in both Appendix A and in associated WinSLAMM *.dat files. The projects and locations where these land use characteristics were available included:

• Jefferson County, AL (high density residential; medium density residential <1960, 1960 to 1980 and >1980; low density residential; apartments; multi-family; offices; shopping center; schools; churches; light industrial; parks; cemeteries; golf courses; and vacant land). These areas were inventoried as part of regional stormwater research and included about 10 single land use neighborhoods for each land use category. Local NPDES data were available to calibrate WinSLAMM for regional conditions using the specific monitored areas. The sites are described in several publications, including:

- Bochis, C., R. Pitt, and P. Johnson. “Land development characteristics in Jefferson County, Alabama.” In: *Stormwater and Urban Water Systems Modeling*, Monograph 16. (edited by W. James, E.A. McBean, R.E. Pitt and S.J. Wright). CHI. Guelph, Ontario, pp. 249 – 282. 2008.

• Bellevue, WA (medium density residential <1960). These data were from test and control watersheds that were extensively monitored as part of the Bellevue project of the EPA’s Nationwide Urban Runoff Program (NURP). Much monitoring data from these sites are available for calibration of WinSLAMM. These areas are described in:

- Pitt, R. and P. Bissonnette. *Bellevue Urban Runoff Program Summary Report*, U.S. Environmental Protection Agency, Water Planning Division. PB84 237213. Washington, D.C. 173 pgs. 1984.
- Pitt, R. *Characterizing and Controlling Urban Runoff through Street and Sewerage Cleaning*. U.S. Environmental Protection Agency, Storm and Combined Sewer Program, Risk Reduction Engineering Laboratory. EPA/600/S2-85/038. PB 85-186500. Cincinnati, Ohio. 467 pgs. June 1985.

• Kansas City, MO (medium density residential <1960). These descriptions are from the test watershed in the current EPA green infrastructure demonstration project being conducted in Kansas City. Detailed inventories were made of each of the approximately 600 homes in the area. Currently, no runoff quality data are available for these areas. These are summarized in the following:

- Pitt, R., J. Voorhees. “Modeling green infrastructure components in a combined sewer area.” Monograph 19. ISBN 978-0-9808853-4-7. *Modeling Urban Water Systems*. *Cognitive Modeling of Urban Water Systems*. James, W., K.N. Irvine, James Y. Li, E.A. McBean, R.E. Pitt, and S.J. Wright (editors). Computational Hydraulics International. Guelph, Ontario. 2011. pp. 139 – 156.
- Pitt, R. and J. Voorhees. “Green infrastructure performance modeling with WinSLAMM.” *2009 World Environmental and Water Resources Congress* Proceedings, Kansas City, MO, May 18 - 22, 2009.

• Downtown Central Business Districts (Atlanta, GA; Chicago, IL; Los Angeles, CA; New York, NY; and San Francisco, CA). These were not monitored locations, but were selected as part of this project report, as this land use was not well represented in the available research projects. Five example areas in the high density downtown areas of each of these five cities were examined in detail using Google maps. The areas associated with each land cover in a several block area were manually measured and described. No runoff quality or quantity data are available for these areas.

• Millburn, NJ (medium density residential 1961-80). Nine homes are being monitored during this current EPA research project investigating the effects of dry-well disposal of stormwater from individual homes, and the potential for irrigation use of this water. Google map aerial photographs and site surveys were conducted at each home to determine the land covers and characteristics. Site stormwater data are not available yet for these areas. Preliminary results will be presented at the following upcoming conferences:

- Talebi, L. and R. Pitt. “Stormwater Non-potable Beneficial Uses: Modeling Groundwater Recharge at a Stormwater Drywell Installation.” ASCE/EWRI World Environment and Water Resources Congress. Palm Springs, CA, May 22-26, 2011.
- Talebi, L. and R. Pitt. “Stormwater Non-potable Beneficial Uses and Effects on Urban Infrastructure.” 84th Annual Water Environment Federation Technical Exhibition and Conference (WEFTEC), Los Angeles, CA, October 15–19, 2011.

• San Jose, CA (medium density residential 1961-80; downtown central business district). Two residential and one downtown area were characterized as part of this early stormwater research project. Stormwater characterization data are available for these areas. These areas are described in the following report:

- Pitt, R. *Demonstration of Nonpoint Pollution Abatement Through Improved Street Cleaning Practices*, EPA-600/2-79-161, U.S. Environmental Protection Agency, Cincinnati, Ohio. 270 pgs. 1979.

• Toronto, Ontario (medium density residential 1961-80; medium industrial). These two areas were characterized and monitored as part of a research project conducted for the Toronto Area Wastewater Management Strategy Study (TAWMS). Stormwater characterization data are also available for these areas. The areas are described in the following reports:

- Pitt, R. and J. McLean. *Humber River Pilot Watershed Project*, Ontario Ministry of the Environment, Toronto, Canada. 483 pgs. June 1986.
- Pitt, R. *Small Storm Urban Flow and Particulate Washoff Contributions to Outfall Discharges*, Ph.D. Dissertation, Civil and Environmental Engineering Department, University of Wisconsin, Madison, WI, November 1987.

• Tuscaloosa, AL (parking lot at city park; City Hall). These two sites were characterized and monitored as part of the pilot-scale and full-scale monitoring projects of the Up-Flo™ filter. The pilot-scale tests were conducted as part of an EPA SBIR project and were conducted at the Tuscaloosa City Hall. The full-scale tests were conducted at the Riverwalk parking lot. Stormwater quality and quantity data are available from both of these sites for model calibration. These sites are described in the following reports:

- Pitt, R. and U. Khambhammettu. *Field Verification Tests of the UpFlow™ Filter. Small Business Innovative Research, Phase 2 (SBIR2) Report*. U.S. Environmental Protection Agency, Edison, NJ. 275 pages. March 2006.
- Khambhammettu. U., R. Pitt, R. Andoh, and S. Clark "UpFlow filtration for the treatment of stormwater at critical source areas." Chapter 9 in: *Contemporary Modeling of Urban Water Systems*, ISBN 0-9736716-3-7, Monograph 15. (edited by W. James, E.A. McBean, R.E. Pitt, and S.J. Wright). CHI. Guelph, Ontario. pp 185 – 204. 2007.
- Togawa, N., R. Pitt. R. Andoh, and K. Osei. "Field Performance Results of UpFlow Stormwater Treatment Device." ASCE/EWRI World Environment and Water Resources Congress. Palm Springs, CA, May 22-26, 2011. Conference CD.

• Wisconsin (downtown central business district; duplex residential; high density residential with alleys; high density residential without alleys; high rise residential; hospital; fairgrounds; light industry; low density residential; medium density residential; medium industry; mobile homes; multi-family residential; open space; schools; shopping center; strip commercial; and suburban residential). These areas are the standard land use areas studied and described by the Wisconsin Department of Natural Resources and the USGS to support WinSLAMM modeling in the state. These area descriptions are based on locations studied throughout the main urban areas in Wisconsin, including Milwaukee, Madison, Green Bay, etc. Generally, about 10 homogeneous areas representing each land use category were examined in each study area to develop these characteristic descriptions. Much stormwater characterization data are available for these areas and calibrated versions of the WinSLAMM parameter files are maintained by the USGS for use by state stormwater managers and regulators. Descriptions of these projects and the source water quality data are summarized in the following:

- Pitt, R., R. Bannerman, S. Clark, and D. Williamson. "Sources of pollutants in urban areas (Part 1) – Older monitoring projects." In: *Effective Modeling of Urban Water Systems*, Monograph 13. (edited by

W. James, K.N. Irvine, E.A. McBean, and R.E. Pitt). CHI. Guelph, Ontario, pp. 465 – 484 and 507 – 530. 2005.
- Pitt, R., R. Bannerman, S. Clark, and D. Williamson. "Sources of pollutants in urban areas (Part 2) – Recent sheetflow monitoring results." In: *Effective Modeling of Urban Water Systems*, Monograph 13. (edited by W. James, K.N. Irvine, E.A. McBean, and R.E. Pitt). CHI. Guelph, Ontario, pp. 485 – 530. 2005.
- Pitt, R., D. Williamson, and J. Voorhees. "Review of historical street dust and dirt accumulation and washoff data." *Effective Modeling of Urban Water Systems*, Monograph 13. (edited by W. James, K.N. Irvine, E.A. McBean, and R.E. Pitt). CHI. Guelph, Ontario, pp 203 – 246. 2005.

• Lincoln, NE (low density residential; medium density residential <1960; 1960-80; >1980; light industry; strip malls; shopping centers; schools; churches; hospitals). These site descriptions are from an on-going project in Lincoln, NE examining pollutant sources and controls. About ten homogeneous examples representing each land use were studied to develop these land use descriptions. Regional NPDES stormwater data are available for this area. There are no project reports available yet for this on-going project.

There are many land uses described from many locations throughout the country. The Wisconsin standard land use files represent the broadest range of land uses and the most observations. These descriptions and analyses were submitted previously. The Birmingham, AL and Lincoln, NE areas also have data representing a broad range of land uses. Several other study areas are also available that represent other geographical areas of the county. Appendix A includes detailed descriptions of all of these individual areas, sorted by major land use category and geographical location. The individual data were initially grouped into six major land use categories: commercial, industrial, institutional, open space, residential, and freeway/highway land uses. Table 1 summarizes the breakdown of these categories into directly connected impervious areas (DCIA), partially connected impervious areas, and pervious areas.

Table 1. Summary of Major Land Use Characteristics (average and COV)

Land Use Category (# of example areas)	Total directly connected impervious areas (DCIA)	total partially connected impervious areas	Total pervious areas
Commercial (16)	79.5 (0.3)	1.8 (2.8)	18.6 (1.0)
Industrial (5)	54.3 (0.3)	21.4 (0.4)	24.3 (0.5)
Institutional (8)	50.0 (0.4)	9.1 (0.9)	40.8 (0.3)
Open Space (5)	10.2 (1.2)	10.6 (1.3)	79.1 (0.3)
Residential (25)	24.0 (0.6)	12.1 (0.5)	63.8 (0.2)
Freeway and Highway (4)	31.9 (1.2)	27.4 (1.2)	40.7 (0.3)

The directly connected impervious areas are most closely related to the runoff quantities. The partially connected impervious areas contribute runoff at later portions of larger rains, while the pervious areas may only contribute flows after substantial rain has occurred. As expected, most of the data represent residential areas, with commercial areas next, and the other areas having fewer than 10 detailed area descriptions.

In order to examine geographical variations in stormwater characteristics, these land uses were sorted into six areas: Northwest; Southwest; Central; Southeast; Great Lakes; and East Coast. Model calibration was performed in each of these six geographical areas for all of the land uses in each area. If a land use was not represented in an area, the overall average land use characteristics were used. As noted in a previous submittal, stormwater quality data from the National Stormwater Quality Database (NSQD) was sorted into groups representing major land use and geographical categories. The modeled concentrations were compared to the observed concentrations, as described in the following section.

Modeled Stormwater Characteristics Compared to Observed Data

As noted above, the land use characteristics were used to create a range of standard land use files for evaluation with WinSLAMM. Six geographical areas and six major land use categories were examined. Many of the locations where the site characteristics were available also had stormwater monitoring data available that was used for regional calibration. If sites did not have site-specific data, NSQD regional data were used instead.

The first task was to sort all of the land use files into these six major land use categories. Table 2 lists the number of sites that were available for each group. As noted, most of the data were available for residential, then commercial areas, with less data available for institutional, industrial, open space, and highway/freeway areas. Overall site characteristics (averaged) were determined for each of these six categories. These six overall averaged files were then used in each of the six geographical areas, to complement available data for each location and land use data set. Some of the area and land use combinations only had this one file available, if no areas were monitored. A total of 114 files were used, with most in the residential and commercial areas, as previously noted, and with most of the files located in the Great Lakes region (due to the large number of Wisconsin observations) and in the Southeast (due to the large number of Birmingham, AL area observations).

Table 2. Number of Land Use Files Used for Each Category

	Commercial	Industrial	Institutional	Open Space	Residential	Freeways/ Highways	Total by Location
Central	4	2	4	1	5	3	19
East Coast	3	1	1	1	2	3	11
Great Lakes	6	4	4	2	11	4	31
Northwest	2	1	1	1	3	3	11
Southeast	7	2	3	5	8	4	29
Southwest	5	1	1	1	2	3	13
Total by Land Use	27	11	14	11	31	20	114

Each of these 114 files was associated with stormwater characteristic data, with preference given to site-specific monitoring data. If local observations were not available, then NSQD data was used. As noted in the earlier NSQD project memo, those observations were separated into land use and regional EPA rain zone categories. The NSQD data associated with the land use-area category were used if at least 30 events were monitored; if not, then the overall land use values for the constituent were used. Infrequently, the overall land use data did not have at least 30 event observations, so the overall average concentration was used.

The original WinSLAMM calibrated parameter files for Wisconsin developed and maintained by the USGS were used for all of the areas, except for the Southeast region. The Southeast region used the Birmingham area previously calibrated parameter files. The characteristics and constituents examined included: Rv (the volumetric runoff coefficient, the ratio of runoff depth to rain depth), TSS, TDS, COD, TP, filtered P, TKN, NO_3+NO_2, Cu, Pb, Zn, and fecal coliforms. The bacterial data was not available for the WI locations, so the NSQD was used for the Great Lakes locations. In addition, calculated peak flow (CFS/100 acres) was also examined. It was hoped that E. coli could also be used in these analyses, but the few data available did not allow suitable calibrations.

Initially, each of the 114 standard land use files were used in WinSLAMM using these original calibrated parameter files. The source area concentration data used in these files are described and summarized in the following publications (previously listed as the sources of the WI data, but these also include data from most of the source areas examined):
- Pitt, R., R. Bannerman, S. Clark, and D. Williamson. "Sources of pollutants in urban areas (Part 1) – Older monitoring projects." In: Effective Modeling of Urban Water Systems, Monograph 13. (edited by W. James, K.N. Irvine, E.A. McBean, and R.E. Pitt). CHI. Guelph, Ontario, pp. 465 – 484 and 507 – 530. 2005.
- Pitt, R., R. Bannerman, S. Clark, and D. Williamson. "Sources of pollutants in urban areas (Part 2) – Recent sheetflow monitoring results." In: Effective Modeling of Urban Water Systems, Monograph 13. (edited by W. James, K.N. Irvine, E.A. McBean, and R.E. Pitt). CHI. Guelph, Ontario, pp. 485 – 530. 2005.
- Pitt, R., D. Williamson, and J. Voorhees. "Review of historical street dust and dirt accumulation and washoff data." Effective Modeling of Urban Water Systems, Monograph 13. (edited by W. James, K.N. Irvine, E.A. McBean, and R.E. Pitt). CHI. Guelph, Ontario, pp 203 – 246. 2005.

Area rain files were selected for each of the regions. The averaged land use files were evaluated using the following rain data for 4 or 5 years (1995 through 1999, except for Lincoln, NE that started in 1996 due to missing rain records): Great Lakes: Madison, WI; East Coast: Newark, NJ; Central: Lincoln, NE; Northwest: Seattle, WA; Southeast: Birmingham, AL; and Southwest: Los Angeles, CA. The sites having site-specific observations used the rain records associated with the sites and for the period of record. The Great Lakes region recognized a winter period (Dec 3 to March 12) as did the Central region (Dec 20 to Feb 10). During these winter periods, no stormwater calculations were made.

The calculated long-term averaged modeled concentrations were compared to the monitored concentrations for each site and for the land use category combined. Factors were applied uniformly to each land use-area pollutant parameter file to adjust the long-term modeled concentrations to best match the monitored/observed values. The WI and AL location files were not changed as they were associated with previously calibrated conditions (except for the constituents that were not measured locally). In addition, the runoff parameter files were not modified as they have been shown to compare well to observed conditions under a wide range of situations.

Appendix B shows the scatterplots of the 114 land use conditions, comparing the modeled with the observed concentrations, after the final adjustments. Table 3 summarizes the results of the comparisons of the modeled to the observed values for all of the 114 files (91 for Rv, as some areas did not have suitable comparison data) for each constituent. As noted in this summary table, the regression statistics were all excellent (the P-values of the regression equations and for the slope terms were all highly significant), and the regression slope terms were all close to 1.0, with a few exceptions. The residual behaviors were all very good, except for total and filtered phosphorus that showed a strong bias, with modeled concentrations being too high for small observed concentrations. The Rv plot also showed a similar, but much less severe bias. All of the other constituents had random variations about the best fit lines with small variabilities.

Table 3. Summary of Observed vs. Modeled Concentrations

	Regression Slope (intercept = 0) and 95% CI	P-value of slope term	P-value of regression	Adjusted R^2	Number of Observations	Residual Behavior Comments
Volumetric Runoff Coefficients	0.93 (0.87, 0.99)	<0.0001	<0.0001	0.90	91	Some modeled values high for small observed RV
Total Suspended Solids	0.90 (0.83, 0.97)	<0.0001	<0.0001	0.85	114	Good
Total Dissolved Solids	0.62 (0.53, 0.70)	<0.0001	<0.0001	0.63	114	Good
Chemical Oxygen Demand	1.00 (0.92, 1.04)	<0.0001	<0.0001	0.93	114	Good
Total Phosphorus	0.88 (0.68, 1.08)	<0.0001	<0.0001	0.40	114	Most modeled values high for small observed TP concentrations
Filterable Phosphorus	0.95 (0.81, 1.09)	<0.0001	<0.0001	0.61	114	Most modeled values high for small observed filterable P concentrations
Total Kjeldahl Nitrogen	1.06 (0.96, 1.15)	<0.0001	<0.0001	0.80	114	Good
Nitrites plus Nitrates	0.70 (0.62, 0.78)	<0.0001	<0.0001	0.71	114	Good
Total Copper	0.59 (0.50, 0.67)	<0.0001	<0.0001	0.60	114	Good
Total Lead	0.99 (0.93, 1.05)	<0.0001	<0.0001	0.90	114	Good
Total Zinc	0.96 (0.92, 1.00)	<0.0001	<0.0001	0.95	114	Good
Fecal Coliform Bacteria	0.74 (0.65, 0.83)	<0.0001	<0.0001	0.68	114	Good

Sources of Stormwater Flows and Pollutants

These calibrated WinSLAMM parameter files and averaged land use files were then used, applying the Great Lakes conditions, to identify the major source areas of each pollutant and flow. This is critical information needed when designing a stormwater management program for an area. Table 4 summarizes the details presented in Appendix C. Table 4 includes summaries of the major flows and pollutant sources for each of eight land use categories (the urban freeway and rural highway were split and an office technology park category was added to the original set of land use categories). The major sources are shown for each flow and constituent, for three different rain event categories: small (<0.5 inches), intermediate (0.5 to 2 inches), and large (>2 inches).

The small category generally includes most of the rain and runoff events by number, but produces a small fraction of the annual runoff mass. This category of events if therefore of greatest interest when the number of events is of concern. If regulatory limits have numeric effluent standards, then the number of runoff events is of the greatest concern, and stormwater control strategies would focus on eliminating as many of the runoff events as possible. Relatively small rains are associated with most of the runoff events, by number (although the total runoff volume from these rains is relatively small). For many locations, typical numeric standards for bacteria and total recoverable heavy metals would be frequently exceeded. Therefore, runoff volume, bacteria, and heavy metals would be of the greatest interest for removal from the small rain category.

The intermediate category generally includes most of the runoff pollutant discharges by mass; frequently more than 75% of the annual pollutant discharges, by mass, occur during these rains. It is therefore greatly desired to remove as much of the runoff from this rain category. However, site soil and development conditions will likely prevent the elimination of all runoff from this category. Therefore, stormwater treatment will be needed for the constituents of concern for runoff that cannot be totally eliminated by site beneficial use or infiltration. Flow, as noted, will always be of interest, but further treatment of stormwater to reduce bacteria, nutrient, and /or heavy metal discharges will also likely be a suitable goal.

The largest rain category includes events that are channel-forming with dramatic effects on habitat conditions. Therefore, volume reductions during some portions of these large rains will provide some benefit, but reductions in runoff energy discharges will also need to be considered. Runoff energy reductions are most effectively associated with flow-duration modifications of the discharge hydrographs. The largest rains in this category (likely not included in the 5-year rainfall periods examined) are associated with drainage design and public safety. Flow sources are therefore of the greatest concern, and like for energy reductions, basin-wide hydraulic analyses would be needed to result in the most effective stormwater management and drainage options. It is unlikely that pollutant discharges would be of great concern during these large events, as they contribute relatively small fractions of the amortized annual flows, and any treatment method that could manage these large flows would be extremely costly and inefficient.

As shown on Table 4, most of the flows originate from the directly connected impervious areas (DCIA), except when undeveloped or landscaped portions of the areas are very large (residential, open space, rural highways). For these areas, the landscaped/undeveloped areas can produce significant flows during the large rains (also during the intermediate rains for the office technology park and open space land uses). The goal of any stormwater management program should therefore be to reduce/eliminate runoff from the DCIA areas. As noted in the project infiltration limitation memo, there are many conditions where large-scale infiltration of stormwater may not be desirable (mainly in areas having severely limited soils hindering infiltration, shallow groundwater, or other factors that would not adequately mitigate pollutant movement to the groundwater). In most cases, roof runoff, being the least contaminated DCIA source water, should be preferentially infiltrated or used on site for beneficial uses.

In residential areas, roof runoff comprises about 20 to 30% of the total annual runoff amount. However, streets (along with driveways and landscaped areas) can comprise the majority of the total flows. A typical strategy in residential areas would therefore apply rain gardens, or otherwise disconnect the roof drainage, for roof runoff control (for currently directly connected roofs). If possible, soil amendments and other strategies to reduce soil compaction to improve infiltration in the landscaped areas could eliminate much of the runoff from those areas. Street and driveway runoff would remain. If the area was drained using grass swales, it is likely that most of the total area runoff would be eliminated. If drained by conventional curbs and gutters, curb-cut bioinfiltration areas could be retrofitted to eliminate almost all of the runoff (and associated pollutants). In residential areas having loamy soils that are not compacted and are drained by grass swales, especially if most of the impervious areas are disconnected and drain to pervious areas, no additional stormwater controls may be needed in residential areas. High-density residential areas having larger amounts of impervious areas would obviously require additional effort.

Commercial areas have most of their runoff originating from paved parking areas, streets, and roofs. These are also the main sources for most of the pollutants examined. Few opportunities exist to utilize rain gardens for roof runoff control in most commercial areas, so bioinfiltration areas that collect runoff from mixed sources may be an appropriate approach. In many parking areas, islands or landscaped edges can be retrofitted with infiltration devices for significant runoff volume reductions. Curb-cut biofilters would need to extend out into the street in most cases due to lack of suitable space near the street edge in most commercial areas. Treatment of commercial area stormwater runoff would therefore be needed, as complete infiltration is not likely to be achieved. Critical source area treatments in areas of major automobile activity, plus pollution prevention to reduce the use of galvanized metals are other strategies. Because of the lack of space in most commercial areas, stormwater treatment may need to be situated in adjacent areas, or in underground chambers.

Industrial areas have most of their flows and pollutants originating from paved parking and storage areas. Roofs and streets are lesser, but still important sources. Infiltration in these areas is of greater concern as the runoff from industrial areas is more likely to lead to groundwater contamination. Critical source area controls (such as media filtration and biofilters using specialized media as part of treatment trains) will likely be necessary, along with pollution prevention to reduce the exposure of metals (especially galvanized) and other materials. In some industrial areas, stormwater can be used for dust suppression. If a relatively large site, wet detention ponds could also be located on available land to collect and further treat any remaining surface runoff.

Many institutional, office technology park and open space areas are predominately landscaped, with less directly connected impervious areas and larger landscaped or undeveloped areas for stormwater management. Designing stormwater management features that take advantage of the topography in these areas can result in significant runoff discharge reductions. Some of these areas have large parking areas with long-term parking that can also benefit from parking lot island or perimeter bioinfiltration areas.

Rural highways usually have substantial undeveloped land within the rights-of-ways that can be used for stormwater management, especially grass swales. A typical 2 or 4 land rural highway could likely be totally controlled with moderately-sized grass swales along both roadway edges. Urban freeways from 4 to 8 (or more) traffic lanes may not have adequate space in the medians or along the roadway edges for grass swales. If the space is available, the swales can result in significant runoff reductions. However, there will likely be significant excess runoff due to the larger paved areas. Freeway intersections or exit/entrance ramps usually have substantial land contained within the rights-of-ways at these locations. This land could be suitable for infiltration controls, or wet detention ponds.

The summaries in Table 4 and Appendix C can be used to illustrate the likely maximum level of control for different stormwater management approaches applied to source areas. If lots of attention were applied to roof rain gardens in residential areas, it is obvious that there will still be significant runoff from other sources, for example. Modeling of the different scenarios can be used to quantify how the different control approaches can (or cannot) meet desired objectives. These summary tables and the figures can however be used to indicate where management strategies should be focused.

Table 4. Summary of Major Sources of Flows and Pollutants

	Residential	Commercial	Industrial	Institutional
Flows				
Small	Streets (50%) Roofs (25%)	Paved parking (40%) Streets (35%) Roofs (20%)	Paved park/stor (55%) Roofs (25%) Streets (17%)	Paved parking (50%) Roofs (20%) Streets (20%)
Intermediate	Streets (40%) Roofs (25%) Driveways (10%)	Paved parking (36%) Roofs (35%) Streets (30%)	Paved park/stor (48%) Roofs (28%) Streets (15%)	Paved parking (35%) Roofs (32%) Streets (18%)
Large	Landscaped (33%) Streets (28%) Roofs (20%)	Paved parking (35%) Roofs (30%) Streets (23%)	Paved park/stor (47%) Roofs (25%) Streets (12%)	Paved parking (33%) Roofs (27%) Streets (15%)
Total Suspended Solids				
Small	Streets (80%)	Streets (50%) Paved parking (20%)	Paved park/stor (60%) Streets (30%)	Streets (50%) Paved parking (25%)
Intermediate	Streets (60%) Small Landscaped (20%)	Paved parking (50%) Streets (30%) Roofs (12%)	Paved park/stor (75%) Streets (15%)	Streets (40%) Paved parking (34%)
Large	Small Landscaped (50%) Streets (30%) Driveways (10%)	Paved parking (62%) Roofs (14%) Streets (12%)	Paved park/stor (73%) Landscaping (10%)	Paved parking (38%) Landscaping (25%) Streets (17%)
Total Dissolved Solids				
Small	Streets (55%) Driveways (15%) Roofs (15%)	Streets (40%) Paved parking (30%) Roofs (10%)	Paved park/stor (65%) Streets (15%) Roofs (11%)	Streets (30%) Paved parking (30%) Roofs (25%)
Intermediate	Streets (44%) Landscaping (18%) Driveways (14%) Roofs (14%)	Roofs (37%) Streets (32%) Paved parking (24%)	Paved park/stor (66%) Streets (15%) Roofs (13%)	Roofs (33%) Paved parking (23%) Streets (22%)
Large	Landscaping (47%) Streets (26%)	Roofs (35%) Streets 28%) Paved parking (24%)	Paved park/stor (62%) Streets (12%) Roofs (11%)	Roofs (29%) Paved parking (20%) Streets (17%) Landscaped (12%)

	Residential	Commercial	Industrial	Institutional
Chemical Oxygen Demand				
Small	Streets (60%) Roofs (15%) Paved parking (10%)	Streets (50%) Paved parking (35%) Roofs (12%)	Paved park/stor (45%) Streets (40%)	Streets (50%) Paved parking (20%) Roofs (17%)
Intermediate	Streets (56%) Landscaping (13%) Roofs (12%) Driveways (10%)	Paved parking (36%) Roofs (35%) Streets (25%)	Paved park/stor (60%) Streets (21%) Roofs (12%)	Roofs (41%) Paved parking (25%) Streets (20%)
Large	Landscaping (44%) Streets (24%) Roofs (13%)	Paved parking (38%) Roofs (36%) Streets (19%)	Paved park/stor (60%) Streets (15%) Roofs (10%)	Roofs (37%) Paved parking (24%) Landscaping (18%) Streets (11%)
Total Phosphorus				
Small	Streets (75%) Driveways (12%)	Streets (50%) Paved parking (25%) Roofs (13%)	Streets (40%) Paved park/stor (40%)	Streets (55%) Paved parking (20%) Roofs (9%)
Intermediate	Streets (57%) Landscaped (25%)	Paved parking (30%) Roofs (30%) Streets (20%)	Paved park/stor (47%) Streets (23%) Landscaping (11%) Roofs (9%)	Landscaping (24%) Paved parking (21%) Streets (20%) Roofs (19%)
Large	Landscaped (70%) Streets (17%)	Landscaped (30%) Paved parking (28%) Roofs (23%) Streets (11%)	Paved park/stor (39%) Landscaping (31%) Streets (13)	Landscaping (60%) Paved parking (14%) Roofs (11%)
Filterable Phosphorus				
Small	Streets (60%) Driveways (15%) Roofs (10%)	Paved parking (35%) Streets (26%) Sidewalks (17%) Roofs (16%)	Streets (68%) Paved park/stor (15%)	Paved parking (35%) Streets (20%) Driveways (12%) Playgrounds (11%)
Intermediate	Landscaping (46%) Streets (33%) Driveways (10%)	Paved parking (27%) Roofs (25%) Streets (19%) Landscaping (15%)	Streets (56%) Paved park/stor (15%) Landscaping (12%)	Landscaping (34%) Paved parking (20%) Roofs (18%) Streets (11%)
Large	Landscaping (77%) Streets (13%)	Landscaping (33%) Paved parking (20%) Roofs (17%) Streets (13%)	Street (37%) Landscaping (34%) Paved park/stor (12%)	Landscaping (60%) Paved parking 10%)

	Residential	Commercial	Industrial	Institutional
Total Kjeldahl Nitrogen				
Small	Streets (58%) Roofs (15%) Driveways (14%)	Streets (55%) Paved parking (20%) Roofs (12%)	Paved park/stor (50%) Streets (35%) Roofs (17%)	Streets (50%) Paved parking (25%) Roofs (18%)
Intermediate	Streets (36%) Landscaping (38%)	Roofs (38%) Paved parking (28%) Streets (23%)	Paved park/stor (46%) Roofs (26%) Streets (12%) Landscaping (10%)	Roofs (34%) Streets (21%) Paved parking (21%) Landscaping (15%)
Large	Landscaping (77%) Streets (9%)	Roofs (35%) Paved parking (28%) Landscaping (19%) Streets (15%)	Paved park/stor (36%) Landscaping (31%) Roofs (20%)	Landscaping (44%) Roofs (23%) Paved parking (16%) Streets (10%)
Nitrites + nitrates				
Small	Streets (45%) Roofs (25%) Driveways (10%)	Paved parking (37%) Streets (35%) Roofs (25%)	Paved park/stor (45%) Roofs (25%) Streets (20%)	Paved parking (40%) Roofs (25%) Streets (25%)
Intermediate	Streets (38%) Roofs (30%) Landscaping (11%) Driveways (9%)	Roofs (41%) Paved parking (29%) Streets (27%)	Paved park/stor (40%) Roofs (37%) Streets (16%)	Roofs (39%) Paved parking (29%) Streets (20%)
Large	Landscaping (33%) Streets (26%) Roofs (24%)	Roofs (39%) Paved parking (30%) Streets (24%)	Paved park/stor (40%) Roofs (34%) Streets (13%)	Roofs (34%) Paved parking (28%) Streets (16%) Landscaping (13%)
Total Copper				
Small	Streets (50%) Paved parking (13%) Roofs (10%)	Streets (50%) Paved parking (30%)	Paved park/stor (40%) Streets (35%) Roofs (20%)	Streets (50%) Paved parking (20%)
Intermediate	Streets (49%) Driveways (14%) Roofs (14%) Paved parking (13%)	Paved parking (46%) Streets (31%) Roofs (19%)	Paved park/stor (46%) Roofs (34%) Streets (14%)	Paved parking (37%) Streets (33%) Roofs (18%)
Large	Landscaping (26%) Streets (25%) Roofs (17%) Driveways (15%) Paved parking (15%)	Paved parking (52%) Roofs (21%) Streets (20%)	Paved park/stor (49%) Roofs (34%) Streets (10%)	Paved parking (42%) Streets (20%) Roofs (19%)

	Residential	Commercial	Industrial	Institutional
Total Lead				
Small	Streets (45%) Roofs (18%) Paved parking (15%) Driveways (15%)	Streets (50%) Paved parking (35%) Roofs (10%)	Paved park/stor (53%) Streets (30%)	Streets (65%) Paved parking (20%)
Intermediate	Streets (40%) Roofs (20%) Paved parking (13%) Landscaping (12%) Driveways (11%)	Paved parking (50%) Roofs (28%) Streets (18%)	Paved park/stor (75%) Streets (10%)	Paved parking (38%) Streets (28%) Roofs (21%)
Large	Landscaping (41%) Roofs (21%) Streets (13%) Paved parking (13%)	Paved parking (56%) Roofs (29%)	Paved park/stor (70%) Landscaping (10%)	Paved parking (42%) Roofs (22%) Landscaping (14%) Streets (12%)
Total Zinc				
Small	Streets (50%) Roofs (19%) Paved parking (15%)	Streets (55%) Paved parking (35%) Roofs (16%)	Paved park/stor (55%) Streets (25%) Roofs (13%)	Streets (55%) Paved parking (25%) Roofs (15%)
Intermediate	Streets (48%) Roofs (16%) Paved parking (14%)	Roofs (40%) Paved parking (38%) Streets (20%)	Paved park/stor (59%) Roofs (14%) Streets (13%)	Roofs (38%) Paved parking (33%) Streets (23%)
Large	Streets (25%) Landscaping (23%) Paved parking (17%) Roofs (16%)	Paved parking (43%) Roofs (42%) Streets (12%)	Paved park/stor (60%) Roofs (33%)	Roofs (40%) Paved parking (38%) Streets (13%)
Fecal Coliform Bacteria				
Small	Streets (48%) Paved parking (25%)	Paved parking (45%) Streets (31%) Sidewalks (15%)	Streets (75%) Paved park/stor (14%)	Paved parking (70%) Streets (15%)
Intermediate	Streets (42%) Paved parking (22%) Sidewalks (13%) Landscaping (12%)	Paved parking (44%) Streets (28%) Sidewalks (18%)	Streets (74%) Paved park/stor (14%)	Paved parking (67%) Streets (15%)
Large	Landscaping (33%) Streets (28%) Paved parking (20%)	Paved parking (38%) Streets (23%) Landscaping (19%) Sidewalks (15%)	Streets (68%) Paved park/stor (14%)	Paved parking (64%) Streets (13%)

Small events: <0.5 inches of rain
Intermediate events: 0.5 to <2.5 inches of rain
Large events: 2.5 and greater inches of rain

Table 4. Summary of Major Sources of Flows and Pollutants (cont.)

	Office Technology Park	Open Space	Urban Freeway	Rural Highway
Flows				
Small	Streets (90%)	Streets (60%) Paved parking (30%)	Paved lane and shoulder (100%)	Paved lane and shoulder (100%)
Intermediate	Streets (55%) Landscaped (35%)	Streets (50%) Landscaped (25%) Paved parking (20%)	Paved lane and shoulder (98%)	Paved lane and shoulder (96%)
Large	Streets (55%) Landscaped (34%) Roofs (10%)	Landscaped (60%) Streets (22%) Paved parking (14%)	Paved lane and shoulder (93%)	Paved lane and shoulder (84%) Large turf area (16%)
Total Suspended Solids				
Small	Streets (95%)	Streets (85%) Paved parking (10%)	Paved lane and shoulder (100%)	Paved lane and shoulder (100%)
Intermediate	Landscaping (50%) Streets (46%)	Streets (65%) Landscaping (28%)	Paved lane and shoulder (99%)	Paved lane and shoulder (98%)
Large	Landscaping (85%)	Landscaping (83%) Streets (12%)	Paved lane and shoulder (94%)	Paved lane and shoulder (81%) Large turf area (19%)
Total Dissolved Solids				
Small	Streets (95%)	Streets (60%) Paved parking (20%)	Paved lane and shoulder (100%)	Paved lane and shoulder (100%)
Intermediate	Streets (50%) Landscaping (43%)	Landscaping (45%) Streets (42%) Paved parking (10%)	Paved lane and shoulder (97%)	Paved lane and shoulder (93%)
Large	Landscaping (70%) Streets (19%)	Landscaping (75%) Streets (16%)	Paved lane and shoulder (91%)	Paved lane and shoulder (79%) Large turf area (21%)
Chemical Oxygen Demand				
Small	Streets (95%)	Streets (75%) Paved parking (10%)	Paved lane and shoulder (100%)	Paved lane and shoulder (100%)
Intermediate	Landscaping (57%) Streets (38%)	Streets (45%) Landscaping (41%) Paved parking (10%)	Paved lane and shoulder (98%)	Paved lane and shoulder (97%)
Large	Landscaping (80%) Streets (10%)	Landscaping (84%)	Paved lane and shoulder (91%)	Paved lane and shoulder (77%) Large turf area (23%)

	Office Technology Park	Open Space	Urban Freeway	Rural Highway
Total Phosphorus				
Small	Streets (80%)	Streets (90%) Paved parking (10%)	Paved lane and shoulder (100%)	Paved lane and shoulder (100%)
Intermediate	Landscaping (85%) Streets (13%)	Streets (50%) Landscaping (46%)	Paved lane and shoulder (98%)	Paved lane and shoulder (92%)
Large	Landscaping (95%)	Landscaping (89%)	Paved lane and shoulder (81%) Large turf (19%)	Paved lane and shoulder (57%) Large turf area (43%)
Filterable Phosphorus				
Small	Streets (80%) Landscaped (20%)	Streets (87%) Paved parking (12%)	Paved lane and shoulder (100%)	Paved lane and shoulder (100%)
Intermediate	Landscaped (90%)	Landscaping (71%) Streets (23%)	Paved lane and shoulder (90%) Large turf (10%)	Paved lane and shoulder (77%) Large turf (23%)
Large	Landscaped (95%)	Landscaping (86%)	Paved lane and shoulder (72%) Large turf (28%)	Large turf area (52%) Paved lane and shoulder (58%)
Total Kjeldahl Nitrogen				
Small	Streets (95%)	Streets (75%) Paved parking (20%)	Paved lane and shoulder (100%)	Paved lane and shoulder (100%)
Intermediate	Landscaping (78%) Streets (18%)	Landscaping (63%) Streets (29%)	Paved lane and shoulder (90%) Large turf (10%)	Paved lane and shoulder (77%) Large turf (23%)
Large	Landscaping (92%)	Landscaping (93%)	Paved lane and shoulder (72%) Large turf (28%)	Large turf area (52%) Paved lane and shoulder (58%)
Nitrites + nitrates				
Small	Streets (95%)	Streets (65%) Paved parking (26%)	Paved lane and shoulder (100%)	Paved lane and shoulder (100%)
Intermediate	Streets (58%) Landscaping (31%) Roofs (10%)	Streets (55%) Paved parking (21%) Landscaping (20%)	Paved lane and shoulder (99%)	Paved lane and shoulder (97%)
Large	Landscaping (56%) Streets (24%) Roofs (15%)	Landscaping (48%) Streets (30%) Paved parking (15%)	Paved lane and shoulder (96%)	Paved lane and shoulder (89%) Large turf area (11%)

	Office Technology Park	Open Space	Urban Freeway	Rural Highway
Total Copper				
Small	Streets (99%)	Streets (65%) Paved parking (33%)	Paved lane and shoulder (100%)	Paved lane and shoulder (100%)
Intermediate	Streets (76%) Landscaping (16)	Streets (55%) Paved parking (24%) Landscaping (18%)	Paved lane and shoulder (99%)	Paved lane and shoulder (99%)
Large	Landscaping (46%) Streets (31%) Roofs (11%)	Landscaping (53%) Streets (19%) Paved parking (19%)	Paved lane and shoulder (99%)	Paved lane and shoulder (96%)
Total Lead				
Small	Streets (100%)	Streets (65%) Paved parking (33%)	Paved lane and shoulder (100%)	Paved lane and shoulder (100%)
Intermediate	Streets (50%) Landscaping (40%)	Streets (43%) Landscaping (30%) Paved parking (21%)	Paved lane and shoulder (100%)	Paved lane and shoulder (99%)
Large	Landscaping (73%) Roofs (11%) Streets (10%)	Landscaping (70%) Paved parking (10%)	Paved lane and shoulder (96%)	Paved lane and shoulder (86%) Turf areas (14%)
Total Zinc				
Small	Streets (95%)	Streets (60%) Paved parking (35%)	Paved lane and shoulder (100%)	Paved lane and shoulder (100%)
Intermediate	Streets (71%) Landscaping (14%) Roofs (11%)	Streets (55%) Paved parking (28%) Landscaping (16%)	Paved lane and shoulder (100%)	Paved lane and shoulder (99%)
Large	Landscaping (36%) Roofs (28%) Streets (25%)	Landscaping (49%) Paved parking (26%) Streets (22%)	Paved lane and shoulder (98%)	Paved lane and shoulder (93%)
Fecal Coliform Bacteria				
Small	Streets (95%)	Streets (90%)	Paved lane and shoulder (100%)	Paved lane and shoulder (100%)
Intermediate	Streets (59%) Landscaping (38%)	Streets (81%)	Paved lane and shoulder (92%)	Paved lane and shoulder (80%) Turf area (20%)
Large	Landscaping (66%) Streets (25%)	Streets (56%) Landscaping (25%) Unpaved parking (12%)	Paved lane and shoulder (74%) Turf area (26%)	Paved lane and shoulder (51%) Turf area (49%)

Appendix A. Land Use Site Descriptions

Commercial Area Site Descriptions

Site Description	**Location**	**land use**	**EPA Rain Zone**	**Pitched Roofs to Impervious-C**	**Flat Roofs to Impervious-C**	**Flat Roofs to Pervious-D**
				(%)	**(%)**	**(%)**
Office Technology Park	composite	commer	all	0.0	0.0	15.0
Downtown CBD	Chicago, IL	commer	1	0.0	33.7	0.0
Downtown CBD	New York, NY	commer	1	0.0	48.3	0.0
Downtown CBD	WI SLU file	commer	1	0.0	41.0	0.0
Shopping Center	WI SLU file	commer	1	0.0	21.6	0.0
Strip commercial	WI SLU file	commer	1	3.7	19.7	0.0
Offices	Jefferson County, AL	commer	3	0.0	17.2	0.3
Shopping Center	Jefferson County, AL	commer	3	0.0	17.8	3.6
Downtown CBD	Atlanta, GA	commer	3	0.0	28.0	0.0
Parking lot at park	Tuscaloosa, AL	commer	3	0.0	0.0	0.0
City Hall	Tuscaloosa, AL	commer	3	20.0	18.0	0.0
Downtown CBD	Los Angeles, CA	commer	6	0.0	27.2	0.0
Downtown CBD	San Francisco, CA	commer	6	0.0	37.4	0.0
Downtown CBD	San Jose, CA	commer	6	0.0	26.0	0.0
Commercial - strip mall	Lincoln, NE	commer	9	0.0	25.0	0.0
Commercial - shopping center	Lincoln, NE	commer	9	0.0	27.1	0.0
			average	1.5	24.3	1.2
			median	0.0	25.5	0.0
			min	0.0	0.0	0.0
			max	20.0	48.3	15.0
			st dev	5.0	12.9	3.8
			COV	3.4	0.5	3.2
			count	16	16	16

Commercial Area Site Descriptions

Site Description	Parking paved-C	Parking paved-D	Parking unpaved-D	Storage paved-C	Driveways paved-C	Driveways paved-D	Walkways-C	Walkways-D
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Office Technology Park	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.5
Downtown CBD (Chicago)	17.8	0.0	0.0	4.1	0.0	0.0	6.1	0.0
Downtown CBD (New York)	3.0	0.0	0.0	14.0	0.0	0.0	4.9	0.0
Downtown CBD (WI)	22.6	0.0	0.0	0.0	1.5	0.0	8.4	0.0
Shopping Center	60.8	0.0	0.3	0.0	1.8	0.0	0.5	0.0
Strip commercial	40.9	0.0	1.4	0.0	2.0	0.0	4.3	0.0
Offices	24.7	1.9	0.0	0.0	1.1	0.6	0.0	0.0
Shopping Center	29.2	0.0	0.6	0.0	0.7	0.0	0.0	0.0
Downtown CBD	22.8	0.0	0.0	5.6	0.0	0.0	3.8	0.0
Parking lot at park	33.9	0.0	0.0	0.0	0.0	0.0	5.4	0.0
City Hall	62.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Downtown CBD (Los Angeles)	20.3	0.0	0.0	8.6	0.0	0.0	5.0	0.0
Downtown CBD (San Francisco)	16.5	0.0	0.0	0.0	0.0	0.0	7.6	0.0
Downtown CBD (San Jose)	14.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0
Commercial - strip mall	45.7	0.0	0.0	0.0	0.3	0.0	0.0	0.0
Commercial - shopping center	47.7	0.0	0.0	0.0	0.1	0.0	0.0	0.0
average	28.9	0.4	0.1	2.0	0.5	0.0	3.1	0.0
median	23.8	0.0	0.0	0.0	0.0	0.0	3.9	0.0
min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
max	62.0	5.0	1.4	14.0	2.0	0.6	8.4	0.5
st dev	18.4	1.3	0.4	4.1	0.7	0.2	3.0	0.1
COV	0.6	3.0	2.6	2.0	1.5	4.0	1.0	4.0
count	16	16	16	16	16	16	16	16

Commercial Area Site Descriptions

Site Description	Street Area	Curb Miles	Street Width	Large Turf	Undevel	Small Landscaping	Other pervious area	Other directly connected Imp area	Other part cncted Imp area	TOTAL
	(%)	per 100 ac	(ft)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Office Technology Park	6.0	4.0	33.0	68.0	0.0	5.5	0.0	0.0	0.0	100.0
Downtown CBD (Chicago)	33.7	11.6	48.0	0.0	0.0	4.6	0.0	0.0	0.0	100.0
Downtown CBD (New York)	23.6	9.3	40.4	0.0	0.6	5.6	0.0	0.0	0.0	100.0
Downtown CBD (WI)	22.2	6.0	60.0	0.0	0.0	3.6	0.6	0.0	0.1	100.0
Shopping Center	6.4	1.7	60.7	0.0	2.9	4.5	0.8	0.4	0.0	100.0
Strip commercial	20.1	7.8	42.0	0.0	0.2	5.8	1.9	0.0	0.0	100.0
Offices	15.5	6.7	38.2	0.0	0.0	38.7	0.0	0.0	0.0	100.0
Shopping Center	16.1	7.0	38.2	0.0	0.0	31.9	0.0	0.0	0.0	100.0
Downtown CBD	30.2	8.5	59.0	0.0	0.0	7.0	2.6	0.0	0.0	100.0
Parking lot at park	28.5	18.8	25.0	0.0	0.0	32.2	0.0	0.0	0.0	100.0
City Hall	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Downtown CBD (Los Angeles)	25.8	7.2	59.0	0.0	2.5	10.6	0.0	0.0	0.0	100.0
Downtown CBD (San Francisco)	31.2	11.0	46.8	0.0	0.0	7.3	0.0	0.0	0.0	100.0
Downtown CBD (San Jose)	21.0	6.8	51.0	0.0	35.0	0.0	0.0	0.0	0.0	100.0
Commercial - strip mall	15.0	4.8	54.0	0.0	0.0	14.0	0.0	0.0	0.0	100.0
Commercial - shopping center	13.4	3.8	58.0	0.0	0.0	11.7	0.0	0.0	0.0	100.0
average	19.3	7.2	44.6	4.3	2.6	11.4	0.4	0.0	0.0	100.0
median	20.6	6.9	47.4	0.0	0.0	6.4	0.0	0.0	0.0	100.0
min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
max	33.7	18.8	60.7	68.0	35.0	38.7	2.6	0.4	0.1	100.0
st dev	9.7	4.4	16.0	17.0	8.7	12.0	0.8	0.1	0.0	0.0
COV	0.5	0.6	0.4	4.0	3.4	1.0	2.1	4.0	4.0	0.0
count	16	16	16	16	16	16	16	16	16	16

Commercial Area Land Use Description Summary

	roofs, percentage directly connected	Total directly connected impervious areas (DCIA)	total partially connected impervious areas	Total pervious areas
Office Technology Park	0.0	6.0	20.5	73.5
Downtown CBD (Chicago)	100.0	95.4	0.0	4.6
Downtown CBD (New York)	100.0	93.8	0.0	6.2
Downtown CBD (WI)	100.0	95.7	0.1	4.2
Shopping Center	100.0	91.5	0.3	8.2
Strip commercial	100.0	90.7	1.4	7.9
Offices	98.1	58.5	2.8	38.7
Shopping Center	83.0	63.8	4.3	31.9
Downtown CBD	100.0	90.5	0.0	9.5
Parking lot at park	0.0	67.8	0.0	32.2
City Hall	100.0	100.0	0.0	0.0
Downtown CBD (Los Angeles)	100.0	86.9	0.0	13.1
Downtown CBD (San Francisco)	100.0	92.7	0.0	7.3
Downtown CBD (San Jose)	100.0	65.0	0.0	35.0
Commercial - strip mall	100.0	86.0	0.0	14.0
Commercial - shopping center	100.0	88.3	0.0	11.7
average	86.3	79.5	1.8	18.6
median	100.0	89.4	0.0	10.6
min	0.0	6.0	0.0	0.0
max	100.0	100.0	20.5	73.5
st dev	34.0	23.5	5.1	19.1
COV	0.4	0.3	2.8	1.0
count	16	16	16	16

Industrial Area Site Descriptions

Land Use	**Location**	**land use**	**EPA Rain Zone**	**Pitched Roofs to Impervious-C**	**Flat Roofs to Impervious-C**	**Flat Roofs to Pervious-D**
				(%)	**(%)**	**(%)**
Medium Industrial	Toronto, Emery	indus	1	31.1	0.0	0.0
Light Industry	WI SLU file	indus	1	2.6	20.5	2.3
Medium Industrial	WI SLU file	indus	1	1.9	16.7	4.5
Light Industrial	Jefferson County, AL	indus	3	0.0	5.5	5.4
Light industry	Lincoln, NE	indus	9	0.0	5.6	4.6
average			average	7.1	9.7	3.4
median			median	1.9	5.6	4.5
min			min	0.0	0.0	0.0
max			max	31.1	20.5	5.4
st dev			st dev	13.5	8.6	2.2
COV			COV	1.9	0.9	0.7
count			count	5	5	5

Industrial Area Site Descriptions

Land Use	**Parking paved-D**	**Parking unpaved-D**	**Storage paved-C**	**Storage paved-D**	**Storage unpaved-D**	**Driveways paved-C**	**Driveways paved-D**	**Walkways-C**	**Walkways-D**
	(%)	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**
Medium Industrial	0.0	0.0	0.0	32.6	0.0	0.0	0.0	0.0	0.0
Light Industry	0.0	6.3	0.0	0.0	0.0	2.6	0.0	1.3	0.0
Medium Industrial	0.0	0.0	0.0	0.0	14.6	1.8	1.0	0.5	0.5
Light Industrial	2.5	1.8	15.7	0.0	8.1	0.3	0.1	0.0	0.0
Light industry	0.0	5.5	24.8	0.0	16.7	9.2	0.0	0.0	0.0
average	0.5	2.7	8.1	6.5	7.9	2.8	0.2	0.4	0.1
median	0.0	1.8	0.0	0.0	8.1	1.8	0.0	0.0	0.0
min	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
max	2.5	6.3	24.8	32.6	16.7	9.2	1.0	1.3	0.5
st dev	1.1	3.0	11.5	14.6	7.9	3.7	0.4	0.6	0.2
COV	2.2	1.1	1.4	2.2	1.0	1.3	2.0	1.6	2.2
count	5	5	5	5	5	5	5	5	5

Industrial Area Site Descriptions

Land Use	Street Area	Curb Miles	Street Width	Large Turf	Undevel	Small Landscaping	Other pervious area	Other part cncted Imp area	TOTAL
	(%)	per 100 ac	(ft)	(%)	(%)	(%)	(%)	(%)	(%)
Medium Industrial	5.7	2.1	40.0	0.0	0.0	25.3	0.0	0.0	100.0
Light Industry	10.8	5.0	35.6	3.5	4.3	9.9	2.8	0.2	100.0
Medium Industrial	7.6	3.5	35.5	2.8	5.4	4.0	4.5	0.2	100.0
Light Industrial	8.0	3.5	37.7	0.0	0.0	43.6	0.0	0.0	100.0
Light industry	10.0	5.9	28.0	0.0	0.0	15.3	0.0	0.0	100.0
average	8.4	4.0	35.4	1.3	1.9	19.6	1.5	0.1	100.0
median	8.0	3.5	35.6	0.0	0.0	15.3	0.0	0.0	100.0
min	5.7	2.1	28.0	0.0	0.0	4.0	0.0	0.0	100.0
max	10.8	5.9	40.0	3.5	5.4	43.6	4.5	0.2	100.0
st dev	2.0	1.5	4.5	1.7	2.7	15.5	2.1	0.1	0.0
COV	0.2	0.4	0.1	1.4	1.4	0.8	1.4	1.4	0.0
count	5	5	5	5	5	5	5	5	5

Industrial Area Land Use Summary

Land Use	roofs, percentage directly connected	Total directly connected impervious areas (DCIA)	total partially connected impervious areas	Total pervious areas
Medium Industrial	100.0	42.1	32.6	25.3
Light Industry	90.9	70.7	8.8	20.5
Medium Industrial	80.5	62.5	20.8	16.7
Light Industrial	50.6	38.4	18.0	43.6
Light industry	54.9	57.9	26.8	15.3
average	75.4	54.3	21.4	24.3
median	80.5	57.9	20.8	20.5
min	50.6	38.4	8.8	15.3
max	100.0	70.7	32.6	43.6
st dev	21.8	13.7	9.0	11.5
COV	0.3	0.3	0.4	0.5
count	5	5	5	5

Institutional Area Site Descriptions

Land Use	**Location**	**land use**	**EPA Rain Zone**	**Pitched Roofs to Impervious-C**	**Pitched Roofs to Pervious-D**	**Flat Roofs to Impervious-C**	**Flat Roofs to Pervious-D**
				(%)	**(%)**	**(%)**	**(%)**
Inst - Fairgrounds	WI SLU file	instit	1	8.4	0.6	5.4	0.0
Hospital	WI SLU file	instit	1	3.9	0.0	31.8	0.0
Schools	WI SLU file	instit	1	0.0	0.0	15.0	0.0
Schools	Jefferson County, AL	instit	3	0.0	0.0	6.0	4.8
Churches	Jefferson County, AL	instit	3	10.4	1.7	0.0	0.0
Institutional - school	Lincoln, NE	instit	9	0.0	0.0	24.0	0.0
Institutional - church	Lincoln, NE	instit	9	4.6	2.2	0.7	6.7
Institutional - hospital	Lincoln, NE	instit	9	0.0	0.0	19.9	5.0
			average	3.4	0.6	12.9	2.1
			median	2.0	0.0	10.5	0.0
			min	0.0	0.0	0.0	0.0
			max	10.4	2.2	31.8	6.7
			st dev	4.2	0.9	11.7	2.9
			COV	1.2	1.6	0.9	1.4
			count	8	8	8	8

Institutional Area Site Descriptions

Land Use	**Parking paved-C**	**Parking unpaved-D**	**Playground paved-D**	**Playground unpaved**	**Driveways paved-C**	**Driveways paved-D**	**Walkways-C**	**Walkways-D**
	(%)	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**
Inst - Fairgrounds	27.2	0.0	1.7	1.7	0.0	3.0	2.2	0.0
Hospital	20.8	0.6	0.0	0.0	6.1	0.0	2.8	0.0
Schools	10.7	0.0	17.3	0.0	0.0	2.0	2.9	0.0
Schools	5.7	0.0	0.0	15.4	0.1	0.1	0.0	0.0
Churches	24.5	4.8	0.0	0.0	0.4	0.4	0.0	0.0
Institutional - school	25.5	0.0	0.0	0.0	1.5	0.0	0.5	0.5
Institutional - church	22.6	0.0	0.0	0.2	2.3	0.3	0.4	0.5
Institutional - hospital	35.6	0.0	0.0	0.2	1.1	0.0	0.0	0.2
average	21.6	0.7	2.4	2.2	1.4	0.7	1.1	0.2
median	23.6	0.0	0.0	0.1	0.7	0.2	0.5	0.0
min	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
max	35.6	4.8	17.3	15.4	6.1	3.0	2.9	0.5
st dev	9.4	1.7	6.1	5.4	2.1	1.1	1.3	0.2
COV	0.4	2.5	2.6	2.5	1.4	1.6	1.2	1.5
count	8	8	8	8	8	8	8	8

Institutional Area Site Descriptions

Land Use	Street Area	Curb Miles	Street Width	Large Turf	Undevel	Small Landscaping	Isolated	Other pervious area	Other part cncted Imp area	TOTAL
	(%)	per 100 ac	(ft)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Inst - Fairgrounds	12.1	5.8	34.5	5.3	1.8	26.6	0.0	2.7	1.3	100.0
Hospital	10.9	5.3	34.0	5.3	0.2	14.0	1.1	2.5	0.0	100.0
Schools	8.6	3.8	35.7	22.1	0.4	17.4	0.0	2.2	1.4	100.0
Schools	4.2	1.8	38.5	13.9	1.0	48.8	0.0	0.0	0.0	100.0
Churches	18.3	7.8	38.7	0.0	7.0	32.4	0.0	0.0	0.0	100.0
Institutional - school	4.5	1.8	42.0	34.8	0.0	8.7	0.0	0.0	0.0	100.0
Institutional - church	13.5	8.5	26.0	40.0	0.0	6.0	0.0	0.0	0.0	100.0
Institutional - hospital	5.1	2.9	29.0	16.4	0.0	16.5	0.0	0.0	0.0	100.0
average	9.6	4.7	34.8	17.2	1.3	21.3	0.1	0.9	0.3	100.0
median	9.8	4.6	35.1	15.2	0.3	17.0	0.0	0.0	0.0	100.0
min	4.2	1.8	26.0	0.0	0.0	6.0	0.0	0.0	0.0	100.0
max	18.3	8.5	42.0	40.0	7.0	48.8	1.1	2.7	1.4	100.0
st dev	5.0	2.6	5.3	14.4	2.4	14.1	0.4	1.3	0.6	0.0
COV	0.5	0.5	0.2	0.8	1.8	0.7	2.8	1.4	1.9	0.0
count	8	8	8	8	8	8	8	8	8	8

Institutional Area Land Use Summary

Land Use	roofs, percentage directly connected	Total directly connected impervious areas (DCIA)	total partially connected impervious areas	Total pervious areas
Inst - Fairgrounds	95.8	55.3	8.3	36.4
Hospital	100.0	76.3	0.6	22.0
Schools	100.0	37.2	20.7	42.1
Schools	56.0	16.0	20.2	63.8
Churches	85.7	53.6	6.9	39.5
Institutional - school	100.0	56.0	0.5	43.5
Institutional - church	37.3	44.1	9.9	46.0
Institutional - hospital	79.9	61.7	5.4	32.9
average	81.8	50.0	9.1	40.8
median	90.8	54.5	7.6	40.8
min	37.3	16.0	0.5	22.0
max	100.0	76.3	20.7	63.8
st dev	23.5	18.0	7.8	12.0
COV	0.3	0.4	0.9	0.3
count	8	8	8	8

Open Space Land Use Characteristics

Land Use	Location	land use	EPA Rain Zone	Flat Roofs to Impervious-C	Flat Roofs to Pervious-D	Parking paved-C	Parking paved-D	Parking unpaved-D
				(%)	(%)	(%)	(%)	(%)
Open space	WI SLU file	open	1	0.6	0.0	0.0	0.0	0.0
Parks	Jefferson County, AL	open	3	0.0	0.0	16.1	0.0	0.0
Cemetery	Jefferson County, AL	open	3	0.0	1.0	0.0	9.2	1.8
Golf Courses	Jefferson County, AL	open	3	0.0	2.8	0.7	0.0	0.0
Vacant	Jefferson County, AL	open	3	0.0	0.0	0.0	0.0	0.0
			average	0.1	0.7	3.4	1.8	0.4
			median	0.0	0.0	0.0	0.0	0.0
			min	0.0	0.0	0.0	0.0	0.0
			max	0.6	2.8	16.1	9.2	1.8
			st dev	0.3	1.2	7.1	4.1	0.8
			COV	2.2	1.6	2.1	2.2	2.2
			count	5	5	5	5	5

Open Space Land Use Characteristics

Land Use	Playground paved-D	Playground unpaved	Driveways paved-C	Driveways paved-D	Driveway unpaved	Walkways-C
	(%)	(%)	(%)	(%)	(%)	(%)
Open space	0.0	0.0	0.0	0.0	0.0	0.6
Parks	8.3	24.8	0.1	0.1	0.0	0.0
Cemetery	0.0	0.0	0.0	0.1	3.3	0.0
Golf Courses	0.7	0.0	0.1	0.1	0.0	0.0
Vacant	0.0	0.0	0.0	0.0	1.3	0.0
average	1.8	5.0	0.0	0.1	0.9	0.1
median	0.0	0.0	0.0	0.1	0.0	0.0
min	0.0	0.0	0.0	0.0	0.0	0.0
max	8.3	24.8	0.1	0.1	3.3	0.6
st dev	3.6	11.1	0.1	0.0	1.5	0.3
COV	2.0	2.2	1.4	1.0	1.6	2.2
count	5	5	5	5	5	5

Open Space Land Use Characteristics

Land Use	Street Area	Curb Miles	Street Width	Large Turf	Undevel	Small Landscaping	TOTAL
	(%)	per 100 ac	(ft)	(%)	(%)	(%)	(%)
Open space	3.9	2.2	27.5	0.6	94.3	0.0	100.0
Parks	16.1	6.9	38.4	15.5	13.7	5.4	100.0
Cemetery	6.9	5.1	22.5	69.5	0.0	8.3	100.0
Golf Courses	1.2	0.5	38.1	75.7	0.0	18.8	100.0
Vacant	4.8	2.1	38.4	26.9	67.0	0.0	100.0
average	6.6	3.4	33.0	37.6	35.0	6.5	100.0
median	4.8	2.2	38.1	26.9	13.7	5.4	100.0
min	1.2	0.5	22.5	0.6	0.0	0.0	100.0
max	16.1	6.9	38.4	75.7	94.3	18.8	100.0
st dev	5.7	2.6	7.5	33.3	43.1	7.8	0.0
COV	0.9	0.8	0.2	0.9	1.2	1.2	0.0
count	5	5	5	5	5	5	5

Open Space Area Land Use Summary

Location	roofs, percentage directly connected	Total directly connected impervious areas (DCIA)	total partially connected impervious areas	Total pervious areas
WI SLU file	100.0	5.1	0.0	94.9
Jefferson County, AL	0.0	32.3	33.1	34.6
Jefferson County, AL	0.0	6.9	15.3	77.8
Jefferson County, AL	0.0	1.9	3.5	94.6
Jefferson County, AL	0.0	4.8	1.3	93.9
average	20.0	10.2	10.6	79.1
median	0.0	5.1	3.5	93.9
min	0.0	1.9	0.0	34.6
max	100.0	32.3	33.1	94.9
st dev	44.7	12.5	13.9	25.9
COV	2.2	1.2	1.3	0.3
count	5	5	5	5

Residential Area Land Use Characteristics

Land Use	Location	land use	EPA Rain Zone	Pitched Roofs to Impervious-C	Pitched Roofs to Pervious-D
				(%)	(%)
Med. Dens.Res (61-80)	Millburn, NJ	resid	1	4.5	11.0
Med. Dens.Res (61-80)	Toronto, Thistledowns, half swales	resid	1	0.0	12.6
Duplex resid	WI SLU file	resid	1	4.5	12.1
High Dens. Res., with alleys	WI SLU file	resid	1	13.6	10.6
High Dens. Res., no alleys	WI SLU file	resid	1	10.3	11.1
High rise resid	WI SLU file	resid	1	0.0	0.0
Low Density Res	WI SLU file	resid	1	1.9	6.1
Med Density Resid no alleys	WI SLU file	resid	1	4.5	10.5
Mobile homes	WI SLU file	resid	1	0.0	0.0
Multi-family res, no alleys	WI SLU file	resid	1	14.1	3.2
Suburban resid	WI SLU file	resid	1	0.0	2.6
High Dens. Res.	Jefferson County, AL	resid	3	4.6	8.1
Med. Dens.Res (<1960)	Jefferson County, AL	resid	3	4.0	5.5
Med. Dens.Res (61-80)	Jefferson County, AL	resid	3	2.2	6.6
Med. Dens.Res (>1980)	Jefferson County, AL	resid	3	6.6	3.2
Low Dens. Res.	Jefferson County, AL	resid	3	0.9	2.9
Apartments	Jefferson County, AL	resid	3	3.6	16.0
Multi Family	Jefferson County, AL	resid	3	10.8	6.7
Med. Dens.Res (<1960)	Kansas City, MO	resid	4	1.9	10.6
Med. Dens.Res (61-80)	San Jose, CA	resid	6	3.0	15.0
Med. Dens.Res (<1960)	Bellevue, WA; Surrey Downs	resid	7	2.9	14.2
Med. Dens.Res (<1960)	Bellevue, WA; Lake Hills	resid	7	3.2	15.7
Low density res	Lincoln, NE	resid	9	1.8	13.1
Med density res <1960	Lincoln, NE	resid	9	2.8	14.7
Med density res 1960 - 1980	Lincoln, NE	resid	9	4.4	13.7
			average	4.2	9.0
			median	3.2	10.6
			min	0.0	0.0
			max	14.1	16.0
			st dev	4.0	5.0
			COV	0.9	0.6
			count	25	25

Residential Area Land Use Characteristics

Land Use	**Flat Roofs to Impervious -C**	**Flat Roofs to Pervious -D**	**Parking paved-C**	**Parking paved-D**	**Parking unpaved-D**	**Playground paved-D**
	(%)	**(%)**	**(%)**	**(%)**	**(%)**	**(%)**
Med. Dens.Res (61-80)	0.0	0.4	1.0	1.0	0.0	0.0
Med. Dens.Res (61-80)	15.0	0.0	0.0	0.0	0.0	0.0
Duplex resid	0.0	0.0	0.0	0.0	0.0	0.0
High Dens. Res., with alleys	0.0	0.0	0.4	0.0	0.0	0.0
High Dens. Res., no alleys	0.0	0.0	0.0	0.0	0.0	0.0
High rise resid	19.0	0.0	21.8	0.0	0.0	0.0
Low Density Res	0.0	0.0	0.1	0.0	0.0	0.0
Med Density Resid no alleys	0.0	0.0	0.2	0.0	0.0	0.0
Mobile homes	16.9	0.0	13.4	0.0	0.6	0.0
Multi-family res, no alleys	3.4	0.0	10.8	0.0	0.5	0.1
Suburban resid	0.0	0.0	0.0	0.1	0.0	0.0
High Dens. Res.	0.0	0.0	0.0	0.0	0.0	0.0
Med. Dens.Res (<1960)	0.0	0.0	0.0	0.0	0.0	0.0
Med. Dens.Res (61-80)	0.0	0.0	0.0	0.0	0.0	0.0
Med. Dens.Res (>1980)	0.0	0.0	0.0	0.0	0.0	0.0
Low Dens. Res.	0.0	0.0	0.0	0.0	0.0	0.0
Apartments	0.0	0.0	6.6	3.9	0.0	0.8
Multi Family	0.0	0.0	8.7	0.0	0.0	0.2
Med. Dens.Res (<1960)	0.0	0.0	1.6	0.0	0.0	0.0
Med. Dens.Res (61-80)	0.0	0.0	3.5	3.5	0.0	0.0
Med. Dens.Res (<1960)	0.0	0.0	2.0	2.0	0.0	0.0
Med. Dens.Res (<1960)	0.0	0.0	0.1	0.1	0.0	0.0
Low density res	0.0	0.0	0.0	0.0	0.0	0.0
Med density res <1960	0.0	0.0	0.0	0.0	1.5	0.0
Med density res 1960 - 1980	0.0	0.0	0.1	0.0	2.1	0.0
average	2.2	0.0	2.8	0.4	0.2	0.0
median	0.0	0.0	0.1	0.0	0.0	0.0
min	0.0	0.0	0.0	0.0	0.0	0.0
max	19.0	0.4	21.8	3.9	2.1	0.8
st dev	5.6	0.1	5.4	1.1	0.5	0.2
COV	2.6	5.0	1.9	2.5	2.7	3.8
count	25	25	25	25	25	25

Residential Area Land Use Characteristics

Land Use	Driveways paved-C	Driveways paved-D	Driveway unpaved	Walkways-C	Walkways-D
	(%)	(%)	(%)	(%)	(%)
Med. Dens.Res (61-80)	5.3	5.3	0.0	0.6	2.4
Med. Dens.Res (61-80)	2.0	2.0	0.0	1.9	1.9
Duplex resid	5.3	0.0	0.0	4.0	0.0
High Dens. Res., with alleys	0.7	0.0	0.0	3.2	3.2
High Dens. Res., no alleys	14.1	0.0	0.0	2.0	2.0
High rise resid	0.9	0.0	0.0	3.4	1.2
Low Density Res	3.2	1.3	0.0	0.4	0.4
Med Density Resid no alleys	5.6	1.6	0.0	1.1	1.1
Mobile homes	12.3	0.0	0.0	0.5	0.5
Multi-family res, no alleys	1.9	0.9	0.0	2.1	2.1
Suburban resid	1.6	1.2	0.0	0.0	0.1
High Dens. Res.	1.6	1.9	0.0	0.0	0.0
Med. Dens.Res (<1960)	1.1	2.0	0.0	0.0	0.0
Med. Dens.Res (61-80)	1.3	1.9	0.0	0.0	0.0
Med. Dens.Res (>1980)	1.1	1.1	0.0	0.0	0.0
Low Dens. Res.	0.2	0.8	0.0	0.0	0.0
Apartments	0.5	1.0	0.0	0.0	0.0
Multi Family	0.6	0.6	0.0	0.1	0.0
Med. Dens.Res (<1960)	4.1	4.0	0.8	1.2	1.3
Med. Dens.Res (61-80)	0.0	0.0	0.0	2.3	2.3
Med. Dens.Res (<1960)	2.6	2.6	0.0	0.0	0.0
Med. Dens.Res (<1960)	2.5	2.5	0.0	0.0	0.0
Low density res	2.7	2.7	0.0	0.0	0.4
Med density res <1960	3.5	3.5	0.0	0.1	0.4
Med density res 1960 - 1980	3.1	3.1	0.0	0.0	0.3
average	3.1	1.6	0.0	0.9	0.8
median	2.0	1.3	0.0	0.1	0.4
min	0.0	0.0	0.0	0.0	0.0
max	14.1	5.3	0.8	4.0	3.2
st dev	3.4	1.4	0.2	1.2	1.0
COV	1.1	0.9	5.0	1.4	1.2
count	25	25	25	25	25

Residential Area Land Use Characteristics

Land Use	Street Area (%)	Curb Miles per 100 ac	Street Width (ft)	Large Turf (%)	Undevel (%)
Med. Dens.Res (61-80)	12.3	6.2	33.0	0.0	1.7
Med. Dens.Res (61-80)	9.5	4.5	35.0	0.0	0.0
Duplex resid	13.3	7.0	31.4	0.0	0.0
High Dens. Res., with alleys	20.2	12.3	27.0	0.0	0.3
High Dens. Res., no alleys	13.5	7.3	30.5	0.0	0.0
High rise resid	18.1	10.0	30.0	0.0	9.5
Low Density Res	7.0	4.5	27.8	0.0	4.4
Med Density Resid no alleys	12.1	6.8	31.2	0.2	0.4
Mobile homes	3.6	0.5	120.0	0.0	4.5
Multi-family res, no alleys	14.6	7.8	30.0	1.4	3.0
Suburban resid	4.0	2.5	26.0	0.0	5.5
High Dens. Res.	7.9	3.4	37.7	0.0	3.9
Med. Dens.Res (<1960)	5.6	2.5	37.2	0.0	0.0
Med. Dens.Res (61-80)	6.7	2.9	38.2	0.0	0.2
Med. Dens.Res (>1980)	7.5	3.3	38.3	0.0	4.8
Low Dens. Res.	5.3	2.3	38.2	0.0	8.4
Apartments	9.8	4.1	39.2	0.0	3.3
Multi Family	7.3	3.2	37.8	0.0	6.9
Med. Dens.Res (<1960)	9.4	5.9	26.2	0.0	0.0
Med. Dens.Res (61-80)	18.0	6.2	48.0	0.0	11.0
Med. Dens.Res (<1960)	10.3	5.8	29.4	2.0	1.6
Med. Dens.Res (<1960)	11.7	6.9	28.0	3.4	0.0
Low density res	13.2	7.9	28.0	0.0	0.0
Med density res <1960	15.1	10.0	25.0	0.0	0.0
Med density res 1960 - 1980	10.4	8.4	23.0	0.0	0.0
average	10.7	5.7	35.8	0.3	2.8
median	10.3	5.9	31.2	0.0	1.6
min	3.6	0.5	23.0	0.0	0.0
max	20.2	12.3	120.0	3.4	11.0
st dev	4.4	2.8	18.5	0.8	3.4
COV	0.4	0.5	0.5	2.9	1.2
count	25	25	25	25	25

Residential Area Land Use Characteristics

Land Use	Small Landscaping	Isolated	Other pervious area	Other directly connected Imp area	Other part cncted Imp area	TOTAL
	(%)	(%)	(%)	(%)	(%)	(%)
Med. Dens.Res (61-80)	54.5	0.0	0.0	0.0	0.0	100.0
Med. Dens.Res (61-80)	55.1	0.0	0.0	0.0	0.0	100.0
Duplex resid	60.8	0.0	0.0	0.0	0.0	100.0
High Dens. Res., with alleys	41.5	0.0	6.3	0.0	0.0	100.0
High Dens. Res., no alleys	41.0	0.1	5.9	0.0	0.0	100.0
High rise resid	22.9	0.0	3.2	0.0	0.0	100.0
Low Density Res	74.7	0.2	0.2	0.0	0.1	100.0
Med Density Resid no alleys	58.5	0.2	4.0	0.0	0.0	100.0
Mobile homes	44.7	1.0	0.0	2.0	0.0	100.0
Multi-family res, no alleys	38.0	0.1	3.8	0.0	0.0	100.0
Suburban resid	84.8	0.1	0.0	0.0	0.0	100.0
High Dens. Res.	72.2	0.0	0.0	0.0	0.0	100.0
Med. Dens.Res (<1960)	81.7	0.0	0.0	0.0	0.0	100.0
Med. Dens.Res (61-80)	81.1	0.0	0.0	0.0	0.0	100.0
Med. Dens.Res (>1980)	75.7	0.0	0.0	0.0	0.0	100.0
Low Dens. Res.	81.5	0.0	0.0	0.0	0.0	100.0
Apartments	54.5	0.0	0.0	0.0	0.0	100.0
Multi Family	58.3	0.0	0.0	0.0	0.0	100.0
Med. Dens.Res (<1960)	65.1	0.0	0.0	0.0	0.0	100.0
Med. Dens.Res (61-80)	41.5	0.0	0.0	0.0	0.0	100.0
Med. Dens.Res (<1960)	59.9	0.0	0.0	0.0	0.0	100.0
Med. Dens.Res (<1960)	60.9	0.0	0.0	0.0	0.0	100.0
Low density res	66.1	0.0	0.0	0.0	0.0	100.0
Med density res <1960	58.4	0.0	0.0	0.0	0.0	100.0
Med density res 1960 - 1980	62.5	0.3	0.0	0.0	0.0	100.0
average	59.8	0.1	0.9	0.1	0.0	100.0
median	59.9	0.0	0.0	0.0	0.0	100.0
min	22.9	0.0	0.0	0.0	0.0	100.0
max	84.8	1.0	6.3	2.0	0.1	100.0
st dev	15.7	0.2	2.0	0.4	0.0	0.0
COV	0.3	2.5	2.1	5.0	5.0	0.0
count	25	25	25	25	25	25

Residential Area Land Use Characteristics Summary

Land Use	**roofs, percentage directly connected**	**Total directly connected impervious areas (DCIA)**	**total partially connected impervious areas**	**Total pervious areas**
Med. Dens.Res (61-80)	28.3	23.7	20.1	56.2
Med. Dens.Res (61-80)	54.3	28.4	16.5	55.1
Duplex resid	27.1	27.1	12.1	60.8
High Dens. Res., with alleys	56.2	38.1	13.8	48.1
High Dens. Res., no alleys	48.1	39.9	13.1	46.9
High rise resid	100.0	63.2	1.2	35.6
Low Density Res	23.8	12.6	7.9	79.3
Med Density Resid no alleys	30.0	23.5	13.2	63.1
Mobile homes	100.0	48.7	1.1	49.2
Multi-family res, no alleys	84.5	46.9	6.8	46.2
Suburban resid	0.0	5.6	4.0	90.3
High Dens. Res.	36.2	14.0	10.0	76.1
Med. Dens.Res (<1960)	41.9	10.7	7.5	81.7
Med. Dens.Res (61-80)	24.8	10.3	8.5	81.2
Med. Dens.Res (>1980)	67.0	15.2	4.3	80.5
Low Dens. Res.	23.0	6.4	3.7	89.8
Apartments	18.4	20.5	21.7	57.8
Multi Family	61.8	27.4	7.4	65.2
Med. Dens.Res (<1960)	15.0	18.1	16.8	65.1
Med. Dens.Res (61-80)	16.7	26.8	20.8	52.5
Med. Dens.Res (<1960)	17.0	17.8	18.8	63.5
Med. Dens.Res (<1960)	17.0	17.5	18.2	64.3
Low density res	12.1	17.7	16.2	66.1
Med density res <1960	16.0	21.5	20.1	58.4
Med density res 1960 - 1980	24.3	18.0	19.2	62.5
average	37.7	24.0	12.1	63.8
median	27.1	20.5	13.1	63.1
min	0.0	5.6	1.1	35.6
max	100.0	63.2	21.7	90.3
st dev	27.3	14.0	6.6	14.3
COV	0.7	0.6	0.5	0.2
count	25	25	25	25

Freeway and Highway Land Use Characteristics

				Curb Miles			
-	-	-	-	**per 100 ac**	-	-	-
Freeways with swales	Jefferson County, AL	freeways	3	8.9	with swales	30,000 AADT	
Freeways with swales	WI SLU file	freeways	1	12.4	with swales	30,000 AADT	
Freeway 4 lane urban	type 5 WisDOT 120 ft ROW	freeways	1	6.8	curb and gutters	30,000 ADT	
Highway 2 lane rural	type 7 WisDOT 66 ft ROW	freeways	1	12.5	curb and gutters	7,500 ADT	
			average	10.2			
			median	10.7			
			min	6.8			
			max	12.5			
			st dev	2.8			
			COV	0.3			
			count	4			

Freeway and Highway Land Use Characteristics

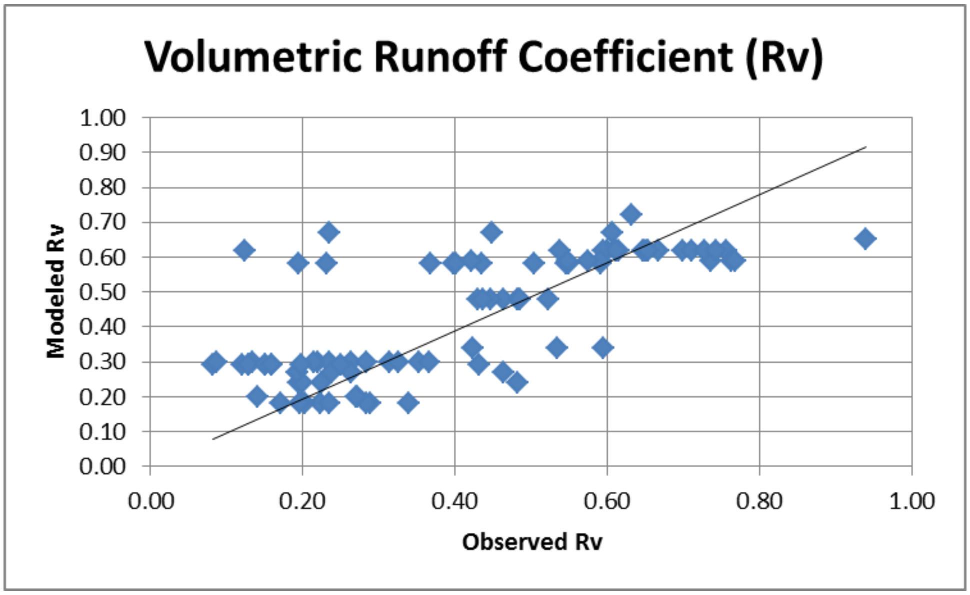
	Street Area - connected - C	Street Area Disconnected - D	Shoulder Connected - C	Shoulder Disconnected- D	Landscap	Grass area at the medium	total
-		(%)		(%)	(%)	(%)	-
Freeways with swales	0.0	46.8	0.0	12.3	32.1	8.8	100.0
Freeways with swales	0.0	50.5	0.0	0.0	49.5	0.0	100.0
Freeway 4 lane urban	56.3	0	18.9	0	24.8	0	100.00
Highway 2 lane rural	36.8	0	15.7	0	47.5	0	100.00
average	23.3	24.3	8.7	3.1	38.5	2.2	100.0
median	18.4	23.4	7.9	0.0	39.8	0.0	100.0
min	0.0	0.0	0.0	0.0	24.8	0.0	100.0
max	56.3	50.5	18.9	12.3	49.5	8.8	100.0
st dev	28.0	28.1	10.1	6.2	12.0	4.4	0.0
COV	1.2	1.2	1.2	2.0	0.3	2.0	0.0
count	4	4	4	4	4	4	4

Freeway Land Use Characteristics Summary

	Total directly connected impervious areas (DCIA)	**total partially connected impervious areas**	**Total pervious areas**
-			
Freeways with swales	0.0	59.1	40.9
Freeways with swales	0.0	50.5	49.5
Freeway 4 lane urban	75.2	0.0	24.8
Highway 2 lane rural	52.5	0.0	47.5
average	31.9	27.4	40.7
median	26.3	25.3	44.2
min	0.0	0.0	24.8
max	75.2	59.1	49.5
st dev	38.0	31.8	11.2
COV	1.2	1.2	0.3
count	4	4	4

Appendix B. Observed vs. Modeled Stormwater Characteristics

Volumetric Runoff Coefficients



Rv Regression Statistics

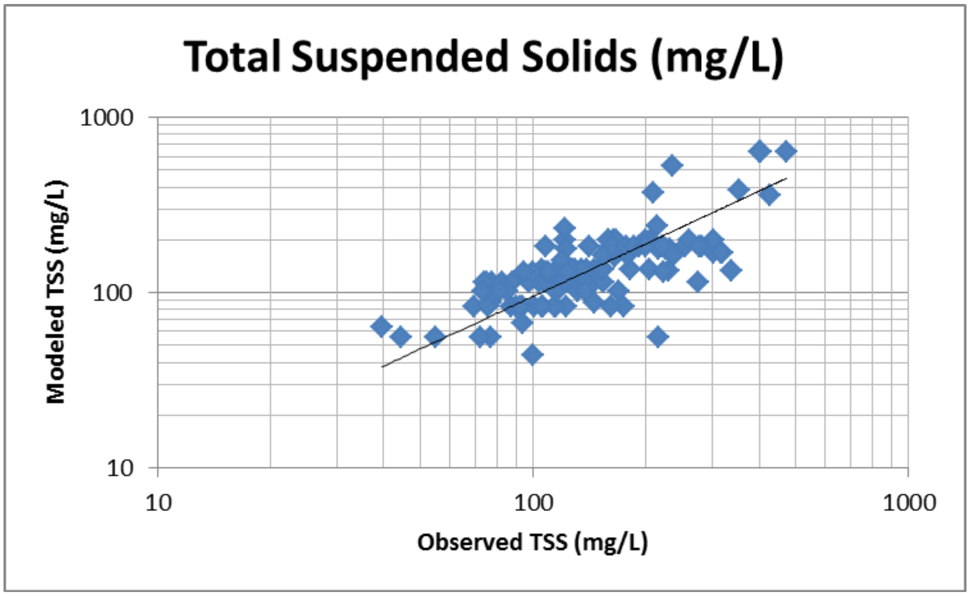
Multiple R	0.95
R Square	0.91
Adjusted R Square	0.90
Standard Error	0.14
Observations	91

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1.00	16.78	16.78	882.15	5.80E-48
Residual	90.00	1.71	0.02		
Total	91.00	18.49			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.00	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	0.93	0.03	29.70	2.74E-48	0.87	0.99

Total Suspended Solids



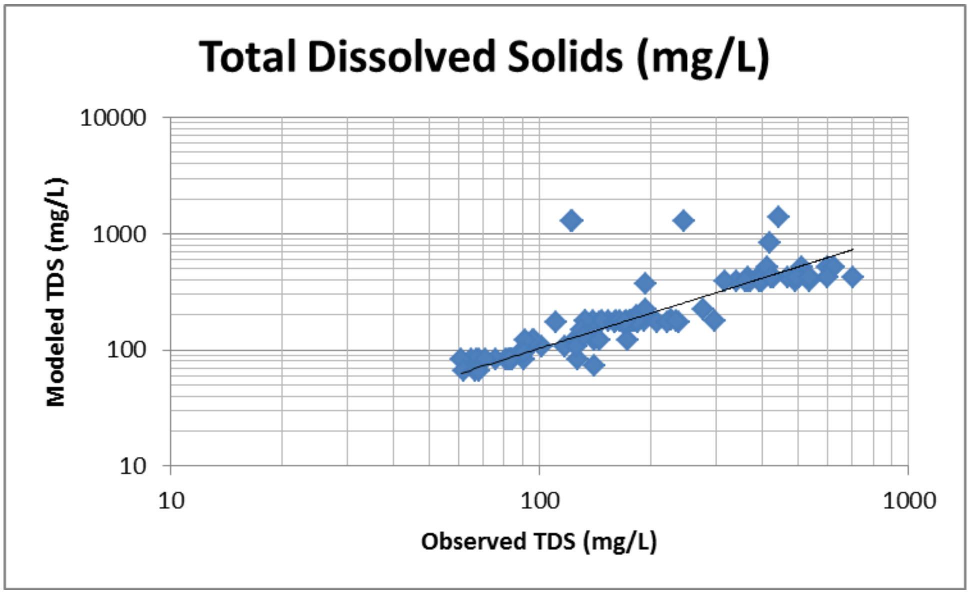
TSS Regression Statistics

Multiple R	0.93
R Square	0.86
Adjusted R Square	0.85
Standard Error	69.10
Observations	114

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*	
Regression	1	3247990	3247990	680.19	2.14E-49	
Residual	113	539589	4775			
Total	114	3787579				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.00	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	0.90	0.03	26.08	1.23E-49	0.83	0.97

Total Dissolved Solids



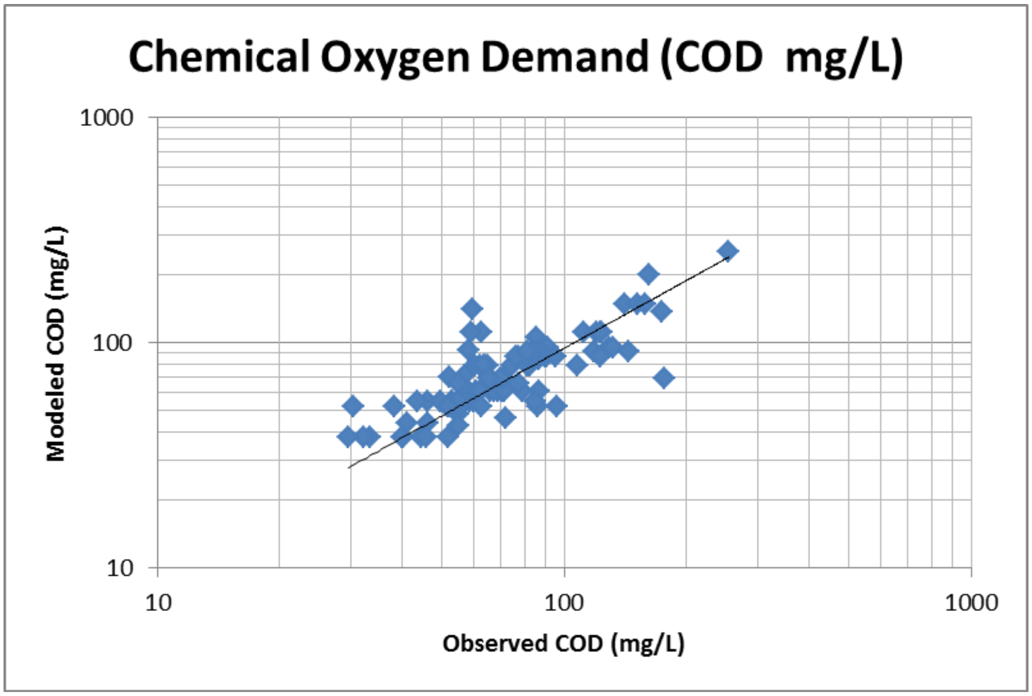
TDS Regression Statistics	
Multiple R	0.80
R Square	0.64
Adjusted R Square	0.63
Standard Error	164
Observations	114

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	5349810	5349810	200.08	1.12E-26
Residual	113	3021473	26739		
Total	114	8371283			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	0.62	0.04	14.14	9.20E-27	0.53	0.70

Chemical Oxygen Demand



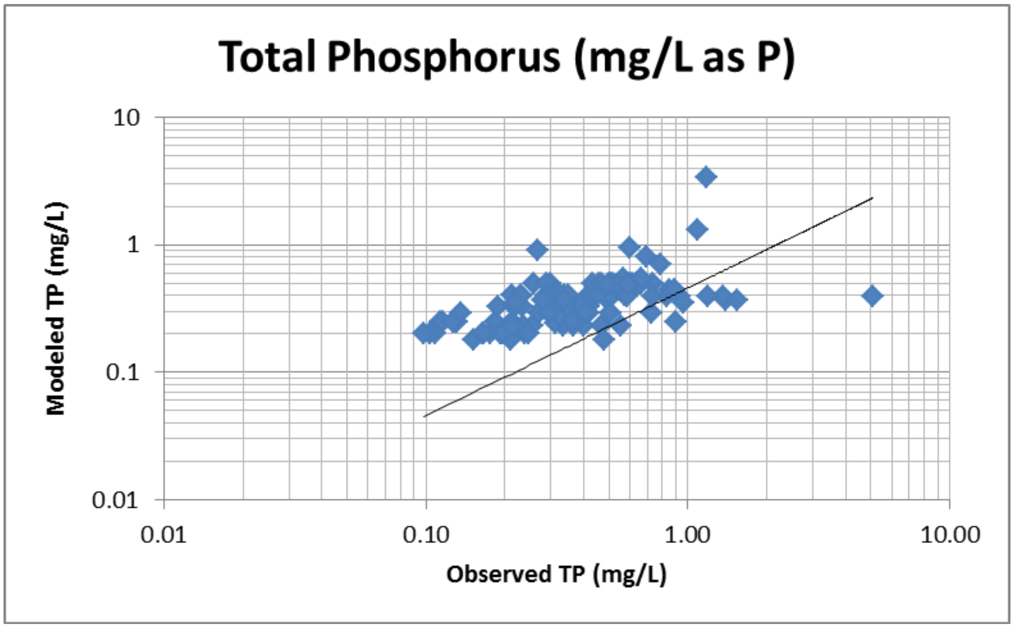
COD Regression Statistics	
Multiple R	0.97
R Square	0.94
Adjusted R Square	0.93
Standard Error	20.37
Observations	114

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	772664	772664	1861	1.29E-71
Residual	113	46904	415		
Total	114	819568			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.00	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	1.00	0.02	43.14	4.93E-72	0.95	1.04

Total Phosphorus



TP Regression Statistics

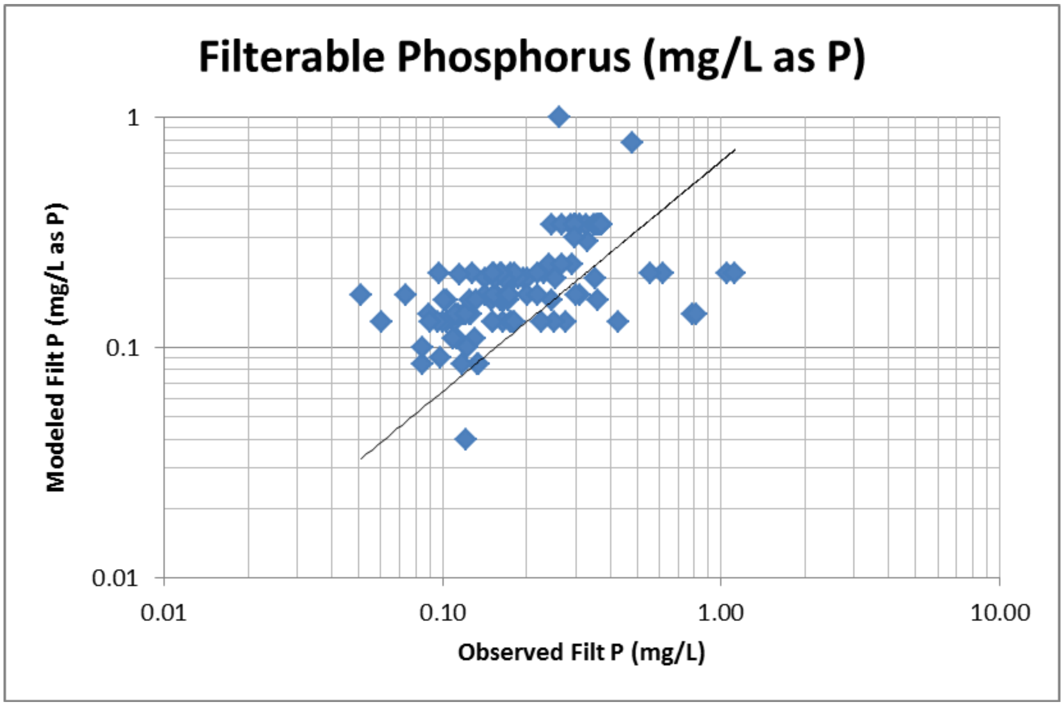
Multiple R	0.64
R Square	0.40
Adjusted R Square	0.40
Standard Error	0.55
Observations	114

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	24	23.55	76.75	2.36E-14
Residual	113	35	0.31		
Total	114	58			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.00	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	0.88	0.10	8.76	2.23E-14	0.68	1.08

Filterable Phosphorus



Filterable P Regression Statistics

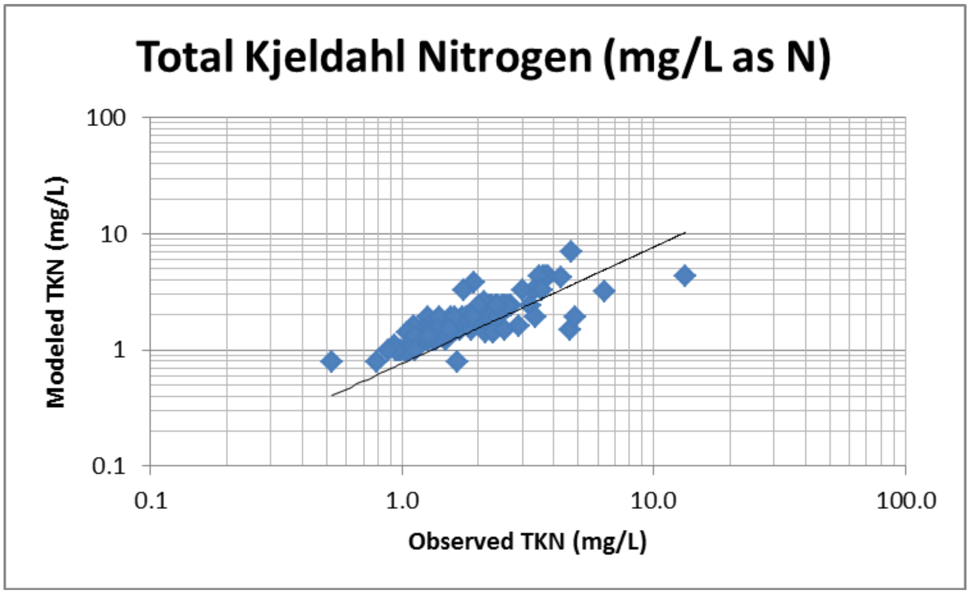
Multiple R	0.78
R Square	0.62
Adjusted R Square	0.61
Standard Error	0.18
Observations	114

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	5.98	5.98	180.85	4.00E-25
Residual	113	3.73	0.03		
Total	114	9.71			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.00	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	0.95	0.07	13.45	3.37E-25	0.81	1.09

Total Kjeldahl Nitrogen



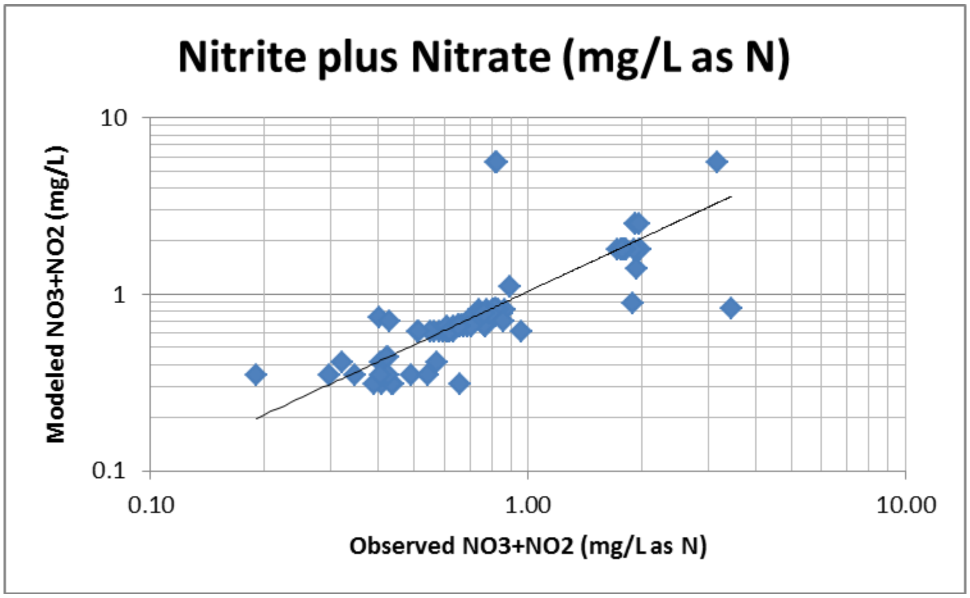
TKN Regression Statistics	
Multiple R	0.90
R Square	0.81
Adjusted R Square	0.80
Standard Error	1.09
Observations	114

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	581	580.70	491.96	8.71E-43
Residual	113	133	1.18		
Total	114	714			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.00	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	1.06	0.05	22.18	5.62E-43	0.96	1.15

Nitrite plus Nitrate Nitrogen



Nitrate + Nitrite Regression Statistics

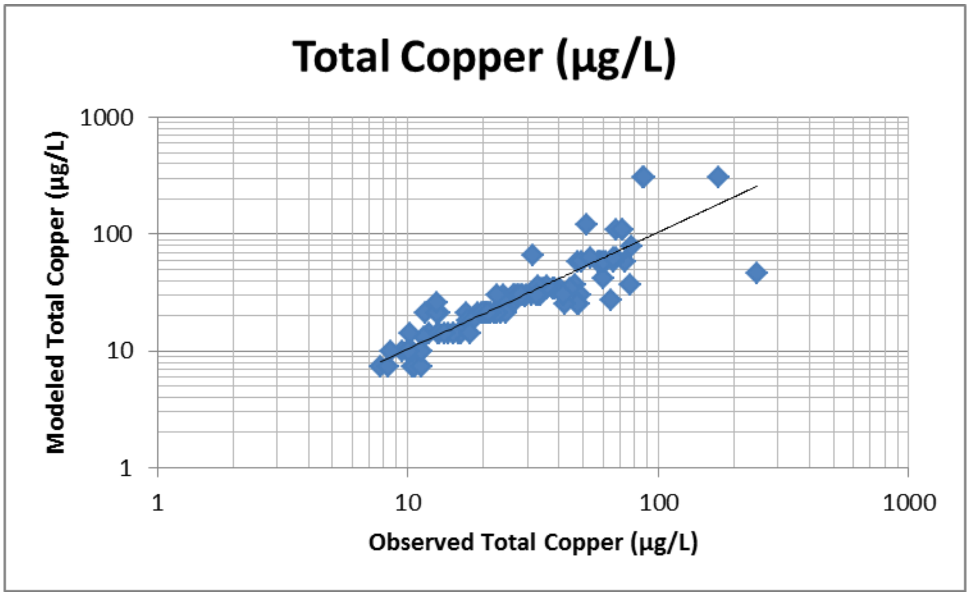
Multiple R	0.85
R Square	0.72
Adjusted R Square	0.71
Standard Error	0.60
Observations	114

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	108	108.20	295.89	3.24E-33
Residual	113	41	0.37		
Total	114	150			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.00	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	0.70	0.04	17.20	2.43E-33	0.62	0.78

Total Copper



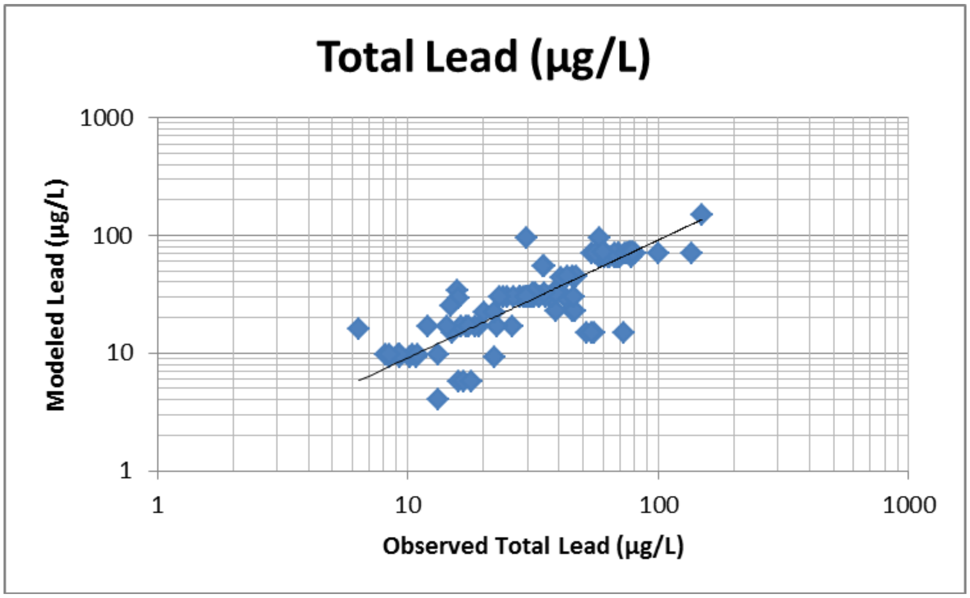
Total Copper Regression Statistics	
Multiple R	0.78
R Square	0.61
Adjusted R Square	0.60
Standard Error	29.60
Observations	114

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	154868	154868	176.78	8.81E-25
Residual	113	98994	876.05		
Total	114	253862			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.00	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	0.59	0.04	13.30	7.44E-25	0.50	0.67

Total Lead



Total Lead Regression Statistics

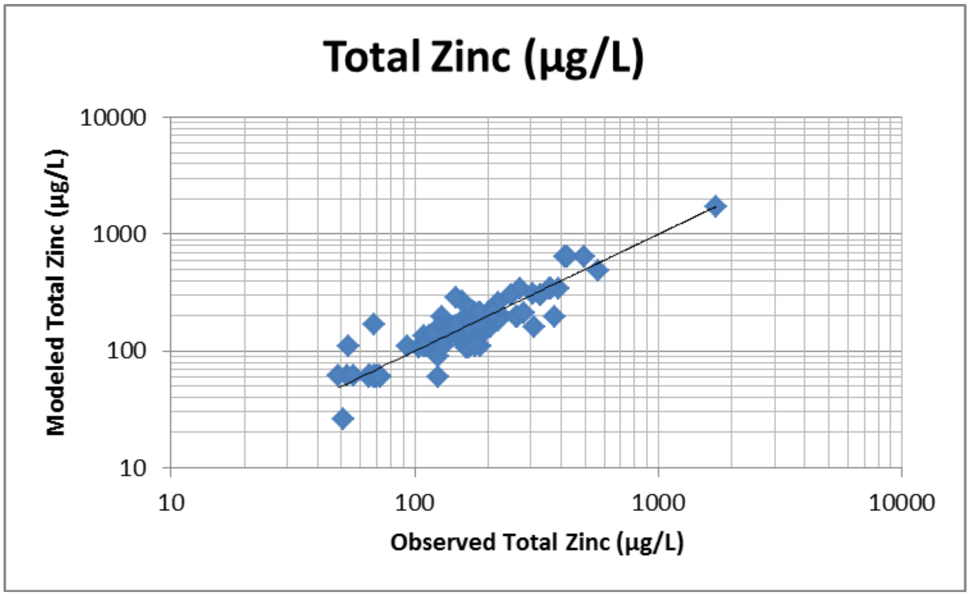
Multiple R	0.95
R Square	0.91
Adjusted R Square	0.90
Standard Error	14.82
Observations	114

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	241585	241585	1100	9.70E-60
Residual	113	24828	220		
Total	114	266414			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.00	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	0.99	0.03	33.16	4.63E-60	0.93	1.05

Total Zinc



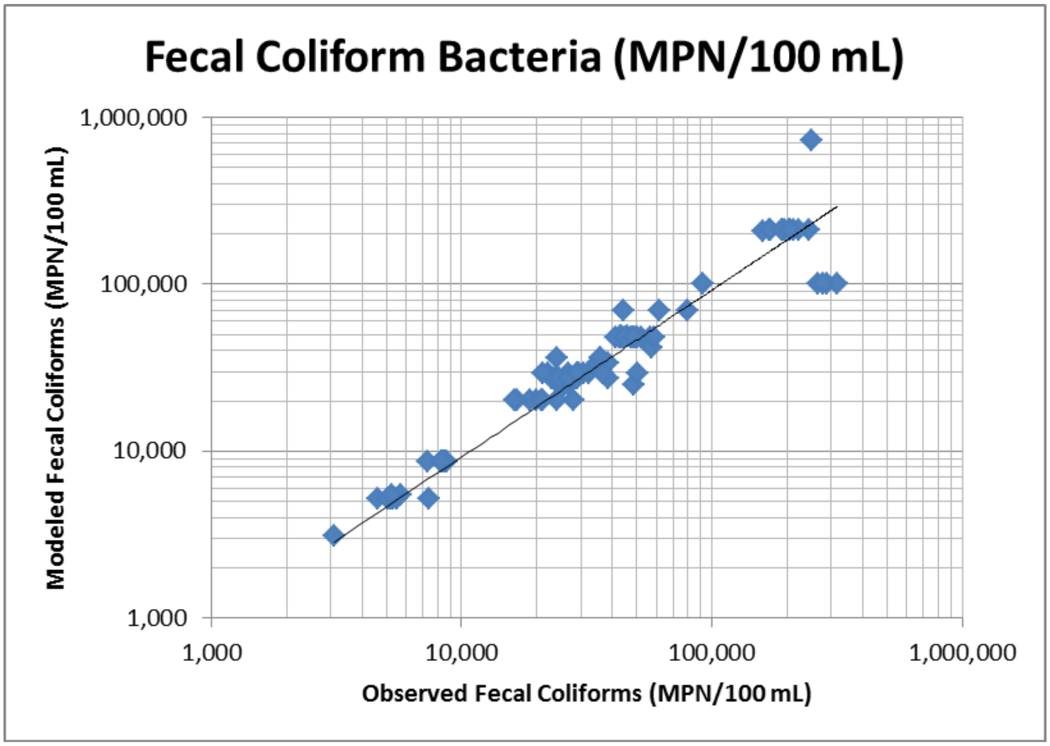
Total Zinc Regression Statistics	
Multiple R	0.98
R Square	0.96
Adjusted R Square	0.95
Standard Error	51.60
Observations	114

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	7207758	7207758	2707	2.70E-80
Residual	113	300829	2662		
Total	114	7508587			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.00	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	0.96	0.02	52.03	8.69E-81	0.92	1.00

Fecal Coliform Bacteria



Fecal Coliforms Regression Statistics	
Multiple R	0.83
R Square	0.68
Adjusted R Square	0.68
Standard Error	52044
Observations	114

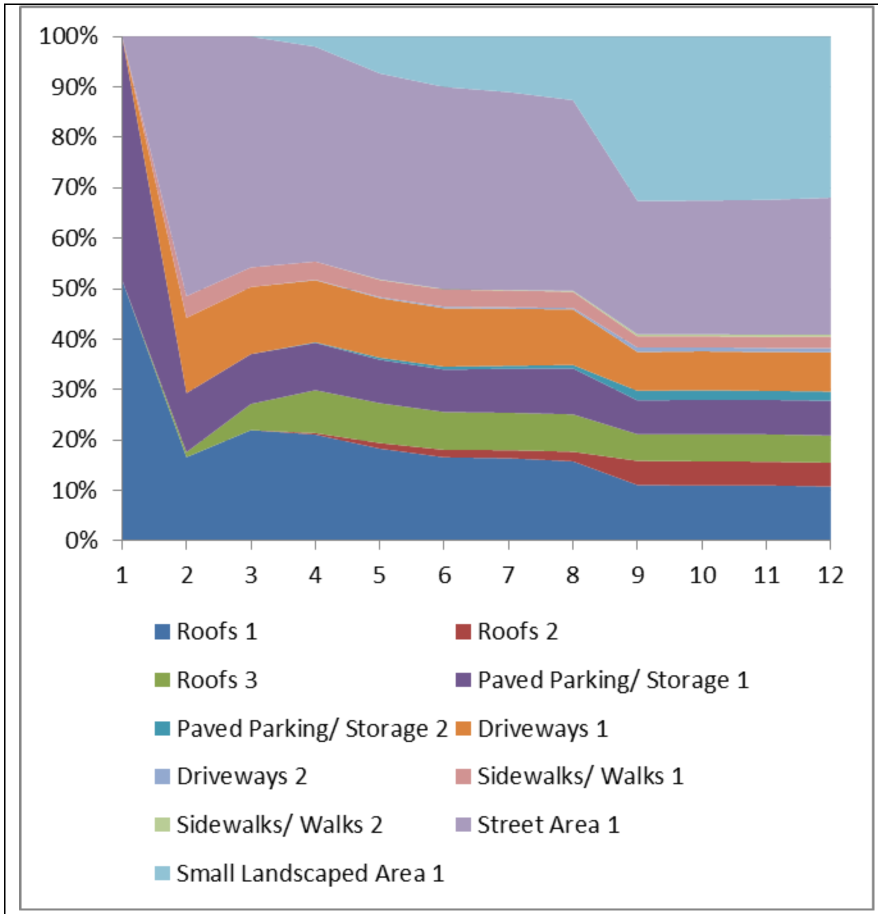
ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	663022202118	663022202118	245	6.00E-30
Residual	113	306069843794	2708582688		
Total	114	969092045912			

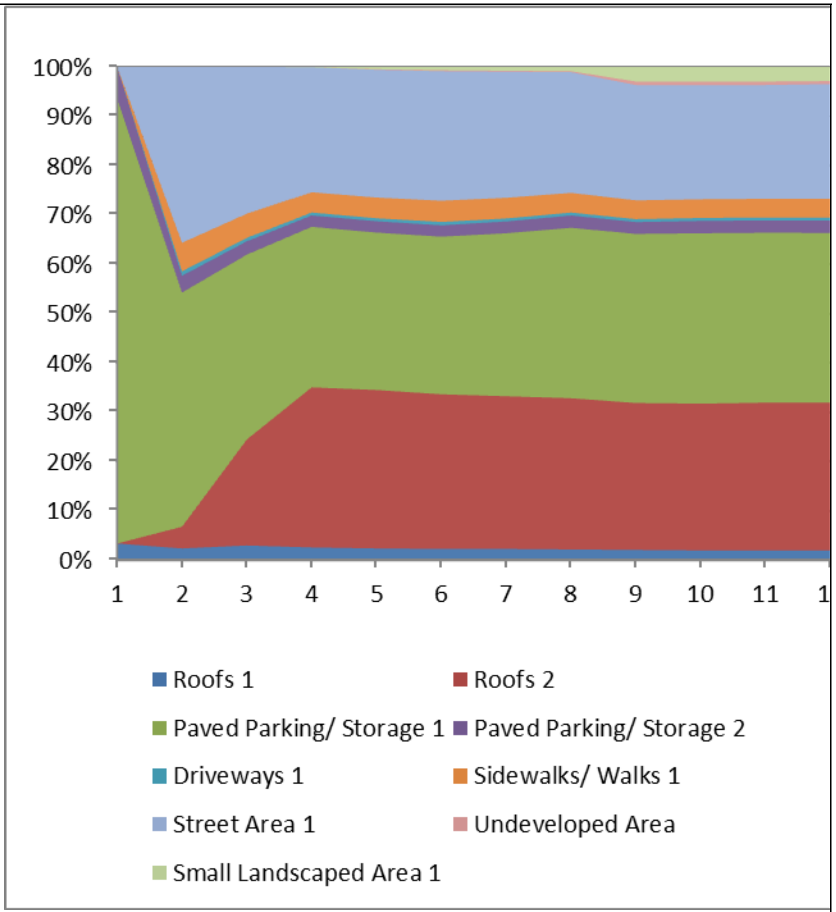
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.00	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	0.74	0.05	15.65	4.72E-30	0.65	0.83

Appendix C. Sources of Stormwater Flows and Pollutants

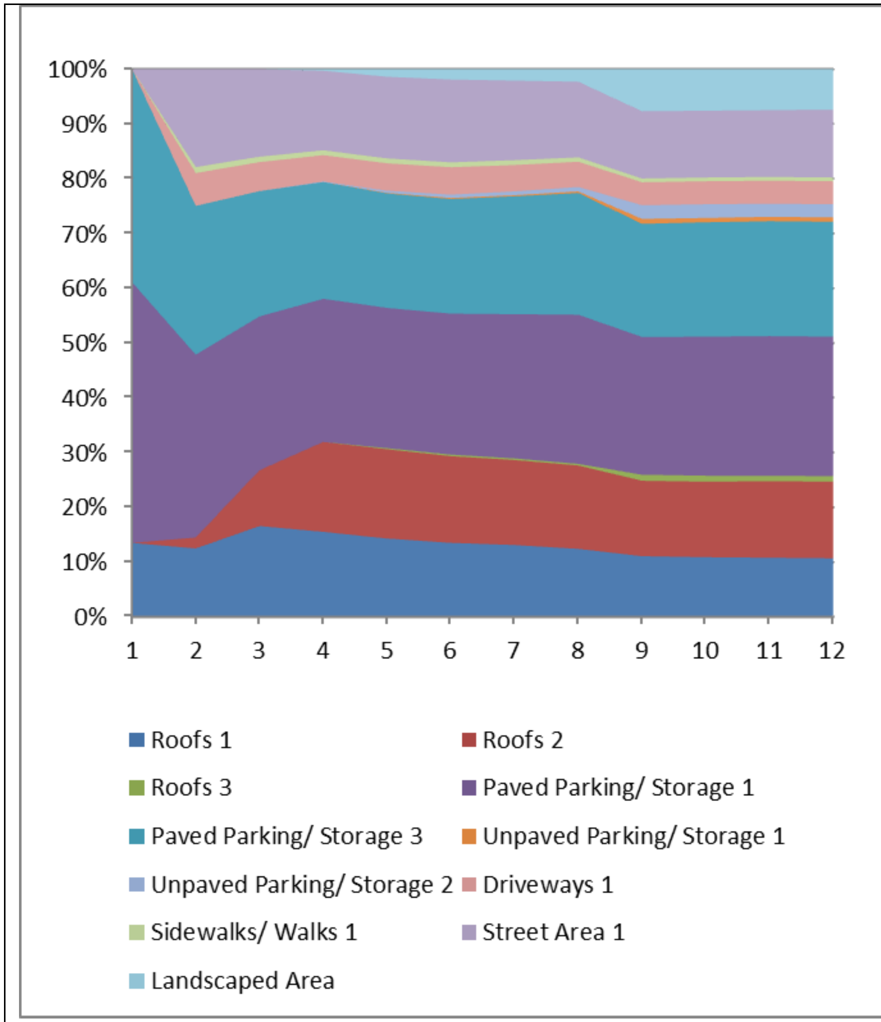
Flow Contributions



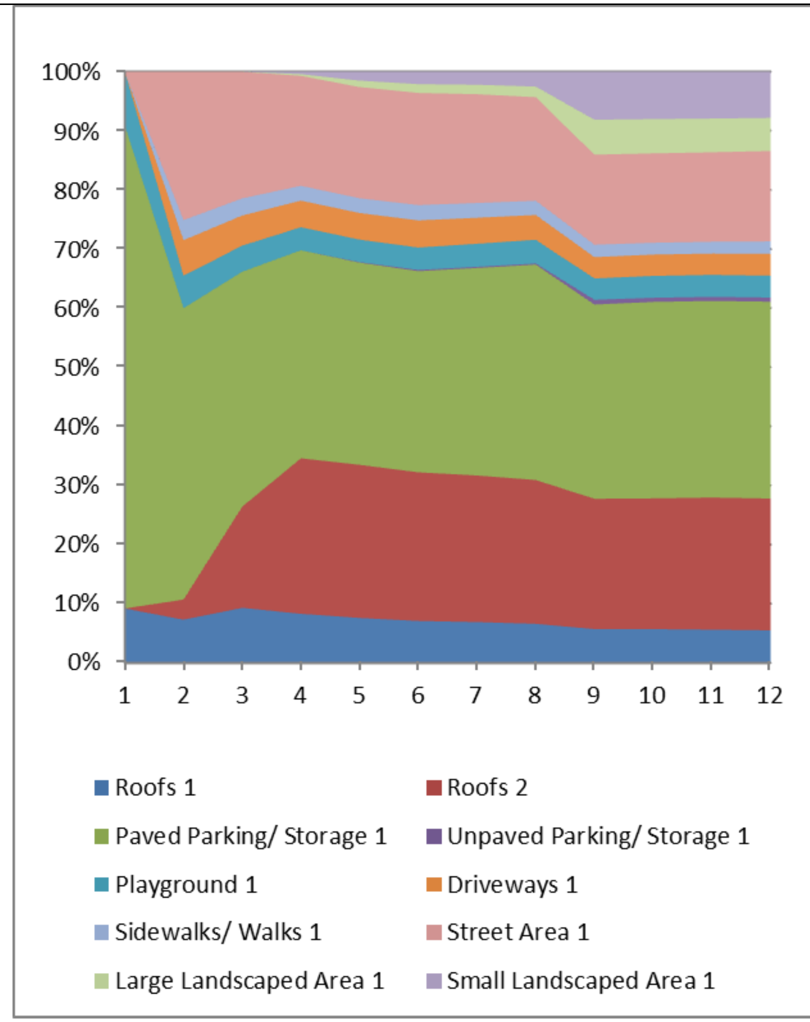
Residential Areas Flow Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



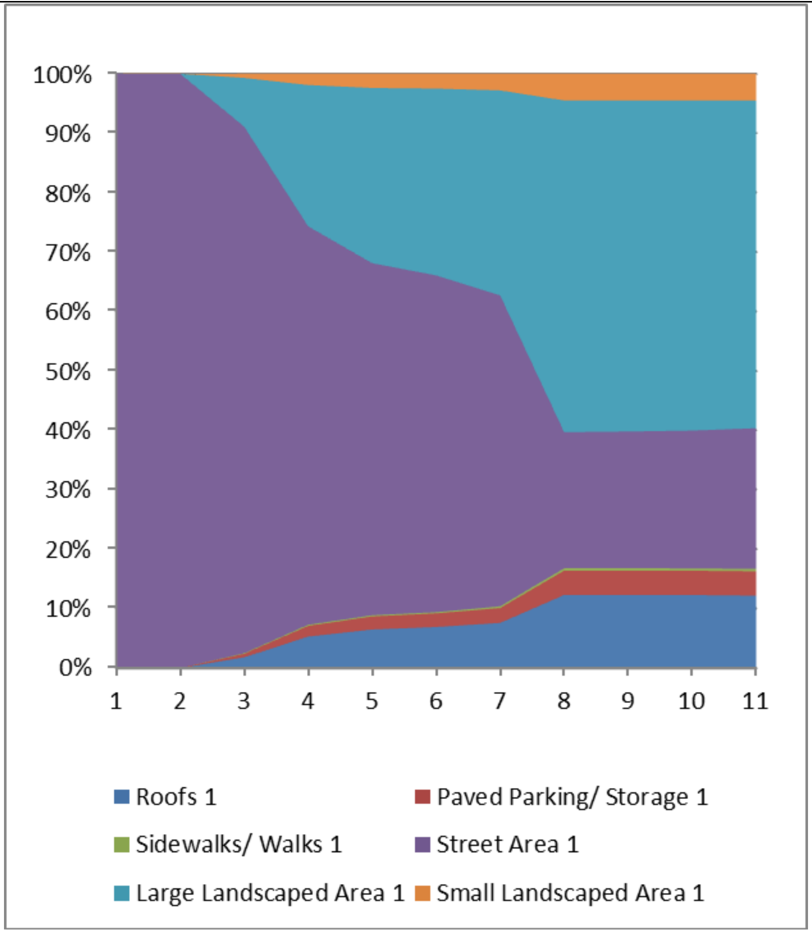
Commercial Areas Flow Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



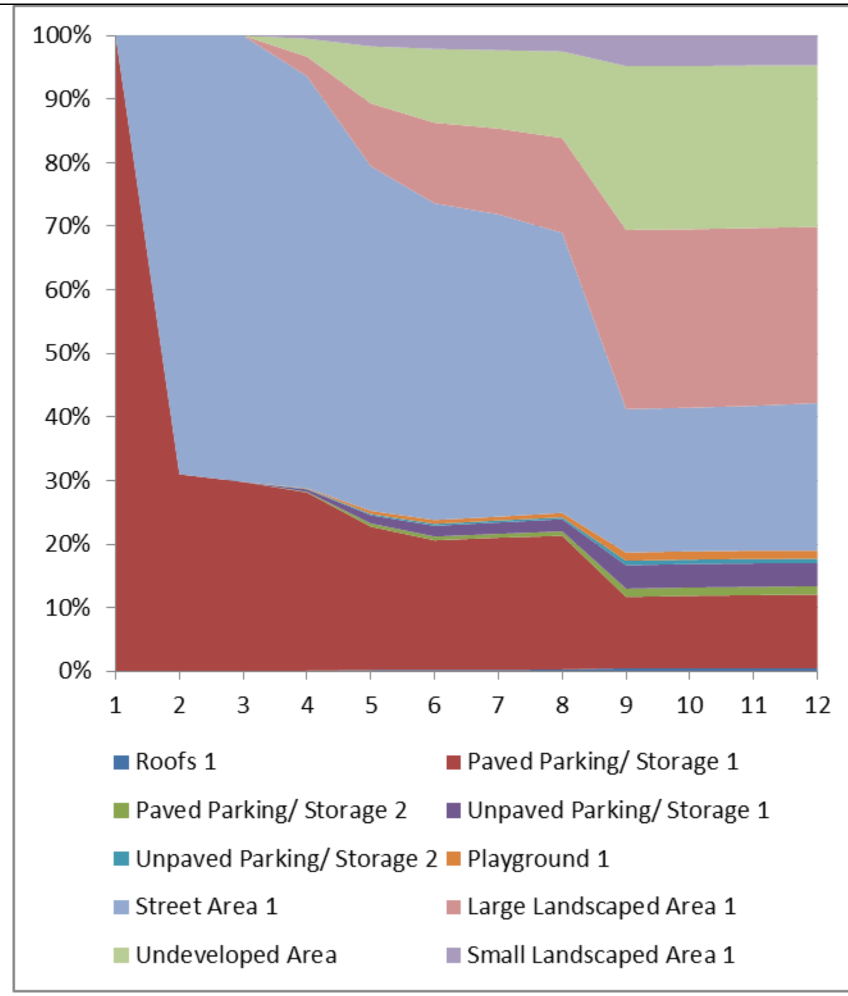
Industrial Areas Flow Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



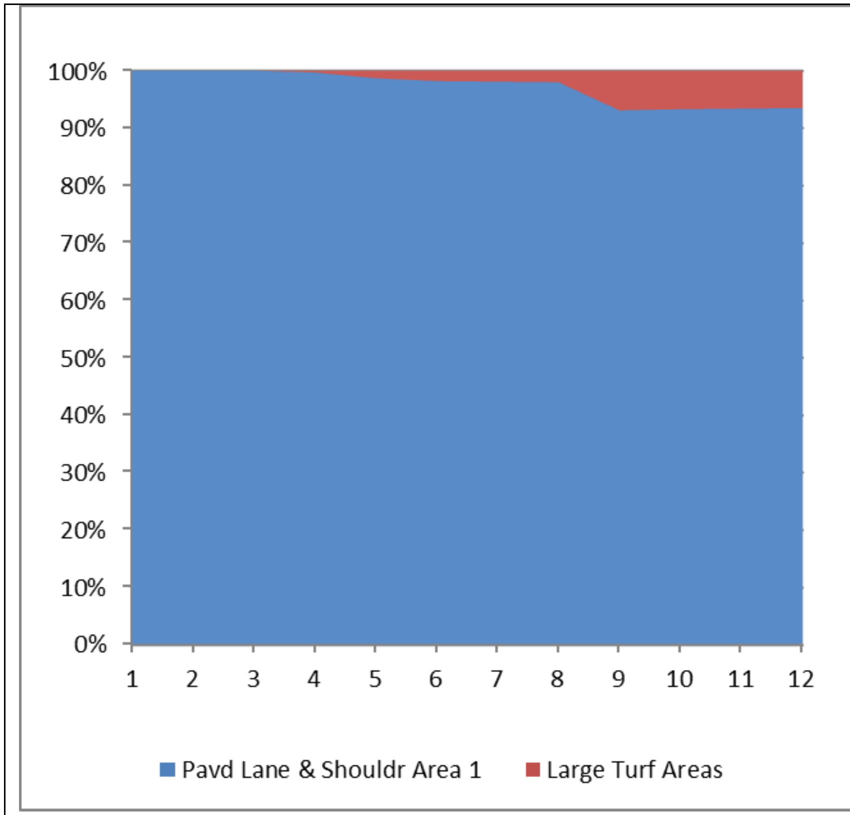
Institutional Areas Flow Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



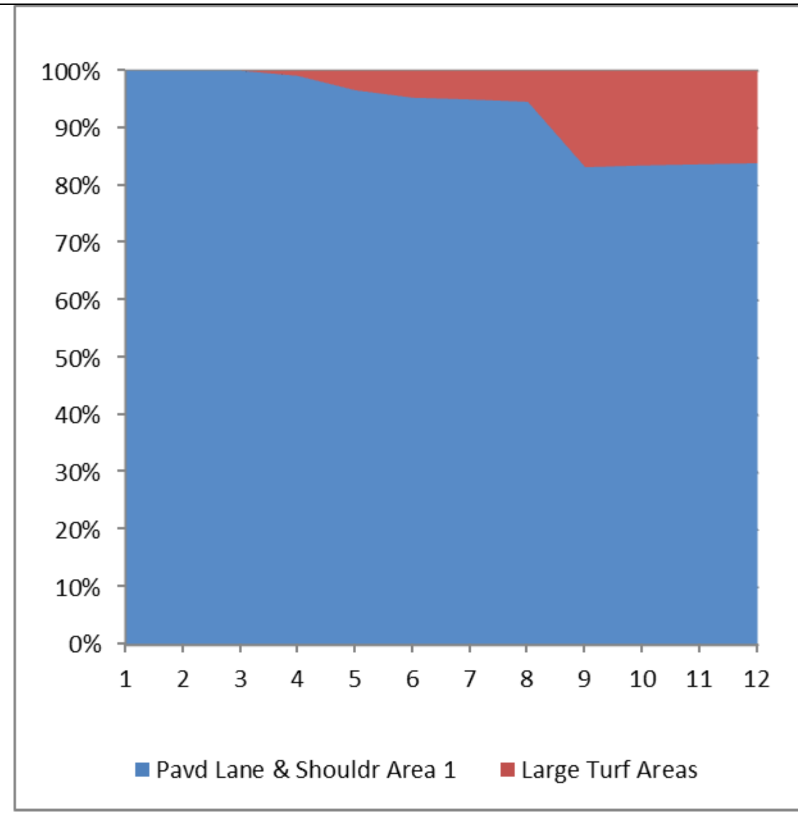
Office Technology Park Areas Flow Contributions
Rains: 1: 0.05”; 2: 0.1”; 3: 0.25”; 4: 0.5”; 5: 0.75”; 6: 1”; 7: 1.5”; 8: 2”; 9: 2.5”; 10:3”; 11: 4” (no runoff expected for 0.01 inch rains)



Open Space Areas Flow Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

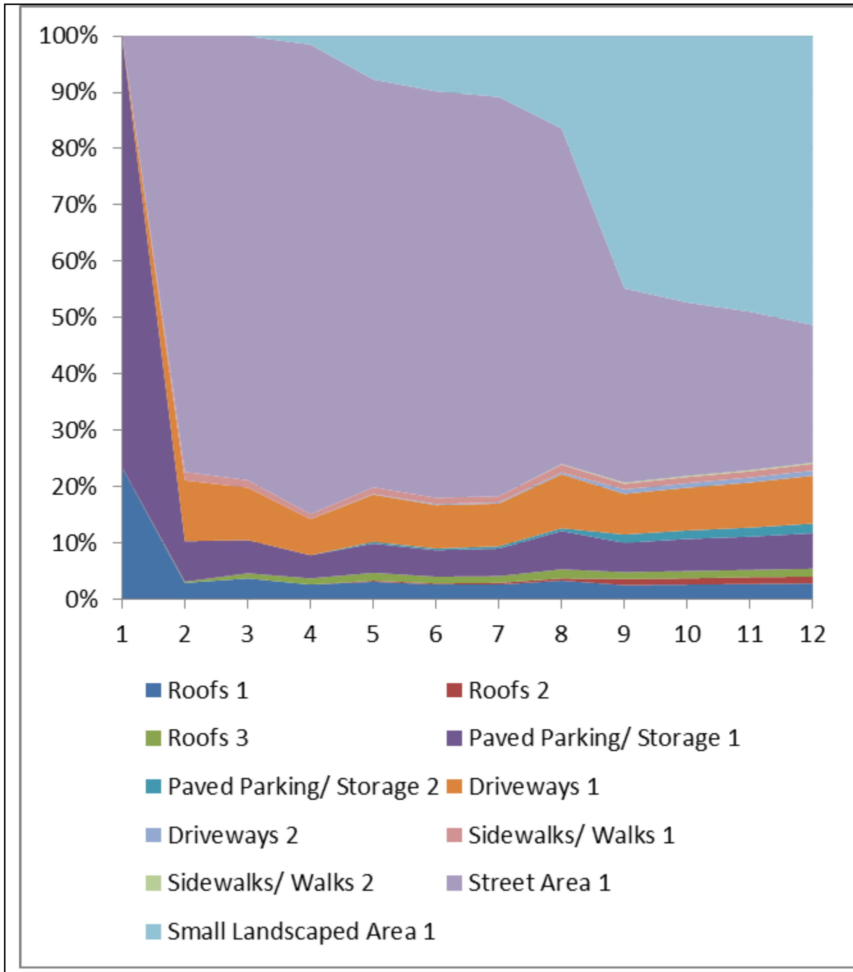


Urban Freeway Areas Flow Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

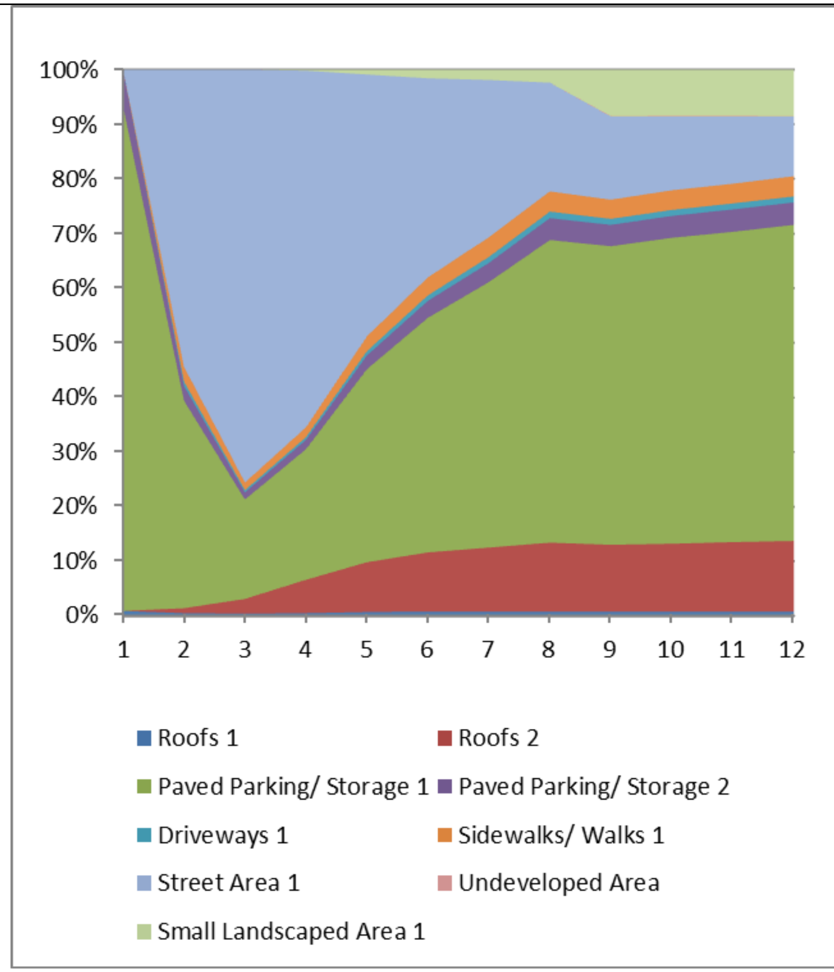


Rural Highway Areas Flow Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

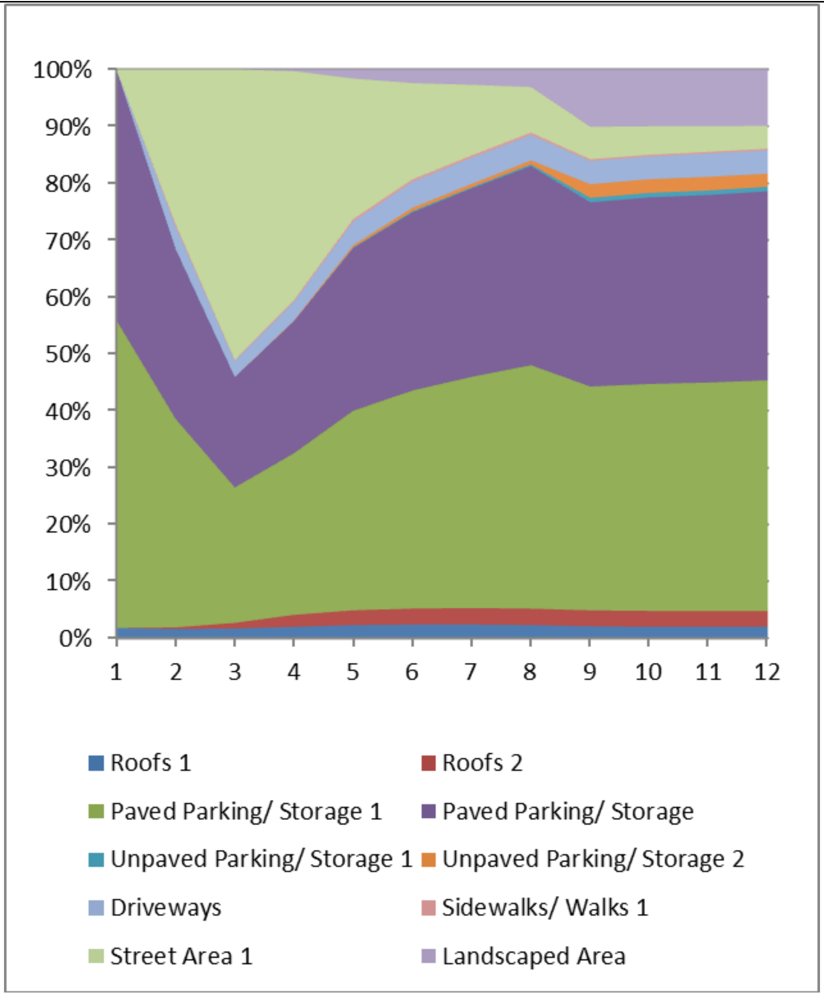
Total Suspended Solids Mass Contributions



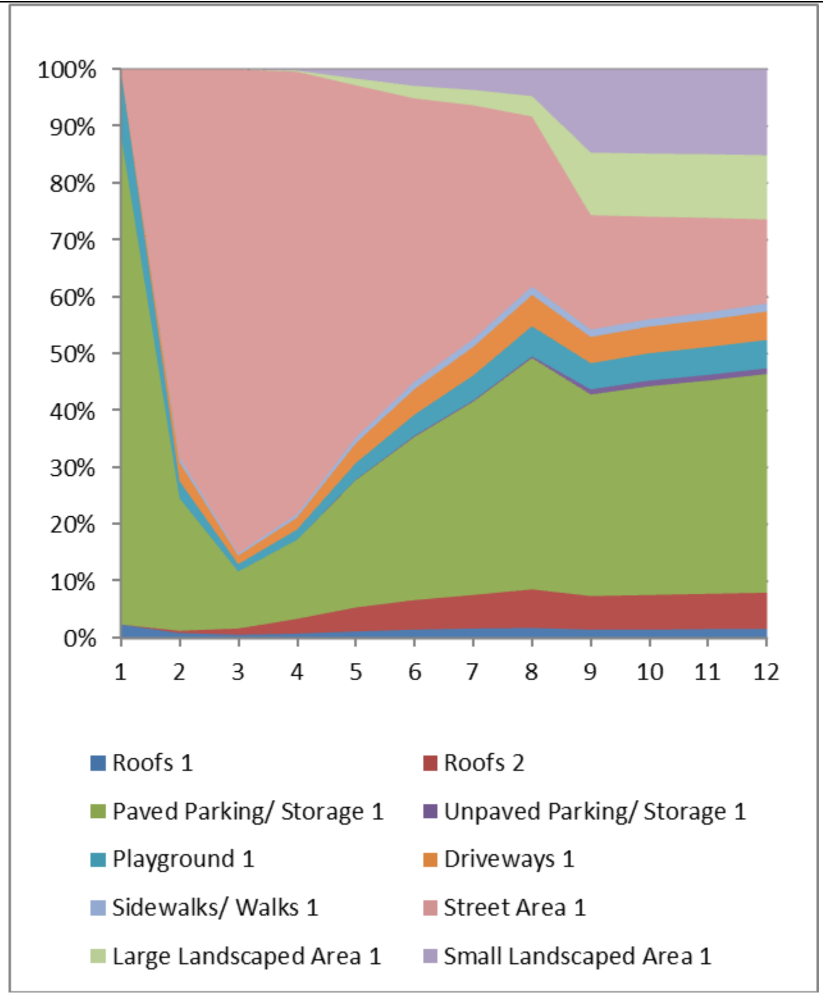
Residential Areas Total Suspended Solids Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



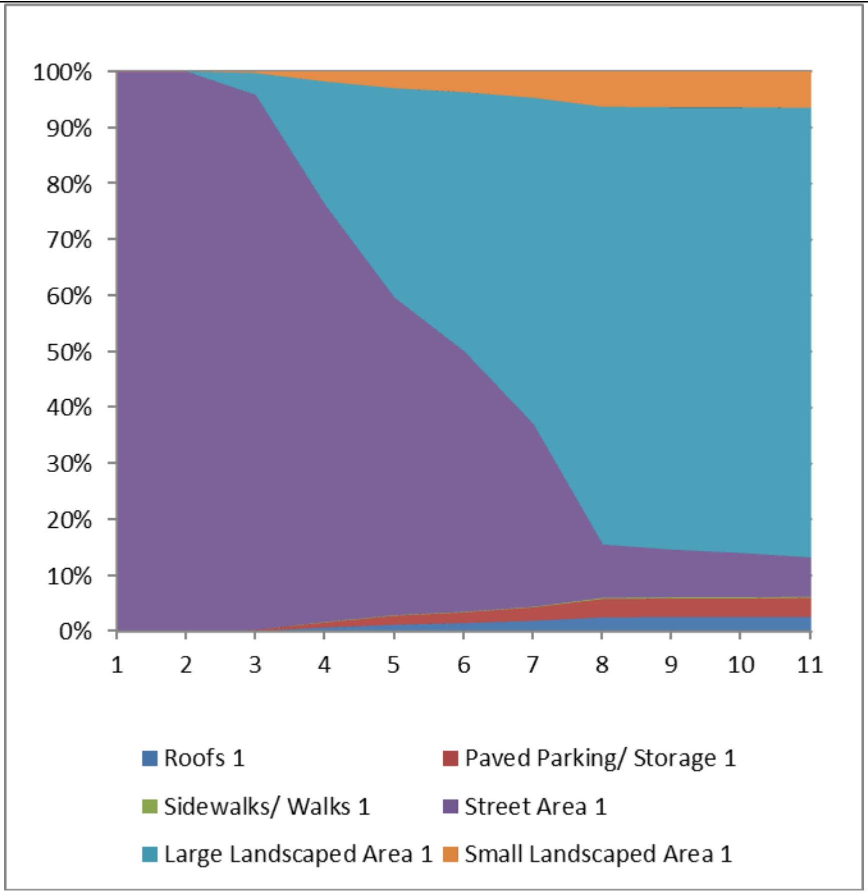
Commercial Areas Total Suspended Solids Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



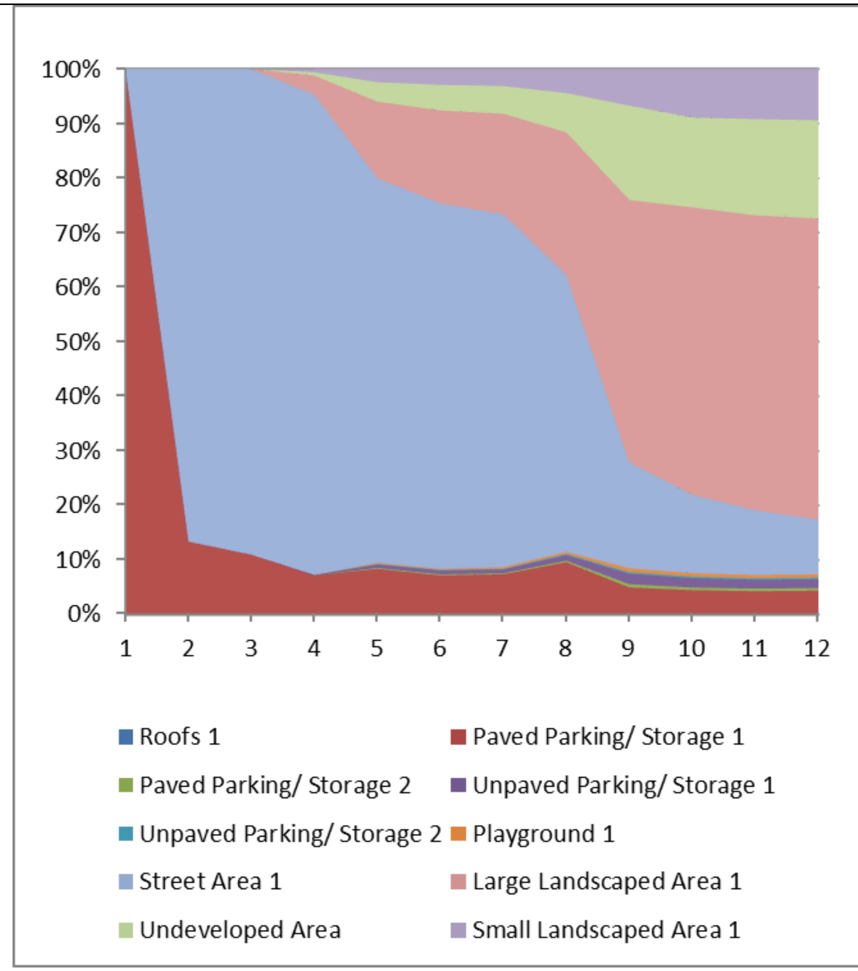
Industrial Areas Total Suspended Solids Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



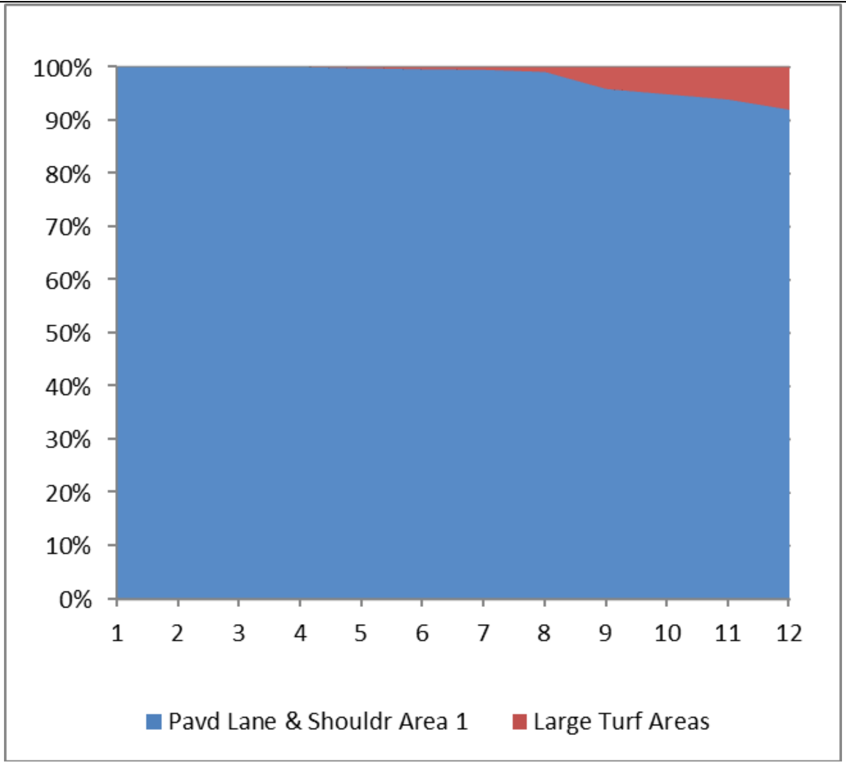
Institutional Areas Total Suspended Solids Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



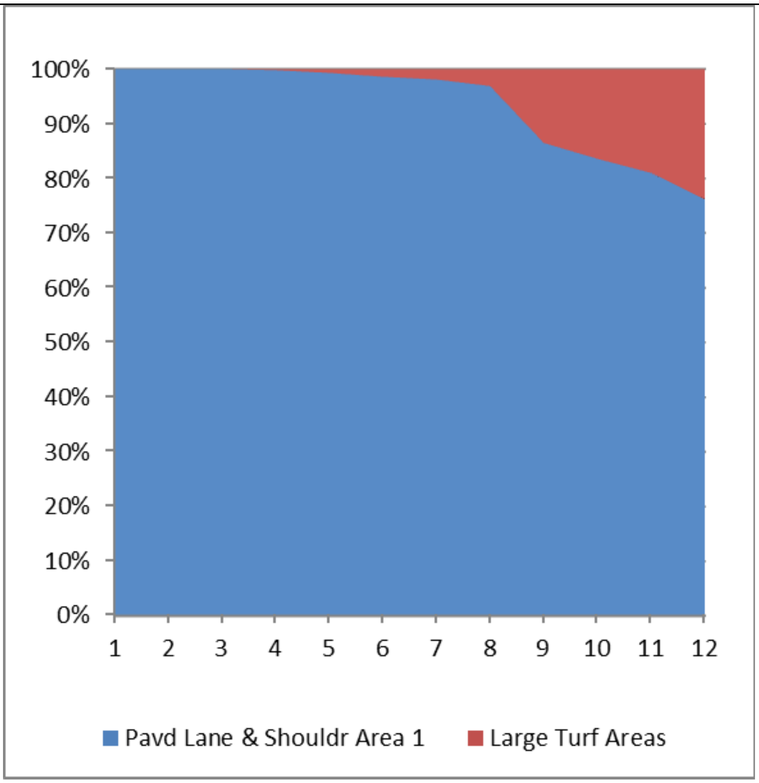
Office Technology Park Areas Total Suspended Solids Mass Contributions
Rains: 1: 0.05"; 2: 0.1"; 3: 0.25"; 4: 0.5"; 5: 0.75"; 6: 1"; 7: 1.5"; 8: 2"; 9: 2.5"; 10:3"; 11: 4" (no runoff expected for 0.01 inch rains)



Open Space Areas Total Suspended Solids Mass Contributions
Rains: 1: 0.01"; 2: 0.05"; 3: 0.1"; 4: 0.25"; 5: 0.5"; 6: 0.75"; 7: 1"; 8: 1.5"; 9: 2"; 10: 2.5"; 11: 3"; 12: 4"

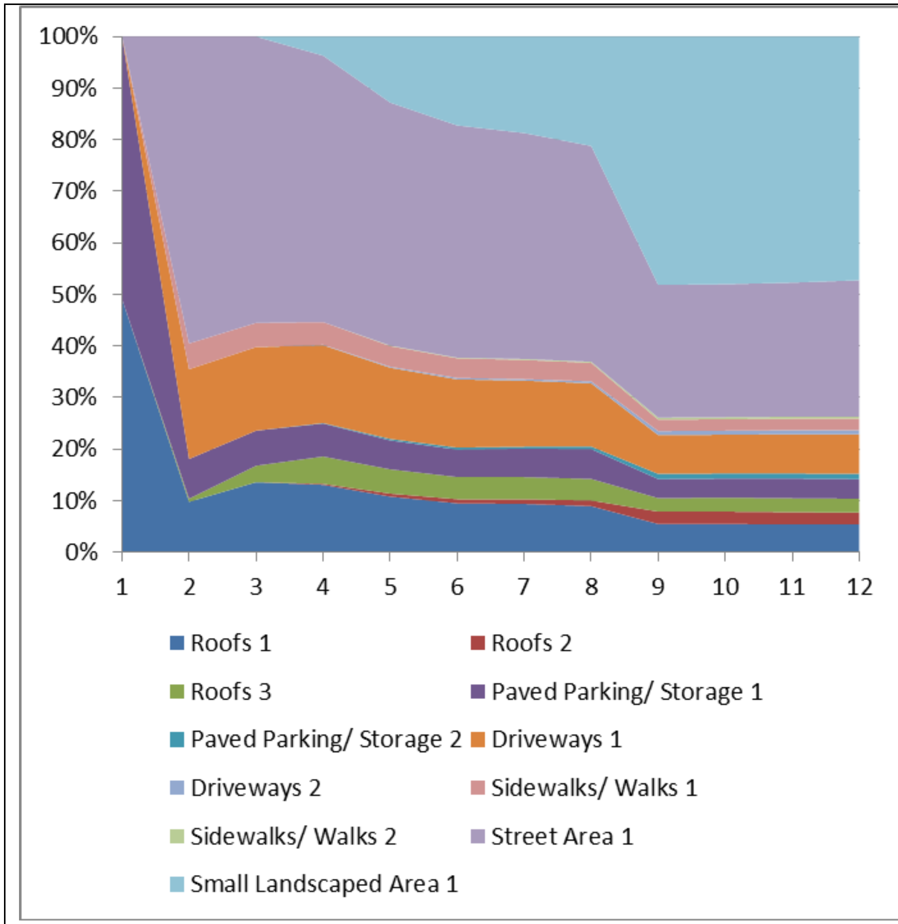


Urban Freeway Areas Total Suspended Solids Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

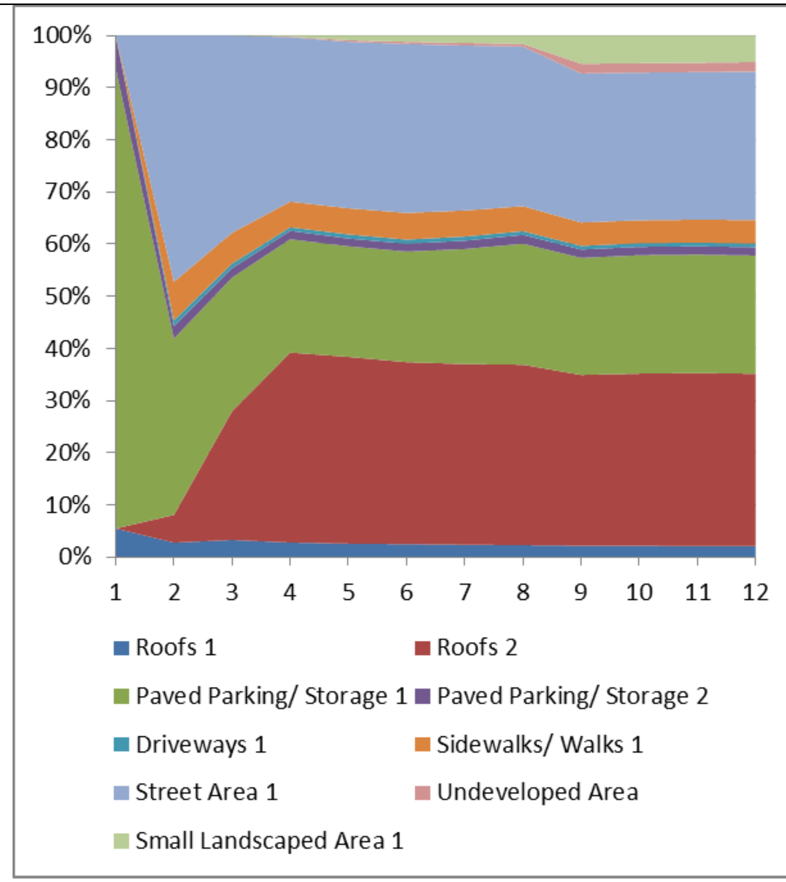


Rural Highway Areas Total Suspended Solids Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

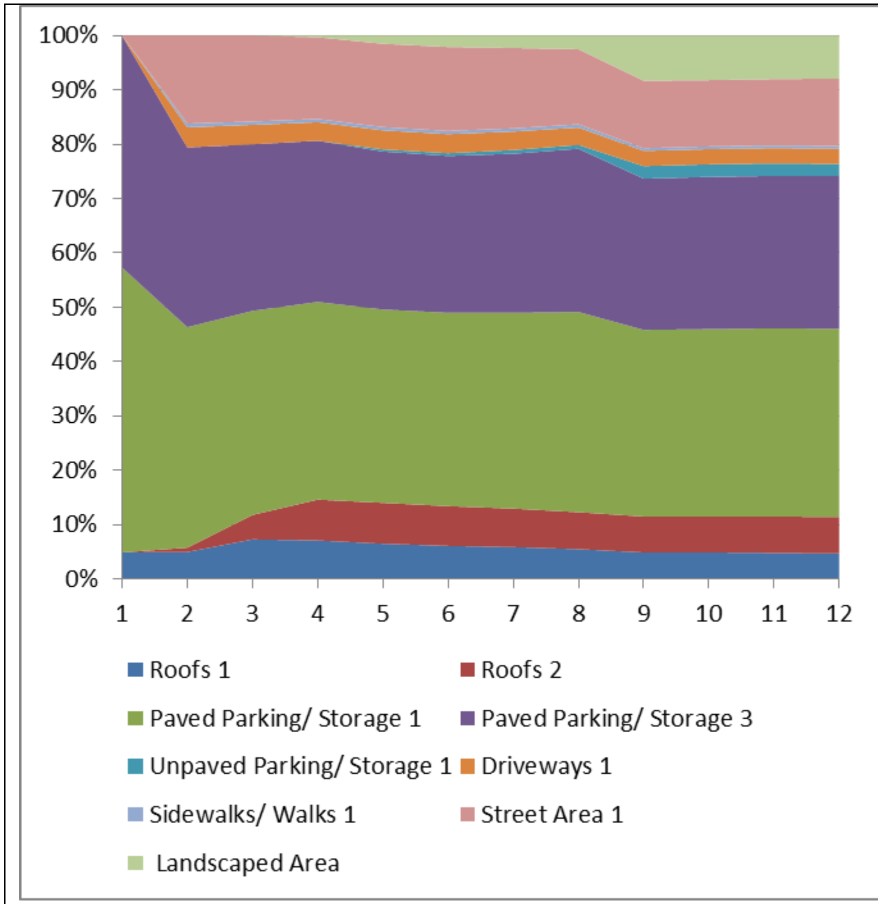
Total Dissolved Solids Mass Contributions



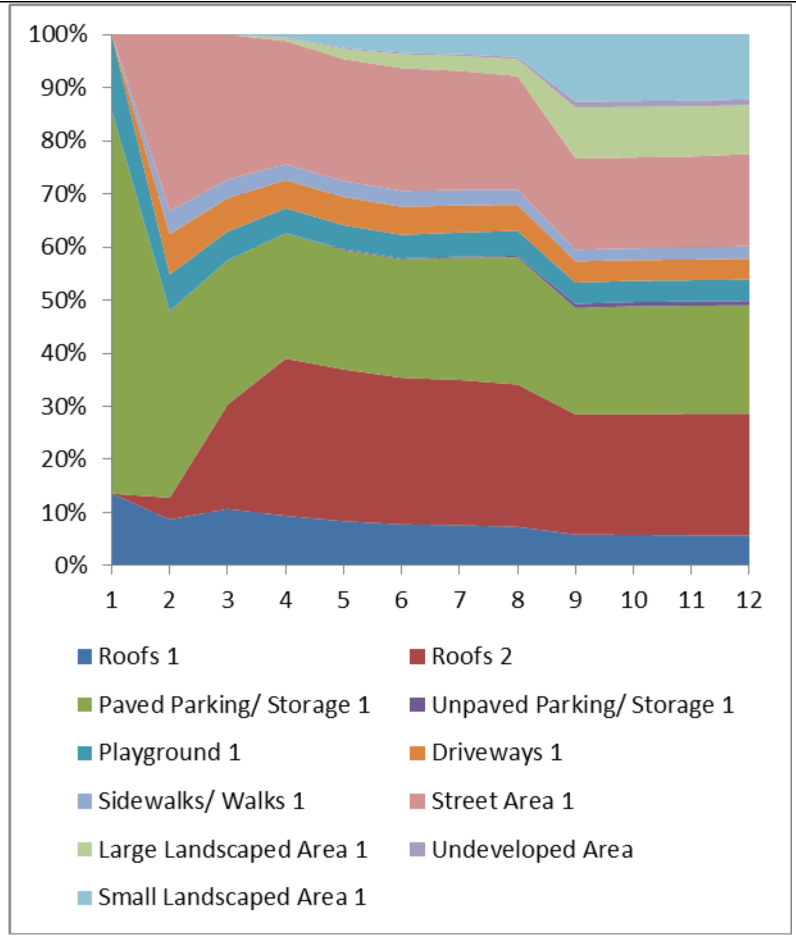
Residential Areas Total Dissolved Solids Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



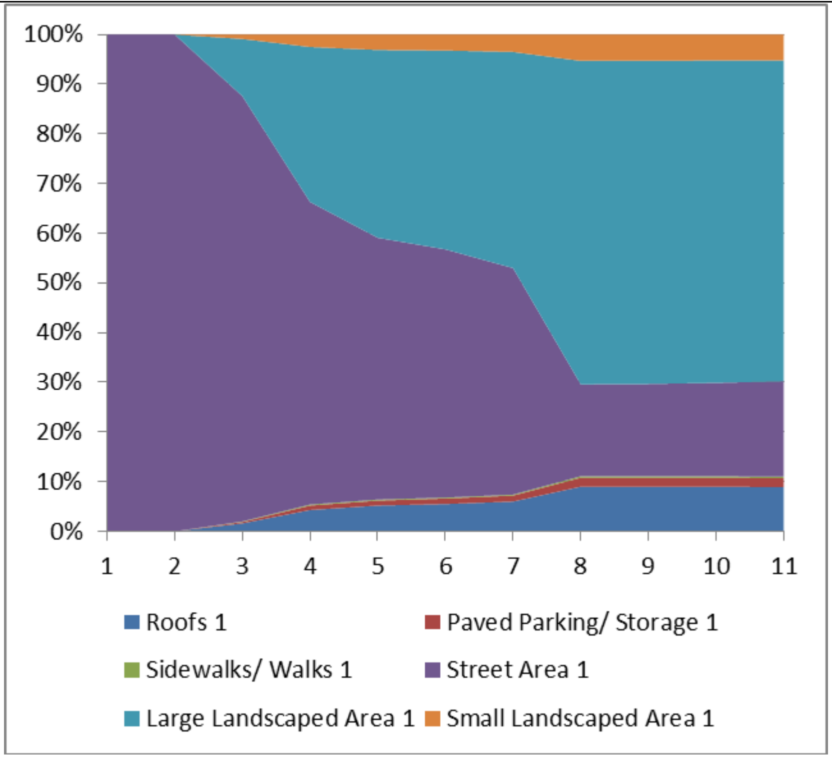
Commercial Areas Total Dissolved Solids Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



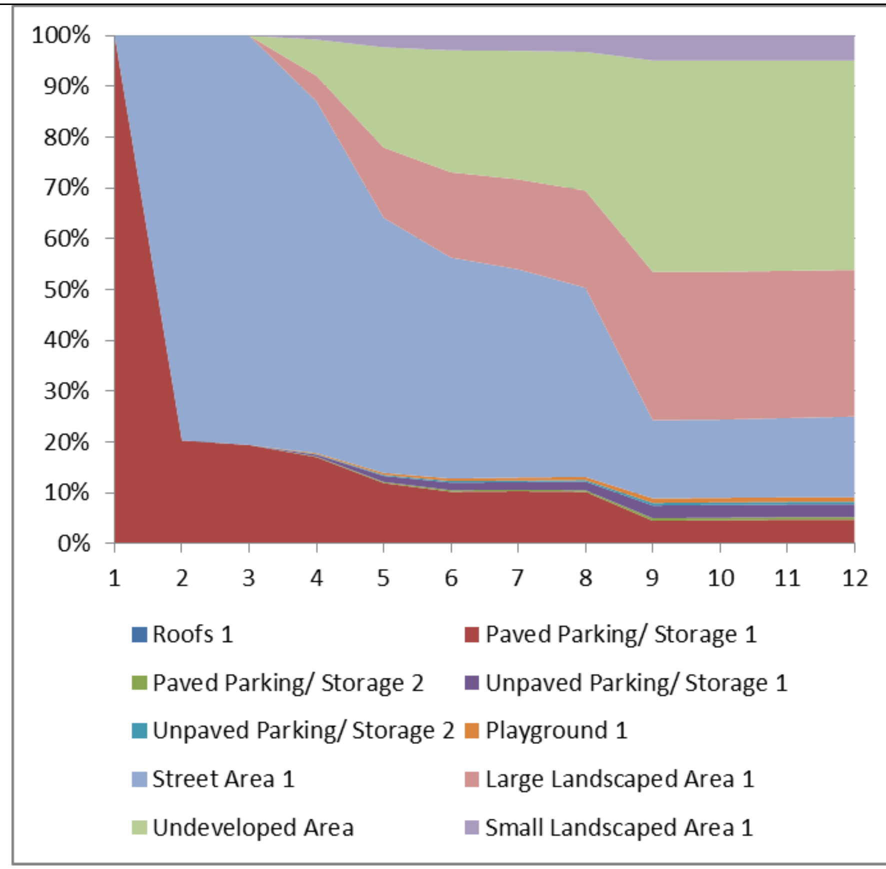
Industrial Areas Total Dissolved Solids Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



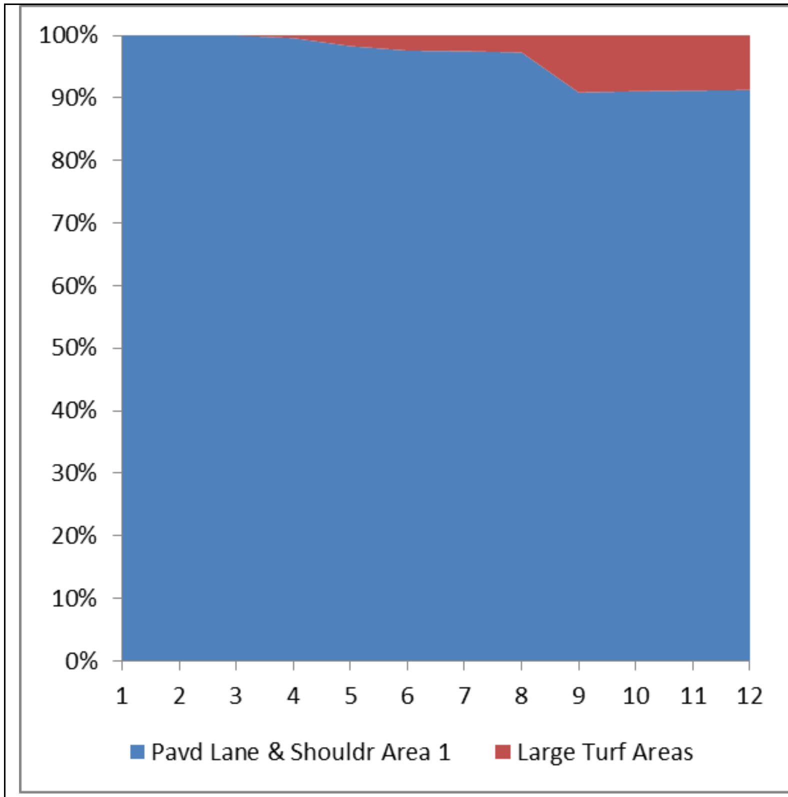
Institutional Areas Total Dissolved Solids Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



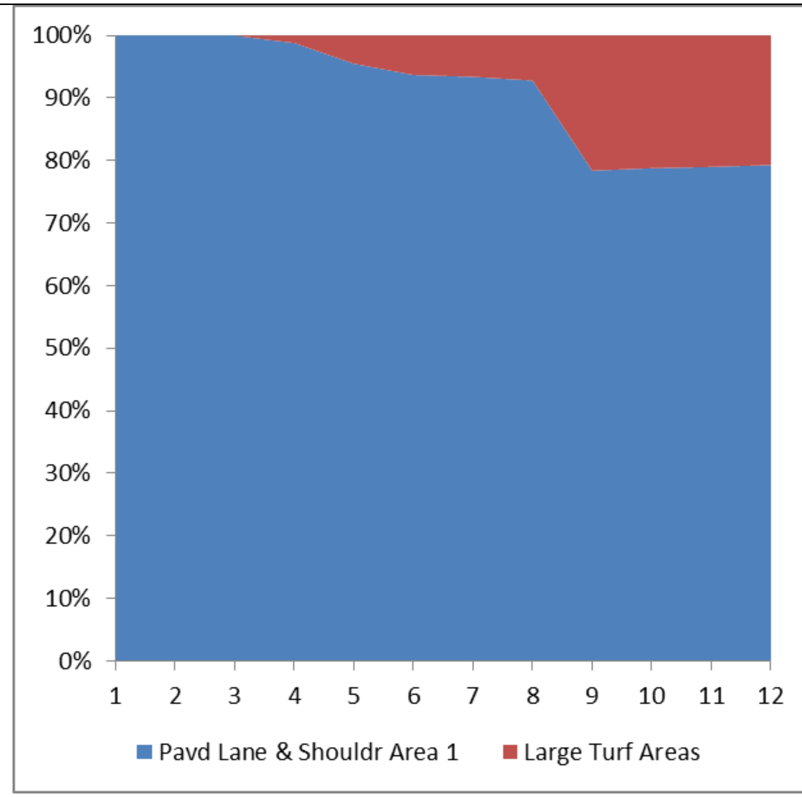
Office Technology Park Areas Total Dissolved Solids Mass Contributions
Rains: 1: 0.05”; 2: 0.1”; 3: 0.25”; 4: 0.5”; 5: 0.75”; 6: 1”; 7: 1.5”; 8: 2”; 9: 2.5”; 10:3”; 11: 4” (no runoff expected for 0.01 inch rains)



Open Space Areas Total Dissolved Solids Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

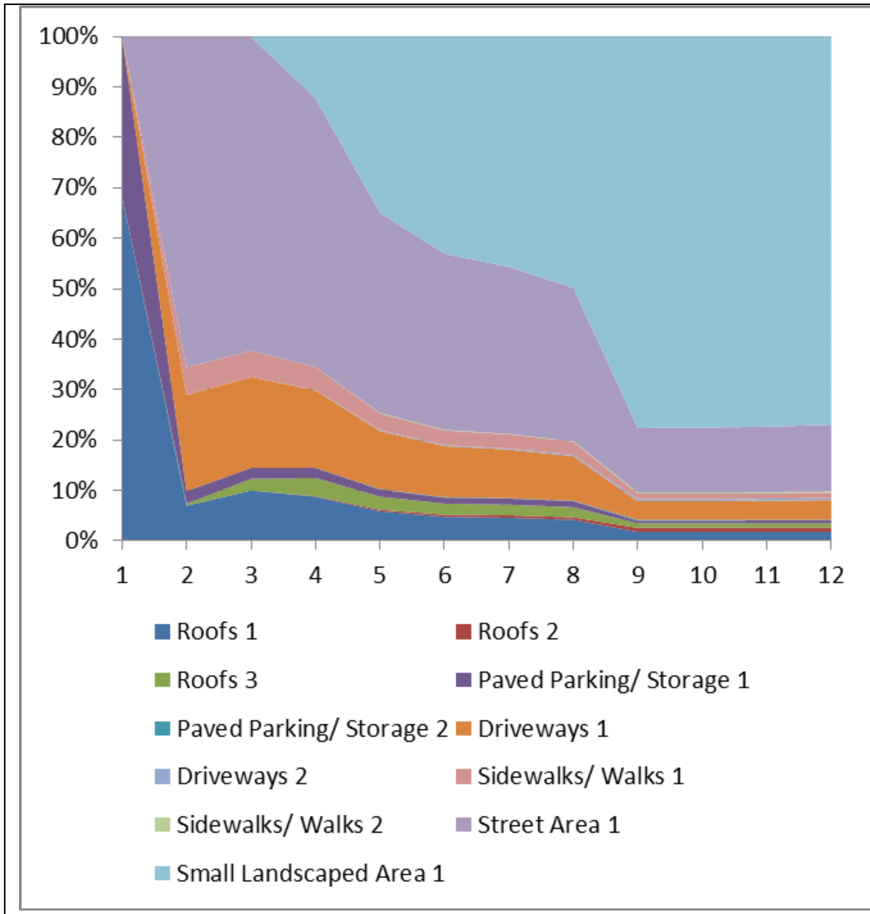


Urban Freeway Areas Total Dissolved Solids Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

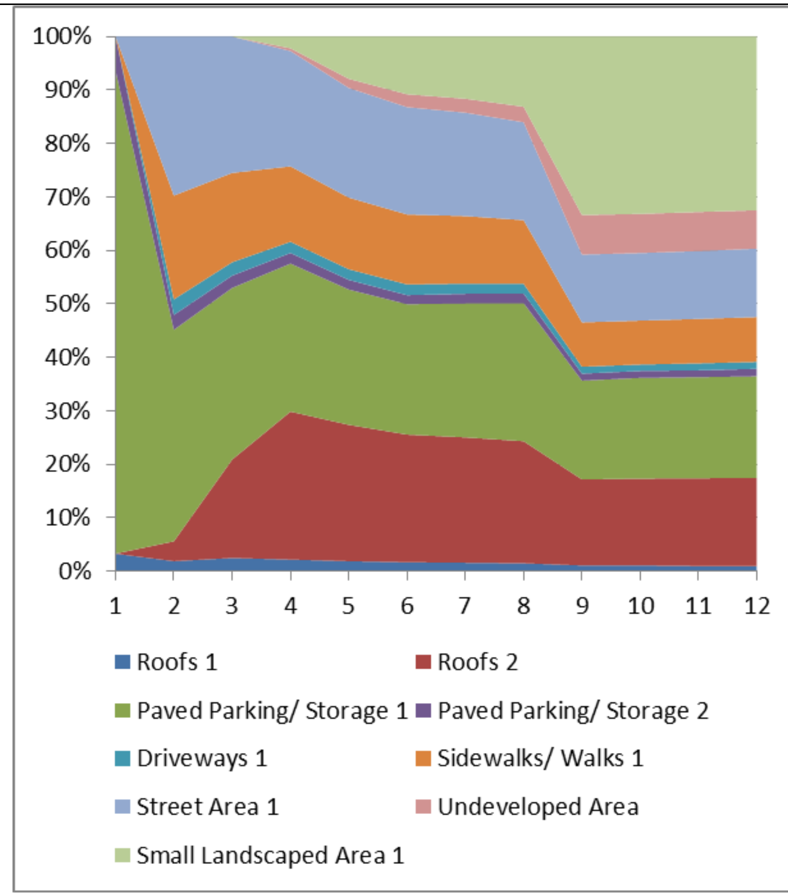


Rural Highway Areas Total Dissolved Solids Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

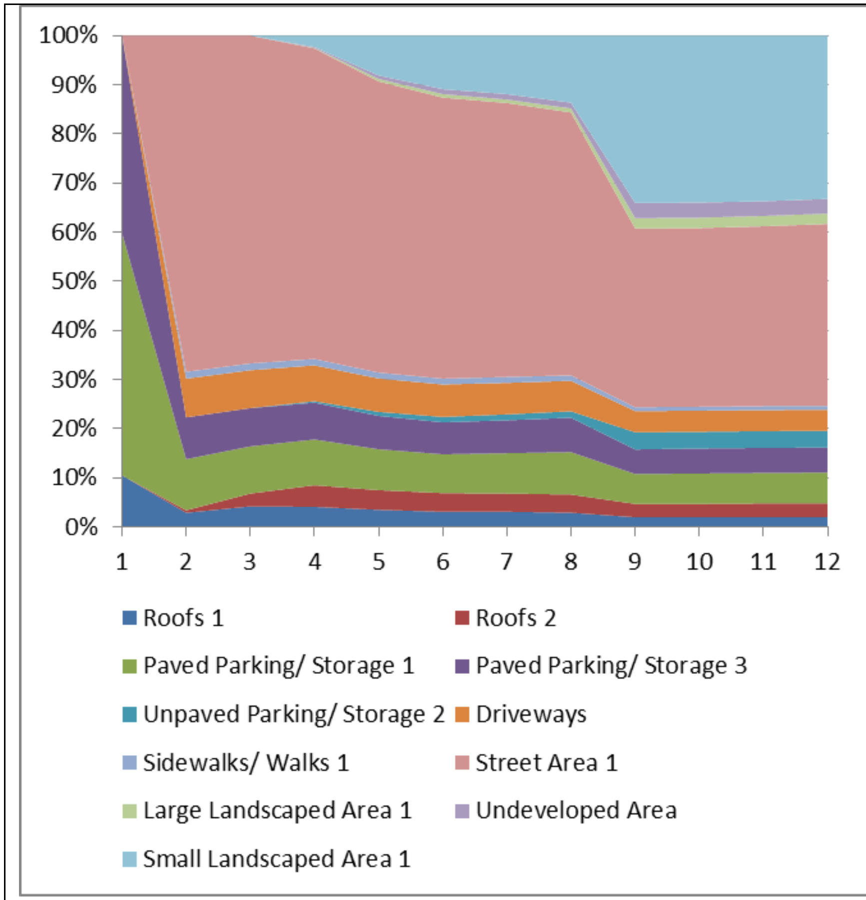
Filterable Phosphorus Mass Contributions



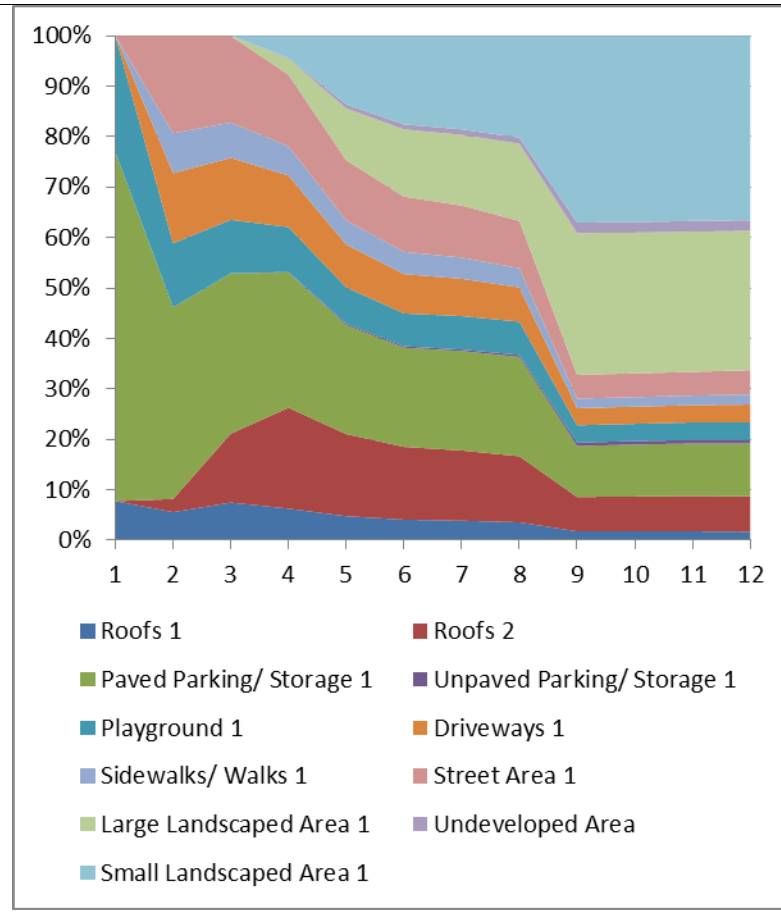
Residential Areas Filterable Phosphorus Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



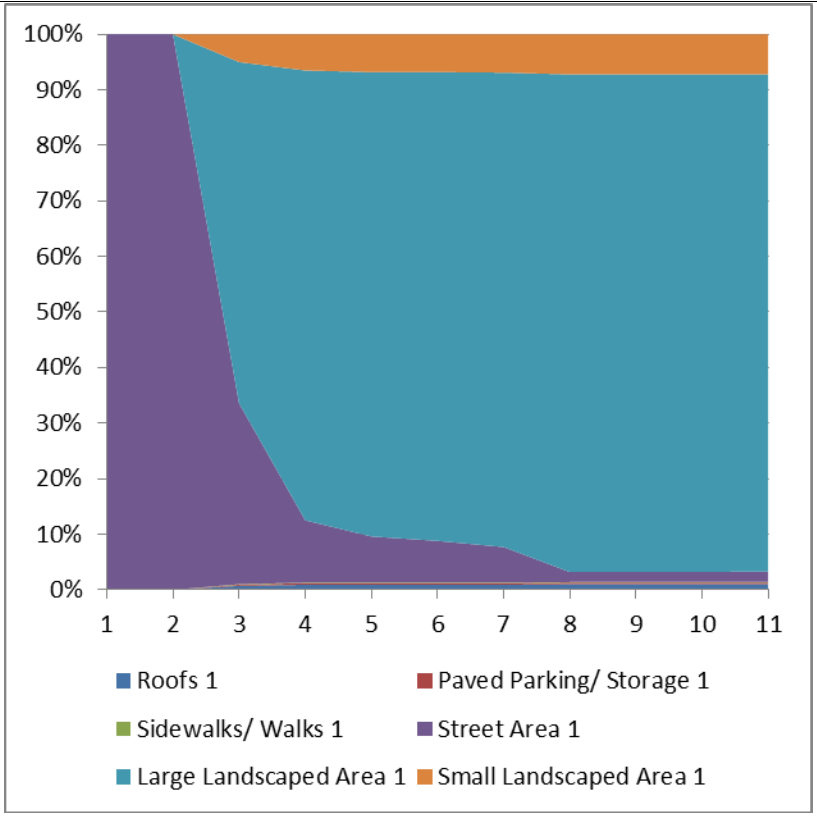
Commercial Areas Filterable Phosphorus Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



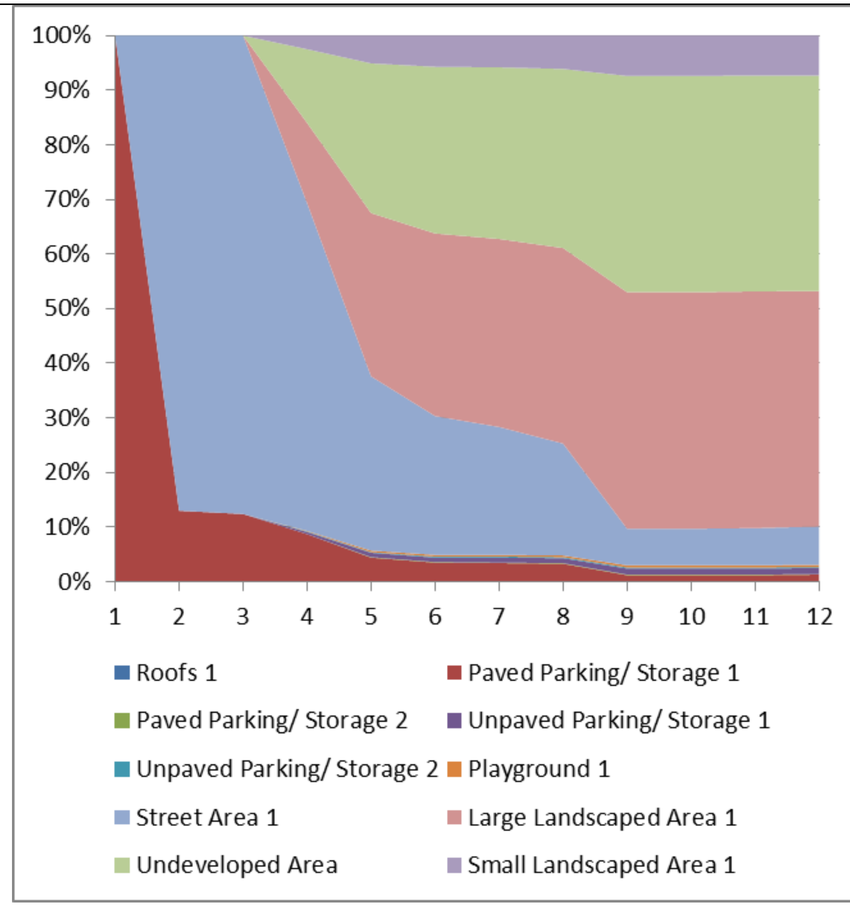
Industrial Areas Filterable Phosphorus Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



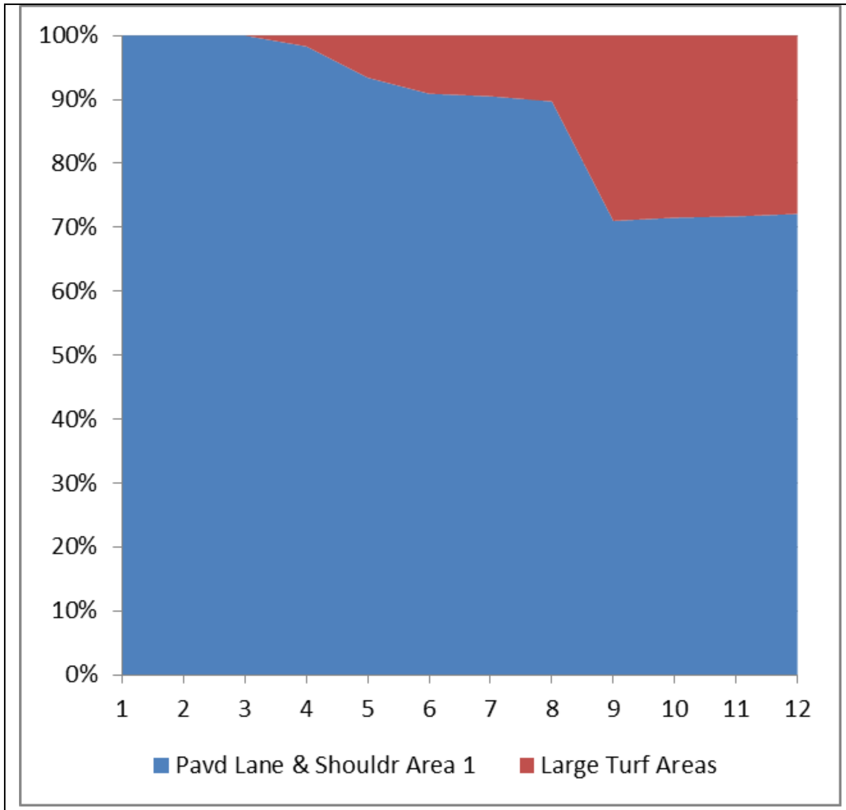
Institutional Areas Filterable Phosphorus Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



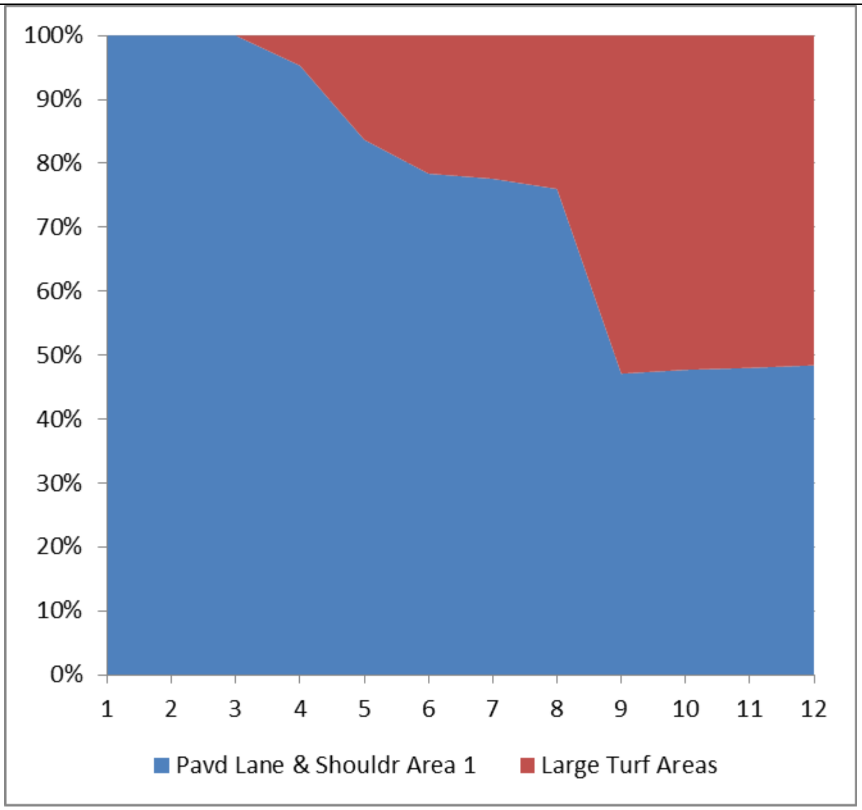
Office Technology Park Areas Filterable Phosphorus Mass Contributions
Rains: 1: 0.05”; 2: 0.1”; 3: 0.25”; 4: 0.5”; 5: 0.75”; 6: 1”; 7: 1.5”; 8: 2”; 9: 2.5”; 10:3”; 11: 4” (no runoff expected for 0.01 inch rains)



Open Space Areas Filterable Phosphorus Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

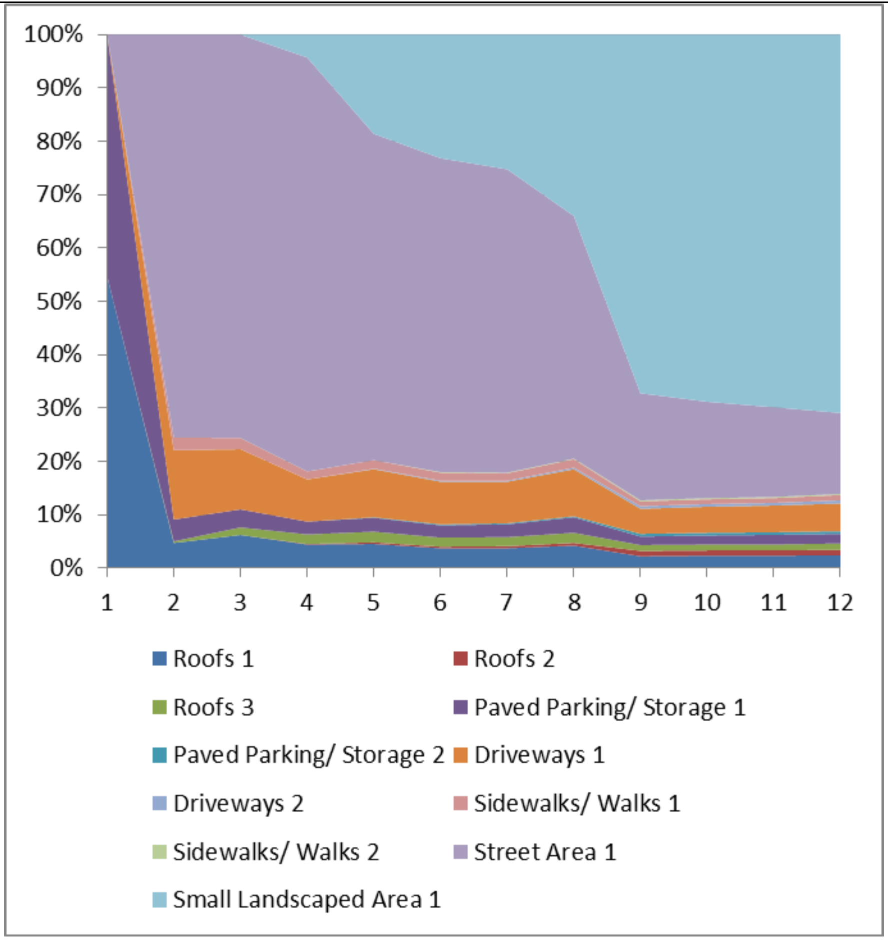


Urban Freeway Areas Filterable Phosphorus Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

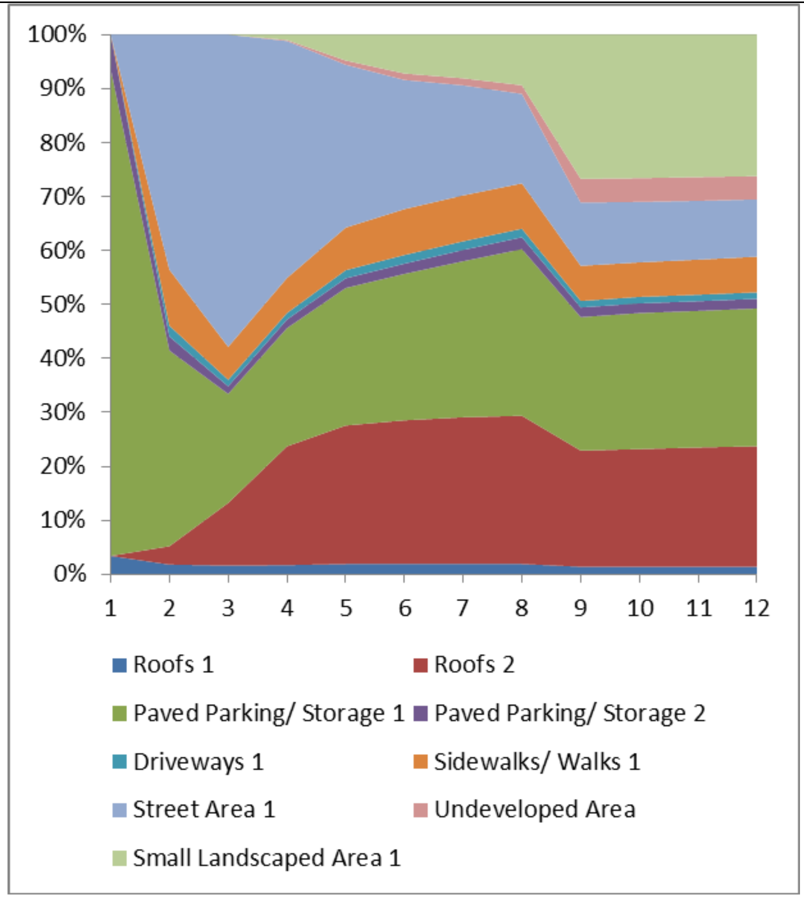


Rural Highway Areas Filterable Phosphorus Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

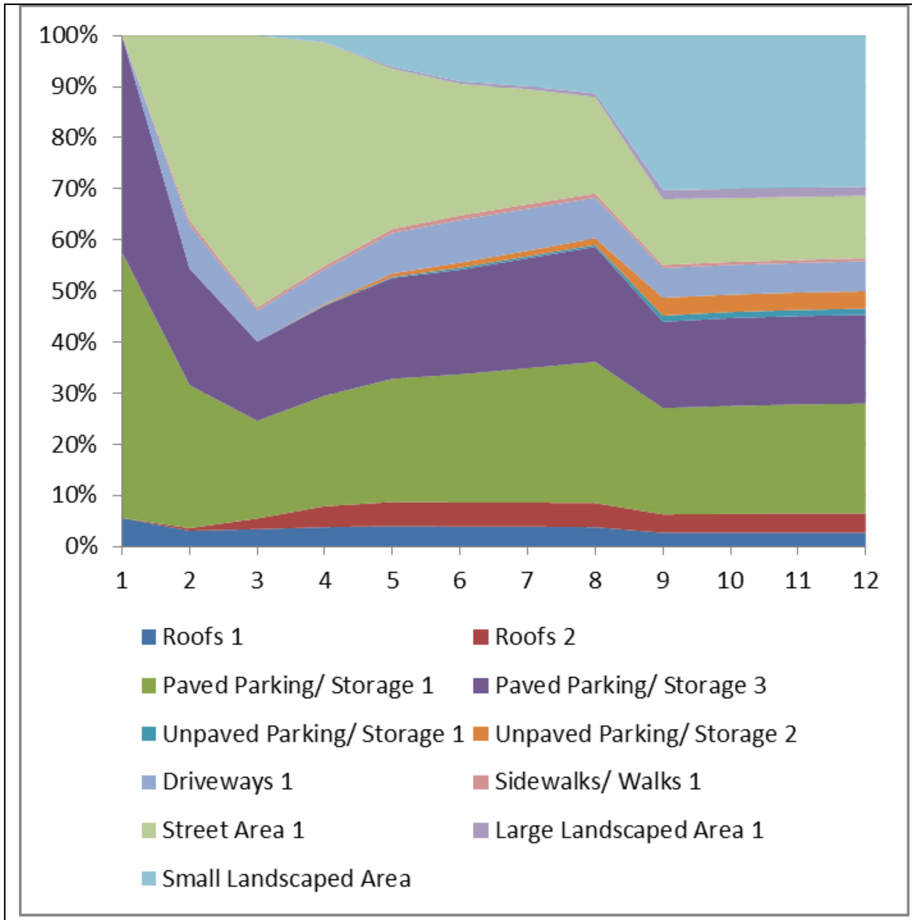
Total Phosphorus Mass Contributions



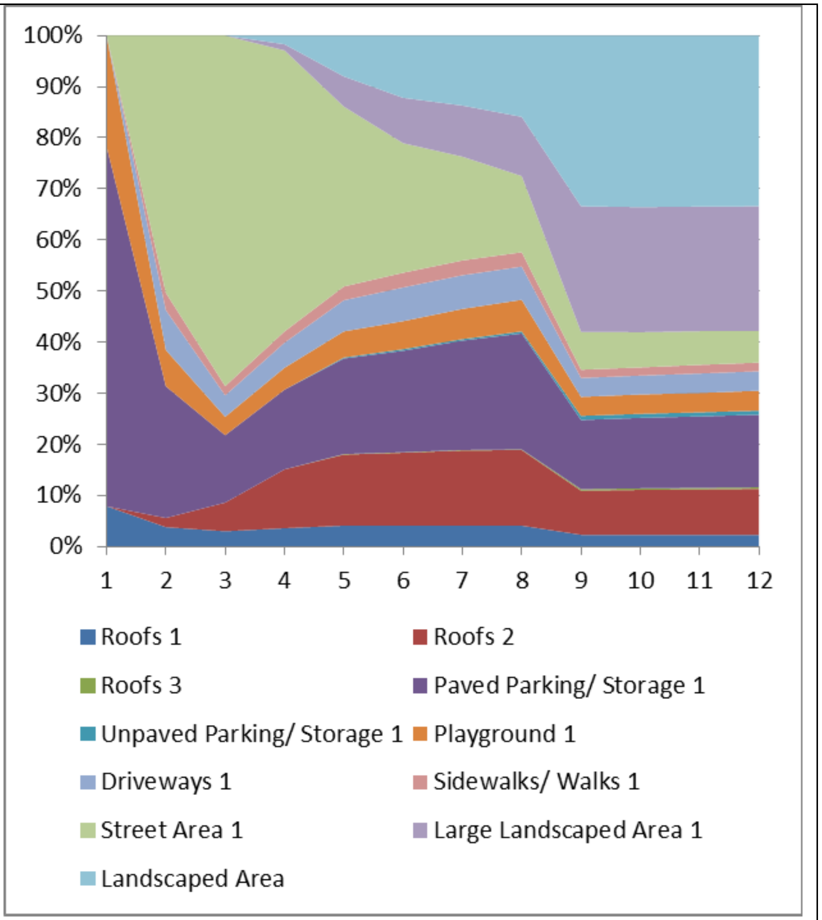
Residential Areas Total Phosphorus Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



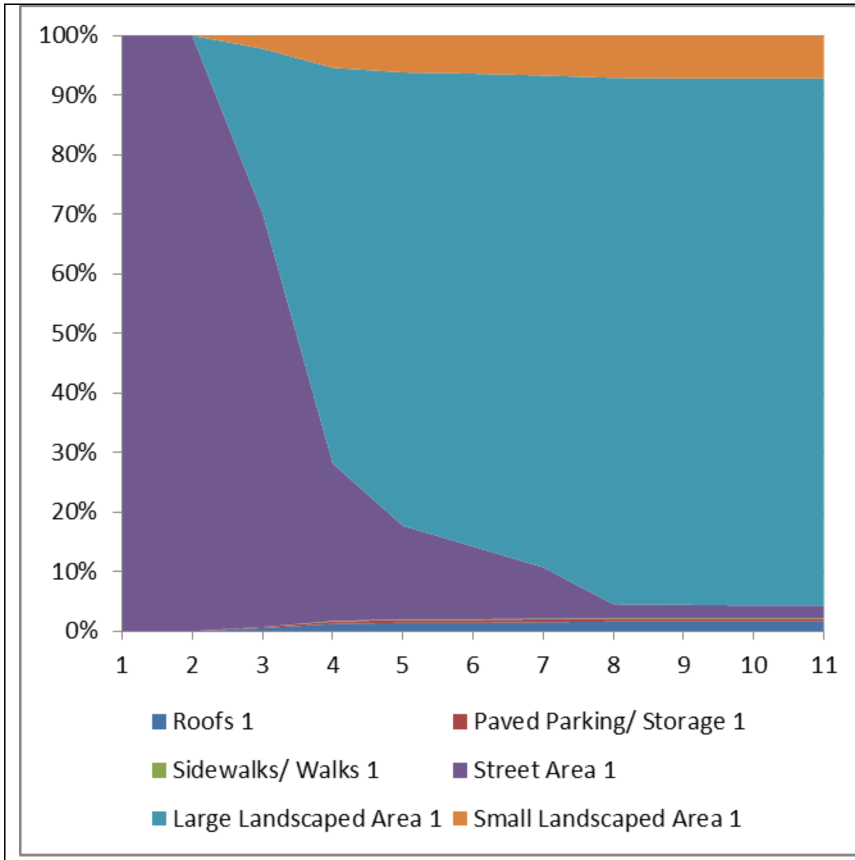
Commercial Areas Total Phosphorus Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



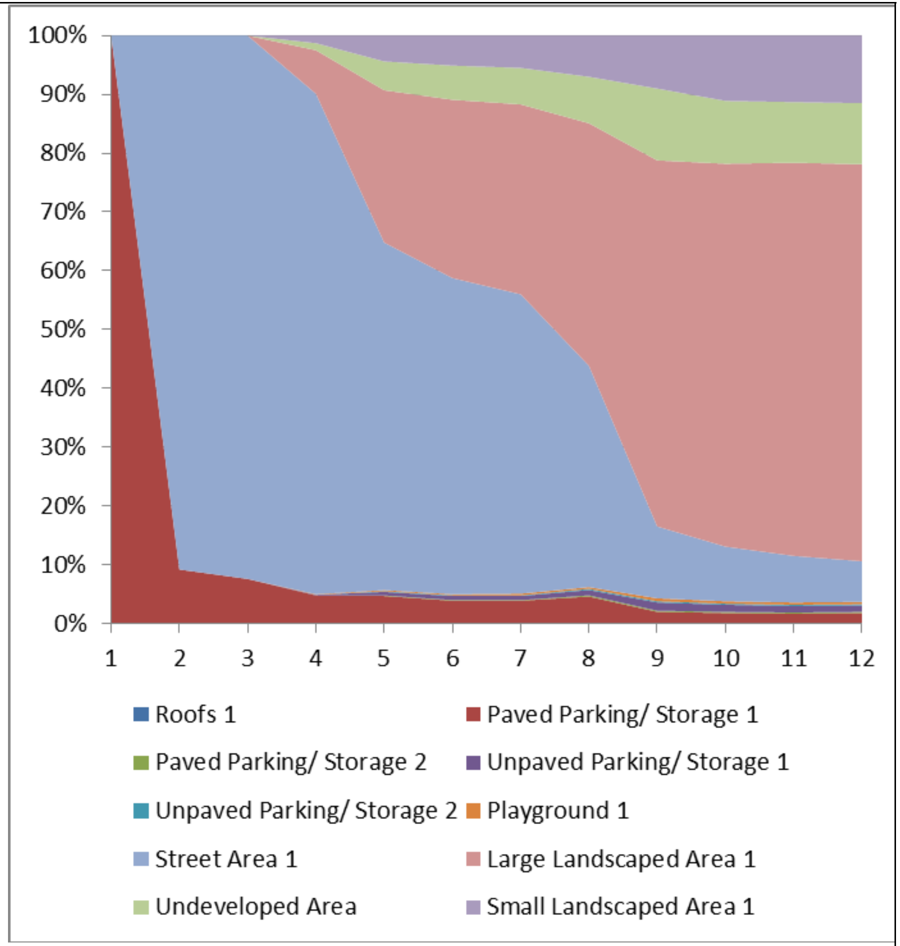
Industrial Areas Total Phosphorus Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



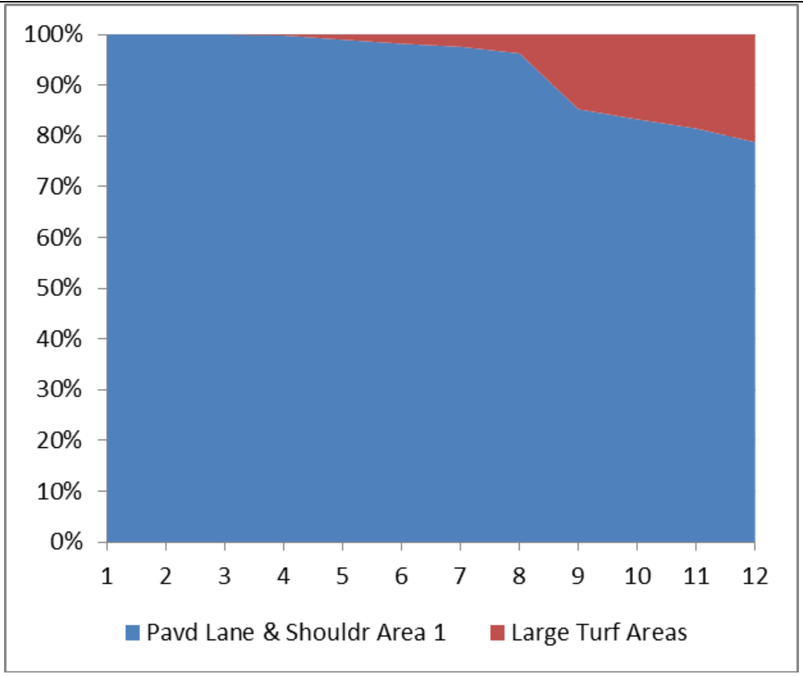
Institutional Areas Total Phosphorus Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



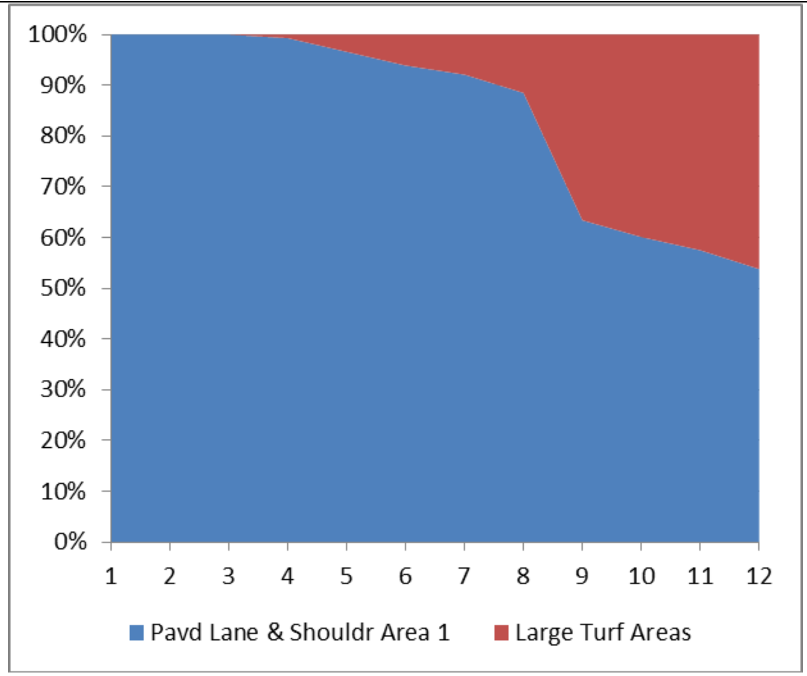
Office Technology Park Areas Total Phosphorus Mass Contributions
Rains: 1: 0.05”; 2: 0.1”; 3: 0.25”; 4: 0.5”; 5: 0.75”; 6: 1”; 7: 1.5”; 8: 2”; 9: 2.5”; 10:3”; 11: 4” (no runoff expected for 0.01 inch rains)



Open Space Areas Total Phosphorus Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

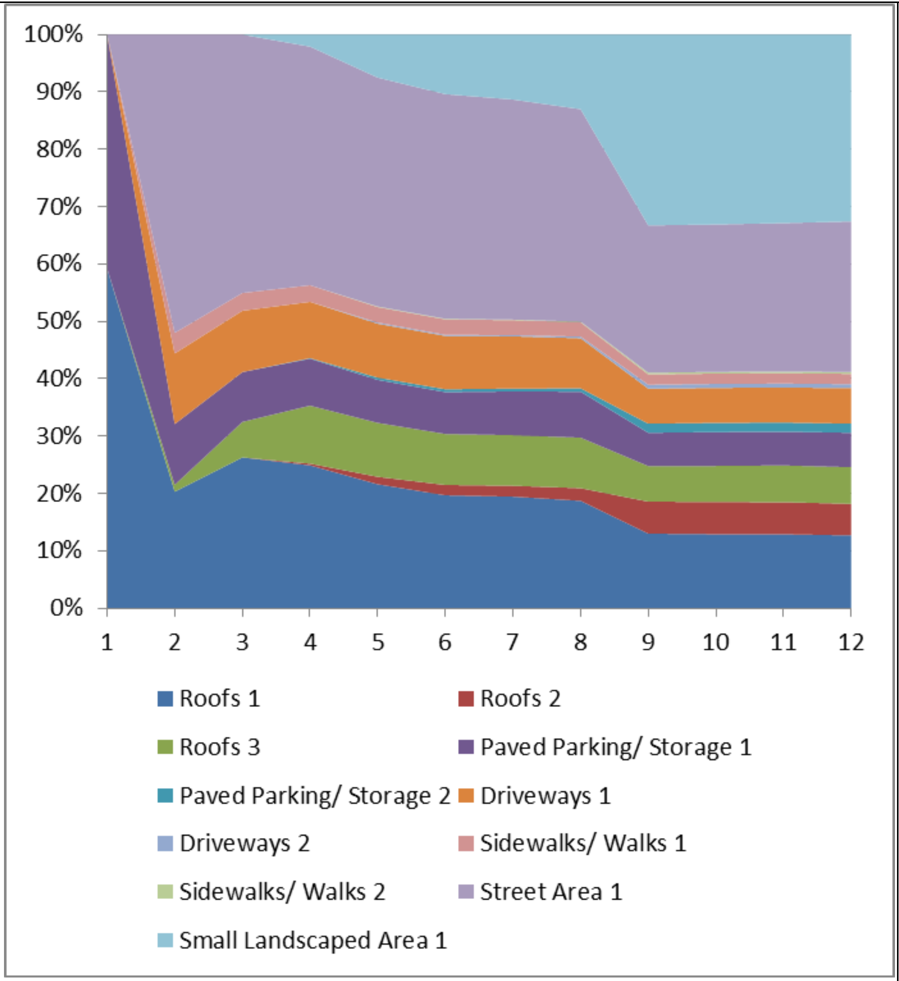


Urban Freeway Areas Total Phosphorus Mass Contributions
Rains: 1: 0.01"; 2: 0.05"; 3: 0.1"; 4: 0.25"; 5: 0.5"; 6: 0.75"; 7: 1"; 8: 1.5"; 9: 2"; 10: 2.5"; 11: 3"; 12: 4"

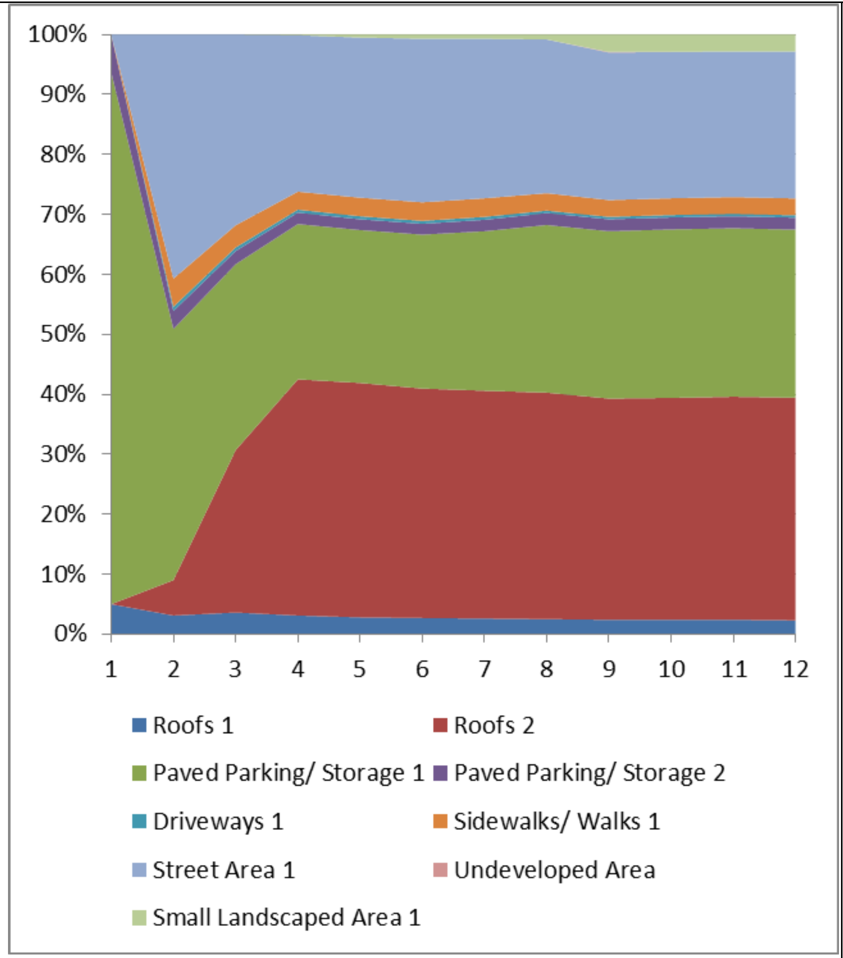


Rural Highway Areas Total Phosphorus Mass Contributions
Rains: 1: 0.01"; 2: 0.05"; 3: 0.1"; 4: 0.25"; 5: 0.5"; 6: 0.75"; 7: 1"; 8: 1.5"; 9: 2"; 10: 2.5"; 11: 3"; 12: 4"

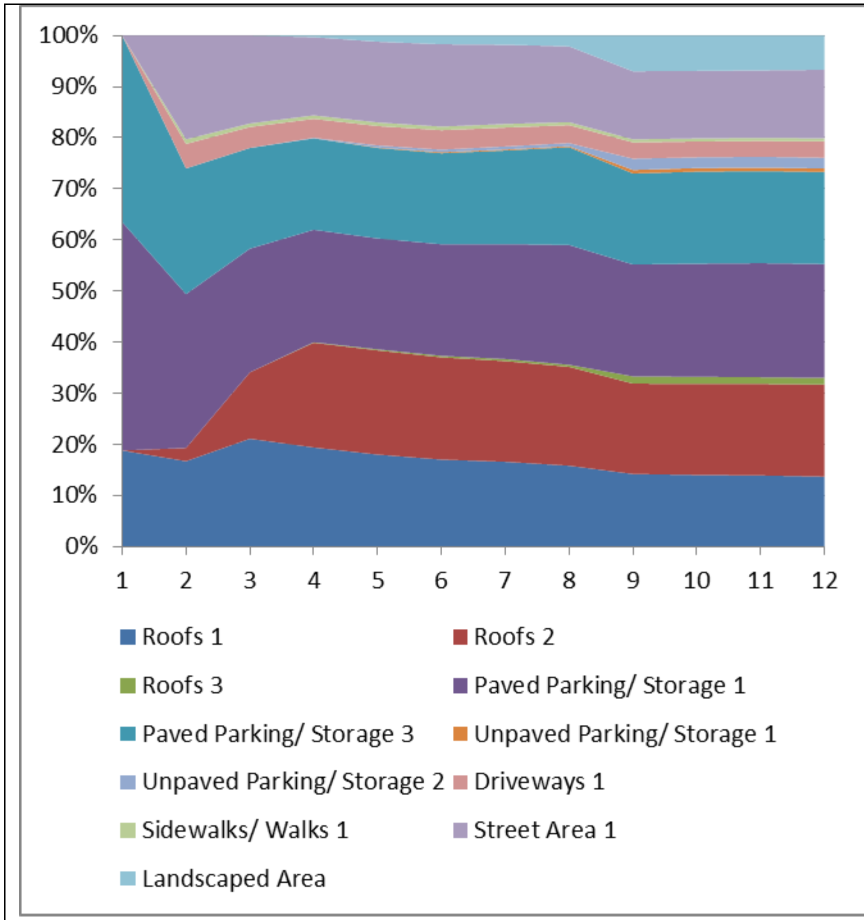
Nitrite plus Nitrate Mass Contributions



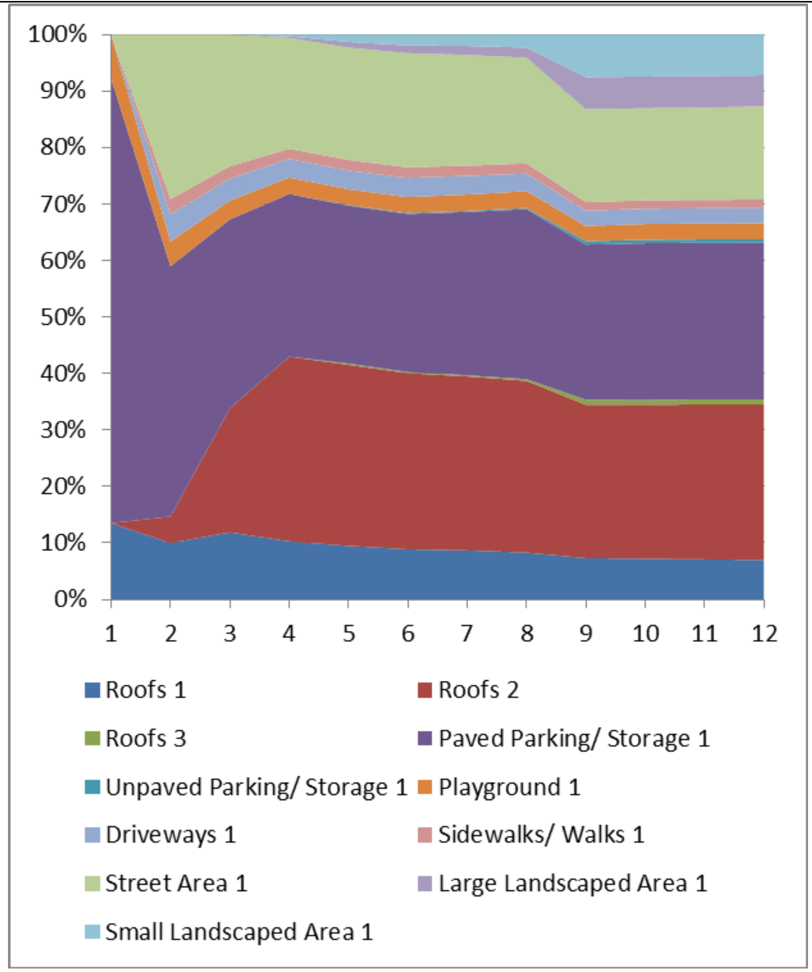
Residential Areas Nitrite plus Nitrate Mass Contributions
Rains: 1: 0.01"; 2: 0.05"; 3: 0.1"; 4: 0.25"; 5: 0.5"; 6: 0.75"; 7: 1"; 8: 1.5"; 9: 2"; 10: 2.5"; 11: 3"; 12: 4"



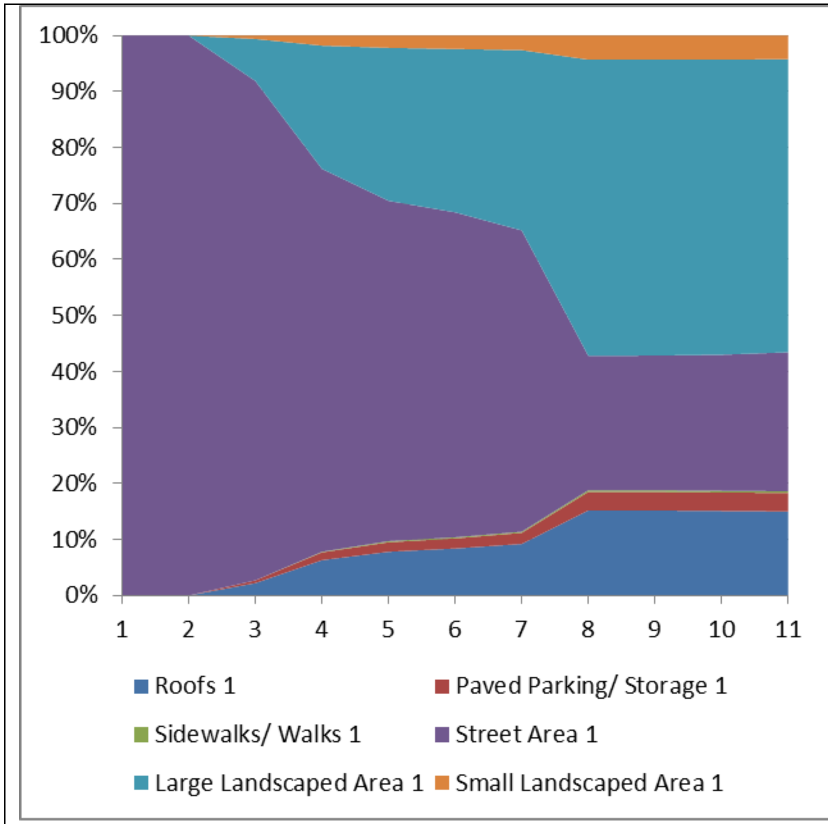
Commercial Areas Nitrite plus Nitrate Mass Contributions
Rains: 1: 0.01"; 2: 0.05"; 3: 0.1"; 4: 0.25"; 5: 0.5"; 6: 0.75"; 7: 1"; 8: 1.5"; 9: 2"; 10: 2.5"; 11: 3"; 12: 4"



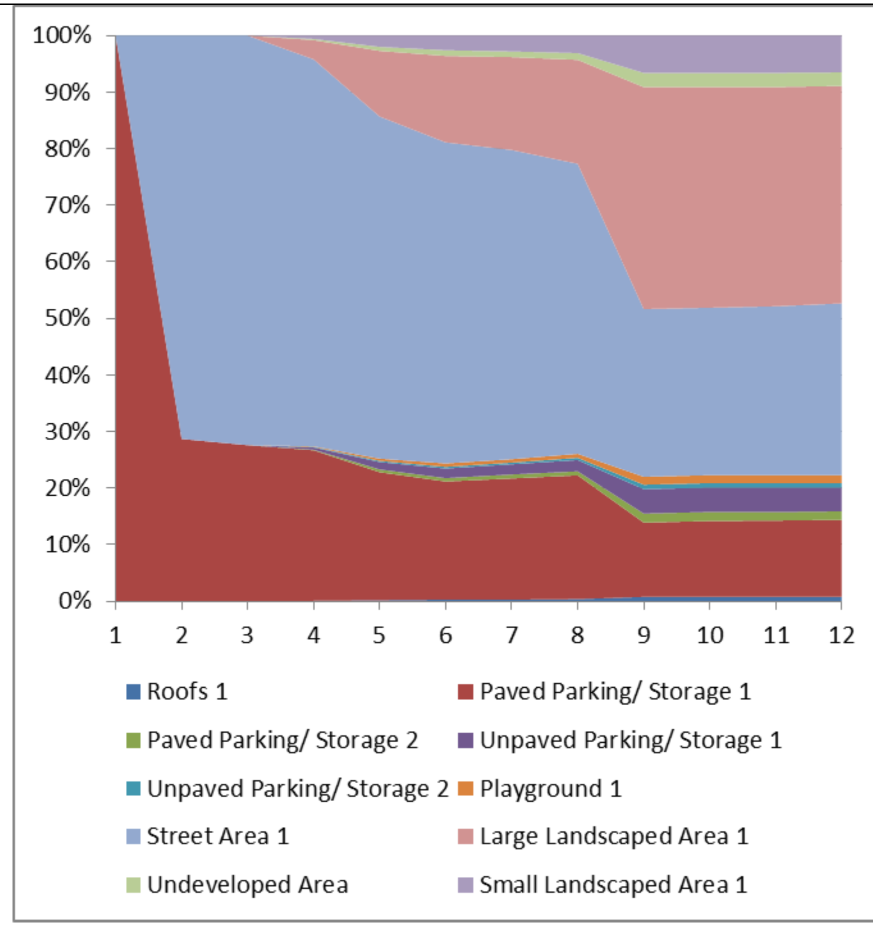
Industrial Areas Nitrite plus Nitrate Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



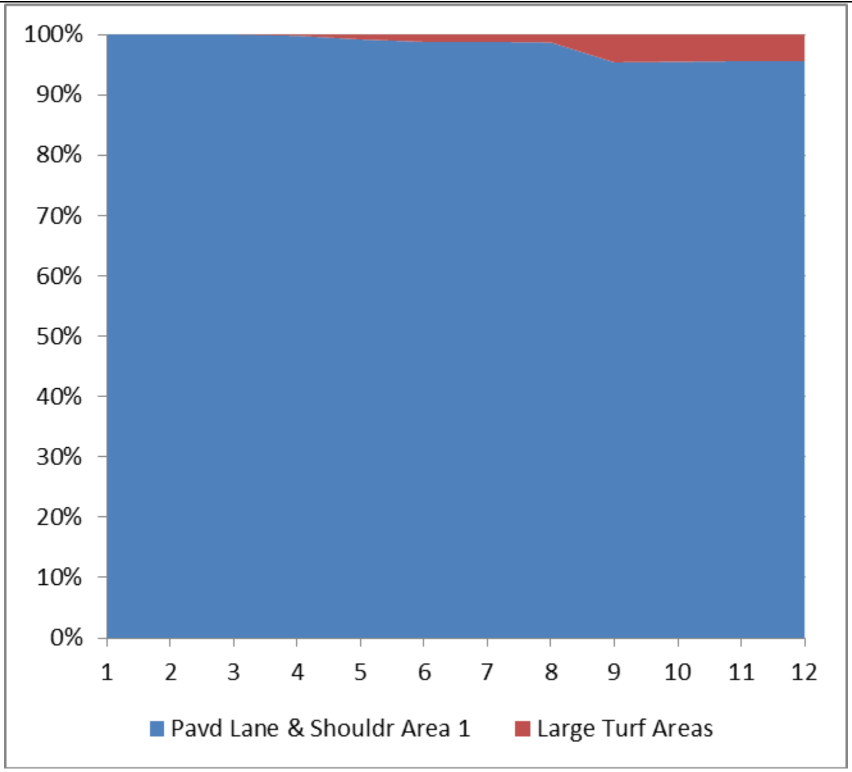
Institutional Areas Nitrite plus Nitrate Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



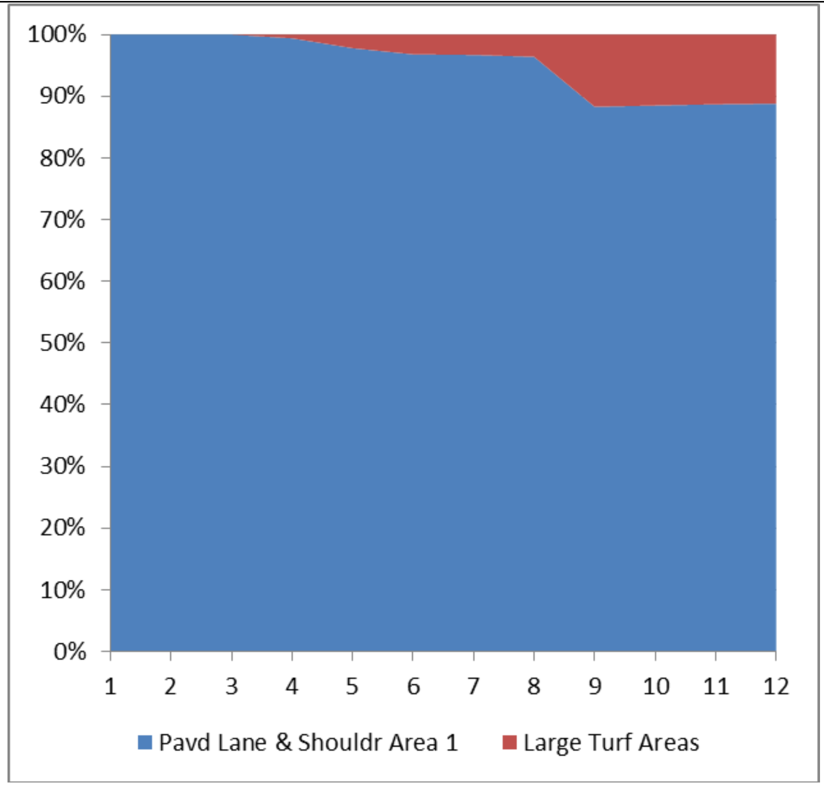
Office Technology Park Areas Nitrite plus Nitrate Mass Contributions
Rains: 1: 0.05”; 2: 0.1”; 3: 0.25”; 4: 0.5”; 5: 0.75”; 6: 1”; 7: 1.5”; 8: 2”; 9: 2.5”; 10:3”; 11: 4” (no runoff expected for 0.01 inch rains)



Open Space Areas Nitrite plus Nitrate Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

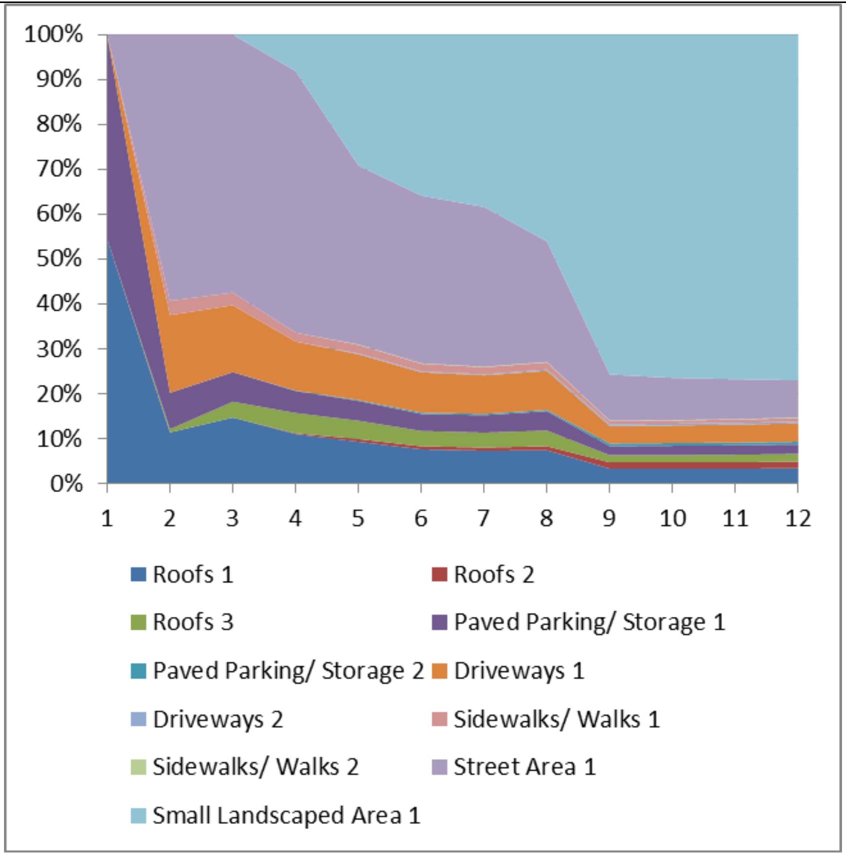


Urban Freeway Areas Nitrite plus Nitrate Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

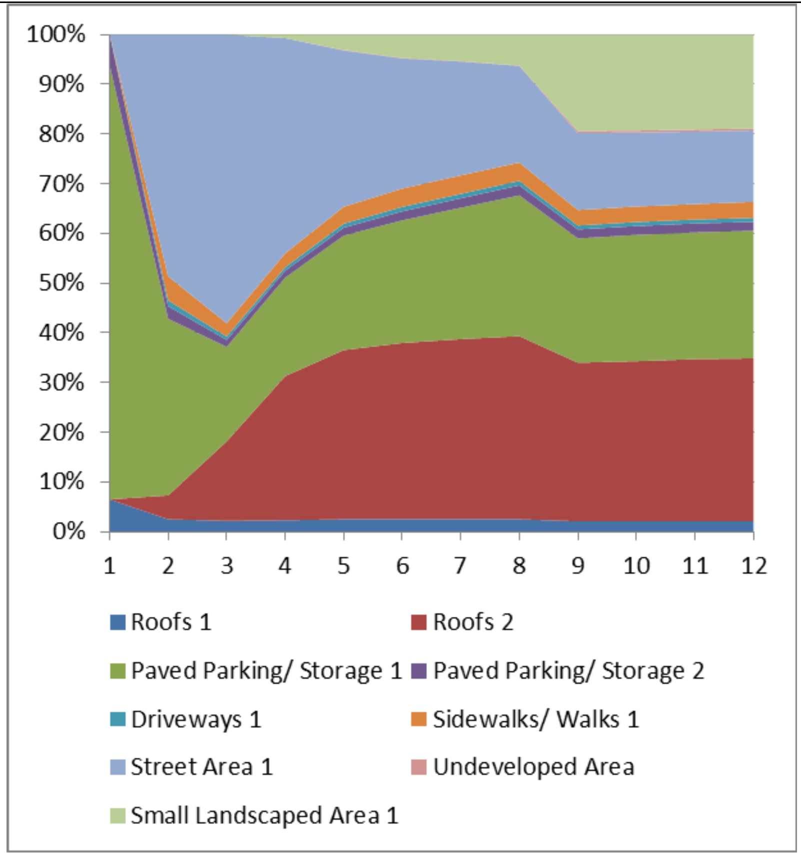


Rural Highway Areas Nitrite plus Nitrate Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

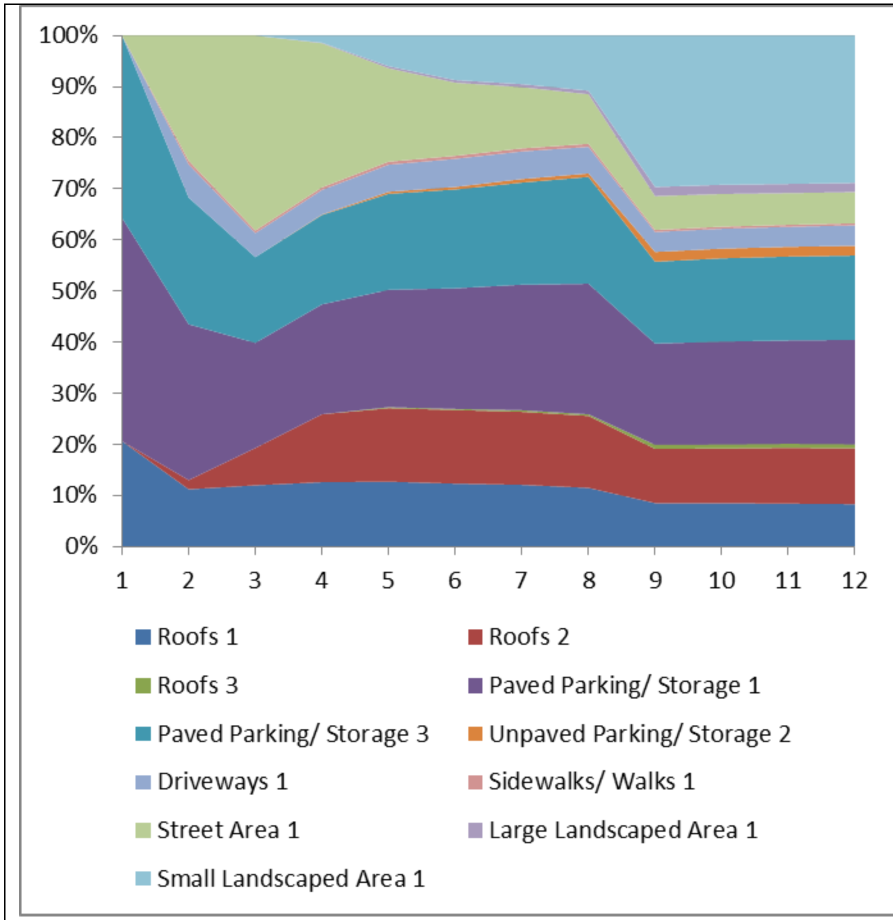
Total Kjeldahl Nitrogen Mass Contributions



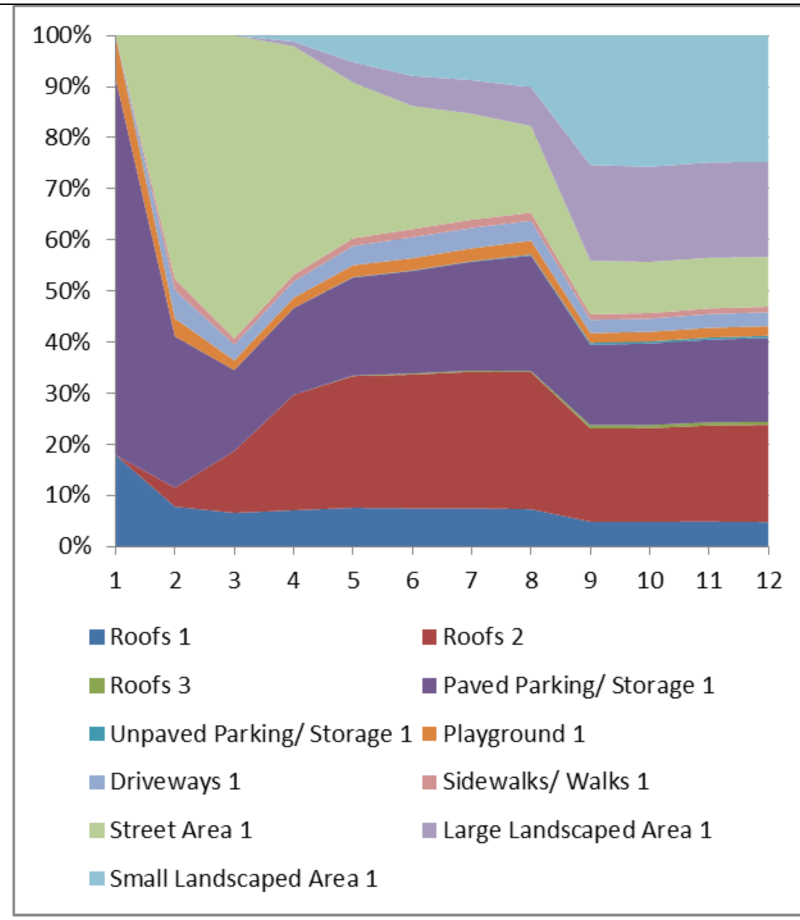
Residential Areas Total Kjeldahl Nitrogen Mass Contributions
Rains: 1: 0.01"; 2: 0.05"; 3: 0.1"; 4: 0.25"; 5: 0.5"; 6: 0.75"; 7: 1"; 8: 1.5"; 9: 2"; 10: 2.5"; 11: 3"; 12: 4"



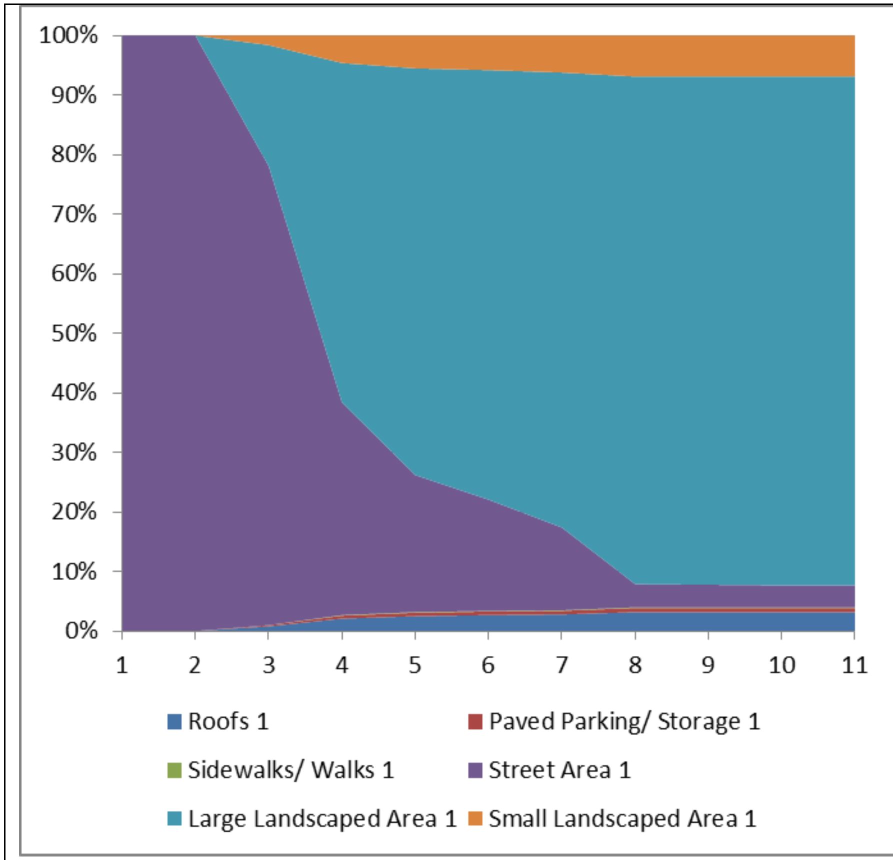
Commercial Areas Total Kjeldahl Nitrogen Mass Contributions
Rains: 1: 0.01"; 2: 0.05"; 3: 0.1"; 4: 0.25"; 5: 0.5"; 6: 0.75"; 7: 1"; 8: 1.5"; 9: 2"; 10: 2.5"; 11: 3"; 12: 4"



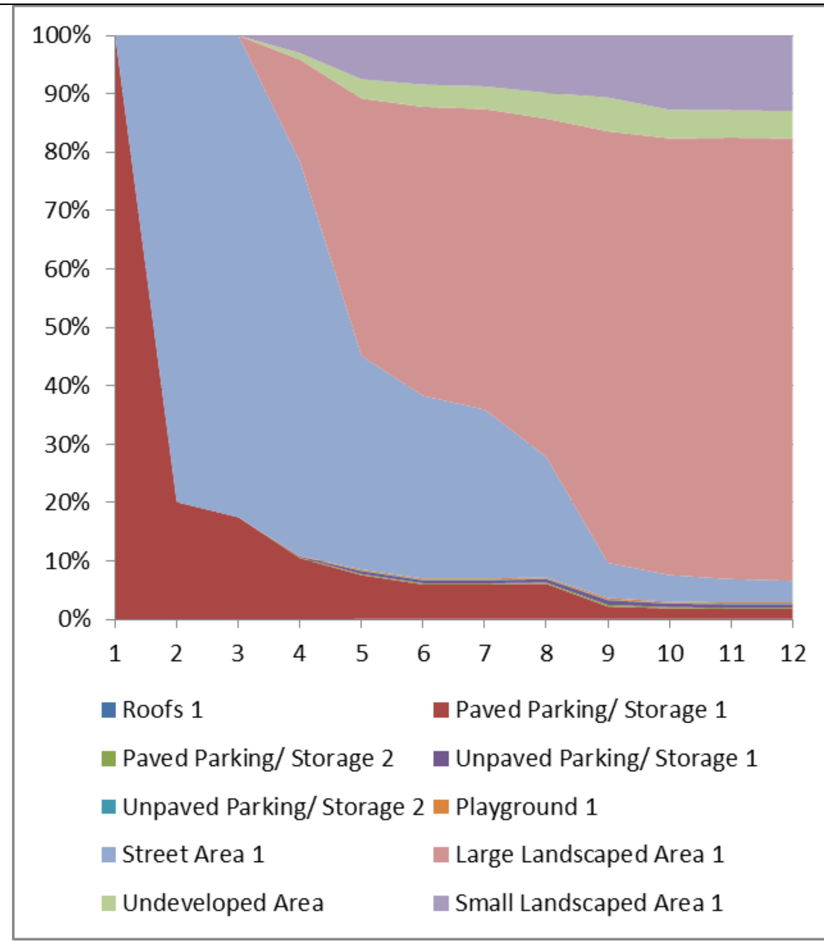
Industrial Areas Total Kjeldahl Nitrogen Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



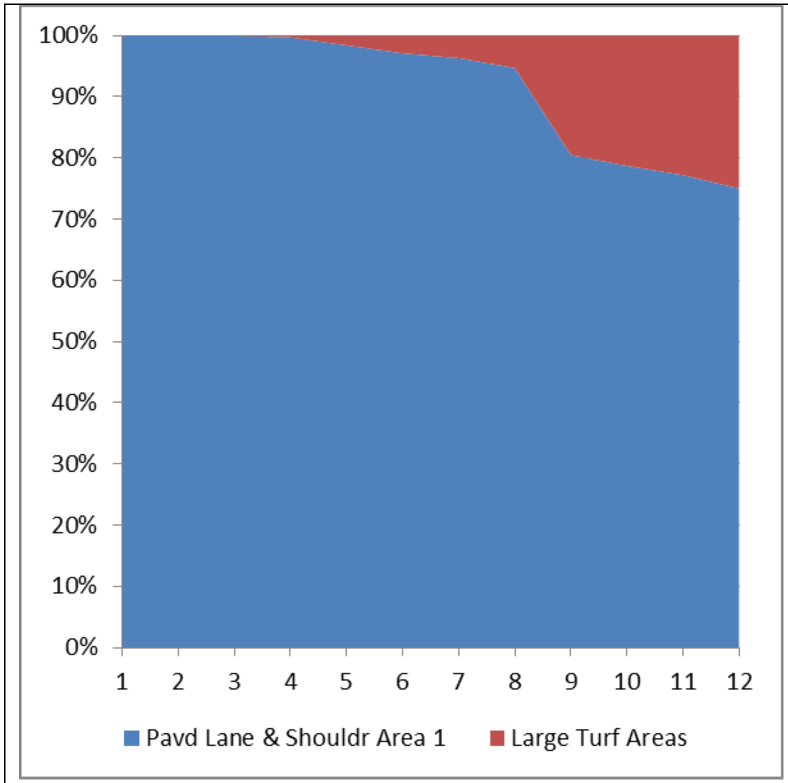
Institutional Areas Total Kjeldahl Nitrogen Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



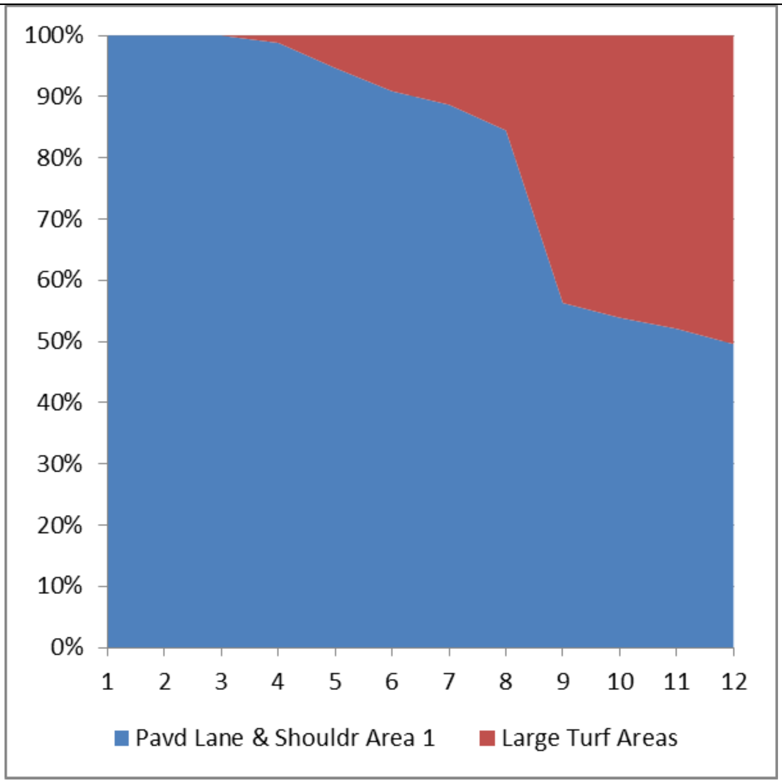
Office Technology Park Areas Total Kjeldahl Nitrogen Mass Contributions
Rains: 1: 0.05”; 2: 0.1”; 3: 0.25”; 4: 0.5”; 5: 0.75”; 6: 1”; 7: 1.5”; 8: 2”; 9: 2.5”; 10:3”; 11: 4” (no runoff expected for 0.01 inch rains)



Open Space Areas Total Kjeldahl Nitrogen Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

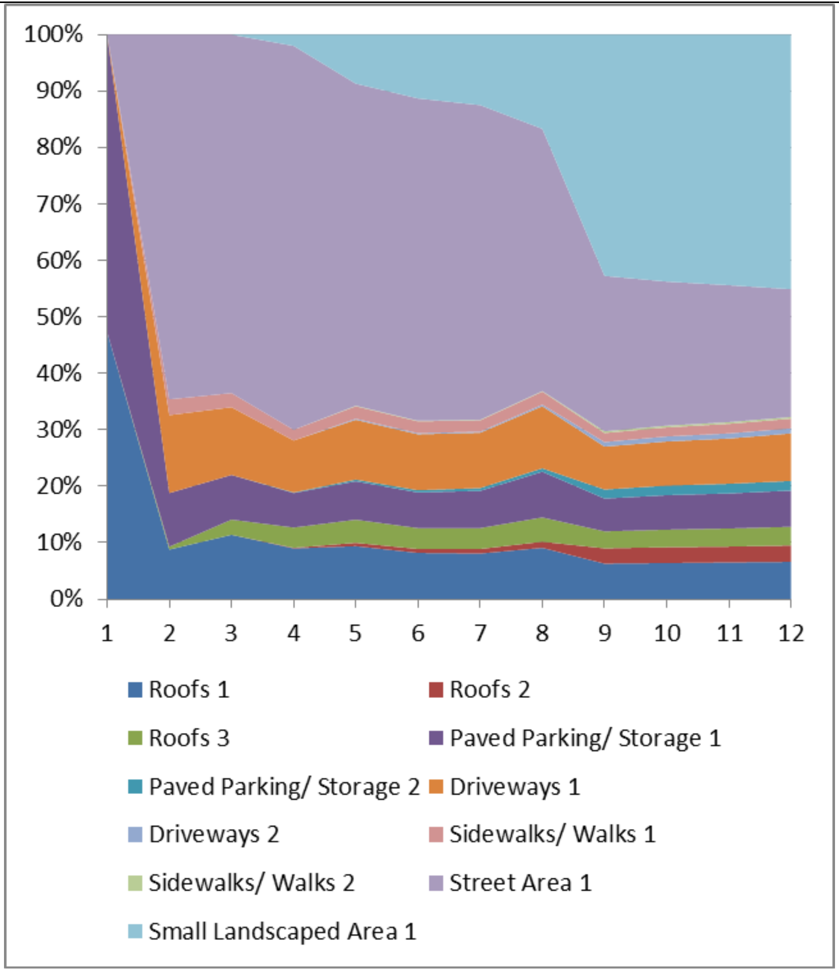


Urban Freeway Areas Total Kjeldahl Nitrogen Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

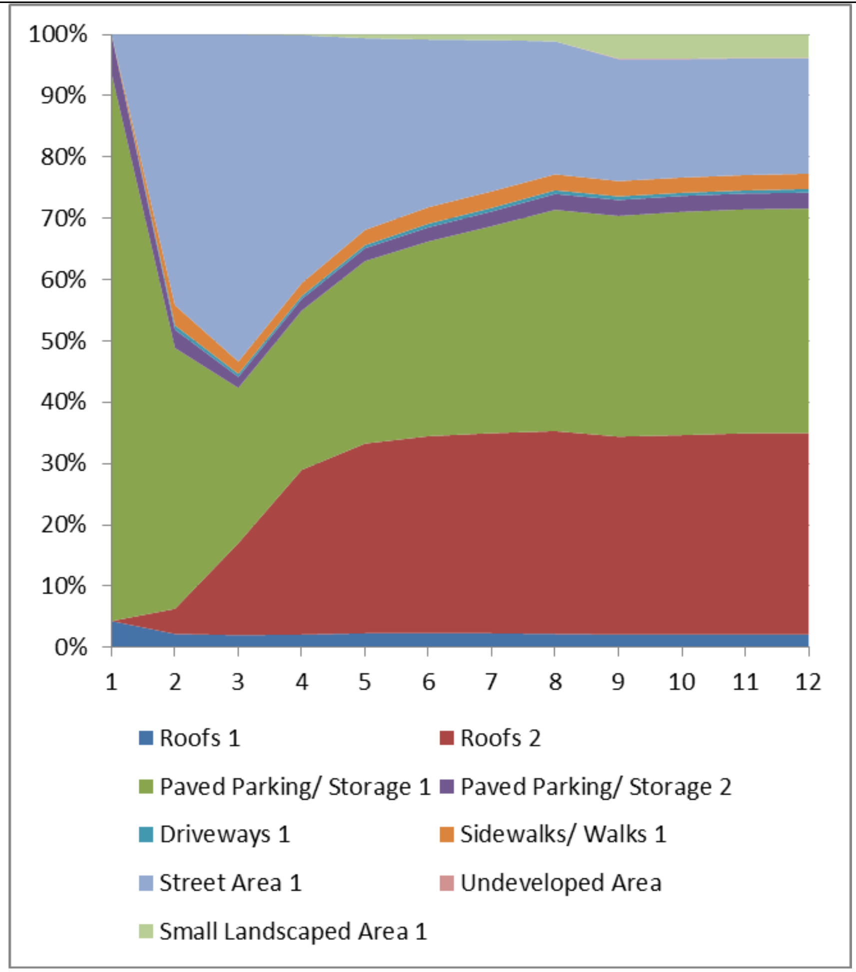


Rural Highway Areas Total Kjeldahl Nitrogen Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

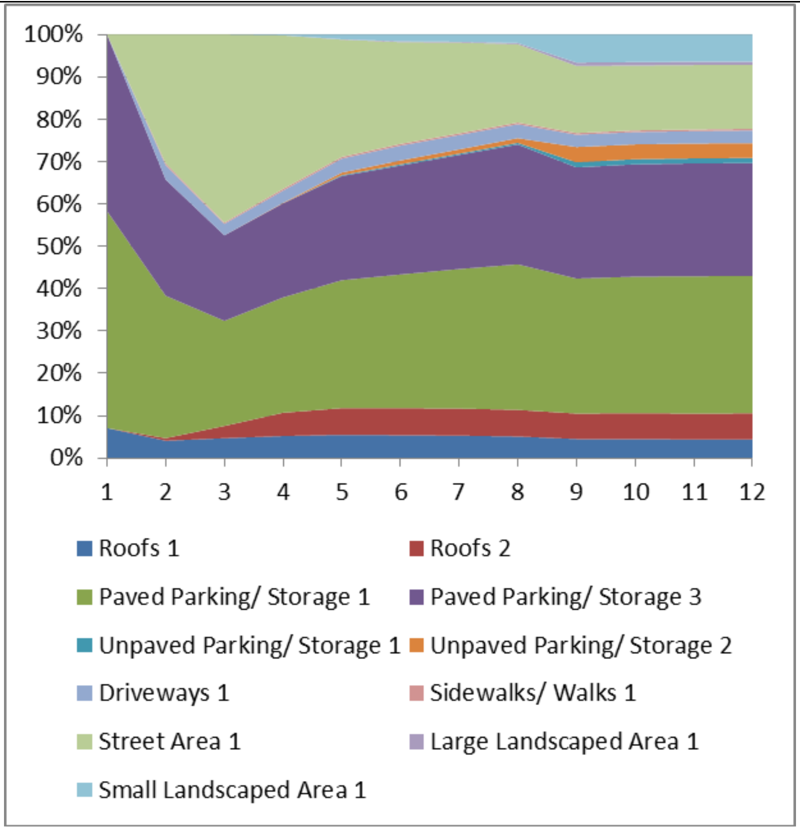
Chemical Oxygen Demand Mass Contributions



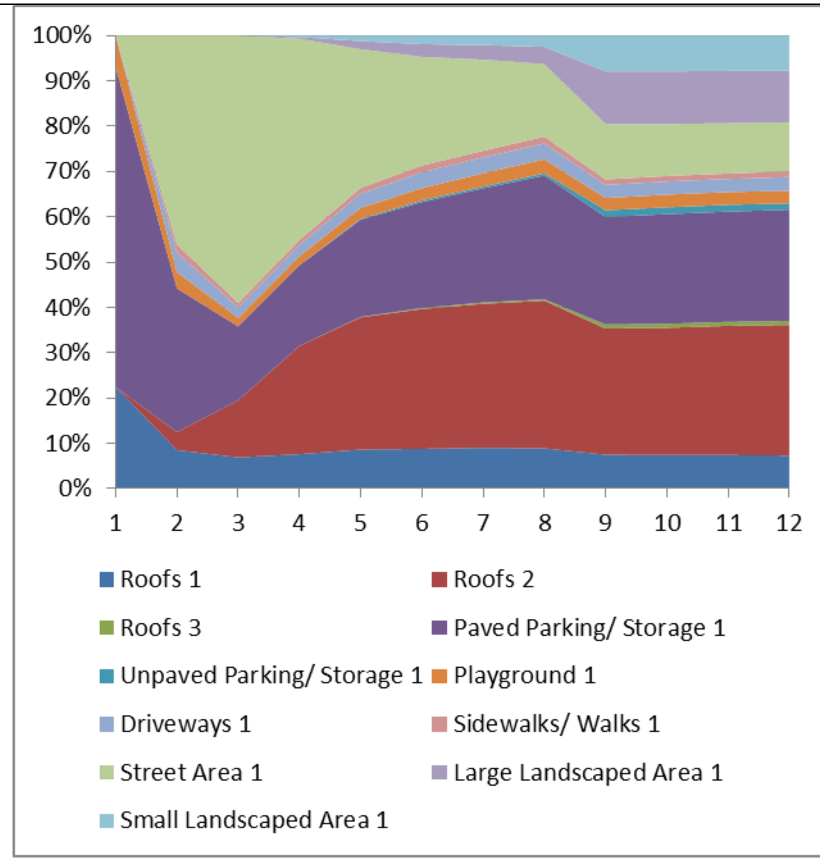
Residential Areas Chemical Oxygen Demand Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



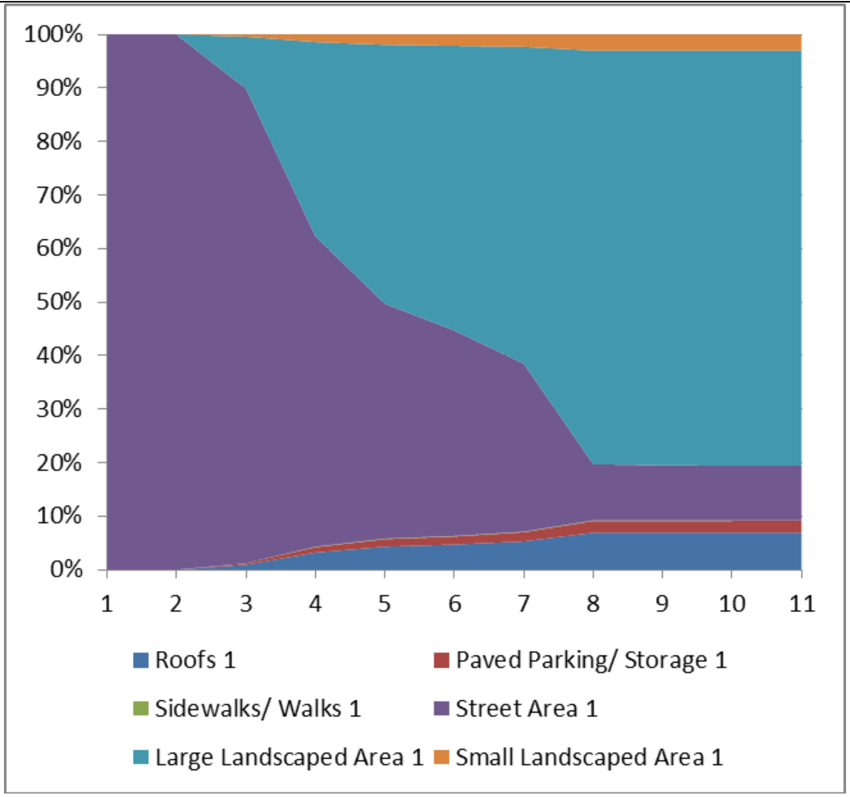
Commercial Areas Chemical Oxygen Demand Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



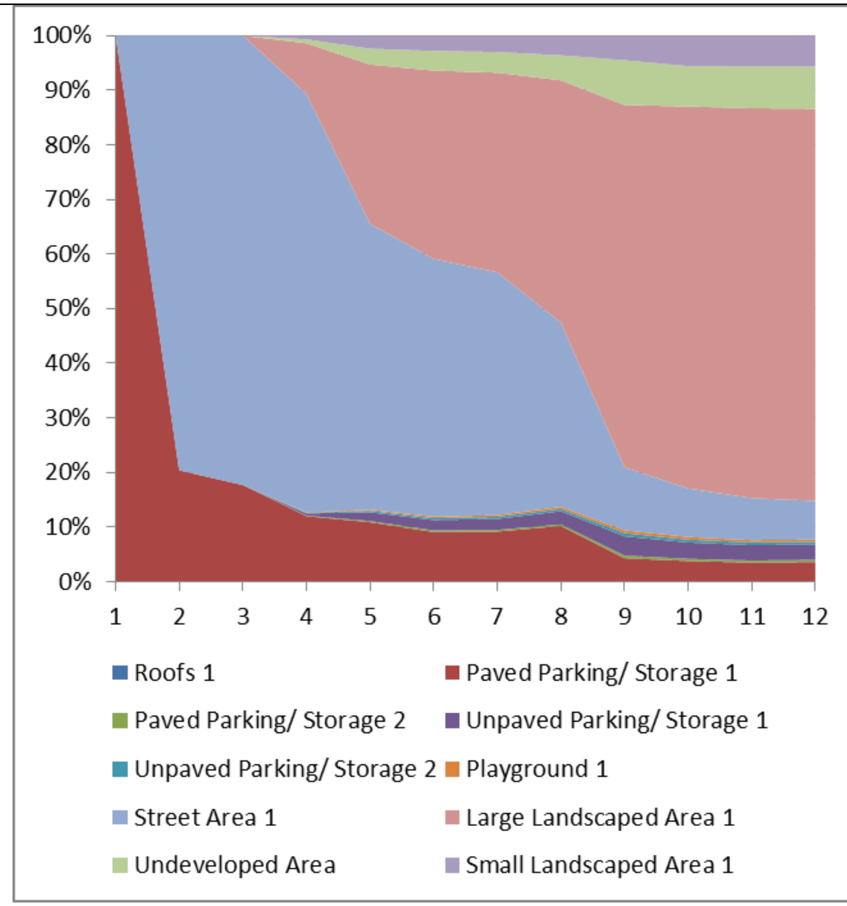
Industrial Areas Chemical Oxygen Demand Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



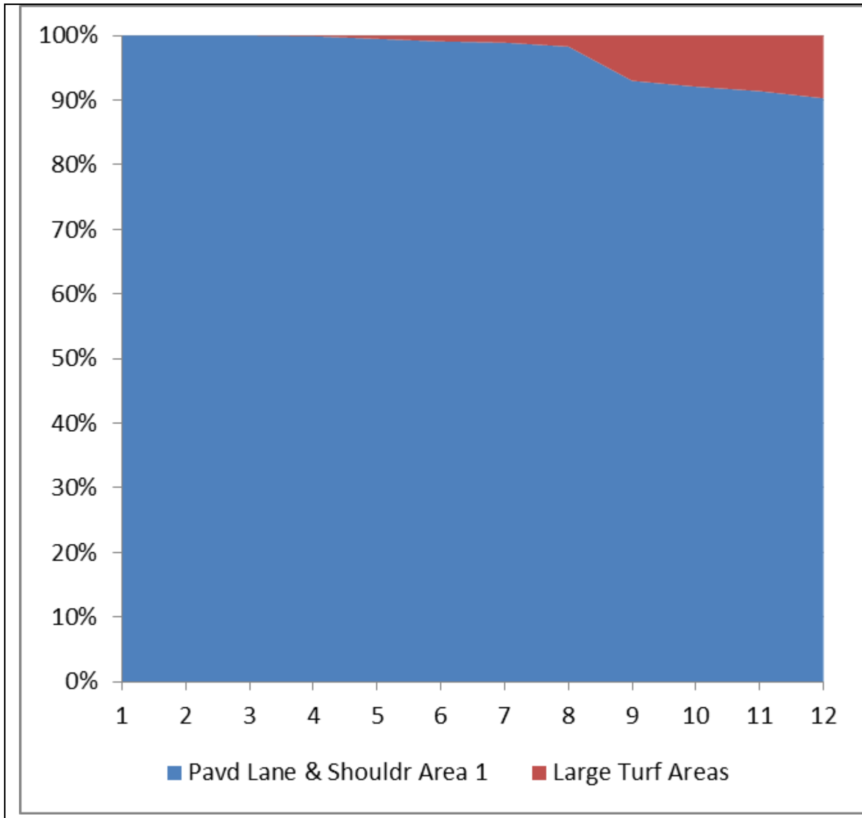
Institutional Areas Chemical Oxygen Demand Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



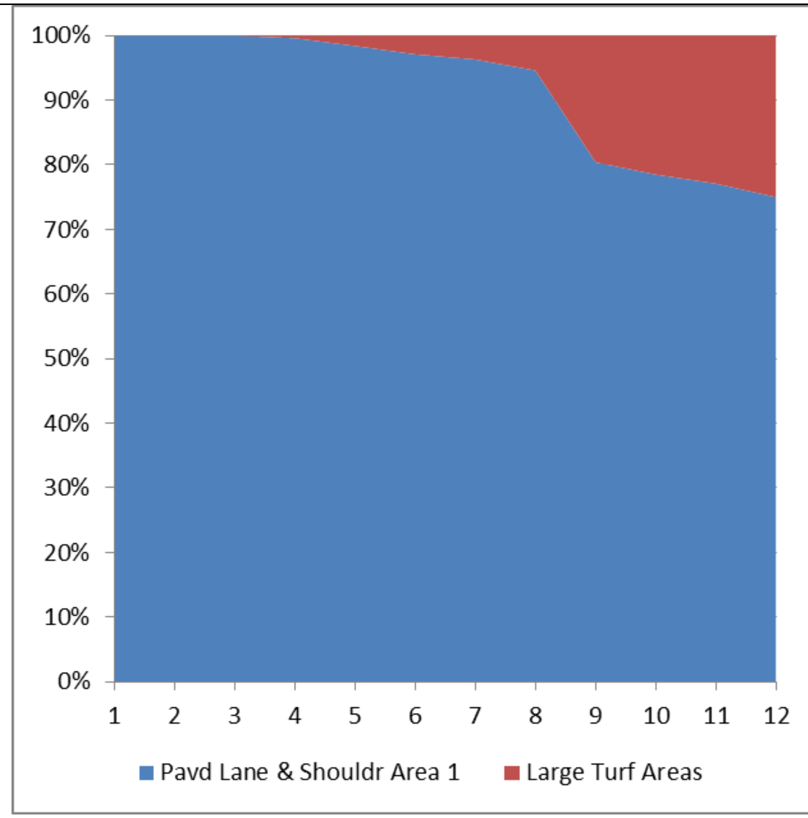
Office Technology Park Areas Chemical Oxygen Demand Mass Contributions
Rains: 1: 0.05”; 2: 0.1”; 3: 0.25”; 4: 0.5”; 5: 0.75”; 6: 1”; 7: 1.5”; 8: 2”; 9: 2.5”; 10:3”; 11: 4” (no runoff expected for 0.01 inch rains)



Open Space Areas Chemical Oxygen Demand Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

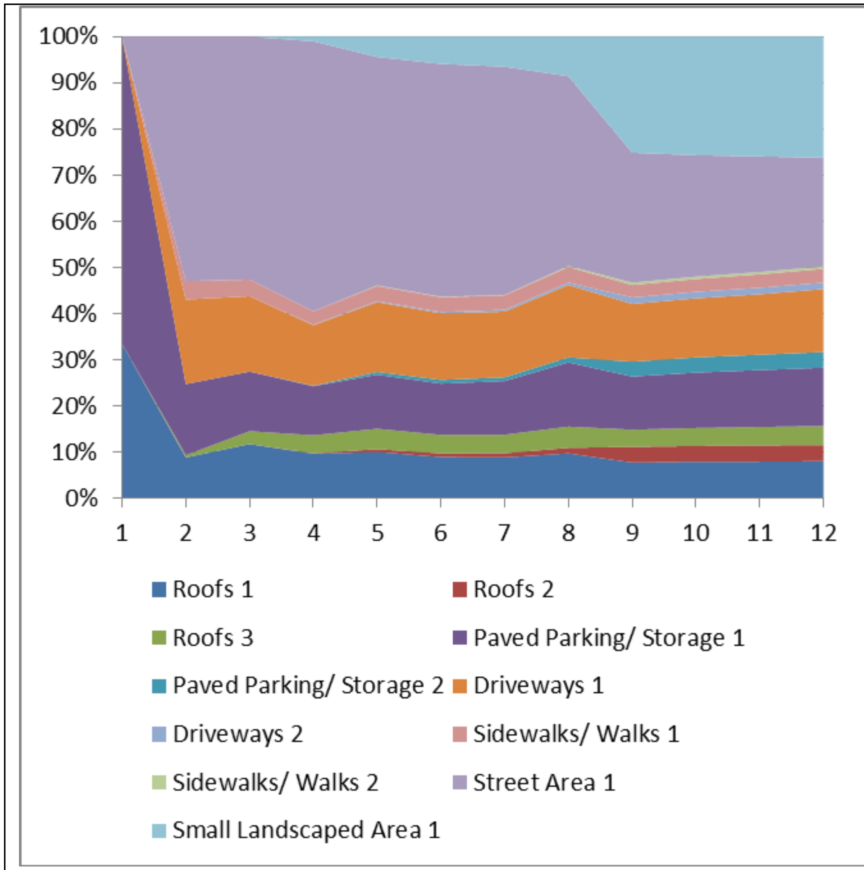


Urban Freeway Areas Chemical Oxygen Demand Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

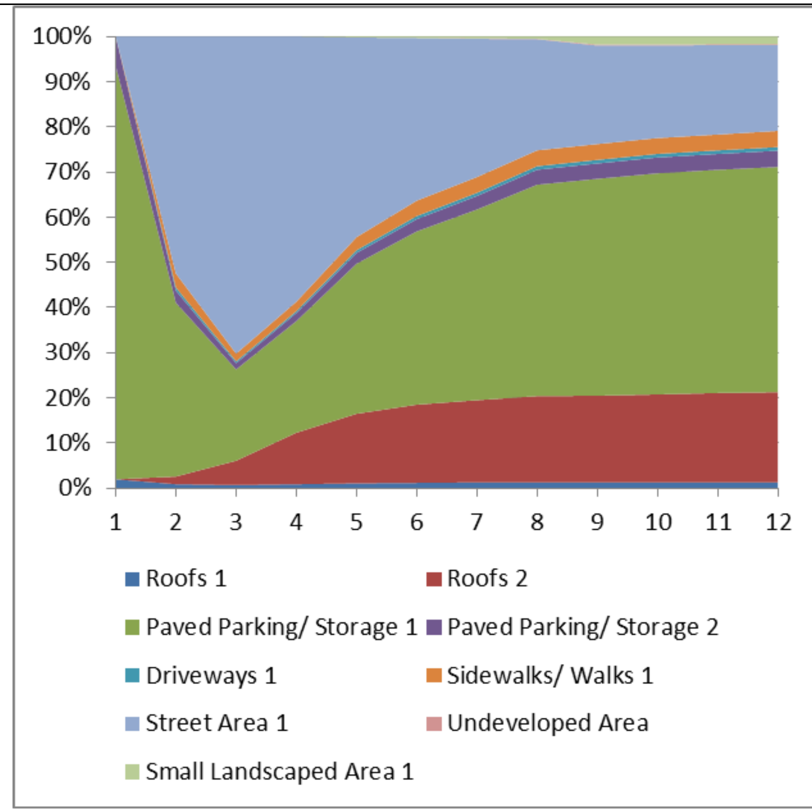


Rural Highway Areas Chemical Oxygen Demand Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

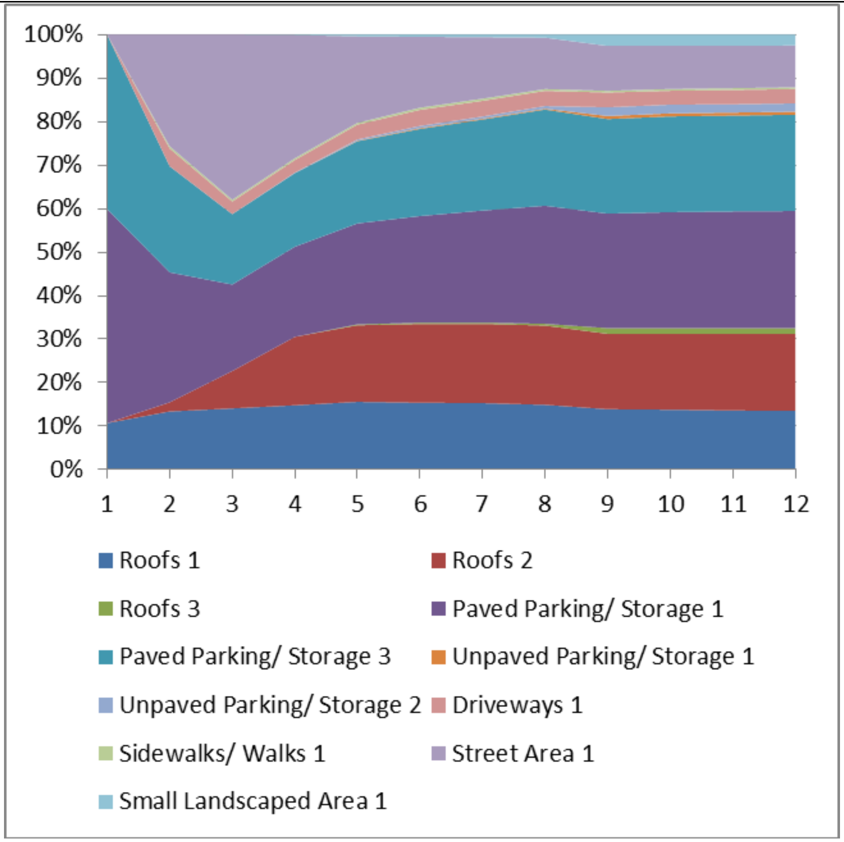
Total Copper Mass Contributions



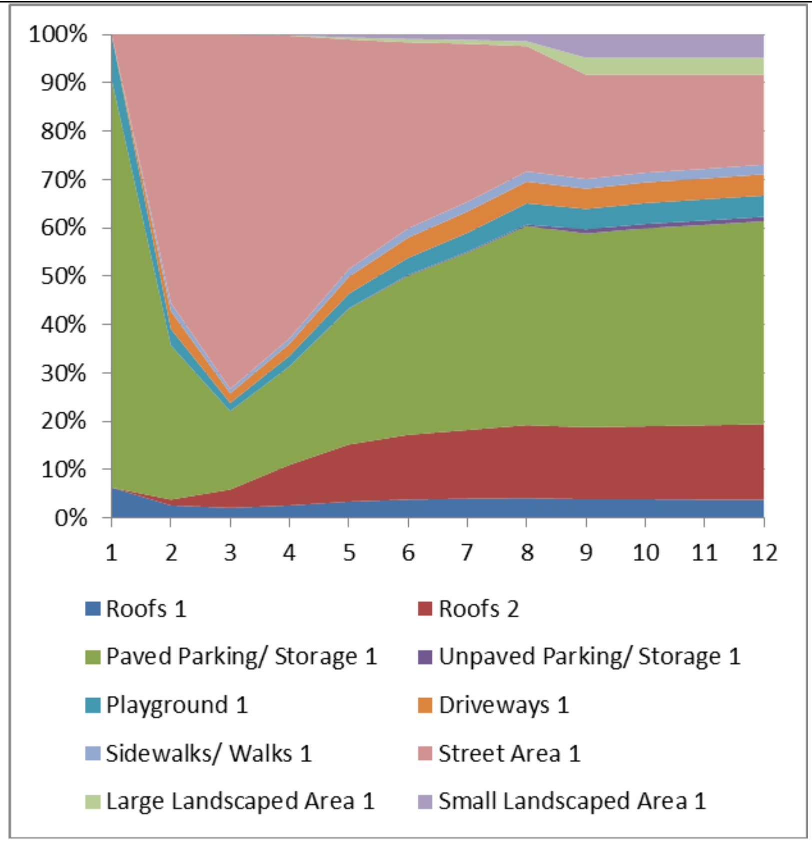
Residential Areas Total Copper Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



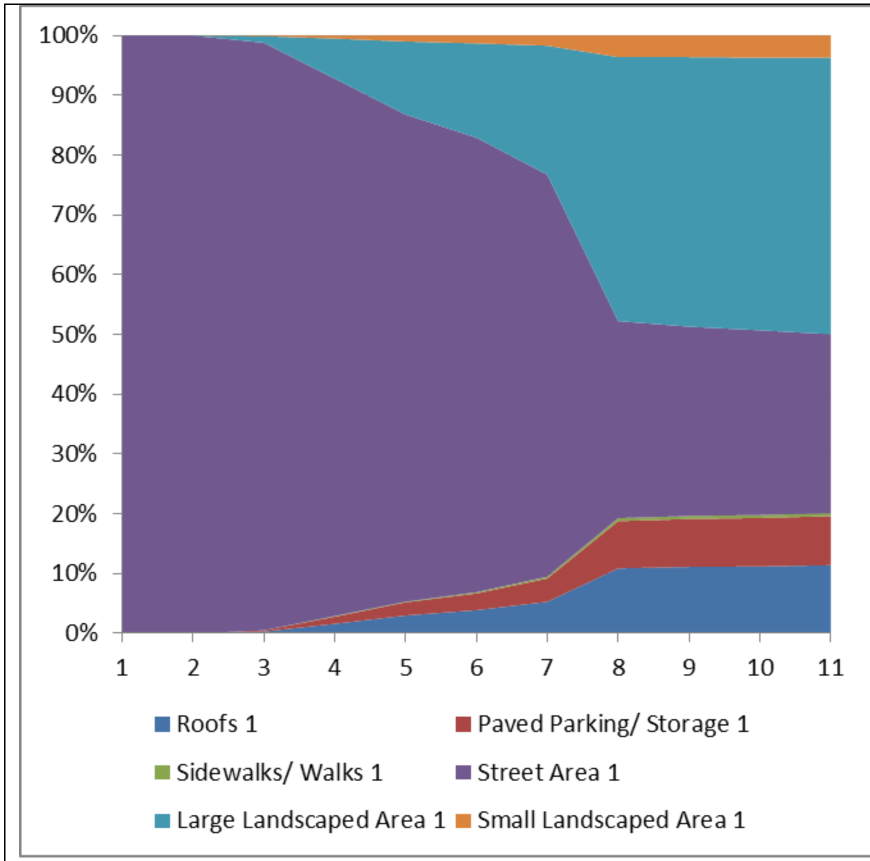
Commercial Areas Total Copper Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



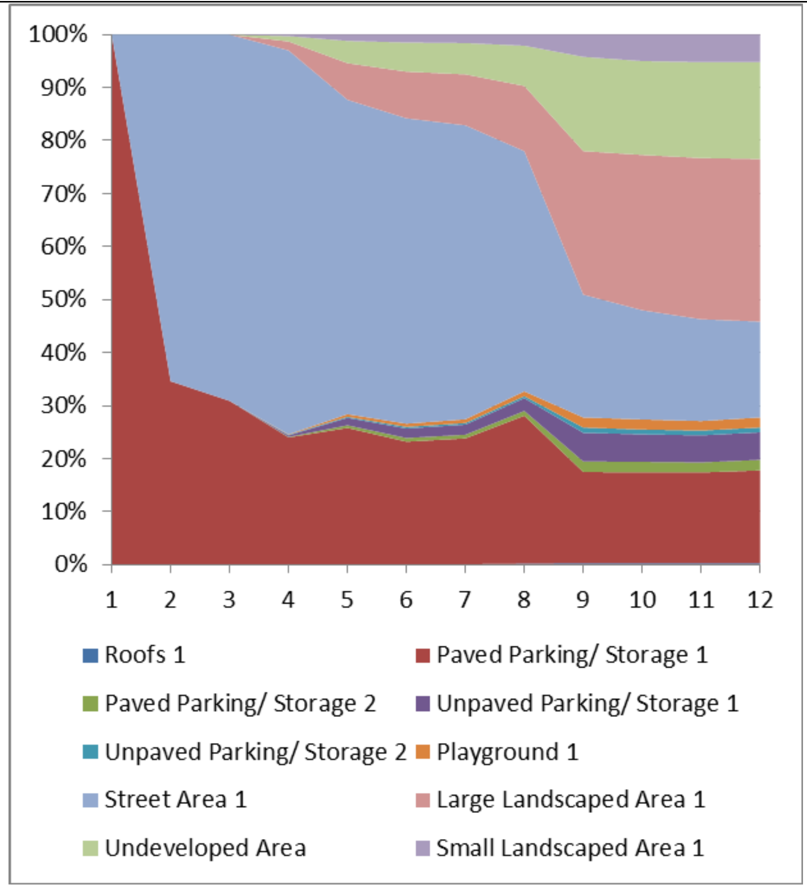
Industrial Areas Total Copper Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



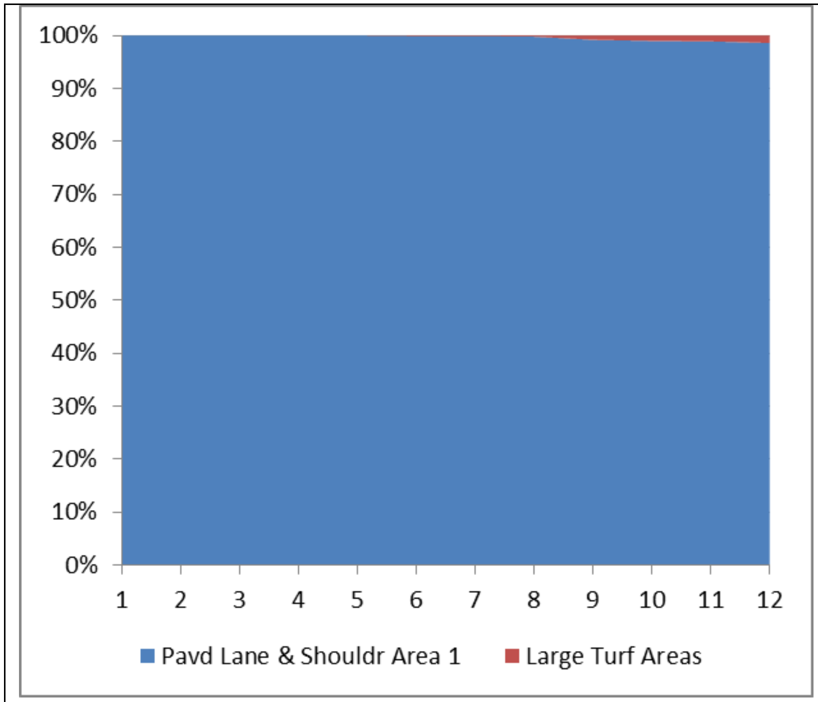
Institutional Areas Total Copper Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



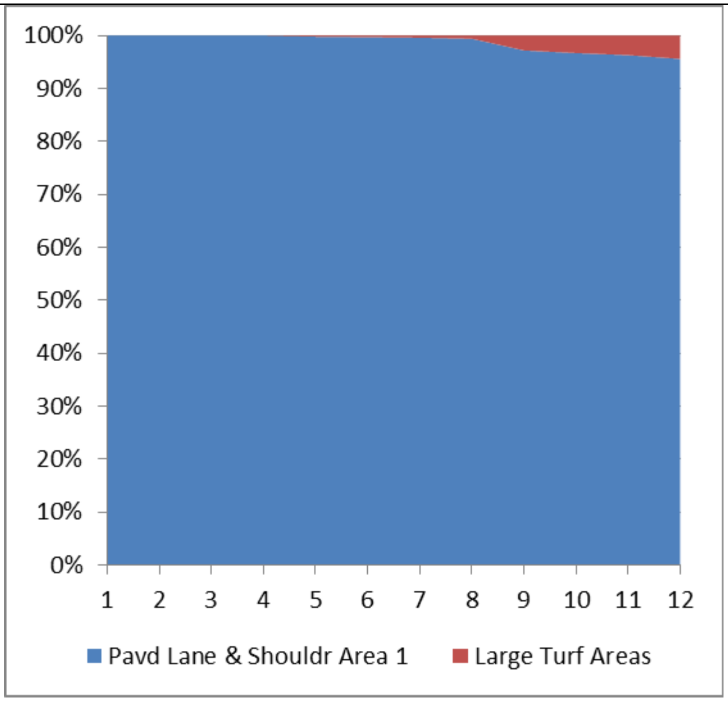
Office Technology Park Areas Total Copper Mass Contributions
Rains: 1: 0.05”; 2: 0.1”; 3: 0.25”; 4: 0.5”; 5: 0.75”; 6: 1”; 7: 1.5”; 8: 2”; 9: 2.5”; 10:3”; 11: 4” (no runoff expected for 0.01 inch rains)



Open Space Areas Total Copper Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

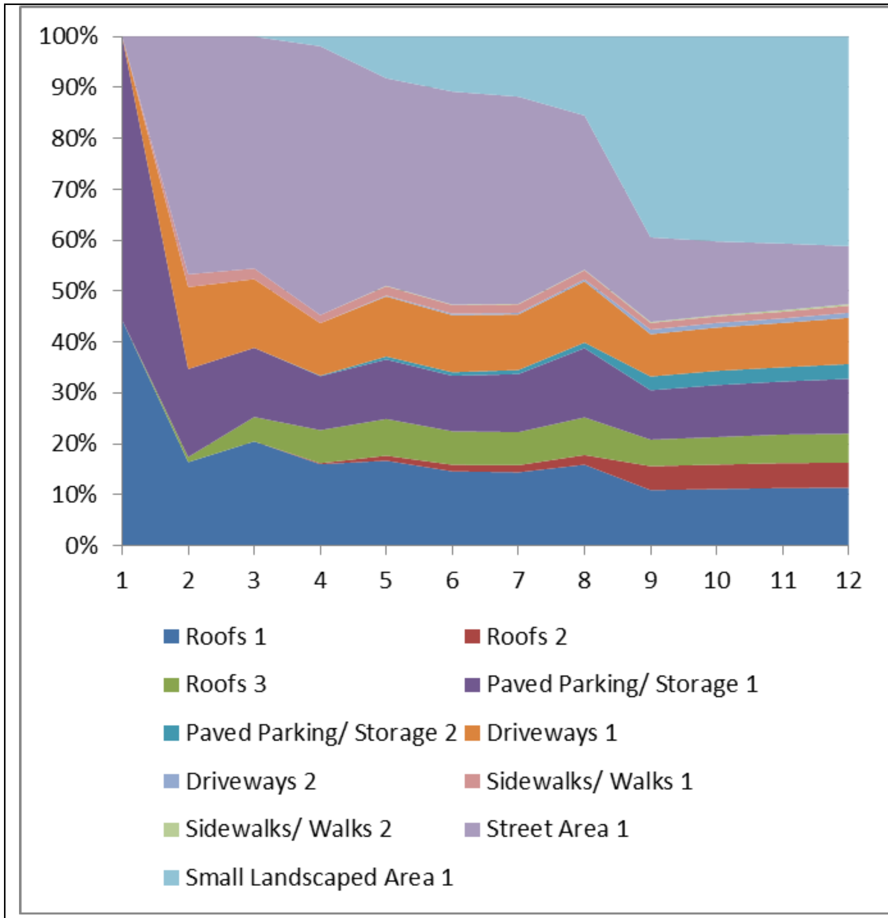


Urban Freeway Areas Total Copper Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

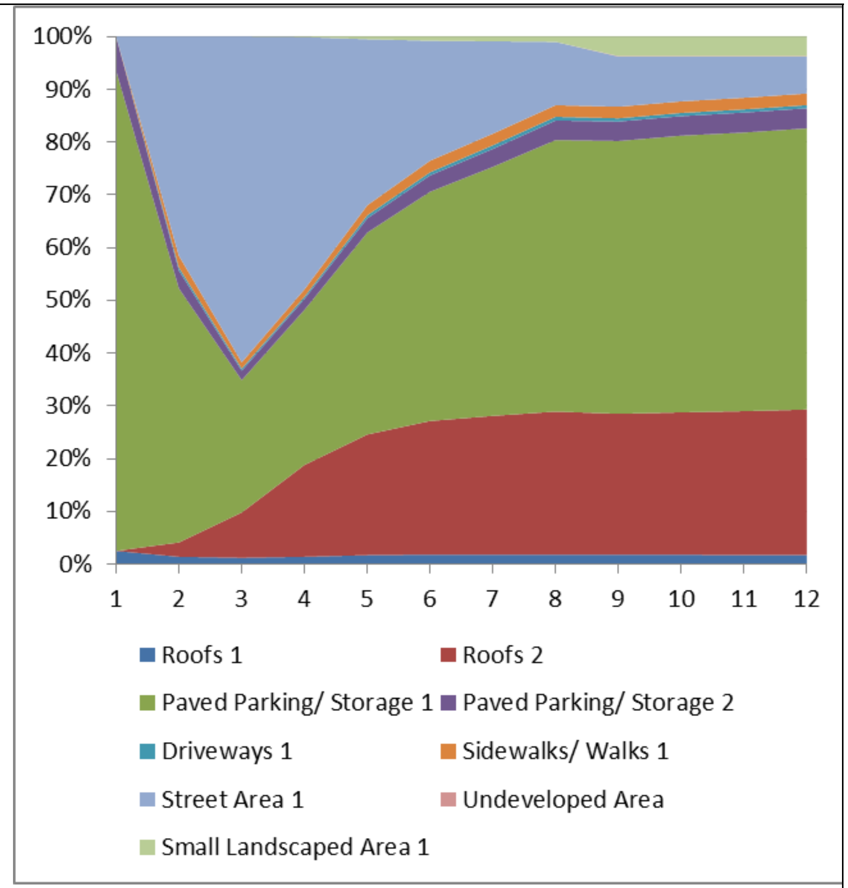


Rural Highway Areas Total Copper Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

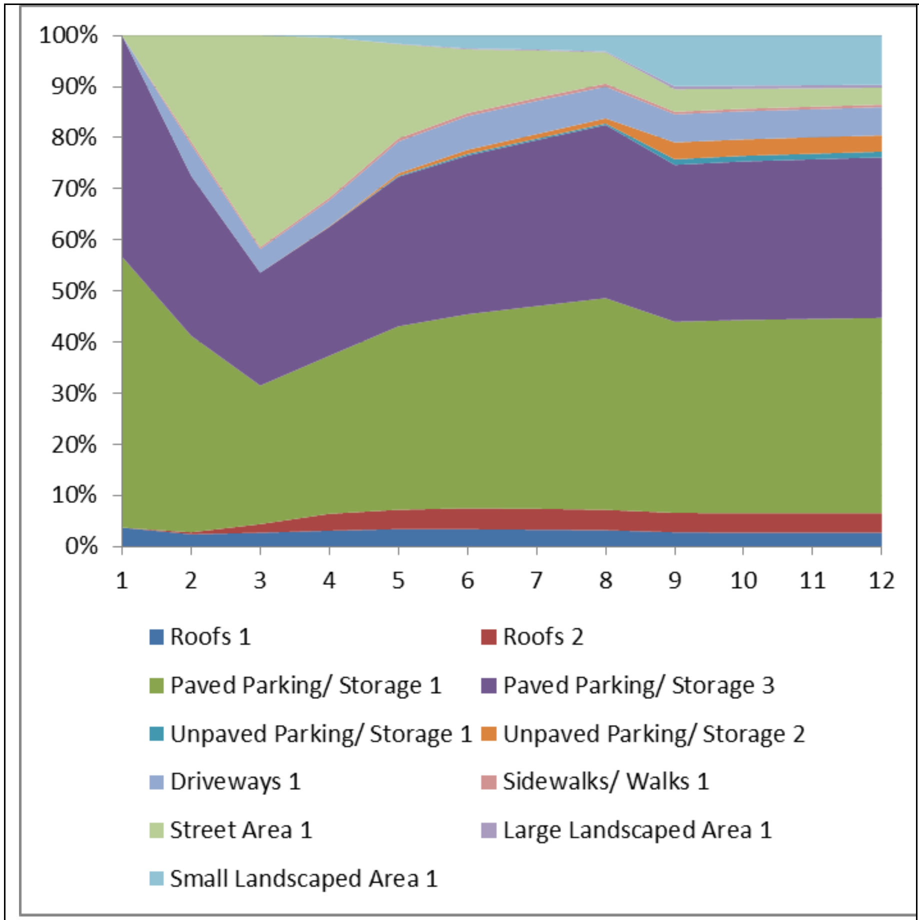
Total Lead Mass Contributions



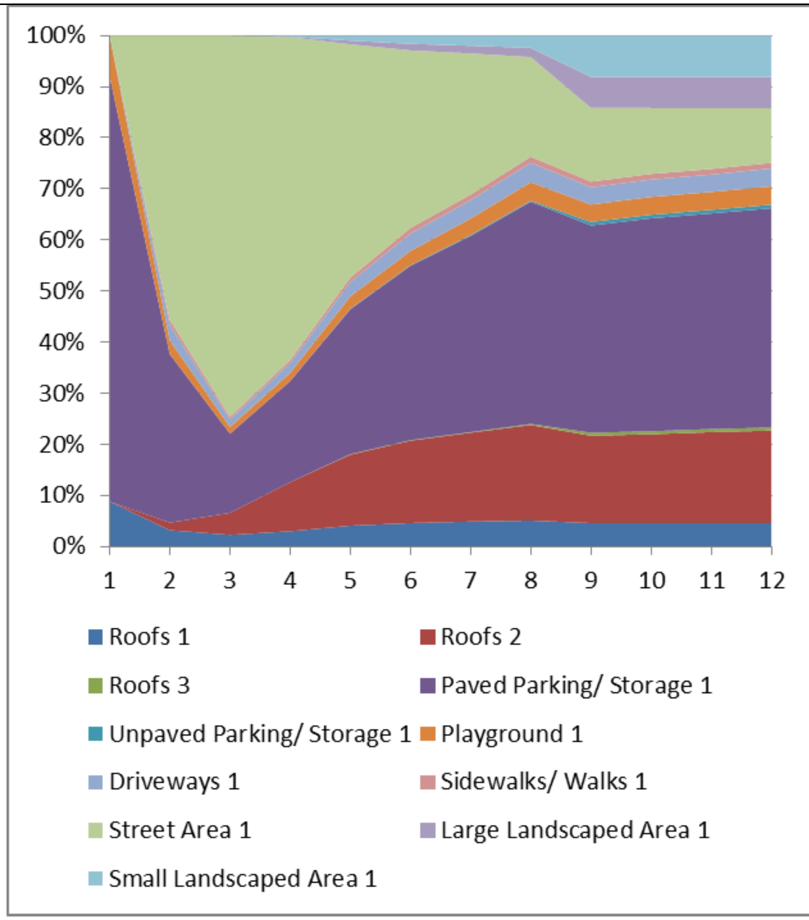
Residential Areas Total Lead Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



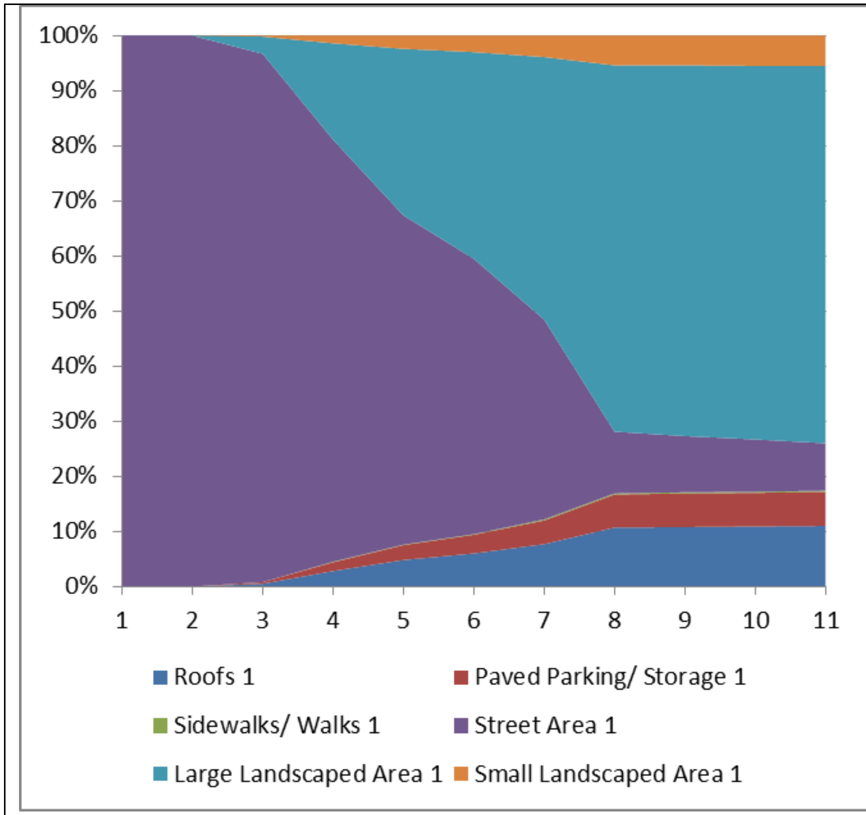
Commercial Areas Total Lead Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



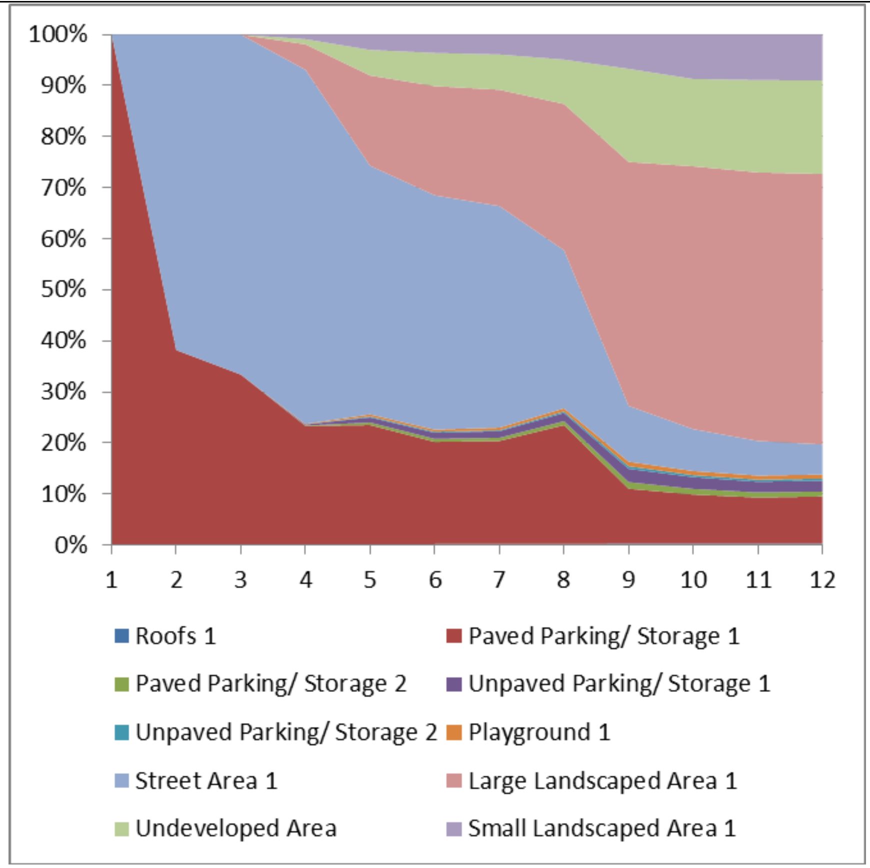
Industrial Areas Total Lead Mass Contributions
Rains: 1: 0.01"; 2: 0.05"; 3: 0.1"; 4: 0.25"; 5: 0.5"; 6: 0.75"; 7: 1"; 8: 1.5"; 9: 2"; 10: 2.5"; 11: 3"; 12: 4"



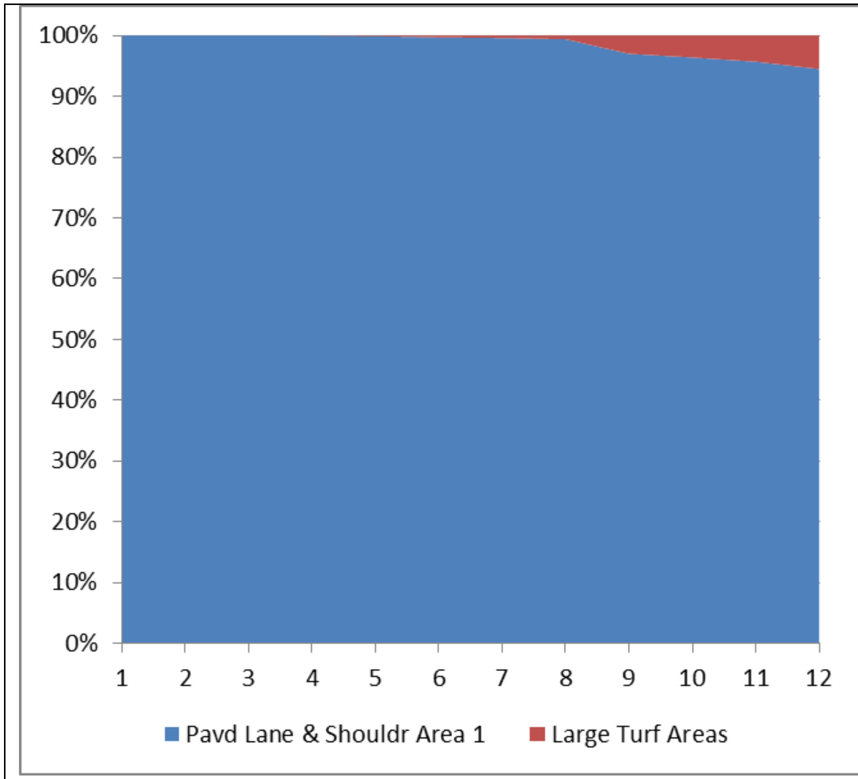
Institutional Areas Total Lead Mass Contributions
Rains: 1: 0.01"; 2: 0.05"; 3: 0.1"; 4: 0.25"; 5: 0.5"; 6: 0.75"; 7: 1"; 8: 1.5"; 9: 2"; 10: 2.5"; 11: 3"; 12: 4"



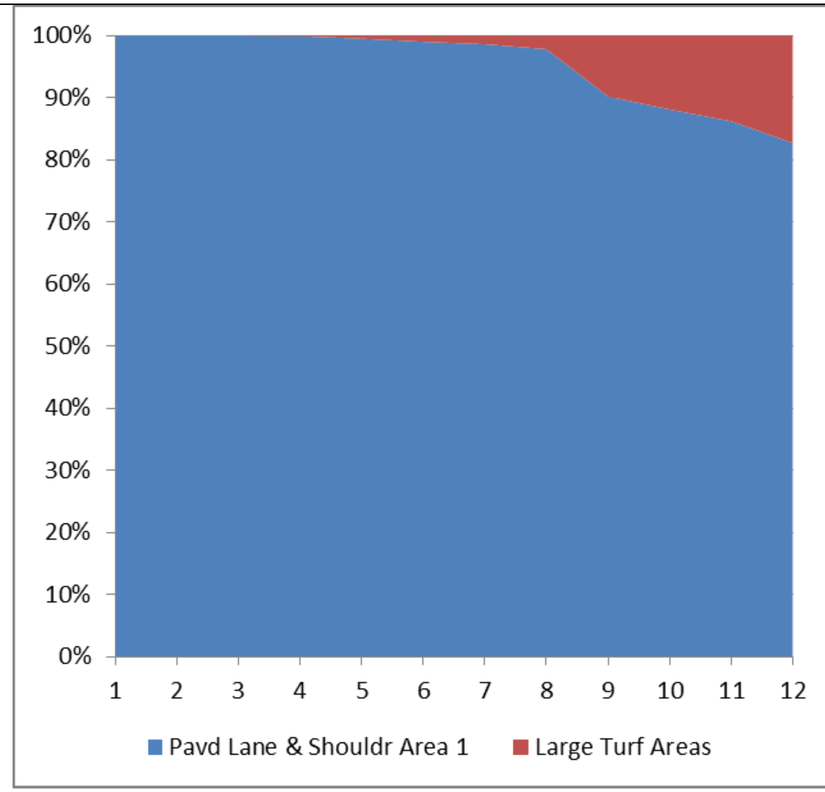
Office Technology Park Areas Total Lead Mass Contributions
Rains: 1: 0.05”; 2: 0.1”; 3: 0.25”; 4: 0.5”; 5: 0.75”; 6: 1”; 7: 1.5”; 8: 2”; 9: 2.5”; 10:3”; 11: 4” (no runoff expected for 0.01 inch rains)



Open Space Areas Total Lead Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

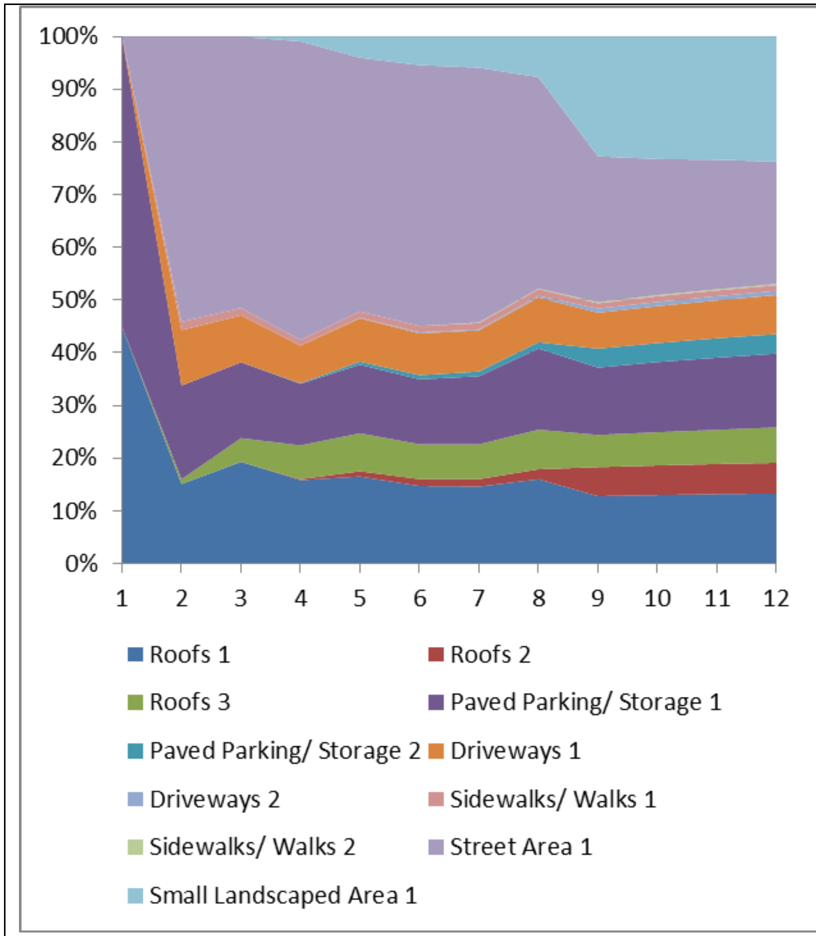


Urban Freeway Areas Total Lead Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

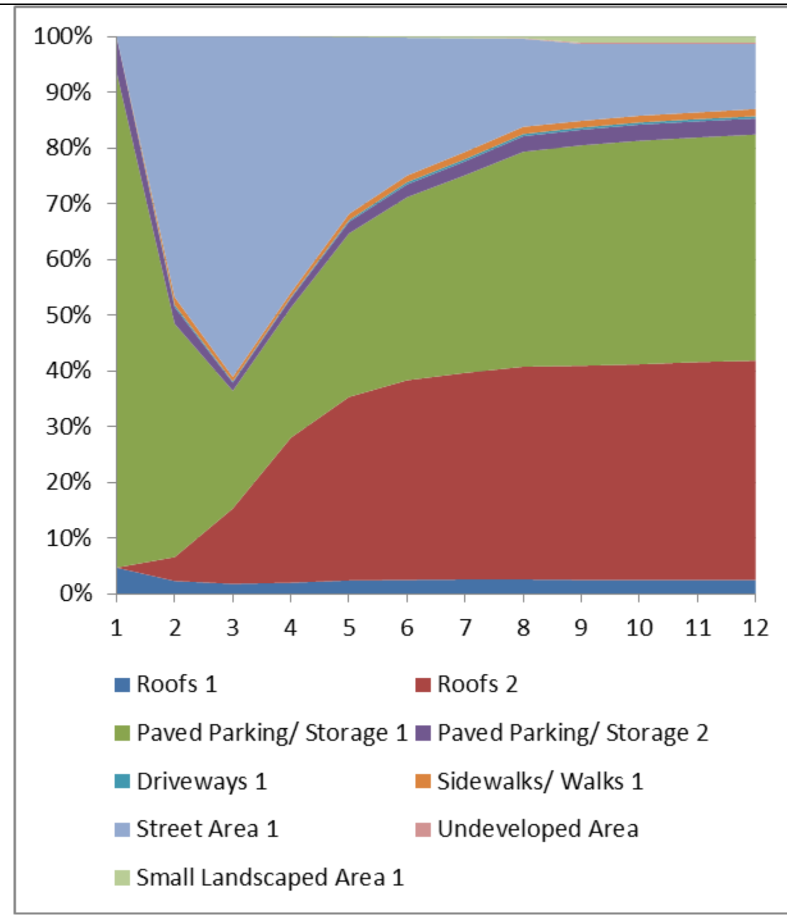


Rural Highway Areas Total Lead Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

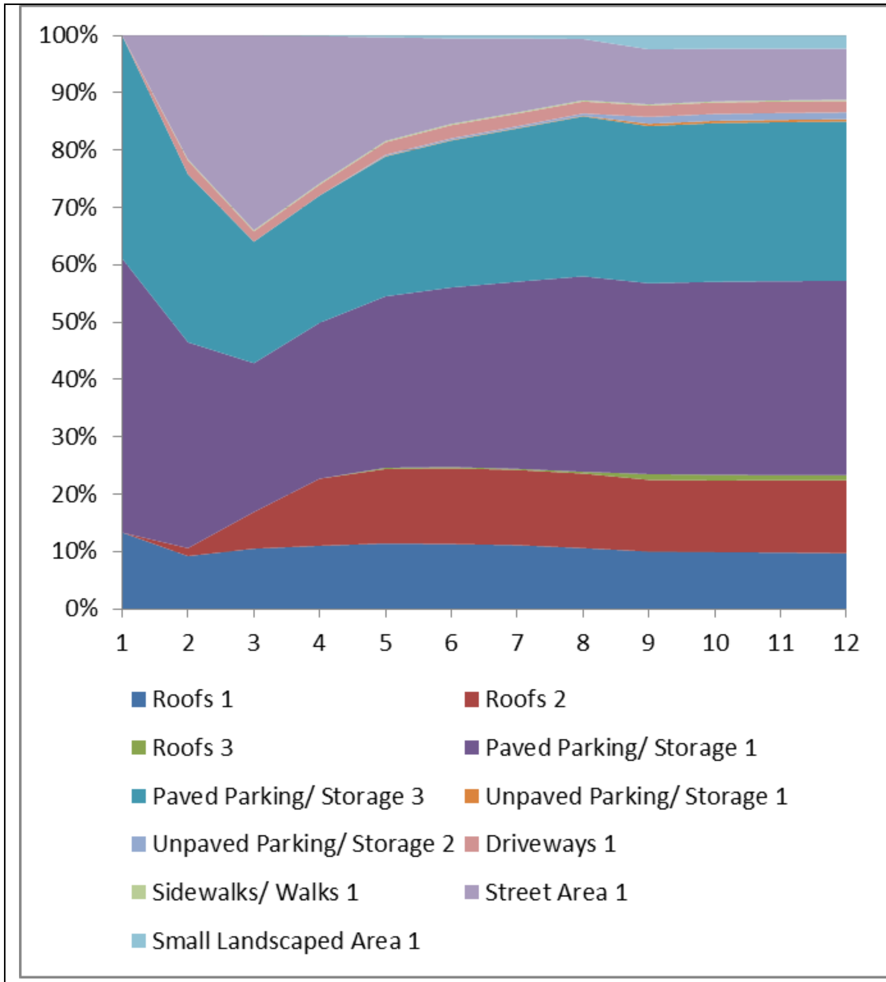
Total Zinc Mass Contributions



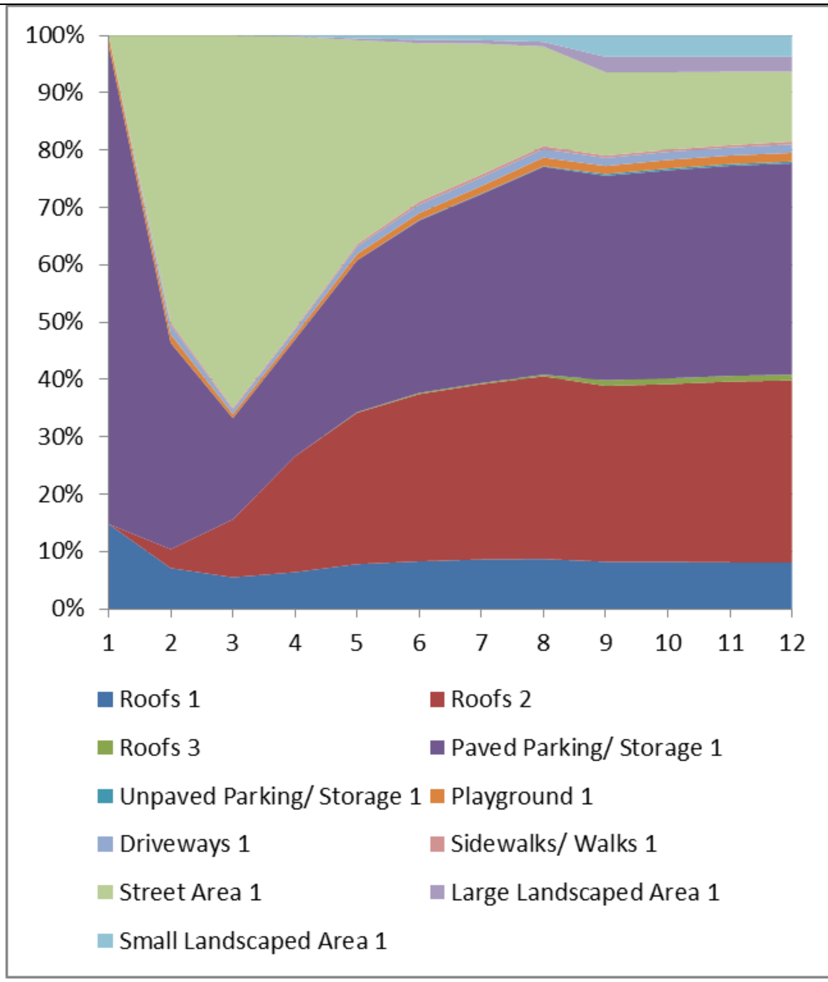
Residential Areas Total Zinc Mass Contributions
Rains: 1: 0.01"; 2: 0.05"; 3: 0.1"; 4: 0.25"; 5: 0.5"; 6: 0.75"; 7: 1"; 8: 1.5"; 9: 2"; 10: 2.5"; 11: 3"; 12: 4"



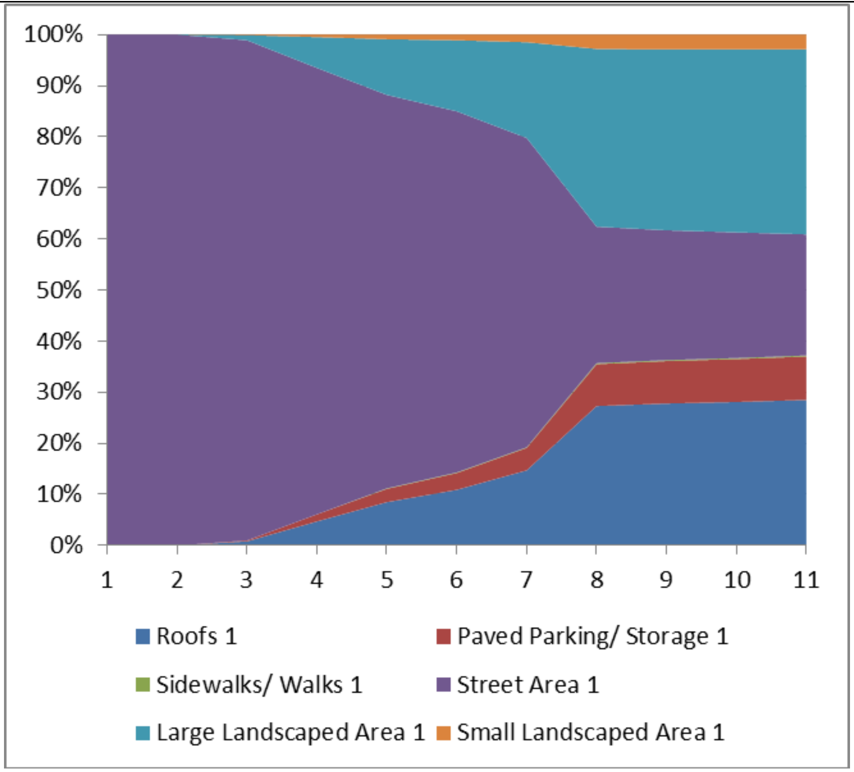
Commercial Areas Total Zinc Mass Contributions
Rains: 1: 0.01"; 2: 0.05"; 3: 0.1"; 4: 0.25"; 5: 0.5"; 6: 0.75"; 7: 1"; 8: 1.5"; 9: 2"; 10: 2.5"; 11: 3"; 12: 4"



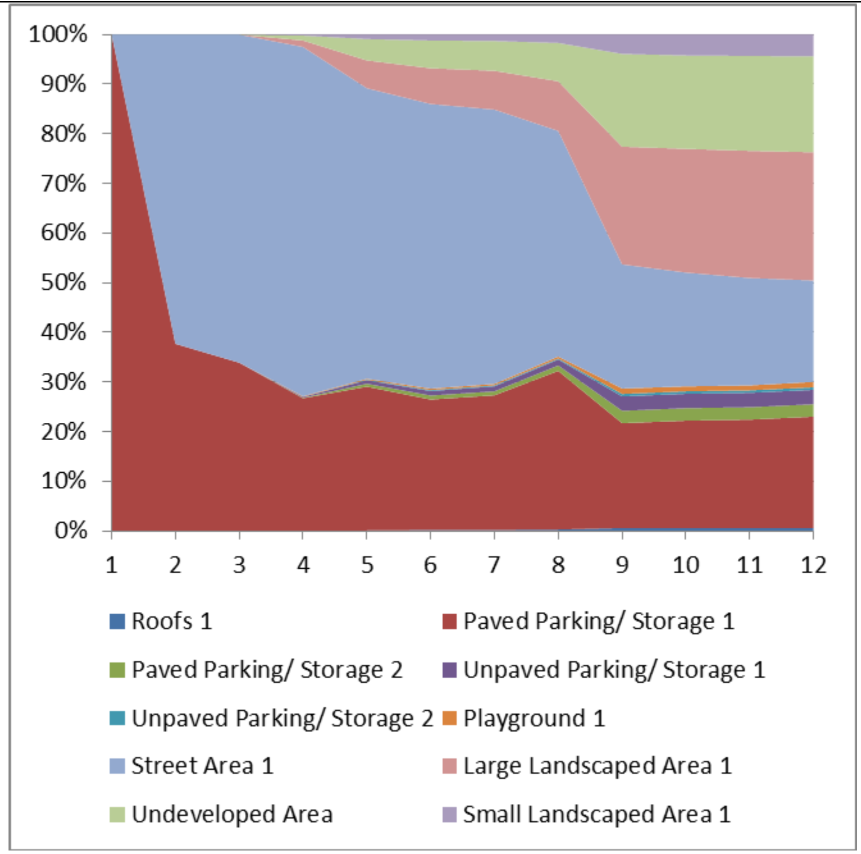
Industrial Areas Total Zinc Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



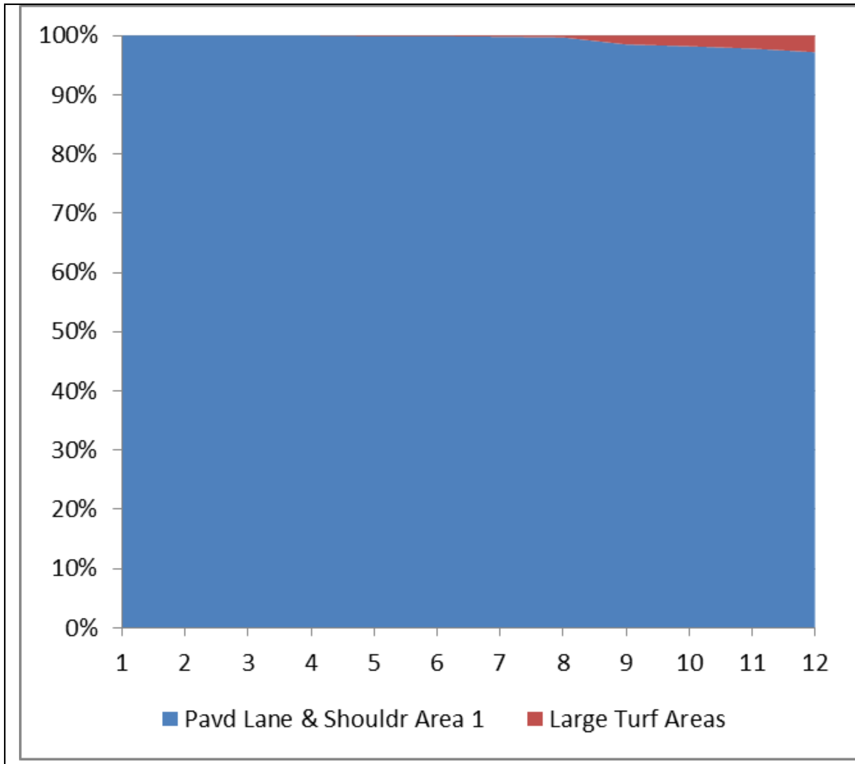
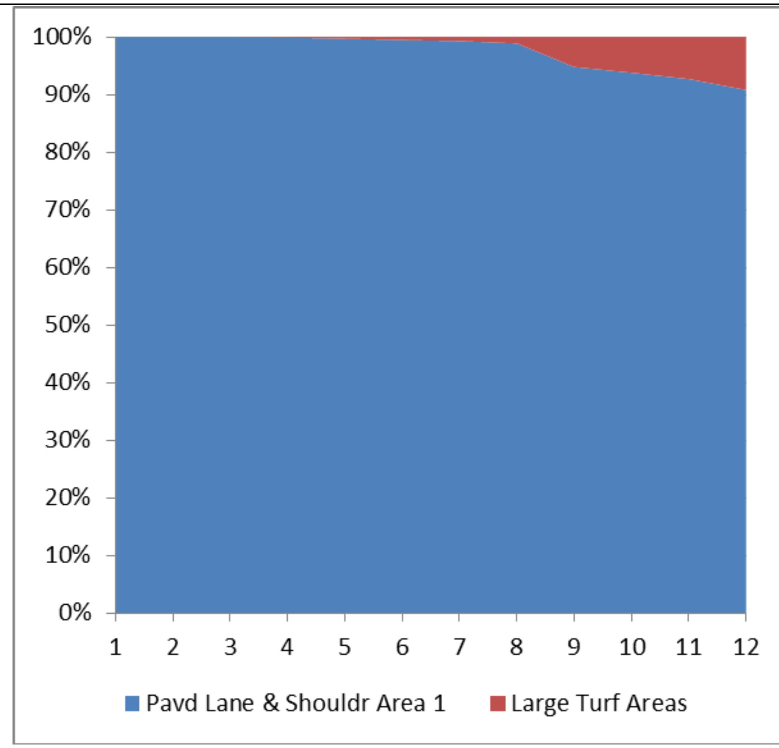
Institutional Areas Total Zinc Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



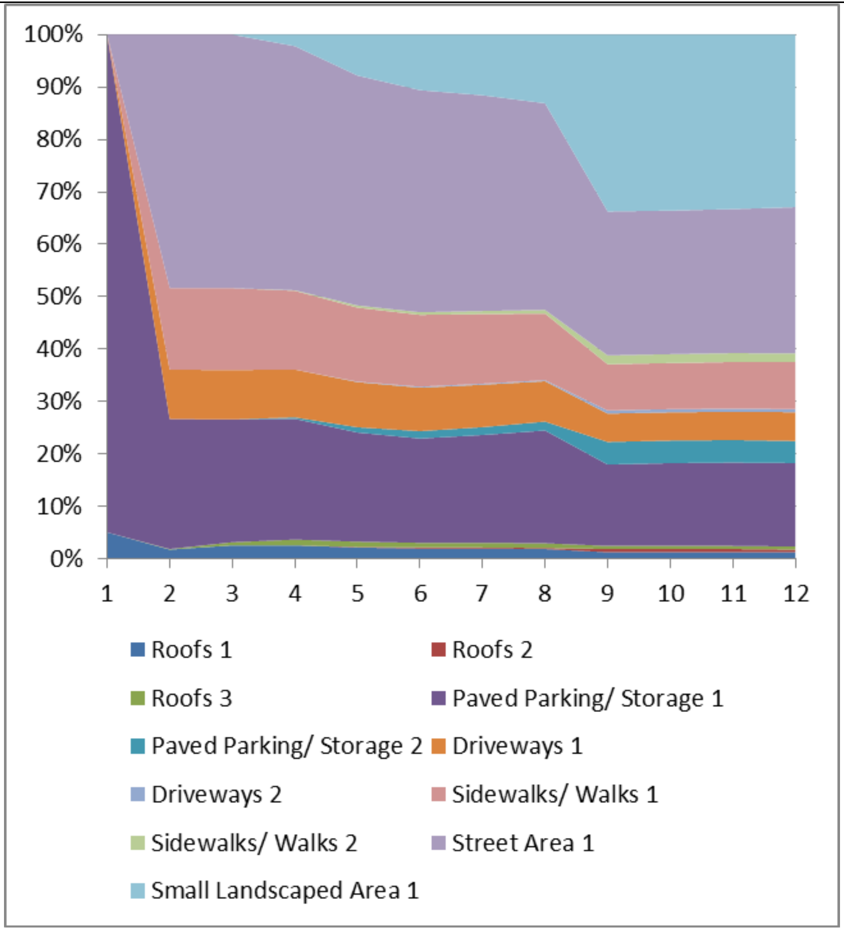
Office Technology Park Areas Total Zinc Mass Contributions
Rains: 1: 0.05”; 2: 0.1”; 3: 0.25”; 4: 0.5”; 5: 0.75”; 6: 1”; 7: 1.5”; 8: 2”; 9: 2.5”; 10:3”; 11: 4” (no runoff expected for 0.01 inch rains)



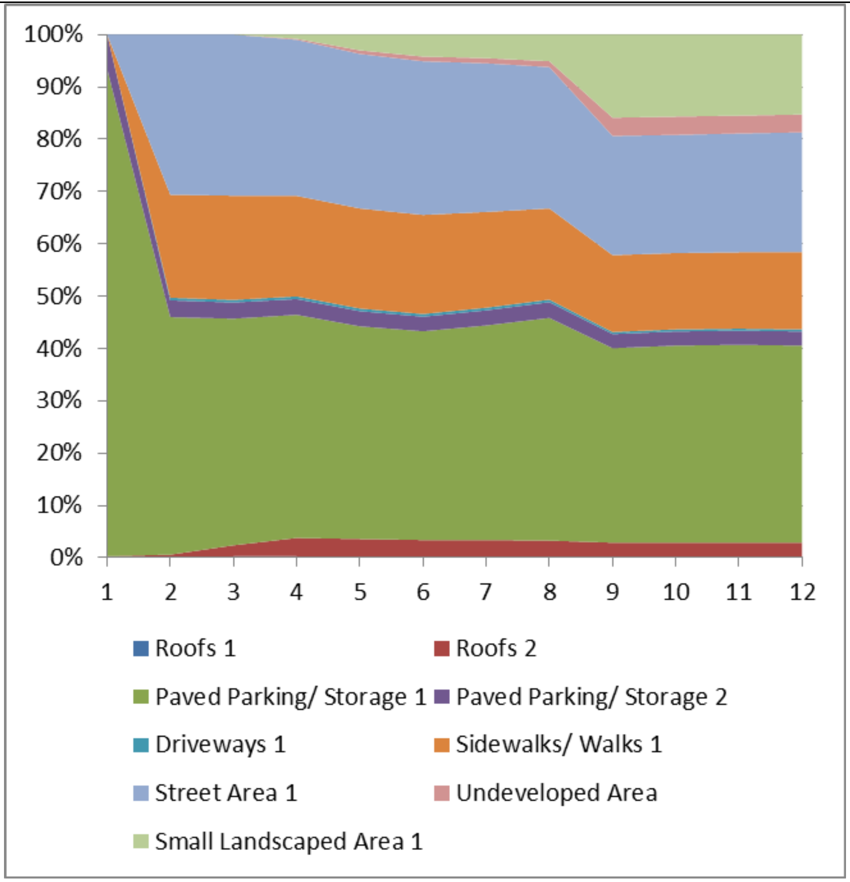
Open Space Areas Total Zinc Mass Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

 Urban Freeway Areas Total Zinc Mass Contributions Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”	 Rural Highway Areas Total Zinc Mass Contributions Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”

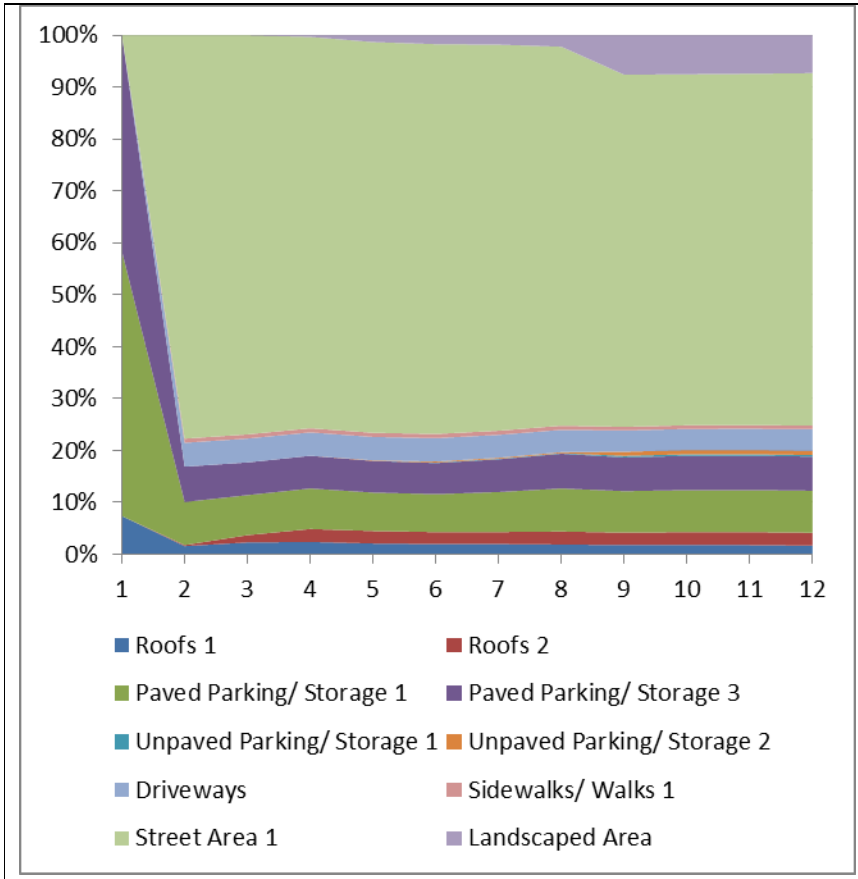
Fecal Coliform Contributions



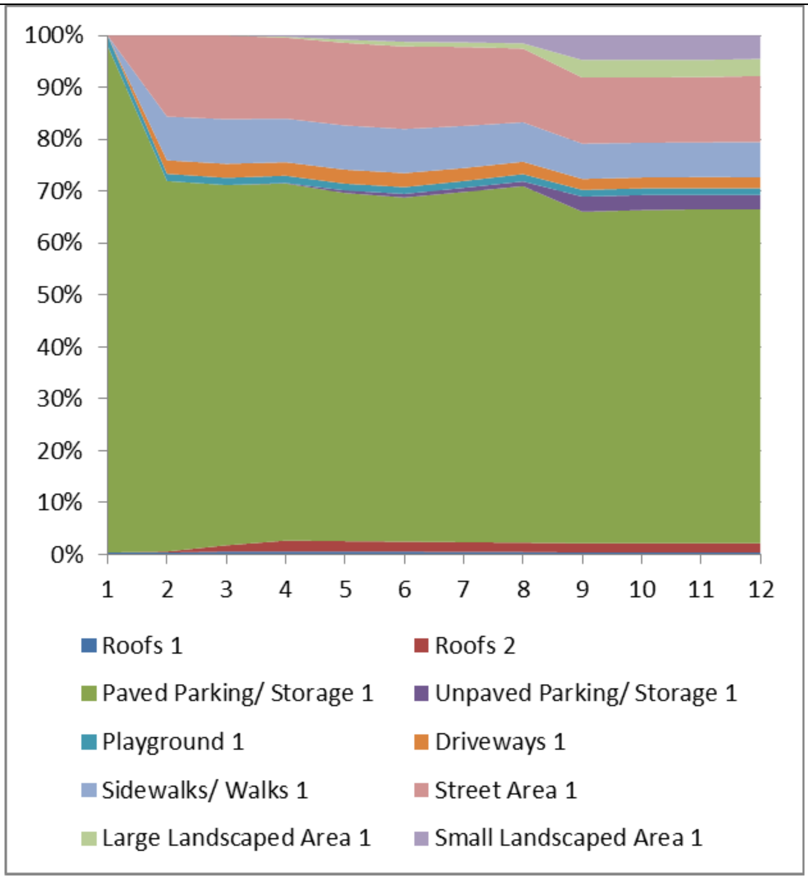
Residential Areas Fecal Coliform Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



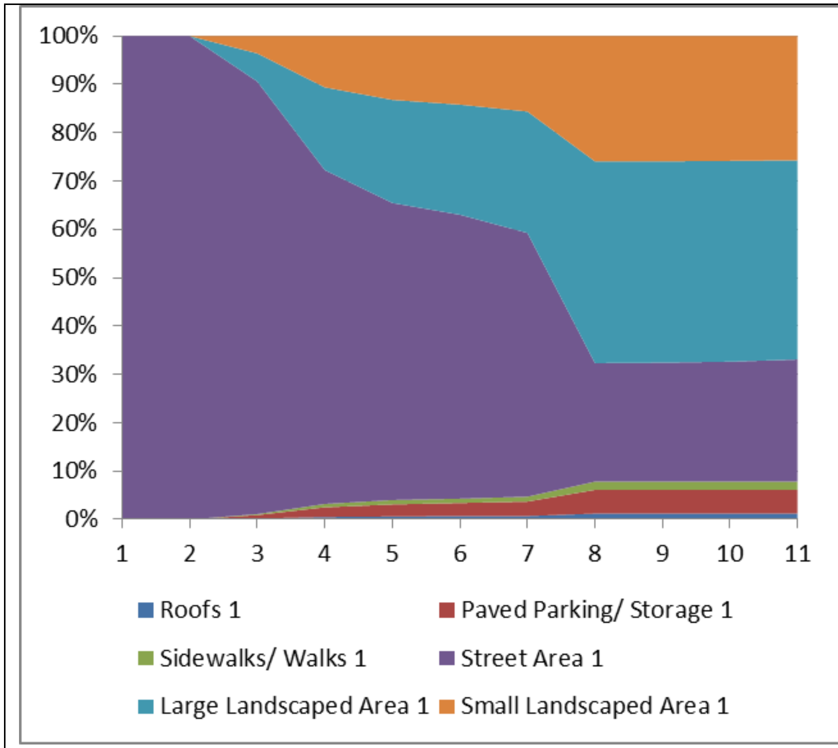
Commercial Areas Fecal Coliform Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



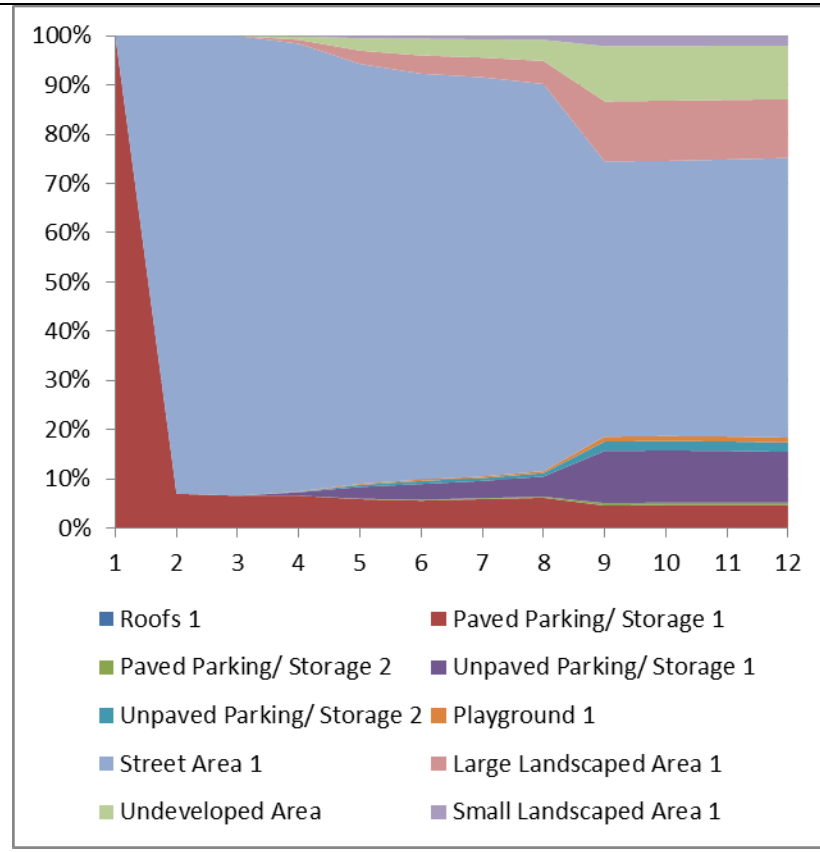
Industrial Areas Fecal Coliform Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



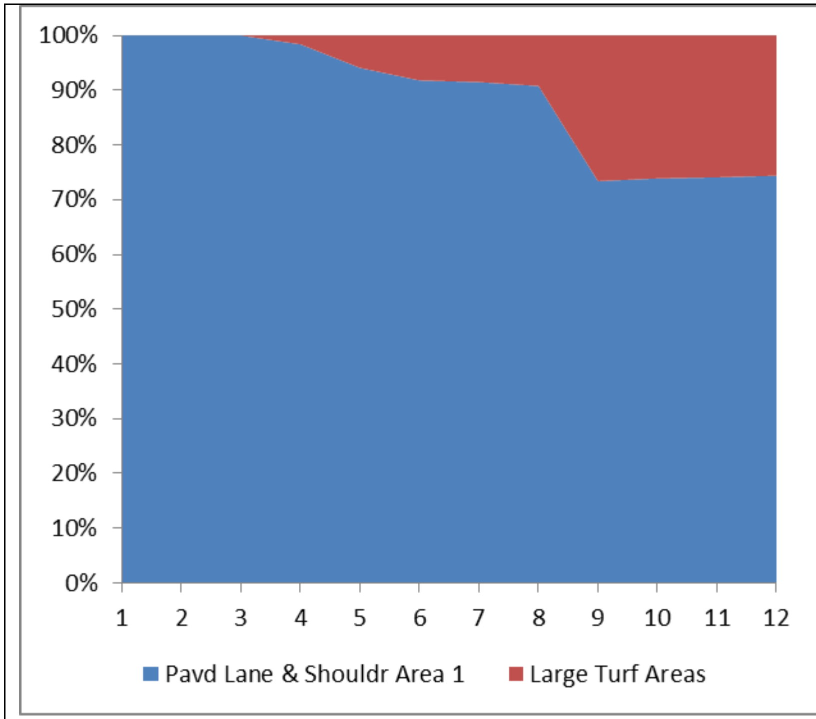
Institutional Areas Fecal Coliform Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



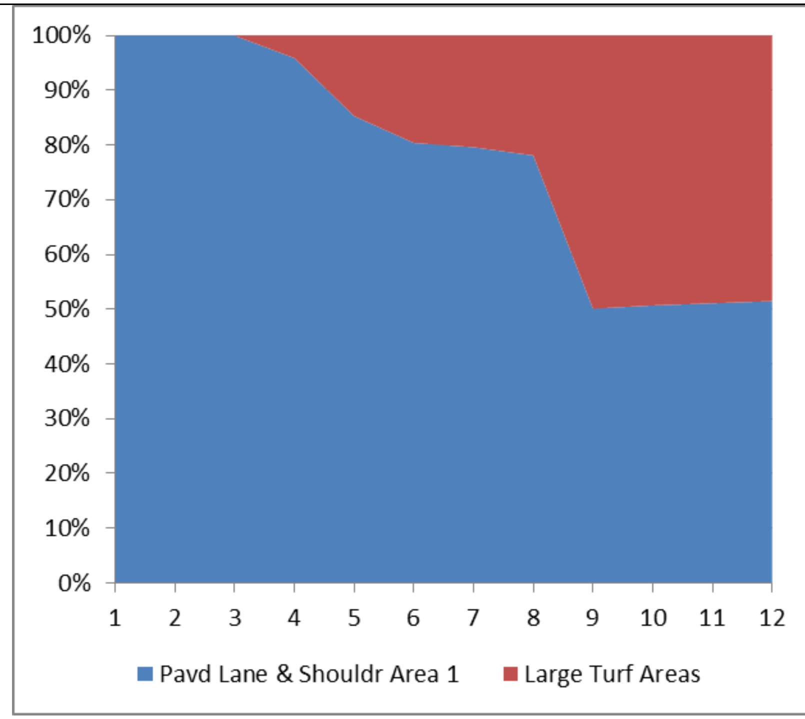
Office Technology Park Areas Fecal Coliform Contributions
Rains: 1: 0.05”; 2: 0.1”; 3: 0.25”; 4: 0.5”; 5: 0.75”; 6: 1”; 7: 1.5”; 8: 2”; 9: 2.5”; 10:3”; 11: 4” (no runoff expected for 0.01 inch rains)



Open Space Areas Fecal Coliform Contributions
Rains: 1: 0.01”; 2: 0.05”; 3: 0.1”; 4: 0.25”; 5: 0.5”; 6: 0.75”; 7: 1”; 8: 1.5”; 9: 2”; 10: 2.5”; 11: 3”; 12: 4”



Urban Freeway Areas Fecal Coliform Contributions
Rains: 1: 0.01"; 2: 0.05"; 3: 0.1"; 4: 0.25"; 5: 0.5"; 6: 0.75"; 7: 1"; 8: 1.5"; 9: 2"; 10: 2.5"; 11: 3"; 12: 4"



Rural Highway Areas Fecal Coliform Contributions
Rains: 1: 0.01"; 2: 0.05"; 3: 0.1"; 4: 0.25"; 5: 0.5"; 6: 0.75"; 7: 1"; 8: 1.5"; 9: 2"; 10: 2.5"; 11: 3"; 12: 4"