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Quantifying Pollutant Removal Rates of Bioretention Basins as a Stormwater Best Management Practice

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QUANTIFYING POLLUTANT REMOVAL RATES OF BIORETENTION BASINS AS A STORMWATER BEST MANAGEMENT PRACTICE

by

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ABSTRACT

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Water pollution is an ongoing problem that can be attributed to human activities. As world population increases and countries become more developed, this problem intensifies. Fortunately, the causes and solutions of water pollution are documented and have been implemented with various levels of success. These solutions, or Best Management Practices (BMPs), vary in type and function and remove pollutants from runoff prior to it reaching rivers, lakes, and other bodies of water. This study investigates bioretention basins, a specific group of BMPs, and presents analysis and prediction of their performance, of which our knowledge is incomplete in the existing literature. To fill this knowledge gap, this study examined mean pollutant removal rates for 25 separate pollutants and developed a series of regression models and nomographs to predict pollutant removal rates given an influent pollutant concentration, rainfall depth, and bioretention basin geometry. Results indicate that a wide variety of factors influence the pollutant removal rates that can be achieved using bioretention basins. This study was performed to gain a better understanding of the processes that define pollutant removal and to develop predictive models that could be used to estimate potential pollutant removal rates provided by bioretention basins. Given the ongoing water pollution problem, this study aims to evaluate the effectiveness of bioretention basins as a possible solution. The predictive models are likely to be the first of their kind and will contribute to the improvement of the design and engineering of bioretention basins.

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CHAPTER 1

INTRODUCTION

1.1. Background

Pollution of our surface waters is an on-going problem that we encounter daily when we drink from water sources, spend time outdoors, and interact with the environment. Environmental impacts caused by human activities have led to an increasing number of ecological problems, such as the contamination of streams, lakes, and rivers. These problems require solutions that not only mitigate past pollution events but also provide the means and methods to ensure that they do not occur again. Population growth has magnified these problems. As world population has increased so have the sources of pollution generation. Thus, the occurrence of environmental impacts, such as the contamination of sources of drinking water, has the potential to increase as well. These impacts are serious and pose substantial risks if ignored. Unless something is done to alleviate this on-going issue, the environment will continue to be at risk. Fortunately, significant research and documentation of the causes of pollution have taken place, leading to the introduction of environmental protection laws and regulations such as the Clean Water Act of 1972. In addition, effective methods and techniques for mitigating and preventing pollution have been researched and established. The hydraulics and hydrology that drive runoff and pollution generation are also well understood. Thus, the aspects of pollution generation and mitigation are understood and can be best applied to minimize environmental impacts while improving the quality of human life.

Pollutant sources such as motor vehicles, factories, and waste disposal facilities generate pollutants during operation. Pollutant concentration and type can vary significantly depending on the source, but all pollutants that are not disposed of onsite are transported by air currents, stormwater runoff, and other flow vectors. Pollutants are generally deposited on the ground and other surfaces during transport. Rain-generated runoff suspends and carries them to bodies of water either directly or via stormwater conveyance networks. Undeveloped land cover types, such meadows and forests, feature irregular drainage patterns due to undulating elevations and natural debris. In addition, undeveloped land is naturally pervious and infiltrates a portion of all runoff it receives. Therefore, runoff is naturally detained, infiltrated, and evaporated by undeveloped land cover types. Natural detention and infiltration provides runoff reduction and removes pollutant-laden runoff from watersheds before it can enter surface waters. Development replaces pervious land cover with impervious cover such as pavement, rooftop, and hardscape. These surfaces do not infiltrate runoff and must be carefully designed to avoid flooding populated areas. As compared to undeveloped land cover, they tend to increase and concentrate pollutant-laden runoff. Development increases pollutant loadings to waterways. However, methods for reducing and treating runoff have been developed and are in use today.

Generally, pollutant treatment solutions for runoff can be separated into two general categories, proactive and reactive. Proactive solutions provide pollutant treatment by reducing pollutants before they enter runoff. These are typically plans and procedures that provide means and methods to reduce pollutants at the source. Reactive solutions provide runoff treatment by reducing pollutants after they enter runoff. This is achieved through treatment and reduction of polluted runoff. Specific pollutant treatment solutions are often referred to as Best Management Practices (BMPs).

BMPs can be grouped into two categories, structural and nonstructural. A nonstructural BMP is any approach that seeks to provide pollutant removal before pollutants enter stormwater runoff. Nonstructural BMPs generally utilize proactive approaches such as plans and documentation that provide the means and methods to provide pollutant source reduction. These plans include information regarding the identification, detection, and elimination of pollutants within a defined area. For example, instructions for safely performing specific activities such as chemical storage and disposal, cleaning of vehicles and equipment, and waste management, are often included in these documents. Nonstructural BMPs are also used as tools to educate the public about grassroots level environmental risks such as dumping waste into storm drains or improper storage of household chemicals. Specific examples of nonstructural BMPs include the Old Dominion University Illicit Discharge Detection and Elimination Program Plan and Nutrient Management Plan. These documents not only outline procedures for the management of potential pollutants but also give ODU the authority to enforce responsible management of environmental impacts within the ODU campus.

Unlike nonstructural BMPs, structural BMPs are constructed facilities that provide runoff volume reduction and pollutant treatment after pollutants enter stormwater runoff. They are typically connected to a storm sewer network and intercept polluted runoff prior to it reaching a downstream water body. Structural BMPs provide pollutant removal through reduction of runoff volume and direct treatment of pollutant-laden runoff. Most structural BMPs provide runoff storage to detain large runoff volumes associated with significant design storm events. Attenuation allows a BMP to reduce large quantities of runoff that would potentially overwhelm downstream runoff conveyance networks. While this reduction is meant to prevent flooding, pollutants that are carried by runoff are attenuated as well, effectively removing them. In addition to runoff reduction, structural BMPs provide pollutant removal through runoff treatment. Runoff treatment consists of filtration and biological upkeep. Many BMPs infiltrate polluted runoff in a process that suspends pollutants while allowing runoff to pass. Biological upkeep occurs when organisms and plants associated with BMPs consume suspended pollutants as nutrients as part as their lifecycles, removing them from polluted runoff.

A specific biological process that can take place in a BMP is denitrification. Denitrification is a process in which anaerobic bacteria reduces forms of oxidized nitrogen in anoxic environments. The denitrification process will reduce nitrogen concentrations in an effluent stream through the conversion of nitrate (NO_3) to diatomic nitrogen (N_2) and will pass through nitrite (NO_2), nitric oxide (NO), and nitrous oxide (N_2O). While often implemented in the treatment of wastewater, denitrification is likewise used to remove nitrogen from stormwater runoff as well.

A particular type of structural BMP is a bioretention basin, a shallow depression that collects and treats runoff from surrounding areas and any storm sewer pipes that are routed to it. It features a construction consisting of a top layer of mulch, a middle layer of engineered soil media, and a bottom layer of open graded stone. Runoff that is intercepted by the bioretention basin is detained and infiltrated through the mulch and soil media, eventually settling in the stone layer. Like all infiltration BMPs, pollutants present in intercepted runoff are suspended by the mulch and soil media. Any remaining runoff will settle in the stone storage layer and will eventually infiltrate into the surrounding native soils. In areas with low permeability soils, runoff will not readily infiltrate. As a solution, underdrains constructed from perforated pipes can be installed in the stone layer to collect and route runoff to a downstream storm sewer network. A bioretention basin is often planted with a variety of water tolerant plants. These plants use suspended pollutants as nutrients during biological uptake, removing them from the mulch and soil media layers. Through the suspension of pollutants and biological uptake, a bioretention basin provides pollutant removal using both runoff reduction and treatment methods.

A properly operating bioretention basin should provide measurable removal of a variety of pollutants. However, this may not be the case for an improperly constructed or mismanaged bioretention basin. A bioretention basin that is improperly operated can create conditions in which pollutants are not removed but are instead concentrated. A significant storm event could potentially wash concentrated pollutants either into the surrounding soils or into downstream water bodies. Concentrated effluent flows could cause a condition known as eutrophication. Eutrophication occurs when excess nutrient concentrations lead to an increase in biological organisms to a level at which oxygen demands are greater than oxygen supplies, resulting in a net removal of oxygen from the aquatic system. As a result, eutrophication can be harmful to biotic species.

Studies have shown that bioretention basins that are constructed and maintained properly can be a source of pollutant removal; otherwise, they can function as a pollutant source. Because of these contradictory functions, the pollutant removal effects of bioretention basins are a persistent research topic. Such topics can either focus on the physical mechanisms that drive pollutant removal or can be statistically based.

In the state of Virginia, regulations related to stormwater quality are executed by the Virginia Department of Environmental Quality (DEQ). The mission of the DEQ is to protect and improve the environment within Virginia. The DEQ derives its authority from the Clean Water Act of 1972 and as a subsidiary of the United States Environmental Protection Agency (USEPA). As authorized by the Virginia Stormwater Management Act and the Virginia Stormwater Management Program (VSMP) Regulations, the DEQ administers and enforces stormwater standards through the Virginia Pollutant Discharge Elimination System (VPDES) permitting program.

The permitting program regulates "point-source" pollutants discharged into surface waters at discrete locations. Generally, a point source is a finite and measurable "end-of-pipe" location. General VPDES Permits are issued by the DEQ to Municipal Separate Storm Sewer Systems (MS4s), storm sewer systems that are operated by counties, cities, public academic institutions, military bases, medical facilities, and other facilities as specified by VSMP regulations. MS4s are required to follow stormwater regulations outlined in the General VPDES Permit. The implementation of BMPs is incorporated into the General VPDES Permit through the implementation of an MS4 Program Plan. An MS4 is required to develop and maintain a plan that outlines stormwater management within its MS4 boundary. The specific parts that make up an MS4 program plan are specified in the General VPDES Permit and require a variety of subplans and documents that address various aspects of stormwater management. These documents will often include nonstructural BMPs that will be implemented within an MS4 boundary. VSMP regulations list the types and styles of BMPs recognized by the DEQ. The DEQ also provides design standards and specifications through the Virginia BMP Clearinghouse to ensure that structural BMPs are standardized, constructed correctly, and operate efficiently.

1.2. Objectives

The ultimate goal of this thesis is to understand the factors that affect pollutant removal rates of bioretention basins.

Specific objectives are to:

1. develop a series of regression models that can be used to predict effluent pollutant concentrations and pollutant removal rates for bioretention basins as a function of influent pollutant concentrations, rainfall depths, and bioretention basin geometries; and
2. develop nomographs that can be used as design and management tools for bioretention basins.

1.3. Test of Hypothesis

To meet the goals of this thesis, a test of hypothesis was performed to better understand mean pollutant removal rates that can be achieved by bioretention basins for a variety of pollutants. Analysis of mean pollutant removal rates provided context to the regression models that were developed as part of this thesis. For a given bioretention basin, a removal rate for a pollutant of interest was calculated as the ratio of the difference between the influent and effluent pollutant concentrations to the influent pollutant concentration. A pollutant removal rate is expressed as a percent reduction resulting from effects of the bioretention basin. The null hypothesis was formulated by assuming that a bioretention basin removes pollutants through biological degradation, chemical reactions, physical filtration, deposition, and plant uptake. The null hypothesis (H_0) and alternative hypothesis (H_α) can be expressed as:

$$H_0 : \mu = -25\% \qquad (Eq. 1\text{-}1)$$

$$H_a : \mu \neq -25\% \qquad (Eq. 1\text{-}2)$$

where μ is the mean pollutant removal rate. μ is negative to signify a pollutant reduction.

From a diagnostic analysis of the data, this thesis reasonably assumed that influent and effluent pollutant concentrations are independent random variables and are taken from a population that is normally distributed. Hence, a Student t-test was performed using a single central tendency encompassing the entire dataset for each pollutant.

1.4. Thesis Structure

Chapter 1 (Introduction) presents background information on the relevant topics broached by this thesis and its goals and objectives. Specifically, this chapter provides background on pollution generation and how pollutants can be removed from runoff. Included is a discussion of pollutant sources and the mechanisms that govern how pollutants enter surface waters. This chapter also introduces the concept of a Best Management Practice (BMP) as a method for runoff treatment. Bioretention basins are further elaborated upon as they are the main focus of this thesis. A brief introduction to Virginia stormwater regulations and laws is provided as well. In addition, context is provided in this section as to why this study was performed, particularly with regards to the benefits that can be achieved by quantitatively predicting stormwater runoff treatment. Further included in this chapter is the introduction of a test of hypothesis that will be used to evaluate mean pollutant removal rates.

Chapter 2 (Materials and Data) presents a summary of the data that was used. Specifically, this chapter summarizes the pollutant types analyzed, the study sites from where data was gathered, and the measured data. The pollutant summary includes descriptions of each pollutant type and why it is an eco-environmental concern. Study site descriptions include the location and characteristics of each bioretention basin. The data summary includes background on databases and sources from which the data was obtained, validation/quality control of data, and data preprocessing.

Chapter 3 (Procedure and Methodology) covers procedures and methods used to process and analyze the data. In addition, it presents assumptions and limitations associated with the datasets and methods. Specifically, the quality and applicability of the datasets is covered in this chapter. Data processing methods including data sorting, outlier removal, regression, and nomograph creation are summarized as well. Further, this chapter summarizes the applicable software packages and calculation methods.

Chapter 4 (Results and Discussion) presents the results of the study, including regression equations and nomographs for each pollutant of interest. In addition, it compares the regression results with well-established Virginia water quality standards. Further, it examines the accuracy and effectiveness of the regression and analyzes sources of possible error.

Chapter 5 (Conclusions and Recommendations for Future Research) presents the final conclusions and further research needs.

CHAPTER 2

MATERIALS AND DATA

2.1. Study Sites

Data used in this thesis was collected from the International Stormwater BMP Database (http://www.bmpdatabase.org). The Database was created in 1996 under an agreement between the American Society of Civil Engineers (ASCE) and the U.S Environmental Protection Agency (USEPA) and was later transitioned in 2004 to be jointly supported by the Water Environment Research Foundation (WERF), Federal Highway Administration (FHA), American Public Works Association (APWA), and Environmental and Water Resources Institute (EWRI). It contains a collection of 500 BMP studies, performance results, tools, and publications. As stated on the Database website, the purpose of the Database is to "provide scientifically sound information to improve the design, selection, and performance of BMPs" and is continuously updated to "lead to a better understanding of factors influencing BMP performance and help to promote improvements in BMP design, selection, and implementation." The Database is an excellent source of data relevant to many aspects of BMP design and selection.

A total of 15 different bioretention basins (Table 2-1) were analyzed in this study. While some of the bioretention basins are located in the southwest, northwest, and central regions of the U.S., most are located in the eastern and southeastern regions. The footprints of the basins vary in size from approximately 1,000 to 10,000 ft^2 and are generally oval or rectangular in shape. Ponding volumes and soil media depths of the basins vary in range from approximately 800 to 7,600 ft^3 and 18 to 47 in., respectively. All the bioretention basins analyzed in this study are planted with vegetation. The vegetation species include grasses, low-lying plants, shrubs, and trees.

Table 2-1. The study sites

Site	State	City/Town	County	Region	Latitude
21st and Iris Rain Garden	CO	Lakewood	Jefferson	SW	39.75
44th Street	WA	Tacoma	Pierce	NW	47.216
BRC Site A	NC	Nashville	Nash	SE	35.97
BRC Site B	NC	Nashville	Nash	SE	35.97
Fort Collins Utility Building	CO	Fort Collins	Larimer	SW	40.595
Cub Run Rec Center	VA	Chantilly	Fairfax	E	38.889
Fort Collins Retrofit	CO	Fort Collins	Larimer	SW	40.595
Graham High School North Cell	NC	Graham	Alamance	SE	36.071
Graham High School South Cell	NC	Graham	Alamance	SE	36.071
Greensboro G1	NC	Greensboro	Guilford	SE	36.153
Greensboro G2	NC	Greensboro	Guilford	SE	36.153
Grissum Building	MO	Columbia	Boone	NW	38.967
Hal Marshall	NC	Charlotte	Mechlenburg	NC	35.232
Highland View	KS	Overland Park	Johnson	C	38.856
I-95 Plaza	DE	Newark	New Castle	E	39.663

Table 2-1. Continued

Site	Longitude	Installation Date	Surface Area (ft^2)	Ponding Volume (ft^3)	Shape	Soil Media Depth (in)
21st and Iris Rain Garden	-105.106	4/25/2011	1,135	812	L-Shaped	18
44th Street	-122.403	6/1/2009	7,000	5,100	Oval	24
BRC Site A	-77.934	11/1/2005	3,120	1,240	Rectangle	24
BRC Site B	-77.934	11/1/2005	2,220	1,120	Rectangle	36
Fort Collins Utility Building	-105.09	4/4/2012	2,152	4,601	Rectangle	18
Cub Run Rec Center	-77.467	-	9,278	4,601	Triangle	24
Fort Collins Retrofit	-105.09	4/4/2012	2,152	1,314	Rectangle	18
Graham High School North Cell	-79.412	6/1/2005	1,100	780	-	30
Graham High School South Cell	-79.412	6/1/2005	1,100	812	-	41
Greensboro G1	-79.872	-	1,076	1,314	Rectangle	40
Greensboro G2	-79.872	-	1,076	1,314	Rectangle	47
Grissum Building	-92.32	10/25/2012	3,905	1,953	Trapezoid	43
Hal Marshall	-80.837	12/1/2003	2,465	1,519	Rectangle	47
Highland View	-94.692	-	5,880	4,534	Oval	24
I-95 Plaza	-75.69	8/1/2004	9,600	7,600	-	24

2.2. Pollutants

A total of 25 pollutants were analyzed in this study. Percent removal rates were determined for each pollutant using methods and calculations described in Chapters 3 and 4. The pollutants can be grouped into four categories: metals, nutrients, total suspended solids (TSS), and biologicals. This section briefly summarizes these pollutants.

Metals are naturally occurring substances that are generally hard surfaced, shiny, and good conductors of heat and electricity. Many metals and their related compounds have a variety of other properties that can be both beneficial and detrimental to life as well as the environment. This thesis analyzed 8 separate metals including arsenic, cadmium, chromium, copper, iron, lead, nickel, and zinc. These metals vary in toxicity from relatively benign to very dangerous. Arsenic, cadmium, and chromium are also known carcinogens. Introduction of these metals into the environment can adversely affect plant and animal life. Most cannot be naturally degraded and broken down. Human beings can contract metals by consuming plants and animals with high concentrations. Metals are used in a wide variety of products and industrial processes. Therefore, their introduction into the environment is likely to originate from factories, waste disposal sites, and industrial facilities. However, a high concentration can occur naturally as well.

Nutrients are chemical compounds that are essential to life. Examples include phosphates and nitrates, both of which were analyzed in this study. Nutrients are critical to many natural processes and cycles. Many of these processes occur in bodies of water where nutrients are used by plants and microbial organisms during biological uptake. When nutrient levels are properly balanced with other factors such as dissolved oxygen, life cycles can function without any significant problems. However, an introduction of a large amount of nutrients into a body of water will likely cause runaway microbial and bacterial growth in the form of large-scale algal growth. As these organisms require oxygen, their rapid growth can greatly reduce the dissolved oxygen level in a body of water. In addition, large quantities of algae will cloud water and block sunlight. These factors can lead to anoxic conditions and block photosynthesis, resulting in eutrophication and the death of plants and biotic species. While eutrophication is a natural process that occurs in the life cycle of a water body, pollution from excess nutrients can prompt its occurrence. Excess nutrients in water bodies can be attributed to the overuse of chemical products (e.g. commercial fertilizers) and from poor management of animal wastes. This study analyzed a total of 7 nutrient species derived from phosphorus and nitrogen.

Total suspended solids (TSS) are solid materials that are small enough to be suspended and carried by water. Such materials generally include very fine soils such as clays and silts, but can also include dissolved metals, organic material, and other fine debris. One of the main concerns of total suspended solids is that they increase the turbidity, or cloudiness, of a body of water. In addition to being unsightly, turbid water blocks sunlight and limits photosynthesis, an essential process for plant life. Further, given that dissolved metals can readily bond to soil particles. TSS have the potential to carry harmful metals.

The three biological organisms analyzed in this study, fecal coliform, Escherichia coli (E. coli), and enterococcus are families of bacteria that are present in the gastrointestinal tract of warm blooded animals. While largely harmless, certain strains of these bacteria can cause sickness in humans. Fecal coliform, while not harmful itself, is an indicator bacteria that is commonly used to detect other pathogens in water. An elevated level of fecal coliform can be a sign of harmful bacteria, such as E. coli and/or enterococcus. E. coli is largely harmless; however, certain strains can cause significant food poisoning that may lead to further health complications. Enterococcus is more resistant than E. coli and can cause various body infections in addition to significant food poisoning.

2.3. Data

Sources of data for this study include the International Stormwater BMP Database (http://www.bmpdatabase.org) and National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Point Precipitation Frequency Estimates (https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html.). These data sources have gone through strict quality control and review processes and thus can be reasonably assumed to be accurate and validated.

BMP Database entries all have associated dates. Using these dates, Database entries and NOAA Atlas 14 data were paired for further analysis. Data filtering was performed on the paired data to remove outliers. To avoid subjectivity, outliers were mathematically identified and removed. Data manipulation processes utilized in this study are summarized in Chapter 3

Except values for bioretention basin retention time, data used in the regression analyses was extracted from the BMP Database. Rainfall depth values were taken from NOAA Atlas 14 to supplement rainfall depths extracted from the BMP Database.

For each bioretention basin, its retention time was calculated as the ratio of the ponding volume to peak inflow rate. Peak inflow rates were calculated using the Rational Equation based on watershed data in the BMP Database and NOAA Atlas 14 data. The Rational Method can be expressed as:

$$Q_p = CIA \quad \textit{(Eq. 2-1)}$$

where Q_p [cfs] is the peak inflow rate; C [-] is the runoff coefficient; I [in/hr] is the rainfall intensity; and A [ac] is the drainage area.

C is the "area-weighted average" of the cover types that comprise the watershed drained to the bioretention basin of interest (Table 2-2). C is calculated as:

$$C = \sum C_j A_j / A \quad \textit{(Eq. 2-2)}$$

where C_j is the runoff coefficient for cover j; A_j is the area of cover j; and A is the total drainage area.

As a simplification, land covers were grouped into two types, impervious and pervious. The composite runoff coefficient for the impervious cover was assumed to be 0.90, while the composite runoff coefficient for the pervious cover was assumed to be 0.30. Equation 2-2 can be simplified as:

$$C = (0.90A_I + 0.30A_P)/A \quad \textit{(Eq. 2-3)}$$

where A_I [ac] is the area of impervious cover and A_p [ac] is the area of pervious cover.

Table 2-2. The study sites and their runoff coefficients.

Site	Watershed Area (ac)	Watershed Impervious Cover (%)	Watershed Impervious Cover (ac)	Runoff Coefficient, C
21st	1.91	47.0	0.90	0.58
44th	13.90	59.0	8.20	0.65
BRC A	1.68	83.0	1.39	0.80
BRC B	1.06	97.0	1.03	0.88
FC 1	2.27	90.0	2.05	0.84
CR	0.98	63.0	0.62	0.68
FC2	2.27	90.0	2.05	0.84
GHSN	1.70	40.0	0.68	0.54
GHSS	1.70	40.0	0.68	0.54
GG1	0.50	100.0	0.50	0.90
GG2	0.48	100.0	0.48	0.90
Gris	19.77	-	-	-
Hal	0.92	100.0	0.92	0.90
High	0.75	-	-	-
I-95	1.97	80.0	1.57	0.78

- Missing in the International BMP Database (http://www.bmpdatabase.org).

Rainfall intensity was calculated in terms of the mean rainfall depth presented in the BMP Database and NOAA Atlas 14 data for each bioretention basin. Using NOAA Atlas 14 rainfall intensity-duration-frequency curves, the rainfall depth for each combination of storm frequency and duration was determined. Using these combinations and tabular NOAA Atlas 14 rainfall intensity curves, the mean rainfall intensity for each bioretention basin was determined.

The drainage areas and ponding volumes for the bioretention basins were extracted from the BMP Database. Table 2-3 shows the calculations of retention times using the approach mentioned previously. The raw data used in this study is provided in Appendix A. Statistics of pollutant concentrations and rainfall depths used in the regression analyses (refer to Chapters 3 and 4) are listed in Appendix B.

Table 2-3. The retention time calculations

Site	Runoff Coefficient, C	Rainfall Intensity, I (in/hr)	Watershed Area, A (ac)	Peak Inflow Rate, Q_p (cfs)	Ponding Volume (ft^3)	Retention Time, t_r (min)
21st	0.58	2.59	1.91	2.90	812	15.40
44th	0.65	4.89	13.90		5,100	7.60
BRC A	0.80	5.69	1.68	7.69	1,240	17.90
BRC B	0.88	5.69	1.06	5.38	1,120	17.50
FC 1	0.84	3.22	2.27	6.20	4,601	8.40
CR	0.68	5.70	0.98	3.82	4,601	20.07
FC2	0.84	3.75	2.27	7.22	1,314	3.03
GHSN	0.54	6.10	1.70	5.66	780	2.30
GHSS	0.54	6.31	1.70	5.86	812	6.94
GG1	0.90	4.48	0.50	2.03	1,314	3.03
GG2	0.90	4.48	0.48	1.95	1,314	3.03
Gris	-	4.58	19.77	-	1,953	-
Hal	0.90	6.57	0.92	5.48	1,519	4.62
High	-	5.22	0.75	-	4,534	-
I-95	0.78	4.10	1.97	6.34	7,600	19.98

- Missing in the International BMP Database (http://www.bmpdatabase.org)

CHAPTER 3

PROCEDURE AND METHODOLOGY

3.1. Assumption and Limitations

As mentioned in Chapter 2, as data was obtained from multiple sources for multiple dates, it was assumed that it was collected by multiple people. Specific collection methods are unknown, but are assumed to have consisted of a series of field measurements and laboratory tests using samples of stormwater runoff. Influent pollutant concentration measurements are assumed to have been taken from runoff prior to it entering the bioretention basins while effluent concentration measurements were assumed to have been taken from runoff after it exits the bioretention basins. Influent and effluent measurements with the same date were assumed to be "paired". A change in pollutant concentration across a paired set of concentration measurements is assumed to be able to represent the removal effects of a bioretention basin. For a given bioretention basin, rainfall depths were assumed to have been extracted from weather data measured at the nearest weather station. It was assumed that the ponding volumes, soil media depths, and retention times are invariant for each of the bioretention basins. That is, they are intrinsic characteristics of each bioretention basin and do not change with time. As mentioned in Chapter 2, retention times were calculated as a ratio of bioretention basin ponding volumes to peak inflow rates. Since detailed hydraulic and hydrologic data for the watershed drained to each bioretention basin was unavailable, the Rational Equation was assumed to be the best choice for calculating peak inflow rates. Drainage areas and cover types were assumed to be invariant for each bioretention basin. Data extracted from the International BMP Database and NOAA Atlas 14 is considered to be error-free because both data sources have passed quality control and validation procedures established by the relevant federal agencies.

Several of the influent and effluent concentration measurements could not be paired because of missing or null values. It is assumed that for such a date, either an influent or effluent concentration was recorded, but not both. A missing or null value may indicate that the corresponding concentration was below the detectable limit of the method and instrument used to make the measurement. Modes were also encountered in multiple datasets, particularly in influent and effluent concentration datasets. Modal measurements could have been simple coincidences but, similar to missing and null measurements, could have also been caused by detection limits. Both missing and null values as well as modal data could introduce limitations to the regression results presented in Chapter 4.

3.2. Analysis Methods and Procedures

In this study, data manipulation, numerical calculations, and statistical analyses were performed using software packages to minimize possible errors. Data manipulation and numerical calculations were performed using Microsoft Excel® 2016. A hypothesis test, statistical analysis, and regression analysis were performed using SAS® 9.3.

Data manipulation included the following procedures. Firstly, because the raw data extracted from the BMP Database and NOAA Atlas 14 was spread out over several different locations, data for each study site was sorted and organized into one location for further analysis and manipulation. Secondly, to detect and remove any possible outliers, an algorithm was developed to re-sort data by pollutant type, determine outlier fences, and remove identified outliers. Outlier fences were determined by calculating the 1st and 3rd quartiles and the associated interquartile range. The minor outlier fence was considered to 1.5 times the interquartile range while the major outlier fence was considered to 3.0 times the interquartile range. A minor outlier was considered to be between the minor and major outlier fences, whereas a major outlier was considered to be beyond the major outlier fence. Both major and minor outliers were removed from the dataset and excluded from further analysis. Following the removal of outliers, each outlier-free dataset was compiled into one master Excel® spreadsheet. Lastly, pairing was performed using an algorithm that detected and identified matching dates throughout all datasets

The master spreadsheet was re-sorted to “pair” influent concentrations, effluent concentrations, and rainfall depths based on measurement dates. Following this process, a subsequent algorithm added bioretention ponding volume, soil media depth, and retention time as additional columns. For a given measurement date, the entire pairing process matched an effluent concentration with an associated influent concentration, rainfall depth, ponding volume, soil media depth, and retention time. Each paired dataset was used to conduct regression analyses. The sorted and paired master datasets, including data from the BMP Database and NOAA Atlas 14, are provided in Appendix A.

The regression analyses were performed using SAS® 9.3. Generic SAS code was written, and data was imported from the master Excel® spreadsheet. Each regression analysis entered one dependent variable (effluent concentration) and five independent variables (influent concentration, rainfall depth, ponding volume, soil media depth, and retention time). In addition, to analyze any interactive effects, each of the independent variables was multiplied by each other independent variable, leading to ten additional terms. Independence between the 15 regression variables was analyzed by computing and examining their correlation coefficients. The final regression model for each pollutant was established using forward, backward, and stepwise selection methods. The details of the regression analyses are documented in Appendix B with a concise description in Chapter 4. Subsequently, these models were rearranged and manipulated in Excel® to produce corresponding nomographs as described in Chapter 4.

The test of hypothesis on mean pollutant removal percent, which was described in Chapter 1, was tested using a Student t-test in SAS® 9.3. Generic SAS code was written and data was imported from the master Excel® spreadsheet. The details of the t-test are documented in Appendix B and are concisely described in Chapter 4.

CHAPTER 4

RESULTS AND DISCUSSION

4.1. The Regression Models

The regression analyses generated 75 models for the 25 pollutants investigated in this study – three models for each pollutant developed using forward, backward, and stepwise selection methods. For a given pollutant, the accuracy of the three models was assessed F-statistics, defined as the ratio of the mean square residual to the mean square error, for each term present in each model. The regression model with the highest F-statistics and best fit to input data was determined as the best model for this pollutant. The general form of the regression models can be expressed as:

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_1 X_2 + \beta_7 X_1 X_3 + \beta_8 X_1 X_4 + \beta_9 X_1 X_5 + \beta_{10} X_2 X_3 + \beta_{11} X_2 X_4 + \beta_{12} X_2 X_5 + \beta_{13} X_3 X_4 + \beta_{14} X_3 X_5 + \beta_{15} X_4 X_5 \quad \text{(Eq. 4-1)}$$

where y [mg/L or CFU/100 mL water] is the effluent concentration; X_1 [mg/L or CFU/100 mL water] is the influent concentration; X_2 [in] is the rainfall depth; X_3 [ft^3] is the bioretention basin ponding volume; X_4 [in] is bioretention basin soil media depth; X_5 [min] is the bioretention basin retention time. Note: X_1 should have units of mg/L for all pollutants except fecal coliform, E. coli, and enterococcus, which should have colony forming units per 100 mL water (i.e CFU/100 mL water).

The removal rates were computed as:

$$Percent\ Removal = (X_1 - y)/X_1 \quad \textit{(Eq. 4-2)}$$

A selection method that produced a regression model that contained all five independent variables was considered superior to a selection method that produced a regression model that contained four or fewer independent variables. Since an influent concentration may be critical for pollutant removal, a selection method was removed from analysis if an influent concentration was not kept in the final regression model. If two or three selection methods for a pollutant produced regression models with the same number of independent variables, the method with higher overall F-statistics was selected as the best model. Table 4-1 presents the coefficients (β_1 through β_{15}) of the regression models.

Table 4-1. The regression coefficients

Pollutant	**Intercept**	**β_1**	**β_2**	**β_3**	**β_4**
Dissolved Cadmium	0.00013	-	-	-	-
Dissolved Chromium	0.00011	-	-	-	-
Dissolved Copper	0.00296	-	0.00001	-	0.00016
Dissolved Iron	0.13328	-	0.13813	-	-
Dissolved Lead	-	-	-	-	-
Dissolved Nickel	0.18620	-	-	-	-0.00093
Dissolved Phosphorus	23.1667	-89.6260	-	0.00105	-1.29517
Dissolved Zinc	-31.4579	-0.21417	-0.01058	-	1.76390
E. Coli	640.831	0.33600	-	-	-15.0260
Enterococcus	51522.0	-	-	-	-
Fecal Coliform	-1097.82	-	-	-	-
Nitrate and Nitrogen	1.09635	-	-	-	-0.01579
Nitrate, Nitrite, and Nitrogen	6.52819	1.51834	-	-0.00368	-0.17626
Orthophosphate	0.28353	-	-	0.00068	-
Total Arsenic	0.00207	-	-	-	-
Total Cadmium	0.00057	-	-	-	-0.00001
Total Chromium	0.00093	-	-	0.0000003	0.00002
Total Copper	0.01165	-	-	-	-
Total Kjeldahl Nitrogen	4.07673	-	-	0.00089	-0.16115
Total Lead	0.00355	-0.20234	0.000001	-0.00005	-0.00040
Total Nickel	-37.4609		-0.00210	-0.02250	0.56539
Total Nitrogen	-17.4224	-	-	0.00466	0.85647
Total Phosphorus	2.77431	-	-	-0.00067	-0.09902
Total Suspended Solids	41.7396	-	-	-	-1.24307
Total Zinc	0.03951	-0.20444	-	0.00001	-0.00087

Table 4-1. Continued

Pollutant	**β_5**	**β_6**	**β_7**	**β_8**	**β_9**
Dissolved Cadmium	-	1.68761	-	-	-
Dissolved Chromium	-	-	0.00084	-	-
Dissolved Copper	-	-0.000020	-	-	2.51873
Dissolved Iron	-	-20.7755	-	-	-
Dissolved Lead	-	-	-	-	-
Dissolved Nickel	-	-4.42799	-	-	0.20484
Dissolved Phosphorus	-	-	-0.00431	5.12137	-
Dissolved Zinc	-	0.39230	-	-	-
E. Coli	-	-	-	-	-
Enterococcus	-	-	-	-	-
Fecal Coliform	-	-	-	0.00031	-
Nitrate and Nitrogen	-	-0.94804	-	-	0.11438
Nitrate, Nitrite, and Nitrogen	-0.44004	-	-0.00037	-0.06471	0.13535
Orthophosphate	-0.05081	-	-	-	0.06495
Total Arsenic	-	-	-	-	0.04421
Total Cadmium	-	-	0.00029	0.17830	-0.13813
Total Chromium	-	-	-	-	-
Total Copper	0.00082	0.74319	-	-0.00773	-
Total Kjeldahl Nitrogen	-0.50213	0.05733	-	-	0.02867
Total Lead	-	0.10519	-	0.00838	-
Total Nickel	9.75613	0.34916	-	-	-
Total Nitrogen	-	-	-	0.04006	-0.30865
Total Phosphorus	-0.24058	-	-	-	0.03806
Total Suspended Solids	-7.90791	-	-	0.00189	-
Total Zinc	-0.00288	0.06598	-0.00006	0.00648	0.02790

Table 4-1. Continued

Pollutant	β_{10}	β_{11}	β_{12}	β_{13}	β_{14}	β_{15}
Dissolved Cadmium	-	-	-	-	-	-
Dissolved Chromium	-	-	-	-	-	-
Dissolved Copper	-	-	-	-	-	-0.10680
Dissolved Iron	-	-	-	-	-	-
Dissolved Lead	-	-	-	-	-	-
Dissolved Nickel	-	0.00030	-	-	-	-
Dissolved Phosphorus	-	-	-	-	-	-
Dissolved Zinc	-	-	-	-	-0.00007	-
E. Coli	-	-	-	-	-	-
Enterococcus	-	-	-	-	-	-
Fecal Coliform	3.08930	-	-1017.38	-	-	5.44198
Nitrate and Nitrogen	-	-0.00956	0.12831	-	-0.00001	-
Nitrate, Nitrite, and Nitrogen	-0.00025	-0.00302	0.06465	0.00011	0.00007	0.01196
Orthophosphate	-	-	-	-0.00003	-	0.00225
Total Arsenic	-	-	-	-	-	-
Total Cadmium	-	-	-	-	-	-
Total Chromium	-	-	-	-	-	-
Total Copper	0.00001	-0.00017	-0.00418	-	-	-
Total Kjeldahl Nitrogen	0.00052	-	-0.12647	-	-0.00005	0.02306
Total Lead	-	-	-	-	-	-
Total Nickel	-	-	0.00032	-	-	-
Total Nitrogen	-	-	-	-0.00063	0.00504	-0.09163
Total Phosphorus	0.00013	-	-0.03081	0.00003	-	0.01021
Total Suspended Solids	-	-	0.00383	-	0.00023	0.27567
Total Zinc	-	-	-	-	-	-

4.2 The Nomographs

The regression models developed in this study are intended to be used as predictive tools to determine pollutant removal rates that can be provided by bioretention basins. To simplify the use of the regression models, nomographs were developed to provide graphical representations of the models. The nomographs were created by arbitrarily selecting values (Table 4-2) for each independent variable.

Table 4-2: Input values for nomograph development

Variable in Equation 4-1	Range	Remarks
y (effluent concentration)	0% to 100% of influent concentration	• Represented on Y-axis as a percentage of the influent concentration • Allows user to find 0% to 100% removal using input variables
X_1 (influent concentration)	Constant	• Difficult to predict or assume in real-world applications • Assumed to be mean value of the measured influent concentrations for each pollutant
X_2 (rainfall depth)	0.5 to 2.0	• Rainfall depth of 0.5, 1.0, 1.5, and 2.0 inches • Large rainfall depths limited by range of input data
X_3 (bioretention basin ponding volume)	Varies	• Different for each pollutant • Treated as dependent variable (See Equation 4-3.) • Represented on X-axis
X_4 (bioretention basin soil media depth)	12 to 36	• Range selected per Virginia DEQ design specification for bioretention basins (See Appendix C)
X_5 (bioretention retention time)	Constant	• 7 Minutes • Selected as mean retention time of bioretention basins used in regression analyses • If retention time is not equal to 7 minutes, nomographs may not be valid

As the nomographs are intended to be predictive tools, for a given target removal rate, the required bioretention ponding volume (X_3) needs to be estimated. X_3 can be an important parameter for designing bioretention basins in practice. Thus, Equation 4-1 is rearranged as:

$$X_3 = (y - \beta_o - \beta_1 X_1 - \beta_2 X_2 - \beta_4 X_4 - \beta_5 X_5 - \beta_6 X_1 X_2 - \beta_8 X_1 X_4 - \beta_9 X_1 X_5 - \beta_{11} X_2 X_4 - \beta_3 + \beta_{12} X_2 X_5 - \beta_{15} X_4 X_5) \,/\, (\beta_7 X_1 + \beta_{10} X_2 + \beta_{13} + X_3\, \beta_{14} X_3) \qquad \text{(Eq. 4-3)}$$

Equation 4-3 is the general equation used to develop all nomographs presented in the following context (Figures 4-1 through 4-17). When the regression coefficients (Table 4-1) and full range of values (Table 4-2) are substituted this equation, a nomograph can be generated that represents various possible design scenarios for that data range and specific pollutant.

Figure 4-1: *Pollutant Removal vs Ponding Volume - Dissolved Chromium*

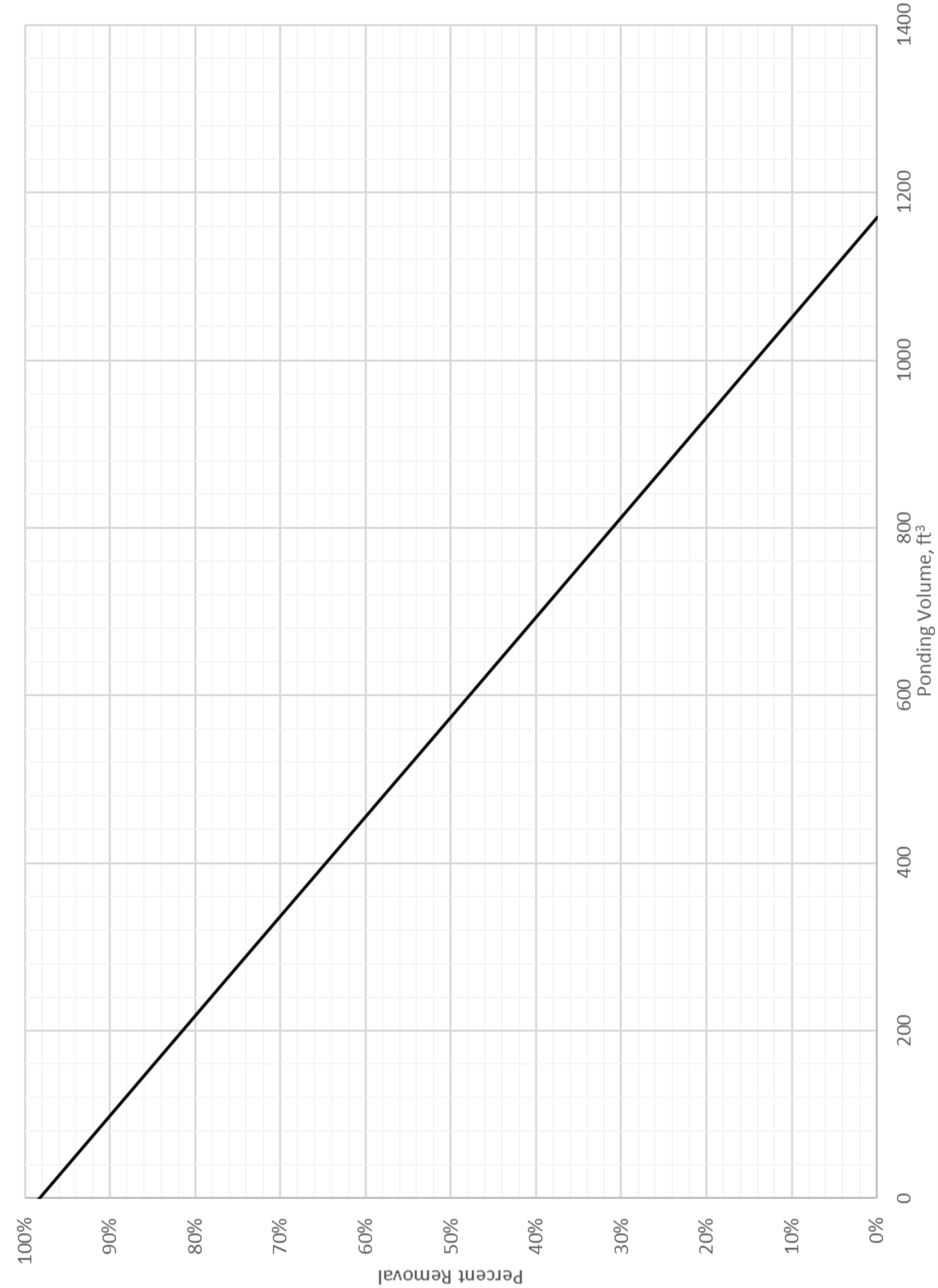


Figure 4-2: *Pollutant Removal vs Ponding Volume - Dissolved Phosphorus*

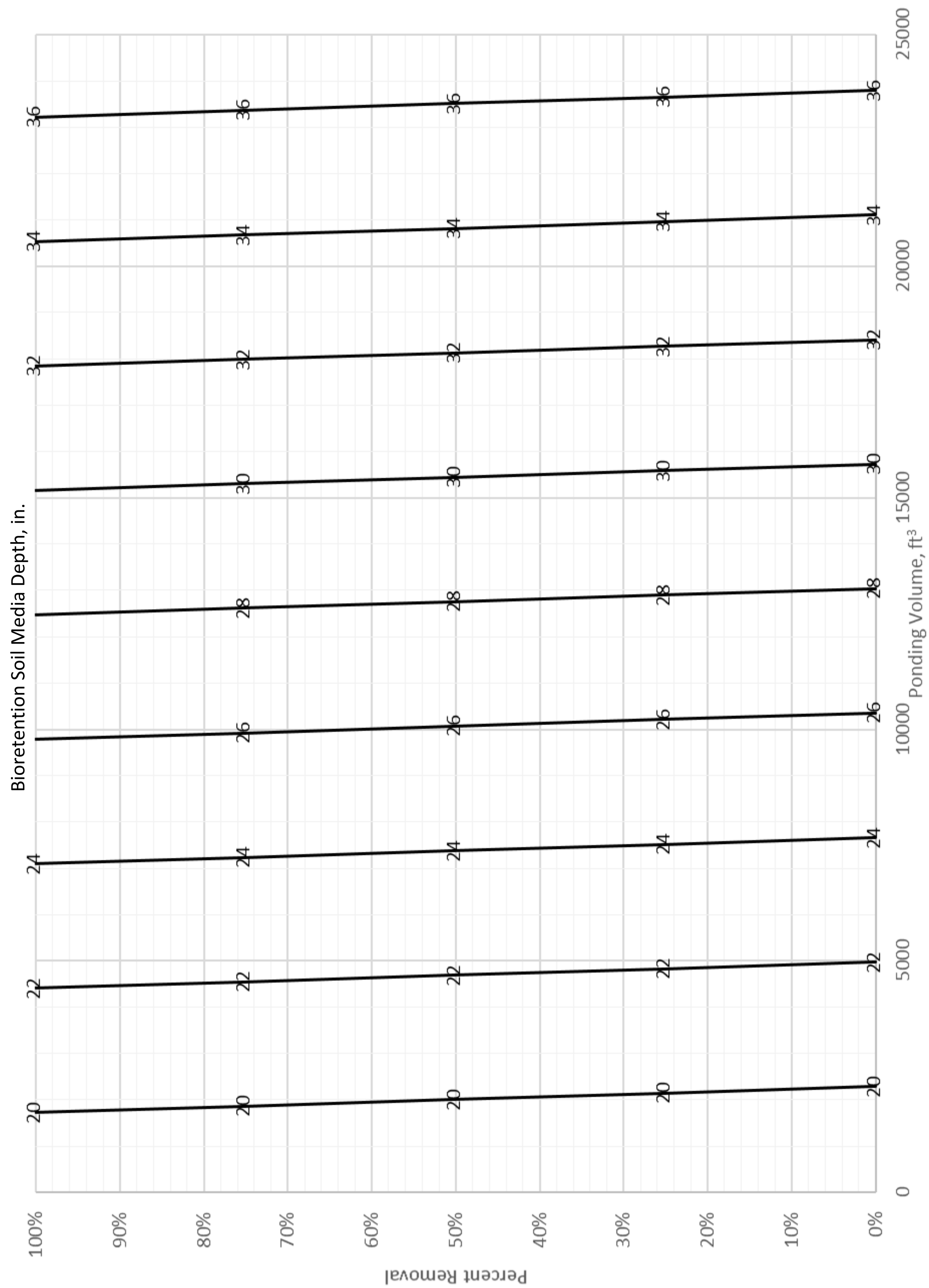


Figure 4-3: *Pollutant Removal vs Ponding Volume - Dissolved Zinc*

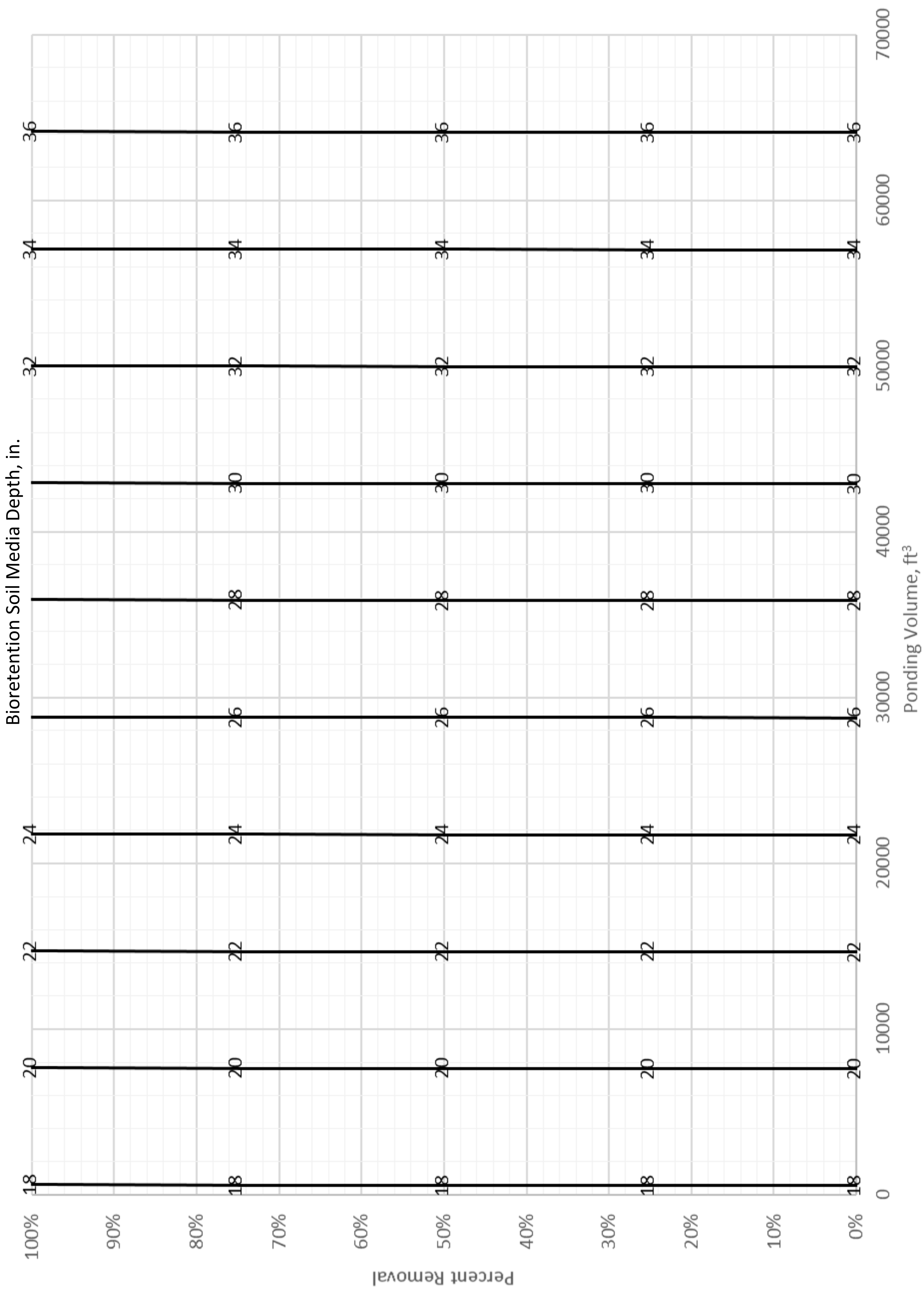


Figure 4-4: *Pollutant Removal vs Ponding Volume - Fecal Coliform*

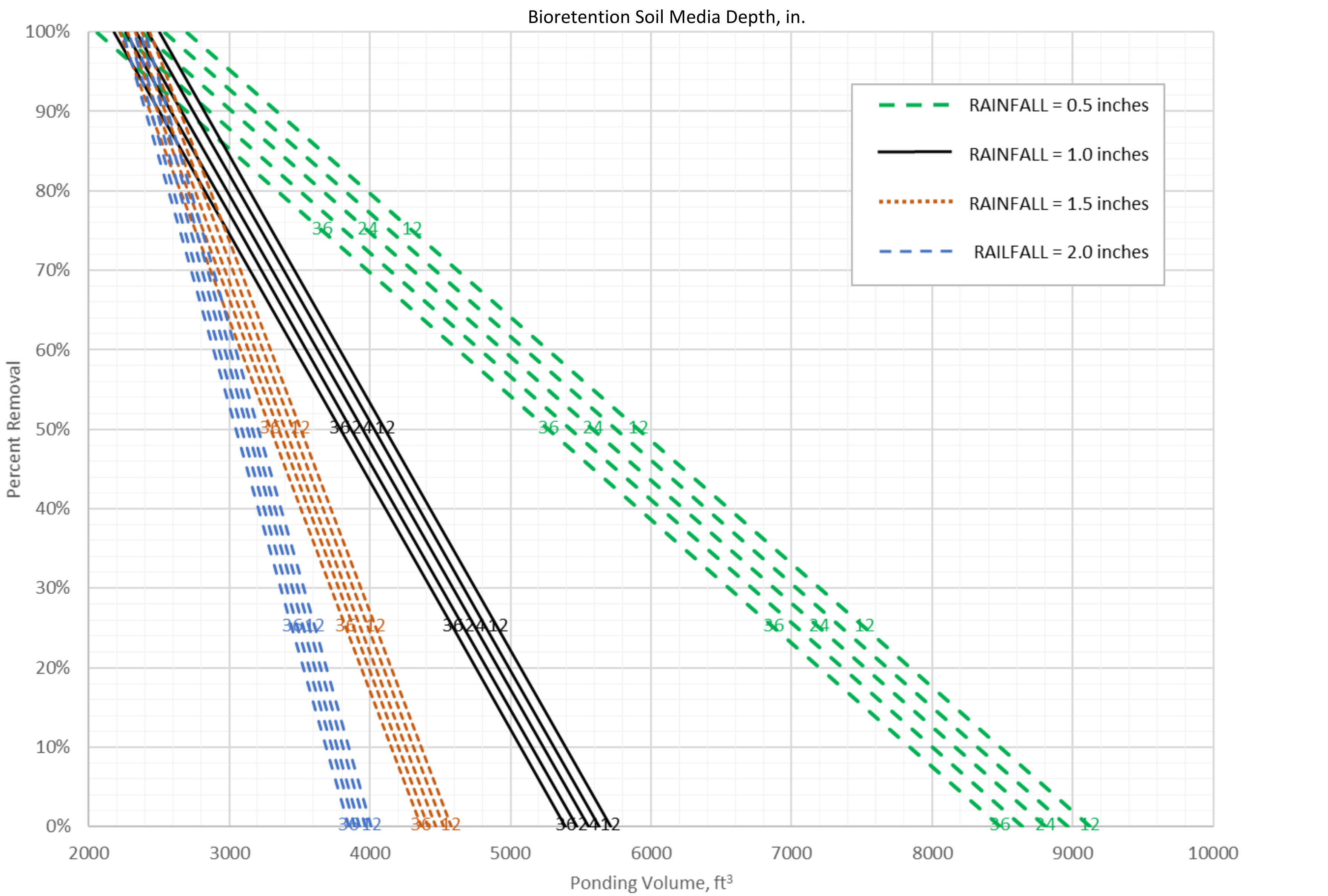


Figure 4-5: *Pollutant Removal vs Ponding Volume - Nitrogen and Nitrate*

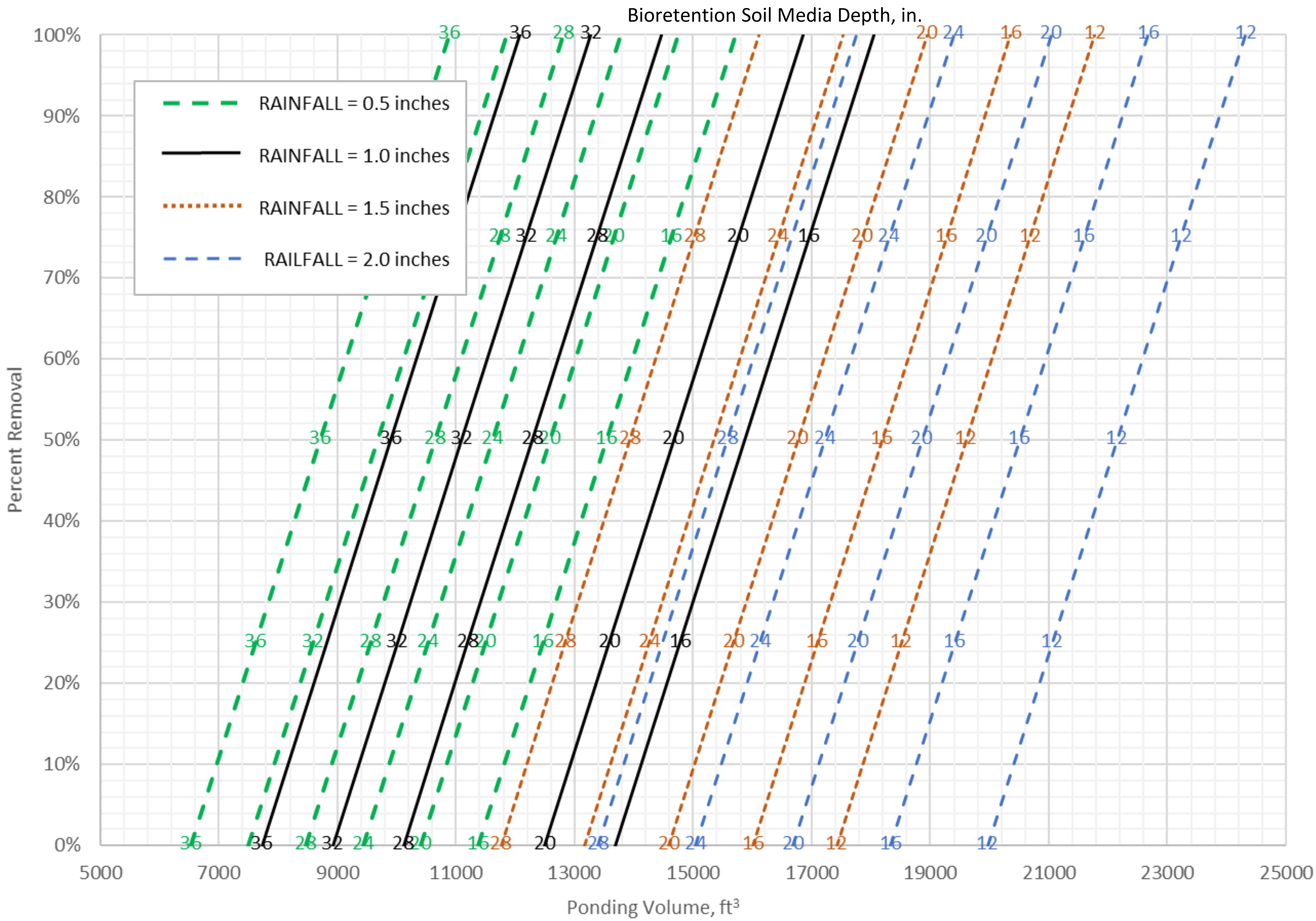


Figure 4-6: *Pollutant Removal vs Ponding Volume - Nitrogen, Nitrite, and Nitrate*

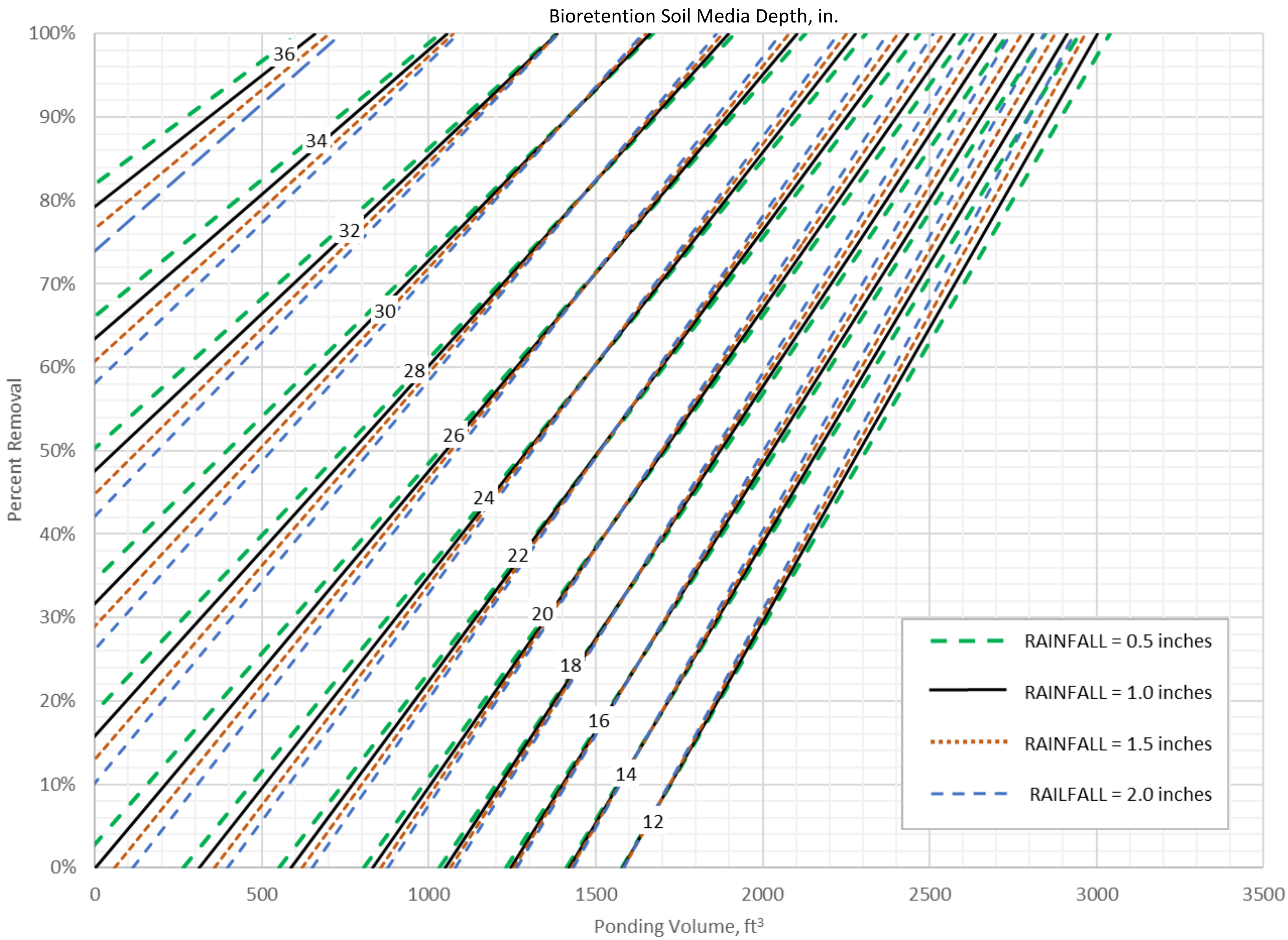


Figure 4-7: *Pollutant Removal vs Ponding Volume - Orthophosphate*

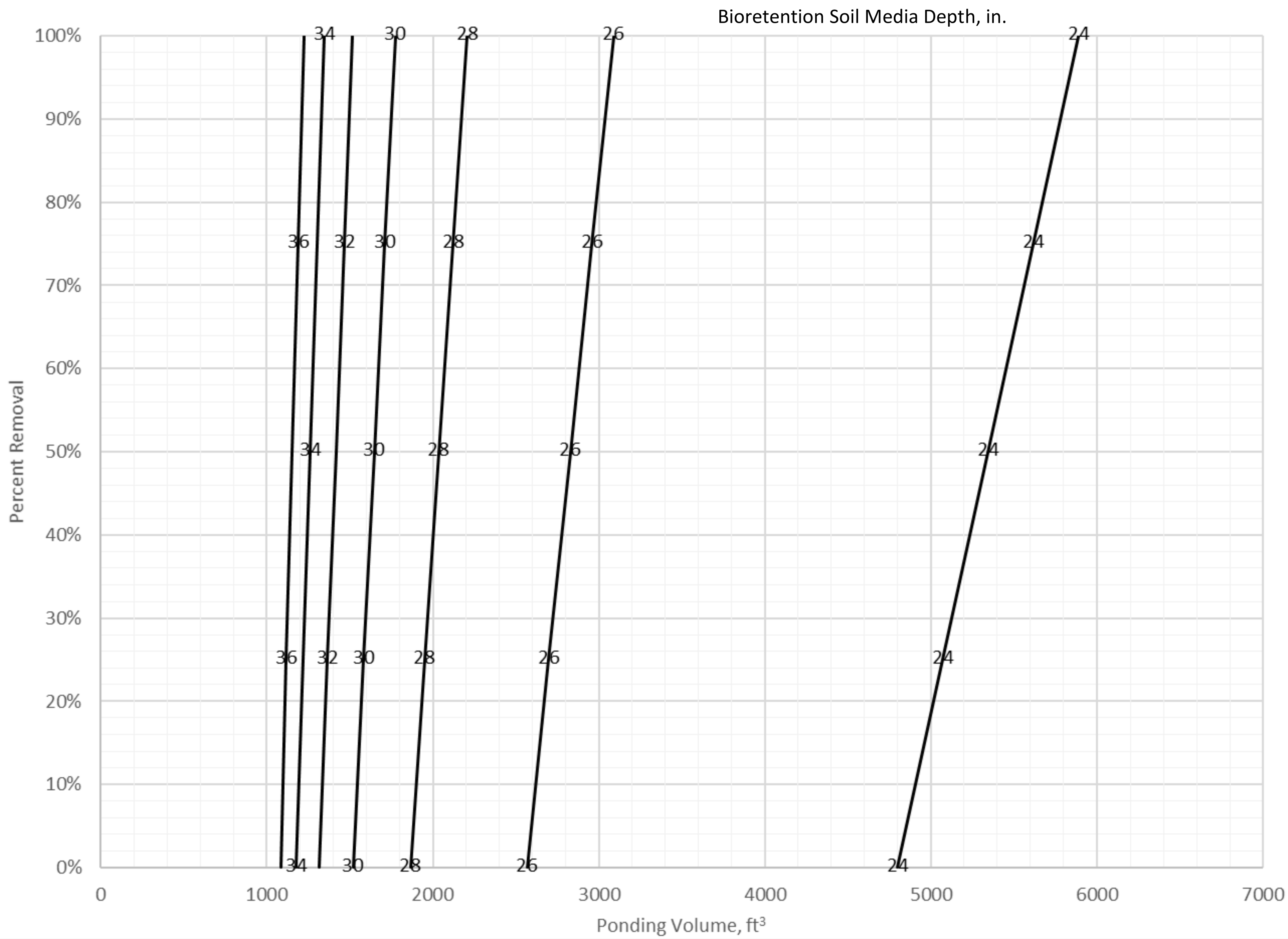


Figure 4-8: *Pollutant Removal vs Ponding Volume - Total Cadmium*

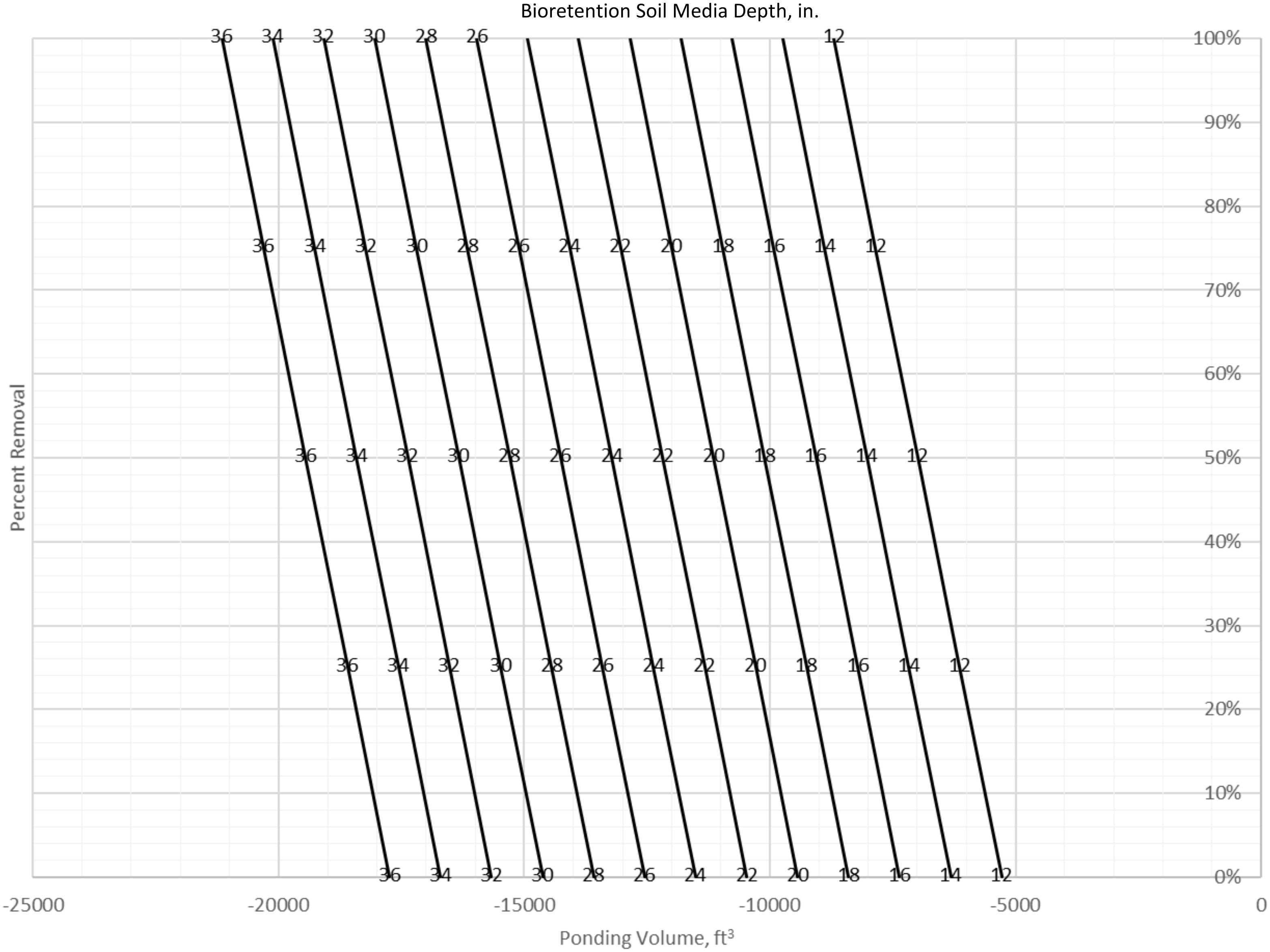


Figure 4-9: *Pollutant Removal vs Ponding Volume - Total Copper*

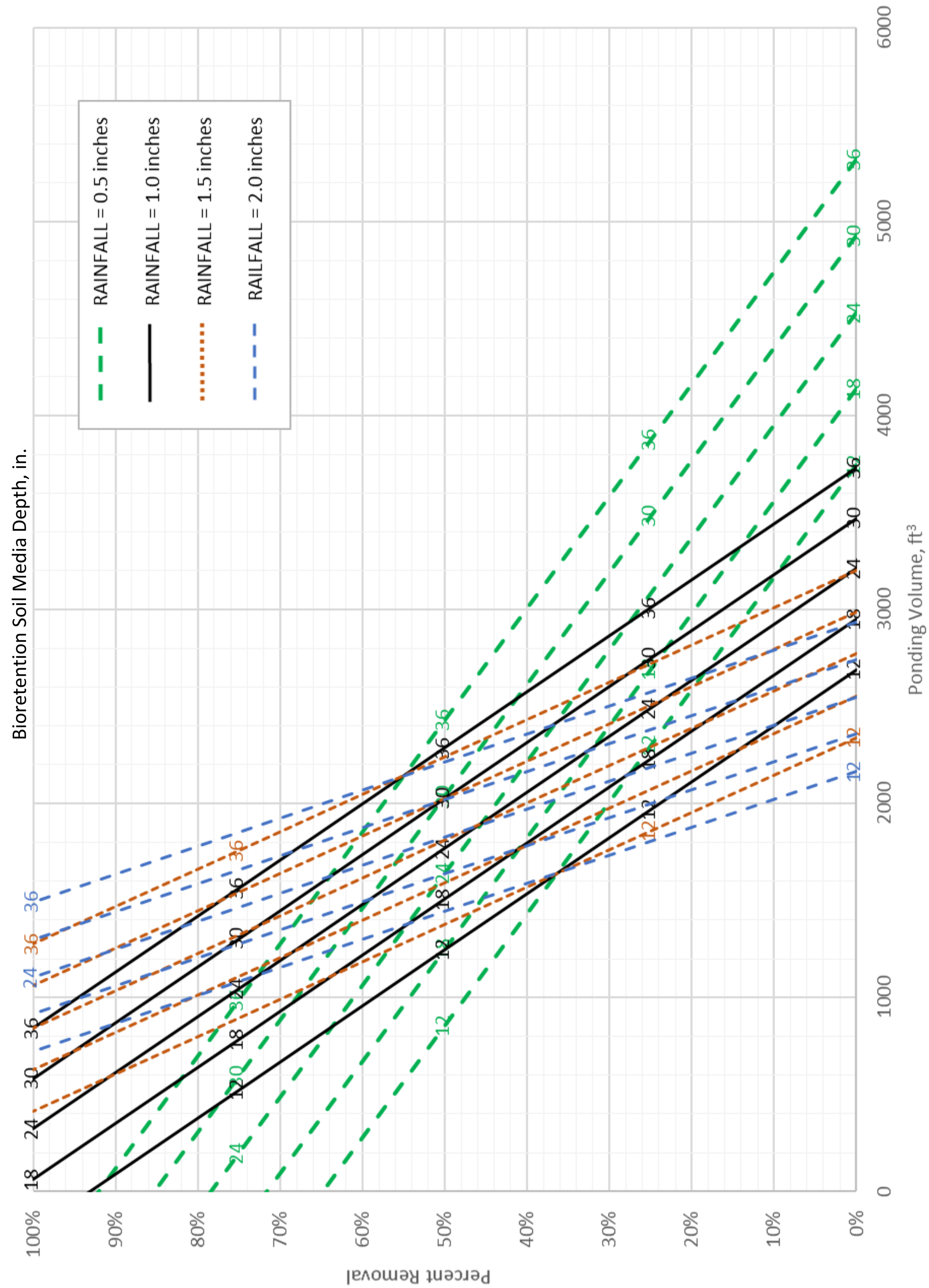


Figure 4-10: *Pollutant Removal vs Ponding Volume - Total Chromium*

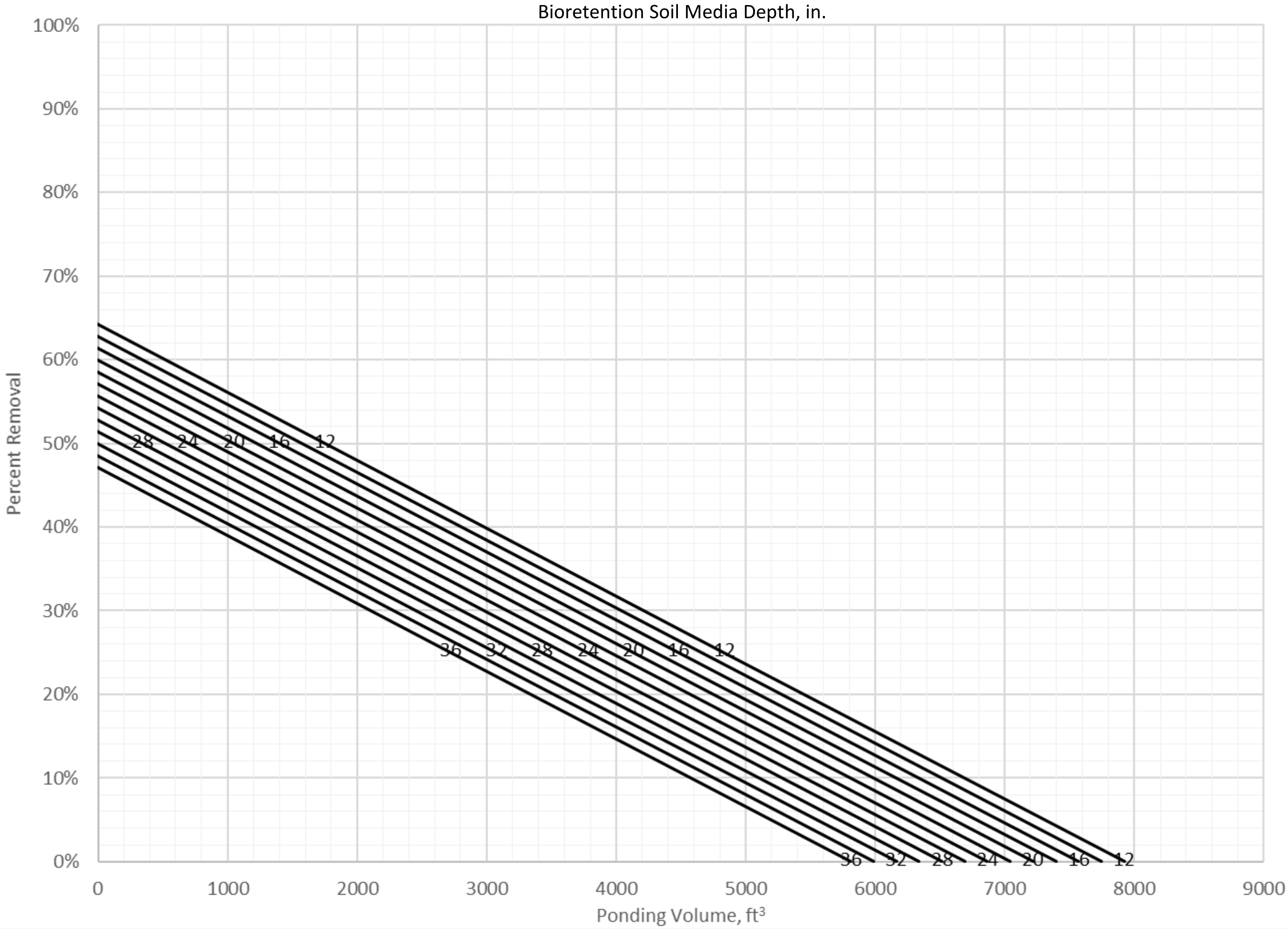


Figure 4-11: *Pollutant Removal vs Ponding Volume - Total Kjeldahl Nitrogen*

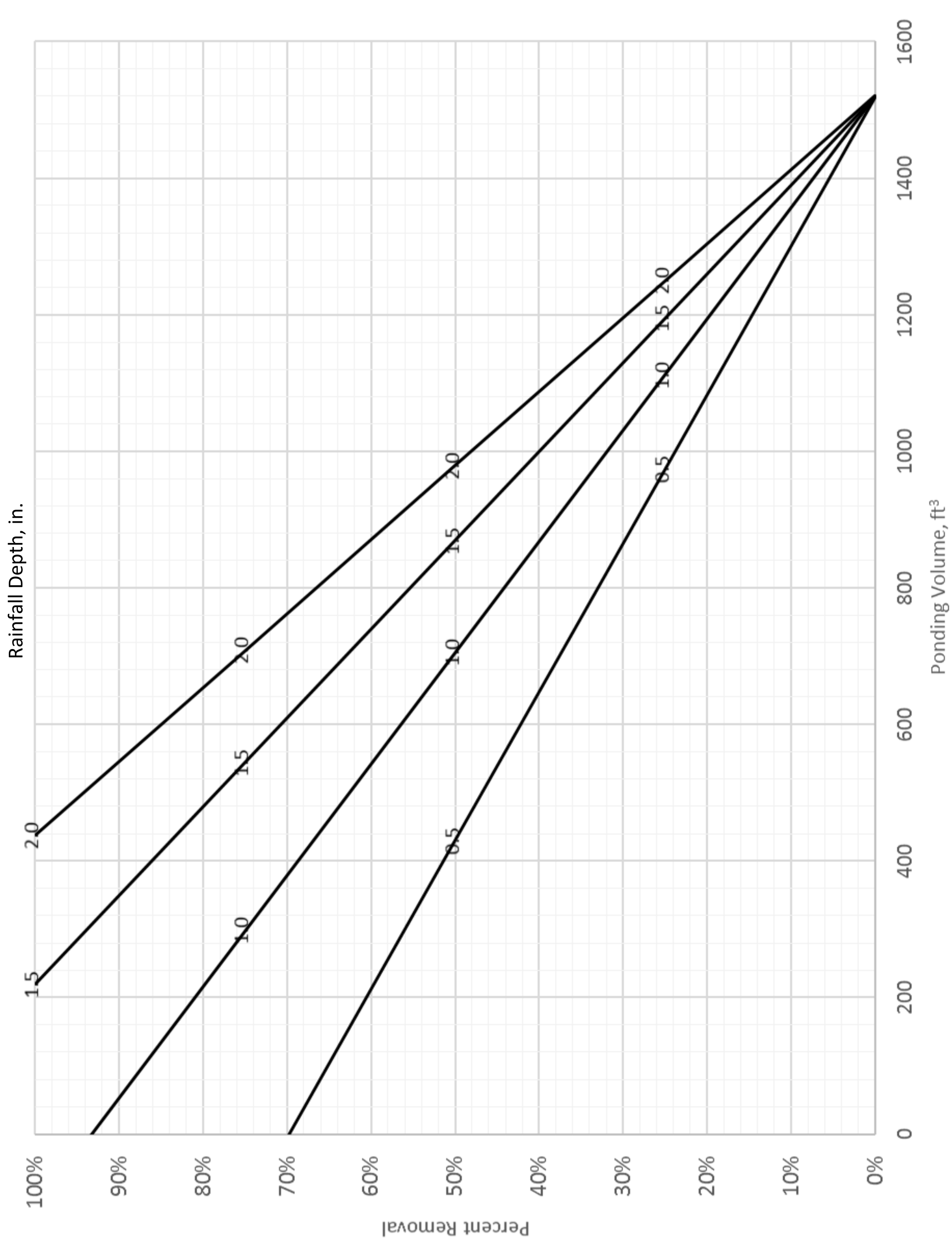


Figure 4-12: *Pollutant Removal vs Ponding Volume - Total Lead*

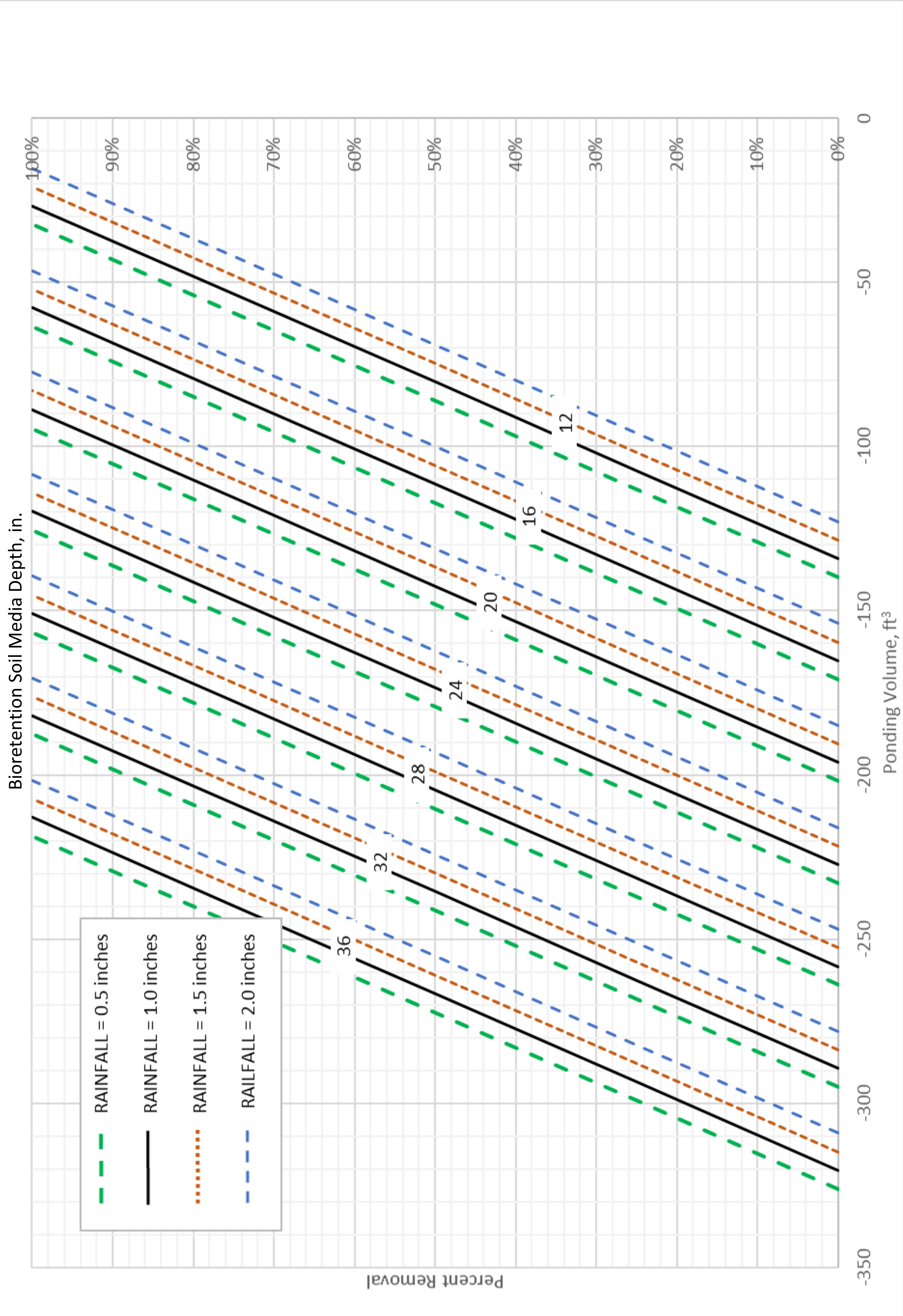


Figure 4-13: *Pollutant Removal vs Ponding Volume - Total Nickel*

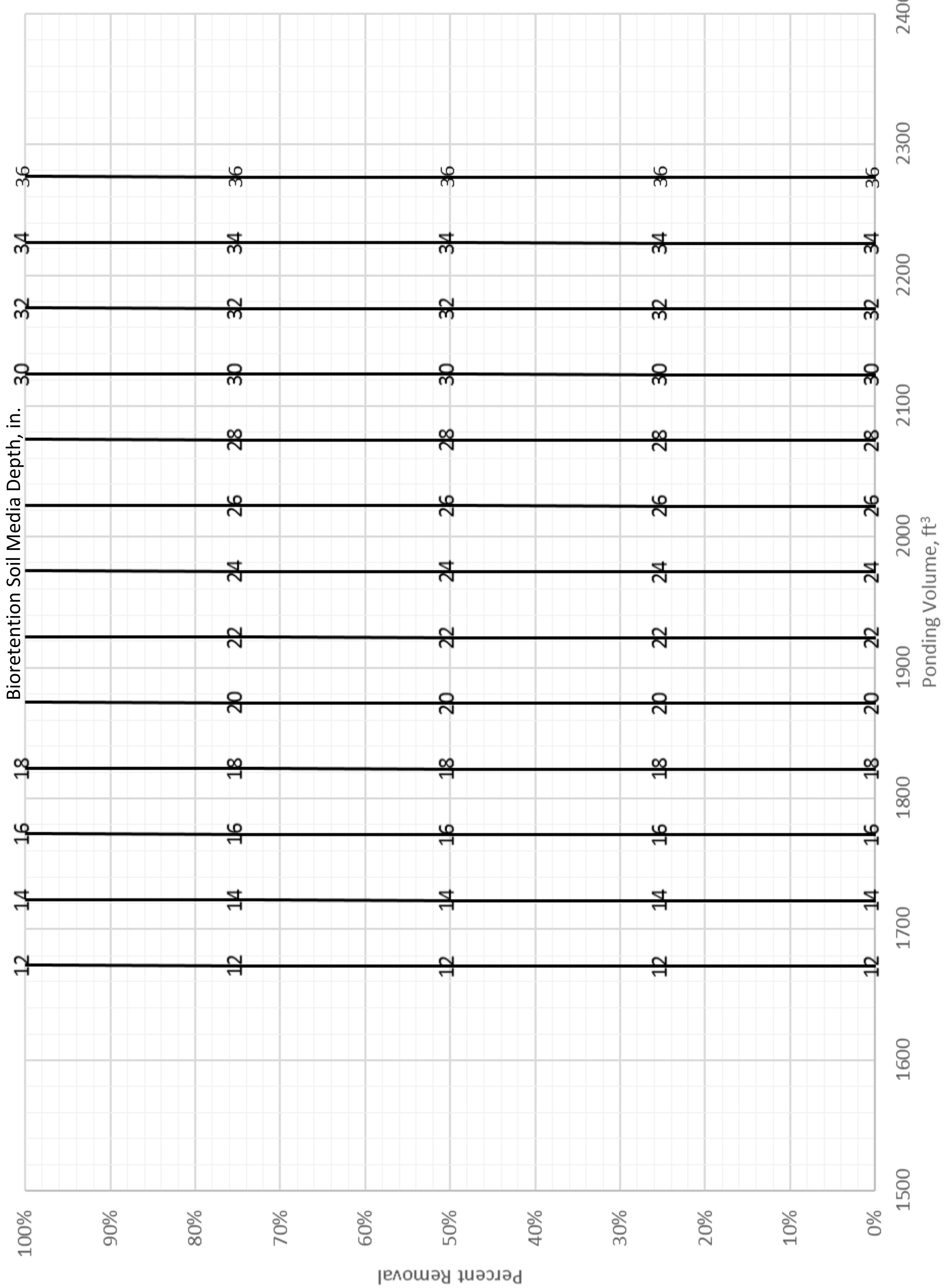
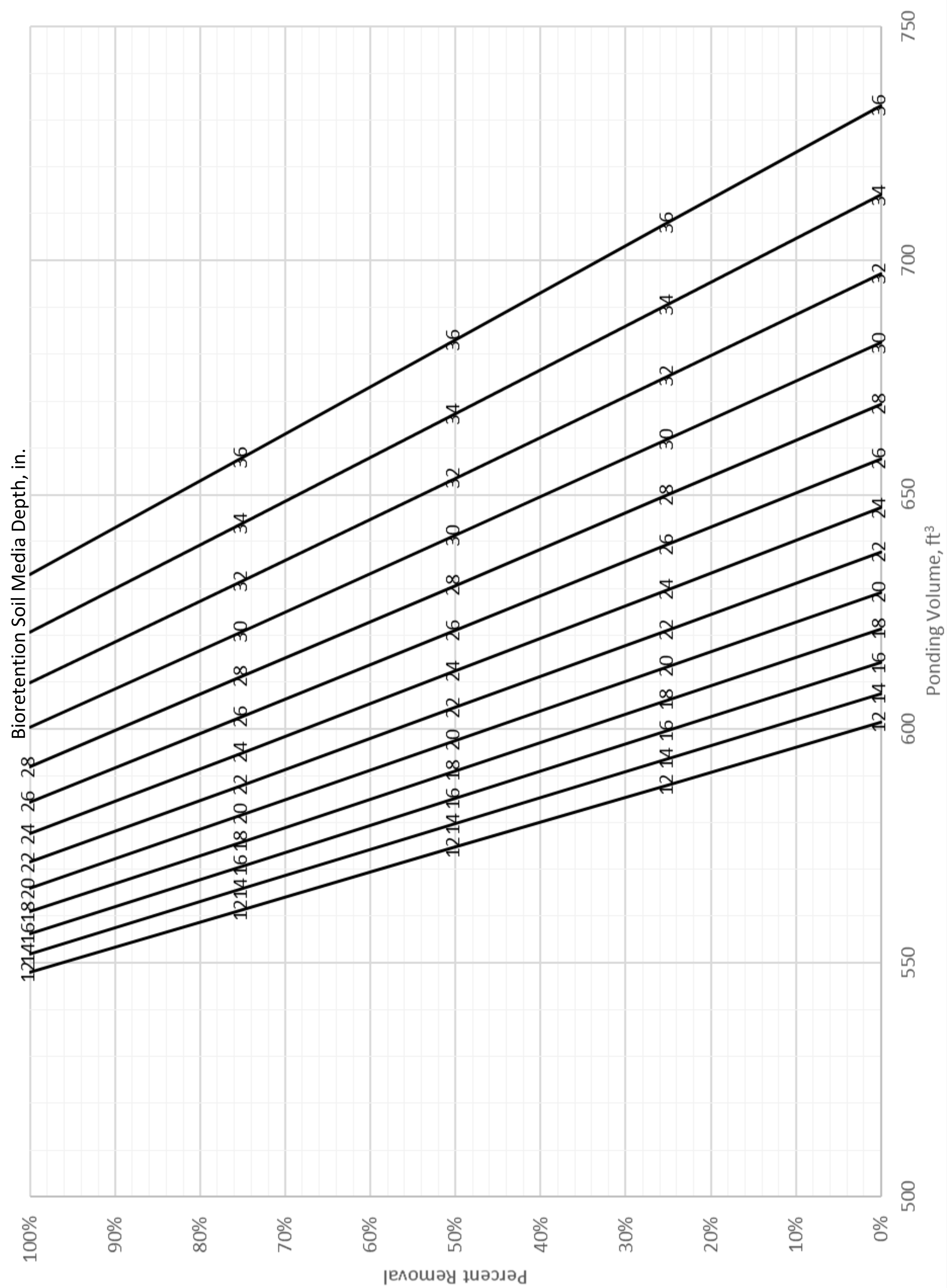


Figure 4-14: *Pollutant Removal vs Ponding Volume - Total Nitrogen*



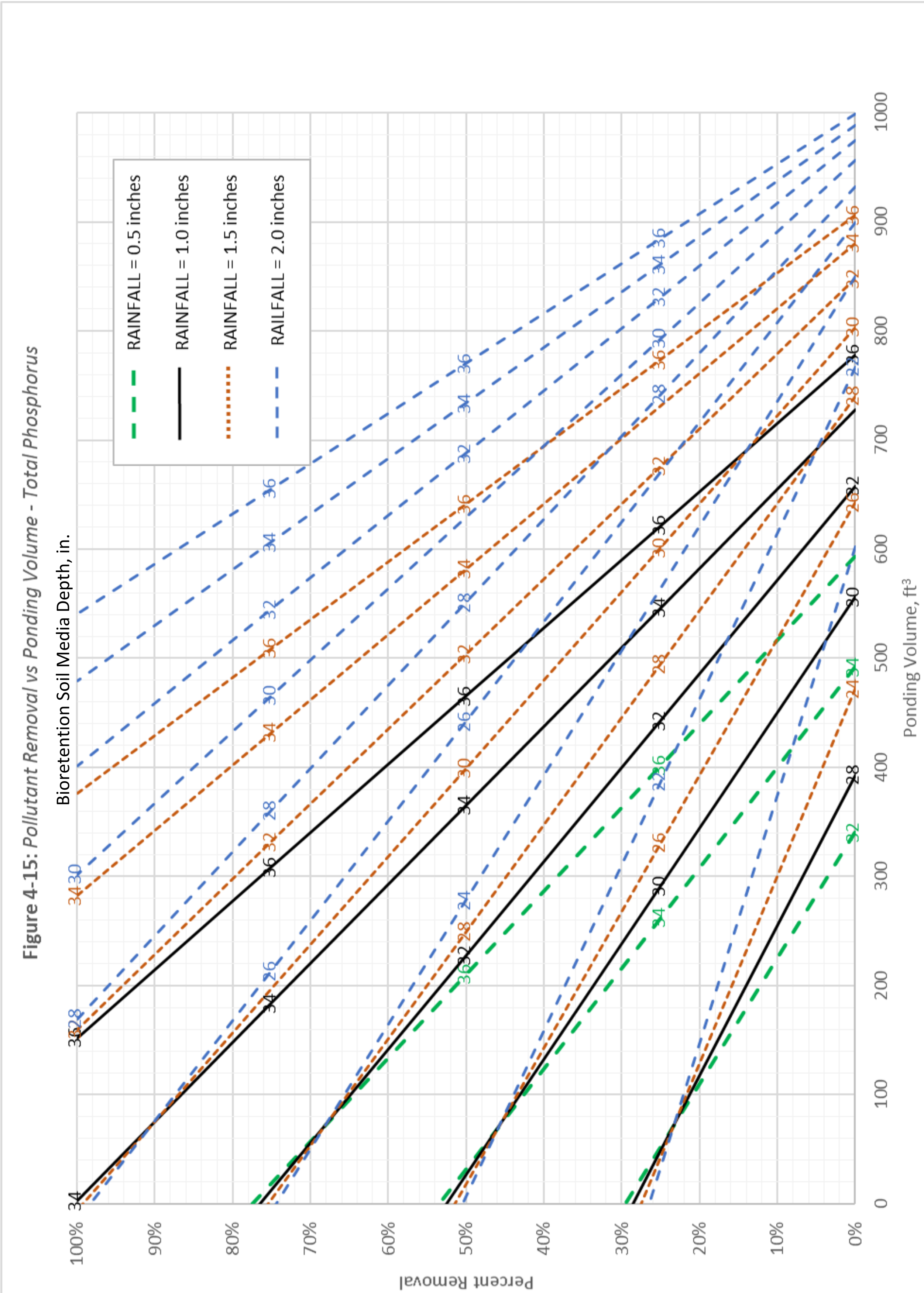


Figure 4-15: *Pollutant Removal vs Ponding Volume - Total Phosphorus*

Figure 4-16: *Pollutant Removal vs Ponding Volume - Total Suspended Solids*

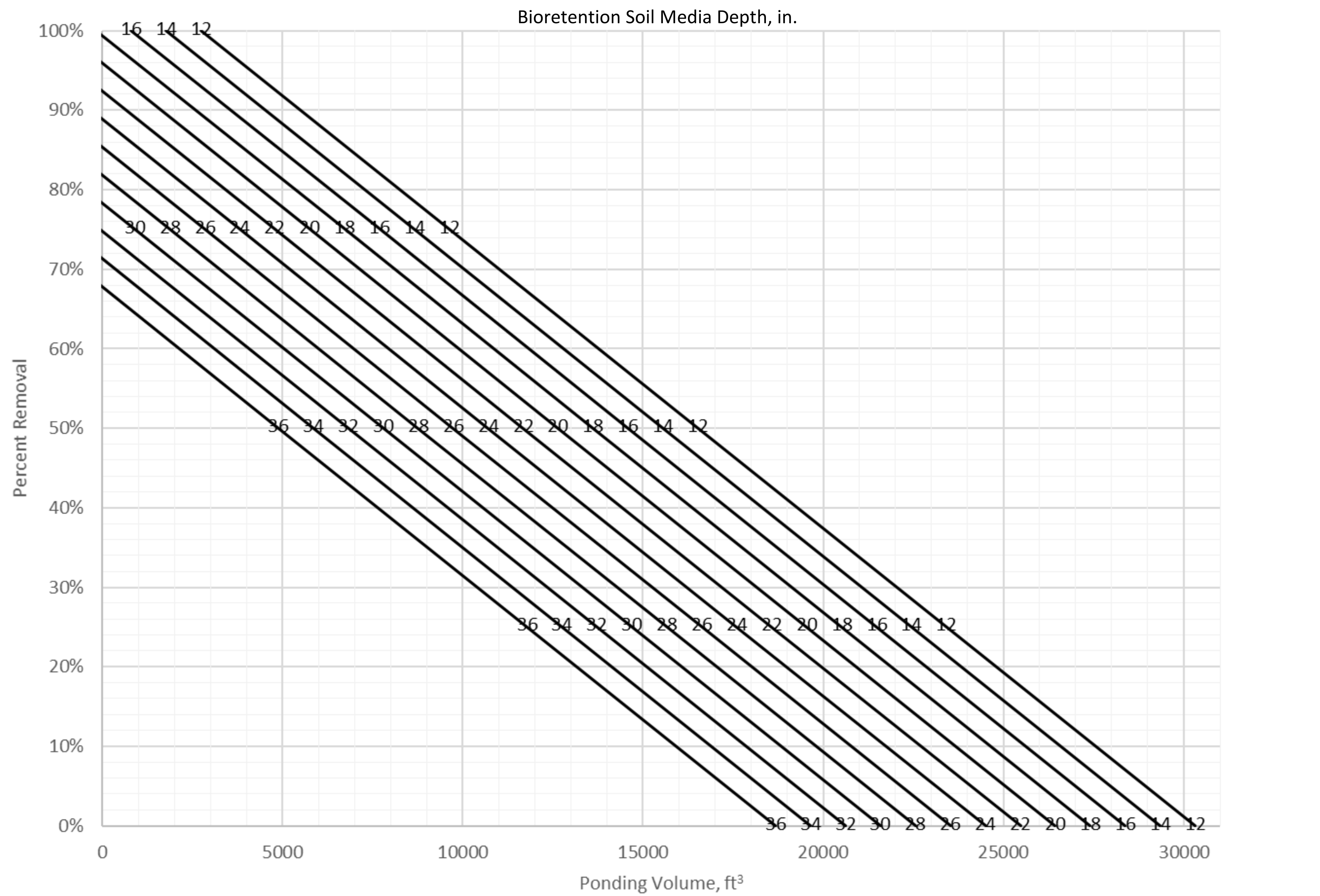
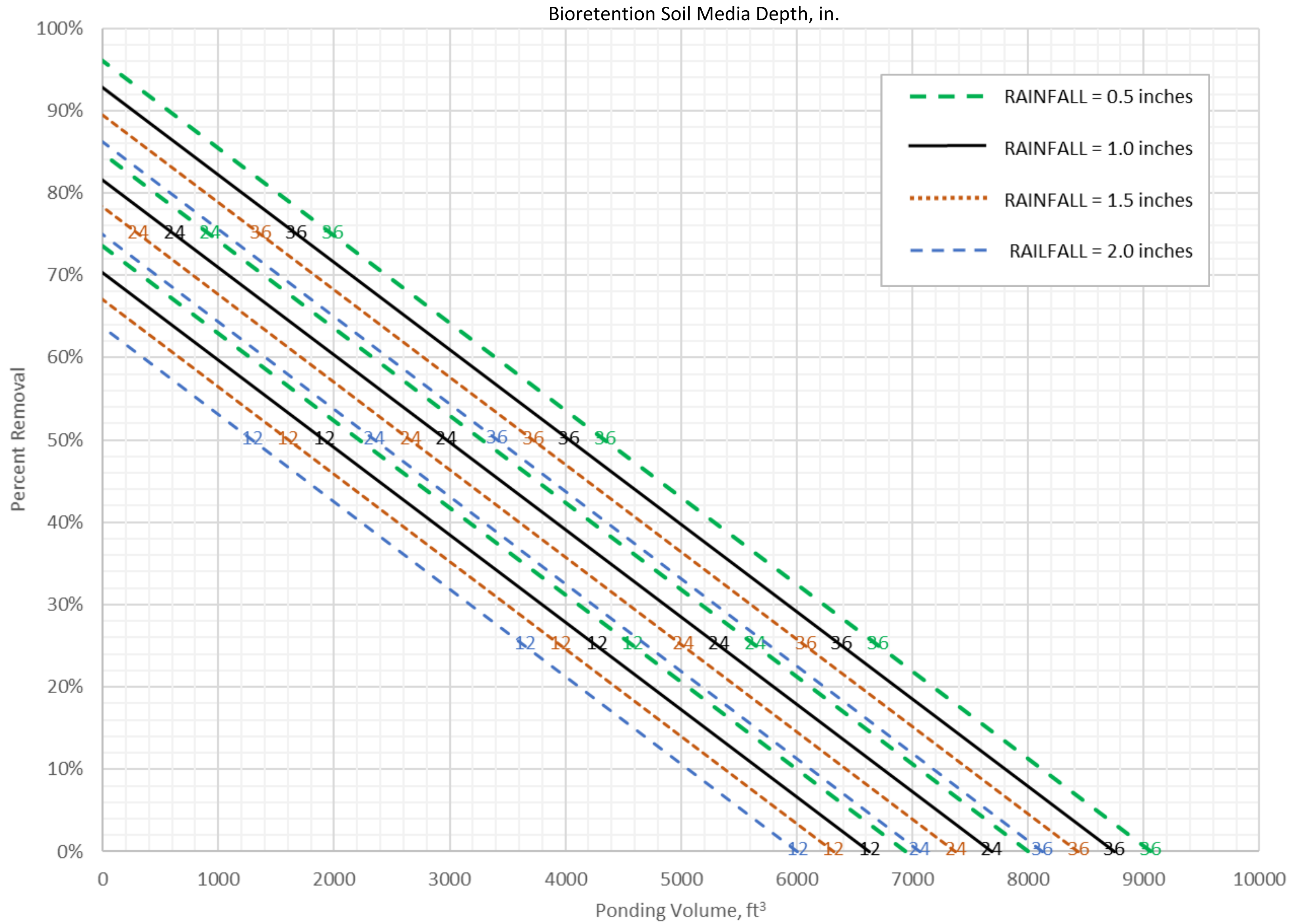


Figure 4-17: *Pollutant Removal vs Ponding Volume - Total Zinc*



The nomographs are subject to several limitations. First, as X_3 is the dependent variable of Equation 4-3, it must be present in the regression model for a specific pollutant to develop a nomograph for that pollutant. For this reason, nomographs for dissolved cadmium, dissolved copper, dissolved iron, dissolved lead, dissolved nickel, E. coli, enterococcus, and total arsenic, could not be developed as part of this study. Second, a retention time of 7 minutes was selected for use in nomograph creation. This value was selected as it is the mean retention time for all the bioretention basins. If a bioretention basin has a different retention time, these nomographs may not be used to predict pollutant removal rates for that bioretention basin. Third, following substitution of input variables, it is possible to generate negative ponding volumes. Given that it is impossible to design or construct a bioretention basin with a negative ponding volume, nomographs that result in negative ponding volumes have been removed from further analysis. Such nomographs include total cadmium (Fig. 4-8) and total lead (Fig. 4-12). These two nomographs are provided for reference only and are not recommended to be used in practice. Fourth, as Equation 4-3 was a simple rearrangement of the general regression model (Equation 4-1), it can be assumed to be reliable when input data falls within the ranges of the corresponding values used to develop the regression models. If input data is outside of these ranges, the predicted ponding volume will have unknown uncertainties.

The nomographs can be used by the following seven steps: 1) select the pollutant to be analyzed, 2) select a target pollutant removal, soil media depth, and rainfall depth, 3) locate the target pollutant removal rate on the Y-axis, 4) locate the diagonal line representing the soil media depth and/or rainfall depth, 5) from the target pollutant removal rate, draw a horizontal line from left to right until it intersects the diagonal line of the selected soil media depth and/or rainfall depth, 6) Draw a vertical line from the point of intersection down until it intersects the X-axis, 7) Determine the ponding volume from the X-axis.

These steps assume that the target removal rate, soil media depth, and rainfall depth are known while the ponding volume needs to be determined. If any three of the four input variables are known, these nomographs can be used to calculate the fourth.

4.3 Test of Hypothesis

Table 4-3 summarizes t statistics and p-values for each pollutant tested. If a mean pollutant removal was significantly different than the null hypothesis, the null hypothesis was rejected. In these cases, a corresponding low p-value confirmed that the null hypothesis should be rejected. The detailed SAS® output for the test of hypothesis can found in Appendix B.

Per the results in Table 4-3, it can be concluded with a 95% level of confidence that there is insufficient evidence indicating that the mean pollutant removal rate is 25% for all pollutants analyzed in this study. It is likely that the mean pollutant removal rate for all pollutants analyzed in this study is not 25%. Therefore, the null hypothesis, and the assumptions used to select it, are called into question. From the wide range of results presented in Table 4-3, it can be concluded that the 25% mean pollutant removal rate for total cadmium is likely coincidental. Pollutant removal rates provided by bioretention basins are unlikely to be the same for different pollutants.

Table 4-3. The t-test results

Pollutant	Mean Pollutant Removal (%)	DF	t-Value	p-Value
Dissolved Cadmium	130.45%	29	6.68	0.0001
Dissolved Chromium	-6.07%	41	7.12	0.0001
Dissolved Copper	43.73%	39	6.02	0.0001
Dissolved Iron	267.22%	39	6.48	0.0001
Dissolved Nickel	225.32%	39	7.74	0.0001
Dissolved Phosphorus	327.24%	59	8.12	0.0001
Dissolved Zinc	-15.23%	34	1.48	0.1487
E. Coli	-32.55%	68	-1.40	0.1656
Enterococcus	18.84%	7	0.70	0.5038
Fecal Coliform	-85.31%	17	-16.78	0.0001
Nitrate and Nitrogen	81.86%	30	6.09	0.0001
Nitrate, Nitrite, and Nitrogen	64.46%	166	7.86	0.0001
Orthophosphate	472.46%	103	7.50	0.0001
Total Arsenic	31.91%	49	6.96	0.0001
Total Cadmium	-6.89%	65	5.53	0.0001
Total Chromium	-25.09%	55	-0.02	0.9857
Total Copper	-43.21%	56	-3.43	0.0012
Total Kjeldahl Nitrogen	-13.98%	193	3.42	0.0080
Total Lead	-13.98%	193	3.42	0.0080
Total Nickel	-16.98%	43	1.42	0.1621
Total Nitrogen	-18.11%	111	1.51	0.1339
Total Phosphorus	80.81%	184	8.10	0.0001
Total Suspended Solids	-57.40%	146	-10.38	0.0001
Total Zinc	-50.46%	101	-6.42	0.0001

4.4. Discussion

Under close examination, several trends can be identified in the regression models and nomographs summarized in this chapter.

Effect of Regression Coefficients

While the general regression equation has a total of five variables and sixteen terms, most of these terms are not present in the final regression equation for nearly every pollutant analyzed. This is due to the results of the regression analyses. In most cases, the regression models contain multiple bivariate terms, allowing for greater variable representation with fewer terms. If a model is missing a variable or variables, it may indicate that percent removal for the pollutant associated with that model is independent of one or more of the missing variables. This is reflected in the nomographs presented in this chapter. A nomograph for a model that contains every input variable is not necessarily more accurate than a nomograph with fewer input variables. Rather, it presents a more complex mathematical relationship between input variables.

The magnitude of the regression coefficients covers a large range. Several coefficients are very close to zero while other are significantly larger in both the positive and negative direction. A coefficient can greatly impact the result of an individual model by scaling the magnitude of the associated input variable. For example, a very small coefficient will reduce the effect of the associated variable to zero. Effectively removing it from the regression model. Conversely, a large coefficient will increase the magnitude of the associated variable, increasing its effect on the results of the model. This coefficient scaling effect can be used to determine which variables are the most responsible for a model result. A variable that is scaled to zero may indicate that it has little to no effect on pollutant removal. The opposite may be true for a variable that is amplified by its coefficient.

Nomograph Trends

The nomographs presented in this chapter follow two general configurations, a “grid” or “fan”. Grid nomographs occur when the soil media depth lines for a single rainfall depth are parallel and evenly spaced. This indicates that for a single pollutant removal rate and rainfall depth, the ponding volume and soil media depth are related linearly. As the soil media depth changes, the ponding volume changes by a constant rate. This relationship occurs throughout the nomographs but can be clearly identified on the fecal coliform nomograph (Fig. 4.4). On this nomograph, the spacing is different for each rainfall event, indicating a different linear relationship between ponding volume and soil media depth for each rainfall event. A fan configuration occurs in a similar situation; however, the relationship between ponding volume and soil media depth is nonlinear. This results in nonparallel lines that intersect at a single point, creating a fan shape. For this relationship to occur, multiple instances of a single variable need to be present in the relationship between ponding volume and soil media depth. This occurs due to variable interactions in the regression equations used to generate the nomographs. This relationship can be identified on the total phosphorus nomograph (Fig. 4-15). An “intersection point” on a fan nomograph occurs at the ponding volume that corresponds to a specific pollutant removal that is both constant and independent of soil media depth or rainfall depth. Intersection points can be identified on the fecal coliform (Fig. 4-4) and total copper (Fig. 4-9) nomographs. When all input variables are present in a regression equation and corresponding nomograph, grid and fan relationships can occur in combinations. For example, the fecal coliform (Fig. 4-4) and total copper (Fig. 4-9) nomographs have grid relationships between soil media depth and ponding volume and fan relationships between rainfall depth and ponding volume.

The slope of the lines present in the nomographs can be used to determine a linear relationship between pollutant removal and ponding volume for a specific soil media depth and rainfall depth. A shallow line indicates a small change in pollutant removal for a corresponding change in ponding depth.

A steep line indicates a large change in pollutant removal for a corresponding change in ponding depth. A horizontal line indicates that pollutant removal is constant and independent of ponding volume. A vertical line implies infinite pollutant removal and is neither reasonable nor realistic. Near-vertical lines occur on the nomographs for dissolved phosphorus (Fig. 4-2), dissolved zinc (Fig. 4-3), and total nickel (Fig. 4-13). These nomographs have been provided for reference and should not be used in predictive analyses.

Test of Hypothesis

In Chapter 1, a test of hypothesis on mean pollutant removal rates was presented. The results of a Student t-test for this hypothesis is presented in this chapter. As part of this test, mean pollutant removal rates were calculated and are summarized in Table 4-3. To analyze the accuracy and effectiveness of the regression models presented in this study, mean input data was entered into the regression models and the resulting pollutant removal rates were compared to the mean removal rates determined as part of the t-test. The mean value for each input variable of each regression model was selected as it should represent the data used to generate the regression model. These values can be found in Table 4-4 along with corresponding effluent concentrations and pollutant removal rates.

Table 4-4. Mean input data and resulting pollutant removal rates

	Influent Concentration	Rainfall Depth	Ponding Volume	Soil Media Depth
Pollutant	X_1	X_2	X_3	X_4
Dissolved Cadmium	0.000048	0.418	2644.48	20.56
Dissolved Chromium	0.000530	0.398	812.00	18.00
Dissolved Copper	0.006507	0.425	2887.08	20.84
Dissolved Iron	0.058455	0.361	812.00	18.00
Dissolved Nickel	0.001096	0.424	1729.30	18.81
Dissolved Phosphorus	0.172857	0.480	1850.22	18.91
Dissolved Zinc	0.016658	0.431	3221.15	21.00
E. Coli	774.8781	0.650	1960.21	23.35
Enterococcus	69033.33	0.449	7600.00	24.00
Fecal Coliform	9927.391	0.820	3221.68	40.56
Nitrate and Nitrogen	0.370079	0.662	2196.32	28.07
Nitrate, Nitrite, and Nitrogen	0.368089	0.804	2174.20	26.13
Orthophosphate	0.061764	0.803	2555.15	23.24
Total Arsenic	0.001844	0.539	986.57	25.16
Total Cadmium	0.000336	0.516	2941.73	24.29
Total Chromium	0.003422	0.532	1574.57	26.36
Total Copper	0.023918	0.625	3183.99	26.68
Total Kjeldahl Nitrogen	1.676258	0.795	2231.97	25.58
Total Lead	0.004963	0.536	2838.96	26.32
Total Nickel	0.005285	0.512	1765.72	25.44
Total Nitrogen	1.727864	0.970	1234.46	32.20
Total Phosphorus	0.230183	0.722	2656.71	25.78
Total Suspended Solids	43.76779	0.624	3026.13	25.81
Total Zinc	0.054922	0.621	3372.10	26.09

Table 4-4. Continued

	Retention Time	Effluent Concentration		
Pollutant	X_5	Y	% Removal	Mean % Removal
Dissolved Cadmium	4.67	0.000164	-241.91%	130.45%
Dissolved Chromium	4.67	0.000475	10.47%	-6.07%
Dissolved Copper	8.12	-17.93861	275765.37%	43.73%
Dissolved Iron	4.67	-0.255745	537.51%	267.22%
Dissolved Nickel	6.74	0.170640	-15463.25%	225.32%
Dissolved Phosphorus	6.60	0.488466	-182.58%	327.24%
Dissolved Zinc	7.35	3.889611	-23249.78%	-15.23%
E. Coli	6.46	289.9118	62.59%	-32.55%
Enterococcus	19.98	51522.00	25.37%	18.84%
Fecal Coliform	8.92	1716.098	82.71%	-85.31%
Nitrate and Nitrogen	7.76	1.024068	-176.72%	81.86%
Nitrate, Nitrite, and Nitrogen	6.09	-0.188238	151.14%	64.46%
Orthophosphate	7.36	0.239095	-287.11%	472.46%
Total Arsenic	4.66	0.002449	-32.84%	31.91%
Total Cadmium	7.48	0.001748	-420.96%	-6.89%
Total Chromium	5.94	0.002012	41.19%	-25.09%
Total Copper	9.60	0.014250	40.42%	-43.21%
Total Kjeldahl Nitrogen	6.39	2.391145	-42.65%	-13.98%
Total Lead	7.24	-0.137623	2872.70%	-13.98%
Total Nickel	6.44	-0.010947	307.13%	-16.98%
Total Nitrogen	3.78	3.427973	-98.39%	-18.11%
Total Phosphorus	6.62	0.478747	-107.98%	80.81%
Total Suspended Solids	7.38	11.02641	74.81%	-57.40%
Total Zinc	8.30	0.025585	53.42%	-50.46%

Analysis of Table 4-4 indicates that mean pollutant removal rates calculated directly from influent and effluent concentrations do not match pollutant removal rates calculated from the input of mean values into the regression models. In some cases, the two calculation methods yield extremely different results, such as dissolved copper, dissolved nickel, dissolved zinc and total lead. The only situation in which the two calculation methods yield similar results is in the case of enterococcus. However, as shown in

Table 4-1, the regression model for enterococcus does not have any input variables present and is a constant function driven entirely by its intercept. Therefore, this result is not generated by input values.

Comparison of Pollutant Removal Rates

The Virginia Department of Environmental Quality (DEQ) has published pollutant removal rates as part of design specifications for bioretention basins in the state of Virginia. These pollutant removal rates are a product of research performed by the DEQ and are intended to represent pollutant removal rates that can be expected from a bioretention basin designed and constructed to standards outlined in specifications maintained by the DEQ. Published bioretention basin removal rates for total nitrogen and total phosphorus are used in the Virginia Runoff Reduction Method (VRRM) for calculating pollutant removal. The VRRM separates bioretention basin designs into two categories, Level 1 and Level 2, based on design elements used to intercept and treat polluted runoff. The VRRM bioretention basin Level 1 and Level 2 pollutant removal rates for total nitrogen and total phosphorus have been compared to the mean pollutant removal rates presented in Table 4-3. A summary of the comparison can be found in Table 4-5.

Table 4-5. Comparison of VRRM pollutant removal rates and calculated mean pollutant removal rates

Pollutant	Published VRRM Pollutant Removal Rates (%)		Calculated Mean Pollutant Removal (%)
	Level 1 Design	Level 2 Design	
Total Nitrogen	40	60	18.11
Total Phosphorus	25	50	-80.81

Analysis of Table 4-5 shows significant differences between published bioretention basin removal rates and calculated mean pollutant removal rates for total nitrogen and total phosphorus. The calculated mean pollutant removal rate for total nitrogen is approximately one-half of the Level 1 and one-third of the Level 2 VRRM pollutant removal rates for total nitrogen. Perhaps more interesting however, is that the calculated mean total phosphorus removal rate indicates that total phosphorus concentrations increase by nearly 80% when intercepted and treated by bioretention basins.

This comparison, however, may not be even. The variables involved in the VRRM are related to the drainage area and cover types routed to a bioretention basin. In addition, the bioretention basins from which data was collected for this study may have been over- or underperforming during data collection, resulting in very high, very low, or negative pollutant removal rates. Specific storm events also have the potential to cause irregular pollutant removal rates. Concentrations of total nitrogen or total phosphorus carried by small storm events may effectively filtered and suspended by the soil media and storage layers of a bioretention basin, resulting in the effective removal of pollutants from the effluent stream. However, a significantly large storm event could wash suspended pollutants out of a bioretention basin before processes such as biological uptake can take place, resulting in a significant increase in pollutant concentration in the effluent stream. If an elevated pollutant concertation was recorded, it will have skewed the data used to calculate mean pollutant removal rates.

Sources of Error

Throughout this study, several potential sources of error have been encountered, particularly during data gathering, data processing, and the creation of the regression models and associated nomographs.

The raw data used in this study was taken from the International Stormwater BMP Database. While this data can be assumed to be accurate and validated, empty or erroneous data entries into the database could lead to calculation errors. For example, a specific pollutant concentration reading could have been outside the precision or accuracy limits for the measuring instrument that recorded it. The field personnel that recorded such a reading may have input a zero or minimum/maximum value in lieu of the correct pollutant concentration

Data used in this study was collected from a total of 15 separate bioretention basins. It is likely that these bioretention basins were designed differently and were in various states of repair at the time of data collection. Some may have been operating at peak efficiency while others may have been damaged or otherwise malfunctioning. A malfunctioning bioretention basin could be the cause for erroneous pollutant concentration field measurements.

As mentioned in Chapter 3, the raw data used in this study required significant processing, sorting, and correlating prior to analysis. While data processing was performed using spreadsheet software to minimize error, the possibility of processing errors should be considered. Error occurrences during data manipulation could have resulted in erroneous output that would have been difficult to detect and could have caused additional propagation of error. Throughout data processing, care was taken to check processing procedures and algorithms to identify and eliminate errors.

To minimize error and maximize results, the regression models and nomographs presented in this study were generated using statistical and spreadsheet software packages. However, much like the data processing, the generation of the regression models and nomographs is subject to potential errors. As mentioned in Chapter 3, the regression analysis was performed using code based software. To simplify analysis, master code was written and then modified with input data for each pollutant. An error in this master code could potentially propagate throughout the regression analyses. However, the master code was thoroughly checked both by hand and with software to ensure no errors.

CHAPTER 5

CONCLUSIONS

5.1. Conclusions

A specific focus of this study was the creation of regression models that can be used to predict pollutant removal rates that could be achieved using bioretention basins. To simplify predictive analyses, nomographs were developed from these models. From the results and discussion presented in Chapter 4, several conclusions can be drawn regarding the regression models and nomographs. These conclusions are discussed below.

The regression models are generally effective tools for predicting pollutant removal rates provided by bioretention basins. Models were successfully created for 24 of the 25 pollutants analyzed in this study. Of these 24 models, 16 contained at least four of the five input variables. In addition, 12 useable nomographs were created from the 24 regression models. The input variables contained in the models and nomographs account for several considerations and can be selected to reflect a variety of design scenarios. However, while the regression models and nomographs successfully reflect input data and are useful, they suffer from some flaws.

For example, calculated pollutant removal rates are irregular at best. Based on the mean input data presented in Table 4-4, some models produce reasonably expected pollutant removal rates of 25% to 80%. However, other models generate pollutant removal rates of over 100% due to negative effluent pollutant concentrations. A pollutant removal rate of greater than 100% is not possible and is an unreasonable result. In addition, Table 4-4 shows a number of models producing increases in pollutant concentrations. While an increase of 30%, 40%, or even 240% could be potentially reasonable, an increase greater than 10,000% is unreasonable. Fortunately, models that produce irregular results in Table 4-4 are easily identifiable. These results are likely caused by the input data used to generate them or the regression models themselves. Further analysis of the regression models that produce irregular results is necessary to determine the causes of irregularities and potential solutions if they exist.

Another shortcoming of the regression models and associated nomographs is the range of data used to generate them, particularly rainfall depth. The range of rainfall depth data is limited, restricting the design storms that can be entered into the regression models. Most design storm depths, such as those generated by a 2- or 10-year storm event, are greater than rainfall depths used in the regression analyses. Therefore, the regression models are not effective at determining pollutant removal rates during large storm events. However, pollutant removal calculations performed using the Virginia Runoff Reduction Method (VRRM) use a 1.0-inch design storm depth. Table 4-5 indicates that the pollutant removal rates calculated by the regression models for total nitrogen and total phosphorus, do not correlate with established VRRM pollutant removal rates for total nitrogen and total phosphorus. As the regression models and VRRM employ different variables and considerations, it is difficult to make an effective comparison of the regression models to the VRRM is difficult to make. To make an effective comparison, VRRM input variables need to be incorporated into the regression models.

While the regression models and nomographs show some reasonable trends for specific pollutants, they are not effective as a general design tool. Therefore, they are best used for estimation and non-design applications. From Table 4-4, it is evident that they are sensitive to the magnitude of input values due to the data ranges used during the regression analyses. To improve the regression models, additional data from the bioretention basins summarized in Chapter 2 or data from new bioretention basins could be added to the regression analyses. Additional data would potentially increase the range of input data and the regression models would be less sensitive. In addition, variables accounting for upstream watersheds, climatic data, and geographic considerations such as karst topography and wetlands, could be introduced into the regression models to account for specific site considerations.

5.2. Recommendations for Future Research

From conclusions made during this study, topics for future research can be identified. For example, research into new data sources and variables will potentially introduce a greater range of input data and real-world applicability to the regression models. Research is necessary to determine appropriate data sources and variables to avoid redundancy and to maximize improvements to the models. While the list of potential variables is significantly large, variables that are particularly intriguing include those that define the drainage area to a bioretention basin, climatic variables such as average annual humidity and temperature, and hydraulic variables that describe inflow and outflow characteristics such as flow rate and flow velocity. These variables introduce several unknowns related to data collection, processing and utilization. Research is necessary to determine how to best approach these unknowns to generate the best possible outcomes.

This study focused on a large-scale analysis involving many pollutants and several variables. A small-scale, detailed study on a single variable could be beneficial in evaluating the effects of that variable on pollutant removal rates for bioretention basins. This approach could be applied to a single pollutant as well. For example, this study attempts to compare total phosphorus and total nitrogen removal rates generated by the regression models to removal rates documented in the VRRM. While a comparison is made, it is not very clear which method, if either, is representative of real-world conditions. A detailed study of removal rates for either total nitrogen and total phosphorus would be beneficial to evaluating the effectiveness of the VRRM and for the development of future pollutant removal calculation methods.

It was concluded that the regression models generated by this study are best used as estimation tools. Even if the models are improved significantly, this conclusion may still hold true. This is because linear regression is a statistical method that introduces coefficients to create predictive models that imitate real-world functions. At best, a regression model can only provide an estimate of a real-world process. To definitively predict effluent pollutant concentrations and associated pollutant removal rates provided by a bioretention basin, an equation for the pollutant removal process must be developed through research and experimentation. Given that a pollutant removal rate cannot be greater than 100%, an effluent pollutant concentration can be expressed as a percent of the associated influent pollutant concentration:

$$C_e = C_i * (1 - Pollutant\ Removal\ Percentage) \qquad \text{(Eq. 5-1)}$$

where C_e is effluent concentration and C_i is influent concentration.

In this proposed equation, the pollutant removal rate can be expressed as a function of input variables such as those described in this study or any other applicable variables. For the purposes of discussion, this set of variables is notated as {X} and contains the variables X_1, X_2, X_3, …, X_n. The pollutant removal rate is expressed as a function of this set. After substitution, Equation 5-1 becomes:

$$C_e = C_i(1 - F(\{X\})) \qquad \text{(Eq. 5-2)}$$

F({X}) is difficult to predict and requires research and experimentation to calculate. However, speculation based on assumptions and observations can be used to estimate its identity. The simplest function is a linear relationship, but nonlinear relationships are more interesting. An exponential decay function is particularly intriguing.

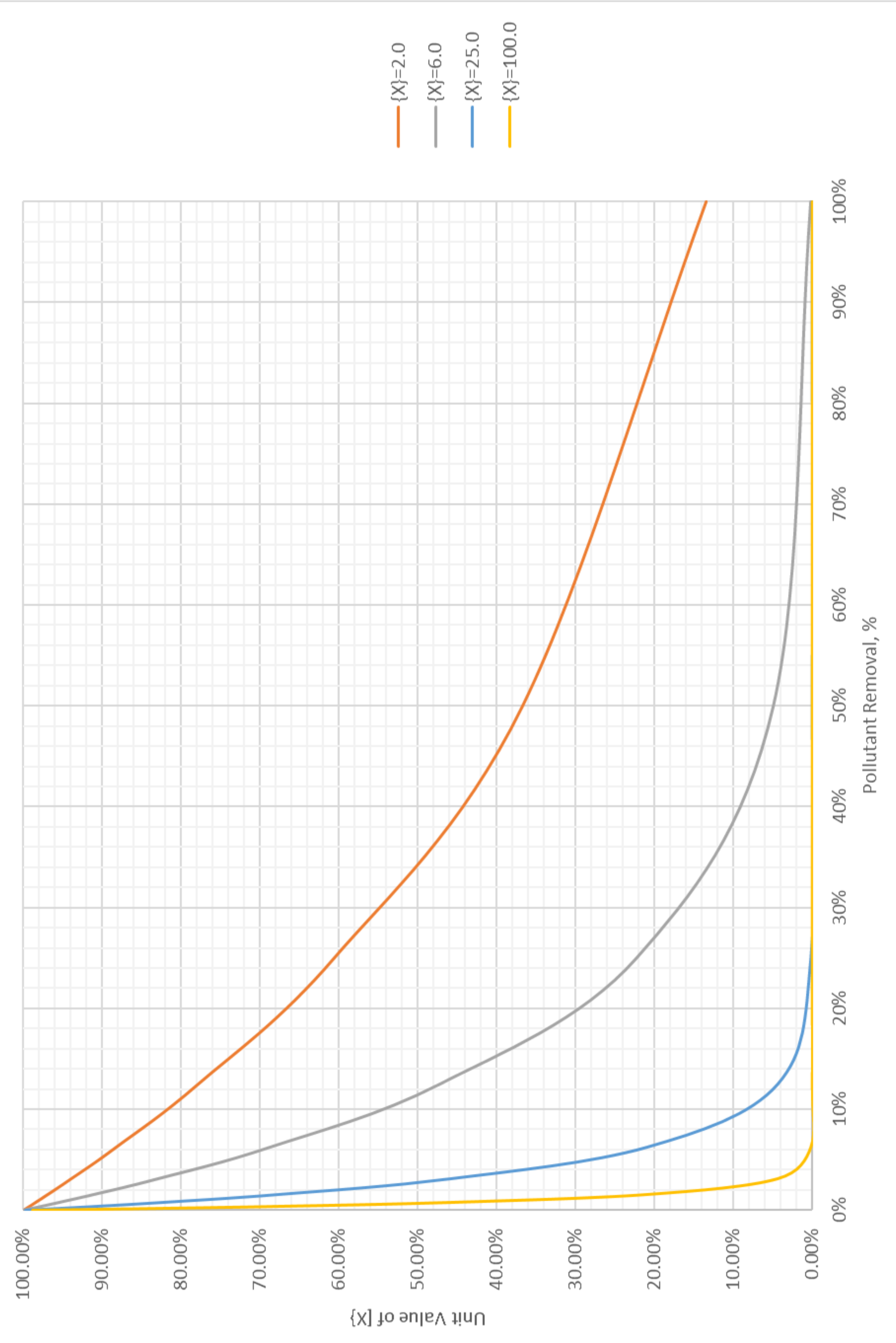
$$C = C_0 e^{-kt} \qquad \text{(Eq. 5-3)}$$

Modifying Equation 5-2 to match the form of Equation 5-3 results in:

$$C_e = C_i(1 - e^{-\{X\}}) \qquad \text{(Eq. 5-4)}$$

As $e^{-\{X\}}$ approaches 1, the effluent concentration approaches zero, meaning the percent removal rate approaches but does not exceed 100%. A properly functioning bioretention basin should provide a certain degree of pollutant removal but cannot meet or exceed 100%. Equation 5-4 also includes the value *e*, or the natural constant. This value is present in many functions that describe natural processes. Given that pollutant removal provided by a bioretention basin is affected by biological upkeep and other natural processes, this constant could potentially be present in a bioretention basin pollutant removal equation. The rate of decay term, *k*, in Equation 5-3 is usually a constant based on specific scenarios in which the exponential decay function is utilized. This term was removed in Equation 5-4 because the specific scenario that would drive the rate of decay is specified by {X}. {X} is a negative value in Equation 5-4, implying a pollutant removal. The $e^{-\{X\}}$ term acts a scaling factor that decreases the influent pollutant concentration based on applicable variables. Equation 5-4 has been plotted for various values of {X} in Figure 5-1.

Figure 5-1: *Unit Value of {X} vs. Pollutant Removal*



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APPENDIX A

DATASET

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DCA	21st	7/7/2011	0.0005	0.00005	1.73	812	18	4.67	.
DCA	21st	9/15/2011	0.0005	.	0.13	812	18	4.67	.
DCA	21st	5/11/2011	0.0004	0.00005	0.17	812	18	4.67	.
DCA	21st	9/15/2011	0.0004	.	0.13	812	18	4.67	.
DCA	21st	7/29/2014	0.0004	0.00005	2.20	812	18	4.67	.
DCA	21st	5/18/2011	0.0003	0.00005	0.69	812	18	4.67	.
DCA	21st	7/12/2011	0.0003	0.00005	0.71	812	18	4.67	.
DCA	21st	7/19/2011	0.0003	0.00005	0.57	812	18	4.67	.
DCA	21st	7/29/2011	0.0003	.	0.15	812	18	4.67	.
DCA	21st	5/5/2012	0.0003	0.00005	0.10	812	18	4.67	.
DCA	21st	7/9/2012	0.0003	.	0.10	812	18	4.67	.
DCA	21st	7/13/2013	0.0003	0.00005	2.14	812	18	4.67	.
DCA	21st	8/26/2014	0.0003	0.00005	0.27	812	18	4.67	.
DCA	21st	5/19/2011	0.0002	.	0.55	812	18	4.67	.
DCA	21st	6/20/2011	0.0002	0.00005	0.45	812	18	4.67	.
DCA	21st	7/13/2011	0.0002	0.00005	0.68	812	18	4.67	.
DCA	21st	7/27/2011	0.0002	0.00005	0.16	812	18	4.67	.
DCA	21st	9/14/2011	0.0002	0.00005	0.87	812	18	4.67	.
DCA	21st	5/6/2012	0.0002	0.0001	0.10	812	18	4.67	100.00%
DCA	21st	5/23/2012	0.0002	0.0001	0.10	812	18	4.67	100.00%
DCA	21st	6/6/2012	0.0002	0.000055	0.45	812	18	4.67	263.64%
DCA	21st	5/29/2013	0.0002	0.00005	0.47	812	18	4.67	.
DCA	21st	7/1/2013	0.0002	0.0001	0.18	812	18	4.67	100.00%
DCA	21st	9/9/2013	0.0002	0.00005	0.50	812	18	4.67	.
DCA	21st	5/21/2014	0.0002	0.00005	0.32	812	18	4.67	.
DCA	21st	5/30/2014	0.0002	0.00005	0.26	812	18	4.67	.
DCA	21st	7/7/2014	0.0002	.	0.10	812	18	4.67	.
DCA	21st	7/15/2014	0.0002	.	0.11	812	18	4.67	.
DCA	21st	7/29/2014	0.0002	0.00005	2.20	812	18	4.67	.
DCA	21st	9/29/2014	0.0002	.	0.47	812	18	4.67	.
DCA	21st	5/6/2012	0.0001	0.0001	0.10	812	18	4.67	0.00%
DCA	21st	7/31/2012	0.0001	.	0.10	812	18	4.67	.
DCA	21st	5/20/2011	0.0001	.	0.16	812	18	4.67	.
DCA	21st	6/4/2013	0.0001	0.00005	0.17	812	18	4.67	100.00%
DCA	21st	7/11/2013	0.0001	0.00005	0.27	812	18	4.67	100.00%
DCA	21st	5/7/2014	0.0001	0.00005	0.55	812	18	4.67	100.00%
DCA	21st	6/8/2014	0.0001	0.00005	0.42	812	18	4.67	100.00%
DCA	21st	8/26/2014	0.0001	0.00005	0.27	812	18	4.67	100.00%
DCA	21st	9/4/2014	0.0001	0.00005	0.08	812	18	4.67	100.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DCA	21st	9/10/2014	0.0001	0.00005	0.16	812	18	4.67	100.00%
DCA	21st	9/28/2014	0.0001	.	0.12	812	18	4.67	.
DCA	21st	5/12/2012	0.00005	0.00005	0.10	812	18	4.67	0.00%
DCA	21st	9/11/2012	0.00005	0.0001	0.10	812	18	4.67	-50.00%
DCA	21st	9/11/2012	0.00005	0.00005	0.10	812	18	4.67	0.00%
DCA	21st	8/3/2013	0.00005	0.00005	1.83	812	18	4.67	0.00%
DCA	21st	9/9/2013	0.00005	0.00005	0.50	812	18	4.67	0.00%
DCA	21st	9/22/2013	0.00005	0.00005	0.10	812	18	4.67	0.00%
DCA	21st	5/8/2014	0.00005	0.00005	0.13	812	18	4.67	0.00%
DCA	21st	5/22/2014	0.00005	0.00005	0.16	812	18	4.67	0.00%
DCA	21st	8/7/2014	0.00005	.	0.11	812	18	4.67	.
DCA	21st	8/9/2014	0.00005	.	0.14	812	18	4.67	.
DCA	21st	8/20/2014	0.00005	0.00005	0.14	812	18	4.67	0.00%
DCA	21st	9/22/2014	0.00005	.	0.17	812	18	4.67	.
DCA	21st	5/9/2013	.	0.0001	0.20	812	18	4.67	.
DCA	44th	2/12/2011	.	0.000099	0.53	5100	24	.	.
DCA	44th	3/20/2012	.	0.000092	0.39	5100	24	.	.
DCA	44th	5/27/2013	.	0.000081	0.38	5100	24	.	.
DCA	44th	1/23/2013	.	0.000075	0.23	5100	24	.	.
DCA	44th	4/3/2012	.	0.000075	0.15	5100	24	.	.
DCA	44th	4/3/2012	.	0.000062	0.15	5100	24	.	.
DCA	44th	5/25/2011	.	0.00006	0.22	5100	24	.	.
DCA	44th	1/21/2011	.	0.00012	0.34	5100	24	.	.
DCA	21st	5/14/2011	.	0.00005	0.28	812	18	4.67	.
DCA	44th	3/5/2012	.	0.000111	0.29	5100	24	.	.
DCA	21st	8/11/2012	.	0.00005	0.08	812	18	4.67	.
DCA	21st	9/11/2012	.	0.00005	0.12	812	18	4.67	.
DCA	21st	7/25/2013	.	0.00005	0.14	812	18	4.67	.
DCA	21st	7/27/2013	.	0.00005	0.10	812	18	4.67	.
DCA	21st	8/11/2013	.	0.00005	0.10	812	18	4.67	.
DCA	21st	7/15/2013	.	0.00005	0.55	812	18	4.67	.
DCA	21st	7/15/2013	.	0.00005	0.55	812	18	4.67	.
DCA	21st	5/10/2014	.	0.00005	0.66	812	18	4.67	.
DCA	21st	6/16/2013	.	0.0001	0.10	812	18	4.67	.
DCA	21st	7/15/2014	.	0.00005	0.11	812	18	4.67	.
DCA	44th	2/28/2013	.	0.000117	0.57	5100	24	.	.
DCA	21st	7/26/2011	.	0.00005	0.15	812	18	4.67	.
DCA	21st	8/28/2014	.	0.00005	0.08	812	18	4.67	.
DCA	44th	2/23/2010	.	0.00005	0.55	5100	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DCA	44th	1/20/2011	.	0.00005	0.34	5100	24	.	.
DCA	44th	11/17/2010	.	0.00005	0.54	5100	24	.	.
DCA	44th	2/12/2011	.	0.000049	0.53	5100	24	.	.
DCA	44th	2/28/2013	.	0.000049	0.57	5100	24	.	.
DCA	44th	3/29/2011	.	0.000048	0.71	5100	24	.	.
DCA	44th	4/25/2012	.	0.000046	0.67	5100	24	.	.
DCA	44th	6/5/2012	.	0.000044	0.30	5100	24	.	.
DCA	44th	6/25/2013	.	0.000041	0.19	5100	24	.	.
DCA	44th	11/16/2010	.	0.00004	0.54	5100	24	.	.
DCA	44th	5/25/2011	.	0.00004	0.22	5100	24	.	.
DCA	44th	1/31/2012	.	0.000039	0.44	5100	24	.	.
DCA	44th	2/23/2010	.	0.00003	0.55	5100	24	.	.
DCA	44th	1/24/2010	.	0.00002	0.44	5100	24	.	.
DCA	44th	2/16/2010	.	0.00002	0.37	5100	24	.	.
DCA	44th	3/4/2011	.	0.0000195	0.20	5100	24	.	.
DCA	44th	3/28/2011	.	0.0000195	0.71	5100	24	.	.
DCA	44th	4/14/2011	.	0.0000195	0.19	5100	24	.	.
DCA	44th	3/4/2011	.	0.0000195	0.20	5100	24	.	.
DCA	44th	3/15/2011	.	0.0000195	0.31	5100	24	.	.
DCA	44th	11/11/2011	.	0.000018	0.19	5100	24	.	.
DCA	44th	10/15/2012	.	0.000018	0.35	5100	24	.	.
DCA	44th	10/22/2012	.	0.000018	0.25	5100	24	.	.
DCA	44th	10/30/2012	.	0.000018	1.33	5100	24	.	.
DCA	44th	11/11/2012	.	0.000018	0.71	5100	24	.	.
DCA	44th	3/19/2013	.	0.000018	0.75	5100	24	.	.
DCA	44th	4/4/2013	.	0.000018	0.57	5100	24	.	.
DCA	44th	4/5/2013	.	0.000018	0.27	5100	24	.	.
DCA	44th	4/10/2013	.	0.000018	0.22	5100	24	.	.
DCA	44th	10/28/2011	.	0.000018	0.30	5100	24	.	.
DCA	44th	3/5/2012	.	0.000018	0.29	5100	24	.	.
DCA	44th	10/30/2012	.	0.000018	1.33	5100	24	.	.
DCA	44th	11/11/2012	.	0.000018	0.71	5100	24	.	.
DCA	44th	3/19/2013	.	0.000018	0.75	5100	24	.	.
DCA	44th	4/12/2013	.	0.000018	0.27	5100	24	.	.
DCA	44th	2/15/2010	.	0.000015	0.37	5100	24	.	.
DCA	44th	4/1/2010	.	0.000015	1.49	5100	24	.	.
DCA	44th	2/4/2010	.	0.00001	0.15	5100	24	.	.
DCA	44th	2/5/2010	.	0.00001	0.15	5100	24	.	.
DCA	44th	5/19/2010	.	0.000004	0.45	5100	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DCH	21st	5/19/2011	0.0012	0.0014	0.55	812	18	4.67	-14.29%
DCH	21st	5/18/2011	0.0011	0.0014	0.69	812	18	4.67	-21.43%
DCH	21st	5/7/2014	0.0009	0.001	0.55	812	18	4.67	-10.00%
DCH	21st	7/7/2014	0.0006	.	0.10	812	18	4.67	.
DCH	21st	7/15/2014	0.0006	0.0007	0.11	812	18	4.67	-14.29%
DCH	21st	6/20/2011	0.0005	0.0005	0.45	812	18	4.67	0.00%
DCH	21st	7/7/2011	0.0005	0.0005	1.73	812	18	4.67	0.00%
DCH	21st	7/12/2011	0.0005	0.0005	0.71	812	18	4.67	0.00%
DCH	21st	7/13/2011	0.0005	0.0005	0.68	812	18	4.67	0.00%
DCH	21st	7/19/2011	0.0005	0.0005	0.57	812	18	4.67	0.00%
DCH	21st	7/29/2011	0.0005	.	0.15	812	18	4.67	.
DCH	21st	7/27/2011	0.0005	0.0005	0.16	812	18	4.67	0.00%
DCH	21st	9/14/2011	0.0005	0.0005	0.87	812	18	4.67	0.00%
DCH	21st	5/5/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DCH	21st	5/6/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DCH	21st	5/6/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DCH	21st	5/12/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DCH	21st	5/23/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DCH	21st	6/6/2012	0.0005	.	0.45	812	18	4.67	.
DCH	21st	7/9/2012	0.0005	.	0.20	812	18	4.67	.
DCH	21st	7/31/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DCH	21st	8/11/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DCH	21st	9/11/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DCH	21st	9/11/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DCH	21st	5/20/2011	0.0005	0.0005	0.16	812	18	4.67	0.00%
DCH	21st	5/29/2013	0.0005	0.0005	0.47	812	18	4.67	0.00%
DCH	21st	6/4/2013	0.0005	0.0005	0.17	812	18	4.67	0.00%
DCH	21st	7/1/2013	0.0005	0.0005	0.18	812	18	4.67	0.00%
DCH	21st	7/11/2013	0.0005	0.0005	0.27	812	18	4.67	0.00%
DCH	21st	7/13/2013	0.0005	.	2.14	812	18	4.67	.
DCH	21st	8/3/2013	0.0005	0.0005	1.83	812	18	4.67	0.00%
DCH	21st	9/9/2013	0.0005	0.0005	0.50	812	18	4.67	0.00%
DCH	21st	9/9/2013	0.0005	0.0005	0.50	812	18	4.67	0.00%
DCH	21st	9/22/2013	0.0005	0.0005	0.10	812	18	4.67	0.00%
DCH	21st	9/15/2011	0.0005	.	0.13	812	18	4.67	.
DCH	21st	5/8/2014	0.00025	0.00025	0.13	812	18	4.67	0.00%
DCH	21st	5/21/2014	0.00025	0.00025	0.32	812	18	4.67	0.00%
DCH	21st	5/22/2014	0.00025	0.0009	0.16	812	18	4.67	-72.22%

Appendix A: *Continued*

Poll.	Site	Date	y	x1	x2	x3	x4	x5	% Change in Pollutant Conc. (Outliers Removed)
			Eff. Conc. (mg/L or CFU/100 ml)	Inf. Conc. (mg/L or CFU/100 ml)	Rainfall Depth (in)	Ponding Volume (ft^3)	Media Depth (in)	Retetion Time (min)	
DCH	21st	5/30/2014	0.00025	0.00025	0.26	812	18	4.67	0.00%
DCH	21st	6/8/2014	0.00025	0.0007	0.42	812	18	4.67	-64.29%
DCH	21st	7/16/2014	0.00025	0.00025	0.29	812	18	4.67	0.00%
DCH	21st	7/29/2014	0.00025	0.0006	2.20	812	18	4.67	-58.33%
DCH	21st	7/29/2014	0.00025	0.00025	2.20	812	18	4.67	0.00%
DCH	21st	8/7/2014	0.00025	.	0.11	812	18	4.67	.
DCH	21st	8/9/2014	0.00025	.	0.14	812	18	4.67	.
DCH	21st	8/20/2014	0.00025	0.00025	0.14	812	18	4.67	0.00%
DCH	21st	8/26/2014	0.00025	0.00025	0.27	812	18	4.67	0.00%
DCH	21st	8/26/2014	0.00025	0.00025	0.27	812	18	4.67	0.00%
DCH	21st	9/4/2014	0.00025	0.00025	0.08	812	18	4.67	0.00%
DCH	21st	9/10/2014	0.00025	0.00025	0.16	812	18	4.67	0.00%
DCH	21st	9/22/2014	0.00025	.	0.17	812	18	4.67	.
DCH	21st	9/28/2014	0.00025	.	0.12	812	18	4.67	.
DCH	21st	9/29/2014	0.00025	.	0.47	812	18	4.67	.
DCH	21st	6/16/2013	.	0.0005	0.10	812	18	4.67	.
DCH	21st	5/14/2011	.	0.0014	0.28	812	18	4.67	.
DCH	21st	9/11/2012	.	0.0005	0.11	812	18	4.67	.
DCH	21st	5/9/2013	.	0.001	0.10	812	18	4.67	.
DCH	21st	7/25/2013	.	0.0005	0.10	812	18	4.67	.
DCH	21st	7/27/2013	.	0.0005	0.10	812	18	4.67	.
DCH	21st	8/11/2013	.	0.0005	0.10	812	18	4.67	.
DCH	21st	8/28/2014	.	0.00025	0.08	812	18	4.67	.
DCH	21st	5/10/2014	.	0.0005	0.66	812	18	4.67	.
DCH	21st	7/26/2011	.	0.0005	0.15	812	18	4.67	.
DCH	21st	9/29/2014	.	0.00025	0.47	812	18	4.67	.
DCO	21st	5/11/2011	0.0227	0.0048	0.17	812	18	4.67	.
DCO	I-95	5/20/2005	0.021	.	0.38	7600	24	19.98	.
DCO	I-95	5/11/2006	0.02	.	0.25	7600	24	19.98	.
DCO	I-95	9/14/2006	0.02	0.014	0.31	7600	24	19.98	42.86%
DCO	21st	6/20/2011	0.0196	.	0.45	812	18	4.67	.
DCO	21st	7/12/2011	0.0193	.	0.71	812	18	4.67	.
DCO	21st	5/19/2011	0.0192	.	0.55	812	18	4.67	.
DCO	21st	7/13/2011	0.0191	0.0042	0.68	812	18	4.67	
DCO	I-95	10/24/2007	0.018	0.014	0.15	7600	24	19.98	28.57%
DCO	21st	7/19/2011	0.017	.	0.57	812	18	4.67	.
DCO	21st	5/21/2014	0.0159	0.0066	0.32	812	18	4.67	140.91%
DCO	FC 1	7/5/2013	0.0154	.	0.50	4601	24	20.07	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DCO	21st	6/6/2012	0.0151	.	0.35	812	18	4.67	.
DCO	21st	8/11/2012	0.015	0.0057	0.08	812	18	4.67	163.16%
DCO	21st	5/7/2014	0.0149	0.0102	0.55	812	18	4.67	46.08%
DCO	21st	7/1/2013	0.0145	0.0112	0.18	812	18	4.67	29.46%
DCO	FC 1	7/18/2013	0.0144	0.0144	0.20	4601	24	20.07	0.00%
DCO	21st	7/9/2012	0.0142	.	0.14	812	18	4.67	.
DCO	21st	5/5/2012	0.014	0.0097	0.10	812	18	4.67	44.33%
DCO	21st	9/9/2013	0.014	0.0033	0.50	812	18	4.67	.
DCO	I-95	11/29/2005	0.014	0.012	0.62	7600	24	19.98	16.67%
DCO	21st	7/29/2011	0.0139	.	0.15	812	18	4.67	.
DCO	I-95	4/12/2007	0.013	0.012	0.65	7600	24	19.98	8.33%
DCO	21st	7/7/2014	0.0128	.	0.10	812	18	4.67	.
DCO	21st	9/14/2011	0.0127	.	0.87	812	18	4.67	.
DCO	21st	9/11/2012	0.0125	0.0084	0.12	812	18	4.67	48.81%
DCO	21st	9/11/2012	0.0125	0.005	0.12	812	18	4.67	150.00%
DCO	21st	5/6/2012	0.0122	0.0057	0.10	812	18	4.67	114.04%
DCO	21st	6/4/2013	0.0118	.	0.17	812	18	4.67	.
DCO	21st	5/29/2013	0.0115	0.0087	0.47	812	18	4.67	32.18%
DCO	21st	7/15/2014	0.011	0.006	0.11	812	18	4.67	83.33%
DCO	21st	7/27/2011	0.0109	0.0034	0.16	812	18	4.67	220.59%
DCO	21st	5/8/2014	0.0104	0.0048	0.13	812	18	4.67	116.67%
DCO	21st	7/29/2014	0.0097	0.0042	2.20	812	18	4.67	130.95%
DCO	21st	9/9/2013	0.0088	0.0033	0.50	812	18	4.67	166.67%
DCO	21st	8/26/2014	0.0085	0.0058	0.27	812	18	4.67	46.55%
DCO	21st	5/6/2012	0.0084	0.0041	0.10	812	18	4.67	104.88%
DCO	21st	5/20/2011	0.0084	0.0068	0.16	812	18	4.67	23.53%
DCO	21st	8/3/2013	0.0084	.	1.83	812	18	4.67	.
DCO	21st	6/8/2014	0.0083	0.005	0.42	812	18	4.67	66.00%
DCO	21st	7/16/2014	0.0083	.	0.29	812	18	4.67	.
DCO	21st	7/29/2014	0.0083	.	2.20	812	18	4.67	.
DCO	FC 1	7/28/2013	0.0082	0.0126	0.10	4601	24	20.07	-34.92%
DCO	21st	5/23/2012	0.0081	0.0075	0.10	812	18	4.67	8.00%
DCO	21st	5/30/2014	0.0079	0.0034	0.26	812	18	4.67	132.35%
DCO	21st	5/12/2012	0.0075	.	0.10	812	18	4.67	.
DCO	21st	9/28/2014	0.0074	.	0.12	812	18	4.67	.
DCO	FC 1	9/9/2013	0.007	0.007	0.10	4601	24	20.07	0.00%
DCO	I-95	4/2/2005	0.007	0.013	1.23	7600	24	19.98	-46.15%
DCO	21st	8/7/2014	0.0065	.	0.11	812	18	4.67	.
DCO	21st	8/26/2014	0.0065	0.0034	0.27	812	18	4.67	91.18%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DCO	21st	9/22/2014	0.0065	.	0.17	812	18	4.67	.
DCO	21st	9/29/2014	0.0061	0.0062	0.47	812	18	4.67	-1.61%
DCO	21st	8/9/2014	0.006	.	0.14	812	18	4.67	.
DCO	21st	9/4/2014	0.006	0.0046	0.08	812	18	4.67	30.43%
DCO	21st	9/10/2014	0.0059	0.0053	0.16	812	18	4.67	11.32%
DCO	21st	8/20/2014	0.0058	0.0046	0.14	812	18	4.67	26.09%
DCO	21st	7/11/2013	0.0054	.	0.27	812	18	4.67	.
DCO	21st	5/22/2014	0.0051	0.0043	0.16	812	18	4.67	18.60%
DCO	21st	7/31/2012	0.0048	0.0125	0.14	812	18	4.67	-61.60%
DCO	21st	9/22/2013	0.0046	0.0038	0.00	812	18	4.67	21.05%
DCO	FC 1	6/28/2013	0.0025	0.0117	0.50	4601	24	20.07	-78.63%
DCO	FC 1	9/22/2013	0.0025	.	0.10	4601	24	20.07	.
DCO	FC 1	9/27/2013	0.0025	.	0.10	4601	24	20.07	.
DCO	FC 1	10/3/2013	0.0025	0.006	0.20	4601	24	20.07	-58.33%
DCO	I-95	10/17/2006	0.0025	0.007	0.52	7600	24	19.98	-64.29%
DCO	I-95	11/15/2007	0.0025	0.008	0.23	7600	24	19.98	-68.75%
DCO	44th	3/20/2012	.	0.00782	0.39	5100	24	.	.
DCO	44th	2/28/2013	.	0.00578	0.57	5100	24	.	.
DCO	44th	3/5/2012	.	0.00599	0.29	5100	24	.	.
DCO	44th	10/15/2012	.	0.0101	0.35	5100	24	.	.
DCO	44th	6/25/2013	.	0.00531	0.19	5100	24	.	.
DCO	21st	6/20/2011	.	0.0063	0.45	812	18	4.67	.
DCO	21st	8/28/2014	.	0.0052	0.08	812	18	4.67	.
DCO	44th	6/6/2012	.	0.01	0.62	5100	24	.	.
DCO	44th	4/5/2013	.	0.00756	0.27	5100	24	.	.
DCO	44th	5/27/2013	.	0.00496	0.38	5100	24	.	.
DCO	44th	4/10/2013	.	0.0118	0.22	5100	24	.	.
DCO	21st	5/9/2013	.	0.0048	0.11	812	18	4.67	.
DCO	44th	4/3/2012	.	0.00811	0.15	5100	24	.	.
DCO	44th	10/14/2012	.	0.00754	0.46	5100	42	.	.
DCO	44th	2/23/2010	.	0.00655	0.55	5100	24	.	.
DCO	44th	3/28/2011	.	0.00454	0.71	5100	24	.	.
DCO	44th	10/30/2012	.	0.00441	1.33	5100	24	.	.
DCO	21st	5/14/2011	.	0.0044	0.28	812	18	4.67	.
DCO	44th	4/4/2013	.	0.00608	0.57	5100	24	.	.
DCO	44th	11/16/2010	.	0.00425	0.54	5100	24	.	.
DCO	44th	10/22/2012	.	0.00686	0.25	5100	24	.	.
DCO	21st	7/25/2013	.	0.0081	0.10	812	18	4.67	.
DCO	44th	1/31/2012	.	0.00765	0.44	5100	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y	x1	x2	x3	x4	x5	% Change in Pollutant Conc. (Outliers Removed)
			Eff. Conc. (mg/L or CFU/100 ml)	Inf. Conc. (mg/L or CFU/100 ml)	Rainfall Depth (in)	Ponding Volume (ft^3)	Media Depth (in)	Retetion Time (min)	
DCO	44th	3/19/2013	.	0.0041	0.75	5100	24	.	.
DCO	21st	7/13/2013	.	0.004	2.14	812	18	4.67	.
DCO	44th	2/4/2010	.	0.00394	0.15	5100	24	.	.
DCO	21st	5/18/2011	.	0.0039	0.69	812	18	4.67	.
DCO	21st	7/7/2011	.	0.0038	1.73	812	18	4.67	.
DCO	FC 1	5/8/2013	.	0.006	0.10	4601	24	20.07	.
DCO	44th	5/25/2011	.	0.00369	0.22	5100	24	.	.
DCO	44th	11/11/2012	.	0.00362	0.71	5100	24	.	.
DCO	44th	2/15/2010	.	0.00358	0.37	5100	24	.	.
DCO	44th	5/19/2010	.	0.00346	0.45	5100	24	.	.
DCO	44th	10/28/2011	.	0.00346	0.30	5100	24	.	.
DCO	44th	2/28/2013	.	0.00346	0.57	5100	24	.	.
DCO	44th	10/30/2012	.	0.00344	1.33	5100	24	.	.
DCO	44th	6/5/2012	.	0.00341	0.30	5100	24	.	.
DCO	44th	1/23/2013	.	0.00815	0.23	5100	24	.	.
DCO	21st	8/11/2013	.	0.0034	0.10	812	18	4.67	.
DCO	21st	7/26/2011	.	0.0074	0.15	812	18	4.67	.
DCO	21st	5/10/2014	.	0.0076	0.66	812	18	4.67	.
DCO	44th	9/18/2010	.	0.00332	1.01	5100	24	.	.
DCO	44th	4/25/2012	.	0.00331	0.67	5100	24	.	.
DCO	44th	11/11/2011	.	0.0115	0.19	5100	24	.	.
DCO	21st	9/14/2011	.	0.0058	0.87	812	18	4.67	.
DI	21st	7/19/2011	0.34	0.06	0.57	812	18	4.67	.
DI	21st	7/12/2011	0.29	0.025	0.71	812	18	4.67	.
DI	21st	5/18/2011	0.28	0.01	0.69	812	18	4.67	.
DI	21st	8/26/2014	0.28	0.05	0.27	812	18	4.67	.
DI	21st	8/9/2014	0.26	.	0.14	812	18	4.67	.
DI	21st	9/9/2013	0.25	0.025	0.50	812	18	4.67	.
DI	21st	9/22/2013	0.25	0.025	0.00	812	18	4.67	.
DI	21st	7/7/2011	0.24	0.025	1.73	812	18	4.67	.
DI	21st	8/7/2014	0.23	.	0.11	812	18	4.67	.
DI	21st	9/29/2014	0.23	0.04	0.47	812	18	4.67	.
DI	21st	7/7/2014	0.21	.	0.10	812	18	4.67	.
DI	21st	7/9/2012	0.2	.	0.14	812	18	4.67	.
DI	21st	5/5/2012	0.19	0.12	0.10	812	18	4.67	58.33%
DI	21st	5/30/2014	0.19	0.05	0.26	812	18	4.67	.
DI	21st	7/29/2014	0.19	0.04	2.20	812	18	4.67	.
DI	21st	7/29/2011	0.18	0.03	0.15	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DI	21st	7/27/2011	0.17	0.025	0.16	812	18	4.67	.
DI	21st	6/4/2013	0.17	0.025	0.17	812	18	4.67	.
DI	21st	8/3/2013	0.17	0.06	1.83	812	18	4.67	183.33%
DI	21st	7/15/2014	0.17	0.04	0.11	812	18	4.67	.
DI	21st	7/13/2011	0.16	0.05	0.68	812	18	4.67	220.00%
DI	21st	6/6/2012	0.16	.	0.14	812	18	4.67	.
DI	21st	9/15/2011	0.16	.	0.13	812	18	4.67	.
DI	21st	9/15/2011	0.16	.	0.13	812	18	4.67	.
DI	21st	5/8/2014	0.16	0.09	0.13	812	18	4.67	77.78%
DI	21st	9/28/2014	0.16	.	0.12	812	18	4.67	.
DI	21st	7/11/2013	0.15	.	0.27	812	18	4.67	.
DI	21st	5/29/2013	0.14	0.1	0.47	812	18	4.67	40.00%
DI	21st	7/16/2014	0.14	0.05	0.29	812	18	4.67	180.00%
DI	21st	5/11/2011	0.13	0.08	0.17	812	18	4.67	62.50%
DI	21st	5/6/2012	0.13	0.05	0.10	812	18	4.67	160.00%
DI	21st	8/20/2014	0.13	0.04	0.14	812	18	4.67	225.00%
DI	21st	6/20/2011	0.12	0.06	0.45	812	18	4.67	100.00%
DI	21st	9/14/2011	0.12	0.06	0.87	812	18	4.67	100.00%
DI	21st	7/29/2014	0.12	.	2.20	812	18	4.67	.
DI	21st	5/6/2012	0.11	0.025	0.10	812	18	4.67	.
DI	21st	5/12/2012	0.1	0.025	0.10	812	18	4.67	.
DI	21st	5/20/2011	0.1	0.06	0.16	812	18	4.67	66.67%
DI	21st	5/23/2012	0.09	0.1	0.10	812	18	4.67	-10.00%
DI	21st	8/11/2012	0.09	0.025	0.08	812	18	4.67	260.00%
DI	21st	9/11/2012	0.09	0.025	0.12	812	18	4.67	260.00%
DI	21st	9/11/2012	0.09	0.11	0.12	812	18	4.67	-18.18%
DI	21st	5/7/2014	0.08	0.1	0.55	812	18	4.67	-20.00%
DI	21st	6/8/2014	0.08	0.04	0.42	812	18	4.67	100.00%
DI	21st	8/26/2014	0.08	0.03	0.27	812	18	4.67	166.67%
DI	21st	5/21/2014	0.07	0.08	0.32	812	18	4.67	-12.50%
DI	21st	9/4/2014	0.07	0.04	0.08	812	18	4.67	75.00%
DI	21st	9/10/2014	0.07	0.03	0.16	812	18	4.67	133.33%
DI	21st	9/22/2014	0.07	.	0.17	812	18	4.67	.
DI	21st	5/22/2014	0.06	0.08	0.16	812	18	4.67	-25.00%
DI	21st	7/31/2012	0.05	0.08	0.14	812	18	4.67	-37.50%
DI	21st	7/1/2013	0.025	0.06	0.18	812	18	4.67	-58.33%
DI	21st	7/26/2011	.	0.09	0.15	812	18	4.67	.
DI	21st	8/28/2014	.	0.04	0.08	812	18	4.67	.
DI	21st	5/14/2011	.	0.1	0.28	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DI	21st	9/11/2012	.	0.06	0.12	812	18	4.67	.
DI	21st	5/19/2011	.	0.13	0.55	812	18	4.67	.
DI	21st	5/9/2013	.	0.05	0.11	812	18	4.67	.
DI	21st	8/11/2013	.	0.07	0.10	812	18	4.67	.
DI	21st	7/15/2013	.	0.05	0.55	812	18	4.67	.
DI	21st	7/25/2013	.	0.12	0.10	812	18	4.67	.
DI	21st	7/15/2013	.	0.05	0.55	812	18	4.67	.
DI	21st	7/27/2013	.	0.06	0.10	812	18	4.67	.
DI	21st	9/9/2013	.	0.025	0.50	812	18	4.67	.
DI	21st	5/10/2014	.	0.11	0.66	812	18	4.67	.
DI	21st	6/16/2013	.	0.12	0.10	812	18	4.67	.
DL	21st	5/11/2011	0.0005	0.0005	0.17	812	18	4.67	0.00%
DL	21st	5/19/2011	0.0005	0.0005	0.55	812	18	4.67	0.00%
DL	21st	6/20/2011	0.0005	0.0005	0.45	812	18	4.67	0.00%
DL	21st	7/7/2011	0.0005	0.0005	1.73	812	18	4.67	0.00%
DL	21st	7/12/2011	0.0005	0.0005	0.71	812	18	4.67	0.00%
DL	21st	7/13/2011	0.0005	0.0005	0.68	812	18	4.67	0.00%
DL	21st	7/19/2011	0.0005	0.0005	0.57	812	18	4.67	0.00%
DL	21st	7/29/2011	0.0005	.	0.15	812	18	4.67	.
DL	21st	7/27/2011	0.0005	0.0005	0.16	812	18	4.67	0.00%
DL	21st	9/14/2011	0.0005	0.0005	0.87	812	18	4.67	0.00%
DL	21st	5/5/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DL	21st	5/6/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DL	21st	5/6/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DL	21st	5/12/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DL	21st	5/23/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
DL	21st	6/6/2012	0.0005	.	0.35	812	18	4.67	.
DL	21st	7/9/2012	0.0005	.	0.14	812	18	4.67	.
DL	21st	7/31/2012	0.0005	0.0005	0.14	812	18	4.67	0.00%
DL	21st	8/11/2012	0.0005	0.0005	0.08	812	18	4.67	0.00%
DL	21st	5/20/2011	0.0005	0.0005	0.16	812	18	4.67	0.00%
DL	21st	5/29/2013	0.0005	0.0005	0.47	812	18	4.67	0.00%
DL	21st	6/4/2013	0.0005	0.0005	0.17	812	18	4.67	0.00%
DL	21st	7/1/2013	0.0005	0.0005	0.18	812	18	4.67	0.00%
DL	21st	7/11/2013	0.0005	0.0005	0.27	812	18	4.67	0.00%
DL	21st	7/13/2013	0.0005	0.0005	2.14	812	18	4.67	0.00%
DL	21st	8/3/2013	0.0005	0.0005	1.83	812	18	4.67	0.00%
DL	21st	9/9/2013	0.0005	0.0005	0.50	812	18	4.67	0.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DL	21st	9/9/2013	0.0005	0.0005	0.50	812	18	4.67	0.00%
DL	21st	9/22/2013	0.0005	0.0005	0.12	812	18	4.67	0.00%
DL	21st	9/15/2011	0.0005	.	0.13	812	18	4.67	.
DL	21st	5/7/2014	0.00025	0.00025	0.55	812	18	4.67	0.00%
DL	21st	5/8/2014	0.00025	0.00025	0.13	812	18	4.67	0.00%
DL	21st	5/21/2014	0.00025	0.00025	0.32	812	18	4.67	0.00%
DL	21st	5/22/2014	0.00025	0.00025	0.16	812	18	4.67	0.00%
DL	21st	5/30/2014	0.00025	0.00025	0.26	812	18	4.67	0.00%
DL	21st	6/8/2014	0.00025	0.00025	0.42	812	18	4.67	0.00%
DL	21st	7/7/2014	0.00025	.	0.10	812	18	4.67	.
DL	21st	7/15/2014	0.00025	0.00025	0.11	812	18	4.67	0.00%
DL	21st	7/16/2014	0.00025	0.00025	0.29	812	18	4.67	0.00%
DL	21st	7/29/2014	0.00025	0.00025	2.20	812	18	4.67	0.00%
DL	21st	7/29/2014	0.00025	0.00025	2.20	812	18	4.67	0.00%
DL	21st	8/7/2014	0.00025	.	0.11	812	18	4.67	.
DL	21st	8/9/2014	0.00025	.	0.14	812	18	4.67	.
DL	21st	8/20/2014	0.00025	0.00025	0.14	812	18	4.67	0.00%
DL	21st	8/26/2014	0.00025	0.00025	0.27	812	18	4.67	0.00%
DL	21st	8/26/2014	0.00025	0.00025	0.27	812	18	4.67	0.00%
DL	21st	9/4/2014	0.00025	0.00025	0.08	812	18	4.67	0.00%
DL	21st	9/10/2014	0.00025	0.00025	0.16	812	18	4.67	0.00%
DL	21st	9/22/2014	0.00025	.	0.17	812	18	4.67	.
DL	21st	9/28/2014	0.00025	.	0.12	812	18	4.67	.
DL	21st	9/29/2014	0.00025	0.00025	0.47	812	18	4.67	0.00%
DL	21st	5/18/2011	.	0.0005	0.69	812	18	4.67	.
DL	21st	7/26/2011	.	0.0005	0.15	812	18	4.67	.
DL	21st	7/25/2013	.	0.0005	0.10	812	18	4.67	.
DL	21st	7/27/2013	.	0.0005	0.10	812	18	4.67	.
DL	21st	8/11/2013	.	0.0005	0.10	812	18	4.67	.
DL	21st	7/15/2013	.	0.0005	0.55	812	18	4.67	.
DL	21st	7/15/2013	.	0.0005	0.55	812	18	4.67	.
DL	21st	5/9/2013	.	0.001	0.11	812	18	4.67	.
DL	21st	9/11/2012	.	0.0005	0.12	812	18	4.67	.
DL	21st	8/28/2014	.	0.00025	0.08	812	18	4.67	.
DL	21st	5/10/2014	.	0.00025	0.66	812	18	4.67	.
DL	21st	5/14/2011	.	0.0005	0.28	812	18	4.67	.
DL	21st	6/16/2013	.	0.0005	0.10	812	18	4.67	.
DL	21st	3/4/2011	.	0.000219	0.09	812	18	4.67	.
DL	21st	3/4/2011	.	0.000185	0.09	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DL	21st	5/25/2011	.	0.000175	0.11	812	18	4.67	.
DL	21st	2/12/2011	.	0.00017	0.08	812	18	4.67	.
DL	21st	2/12/2011	.	0.00017	0.08	812	18	4.67	.
DL	21st	5/27/2013	.	0.000166	0.10	812	18	4.67	.
DL	21st	3/28/2011	.	0.00015	0.09	812	18	4.67	.
DL	21st	4/12/2013	.	0.000145	0.10	812	18	4.67	.
DL	21st	10/15/2012	.	0.000128	0.10	812	18	4.67	.
DL	21st	6/6/2012	.	0.000126	0.35	812	18	4.67	.
DL	21st	4/3/2012	.	0.000123	0.12	812	18	4.67	.
DL	21st	10/22/2012	.	0.000115	0.10	812	18	4.67	.
DL	21st	4/10/2013	.	0.000112	0.12	812	18	4.67	.
DL	21st	2/23/2010	.	0.00011	0.10	812	18	4.67	.
DL	21st	5/19/2010	.	0.00011	0.10	812	18	4.67	.
DL	21st	2/16/2010	.	0.0001	0.10	812	18	4.67	.
DL	21st	4/14/2011	.	0.000097	0.10	812	18	4.67	.
DL	21st	3/5/2012	.	0.000093	0.09	812	18	4.67	.
DL	21st	11/11/2011	.	0.000089	0.10	812	18	4.67	.
DL	21st	3/5/2012	.	0.000089	0.09	812	18	4.67	.
DL	21st	3/29/2011	.	0.000084	0.09	812	18	4.67	.
DL	21st	4/3/2012	.	0.000084	0.12	812	18	4.67	.
DL	21st	3/20/2012	.	0.000082	0.06	812	18	4.67	.
DL	21st	11/16/2010	.	0.00008	0.10	812	18	4.67	.
DL	21st	1/20/2011	.	0.00008	0.09	812	18	4.67	.
DL	21st	1/31/2012	.	0.000077	0.09	812	18	4.67	.
DL	21st	10/30/2012	.	0.000076	0.10	812	18	4.67	.
DL	21st	3/15/2011	.	0.000074	0.09	812	18	4.67	.
DL	21st	1/23/2013	.	0.00007	0.09	812	18	4.67	.
DL	21st	2/28/2013	.	0.000068	0.09	812	18	4.67	.
DL	21st	4/1/2010	.	0.00006	0.00	812	18	4.67	.
DL	21st	4/5/2013	.	0.00005	0.10	812	18	4.67	.
DL	21st	6/25/2013	.	0.00005	0.12	812	18	4.67	.
DL	21st	3/19/2013	.	0.000049	0.11	812	18	4.67	.
DL	21st	10/30/2012	.	0.000048	0.10	812	18	4.67	.
DL	21st	2/23/2010	.	0.00004	0.10	812	18	4.67	.
DL	21st	1/21/2011	.	0.00004	0.09	812	18	4.67	.
DL	21st	4/4/2013	.	0.000039	0.10	812	18	4.67	.
DL	21st	11/11/2012	.	0.000035	0.09	812	18	4.67	.
DL	21st	10/14/2012	.	0.000029	0.10	812	18	4.67	.
DL	21st	2/28/2013	.	0.000028	0.09	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DL	21st	4/25/2012	.	0.000021	0.12	812	18	4.67	.
DL	21st	3/19/2013	.	0.000016	0.11	812	18	4.67	.
DL	21st	1/24/2010	.	0.0000155	0.10	812	18	4.67	.
DL	21st	2/4/2010	.	0.0000155	0.10	812	18	4.67	.
DL	21st	2/15/2010	.	0.0000155	0.10	812	18	4.67	.
DL	21st	2/5/2010	.	0.0000155	0.10	812	18	4.67	.
DL	21st	9/18/2010	.	0.0000155	0.10	812	18	4.67	.
DL	21st	11/17/2010	.	0.0000155	0.10	812	18	4.67	.
DL	21st	5/25/2011	.	0.000013	0.11	812	18	4.67	.
DL	21st	10/28/2011	.	0.000007	0.10	812	18	4.67	.
DL	21st	6/5/2012	.	0.000007	0.14	812	18	4.67	.
DN	21st	5/18/2011	0.0082	0.0005	0.69	812	18	4.67	.
DN	21st	9/15/2011	0.0081	.	0.13	812	18	4.67	.
DN	21st	7/13/2013	0.0066	.	2.14	812	18	4.67	.
DN	21st	7/12/2011	0.0064	0.0005	0.71	812	18	4.67	.
DN	21st	7/19/2011	0.0056	0.0005	0.57	812	18	4.67	.
DN	I-95	4/2/2005	0.0055	.	1.23	7600	24	19.98	.
DN	I-95	5/20/2005	0.0055	.	0.38	7600	24	19.98	.
DN	I-95	7/8/2005	0.0055	.	1.19	7600	24	19.98	.
DN	I-95	11/29/2005	0.0055	.	0.62	7600	24	19.98	.
DN	I-95	5/11/2006	0.0055	.	0.25	7600	24	19.98	.
DN	I-95	9/14/2006	0.0055	.	0.31	7600	24	19.98	.
DN	21st	6/20/2011	0.0053	0.0011	0.45	812	18	4.67	.
DN	21st	7/29/2011	0.0053	.	0.15	812	18	4.67	.
DN	21st	7/13/2011	0.0047	0.001	0.68	812	18	4.67	.
DN	21st	8/3/2013	0.0045	0.0012	1.83	812	18	4.67	.
DN	21st	7/27/2011	0.0042	0.0005	0.16	812	18	4.67	.
DN	21st	7/9/2012	0.0042	.	0.14	812	18	4.67	.
DN	21st	8/11/2012	0.0041	0.0012	0.08	812	18	4.67	241.67%
DN	21st	5/5/2012	0.004	0.0016	0.10	812	18	4.67	150.00%
DN	21st	8/7/2014	0.004	.	0.11	812	18	4.67	.
DN	21st	5/19/2011	0.0039	0.0005	0.55	812	18	4.67	.
DN	21st	6/6/2012	0.0038	.	0.14	812	18	4.67	.
DN	21st	9/9/2013	0.0038	0.0005	0.50	812	18	4.67	.
DN	21st	7/15/2014	0.0038	0.002	0.11	812	18	4.67	90.00%
DN	21st	9/9/2013	0.0037	0.0005	0.50	812	18	4.67	.
DN	21st	8/9/2014	0.0037	.	0.14	812	18	4.67	.
DN	21st	5/29/2013	0.0035	0.0019	0.47	812	18	4.67	84.21%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DN	21st	7/11/2013	0.0035	0.0019	0.27	812	18	4.67	84.21%
DN	21st	7/1/2013	0.0034	0.0018	0.18	812	18	4.67	88.89%
DN	21st	7/7/2014	0.0034	.	0.10	812	18	4.67	.
DN	21st	9/14/2011	0.0032	0.0014	0.87	812	18	4.67	128.57%
DN	21st	6/4/2013	0.0032	0.0005	0.17	812	18	4.67	.
DN	21st	8/26/2014	0.0031	0.0009	0.27	812	18	4.67	244.44%
DN	21st	5/6/2012	0.003	0.0005	0.10	812	18	4.67	.
DN	21st	7/29/2014	0.003	0.0009	2.20	812	18	4.67	233.33%
DN	21st	7/16/2014	0.0029	0.0007	0.29	812	18	4.67	.
DN	21st	7/29/2014	0.0028	0.0012	2.20	812	18	4.67	133.33%
DN	21st	9/11/2012	0.0027	0.0011	0.12	812	18	4.67	145.45%
DN	21st	9/11/2012	0.0027	0.0005	0.12	812	18	4.67	.
DN	21st	9/28/2014	0.0027	.	0.12	812	18	4.67	.
DN	21st	5/7/2014	0.0026	0.0021	0.55	812	18	4.67	23.81%
DN	21st	9/29/2014	0.0026	0.0014	0.47	812	18	4.67	85.71%
DN	21st	5/30/2014	0.0025	0.0011	0.26	812	18	4.67	127.27%
DN	21st	5/8/2014	0.0024	0.0009	0.13	812	18	4.67	166.67%
DN	21st	6/8/2014	0.0024	0.0017	0.42	812	18	4.67	41.18%
DN	21st	5/23/2012	0.0023	0.0019	0.10	812	18	4.67	21.05%
DN	21st	5/20/2011	0.0023	0.0013	0.16	812	18	4.67	76.92%
DN	21st	8/20/2014	0.0021	0.001	0.14	812	18	4.67	110.00%
DN	21st	5/6/2012	0.002	0.0005	0.10	812	18	4.67	.
DN	21st	8/26/2014	0.002	0.0006	0.27	812	18	4.67	233.33%
DN	I-95	10/17/2006	0.002	0.001	0.52	7600	24	19.98	100.00%
DN	21st	5/12/2012	0.0019	0.0005	0.10	812	18	4.67	.
DN	21st	5/21/2014	0.0019	0.0018	0.32	812	18	4.67	5.56%
DN	21st	9/4/2014	0.0019	0.0008	0.08	812	18	4.67	137.50%
DN	21st	9/22/2014	0.0019	.	0.17	812	18	4.67	.
DN	21st	9/10/2014	0.0018	0.0011	0.16	812	18	4.67	63.64%
DN	21st	9/22/2013	0.0016	.	0.00	812	18	4.67	.
DN	21st	5/22/2014	0.0014	0.0008	0.16	812	18	4.67	75.00%
DN	21st	7/31/2012	0.0013	.	0.14	812	18	4.67	.
DN	21st	6/16/2013	.	0.003	0.10	812	18	4.67	.
DN	21st	5/11/2011	.	0.0005	0.17	812	18	4.67	.
DN	21st	9/11/2012	.	0.0021	0.12	812	18	4.67	.
DN	21st	5/9/2013	.	0.001	0.10	812	18	4.67	.
DN	21st	5/14/2011	.	0.0005	0.28	812	18	4.67	.
DN	21st	8/28/2014	.	0.0009	0.08	812	18	4.67	.
DN	21st	7/7/2011	.	0.0005	1.73	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DN	21st	7/26/2011	.	0.0013	0.15	812	18	4.67	.
DN	21st	8/3/2013	.	0.0012	1.83	812	18	4.67	.
DN	21st	8/11/2013	.	0.0005	0.10	812	18	4.67	.
DN	21st	5/10/2014	.	0.0015	0.66	812	18	4.67	.
DN	21st	9/22/2013	.	0.0005	0.10	812	18	4.67	.
DN	21st	7/27/2013	.	0.0005	0.10	812	18	4.67	.
DN	I-95	10/24/2007	0.001	0.001	0.15	7600	24	19.98	0.00%
DN	I-95	11/15/2007	0.001	0.001	0.23	7600	24	19.98	0.00%
DN	I-95	4/12/2007	.	0.0025	0.65	7600	24	19.98	.
DP	21st	5/18/2011	1.54	0.12	0.69	812	18	4.67	.
DP	21st	5/19/2011	1.5	0.08	0.55	812	18	4.67	.
DP	FC2	6/22/2014	1.32	0.114	0.34	1314	18	3.03	.
DP	FC2	6/22/2014	1.32	0.114	0.34	1314	18	3.03	.
DP	FC2	7/15/2014	1.32	0.125	0.55	1314	18	3.03	.
DP	FC2	7/15/2014	1.32	0.125	0.55	1314	18	3.03	.
DP	21st	7/12/2011	1.23	0.07	0.71	812	18	4.67	.
DP	21st	7/19/2011	1.23	0.015	0.57	812	18	4.67	.
DP	21st	7/13/2011	1.19	0.09	0.68	812	18	4.67	.
DP	21st	7/27/2011	1.11	0.03	0.16	812	18	4.67	.
DP	21st	7/29/2011	1.07	.	0.15	812	18	4.67	.
DP	21st	6/20/2011	1.02	0.33	0.45	812	18	4.67	209.09%
DP	21st	5/11/2011	0.98	0.16	0.17	812	18	4.67	.
DP	21st	7/7/2011	0.94	0.015	1.73	812	18	4.67	.
DP	FC2	6/8/2014	0.924	0.121	0.16	1314	18	3.03	.
DP	FC2	6/8/2014	0.924	0.121	0.16	1314	18	3.03	.
DP	FC2	10/9/2014	0.88	0.125	0.75	1314	18	3.03	.
DP	FC2	10/9/2014	0.88	0.125	0.75	1314	18	3.03	.
DP	21st	9/15/2011	0.87	.	0.13	812	18	4.67	.
DP	21st	9/15/2011	0.87	.	0.13	812	18	4.67	.
DP	FC2	7/29/2014	0.8	0.125	1.50	1314	18	3.03	.
DP	FC2	7/29/2014	0.8	0.125	1.50	1314	18	3.03	.
DP	21st	5/5/2012	0.75	.	0.10	812	18	4.67	.
DP	21st	9/14/2011	0.64	0.22	0.87	812	18	4.67	190.91%
DP	FC2	9/29/2014	0.596	0.125	0.39	1314	18	3.03	.
DP	FC2	9/29/2014	0.596	0.125	0.39	1314	18	3.03	.
DP	21st	5/6/2012	0.58	0.15	0.10	812	18	4.67	.
DP	21st	6/4/2013	0.57	0.1	0.17	812	18	4.67	.
DP	21st	5/6/2012	0.53	0.39	0.10	812	18	4.67	35.90%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DP	FC2	6/11/2015	0.507	0.25	0.63	1314	18	3.03	102.80%
DP	FC2	6/11/2015	0.507	0.25	0.63	1314	18	3.03	102.80%
DP	21st	7/15/2014	0.49	0.07	0.11	812	18	4.67	.
DP	21st	7/16/2014	0.48	0.07	0.29	812	18	4.67	.
DP	21st	7/29/2014	0.47	0.07	2.20	812	18	4.67	.
DP	21st	5/8/2014	0.46	0.13	0.13	812	18	4.67	253.85%
DP	21st	6/18/2014	0.46	0.18	0.10	812	18	4.67	155.56%
DP	21st	9/9/2013	0.45	0.07	0.50	812	18	4.67	.
DP	21st	7/7/2014	0.44	.	0.10	812	18	4.67	.
DP	21st	5/29/2013	0.41	0.25	0.47	812	18	4.67	64.00%
DP	21st	5/7/2014	0.39	0.38	0.55	812	18	4.67	2.63%
DP	21st	7/29/2014	0.38	0.13	2.20	812	18	4.67	192.31%
DP	21st	5/22/2014	0.36	0.09	0.16	812	18	4.67	.
DP	21st	5/30/2014	0.35	0.08	0.26	812	18	4.67	.
DP	21st	9/29/2014	0.35	0.14	0.47	812	18	4.67	150.00%
DP	21st	5/20/2011	0.34	0.05	0.16	812	18	4.67	.
DP	21st	8/26/2014	0.34	0.09	0.27	812	18	4.67	.
DP	21st	9/4/2014	0.34	0.12	0.08	812	18	4.67	183.33%
DP	21st	9/9/2013	0.33	0.07	0.50	812	18	4.67	.
DP	21st	8/26/2014	0.33	0.23	0.27	812	18	4.67	43.48%
DP	21st	5/21/2014	0.31	0.05	0.32	812	18	4.67	.
DP	21st	8/20/2014	0.31	.	0.14	812	18	4.67	.
DP	21st	9/22/2014	0.29	.	0.17	812	18	4.67	.
DP	21st	9/10/2014	0.27	0.16	0.16	812	18	4.67	68.75%
DP	FC 1	8/18/2015	0.25	0.25	0.10	4601	24	20.07	0.00%
DP	FC 1	9/7/2015	0.25	0.25	0.10	4601	24	20.07	0.00%
DP	FC 1	10/3/2015	0.25	0.25	0.10	4601	24	20.07	0.00%
DP	FC2	4/26/2015	0.25	0.25	0.47	1314	18	3.03	0.00%
DP	FC2	4/26/2015	0.25	0.25	0.47	1314	18	3.03	0.00%
DP	FC2	5/19/2015	0.25	0.25	1.52	1314	18	3.03	0.00%
DP	FC2	5/19/2015	0.25	0.25	1.52	1314	18	3.03	0.00%
DP	21st	8/3/2013	0.24	0.07	1.83	812	18	4.67	242.86%
DP	21st	8/7/2014	0.24	.	0.11	812	18	4.67	.
DP	21st	9/22/2013	0.22	0.14	0.10	812	18	4.67	57.14%
DP	FC2	7/11/2014	0.125	0.125	0.87	1314	18	3.03	0.00%
DP	FC2	7/11/2014	0.125	0.125	0.87	1314	18	3.03	0.00%
DP	21st	9/28/2014	0.03	.	0.12	812	18	4.67	.
DP	I-95	5/20/2005	0.36	0.16	0.38	7600	24	19.98	125.00%
DP	I-95	9/14/2006	0.26	0.2	0.31	7600	24	19.98	30.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DP	I-95	7/8/2005	0.17	0.1	1.19	7600	24	19.98	70.00%
DP	I-95	4/2/2005	0.12	0.07	1.23	7600	24	19.98	71.43%
DP	I-95	11/29/2005	0.11	0.05	0.62	7600	24	19.98	120.00%
DP	I-95	10/17/2006	0.11	0.08	0.52	7600	24	19.98	37.50%
DP	I-95	4/12/2007	0.07	0.05	0.65	7600	24	19.98	40.00%
DP	I-95	5/11/2006	.	0.08	0.25	7600	24	19.98	.
DP	I-95	11/15/2007	.	1.43	0.23	7600	24	19.98	.
DP	I-95	10/24/2007	.	1.45	0.15	7600	24	19.98	.
DP	21st	7/26/2011	.	0.05	0.15	812	18	4.67	.
DP	21st	6/16/2013	.	0.37	0.10	812	18	4.67	.
DP	21st	5/9/2013	.	0.09	0.10	812	18	4.67	.
DP	21st	7/25/2013	.	0.04	0.10	812	18	4.67	.
DP	21st	7/11/2013	.	0.29	0.27	812	18	4.67	.
DP	21st	8/11/2013	.	0.02	0.10	812	18	4.67	.
DP	21st	5/10/2014	.	0.24	0.66	812	18	4.67	.
DP	21st	8/28/2014	.	0.09	0.08	812	18	4.67	.
DP	21st	7/27/2013	.	0.01	0.10	812	18	4.67	.
DP	21st	5/14/2011	.	0.06	0.28	812	18	4.67	.
DZ	I-95	5/20/2005	0.028	0.049	0.38	7600	24	19.98	-42.86%
DZ	I-95	10/24/2007	0.028	0.051	0.15	7600	24	19.98	-45.10%
DZ	21st	10/17/2006	0.0259	.	0.10	812	18	4.67	.
DZ	I-95	9/9/2013	0.024	.	0.10	7600	24	19.98	.
DZ	21st	5/6/2012	0.0231	0.0216	0.10	812	18	4.67	6.94%
DZ	I-95	9/22/2013	0.023	.	0.10	7600	24	19.98	.
DZ	21st	5/12/2012	0.0221	0.0058	0.11	812	18	4.67	.
DZ	21st	9/10/2014	0.0218	0.0178	0.16	812	18	4.67	22.47%
DZ	21st	7/13/2011	0.0217	0.0053	0.68	812	18	4.67	.
DZ	21st	6/4/2013	0.0204	0.0109	0.17	812	18	4.67	87.16%
DZ	21st	8/20/2014	0.0202	0.0261	0.14	812	18	4.67	-22.61%
DZ	21st	4/12/2007	0.0202		0.10	812	18	4.67	.
DZ	21st	5/22/2014	0.02	0.0168	0.16	812	18	4.67	19.05%
DZ	21st	9/11/2012	0.0198	0.0216	0.12	812	18	4.67	-8.33%
DZ	21st	9/11/2012	0.0192	0.0454	0.12	812	18	4.67	-57.71%
DZ	21st	8/3/2013	0.0191	0.0283	1.83	812	18	4.67	-32.51%
DZ	21st	9/22/2014	0.019	.	0.17	812	18	4.67	.
DZ	I-95	5/23/2012	0.019	.	0.10	7600	24	19.98	.
DZ	21st	8/7/2014	0.0186	.	0.11	812	18	4.67	.
DZ	21st	7/11/2013	0.0178	0.0207	0.27	812	18	4.67	-14.01%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DZ	21st	5/8/2014	0.017	0.0152	0.13	812	18	4.67	11.84%
DZ	21st	7/16/2014	0.0168	0.0126	0.29	812	18	4.67	33.33%
DZ	21st	8/26/2014	0.0167	0.021	0.27	812	18	4.67	-20.48%
DZ	21st	7/27/2011	0.0161	0.0196	0.16	812	18	4.67	-17.86%
DZ	21st	5/6/2012	0.0157	0.0133	0.10	812	18	4.67	18.05%
DZ	21st	7/29/2011	0.0157	.	0.15	812	18	4.67	.
DZ	21st	8/26/2014	0.0156	0.0153	0.27	812	18	4.67	1.96%
DZ	21st	9/4/2014	0.0156	0.0152	0.08	812	18	4.67	2.63%
DZ	21st	9/14/2011	0.0155	0.0401	0.87	812	18	4.67	-61.35%
DZ	21st	7/29/2014	0.0153	0.0253	2.20	812	18	4.67	-39.53%
DZ	21st	5/20/2011	0.0152	0.0199	0.16	812	18	4.67	-23.62%
DZ	21st	9/9/2013	0.0151	0.0126	0.50	812	18	4.67	19.84%
DZ	21st	5/30/2014	0.015	0.0239	0.26	812	18	4.67	-37.24%
DZ	21st	5/19/2011	0.0146	0.0056	0.55	812	18	4.67	160.71%
DZ	21st	7/1/2013	0.0146	.	0.18	812	18	4.67	.
DZ	21st	6/20/2011	0.0145	0.0234	0.45	812	18	4.67	-38.03%
DZ	21st	5/7/2014	0.0143	0.0333	0.55	812	18	4.67	-57.06%
DZ	21st	7/29/2014	0.0138	0.0223	2.20	812	18	4.67	-38.12%
DZ	21st	6/8/2014	0.0137	0.02	0.42	812	18	4.67	-31.50%
DZ	21st	5/29/2013	0.0134	0.0279	0.47	812	18	4.67	-51.97%
DZ	21st	6/6/2012	0.0131	.	0.35	812	18	4.67	.
DZ	21st	7/19/2011	0.013	0.0088	0.57	812	18	4.67	47.73%
DZ	21st	9/28/2014	0.0129	.	0.12	812	18	4.67	.
DZ	21st	7/12/2011	0.0128	0.0075	0.71	812	18	4.67	70.67%
DZ	21st	9/14/2006	0.0125	.	0.10	812	18	4.67	.
DZ	21st	7/15/2014	0.0124	0.0364	0.11	812	18	4.67	-65.93%
DZ	21st	5/21/2014	0.0117	0.0367	0.32	812	18	4.67	-68.12%
DZ	21st	9/29/2014	0.0117	.	0.47	812	18	4.67	.
DZ	21st	7/7/2014	0.0116	.	0.10	812	18	4.67	.
DZ	21st	9/15/2011	0.01	.	0.13	812	18	4.67	.
DZ	21st	9/15/2011	0.01	.	0.13	812	18	4.67	.
DZ	21st	5/5/2012	0.0098	0.0425	0.10	812	18	4.67	-76.94%
DZ	21st	7/13/2013	0.0097	.	2.14	812	18	4.67	.
DZ	21st	5/18/2011	0.009	0.009	0.69	812	18	4.67	0.00%
DZ	21st	11/15/2007	0.0085	.	0.10	812	18	4.67	.
DZ	21st	7/7/2011	0.0083	0.0109	1.73	812	18	4.67	-23.85%
DZ	21st	11/29/2005	0.0054	.	0.10	812	18	4.67	.
DZ	21st	8/28/2014	.	0.0122	0.08	812	18	4.67	.
DZ	21st	5/23/2012	.	0.009	0.10	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DZ	21st	9/11/2012	.	0.0089	0.12	812	18	4.67	.
DZ	21st	7/27/2013	.	0.0311	0.10	812	18	4.67	.
DZ	21st	5/9/2013	.	0.005	0.10	812	18	4.67	.
DZ	21st	8/11/2012	.	0.0304	0.10	812	18	4.67	.
DZ	21st	9/9/2013	.	0.0126	0.50	812	18	4.67	.
DZ	21st	8/11/2013	.	0.033	0.10	812	18	4.67	.
DZ	21st	5/10/2014	.	0.0214	0.66	812	18	4.67	.
DZ	21st	7/26/2011	.	0.0389	0.15	812	18	4.67	.
DZ	21st	5/11/2011	.	0.0168	0.17	812	18	4.67	.
DZ	21st	5/14/2011	.	0.0157	0.28	812	18	4.67	.
DZ	21st	9/22/2013	.	0.0127	0.10	812	18	4.67	.
DZ	21st	7/13/2013	.	0.0374	2.14	812	18	4.67	.
DZ	I-95	7/9/2012	0.0025	.	0.10	7600	24	19.98	.
DZ	I-95	8/9/2014	0.01	.	0.10	7600	24	19.98	.
DZ	I-95	4/12/2007	.	0.041	0.65	7600	24	19.98	.
DZ	I-95	5/11/2006	.	0.024	0.25	7600	24	19.98	.
DZ	I-95	10/17/2006	.	0.012	0.52	7600	24	19.98	.
DZ	44th	4/5/2013	.	0.0215	0.27	5100	24	.	.
DZ	I-95	9/14/2006	.	0.042	0.31	7600	24	19.98	.
DZ	44th	4/12/2013	.	0.0181	0.27	5100	24	.	.
DZ	I-95	7/8/2005	.	0.038	1.19	7600	24	19.98	.
DZ	44th	5/25/2011	.	0.0169	0.22	5100	24	.	.
DZ	44th	6/6/2012	.	0.0169	0.62	5100	24	.	.
DZ	44th	2/23/2010	.	0.0168	0.55	5100	24	.	.
DZ	44th	11/11/2011	.	0.0159	0.19	5100	24	.	.
DZ	44th	2/28/2013	.	0.0295	0.57	5100	24	.	.
DZ	44th	10/22/2012	.	0.015	0.25	5100	24	.	.
DZ	44th	4/10/2013	.	0.015	0.22	5100	24	.	.
DZ	44th	4/3/2012	.	0.013	0.15	5100	24	.	.
DZ	I-95	11/15/2007	.	0.034	0.23	7600	24	19.98	.
DZ	I-95	4/2/2005	.	0.051	1.23	7600	24	19.98	.
DZ	44th	2/12/2011	.	0.0115	0.53	5100	24	.	.
DZ	44th	3/5/2012	.	0.0114	0.29	5100	24	.	.
DZ	44th	4/4/2013	.	0.0106	0.57	5100	24	.	.
DZ	44th	3/19/2013	.	0.0104	0.75	5100	24	.	.
DZ	44th	2/15/2010	.	0.0101	0.37	5100	24	.	.
DZ	44th	3/4/2011	.	0.0101	0.20	5100	24	.	.
DZ	44th	10/15/2012	.	0.00996	0.35	5100	24	.	.
DZ	44th	1/24/2010	.	0.00985	0.44	5100	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
DZ	44th	5/19/2010	.	0.00928	0.45	5100	24	.	.
DZ	44th	1/31/2012	.	0.00909	0.44	5100	24	.	.
DZ	44th	10/30/2012	.	0.00803	1.33	5100	24	.	.
DZ	44th	1/20/2011	.	0.00755	0.34	5100	24	.	.
DZ	44th	3/28/2011	.	0.00695	0.71	5100	24	.	.
DZ	44th	9/18/2010	.	0.00612	1.01	5100	24	.	.
DZ	44th	2/28/2013	.	0.00581	0.57	5100	24	.	.
DZ	44th	11/16/2010	.	0.0543	0.54	5100	24	.	.
DZ	44th	2/4/2010	.	0.00577	0.15	5100	24	.	.
DZ	44th	11/11/2012	.	0.00573	0.71	5100	24	.	.
DZ	44th	1/23/2013	.	0.0446	0.23	5100	24	.	.
DZ	44th	4/14/2011	.	0.00502	0.19	5100	24	.	.
DZ	44th	10/30/2012	.	0.00447	1.33	5100	24	.	.
DZ	44th	2/12/2011	.	0.00419	0.53	5100	24	.	.
DZ	44th	11/11/2012	.	0.00411	0.71	5100	24	.	.
DZ	44th	6/5/2012	.	0.00349	0.30	5100	24	.	.
DZ	44th	3/4/2011	.	0.00345	0.20	5100	24	.	.
DZ	44th	5/27/2013	.	0.00338	0.38	5100	24	.	.
DZ	44th	4/1/2010	.	0.00272	1.49	5100	24	.	.
DZ	44th	2/16/2010	.	0.00271	0.37	5100	24	.	.
DZ	44th	3/20/2012	.	0.00228	0.39	5100	24	.	.
DZ	44th	6/25/2013	.	0.0022	0.19	5100	24	.	.
DZ	44th	4/3/2012	.	0.0021	0.15	5100	24	.	.
DZ	44th	10/28/2011	.	0.00207	0.30	5100	24	.	.
DZ	44th	5/25/2011	.	0.002	0.22	5100	24	.	.
DZ	44th	3/5/2012	.	0.00194	0.29	5100	24	.	.
DZ	44th	2/23/2010	.	0.00179	0.55	5100	24	.	.
DZ	44th	3/19/2013	.	0.00177	0.75	5100	24	.	.
DZ	44th	10/14/2012	.	0.00175	0.46	5100	24	.	.
DZ	44th	4/25/2012	.	0.00154	0.67	5100	24	.	.
DZ	44th	3/15/2011	.	0.00137	0.31	5100	24	.	.
DZ	44th	3/29/2011	.	0.00128	0.71	5100	24	.	.
DZ	44th	1/21/2011	.	0.00113	0.34	5100	24	.	.
DZ	44th	2/5/2010	.	0.00084	0.15	5100	24	.	.
EC	FC 1	10/3/2013	4000	6000	0.20	4601	24	20.07	-33.33%
EC	FC 1	9/7/2015	1100	200	0.10	4601	24	20.07	.
EC	FC 1	9/7/2015	600	166.7	0.10	4601	24	20.07	259.93%
EC	FC 1	9/7/2015	533.3333	160	0.10	4601	24	20.07	233.33%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
EC	FC 1	9/7/2015	400	133.3	0.10	4601	24	20.07	200.08%
EC	FC 1	10/3/2015	400	400	0.20	4601	24	20.07	0.00%
EC	FC 1	9/7/2015	340	0	0.10	4601	24	20.07	.
EC	FC 1	10/3/2015	333.3333	233.3	0.20	4601	24	20.07	42.88%
EC	FC 1	10/3/2013	300	5000	0.20	4601	24	20.07	-94.00%
EC	FC 1	8/18/2015	200	800	0.10	4601	24	20.07	-75.00%
EC	FC 1	8/18/2015	166.6667	760	0.10	4601	24	20.07	-78.07%
EC	FC 1	8/18/2015	160	700	0.10	4601	24	20.07	-77.14%
EC	FC 1	8/18/2015	133.3333	500	0.10	4601	24	20.07	-73.33%
EC	FC 1	10/3/2015	100	200	0.20	4601	24	20.07	-50.00%
EC	FC 1	8/18/2015	0	1000	0.10	4601	24	20.07	-100.00%
EC	FC 1	8/18/2015	0	833	0.10	4601	24	20.07	-100.00%
EC	FC 1	10/3/2015	200	180	0.20	4601	24	20.07	11.11%
EC	FC 1	10/3/2015	.	100	0.20	4601	24	20.07	.
EC	FC2	7/15/2014	800	800	0.55	1314	18	3.03	0.00%
EC	FC2	7/15/2014	800	800	0.55	1314	18	3.03	0.00%
EC	FC2	7/15/2014	800	400	0.55	1314	18	3.03	100.00%
EC	FC2	7/29/2014	800	800	1.50	1314	18	3.03	0.00%
EC	FC2	7/29/2014	800	800	1.50	1314	18	3.03	0.00%
EC	FC2	7/29/2014	750	800	1.50	1314	18	3.03	-6.25%
EC	FC2	7/29/2014	750	800	1.50	1314	18	3.03	-6.25%
EC	FC2	6/11/2015	700	1100	0.63	1314	18	3.03	-36.36%
EC	FC2	6/11/2015	700	1100	0.63	1314	18	3.03	-36.36%
EC	FC2	7/5/2015	700	1800	0.71	1314	18	3.03	-61.11%
EC	FC2	7/5/2015	700	1800	0.71	1314	18	3.03	-61.11%
EC	FC2	7/5/2015	633.3333	1333.333	0.71	1314	18	3.03	-52.50%
EC	FC2	7/5/2015	633.3	2200	0.71	1314	18	3.03	-71.21%
EC	FC2	6/11/2015	600	900	0.63	1314	18	3.03	-33.33%
EC	FC2	6/11/2015	600	900	0.63	1314	18	3.03	-33.33%
EC	FC2	7/5/2015	600	2200	0.71	1314	18	3.03	-72.73%
EC	FC2	7/5/2015	600	1166.667	0.71	1314	18	3.03	-48.57%
EC	FC2	6/11/2015	566.6667	766.6667	0.63	1314	18	3.03	-26.09%
EC	FC2	6/11/2015	566.6667	766.6667	0.63	1314	18	3.03	-26.09%
EC	FC2	7/5/2015	560	1166.667	0.71	1314	18	3.03	-52.00%
EC	FC2	7/5/2015	560	1140	0.71	1314	18	3.03	-50.88%
EC	FC2	7/15/2014	500	400	0.55	1314	18	3.03	25.00%
EC	FC2	7/15/2014	500	400	0.55	1314	18	3.03	25.00%
EC	FC2	7/29/2014	500	500	1.50	1314	18	3.03	0.00%
EC	FC2	7/29/2014	500	500	1.50	1314	18	3.03	0.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
EC	FC2	9/29/2014	500	150	0.39	1314	18	3.03	233.33%
EC	FC2	9/29/2014	500	150	0.39	1314	18	3.03	233.33%
EC	FC2	6/11/2015	500	640	0.63	1314	18	3.03	-21.88%
EC	FC2	6/11/2015	500	640	0.63	1314	18	3.03	-21.88%
EC	FC2	6/11/2015	460	600	0.63	1314	18	3.03	-23.33%
EC	FC2	6/11/2015	460	600	0.63	1314	18	3.03	-23.33%
EC	FC2	7/5/2015	1300	1140	0.71	1314	18	3.03	14.04%
EC	FC2	7/5/2015	1300	1060	0.71	1314	18	3.03	22.64%
EC	FC2	7/15/2014	400	400	0.55	1314	18	3.03	0.00%
EC	FC2	7/15/2014	400	400	0.55	1314	18	3.03	0.00%
EC	FC2	7/29/2014	400	400	1.50	1314	18	3.03	0.00%
EC	FC2	7/29/2014	400	400	1.50	1314	18	3.03	0.00%
EC	FC2	7/29/2014	400	400	1.50	1314	18	3.03	0.00%
EC	FC2	7/29/2014	400	400	1.50	1314	18	3.03	0.00%
EC	FC2	7/15/2014	1200	400	0.55	1314	18	3.03	200.00%
EC	FC2	6/11/2015	340	400	0.63	1314	18	3.03	-15.00%
EC	FC2	6/11/2015	340	400	0.63	1314	18	3.03	-15.00%
EC	FC2	7/15/2014	1200	400	0.55	1314	18	3.03	200.00%
EC	FC2	7/15/2014	1200	400	0.55	1314	18	3.03	200.00%
EC	FC2	10/9/2014	300	100	0.75	1314	18	3.03	200.00%
EC	FC2	10/9/2014	300	100	0.75	1314	18	3.03	200.00%
EC	FC2	10/9/2014	250	33.33	0.75	1314	18	3.03	.
EC	FC2	10/9/2014	250	33.33	0.75	1314	18	3.03	.
EC	FC2	7/15/2014	1200	400	0.55	1314	18	3.03	200.00%
EC	FC2	7/15/2014	800	400	0.55	1314	18	3.03	100.00%
EC	FC2	9/29/2014	200	0	0.39	1314	18	3.03	.
EC	FC2	9/29/2014	200	0	0.39	1314	18	3.03	.
EC	FC2	10/9/2014	166.667	0	0.75	1314	18	3.03	.
EC	FC2	10/9/2014	166.667	0	0.75	1314	18	3.03	.
EC	FC2	7/29/2014	1200	250	1.50	1314	18	3.03	.
EC	FC2	7/29/2014	1200	250	1.50	1314	18	3.03	.
EC	FC2	7/5/2015	900	1060	0.71	1314	18	3.03	-15.09%
EC	FC2	7/5/2015	900	1333.333	0.71	1314	18	3.03	-32.50%
EC	FC2	9/29/2014	50	100	0.39	1314	18	3.03	-50.00%
EC	FC2	9/29/2014	50	100	0.39	1314	18	3.03	-50.00%
EC	FC2	6/8/2014	.	1600	0.16	1314	18	3.03	.
EC	FC2	6/8/2014	.	1600	0.16	1314	18	3.03	.
EC	FC2	6/8/2014	.	900	0.16	1314	18	3.03	.
EC	FC2	6/8/2014	.	900	0.16	1314	18	3.03	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
EC	Hal	5/13/2005	2400	2400	0.25	1519	47	4.62	0.00%
EC	Hal	6/28/2005	1200	2400	0.70	1519	47	4.62	-50.00%
EC	Hal	4/13/2005	70	1400	1.68	1519	47	4.62	-95.00%
EC	Hal	1/14/2005	30	820	1.03	1519	47	4.62	-96.34%
EC	Hal	12/5/2005	30	2000	1.27	1519	47	4.62	-98.50%
EC	Hal	12/16/2005	30	10	1.68	1519	47	4.62	200.00%
EC	Hal	3/22/2006	28	210	0.95	1519	47	4.62	-86.67%
EC	Hal	2/14/2005	10	10	0.28	1519	47	4.62	0.00%
EC	Hal	2/22/2005	10	120	0.45	1519	47	4.62	-91.67%
EC	Hal	3/8/2005	10	120	0.65	1519	47	4.62	-91.67%
EC	Hal	10/6/2005	10	48	2.08	1519	47	4.62	-79.17%
EC	Hal	12/6/2004	1	1200	0.44	1519	47	4.62	-99.92%
EC	Hal	4/7/2005	1	2400	0.08	1519	47	4.62	-99.96%
EC	Hal	12/29/2005	1	4	0.35	1519	47	4.62	-75.00%
FC	I-95	4/2/2005	5000	.	1.23	7600	24	19.98	.
FC	I-95	11/29/2005	5000	14000	0.62	7600	24	19.98	-64.29%
FC	I-95	5/20/2005	3000	30000	0.38	7600	24	19.98	-90.00%
FC	I-95	5/11/2006	2300	24000	0.25	7600	24	19.98	-90.42%
FC	I-95	4/12/2007	2300	11000	0.65	7600	24	19.98	-79.09%
FC	I-95	11/15/2007	2300	5000	0.23	7600	24	19.98	-54.00%
FC	I-95	10/24/2007	.	2300	0.15	7600	24	19.98	.
FC	Hal	8/12/2004	1500	.	0.70	1519	47	4.62	.
FC	Hal	6/28/2005	1100	50000	0.70	1519	47	4.62	-97.80%
FC	Hal	10/6/2005	400	5000	2.08	1519	47	4.62	-92.00%
FC	Hal	12/5/2005	190	1900	1.27	1519	47	4.62	-90.00%
FC	Hal	11/4/2004	180	35000	0.82	1519	47	4.62	-99.49%
FC	Hal	4/13/2005	120	2700	1.68	1519	47	4.62	-95.56%
FC	Hal	8/28/2004	100	7500	0.98	1519	47	4.62	-98.67%
FC	Hal	9/27/2004	100	14000	2.43	1519	47	4.62	-99.29%
FC	Hal	12/6/2004	100	1100	0.44	1519	47	4.62	-90.91%
FC	Hal	1/14/2005	100	540	1.03	1519	47	4.62	-81.48%
FC	Hal	2/14/2005	100	100	0.28	1519	47	4.62	0.00%
FC	Hal	2/22/2005	100	100	0.45	1519	47	4.62	0.00%
FC	Hal	3/8/2005	100	230	0.65	1519	47	4.62	-56.52%
FC	Hal	4/7/2005	100	3100	0.08	1519	47	4.62	-96.77%
FC	Hal	12/29/2005	100	100	0.35	1519	47	4.62	0.00%
FC	Hal	3/22/2006	100	280	0.95	1519	47	4.62	-64.29%
FC	Hal	12/16/2005	19	380	1.68	1519	47	4.62	-95.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
FC	Hal	10/13/2004	.	20000	0.45	1519	47	4.62	.
ENC	I-95	9/14/2006	160000	160000	0.31	7600	24	19.98	0.00%
ENC	I-95	11/29/2005	90000	90000	0.62	7600	24	19.98	0.00%
ENC	I-95	10/24/2007	90000	160000	d	7600	24	19.98	-43.75%
ENC	I-95	10/24/2007	90000	1700	0.15	7600	24	19.98	.
ENC	I-95	4/2/2005	28000	.	1.23	7600	24	19.98	.
ENC	I-95	5/11/2006	14000	11000	0.25	7600	24	19.98	27.27%
ENC	I-95	10/17/2006	14000	2600	0.52	7600	24	19.98	.
ENC	I-95	5/20/2005	2300	160000	0.38	7600	24	19.98	-98.56%
ENC	I-95	4/12/2007	1700	8000	0.65	7600	24	19.98	-78.75%
ENC	I-95	11/15/2007	1700	28000	0.23	7600	24	19.98	-93.93%
N2	FC 1	9/7/2015	1.79	0.767	0.10	4601	24	20.07	133.38%
N2	FC 1	7/5/2013	1.6	0.452	0.50	4601	24	20.07	253.98%
N2	FC 1	8/18/2015	1.46	0.439	0.10	4601	24	20.07	232.57%
N2	FC2	6/22/2014	1.29	0.343	0.34	1314	18	3.03	.
N2	FC2	6/22/2014	1.29	0.343	0.34	1314	18	3.03	.
N2	FC2	6/11/2015	1.11	0.192	0.63	1314	18	3.03	.
N2	FC2	6/11/2015	1.11	0.192	0.63	1314	18	3.03	.
N2	FC2	7/11/2014	1.04	.	0.87	1314	18	3.03	.
N2	FC2	7/11/2014	1.04	.	0.87	1314	18	3.03	.
N2	FC 1	6/28/2013	1.02	0.05	0.50	4601	24	20.07	.
N2	FC2	7/29/2014	1	0.393	1.50	1314	18	3.03	154.45%
N2	FC2	7/29/2014	1	0.393	1.50	1314	18	3.03	154.45%
N2	FC 1	10/3/2015	0.935	0.432	0.10	4601	24	20.07	116.44%
N2	FC 1	10/3/2013	0.858	0.457	0.20	4601	24	20.07	87.75%
N2	FC 1	9/9/2013	0.712	0.405	0.10	4601	24	20.07	75.80%
N2	FC2	9/29/2014	0.662	.	0.39	1314	18	3.03	.
N2	FC2	9/29/2014	0.662	.	0.39	1314	18	3.03	.
N2	FC2	10/9/2014	0.643	0.287	0.75	1314	18	3.03	124.04%
N2	FC2	10/9/2014	0.643	0.287	0.75	1314	18	3.03	124.04%
N2	FC2	7/15/2014	0.567	0.267	0.55	1314	18	3.03	112.36%
N2	FC2	7/15/2014	0.567	0.267	0.55	1314	18	3.03	112.36%
N2	Hal	11/4/2004	0.56	.	0.82	1519	47	4.62	.
N2	Hal	7/17/2004	0.5	0.19	2.43	1519	47	4.62	163.16%
N2	FC 1	7/18/2013	0.499	0.499	0.20	4601	24	20.07	0.00%
N2	Hal	10/13/2004	0.48	0.22	0.45	1519	47	4.62	118.18%
N2	Hal	2/22/2005	0.48	0.4	0.45	1519	47	4.62	20.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
N2	FC 1	9/22/2013	0.464	0.414	0.10	4601	24	20.07	12.08%
N2	FC 1	9/27/2013	0.441	0.362	0.10	4601	24	20.07	21.82%
N2	FC2	4/26/2015	0.412	0.354	0.47	1314	18	3.03	16.38%
N2	FC2	4/26/2015	0.412	0.354	0.47	1314	18	3.03	16.38%
N2	Hal	1/14/2005	0.39	0.32	1.03	1519	47	4.62	21.88%
N2	Hal	8/28/2004	0.34	0.24	0.98	1519	47	4.62	41.67%
N2	FC2	5/19/2015	0.328	0.544	1.52	1314	18	3.03	-39.71%
N2	FC2	5/19/2015	0.328	0.544	1.52	1314	18	3.03	-39.71%
N2	Hal	6/1/2004	0.28	0.53	0.35	1519	47	4.62	-47.17%
N2	Hal	12/6/2004	0.24	0.21	0.44	1519	47	4.62	14.29%
N2	Hal	9/27/2004	0.2	0.09	2.43	1519	47	4.62	122.22%
N2	Hal	5/5/2004	0.17	0.65	0.95	1519	47	4.62	-73.85%
N2	Hal	2/7/2004	0.12	0.33	1.41	1519	47	4.62	-63.64%
N2	FC1	7/28/2013	0.05	.	0.10	4601	24	20.07	.
N2	FC2	6/8/2014	.	0.488	0.16	1314	18	3.03	.
N2	Hal	2/14/2005	.	0.48	0.28	1519	47	4.62	.
N2	Hal	8/12/2004	.	0.39	0.70	1519	47	4.62	.
N2	FC2	6/8/2014	.	0.488	0.16	1314	18	3.03	.
N3	High	3/23/2009	3.66	0.48	0.55	4534	24	.	.
N3	I-95	3/24/2009	3.66	.	0.65	7600	24	19.98	.
N3	21st	5/7/2014	3.52	0.8	0.55	812	18	4.67	.
N3	21st	7/7/2014	3.5	.	0.10	812	18	4.67	.
N3	21st	9/4/2014	3.43	0.59	0.08	812	18	4.67	.
N3	21st	9/10/2014	3.15	0.58	0.16	812	18	4.67	.
N3	21st	9/28/2014	3.1	.	0.12	812	18	4.67	.
N3	High	3/10/2009	2.95	0.31	1.53	4534	24	.	.
N3	21st	7/29/2014	2.72	0.56	2.20	812	18	4.67	.
N3	21st	7/31/2012	2.6	0.36	0.14	812	18	4.67	.
N3	21st	7/16/2014	2.57	0.63	0.29	812	18	4.67	.
N3	BRC B	9/16/2008	2.563	0.246	0.52	1120	36	3.47	.
N3	21st	5/30/2014	2.47	0.4	0.26	812	18	4.67	.
N3	21st	8/3/2013	2.43	0.03	1.83	812	18	4.67	.
N3	21st	5/20/2011	2.41	.	0.16	812	18	4.67	.
N3	21st	8/11/2012	2.4	0.76	0.08	812	18	4.67	215.79%
N3	BRC A	8/20/2008	2.396	0.414	0.52	1240	24	2.69	.
N3	21st	6/20/2011	2.36	0.63	0.45	812	18	4.67	.
N3	BRC B	9/25/2008	2.358	0.119	0.16	1120	36	3.47	.
N3	21st	9/22/2014	2.32	.	0.17	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
N3	I-95	4/12/2007	2.32	.	0.65	7600	24	19.98	.
N3	I-95	5/11/2006	2.22	.	0.25	7600	24	19.98	.
N3	21st	5/5/2012	2.21	0.73	0.10	812	18	4.67	202.74%
N3	High	11/7/2011	2.21	0.53	1.97	4534	24	.	.
N3	21st	8/20/2014	2.2	1.02	0.14	812	18	4.67	115.69%
N3	21st	9/29/2014	2.2	.	0.47	812	18	4.67	.
N3	High	10/15/2008	2.11	.	0.98	4534	24	.	.
N3	Hal	9/19/2005	2.1	.	0.59	1519	47	4.62	.
N3	High	11/5/2008	2.09	.	1.10	4534	24	.	.
N3	High	10/1/2009	2.02	0.53	0.31	4534	24	.	.
N3	21st	5/29/2013	1.98	0.9	0.47	812	18	4.67	120.00%
N3	21st	8/26/2014	1.96	0.81	0.27	812	18	4.67	141.98%
N3	BRC A	9/16/2008	1.917	0.246	0.52	1240	24	2.69	.
N3	GG1	7/23/2003	1.9	0.33	0.47	1314	18	3.03	.
N3	21st	9/9/2013	1.87	0.67	0.50	812	18	4.67	179.10%
N3	BRC A	7/19/2008	1.826	0.235	0.35	1240	24	2.69	.
N3	21st	7/29/2011	1.81	.	0.15	812	18	4.67	.
N3	High	11/2/2011	1.8	.	1.41	4534	24	.	.
N3	I-95	6/15/2009	1.8	0.08	0.23	7600	24	19.98	.
N3	High	11/14/2009	1.77	0.25	1.14	4534	24	.	.
N3	High	9/24/2008	1.75	0.54	0.31	4534	24	.	224.07%
N3	21st	8/7/2014	1.72	.	0.11	812	18	4.67	.
N3	21st	7/19/2011	1.66	1.16	0.57	812	18	4.67	43.10%
N3	High	5/8/2009	1.64	0.46	0.31	4534	24	.	256.52%
N3	21st	7/27/2011	1.59	1.12	0.16	812	18	4.67	41.96%
N3	21st	5/22/2014	1.57	1.03	0.16	812	18	4.67	52.43%
N3	21st	5/8/2014	1.53	0.51	0.13	812	18	4.67	200.00%
N3	21st	6/6/2012	1.52	.	0.35	812	18	4.67	.
N3	BRC B	8/26/2008	1.513	0.139	0.30	1120	36	3.47	.
N3	High	5/15/2009	1.51	0.15	0.86	4534	24	.	.
N3	21st	5/19/2011	1.48	0.37	0.55	812	18	4.67	.
N3	High	4/26/2009	1.48	0.17	2.20	4534	24	.	.
N3	High	6/9/2009	1.4	0.37	1.49	4534	24	.	.
N3	21st	5/6/2012	1.33	0.57	0.10	812	18	4.67	133.33%
N3	21st	5/23/2012	1.32	0.81	0.10	812	18	4.67	62.96%
N3	High	9/1/2010	1.3	0.5	0.86	4534	24	.	160.00%
N3	21st	8/9/2014	1.22	.	0.14	812	18	4.67	.
N3	High	10/22/2009	1.21	.	0.10	4534	24	.	.
N3	BRC A	9/25/2008	1.208	0.119	0.16	1240	24	2.69	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
N3	High	10/21/2008	1.15	.	2.28	4534	24	.	.
N3	21st	9/14/2011	1.12	0.99	0.87	812	18	4.67	13.13%
N3	CR	3/11/2010	1.1	0.35	0.62	4601	24	20.07	214.29%
N3	High	8/16/2009	1.05	0.64	1.93	4534	24	.	64.06%
N3	21st	7/12/2011	1	0.55	0.71	812	18	4.67	81.82%
N3	BRC A	8/26/2008	0.956	0.139	0.30	1240	24	2.69	.
N3	High	7/20/2010	0.95	0.12	0.75	4534	24	.	.
N3	Hal	3/22/2006	0.92	0.44	0.95	1519	47	4.62	109.09%
N3	High	9/13/2010	0.91	0.42	0.67	4534	24	.	116.67%
N3	High	7/3/2009	0.9	0.6	0.63	4534	24	.	50.00%
N3	BRC B	7/9/2008	0.855	0.238	0.64	1120	36	3.47	259.24%
N3	BRC B	4/22/2008	0.84	0.109	0.41	1120	36	3.47	.
N3	I-95	5/20/2005	0.84	0.9	0.38	7600	24	19.98	-6.67%
N3	GHSS	4/17/2007	0.787	0.393	2.37	812	47	6.94	100.25%
N3	High	8/19/2009	0.77	0.5	0.28	4534	24	.	54.00%
N3	21st	7/9/2012	0.74	.	0.14	812	18	4.67	.
N3	BRC B	11/4/2008	0.736	0.166	0.91	1120	36	3.47	.
N3	21st	8/26/2014	0.69	.	0.27	812	18	4.67	.
N3	High	9/15/2010	0.66	0.43	0.75	4534	24	.	53.49%
N3	21st	7/13/2011	0.64	0.41	0.68	812	18	4.67	56.10%
N3	GHSN	4/3/2006	0.63999	0.43	0.21	780	30	2.30	48.83%
N3	High	10/25/2009	0.63	0.23	0.83	4534	24	.	173.91%
N3	High	7/11/2010	0.63	0.67	2.00	4534	24	.	-5.97%
N3	GHSS	10/17/2006	0.60199	0.10199	0.93	812	47	6.94	.
N3	GG2	4/26/2004	0.6	.	0.62	1314	18	3.03	.
N3	CR	8/21/2009	0.58	0.3171	2.36	4601	24	20.07	82.91%
N3	GG1	7/29/2003	0.58	0.29	1.07	1314	18	3.03	100.00%
N3	GG1	9/6/2004	0.58	0.05	5.27	1314	18	3.03	.
N3	GHSS	4/13/2007	0.578	0.47299	1.14	812	47	6.94	22.20%
N3	21st	6/4/2013	0.54	0.11	0.17	812	18	4.67	.
N3	I-95	11/15/2007	0.54	0.47	0.23	7600	24	19.98	14.89%
N3	BRC A	5/28/2008	0.531	0.466	0.49	1240	24	2.69	13.95%
N3	GHSN	4/4/2006	0.52999	0.40999	0.19	780	30	2.30	29.27%
N3	GHSS	3/19/2007	0.52399	0.35199	1.37	812	47	6.94	48.87%
N3	BRC B	5/28/2008	0.523	0.466	0.49	1120	36	3.47	12.23%
N3	GHSS	11/7/2006	0.523	0.43099	1.30	812	47	6.94	21.35%
N3	High	9/15/2010	0.51	0.23	0.75	4534	24	.	121.74%
N3	BRC B	4/20/2008	0.508	0.148	1.60	1120	36	3.47	243.24%
N3	21st	5/6/2012	0.49	0.5	0.10	812	18	4.67	-2.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
N3	21st	5/12/2012	0.49	0.49	0.10	812	18	4.67	0.00%
N3	CR	3/28/2010	0.49	0.1	0.62	4601	24	20.07	.
N3	GHSS	10/28/2006	0.48399	0.28799	0.89	812	47	6.94	68.06%
N3	BRC B	9/5/2008	0.474	0.03	2.61	1120	36	3.47	.
N3	Hal	4/13/2005	0.47	0.4	1.68	1519	47	4.62	17.50%
N3	High	6/15/2009	0.46	0.23	0.35	4534	24	.	100.00%
N3	High	7/20/2009	0.45	0.18	0.86	4534	24	.	150.00%
N3	GHSS	6/26/2006	0.43	0.4	1.74	812	47	6.94	7.50%
N3	GHSS	2/3/2007	0.421	0.26699	0.82	812	47	6.94	57.68%
N3	21st	9/11/2012	0.42	1.08	0.12	812	18	4.67	-61.11%
N3	High	9/12/2008	0.42	0.07	1.77	4534	24	.	.
N3	GHSS	4/28/2006	0.41999	0.28	0.81	812	47	6.94	50.00%
N3	GHSN	4/13/2007	0.404	0.47299	1.14	780	30	2.30	-14.59%
N3	GHSN	3/19/2007	0.38499	0.35199	1.37	780	30	2.30	9.38%
N3	BRC B	5/15/2008	0.383	0.272	0.25	1120	36	3.47	40.81%
N3	GHSS	2/26/2007	0.38299	0.158	0.90	812	47	6.94	142.40%
N3	BRC A	11/4/2008	0.382	0.166	0.91	1240	24	2.69	130.12%
N3	High	8/19/2009	0.38	0.14	0.28	4534	24	.	171.43%
N3	GHSN	2/3/2007	0.37599	0.26699	0.82	780	30	2.30	40.83%
N3	High	10/29/2009	0.36	0.02	1.10	4534	24	.	.
N3	High	7/8/2010	0.36	0.37	0.28	4534	24	.	-2.70%
N3	I-95	10/24/2007	0.36	0.43	0.15	7600	24	19.98	-16.28%
N3	GG2	8/14/2003	0.35	.	0.15	1314	18	3.03	.
N3	Hal	6/28/2005	0.35	0.27	0.70	1519	47	4.62	29.63%
N3	Hal	12/16/2005	0.35	0.18	1.68	1519	47	4.62	94.44%
N3	21st	7/29/2014	0.34	0.46	2.20	812	18	4.67	-26.09%
N3	GHSS	7/24/2006	0.34	0.57999	0.98	812	47	6.94	-41.38%
N3	GHSS	7/14/2006	0.33	0.43999	0.92	812	47	6.94	-25.00%
N3	I-95	9/14/2006	0.33	0.24	0.31	7600	24	19.98	37.50%
N3	BRC A	7/9/2008	0.328	0.238	0.64	1240	24	2.69	37.82%
N3	GG2	6/19/2004	0.32	.	1.24	1314	18	3.03	.
N3	Hal	10/6/2005	0.32	0.16	2.08	1519	47	4.62	100.00%
N3	GHSN	4/17/2007	0.31499	0.393	2.37	780	30	2.30	-19.85%
N3	BRC B	1/28/2009	0.305	0.124	0.34	1120	36	3.47	145.97%
N3	21st	9/15/2011	0.3	.	0.13	812	18	4.67	.
N3	21st	9/15/2011	0.3	.	0.13	812	18	4.67	.
N3	GG1	9/27/2003	0.29	0.05	0.34	1314	18	3.03	.
N3	Hal	12/12/2005	0.29	0.39	0.43	1519	47	4.62	-25.64%
N3	GHSN	5/8/2006	0.28999	0.37999	0.79	780	30	2.30	-23.68%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
N3	GHSN	5/19/2006	0.28999	0.55	0.16	780	30	2.30	-47.27%
N3	GHSN	4/10/2006	0.28	0.77999	0.23	780	30	2.30	-64.10%
N3	GHSS	7/7/2006	0.28	0.37999	1.88	812	47	6.94	-26.31%
N3	GHSS	11/13/2006	0.273	0.243	0.90	812	47	6.94	12.35%
N3	GHSN	4/28/2006	0.27	0.28	0.81	780	30	2.30	-3.57%
N3	GG2	8/23/2003	0.27	0.75	0.72	1314	18	3.03	-64.00%
N3	CR	6/3/2009	0.26	0.373	1.28	4601	24	20.07	-30.29%
N3	GG2	6/4/2004	0.26	0.12	0.89	1314	18	3.03	116.67%
N3	Hal	3/8/2005	0.26	0.26	0.65	1519	47	4.62	0.00%
N3	I-95	4/2/2005	0.26	0.4	1.23	7600	24	19.98	-35.00%
N3	CR	4/20/2009	0.25	0.2076	0.62	4601	24	20.07	20.42%
N3	I-95	10/17/2006	0.25	0.17	0.52	7600	24	19.98	47.06%
N3	GG2	9/3/2003	0.24	.	0.83	1314	18	3.03	.
N3	Hal	12/5/2005	0.24	0.14	1.27	1519	47	4.62	71.43%
N3	21st	9/11/2012	0.23	.	0.12	812	18	4.67	.
N3	GHSN	8/31/2006	0.23	0.63999	1.51	780	30	2.30	-64.06%
N3	BRC A	9/5/2008	0.228	0.03	2.61	1240	24	2.69	.
N3	GHSN	2/26/2007	0.221	0.158	0.90	780	30	2.30	39.87%
N3	BRC B	4/27/2008	0.218	0.118	0.78	1120	36	3.47	84.75%
N3	BRC A	1/28/2009	0.216	0.124	0.34	1240	24	2.69	74.19%
N3	BRC B	11/15/2008	0.215	0.082	0.34	1120	36	3.47	162.20%
N3	BRC B	2/28/2009	0.21	0.232	1.07	1120	36	3.47	-9.48%
N3	GG2	12/10/2003	0.21	0.4	1.02	1314	18	3.03	-47.50%
N3	GHSN	6/26/2006	0.20999	0.4	1.74	780	30	2.30	-47.50%
N3	BRC A	4/27/2008	0.209	0.118	0.78	1240	24	2.69	77.12%
N3	GHSS	11/16/2006	0.20399	0.18999	1.17	812	47	6.94	7.37%
N3	GHSS	5/8/2006	0.2	0.37999	0.79	812	47	6.94	-47.37%
N3	BRC A	2/18/2009	0.193	.	0.60	1240	24	2.69	.
N3	BRC A	5/15/2008	0.192	0.272	0.25	1240	24	2.69	-29.41%
N3	BRC A	4/20/2008	0.19	0.148	1.60	1240	24	2.69	28.38%
N3	GG2	9/18/2003	0.19	0.39	1.97	1314	18	3.03	-51.28%
N3	BRC B	2/18/2009	0.179	.	0.60	1120	36	3.47	.
N3	BRC B	1/6/2009	0.174	0.261	0.88	1120	36	3.47	-33.33%
N3	BRC A	4/22/2008	0.172	0.109	0.41	1240	24	2.69	57.80%
N3	GHSN	10/8/2006	0.17126	0.3	0.71	780	30	2.30	-42.91%
N3	GHSN	7/24/2006	0.17	0.57999	0.98	780	30	2.30	-70.69%
N3	GG2	5/19/2004	0.17	0.16	0.12	1314	18	3.03	6.25%
N3	Hal	7/8/2005	0.17	0.44	0.63	1519	47	4.62	-61.36%
N3	CR	9/11/2009	0.16	0.16	0.15	4601	24	20.07	0.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
N3	GG1	9/18/2003	0.16	0.05	1.97	1314	18	3.03	220.00%
N3	GHSN	9/24/2006	0.1544	0.323	0.38	780	30	2.30	-52.20%
N3	GHSS	9/24/2006	0.1544	0.323	0.38	812	47	6.94	-52.20%
N3	GG2	7/13/2003	0.13	0.22	3.96	1314	18	3.03	-40.91%
N3	GG2	11/19/2003	0.13		0.88	1314	18	3.03	.
N3	GHSS	9/14/2006	0.12999	0.23999	1.44	812	47	6.94	-45.84%
N3	BRC B	12/10/2008	0.127	0.079	1.49	1120	36	3.47	60.76%
N3	BRC A	1/6/2009	0.124	0.261	0.88	1240	24	2.69	-52.49%
N3	GHSN	10/17/2006	0.11806	0.10199	0.93	780	30	2.30	15.76%
N3	GG1	6/19/2004	0.11	0.22	1.24	1314	18	3.03	-50.00%
N3	GG2	8/10/2003	0.11	0.16	0.46	1314	18	3.03	-31.25%
N3	Hal	12/29/2005	0.11	0.31	0.35	1519	47	4.62	-64.52%
N3	BRC A	11/15/2008	0.106	0.082	0.34	1240	24	2.69	29.27%
N3	GHSN	11/16/2006	0.0961	0.18999	1.17	780	30	2.30	-49.42%
N3	BRC A	2/28/2009	0.091	0.232	0.34	1240	24	2.69	-60.78%
N3	Hal	5/13/2005	0.09	0.76	0.25	1519	47	4.62	-88.16%
N3	I-95	11/29/2005	0.09	0.1	0.62	7600	24	19.98	-10.00%
N3	GHSN	11/13/2006	0.0819	0.243	0.90	780	30	2.30	-66.30%
N3	GHSN	11/7/2006	0.07769	0.43099	1.30	780	30	2.30	-81.97%
N3	BRC A	12/10/2008	0.076	0.079	1.49	1240	24	2.69	-3.80%
N3	GHSS	10/8/2006	0.0636	0.3	0.71	812	47	6.94	-78.80%
N3	GHSN	7/14/2006	0.05	0.43999	0.92	780	30	2.30	-88.64%
N3	GG1	7/12/2003	0.05	0.18	4.56	1314	18	3.03	-72.22%
N3	GG1	8/2/2003	0.05	0.22	2.45	1314	18	3.03	-77.27%
N3	GG1	8/8/2003	0.05	0.25	2.88	1314	18	3.03	-80.00%
N3	GG1	8/23/2003	0.05	0.41	0.72	1314	18	3.03	-87.80%
N3	GG1	12/13/2003	0.05	0.05	1.26	1314	18	3.03	0.00%
N3	GG1	8/12/2004	0.05	0.19	1.47	1314	18	3.03	-73.68%
N3	GG2	8/12/2004	0.05	0.31	1.47	1314	18	3.03	-83.87%
N3	GHSN	10/28/2006	0.04289	0.28799	0.89	780	30	2.30	-85.11%
N3	I-95	7/8/2005	0.04	0.04	1.19	7600	24	19.98	0.00%
N3	GHSN	7/7/2006	0.03999	0.37999	1.88	780	30	2.30	-89.48%
N3	GHSN	6/28/2006	0.01999	0.03999	0.32	780	30	2.30	-50.01%
N3	GHSN	9/14/2006	0.01999	0.23999	1.44	780	30	2.30	-91.67%
N3	21st	9/9/2013	0.01	0.67	0.50	812	18	4.67	-98.51%
N3	CR	9/26/2009	0.01	0.1	0.48	4601	24	20.07	-90.00%
N3	CR	10/15/2009	0.01	0.22	0.62	4601	24	20.07	-95.45%
N3	CR	11/11/2009	0.01	.	1.09	4601	24	20.07	.
N3	CR	9/25/2008	0.01	0.57	0.62	4601	24	20.07	-98.25%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
N3	GHSS	4/3/2006	0.00999	0.43	0.21	812	47	6.94	-97.68%
N3	GG2	7/22/2003	0.005	0.35	0.47	1314	18	3.03	-98.57%
N3	GG2	7/29/2003	0.005	0.26	1.07	1314	18	3.03	-98.08%
N3	GG2	8/5/2003	0.005	.	2.45	1314	18	3.03	.
N3	GG2	8/16/2003	0.005	.	1.62	1314	18	3.03	.
N3	GG2	12/13/2003	0.005	0.19	1.26	1314	18	3.03	-97.37%
N3	21st	5/14/2011	.	0.91	0.28	812	18	4.67	.
N3	High	10/21/2009	.	0.23	0.75	4534	24	.	.
N3	GHSS	4/4/2006	.	0.40999	0.19	812	47	6.94	.
N3	GHSS	5/19/2006	.	0.55	0.16	812	47	6.94	.
N3	I-95	6/9/2009	.	0.26	0.15	7600	24	19.98	.
N3	GG1	11/28/2003	.	0.16	0.26	1314	18	3.03	.
N3	High	10/21/2009	.	0.24	0.75	4534	24	.	.
N3	GG2	8/30/2004	.	0.26	0.27	1314	18	3.03	.
N3	GG1	5/1/2004	.	0.41	0.63	1314	18	3.03	.
N3	High	10/21/2009	.	0.29	0.75	4534	24	.	.
N3	Hal	1/31/2006	.	0.7	0.24	1519	47	4.62	.
N3	21st	7/7/2011	.	0.65	1.73	812	18	4.67	.
N3	21st	7/25/2013	.	0.82	0.10	812	18	4.67	.
N3	21st	9/23/2013	.	0.44	0.10	812	18	4.67	.
N3	High	10/21/2009	.	0.24	0.75	4534	24	.	.
N3	21st	5/30/2014	.	0.11	0.26	812	18	4.67	.
N3	GG2	11/6/2003	.	0.17	0.26	1314	18	3.03	.
N3	21st	5/11/2011	.	0.5	0.17	812	18	4.67	.
N3	I-95	10/21/2008	.	0.61	0.62	7600	24	19.98	.
N3	21st	7/13/2013	.	0.33	2.14	812	18	4.67	.
N3	21st	7/26/2011	.	0.76	0.15	812	18	4.67	.
N3	GHSS	8/31/2006	.	0.63999	1.51	812	47	6.94	.
N3	I-95	9/12/2008	.	0.12	1.23	7600	24	19.98	.
N3	I-95	10/13/2008	.	0.12	0.38	7600	24	19.98	.
N3	High	10/21/2009	.	0.57	0.75	4534	24	.	.
N3	I-95	3/7/2009	.	0.83	0.31	7600	24	19.98	.
N3	21st	5/18/2011	.	0.59	0.69	812	18	4.67	.
N3	High	10/21/2009	.	0.3	0.75	4534	24	.	.
N3	21st	5/9/2013	.	0.68	0.10	812	18	4.67	.
N3	21st	7/11/2013	.	0.94	0.27	812	18	4.67	.
N3	GG1	11/19/2003	.	0.11	0.88	1314	18	3.03	.
N3	21st	7/15/2014	.	0.47	0.11	812	18	4.67	.
N3	GHSS	4/10/2006	.	0.77999	0.23	812	47	6.94	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
N3	GG2	5/3/2004	.	0.24	0.63	1314	18	3.03	.
N3	GG1	9/3/2003	.	0.25	0.83	1314	18	3.03	.
N3	21st	7/15/2013	.	0.96	0.55	812	18	4.67	.
N3	GG1	8/30/2004	.	0.23	0.27	1314	18	3.03	.
N3	21st	6/16/2013	.	0.56	0.10	812	18	4.67	.
N3	44th	4/14/2011	.	0.083	0.19	5100	24	.	.
N3	BRC B	8/20/2008	.	0.414	0.52	1120	36	3.47	.
N3	High	10/21/2009	.	0.29	0.75	4534	24	.	.
N3	GG2	9/6/2004	.	0.17	5.27	1314	18	3.03	.
N3	FC 1	5/8/2013	.	0.598	0.10	4601	24	20.07	.
N3	BRC B	7/19/2008	.	0.235	0.35	1120	36	3.47	.
N3	44th	3/4/2011	.	0.074	0.20	5100	24	.	.
N3	High	10/21/2009	.	0.36	0.75	4534	24	.	.
N3	I-95	10/15/2008	.	0.06	1.19	7600	24	19.98	.
N3	GG1	8/17/2003	.	0.05	1.62	1314	18	3.03	.
N3	High	10/21/2009	.	0.23	0.75	4534	24	.	.
N3	21st	7/15/2013	.	0.96	0.55	812	18	4.67	.
N3	GG1	12/10/2003	.	0.05	1.02	1314	18	3.03	.
N3	I-95	11/5/2008	.	0.69	0.25	7600	24	19.98	.
N3	GG1	12/30/2003	.	0.05	0.09	1314	18	3.03	.
N3	I-95	3/10/2009	.	0.56	0.52	7600	24	19.98	.
N3	21st	8/11/2013	.	0.04	0.10	812	18	4.67	.
N3	21st	6/18/2014	.	0.77	0.10	812	18	4.67	.
N3	GG1	11/6/2003	.	0.2	0.26	1314	18	3.03	.
N3	GHSS	6/28/2006	.	0.03999	0.32	812	47	6.94	.
N3	High	3/7/2009	.	0.92	0.55	4534	24	.	.
N3	21st	7/27/2013	.	0.03	0.10	812	18	4.67	.
N3	21st	5/10/2014	.	1.08	0.66	812	18	4.67	.
N3	44th	3/4/2011	.	0.232	0.20	5100	24	.	.
N3	21st	6/8/2014	.	0.72	0.42	812	18	4.67	.
OP	GG2	9/3/2003	1.2	.	0.83	1314	18	3.03	.
OP	FC 1	7/5/2013	1.12	0.25	0.50	4601	24	20.07	.
OP	GG1	7/12/2003	1.1	.	4.56	1314	18	3.03	.
OP	GG2	8/10/2003	1.1	0.03	0.46	1314	18	3.03	.
OP	GG2	9/18/2003	1.1	0.01	1.97	1314	18	3.03	.
OP	21st	6/4/2013	1.04	.	0.17	812	18	4.67	.
OP	GG2	6/4/2004	0.95	.	0.89	1314	18	3.03	.
OP	High	10/15/2008	0.94	.	0.98	4534	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
OP	CR	9/11/2009	0.87	.	0.15	4601	24	20.07	.
OP	GG1	7/29/2003	0.75	0.02	1.07	1314	18	3.03	.
OP	GG1	9/18/2003	0.72	0.01	1.97	1314	18	3.03	.
OP	FC 1	6/28/2013	0.709	0.318	0.50	4601	24	20.07	122.96%
OP	21st	7/9/2012	0.66	.	0.14	812	18	4.67	.
OP	21st	6/6/2012	0.65	.	0.14	812	18	4.67	.
OP	High	3/10/2009	0.62	0.005	1.53	4534	24	.	.
OP	21st	9/11/2012	0.61	0.15	0.12	812	18	4.67	.
OP	GG1	9/6/2004	0.61	0.01	5.27	1314	18	3.03	.
OP	High	11/5/2008	0.58	0.02	1.10	4534	24	.	.
OP	GG1	12/10/2003	0.57	0.06	1.02	1314	18	3.03	.
OP	21st	8/11/2012	0.56	0.05	0.08	812	18	4.67	.
OP	GG1	8/2/2003	0.56	0.02	2.45	1314	18	3.03	.
OP	High	3/23/2009	0.56	0.005	0.55	4534	24	.	.
OP	GG1	7/23/2003	0.54	0.02	0.47	1314	18	3.03	.
OP	FC 1	9/9/2013	0.514	0.204	0.10	4601	24	20.07	151.96%
OP	GG1	8/8/2003	0.51	0.05	2.88	1314	18	3.03	.
OP	GG1	8/23/2003	0.51	0.04	0.72	1314	18	3.03	.
OP	21st	7/16/2014	0.5	0.07	0.29	812	18	4.67	.
OP	21st	7/29/2014	0.5	0.1	2.20	812	18	4.67	.
OP	21st	7/15/2014	0.49	0.05	0.11	812	18	4.67	.
OP	GG1	8/12/2004	0.49	0.01	1.47	1314	18	3.03	.
OP	GG2	7/13/2003	0.47	0.2	3.96	1314	18	3.03	135.00%
OP	21st	5/8/2014	0.46	0.14	0.13	812	18	4.67	228.57%
OP	High	6/9/2009	0.46	0.01	1.49	4534	24	.	.
OP	21st	9/9/2013	0.45	0.08	0.50	812	18	4.67	.
OP	GG2	5/19/2004	0.45	0.03	0.12	1314	18	3.03	.
OP	High	5/15/2009	0.45	0.005	0.86	4534	24	.	.
OP	21st	5/23/2012	0.44	.	0.10	812	18	4.67	.
OP	21st	6/18/2014	0.44	0.14	0.10	812	18	4.67	214.29%
OP	High	9/12/2008	0.44	0.005	1.77	4534	24	.	.
OP	21st	5/29/2013	0.43	0.21	0.47	812	18	4.67	104.76%
OP	High	7/8/2010	0.43	0.03	0.28	4534	24	.	.
OP	21st	7/11/2013	0.42	.	0.27	812	18	4.67	.
OP	High	4/26/2009	0.42	0.005	2.20	4534	24	.	.
OP	21st	5/7/2014	0.41	.	0.55	812	18	4.67	.
OP	21st	6/8/2014	0.4	0.14	0.42	812	18	4.67	185.71%
OP	21st	7/7/2014	0.4	.	0.10	812	18	4.67	.
OP	21st	7/29/2014	0.37	0.06	2.20	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
OP	High	6/15/2009	0.37	0.005	0.35	4534	24	.	.
OP	FC 1	10/3/2013	0.363	0.25	0.20	4601	24	20.07	45.20%
OP	21st	7/1/2013	0.36	0.15	0.18	812	18	4.67	140.00%
OP	High	10/21/2008	0.36	.	2.28	4534	24	.	.
OP	FC 1	9/27/2013	0.358	0.25	0.10	4601	24	20.07	43.20%
OP	21st	5/22/2014	0.35	0.08	0.16	812	18	4.67	.
OP	21st	9/4/2014	0.35	0.12	0.08	812	18	4.67	191.67%
OP	High	11/2/2011	0.35	.	1.41	4534	24	.	.
OP	High	11/7/2011	0.35	0.025	1.97	4534	24	.	.
OP	21st	5/20/2011	0.34	0.015	0.16	812	18	4.67	.
OP	21st	8/26/2014	0.34	0.32	0.27	812	18	4.67	6.25%
OP	FC 1	9/22/2013	0.336	0.25	0.10	4601	24	20.07	34.40%
OP	21st	5/30/2014	0.33	0.05	0.26	812	18	4.67	.
OP	High	7/20/2010	0.32	0.02	0.75	4534	24	.	.
OP	21st	9/9/2013	0.31	0.08	0.50	812	18	4.67	.
OP	21st	8/20/2014	0.31	0.09	0.14	812	18	4.67	244.44%
OP	21st	9/29/2014	0.31	0.12	0.47	812	18	4.67	158.33%
OP	21st	5/21/2014	0.3	0.015	0.32	812	18	4.67	.
OP	High	9/15/2010	0.3	0.005	0.75	4534	24	.	.
OP	21st	9/10/2014	0.29	0.15	0.16	812	18	4.67	93.33%
OP	High	9/24/2008	0.29	0.08	0.31	4534	24	.	262.50%
OP	High	10/22/2009	0.29	.	0.83	4534	24	.	.
OP	21st	9/22/2014	0.28	.	0.17	812	18	4.67	.
OP	21st	7/13/2013	0.27	.	2.14	812	18	4.67	.
OP	21st	8/9/2014	0.27	.	0.14	812	18	4.67	.
OP	21st	9/28/2014	0.27	.	0.12	812	18	4.67	.
OP	High	7/11/2010	0.26	0.005	2.00	4534	24	.	
OP	21st	9/11/2012	0.25	0.07	0.12	812	18	4.67	257.14%
OP	FC 1	7/18/2013	0.25	0.25	0.20	4601	24	20.07	0.00%
OP	FC 1	7/28/2013	0.24	0.303	0.10	4601	24	20.07	-20.79%
OP	High	9/13/2010	0.24	0.005	0.67	4534	24	.	.
OP	21st	8/3/2013	0.23	0.05	1.83	812	18	4.67	.
OP	GG1	6/19/2004	0.23	0.05	1.24	1314	18	3.03	.
OP	High	9/15/2010	0.23	0.005	0.75	4534	24	.	.
OP	21st	8/7/2014	0.22	.	0.11	812	18	4.67	.
OP	21st	9/24/2013	0.21	0.11	0.10	812	18	4.67	90.91%
OP	21st	8/26/2014	0.21	0.1	0.27	812	18	4.67	110.00%
OP	CR	3/28/2010	0.2	0.02	0.62	4601	24	20.07	.
OP	I-95	9/14/2006	0.2	0.25	0.31	7600	24	19.98	-20.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
OP	CR	6/3/2009	0.18	0.0209	1.28	4601	24	20.07	.
OP	CR	8/21/2009	0.17	0.0906	2.36	4601	24	20.07	87.64%
OP	I-95	5/20/2005	0.15	.	0.38	7600	24	19.98	.
OP	CR	3/11/2010	0.14	0.005	0.62	4601	24	20.07	.
OP	I-95	10/24/2007	0.14	0.18	0.15	7600	24	19.98	-22.22%
OP	GG1	12/13/2003	0.13	0.05	1.26	1314	18	3.03	160.00%
OP	BRC B	11/4/2008	0.089	0.006	0.91	1120	36	3.47	.
OP	BRC B	9/25/2008	0.084	0.005	0.16	1120	36	3.47	.
OP	BRC A	9/16/2008	0.083	.	0.52	1240	24	2.69	.
OP	21st	5/12/2012	0.08	0.08	0.10	812	18	4.67	0.00%
OP	I-95	11/15/2007	0.08	0.1	0.23	7600	24	19.98	-20.00%
OP	BRC A	9/25/2008	0.072	0.005	0.16	1240	24	2.69	.
OP	BRC A	11/4/2008	0.072	0.006	0.91	1240	24	2.69	.
OP	GG1	9/27/2003	0.07	.	0.34	1314	18	3.03	.
OP	GG2	6/19/2004	0.07	.	1.24	1314	18	3.03	.
OP	I-95	11/29/2005	0.07	0.002	0.62	7600	24	19.98	.
OP	BRC A	8/20/2008	0.064	0.006	0.52	1240	24	2.69	.
OP	I-95	5/11/2006	0.06	.	0.25	7600	24	19.98	.
OP	I-95	10/17/2006	0.06	0.1	0.52	7600	24	19.98	-40.00%
OP	BRC B	9/16/2008	0.051	.	0.52	1120	36	3.47	.
OP	I-95	4/12/2007	0.05	0.1	0.65	7600	24	19.98	-50.00%
OP	BRC B	7/19/2008	0.045	0.002	0.35	1120	36	3.47	.
OP	I-95	7/8/2005	0.04	0.3	1.19	7600	24	19.98	-86.67%
OP	BRC B	12/10/2008	0.038	0.005	1.49	1120	36	3.47	.
OP	BRC A	8/26/2008	0.03	0.006	0.30	1240	24	2.69	.
OP	BRC A	12/10/2008	0.03	0.005	1.49	1240	24	2.69	.
OP	I-95	4/2/2005	0.03	0.04	1.23	7600	24	19.98	-25.00%
OP	BRC B	4/22/2008	0.029	0.005	0.41	1120	36	3.47	
OP	BRC B	11/15/2008	0.029	0.01	0.34	1120	36	3.47	190.00%
OP	BRC A	11/15/2008	0.024	0.01	0.34	1240	24	2.69	140.00%
OP	BRC B	9/5/2008	0.024	0.003	2.61	1120	36	3.47	.
OP	BRC A	9/5/2008	0.023	0.003	2.61	1240	24	2.69	.
OP	BRC A	7/19/2008	0.022	0.002	0.35	1240	24	2.69	.
OP	BRC A	2/18/2009	0.018	.	0.60	1240	24	2.69	.
OP	BRC B	8/20/2008	0.018	0.006	0.52	1120	36	3.47	200.00%
OP	GHSN	4/17/2007	0.01799	0.016	2.37	780	30	2.30	12.44%
OP	BRC B	2/18/2009	0.016	.	0.60	1120	36	3.47	.
OP	GHSN	4/13/2007	0.016	0.00499	1.14	780	30	2.30	220.64%
OP	GHSS	3/19/2007	0.016	0.00899	1.37	812	47	6.94	77.98%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
OP	21st	7/31/2012	0.015	.	0.14	812	18	4.67	.
OP	GHSS	2/3/2007	0.01499	0.012	0.82	812	47	6.94	24.92%
OP	GHSS	2/26/2007	0.01499	0.00899	0.90	812	47	6.94	66.74%
OP	GHSS	4/13/2007	0.01499	0.00499	1.14	812	47	6.94	200.40%
OP	GHSS	4/17/2007	0.013	0.016	2.37	812	47	6.94	-18.75%
OP	BRC A	4/27/2008	0.012	0.004	0.78	1240	24	2.69	200.00%
OP	BRC B	8/26/2008	0.012	0.006	0.30	1120	36	3.47	100.00%
OP	GHSN	2/3/2007	0.012	0.012	0.82	780	30	2.30	0.00%
OP	GHSN	2/26/2007	0.012	0.00899	0.90	780	30	2.30	33.48%
OP	BRC A	4/22/2008	0.011	0.005	0.41	1240	24	2.69	120.00%
OP	BRC A	1/6/2009	0.011	0.003	0.88	1240	24	2.69	266.67%
OP	GHSN	3/19/2007	0.01099	0.00899	1.37	780	30	2.30	22.25%
OP	BRC B	4/20/2008	0.01	0.007	1.60	1120	36	3.47	42.86%
OP	BRC B	5/15/2008	0.01	0.009	0.25	1120	36	3.47	11.11%
OP	BRC B	7/9/2008	0.009	0.002	0.64	1120	36	3.47	
OP	BRC A	5/15/2008	0.008	0.009	0.25	1240	24	2.69	-11.11%
OP	BRC B	5/28/2008	0.008	0.005	0.49	1120	36	3.47	60.00%
OP	BRC A	5/28/2008	0.007	0.005	0.49	1240	24	2.69	40.00%
OP	BRC A	7/9/2008	0.006	0.002	0.64	1240	24	2.69	200.00%
OP	BRC B	4/27/2008	0.006	0.004	0.78	1120	36	3.47	50.00%
OP	BRC B	1/6/2009	0.006	0.003	0.88	1120	36	3.47	100.00%
OP	CR	9/26/2009	0.005	0.04	0.48	4601	24	20.07	-87.50%
OP	CR	10/15/2009	0.005	0.02	0.62	4601	24	20.07	-75.00%
OP	CR	11/11/2009	0.005	0.0497	1.09	4601	24	20.07	-89.94%
OP	CR	9/25/2008	0.005	0.05	0.62	4601	24	20.07	-90.00%
OP	CR	4/20/2009	0.005	0.005	0.62	4601	24	20.07	0.00%
OP	High	5/8/2009	0.005	.	0.31	4534	24	.	.
OP	BRC A	4/20/2008	0.004	0.007	1.60	1240	24	2.69	-42.86%
OP	I-95	3/24/2009	.	0.15	0.65	7600	24	19.98	.
OP	21st	8/11/2013	.	0.015	0.10	812	18	4.67	.
OP	High	10/21/2009	.	0.02	0.75	4534	24	.	.
OP	High	10/21/2009	.	0.04	0.75	4534	24	.	.
OP	I-95	10/13/2008	.	0.16	0.38	7600	24	19.98	.
OP	High	10/21/2009	.	0.01	0.75	4534	24	.	.
OP	High	3/7/2009	.	0.15	0.55	4534	24	.	.
OP	GG1	11/19/2003	.	0.02	0.88	1314	18	3.03	.
OP	GG2	8/12/2004	.	0.02	1.47	1314	18	3.03	.
OP	High	10/21/2009	.	0.01	0.75	4534	24	.	.
OP	GG1	8/30/2004	.	0.02	0.27	1314	18	3.03	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
OP	GG1	5/16/2004	.	0.15	0.58	1314	18	3.03	.
OP	GG1	5/1/2004	.	0.09	0.63	1314	18	3.03	.
OP	GG2	7/22/2003	.	0.04	0.47	1314	18	3.03	.
OP	GG2	12/13/2003	.	0.14	1.26	1314	18	3.03	.
OP	High	10/6/2008	.	0.005	0.12	4534	24	.	.
OP	21st	5/10/2014	.	0.22	0.66	812	18	4.67	.
OP	I-95	11/5/2008	.	0.18	0.25	7600	24	19.98	.
OP	I-95	10/21/2008	.	0.08	0.62	7600	24	19.98	.
OP	GG2	8/23/2003	.	0.04	0.72	1314	18	3.03	.
OP	21st	7/27/2013	.	0.015	0.10	812	18	4.67	.
OP	High	10/21/2009	.	0.005	0.75	4534	24	.	.
OP	High	10/21/2009	.	0.005	0.75	4534	24	.	.
OP	High	10/21/2009	.	0.005	0.75	4534	24	.	.
OP	GG2	9/6/2004	.	0.05	5.27	1314	18	3.03	.
OP	21st	8/28/2014	.	0.08	0.08	812	18	4.67	.
OP	21st	5/9/2013	.	0.07	0.10	812	18	4.67	.
OP	GG2	12/10/2003	.	0.19	1.02	1314	18	3.03	.
OP	I-95	3/10/2009	.	0.005	0.52	7600	24	19.98	.
OP	21st	7/25/2013	.	0.015	0.10	812	18	4.67	.
OP	GG1	9/3/2003	.	0.01	0.83	1314	18	3.03	.
OP	GG1	11/6/2003	.	0.13	0.26	1314	18	3.03	.
OP	21st	6/16/2013	.	0.25	0.10	812	18	4.67	.
OP	GG2	5/3/2004	.	0.06	0.63	1314	18	3.03	.
OP	I-95	9/12/2008	.	0.04	1.23	7600	24	19.98	.
OP	High	10/21/2009	.	0.02	0.75	4534	24	.	.
OP	GG2	7/29/2003	.	0.01	1.07	1314	18	3.03	.
OP	High	10/21/2009	.	0.01	0.75	4534	24	.	.
OP	GG2	11/6/2003	.	0.09	0.26	1314	18	3.03	.
OP	I-95	3/7/2009	.	0.15	0.31	7600	24	19.98	.
OP	GG2	8/30/2004	.	0.05	0.27	1314	18	3.03	.
OP	I-95	6/15/2009	.	0.03	0.23	7600	24	19.98	.
TA	21st	7/27/2011	0.006	0.0025	0.16	812	18	4.67	140.00%
TA	21st	9/14/2011	0.0055	.	0.87	812	18	4.67	.
TA	21st	7/13/2011	0.0045	0.0025	0.68	812	18	4.67	80.00%
TA	21st	9/9/2013	0.0042	0.001	0.50	812	18	4.67	.
TA	21st	9/9/2013	0.0037	0.001	0.50	812	18	4.67	.
TA	21st	9/4/2014	0.0032	0.0014	0.08	812	18	4.67	128.57%
TA	21st	7/7/2014	0.003	0.0026	0.55	812	18	4.67	15.38%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TA	21st	9/22/2013	0.0028	0.001	0.20	812	18	4.67	180.00%
TA	21st	8/20/2014	0.0028	0.0016	0.14	812	18	4.67	75.00%
TA	21st	7/11/2013	0.0027	0.0013	0.27	812	18	4.67	107.69%
TA	21st	9/29/2014	0.0026	0.0016	0.47	812	18	4.67	62.50%
TA	21st	5/5/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TA	21st	5/6/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TA	21st	5/6/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TA	21st	5/12/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TA	21st	5/23/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TA	21st	6/6/2012	0.0025	.	0.45	812	18	4.67	.
TA	21st	7/9/2012	0.0025	.	0.10	812	18	4.67	.
TA	21st	7/31/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TA	21st	8/11/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TA	21st	9/11/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TA	21st	9/11/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TA	21st	6/4/2013	0.0025	0.0005	0.17	812	18	4.67	.
TA	Hal	2/7/2004	0.0025	0.0025	1.41	1519	47	4.62	0.00%
TA	Hal	4/26/2004	0.0025	.	0.11	1519	47	4.62	.
TA	Hal	5/5/2004	0.0025	0.0025	0.95	1519	47	4.62	0.00%
TA	Hal	6/1/2004	0.0025	0.0025	0.35	1519	47	4.62	0.00%
TA	Hal	7/17/2004	0.0025	0.0025	2.43	1519	47	4.62	0.00%
TA	Hal	8/12/2004	0.0025	.	3.17	1519	47	4.62	.
TA	Hal	8/28/2004	0.0025	0.0025	0.98	1519	47	4.62	0.00%
TA	Hal	9/27/2004	0.0025	0.0025	2.43	1519	47	4.62	0.00%
TA	Hal	10/13/2004	0.0025	0.0025	0.45	1519	47	4.62	0.00%
TA	Hal	11/4/2004	0.0025	0.0025	0.82	1519	47	4.62	0.00%
TA	Hal	12/6/2004	0.0025	0.0025	0.44	1519	47	4.62	0.00%
TA	Hal	1/14/2005	0.0025	0.0025	1.03	1519	47	4.62	0.00%
TA	Hal	2/14/2005	0.0025	.	0.28	1519	47	4.62	.
TA	Hal	2/22/2005	0.0025	0.0025	0.45	1519	47	4.62	0.00%
TA	Hal	3/8/2005	0.0025	0.0025	0.65	1519	47	4.62	0.00%
TA	Hal	4/13/2005	0.0025	0.0025	1.68	1519	47	4.62	0.00%
TA	Hal	5/13/2005	0.0025	0.0025	0.25	1519	47	4.62	0.00%
TA	Hal	6/28/2005	0.0025	0.0025	0.70	1519	47	4.62	0.00%
TA	Hal	7/8/2005	0.0025	0.0025	0.63	1519	47	4.62	0.00%
TA	Hal	9/19/2005	0.0025	0.0025	0.59	1519	47	4.62	0.00%
TA	21st	7/11/2013	0.0024	0.001	0.27	812	18	4.67	140.00%
TA	21st	7/16/2014	0.0024	0.0011	0.29	812	18	4.67	118.18%
TA	21st	7/29/2014	0.0023	0.0006	2.20	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TA	21st	5/29/2013	0.0022	0.001	0.47	812	18	4.67	120.00%
TA	21st	9/28/2014	0.0022	0.001	0.12	812	18	4.67	120.00%
TA	21st	5/30/2014	0.0021	0.0011	0.26	812	18	4.67	90.91%
TA	21st	7/15/2014	0.0021	0.0019	0.11	812	18	4.67	10.53%
TA	21st	7/1/2013	0.002	0.0033	0.18	812	18	4.67	-39.39%
TA	21st	7/29/2014	0.002	0.0009	2.20	812	18	4.67	122.22%
TA	21st	9/22/2014	0.0018	0.0013	0.42	812	18	4.67	38.46%
TA	21st	8/26/2014	0.0018	0.0007	0.27	812	18	4.67	157.14%
TA	21st	5/8/2014	0.0016	0.0015	0.13	812	18	4.67	6.67%
TA	21st	6/8/2014	0.0016	0.0013	0.42	812	18	4.67	23.08%
TA	21st	5/7/2014	0.0014	0.0026	0.55	812	18	4.67	-46.15%
TA	21st	5/21/2014	0.0013	0.0018	0.20	812	18	4.67	-27.78%
TA	21st	5/22/2014	0.0012	0.0019	0.32	812	18	4.67	-36.84%
TA	21st	9/10/2014	0.0012	0.0011	0.16	812	18	4.67	9.09%
TA	21st	5/20/2011	0.001	0.0005	0.16	812	18	4.67	100.00%
TA	21st	7/12/2011	.	0.0025	0.16	812	18	4.67	.
TA	21st	8/3/2013	.	0.001	1.83	812	18	4.67	.
TA	21st	7/19/2011	.	0.0025	0.57	812	18	4.67	.
TA	21st	7/26/2011	.	0.0025	0.15	812	18	4.67	.
TA	21st	5/10/2014	.	0.0034	0.66	812	18	4.67	.
TA	21st	9/22/2013	.	0.001	0.10	812	18	4.67	.
TA	21st	7/25/2013	.	0.001	0.10	812	18	4.67	.
TA	21st	7/27/2013	.	0.001	0.10	812	18	4.67	.
TA	21st	8/28/2014	.	0.0008	0.08	812	18	4.67	.
TA	21st	6/6/2012	.	0.0025	0.35	812	18	4.67	.
TA	21st	7/9/2012	.	0.0025	0.14	812	18	4.67	.
TA	21st	5/19/2011	.	0.001	0.46	812	18	4.67	.
TA	21st	5/14/2011	.	0.0005	0.18	812	18	4.67	.
TA	21st	5/14/2011	.	0.0005	0.28	812	18	4.67	.
TA	21st	5/11/2011	.	0.0005	0.55	812	18	4.67	.
TA	21st	7/7/2011	.	0.0025	1.73	812	18	4.67	.
TA	21st	7/13/2011	.	0.0025	0.71	812	18	4.67	.
TA	21st	5/18/2011	.	0.0013	0.70	812	18	4.67	.
TA	21st	6/16/2013	.	0.0012	0.10	812	18	4.67	.
TA	21st	7/25/2013	.	0.001	0.10	812	18	4.67	.
TCA	I-95	4/2/2005	0.002	.	1.23	7600	24	19.98	.
TCA	I-95	5/20/2005	0.002	.	0.38	7600	24	19.98	.
TCA	Hal	7/8/2005	.	0.0005	0.63	1519	47	4.62	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TCA	I-95	7/8/2005	0.002	.	1.19	7600	24	19.98	.
TCA	I-95	11/29/2005	0.002	.	0.62	7600	24	19.98	.
TCA	I-95	5/11/2006	0.002	.	0.25	7600	24	19.98	.
TCA	I-95	9/14/2006	0.002	.	0.31	7600	24	19.98	.
TCA	I-95	4/12/2007	0.002	.	0.65	7600	24	19.98	.
TCA	21st	5/11/2011	0.0014	0.0001	0.17	812	18	4.67	.
TCA	21st	8/11/2012	0.0014	0.0005	0.10	812	18	4.67	180.00%
TCA	21st	5/19/2011	0.0012	0.0001	0.55	812	18	4.67	.
TCA	21st	7/16/2014	0.0011	.	0.29	812	18	4.67	.
TCA	21st	5/18/2011	0.001	0.0001	0.69	812	18	4.67	.
TCA	Hal	2/7/2004	0.001	0.001	1.41	1519	47	4.62	0.00%
TCA	Hal	5/5/2004	0.001	0.001	0.95	1519	47	4.62	0.00%
TCA	Hal	6/1/2004	0.001	0.001	0.35	1519	47	4.62	0.00%
TCA	Hal	7/17/2004	0.001	0.001	2.43	1519	47	4.62	0.00%
TCA	Hal	8/28/2004	0.001	0.001	0.98	1519	47	4.62	0.00%
TCA	Hal	9/27/2004	0.001	0.001	2.43	1519	47	4.62	0.00%
TCA	Hal	10/13/2004	0.001	0.001	0.45	1519	47	4.62	0.00%
TCA	Hal	11/4/2004	0.001	0.001	0.82	1519	47	4.62	0.00%
TCA	Hal	12/6/2004	0.001	0.001	0.44	1519	47	4.62	0.00%
TCA	Hal	1/14/2005	0.001	0.001	1.03	1519	47	4.62	0.00%
TCA	Hal	2/22/2005	0.001	0.001	0.45	1519	47	4.62	0.00%
TCA	Hal	3/8/2005	0.001	0.001	0.65	1519	47	4.62	0.00%
TCA	I-95	10/17/2006	0.001	0.001	0.52	7600	24	19.98	0.00%
TCA	I-95	10/24/2007	0.001	0.001	0.15	7600	24	19.98	0.00%
TCA	I-95	11/15/2007	0.001	0.001	0.23	7600	24	19.98	0.00%
TCA	21st	8/7/2014	0.0007	.	0.11	812	18	4.67	.
TCA	CR	3/28/2010	0.0006	.	0.62	4601	24	20.07	.
TCA	21st	6/20/2011	0.0005	.	0.45	812	18	4.67	.
TCA	21st	7/7/2011	0.0005	0.0005	1.73	812	18	4.67	0.00%
TCA	21st	7/12/2011	0.0005	0.0005	0.71	812	18	4.67	0.00%
TCA	21st	7/13/2011	0.0005	0.0005	0.68	812	18	4.67	0.00%
TCA	21st	7/19/2011	0.0005	0.0005	0.57	812	18	4.67	0.00%
TCA	21st	7/29/2011	0.0005	.	0.15	812	18	4.67	.
TCA	21st	7/27/2011	0.0005	0.0005	0.16	812	18	4.67	0.00%
TCA	21st	9/14/2011	0.0005	0.0005	0.87	812	18	4.67	0.00%
TCA	21st	5/5/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
TCA	21st	5/6/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
TCA	21st	5/6/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
TCA	21st	5/12/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TCA	21st	5/23/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
TCA	21st	6/6/2012	0.0005	.	0.45	812	18	4.67	.
TCA	21st	7/9/2012	0.0005	.	0.10	812	18	4.67	.
TCA	21st	7/31/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
TCA	21st	9/11/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
TCA	21st	9/11/2012	0.0005	0.0005	0.10	812	18	4.67	0.00%
TCA	21st	8/3/2013	0.0005	0.0004	1.83	812	18	4.67	25.00%
TCA	21st	9/15/2011	0.0005	.	0.13	812	18	4.67	.
TCA	Hal	4/13/2005	0.0005	0.0005	1.68	1519	47	4.62	0.00%
TCA	Hal	5/13/2005	0.0005	0.0005	0.25	1519	47	4.62	0.00%
TCA	Hal	6/28/2005	0.0005	0.0005	0.70	1519	47	4.62	0.00%
TCA	Hal	8/12/2004	0.0005	0.001	0.70	1519	47	4.62	-50.00%
TCA	Hal	9/19/2005	0.0005	0.0005	0.59	1519	47	4.62	0.00%
TCA	21st	9/15/2011	0.0004	.	0.13	812	18	4.67	.
TCA	21st	7/29/2014	0.0004	0.0002	2.20	812	18	4.67	100.00%
TCA	21st	8/9/2014	0.0004	.	0.14	812	18	4.67	.
TCA	21st	8/26/2014	0.0003	0.0004	0.27	812	18	4.67	-25.00%
TCA	21st	9/4/2014	0.0003	.	0.08	812	18	4.67	.
TCA	CR	6/3/2009	0.00025	0.00025	1.28	4601	24	20.07	0.00%
TCA	CR	8/21/2009	0.00025	0.00025	2.36	4601	24	20.07	0.00%
TCA	CR	9/11/2009	0.00025	0.00025	0.15	4601	24	20.07	0.00%
TCA	CR	9/26/2009	0.00025	0.00025	0.48	4601	24	20.07	0.00%
TCA	CR	10/15/2009	0.00025	0.00025	0.62	4601	24	20.07	0.00%
TCA	CR	11/11/2009	0.00025	0.00025	1.09	4601	24	20.07	0.00%
TCA	CR	9/25/2008	0.00025	0.00025	0.62	4601	24	20.07	0.00%
TCA	CR	4/20/2009	0.00025	0.00025	0.62	4601	24	20.07	0.00%
TCA	CR	3/11/2010	0.00025	.	0.62	4601	24	20.07	.
TCA	21st	5/20/2011	0.0002	0.0006	0.16	812	18	4.67	-66.67%
TCA	21st	5/29/2013	0.0002	0.0002	0.47	812	18	4.67	0.00%
TCA	21st	7/11/2013	0.0002	0.0002	0.27	812	18	4.67	0.00%
TCA	21st	7/13/2013	0.0002	0.0002	2.14	812	18	4.67	0.00%
TCA	21st	9/9/2013	0.0002	0.0002	0.50	812	18	4.67	0.00%
TCA	21st	9/9/2013	0.0002	0.0002	0.50	812	18	4.67	0.00%
TCA	21st	9/22/2013	0.0002	0.0002	0.00	812	18	4.67	0.00%
TCA	21st	5/7/2014	0.0002	0.0008	0.55	812	18	4.67	-75.00%
TCA	21st	5/8/2014	0.0002	0.0002	0.13	812	18	4.67	0.00%
TCA	21st	5/21/2014	0.0002	0.0005	0.32	812	18	4.67	-60.00%
TCA	21st	5/22/2014	0.0002	0.0002	0.16	812	18	4.67	0.00%
TCA	21st	5/30/2014	0.0002	0.0002	0.26	812	18	4.67	0.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TCA	21st	6/8/2014	0.0002	0.0002	0.42	812	18	4.67	0.00%
TCA	21st	7/7/2014	0.0002	.	0.10	812	18	4.67	.
TCA	21st	7/15/2014	0.0002	0.0004	0.11	812	18	4.67	-50.00%
TCA	21st	7/29/2014	0.0002	0.0002	2.20	812	18	4.67	0.00%
TCA	21st	5/19/2010	0.0002	0.00024	0.10	812	18	4.67	-16.67%
TCA	21st	6/4/2013	0.0001	.	0.17	812	18	4.67	.
TCA	21st	7/1/2013	0.0001	0.001	0.18	812	18	4.67	-90.00%
TCA	21st	8/20/2014	0.0001	0.0005	0.14	812	18	4.67	-80.00%
TCA	21st	8/26/2014	0.0001	0.0001	0.27	812	18	4.67	0.00%
TCA	21st	9/10/2014	0.0001	0.0001	0.16	812	18	4.67	0.00%
TCA	21st	9/22/2014	0.0001	.	0.17	812	18	4.67	.
TCA	21st	5/14/2011	0.0001	0.0003	0.28	812	18	4.67	-66.67%
TCA	21st	6/16/2013	.	0.0003	0.10	812	18	4.67	.
TCA	21st	5/9/2013	.	0.0003	0.20	812	18	4.67	.
TCA	21st	7/25/2013	.	0.0002	0.10	812	18	4.67	.
TCA	21st	7/27/2013	.	0.0002	0.10	812	18	4.67	.
TCA	21st	7/15/2013	.	0.0002	0.55	812	18	4.67	.
TCA	21st	7/15/2013	.	0.0002	0.55	812	18	4.67	.
TCA	21st	8/11/2013	.	0.0005	0.10	812	18	4.67	.
TCA	21st	5/10/2014	.	0.0002	0.66	812	18	4.67	.
TCA	21st	7/26/2011	.	0.0005	0.15	812	18	4.67	.
TCA	21st	6/20/2011	.	0.0002	0.45	812	18	4.67	.
TCA	Hal	2/14/2005	.	0.001	0.28	1519	47	4.62	.
TCA	44th	3/4/2011	.	0.000842	0.20	5100	24	.	.
TCA	21st	9/11/2012	.	0.0005	0.00	812	18	4.67	.
TCA	44th	9/18/2010	.	0.00019	1.01	5100	24	.	.
TCA	44th	4/14/2011	.	0.000172	0.19	5100	24	.	.
TCA	44th	11/16/2010	.	0.00017	0.54	5100	24	.	.
TCA	44th	2/28/2013	.	0.000157	0.57	5100	24	.	.
TCA	44th	1/20/2011	.	0.00014	0.34	5100	24	.	.
TCA	44th	3/20/2012	.	0.000137	0.39	5100	24	.	.
TCA	44th	11/11/2012	.	0.000131	0.71	5100	24	.	.
TCA	44th	2/12/2011	.	0.000126	0.53	5100	24	.	.
TCA	44th	3/28/2011	.	0.000123	0.71	5100	24	.	.
TCA	44th	1/23/2013	.	0.000123	0.23	5100	24	.	.
TCA	44th	10/14/2012	.	0.000109	0.46	5100	24	.	.
TCA	44th	3/5/2012	.	0.000107	0.29	5100	24	.	.
TCA	44th	5/25/2011	.	0.000106	0.22	5100	24	.	.
TCA	Hal	4/26/2004	.	0.001	0.11	1519	47	4.62	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TCA	21st	6/4/2013	.	0.0001	0.17	812	18	4.67	.
TCA	44th	4/3/2012	.	0.000391	0.15	5100	24	.	.
TCA	21st	8/28/2014	.	0.0001	0.08	812	18	4.67	.
TCA	21st	9/4/2014	.	0.0001	0.08	812	18	4.67	.
TCA	44th	2/12/2011	.	0.000337	0.53	5100	24	.	.
TCA	44th	3/15/2011	.	0.0001	0.31	5100	24	.	.
TCA	44th	6/6/2012	.	0.000092	0.62	5100	24	.	.
TCA	44th	4/3/2012	.	0.000091	0.15	5100	24	.	.
TCA	44th	4/25/2012	.	0.000071	0.67	5100	24	.	.
TCA	44th	2/23/2010	.	0.00007	0.55	5100	24	.	.
TCA	44th	10/30/2012	.	0.00007	1.33	5100	24	.	.
TCA	44th	3/29/2011	.	0.00007	0.71	5100	24	.	.
TCA	44th	5/27/2013	.	0.000064	0.38	5100	24	.	.
TCA	44th	5/25/2011	.	0.000062	0.22	5100	24	.	.
TCA	44th	2/16/2010	.	0.00006	0.37	5100	24	.	.
TCA	44th	11/17/2010	.	0.00006	0.54	5100	24	.	.
TCA	44th	1/21/2011	.	0.00006	0.34	5100	24	.	.
TCA	44th	11/11/2012	.	0.000056	0.71	5100	24	.	.
TCA	44th	11/11/2011	.	0.000053	0.19	5100	24	.	.
TCA	44th	4/5/2013	.	0.000053	0.27	5100	24	.	.
TCA	44th	4/12/2013	.	0.000051	0.27	5100	24	.	.
TCA	44th	2/15/2010	.	0.00005	0.37	5100	24	.	.
TCA	44th	10/30/2012	.	0.00005	1.33	5100	24	.	.
TCA	44th	10/15/2012	.	0.000049	0.35	5100	24	.	.
TCA	44th	6/25/2013	.	0.000046	0.19	5100	24	.	.
TCA	44th	3/4/2011	.	0.000042	0.20	5100	24	.	.
TCA	44th	3/5/2012	.	0.000035	0.29	5100	24	.	.
TCA	44th	4/10/2013	.	0.000033	0.22	5100	24	.	.
TCA	44th	10/30/2012	.	0.000032	1.33	5100	24	.	.
TCA	44th	2/28/2013	.	0.000032	0.57	5100	24	.	.
TCA	44th	1/24/2010	.	0.0000205	0.44	5100	24	.	.
TCA	44th	2/4/2010	.	0.0000205	0.15	5100	24	.	.
TCA	44th	2/5/2010	.	0.0000205	0.15	5100	24	.	.
TCA	44th	2/23/2010	.	0.0000205	0.55	5100	24	.	.
TCA	44th	4/1/2010	.	0.0000205	1.49	5100	24	.	.
TCA	44th	1/31/2012	.	0.000015	0.44	5100	24	.	.
TCA	44th	3/19/2013	.	0.000015	0.75	5100	24	.	.
TCA	44th	4/4/2013	.	0.000015	0.57	5100	24	.	.
TCA	44th	10/28/2011	.	0.000015	0.30	5100	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TCA	44th	6/5/2012	.	0.000015	0.30	5100	24	.	.
TCA	44th	3/19/2013	.	0.000015	0.75	5100	24	.	.
TCH	I-95	4/2/2005	0.004	0.008	1.23	7600	24	19.98	-50.00%
TCH	I-95	5/20/2005	0.004	.	0.38	7600	24	19.98	.
TCH	I-95	7/8/2005	0.004	0.004	1.19	7600	24	19.98	0.00%
TCH	I-95	9/14/2006	0.004	0.004	0.31	7600	24	19.98	0.00%
TCH	21st	6/20/2011	0.0032	0.0054	0.45	812	18	4.67	-40.74%
TCH	21st	7/7/2011	0.0025	0.0025	1.73	812	18	4.67	0.00%
TCH	21st	7/12/2011	0.0025	.	0.71	812	18	4.67	.
TCH	21st	7/13/2011	0.0025	0.0025	0.68	812	18	4.67	0.00%
TCH	21st	7/19/2011	0.0025	0.0092	0.57	812	18	4.67	-72.83%
TCH	21st	7/29/2011	0.0025	.	0.15	812	18	4.67	.
TCH	21st	7/27/2011	0.0025	0.0025	0.16	812	18	4.67	0.00%
TCH	21st	9/14/2011	0.0025	0.0025	0.87	812	18	4.67	0.00%
TCH	21st	5/5/2012	0.0025	0.0077	0.10	812	18	4.67	-67.53%
TCH	21st	5/6/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TCH	21st	5/6/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TCH	21st	5/12/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TCH	21st	5/23/2012	0.0025	.	0.10	812	18	4.67	.
TCH	21st	6/6/2012	0.0025	.	0.35	812	18	4.67	.
TCH	21st	7/9/2012	0.0025	.	0.14	812	18	4.67	.
TCH	21st	7/31/2012	0.0025	0.0025	0.12	812	18	4.67	0.00%
TCH	21st	8/11/2012	0.0025	0.0025	0.08	812	18	4.67	0.00%
TCH	21st	9/11/2012	0.0025	0.0025	0.12	812	18	4.67	0.00%
TCH	21st	9/11/2012	0.0025	0.0025	0.12	812	18	4.67	0.00%
TCH	21st	9/15/2011	0.0025	.	0.13	812	18	4.67	.
TCH	Hal	2/7/2004	0.0025	0.005	1.41	1519	47	4.62	-50.00%
TCH	Hal	7/17/2004	0.0025	0.0025	2.43	1519	47	4.62	0.00%
TCH	Hal	8/28/2004	0.0025	0.0025	0.98	1519	47	4.62	0.00%
TCH	Hal	9/27/2004	0.0025	0.0025	2.43	1519	47	4.62	0.00%
TCH	Hal	10/13/2004	0.0025	0.0025	0.45	1519	47	4.62	0.00%
TCH	Hal	11/4/2004	0.0025	0.0025	0.82	1519	47	4.62	0.00%
TCH	Hal	12/6/2004	0.0025	0.0025	0.44	1519	47	4.62	0.00%
TCH	Hal	1/14/2005	0.0025	0.0025	1.03	1519	47	4.62	0.00%
TCH	Hal	2/22/2005	0.0025	0.0025	0.45	1519	47	4.62	0.00%
TCH	Hal	3/8/2005	0.0025	0.0025	0.65	1519	47	4.62	0.00%
TCH	Hal	4/13/2005	0.0025	0.0025	1.68	1519	47	4.62	0.00%
TCH	Hal	5/13/2005	0.0025	0.0025	0.25	1519	47	4.62	0.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TCH	Hal	6/28/2005	0.0025	0.0025	0.70	1519	47	4.62	0.00%
TCH	Hal	7/8/2005	0.0025	0.0055	0.63	1519	47	4.62	-54.55%
TCH	Hal	9/19/2005	0.0025	0.0025	0.59	1519	47	4.62	0.00%
TCH	Hal	10/6/2005	0.0025	0.0025	2.08	1519	47	4.62	0.00%
TCH	Hal	12/5/2005	0.0025	0.0025	1.27	1519	47	4.62	0.00%
TCH	Hal	12/16/2005	0.0025	0.0025	1.68	1519	47	4.62	0.00%
TCH	Hal	12/29/2005	0.0025	0.0025	0.35	1519	47	4.62	0.00%
TCH	I-95	11/15/2007	0.0025	0.005	0.23	7600	24	19.98	-50.00%
TCH	21st	5/20/2011	0.001	.	0.16	812	18	4.67	.
TCH	21st	5/29/2013	0.001	0.0051	0.47	812	18	4.67	-80.39%
TCH	21st	7/11/2013	0.001	0.0021	0.27	812	18	4.67	-52.38%
TCH	21st	7/13/2013	0.001	0.0023	2.14	812	18	4.67	-56.52%
TCH	21st	8/3/2013	0.001	0.006	1.83	812	18	4.67	-83.33%
TCH	21st	9/9/2013	0.001	0.001	0.50	812	18	4.67	0.00%
TCH	21st	9/9/2013	0.001	0.001	0.50	812	18	4.67	0.00%
TCH	21st	9/22/2013	0.001	0.001	0.00	812	18	4.67	0.00%
TCH	21st	5/7/2014	0.001	.	0.55	812	18	4.67	.
TCH	21st	5/8/2014	0.001	0.0093	0.13	812	18	4.67	-89.25%
TCH	21st	5/21/2014	0.001	0.0092	0.32	812	18	4.67	-89.13%
TCH	21st	5/22/2014	0.001	0.0028	0.16	812	18	4.67	-64.29%
TCH	21st	5/30/2014	0.001	0.0054	0.26	812	18	4.67	-81.48%
TCH	21st	6/8/2014	0.001	0.0064	0.42	812	18	4.67	-84.38%
TCH	21st	7/7/2014	0.001	.	0.10	812	18	4.67	.
TCH	21st	7/15/2014	0.001	0.008	0.11	812	18	4.67	-87.50%
TCH	21st	7/16/2014	0.001	.	0.29	812	18	4.67	.
TCH	21st	7/29/2014	0.001	0.001	2.20	812	18	4.67	0.00%
TCH	21st	7/29/2014	0.001	0.001	2.20	812	18	4.67	0.00%
TCH	21st	8/7/2014	0.001	.	0.11	812	18	4.67	.
TCH	21st	8/9/2014	0.001	.	0.14	812	18	4.67	.
TCH	21st	6/4/2013	0.0005	.	0.17	812	18	4.67	.
TCH	21st	7/1/2013	0.0005	.	0.18	812	18	4.67	.
TCH	21st	9/15/2011	0.0005	.	0.13	812	18	4.67	.
TCH	21st	8/20/2014	0.0005	.	0.14	812	18	4.67	.
TCH	21st	8/26/2014	0.0005	0.0066	0.27	812	18	4.67	-92.42%
TCH	21st	8/26/2014	0.0005	0.0022	0.27	812	18	4.67	-77.27%
TCH	21st	9/4/2014	0.0005	0.0026	0.08	812	18	4.67	-80.77%
TCH	21st	9/10/2014	0.0005	0.0005	0.16	812	18	4.67	0.00%
TCH	21st	9/22/2014	0.0005	.	0.17	812	18	4.67	.
TCH	21st	9/28/2014	0.0005	.	0.12	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TCH	21st	9/29/2014	0.0005	.	0.47	812	18	4.67	.
TCH	Hal	1/14/2005	.	0.0025	1.03	1519	47	4.62	.
TCH	Hal	2/14/2005	.	0.0025	0.28	1519	47	4.62	.
TCH	21st	5/10/2014	.	0.0033	0.66	812	18	4.67	.
TCH	21st	5/14/2011	.	0.0032	0.28	812	18	4.67	.
TCH	21st	6/16/2013	.	0.0032	0.10	812	18	4.67	.
TCH	Hal	5/13/2005	.	0.0025	0.25	1519	47	4.62	.
TCH	Hal	4/26/2004	.	0.0025	0.11	1519	47	4.62	.
TCH	21st	5/19/2011	.	0.0025	0.55	812	18	4.67	.
TCH	21st	5/11/2011	.	0.004	0.17	812	18	4.67	.
TCH	Hal	5/5/2004	.	0.0025	0.95	1519	47	4.62	.
TCH	Hal	12/12/2005	.	0.0025	0.43	1519	47	4.62	.
TCH	21st	7/26/2011	.	0.0025	0.15	812	18	4.67	.
TCH	21st	8/11/2013	.	0.0077	0.10	812	18	4.67	.
TCH	Hal	1/31/2006	.	0.0025	0.24	1519	47	4.62	.
TCH	Hal	3/22/2006	.	0.0025	0.95	1519	47	4.62	.
TCH	I-95	10/17/2006	.	0.0025	0.52	7600	24	19.98	.
TCH	I-95	4/12/2007	.	0.0025	0.65	7600	24	19.98	.
TCH	21st	5/18/2011	.	0.006	0.69	812	18	4.67	.
TCH	I-95	10/24/2007	.	0.007	0.15	7600	24	19.98	.
TCH	Hal	6/1/2004	.	0.0025	0.35	1519	47	4.62	.
TCH	21st	8/28/2014	.	0.0016	0.08	812	18	4.67	.
TCH	21st	5/23/2012	.	0.0025	0.10	812	18	4.67	.
TCH	I-95	5/11/2006	.	0.004	0.25	7600	24	19.98	.
TCH	21st	8/20/2014	.	0.0089	0.14	812	18	4.67	.
TCH	21st	7/25/2013	.	0.001	0.10	812	18	4.67	.
TCH	21st	7/27/2013	.	0.001	0.10	812	18	4.67	.
TCH	21st	7/15/2013	.	0.001	0.55	812	18	4.67	.
TCH	21st	7/15/2013	.	0.001	0.55	812	18	4.67	.
TCH	Hal	8/12/2004	.	0.0025	0.70	1519	47	4.62	.
TCH	21st	5/9/2013	.	0.0075	0.11	812	18	4.67	.
TCH	21st	9/11/2012	.	0.0025	0.12	812	18	4.67	.
TCO	21st	7/19/2011	0.0267	0.0246	0.57	812	18	4.67	8.54%
TCO	I-95	5/11/2006	0.026	0.044	0.25	7600	24	19.98	-40.91%
TCO	I-95	4/12/2007	0.026	0.015	0.65	7600	24	19.98	73.33%
TCO	FC 1	7/18/2013	0.0254	0.0254	0.20	4601	24	20.07	0.00%
TCO	I-95	9/14/2006	0.024	0.018	0.31	7600	24	19.98	33.33%
TCO	I-95	10/24/2007	0.023	0.021	0.15	7600	24	19.98	9.52%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TCO	21st	5/5/2012	0.0227	0.0278	0.10	812	18	4.67	-18.35%
TCO	FC 1	7/5/2013	0.0227	.	0.50	4601	24	20.07	.
TCO	FC 1	9/9/2013	0.02	0.023	0.10	4601	24	20.07	-13.04%
TCO	FC 1	9/27/2013	0.019	0.023	0.10	4601	24	20.07	-17.39%
TCO	21st	6/6/2012	0.0183	.	0.35	812	18	4.67	.
TCO	I-95	11/29/2005	0.018	0.012	0.62	7600	24	19.98	50.00%
TCO	21st	7/29/2011	0.0178	.	0.15	812	18	4.67	.
TCO	Hal	5/5/2004	0.017	0.032	0.95	1519	47	4.62	-46.88%
TCO	21st	5/7/2014	0.0167	0.0489	0.55	812	18	4.67	-65.85%
TCO	21st	7/9/2012	0.0166	.	0.14	812	18	4.67	.
TCO	21st	7/7/2014	0.0165	.	0.10	812	18	4.67	.
TCO	21st	7/31/2012	0.0158	0.0137	0.00	812	18	4.67	15.33%
TCO	High	6/9/2009	0.0157	.	1.49	4534	24	.	.
TCO	21st	8/11/2012	0.0155	0.033	0.08	812	18	4.67	-53.03%
TCO	21st	5/6/2012	0.0154	.	0.10	812	18	4.67	.
TCO	21st	7/1/2013	0.0153	.	0.18	812	18	4.67	.
TCO	I-95	4/2/2005	0.015	0.023	1.23	7600	24	19.98	-34.78%
TCO	21st	5/29/2013	0.0149	0.0209	0.47	812	18	4.67	-28.71%
TCO	21st	9/9/2013	0.0144	.	0.50	812	18	4.67	.
TCO	21st	9/11/2012	0.0143	0.0147	0.12	812	18	4.67	-2.72%
TCO	21st	7/27/2011	0.014	0.0148	0.16	812	18	4.67	-5.41%
TCO	21st	9/14/2011	0.014	0.0142	0.87	812	18	4.67	-1.41%
TCO	I-95	11/15/2007	0.014	0.012	0.23	7600	24	19.98	16.67%
TCO	21st	6/4/2013	0.0136	.	0.17	812	18	4.67	.
TCO	21st	7/11/2013	0.0136	0.012	0.27	812	18	4.67	13.33%
TCO	21st	9/22/2014	0.0135	0.03	0.17	812	18	4.67	-55.00%
TCO	21st	9/4/2014	0.0126	0.0144	0.08	812	18	4.67	-12.50%
TCO	21st	8/3/2013	0.0125	0.0233	1.83	812	18	4.67	-46.35%
TCO	21st	5/8/2014	0.0121	0.0275	0.13	812	18	4.67	-56.00%
TCO	21st	8/7/2014	0.0121	.	0.11	812	18	4.67	.
TCO	Hal	5/13/2005	0.012	0.013	0.25	1519	47	4.62	-7.69%
TCO	21st	5/6/2012	0.0118	0.012	0.10	812	18	4.67	-1.67%
TCO	21st	7/15/2014	0.0113	0.0304	0.11	812	18	4.67	-62.83%
TCO	High	10/21/2008	0.0109	.	2.28	4534	24	.	.
TCO	21st	5/23/2012	0.0106	0.0448	0.10	812	18	4.67	-76.34%
TCO	21st	5/20/2011	0.0106	0.0459	0.16	812	18	4.67	-76.91%
TCO	21st	9/9/2013	0.0104	.	0.50	812	18	4.67	.
TCO	Hal	6/1/2004	0.01	0.017	0.35	1519	47	4.62	-41.18%
TCO	Hal	3/22/2006	0.01	.	0.95	1519	47	4.62	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TCO	I-95	10/17/2006	0.01	.	0.52	7600	24	19.98	.
TCO	21st	5/30/2014	0.0099	0.0182	0.26	812	18	4.67	-45.60%
TCO	21st	7/29/2014	0.0099	.	2.20	812	18	4.67	.
TCO	21st	8/26/2014	0.0099	0.0264	0.27	812	18	4.67	-62.50%
TCO	Hal	12/12/2005	0.0099	.	0.43	1519	47	4.62	.
TCO	CR	8/21/2009	0.0098	.	2.36	4601	24	20.07	.
TCO	High	7/24/2010	0.0097	.	1.41	4534	24	.	.
TCO	CR	3/28/2010	0.0093	0.041	0.62	4601	24	20.07	-77.32%
TCO	21st	8/9/2014	0.0092	.	0.14	812	18	4.67	.
TCO	21st	6/8/2014	0.0088	0.0203	0.42	812	18	4.67	-56.65%
TCO	21st	7/29/2014	0.0088	.	2.20	812	18	4.67	.
TCO	21st	7/16/2014	0.0087	0.0168	0.29	812	18	4.67	-48.21%
TCO	21st	5/21/2014	0.0084	0.03	0.32	812	18	4.67	-72.00%
TCO	High	9/1/2010	0.0082	.	0.86	4534	24	.	.
TCO	21st	9/29/2014	0.0081	.	0.47	812	18	4.67	.
TCO	Hal	2/7/2004	0.008	0.019	1.41	1519	47	4.62	-57.89%
TCO	21st	8/20/2014	0.0077	0.0281	0.14	812	18	4.67	-72.60%
TCO	I-95	3/10/2009	0.0075	.	0.52	7600	24	19.98	.
TCO	Gris	5/10/2014	.	0.05	0.83	1953	43	.	.
TCO	I-95	9/12/2008	0.0073	.	1.23	7600	24	19.98	.
TCO	21st	9/11/2012	0.0072	0.0136	0.12	812	18	4.67	-47.06%
TCO	21st	8/26/2014	0.0072	.	0.27	812	18	4.67	.
TCO	High	11/2/2011	0.0072	.	1.41	4534	24	.	.
TCO	21st	9/28/2014	0.0069	.	0.12	812	18	4.67	.
TCO	CR	6/3/2009	0.0069	.	1.28	4601	24	20.07	.
TCO	High	8/20/2010	0.0069	.	1.93	4534	24	.	.
TCO	21st	9/10/2014	0.0067	.	0.16	812	18	4.67	.
TCO	High	9/13/2010	0.0067	.	0.67	4534	24	.	.
TCO	Hal	12/29/2005	0.0066	0.016	0.35	1519	47	4.62	-58.75%
TCO	High	3/23/2009	0.0064	.	0.55	4534	24	.	.
TCO	I-95	6/15/2009	0.0063	.	0.23	7600	24	19.98	.
TCO	CR	9/11/2009	0.0062	.	0.15	4601	24	20.07	.
TCO	High	10/29/2009	0.0062	.	1.10	4534	24	.	.
TCO	21st	5/22/2014	0.006	.	0.16	812	18	4.67	.
TCO	Gris	12/15/2012	0.006	0.04	0.56	1953	43	.	-85.00%
TCO	Gris	1/29/2013	0.006	.	0.19	1953	43	.	.
TCO	Gris	1/3/2015	0.006	0.022	0.38	1953	43	.	-72.73%
TCO	High	7/20/2010	0.006	.	0.75	4534	24	.	.
TCO	I-95	10/15/2008	0.006	.	1.19	7600	24	19.98	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TCO	Hal	10/6/2005	0.0058	.	2.08	1519	47	4.62	.
TCO	I-95	6/9/2009	0.0058	.	0.15	7600	24	19.98	.
TCO	High	7/20/2009	0.0057	.	0.86	4534	24	.	.
TCO	Hal	7/8/2005	0.0056	0.023	0.63	1519	47	4.62	-75.65%
TCO	I-95	10/21/2008	0.0056	.	0.62	7600	24	19.98	.
TCO	21st	9/22/2013	0.0051	.	0.12	812	18	4.67	.
TCO	CR	3/11/2010	0.0051	0.024	0.62	4601	24	20.07	-78.75%
TCO	High	9/15/2010	0.005	.	0.75	4534	24	.	.
TCO	I-95	11/5/2008	0.005	.	0.25	7600	24	19.98	.
TCO	21st	5/12/2012	0.0049	.	0.10	812	18	4.67	.
TCO	High	9/15/2010	0.0049	.	0.75	4534	24	.	.
TCO	Hal	1/14/2005	0.0046	.	1.03	1519	47	4.62	.
TCO	Hal	9/19/2005	0.0046	0.03	0.59	1519	47	4.62	-84.67%
TCO	Hal	12/5/2005	0.0046	.	1.27	1519	47	4.62	.
TCO	Hal	9/27/2004	0.0044	.	2.43	1519	47	4.62	.
TCO	High	3/10/2009	0.0044	.	1.53	4534	24	.	.
TCO	Hal	2/22/2005	0.004	.	0.45	1519	47	4.62	.
TCO	Hal	4/13/2005	0.004	0.012	1.68	1519	47	4.62	-66.67%
TCO	High	7/8/2010	0.004	.	0.28	4534	24	.	.
TCO	I-95	3/24/2009	0.004	0.0123	0.65	7600	24	19.98	-67.48%
TCO	Hal	12/16/2005	0.0039	.	1.68	1519	47	4.62	.
TCO	High	4/26/2009	0.0038	.	2.20	4534	24	.	.
TCO	High	8/16/2009	0.0037	.	1.93	4534	24	.	.
TCO	High	10/25/2009	0.0036	.	0.83	4534	24	.	.
TCO	Hal	11/4/2004	0.0035	.	0.82	1519	47	4.62	.
TCO	Hal	3/8/2005	0.0035	0.013	0.65	1519	47	4.62	-73.08%
TCO	High	10/1/2009	0.0035	.	0.31	4534	24	.	.
TCO	High	11/14/2009	0.0035	.	1.14	4534	24	.	.
TCO	High	10/22/2009	0.0033	.	0.83	4534	24	.	.
TCO	Hal	12/6/2004	0.0032	.	0.44	1519	47	4.62	.
TCO	High	11/7/2011	0.0032	.	1.97	4534	24	.	.
TCO	High	11/5/2008	0.0031	0.0242	1.10	4534	24	.	-87.19%
TCO	Gris	7/30/2013	0.003	.	0.23	1953	43	.	.
TCO	Gris	4/24/2014	0.003	0.029	0.40	1953	43	.	-89.66%
TCO	Gris	5/10/2014	0.003	.	0.83	1953	43	.	.
TCO	Gris	8/15/2014	0.003	0.027	1.14	1953	43	.	-88.89%
TCO	Gris	8/29/2014	0.003	0.042	0.29	1953	43	.	-92.86%
TCO	Gris	9/5/2014	0.003	0.029	0.56	1953	43	.	-89.66%
TCO	Gris	11/23/2014	0.003	.	0.67	1953	43	.	.

Appendix A: *Continued*

Poll.	Site	Date	y	x1	x2	x3	x4	x5	% Change in Pollutant Conc. (Outliers Removed)
			Eff. Conc. (mg/L or CFU/100 ml)	Inf. Conc. (mg/L or CFU/100 ml)	Rainfall Depth (in)	Ponding Volume (ft^3)	Media Depth (in)	Retetion Time (min)	
TCO	Gris	12/5/2014	0.003	0.036	0.48	1953	43	.	-91.67%
TCO	Hal	8/28/2004	0.003	0.018	0.98	1519	47	4.62	-83.33%
TCO	High	7/3/2009	0.003	.	0.63	4534	24	.	.
TCO	High	8/19/2009	0.003	.	0.28	4534	24	.	.
TCO	High	7/11/2010	0.003	.	2.00	4534	24	.	.
TCO	Hal	10/13/2004	0.0029	.	0.45	1519	47	4.62	.
TCO	High	8/19/2009	0.0027	.	0.28	4534	24	.	.
TCO	High	9/24/2008	0.0026	.	0.31	4534	24	.	.
TCO	High	10/15/2008	0.0026	.	0.98	4534	24	.	.
TCO	FC 1	6/28/2013	0.0025	0.0312	0.50	4601	24	20.07	-91.99%
TCO	FC 1	9/22/2013	0.0025	.	0.10	4601	24	20.07	.
TCO	FC 1	10/3/2013	0.0025	.	0.20	4601	24	20.07	.
TCO	High	9/12/2008	0.0025	.	1.77	4534	24	.	.
TCO	High	5/15/2009	0.0025	.	0.86	4534	24	.	.
TCO	Hal	6/28/2005	0.0023	.	0.70	1519	47	4.62	.
TCO	Hal	7/17/2004	0.002	.	2.43	1519	47	4.62	.
TCO	High	5/8/2009	0.0017	.	0.31	4534	24	.	.
TCO	High	6/15/2009	0.0017	.	0.35	4534	24	.	.
TCO	CR	9/26/2009	0.001	.	0.48	4601	24	20.07	.
TCO	CR	10/15/2009	0.001	.	0.62	4601	24	20.07	.
TCO	CR	11/11/2009	0.001	.	1.09	4601	24	20.07	.
TCO	CR	9/25/2008	0.001	.	0.62	4601	24	20.07	.
TCO	CR	4/20/2009	0.001	.	0.62	4601	24	20.07	.
TCO	High	10/21/2009	.	0.0176	0.75	4534	24	.	.
TCO	44th	11/16/2010	.	0.0171	0.54	5100	24	.	.
TCO	21st	5/18/2011	.	0.017	0.69	812	18	4.67	.
TCO	Gris	7/29/2013	.	0.02	0.19	1953	43	.	.
TCO	44th	11/11/2011	.	0.0202	0.19	5100	24	.	.
TCO	21st	7/26/2011	.	0.0165	0.15	812	18	4.67	.
TCO	44th	2/12/2011	.	0.016	0.53	5100	24	.	.
TCO	21st	5/9/2013	.	0.0224	0.10	812	18	4.67	.
TCO	44th	3/28/2011	.	0.0159	0.71	5100	24	.	.
TCO	44th	6/6/2012	.	0.0176	0.62	5100	24	.	.
TCO	44th	5/19/2010	.	0.0309	0.45	5100	24	.	.
TCO	21st	7/12/2011	.	0.031	0.71	812	18	4.67	.
TCO	44th	1/23/2013	.	0.0147	0.23	5100	24	.	.
TCO	44th	4/10/2013	.	0.0143	0.22	5100	24	.	.
TCO	44th	4/14/2011	.	0.0143	0.19	5100	24	.	.
TCO	21st	6/20/2011	.	0.0201	0.45	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TCO	21st	6/16/2013	.	0.0307	0.10	812	18	4.67	.
TCO	44th	4/3/2012	.	0.0138	0.15	5100	24	.	.
TCO	I-95	5/20/2005	.	0.036	0.38	7600	24	19.98	.
TCO	44th	5/25/2011	.	0.0466	0.22	5100	24	.	.
TCO	44th	10/15/2012	.	0.0214	0.35	5100	24	.	.
TCO	I-95	3/7/2009	.	0.0481	0.31	7600	24	19.98	.
TCO	44th	1/20/2011	.	0.0125	0.34	5100	24	.	.
TCO	44th	3/4/2011	.	0.0231	0.20	5100	24	.	.
TCO	21st	7/13/2011	.	0.0232	0.68	812	18	4.67	.
TCO	Hal	2/14/2005	.	0.012	0.28	1519	47	4.62	.
TCO	21st	5/11/2011	.	0.0298	0.17	812	18	4.67	.
TCO	FC 1	5/8/2013	.	0.0513	0.10	4601	24	20.07	.
TCO	I-95	7/8/2005	.	0.028	1.19	7600	24	19.98	.
TCO	21st	7/25/2013	.	0.0118	0.10	812	18	4.67	.
TCO	44th	3/5/2012	.	0.0114	0.29	5100	24	.	.
TKN	GG1	6/19/2004	5.2	1.6	1.24	1314	18	3.03	225.00%
TKN	21st	5/19/2011	5.1	1.1	0.55	812	18	4.67	.
TKN	GG1	9/27/2003	5.1	1.1	0.34	1314	18	3.03	.
TKN	GG1	7/29/2003	5	0.95	1.07	1314	18	3.03	.
TKN	GG1	9/18/2003	5	0.4	1.97	1314	18	3.03	.
TKN	GG2	8/23/2003	4.7	0.9	0.72	1314	18	3.03	.
TKN	21st	6/20/2011	4.6	4.5	0.45	812	18	4.67	2.22%
TKN	GG1	7/12/2003	4.4	1.2	4.56	1314	18	3.03	266.67%
TKN	GG2	9/3/2003	4.3	.	0.83	1314	18	3.03	.
TKN	GG2	6/4/2004	4.3	3.5	0.89	1314	18	3.03	22.86%
TKN	GG1	12/13/2003	4.2	1.3	1.26	1314	18	3.03	223.08%
TKN	GG1	8/8/2003	4	2.6	2.88	1314	18	3.03	53.85%
TKN	GG1	8/2/2003	3.9	2.4	2.45	1314	18	3.03	62.50%
TKN	GG2	8/5/2003	3.9	.	2.45	1314	18	3.03	.
TKN	FC 1	9/9/2013	3.87	5.2	0.10	4601	24	20.07	-25.58%
TKN	GG2	9/18/2003	3.8	0.66	1.97	1314	18	3.03	.
TKN	I-95	3/10/2009	3.8	3.1	0.52	7600	24	19.98	22.58%
TKN	21st	7/29/2011	3.6	.	0.15	812	18	4.67	.
TKN	FC2	7/11/2014	3.44	.	0.87	1314	18	3.03	.
TKN	FC2	7/11/2014	3.44	.	0.87	1314	18	3.03	.
TKN	FC2	6/8/2014	3.42	3.13	0.16	1314	18	3.03	9.27%
TKN	FC2	6/8/2014	3.42	3.13	0.16	1314	18	3.03	9.27%
TKN	I-95	9/12/2008	3.4	0.6	1.23	7600	24	19.98	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TKN	GG1	12/10/2003	3.3	0.6	1.02	1314	18	3.03	.
TKN	High	9/1/2010	3.3	0.6	0.86	4534	24	.	.
TKN	I-95	5/11/2006	3.29	.	0.25	7600	24	19.98	.
TKN	21st	7/19/2011	3.2	3.9	0.57	812	18	4.67	-17.95%
TKN	GG1	8/23/2003	3.2	1.7	0.72	1314	18	3.03	88.24%
TKN	FC 1	7/5/2013	3.15	2.84	0.50	4601	24	20.07	10.92%
TKN	GG2	8/16/2003	3.1	.	1.62	1314	18	3.03	.
TKN	High	7/8/2010	3.1	0.9	0.28	4534	24	.	244.44%
TKN	I-95	10/15/2008	3.1	.	1.19	7600	24	19.98	.
TKN	High	3/23/2009	3	1.7	0.55	4534	24	.	76.47%
TKN	21st	5/5/2012	2.9	.	0.10	812	18	4.67	.
TKN	GG2	7/13/2003	2.9	0.6	3.96	1314	18	3.03	.
TKN	21st	9/15/2011	2.8	.	0.13	812	18	4.67	.
TKN	21st	9/15/2011	2.8	.	0.13	812	18	4.67	.
TKN	GG2	8/14/2003	2.8	.	0.15	1314	18	3.03	.
TKN	FC 1	7/18/2013	2.75	2.75	0.20	4601	24	20.07	0.00%
TKN	FC2	7/29/2014	2.75	3.99	1.50	1314	18	3.03	-31.08%
TKN	FC2	7/29/2014	2.75	3.99	1.50	1314	18	3.03	-31.08%
TKN	High	10/22/2009	2.6	.	0.83	4534	24	.	.
TKN	I-95	6/15/2009	2.6	1.4	0.23	7600	24	19.98	85.71%
TKN	21st	7/31/2012	2.5	2.8	0.14	812	18	4.67	-10.71%
TKN	21st	8/11/2012	2.5	3.4	0.08	812	18	4.67	-26.47%
TKN	21st	7/1/2013	2.5	.	0.18	812	18	4.67	.
TKN	21st	7/13/2013	2.5	.	2.14	812	18	4.67	.
TKN	High	3/10/2009	2.5	1.2	1.53	4534	24	.	108.33%
TKN	High	10/1/2009	2.5	2	0.31	4534	24	.	25.00%
TKN	High	9/13/2010	2.5	1.3	0.67	4534	24	.	92.31%
TKN	I-95	5/20/2005	2.5	2.83	0.38	7600	24	19.98	-11.66%
TKN	I-95	10/21/2008	2.5	4.5	0.62	7600	24	19.98	-44.44%
TKN	FC 1	7/28/2013	2.49	4.65	0.10	4601	24	20.07	-46.45%
TKN	21st	7/12/2011	2.4	3	0.71	812	18	4.67	-20.00%
TKN	21st	7/7/2014	2.4	.	0.10	812	18	4.67	.
TKN	I-95	11/5/2008	2.4	3.6	0.25	7600	24	19.98	-33.33%
TKN	FC 1	9/27/2013	2.35	3.02	0.10	4601	24	20.07	-22.19%
TKN	I-95	3/24/2009	2.3	.	0.65	7600	24	19.98	.
TKN	21st	9/9/2013	2.2	1.1	0.50	812	18	4.67	100.00%
TKN	21st	7/15/2014	2.2	5	0.11	812	18	4.67	-56.00%
TKN	21st	8/7/2014	2.1	.	0.11	812	18	4.67	.
TKN	FC2	7/15/2014	2.1	3.52	0.55	1314	18	3.03	-40.34%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TKN	FC2	7/15/2014	2.1	3.52	0.55	1314	18	3.03	-40.34%
TKN	High	5/8/2009	2.1	2.1	0.31	4534	24	.	0.00%
TKN	21st	7/13/2011	2	2.4	0.68	812	18	4.67	-16.67%
TKN	21st	7/27/2011	2	2.9	0.16	812	18	4.67	-31.03%
TKN	21st	9/14/2011	2	3.1	0.87	812	18	4.67	-35.48%
TKN	21st	8/3/2013	2	3.8	1.83	812	18	4.67	-47.37%
TKN	21st	6/18/2014	2	5.1	0.10	812	18	4.67	-60.78%
TKN	CR	4/20/2009	2	3.302	0.62	4601	24	20.07	-39.43%
TKN	GG2	8/10/2003	2	0.54	0.46	1314	18	3.03	.
TKN	High	7/3/2009	2	1.3	0.63	4534	24	.	53.85%
TKN	High	7/20/2010	2	1	0.75	4534	24	.	100.00%
TKN	High	9/15/2010	2	0.6	0.75	4534	24	.	233.33%
TKN	21st	5/20/2011	1.9	.	0.16	812	18	4.67	.
TKN	High	10/15/2008	1.9	.	0.98	4534	24	.	.
TKN	High	8/16/2009	1.9	1.4	1.93	4534	24	.	35.71%
TKN	I-95	10/24/2007	1.89	3.75	0.15	7600	24	19.98	-49.60%
TKN	FC 1	9/7/2015	1.88	2.032	0.10	4601	24	20.07	-7.48%
TKN	FC2	4/26/2015	1.84	2.36	0.47	1314	18	3.03	-22.03%
TKN	FC2	4/26/2015	1.84	2.36	0.47	1314	18	3.03	-22.03%
TKN	21st	6/6/2012	1.8	.	0.14	812	18	4.67	.
TKN	CR	6/3/2009	1.8	1.8221	1.28	4601	24	20.07	-1.21%
TKN	CR	8/21/2009	1.8	1.178	2.36	4601	24	20.07	52.80%
TKN	High	5/15/2009	1.8	2.1	0.86	4534	24	.	-14.29%
TKN	High	10/29/2009	1.8	1.1	1.10	4534	24	.	63.64%
TKN	High	11/7/2011	1.8	3.5	1.97	4534	24	.	-48.57%
TKN	FC2	6/22/2014	1.73	2.41	0.34	1314	18	3.03	-28.22%
TKN	FC2	6/22/2014	1.73	2.41	0.34	1314	18	3.03	-28.22%
TKN	21st	9/11/2012	1.7	2	0.12	812	18	4.67	-15.00%
TKN	High	9/24/2008	1.7	3.7	0.31	4534	24	.	-54.05%
TKN	High	10/21/2008	1.7	.	2.28	4534	24	.	.
TKN	High	4/26/2009	1.7	1.4	2.20	4534	24	.	21.43%
TKN	High	6/9/2009	1.7	2.3	1.49	4534	24	.	-26.09%
TKN	FC 1	9/22/2013	1.63	2.54	0.10	4601	24	20.07	-35.83%
TKN	FC2	9/29/2014	1.63	1.97	0.39	1314	18	3.03	-17.26%
TKN	FC2	9/29/2014	1.63	1.97	0.39	1314	18	3.03	-17.26%
TKN	I-95	7/8/2005	1.61	1.47	1.19	7600	24	19.98	9.52%
TKN	21st	7/11/2013	1.6	.	0.27	812	18	4.67	.
TKN	21st	8/9/2014	1.6	.	0.14	812	18	4.67	.
TKN	CR	3/28/2010	1.6	3.7	0.62	4601	24	20.07	-56.76%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TKN	21st	5/6/2012	1.5	1.1	0.10	812	18	4.67	36.36%
TKN	21st	5/29/2013	1.5	4.4	0.47	812	18	4.67	-65.91%
TKN	GG1	7/23/2003	1.5	2.1	0.47	1314	18	3.03	-28.57%
TKN	High	11/5/2008	1.5	3.6	1.10	4534	24	.	-58.33%
TKN	High	7/20/2009	1.5	0.8	0.86	4534	24	.	87.50%
TKN	High	10/25/2009	1.5	1.2	0.83	4534	24	.	25.00%
TKN	High	11/14/2009	1.5	2.5	1.14	4534	24	.	-40.00%
TKN	FC2	5/19/2015	1.44	1.92	1.52	1314	18	3.03	-25.00%
TKN	FC2	5/19/2015	1.44	1.92	1.52	1314	18	3.03	-25.00%
TKN	21st	5/7/2014	1.4	.	0.55	812	18	4.67	.
TKN	21st	5/21/2014	1.4	4.4	0.32	812	18	4.67	-68.18%
TKN	21st	7/29/2014	1.4	1.8	2.20	812	18	4.67	-22.22%
TKN	21st	8/26/2014	1.4	1.9	0.27	812	18	4.67	-26.32%
TKN	FC 1	8/18/2015	1.4	1.64	0.10	4601	24	20.07	-14.63%
TKN	Hal	12/29/2005	1.4	0.93	0.35	1519	47	4.62	50.54%
TKN	High	9/12/2008	1.4	0.5	1.77	4534	24	.	180.00%
TKN	High	8/19/2009	1.4	0.4	0.28	4534	24	.	250.00%
TKN	High	8/19/2009	1.4	0.3	0.28	4534	24	.	.
TKN	High	7/11/2010	1.4	1.1	2.00	4534	24	.	27.27%
TKN	High	9/15/2010	1.4	0.6	0.75	4534	24	.	133.33%
TKN	I-95	9/14/2006	1.38	1.72	0.31	7600	24	19.98	-19.77%
TKN	GHSN	9/24/2006	1.359	1.036	0.38	780	30	2.30	31.18%
TKN	GHSS	9/24/2006	1.359	1.036	0.38	812	47	6.94	31.18%
TKN	21st	7/16/2014	1.3	2.5	0.29	812	18	4.67	-48.00%
TKN	Hal	5/5/2004	1.3	2.1	0.95	1519	47	4.62	-38.10%
TKN	Hal	5/13/2005	1.3	1.5	0.25	1519	47	4.62	-13.33%
TKN	FC 1	10/3/2013	1.29	2.24	0.20	4601	24	20.07	-42.41%
TKN	BRC A	7/19/2008	1.246	0.767	0.35	1240	24	2.69	62.45%
TKN	BRC B	7/19/2008	1.208	0.767	0.35	1120	36	3.47	57.50%
TKN	21st	7/9/2012	1.2	.	0.14	812	18	4.67	.
TKN	21st	6/4/2013	1.2	1.8	0.17	812	18	4.67	-33.33%
TKN	21st	9/22/2013	1.2	1.4	0.10	812	18	4.67	-14.29%
TKN	21st	6/8/2014	1.2	3.7	0.42	812	18	4.67	-67.57%
TKN	21st	9/22/2014	1.2	.	0.17	812	18	4.67	.
TKN	Hal	6/1/2004	1.2	1.7	0.35	1519	47	4.62	-29.41%
TKN	High	6/15/2009	1.2	1.6	0.35	4534	24	.	-25.00%
TKN	I-95	4/12/2007	1.2	1.41	0.65	7600	24	19.98	-14.89%
TKN	BRC B	5/28/2008	1.154	1.04	0.49	1120	36	3.47	10.96%
TKN	21st	5/12/2012	1.1	1.1	0.10	812	18	4.67	0.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TKN	21st	5/23/2012	1.1	0.8	0.10	812	18	4.67	37.50%
TKN	21st	9/9/2013	1.1	1.1	0.50	812	18	4.67	0.00%
TKN	21st	5/8/2014	1.1	3.2	0.13	812	18	4.67	-65.63%
TKN	21st	5/30/2014	1.1	3.1	0.26	812	18	4.67	-64.52%
TKN	21st	8/20/2014	1.1	3.6	0.14	812	18	4.67	-69.44%
TKN	21st	9/28/2014	1.1	.	0.12	812	18	4.67	.
TKN	Hal	7/8/2005	1.1	2.4	0.63	1519	47	4.62	-54.17%
TKN	GHSN	11/13/2006	1.068	0.82499	0.90	780	30	2.30	29.46%
TKN	FC 1	10/3/2015	1.04	1.24	0.20	4601	24	20.07	-16.13%
TKN	FC2	10/9/2014	0.99	2.06	0.75	1314	18	3.03	-51.94%
TKN	FC2	10/9/2014	0.99	2.06	0.75	1314	18	3.03	-51.94%
TKN	GHSN	11/7/2006	0.95399	0.523	1.30	780	30	2.30	82.41%
TKN	21st	9/11/2012	0.9	3.8	0.12	812	18	4.67	-76.32%
TKN	21st	9/4/2014	0.9	1.6	0.08	812	18	4.67	-43.75%
TKN	21st	9/29/2014	0.9	.	0.47	812	18	4.67	.
TKN	CR	3/11/2010	0.9	2.2	0.62	4601	24	20.07	-59.09%
TKN	Hal	2/7/2004	0.89	1.4	1.41	1519	47	4.62	-36.43%
TKN	BRC A	8/20/2008	0.881	0.972	0.52	1240	24	2.69	-9.36%
TKN	GHSN	11/16/2006	0.879	0.689	1.17	780	30	2.30	27.58%
TKN	BRC B	8/20/2008	0.857	0.972	0.52	1120	36	3.47	-11.83%
TKN	FC2	6/11/2015	0.84	1.52	0.63	1314	18	3.03	-44.74%
TKN	FC2	6/11/2015	0.84	1.52	0.63	1314	18	3.03	-44.74%
TKN	Hal	9/27/2004	0.84	1.1	2.43	1519	47	4.62	-23.64%
TKN	I-95	11/15/2007	0.84	1.07	0.23	7600	24	19.98	-21.50%
TKN	BRC A	7/9/2008	0.835	0.546	0.64	1240	24	2.69	52.93%
TKN	Hal	3/22/2006	0.82	0.87	0.95	1519	47	4.62	-5.75%
TKN	BRC A	5/28/2008	0.813	1.04	0.49	1240	24	2.69	-21.83%
TKN	21st	7/29/2014	0.8	1.1	2.20	812	18	4.67	-27.27%
TKN	21st	8/26/2014	0.8	2.8	0.27	812	18	4.67	-71.43%
TKN	21st	9/10/2014	0.8	1.3	0.16	812	18	4.67	-38.46%
TKN	Hal	7/17/2004	0.79	0.59	2.43	1519	47	4.62	33.90%
TKN	BRC B	4/22/2008	0.789	0.465	0.41	1120	36	3.47	69.68%
TKN	GHSS	10/8/2006	0.762	0.462	0.71	812	47	6.94	64.94%
TKN	I-95	4/2/2005	0.76	0.77	1.23	7600	24	19.98	-1.30%
TKN	Hal	9/19/2005	0.72	3.1	0.59	1519	47	4.62	-76.77%
TKN	21st	5/6/2012	0.7	2.4	0.10	812	18	4.67	-70.83%
TKN	21st	5/22/2014	0.7	1.9	0.16	812	18	4.67	-63.16%
TKN	Hal	8/28/2004	0.7	1.3	0.98	1519	47	4.62	-46.15%
TKN	I-95	6/9/2009	0.7	1.8	0.15	7600	24	19.98	-61.11%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TKN	BRC A	9/16/2008	0.697	4.014	0.52	1240	24	2.69	-82.64%
TKN	I-95	10/17/2006	0.69	0.9	0.52	7600	24	19.98	-23.33%
TKN	BRC B	1/28/2009	0.687	0.515	0.34	1120	36	3.47	33.40%
TKN	Hal	6/28/2005	0.65	0.98	0.70	1519	47	4.62	-33.67%
TKN	I-95	11/29/2005	0.65	0.11	0.62	7600	24	19.98	.
TKN	BRC B	5/15/2008	0.629	1.068	0.25	1120	36	3.47	-41.10%
TKN	BRC B	7/9/2008	0.623	0.546	0.64	1120	36	3.47	14.10%
TKN	BRC A	5/15/2008	0.618	1.068	0.25	1240	24	2.69	-42.13%
TKN	BRC B	9/16/2008	0.598	4.014	0.52	1120	36	3.47	-85.10%
TKN	Hal	4/13/2005	0.59	3	1.68	1519	47	4.62	-80.33%
TKN	GHSN	10/28/2006	0.58099	0.293	0.89	780	30	2.30	98.29%
TKN	BRC A	4/20/2008	0.557	0.619	1.60	1240	24	2.69	-10.02%
TKN	BRC B	9/25/2008	0.551	0.426	0.16	1120	36	3.47	29.34%
TKN	GHSS	10/28/2006	0.532	0.293	0.89	812	47	6.94	81.57%
TKN	GHSS	4/13/2007	0.513	0.722	1.14	812	47	6.94	-28.95%
TKN	BRC A	8/26/2008	0.499	0.312	0.30	1240	24	2.69	59.94%
TKN	BRC A	9/25/2008	0.498	0.426	0.16	1240	24	2.69	16.90%
TKN	GHSS	11/13/2006	0.497	0.82499	0.90	812	47	6.94	-39.76%
TKN	BRC B	4/27/2008	0.482	0.436	0.78	1120	36	3.47	10.55%
TKN	Hal	11/4/2004	0.48	1	0.82	1519	47	4.62	-52.00%
TKN	Hal	3/8/2005	0.48	1.2	0.65	1519	47	4.62	-60.00%
TKN	GHSS	3/19/2007	0.467	0.526	1.37	812	47	6.94	-11.22%
TKN	BRC A	4/27/2008	0.463	0.436	0.78	1240	24	2.69	6.19%
TKN	GHSS	11/7/2006	0.46099	0.523	1.30	812	47	6.94	-11.86%
TKN	BRC B	4/20/2008	0.46	0.619	1.60	1120	36	3.47	-25.69%
TKN	GHSN	3/19/2007	0.46	0.526	1.37	780	30	2.30	-12.55%
TKN	GHSS	4/17/2007	0.456	0.921	2.37	812	47	6.94	-50.49%
TKN	Hal	1/14/2005	0.45	1.1	1.03	1519	47	4.62	-59.09%
TKN	BRC A	1/28/2009	0.444	0.515	0.34	1240	24	2.69	-13.79%
TKN	GHSS	2/26/2007	0.442	0.699	0.90	812	47	6.94	-36.77%
TKN	GHSN	4/13/2007	0.423	0.722	1.14	780	30	2.30	-41.41%
TKN	Hal	12/5/2005	0.41	0.49	1.27	1519	47	4.62	-16.33%
TKN	BRC A	4/22/2008	0.406	0.465	0.41	1240	24	2.69	-12.69%
TKN	GHSN	2/26/2007	0.40599	0.699	0.90	780	30	2.30	-41.92%
TKN	GHSS	11/16/2006	0.405	0.689	1.17	812	47	6.94	-41.22%
TKN	BRC A	11/4/2008	0.398	0.478	0.91	1240	24	2.69	-16.74%
TKN	BRC B	11/4/2008	0.398	0.478	0.91	1120	36	3.47	-16.74%
TKN	BRC A	2/18/2009	0.394		0.60	1240	24	2.69	.
TKN	Hal	10/6/2005	0.39	0.59	2.08	1519	47	4.62	-33.90%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TKN	GHSS	10/17/2006	0.38699	0.279	0.93	812	47	6.94	38.71%
TKN	GHSN	4/17/2007	0.38499	0.921	2.37	780	30	2.30	-58.20%
TKN	GHSN	2/3/2007	0.38199	0.44299	0.82	780	30	2.30	-13.77%
TKN	Hal	10/13/2004	0.38	1.1	0.45	1519	47	4.62	-65.45%
TKN	BRC A	11/15/2008	0.372	0.371	0.34	1240	24	2.69	0.27%
TKN	Hal	12/6/2004	0.37	0.76	0.44	1519	47	4.62	-51.32%
TKN	BRC A	9/5/2008	0.364	0.272	2.61	1240	24	2.69	33.82%
TKN	GHSS	2/3/2007	0.36399	0.44299	0.82	812	47	6.94	-17.83%
TKN	BRC B	2/28/2009	0.358	0.503	1.07	1120	36	3.47	-28.83%
TKN	BRC A	12/10/2008	0.34	0.544	1.49	1240	24	2.69	-37.50%
TKN	GHSN	10/8/2006	0.30478	.	0.71	780	30	2.30	.
TKN	Hal	12/12/2005	0.3	0.67	0.43	1519	47	4.62	-55.22%
TKN	Hal	12/16/2005	0.3	0.52	1.68	1519	47	4.62	-42.31%
TKN	BRC B	8/26/2008	0.293	0.312	0.30	1120	36	3.47	-6.09%
TKN	Hal	2/22/2005	0.29	0.63	0.45	1519	47	4.62	-53.97%
TKN	BRC B	2/18/2009	0.281	.	0.60	1120	36	3.47	.
TKN	BRC A	2/28/2009	0.274	0.503	0.60	1240	24	2.69	-45.53%
TKN	CR	9/26/2009	0.25	0.9	0.48	4601	24	20.07	-72.22%
TKN	CR	10/15/2009	0.25	0.7	0.62	4601	24	20.07	-64.29%
TKN	CR	11/11/2009	0.25	2.4837	1.09	4601	24	20.07	-89.93%
TKN	CR	9/25/2008	0.25	0.5	0.62	4601	24	20.07	-50.00%
TKN	BRC B	11/15/2008	0.236	0.371	0.34	1120	36	3.47	-36.39%
TKN	BRC B	9/5/2008	0.235	0.272	2.61	1120	36	3.47	-13.60%
TKN	GHSN	9/28/2006	0.215	1.459	0.18	780	30	2.30	-85.26%
TKN	GHSN	10/17/2006	0.21365	0.279	0.93	780	30	2.30	-23.42%
TKN	BRC B	12/10/2008	0.205	0.544	1.49	1120	36	3.47	-62.32%
TKN	BRC A	1/6/2009	0.158	0.299	0.88	1240	24	2.69	-47.16%
TKN	BRC B	1/6/2009	0.09	0.299	0.88	1120	36	3.47	-69.90%
TKN	High	10/21/2009	.	1.5	0.75	4534	24	.	.
TKN	GG2	8/30/2004	.	1.2	0.27	1314	18	3.03	.
TKN	High	10/21/2009	.	1.5	0.75	4534	24	.	.
TKN	Hal	2/14/2005	.	1.1	0.28	1519	47	4.62	.
TKN	GG2	5/3/2004	.	2.7	0.63	1314	18	3.03	.
TKN	GG2	9/27/2003	.	1.1	3.99	1314	18	3.03	.
TKN	GG2	9/6/2004	.	1.6	5.27	1314	18	3.03	.
TKN	High	10/21/2009	.	1.6	0.75	4534	24	.	.
TKN	GG2	12/13/2003	.	0.54	1.26	1314	18	3.03	.
TKN	Hal	1/31/2006	.	0.97	0.24	1519	47	4.62	.
TKN	21st	8/28/2014	.	1.7	0.08	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TKN	High	10/21/2009	.	1.6	0.75	4534	24	.	.
TKN	Hal	8/12/2004	.	0.93	0.70	1519	47	4.62	.
TKN	High	10/6/2008	.	3.6	0.12	4534	24	.	.
TKN	21st	7/25/2013	.	3.5	0.10	812	18	4.67	.
TKN	GG2	5/19/2004	.	1.2	0.12	1314	18	3.03	.
TKN	21st	5/11/2011	.	1.5	0.17	812	18	4.67	.
TKN	GG1	5/1/2004	.	4.9	0.63	1314	18	3.03	.
TKN	GG1	9/6/2004	.	1	5.27	1314	18	3.03	.
TKN	21st	5/14/2011	.	1.8	0.28	812	18	4.67	.
TKN	GG1	11/19/2003	.	0.67	0.88	1314	18	3.03	.
TKN	GG1	8/17/2003	.	4.6	1.62	1314	18	3.03	.
TKN	GG2	11/6/2003	.	0.86	0.26	1314	18	3.03	.
TKN	21st	7/26/2011	.	3.1	0.15	812	18	4.67	.
TKN	High	10/21/2009	.	1.2	0.75	4534	24	.	.
TKN	GHSN	10/8/2006	.	0.462	0.71	780	30	2.30	.
TKN	High	10/21/2009	.	1.2	0.75	4534	24	.	.
TKN	GG2	12/10/2003	.	0.8	1.02	1314	18	3.03	.
TKN	High	10/21/2009	.	2.2	0.75	4534	24	.	.
TKN	GG1	9/3/2003	.	1.1	0.83	1314	18	3.03	.
TKN	21st	9/11/2012	.	1.1	0.12	812	18	4.67	.
TKN	High	10/21/2009	.	1.6	0.75	4534	24	.	.
TKN	GG2	7/22/2003	.	1.5	0.47	1314	18	3.03	.
TKN	21st	8/11/2013	.	4.8	0.10	812	18	4.67	.
TKN	21st	5/18/2011	.	1.8	0.69	812	18	4.67	.
TKN	21st	7/27/2013	.	3.2	0.10	812	18	4.67	.
TKN	21st	5/10/2014	.	2.5	0.66	812	18	4.67	.
TKN	GG1	8/12/2004	.	1.2	1.47	1314	18	3.03	.
TKN	GG1	8/30/2004	.	1.3	0.27	1314	18	3.03	.
TKN	21st	7/7/2011	.	1.8	1.73	812	18	4.67	.
TKN	FC 1	5/8/2013	.	2.13	0.10	4601	24	20.07	.
TKN	GHSS	9/28/2006	.	1.459	0.18	812	47	6.94	.
TKN	21st	5/9/2013	.	3	0.10	812	18	4.67	.
TKN	GG1	11/6/2003	.	2	0.26	1314	18	3.03	.
TKN	GG2	7/29/2003	.	1.5	1.07	1314	18	3.03	.
TKN	I-95	10/13/2008	.	1.8	0.38	7600	24	19.98	.
TKN	High	10/21/2009	.	1.9	0.75	4534	24	.	.
TKN	GG2	8/12/2004	.	1.8	1.47	1314	18	3.03	.
TKN	High	3/7/2009	.	3	0.55	4534	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TL	21st	6/20/2011	0.0083	0.0111	0.45	812	18	4.67	-25.23%
TL	21st	7/7/2011	0.0081	0.0056	1.73	812	18	4.67	44.64%
TL	Hal	2/7/2004	0.008	0.017	1.41	1519	47	4.62	-52.94%
TL	21st	7/12/2011	0.0077	.	0.71	812	18	4.67	.
TL	21st	8/7/2014	0.0065	.	0.11	812	18	4.67	.
TL	21st	9/15/2011	0.0061	.	0.13	812	18	4.67	.
TL	Hal	6/1/2004	0.006	0.009	0.35	1519	47	4.62	-33.33%
TL	Hal	7/17/2004	0.006	0.007	2.43	1519	47	4.62	-14.29%
TL	21st	7/19/2011	0.0057	.	0.57	812	18	4.67	.
TL	I-95	10/17/2006	0.005	0.005	0.52	7600	24	19.98	0.00%
TL	I-95	4/12/2007	0.005	0.005	0.65	7600	24	19.98	0.00%
TL	I-95	10/24/2007	0.005	0.005	0.15	7600	24	19.98	0.00%
TL	I-95	11/15/2007	0.005	0.005	0.23	7600	24	19.98	0.00%
TL	21st	8/9/2014	0.0044	.	0.14	812	18	4.67	.
TL	21st	8/3/2013	0.0041	0.0192	1.83	812	18	4.67	-78.65%
TL	Gris	12/15/2012	0.003	.	0.56	1953	43	.	.
TL	Gris	1/29/2013	0.003	.	0.19	1953	43	.	.
TL	Gris	4/24/2014	0.003	.	0.40	1953	43	.	.
TL	Gris	5/10/2014	0.003	.	0.83	1953	43	.	.
TL	Gris	8/15/2014	0.003	0.016	1.14	1953	43	.	-81.25%
TL	Gris	8/29/2014	0.003	.	0.29	1953	43	.	.
TL	Gris	9/5/2014	0.003	.	0.56	1953	43	.	.
TL	Gris	11/23/2014	0.003	0.006	0.67	1953	43	.	-50.00%
TL	Gris	12/5/2014	0.003	.	0.48	1953	43	.	.
TL	Gris	1/3/2015	0.003	0.014	0.38	1953	43	.	-78.57%
TL	21st	7/29/2011	0.0025	.	0.15	812	18	4.67	.
TL	21st	7/27/2011	0.0025	0.0095	0.16	812	18	4.67	-73.68%
TL	21st	9/14/2011	0.0025	0.0069	0.87	812	18	4.67	-63.77%
TL	21st	5/5/2012	0.0025	0.019	0.10	812	18	4.67	-86.84%
TL	21st	5/6/2012	0.0025	0.0057	0.10	812	18	4.67	-56.14%
TL	21st	5/6/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TL	21st	5/12/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TL	21st	5/23/2012	0.0025	0.0025	0.10	812	18	4.67	0.00%
TL	21st	6/6/2012	0.0025	.	0.35	812	18	4.67	.
TL	21st	7/9/2012	0.0025	.	0.14	812	18	4.67	.
TL	21st	7/31/2012	0.0025	0.0061	0.14	812	18	4.67	-59.02%
TL	21st	8/11/2012	0.0025	0.0025	0.08	812	18	4.67	0.00%
TL	21st	9/11/2012	0.0025	0.0025	0.12	812	18	4.67	0.00%
TL	21st	9/11/2012	0.0025	0.0025	0.12	812	18	4.67	0.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TL	Hal	8/28/2004	0.0025	0.0025	0.98	1519	47	4.62	0.00%
TL	Hal	9/27/2004	0.0025	0.0025	2.43	1519	47	4.62	0.00%
TL	Hal	10/13/2004	0.0025	0.0025	0.45	1519	47	4.62	0.00%
TL	Hal	11/4/2004	0.0025	0.0025	0.82	1519	47	4.62	0.00%
TL	Hal	12/6/2004	0.0025	0.0025	0.44	1519	47	4.62	0.00%
TL	Hal	1/14/2005	0.0025	0.0059	1.03	1519	47	4.62	-57.63%
TL	Hal	2/22/2005	0.0025	0.0025	0.45	1519	47	4.62	0.00%
TL	Hal	3/8/2005	0.0025	0.0072	0.65	1519	47	4.62	-65.28%
TL	Hal	4/13/2005	0.0025	0.0055	1.68	1519	47	4.62	-54.55%
TL	Hal	5/13/2005	0.0025	0.006	0.25	1519	47	4.62	-58.33%
TL	Hal	6/28/2005	0.0025	0.0025	0.70	1519	47	4.62	0.00%
TL	Hal	7/8/2005	0.0025	0.0072	0.63	1519	47	4.62	-65.28%
TL	Hal	9/19/2005	0.0025	0.006	0.59	1519	47	4.62	-58.33%
TL	Hal	10/6/2005	0.0025	0.0025	2.08	1519	47	4.62	0.00%
TL	Hal	12/5/2005	0.0025	0.0025	1.27	1519	47	4.62	0.00%
TL	Hal	12/12/2005	0.0025	0.0025	0.43	1519	47	4.62	0.00%
TL	Hal	12/16/2005	0.0025	0.0025	1.68	1519	47	4.62	0.00%
TL	Hal	12/29/2005	0.0025	0.0082	0.35	1519	47	4.62	-69.51%
TL	Hal	3/22/2006	0.0025	0.0025	0.95	1519	47	4.62	0.00%
TL	21st	7/13/2013	0.002	0.0083	2.14	812	18	4.67	-75.90%
TL	21st	5/20/2011	0.001	.	0.16	812	18	4.67	.
TL	21st	5/29/2013	0.001	0.0081	0.47	812	18	4.67	-87.65%
TL	21st	7/1/2013	0.001	.	0.18	812	18	4.67	.
TL	21st	7/11/2013	0.001	0.0049	0.27	812	18	4.67	-79.59%
TL	21st	9/9/2013	0.001	0.001	0.50	812	18	4.67	0.00%
TL	21st	9/9/2013	0.001	0.001	0.50	812	18	4.67	0.00%
TL	21st	9/22/2013	0.001	0.001	0.00	812	18	4.67	0.00%
TL	21st	5/7/2014	0.001	.	0.55	812	18	4.67	.
TL	21st	5/8/2014	0.001	0.019	0.13	812	18	4.67	-94.74%
TL	21st	5/21/2014	0.001	0.0189	0.32	812	18	4.67	-94.71%
TL	21st	5/22/2014	0.001	0.0045	0.16	812	18	4.67	-77.78%
TL	21st	5/30/2014	0.001	0.012	0.26	812	18	4.67	-91.67%
TL	21st	6/8/2014	0.001	0.0107	0.42	812	18	4.67	-90.65%
TL	21st	7/7/2014	0.001	.	0.10	812	18	4.67	.
TL	21st	7/15/2014	0.001	0.0217	0.11	812	18	4.67	-95.39%
TL	21st	7/16/2014	0.001	0.0095	0.29	812	18	4.67	-89.47%
TL	21st	7/29/2014	0.001	0.004	2.20	812	18	4.67	-75.00%
TL	21st	7/29/2014	0.001	0.001	2.20	812	18	4.67	0.00%
TL	21st	8/20/2014	0.001	.	0.14	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TL	44th	8/20/2014	.	0.00826	0.42	5100	24	.	.
TL	CR	6/3/2009	0.001	0.001	1.28	4601	24	20.07	0.00%
TL	CR	8/21/2009	0.001	0.001	2.36	4601	24	20.07	0.00%
TL	CR	9/11/2009	0.001	0.001	0.15	4601	24	20.07	0.00%
TL	CR	9/26/2009	0.001	0.001	0.48	4601	24	20.07	0.00%
TL	CR	10/15/2009	0.001	0.001	0.62	4601	24	20.07	0.00%
TL	CR	11/11/2009	0.001	0.001	1.09	4601	24	20.07	0.00%
TL	CR	3/28/2010	0.001	0.02	0.62	4601	24	20.07	-95.00%
TL	CR	9/25/2008	0.001	0.001	0.62	4601	24	20.07	0.00%
TL	CR	4/20/2009	0.001	.	0.62	4601	24	20.07	.
TL	21st	4/20/2009	.	0.0215	0.10	812	18	4.67	.
TL	CR	3/11/2010	0.001	0.014	0.62	4601	24	20.07	-92.86%
TL	21st	6/4/2013	0.0005	0.0069	0.17	812	18	4.67	-92.75%
TL	21st	9/15/2011	0.0005	.	0.13	812	18	4.67	.
TL	21st	8/26/2014	0.0005	0.0064	0.27	812	18	4.67	-92.19%
TL	21st	8/26/2014	0.0005	0.0176	0.27	812	18	4.67	-97.16%
TL	21st	9/4/2014	0.0005	0.0047	0.08	812	18	4.67	-89.36%
TL	21st	9/10/2014	0.0005	0.0016	0.16	812	18	4.67	-68.75%
TL	21st	9/22/2014	0.0005	.	0.17	812	18	4.67	.
TL	21st	9/28/2014	0.0005	.	0.12	812	18	4.67	.
TL	21st	9/29/2014	0.0005	.	0.47	812	18	4.67	.
TL	44th	1/23/2013	.	0.00265	0.23	5100	24	.	.
TL	I-95	4/2/2005	.	0.012	1.23	7600	24	19.98	.
TL	I-95	5/20/2005	.	0.012	0.38	7600	24	19.98	.
TL	I-95	9/14/2006	.	0.012	0.31	7600	24	19.98	.
TL	21st	8/28/2014	.	0.004	0.08	812	18	4.67	.
TL	21st	8/11/2012	.	0.0025	0.08	812	18	4.67	.
TL	I-95	11/29/2005	.	0.0055	0.62	7600	24	19.98	.
TL	Hal	4/26/2004	.	0.008	0.11	1519	47	4.62	.
TL	Hal	5/5/2004	.	0.0025	0.95	1519	47	4.62	.
TL	21st	5/18/2011	.	0.0138	0.69	812	18	4.67	.
TL	44th	4/14/2011	.	0.00504	0.19	5100	24	.	.
TL	44th	2/12/2011	.	0.00833	0.53	5100	24	.	.
TL	I-95	7/8/2005	.	0.012	1.19	7600	24	19.98	.
TL	21st	5/11/2011	.	0.0037	0.17	812	18	4.67	.
TL	21st	7/26/2011	.	0.0071	0.15	812	18	4.67	.
TL	Hal	8/12/2004	.	0.007	0.70	1519	47	4.62	.
TL	21st	7/13/2011	.	0.02	0.68	812	18	4.67	.
TL	21st	7/15/2013	.	0.0032	0.55	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TL	44th	11/16/2010	.	0.00647	0.54	5100	24	.	.
TL	Hal	1/31/2006	.	0.0025	0.24	1519	47	4.62	.
TL	21st	5/19/2011	.	0.0062	0.55	812	18	4.67	.
TL	21st	7/25/2013	.	0.0024	0.10	812	18	4.67	.
TL	21st	5/10/2014	.	0.002	0.66	812	18	4.67	.
TL	44th	5/25/2011	.	0.002	0.22	5100	24	.	.
TL	44th	6/6/2012	.	0.00197	0.62	5100	24	.	.
TL	44th	1/24/2010	.	0.00172	0.44	5100	24	.	.
TL	44th	11/11/2011	.	0.00171	0.19	5100	24	.	.
TL	44th	4/3/2012	.	0.00168	0.15	5100	24	.	.
TL	44th	10/15/2012	.	0.00313	0.35	5100	24	.	.
TL	44th	2/4/2010	.	0.00156	0.15	5100	24	.	.
TL	44th	10/22/2012	.	0.00138	0.25	5100	24	.	.
TL	44th	3/5/2012	.	0.00137	0.29	5100	24	.	.
TL	44th	4/5/2013	.	0.00123	0.27	5100	24	.	.
TL	Hal	2/14/2005	.	0.006	0.28	1519	47	4.62	.
TL	21st	6/16/2013	.	0.006	0.10	812	18	4.67	.
TL	21st	7/15/2013	.	0.0032	0.55	812	18	4.67	.
TL	44th	1/20/2011	.	0.00591	0.34	5100	24	.	.
TL	44th	3/4/2011	.	0.0138	0.20	5100	24	.	.
TL	21st	5/9/2013	.	0.016	0.12	812	18	4.67	.
TL	21st	7/27/2013	.	0.0048	0.10	812	18	4.67	.
TL	44th	3/28/2011	.	0.00475	0.71	5100	24	.	.
TL	21st	5/14/2011	.	0.0044	0.28	812	18	4.67	.
TL	44th	2/23/2010	.	0.00093	0.55	5100	24	.	.
TL	44th	4/10/2013	.	0.000927	0.22	5100	24	.	.
TL	44th	2/15/2010	.	0.00088	0.37	5100	24	.	.
TL	44th	3/19/2013	.	0.000565	0.75	5100	24	.	.
TL	44th	1/31/2012	.	0.000563	0.44	5100	24	.	.
TL	44th	11/11/2012	.	0.000547	0.71	5100	24	.	.
TL	44th	2/28/2013	.	0.000538	0.57	5100	24	.	.
TL	44th	4/4/2013	.	0.000504	0.57	5100	24	.	.
TL	44th	10/30/2012	.	0.000407	1.33	5100	24	.	.
TL	44th	10/14/2012	.	0.000356	0.46	5100	24	.	.
TL	44th	2/12/2011	.	0.000322	0.53	5100	24	.	.
TL	44th	3/4/2011	.	0.000311	0.20	5100	24	.	.
TL	44th	6/25/2013	.	0.000244	0.19	5100	24	.	.
TL	44th	10/30/2012	.	0.000189	1.33	5100	24	.	.
TL	44th	11/11/2012	.	0.000176	0.71	5100	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y	x1	x2	x3	x4	x5	% Change in Pollutant Conc. (Outliers Removed)
			Eff. Conc. (mg/L or CFU/100 ml)	Inf. Conc. (mg/L or CFU/100 ml)	Rainfall Depth (in)	Ponding Volume (ft^3)	Media Depth (in)	Retetion Time (min)	
TL	44th	11/17/2010	.	0.00017	0.54	5100	24	.	.
TL	44th	3/15/2011	.	0.00015	0.31	5100	24	.	.
TL	44th	2/28/2013	.	0.000131	0.57	5100	24	.	.
TL	44th	4/12/2013	.	0.000121	0.27	5100	24	.	.
TL	44th	1/21/2011	.	0.00012	0.34	5100	24	.	.
TL	44th	3/20/2012	.	0.000113	0.39	5100	24	.	.
TL	44th	3/5/2012	.	0.000111	0.29	5100	24	.	.
TL	44th	3/19/2013	.	0.000104	0.75	5100	24	.	.
TL	44th	9/18/2010	.	0.0001	1.01	5100	24	.	.
TL	44th	5/27/2013	.	0.000092	0.38	5100	24	.	.
TL	44th	4/3/2012	.	0.000088	0.15	5100	24	.	.
TL	44th	2/16/2010	.	0.00008	0.37	5100	24	.	.
TL	44th	4/1/2010	.	0.00008	1.49	5100	24	.	.
TL	44th	5/25/2011	.	0.000079	0.22	5100	24	.	.
TL	44th	4/25/2012	.	0.000073	0.67	5100	24	.	.
TL	44th	6/5/2012	.	0.000073	0.30	5100	24	.	.
TL	44th	10/28/2011	.	0.000072	0.30	5100	24	.	.
TL	44th	2/5/2010	.	0.00005	0.15	5100	24	.	.
TL	44th	2/23/2010	.	0.0000315	0.55	5100	24	.	.
TL	44th	3/29/2011	.	0.00003	0.71	5100	24	.	.
TN	I-95	7/8/2005	0.011	0.0055	1.19	7600	24	19.98	100.00%
TN	21st	6/20/2011	0.0104	0.0055	0.45	812	18	4.67	89.09%
TN	21st	7/12/2011	0.0102	0.0082	0.71	812	18	4.67	24.39%
TN	21st	7/13/2011	0.0096	0.0066	0.68	812	18	4.67	45.45%
TN	21st	7/19/2011	0.0088	0.0076	0.57	812	18	4.67	15.79%
TN	21st	9/15/2011	0.0081		0.13	812	18	4.67	.
TN	I-95	10/17/2006	0.008	.	0.52	7600	24	19.98	.
TN	21st	8/7/2014	0.0077	.	0.11	812	18	4.67	.
TN	21st	8/3/2013	0.0075	0.0069	1.83	812	18	4.67	8.70%
TN	21st	7/29/2011	0.0066	.	0.15	812	18	4.67	.
TN	Hal	5/5/2004	0.006	0.008	0.95	1519	47	4.62	-25.00%
TN	21st	8/9/2014	0.0056	.	0.14	812	18	4.67	.
TN	I-95	11/29/2005	0.0055	.	0.62	7600	24	19.98	.
TN	I-95	5/11/2006	0.0055	0.0055	0.25	7600	24	19.98	0.00%
TN	I-95	9/14/2006	0.0055	0.0055	0.31	7600	24	19.98	0.00%
TN	21st	5/5/2012	0.0053	0.0071	0.10	812	18	4.67	-25.35%
TN	21st	7/27/2011	0.0051	0.0032	0.16	812	18	4.67	59.38%
TN	21st	7/9/2012	0.0049	.	0.14	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TN	21st	7/7/2014	0.0048	.	0.10	812	18	4.67	.
TN	21st	6/6/2012	0.0046	.	0.14	812	18	4.67	.
TN	21st	8/11/2012	0.0046	.	0.08	812	18	4.67	.
TN	21st	7/31/2012	0.0045	0.0035	0.14	812	18	4.67	28.57%
TN	21st	9/9/2013	0.0044	.	0.50	812	18	4.67	.
TN	21st	9/9/2013	0.0043	.	0.50	812	18	4.67	.
TN	21st	5/29/2013	0.0041	0.0056	0.47	812	18	4.67	-26.79%
TN	I-95	10/24/2007	0.004	0.003	0.15	7600	24	19.98	33.33%
TN	21st	5/6/2012	0.0038	0.0029	0.10	812	18	4.67	31.03%
TN	21st	7/11/2013	0.0038	0.0038	0.27	812	18	4.67	0.00%
TN	21st	7/15/2014	0.0038	0.0085	0.11	812	18	4.67	-55.29%
TN	21st	9/14/2011	0.0037	0.0037	0.87	812	18	4.67	0.00%
TN	21st	9/4/2014	0.0037	0.003	0.08	812	18	4.67	23.33%
TN	21st	9/11/2012	0.0036	0.0032	0.12	812	18	4.67	12.50%
TN	21st	7/1/2013	0.0035	.	0.18	812	18	4.67	.
TN	21st	6/4/2013	0.0034	.	0.17	812	18	4.67	.
TN	21st	8/26/2014	0.0034	0.0069	0.27	812	18	4.67	-50.72%
TN	21st	7/29/2014	0.0031	0.0028	2.20	812	18	4.67	10.71%
TN	21st	9/11/2012	0.003	.	0.12	812	18	4.67	.
TN	21st	7/16/2014	0.003	0.0034	0.29	812	18	4.67	-11.76%
TN	21st	7/29/2014	0.003	.	2.20	812	18	4.67	.
TN	21st	9/29/2014	0.003	0.0098	0.47	812	18	4.67	-69.39%
TN	21st	5/6/2012	0.0029	.	0.10	812	18	4.67	.
TN	21st	5/30/2014	0.0029	0.005	0.26	812	18	4.67	-42.00%
TN	21st	5/20/2011	0.0028	.	0.16	812	18	4.67	.
TN	21st	5/7/2014	0.0028	0.0138	0.55	812	18	4.67	-79.71%
TN	21st	5/8/2014	0.0028	0.0081	0.13	812	18	4.67	-65.43%
TN	21st	8/20/2014	0.0025	0.0085	0.14	812	18	4.67	-70.59%
TN	21st	9/28/2014	0.0025	.	0.12	812	18	4.67	.
TN	Hal	2/7/2004	0.0025	0.007	1.41	1519	47	4.62	-64.29%
TN	Hal	6/1/2004	0.0025	0.007	0.35	1519	47	4.62	-64.29%
TN	Hal	7/17/2004	0.0025	0.0025	2.43	1519	47	4.62	0.00%
TN	Hal	8/28/2004	0.0025	0.0025	0.98	1519	47	4.62	0.00%
TN	Hal	9/27/2004	0.0025	0.0025	2.43	1519	47	4.62	0.00%
TN	Hal	10/13/2004	0.0025	0.0025	0.45	1519	47	4.62	0.00%
TN	Hal	11/4/2004	0.0025	0.0059	0.82	1519	47	4.62	-57.63%
TN	Hal	12/6/2004	0.0025	0.0025	0.44	1519	47	4.62	0.00%
TN	Hal	1/14/2005	0.0025	0.0025	1.03	1519	47	4.62	0.00%
TN	Hal	2/22/2005	0.0025	0.0025	0.45	1519	47	4.62	0.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TN	Hal	3/8/2005	0.0025	0.0053	0.65	1519	47	4.62	-52.83%
TN	Hal	4/13/2005	0.0025	0.0025	1.68	1519	47	4.62	0.00%
TN	Hal	6/28/2005	0.0025	0.0025	0.70	1519	47	4.62	0.00%
TN	Hal	7/8/2005	0.0025	0.0054	0.63	1519	47	4.62	-53.70%
TN	Hal	9/19/2005	0.0025	0.0092	0.59	1519	47	4.62	-72.83%
TN	21st	6/8/2014	0.0024	0.0067	0.42	812	18	4.67	-64.18%
TN	21st	5/21/2014	0.0022	0.0092	0.32	812	18	4.67	-76.09%
TN	21st	8/26/2014	0.0021	0.0024	0.27	812	18	4.67	-12.50%
TN	21st	9/22/2013	0.002	.	0.10	812	18	4.67	.
TN	21st	9/10/2014	0.002	.	0.16	812	18	4.67	.
TN	21st	9/22/2014	0.002	.	0.17	812	18	4.67	.
TN	21st	5/22/2014	0.0016	.	0.16	812	18	4.67	.
TN	21st	5/12/2012	0.00125	.	0.10	812	18	4.67	.
TN	21st	5/23/2012	0.00125	.	0.10	812	18	4.67	.
TN	I-95	11/15/2007	0.001	.	0.23	7600	24	19.98	.
TN	21st	7/26/2011	.	0.003	0.15	812	18	4.67	.
TN	I-95	4/2/2005	.	0.0055	1.23	7600	24	19.98	.
TN	Hal	8/12/2004	.	0.0025	0.70	1519	47	4.62	.
TN	21st	6/16/2013	.	0.005	0.10	812	18	4.67	.
TN	Hal	4/26/2004	.	0.014	0.11	1519	47	4.62	.
TN	21st	5/18/2011	.	0.0042	0.69	812	18	4.67	.
TN	21st	5/9/2013	.	0.0061	0.10	812	18	4.67	.
TN	21st	7/13/2013	.	0.0036	2.14	812	18	4.67	.
TN	21st	8/11/2013	.	0.0086	0.10	812	18	4.67	.
TN	I-95	5/20/2005	.	0.0055	0.38	7600	24	19.98	.
TN	Hal	5/13/2005	.	0.0025	0.25	1519	47	4.62	.
TN	Hal	2/14/2005	.	0.0056	0.28	1519	47	4.62	.
TN	I-95	4/12/2007	.	0.0025	0.65	7600	24	19.98	.
TN	21st	7/25/2013	.	0.0028	0.10	812	18	4.67	.
TNI	GG2	7/22/2003	6.505	1.85	0.47	1314	18	3.03	251.62%
TNI	GG2	5/19/2004	6.27	1.36	0.12	1314	18	3.03	.
TNI	BRC B	7/19/2008	5.887	1.002	0.35	1120	36	3.47	.
TNI	GG1	7/29/2003	5.58	1.24	1.07	1314	18	3.03	.
TNI	GG1	6/19/2004	5.31	1.82	1.24	1314	18	3.03	191.76%
TNI	GG1	9/18/2003	5.16	0.45	1.97	1314	18	3.03	.
TNI	BRC B	8/20/2008	4.975	1.386	0.52	1120	36	3.47	258.95%
TNI	GG2	8/23/2003	4.97	1.65	0.72	1314	18	3.03	201.21%
TNI	GG2	6/4/2004	4.56	3.62	0.89	1314	18	3.03	25.97%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TNI	GG2	9/3/2003	4.54	.	0.83	1314	18	3.03	.
TNI	FC2	7/11/2014	4.53	.	0.87	1314	18	3.03	.
TNI	FC2	7/11/2014	4.53	.	0.87	1314	18	3.03	.
TNI	GG1	7/12/2003	4.45	1.38	4.56	1314	18	3.03	222.46%
TNI	GG1	12/13/2003	4.25	1.35	1.26	1314	18	3.03	214.81%
TNI	GG1	8/8/2003	4.05	2.85	2.88	1314	18	3.03	42.11%
TNI	GG2	9/18/2003	3.99	1.05	1.97	1314	18	3.03	.
TNI	GG1	8/2/2003	3.95	2.62	2.45	1314	18	3.03	50.76%
TNI	GG2	8/5/2003	3.905	.	2.45	1314	18	3.03	.
TNI	FC2	7/29/2014	3.8	4.433	1.50	1314	18	3.03	-14.28%
TNI	FC2	7/29/2014	3.8	4.433	1.50	1314	18	3.03	-14.28%
TNI	GG1	12/10/2003	3.35	0.65	1.02	1314	18	3.03	.
TNI	BRC A	8/20/2008	3.277	1.386	0.52	1240	24	2.69	136.44%
TNI	GG1	8/23/2003	3.25	2.11	0.72	1314	18	3.03	54.03%
TNI	BRC B	9/16/2008	3.161	4.26	0.52	1120	36	3.47	-25.80%
TNI	GG2	8/14/2003	3.15	.	0.15	1314	18	3.03	.
TNI	GG2	8/16/2003	3.105	.	1.62	1314	18	3.03	.
TNI	BRC A	7/19/2008	3.072	1.002	0.35	1240	24	2.69	206.59%
TNI	FC2	6/22/2014	3.07	2.803	0.34	1314	18	3.03	9.53%
TNI	FC2	6/22/2014	3.07	2.803	0.34	1314	18	3.03	9.53%
TNI	GG2	7/13/2003	3.03	0.82	3.96	1314	18	3.03	.
TNI	BRC B	9/25/2008	2.909	0.545	0.16	1120	36	3.47	.
TNI	Hal	9/19/2005	2.82	4.3	0.59	1519	47	4.62	-34.42%
TNI	FC2	7/15/2014	2.717	3.837	0.55	1314	18	3.03	-29.19%
TNI	FC2	7/15/2014	2.717	3.837	0.55	1314	18	3.03	-29.19%
TNI	Gris	8/29/2014	2.693	4.5	0.29	1953	43	.	-40.16%
TNI	BRC A	9/16/2008	2.614	4.26	0.52	1240	24	2.69	-38.64%
TNI	Gris	4/24/2014	2.47	4.4	0.40	1953	43	.	-43.86%
TNI	FC2	9/29/2014	2.342	4.04	0.39	1314	18	3.03	-42.03%
TNI	FC2	9/29/2014	2.342	4.04	0.39	1314	18	3.03	-42.03%
TNI	GG2	8/10/2003	2.11	0.7	0.46	1314	18	3.03	201.43%
TNI	BRC B	8/26/2008	1.806	0.451	0.30	1120	36	3.47	.
TNI	Hal	3/22/2006	1.74	1.31	0.95	1519	47	4.62	32.82%
TNI	BRC A	9/25/2008	1.706	0.545	0.16	1240	24	2.69	213.03%
TNI	Gris	12/5/2014	1.7	4.343	0.48	1953	43	.	-60.86%
TNI	FC2	10/9/2014	1.683	2.397	0.75	1314	18	3.03	-29.79%
TNI	FC2	10/9/2014	1.683	2.397	0.75	1314	18	3.03	-29.79%
TNI	BRC B	5/28/2008	1.677	1.506	0.49	1120	36	3.47	11.35%
TNI	Gris	8/15/2014	1.661	3.069	1.14	1953	43	.	-45.88%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TNI	BRC B	4/22/2008	1.629	0.574	0.41	1120	36	3.47	183.80%
TNI	Gris	11/23/2014	1.629	4.23	0.67	1953	43	.	-61.49%
TNI	Gris	12/15/2012	1.6	4.8	0.56	1953	43	.	-66.67%
TNI	Hal	5/5/2004	1.55	2.8	0.95	1519	47	4.62	-44.64%
TNI	Hal	6/1/2004	1.54	2.28	0.35	1519	47	4.62	-32.46%
TNI	Hal	12/29/2005	1.51	1.24	0.35	1519	47	4.62	21.77%
TNI	BRC B	7/9/2008	1.478	0.784	0.64	1120	36	3.47	88.52%
TNI	BRC A	8/26/2008	1.455	0.451	0.30	1240	24	2.69	222.62%
TNI	Hal	5/13/2005	1.39	2.26	0.25	1519	47	4.62	-38.50%
TNI	Gris	9/5/2014	1.377	2.782	0.56	1953	43	.	-50.50%
TNI	BRC A	5/28/2008	1.344	1.506	0.49	1240	24	2.69	-10.76%
TNI	Hal	7/17/2004	1.34	0.83	2.43	1519	47	4.62	61.45%
TNI	Hal	7/8/2005	1.27	2.84	0.63	1519	47	4.62	-55.28%
TNI	GHSS	4/17/2007	1.243	1.314	2.37	812	47	6.94	-5.40%
TNI	Gris	7/30/2013	1.2	.	0.23	1953	43	.	.
TNI	BRC A	7/9/2008	1.163	0.784	0.64	1240	24	2.69	48.34%
TNI	BRC B	11/4/2008	1.134	0.644	0.91	1120	36	3.47	76.09%
TNI	GHSS	4/13/2007	1.091	1.195	1.14	812	47	6.94	-8.70%
TNI	Hal	8/28/2004	1.09	1.59	0.98	1519	47	4.62	-31.45%
TNI	Hal	9/27/2004	1.09	1.24	2.43	1519	47	4.62	-12.10%
TNI	Hal	11/4/2004	1.09	1.97	0.82	1519	47	4.62	-44.67%
TNI	Hal	2/7/2004	1.06	1.78	1.41	1519	47	4.62	-40.45%
TNI	Hal	4/13/2005	1.06	3.4	1.68	1519	47	4.62	-68.82%
TNI	GHSN	4/4/2006	1.04	2.92	0.19	780	30	2.30	-64.38%
TNI	GHSS	10/28/2006	1.016	0.58099	0.89	812	47	6.94	74.87%
TNI	BRC B	5/15/2008	1.012	1.34	0.25	1120	36	3.47	-24.48%
TNI	Gris	5/10/2014	1.01	4.1	0.83	1953	43	.	-75.37%
TNI	Hal	6/28/2005	1	1.25	0.70	1519	47	4.62	-20.00%
TNI	BRC B	1/28/2009	0.992	0.639	0.34	1120	36	3.47	55.24%
TNI	GHSS	3/19/2007	0.99099	0.878	1.37	812	47	6.94	12.87%
TNI	GHSS	10/17/2006	0.989	0.381	0.93	812	47	6.94	159.58%
TNI	GHSS	11/7/2006	0.984	0.95399	1.30	812	47	6.94	3.15%
TNI	BRC B	4/20/2008	0.968	0.767	1.60	1120	36	3.47	26.21%
TNI	GHSN	6/26/2006	0.95999	1.91	1.74	780	30	2.30	-49.74%
TNI	GHSN	5/19/2006	0.93999	2.93	0.16	780	30	2.30	-67.92%
TNI	GHSS	4/28/2006	0.91	0.93999	0.81	812	47	6.94	-3.19%
TNI	Hal	10/13/2004	0.91	1.37	0.45	1519	47	4.62	-33.58%
TNI	Hal	1/14/2005	0.89	1.47	1.03	1519	47	4.62	-39.46%
TNI	GHSN	3/19/2007	0.845	0.878	1.37	780	30	2.30	-3.76%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TNI	GHSN	4/13/2007	0.827	1.195	1.14	780	30	2.30	-30.79%
TNI	GHSS	2/26/2007	0.82499	0.85699	0.90	812	47	6.94	-3.73%
TNI	Hal	2/22/2005	0.82	1.08	0.45	1519	47	4.62	-24.07%
TNI	BRC A	5/15/2008	0.81	1.34	0.25	1240	24	2.69	-39.55%
TNI	GHSN	4/3/2006	0.79	0.88999	0.21	780	30	2.30	-11.23%
TNI	GHSS	2/3/2007	0.785	0.70999	0.82	812	47	6.94	10.56%
TNI	BRC A	11/4/2008	0.78	0.644	0.91	1240	24	2.69	21.12%
TNI	Gris	1/3/2015	0.775	3.04	0.38	1953	43	.	-74.51%
TNI	GHSS	11/13/2006	0.76999	1.068	0.90	812	47	6.94	-27.90%
TNI	GHSN	2/3/2007	0.758	0.70999	0.82	780	30	2.30	6.76%
TNI	BRC A	4/20/2008	0.747	0.767	1.60	1240	24	2.69	-2.61%
TNI	Hal	3/8/2005	0.74	1.46	0.65	1519	47	4.62	-49.32%
TNI	Hal	10/6/2005	0.71	0.75	2.08	1519	47	4.62	-5.33%
TNI	BRC B	9/5/2008	0.709	0.302	2.61	1120	36	3.47	134.77%
TNI	BRC B	4/27/2008	0.7	0.554	0.78	1120	36	3.47	26.35%
TNI	GHSN	4/17/2007	0.69999	1.314	2.37	780	30	2.30	-46.73%
TNI	GHSS	7/24/2006	0.69999	2.25	0.98	812	47	6.94	-68.89%
TNI	GHSN	7/24/2006	0.68999	2.25	0.98	780	30	2.30	-69.33%
TNI	GHSS	7/7/2006	0.68999	1.14	1.88	812	47	6.94	-39.47%
TNI	GHSN	4/10/2006	0.68	3.22	0.23	780	30	2.30	-78.88%
TNI	GHSN	4/28/2006	0.68	0.93999	0.81	780	30	2.30	-27.66%
TNI	BRC A	4/27/2008	0.672	0.554	0.78	1240	24	2.69	21.30%
TNI	BRC A	1/28/2009	0.66	0.639	0.34	1240	24	2.69	3.29%
TNI	Hal	12/6/2004	0.66	1.02	0.44	1519	47	4.62	-35.29%
TNI	Hal	12/5/2005	0.65	0.63	1.27	1519	47	4.62	3.17%
TNI	Hal	12/16/2005	0.65	0.7	1.68	1519	47	4.62	-7.14%
TNI	GHSS	7/14/2006	0.63999	2.45	0.92	812	47	6.94	-73.88%
TNI	GHSN	2/26/2007	0.62699	0.85699	0.90	780	30	2.30	-26.84%
TNI	GHSS	11/16/2006	0.609	0.879	1.17	812	47	6.94	-30.72%
TNI	GHSN	5/8/2006	0.6	1.96	0.79	780	30	2.30	-69.39%
TNI	BRC A	9/5/2008	0.592	0.302	2.61	1240	24	2.69	96.03%
TNI	Hal	12/12/2005	0.59	1.06	0.43	1519	47	4.62	-44.34%
TNI	GHSS	6/26/2006	0.58999	1.91	1.74	812	47	6.94	-69.11%
TNI	BRC A	2/18/2009	0.587	.	0.60	1240	24	2.69	.
TNI	BRC A	4/22/2008	0.578	0.574	0.41	1240	24	2.69	0.70%
TNI	GHSN	7/14/2006	0.56999	2.45	0.92	780	30	2.30	-76.74%
TNI	BRC B	2/28/2009	0.568	0.735	1.07	1120	36	3.47	-22.72%
TNI	BRC A	11/15/2008	0.478	0.453	0.34	1240	24	2.69	5.52%
TNI	GHSN	10/8/2006	0.47605	0.762	0.71	780	30	2.30	-37.53%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TNI	GHSS	5/8/2006	0.46999	1.96	0.79	812	47	6.94	-76.02%
TNI	BRC B	2/18/2009	0.46	.	0.60	1120	36	3.47	.
TNI	BRC B	11/15/2008	0.451	0.453	0.34	1120	36	3.47	-0.44%
TNI	GHSN	7/7/2006	0.44999	1.14	1.88	780	30	2.30	-60.53%
TNI	GHSN	8/31/2006	0.44999	2.34	1.51	780	30	2.30	-80.77%
TNI	BRC A	12/10/2008	0.416	0.623	1.49	1240	24	2.69	-33.23%
TNI	BRC A	2/28/2009	0.365	0.735	0.34	1240	24	2.69	-50.34%
TNI	BRC B	12/10/2008	0.332	0.623	1.49	1120	36	3.47	-46.71%
TNI	GHSN	10/17/2006	0.33171	0.381	0.93	780	30	2.30	-12.94%
TNI	BRC A	1/6/2009	0.282	0.56	0.88	1240	24	2.69	-49.64%
TNI	BRC B	1/6/2009	0.264	0.56	0.88	1120	36	3.47	-52.86%
TNI	Gris	1/29/2013	0.25	.	0.19	1953	43	.	.
TNI	GHSS	9/14/2006	0.2	0.75	1.44	812	47	6.94	-73.33%
TNI	GHSN	9/14/2006	0.18	0.75	1.44	780	30	2.30	-76.00%
TNI	GHSS	4/3/2006	0.11999	0.88999	0.21	812	47	6.94	-86.52%
TNI	GHSN	6/28/2006	0.09	1.09	0.32	780	30	2.30	-91.74%
TNI	GHSS	6/28/2006	.	1.09	0.32	812	47	6.94	.
TNI	Hal	8/12/2004	.	1.37	0.70	1519	47	4.62	.
TNI	GG1	11/19/2003	.	0.78	0.88	1314	18	3.03	.
TNI	FC2	6/8/2014	.	3.668	0.16	1314	18	3.03	.
TNI	GG1	8/17/2003	.	4.65	1.62	1314	18	3.03	.
TNI	GHSS	5/19/2006	.	2.93	0.16	812	47	6.94	.
TNI	GG2	11/6/2003	.	1.03	0.26	1314	18	3.03	.
TNI	GG2	8/30/2004	.	1.46	0.27	1314	18	3.03	.
TNI	GG2	12/13/2003	.	0.73	1.26	1314	18	3.03	.
TNI	GG2	12/10/2003	.	1.2	1.02	1314	18	3.03	.
TNI	GHSS	4/4/2006	.	2.92	0.19	812	47	6.94	.
TNI	GG1	8/30/2004	.	1.53	0.27	1314	18	3.03	.
TNI	GG1	9/3/2003	.	1.35	0.83	1314	18	3.03	.
TNI	GG2	9/27/2003	.	2.3	3.99	1314	18	3.03	.
TNI	FC2	6/8/2014	.	3.668	0.16	1314	18	3.03	.
TNI	GG2	9/6/2004	.	1.77	5.27	1314	18	3.03	.
TNI	GG1	7/23/2003	.	2.43	0.47	1314	18	3.03	.
TNI	Gris	7/29/2013	.	1.7	0.23	1953	43	.	.
TNI	Gris	1/10/2013	.	0.96	0.19	1953	43	.	.
TNI	GG2	5/3/2004	.	2.94	0.63	1314	18	3.03	.
TNI	Hal	2/14/2005	.	1.63	0.28	1519	47	4.62	.
TNI	GG1	11/6/2003	.	2.2	0.26	1314	18	3.03	.
TNI	GG2	7/29/2003	.	1.76	1.07	1314	18	3.03	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TNI	GG2	8/12/2004	.	2.11	1.47	1314	18	3.03	.
TNI	GHSS	8/31/2006	.	2.34	1.51	812	47	6.94	.
TNI	GHSS	4/10/2006	.	3.22	0.23	812	47	6.94	.
TNI	GG1	8/12/2004	.	1.39	1.47	1314	18	3.03	.
TNI	GG1	9/27/2003	.	1.39	0.34	1314	18	3.03	.
TNI	Hal	1/31/2006	.	1.67	0.24	1519	47	4.62	.
TNI	GG1	9/6/2004	.	1.05	5.27	1314	18	3.03	.
TP	I-95	9/12/2008	1.76	0.12	1.23	7600	24	19.98	.
TP	I-95	3/24/2009	1.76	0.53	0.65	7600	24	19.98	232.08%
TP	GG2	8/14/2003	1.7	.	0.15	1314	18	3.03	.
TP	GG2	9/3/2003	1.7	.	0.83	1314	18	3.03	.
TP	FC2	7/15/2014	1.64	.	0.55	1314	18	3.03	.
TP	FC2	7/15/2014	1.64	.	0.55	1314	18	3.03	.
TP	FC2	7/29/2014	1.64	0.125	1.50	1314	18	3.03	.
TP	FC2	7/29/2014	1.64	0.125	1.50	1314	18	3.03	.
TP	21st	7/7/2011	1.63	0.39	1.73	812	18	4.67	.
TP	21st	7/13/2011	1.63	0.55	0.68	812	18	4.67	196.36%
TP	21st	7/19/2011	1.62	.	0.57	812	18	4.67	.
TP	FC 1	7/5/2013	1.6	0.37	0.10	4601	24	20.07	.
TP	GG2	9/18/2003	1.6	0.13	1.97	1314	18	3.03	.
TP	GG2	8/16/2003	1.5	.	1.62	1314	18	3.03	.
TP	High	11/2/2011	1.37	.	1.41	4534	24	.	.
TP	21st	7/29/2011	1.36	.	0.15	812	18	4.67	.
TP	FC2	6/22/2014	1.35	0.228	0.34	1314	18	3.03	.
TP	FC2	6/22/2014	1.35	0.228	0.34	1314	18	3.03	.
TP	21st	7/27/2011	1.32	0.27	0.16	812	18	4.67	.
TP	CR	9/11/2009	1.3	.	0.15	4601	24	20.07	.
TP	FC 1	6/28/2013	1.17	0.84	0.10	4601	24	20.07	39.29%
TP	21st	9/15/2011	1.16	.	0.13	812	18	4.67	.
TP	21st	9/15/2011	1.16	.	0.13	812	18	4.67	.
TP	21st	8/9/2014	1.15	.	0.14	812	18	4.67	.
TP	GG1	7/12/2003	1.1	0.55	4.56	1314	18	3.03	100.00%
TP	GG2	8/10/2003	1.1	0.07	0.46	1314	18	3.03	.
TP	FC2	7/11/2014	1.05	0.396	0.87	1314	18	3.03	165.15%
TP	FC2	7/11/2014	1.05	0.396	0.87	1314	18	3.03	165.15%
TP	FC2	9/29/2014	1.04	0.125	0.39	1314	18	3.03	.
TP	FC2	9/29/2014	1.04	0.125	0.39	1314	18	3.03	.
TP	GG2	6/19/2004	1	.	1.24	1314	18	3.03	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TP	GG1	9/18/2003	0.98	0.04	1.97	1314	18	3.03	.
TP	FC2	6/8/2014	0.961	0.242	0.16	1314	18	3.03	.
TP	FC2	6/8/2014	0.961	0.242	0.16	1314	18	3.03	.
TP	GG1	9/6/2004	0.96	0.1	5.27	1314	18	3.03	.
TP	High	3/10/2009	0.96	0.06	1.53	4534	24	.	.
TP	21st	8/3/2013	0.92	0.78	1.83	812	18	4.67	17.95%
TP	High	3/23/2009	0.91	0.05	0.55	4534	24	.	.
TP	21st	7/31/2012	0.85	0.46	0.14	812	18	4.67	84.78%
TP	GG1	7/29/2003	0.84	0.06	1.07	1314	18	3.03	.
TP	21st	7/12/2011	0.83	0.71	0.71	812	18	4.67	16.90%
TP	21st	9/14/2011	0.83	0.36	0.87	812	18	4.67	130.56%
TP	GG2	5/19/2004	0.83	0.03	0.12	1314	18	3.03	.
TP	21st	6/6/2012	0.82	.	0.14	812	18	4.67	.
TP	FC2	6/11/2015	0.781	0.581	0.63	1314	18	3.03	34.42%
TP	FC2	6/11/2015	0.781	0.581	0.63	1314	18	3.03	34.42%
TP	GG1	8/12/2004	0.75	0.17	1.47	1314	18	3.03	.
TP	FC 1	10/3/2015	0.735	0.47	0.10	4601	24	20.07	56.38%
TP	GG2	7/13/2003	0.73	0.31	3.96	1314	18	3.03	135.48%
TP	High	6/9/2009	0.73	0.12	1.49	4534	24	.	.
TP	21st	7/9/2012	0.71	.	0.14	812	18	4.67	.
TP	GG1	12/10/2003	0.69	0.07	1.02	1314	18	3.03	.
TP	High	11/5/2008	0.69	0.14	1.10	4534	24	.	.
TP	High	9/12/2008	0.66	0.1	1.77	4534	24	.	.
TP	21st	9/9/2013	0.65	0.16	0.50	812	18	4.67	.
TP	21st	8/11/2012	0.61	0.38	0.08	812	18	4.67	60.53%
TP	High	5/8/2009	0.61	.	0.31	4534	24	.	.
TP	High	6/15/2009	0.61	0.025	0.35	4534	24	.	.
TP	21st	6/4/2013	0.6	0.27	0.17	812	18	4.67	122.22%
TP	21st	9/9/2013	0.6	0.16	0.50	812	18	4.67	.
TP	21st	7/7/2014	0.6	.	0.10	812	18	4.67	.
TP	GG1	8/23/2003	0.6	0.13	0.72	1314	18	3.03	.
TP	High	10/15/2008	0.6	.	0.98	4534	24	.	.
TP	High	4/26/2009	0.6	0.1	2.20	4534	24	.	.
TP	High	8/16/2009	0.6	0.15	1.93	4534	24	.	.
TP	High	8/19/2009	0.6	0.025	0.28	4534	24	.	.
TP	21st	7/16/2014	0.59	0.3	0.29	812	18	4.67	96.67%
TP	High	10/1/2009	0.58	0.14	0.31	4534	24	.	.
TP	21st	5/5/2012	0.56	0.22	0.10	812	18	4.67	154.55%
TP	21st	9/11/2012	0.56	0.23	0.12	812	18	4.67	143.48%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TP	GG1	7/23/2003	0.56	0.07	0.47	1314	18	3.03	.
TP	GG1	8/2/2003	0.56	0.17	2.45	1314	18	3.03	229.41%
TP	21st	5/6/2012	0.55	0.22	0.10	812	18	4.67	150.00%
TP	21st	8/20/2014	0.55	0.58	0.14	812	18	4.67	-5.17%
TP	GG1	8/8/2003	0.55	0.24	2.88	1314	18	3.03	129.17%
TP	FC 1	8/18/2015	0.542	0.153	0.10	4601	24	20.07	254.25%
TP	High	10/21/2008	0.54	.	2.28	4534	24	.	.
TP	High	11/14/2009	0.54	0.12	1.14	4534	24	.	.
TP	High	9/1/2010	0.54	0.025	0.86	4534	24	.	.
TP	21st	7/15/2014	0.53	0.72	0.11	812	18	4.67	-26.39%
TP	High	5/15/2009	0.53	0.07	0.86	4534	24	.	.
TP	21st	5/29/2013	0.52	0.48	0.47	812	18	4.67	8.33%
TP	21st	7/11/2013	0.52	.	0.27	812	18	4.67	.
TP	High	7/3/2009	0.51	0.025	0.63	4534	24	.	.
TP	High	11/7/2011	0.51	0.46	1.97	4534	24	.	10.87%
TP	21st	5/23/2012	0.5	0.49	0.10	812	18	4.67	2.04%
TP	21st	7/29/2014	0.5	0.27	2.20	812	18	4.67	85.19%
TP	21st	8/26/2014	0.5	0.34	0.27	812	18	4.67	47.06%
TP	BRC A	9/16/2008	0.498	0.498	0.52	1240	24	2.69	0.00%
TP	21st	5/8/2014	0.49	0.8	0.13	812	18	4.67	-38.75%
TP	21st	5/6/2012	0.48	0.09	0.10	812	18	4.67	.
TP	21st	6/18/2014	0.48	0.65	0.10	812	18	4.67	-26.15%
TP	High	10/29/2009	0.48	0.025	1.10	4534	24	.	.
TP	I-95	6/9/2009	0.48	0.13	0.15	7600	24	19.98	.
TP	21st	7/1/2013	0.47	.	0.18	812	18	4.67	.
TP	High	8/19/2009	0.47	0.025	0.28	4534	24	.	.
TP	High	7/8/2010	0.47	0.025	0.28	4534	24	.	.
TP	21st	7/13/2013	0.46	.	2.14	812	18	4.67	.
TP	21st	9/22/2013	0.46	0.18	0.10	812	18	4.67	155.56%
TP	21st	9/29/2014	0.46	0.87	0.47	812	18	4.67	-47.13%
TP	High	7/20/2009	0.46	0.07	0.86	4534	24	.	.
TP	21st	6/8/2014	0.45	0.61	0.42	812	18	4.67	-26.23%
TP	High	7/20/2010	0.45	0.1	0.75	4534	24	.	.
TP	High	9/13/2010	0.45	0.05	0.67	4534	24	.	.
TP	21st	5/7/2014	0.44	.	0.55	812	18	4.67	.
TP	High	9/24/2008	0.43	0.38	0.31	4534	24	.	13.16%
TP	High	10/25/2009	0.43	0.025	0.83	4534	24	.	.
TP	21st	5/20/2011	0.42	.	0.16	812	18	4.67	.
TP	21st	5/30/2014	0.42	0.52	0.26	812	18	4.67	-19.23%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TP	21st	8/26/2014	0.42	0.6	0.27	812	18	4.67	-30.00%
TP	High	10/22/2009	0.42	.	0.10	4534	24	.	.
TP	FC2	5/19/2015	0.409	0.025	1.52	1314	18	3.03	.
TP	FC2	5/19/2015	0.409	0.025	1.52	1314	18	3.03	.
TP	21st	9/4/2014	0.4	0.22	0.08	812	18	4.67	81.82%
TP	21st	7/29/2014	0.39	0.14	2.20	812	18	4.67	178.57%
TP	FC 1	10/3/2013	0.381	0.078	0.20	4601	24	20.07	.
TP	21st	9/28/2014	0.38	.	0.12	812	18	4.67	.
TP	High	9/15/2010	0.38	0.025	0.75	4534	24	.	.
TP	21st	5/21/2014	0.37	0.7	0.32	812	18	4.67	-47.14%
TP	21st	5/22/2014	0.37	0.26	0.16	812	18	4.67	42.31%
TP	21st	9/11/2012	0.35	0.14	0.12	812	18	4.67	150.00%
TP	High	7/11/2010	0.35	0.025	2.00	4534	24	.	.
TP	High	9/15/2010	0.35	0.025	0.75	4534	24	.	.
TP	21st	9/10/2014	0.32	0.21	0.16	812	18	4.67	52.38%
TP	GG1	6/19/2004	0.32	0.11	1.24	1314	18	3.03	190.91%
TP	CR	8/21/2009	0.31	0.1178	2.36	4601	24	20.07	163.16%
TP	FC2	4/26/2015	0.309	0.025	0.47	1314	18	3.03	.
TP	FC2	4/26/2015	0.309	0.025	0.47	1314	18	3.03	.
TP	21st	9/22/2014	0.29	.	0.17	812	18	4.67	.
TP	FC 1	7/18/2013	0.28	0.28	0.20	4601	24	20.07	0.00%
TP	CR	3/28/2010	0.28	0.77	0.62	4601	24	20.07	-63.64%
TP	CR	4/20/2009	0.28	.	0.62	4601	24	20.07	.
TP	Hal	12/29/2005	0.27	0.17	0.35	1519	47	4.62	58.82%
TP	FC 1	9/27/2013	0.263	0.06	0.10	4601	24	20.07	.
TP	I-95	4/12/2007	0.26	0.17	0.65	7600	24	19.98	52.94%
TP	Hal	5/13/2005	0.25	0.4	0.25	1519	47	4.62	-37.50%
TP	21st	6/20/2011	0.24	0.75	0.45	812	18	4.67	-68.00%
TP	CR	6/3/2009	0.24	0.0415	1.28	4601	24	20.07	.
TP	GG1	9/27/2003	0.23	0.76	0.34	1314	18	3.03	-69.74%
TP	I-95	9/14/2006	0.23	0.31	0.31	7600	24	19.98	-25.81%
TP	Gris	9/5/2014	0.22	0.3	0.56	1953	43	.	-26.67%
TP	FC 1	7/28/2013	0.21	0.16	0.10	4601	24	20.07	31.25%
TP	Hal	6/1/2004	0.21	0.25	0.35	1519	47	4.62	-16.00%
TP	Gris	8/29/2014	0.2	0.61	0.29	1953	43	.	-67.21%
TP	I-95	10/24/2007	0.2	0.52	0.15	7600	24	19.98	-61.54%
TP	CR	3/11/2010	0.19	0.4	0.62	4601	24	20.07	-52.50%
TP	GG1	12/13/2003	0.19	0.12	1.26	1314	18	3.03	58.33%
TP	Hal	2/7/2004	0.19	0.27	1.41	1519	47	4.62	-29.63%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TP	Hal	7/8/2005	0.17	0.74	0.63	1519	47	4.62	-77.03%
TP	21st	5/12/2012	0.16	0.16	0.10	812	18	4.67	0.00%
TP	I-95	5/20/2005	0.16	0.59	0.38	7600	24	19.98	-72.88%
TP	Hal	3/22/2006	0.15	0.11	0.95	1519	47	4.62	36.36%
TP	FC 1	9/9/2013	0.148	0.081	0.10	4601	24	20.07	82.72%
TP	I-95	5/11/2006	0.13	0.77	0.25	7600	24	19.98	-83.12%
TP	FC 1	9/7/2015	0.125	0.025	0.10	4601	24	20.07	.
TP	Hal	12/12/2005	0.12	0.066	0.43	1519	47	4.62	81.82%
TP	GHSN	2/3/2007	0.111	0.039	0.82	780	30	2.30	184.62%
TP	Gris	12/15/2012	0.11	0.8	0.56	1953	43	.	-86.25%
TP	Gris	5/10/2014	0.11	0.4	0.83	1953	43	.	-72.50%
TP	Gris	8/15/2014	0.11	0.22	1.14	1953	43	.	-50.00%
TP	Hal	6/28/2005	0.11	0.16	0.70	1519	47	4.62	-31.25%
TP	I-95	11/15/2007	0.11	0.15	0.23	7600	24	19.98	-26.67%
TP	BRC B	11/4/2008	0.106	0.043	0.91	1120	36	3.47	146.51%
TP	I-95	7/8/2005	0.1	0.11	1.19	7600	24	19.98	-9.09%
TP	I-95	10/17/2006	0.1	0.12	0.52	7600	24	19.98	-16.67%
TP	BRC B	7/19/2008	0.094	0.071	0.35	1120	36	3.47	32.39%
TP	GHSS	10/28/2006	0.09399	0.04289	0.89	812	47	6.94	119.14%
TP	Hal	4/13/2005	0.09	0.4	1.68	1519	47	4.62	-77.50%
TP	BRC A	5/28/2008	0.088	0.088	0.49	1240	24	2.69	0.00%
TP	BRC B	9/25/2008	0.088	0.05	0.16	1120	36	3.47	76.00%
TP	FC 1	9/22/2013	0.087	0.069	0.10	4601	24	20.07	26.09%
TP	Hal	10/6/2005	0.087	0.1	2.08	1519	47	4.62	-13.00%
TP	Hal	12/5/2005	0.087	0.081	1.27	1519	47	4.62	7.41%
TP	BRC B	1/28/2009	0.085	0.06	0.34	1120	36	3.47	41.67%
TP	Hal	12/16/2005	0.085	0.072	1.68	1519	47	4.62	18.06%
TP	Hal	1/14/2005	0.08	0.16	1.03	1519	47	4.62	-50.00%
TP	Hal	3/8/2005	0.08	0.2	0.65	1519	47	4.62	-60.00%
TP	I-95	11/29/2005	0.08	0.05	0.62	7600	24	19.98	60.00%
TP	BRC B	9/16/2008	0.077	0.498	0.52	1120	36	3.47	-84.54%
TP	GHSS	11/16/2006	0.07699	0.0961	1.17	812	47	6.94	-19.89%
TP	BRC B	5/28/2008	0.076	0.088	0.49	1120	36	3.47	-13.64%
TP	BRC B	4/22/2008	0.073	0.029	0.41	1120	36	3.47	151.72%
TP	BRC A	7/19/2008	0.071	0.071	0.35	1240	24	2.69	0.00%
TP	BRC B	11/15/2008	0.07	0.051	0.34	1120	36	3.47	37.25%
TP	Hal	7/17/2004	0.07	0.1	2.43	1519	47	4.62	-30.00%
TP	Hal	2/22/2005	0.07	0.07	0.45	1519	47	4.62	0.00%
TP	I-95	4/2/2005	0.07	0.09	1.23	7600	24	19.98	-22.22%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TP	BRC A	5/15/2008	0.066	0.066	0.25	1240	24	2.69	0.00%
TP	BRC A	12/10/2008	0.066	0.066	1.49	1240	24	2.69	0.00%
TP	BRC B	2/18/2009	0.063	.	0.60	1120	36	3.47	.
TP	GHSS	11/13/2006	0.061	0.0819	0.90	812	47	6.94	-25.52%
TP	BRC A	1/28/2009	0.06	0.06	0.34	1240	24	2.69	0.00%
TP	Gris	1/29/2013	0.06	.	0.19	1953	43	.	.
TP	Hal	8/28/2004	0.06	0.14	0.98	1519	47	4.62	-57.14%
TP	GHSS	11/7/2006	0.05799	0.07769	1.30	812	47	6.94	-25.36%
TP	BRC A	2/28/2009	0.057	0.057	0.34	1240	24	2.69	0.00%
TP	BRC B	5/15/2008	0.057	0.066	0.25	1120	36	3.47	-13.64%
TP	GHSS	2/26/2007	0.056	0.059	0.90	812	47	6.94	-5.08%
TP	BRC A	8/20/2008	0.055	0.055	0.52	1240	24	2.69	0.00%
TP	GHSS	10/17/2006	0.05499	0.07069	0.93	812	47	6.94	-22.21%
TP	BRC A	11/15/2008	0.051	0.051	0.34	1240	24	2.69	0.00%
TP	GHSN	4/13/2007	0.05099	0.06599	1.14	780	30	2.30	-22.73%
TP	BRC A	9/25/2008	0.05	0.05	0.16	1240	24	2.69	0.00%
TP	BRC B	12/10/2008	0.05	0.066	1.49	1120	36	3.47	-24.24%
TP	GHSN	4/17/2007	0.05	0.07299	2.37	780	30	2.30	-31.50%
TP	BRC B	8/20/2008	0.049	0.055	0.52	1120	36	3.47	-10.91%
TP	GHSN	2/26/2007	0.04899	0.059	0.90	780	30	2.30	-16.97%
TP	Hal	10/13/2004	0.048	0.12	0.45	1519	47	4.62	-60.00%
TP	Hal	12/6/2004	0.048	0.11	0.44	1519	47	4.62	-56.36%
TP	Hal	11/4/2004	0.047	0.07	0.82	1519	47	4.62	-32.86%
TP	GHSS	4/17/2007	0.04699	0.07299	2.37	812	47	6.94	-35.62%
TP	GHSN	10/8/2006	0.04692	0.0636	0.71	780	30	2.30	-26.23%
TP	BRC B	2/28/2009	0.046	0.057	1.07	1120	36	3.47	-19.30%
TP	Hal	9/27/2004	0.046	0.1	2.43	1519	47	4.62	-54.00%
TP	GHSS	3/19/2007	0.045	0.046	1.37	812	47	6.94	-2.17%
TP	BRC A	4/20/2008	0.044	0.044	1.60	1240	24	2.69	0.00%
TP	GHSS	2/3/2007	0.04399	0.039	0.82	812	47	6.94	12.79%
TP	BRC A	11/4/2008	0.043	0.043	0.91	1240	24	2.69	0.00%
TP	BRC B	9/5/2008	0.041	0.028	2.61	1120	36	3.47	46.43%
TP	GHSS	4/13/2007	0.041	0.06599	1.14	812	47	6.94	-37.87%
TP	BRC B	7/9/2008	0.04	0.03	0.64	1120	36	3.47	33.33%
TP	GHSN	10/17/2006	0.03953	0.07069	0.93	780	30	2.30	-44.08%
TP	GHSN	3/19/2007	0.039	0.046	1.37	780	30	2.30	-15.22%
TP	BRC B	4/20/2008	0.037	0.044	1.60	1120	36	3.47	-15.91%
TP	BRC B	4/27/2008	0.035	0.023	0.78	1120	36	3.47	52.17%
TP	BRC A	7/9/2008	0.03	0.03	0.64	1240	24	2.69	0.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TP	Gris	4/24/2014	0.03	0.4	0.40	1953	43	.	-92.50%
TP	BRC A	4/22/2008	0.029	0.029	0.41	1240	24	2.69	0.00%
TP	BRC A	8/26/2008	0.028	0.028	0.30	1240	24	2.69	0.00%
TP	BRC A	9/5/2008	0.028	0.028	2.61	1240	24	2.69	0.00%
TP	BRC B	8/26/2008	0.025	0.028	0.30	1120	36	3.47	-10.71%
TP	Gris	11/23/2014	0.025	0.24	0.67	1953	43	.	-89.58%
TP	Gris	12/5/2014	0.025	0.39	0.48	1953	43	.	-93.59%
TP	Gris	1/3/2015	0.025	0.26	0.38	1953	43	.	-90.38%
TP	BRC A	4/27/2008	0.023	0.023	0.78	1240	24	2.69	0.00%
TP	BRC A	1/6/2009	0.023	0.023	0.88	1240	24	2.69	0.00%
TP	BRC B	1/6/2009	0.021	0.023	0.88	1120	36	3.47	-8.70%
TP	FC2	10/9/2014	0.0125	0.819	0.75	1314	18	3.03	-98.47%
TP	FC2	10/9/2014	0.0125	0.819	0.75	1314	18	3.03	-98.47%
TP	CR	9/26/2009	0.005	0.06	0.48	4601	24	20.07	-91.67%
TP	CR	10/15/2009	0.005	0.06	0.62	4601	24	20.07	-91.67%
TP	CR	11/11/2009	0.005	0.1192	1.09	4601	24	20.07	-95.81%
TP	CR	9/25/2008	0.005	0.09	0.62	4601	24	20.07	-94.44%
TP	GG2	8/30/2004	.	0.14	0.27	1314	18	3.03	.
TP	44th	3/20/2012	.	0.402	0.39	5100	24	.	.
TP	21st	7/26/2011	.	0.36	0.15	812	18	4.67	.
TP	GG2	8/12/2004	.	0.15	1.47	1314	18	3.03	.
TP	44th	11/11/2012	.	0.616	0.71	5100	24	.	.
TP	21st	8/28/2014	.	0.21	0.08	812	18	4.67	.
TP	44th	4/14/2011	.	0.209	0.19	5100	24	.	.
TP	44th	2/15/2010	.	0.01405	0.37	5100	24	.	.
TP	Hal	9/19/2005	.	0.4	0.59	1519	47	4.62	.
TP	GG2	8/23/2003	.	0.11	0.72	1314	18	3.03	.
TP	44th	3/4/2011	.	0.651	0.20	5100	24	.	.
TP	Hal	1/31/2006	.	0.1	0.24	1519	47	4.62	.
TP	21st	5/19/2011	.	0.2	0.55	812	18	4.67	.
TP	I-95	3/10/2009	.	0.25	0.52	7600	24	19.98	.
TP	44th	10/28/2011	.	0.66	0.30	5100	24	.	.
TP	GG2	12/13/2003	.	0.2	1.26	1314	18	3.03	.
TP	GG2	7/29/2003	.	0.07	1.07	1314	18	3.03	.
TP	44th	9/18/2010	.	0.62	1.01	5100	24	.	.
TP	21st	9/11/2012	.	0.65	0.12	812	18	4.67	.
TP	High	10/21/2009	.	0.06	0.75	4534	24	.	.
TP	High	10/21/2009	.	0.06	0.75	4534	24	.	.
TP	44th	11/11/2012	.	0.059	0.71	5100	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TP	High	10/21/2009	.	0.11	0.75	4534	24	.	.
TP	21st	5/14/2011	.	0.23	0.28	812	18	4.67	.
TP	44th	4/25/2012	.	0.804	0.67	5100	24	.	.
TP	44th	3/19/2013	.	0.6	0.75	5100	24	.	.
TP	I-95	10/21/2008	.	0.3	0.62	7600	24	19.98	.
TP	GG1	11/6/2003	.	0.22	0.26	1314	18	3.03	.
TP	44th	4/10/2013	.	0.052	0.22	5100	24	.	.
TP	44th	4/3/2012	.	0.051	0.15	5100	24	.	.
TP	44th	1/23/2013	.	0.051	0.23	5100	24	.	.
TP	GG2	7/22/2003	.	0.11	0.47	1314	18	3.03	.
TP	21st	5/18/2011	.	0.38	0.69	812	18	4.67	.
TP	GG2	5/3/2004	.	0.11	0.63	1314	18	3.03	.
TP	44th	10/30/2012	.	0.636	1.33	5100	24	.	.
TP	GG1	11/19/2003	.	0.05	0.88	1314	18	3.03	.
TP	44th	2/28/2013	.	0.648	0.57	5100	24	.	.
TP	21st	7/25/2013	.	0.35	0.10	812	18	4.67	.
TP	Hal	4/26/2004	.	0.6	0.11	1519	47	4.62	.
TP	44th	4/5/2013	.	0.049	0.27	5100	24	.	.
TP	44th	3/5/2012	.	0.696	0.29	5100	24	.	.
TP	44th	3/29/2011	.	0.578	0.71	5100	24	.	.
TP	21st	5/10/2014	.	0.31	0.66	812	18	4.67	.
TP	I-95	6/15/2009	.	0.18	0.23	7600	24	19.98	.
TP	44th	2/16/2010	.	0.524	0.37	5100	24	.	.
TP	44th	11/17/2010	.	0.462	0.54	5100	24	.	.
TP	I-95	11/5/2008	.	0.48	0.25	7600	24	19.98	.
TP	21st	5/9/2013	.	0.49	0.10	812	18	4.67	.
TP	44th	1/24/2010	.	0.0409	0.44	5100	24	.	.
TP	44th	11/16/2010	.	0.286	0.54	5100	24	.	.
TP	GG2	9/6/2004	.	0.18	5.27	1314	18	3.03	.
TP	21st	7/27/2013	.	0.36	0.10	812	18	4.67	.
TP	44th	1/31/2012	.	0.038	0.44	5100	24	.	.
TP	44th	3/19/2013	.	0.036	0.75	5100	24	.	.
TP	44th	2/28/2013	.	0.035	0.57	5100	24	.	.
TP	44th	3/5/2012	.	0.031	0.29	5100	24	.	.
TP	GG2	11/6/2003	.	0.12	0.26	1314	18	3.03	.
TP	I-95	10/13/2008	.	0.41	0.38	7600	24	19.98	.
TP	GG1	9/3/2003	.	0.03	0.83	1314	18	3.03	.
TP	44th	5/19/2010	.	0.614	0.45	5100	24	.	.
TP	44th	10/30/2012	.	0.029	1.33	5100	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TP	High	10/6/2008	.	0.17	0.12	4534	24	.	.
TP	Hal	8/12/2004	.	0.13	0.70	1519	47	4.62	.
TP	44th	2/4/2010	.	0.0289	0.15	5100	24	.	.
TP	44th	10/22/2012	.	0.078	0.25	5100	24	.	.
TP	44th	4/12/2013	.	0.298	0.27	5100	24	.	.
TP	44th	1/20/2011	.	0.198	0.34	5100	24	.	.
TP	44th	4/3/2012	.	0.484	0.15	5100	24	.	.
TP	44th	6/6/2012	.	0.026	0.62	5100	24	.	.
TP	FC 1	5/8/2013	.	0.025	0.10	4601	24	20.07	.
TP	GG2	12/10/2003	.	0.19	1.02	1314	18	3.03	.
TP	44th	2/12/2011	.	0.258	0.53	5100	24	.	.
TP	21st	5/11/2011	.	0.25	0.17	812	18	4.67	.
TP	GG1	8/30/2004	.	0.19	0.27	1314	18	3.03	.
TP	44th	4/1/2010	.	0.496	1.49	5100	24	.	.
TP	44th	6/5/2012	.	0.794	0.30	5100	24	.	.
TP	GHSS	9/28/2006	.	0.215	0.18	812	47	6.94	.
TP	21st	8/11/2013	.	0.75	0.10	812	18	4.67	.
TP	44th	2/5/2010	.	0.55	0.15	5100	24	.	.
TP	High	10/21/2009	.	0.025	0.75	4534	24	.	.
TP	High	10/21/2009	.	0.025	0.75	4534	24	.	.
TP	High	10/21/2009	.	0.025	0.75	4534	24	.	.
TP	High	10/21/2009	.	0.025	0.75	4534	24	.	.
TP	High	10/21/2009	.	0.025	0.75	4534	24	.	.
TP	High	10/21/2009	.	0.025	0.75	4534	24	.	.
TP	Gris	7/29/2013	.	0.33	0.23	1953	43	.	.
TP	High	3/7/2009	.	0.39	0.55	4534	24	.	.
TP	44th	3/4/2011	.	0.38	0.20	5100	24	.	.
TP	44th	3/15/2011	.	0.532	0.31	5100	24	.	.
TP	44th	1/21/2011	.	0.418	0.34	5100	24	.	.
TP	GG1	5/1/2004	.	0.29	0.63	1314	18	3.03	.
TP	44th	2/23/2010	.	0.101	0.55	5100	24	.	.
TP	Hal	2/14/2005	.	0.13	0.28	1519	47	4.62	.
TP	21st	6/16/2013	.	0.85	0.10	812	18	4.67	.
TP	44th	3/28/2011	.	0.083	0.71	5100	24	.	.
TP	44th	11/11/2011	.	0.088	0.19	5100	24	.	.
TP	44th	4/4/2013	.	0.022	0.57	5100	24	.	.
TSS	High	3/23/2009	44	27	0.55	4534	24	.	62.96%
TSS	I-95	3/10/2009	40	94	0.52	7600	24	19.98	-57.45%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TSS	21st	7/13/2011	39	.	0.68	812	18	4.67	.
TSS	21st	8/3/2013	38	.	1.83	812	18	4.67	.
TSS	I-95	5/20/2005	38	22	0.38	7600	24	19.98	72.73%
TSS	21st	7/19/2011	36	.	0.57	812	18	4.67	.
TSS	Hal	6/28/2005	35	39	0.70	1519	47	4.62	-10.26%
TSS	I-95	3/24/2009	35	138	0.65	7600	24	19.98	-74.64%
TSS	BRC B	2/18/2009	34	.	0.60	1120	36	3.47	.
TSS	I-95	6/15/2009	33	32	0.23	7600	24	19.98	3.13%
TSS	BRC A	2/18/2009	32	.	0.60	1240	24	2.69	.
TSS	Hal	2/7/2004	32	125	1.41	1519	47	4.62	-74.40%
TSS	I-95	6/9/2009	32	56	0.15	7600	24	19.98	-42.86%
TSS	BRC B	1/28/2009	31	13	0.34	1120	36	3.47	138.46%
TSS	FC 1	9/9/2013	30	72	0.10	4601	24	20.07	-58.33%
TSS	Hal	7/8/2005	29	84	0.63	1519	47	4.62	-65.48%
TSS	21st	8/9/2014	28	.	0.14	812	18	4.67	.
TSS	High	9/13/2010	28	21	0.67	4534	24	.	33.33%
TSS	BRC A	7/9/2008	27	17	0.64	1240	24	2.69	58.82%
TSS	High	9/1/2010	27	15	0.86	4534	24	.	80.00%
TSS	I-95	11/5/2008	27	66	0.25	7600	24	19.98	-59.09%
TSS	21st	9/15/2011	26	.	0.13	812	18	4.67	.
TSS	21st	9/15/2011	26	.	0.13	812	18	4.67	.
TSS	I-95	10/15/2008	26	112	1.19	7600	24	19.98	-76.79%
TSS	21st	9/9/2013	24	52	0.50	812	18	4.67	-53.85%
TSS	Hal	5/13/2005	24	132	0.25	1519	47	4.62	-81.82%
TSS	High	4/26/2009	24	25	2.20	4534	24	.	-4.00%
TSS	High	7/20/2010	24	16	0.75	4534	24	.	50.00%
TSS	FC2	7/29/2014	23	40	1.50	1314	18	3.03	-42.50%
TSS	FC2	7/29/2014	23	40	1.50	1314	18	3.03	-42.50%
TSS	High	11/2/2011	23	.	1.41	4534	24	.	.
TSS	FC2	6/8/2014	22	62	0.16	1314	18	3.03	-64.52%
TSS	FC2	6/8/2014	22	62	0.16	1314	18	3.03	-64.52%
TSS	I-95	7/8/2005	22	25	1.19	7600	24	19.98	-12.00%
TSS	I-95	10/21/2008	22	42	0.62	7600	24	19.98	-47.62%
TSS	21st	7/29/2011	21	.	0.15	812	18	4.67	.
TSS	21st	5/5/2012	21	.	0.10	812	18	4.67	.
TSS	21st	5/12/2012	21	21	0.10	812	18	4.67	0.00%
TSS	21st	9/14/2011	20	178	0.87	812	18	4.67	-88.76%
TSS	21st	7/1/2013	20	.	0.18	812	18	4.67	.
TSS	High	10/15/2008	20	.	0.98	4534	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TSS	High	6/9/2009	20	28	1.49	4534	24	.	-28.57%
TSS	CR	3/11/2010	19	190	0.62	4601	24	20.07	-90.00%
TSS	FC2	10/9/2014	19	32	0.75	1314	18	3.03	-40.63%
TSS	FC2	10/9/2014	19	32	0.75	1314	18	3.03	-40.63%
TSS	High	7/24/2010	19	30	1.41	4534	24	.	-36.67%
TSS	I-95	9/12/2008	19	26	1.23	7600	24	19.98	-26.92%
TSS	FC 1	9/7/2015	18	51	0.10	4601	24	20.07	-64.71%
TSS	Hal	8/28/2004	18	22	0.98	1519	47	4.62	-18.18%
TSS	Hal	3/22/2006	18	19	0.95	1519	47	4.62	-5.26%
TSS	High	10/21/2008	18	.	2.28	4534	24	.	.
TSS	High	11/5/2008	18	60	1.10	4534	24	.	-70.00%
TSS	High	5/15/2009	18	63	0.86	4534	24	.	-71.43%
TSS	High	8/16/2009	18	216	1.93	4534	24	.	-91.67%
TSS	High	10/1/2009	18	30	0.31	4534	24	.	-40.00%
TSS	BRC A	1/28/2009	17	13	0.34	1240	24	2.69	30.77%
TSS	Gris	4/24/2014	17	.	0.40	1953	43	.	.
TSS	High	9/24/2008	17	132	0.31	4534	24	.	-87.12%
TSS	21st	7/7/2014	16	.	0.10	812	18	4.67	.
TSS	BRC A	8/26/2008	16	26	0.30	1240	24	2.69	-38.46%
TSS	Gris	8/29/2014	16	.	0.29	1953	43	.	.
TSS	High	5/8/2009	16	36	0.31	4534	24	.	-55.56%
TSS	High	10/22/2009	16	.	0.83	4534	24	.	.
TSS	High	8/20/2010	16	11	1.93	4534	24	.	45.45%
TSS	21st	7/13/2013	15	.	2.14	812	18	4.67	.
TSS	Gris	8/15/2014	15	.	1.14	1953	43	.	.
TSS	Hal	7/17/2004	15	20	2.43	1519	47	4.62	-25.00%
TSS	High	9/12/2008	15	11	1.77	4534	24	.	36.36%
TSS	I-95	5/11/2006	15	113	0.25	7600	24	19.98	-86.73%
TSS	21st	7/27/2011	14	170	0.16	812	18	4.67	-91.76%
TSS	21st	6/6/2012	14	.	0.14	812	18	4.67	.
TSS	CR	3/28/2010	14	.	0.62	4601	24	20.07	.
TSS	FC2	6/22/2014	14	53	0.34	1314	18	3.03	-73.58%
TSS	FC2	6/22/2014	14	53	0.34	1314	18	3.03	-73.58%
TSS	Hal	9/19/2005	14	63	0.59	1519	47	4.62	-77.78%
TSS	High	11/14/2009	14	11	1.14	4534	24	.	27.27%
TSS	I-95	11/29/2005	14	139	0.62	7600	24	19.98	-89.93%
TSS	FC2	6/11/2015	13.5	134	0.63	1314	18	3.03	-89.93%
TSS	FC2	6/11/2015	13.5	134	0.63	1314	18	3.03	-89.93%
TSS	BRC A	7/19/2008	13	43	0.35	1240	24	2.69	-69.77%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TSS	Gris	1/29/2013	13	.	0.19	1953	43	.	.
TSS	BRC A	5/15/2008	12	23	0.25	1240	24	2.69	-47.83%
TSS	BRC A	11/15/2008	12	30	0.34	1240	24	2.69	-60.00%
TSS	BRC B	8/20/2008	12	45	0.52	1120	36	3.47	-73.33%
TSS	FC2	7/11/2014	12	48	0.87	1314	18	3.03	-75.00%
TSS	FC2	7/11/2014	12	48	0.87	1314	18	3.03	-75.00%
TSS	Gris	5/10/2014	12	.	0.83	1953	43	.	.
TSS	Hal	1/14/2005	12	68	1.03	1519	47	4.62	-82.35%
TSS	High	7/20/2009	12	8	0.86	4534	24	.	50.00%
TSS	High	10/29/2009	12	16	1.10	4534	24	.	-25.00%
TSS	High	7/8/2010	12	48	0.28	4534	24	.	-75.00%
TSS	High	7/16/2010	12	27	0.28	4534	24	.	-55.56%
TSS	High	9/15/2010	12	38	0.75	4534	24	.	-68.42%
TSS	High	9/15/2010	12	15	0.75	4534	24	.	-20.00%
TSS	21st	7/31/2012	11	161	0.14	812	18	4.67	-93.17%
TSS	21st	8/11/2012	11	108	0.08	812	18	4.67	-89.81%
TSS	BRC B	11/15/2008	11	30	0.34	1120	36	3.47	-63.33%
TSS	FC 1	8/18/2015	11	0.32	0.10	4601	24	20.07	.
TSS	FC 1	10/3/2015	11	25	0.20	4601	24	20.07	-56.00%
TSS	CR	9/11/2009	11	11	0.15	4601	24	20.07	0.00%
TSS	Gris	1/3/2015	11	.	0.38	1953	43	.	.
TSS	Hal	4/13/2005	11	66	1.68	1519	47	4.62	-83.33%
TSS	High	8/19/2009	11	39	0.28	4534	24	.	-71.79%
TSS	High	7/11/2010	11	33	2.00	4534	24	.	-66.67%
TSS	21st	5/11/2011	10	70	0.17	812	18	4.67	-85.71%
TSS	BRC A	12/10/2008	10	65	1.49	1240	24	2.69	-84.62%
TSS	BRC B	4/27/2008	10	14	0.78	1120	36	3.47	-28.57%
TSS	BRC B	8/26/2008	10	26	0.30	1120	36	3.47	-61.54%
TSS	CR	6/3/2009	10	4.9564	1.28	4601	24	20.07	101.76%
TSS	Gris	12/5/2014	10	.	0.48	1953	43	.	.
TSS	Hal	9/27/2004	10	50	2.43	1519	47	4.62	-80.00%
TSS	Hal	2/22/2005	10	18	0.45	1519	47	4.62	-44.44%
TSS	High	10/25/2009	10	9	0.83	4534	24	.	11.11%
TSS	I-95	11/15/2007	10	13	0.23	7600	24	19.98	-23.08%
TSS	FC2	9/29/2014	9.5	31.5	0.39	1314	18	3.03	-69.84%
TSS	FC2	9/29/2014	9.5	31.5	0.39	1314	18	3.03	-69.84%
TSS	21st	9/9/2013	9	52	0.50	812	18	4.67	-82.69%
TSS	21st	9/22/2014	9	.	0.17	812	18	4.67	.
TSS	BRC A	2/28/2009	9	21	1.07	1240	24	2.69	-57.14%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TSS	High	6/15/2009	9	12	0.35	4534	24	.	-25.00%
TSS	High	8/19/2009	9	9	0.28	4534	24	.	0.00%
TSS	21st	5/6/2012	8	40	0.10	812	18	4.67	-80.00%
TSS	21st	5/20/2011	8		0.16	812	18	4.67	.
TSS	BRC A	4/20/2008	8	16	1.60	1240	24	2.69	-50.00%
TSS	BRC B	7/9/2008	8	17	0.64	1120	36	3.47	-52.94%
TSS	BRC B	2/28/2009	8	21	1.07	1120	36	3.47	-61.90%
TSS	FC 1	9/22/2013	8	104	0.10	4601	24	20.07	-92.31%
TSS	FC2	7/15/2014	8	.	0.55	1314	18	3.03	.
TSS	FC2	7/15/2014	8	.	0.55	1314	18	3.03	.
TSS	FC2	5/19/2015	8	5.5	1.52	1314	18	3.03	45.45%
TSS	FC2	5/19/2015	8	5.5	1.52	1314	18	3.03	45.45%
TSS	21st	5/6/2012	7	127	0.10	812	18	4.67	-94.49%
TSS	21st	5/29/2013	7	149	0.47	812	18	4.67	-95.30%
TSS	21st	7/11/2013	7	121	0.27	812	18	4.67	-94.21%
TSS	21st	5/8/2014	7	.	0.13	812	18	4.67	.
TSS	21st	5/30/2014	7	.	0.26	812	18	4.67	.
TSS	21st	8/20/2014	7	.	0.14	812	18	4.67	.
TSS	BRC A	4/27/2008	7	14	0.78	1240	24	2.69	-50.00%
TSS	BRC A	5/28/2008	7	15	0.49	1240	24	2.69	-53.33%
TSS	BRC A	8/20/2008	7	45	0.52	1240	24	2.69	-84.44%
TSS	BRC B	5/15/2008	7	23	0.25	1120	36	3.47	-69.57%
TSS	FC2	4/26/2015	7	12.5	0.47	1314	18	3.03	-44.00%
TSS	FC2	4/26/2015	7	12.5	0.47	1314	18	3.03	-44.00%
TSS	Hal	12/12/2005	7	11	0.43	1519	47	4.62	-36.36%
TSS	I-95	9/14/2006	7	10	0.31	7600	24	19.98	-30.00%
TSS	21st	9/11/2012	6	64	0.12	812	18	4.67	-90.63%
TSS	21st	5/7/2014	6	.	0.55	812	18	4.67	.
TSS	21st	5/21/2014	6	.	0.32	812	18	4.67	.
TSS	21st	8/26/2014	6	176	0.27	812	18	4.67	-96.59%
TSS	21st	9/29/2014	6	.	0.47	812	18	4.67	.
TSS	BRC A	9/16/2008	6	28	0.52	1240	24	2.69	-78.57%
TSS	BRC B	5/28/2008	6	15	0.49	1120	36	3.47	-60.00%
TSS	FC 1	9/27/2013	6	33	0.10	4601	24	20.07	-81.82%
TSS	FC 1	10/3/2013	6	42	0.20	4601	24	20.07	-85.71%
TSS	Gris	9/5/2014	6	.	0.56	1953	43	.	.
TSS	Hal	10/6/2005	6	21	2.08	1519	47	4.62	-71.43%
TSS	High	11/7/2011	6	21	1.97	4534	24	.	-71.43%
TSS	I-95	10/24/2007	6	12	0.15	7600	24	19.98	-50.00%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TSS	21st	7/9/2012	5	.	0.10	812	18	4.67	.
TSS	21st	9/22/2013	5	19	0.10	812	18	4.67	-73.68%
TSS	BRC A	4/22/2008	5	14	0.41	1240	24	2.69	-64.29%
TSS	BRC A	9/5/2008	5	32	2.61	1240	24	2.69	-84.38%
TSS	BRC A	9/25/2008	5	34	0.16	1240	24	2.69	-85.29%
TSS	BRC A	11/4/2008	5	18	0.91	1240	24	2.69	-72.22%
TSS	BRC A	1/6/2009	5	2	0.88	1240	24	2.69	150.00%
TSS	BRC B	4/20/2008	5	16	1.60	1120	36	3.47	-68.75%
TSS	BRC B	4/22/2008	5	14	0.41	1120	36	3.47	-64.29%
TSS	BRC B	12/10/2008	5	65	1.49	1120	36	3.47	-92.31%
TSS	FC 1	7/28/2013	5	40	0.20	4601	24	20.07	-87.50%
TSS	High	7/3/2009	5	6	0.63	4534	24	.	-16.67%
TSS	21st	5/23/2012	4	4	0.10	812	18	4.67	0.00%
TSS	21st	5/22/2014	4	78	0.16	812	18	4.67	-94.87%
TSS	21st	6/8/2014	4	.	0.42	812	18	4.67	.
TSS	21st	7/16/2014	3	193	0.29	812	18	4.67	-98.45%
TSS	21st	8/26/2014	3	.	0.27	812	18	4.67	.
TSS	21st	9/10/2014	3	158	0.16	812	18	4.67	-98.10%
TSS	21st	9/28/2014	3	.	0.12	812	18	4.67	.
TSS	BRC B	7/19/2008	3	43	0.35	1120	36	3.47	-93.02%
TSS	BRC B	9/16/2008	3	28	0.52	1120	36	3.47	-89.29%
TSS	BRC B	9/25/2008	3	34	0.16	1120	36	3.47	-91.18%
TSS	BRC B	11/4/2008	3	18	0.91	1120	36	3.47	-83.33%
TSS	BRC B	1/6/2009	3	2	0.88	1120	36	3.47	50.00%
TSS	Hal	10/13/2004	2.5	49	0.45	1519	47	4.62	-94.90%
TSS	Hal	11/4/2004	2.5	16	0.82	1519	47	4.62	-84.38%
TSS	Hal	12/6/2004	2.5	46	0.44	1519	47	4.62	-94.57%
TSS	Hal	3/8/2005	2.5	92	0.65	1519	47	4.62	-97.28%
TSS	Hal	12/5/2005	2.5	29	1.27	1519	47	4.62	-91.38%
TSS	Hal	12/16/2005	2.5	15	1.68	1519	47	4.62	-83.33%
TSS	21st	6/18/2014	2	.	0.10	812	18	4.67	.
TSS	21st	7/15/2014	2	.	0.11	812	18	4.67	.
TSS	21st	7/29/2014	2	86	2.20	812	18	4.67	-97.67%
TSS	BRC B	9/5/2008	2	32	2.61	1120	36	3.47	-93.75%
TSS	CR	8/21/2009	2	22.653	2.36	4601	24	20.07	-91.17%
TSS	21st	7/29/2014	1	84	2.20	812	18	4.67	-98.81%
TSS	CR	9/26/2009	0.5	4	0.48	4601	24	20.07	-87.50%
TSS	CR	10/15/2009	0.5	6	0.62	4601	24	20.07	-91.67%
TSS	CR	11/11/2009	0.5	8.9412	1.09	4601	24	20.07	-94.41%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TSS	CR	9/25/2008	0.5	.	0.62	4601	24	20.07	.
TSS	Gris	11/23/2014	0.5	.	0.67	1953	43	.	.
TSS	Hal	2/14/2005	0	44	0.28	1519	47	4.62	-100.00%
TSS	44th	10/15/2012	.	36.3	0.35	5100	24	.	.
TSS	44th	5/25/2011	.	18.8	0.22	5100	24	.	.
TSS	21st	5/14/2011	.	105	0.28	812	18	4.67	.
TSS	21st	6/4/2013	.	149	0.17	812	18	4.67	.
TSS	Hal	4/26/2004	.	44	0.11	1519	47	4.62	.
TSS	44th	4/5/2013	.	15.6	0.27	5100	24	.	.
TSS	FC 1	7/18/2013	.	118	0.20	4601	24	20.07	.
TSS	I-95	10/13/2008	.	30	0.38	7600	24	19.98	.
TSS	High	10/21/2009	.	19	0.75	4534	24	.	.
TSS	Hal	12/29/2005	.	60	0.35	1519	47	4.62	.
TSS	21st	7/25/2013	.	52	0.20	812	18	4.67	.
TSS	44th	3/5/2012	.	14.3	0.29	5100	24	.	.
TSS	21st	5/18/2011	.	232	0.69	812	18	4.67	.
TSS	44th	4/3/2012	.	18.5	0.15	5100	24	.	.
TSS	44th	1/23/2013	.	21.2	0.23	5100	24	.	.
TSS	I-95	4/2/2005	.	76	1.23	7600	24	19.98	.
TSS	I-95	4/12/2007	.	14	0.65	7600	24	19.98	.
TSS	44th	4/4/2013	.	13.8	0.57	5100	24	.	.
TSS	44th	2/4/2010	.	13.5	0.15	5100	24	.	.
TSS	44th	3/4/2011	.	79.6	0.20	5100	24	.	.
TSS	21st	6/16/2013	.	166	0.10	812	18	4.67	.
TSS	44th	1/20/2011	.	84	0.34	5100	24	.	.
TSS	44th	11/16/2010	.	114	0.54	5100	24	.	.
TSS	High	3/10/2009	.	33	1.53	4534	24	.	.
TSS	21st	7/27/2013	.	205	0.10	812	18	4.67	.
TSS	21st	5/10/2014	.	39	0.66	812	18	4.67	.
TSS	44th	10/14/2012	.	11.7	0.46	5100	24	.	.
TSS	21st	9/11/2012	.	11	0.10	812	18	4.67	.
TSS	44th	3/28/2011	.	58.8	0.71	5100	24	.	.
TSS	21st	8/28/2014	.	136	0.08	812	18	4.67	.
TSS	44th	2/12/2011	.	97.2	0.53	5100	24	.	.
TSS	21st	5/19/2011	.	64	0.55	812	18	4.67	.
TSS	21st	7/15/2013	.	73	0.55	812	18	4.67	.
TSS	I-95	10/17/2006	.	11	0.52	7600	24	19.98	.
TSS	21st	7/26/2011	.	158	0.15	812	18	4.67	.
TSS	21st	7/15/2013	.	73	0.55	812	18	4.67	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TSS	Hal	6/1/2004	.	76	0.35	1519	47	4.62	.
TSS	FC 1	7/5/2013	.	158	0.20	4601	24	20.07	.
TSS	21st	9/11/2012	.	8	0.10	812	18	4.67	.
TSS	44th	11/11/2011	.	8	0.19	5100	24	.	.
TSS	High	10/6/2008	.	57	0.12	4534	24	.	.
TSS	High	10/21/2009	.	8	0.75	4534	24	.	.
TSS	High	10/21/2009	.	8	0.75	4534	24	.	.
TSS	High	10/21/2009	.	8	0.75	4534	24	.	.
TSS	44th	11/11/2012	.	7.83	0.71	5100	24	.	.
TSS	44th	2/15/2010	.	7.4	0.37	5100	24	.	.
TSS	High	10/21/2009	.	7	0.75	4534	24	.	.
TSS	44th	2/28/2013	.	6.67	0.57	5100	24	.	.
TSS	44th	10/22/2012	.	6.53	0.25	5100	24	.	.
TSS	44th	3/19/2013	.	6	0.75	5100	24	.	.
TSS	High	3/7/2009	.	120	0.55	4534	24	.	.
TSS	FC 1	5/8/2013	.	108	0.20	4601	24	20.07	.
TSS	High	10/21/2009	.	6	0.75	4534	24	.	.
TSS	High	10/21/2009	.	6	0.75	4534	24	.	.
TSS	44th	4/10/2013	.	5.92	0.22	5100	24	.	.
TSS	High	10/21/2009	.	36	0.75	4534	24	.	.
TSS	44th	6/6/2012	.	29.4	0.62	5100	24	.	.
TSS	Hal	8/12/2004	.	5	0.70	1519	47	4.62	.
TSS	High	10/21/2009	.	5	0.75	4534	24	.	.
TSS	44th	1/24/2010	.	28.2	0.44	5100	24	.	.
TSS	44th	1/31/2012	.	4.32	0.44	5100	24	.	.
TSS	44th	4/14/2011	.	43.9	0.19	5100	24	.	.
TSS	Hal	5/5/2004	.	18	0.95	1519	47	4.62	.
TSS	44th	2/23/2010	.	3.6	0.55	5100	24	.	.
TSS	44th	10/30/2012	.	3.6	1.33	5100	24	.	.
TSS	44th	11/11/2012	.	2.63	0.71	5100	24	.	.
TSS	Hal	1/31/2006	.	21	0.24	1519	47	4.62	.
TSS	44th	10/30/2012	.	1.9	1.33	5100	24	.	.
TSS	44th	2/28/2013	.	1.75	0.57	5100	24	.	.
TSS	44th	2/12/2011	.	1.6	0.53	5100	24	.	.
TSS	44th	3/5/2012	.	1.47	0.29	5100	24	.	.
TSS	44th	4/12/2013	.	1.43	0.27	5100	24	.	.
TSS	44th	1/21/2011	.	1.3	0.34	5100	24	.	.
TSS	44th	6/25/2013	.	1.24	0.19	5100	24	.	.
TSS	44th	3/19/2013	.	1.16	0.75	5100	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TSS	44th	11/17/2010	.	1	0.54	5100	24	.	.
TSS	44th	4/1/2010	.	0.8	1.49	5100	24	.	.
TSS	44th	4/3/2012	.	0.73	0.15	5100	24	.	.
TSS	44th	10/28/2011	.	0.46	0.30	5100	24	.	.
TSS	21st	9/4/2014	.	48	0.08	812	18	4.67	.
TSS	44th	4/25/2012	.	0.3	0.67	5100	24	.	.
TSS	44th	5/27/2013	.	0.265	0.38	5100	24	.	.
TSS	44th	6/5/2012	.	0.26	0.30	5100	24	.	.
TSS	44th	2/5/2010	.	0.255	0.15	5100	24	.	.
TSS	44th	2/16/2010	.	0.255	0.37	5100	24	.	.
TSS	44th	2/23/2010	.	0.255	0.55	5100	24	.	.
TSS	44th	9/18/2010	.	0.255	1.01	5100	24	.	.
TSS	44th	3/4/2011	.	0.255	0.20	5100	24	.	.
TSS	44th	3/15/2011	.	0.255	0.31	5100	24	.	.
TSS	44th	3/29/2011	.	0.255	0.71	5100	24	.	.
TSS	44th	5/25/2011	.	0.255	0.22	5100	24	.	.
TZ	CR	4/20/2009	0.064	.	0.62	4601	24	20.07	.
TZ	Gris	12/15/2012	0.059	0.0436	0.56	1953	43	.	35.32%
TZ	I-95	5/20/2005	0.057	0.092	0.38	7600	24	19.98	-38.04%
TZ	I-95	10/15/2008	0.057	0.137	1.19	7600	24	19.98	-58.39%
TZ	I-95	7/8/2005	0.052	0.054	1.19	7600	24	19.98	-3.70%
TZ	21st	7/7/2011	0.0503	0.025	1.73	812	18	4.67	101.20%
TZ	I-95	10/24/2007	0.049	0.071	0.15	7600	24	19.98	-30.99%
TZ	21st	8/7/2014	0.0488	.	0.11	812	18	4.67	.
TZ	High	10/15/2008	0.046	.	0.98	4534	24	.	.
TZ	21st	6/20/2011	0.0457	0.148	0.45	812	18	4.67	-69.12%
TZ	High	8/19/2009	0.044	0.049	0.28	4534	24	.	-10.20%
TZ	High	10/21/2008	0.043	.	2.28	4534	24	.	.
TZ	21st	8/3/2013	0.0422	0.173	1.83	812	18	4.67	-75.61%
TZ	CR	3/11/2010	0.04	0.094	0.62	4601	24	20.07	-57.45%
TZ	I-95	11/15/2007	0.04	0.053	0.23	7600	24	19.98	-24.53%
TZ	I-95	6/15/2009	0.039	0.042	0.23	7600	24	19.98	-7.14%
TZ	High	10/22/2009	0.038	.	0.83	4534	24	.	.
TZ	CR	3/28/2010	0.037	0.13	0.62	4601	24	20.07	-71.54%
TZ	High	4/26/2009	0.037	0.046	2.20	4534	24	.	-19.57%
TZ	High	8/19/2009	0.037	0.041	0.28	4534	24	.	-9.76%
TZ	I-95	3/10/2009	0.037	0.177	0.52	7600	24	19.98	-79.10%
TZ	High	7/24/2010	0.036	0.027	1.41	4534	24	.	33.33%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TZ	21st	8/9/2014	0.0345	.	0.14	812	18	4.67	.
TZ	High	7/3/2009	0.034	0.029	0.63	4534	24	.	17.24%
TZ	I-95	11/29/2005	0.034	0.002	0.62	7600	24	19.98	.
TZ	High	5/15/2009	0.033	0.046	0.86	4534	24	.	-28.26%
TZ	I-95	10/21/2008	0.032	0.093	0.62	7600	24	19.98	-65.59%
TZ	Hal	5/5/2004	0.031	0.069	0.95	1519	47	4.62	-55.07%
TZ	High	3/23/2009	0.031	0.022	0.55	4534	24	.	40.91%
TZ	High	10/25/2009	0.03	0.029	0.83	4534	24	.	3.45%
TZ	High	11/14/2009	0.03	0.036	1.14	4534	24	.	-16.67%
TZ	I-95	9/14/2006	0.03	0.084	0.31	7600	24	19.98	-64.29%
TZ	I-95	10/17/2006	0.03	0.023	0.52	7600	24	19.98	30.43%
TZ	High	3/10/2009	0.029	0.034	1.53	4534	24	.	-14.71%
TZ	High	9/24/2008	0.028	0.077	0.31	4534	24	.	-63.64%
TZ	High	7/20/2009	0.027	0.034	0.86	4534	24	.	-20.59%
TZ	21st	7/7/2014	0.0261	.	0.10	812	18	4.67	.
TZ	Hal	2/7/2004	0.026	0.11	1.41	1519	47	4.62	-76.36%
TZ	Hal	5/13/2005	0.026	0.071	0.25	1519	47	4.62	-63.38%
TZ	21st	7/12/2011	0.025	0.166	0.71	812	18	4.67	-84.94%
TZ	21st	7/19/2011	0.025	0.178	0.57	812	18	4.67	-85.96%
TZ	21st	7/29/2011	0.025	.	0.15	812	18	4.67	.
TZ	21st	7/27/2011	0.025	0.0992	0.16	812	18	4.67	-74.80%
TZ	21st	9/14/2011	0.025	0.153	0.87	812	18	4.67	-83.66%
TZ	21st	5/5/2012	0.025	0.191	0.10	812	18	4.67	-86.91%
TZ	21st	5/6/2012	0.025	0.0676	0.10	812	18	4.67	-63.02%
TZ	21st	5/6/2012	0.025	0.025	0.10	812	18	4.67	0.00%
TZ	21st	5/12/2012	0.025	0.025	0.10	812	18	4.67	0.00%
TZ	21st	5/23/2012	0.025	0.025	0.10	812	18	4.67	0.00%
TZ	21st	6/6/2012	0.025	.	0.35	812	18	4.67	.
TZ	21st	7/9/2012	0.025	.	0.14	812	18	4.67	.
TZ	21st	9/11/2012	0.025	0.0843	0.12	812	18	4.67	-70.34%
TZ	21st	9/11/2012	0.025	0.025	0.12	812	18	4.67	0.00%
TZ	21st	9/15/2011	0.025	.	0.13	812	18	4.67	.
TZ	21st	9/15/2011	0.025	.	0.13	812	18	4.67	.
TZ	Hal	9/19/2005	0.025	0.15	0.59	1519	47	4.62	-83.33%
TZ	CR	9/11/2009	0.024	0.024	0.15	4601	24	20.07	0.00%
TZ	High	10/29/2009	0.024	0.024	1.10	4534	24	.	0.00%
TZ	High	11/2/2011	0.024	.	1.41	4534	24	.	.
TZ	Hal	3/22/2006	0.023	0.047	0.95	1519	47	4.62	-51.06%
TZ	High	9/12/2008	0.023	0.015	1.77	4534	24	.	53.33%

Appendix A: *Continued*

Poll.	Site	Date	y	x1	x2	x3	x4	x5	% Change in Pollutant Conc. (Outliers Removed)
			Eff. Conc. (mg/L or CFU/100 ml)	Inf. Conc. (mg/L or CFU/100 ml)	Rainfall Depth (in)	Ponding Volume (ft^3)	Media Depth (in)	Retetion Time (min)	
TZ	High	6/15/2009	0.023	0.027	0.35	4534	24	.	-14.81%
TZ	21st	5/29/2013	0.022	0.13	0.47	812	18	4.67	-83.08%
TZ	21st	9/29/2014	0.0212	.	0.47	812	18	4.67	.
TZ	21st	5/20/2011	0.0205	.	0.16	812	18	4.67	.
TZ	CR	6/3/2009	0.02	0.0438	1.28	4601	24	20.07	-54.34%
TZ	High	9/1/2010	0.02	0.016	0.86	4534	24	.	25.00%
TZ	21st	9/4/2014	0.0196	0.0698	0.08	812	18	4.67	-71.92%
TZ	21st	7/1/2013	0.0195	.	0.18	812	18	4.67	.
TZ	High	8/20/2010	0.019	0.022	1.93	4534	24	.	-13.64%
TZ	High	9/13/2010	0.019	0.015	0.67	4534	24	.	26.67%
TZ	I-95	11/5/2008	0.018	0.127	0.25	7600	24	19.98	-85.83%
TZ	Gris	1/3/2015	0.017	0.195	0.38	1953	43	.	-91.28%
TZ	I-95	9/12/2008	0.017	0.031	1.23	7600	24	19.98	-45.16%
TZ	21st	9/22/2014	0.0165	.	0.17	812	18	4.67	.
TZ	Hal	12/29/2005	0.016	0.081	0.35	1519	47	4.62	-80.25%
TZ	High	11/5/2008	0.016	0.078	1.10	4534	24	.	-79.49%
TZ	High	7/8/2010	0.016	0.033	0.28	4534	24	.	-51.52%
TZ	I-95	6/9/2009	0.016	0.059	0.15	7600	24	19.98	-72.88%
TZ	21st	8/26/2014	0.0159	0.069	0.27	812	18	4.67	-76.96%
TZ	Gris	8/29/2014	0.015	.	0.29	1953	43	.	.
TZ	High	6/9/2009	0.015	0.038	1.49	4534	24	.	-60.53%
TZ	High	10/1/2009	0.015	0.023	0.31	4534	24	.	-34.78%
TZ	Gris	11/23/2014	0.014	0.136	0.67	1953	43	.	-89.71%
TZ	High	7/20/2010	0.014	0.018	0.75	4534	24	.	-22.22%
TZ	High	9/15/2010	0.014	0.013	0.75	4534	24	.	7.69%
TZ	High	9/15/2010	0.014	0.01	0.75	4534	24	.	40.00%
TZ	I-95	3/24/2009	0.014	.	0.65	7600	24	19.98	.
TZ	21st	8/20/2014	0.0137	.	0.14	812	18	4.67	.
TZ	Gris	12/5/2014	0.013	.	0.48	1953	43	.	.
TZ	Hal	1/14/2005	0.013	0.08	1.03	1519	47	4.62	-83.75%
TZ	Hal	12/12/2005	0.013	0.037	0.43	1519	47	4.62	-64.86%
TZ	21st	9/10/2014	0.0122	0.0367	0.16	812	18	4.67	-66.76%
TZ	Gris	5/10/2014	0.012	.	0.83	1953	43	.	.
TZ	Gris	8/15/2014	0.012	.	1.14	1953	43	.	.
TZ	Hal	11/4/2004	0.012	.	0.82	1519	47	4.62	.
TZ	21st	6/4/2013	0.0119	0.0556	0.17	812	18	4.67	-78.60%
TZ	21st	9/28/2014	0.0119	.	0.12	812	18	4.67	.
TZ	21st	9/9/2013	0.01	0.0212	0.50	812	18	4.67	-52.83%
TZ	21st	9/9/2013	0.01	0.0212	0.50	812	18	4.67	-52.83%

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TZ	21st	9/22/2013	0.01	0.0229	0.00	812	18	4.67	-56.33%
TZ	21st	5/7/2014	0.01	.	0.55	812	18	4.67	.
TZ	21st	5/8/2014	0.01	0.19	0.13	812	18	4.67	-94.74%
TZ	21st	5/21/2014	0.01	.	0.32	812	18	4.67	.
TZ	21st	5/22/2014	0.01	0.0511	0.16	812	18	4.67	-80.43%
TZ	21st	5/30/2014	0.01	0.116	0.26	812	18	4.67	-91.38%
TZ	21st	6/8/2014	0.01	0.146	0.42	812	18	4.67	-93.15%
TZ	21st	7/15/2014	0.01	.	0.11	812	18	4.67	.
TZ	21st	7/16/2014	0.01	0.0955	0.29	812	18	4.67	-89.53%
TZ	21st	7/29/2014	0.01	0.0261	2.20	812	18	4.67	-61.69%
TZ	21st	7/29/2014	0.01	0.0712	2.20	812	18	4.67	-85.96%
TZ	21st	8/26/2014	0.01	0.192	0.27	812	18	4.67	-94.79%
TZ	Hal	4/13/2005	0.01	0.062	1.68	1519	47	4.62	-83.87%
TZ	High	7/11/2010	0.01	0.02	2.00	4534	24	.	-50.00%
TZ	Gris	7/30/2013	0.009	.	0.23	1953	43	.	.
TZ	High	5/8/2009	0.009	0.028	0.31	4534	24	.	-67.86%
TZ	High	11/7/2011	0.009	0.036	1.97	4534	24	.	-75.00%
TZ	Hal	6/1/2004	0.0085	0.095	0.35	1519	47	4.62	-91.05%
TZ	Hal	7/17/2004	0.0085	0.051	2.43	1519	47	4.62	-83.33%
TZ	High	8/16/2009	0.008	0.02	1.93	4534	24	.	-60.00%
TZ	Gris	4/24/2014	0.007	.	0.40	1953	43	.	.
TZ	CR	9/26/2009	0.005	0.005	0.48	4601	24	20.07	0.00%
TZ	CR	10/15/2009	0.005	0.019	0.62	4601	24	20.07	-73.68%
TZ	CR	11/11/2009	0.005	0.0318	1.09	4601	24	20.07	-84.28%
TZ	CR	9/25/2008	0.005	0.073	0.62	4601	24	20.07	-93.15%
TZ	Hal	8/28/2004	0.005	0.052	0.98	1519	47	4.62	-90.38%
TZ	Hal	10/13/2004	0.005	0.072	0.45	1519	47	4.62	-93.06%
TZ	Hal	12/6/2004	0.005	0.066	0.44	1519	47	4.62	-92.42%
TZ	Hal	2/22/2005	0.005	0.057	0.45	1519	47	4.62	-91.23%
TZ	Hal	3/8/2005	0.005	0.069	0.65	1519	47	4.62	-92.75%
TZ	Hal	6/28/2005	0.005	0.04	0.70	1519	47	4.62	-87.50%
TZ	Hal	7/8/2005	0.005	0.068	0.63	1519	47	4.62	-92.65%
TZ	Hal	10/6/2005	0.005	0.037	2.08	1519	47	4.62	-86.49%
TZ	Hal	12/5/2005	0.005	.	1.27	1519	47	4.62	.
TZ	Hal	12/16/2005	0.005	0.04	1.68	1519	47	4.62	-87.50%
TZ	Gris	1/29/2013	0.003	.	0.19	1953	43	.	.
TZ	Gris	9/5/2014	0.003	.	0.56	1953	43	.	.
TZ	High	10/21/2009	.	0.038	0.75	4534	24	.	.
TZ	High	10/21/2009	.	0.039	0.75	4534	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TZ	21st	7/27/2013	.	0.0688	0.10	812	18	4.67	.
TZ	21st	8/11/2012	.	0.0588	0.10	812	18	4.67	.
TZ	21st	7/15/2013	.	0.0361	0.55	812	18	4.67	.
TZ	21st	7/15/2013	.	0.0361	0.55	812	18	4.67	.
TZ	21st	5/11/2011	.	0.0491	0.17	812	18	4.67	.
TZ	Gris	7/29/2013	.	0.178	0.23	1953	43	.	.
TZ	44th	11/11/2011	.	0.0345	0.19	5100	24	.	.
TZ	44th	5/25/2011	.	0.039	0.22	5100	24	.	.
TZ	21st	5/9/2013	.	0.137	0.10	812	18	4.67	.
TZ	High	10/21/2009	.	0.034	0.75	4534	24	.	.
TZ	44th	4/14/2011	.	0.0541	0.19	5100	24	.	.
TZ	44th	4/5/2013	.	0.0328	0.27	5100	24	.	.
TZ	44th	6/6/2012	.	0.0324	0.62	5100	24	.	.
TZ	21st	5/10/2014	.	0.0447	0.66	812	18	4.67	.
TZ	High	10/21/2009	.	0.031	0.75	4534	24	.	.
TZ	21st	5/19/2011	.	0.0435	0.55	812	18	4.67	.
TZ	High	10/21/2009	.	0.03	0.75	4534	24	.	.
TZ	High	10/21/2009	.	0.03	0.75	4534	24	.	.
TZ	21st	9/11/2012	.	0.025	0.12	812	18	4.67	.
TZ	I-95	5/11/2006	.	0.123	0.25	7600	24	19.98	.
TZ	44th	4/3/2012	.	0.028	0.15	5100	24	.	.
TZ	Hal	9/27/2004	.	0.047	2.43	1519	47	4.62	.
TZ	44th	3/5/2012	.	0.0279	0.29	5100	24	.	.
TZ	44th	1/23/2013	.	0.0761	0.23	5100	24	.	.
TZ	21st	7/13/2013	.	0.0912	2.14	812	18	4.67	.
TZ	Hal	8/12/2004	.	0.07	0.70	1519	47	4.62	.
TZ	High	10/21/2009	.	0.026	0.75	4534	24	.	.
TZ	I-95	4/2/2005	.	0.155	1.23	7600	24	19.98	.
TZ	44th	2/12/2011	.	0.0898	0.53	5100	24	.	.
TZ	44th	11/16/2010	.	0.0846	0.54	5100	24	.	.
TZ	21st	6/16/2013	.	0.112	0.10	812	18	4.67	.
TZ	Hal	1/31/2006	.	0.083	0.24	1519	47	4.62	.
TZ	Hal	2/14/2005	.	0.068	0.28	1519	47	4.62	.
TZ	44th	1/24/2010	.	0.025	0.44	5100	24	.	.
TZ	21st	7/25/2013	.	0.061	0.10	812	18	4.67	.
TZ	High	10/21/2009	.	0.024	0.75	4534	24	.	.
TZ	44th	5/19/2010	.	0.0794	0.45	5100	24	.	.
TZ	44th	10/22/2012	.	0.0239	0.25	5100	24	.	.
TZ	44th	2/4/2010	.	0.0237	0.15	5100	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y	x1	x2	x3	x4	x5	% Change in Pollutant Conc. (Outliers Removed)
			Eff. Conc. (mg/L or CFU/100 ml)	Inf. Conc. (mg/L or CFU/100 ml)	Rainfall Depth (in)	Ponding Volume (ft^3)	Media Depth (in)	Retetion Time (min)	
TZ	44th	2/28/2013	.	0.0235	0.57	5100	24	.	.
TZ	44th	2/23/2010	.	0.0234	0.55	5100	24	.	.
TZ	44th	4/10/2013	.	0.0232	0.22	5100	24	.	.
TZ	I-95	10/13/2008	.	0.091	0.38	7600	24	19.98	.
TZ	44th	3/4/2011	.	0.111	0.20	5100	24	.	.
TZ	44th	1/20/2011	.	0.0585	0.34	5100	24	.	.
TZ	21st	7/13/2011	.	0.123	0.68	812	18	4.67	.
TZ	CR	8/21/2009	.	0.0498	2.36	4601	24	20.07	.
TZ	44th	3/28/2011	.	0.0579	0.71	5100	24	.	.
TZ	Hal	4/26/2004	.	0.142	0.11	1519	47	4.62	.
TZ	44th	2/15/2010	.	0.021	0.37	5100	24	.	.
TZ	21st	5/14/2011	.	0.0732	0.28	812	18	4.67	.
TZ	21st	8/28/2014	.	0.0484	0.08	812	18	4.67	.
TZ	44th	11/17/2010	.	0.0191	0.54	5100	24	.	.
TZ	44th	10/15/2012	.	0.0458	0.35	5100	24	.	.
TZ	I-95	4/12/2007	.	0.066	0.65	7600	24	19.98	.
TZ	44th	3/19/2013	.	0.016	0.75	5100	24	.	.
TZ	High	3/7/2009	.	0.073	0.55	4534	24	.	.
TZ	44th	4/4/2013	.	0.0151	0.57	5100	24	.	.
TZ	21st	7/26/2011	.	0.102	0.15	812	18	4.67	.
TZ	Hal	12/5/2005	.	0.046	1.27	1519	47	4.62	.
TZ	44th	11/11/2012	.	0.0145	0.71	5100	24	.	.
TZ	44th	10/30/2012	.	0.0144	1.33	5100	24	.	.
TZ	44th	1/31/2012	.	0.0135	0.44	5100	24	.	.
TZ	21st	7/11/2013	.	0.0658	0.27	812	18	4.67	.
TZ	21st	5/18/2011	.	0.0942	0.69	812	18	4.67	.
TZ	44th	2/28/2013	.	0.00687	0.57	5100	24	.	.
TZ	44th	10/30/2012	.	0.00647	1.33	5100	24	.	.
TZ	44th	2/12/2011	.	0.0062	0.53	5100	24	.	.
TZ	High	10/21/2009	.	0.046	0.75	4534	24	.	.
TZ	44th	10/14/2012	.	0.00466	0.46	5100	24	.	.
TZ	44th	11/11/2012	.	0.00436	0.71	5100	24	.	.
TZ	44th	9/18/2010	.	0.00411	1.01	5100	24	.	.
TZ	44th	3/4/2011	.	0.00406	0.20	5100	24	.	.
TZ	44th	4/12/2013	.	0.00308	0.27	5100	24	.	.
TZ	44th	3/20/2012	.	0.00306	0.39	5100	24	.	.
TZ	44th	4/3/2012	.	0.00306	0.15	5100	24	.	.
TZ	44th	3/19/2013	.	0.00246	0.75	5100	24	.	.
TZ	44th	6/25/2013	.	0.00237	0.19	5100	24	.	.

Appendix A: *Continued*

Poll.	Site	Date	y Eff. Conc. (mg/L or CFU/100 ml)	x1 Inf. Conc. (mg/L or CFU/100 ml)	x2 Rainfall Depth (in)	x3 Ponding Volume (ft^3)	x4 Media Depth (in)	x5 Retetion Time (min)	% Change in Pollutant Conc. (Outliers Removed)
TZ	44th	5/27/2013	.	0.0021	0.38	5100	24	.	.
TZ	High	10/6/2008	.	0.136	0.12	4534	24	.	.
TZ	44th	6/5/2012	.	0.00196	0.30	5100	24	.	.
TZ	44th	5/25/2011	.	0.00195	0.22	5100	24	.	.
TZ	44th	3/29/2011	.	0.00182	0.71	5100	24	.	.
TZ	44th	4/25/2012	.	0.00181	0.67	5100	24	.	.
TZ	44th	3/15/2011	.	0.00176	0.31	5100	24	.	.
TZ	44th	10/28/2011	.	0.00174	0.30	5100	24	.	.
TZ	44th	3/5/2012	.	0.0017	0.29	5100	24	.	.
TZ	44th	1/21/2011	.	0.00133	0.34	5100	24	.	.
TZ	44th	2/5/2010	.	0.00123	0.15	5100	24	.	.
TZ	44th	2/16/2010	.	0.00121	0.37	5100	24	.	.
TZ	44th	2/23/2010	.	0.00113	0.55	5100	24	.	.
TZ	44th	4/1/2010	.	0.000615	1.49	5100	24	.	.

APPENDIX B

SAS OUTPUT

DESCRIPTIVE STATISTICS

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = DCA

Moments			
N	53	Sum Weights	53
Mean	0.00018302	Sum Observations	0.0097
Std Deviation	0.00011967	Variance	1.43215E-8
Skewness	0.84770073	Kurtosis	0.25152041
Uncorrected SS	2.52E-6	Corrected SS	7.44717E-7
Coeff Variation	65.3880057	Std Error Mean	0.00001644

Basic Statistical Measures			
Location		Variability	
Mean	0.000183	Std Deviation	0.0001197
Median	0.000200	Variance	1.43215E-8
Mode	0.000200	Range	0.0004500
		Interquartile Range	0.0001000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	11.13371	Pr > |t|	<.0001
Sign	M	26.5	Pr >= |M|	<.0001
Signed Rank	S	715.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.00050
99%	0.00050
95%	0.00040
90%	0.00030
75% Q3	0.00020
50% Median	0.00020
25% Q1	0.00010

10%	0.00005
5%	0.00005
1%	0.00005
0% Min	0.00005

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.00005	134	0.0004	84
0.00005	133	0.0004	85
0.00005	132	0.0004	86
0.00005	131	0.0005	82
0.00005	130	0.0005	83

Missing Values			
Missing Value	**Count**	**Percent Of**	
		All Obs	**Missing Obs**
.	64	54.70	100.00

```
Stem Leaf                       #             Boxplot
  50 00                         2                0
  48
  46
  44
  42
  40 000                        3                0
  38
  36
  34
  32
  30 00000000                   8                |
  28                                             |
  26                                             |
  24                                             |
  22                                             |
  20 00000000000000000         17             +-----+
  18                                          |  +  |
  16                                          |     |
  14                                          |     |
  12                                          |     |
  10 00000000000               11             +-----+
   8                                             |
```

```
  6                                        |
  4 000000000000            12             |
    ----+----+----+----+
Multiply Stem.Leaf by 10**-5
```

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = DCA

```
                        Normal Probability Plot
   0.00051+                                           *   *
          |                                                 +
          |                                                +
          |                                              ++
          |                                            ++
          |                                      ** * +
          |                                         ++
          |                                       ++
          |                                      +
          |                                    ++
          |                               *******
          |                                 +
          |                               ++
          |                             ++
          |                            +
          |                       *********
          |                        ++
          |                       +
          |                     ++
          |                   ++
          |                 ******
          |                ++
          |              ++
   0.00005+  *   * * ********
           +----+----+----+----+----+----+----+----+----+----+
               -2        -1         0        +1        +2
```

===

Univariate Procedure, Effluent Concentration

===

The UNIVARIATE Procedure
Variable: Y
Poll = DCH

Moments			
N	53	Sum Weights	53
Mean	0.00045094	Sum Observations	0.0239
Std Deviation	0.00019746	Variance	3.89895E-8
Skewness	1.68312142	Kurtosis	4.81892095
Uncorrected SS	0.0000128	Corrected SS	2.02745E-6
Coeff Variation	43.7876539	Std Error Mean	0.00002712

Basic Statistical Measures			
Location		Variability	
Mean	0.000451	Std Deviation	0.0001975
Median	0.000500	Variance	3.89895E-8
Mode	0.000500	Range	0.0009500
		Interquartile Range	0.0002500

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	16.62594	Pr > |t|	<.0001
Sign	M	26.5	Pr >= |M|	<.0001
Signed Rank	S	715.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.00120
99%	0.00120
95%	0.00090
90%	0.00050
75% Q3	0.00050
50% Median	0.00050
25% Q1	0.00025

10%	0.00025
5%	0.00025
1%	0.00025
0% Min	0.00025

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.00025	412	0.0006	363
0.00025	411	0.0006	364
0.00025	410	0.0009	362
0.00025	409	0.0011	361
0.00025	408	0.0012	360

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	11	17.19	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = DCH

```
 Stem Leaf                                   #             Boxplot
   12 0                                      1                0
   11
   11 0                                      1                0
   10
   10
    9
    9 0                                      1                0
    8
    8
    7
    7
    6
    6 00                                     2                |
    5                                                         |
    5 000000000000000000000000000000        30             +-----+
    4                                                      |  +  |
    4                                                      |     |
    3                                                      |     |
    3                                                      |     |
    2 555555555555555555                    18             +-----+
      ----+----+----+----+----+----+
  Multiply Stem.Leaf by 10**-4


                          Normal Probability Plot
0.001225+                                                     *
        |
        |                                                 *
        |
        |
        |
        |                                               *     +++
        |                                                   ++
        |                                                +++
        |                                              ++
        |                                           +++
        |                                         ++
        |                                      +++    **
```

```
          |                                     ++
          |                          *****************
          |                              +++
          |                            ++
          |                         +++
          |                       ++
0.000275+   *   * * ************
          +----+----+----+----+----+----+----+----+----+----+
               -2        -1         0        +1        +2
```

==

Univariate Procedure, Effluent Concentration

==

The UNIVARIATE Procedure
Variable: Y
Poll = DCO

Moments			
N	67	Sum Weights	67
Mean	0.0107	Sum Observations	0.7169
Std Deviation	0.00527518	Variance	0.00002783
Skewness	0.35031052	Kurtosis	-0.7288735
Uncorrected SS	0.00950745	Corrected SS	0.00183662
Coeff Variation	49.3007935	Std Error Mean	0.00064447

Basic Statistical Measures			
Location		Variability	
Mean	0.010700	Std Deviation	0.00528
Median	0.009700	Variance	0.0000278
Mode	0.002500	Range	0.02020
		Interquartile Range	0.00790

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	16.60288	Pr > |t|	<.0001
Sign	M	33.5	Pr >= |M|	<.0001
Signed Rank	S	1139	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0227
99%	0.0227
95%	0.0200
90%	0.0192
75% Q3	0.0144
50% Median	0.0097
25% Q1	0.0065

10%	0.0046
5%	0.0025
1%	0.0025
0% Min	0.0025

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.0025	597	0.0196	535
0.0025	596	0.0200	533
0.0025	595	0.0200	534
0.0025	594	0.0210	532
0.0025	593	0.0227	531

Missing Values			
		Percent Of	
Missing Value	Count	All Obs	Missing Obs
.	45	40.18	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = DCO

```
    Stem Leaf                     #             Boxplot
      22 7                        1                |
      21 0                        1                |
      20 00                       2                |
      19 1236                     4                |
      18 0                        1                |
      17 0                        1                |
      16                                           |
      15 0149                     4                |
      14 0002459                  7             +-----+
      13 09                       2             |     |
      12 25578                    5             |     |
      11 058                      3             |     |
      10 49                       2             |  +  |
       9 7                        1             *-----*
       8 1233344458              10             |     |
       7 00459                    5             |     |
       6 001555                   6             +-----+
       5 1489                     4                |
       4 68                       2                |
       3                                           |
       2 555555                   6                |
         ----+----+----+----+
     Multiply Stem.Leaf by 10**-3


                       Normal Probability Plot
0.0225+                                                ++*
      |                                              *+
0.0205+                                          *  *+
      |                                      ****++
0.0185+                                     *   ++
      |                                     *++
0.0165+                                     +
      |                                  ***
0.0145+                               ****
      |                              **+
0.0125+                            ***
      |                           **
```

```
0.0105+                        +**
      |                      ++ *
0.0085+                    +*****
      |                  +***
0.0065+                ****
      |              ***
0.0045+            **+
      |           ++
0.0025+ *   * * ***
       +----+----+----+----+----+----+----+----+----+----+
           -2        -1         0        +1        +2
```

===
Univariate Procedure, Effluent Concentration
===

The UNIVARIATE Procedure
Variable: Y
Poll = DI

Moments			
N	52	Sum Weights	52
Mean	0.15298077	Sum Observations	7.955
Std Deviation	0.07073327	Variance	0.0050032
Skewness	0.53887112	Kurtosis	-0.2143143
Uncorrected SS	1.472125	Corrected SS	0.25516298
Coeff Variation	46.236708	Std Error Mean	0.00980894

Basic Statistical Measures			
Location		Variability	
Mean	0.152981	Std Deviation	0.07073
Median	0.155000	Variance	0.00500
Mode	0.160000	Range	0.31500
		Interquartile Range	0.10000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	15.59606	Pr > |t|	<.0001
Sign	M	26	Pr >= |M|	<.0001
Signed Rank	S	689	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.340
99%	0.340
95%	0.280
90%	0.250
75% Q3	0.190
50% Median	0.155
25% Q1	0.090

10%	0.070
5%	0.060
1%	0.025
0% Min	0.025

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.025	871	0.26	824
0.050	870	0.28	822
0.060	869	0.28	823
0.070	868	0.29	821
0.070	867	0.34	820

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	14	21.21	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = DI

```
                Stem Leaf                     #             Boxplot
                  34 0                        1                |
                  32                                           |
                  30                                           |
                  28 000                      3                |
                  26 0                        1                |
                  24 000                      3                |
                  22 00                       2                |
                  20 00                       2                |
                  18 0000                     4             +-----+
                  16 0000000000              10             |     |
                  14 000                      3             *--+--*
                  12 000000                   6             |     |
                  10 000                      3             |     |
                   8 0000000                  7             +-----+
                   6 00000                    5                |
                   4 0                        1                |
                   2 5                        1                |
                     ----+----+----+----+
                 Multiply Stem.Leaf by 10**-2


                               Normal Probability Plot
              0.35+                                                  *
                  |                                                   ++
                  |                                                ++++
                  |                                          **  +*+
                  |                                        *   ++
                  |                                      **+++
                  |                                    **++
                  |                                  +*+
              0.19+                               +***
                  |                           ******
                  |                          **
                  |                       ***
                  |                    +**
                  |                ******
                  |           ** ***
                  |        *    ++
```

```
0.03+  *     +++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = DL

Moments			
N	51	Sum Weights	51
Mean	0.00039706	Sum Observations	0.02025
Std Deviation	0.00012426	Variance	1.54412E-8
Skewness	-0.3695271	Kurtosis	-1.9412051
Uncorrected SS	8.8125E-6	Corrected SS	7.72059E-7
Coeff Variation	31.2957484	Std Error Mean	0.0000174

Basic Statistical Measures			
Location		Variability	
Mean	0.000397	Std Deviation	0.0001243
Median	0.000500	Variance	1.54412E-8
Mode	0.000500	Range	0.0002500
		Interquartile Range	0.0002500

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	22.81916	Pr > |t|	<.0001
Sign	M	25.5	Pr >= |M|	<.0001
Signed Rank	S	663	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.00050
99%	0.00050
95%	0.00050
90%	0.00050
75% Q3	0.00050
50% Median	0.00050
25% Q1	0.00025

10%	0.00025
5%	0.00025
1%	0.00025
0% Min	0.00025

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.00025	936	0.0005	911
0.00025	935	0.0005	912
0.00025	934	0.0005	913
0.00025	933	0.0005	914
0.00025	932	0.0005	915

Missing Values			
Missing Value	**Count**	**Percent Of**	
		All Obs	**Missing Obs**
.	65	56.03	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = DL

```
Stem Leaf                                 #             Boxplot
  50 000000000000000000000000000000      30             +-----+
  48                                                    |     |
  46                                                    |     |
  44                                                    |     |
  42                                                    |     |
  40                                                    |     |
  38                                                    |  +  |
  36                                                    |     |
  34                                                    |     |
  32                                                    |     |
  30                                                    |     |
  28                                                    |     |
  26                                                    |     |
  24 000000000000000000000               21             +-----+
     ----+----+----+----+----+----+
 Multiply Stem.Leaf by 10**-5


                      Normal Probability Plot
0.00051+                       *************** **  *   *
       |                                ++
       |                               +
       |                             ++
       |                           ++
       |                          +
       |                        ++
       |                       +
       |                     ++
       |                   ++
       |                  +
       |                ++
       |              ++
0.00025+  *   *  ** ***********
        +----+----+----+----+----+----+----+----+----+----+
            -2        -1         0        +1        +2
```

===
Univariate Procedure, Effluent Concentration
===

The UNIVARIATE Procedure
Variable: Y
Poll = DN

Moments			
N	61	Sum Weights	61
Mean	0.00352295	Sum Observations	0.2149
Std Deviation	0.0016313	Variance	2.66113E-6
Skewness	0.84979641	Kurtosis	0.53158748
Uncorrected SS	0.00091675	Corrected SS	0.00015967
Coeff Variation	46.3048582	Std Error Mean	0.00020887

Basic Statistical Measures			
Location		Variability	
Mean	0.003523	Std Deviation	0.00163
Median	0.003200	Variance	2.66113E-6
Mode	0.005500	Range	0.00720
		Interquartile Range	0.00190

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	16.86702	Pr > |t|	<.0001
Sign	M	30.5	Pr >= |M|	<.0001
Signed Rank	S	945.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0082
99%	0.0082
95%	0.0064
90%	0.0055
75% Q3	0.0042
50% Median	0.0032
25% Q1	0.0023

10%	0.0019
5%	0.0014
1%	0.0010
0% Min	0.0010

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.0010	1251	0.0056	1182
0.0010	1250	0.0064	1181
0.0013	1236	0.0066	1180
0.0014	1235	0.0081	1179
0.0016	1234	0.0082	1178

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	14	18.67	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = DN

```
    Stem Leaf                     #             Boxplot
       8 12                       2                0
       7
       7
       6 6                        1                |
       6 4                        1                |
       5 5555556                  7                |
       5 33                       2                |
       4 57                       2                |
       4 00122                    5             +-----+
       3 55778889                 8             |  +  |
       3 0012244                  7             *-----*
       2 56677789                 8             |     |
       2 00013344                 8             +-----+
       1 689999                   6                |
       1 0034                     4                |
         ----+----+----+----+
     Multiply Stem.Leaf by 10**-3


                         Normal Probability Plot
0.00825+                                            *   *
       |                                                  +
       |                                               +++
       |                                          *  +++
       |                                         *++
       |                                  ******+
       |                                 **+++
0.00475+                               +**+
       |                            ++***
       |                         +****
       |                      +****
       |                   +****
       |                ****
       |           *****
0.00125+  *   *  **+++
        +----+----+----+----+----+----+----+----+----+----+
            -2        -1         0        +1        +2
```

===

Univariate Procedure, Effluent Concentration

===

The UNIVARIATE Procedure
Variable: Y
Poll = DP

Moments			
N	73	Sum Weights	73
Mean	0.56978082	Sum Observations	41.594
Std Deviation	0.38998876	Variance	0.15209123
Skewness	0.85573922	Kurtosis	-0.3280664
Uncorrected SS	34.650032	Corrected SS	10.9505685
Coeff Variation	68.4453987	Std Error Mean	0.04564473

Basic Statistical Measures			
Location		Variability	
Mean	0.569781	Std Deviation	0.38999
Median	0.450000	Variance	0.15209
Mode	0.250000	Range	1.51000
		Interquartile Range	0.61000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	12.48295	Pr > |t|	<.0001
Sign	M	36.5	Pr >= |M|	<.0001
Signed Rank	S	1350.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1.54
99%	1.54
95%	1.32
90%	1.23
75% Q3	0.87
50% Median	0.45
25% Q1	0.26

10%	0.17
5%	0.11
1%	0.03
0% Min	0.03

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.03	2562	1.32	2500
0.07	2569	1.32	2501
0.11	2568	1.32	2502
0.11	2567	1.50	2498
0.12	2566	1.54	2497

Missing Values			
Missing Value	**Count**	**Percent Of**	
		All Obs	**Missing Obs**
.	13	15.12	100.00

==
Univariate Procedure, Effluent Concentration
==

The UNIVARIATE Procedure
Variable: Y
Poll = DP

```
  Stem Leaf                     #             Boxplot
    15 04                       2                |
    14                                           |
    13 2222                     4                |
    12 33                       2                |
    11 19                       2                |
    10 27                       2                |
     9 2248                     4                |
     8 007788                   6             +-----+
     7 5                        1             |     |
     6 004                      3             |     |
     5 11378                    5             |  +  |
     4 14566789                 8             *-----*
     3 1133444556689           13             |     |
     2 2445555555679           13             +-----+
     1 112227                   6                |
     0 37                       2                |
       ----+----+----+----+
   Multiply Stem.Leaf by 10**-1
```

```
                   Normal Probability Plot
1.55+                                             *   *+
    |                                               ++
    |                                       *** *+++
1.25+                                      *   ++
    |                                    ** +++
    |                                   **++
0.95+                                 **++
    |                              ***+
    |                             +*
0.65+                          +++ *
    |                        ++ ***
    |                     +++****
0.35+                   +*****
    |             *******
    |       * ****+++
0.05+ *   *     ++
     +----+----+----+----+----+----+----+----+----+----+
```

-2 -1 0 +1 +2

==
Univariate Procedure, Effluent Concentration
==

The UNIVARIATE Procedure
Variable: Y
Poll = DZ

Moments			
N	59	Sum Weights	59
Mean	0.01576271	Sum Observations	0.93
Std Deviation	0.00521642	Variance	0.00002721
Skewness	0.16984885	Kurtosis	0.19605484
Uncorrected SS	0.01623756	Corrected SS	0.00157824
Coeff Variation	33.093394	Std Error Mean	0.00067912

Basic Statistical Measures			
Location		Variability	
Mean	0.015763	Std Deviation	0.00522
Median	0.015300	Variance	0.0000272
Mode	0.010000	Range	0.02550
		Interquartile Range	0.00670

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	23.21051	Pr > |t|	<.0001
Sign	M	29.5	Pr >= |M|	<.0001
Signed Rank	S	885	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0280
99%	0.0280
95%	0.0259
90%	0.0230
75% Q3	0.0192
50% Median	0.0153
25% Q1	0.0125

10%	0.0097
5%	0.0083
1%	0.0025
0% Min	0.0025

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.0025	1410	0.0231	1343
0.0054	1395	0.0240	1342
0.0083	1394	0.0259	1341
0.0085	1393	0.0280	1339
0.0090	1392	0.0280	1340

Missing Values			
		Percent Of	
Missing Value	Count	All Obs	Missing Obs
.	73	55.30	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = DZ

```
Stem Leaf                      #             Boxplot
  28 00                        2                |
  27                                            |
  26                                            |
  25 9                         1                |
  24 0                         1                |
  23 01                        2                |
  22 1                         1                |
  21 78                        2                |
  20 0224                      4                |
  19 00128                     5             +-----+
  18 6                         1             |     |
  17 08                        2             |     |
  16 178                       3             |     |
  15 012356677                 9             *--+--*
  14 3566                      4             |     |
  13 01478                     5             |     |
  12 4589                      4             +-----+
  11 677                       3                |
  10 000                       3                |
   9 078                       3                |
   8 35                        2                |
   7                                            |
   6                                            |
   5 4                         1                |
   4                                            |
   3                                            |
   2 5                         1                |
     ----+----+----+----+
 Multiply Stem.Leaf by 10**-3
```

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = DZ

```
                     Normal Probability Plot
0.0285+                                            *   *++
      |                                               ++
      |                                             ++
      |                                          *++
      |                                        *++
      |                                      **+
      |                                     *+
      |                                    *
      |                                 ***
      |                              ***+
      |                              *+
      |                            +*
      |                          ++*
0.0155+                        ****
      |                      **
      |                    ***
      |                  **
      |                **
      |              **
      |           ***
      |        * *++
      |         ++
      |       ++
      |     +*
      |   ++
      | ++
0.0025++ *
       +----+----+----+----+----+----+----+----+----+----+
           -2        -1         0        +1        +2
```

==

Univariate Procedure, Effluent Concentration

==

The UNIVARIATE Procedure
Variable: Y
Poll = EC

Moments			
N	91	Sum Weights	91
Mean	542.318322	Sum Observations	49350.9673
Std Deviation	550.088097	Variance	302596.915
Skewness	3.27954962	Kurtosis	17.4451363
Uncorrected SS	53997656.1	Corrected SS	27233722.3
Coeff Variation	101.432696	Std Error Mean	57.6649011

Basic Statistical Measures			
Location		Variability	
Mean	542.3183	Std Deviation	550.08810
Median	500.0000	Variance	302597
Mode	400.0000	Range	4000
		Interquartile Range	500.00000

Note: The mode displayed is the smallest of 2 modes with a count of 8.

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	9.404652	Pr > |t|	<.0001
Sign	M	44.5	Pr >= |M|	<.0001
Signed Rank	S	2002.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	4000
99%	4000
95%	1200
90%	1200
75% Q3	700

50% Median	500
25% Q1	200
10%	28
5%	1
1%	0
0% Min	0

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0	3424	1200	3492
0	3423	1300	3458
1	3504	1300	3459
1	3503	2400	3491
1	3502	4000	3409

Missing Values			
		Percent Of	
Missing Value	Count	All Obs	Missing Obs
.	5	5.21	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = EC

```
Stem Leaf                     #             Boxplot
  40 0                        1                *
  38
  36
  34
  32
  30
  28
  26
  24 0                        1                *
  22
  20
  18
  16
  14
  12 000000000                9                |
  10 0                        1                |
   8 00000000                 8                |
   6 0000033000055           13             +-----+
   4 00000000660000000036677 23             *--+--*
   2 0000550003444           13             +-----+
   0 0000011113333557036777  22                |
     ----+----+----+----+---
 Multiply Stem.Leaf by 10**+2


                     Normal Probability Plot
4100+                                                   *
    |
3700+
    |
3300+
    |
2900+
    |
2500+                                               *
    |
2100+
    |                                                 +++
```

```
1700+                                                 +++
    |                                             ++++
1300+                                         ***** **
    |                                     ++*
 900+                                 +++****
    |                              ++*****
 500+                        *******
    |                    *****
 100+*    * ** **********
     +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

===

Univariate Procedure, Effluent Concentration

===

The UNIVARIATE Procedure
Variable: Y
Poll = ENC

Moments			
N	10	Sum Weights	10
Mean	49170	Sum Observations	491700
Std Deviation	54681.0764	Variance	2990020111
Skewness	0.97874707	Kurtosis	-0.007048
Uncorrected SS	5.10871E10	Corrected SS	2.69102E10
Coeff Variation	111.208209	Std Error Mean	17291.6746

Basic Statistical Measures			
Location		Variability	
Mean	49170.00	Std Deviation	54681
Median	21000.00	Variance	2990020111
Mode	90000.00	Range	158300
		Interquartile Range	87700

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	2.843565	Pr > |t|	0.0193
Sign	M	5	Pr >= |M|	0.0020
Signed Rank	S	27.5	Pr >= |S|	0.0020

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	160000
99%	160000
95%	160000
90%	125000
75% Q3	90000
50% Median	21000
25% Q1	2300

10%	1700
5%	1700
1%	1700
0% Min	1700

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
1700	3539	28000	3534
1700	3538	90000	3531
2300	3537	90000	3532
14000	3536	90000	3533
14000	3535	160000	3530

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = ENC

```
     Stem Leaf                     #             Boxplot
       16 0                        1                |
       14                                           |
       12                                           |
       10                                           |
        8 000                      3             +-----+
        6                                        |     |
        4                                        |  +  |
        2 8                        1             *-----*
        0 22244                    5             +-----+
          ----+----+----+----+
      Multiply Stem.Leaf by 10**+4


                        Normal Probability Plot
   170000+                                       *     +++
         |                                           ++++
         |                                       ++++
         |                                    +++
    90000+                                *  +*++*
         |                              ++++
         |                           +++
         |                       ++++   *
    10000+         *     *  +*+  *   *
          +----+----+----+----+----+----+----+----+----+----+
              -2        -1         0        +1        +2
```

===
Univariate Procedure, Effluent Concentration
===

The UNIVARIATE Procedure
Variable: Y
Poll = FC

Moments			
N	23	Sum Weights	23
Mean	1061.26087	Sum Observations	24409
Std Deviation	1548.73767	Variance	2398588.38
Skewness	1.64569105	Kurtosis	1.88479705
Uncorrected SS	78673261	Corrected SS	52768944.4
Coeff Variation	145.93374	Std Error Mean	322.934129

Basic Statistical Measures			
Location		Variability	
Mean	1061.261	Std Deviation	1549
Median	120.000	Variance	2398588
Mode	100.000	Range	4981
		Interquartile Range	2200

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	3.286308	Pr > |t|	0.0034
Sign	M	11.5	Pr >= |M|	<.0001
Signed Rank	S	138	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	5000
99%	5000
95%	5000
90%	3000
75% Q3	2300
50% Median	120
25% Q1	100

10%	100
5%	100
1%	19
0% Min	19

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
19	3528	2300	3509
100	3527	2300	3510
100	3526	3000	3507
100	3525	5000	3505
100	3524	5000	3506

Missing Values			
		Percent Of	
Missing Value	**Count**	**All Obs**	**Missing Obs**
.	2	8.00	100.00

==

Univariate Procedure, Effluent Concentration

==

The UNIVARIATE Procedure
Variable: Y
Poll = FC

```
Stem Leaf                     #             Boxplot
   5 00                       2                |
   4                                           |
   4                                           |
   3                                           |
   3 0                        1                |
   2                                           |
   2 333                      3             +-----+
   1 5                        1             |     |
   1 1                        1             |  +  |
   0                                        |     |
   0 011111111111224         15             *-----*
     ----+----+----+----+
 Multiply Stem.Leaf by 10**+3


                   Normal Probability Plot
5250+                                        *   *
    |                                                +++
    |                                            ++++
    |                                         +++
    |                                     *+++
2750+                                   +++
    |                                ***+*
    |                            +++*
    |                         +++ *
    |                      +++
 250+      *   *  *  * ***+********
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

===

Univariate Procedure, Effluent Concentration

===

The UNIVARIATE Procedure
Variable: Y
Poll = N2

Moments			
N	40	Sum Weights	40
Mean	0.692325	Sum Observations	27.693
Std Deviation	0.42093226	Variance	0.17718397
Skewness	0.77261346	Kurtosis	0.01655103
Uncorrected SS	26.082731	Corrected SS	6.91017477
Coeff Variation	60.7998066	Std Error Mean	0.06655523

Basic Statistical Measures			
Location		Variability	
Mean	0.692325	Std Deviation	0.42093
Median	0.567000	Variance	0.17718
Mode	0.328000	Range	1.74000
		Interquartile Range	0.60900

Note: The mode displayed is the smallest of 10 modes with a count of 2.

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	10.40226	Pr > |t|	<.0001
Sign	M	20	Pr >= |M|	<.0001
Signed Rank	S	410	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1.790
99%	1.790
95%	1.530
90%	1.290
75% Q3	1.010

50% Median	0.567
25% Q1	0.401
10%	0.220
5%	0.145
1%	0.050
0% Min	0.050

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.05	2492	1.29	2456
0.12	2491	1.29	2457
0.17	2490	1.46	2455
0.20	2489	1.60	2454
0.24	2488	1.79	2453

Missing Values			
		Percent Of	
Missing Value	**Count**	**All Obs**	**Missing Obs**
.	4	9.09	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = N2

```
        Stem Leaf                     #             Boxplot
          17 9                        1                |
          16 0                        1                |
          15                                           |
          14 6                        1                |
          13                                           |
          12 99                       2                |
          11 11                       2                |
          10 00244                    5             +-----+
           9 4                        1             |     |
           8 6                        1             |     |
           7 1                        1             |     |
           6 4466                     4             |  +  |
           5 00677                    5             *-----*
           4 114688                   6             +-----+
           3 3349                     4                |
           2 048                      3                |
           1 27                       2                |
           0 5                        1                |
             ----+----+----+----+
         Multiply Stem.Leaf by 10**-1


                         Normal Probability Plot
      1.75+                                                 * ++
          |                                            *     ++
          |                                                ++
          |                                          * +++
          |                                          ++
          |                                       **+
          |                                     **+
          |                                 ****
          |                                *++
          |                              +*
          |                            ++*
          |                         +++***
          |                       ++***
          |                     *****
          |                 ****
```

```
     |            ***+
     |        * *+++
0.05+   *      ++
     +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

===

Univariate Procedure, Effluent Concentration

===

The UNIVARIATE Procedure
Variable: Y
Poll = N3

Moments			
N	221	Sum Weights	221
Mean	0.81143489	Sum Observations	179.32711
Std Deviation	0.88523047	Variance	0.78363299
Skewness	1.36302785	Kurtosis	0.98007535
Uncorrected SS	317.911531	Corrected SS	172.399258
Coeff Variation	109.094456	Std Error Mean	0.05954705

Basic Statistical Measures			
Location		Variability	
Mean	0.811435	Std Deviation	0.88523
Median	0.404000	Variance	0.78363
Mode	0.050000	Range	3.65500
		Interquartile Range	1.10800

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.62679	Pr > |t|	<.0001
Sign	M	110.5	Pr >= |M|	<.0001
Signed Rank	S	12265.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	3.66000
99%	3.52000
95%	2.56300
90%	2.21000
75% Q3	1.30000
50% Median	0.40400
25% Q1	0.19200

10%	0.05000
5%	0.01999
1%	0.00500
0% Min	0.00500

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.005	2389	3.43	2173
0.005	2388	3.50	2172
0.005	2387	3.52	2171
0.005	2386	3.66	2169
0.005	2385	3.66	2170

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	63	22.18	100.00

==
Univariate Procedure, Effluent Concentration
==

The UNIVARIATE Procedure
Variable: Y
Poll = N3

```
                     Histogram                        #             Boxplot
   3.7+*                                              2                0
      .**                                             3                0
      .
      .*                                              2                0
      .*                                              1                |
      .*                                              2                |
      .***                                            6                |
      .*****                                         10                |
      .**                                             4                |
   1.9+*****                                          9                |
      .***                                            5                |
      .*****                                          9                |
      .***                                            6             +-----+
      .***                                            5             |     |
      .****                                           8             |  +  |
      .******                                        12             |     |
      .**************                                27             *-----*
      .***************************                   53             |     |
   0.1+*****************************                 57             +-----+
       ----+----+----+----+----+----
       * may represent up to 2 counts


                         Normal Probability Plot
   3.7+                                                         **
      |                                                     ** *
      |
      |                                                    **    +
      |                                                   *    ++
      |                                                 **   ++
      |                                               ***+++
      |                                            *** ++
      |                                           ** ++
   1.9+                                         ***++
      |                                         *++
      |                                       **
      |                                     +**
      |                                   ++ *
```

```
    |                                             +++   *
    |                                          ++    **
    |                                       ++   ****
    |                                    *******
 0.1+*** **************
     +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

===
Univariate Procedure, Effluent Concentration
===

The UNIVARIATE Procedure
Variable: Y
Poll = OP

Moments			
N	153	Sum Weights	153
Mean	0.28103889	Sum Observations	42.99895
Std Deviation	0.27989136	Variance	0.07833917
Skewness	1.20961754	Kurtosis	1.31220957
Uncorrected SS	23.9919315	Corrected SS	11.9075544
Coeff Variation	99.5916834	Std Error Mean	0.02262788

Basic Statistical Measures			
Location		Variability	
Mean	0.281039	Std Deviation	0.27989
Median	0.240000	Variance	0.07834
Mode	0.005000	Range	1.19600
		Interquartile Range	0.41100

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	12.42003	Pr > |t|	<.0001
Sign	M	76.5	Pr >= |M|	<.0001
Signed Rank	S	5890.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1.200
99%	1.120
95%	0.940
90%	0.610
75% Q3	0.440
50% Median	0.240
25% Q1	0.029

10%	0.010
5%	0.006
1%	0.005
0% Min	0.004

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.004	2735	1.10	2585
0.005	2734	1.10	2586
0.005	2733	1.10	2587
0.005	2732	1.12	2584
0.005	2731	1.20	2583

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	42	21.54	100.00

==
Univariate Procedure, Effluent Concentration
==

The UNIVARIATE Procedure
Variable: Y
Poll = OP

```
Stem Leaf                                            #     Boxplot
  12 0                                               1        0
  11
  11 0002                                            4        0
  10
  10 4                                               1        |
   9 5                                               1        |
   9 4                                               1        |
   8 7                                               1        |
   8                                                          |
   7 5                                               1        |
   7 12                                              2        |
   6 56                                              2        |
   6 112                                             3        |
   5 66678                                           5        |
   5 001114                                          6        |
   4 55566799                                        8        |
   4 0012233444                                     10     +-----+
   3 5555666677                                     10     |     |
   3 0011123444                                     10     |     |
   2 5567778999                                     10     |  +  |
   2 0011233344                                     10     *-----*
   1 578                                             3     |     |
   1 344                                             3     |     |
   0 556667777788889                                15     |     |
   0 0000000111111111111111111112222222222233333444   46     +-----+
     ----+----+----+----+----+----+----+----+----+-
 Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = OP

```
                    Normal Probability Plot
1.225+                                                  *
     |
     |                                            *** *
     |
     |                                           *
     |                                          *      ++
     |                                         *      +
     |                                         *    ++
     |                                            ++
     |                                        * ++
     |                                       **+
     |                                      **
0.625+                                     **
     |                                   +**
     |                                 +**
     |                                ***
     |                              ***
     |                            +**
     |                          +**
     |                        +***
     |                       +**
     |                     ++*
     |                   ++  *
     |                 ++ ***
0.025+* * *****************
      +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

===

Univariate Procedure, Effluent Concentration

===

The UNIVARIATE Procedure
Variable: Y
Poll = TA

Moments			
N	61	Sum Weights	61
Mean	0.00251803	Sum Observations	0.1536
Std Deviation	0.00084133	Variance	7.07836E-7
Skewness	2.00622916	Kurtosis	6.73438365
Uncorrected SS	0.00042924	Corrected SS	0.00004247
Coeff Variation	33.4121916	Std Error Mean	0.00010772

Basic Statistical Measures			
Location		Variability	
Mean	0.002518	Std Deviation	0.0008413
Median	0.002500	Variance	7.07836E-7
Mode	0.002500	Range	0.00500
		Interquartile Range	0.0002000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	23.37545	Pr > |t|	<.0001
Sign	M	30.5	Pr >= |M|	<.0001
Signed Rank	S	945.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0060
99%	0.0060
95%	0.0042
90%	0.0030
75% Q3	0.0025
50% Median	0.0025
25% Q1	0.0023

10%	0.0016
5%	0.0013
1%	0.0010
0% Min	0.0010

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.0010	61	0.0037	5
0.0012	60	0.0042	4
0.0012	59	0.0045	3
0.0013	58	0.0055	2
0.0014	57	0.0060	1

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	20	24.69	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = TA

```
 Stem Leaf                                   #             Boxplot
   60 0                                      1                *
   58
   56
   54 0                                      1                *
   52
   50
   48
   46
   44 0                                      1                *
   42 0                                      1                *
   40
   38
   36 0                                      1                *
   34
   32 0                                      1                *
   30 0                                      1                0
   28 00                                     2                |
   26 00                                     2                |
   24 0000000000000000000000000000000000    34             +--+--+
   22 000                                    3             +-----+
   20 0000                                   4                |
   18 00                                     2                0
   16 00                                     2                *
   14 0                                      1                *
   12 000                                    3                *
   10 0                                      1                *
      ----+----+----+----+----+----+----
  Multiply Stem.Leaf by 10**-4
```

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = TA

```
                     Normal Probability Plot
0.0061+                                                *
      |
      |
      |                                            *
      |
0.0051+
      |
      |
      |                                                  +
      |                                          *     ++
      |                                         *   +++
0.0041+                                           ++
      |                                         ++
      |                                      +*+
      |                                    ++
      |                                  ++  *
0.0031+                               +++   *
      |                             ++     **
      |                          +++     **
      |                   ***************
      |                 **   ++
0.0021+               *** +++
      |             **  ++
      |            ** ++
      |           *+++
      |      * **++
0.0011+  *    +++
       +----+----+----+----+----+----+----+----+----+----+
           -2        -1         0        +1        +2
```

==
Univariate Procedure, Effluent Concentration
==

The UNIVARIATE Procedure
Variable: Y
Poll = TCA

Moments			
N	92	Sum Weights	92
Mean	0.00062011	Sum Observations	0.05705
Std Deviation	0.00051638	Variance	2.66652E-7
Skewness	1.44247333	Kurtosis	1.49816722
Uncorrected SS	0.00005964	Corrected SS	0.00002427
Coeff Variation	83.2730181	Std Error Mean	0.00005384

Basic Statistical Measures			
Location		Variability	
Mean	0.000620	Std Deviation	0.0005164
Median	0.000500	Variance	2.66652E-7
Mode	0.000500	Range	0.00190
		Interquartile Range	0.0008000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	11.51833	Pr > |t|	<.0001
Sign	M	46	Pr >= |M|	<.0001
Signed Rank	S	2139	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0020
99%	0.0020
95%	0.0020
90%	0.0012
75% Q3	0.0010
50% Median	0.0005
25% Q1	0.0002

10%	0.0002
5%	0.0001
1%	0.0001
0% Min	0.0001

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.0001	291	0.002	202
0.0001	290	0.002	203
0.0001	289	0.002	204
0.0001	288	0.002	205
0.0001	287	0.002	206

Missing Values			
		Percent Of	
Missing Value	Count	All Obs	Missing Obs
.	69	42.86	100.00

==
Univariate Procedure, Effluent Concentration
==

The UNIVARIATE Procedure
Variable: Y
Poll = TCA

```
    Stem Leaf                           #             Boxplot
      20 0000000                        7                |
      19                                                 |
      18                                                 |
      17                                                 |
      16                                                 |
      15                                                 |
      14 00                             2                |
      13                                                 |
      12 0                              1                |
      11 0                              1                |
      10 0000000000000000              16             +-----+
       9                                              |     |
       8                                              |     |
       7 0                              1             |     |
       6 0                              1             |  +  |
       5 0000000000000000000000000     25             *-----*
       4 000                            3             |     |
       3 00                             2             |     |
       2 00000000000000000555555555    26             +-----+
       1 0000000                        7                |
         ----+----+----+----+----+-
     Multiply Stem.Leaf by 10**-4


                       Normal Probability Plot
   0.00205+                                        ** ** *   *
          |                                                  +
          |                                                ++
          |                                              ++
          |                                            ++
          |                                           +
          |                                      **  ++
          |                                        ++
          |                                      +*
          |                                    ++*
          |                                ******
          |                                ++
          |                              ++
```

```
          |                                    ++ *
          |                                  ++    *
          |                                ********
          |                              +**
          |                            ++ *
          |                    ***********
0.00015+*   * ** **     ++
        +----+----+----+----+----+----+----+----+----+----+
            -2        -1         0        +1        +2
```

==

Univariate Procedure, Effluent Concentration

==

The UNIVARIATE Procedure
Variable: Y
Poll = TCH

Moments			
N	76	Sum Weights	76
Mean	0.00188421	Sum Observations	0.1432
Std Deviation	0.00097926	Variance	9.58947E-7
Skewness	0.08135636	Kurtosis	-0.8936809
Uncorrected SS	0.00034174	Corrected SS	0.00007192
Coeff Variation	51.9718241	Std Error Mean	0.00011233

Basic Statistical Measures			
Location		Variability	
Mean	0.001884	Std Deviation	0.0009793
Median	0.002500	Variance	9.58947E-7
Mode	0.002500	Range	0.00350
		Interquartile Range	0.00150

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	16.77408	Pr > |t|	<.0001
Sign	M	38	Pr >= |M|	<.0001
Signed Rank	S	1463	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0040
99%	0.0040
95%	0.0040
90%	0.0025
75% Q3	0.0025
50% Median	0.0025
25% Q1	0.0010

10%	0.0005
5%	0.0005
1%	0.0005
0% Min	0.0005

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.0005	499	0.0032	428
0.0005	498	0.0040	424
0.0005	497	0.0040	425
0.0005	496	0.0040	426
0.0005	495	0.0040	427

Missing Values			
		Percent Of	
Missing Value	Count	All Obs	Missing Obs
.	31	28.97	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = TCH

```
Stem Leaf                                          #             Boxplot
  40 0000                                          4                |
  38                                                                |
  36                                                                |
  34                                                                |
  32 0                                             1                |
  30                                                                |
  28                                                                |
  26                                                                |
  24 000000000000000000000000000000000000000      39             +-----+
  22                                                             |     |
  20                                                             |     |
  18                                                             |  +  |
  16                                                             |     |
  14                                                             |     |
  12                                                             |     |
  10 000000000000000000000                        21             +-----+
   8                                                                |
   6                                                                |
   4 00000000000                                  11                |
     ----+----+----+----+----+----+----+----
 Multiply Stem.Leaf by 10**-4


                        Normal Probability Plot
     0.0041+                                           ** * ++*
           |                                                ++
           |                                              ++
           |                                            ++
           |                                          +*
           |                                        ++
           |                                      ++
           |                                    ++
           |                           ****************
     0.0023+                              ++
           |                            ++
           |                          ++
           |                        ++
           |                      ++
```

```
         |              ++
         |           *********
         |          ++
         |        ++
0.0005+ *    * ** *****
        +----+----+----+----+----+----+----+----+----+----+
            -2        -1         0        +1        +2
```

===

Univariate Procedure, Effluent Concentration

===

The UNIVARIATE Procedure
Variable: Y
Poll = TCO

Moments			
N	145	Sum Weights	145
Mean	0.0084531	Sum Observations	1.2257
Std Deviation	0.00609706	Variance	0.00003717
Skewness	1.13155646	Kurtosis	0.72572072
Uncorrected SS	0.01571405	Corrected SS	0.00535308
Coeff Variation	72.1280983	Std Error Mean	0.00050633

Basic Statistical Measures			
Location		Variability	
Mean	0.008453	Std Deviation	0.00610
Median	0.006600	Variance	0.0000372
Mode	0.003000	Range	0.02570
		Interquartile Range	0.00850

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	16.69473	Pr > |t|	<.0001
Sign	M	72.5	Pr >= |M|	<.0001
Signed Rank	S	5292.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0267
99%	0.0260
95%	0.0227
90%	0.0167
75% Q3	0.0120
50% Median	0.0066
25% Q1	0.0035

10%	0.0026
5%	0.0020
1%	0.0010
0% Min	0.0010

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.001	788	0.0240	647
0.001	787	0.0254	646
0.001	786	0.0260	644
0.001	785	0.0260	645
0.001	784	0.0267	643

Missing Values			
		Percent Of	
Missing Value	Count	All Obs	Missing Obs
.	32	18.08	100.00

==

Univariate Procedure, Effluent Concentration

==

The UNIVARIATE Procedure
Variable: Y
Poll = TCO

```
Stem Leaf                          #           Boxplot
  26 007                           3              0
  25 4                             1              0
  24 0                             1              |
  23 0                             1              |
  22 77                            2              |
  21                                              |
  20 0                             1              |
  19 0                             1              |
  18 03                            2              |
  17 08                            2              |
  16 567                           3              |
  15 034578                        6              |
  14 000349                        6              |
  13 566                           3              |
  12 01156                         5           +-----+
  11 38                            2           |     |
  10 0004669                       7           |     |
   9 23789999                      8           |     |
   8 0124788                       7           |  +  |
   7 222357                        6           |     |
   6 0000002234677999             16           *-----*
   5 001166788                     9           |     |
   4 00004466699                  11           |     |
   3 000000000000122355556789     24           +-----+
   2 03555556679                  11              |
   1 0000077                       7              |
     ----+----+----+----+----
 Multiply Stem.Leaf by 10**-3
```

==

Univariate Procedure, Effluent Concentration

==

The UNIVARIATE Procedure
Variable: Y
Poll = TCO

```
                    Normal Probability Plot
0.0265+                                              * * *
      |                                             *
      |                                            *
      |                                           *     ++
      |                                         **     +
0.0215+                                              ++
      |                                         *  ++
      |                                        *  +
      |                                       **++
      |                                      **+
0.0165+                                     **+
      |                                   ***
      |                                  **
      |                                 *+
      |                               +**
0.0115+                              +*
      |                            ++**
      |                          ++***
      |                         + **
      |                       ++ **
0.0065+                     ++****
      |                    + **
      |                  ++**
      |              ******
      |         ***** ++
0.0015+* * *****    ++
       +----+----+----+----+----+----+----+----+----+----+
           -2        -1         0       +1        +2
```

===
Univariate Procedure, Effluent Concentration
===

The UNIVARIATE Procedure
Variable: Y
Poll = TKN

Moments			
N	246	Sum Weights	246
Mean	1.573725	Sum Observations	387.13635
Std Deviation	1.16459487	Variance	1.35628121
Skewness	1.08752263	Kurtosis	0.70090439
Uncorrected SS	941.535049	Corrected SS	332.288896
Coeff Variation	74.0024381	Std Error Mean	0.07425186

Basic Statistical Measures			
Location		Variability	
Mean	1.573725	Std Deviation	1.16459
Median	1.359000	Variance	1.35628
Mode	1.400000	Range	5.11000
		Interquartile Range	1.47100

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	21.19442	Pr > |t|	<.0001
Sign	M	123	Pr >= |M|	<.0001
Signed Rank	S	15190.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	5.200
99%	5.100
95%	3.900
90%	3.300
75% Q3	2.100
50% Median	1.359
25% Q1	0.629

10%	0.380
5%	0.281
1%	0.205
0% Min	0.090

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.09000	1947	5.0	1705
0.15800	1946	5.0	1706
0.20500	1945	5.1	1703
0.21365	1944	5.1	1704
0.21500	1943	5.2	1702

Missing Values			
		Percent Of	
Missing Value	Count	All Obs	Missing Obs
.	49	16.61	100.00

===

Univariate Procedure, Effluent Concentration

===

The UNIVARIATE Procedure
Variable: Y
Poll = TKN

```
 Stem Leaf                           #             Boxplot
   52 0                              1                0
   50 0000                           4                0
   48
   46 00                             2                0
   44 0                              1                0
   42 000                            3                |
   40 0                              1                |
   38 00700                          5                |
   36 0                              1                |
   34 02244                          5                |
   32 00900                          5                |
   30 00005                          5                |
   28 00000                          5                |
   26 00555                          5                |
   24 0009000000000                 13                |
   22 0005                           4                |
   20 00000000000000                14             +-----+
   18 0000004489000                 13             |     |
   16 00013330000033                14             |     |
   14 00000000000440000000          20             |  +  |
   12 00000000159000668             17             *-----*
   10 47000000005                   11             |     |
    8 000124444468890000599         21             |     |
    6 022355990000026699            18             +-----+
    4 0001112445666667888000135689  28                |
    2 0124455557899000466677888999  28                |
    0 96                             2                |
      ----+----+----+----+----+---
  Multiply Stem.Leaf by 10**-1
```

==
Univariate Procedure, Effluent Concentration
==

The UNIVARIATE Procedure
Variable: Y
Poll = TKN

```
                  Normal Probability Plot
5.3+                                                  *
   |                                              *** *
   |
   |                                            **
   |                                            *     +
   |                                          **    ++
   |                                          *   ++
   |                                        **   +
   |                                        *  ++
   |                                      ** ++
   |                                     **++
   |                                    **+
   |                                   **+
2.7+                                  **
   |                                 **
   |                               +*
   |                             +***
   |                           ++**
   |                          +***
   |                        +***
   |                      ++**
   |                     +**
   |                   +***
   |                 +***
   |              *****
   |  *************
0.1+*           ++
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = TL

Moments			
N	97	Sum Weights	97
Mean	0.00246289	Sum Observations	0.2389
Std Deviation	0.00182867	Variance	3.34402E-6
Skewness	1.47376886	Kurtosis	2.04113663
Uncorrected SS	0.00090941	Corrected SS	0.00032103
Coeff Variation	74.2489535	Std Error Mean	0.00018567

Basic Statistical Measures			
Location		Variability	
Mean	0.002463	Std Deviation	0.00183
Median	0.002500	Variance	3.34402E-6
Mode	0.002500	Range	0.00780
		Interquartile Range	0.00200

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.26464	Pr > |t|	<.0001
Sign	M	48.5	Pr >= |M|	<.0001
Signed Rank	S	2376.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0083
99%	0.0083
95%	0.0065
90%	0.0050
75% Q3	0.0030
50% Median	0.0025
25% Q1	0.0010

10%	0.0010
5%	0.0005
1%	0.0005
0% Min	0.0005

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.0005	1100	0.0065	1006
0.0005	1099	0.0077	1005
0.0005	1098	0.0080	1004
0.0005	1097	0.0081	1003
0.0005	1096	0.0083	1002

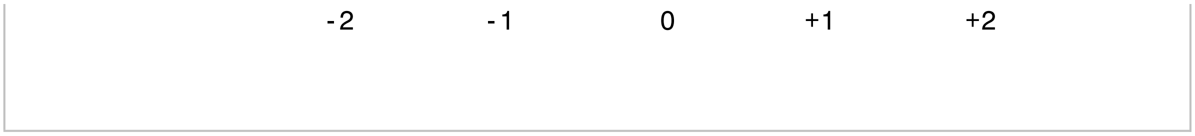
Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	79	44.89	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = TL

```
Stem Leaf                                  #             Boxplot
   8 013                                   3                0
   7 7                                     1                0
   7
   6 5                                     1                0
   6 001                                   3                0
   5 7                                     1                |
   5 0000                                  4                |
   4                                                        |
   4 14                                    2                |
   3                                                        |
   3 0000000000                           10             +-----+
   2 555555555555555555555555555555555    33             *--+--*
   2 0                                     1             |     |
   1                                                     |     |
   1 00000000000000000000000000000        29             +-----+
   0 555555555                             9                |
     ----+----+----+----+----+----+---
 Multiply Stem.Leaf by 10**-3
```

```
                      Normal Probability Plot
0.00825+                                            * *   *
       |                                           *
       |                                                  +
0.00675+                                          *     ++
       |                                       ***   +++
       |                                      *   +++
0.00525+                                    ***+++
       |                                     ++
       |                                  +**
0.00375+                               +++
       |                            +++ ****
       |                       *********
0.00225+                      *+++
       |                    +++
       |            ***********
0.00075+*   * *******  +++
        +----+----+----+----+----+----+----+----+----+----+
```


-2
-1
0
+1
+2

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = TN

Moments			
N	72	Sum Weights	72
Mean	0.0040125	Sum Observations	0.2889
Std Deviation	0.00228194	Variance	5.20724E-6
Skewness	1.45523603	Kurtosis	1.60722712
Uncorrected SS	0.00152892	Corrected SS	0.00036971
Coeff Variation	56.870701	Std Error Mean	0.00026893

Basic Statistical Measures			
Location		Variability	
Mean	0.004012	Std Deviation	0.00228
Median	0.003050	Variance	5.20724E-6
Mode	0.002500	Range	0.01000
		Interquartile Range	0.00235

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	14.9203	Pr > |t|	<.0001
Sign	M	36	Pr >= |M|	<.0001
Signed Rank	S	1314	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.01100
99%	0.01100
95%	0.00960
90%	0.00770
75% Q3	0.00485
50% Median	0.00305
25% Q1	0.00250

10%	0.00210
5%	0.00160
1%	0.00100
0% Min	0.00100

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.00100	1324	0.0088	1257
0.00125	1323	0.0096	1256
0.00125	1322	0.0102	1255
0.00160	1321	0.0104	1254
0.00200	1320	0.0110	1253

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	14	16.28	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = TN

```
                 Stem Leaf                      #             Boxplot
                   11 0                         1                0
                   10
                   10 24                        2                0
                    9 6                         1                0
                    9
                    8 8                         1                0
                    8 01                        2                |
                    7 57                        2                |
                    7                                            |
                    6 6                         1                |
                    6 0                         1                |
                    5 5556                      4                |
                    5 13                        2                |
                    4 56689                     5             +-----+
                    4 0134                      4             |  +  |
                    3 5677888                   7             |     |
                    3 0000144                   7             *-----*
                    2 5555555555555555588899   22             +-----+
                    2 000124                    6                |
                    1 6                         1                |
                    1 022                       3                |
                      ----+----+----+----+--
                  Multiply Stem.Leaf by 10**-3


                                   Normal Probability Plot
             0.01125+                                                 *
                    |
             0.01025+                                           *  *
                    |                                         *          +
             0.00925+                                                 +++
                    |                                        *     ++
             0.00825+                                      **    ++
                    |                                     **   ++
             0.00725+                                       ++
                    |                                    *++
             0.00625+                                  +*
                    |                                +***
```

```
0.00525+                             ++**
       |                           ++***
0.00425+                        +++ **
       |                      ++ ***
0.00325+                    ++ ***
       |              *********
0.00225+         *****  ++
       |        *    +++
0.00125+ *   * *    ++
       +----+----+----+----+----+----+----+----+----+----+
           -2        -1         0        +1        +2
```

===

Univariate Procedure, Effluent Concentration

===

The UNIVARIATE Procedure
Variable: Y
Poll = TNI

Moments			
N	142	Sum Weights	142
Mean	1.71353232	Sum Observations	243.32159
Std Deviation	1.48949047	Variance	2.21858186
Skewness	1.35758809	Kurtosis	0.96920632
Uncorrected SS	729.759451	Corrected SS	312.820042
Coeff Variation	86.9251457	Std Error Mean	0.12499526

Basic Statistical Measures			
Location		Variability	
Mean	1.713532	Std Deviation	1.48949
Median	1.050000	Variance	2.21858
Mode	1.090000	Range	6.41500
		Interquartile Range	1.93400

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.70878	Pr > |t|	<.0001
Sign	M	71	Pr >= |M|	<.0001
Signed Rank	S	5076.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	6.50500
99%	6.27000
95%	4.97000
90%	4.05000
75% Q3	2.61400
50% Median	1.05000
25% Q1	0.68000

10%	0.46000
5%	0.33171
1%	0.11999
0% Min	0.09000

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.09000	2138	5.310	2001
0.11999	2137	5.580	2000
0.18000	2136	5.887	1999
0.20000	2135	6.270	1998
0.25000	2134	6.505	1997

Missing Values			
		Percent Of	
Missing Value	**Count**	**All Obs**	**Missing Obs**
.	30	17.44	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = TNI

```
 Stem Leaf                                          #    Boxplot
    6 5                                             1       0
    6 3                                             1       0
    5 69                                            2       0
    5 0023                                          4       |
    4 5556                                          4       |
    4 00024                                         5       |
    3 889                                           3       |
    3 0111122234                                   10       |
    2 5677789                                       7    +-----+
    2 133                                           3    |     |
    1 5555666677777778                             16    |  +  |
    1 00000000000111111122233344                   26    *-----*
    0 55555666666666666677777777777778888888888889999  47    +-----+
    0 1122233334444                                13       |
      ----+----+----+----+----+----+----+----+----+--


                          Normal Probability Plot
       6.75+                                                  *
           |                                                *
           |                                             **
           |                                           *    +++
           |                                       **** ++++
           |                                      *  +++
           |                                    **+++
           |                                 ****
           |                               +**
           |                           +++++**
           |                        +++ ****
           |                     +++*****
           |              ***********
       0.25+* *  **  *******+++
            +----+----+----+----+----+----+----+----+----+----+
                -2        -1         0        +1        +2
```

==
Univariate Procedure, Effluent Concentration
==

The UNIVARIATE Procedure
Variable: Y
Poll = TP

Moments			
N	243	Sum Weights	243
Mean	0.4471044	Sum Observations	108.64637
Std Deviation	0.44856455	Variance	0.20121016
Skewness	1.27499934	Kurtosis	0.96427369
Uncorrected SS	97.2691281	Corrected SS	48.6928577
Coeff Variation	100.326579	Std Error Mean	0.02877543

Basic Statistical Measures			
Location		Variability	
Mean	0.447104	Std Deviation	0.44856
Median	0.350000	Variance	0.20121
Mode	0.600000	Range	1.75500
		Interquartile Range	0.52900

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	15.53771	Pr > |t|	<.0001
Sign	M	121.5	Pr >= |M|	<.0001
Signed Rank	S	14823	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1.760
99%	1.700
95%	1.600
90%	1.100
75% Q3	0.600
50% Median	0.350
25% Q1	0.071

10%	0.041
5%	0.025
1%	0.005
0% Min	0.005

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.0050	3020	1.64	2785
0.0050	3019	1.70	2780
0.0050	3018	1.70	2781
0.0050	3017	1.76	2778
0.0125	3016	1.76	2779

Missing Values			
Missing Value	**Count**	**Percent Of**	
		All Obs	**Missing Obs**
.	97	28.53	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = TP

```
                   Histogram                          #             Boxplot
 1.75+**                                              4                0
     .*****                                           9                0
     .*                                               1                0
     .
     .***                                             6                |
     .                                                                 |
     .***                                             6                |
     .***                                             5                |
     .****                                            7                |
     .***                                             6                |
     .****                                            7                |
     .********                                       15             +-----+
     .***********                                    22             |     |
     .*************                                  26             |  +  |
     .*******                                        14             *-----*
     .*********                                      17             |     |
     .**********                                     20             |     |
 0.05+***************************************        78             +-----+
      ----+----+----+----+----+----+----+----
      * may represent up to 2 counts


                         Normal Probability Plot
        1.75+                                                  ** *
            |                                            ******
            |                                            *       ++
            |                                                  ++
            |                                          ***   ++
            |                                             +++
            |                                         **++
            |                                       **++
            |                                      **+
            |                                    +**
            |                                  ++**
            |                                ++***
            |                              ++***
            |                           ++***
            |                         ++***
```

```
     |                    ++ **
     |                  ++****
0.05+* ******************
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

==
Univariate Procedure, Effluent Concentration
==

The UNIVARIATE Procedure
Variable: Y
Poll = TSS

Moments			
N	200	Sum Weights	200
Mean	13.0425	Sum Observations	2608.5
Std Deviation	9.34201853	Variance	87.2733103
Skewness	1.0353793	Kurtosis	0.62514473
Uncorrected SS	51388.75	Corrected SS	17367.3887
Coeff Variation	71.6275142	Std Error Mean	0.66058047

Basic Statistical Measures			
Location		Variability	
Mean	13.04250	Std Deviation	9.34202
Median	11.00000	Variance	87.27331
Mode	7.00000	Range	44.00000
		Interquartile Range	12.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	19.744	Pr > |t|	<.0001
Sign	M	99.5	Pr >= |M|	<.0001
Signed Rank	S	9950	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	44.0
99%	39.5
95%	32.5
90%	27.0
75% Q3	18.0
50% Median	11.0
25% Q1	6.0

10%	3.0
5%	2.0
1%	0.5
0% Min	0.0

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.0	3317	38	3121
0.5	3316	38	3122
0.5	3315	39	3120
0.5	3314	40	3119
0.5	3313	44	3118

Missing Values			
Missing Value	**Count**	**Percent Of**	
		All Obs	**Missing Obs**
.	91	31.27	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = TSS

```
  Stem Leaf                           #          Boxplot
    44 0                              1             0
    42
    40 0                              1             0
    38 000                            3             0
    36 0                              1             |
    34 000                            3             |
    32 0000                           4             |
    30 00                             2             |
    28 000                            3             |
    26 000000                         6             |
    24 0000                           4             |
    22 0000000                        7             |
    20 0000000                        7             |
    18 0000000000000                 13          +-----+
    16 000000000                      9          |     |
    14 0000000000000                 13          |     |
    12 00000000000000055             17          |  +  |
    10 00000000000000000000          20          *-----*
     8 00000000000000055             17          |     |
     6 000000000000000000000000000   27          +-----+
     4 000000000000000               15             |
     2 00000555555000000000          20             |
     0 0555550                        7             |
       ----+----+----+----+----+--
```

==

Univariate Procedure, Effluent Concentration

==

The UNIVARIATE Procedure
Variable: Y
Poll = TSS

```
                           Normal Probability Plot
   45+                                                  *
     |
     |                                                 *
     |                                             ***
     |                                            *     +
     |                                          **    ++
     |                                        ***   ++
     |                                        *   ++
     |                                       *  ++
     |                                     **+++
     |                                    **+
   23+                                  ***
     |                                 **
     |                               ***
     |                             +**
     |                           +***
     |                        ++***
     |                      +****
     |                    +***
     |                 *****
     |              ****
     |       ********+
    1+** *****    ++
      +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = TZ

Moments			
N	137	Sum Weights	137
Mean	0.0214635	Sum Observations	2.9405
Std Deviation	0.01353734	Variance	0.00018326
Skewness	0.90906775	Kurtosis	0.40718591
Uncorrected SS	0.08803673	Corrected SS	0.0249233
Coeff Variation	63.0714304	Std Error Mean	0.00115657

Basic Statistical Measures			
Location		Variability	
Mean	0.021464	Std Deviation	0.01354
Median	0.019500	Variance	0.0001833
Mode	0.025000	Range	0.06100
		Interquartile Range	0.01800

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	18.55785	Pr > |t|	<.0001
Sign	M	68.5	Pr >= |M|	<.0001
Signed Rank	S	4726.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0640
99%	0.0590
95%	0.0490
90%	0.0400
75% Q3	0.0280
50% Median	0.0195
25% Q1	0.0100

10%	0.0050
5%	0.0050
1%	0.0030
0% Min	0.0030

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.003	1607	0.052	1475
0.003	1606	0.057	1473
0.005	1605	0.057	1474
0.005	1604	0.059	1472
0.005	1603	0.064	1471

Missing Values			
		Percent Of	
Missing Value	Count	All Obs	Missing Obs
.	94	40.69	100.00

Univariate Procedure, Effluent Concentration

The UNIVARIATE Procedure
Variable: Y
Poll = TZ

```
Stem Leaf                               #             Boxplot
   6 4                                  1                0
   5 779                                3                0
   5 02                                 2                |
   4 6699                               4                |
   4 00234                              5                |
   3 6777789                            7                |
   3 00001123444                       11                |
   2 55555555555555555666789           23             +-----+
   2 0000012333444                     13             *--+--*
   1 55566666677899                    14             |     |
   1 0000000000000000222222333444444   31             +-----+
   0 555555555555557888999             21                |
   0 33                                 2                |
     ----+----+----+----+----+----+-
  Multiply Stem.Leaf by 10**-2


                       Normal Probability Plot
  0.0625+                                                  *
        |                                           * * * +
        |                                         **   +++
        |                                       ***++++
        |                                    ***+++
        |                                  ***+
  0.0325+                               ****
        |                          ******
        |                       +***
        |                    +****
        |               *******
        |     * **********+
  0.0025+* *       +++
         +----+----+----+----+----+----+----+----+----+----+
             -2        -1         0        +1        +2
```

==

Univariate Procedure, Influent Concentration

==

The UNIVARIATE Procedure
Variable: X1
Poll = DCA

Moments			
N	103	Sum Weights	103
Mean	0.00004791	Sum Observations	0.0049345
Std Deviation	0.00002568	Variance	6.5923E-10
Skewness	0.83497446	Kurtosis	0.66394663
Uncorrected SS	3.03642E-7	Corrected SS	6.72414E-8
Coeff Variation	53.593519	Std Error Mean	2.52988E-6

Basic Statistical Measures			
Location		Variability	
Mean	0.000048	Std Deviation	0.0000257
Median	0.000050	Variance	6.5923E-10
Mode	0.000050	Range	0.0001160
		Interquartile Range	0.0000300

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	18.93679	Pr > |t|	<.0001
Sign	M	51.5	Pr >= |M|	<.0001
Signed Rank	S	2678	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.000120
99%	0.000117
95%	0.000100
90%	0.000099
75% Q3	0.000050
50% Median	0.000050
25% Q1	0.000020

10%	0.000018
5%	0.000018
1%	0.000010
0% Min	0.000004

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
4.00000E-06	198	0.000100	135
1.00000E-05	197	0.000100	154
1.00000E-05	196	0.000111	145
1.50000E-05	195	0.000117	156
1.50000E-05	194	0.000120	143

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	14	11.97	100.00

```
   Stem Leaf                                                #   Boxplot
     12 0                                                   1      0
     11 7                                                   1      0
     11 1                                                   1      0
     10
     10 0000000                                             7      0
      9 9                                                   1      0
      9 2                                                   1      |
      8                                                            |
      8 1                                                   1      |
      7 55                                                  2      |
      7                                                            |
      6                                                            |
      6 02                                                  2      |
      5 5                                                   1      |
      5 000000000000000000000000000000000000000000000000   48   +-----+
      4 6899                                                4   |  +  |
      4 0014                                                4   |     |
      3 9                                                   1   |     |
      3 0                                                   1   |     |
      2                                                         |     |
      2 0000000                                             7   +-----+
      1 55888888888888888                                  17      |
```

```
  1 00                                                  2      |
  0                                                            |
  0 4                                                   1      |
    ----+----+----+----+----+----+----+----+----+---
Multiply Stem.Leaf by 10**-5
```

==
Univariate Procedure, Influent Concentration
==

The UNIVARIATE Procedure
Variable: X1
Poll = DCA

```
                       Normal Probability Plot
0.000123+                                                  *
        |                                               *
        |                                             *    +
        |                                                ++
        |                                      ******  ++
        |                                      *     ++
        |                                     *    ++
        |                                        ++
        |                                     *++
        |                                    *+
        |                                  ++
        |                                ++
0.000063+                              ++   *
        |                            ++     *
        |                      *************
        |                    **  ++
        |                   ** ++
        |                   *++
        |                   *
        |                 ++
        |               ++ **
        |       ************
        |   * *     ++
        |         ++
  2.5E-6+*      ++
         +----+----+----+----+----+----+----+----+----+----+
             -2        -1         0        +1        +2
```

===

Univariate Procedure, Influent Concentration

===

The UNIVARIATE Procedure
Variable: X1
Poll = DCH

Moments			
N	53	Sum Weights	53
Mean	0.00053019	Sum Observations	0.0281
Std Deviation	0.00027322	Variance	7.4648E-8
Skewness	1.93771287	Kurtosis	4.21314555
Uncorrected SS	0.00001878	Corrected SS	3.8817E-6
Coeff Variation	51.5322086	Std Error Mean	0.00003753

Basic Statistical Measures			
Location		Variability	
Mean	0.000530	Std Deviation	0.0002732
Median	0.000500	Variance	7.4648E-8
Mode	0.000500	Range	0.00115
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	14.1273	Pr > |t|	<.0001
Sign	M	26.5	Pr >= |M|	<.0001
Signed Rank	S	715.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.00140
99%	0.00140
95%	0.00140
90%	0.00090
75% Q3	0.00050
50% Median	0.00050
25% Q1	0.00050

10%	0.00025
5%	0.00025
1%	0.00025
0% Min	0.00025

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
2.5E-04	423	0.0010	362
2.5E-04	420	0.0010	416
2.5E-04	409	0.0014	360
2.5E-04	408	0.0014	361
2.5E-04	407	0.0014	414

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	11	17.19	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = DCH

```
Stem Leaf                                  #           Boxplot
  14 000                                   3              *
  13
  13
  12
  12
  11
  11
  10
  10 00                                    2              *
   9
   9 0                                     1              *
   8
   8
   7
   7 00                                    2              *
   6
   6 0                                     1              *
   5
   5 00000000000000000000000000000000     32           +--+--+
   4
   4
   3
   3
   2 555555555555                         12              *
     ----+----+----+----+----+----+--
 Multiply Stem.Leaf by 10**-4
```

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = DCH

```
                       Normal Probability Plot
0.001425+                                          *  *   *
        |
        |
        |
        |                                                   +
        |                                                ++
        |                                              ++
        |                                             +
        |                                       **   ++
        |                                         ++
        |                                      *++
        |                                     ++
        |                                   ++
        |                                  +
        |                                ++   **
        |                              ++
        |                            ++      *
        |                          ++
        |                  *****************
        |                        +
        |                      ++
        |                    ++
        |                  ++
0.000275+  *   * * ********
         +----+----+----+----+----+----+----+----+----+----+
             -2        -1         0        +1        +2
```

===
Univariate Procedure, Influent Concentration
===

The UNIVARIATE Procedure
Variable: X1
Poll = DCO

Moments			
N	88	Sum Weights	88
Mean	0.00650739	Sum Observations	0.57265
Std Deviation	0.00301443	Variance	9.08681E-6
Skewness	1.03261593	Kurtosis	0.13346051
Uncorrected SS	0.00451701	Corrected SS	0.00079055
Coeff Variation	46.3232566	Std Error Mean	0.00032134

Basic Statistical Measures			
Location		Variability	
Mean	0.006507	Std Deviation	0.00301
Median	0.005790	Variance	9.08681E-6
Mode	0.003400	Range	0.01110
		Interquartile Range	0.00381

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	20.2508	Pr > |t|	<.0001
Sign	M	44	Pr >= |M|	<.0001
Signed Rank	S	1958	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.01440
99%	0.01440
95%	0.01260
90%	0.01180
75% Q3	0.00791
50% Median	0.00579
25% Q1	0.00410

10%	0.00341
5%	0.00340
1%	0.00330
0% Min	0.00330

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
3.3E-03	565	0.0126	573
3.3E-03	550	0.0130	579
3.3E-03	640	0.0140	534
3.3E-03	639	0.0140	539
3.4E-03	636	0.0144	547

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	24	21.43	100.00

===
Univariate Procedure, Influent Concentration
===

The UNIVARIATE Procedure
Variable: X1
Poll = DCO

```
Stem Leaf                     #             Boxplot
  14 004                      3                0
  13
  13 0                        1                |
  12 56                       2                |
  12 00                       2                |
  11 578                      3                |
  11 2                        1                |
  10                                           |
  10 012                      3                |
   9 7                        1                |
   9                                           |
   8 7                        1                |
   8 01124                    5                |
   7 556668                   6             +-----+
   7 004                      3             |     |
   6 6689                     4             |  +  |
   6 0000123                  7             |     |
   5 77888                    5             *-----*
   5 000233                   6             |     |
   4 566888                   6             |     |
   4 011222344                9             +-----+
   3 5556678899              10                |
   3 3333444444              10                |
     ----+----+----+----+
 Multiply Stem.Leaf by 10**-3
```

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = DCO

```
                      Normal Probability Plot
0.01425+                                             * *   *
       |                                                  +
       |                                          *     ++
       |                                        **    ++
       |                                       *    +
       |                                     **   ++
       |                                    *   ++
       |                                       +
       |                                   **++
       |                                  *++
       |                                  +
0.00875+                                ++*
       |                              ++**
       |                             +***
       |                           ++**
       |                         ++ **
       |                        + **
       |                      ++***
       |                    ++ **
       |                   + ***
       |                 +***
       |               ***
0.00325+*   * * *******+
        +----+----+----+----+----+----+----+----+----+----+
            -2        -1         0        +1        +2
```

==

Univariate Procedure, Influent Concentration

==

The UNIVARIATE Procedure
Variable: X1
Poll = DI

Moments			
N	55	Sum Weights	55
Mean	0.05845455	Sum Observations	3.215
Std Deviation	0.03125274	Variance	0.00097673
Skewness	0.68439174	Kurtosis	-0.5655259
Uncorrected SS	0.240675	Corrected SS	0.05274364
Coeff Variation	53.4650364	Std Error Mean	0.00421412

Basic Statistical Measures			
Location		Variability	
Mean	0.058455	Std Deviation	0.03125
Median	0.050000	Variance	0.0009767
Mode	0.025000	Range	0.12000
		Interquartile Range	0.05000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.87112	Pr > |t|	<.0001
Sign	M	27.5	Pr >= |M|	<.0001
Signed Rank	S	770	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.130
99%	0.130
95%	0.120
90%	0.110
75% Q3	0.080
50% Median	0.050
25% Q1	0.030

10%	0.025
5%	0.025
1%	0.010
0% Min	0.010

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
1.E-02	822	0.11	884
3.E-02	883	0.12	832
3.E-02	860	0.12	880
3.E-02	859	0.12	885
3.E-02	856	0.13	876

Missing Values			
		Percent Of	
Missing Value	**Count**	**All Obs**	**Missing Obs**
.	11	16.67	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = DI

```
Stem Leaf                        #             Boxplot
  13 0                           1                |
  12                                              |
  12 000                         3                |
  11                                              |
  11 00                          2                |
  10                                              |
  10 0000                        4                |
   9                                              |
   9 00                          2                |
   8                                              |
   8 0000                        4             +-----+
   7                                           |     |
   7 0                           1             |     |
   6                                           |     |
   6 00000000                    8             |     |
   5                                           |  +  |
   5 00000000                    8             *-----*
   4                                           |     |
   4 0000000                       7           |     |
   3                                           |     |
   3 000                         3             +-----+
   2 55555555555                11                |
   2                                              |
   1                                              |
   1 0                           1                |
     ----+----+----+----+
 Multiply Stem.Leaf by 10**-2
```

==

Univariate Procedure, Influent Concentration

==

The UNIVARIATE Procedure
Variable: X1
Poll = DI

```
                     Normal Probability Plot
0.1325+                                                *+
      |                                               +
      |                                        * * *++
      |                                            +
      |                                      **  ++
      |                                        ++
      |                                  **** +
      |                                     ++
      |                                 ** +
      |                                  ++
      |                               **+
      |                               +
0.0725+                             +*
      |                            +
      |                          *****
      |                        ++
      |                       ****
      |                     ++
      |                   ****
      |                  ++
      |                ++**
      |      * * ********
      |             ++
      |            +
0.0125+  *       ++
       +----+----+----+----+----+----+----+----+----+----+
           -2        -1         0        +1        +2
```

==

Univariate Procedure, Influent Concentration

==

The UNIVARIATE Procedure
Variable: X1
Poll = DL

Moments			
N	107	Sum Weights	107
Mean	0.00025768	Sum Observations	0.027572
Std Deviation	0.00020574	Variance	4.23279E-8
Skewness	0.60321011	Kurtosis	-0.2573127
Uncorrected SS	0.00001159	Corrected SS	4.48676E-6
Coeff Variation	79.841536	Std Error Mean	0.00001989

Basic Statistical Measures			
Location		Variability	
Mean	0.000258	Std Deviation	0.0002057
Median	0.000250	Variance	4.23279E-8
Mode	0.000500	Range	0.0009930
		Interquartile Range	0.0004230

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	12.95576	Pr > |t|	<.0001
Sign	M	53.5	Pr >= |M|	<.0001
Signed Rank	S	2889	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0010000
99%	0.0005000
95%	0.0005000
90%	0.0005000
75% Q3	0.0005000
50% Median	0.0002500
25% Q1	0.0000770

10%	0.0000210
5%	0.0000155
1%	0.0000070
0% Min	0.0000070

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
7.00000E-06	1001	0.0005	943
7.00000E-06	1000	0.0005	945
1.30000E-05	999	0.0005	948
1.55000E-05	998	0.0005	949
1.55000E-05	997	0.0010	944

Missing Values			
		Percent Of	
Missing Value	**Count**	**All Obs**	**Missing Obs**
.	9	7.76	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = DL

```
   Stem Leaf                                      #             Boxplot
     10 0                                         1                |
      9                                                            |
      9                                                            |
      8                                                            |
      8                                                            |
      7                                                            |
      7                                                            |
      6                                                            |
      6                                                            |
      5                                                            |
      5 000000000000000000000000000000000000     36             +-----+
      4                                                         |     |
      4                                                         |     |
      3                                                         |     |
      3                                                         |     |
      2 555555555555555555                       18             *--+--*
      2 2                                         1             |     |
      1 577788                                    6             |     |
      1 0011122334                               10             |     |
      0 555567778888888999                       18             +-----+
      0 11122222222334444                        17                |
        ----+----+----+----+----+----+----+-
    Multiply Stem.Leaf by 10**-4


                            Normal Probability Plot
     0.001025+                                                     *
             |
     0.000925+
             |
     0.000825+
             |                                                   ++
     0.000725+                                                 ++
             |                                               ++
     0.000625+                                            +++
             |                                          ++
     0.000525+                               ************** * *
             |                                     ++
```

```
0.000425+                                   +++
        |                                 ++
0.000325+                               ++
        |                            *****
0.000225+                          ++*
        |                       +++**
0.000125+                     ++ ***
        |                   +******
0.000025+*   * * **********
         +----+----+----+----+----+----+----+----+----+----+
             -2        -1         0        +1        +2
```

===
Univariate Procedure, Influent Concentration
===

The UNIVARIATE Procedure
Variable: X1
Poll = DN

Moments			
N	57	Sum Weights	57
Mean	0.00108596	Sum Observations	0.0619
Std Deviation	0.00059204	Variance	3.50514E-7
Skewness	1.04256822	Kurtosis	0.80480431
Uncorrected SS	0.00008685	Corrected SS	0.00001963
Coeff Variation	54.5176036	Std Error Mean	0.00007842

Basic Statistical Measures			
Location		Variability	
Mean	0.001086	Std Deviation	0.0005920
Median	0.001000	Variance	3.50514E-7
Mode	0.000500	Range	0.00250
		Interquartile Range	0.0009000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.84843	Pr > |t|	<.0001
Sign	M	28.5	Pr >= |M|	<.0001
Signed Rank	S	826.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0030
99%	0.0030
95%	0.0021
90%	0.0019
75% Q3	0.0014
50% Median	0.0010
25% Q1	0.0005

10%	0.0005
5%	0.0005
1%	0.0005
0% Min	0.0005

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
5.0E-04	1249	0.0020	1201
5.0E-04	1248	0.0021	1218
5.0E-04	1246	0.0021	1239
5.0E-04	1243	0.0025	1252
5.0E-04	1241	0.0030	1237

Missing Values			
		Percent Of	
Missing Value	**Count**	**All Obs**	**Missing Obs**
.	18	24.00	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = DN

```
Stem Leaf                     #             Boxplot
  30 0                        1                0
  29
  28
  27
  26
  25 0                        1                |
  24                                           |
  23                                           |
  22                                           |
  21 00                       2                |
  20 0                        1                |
  19 000                      3                |
  18 00                       2                |
  17 0                        1                |
  16 0                        1                |
  15 0                        1                |
  14 00                       2             +-----+
  13 00                       2             |     |
  12 0000                     4             |     |
  11 0000                     4             |     |
  10 000000                   6             *--+--*
   9 0000                     4             |     |
   8 00                       2             |     |
   7 0                        1             |     |
   6 0                        1             |     |
   5 000000000000000000      18             +-----+
     ----+----+----+----+
 Multiply Stem.Leaf by 10**-4
```

==

Univariate Procedure, Influent Concentration

==

The UNIVARIATE Procedure
Variable: X1
Poll = DN

```
                      Normal Probability Plot
0.00305+                                                *
       |
       |
       |
       |
0.00255+                                            *    ++
       |                                                +
       |                                              ++
       |                                            ++
       |                                        * *+
0.00205+                                       * ++
       |                                    ***++
       |                                   *  +
       |                                  * ++
       |                                 *++
0.00155+                                +*
       |                               +*
       |                             ++*
       |                           ++**
       |                          +**
0.00105+                        ***
       |                      ***
       |                     **
       |                   ++*
       |                 ++ *
0.00055+  *   * * ***********
        +----+----+----+----+----+----+----+----+----+----+
            -2        -1         0        +1        +2
```

==
Univariate Procedure, Influent Concentration
==

The UNIVARIATE Procedure
Variable: X1
Poll = DP

Moments			
N	77	Sum Weights	77
Mean	0.17285714	Sum Observations	13.31
Std Deviation	0.22614752	Variance	0.0511427
Skewness	4.73953212	Kurtosis	25.0285561
Uncorrected SS	6.187574	Corrected SS	3.88684543
Coeff Variation	130.829147	Std Error Mean	0.0257719

Basic Statistical Measures			
Location		Variability	
Mean	0.172857	Std Deviation	0.22615
Median	0.125000	Variance	0.05114
Mode	0.125000	Range	1.44000
		Interquartile Range	0.15000

Note: The mode displayed is the smallest of 2 modes with a count of 10.

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	6.707194	Pr > |t|	<.0001
Sign	M	38.5	Pr >= |M|	<.0001
Signed Rank	S	1501.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1.450
99%	1.450
95%	0.380
90%	0.250
75% Q3	0.220

50% Median	0.125
25% Q1	0.070
10%	0.050
5%	0.020
1%	0.010
0% Min	0.010

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
1.E-02	2579	0.37	2572
2.E-02	2508	0.38	2534
2.E-02	2502	0.39	2523
2.E-02	2576	1.43	2569
3.E-02	2504	1.45	2570

Missing Values			
		Percent Of	
Missing Value	**Count**	**All Obs**	**Missing Obs**
.	9	10.47	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = DP

```
Stem Leaf                                 #              Boxplot
  14 35                                   2                 *
  13
  12
  11
  10
   9
   8
   7
   6
   5
   4
   3 3789                                 4                 |
   2 023455555555559                     15              +-----+
   1 001122222222222222334456668         27              *--+--*
   0 12223455555677777778888899999       29              +-----+
     ----+----+----+----+----+----
 Multiply Stem.Leaf by 10**-1


                         Normal Probability Plot
   1.45+                                             *   *
       |
       |
       |
       |
       |
       |
   0.75+                                                 ++
       |                                            +++++
       |                                        ++++
       |                                    ++++
       |                               +++++    ****
       |                           ++++*********
       |                      **********
   0.05+ *   * ***************
        +----+----+----+----+----+----+----+----+----+----+
            -2        -1         0        +1        +2
```

===

Univariate Procedure, Influent Concentration

===

The UNIVARIATE Procedure
Variable: X1
Poll = DZ

Moments			
N	103	Sum Weights	103
Mean	0.01613146	Sum Observations	1.66154
Std Deviation	0.01305985	Variance	0.00017056
Skewness	0.97700671	Kurtosis	0.15798835
Uncorrected SS	0.04420016	Corrected SS	0.0173971
Coeff Variation	80.9589261	Std Error Mean	0.00128683

Basic Statistical Measures			
Location		Variability	
Mean	0.016131	Std Deviation	0.01306
Median	0.012600	Variance	0.0001706
Mode	0.012600	Range	0.05346
		Interquartile Range	0.01657

Note: The mode displayed is the smallest of 2 modes with a count of 3.

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	12.53585	Pr > |t|	<.0001
Sign	M	51.5	Pr >= |M|	<.0001
Signed Rank	S	2678	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.05430
99%	0.05100
95%	0.04200
90%	0.03740
75% Q3	0.02230

50% Median	0.01260
25% Q1	0.00573
10%	0.00207
5%	0.00175
1%	0.00113
0% Min	0.00084

Extreme Observations

Lowest		Highest	
Value	**Obs**	**Value**	**Obs**
8.4E-04	1469	0.0425	1389
1.1E-03	1468	0.0446	1446
1.3E-03	1467	0.0454	1352
1.4E-03	1466	0.0510	1427
1.5E-03	1465	0.0543	1443

Missing Values

Missing Value	Count	Percent Of All Obs	Percent Of Missing Obs
.	17	14.17	100.00

===
Univariate Procedure, Influent Concentration
===

The UNIVARIATE Procedure
Variable: X1
Poll = DZ

```
   Stem Leaf                     #             Boxplot
      5 14                       2                0
      4 55                       2                |
      4 0122                     4                |
      3 67789                    5                |
      3 001334                   6                |
      2 588                      3                |
      2 000111222344            12             +-----+
      1 5555566777778           13             |  +  |
      1 00000111222333333       17             *-----*
      0 55666667888999999       17             +-----+
      0 1111222222222233333444  22                |
        ----+----+----+----+--
    Multiply Stem.Leaf by 10**-2


                     Normal Probability Plot
  0.0525+                                                 *  *
        |                                               *  +++
        |                                         *****++++
        |                                       ***++++
        |                                     **+++
  0.0275+                                  +**+
        |                              ++****
        |                           +*****
        |                       ++****
        |                   ******
  0.0025+*  * * ***********
         +----+----+----+----+----+----+----+----+----+----+
             -2        -1         0        +1        +2
```

===

Univariate Procedure, Influent Concentration

===

The UNIVARIATE Procedure
Variable: X1
Poll = N2

Moments			
N	38	Sum Weights	38
Mean	0.37007895	Sum Observations	14.063
Std Deviation	0.14610851	Variance	0.0213477
Skewness	0.2069843	Kurtosis	0.63931462
Uncorrected SS	5.994285	Corrected SS	0.78986476
Coeff Variation	39.4803621	Std Error Mean	0.02370193

Basic Statistical Measures			
Location		Variability	
Mean	0.370079	Std Deviation	0.14611
Median	0.376000	Variance	0.02135
Mode	0.192000	Range	0.71700
		Interquartile Range	0.19000

Note: The mode displayed is the smallest of 8 modes with a count of 2.

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	15.61387	Pr > |t|	<.0001
Sign	M	19	Pr >= |M|	<.0001
Signed Rank	S	370.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.767
99%	0.767
95%	0.650
90%	0.544
75% Q3	0.457

50% Median	0.376
25% Q1	0.267
10%	0.192
5%	0.090
1%	0.050
0% Min	0.050

Extreme Observations

Lowest		Highest	
Value	**Obs**	**Value**	**Obs**
5.E-02	2460	0.530	2485
9.E-02	2487	0.544	2483
2.E-01	2473	0.544	2484
2.E-01	2457	0.650	2488
2.E-01	2456	0.767	2451

Missing Values

Missing Value	Count	Percent Of	
		All Obs	**Missing Obs**
.	6	13.64	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = N2

```
    Stem Leaf                     #             Boxplot
       7 7                        1                0
       7
       6 5                        1                |
       6                                           |
       5                                           |
       5 0344                     4                |
       4 56899                    5             +-----+
       4 00134                    5             |     |
       3 556999                   6             *--+--*
       3 2344                     4             |     |
       2 7799                     4             +-----+
       2 124                      3                |
       1 999                      3                |
       1                                           |
       0 59                       2                |
         ----+----+----+----+
     Multiply Stem.Leaf by 10**-1


                         Normal Probability Plot
  0.775+                                                  *
       |                                                    +++
       |                                              *  +++
       |                                             ++++
       |                                          +++
       |                                      +++** *
       |                                   *****
  0.425+                               ****
       |                           *****
       |                         ***
       |                     ****
       |                  +***
       |              *+**
       |           +++
  0.075+        *++ *
        +----+----+----+----+----+----+----+----+----+----+
            -2        -1         0        +1        +2
```

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = N3

Moments			
N	100	Sum Weights	100
Mean	0.3596287	Sum Observations	35.96287
Std Deviation	0.26411389	Variance	0.06975615
Skewness	0.8465006	Kurtosis	-0.2169903
Uncorrected SS	19.8391386	Corrected SS	6.90585839
Coeff Variation	73.4407146	Std Error Mean	0.02641139

Basic Statistical Measures			
Location		Variability	
Mean	0.359629	Std Deviation	0.26411
Median	0.260000	Variance	0.06976
Mode	0.050000	Range	1.05000
		Interquartile Range	0.39000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.61643	Pr > |t|	<.0001
Sign	M	50	Pr >= |M|	<.0001
Signed Rank	S	2525	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1.080000
99%	1.020000
95%	0.915000
90%	0.765000
75% Q3	0.560000
50% Median	0.260000
25% Q1	0.170000

10%	0.067000
5%	0.045000
1%	0.034995
0% Min	0.030000

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
3.0E-02	2447	0.92	2446
4.0E-02	2445	0.94	2417
4.0E-02	2375	0.96	2423
4.0E-02	2442	0.96	2437
4.0E-02	2373	1.08	2448

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	3	2.91	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = N3

```
Stem Leaf                     #             Boxplot
  10 8                        1                |
  10                                           |
   9 66                       2                |
   9 124                      3                |
   8                                           |
   8 23                       2                |
   7 6678                     4                |
   7 02                       2                |
   6 5789                     4                |
   6 014                      3                |
   5 566779                   6             +-----+
   5 0                        1             |     |
   4 7                        1             |     |
   4 11113344                 8             |     |
   3 568                      3             |  +  |
   3 00113                    5             |     |
   2 556666999                9             *-----*
   2 0222333334444444        16             |     |
   1 66778999                 8             +-----+
   1 0001122                  7                |
   0 5555678888              10                |
   0 34444                    5                |
     ----+----+----+----+
 Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = N3

```
                    Normal Probability Plot
1.075+                                                  *
     |                                                  +
     |                                            * * ++
     |                                         ***  ++
     |                                            ++
     |                                       ** ++
     |                                     ***++
0.725+                                    * ++
     |                                  ***+
     |                                  *+
     |                               ***+
     |                               *+
     |                             ++*
     |                           +***
0.375+                         ++ *
     |                       ++ **
     |                     ++ ***
     |                   +*****
     |                 ****
     |               ***
     |         ******+
0.025+*   * ***   ++
      +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

===
Univariate Procedure, Influent Concentration
===

The UNIVARIATE Procedure
Variable: X1
Poll = OP

Moments			
N	165	Sum Weights	165
Mean	0.06176448	Sum Observations	10.19114
Std Deviation	0.07782586	Variance	0.00605686
Skewness	1.59852625	Kurtosis	1.79677273
Uncorrected SS	1.62277634	Corrected SS	0.99332583
Coeff Variation	126.004228	Std Error Mean	0.00605874

Basic Statistical Measures			
Location		Variability	
Mean	0.061764	Std Deviation	0.07783
Median	0.020000	Variance	0.00606
Mode	0.005000	Range	0.31800
		Interquartile Range	0.08400

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	10.19429	Pr > |t|	<.0001
Sign	M	82.5	Pr >= |M|	<.0001
Signed Rank	S	6847.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.320
99%	0.318
95%	0.250
90%	0.180
75% Q3	0.090
50% Median	0.020
25% Q1	0.006

10%	0.005
5%	0.003
1%	0.002
0% Min	0.002

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
2.E-03	2724	0.250	2766
2.E-03	2720	0.300	2689
2.E-03	2699	0.303	2657
2.E-03	2688	0.318	2592
2.E-03	2682	0.320	2638

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	30	15.38	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = OP

```
                   Histogram                          #             Boxplot
 0.33+*                                               1                0
     .**                                              3                0
     .
     .
     .****                                            7                0
     .*                                               1                0
     .**                                              3                |
     .**                                              3                |
 0.17+*                                               1                |
     .******                                         11                |
     .**                                              3                |
     .***                                             6                |
     .******                                         11             +-----+
     .***                                             6             |  +  |
     .*********                                      18             |     |
     .*********                                      18             *-----*
 0.01+************************************           73             +-----+
      ----+----+----+----+----+----+----+--
      * may represent up to 2 counts


                        Normal Probability Plot
        0.33+                                                  *
            |                                              ** *
            |
            |
            |                                         *****   +++
            |                                         *     ++
            |                                        *   +++
            |                                      **  ++
        0.17+                                      *+++
            |                                   ****
            |                                  +*+
            |                               ++**
            |                             ++***
            |                          +++ **
            |                        ++ ****
            |                     +++ ***
```

```
0.01+* * *******************
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

===

Univariate Procedure, Influent Concentration

===

The UNIVARIATE Procedure
Variable: X1
Poll = TA

Moments			
N	75	Sum Weights	75
Mean	0.001844	Sum Observations	0.1383
Std Deviation	0.00079581	Variance	6.33308E-7
Skewness	-0.2605879	Kurtosis	-1.3904934
Uncorrected SS	0.00030189	Corrected SS	0.00004686
Coeff Variation	43.1565389	Std Error Mean	0.00009189

Basic Statistical Measures			
Location		Variability	
Mean	0.001844	Std Deviation	0.0007958
Median	0.002500	Variance	6.33308E-7
Mode	0.002500	Range	0.00290
		Interquartile Range	0.00150

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	20.06707	Pr > |t|	<.0001
Sign	M	37.5	Pr >= |M|	<.0001
Signed Rank	S	1425	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0034
99%	0.0034
95%	0.0026
90%	0.0025
75% Q3	0.0025
50% Median	0.0025
25% Q1	0.0010

10%	0.0008
5%	0.0005
1%	0.0005
0% Min	0.0005

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
5.0E-04	76	0.0025	78
5.0E-04	75	0.0026	7
5.0E-04	74	0.0026	57
5.0E-04	61	0.0033	51
5.0E-04	23	0.0034	66

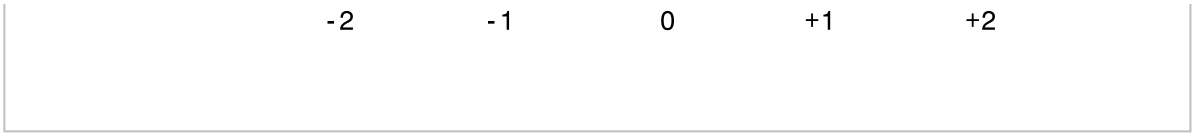
Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	6	7.41	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TA

```
Stem Leaf                                   #             Boxplot
  34 0                                      1                |
  32 0                                      1                |
  30                                                         |
  28                                                         |
  26 00                                     2                |
  24 00000000000000000000000000000000000   35             +-----+
  22                                                      |     |
  20                                                      |     |
  18 000                                    3             |  +  |
  16 00                                     2             |     |
  14 00                                     2             |     |
  12 00000                                  5             |     |
  10 000000000000000                       15             +-----+
   8 00                                     2                |
   6 00                                     2                |
   4 00000                                  5                |
     ----+----+----+----+----+----+----+
 Multiply Stem.Leaf by 10**-4


                          Normal Probability Plot
   0.0035+                                              +++ *
         |                                            ++*
         |                                         +++
   0.0029+                                       ++
         |                                    +++    **
         |                          ****************
   0.0023+                               ++
         |                            +++
         |                         *++
   0.0017+                       +*+
         |                     ++**
         |                  +++ **
   0.0011+               *******
         |             **+
         |           +*
   0.0005+ *   * **+*
            +----+----+----+----+----+----+----+----+----+----+
```


-2
-1
0
+1
+2

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TCA

Moments			
N	139	Sum Weights	139
Mean	0.00033558	Sum Observations	0.0466455
Std Deviation	0.00031886	Variance	1.01673E-7
Skewness	1.08347427	Kurtosis	-0.0236982
Uncorrected SS	0.00002968	Corrected SS	0.00001403
Coeff Variation	95.0185068	Std Error Mean	0.00002705

Basic Statistical Measures			
Location		Variability	
Mean	0.000336	Std Deviation	0.0003189
Median	0.000200	Variance	1.01673E-7
Mode	0.000500	Range	0.0009850
		Interquartile Range	0.0004080

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	12.40793	Pr > |t|	<.0001
Sign	M	69.5	Pr >= |M|	<.0001
Signed Rank	S	4865	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0010000
99%	0.0010000
95%	0.0010000
90%	0.0010000
75% Q3	0.0005000
50% Median	0.0002000
25% Q1	0.0000920

10%	0.0000330
5%	0.0000205
1%	0.0000150
0% Min	0.0000150

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
1.50E-05	359	0.001	226
1.50E-05	358	0.001	252
1.50E-05	357	0.001	286
1.50E-05	356	0.001	302
1.50E-05	355	0.001	318

Missing Values			
		Percent Of	
Missing Value	**Count**	**All Obs**	**Missing Obs**
.	22	13.66	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TCA

```
      Stem Leaf                     #             Boxplot
        10 0000000000000000000     19                |
         9                                           |
         9                                           |
         8                                           |
         8 04                       2                |
         7                                           |
         7                                           |
         6                                           |
         6 0                        1                |
         5                                           |
         5 0000000000000000000000000 25           +-----+
         4                                        |     |
         4 000                      3             |     |
         3 9                        1             |     |
         3 0004                     4             |  +  |
         2 55555555                 8             |     |
         2 0000000000000000004     19             *-----*
         1 6779                     4             |     |
         1 000000000111223344      18             |     |
         0 5555555666666777799     19             +-----+
         0 2222222222233344        16                |
           ----+----+----+----+----+
       Multiply Stem.Leaf by 10**-4


                        Normal Probability Plot
    0.001025+                                    ********* *+* *
            |                                              +
    0.000925+                                            ++
            |                                          +
    0.000825+                                   **    ++
            |                                       ++
    0.000725+                                     +
            |                                   ++
    0.000625+                                  +*
            |                                ++
    0.000525+                             *******
            |                             ++
```

```
0.000425+                                  +*
        |                               ++*
0.000325+                            ++   *
        |                           +   ***
0.000225+                        ++****
        |                       + **
0.000125+                    *****
        |              *****
0.000025+* * * *********++
         +----+----+----+----+----+----+----+----+----+----+
             -2        -1         0        +1        +2
```

==
Univariate Procedure, Influent Concentration
==

The UNIVARIATE Procedure
Variable: X1
Poll = TCH

Moments			
N	87	**Sum Weights**	87
Mean	0.00342184	**Sum Observations**	0.2977
Std Deviation	0.00215813	**Variance**	4.65754E-6
Skewness	1.35742441	**Kurtosis**	0.96460461
Uncorrected SS	0.00141923	**Corrected SS**	0.00040055
Coeff Variation	63.0694074	**Std Error Mean**	0.00023138

Basic Statistical Measures			
Location		**Variability**	
Mean	0.003422	**Std Deviation**	0.00216
Median	0.002500	**Variance**	4.65754E-6
Mode	0.002500	**Range**	0.00880
		Interquartile Range	0.00150

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	14.78907	**Pr > |t|**	<.0001
Sign	**M**	43.5	**Pr >= |M|**	<.0001
Signed Rank	**S**	1914	**Pr >= |S|**	<.0001

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	0.0093
99%	0.0093
95%	0.0080
90%	0.0075
75% Q3	0.0040
50% Median	0.0025
25% Q1	0.0025

10%	0.0010
5%	0.0010
1%	0.0005
0% Min	0.0005

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
5.0E-04	496	0.0080	483
1.0E-03	527	0.0089	523
1.0E-03	526	0.0092	432
1.0E-03	525	0.0092	478
1.0E-03	524	0.0093	477

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	20	18.69	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TCH

```
   Stem Leaf                                           #    Boxplot
      9 223                                            3       *
      8 9                                              1       *
      8 00                                             2       0
      7 577                                            3       0
      7 0                                              1       0
      6 6                                              1       0
      6 004                                            3       0
      5 5                                              1       |
      5 00144                                          5       |
      4                                                        |
      4 0000                                           4    +-----+
      3                                                     |     |
      3 223                                            3    |  +  |
      2 5555555555555555555555555555555555555555555568  46   *-----*
      2 123                                            3       |
      1 6                                              1       |
      1 000000000                                      9       |
      0 5                                              1       |
        ----+----+----+----+----+----+----+----+----+-
    Multiply Stem.Leaf by 10**-3


                         Normal Probability Plot
       0.00925+                                              * *  *
              |                                            *     ++
              |                                          **    ++
              |                                        **    +++
              |                                       *    ++
              |                                       *  ++
              |                                     **+++
              |                                     *+
              |                                   **
              |                                +++
              |                              ++ **
              |                            ++
              |                          ++    **
              |                ***************
              |               **    ++
```

```
        |             *   ++
        |    * * ******+++
0.00075+ *           ++
         +----+----+----+----+----+----+----+----+----+----+
             -2        -1         0        +1        +2
```

===
Univariate Procedure, Influent Concentration
===

The UNIVARIATE Procedure
Variable: X1
Poll = TCO

Moments			
N	89	Sum Weights	89
Mean	0.02391798	Sum Observations	2.1287
Std Deviation	0.01051092	Variance	0.00011048
Skewness	0.96435169	Kurtosis	0.18149784
Uncorrected SS	0.06063639	Corrected SS	0.00972219
Coeff Variation	43.9456902	Std Error Mean	0.00111416

Basic Statistical Measures			
Location		Variability	
Mean	0.023918	Std Deviation	0.01051
Median	0.022000	Variance	0.0001105
Mode	0.012000	Range	0.03990
		Interquartile Range	0.01500

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	21.46736	Pr > |t|	<.0001
Sign	M	44.5	Pr >= |M|	<.0001
Signed Rank	S	2002.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0513
99%	0.0513
95%	0.0466
90%	0.0420
75% Q3	0.0300
50% Median	0.0220
25% Q1	0.0150

10%	0.0123
5%	0.0120
1%	0.0114
0% Min	0.0114

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
1.1E-02	819	0.0466	808
1.2E-02	818	0.0481	810
1.2E-02	814	0.0489	657
1.2E-02	744	0.0500	706
1.2E-02	680	0.0513	816

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	88	49.72	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TCO

```
                 Stem Leaf                     #             Boxplot
                   50 03                       2                |
                   48 19                       2                |
                   46 6                        1                |
                   44 089                      3                |
                   42 0                        1                |
                   40 00                       2                |
                   38                                           |
                   36 00                       2                |
                   34                                           |
                   32 00                       2                |
                   30 00047902                 8             +-----+
                   28 01008                    5             |     |
                   26 4058                     4             |     |
                   24 0264                     4             |     |
                   22 040000123                9             *--+--*
                   20 0123904                  7             |     |
                   18 0020                     4             |     |
                   16 005800166                9             |     |
                   14 233477809                9             +-----+
                   12 0000003500678           13                |
                   10 48                       2                |
                      ----+----+----+----+
                  Multiply Stem.Leaf by 10**-3


                               Normal Probability Plot
              0.051+                                                  *   *
                   |                                              * *   ++
              0.047+                                             *     +
                   |                                           **    ++
              0.043+                                          *    ++
                   |                                         *   ++
              0.039+                                           ++
                   |                                        *++
              0.035+                                       ++
                   |                                     ++*
              0.031+                                   +***
                   |                                 +**
```

```
0.027+                                       ++**
     |                                      +  *
0.023+                                    +***
     |                                  +***
0.019+                                ++**
     |                              +****
0.015+                            ****
     |      *  ********
0.011+*    *        ++
      +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

===

Univariate Procedure, Influent Concentration

===

The UNIVARIATE Procedure
Variable: X1
Poll = TKN

Moments			
N	187	Sum Weights	187
Mean	1.7795031	Sum Observations	332.76708
Std Deviation	1.2100778	Variance	1.46428828
Skewness	0.85092734	Kurtosis	-0.2004422
Uncorrected SS	864.51767	Corrected SS	272.357619
Coeff Variation	68.0008816	Std Error Mean	0.08848965

Basic Statistical Measures			
Location		Variability	
Mean	1.779503	Std Deviation	1.21008
Median	1.400000	Variance	1.46429
Mode	1.100000	Range	5.09000
		Interquartile Range	1.70000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	20.10973	Pr > |t|	<.0001
Sign	M	93.5	Pr >= |M|	<.0001
Signed Rank	S	8789	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	5.200
99%	5.100
95%	4.014
90%	3.700
75% Q3	2.500
50% Median	1.400
25% Q1	0.800

10%	0.515
5%	0.436
1%	0.293
0% Min	0.110

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
1.E-01	1884	4.50	1752
3.E-01	1893	4.65	1753
3.E-01	1890	5.00	1760
3.E-01	1819	5.10	1769
3.E-01	1895	5.20	1715

Missing Values			
		Percent Of	
Missing Value	Count	All Obs	Missing Obs
.	30	13.82	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TKN

```
Stem Leaf                      #           Boxplot
  52 0                         1              0
  50 00                        2              0
  48                                          |
  46 5                         1              |
  44 0000                      4              |
  42                                          |
  40 11                        2              |
  38 00099                     5              |
  36 0000005                   7              |
  34 00022                     5              |
  32 00                        2              |
  30 002000033                 9              |
  28 00340                     5              |
  26 05                        2              |
  24 000011004                 9           +-----+
  22 04066                     5           |     |
  20 003660000                 9           |     |
  18 0002002277               10           |     |
  16 00040002                  8           |  +  |
  14 0000017022               10           *-----*
  12 0000400000               10           |     |
  10 004444777000000000008    21           |     |
   8 00227000235778           14           +-----+
   6 000000226990022777       18              |
   4 00334466688902222334559  23              |
   2 9901                      4              |
   0 1                         1              |
     ----+----+----+----+---
 Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TKN

```
                  Normal Probability Plot
5.3+                                                  *
   |                                               * *
   |                                                  +
   |                                              *  +
   |                                          **** ++
   |                                              +
   |                                         ** ++
   |                                       ***++
   |                                     *** +
   |                                    ** ++
   |                                   * ++
   |                                 ***+
   |                                **++
2.7+                                *+
   |                               **
   |                             +*
   |                           ++**
   |                          +**
   |                        ++**
   |                      ++ **
   |                     + ***
   |                   +****
   |                 +***
   |               ****
   |      **********
   | * ***      ++
0.1+*          +
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TL

Moments			
N	151	Sum Weights	151
Mean	0.00496349	Sum Observations	0.7494875
Std Deviation	0.00539775	Variance	0.00002914
Skewness	1.46173467	Kurtosis	1.45577967
Uncorrected SS	0.00809044	Corrected SS	0.00437036
Coeff Variation	108.749088	Std Error Mean	0.00043926

Basic Statistical Measures			
Location		Variability	
Mean	0.004963	Std Deviation	0.00540
Median	0.002500	Variance	0.0000291
Mode	0.002500	Range	0.02167
		Interquartile Range	0.00590

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	11.29959	Pr > |t|	<.0001
Sign	M	75.5	Pr >= |M|	<.0001
Signed Rank	S	5738	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0217000
99%	0.0215000
95%	0.0189000
90%	0.0138000
75% Q3	0.0069000
50% Median	0.0025000
25% Q1	0.0010000

10%	0.0001200
5%	0.0000800
1%	0.0000315
0% Min	0.0000300

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
3.000E-05	1177	0.0192	1016
3.150E-05	1176	0.0200	1087
5.000E-05	1175	0.0200	1117
7.200E-05	1174	0.0215	1090
7.300E-05	1173	0.0217	1075

Missing Values			
Missing Value	**Count**	**Percent Of**	
		All Obs	**Missing Obs**
.	25	14.20	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TL

```
Stem Leaf                                   #             Boxplot
  21 57                                     2                0
  20 00                                     2                0
  19 002                                    3                0
  18 9                                      1                0
  17 06                                     2                0
  16 00                                     2                0
  15
  14 00                                     2                |
  13 88                                     2                |
  12 00000                                  5                |
  11 1                                      1                |
  10 7                                      1                |
   9 055                                    3                |
   8 012333                                 6                |
   7 00122                                  5                |
   6 00000124599                           11             +-----+
   5 00000556799                           11             |  +  |
   4 00457889                               8             |     |
   3 1227                                   4             |     |
   2 00045555555555555555555556            26             *-----*
   1 0000000000024466777                   19             +-----+
   0 00011111111111111112222233445556699 9 35                |
     ----+----+----+----+----+----+----+
 Multiply Stem.Leaf by 10**-3
```

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TL

```
                    Normal Probability Plot
0.0215+                                                * *
      |                                             **
      |                                          ***
      |                                         *        +
      |                                        **      ++
      |                                       **     ++
      |                                            ++
0.0145+                                      **  ++
      |                                      * ++
      |                                    ** +
      |                                    *++
      |                                   *+
      |                                 ++*
      |                               ++**
0.0075+                             ++ **
      |                           ++ ***
      |                          + ***
      |                        ++***
      |                      ++  *
      |                    ++*****
      |                  ****
0.0005+* * ***************
       +----+----+----+----+----+----+----+----+----+----+
           -2        -1         0        +1        +2
```

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TN

Moments			
N	5	Sum Weights	5
Mean	0.00668	Sum Observations	0.0334
Std Deviation	0.00121943	Variance	1.487E-6
Skewness	0.23068609	Kurtosis	-2.3853582
Uncorrected SS	0.00022906	Corrected SS	5.948E-6
Coeff Variation	18.2548817	Std Error Mean	0.00054534

Basic Statistical Measures			
Location		Variability	
Mean	0.006680	Std Deviation	0.00122
Median	0.006600	Variance	1.487E-6
Mode	0.005500	Range	0.00270
		Interquartile Range	0.00210

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	12.24915	Pr > |t|	0.0003
Sign	M	2.5	Pr >= |M|	0.0625
Signed Rank	S	7.5	Pr >= |S|	0.0625

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.0082
99%	0.0082
95%	0.0082
90%	0.0082
75% Q3	0.0076
50% Median	0.0066
25% Q1	0.0055

10%	0.0055
5%	0.0055
1%	0.0055
0% Min	0.0055

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
5.5E-03	1254	0.0055	1253
5.5E-03	1253	0.0055	1254
6.6E-03	1256	0.0066	1256
7.6E-03	1257	0.0076	1257
8.2E-03	1255	0.0082	1255

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	1	16.67	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TN

```
Stem Leaf                     #             Boxplot
   8 2                        1                |
   7 6                        1             +-----+
   7                                        |     |
   6 6                        1             *--+--*
   6                                        |     |
   5 55                       2             +-----+
     ----+----+----+----+
 Multiply Stem.Leaf by 10**-3


                  Normal Probability Plot
0.00825+                                    +*++
       |                              * ++++
       |                            ++++
       |                        +*++
       |                    ++++
0.00575+             *   ++++*
        +----+----+----+----+----+----+----+----+----+----+
            -2        -1         0        +1        +2
```

===

Univariate Procedure, Influent Concentration

===

The UNIVARIATE Procedure
Variable: X1
Poll = TP

Moments			
N	310	Sum Weights	310
Mean	0.23018345	Sum Observations	71.35687
Std Deviation	0.22556994	Variance	0.0508818
Skewness	1.17219189	Kurtosis	0.26436566
Uncorrected SS	32.1476458	Corrected SS	15.7224752
Coeff Variation	97.9957229	Std Error Mean	0.01281151

Basic Statistical Measures			
Location		Variability	
Mean	0.230183	Std Deviation	0.22557
Median	0.130000	Variance	0.05088
Mode	0.025000	Range	0.85595
		Interquartile Range	0.31000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	17.96692	Pr > |t|	<.0001
Sign	M	155	Pr >= |M|	<.0001
Signed Rank	S	24102.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.87000
99%	0.81900
95%	0.74000
90%	0.60500
75% Q3	0.37000
50% Median	0.13000
25% Q1	0.06000

10%	0.02800
5%	0.02500
1%	0.02300
0% Min	0.01405

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
1.4E-02	3026	0.819	3013
2.2E-02	3115	0.819	3014
2.3E-02	3012	0.840	2796
2.3E-02	3011	0.850	3112
2.3E-02	3010	0.870	2875

Missing Values			
		Percent Of	
Missing Value	Count	All Obs	Missing Obs
.	30	8.82	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TP

```
                     Histogram                         #             Boxplot
   0.875+*                                             2                0
        .***                                           6                0
        .****                                          7                |
        .**                                            4                |
        .***                                           5                |
        .*****                                        10                |
        .****                                          8                |
        .***                                           5                |
        .******                                       12                |
        .*****                                         9                |
        .*******                                      14             +-----+
        .****                                          8             |     |
        .*******                                      14             |     |
        .**********                                   20             |  +  |
        .***********                                  21             |     |
        .*********************                        41             *-----*
        .*********************************            65             +-----+
   0.025+******************************               59                |
         ----+----+----+----+----+----+---
         * may represent up to 2 counts


                          Normal Probability Plot
        0.875+                                                          *
             |                                                     *****
             |                                                  ***    ++
             |                                                 *    +++
             |                                               **   ++
             |                                             ***  ++
             |                                            **  ++
             |                                           **+++
             |                                          **+
             |                                         **
             |                                       ***
             |                                     ++*
             |                                  +++**
             |                                ++   **
             |                              ++   **
```

```
     |                    ++ ****
     |                ******* 
0.025+*****************+
      +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

===
Univariate Procedure, Influent Concentration
===

The UNIVARIATE Procedure
Variable: X1
Poll = TSS

Moments			
N	95	Sum Weights	95
Mean	52.0344884	Sum Observations	4943.2764
Std Deviation	46.305336	Variance	2144.18415
Skewness	1.60727447	Kurtosis	2.06694166
Uncorrected SS	458774.168	Corrected SS	201553.31
Coeff Variation	88.9897017	Std Error Mean	4.75082724

Basic Statistical Measures			
Location		Variability	
Mean	52.03449	Std Deviation	46.30534
Median	36.00000	Variance	2144
Mode	11.00000	Range	215.68000
		Interquartile Range	42.00000

Note: The mode displayed is the smallest of 2 modes with a count of 4.

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	10.95272	Pr > |t|	<.0001
Sign	M	47.5	Pr >= |M|	<.0001
Signed Rank	S	2280	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	216.00
99%	216.00
95%	161.00
90%	132.00
75% Q3	63.00

50% Median	36.00
25% Q1	21.00
10%	12.00
5%	9.00
1%	0.32
0% Min	0.32

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
3.2E-01	3213	161	3210
5.0E+00	3224	170	3185
8.0E+00	3204	178	3154
9.0E+00	3236	190	3158
9.0E+00	3228	216	3169

Missing Values			
Missing Value	**Count**	**Percent Of**	
		All Obs	**Missing Obs**
.	28	22.76	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TSS

```
Stem Leaf                      #             Boxplot
  21 6                         1                *
  20
  19 0                         1                *
  18
  17 08                        2                0
  16 1                         1                0
  15
  14
  13 224489                    6                0
  12 5                         1                |
  11 23                        2                |
  10 8                         1                |
   9 4                         1                |
   8 4                         1                |
   7 02                        2                |
   6 022335668                 9             +-----+
   5 0122336                   7             |  +  |
   4 000235888                 9             |     |
   3 00002222236899           14             *-----*
   2 0111223555666778         16             +-----+
   1 1111233345566789         16                |
   0 05899                     5                |
     ----+----+----+----+
 Multiply Stem.Leaf by 10**+1
```

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TSS

```
                         Normal Probability Plot
     215+                                                  *
        |
        |                                              *
        |
        |                                           **
        |                                          *      ++
        |                                               ++
     145+                                            +++
        |                                     *****++
        |                                     *  ++
        |                                    * ++
        |                                    *++
        |                                  +*
        |                                ++*
      75+                             +++  *
        |                           ++  ***
        |                         ++ ***
        |                       ++ ***
        |                     +*****
        |                  *****
        |         *********+
       5+*   * ***     ++
         +----+----+----+----+----+----+----+----+----+----+
             -2        -1         0        +1        +2
```

===

Univariate Procedure, Influent Concentration

===

The UNIVARIATE Procedure
Variable: X1
Poll = TZ

Moments			
N	198	Sum Weights	198
Mean	0.05492179	Sum Observations	10.874515
Std Deviation	0.04676373	Variance	0.00218685
Skewness	1.19179646	Kurtosis	0.86298455
Uncorrected SS	1.02805654	Corrected SS	0.43080868
Coeff Variation	85.1460298	Std Error Mean	0.00332335

Basic Statistical Measures			
Location		Variability	
Mean	0.054922	Std Deviation	0.04676
Median	0.040500	Variance	0.00219
Mode	0.025000	Range	0.19439
		Interquartile Range	0.05020

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	16.52602	Pr > |t|	<.0001
Sign	M	99	Pr >= |M|	<.0001
Signed Rank	S	9850.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	0.195000
99%	0.192000
95%	0.155000
90%	0.130000
75% Q3	0.073200
50% Median	0.040500
25% Q1	0.023000

10%	0.004060
5%	0.001820
1%	0.001130
0% Min	0.000615

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
6.15E-04	1700	0.178	1614
1.13E-03	1699	0.190	1572
1.21E-03	1698	0.191	1514
1.23E-03	1697	0.192	1581
1.33E-03	1696	0.195	1542

Missing Values			
Missing Value	**Count**	**Percent Of**	
		All Obs	**Missing Obs**
.	33	14.29	100.00

Univariate Procedure, Influent Concentration

The UNIVARIATE Procedure
Variable: X1
Poll = TZ

```
Stem Leaf                              #             Boxplot
  19 0125                              4                0
  18
  17 3788                              4                0
  16 6                                 1                0
  15 035                               3                0
  14 268                               3                |
  13 006677                            6                |
  12 337                               3                |
  11 0126                              4                |
  10 2                                 1                |
   9 0112344569                       10                |
   8 013445                            6                |
   7 0011123336789                    13             +-----+
   6 126668889999                     12             |     |
   5 0112344678899                    13             |  +  |
   4 001244456666677899               18             *-----*
   3 00112233444466667778899          23             |     |
   2 0011122333334444445555555667788899 34           +-----+
   1 0344455566899                    13                |
   0 111112222222222233344455667      27                |
     ----+----+----+----+----+----+----
 Multiply Stem.Leaf by 10**-2


                    Normal Probability Plot
    0.195+                                         ** **
         |
         |                                      ***    +
         |                                     *     ++
         |                                    **   ++
         |                                  **   ++
         |                                 **  ++
         |                                * +++
         |                               **+
         |                              +*
         |                            +**
         |                          ++**
         |                        ++**
```

```
     |                          ++***
     |                       +++***
     |                     ++ ***
     |                   ++****
     |                ******
     |             ****
0.005+** ************+
      +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DCA

Moments			
N	117	Sum Weights	117
Mean	0.41863248	Sum Observations	48.98
Std Deviation	0.43164662	Variance	0.1863188
Skewness	2.54947991	Kurtosis	7.12554525
Uncorrected SS	42.1176	Corrected SS	21.6129812
Coeff Variation	103.108727	Std Error Mean	0.03990574

Basic Statistical Measures			
Location		Variability	
Mean	0.418632	Std Deviation	0.43165
Median	0.270000	Variance	0.18632
Mode	0.100000	Range	2.12000
		Interquartile Range	0.40000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	10.49053	Pr > |t|	<.0001
Sign	M	58.5	Pr >= |M|	<.0001
Signed Rank	S	3451.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.20
99%	2.20
95%	1.49
90%	0.71
75% Q3	0.55
50% Median	0.27
25% Q1	0.15

10%	0.10
5%	0.10
1%	0.08
0% Min	0.08

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.08	158	1.73	82
0.08	146	1.83	126
0.08	120	2.14	93
0.10	154	2.20	86
0.10	150	2.20	110

```
   Stem Leaf                                        #             Boxplot
     22 00                                          2                *
     21 4                                           1                *
     20
     19
     18 3                                           1                *
     17 3                                           1                0
     16
     15
     14 9                                           1                0
     13 33                                          2                0
     12
     11
     10
      9
      8 7                                           1                |
      7 1111155                                     7                |
      6 6789                                        4                |
      5 0033445555557777                           16             +-----+
      4 24455577                                    8             |  +  |
      3 00124457789                                11             |     |
      2 00022235677777899                          17             *-----*
      1 000000000000011122333444555555666677778999 42             +-----+
      0 888                                         3                |
        ----+----+----+----+----+----+----+----+--
    Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DCA

```
                   Normal Probability Plot
2.25+                                               *  *
    |                                             *
    |
    |
    |                                            *
    |                                           *
    |
    |
    |                                          *     +++
    |                                        **    ++
    |                                            ++
1.15+                                         +++
    |                                       ++
    |                                     ++
    |                                  +++  *
    |                                ++  ****
    |                              ++   **
    |                           +++*****
    |                         ++ ***
    |                       ++ ***
    |                    ++*****
    |      *****************
0.05+*  * *          ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DCH

Moments			
N	64	Sum Weights	64
Mean	0.398125	Sum Observations	25.48
Std Deviation	0.51780328	Variance	0.26812024
Skewness	2.56181813	Kurtosis	6.06673365
Uncorrected SS	27.0358	Corrected SS	16.891575
Coeff Variation	130.060479	Std Error Mean	0.06472541

Basic Statistical Measures			
Location		Variability	
Mean	0.398125	Std Deviation	0.51780
Median	0.165000	Variance	0.26812
Mode	0.100000	Range	2.12000
		Interquartile Range	0.37000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	6.150985	Pr > |t|	<.0001
Sign	M	32	Pr >= |M|	<.0001
Signed Rank	S	1040	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.200
99%	2.200
95%	1.830
90%	0.710
75% Q3	0.470
50% Median	0.165
25% Q1	0.100

10%	0.100
5%	0.100
1%	0.080
0% Min	0.080

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.08	420	1.73	366
0.08	408	1.83	390
0.10	419	2.14	389
0.10	418	2.20	401
0.10	417	2.20	402

==

Univariate Procedure, Rainfall Depth

==

The UNIVARIATE Procedure
Variable: X2
Poll = DCH

```
 Stem Leaf                                   #             Boxplot
   22 00                                     2                *
   21 4                                      1                *
   20
   19
   18 3                                      1                *
   17 3                                      1                *
   16
   15
   14
   13
   12
   11
   10
    9
    8 7                                      1                |
    7 1                                      1                |
    6 689                                    3                |
    5 00557                                  5                |
    4 255777                                 6             +--+--+
    3 2                                      1             |     |
    2 0677789                                7             |     |
    1 000000000000000011123344556666778     33             *-----*
    0 88                                     2                |
      ----+----+----+----+----+----+---
  Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DCH

```
                   Normal Probability Plot
2.25+                                             *  *
    |                                          *
    |
    |
    |                                         *
    |                                        *
    |                                                 ++
    |                                               ++
    |                                             ++
    |                                           ++
    |                                         ++
1.15+                                       ++
    |                                     ++
    |                                   ++
    |                                 ++    *
    |                               ++     *
    |                             ++    ***
    |                           ++   ****
    |                          +   ***
    |                         ++  *
    |                       ++ ****
    |        ******************
0.05+  *  *            ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DCO

Moments			
N	112	Sum Weights	112
Mean	0.42535714	Sum Observations	47.64
Std Deviation	0.43862999	Variance	0.19239627
Skewness	2.44397893	Kurtosis	6.59699894
Uncorrected SS	41.62	Corrected SS	21.3559857
Coeff Variation	103.120401	Std Error Mean	0.04144664

Basic Statistical Measures			
Location		Variability	
Mean	0.425357	Std Deviation	0.43863
Median	0.275000	Variance	0.19240
Mode	0.100000	Range	2.20000
		Interquartile Range	0.40500

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	10.26277	Pr > |t|	<.0001
Sign	M	55.5	Pr >= |M|	<.0001
Signed Rank	S	3108	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.200
99%	2.200
95%	1.330
90%	0.750
75% Q3	0.550
50% Median	0.275
25% Q1	0.145

10%	0.100
5%	0.100
1%	0.080
0% Min	0.000

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.00	591	1.73	625
0.08	604	1.83	569
0.08	585	2.14	622
0.08	544	2.20	564
0.10	636	2.20	572

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DCO

```
Stem Leaf                                        #              Boxplot
  22 00                                          2                 *
  21 4                                           1                 *
  20
  19
  18 3                                           1                 *
  17 3                                           1                 0
  16
  15
  14
  13 33                                          2                 0
  12 3                                           1                 0
  11
  10 1                                           1                 |
   9                                                               |
   8 77                                          2                 |
   7 1115                                        4                 |
   6 2256789                                     7                 |
   5 0000245557777                              13              +-----+
   4 24555677                                    8              |  +  |
   3 0012557889                                 10              |     |
   2 0022335567777899                           16              *-----*
   1 000000000000011122234444555556666777899    39              +-----+
   0 0888                                        4                 |
     ----+----+----+----+----+----+----+----
 Multiply Stem.Leaf by 10**-1
```

===
Univariate Procedure, Rainfall Depth
===

The UNIVARIATE Procedure
Variable: X2
Poll = DCO

```
                   Normal Probability Plot
2.25+                                               *  *
    |                                             *
    |
    |
    |                                           *
    |                                          *
    |
    |                                                  +
    |                                                ++
    |                                         *   +++
    |                                        *  ++
1.15+                                         ++
    |                                       *+
    |                                    +++
    |                                  ++  **
    |                                ++  ***
    |                             +++  ***
    |                           ++ ****
    |                         ++ ***
    |                       ++ ***
    |                    ++*****
    |        ***************
0.05+*  * * *        ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1          0        +1        +2
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DI

Moments			
N	66	Sum Weights	66
Mean	0.36181818	Sum Observations	23.88
Std Deviation	0.46495296	Variance	0.21618126
Skewness	2.82317454	Kurtosis	8.13854948
Uncorrected SS	22.692	Corrected SS	14.0517818
Coeff Variation	128.504588	Std Error Mean	0.05723175

Basic Statistical Measures			
Location		Variability	
Mean	0.361818	Std Deviation	0.46495
Median	0.160000	Variance	0.21618
Mode	0.100000	Range	2.20000
		Interquartile Range	0.36000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	6.321983	Pr > |t|	<.0001
Sign	M	32.5	Pr >= |M|	<.0001
Signed Rank	S	1072.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.20
99%	2.20
95%	1.73
90%	0.69
75% Q3	0.47
50% Median	0.16
25% Q1	0.11

10%	0.10
5%	0.08
1%	0.00
0% Min	0.00

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.00	826	0.87	853
0.08	873	1.73	827
0.08	866	1.83	838
0.08	859	2.20	834
0.10	885	2.20	854

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DI

```
Stem Leaf                                   #              Boxplot
  22 00                                     2                 *
  21
  20
  19
  18 3                                      1                 *
  17 3                                      1                 *
  16
  15
  14
  13
  12
  11
  10
   9
   8 7                                      1                 |
   7 1                                      1                 |
   6 689                                    3                 |
   5 0055557                                7                 |
   4 2577                                   4              +-----+
   3 2                                      1              |  +  |
   2 677789                                 6              |     |
   1 00000000001112222333444445566667778   35              *-----*
   0 0888                                   4                 |
     ----+----+----+----+----+----+----+
   Multiply Stem.Leaf by 10**-1
```

==

Univariate Procedure, Rainfall Depth

==

The UNIVARIATE Procedure
Variable: X2
Poll = DI

```
                   Normal Probability Plot
2.25+                                             *  *
    |
    |
    |
    |                                           *
    |                                         *
    |
    |                                                  +
    |                                                ++
    |                                              ++
    |                                            ++
1.15+                                         +++
    |                                       ++
    |                                     ++
    |                                   ++    *
    |                                 ++     *
    |                               ++    ***
    |                            +++ *****
    |                          ++  ***
    |                        ++     *
    |                      ++   ***
    |          ******************
0.05+  *  * * *        ++
      +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

==
Univariate Procedure, Rainfall Depth
==

The UNIVARIATE Procedure
Variable: X2
Poll = DL

Moments			
N	116	Sum Weights	116
Mean	0.26974138	Sum Observations	31.29
Std Deviation	0.41204994	Variance	0.16978515
Skewness	3.55627898	Kurtosis	13.0755892
Uncorrected SS	27.9655	Corrected SS	19.5252922
Coeff Variation	152.757407	Std Error Mean	0.03825788

Basic Statistical Measures			
Location		Variability	
Mean	0.269741	Std Deviation	0.41205
Median	0.110000	Variance	0.16979
Mode	0.100000	Range	2.20000
		Interquartile Range	0.16500

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	7.05061	Pr > |t|	<.0001
Sign	M	57.5	Pr >= |M|	<.0001
Signed Rank	S	3335	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.200
99%	2.200
95%	0.870
90%	0.550
75% Q3	0.265
50% Median	0.110
25% Q1	0.100

10%	0.090
5%	0.080
1%	0.060
0% Min	0.000

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.00	980	1.73	889
0.06	972	1.83	911
0.08	954	2.14	910
0.08	953	2.20	925
0.08	946	2.20	926

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DL

```
                 Histogram                        #             Boxplot
    2.25+*                                        2                *
        .*                                        1                *
        .
        .
        .*                                        1                *
        .*                                        1                *
        .
        .
        .
        .
        .
    1.15+
        .
        .
        .*                                        1                *
        .*                                        1                0
        .**                                       3                0
        .****                                     7                0
        .**                                       4                |
        .**                                       3                |
        .***                                      6             +--+--+
        .*********************************       65             *-----*
    0.05+***********                             21                |
         ----+----+----+----+----+----+---
         * may represent up to 2 counts
```

==

Univariate Procedure, Rainfall Depth

==

The UNIVARIATE Procedure
Variable: X2
Poll = DL

```
                          Normal Probability Plot
2.25+                                               *  *
    |                                             *
    |
    |
    |                                            *
    |                                           *
    |
    |
    |
    |
    |                                                +++
1.15+                                              ++
    |                                           +++
    |                                         ++
    |                                      +++ *
    |                                    ++   *
    |                                  ++   **
    |                               +++  ***
    |                             ++   **
    |                          +++    **
    |                        ++      **
    |                ***************
0.05+*  * ************  ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DN

Moments			
N	75	Sum Weights	75
Mean	0.42853333	Sum Observations	32.14
Std Deviation	0.52771996	Variance	0.27848836
Skewness	2.24629342	Kurtosis	4.44137066
Uncorrected SS	34.3812	Corrected SS	20.6081387
Coeff Variation	123.145605	Std Error Mean	0.06093585

Basic Statistical Measures			
Location		Variability	
Mean	0.428533	Std Deviation	0.52772
Median	0.170000	Variance	0.27849
Mode	0.100000	Range	2.20000
		Interquartile Range	0.40000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	7.032532	Pr > |t|	<.0001
Sign	M	37	Pr >= |M|	<.0001
Signed Rank	S	1387.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.20
99%	2.20
95%	1.83
90%	1.19
75% Q3	0.52
50% Median	0.17
25% Q1	0.12

10%	0.10
5%	0.08
1%	0.00
0% Min	0.00

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.00	1234	1.83	1192
0.08	1242	1.83	1245
0.08	1231	2.14	1180
0.08	1195	2.20	1212
0.10	1249	2.20	1214

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DN

```
 Stem Leaf                                 #             Boxplot
   22 00                                   2                *
   21 4                                    1                *
   20
   19
   18 33                                   2                *
   17 3                                    1                *
   16
   15
   14
   13
   12 3                                    1                0
   11 9                                    1                0
   10
    9
    8 7                                    1                |
    7 1                                    1                |
    6 25689                                5                |
    5 002557                               6             +-----+
    4 2577                                 4             |  +  |
    3 128                                  3             |     |
    2 35677789                             8             |     |
    1 00000000000112222334444455566667778 35             *-----*
    0 0888                                 4                |
      ----+----+----+----+----+----+----+
   Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DN

```
                    Normal Probability Plot
2.25+                                             *   *
    |                                           *
    |
    |
    |                                        * *
    |                                       *          +
    |                                                 ++
    |                                               ++
    |                                             ++
    |                                           ++
    |                                       *++
1.15+                                      *+
    |                                    ++
    |                                  ++
    |                                 +   *
    |                              ++    *
    |                            ++    ***
    |                          ++   ***
    |                        ++   ***
    |                      ++    **
    |                    ++   ***
    |          ****************
0.05+ *   * **        ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DP

Moments			
N	86	Sum Weights	86
Mean	0.48093023	Sum Observations	41.36
Std Deviation	0.49059778	Variance	0.24068618
Skewness	1.86164538	Kurtosis	3.20409087
Uncorrected SS	40.3496	Corrected SS	20.4583256
Coeff Variation	102.010177	Std Error Mean	0.05290252

Basic Statistical Measures			
Location		Variability	
Mean	0.480930	Std Deviation	0.49060
Median	0.300000	Variance	0.24069
Mode	0.100000	Range	2.12000
		Interquartile Range	0.50000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	9.090876	Pr > |t|	<.0001
Sign	M	43	Pr >= |M|	<.0001
Signed Rank	S	1870.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.20
99%	2.20
95%	1.52
90%	1.23
75% Q3	0.63
50% Median	0.30
25% Q1	0.13

10%	0.10
5%	0.10
1%	0.08
0% Min	0.08

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.08	2580	1.52	2556
0.08	2543	1.73	2510
0.10	2581	1.83	2557
0.10	2578	2.20	2530
0.10	2576	2.20	2537

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DP

```
 Stem Leaf                                 #             Boxplot
   22 00                                   2                *
   21
   20
   19
   18 3                                    1                0
   17 3                                    1                0
   16
   15 0022                                 4                0
   14
   13
   12 3                                    1                |
   11 9                                    1                |
   10                                                       |
    9                                                       |
    8 777                                  3                |
    7 155                                  3                |
    6 2335689                              7             +-----+
    5 00255557                             8             |     |
    4 57777                                5             |  +  |
    3 1244899                              7             *-----*
    2 35677789                             8             |     |
    1 000000000000011233345556666667777   33             +-----+
    0 88                                   2                |
      ----+----+----+----+----+----+---
  Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DP

```
                   Normal Probability Plot
2.25+                                              *  *
     |
     |
     |
     |                                           *
     |                                         *       +
     |                                               ++
     |                                      ***    ++
     |                                           ++
     |                                         ++
     |                                     * ++
1.15+                                     *++
     |                                   ++
     |                                 ++
     |                               ++  **
     |                             ++  **
     |                           ++ ****
     |                         ++ ***
     |                       ++ **
     |                     ++ ***
     |                   ++ ***
     |     * ***************
0.05+ *  *           ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

==
Univariate Procedure, Rainfall Depth
==

The UNIVARIATE Procedure
Variable: X2
Poll = DZ

Moments			
N	132	Sum Weights	132
Mean	0.43143939	Sum Observations	56.95
Std Deviation	0.45275936	Variance	0.20499104
Skewness	2.37781949	Kurtosis	5.92306683
Uncorrected SS	51.4243	Corrected SS	26.8538265
Coeff Variation	104.941591	Std Error Mean	0.03940764

Basic Statistical Measures			
Location		Variability	
Mean	0.431439	Std Deviation	0.45276
Median	0.275000	Variance	0.20499
Mode	0.100000	Range	2.12000
		Interquartile Range	0.40500

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	10.94811	Pr > |t|	<.0001
Sign	M	66	Pr >= |M|	<.0001
Signed Rank	S	4389	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.200
99%	2.200
95%	1.490
90%	0.750
75% Q3	0.550
50% Median	0.275
25% Q1	0.145

10%	0.100
5%	0.100
1%	0.080
0% Min	0.080

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.08	1396	1.83	1354
0.08	1366	2.14	1391
0.10	1411	2.14	1409
0.10	1410	2.20	1368
0.10	1408	2.20	1376

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DZ

```
                 Histogram                      #             Boxplot
     2.25+*                                     2                *
         .*                                     2                *
         .
         .
         .*                                     1                *
         .*                                     1                0
         .
         .
         .*                                     1                0
         .*                                     2                0
         .*                                     1                0
     1.15+*                                     1                0
         .*                                     1                |
         .                                                       |
         .*                                     1                |
         .****                                  7                |
         .***                                   6                |
         .*******                              14             +-----+
         .****                                  8             |  +  |
         .*******                              14             |     |
         .**********                           19             *-----*
         .*************************            49             +-----+
     0.05+*                                     2                |
          ----+----+----+----+----+
          * may represent up to 2 counts
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = DZ

```
                   Normal Probability Plot
2.25+                                               *  *
    |                                            * *
    |
    |
    |                                           *
    |                                          *
    |
    |                                                ++
    |                                         *     ++
    |                                        **   ++
    |                                        * +++
1.15+                                       *++
    |                                      +*
    |                                    ++
    |                                  ++  *
    |                               +++ ****
    |                             ++   **
    |                           ++ ****
    |                         ++  **
    |                       ++ ***
    |                    ++*****
    |    * ****************
0.05+*  *            ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

===

Univariate Procedure, Rainfall Depth

===

The UNIVARIATE Procedure
Variable: X2
Poll = EC

Moments			
N	96	Sum Weights	96
Mean	0.6515625	Sum Observations	62.55
Std Deviation	0.46558018	Variance	0.2167649
Skewness	0.99185091	Kurtosis	0.37023535
Uncorrected SS	61.3479	Corrected SS	20.5926656
Coeff Variation	71.4559504	Std Error Mean	0.04751808

Basic Statistical Measures			
Location		Variability	
Mean	0.651563	Std Deviation	0.46558
Median	0.630000	Variance	0.21676
Mode	0.550000	Range	2.00000
		Interquartile Range	0.46500

Note: The mode displayed is the smallest of 4 modes with a count of 12.

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.71189	Pr > |t|	<.0001
Sign	M	48	Pr >= |M|	<.0001
Signed Rank	S	2328	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.080
99%	2.080
95%	1.500
90%	1.500
75% Q3	0.730

50% Median	0.630
25% Q1	0.265
10%	0.100
5%	0.100
1%	0.080
0% Min	0.080

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.08	3503	1.50	3481
0.10	3424	1.50	3482
0.10	3423	1.68	3493
0.10	3421	1.68	3496
0.10	3420	2.08	3501

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = EC

```
                    Stem Leaf                     #             Boxplot
                      20 8                        1                0
                      19
                      18
                      17
                      16 88                       2                0
                      15 000000000000            12                0
                      14
                      13
                      12 7                        1                |
                      11                                           |
                      10 3                        1                |
                       9 5                        1                |
                       8                                           |
                       7 0111111111111555555     19             +-----+
                       6 3333333333335           13             *--+--*
                       5 555555555555            12             |     |
                       4 45                       2             |     |
                       3 5999999                  7             |     |
                       2 000000058                9             +-----+
                       1 000000000006666         15                |
                       0 8                        1                |
                         ----+----+----+----+
                     Multiply Stem.Leaf by 10**-1


                                   Normal Probability Plot
                 2.05+                                                     *
                     |
                 1.85+                                                     +
                     |                                                   ++
                 1.65+                                               *  *+
                     |                                     *********++
                 1.45+                                             ++
                     |                                          +++
                 1.25+                                     *  ++
                     |                                     ++
                 1.05+                                   +*
                     |                                 ++  *
```

```
0.85+                             ++
    |                           +*******
0.65+                        +****
    |                     ****
0.45+                    +*
    |                  +***
0.25+                ***
    |    * **********
0.05+*           ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

==

Univariate Procedure, Rainfall Depth

==

The UNIVARIATE Procedure
Variable: X2
Poll = ENC

Moments			
N	10	Sum Weights	10
Mean	0.449	Sum Observations	4.49
Std Deviation	0.32915549	Variance	0.10834333
Skewness	1.61625734	Kurtosis	3.0016433
Uncorrected SS	2.9911	Corrected SS	0.97509
Coeff Variation	73.3085713	Std Error Mean	0.1040881

Basic Statistical Measures			
Location		Variability	
Mean	0.449000	Std Deviation	0.32916
Median	0.345000	Variance	0.10834
Mode	0.150000	Range	1.08000
		Interquartile Range	0.39000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	4.313653	Pr > |t|	0.0020
Sign	M	5	Pr >= |M|	0.0020
Signed Rank	S	27.5	Pr >= |S|	0.0020

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1.230
99%	1.230
95%	1.230
90%	0.940
75% Q3	0.620
50% Median	0.345
25% Q1	0.230

10%	0.150
5%	0.150
1%	0.150
0% Min	0.150

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.15	3533	0.38	3537
0.15	3532	0.52	3536
0.23	3539	0.62	3531
0.25	3535	0.65	3538
0.31	3530	1.23	3534

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = ENC

```
 Stem Leaf                     #             Boxplot
   12 3                        1                0
   10
    8
    6 25                       2             +-----+
    4 2                        1             |  +  |
    2 3518                     4             *-----*
    0 55                       2                |
      ----+----+----+----+
  Multiply Stem.Leaf by 10**-1


                  Normal Probability Plot
1.3+                                       *       +++
   |                                         ++++++
   |                                   ++++++
0.7+                             ++*++*
   |                       +++++*
   |                 *++*++* *
0.1+         * +++*++
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = FC

Moments			
N	25	Sum Weights	25
Mean	0.8212	Sum Observations	20.53
Std Deviation	0.61361171	Variance	0.37651933
Skewness	1.16996838	Kurtosis	0.86579372
Uncorrected SS	25.8957	Corrected SS	9.036464
Coeff Variation	74.7213483	Std Error Mean	0.12272234

Basic Statistical Measures			
Location		Variability	
Mean	0.821200	Std Deviation	0.61361
Median	0.650000	Variance	0.37652
Mode	0.450000	Range	2.35000
		Interquartile Range	0.65000

Note: The mode displayed is the smallest of 4 modes with a count of 2.

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	6.691528	Pr > |t|	<.0001
Sign	M	12.5	Pr >= |M|	<.0001
Signed Rank	S	162.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.43
99%	2.43
95%	2.08
90%	1.68
75% Q3	1.03

50% Median	0.65
25% Q1	0.38
10%	0.23
5%	0.15
1%	0.08
0% Min	0.08

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.08	3525	1.27	3515
0.15	3511	1.68	3517
0.23	3510	1.68	3528
0.25	3508	2.08	3514
0.28	3522	2.43	3519

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = FC

```
Stem Leaf                     #             Boxplot
   2 14                       2                0
   1 77                       2                |
   1 00023                    5             +-----+
   0 666778                   6             *--+--*
   0 1222344444              10             +-----+
     ----+----+----+----+


                    Normal Probability Plot
2.25+                                          *    *+++++
    |                                      *+*+++++++
1.25+                              +++*+***++
    |                      +++********
0.25+    *    *  *+*+**+****
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

===

Univariate Procedure, Rainfall Depth

===

The UNIVARIATE Procedure
Variable: X2
Poll = N2

Moments			
N	44	Sum Weights	44
Mean	0.66318182	Sum Observations	29.18
Std Deviation	0.57402606	Variance	0.32950592
Skewness	1.55202581	Kurtosis	2.41820572
Uncorrected SS	33.5204	Corrected SS	14.1687545
Coeff Variation	86.556363	Std Error Mean	0.08653768

Basic Statistical Measures			
Location		Variability	
Mean	0.663182	Std Deviation	0.57403
Median	0.485000	Variance	0.32951
Mode	0.100000	Range	2.33000
		Interquartile Range	0.63000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	7.663503	Pr > |t|	<.0001
Sign	M	22	Pr >= |M|	<.0001
Signed Rank	S	495	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.430
99%	2.430
95%	1.520
90%	1.500
75% Q3	0.870
50% Median	0.485
25% Q1	0.240

10%	0.100
5%	0.100
1%	0.100
0% Min	0.100

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.1	2492	1.50	2464
0.1	2480	1.52	2485
0.1	2479	1.52	2486
0.1	2467	2.43	2475
0.1	2465	2.43	2489

===
Univariate Procedure, Rainfall Depth
===

The UNIVARIATE Procedure
Variable: X2
Poll = N2

```
 Stem Leaf                     #             Boxplot
   24 33                       2                0
   22
   20
   18
   16
   14 10022                    5                |
   12                                           |
   10 3                        1                |
    8 27758                    5             +-----+
    6 33055                    5             |  +  |
    4 455770055                9             *-----*
    2 00844599                 8             +-----+
    0 000000066                9                |
      ----+----+----+----+
  Multiply Stem.Leaf by 10**-1


                   Normal Probability Plot
2.5+                                          *   *
   |
   |                                                ++
   |                                            ++++
   |                                         +++
   |                                  ** **+*
1.3+                                  +++
   |                              +++*
   |                           +++****
   |                       ++++***
   |                    +******
   |                ******
0.1+   *    * *  ** ***
    +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

==
Univariate Procedure, Rainfall Depth
==

The UNIVARIATE Procedure
Variable: X2
Poll = N3

Moments			
N	284	Sum Weights	284
Mean	0.80535211	Sum Observations	228.72
Std Deviation	0.76836448	Variance	0.59038397
Skewness	2.49657131	Kurtosis	9.63677191
Uncorrected SS	351.2788	Corrected SS	167.078665
Coeff Variation	95.4072719	Std Error Mean	0.04559404

Basic Statistical Measures			
Location		Variability	
Mean	0.805352	Std Deviation	0.76836
Median	0.620000	Variance	0.59038
Mode	0.100000	Range	5.19000
		Interquartile Range	0.80000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	17.66354	Pr > |t|	<.0001
Sign	M	142	Pr >= |M|	<.0001
Signed Rank	S	20235	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	5.27
99%	4.56
95%	2.20
90%	1.74
75% Q3	1.07
50% Median	0.62
25% Q1	0.27

10%	0.14
5%	0.10
1%	0.09
0% Min	0.08

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
0.08	2184	2.88	2369
0.08	2173	3.96	2348
0.09	2442	4.56	2367
0.10	2449	5.27	2255
0.10	2445	5.27	2431

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = N3

```
                  Histogram                       #             Boxplot
        5.3+*                                     2                *
           .
           .
           .
           .*                                     1                *
           .
           .
           .*                                     1                *
           .
           .
           .
           .
           .*                                     1                0
        2.7+*                                     2                0
           .*                                     2                0
           .****                                  7                0
           .**                                    3                |
           .****                                  7                |
           .*****                                10                |
           .******                               11                |
           .******                               12                |
           .********                             15             +-----+
           .****************                     32             |  +  |
           .***********************              45             *-----*
           .***************                      29             |     |
           .***************************          53             +-----+
        0.1+**************************           51                |
            ----+----+----+----+----+--
            * may represent up to 2 counts
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = N3

```
                  Normal Probability Plot
5.3+                                                  *
   |
   |
   |
   |                                                 *
   |
   |
   |                                               *
   |
   |
   |
   |
   |                                              *
2.7+                                             **  ++
   |                                            * +++
   |                                         ***++
   |                                        **++
   |                                      ***
   |                                    ***
   |                                 ++**
   |                               ++***
   |                            +++***
   |                         +++****
   |                       +*****
   |                    ++***
   |                ******* 
0.1+**  **************+
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1        0        +1        +2
```

==

Univariate Procedure, Rainfall Depth

==

The UNIVARIATE Procedure
Variable: X2
Poll = OP

Moments			
N	195	Sum Weights	195
Mean	0.80405128	Sum Observations	156.79
Std Deviation	0.84918973	Variance	0.72112319
Skewness	2.6161906	Kurtosis	9.24196114
Uncorrected SS	265.9651	Corrected SS	139.897899
Coeff Variation	105.613876	Std Error Mean	0.06081174

Basic Statistical Measures			
Location		Variability	
Mean	0.804051	Std Deviation	0.84919
Median	0.580000	Variance	0.72112
Mode	0.100000	Range	5.19000
		Interquartile Range	0.76000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.22197	Pr > |t|	<.0001
Sign	M	97.5	Pr >= |M|	<.0001
Signed Rank	S	9555	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	5.27
99%	5.27
95%	2.37
90%	1.97
75% Q3	1.02
50% Median	0.58
25% Q1	0.26

10%	0.12
5%	0.10
1%	0.08
0% Min	0.08

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.08	2761	2.88	2607
0.08	2636	3.96	2613
0.08	2602	4.56	2585
0.10	2768	5.27	2599
0.10	2765	5.27	2760

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = OP

```
Stem Leaf                                    #             Boxplot
  52 77                                      2                *
  50
  48
  46
  44 6                                       1                *
  42
  40
  38 6                                       1                *
  36
  34
  32
  30
  28 8                                       1                0
  26 11                                      2                0
  24 5                                       1                0
  22 0008677                                 7                0
  20 04                                      2                |
  18 3777                                    4                |
  16 007                                     3                |
  14 1779993                                 7                |
  12 334466877                               9                |
  10 227790449                               9             +-----+
   8 223336888900118                        15             |  +  |
   6 002222222334455672255555555555588      33             |     |
   4 1126777789900002222225558              25             *-----*
   2 003355556667777789001111244455588      33             +-----+
   0 8880000000000000001122222344444556666778  40             |
     ----+----+----+----+----+----+----+----+
 Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = OP

```
                  Normal Probability Plot
5.3+                                                 **
   |
   |
   |
   |                                               *
   |
   |
   |                                              *
   |
   |
   |
   |
   |                                             *   ++
2.7+                                           **  ++
   |                                           *+++
   |                                       ****+
   |                                       *++
   |                                     +*+
   |                                   ++*
   |                                 ++**
   |                              +++***
   |                            ++  **
   |                         +++  ***
   |                       ++*****
   |                     +****
   |                 ******
0.1+** ***************
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

===

Univariate Procedure, Rainfall Depth

===

The UNIVARIATE Procedure
Variable: X2
Poll = TA

Moments			
N	81	Sum Weights	81
Mean	0.53851852	Sum Observations	43.62
Std Deviation	0.63380224	Variance	0.40170528
Skewness	2.25088875	Kurtosis	4.98833451
Uncorrected SS	55.6266	Corrected SS	32.1364222
Coeff Variation	117.693676	Std Error Mean	0.07042247

Basic Statistical Measures			
Location		Variability	
Mean	0.538519	Std Deviation	0.63380
Median	0.290000	Variance	0.40171
Mode	0.100000	Range	3.09000
		Interquartile Range	0.50000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	7.64697	Pr > |t|	<.0001
Sign	M	40.5	Pr >= |M|	<.0001
Signed Rank	S	1660.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	3.17
99%	3.17
95%	2.20
90%	1.41
75% Q3	0.63
50% Median	0.29
25% Q1	0.13

10%	0.10
5%	0.10
1%	0.08
0% Min	0.08

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.08	70	2.20	46
0.08	6	2.20	52
0.10	81	2.43	28
0.10	80	2.43	31
0.10	69	3.17	29

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TA

```
Stem Leaf                              #             Boxplot
  30 7                                 1                *
  28
  26
  24 33                                2                *
  22 00                                2                *
  20
  18 3                                 1                0
  16 83                                2                0
  14 1                                 1                0
  12
  10 3                                 1                |
   8 2758                              4                |
   6 3568001                           7             +-----+
   4 2245556770055579                 16             |  +  |
   2 0056777889255                    13             *-----*
   0 8800000000000000011234456666788  31             +-----+
     ----+----+----+----+----+----+-
 Multiply Stem.Leaf by 10**-1


                    Normal Probability Plot
     3.1+                                                  *
        |
        |
     2.5+                                            *  *
        |                                          **
        |                                                  ++
     1.9+                                         *    ++++
        |                                       **  +++
        |                                      * +++
     1.3+                                     +++
        |                                  +++ *
        |                               +++   **
     0.7+                           ++++  ***
        |                        +++******
        |                     ++******
     0.1+ *  *  ***************
         +----+----+----+----+----+----+----+----+----+----+
```

-2	-1	0	+1	+2

==

Univariate Procedure, Rainfall Depth

==

The UNIVARIATE Procedure
Variable: X2
Poll = TCA

Moments			
N	161	Sum Weights	161
Mean	0.51658385	Sum Observations	83.17
Std Deviation	0.50324709	Variance	0.25325763
Skewness	2.05294817	Kurtosis	4.40091214
Uncorrected SS	83.4855	Corrected SS	40.5212211
Coeff Variation	97.4182773	Std Error Mean	0.03966143

Basic Statistical Measures			
Location		Variability	
Mean	0.516584	Std Deviation	0.50325
Median	0.370000	Variance	0.25326
Mode	0.100000	Range	2.43000
		Interquartile Range	0.46000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.02484	Pr > |t|	<.0001
Sign	M	79.5	Pr >= |M|	<.0001
Signed Rank	S	6360	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.43
99%	2.43
95%	1.68
90%	1.19
75% Q3	0.62
50% Median	0.37
25% Q1	0.16

10%	0.10
5%	0.10
1%	0.00
0% Min	0.00

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.00	304	2.20	255
0.00	274	2.20	283
0.08	322	2.36	260
0.08	321	2.43	215
0.08	258	2.43	217

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TCA

```
Stem Leaf                                             #       Boxplot
  24 33                                               2          *
  23 6                                                1          *
  22 00                                               2          *
  21 4                                                1          *
  20
  19
  18 3                                                1          0
  17 3                                                1          0
  16 8                                                1          0
  15
  14 19                                               2          0
  13 333                                              3          0
  12 38                                               2          |
  11 9                                                1          |
  10 139                                              3          |
   9 58                                               2          |
   8 27                                               2          |
   7 001111155                                        9          |
   6 22222223556789                                  14       +-----+
   5 002334455555577779                              18       |  +  |
   4 244455555678                                    12       |     |
   3 00112445577889                                  14       *-----*
   2 000222335567777788999                           21       |     |
   1 00000000000000011133334455555555666677778999    44       +-----+
   0 00888                                            5          |
     ----+----+----+----+----+----+----+----+----
 Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TCA

```
                         Normal Probability Plot
2.45+                                                * *
    |                                              *
    |                                            **
    |                                           *
    |
    |
    |                                          *
    |                                          *      ++
    |                                         *     ++
    |                                             ++
    |                                        ** ++
    |                                       **++
1.25+                                      *++
    |                                     +*
    |                                   ++*
    |                                 ++ *
    |                               ++   *
    |                             ++   ***
    |                           ++   ***
    |                         ++ ***
    |                       ++ **
    |                     ++***
    |                   +****
    |       *************
0.05+* * ***        ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

==

Univariate Procedure, Rainfall Depth

==

The UNIVARIATE Procedure
Variable: X2
Poll = TCH

Moments			
N	107	Sum Weights	107
Mean	0.53242991	Sum Observations	56.97
Std Deviation	0.57836275	Variance	0.33450347
Skewness	1.82573431	Kurtosis	2.71728217
Uncorrected SS	65.7899	Corrected SS	35.4573682
Coeff Variation	108.627022	Std Error Mean	0.05591244

Basic Statistical Measures			
Location		Variability	
Mean	0.532430	Std Deviation	0.57836
Median	0.290000	Variance	0.33450
Mode	0.100000	Range	2.43000
		Interquartile Range	0.53000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	9.522567	Pr > |t|	<.0001
Sign	M	53	Pr >= |M|	<.0001
Signed Rank	S	2835.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.43
99%	2.43
95%	2.08
90%	1.41
75% Q3	0.66
50% Median	0.29
25% Q1	0.13

10%	0.10
5%	0.10
1%	0.08
0% Min	0.00

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.00	475	2.14	471
0.08	520	2.20	485
0.08	495	2.20	486
0.08	444	2.43	449
0.10	525	2.43	451

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TCH

```
Stem Leaf                                       #             Boxplot
  24 33                                         2                *
  23
  22 00                                         2                0
  21 4                                          1                0
  20 8                                          1                0
  19
  18 3                                          1                0
  17 3                                          1                0
  16 88                                         2                0
  15
  14 1                                          1                |
  13                                                             |
  12 37                                         2                |
  11 9                                          1                |
  10 33                                         2                |
   9 558                                        3                |
   8 27                                         2                |
   7 001                                        3                |
   6 355689                                     6             +-----+
   5 002555579                                  9             |  +  |
   4 23455577                                   8             |     |
   3 125558                                     6             |     |
   2 345556777889                              12             *-----*
   1 00000000000111122222333444455566667778    38             +-----+
   0 0888                                       4                |
     ----+----+----+----+----+----+----+---
 Multiply Stem.Leaf by 10**-1
```

==

Univariate Procedure, Rainfall Depth

==

The UNIVARIATE Procedure
Variable: X2
Poll = TCH

```
                   Normal Probability Plot
2.45+                                               *  *
    |
    |                                           * *
    |                                          *
    |                                         *
    |                                                 ++
    |                                        *      ++
    |                                        *     +
    |                                      **    ++
    |                                          ++
    |                                      *  +
    |                                       ++
1.25+                                     *+
    |                                   +*
    |                                  + *
    |                                ++**
    |                              ++  *
    |                            ++   *
    |                           +   **
    |                         ++  ***
    |                       ++  **
    |                     ++  **
    |                    + ****
    |        ***************
0.05+*  * * *        ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TCO

Moments			
N	177	Sum Weights	177
Mean	0.62559322	Sum Observations	110.73
Std Deviation	0.57246458	Variance	0.3277157
Skewness	1.51036805	Kurtosis	1.68267609
Uncorrected SS	126.9499	Corrected SS	57.6779627
Coeff Variation	91.5074785	Std Error Mean	0.04302907

Basic Statistical Measures			
Location		Variability	
Mean	0.625593	Std Deviation	0.57246
Median	0.450000	Variance	0.32772
Mode	0.100000	Range	2.43000
		Interquartile Range	0.63000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	14.53885	Pr > |t|	<.0001
Sign	M	88	Pr >= |M|	<.0001
Signed Rank	S	7788	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.43
99%	2.43
95%	2.00
90%	1.49
75% Q3	0.83
50% Median	0.45
25% Q1	0.20

10%	0.11
5%	0.10
1%	0.08
0% Min	0.00

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.00	660	2.20	748
0.08	675	2.28	682
0.08	662	2.36	693
0.10	818	2.43	741
0.10	816	2.43	781

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TCO

```
Stem Leaf                                        #        Boxplot
  24 33                                          2           0
  23 6                                           1           0
  22 0008                                        4           0
  21
  20 08                                          2           0
  19 337                                         3           0
  18 3                                           1           0
  17 7                                           1           |
  16 88                                          2           |
  15 3                                           1           |
  14 1119                                        4           |
  13                                                         |
  12 3378                                        4           |
  11 004499                                      6           |
  10 39                                          2           |
   9 5588                                        4           |
   8 233336667                                   9        +-----+
   7 0115555                                     7        |     |
   6 22222222335557789                          17        |  +  |
   5 00002234556679                             14        |     |
   4 023455557788                               12        *-----*
   3 11111245555588                             14        |     |
   2 00022333355567778888999                    23        +-----+
   1 00000000000011222234445555555666677789999  41           |
   0 088                                         3           |
     ----+----+----+----+----+----+----+----+-
 Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TCO

```
                  Normal Probability Plot
2.45+                                                 **
    |                                               *
    |                                           ***
    |
    |                                          *       +
    |                                        **      ++
    |                                        *     ++
    |                                       *    ++
    |                                       *   +
    |                                      *  ++
    |                                     **++
    |                                     ++
1.25+                                    **
    |                                  ***
    |                                ++*
    |                              ++ **
    |                             +  **
    |                           ++ **
    |                         ++ ***
    |                       ++ ***
    |                      + ***
    |                    ++***
    |                  *****
    |     *************
0.05+** *           +
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

==
Univariate Procedure, Rainfall Depth
==

The UNIVARIATE Procedure
Variable: X2
Poll = TKN

Moments			
N	295	Sum Weights	295
Mean	0.79589831	Sum Observations	234.79
Std Deviation	0.78459777	Variance	0.61559366
Skewness	2.54284625	Kurtosis	9.3431369
Uncorrected SS	367.8535	Corrected SS	180.984537
Coeff Variation	98.5801536	Std Error Mean	0.04568105

Basic Statistical Measures			
Location		Variability	
Mean	0.795898	Std Deviation	0.78460
Median	0.620000	Variance	0.61559
Mode	0.100000	Range	5.19000
		Interquartile Range	0.71000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	17.42294	Pr > |t|	<.0001
Sign	M	147.5	Pr >= |M|	<.0001
Signed Rank	S	21830	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	5.27
99%	4.56
95%	2.36
90%	1.68
75% Q3	0.98
50% Median	0.62
25% Q1	0.27

10%	0.12
5%	0.10
1%	0.08
0% Min	0.08

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.08	1958	3.96	1736
0.08	1855	3.99	1953
0.08	1746	4.56	1709
0.10	1990	5.27	1954
0.10	1988	5.27	1966

===

Univariate Procedure, Rainfall Depth

===

The UNIVARIATE Procedure
Variable: X2
Poll = TKN

```
                Histogram                  #             Boxplot
    5.3+*                                  2                *
       .
       .
       .
       .*                                  1                *
       .
       .
       .*                                  2                *
       .
       .
       .
       .
       .*                                  1                0
    2.7+*                                  2                0
       .**                                 4                0
       .****                               7                0
       .**                                 3                0
       .***                                5                |
       .****                               8                |
       .******                            11                |
       .******                            11                |
       .********                          16                |
       .****************                  31             +-----+
       .*************************         49             *--+--*
       .******************                35             |     |
       .*************************         50             +-----+
    0.1+*****************************     57                |
        ----+----+----+----+----+----
        * may represent up to 2 counts
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TKN

```
                  Normal Probability Plot
5.3+                                                  *
   |
   |
   |
   |                                                 *
   |
   |
   |                                               *
   |
   |
   |
   |
   |                                              *
2.7+                                            **  +++
   |                                           ** ++
   |                                        ***+++
   |                                        *++
   |                                      **+
   |                                    +**
   |                                 ++***
   |                               ++ **
   |                            +++ ***
   |                          ++ ****
   |                       ++*****
   |                    ++***
   |                ******
0.1+** **************+
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

===
Univariate Procedure, Rainfall Depth
===

The UNIVARIATE Procedure
Variable: X2
Poll = TL

Moments			
N	176	Sum Weights	176
Mean	0.53721591	Sum Observations	94.55
Std Deviation	0.50574266	Variance	0.25577563
Skewness	1.98118319	Kurtosis	3.97630533
Uncorrected SS	95.5545	Corrected SS	44.7607358
Coeff Variation	94.1414144	Std Error Mean	0.03812179

Basic Statistical Measures			
Location		Variability	
Mean	0.537216	Std Deviation	0.50574
Median	0.395000	Variance	0.25578
Mode	0.100000	Range	2.43000
		Interquartile Range	0.47500

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	14.0921	Pr > |t|	<.0001
Sign	M	87.5	Pr >= |M|	<.0001
Signed Rank	S	7700	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.430
99%	2.430
95%	1.730
90%	1.230
75% Q3	0.650
50% Median	0.395
25% Q1	0.175

10%	0.110
5%	0.100
1%	0.080
0% Min	0.000

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.00	1067	2.20	1077
0.08	1106	2.20	1078
0.08	1105	2.36	1082
0.08	1096	2.43	1009
0.08	1038	2.43	1042

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TL

```
Stem Leaf                                          #     Boxplot
  24 33                                            2        *
  23 6                                             1        *
  22 00                                            2        *
  21 4                                             1        *
  20 8                                             1        *
  19
  18 3                                             1        0
  17 3                                             1        0
  16 88                                            2        0
  15
  14 19                                            2        0
  13 33                                            2        |
  12 378                                           3        |
  11 49                                            2        |
  10 139                                           3        |
   9 558                                           3        |
   8 237                                           3        |
   7 001111155                                     9        |
   6 222222235567789                              15     +-----+
   5 00233445555556677779                         20     |  +  |
   4 022344455567788                              15     *-----*
   3 00112445555778889                            17     |     |
   2 0022233455677777889999                       22     |     |
   1 00000000001112222333444455555555666677789999 44     +-----+
   0 08888                                         5        |
     ----+----+----+----+----+----+----+----+----
 Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TL

```
                            Normal Probability Plot
    2.45+                                                 **
        |                                               *
        |                                            **
        |                                            *
        |                                           *
        |
        |                                          *       +
        |                                          *     ++
        |                                         *     +
        |                                             ++
        |                                        *  ++
        |                                       * ++
    1.25+                                      *++
        |                                     *+
        |                                   +**
        |                                 ++ *
        |                               ++  *
        |                             ++  ***
        |                           ++ ****
        |                         ++****
        |                       ++***
        |                     ++***
        |                   ****
        |      *************
    0.05+** * **        ++
         +----+----+----+----+----+----+----+----+----+----+
             -2        -1         0        +1        +2
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TN

Moments			
N	86	Sum Weights	86
Mean	0.5122093	Sum Observations	44.05
Std Deviation	0.57238901	Variance	0.32762918
Skewness	2.02226293	Kurtosis	3.6381005
Uncorrected SS	50.4113	Corrected SS	27.8484802
Coeff Variation	111.749046	Std Error Mean	0.06172229

Basic Statistical Measures			
Location		Variability	
Mean	0.512209	Std Deviation	0.57239
Median	0.275000	Variance	0.32763
Mode	0.100000	Range	2.35000
		Interquartile Range	0.51000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	8.298611	Pr > |t|	<.0001
Sign	M	43	Pr >= |M|	<.0001
Signed Rank	S	1870.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.430
99%	2.430
95%	2.140
90%	1.230
75% Q3	0.650
50% Median	0.275
25% Q1	0.140

10%	0.100
5%	0.100
1%	0.080
0% Min	0.080

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.08	1283	2.14	1332
0.08	1273	2.20	1288
0.10	1338	2.20	1291
0.10	1333	2.43	1302
0.10	1331	2.43	1304

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TN

```
Stem Leaf                                 #             Boxplot
  24 33                                   2                *
  23
  22 00                                   2                *
  21 4                                    1                0
  20
  19
  18 3                                    1                0
  17
  16 8                                    1                0
  15
  14 1                                    1                |
  13                                                       |
  12 3                                    1                |
  11 9                                    1                |
  10 3                                    1                |
   9 58                                   2                |
   8 27                                   2                |
   7 001                                  3                |
   6 235589                               6             +-----+
   5 002579                               6             |  +  |
   4 2455577                              7             |     |
   3 1258                                 4             |     |
   2 355677789                            9             *-----*
   1 0000000000011122233444445556666778  34             +-----+
   0 88                                   2                |
     ----+----+----+----+----+----+----
  Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TN

```
                   Normal Probability Plot
2.45+                                              *  *
    |
    |                                          * *
    |                                         *
    |
    |                                                  +
    |                                        *       ++
    |                                              ++
    |                                       *     +
    |                                           ++
    |                                       * ++
    |                                       ++
1.25+                                      *
    |                                    +*
    |                                  ++ *
    |                                ++  *
    |                               +   *
    |                             ++  **
    |                           ++  ***
    |                         ++  ***
    |                        +  ***
    |                      ++  **
    |                    ++ ***
    |      * ****************
0.05+ *  *            +
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

==
Univariate Procedure, Rainfall Depth
==

The UNIVARIATE Procedure
Variable: X2
Poll = TNI

Moments			
N	172	Sum Weights	172
Mean	0.97168605	Sum Observations	167.13
Std Deviation	0.8802977	Variance	0.77492404
Skewness	2.44689849	Kurtosis	7.90631788
Uncorrected SS	294.9099	Corrected SS	132.512011
Coeff Variation	90.5948689	Std Error Mean	0.06712207

Basic Statistical Measures			
Location		Variability	
Mean	0.971686	Std Deviation	0.88030
Median	0.785000	Variance	0.77492
Mode	0.340000	Range	5.15000
		Interquartile Range	0.91000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	14.4764	Pr > |t|	<.0001
Sign	M	86	Pr >= |M|	<.0001
Signed Rank	S	7439	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	5.270
99%	5.270
95%	2.450
90%	1.880
75% Q3	1.260
50% Median	0.785
25% Q1	0.350

10%	0.230
5%	0.190
1%	0.150
0% Min	0.120

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.12	1998	3.96	2026
0.15	2021	3.99	2152
0.16	2153	4.56	2009
0.16	2144	5.27	2154
0.16	2142	5.27	2168

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TNI

```
Stem Leaf                                  #             Boxplot
  52 77                                    2                *
  50
  48
  46
  44 6                                     1                *
  42
  40
  38 69                                    2                0
  36
  34
  32
  30
  28 8                                     1                0
  26 11                                    2                |
  24 3355                                  4                |
  22 77                                    2                |
  20 8                                     1                |
  18 8877                                  4                |
  16 00228844                              8                |
  14 14477990011                          11                |
  12 4667077                               7             +-----+
  10 2237774447                           10             |     |
   8 11222333778889900011223355888        29             |  +  |
   6 0033445700122558899                  19             *-----*
   4 0113455677899222255669               22             |     |
   2 11333345556677890022444444445555899  35             +-----+
   0 256666669999                         12                |
     ----+----+----+----+----+----+----+
 Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TNI

```
                  Normal Probability Plot
5.3+                                                * *
   |
   |
   |
   |                                               *
   |
   |
   |                                            **
   |
   |
   |
   |                                                 ++
   |                                           *  +++
2.7+                                          **++
   |                                        **++
   |                                       **+
   |                                     ++*
   |                                   ++**
   |                                 ++***
   |                              +++***
   |                            ++ ***
   |                          ++  **
   |                        +******
   |                     ++***
   |                   ****
   |          **********
0.1+* ** ******   +++
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TP

Moments			
N	340	Sum Weights	340
Mean	0.72244118	Sum Observations	245.63
Std Deviation	0.7239609	Variance	0.52411939
Skewness	2.77480298	Kurtosis	11.6346845
Uncorrected SS	355.1297	Corrected SS	177.676474
Coeff Variation	100.21036	Std Error Mean	0.03926229

Basic Statistical Measures			
Location		Variability	
Mean	0.722441	Std Deviation	0.72396
Median	0.540000	Variance	0.52412
Mode	0.100000	Range	5.19000
		Interquartile Range	0.63000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	18.40038	Pr > |t|	<.0001
Sign	M	170	Pr >= |M|	<.0001
Signed Rank	S	28985	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	5.270
99%	3.960
95%	2.170
90%	1.520
75% Q3	0.885
50% Median	0.540
25% Q1	0.255

10%	0.120
5%	0.100
1%	0.100
0% Min	0.080

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.08	3026	2.88	2852
0.08	2891	3.96	2826
0.08	2833	4.56	2802
0.10	3114	5.27	2812
0.10	3098	5.27	3071

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TP

```
                 Histogram                          #             Boxplot
   5.3+*                                            2                *
      .
      .
      .
      .*                                            1                *
      .
      .
      .*                                            1                *
      .
      .
      .
      .
      .*                                            1                *
   2.7+*                                            2                0
      .**                                           3                0
      .****                                         7                0
      .**                                           3                0
      .***                                          5                0
      .****                                         7                |
      .*******                                     13                |
      .*******                                     13                |
      .********                                    16                |
      .**************                              27             +-----+
      .***************************                 54             |  +  |
      .************************                    48             *-----*
      .**********************************          68             +-----+
   0.1+***********************************         69                |
       ----+----+----+----+----+----+----+
       * may represent up to 2 counts
```

==

Univariate Procedure, Rainfall Depth

==

The UNIVARIATE Procedure
Variable: X2
Poll = TP

```
                  Normal Probability Plot
5.3+                                                  *
   |
   |
   |
   |                                                 *
   |
   |
   |                                                *
   |
   |
   |
   |
   |                                               *
2.7+                                              *
   |                                            **   ++
   |                                          *** +++
   |                                         * +++
   |                                        *++
   |                                      **
   |                                   +***
   |                                +++**
   |                             +++ **
   |                           ++ ****
   |                        ++*****
   |                     ++****
   |                 *******
0.1+*****************
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TSS

Moments			
N	291	Sum Weights	291
Mean	0.62487973	Sum Observations	181.84
Std Deviation	0.54005322	Variance	0.29165749
Skewness	1.61493379	Kurtosis	2.38082483
Uncorrected SS	198.2088	Corrected SS	84.5806708
Coeff Variation	86.4251476	Std Error Mean	0.03165848

Basic Statistical Measures			
Location		Variability	
Mean	0.624880	Std Deviation	0.54005
Median	0.490000	Variance	0.29166
Mode	0.100000	Range	2.53000
		Interquartile Range	0.52000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	19.73815	Pr > |t|	<.0001
Sign	M	145.5	Pr >= |M|	<.0001
Signed Rank	S	21243	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.61
99%	2.43
95%	1.93
90%	1.49
75% Q3	0.75
50% Median	0.49
25% Q1	0.23

10%	0.14
5%	0.10
1%	0.08
0% Min	0.08

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.08	3397	2.36	3310
0.08	3347	2.43	3184
0.08	3213	2.43	3228
0.10	3356	2.61	3279
0.10	3345	2.61	3309

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TSS

```
                  Histogram                     #              Boxplot
    2.65+*                                      2                 *
        .
        .*                                      2                 *
        .*                                      1                 *
        .**                                     4                 0
        .*                                      1                 0
        .*                                      2                 0
        .**                                     3                 0
        .*                                      1                 0
        .*                                      1                 0
        .**                                     4                 0
        .***                                    5                 |
        .****                                   7                 |
    1.35+*                                      2                 |
        .**                                     4                 |
        .***                                    6                 |
        .***                                    5                 |
        .***                                    6                 |
        .******                                12                 |
        .************                          24              +-----+
        .************                          24              |  +  |
        .**************                        28              |     |
        .**********                            19              *-----*
        .****************                      32              |     |
        .*******************                   38              +-----+
        .****************************          55                 |
    0.05+**                                     3                 |
         ----+----+----+----+----+---
         * may represent up to 2 counts
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TSS

```
                   Normal Probability Plot
2.65+                                                  *
    |
    |                                              * *
    |                                              *
    |                                            ***
    |                                           *
    |                                           *
    |                                         **      ++
    |                                         *     ++
    |                                         *   ++
    |                                        **  +
    |                                       *  ++
    |                                     ** ++
1.35+                                     *++
    |                                    **
    |                                  +**
    |                                ++ *
    |                               +  *
    |                             ++ ***
    |                           ++ ***
    |                         ++ ***
    |                       ++****
    |                     ++ **
    |                   ++***
    |                 *****
    |   **************
0.05+**            ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TZ

Moments			
N	231	Sum Weights	231
Mean	0.62207792	Sum Observations	143.7
Std Deviation	0.53735424	Variance	0.28874958
Skewness	1.56736894	Kurtosis	2.08220702
Uncorrected SS	155.805	Corrected SS	66.4124026
Coeff Variation	86.380535	Std Error Mean	0.03535531

Basic Statistical Measures			
Location		Variability	
Mean	0.622078	Std Deviation	0.53735
Median	0.480000	Variance	0.28875
Mode	0.750000	Range	2.43000
		Interquartile Range	0.52000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	17.59503	Pr > |t|	<.0001
Sign	M	115	Pr >= |M|	<.0001
Signed Rank	S	13282.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	2.43
99%	2.36
95%	1.93
90%	1.41
75% Q3	0.75
50% Median	0.48
25% Q1	0.23

10%	0.13
5%	0.10
1%	0.08
0% Min	0.00

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
0.00	1571	2.20	1581
0.08	1661	2.28	1482
0.08	1538	2.36	1656
0.10	1644	2.43	1589
0.10	1640	2.43	1631

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TZ

```
Stem Leaf                                           #     Boxplot
  24 33                                             2        *
  23 6                                              1        *
  22 0008                                           4        0
  21 4                                              1        0
  20 08                                             2        0
  19 337                                            3        0
  18 3                                              1        0
  17 37                                             2        0
  16 88                                             2        0
  15 3                                              1        |
  14 11199                                          5        |
  13 33                                             2        |
  12 33778                                          5        |
  11 004499                                         6        |
  10 139                                            3        |
   9 5588                                           4        |
   8 23336667                                       8        |
   7 001111555555555555555                         21     +-----+
   6 2222222233555677789                           19     |  +  |
   5 00223344555555556677779                       23     |     |
   4 023444555567788                               15     *-----*
   3 0011111244555557788889                        22     |     |
   2 002223333345555677777888889999                30     +-----+
   1 0000000000011122222333444555555555666677789999 46        |
   0 088                                            3        |
     ----+----+----+----+----+----+----+----+----+-
 Multiply Stem.Leaf by 10**-1
```

Univariate Procedure, Rainfall Depth

The UNIVARIATE Procedure
Variable: X2
Poll = TZ

```
                  Normal Probability Plot
2.45+                                                  *
    |                                                *
    |                                            ****
    |                                           *
    |                                          **
    |                                         **      ++
    |                                         *     ++
    |                                        *     +
    |                                       **   ++
    |                                       *  ++
    |                                      **++
    |                                     *++
1.25+                                    **
    |                                  +**
    |                                 +**
    |                               ++ *
    |                             ++  **
    |                           ++ ***
    |                         ++ ***
    |                       ++****
    |                     ++***
    |                    +***
    |                 *****
    |   **************
0.05+* *           ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = DCA

Moments			
N	117	Sum Weights	117
Mean	2644.47863	Sum Observations	309404
Std Deviation	2130.37106	Variance	4538480.87
Skewness	0.29754359	Kurtosis	-1.9450156
Uncorrected SS	1344676048	Corrected SS	526463781
Coeff Variation	80.5592088	Std Error Mean	196.952875

Basic Statistical Measures			
Location		Variability	
Mean	2644.479	Std Deviation	2130
Median	812.000	Variance	4538481
Mode	812.000	Range	4288
		Interquartile Range	4288

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.42696	Pr > |t|	<.0001
Sign	M	58.5	Pr >= |M|	<.0001
Signed Rank	S	3451.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	5100
99%	5100
95%	5100
90%	5100
75% Q3	5100
50% Median	812
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	158	5100	194
812	157	5100	195
812	155	5100	196
812	154	5100	197
812	153	5100	198

```
                Histogram                   #             Boxplot
5100+*************************             50             +-----+
    .                                                     |     |
    .                                                     |     |
    .                                                     |     |
    .                                                     |     |
    .                                                     |     |
    .                                                     |     |
3700+                                                     |     |
    .                                                     |     |
    .                                                     |     |
    .                                                     |     |
    .                                                     |     |
    .                                                     |  +  |
    .                                                     |     |
2300+                                                     |     |
    .                                                     |     |
    .                                                     |     |
    .                                                     |     |
    .                                                     |     |
    .                                                     |     |
    .                                                     |     |
 900+**********************************    67             *-----*
     ----+----+----+----+----+----+----
     * may represent up to 2 counts
```

===

Univariate Procedure, Ponding Volume

===

The UNIVARIATE Procedure
Variable: X3
Poll = DCA

```
                       Normal Probability Plot
    5100+                           ******************* *  *
        |                                    +
        |                                   +
        |                                  +
        |                                 +
        |                                +
        |                               +
    3700+                              +
        |                             +
        |                            +
        |                           +
        |                          +
        |                         +
        |                        +
    2300+                       +
        |                      +
        |
        |                     +
        |                    +
        |                   +
        |                  +
     900+*  * ***********************
         +----+----+----+----+----+----+----+----+----+----+
             -2        -1         0        +1        +2
```

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = DCH

Moments			
N	64	Sum Weights	64
Mean	812	Sum Observations	51968
Std Deviation	0	Variance	0
Skewness	.	Kurtosis	.
Uncorrected SS	42198016	Corrected SS	0
Coeff Variation	0	Std Error Mean	0

Basic Statistical Measures			
Location		Variability	
Mean	812.0000	Std Deviation	0
Median	812.0000	Variance	0
Mode	812.0000	Range	0
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	.	Pr > |t|	.
Sign	M	32	Pr >= |M|	<.0001
Signed Rank	S	1040	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	812
99%	812
95%	812
90%	812
75% Q3	812
50% Median	812
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	423	812	419
812	422	812	420
812	421	812	421
812	420	812	422
812	419	812	423

==

Univariate Procedure, Ponding Volume

==

The UNIVARIATE Procedure
Variable: X3
Poll = DCO

Moments			
N	112	**Sum Weights**	112
Mean	2887.08036	**Sum Observations**	323353
Std Deviation	2419.91743	**Variance**	5856000.38
Skewness	0.50504186	**Kurtosis**	-1.2984383
Uncorrected SS	1583562137	**Corrected SS**	650016042
Coeff Variation	83.8188458	**Std Error Mean**	228.660704

Basic Statistical Measures			
Location		**Variability**	
Mean	2887.080	**Std Deviation**	2420
Median	812.000	**Variance**	5856000
Mode	812.000	**Range**	6788
		Interquartile Range	4288

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	12.62605	**Pr > |t|**	<.0001
Sign	**M**	56	**Pr >= |M|**	<.0001
Signed Rank	**S**	3164	**Pr >= |S|**	<.0001

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	7600
99%	7600
95%	7600
90%	5100
75% Q3	5100
50% Median	812
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	642	7600	551
812	638	7600	553
812	637	7600	579
812	636	7600	596
812	625	7600	597

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = DCO

```
                Histogram                #             Boxplot
7750+*****                               9                |
    .                                                     |
    .                                                     |
    .                                                     |
    .                                                     |
    .***************                    32             +-----+
    .*****                               9             |     |
4250+                                                  |     |
    .                                                  |     |
    .                                                  |     |
    .                                                  |  +  |
    .                                                  |     |
    .                                                  |     |
    .                                                  |     |
 750+*******************************    62             *-----*
     ----+----+----+----+----+----+-
     * may represent up to 2 counts


                       Normal Probability Plot
    7750+                                       ***** *+*  *
        |                                          +++
        |                                        ++
        |                                      ++
        |                                    ++
        |                             ***********
        |                          ***   ++
    4250+                              ++
        |                            ++
        |                          ++
        |                        ++
        |                      ++
        |                    ++
        |                  ++
     750+*  * * *******************
         +----+----+----+----+----+----+----+----+----+----+
             -2        -1         0        +1        +2
```

===

Univariate Procedure, Ponding Volume

===

The UNIVARIATE Procedure
Variable: X3
Poll = DI

Moments			
N	66	Sum Weights	66
Mean	812	Sum Observations	53592
Std Deviation	0	Variance	0
Skewness	.	Kurtosis	.
Uncorrected SS	43516704	Corrected SS	0
Coeff Variation	0	Std Error Mean	0

Basic Statistical Measures			
Location		Variability	
Mean	812.0000	Std Deviation	0
Median	812.0000	Variance	0
Mode	812.0000	Range	0
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	.	Pr > |t|	.
Sign	M	33	Pr >= |M|	<.0001
Signed Rank	S	1105.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	812
99%	812
95%	812
90%	812
75% Q3	812
50% Median	812
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	885	812	881
812	884	812	882
812	883	812	883
812	882	812	884
812	881	812	885

===
Univariate Procedure, Ponding Volume
===

The UNIVARIATE Procedure
Variable: X3
Poll = DL

Moments			
N	116	Sum Weights	116
Mean	812	Sum Observations	94192
Std Deviation	0	Variance	0
Skewness	.	Kurtosis	.
Uncorrected SS	76483904	Corrected SS	0
Coeff Variation	0	Std Error Mean	0

Basic Statistical Measures			
Location		Variability	
Mean	812.0000	Std Deviation	0
Median	812.0000	Variance	0
Mode	812.0000	Range	0
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	.	Pr > |t|	.
Sign	M	58	Pr >= |M|	<.0001
Signed Rank	S	3393	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	812
99%	812
95%	812
90%	812
75% Q3	812
50% Median	812
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	1001	812	997
812	1000	812	998
812	999	812	999
812	998	812	1000
812	997	812	1001

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = DN

Moments			
N	75	Sum Weights	75
Mean	1717.06667	Sum Observations	128780
Std Deviation	2323.01503	Variance	5396398.85
Skewness	2.20155552	Kurtosis	2.92413066
Uncorrected SS	620457360	Corrected SS	399333515
Coeff Variation	135.28974	Std Error Mean	268.238671

Basic Statistical Measures			
Location		Variability	
Mean	1717.067	Std Deviation	2323
Median	812.000	Variance	5396399
Mode	812.000	Range	6788
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	6.401264	Pr > |t|	<.0001
Sign	M	37.5	Pr >= |M|	<.0001
Signed Rank	S	1425	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	7600
75% Q3	812
50% Median	812
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	1249	7600	1188
812	1248	7600	1228
812	1247	7600	1250
812	1246	7600	1251
812	1245	7600	1252

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = DN

```
                 Histogram                       #             Boxplot
  7750+*****                                    10                *
      .
      .
      .
      .
      .
      .
  4250+
      .
      .
      .
      .
      .
      .
   750+*********************************        65             +--+--+
       ----+----+----+----+----+----+---
       * may represent up to 2 counts


                        Normal Probability Plot
       7750+                               ***** ** *   *+
           |                                            ++
           |                                          ++
           |                                        ++
           |                                      ++
           |                                    ++
           |                                 +++
       4250+                               ++
           |                             ++
           |                           ++
           |                         ++
           |                       ++
           |                     ++
           |                  +++
        750+ *   * ** *************************
            +----+----+----+----+----+----+----+----+----+----+
                -2        -1         0        +1        +2
```

==
Univariate Procedure, Ponding Volume
==

The UNIVARIATE Procedure
Variable: X3
Poll = DP

Moments			
N	86	Sum Weights	86
Mean	1850.22093	Sum Observations	159119
Std Deviation	2212.74238	Variance	4896228.83
Skewness	2.113353	Kurtosis	2.77092264
Uncorrected SS	710584755	Corrected SS	416179451
Coeff Variation	119.593414	Std Error Mean	238.606147

Basic Statistical Measures			
Location		Variability	
Mean	1850.221	Std Deviation	2213
Median	812.000	Variance	4896229
Mode	812.000	Range	6788
		Interquartile Range	502.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	7.754289	Pr > |t|	<.0001
Sign	M	43	Pr >= |M|	<.0001
Signed Rank	S	1870.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	7600
75% Q3	1314
50% Median	812
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	2582	7600	2568
812	2581	7600	2569
812	2580	7600	2570
812	2579	7600	2571
812	2578	7600	2572

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = DP

```
                   Histogram                       #             Boxplot
     7750+*****                                   10                *
         .
         .
         .
         .
         .
         .**                                       3                *
     4250+
         .
         .
         .
         .
         .
         .**********                              20             +-----+
      750+***************************             53             *--+--*
          ----+----+----+----+----+--
          * may represent up to 2 counts


                         Normal Probability Plot
      7750+                                     ****** * *  *
          |                                                  ++
          |                                                ++
          |                                             +++
          |                                           ++
          |                                         ++
          |                                     **++
      4250+                                    ++
          |                                  ++
          |                                ++
          |                             +++
          |                           ++
          |                         ++
          |                       ++    ********
       750+ *  * * ********************
           +----+----+----+----+----+----+----+----+----+----+
                -2        -1         0        +1        +2
```

==

Univariate Procedure, Ponding Volume

==

The UNIVARIATE Procedure
Variable: X3
Poll = DZ

Moments			
N	132	Sum Weights	132
Mean	3221.15152	Sum Observations	425192
Std Deviation	2524.79135	Variance	6374571.37
Skewness	0.28774744	Kurtosis	-1.4930233
Uncorrected SS	2204676704	Corrected SS	835068849
Coeff Variation	78.381639	Std Error Mean	219.75488

Basic Statistical Measures			
Location		Variability	
Mean	3221.152	Std Deviation	2525
Median	2956.000	Variance	6374571
Mode	812.000	Range	6788
		Interquartile Range	4288

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	14.65793	Pr > |t|	<.0001
Sign	M	66	Pr >= |M|	<.0001
Signed Rank	S	4389	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	7600
75% Q3	5100
50% Median	2956
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	1409	7600	1414
812	1408	7600	1416
812	1407	7600	1418
812	1406	7600	1427
812	1405	7600	1428

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = DZ

```
                Histogram                   #              Boxplot
7750+*******                               14                 |
    .                                                         |
    .                                                         |
    .                                                         |
    .                                                         |
    .**************************            52              +-----+
    .                                                      |     |
4250+                                                      |     |
    .                                                      |     |
    .                                                      |  +  |
    .                                                      *-----*
    .                                                      |     |
    .                                                      |     |
    .                                                      |     |
 750+*********************************     66              +-----+
     ----+----+----+----+----+----+---
     * may represent up to 2 counts
```

```
                        Normal Probability Plot
     7750+                                      *******  **   *
         |                                        ++
         |                                      ++
         |                                     +
         |                                   ++
         |                         *************
         |                               ++
     4250+                             ++
         |                           ++
         |                         ++
         |                       ++
         |                     ++
         |                   ++
         |                 ++
      750+*  ** ********************
          +----+----+----+----+----+----+----+----+----+----+
              -2        -1         0        +1        +2
```

==
Univariate Procedure, Ponding Volume
==

The UNIVARIATE Procedure
Variable: X3
Poll = EC

Moments			
N	96	Sum Weights	96
Mean	1960.20833	Sum Observations	188180
Std Deviation	1277.24544	Variance	1631355.91
Skewness	1.61499015	Kurtosis	0.64038627
Uncorrected SS	523850816	Corrected SS	154978812
Coeff Variation	65.1586578	Std Error Mean	130.358317

Basic Statistical Measures			
Location		Variability	
Mean	1960.208	Std Deviation	1277
Median	1314.000	Variance	1631356
Mode	1314.000	Range	3287
		Interquartile Range	205.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	15.03708	Pr > |t|	<.0001
Sign	M	48	Pr >= |M|	<.0001
Signed Rank	S	2328	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	4601
99%	4601
95%	4601
90%	4601
75% Q3	1519
50% Median	1314
25% Q1	1314

10%	1314
5%	1314
1%	1314
0% Min	1314

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
1314	3490	4601	3422
1314	3489	4601	3423
1314	3488	4601	3424
1314	3487	4601	3425
1314	3486	4601	3426

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = EC

```
                   Histogram                          #             Boxplot
    4700+*********                                   18                *
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .*******                                     14             +-----+
    1300+********************************            64             *--+--*
         ----+----+----+----+----+----+--
         * may represent up to 2 counts


                          Normal Probability Plot
        4700+                                      *********** *+  *
            |                                                 +
            |                                               ++
            |                                             ++
            |                                            +
            |                                          ++
            |                                         +
            |                                       ++
            |                                      +
            |                                    ++
            |                                   +
            |                                 ++
            |                               ++
            |                              +
            |                            ++
```

```
     |                        +
     |                      ++        ******
1300+*    *  ***********************
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

===

Univariate Procedure, Ponding Volume

===

The UNIVARIATE Procedure
Variable: X3
Poll = ENC

Moments			
N	10	Sum Weights	10
Mean	7600	Sum Observations	76000
Std Deviation	0	Variance	0
Skewness	.	Kurtosis	.
Uncorrected SS	577600000	Corrected SS	0
Coeff Variation	0	Std Error Mean	0

Basic Statistical Measures			
Location		Variability	
Mean	7600.000	Std Deviation	0
Median	7600.000	Variance	0
Mode	7600.000	Range	0
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	.	Pr > |t|	.
Sign	M	5	Pr >= |M|	0.0020
Signed Rank	S	27.5	Pr >= |S|	0.0020

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	7600
75% Q3	7600
50% Median	7600
25% Q1	7600

10%	7600
5%	7600
1%	7600
0% Min	7600

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
7600	3539	7600	3535
7600	3538	7600	3536
7600	3537	7600	3537
7600	3536	7600	3538
7600	3535	7600	3539

==

Univariate Procedure, Ponding Volume

==

The UNIVARIATE Procedure
Variable: X3
Poll = FC

Moments			
N	25	Sum Weights	25
Mean	3221.68	Sum Observations	80542
Std Deviation	2786.66428	Variance	7765497.81
Skewness	1.04365078	Kurtosis	-0.9975532
Uncorrected SS	445852498	Corrected SS	186371947
Coeff Variation	86.49724	Std Error Mean	557.332856

Basic Statistical Measures			
Location		Variability	
Mean	3221.680	Std Deviation	2787
Median	1519.000	Variance	7765498
Mode	1519.000	Range	6081
		Interquartile Range	6081

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	5.780531	Pr > |t|	<.0001
Sign	M	12.5	Pr >= |M|	<.0001
Signed Rank	S	162.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	7600
75% Q3	7600
50% Median	1519
25% Q1	1519

10%	1519
5%	1519
1%	1519
0% Min	1519

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
1519	3529	7600	3507
1519	3528	7600	3508
1519	3527	7600	3509
1519	3526	7600	3510
1519	3525	7600	3511

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = FC

```
 Stem Leaf                     #             Boxplot
    7 6666666                  7             +-----+
    6                                        |     |
    5                                        |     |
    4                                        |     |
    3                                        |  +  |
    2                                        |     |
    1 555555555555555555      18             *-----*
      ----+----+----+----+
  Multiply Stem.Leaf by 10**+3


                   Normal Probability Plot
7500+                             * ** * *+*++  *
    |                                 ++++
    |                              +++
4500+                          ++++
    |                       +++
    |                   ++++
1500+     *    * * * **+************
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

==

Univariate Procedure, Ponding Volume

==

The UNIVARIATE Procedure
Variable: X3
Poll = N2

Moments			
N	44	Sum Weights	44
Mean	2196.31818	Sum Observations	96638
Std Deviation	1407.13322	Variance	1980023.9
Skewness	1.18205531	Kurtosis	-0.6112386
Uncorrected SS	297388824	Corrected SS	85141027.5
Coeff Variation	64.0678218	Std Error Mean	212.133314

Basic Statistical Measures			
Location		Variability	
Mean	2196.318	Std Deviation	1407
Median	1519.000	Variance	1980024
Mode	1314.000	Range	3287
		Interquartile Range	1746

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	10.35348	Pr > |t|	<.0001
Sign	M	22	Pr >= |M|	<.0001
Signed Rank	S	495	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	4601
99%	4601
95%	4601
90%	4601
75% Q3	3060
50% Median	1519
25% Q1	1314

10%	1314
5%	1314
1%	1314
0% Min	1314

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
1314	2496	4601	2467
1314	2493	4601	2476
1314	2486	4601	2479
1314	2485	4601	2480
1314	2482	4601	2492

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = N2

```
Stem Leaf                       #             Boxplot
  46 00000000000               11                |
  44                                             |
  42                                             |
  40                                             |
  38                                             |
  36                                             |
  34                                             |
  32                                             |
  30                                          +-----+
  28                                          |     |
  26                                          |     |
  24                                          |     |
  22                                          |  +  |
  20                                          |     |
  18                                          |     |
  16                                          |     |
  14 2222222222222             13             *-----*
  12 11111111111111111111      20             +-----+
     ----+----+----+----+
 Multiply Stem.Leaf by 10**+2


                       Normal Probability Plot
 4700+                                ***** ** * *   *
     |                                          ++
     |                                         +
     |                                       ++
     |                                      +
     |                                    ++
     |                                   +
     |                                  +
     |                                ++
     |                               +
     |                             ++
     |                            +
     |                           +
     |                         ++
     |                        +
```

```
     |                                           ++
     |                                         +     ********
1300+     *      *  *  **  ***********
      +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0         +1        +2
```

==

Univariate Procedure, Ponding Volume

==

The UNIVARIATE Procedure
Variable: X3
Poll = N3

Moments			
N	284	Sum Weights	284
Mean	2174.20423	Sum Observations	617474
Std Deviation	2057.69976	Variance	4234128.3
Skewness	1.47112	Kurtosis	0.92884034
Uncorrected SS	2540772888	Corrected SS	1198258308
Coeff Variation	94.6415123	Std Error Mean	122.102017

Basic Statistical Measures			
Location		Variability	
Mean	2174.204	Std Deviation	2058
Median	1240.000	Variance	4234128
Mode	812.000	Range	6820
		Interquartile Range	3722

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	17.80646	Pr > |t|	<.0001
Sign	M	142	Pr >= |M|	<.0001
Signed Rank	S	20235	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	4601
75% Q3	4534
50% Median	1240
25% Q1	812

10%	812
5%	780
1%	780
0% Min	780

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
780	2378	7600	2413
780	2377	7600	2415
780	2376	7600	2436
780	2374	7600	2441
780	2366	7600	2443

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = N3

```
                Histogram                         #             Boxplot
 7750+*******                                    20                |
     .                                                             |
     .                                                             |
     .                                                             |
     .                                                             |
     .*                                           3                |
     .*****************                          52             +-----+
 4250+                                                          |     |
     .                                                          |     |
     .                                                          |     |
     .                                                          |     |
     .                                                          |  +  |
     .*****                                      13             |     |
     .**************************                 81             *-----*
  750+***************************************   115             +-----+
      ----+----+----+----+----+----+----+----
      * may represent up to 3 counts


                      Normal Probability Plot
        7750+                                        ******** **
            |                                                 ++
            |                                               ++
            |                                            +++
            |                                          ++
            |                                       **+
            |                               *********
        4250+                                  +++
            |                                ++
            |                              ++
            |                           +++
            |                         ++
            |                      +++       **
            |                    ++ ********
         750+** ********************
             +----+----+----+----+----+----+----+----+----+----+
                 -2        -1         0        +1        +2
```

==
Univariate Procedure, Ponding Volume
==

The UNIVARIATE Procedure
Variable: X3
Poll = OP

Moments			
N	195	Sum Weights	195
Mean	2555.14872	Sum Observations	498254
Std Deviation	2215.67853	Variance	4909231.36
Skewness	1.07828229	Kurtosis	-0.1343213
Uncorrected SS	2225503954	Corrected SS	952390885
Coeff Variation	86.714269	Std Error Mean	158.668035

Basic Statistical Measures			
Location		Variability	
Mean	2555.149	Std Deviation	2216
Median	1314.000	Variance	4909231
Mode	812.000	Range	6820
		Interquartile Range	3722

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	16.10374	Pr > |t|	<.0001
Sign	M	97.5	Pr >= |M|	<.0001
Signed Rank	S	9555	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	4601
75% Q3	4534
50% Median	1314
25% Q1	812

10%	812
5%	812
1%	780
0% Min	780

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
780	2719	7600	2754
780	2716	7600	2764
780	2715	7600	2770
780	2706	7600	2775
780	2704	7600	2777

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = OP

```
                     Histogram                       #             Boxplot
   7750+*********                                   18                |
       .                                                              |
       .                                                              |
       .                                                              |
       .                                                              |
       .                                                              |
       .************************                    50             +-----+
   4250+                                                           |     |
       .                                                           |     |
       .                                                           |     |
       .                                                           |  +  |
       .                                                           |     |
       .                                                           |     |
       .**********************************          70             *-----*
    750+****************************                57             +-----+
        ----+----+----+----+----+----+----+
        * may represent up to 2 counts


                          Normal Probability Plot
         7750+                                          **********+**
             |                                                  ++
             |                                               +++
             |                                             ++
             |                                           ++
             |                                         ++
             |                                ********* 
         4250+                                   ++
             |                                 ++
             |                               ++
             |                            +++
             |                          ++
             |                        ++
             |                     ++**********
          750+** ****************
              +----+----+----+----+----+----+----+----+----+----+
                  -2        -1         0        +1        +2
```

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = TA

Moments			
N	81	Sum Weights	81
Mean	986.567901	Sum Observations	79912
Std Deviation	306.769251	Variance	94107.3735
Skewness	1.19609136	Kurtosis	-0.5844175
Uncorrected SS	86367204	Corrected SS	7528589.88
Coeff Variation	31.0945907	Std Error Mean	34.0854724

Basic Statistical Measures			
Location		Variability	
Mean	986.5679	Std Deviation	306.76925
Median	812.0000	Variance	94107
Mode	812.0000	Range	707.00000
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	28.94394	Pr > |t|	<.0001
Sign	M	40.5	Pr >= |M|	<.0001
Signed Rank	S	1660.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1519
99%	1519
95%	1519
90%	1519
75% Q3	812
50% Median	812
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
812	81	1519	39
812	80	1519	40
812	79	1519	41
812	78	1519	42
812	77	1519	43

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = TA

```
                     Histogram                       #             Boxplot
       1525+**********                               20               *
           .
           .
           .
           .
           .
           .
       1175+
           .
           .
           .
           .
           .
           .
        825+******************************           61            +--+--+
            ----+----+----+----+----+----+-
            * may represent up to 2 counts


                            Normal Probability Plot
           1525+                                ************   *   *
               |                                            +
               |                                          ++
               |                                        ++
               |                                       +
               |                                    ++
               |                                  ++
           1175+                                 +
               |                              ++
               |                             +
               |                           ++
               |                         ++
               |                        +
               |                      ++
            825+ *  *  ************************
                +----+----+----+----+----+----+----+----+----+----+
                    -2        -1         0        +1        +2
```

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = TCA

Moments			
N	161	Sum Weights	161
Mean	2941.72671	Sum Observations	473618
Std Deviation	2291.55958	Variance	5251245.29
Skewness	0.44974226	Kurtosis	-1.3124219
Uncorrected SS	2233453966	Corrected SS	840199246
Coeff Variation	77.8984523	Std Error Mean	180.600195

Basic Statistical Measures			
Location		Variability	
Mean	2941.727	Std Deviation	2292
Median	1519.000	Variance	5251245
Mode	812.000	Range	6788
		Interquartile Range	4288

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	16.28861	Pr > |t|	<.0001
Sign	M	80.5	Pr >= |M|	<.0001
Signed Rank	S	6520.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	5100
75% Q3	5100
50% Median	1519
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	322	7600	205
812	321	7600	206
812	319	7600	224
812	304	7600	225
812	301	7600	226

==

Univariate Procedure, Ponding Volume

==

The UNIVARIATE Procedure
Variable: X3
Poll = TCA

```
                 Histogram                   #             Boxplot
7750+*****                                  10                |
    .                                                         |
    .                                                         |
    .                                                         |
    .                                                         |
    .**************************             52             +-----+
    .*****                                  10             |     |
4250+                                                      |     |
    .                                                      |     |
    .                                                      |     |
    .                                                      |  +  |
    .                                                      |     |
    .**********                             20             *-----*
    .                                                      |     |
 750+***********************************    69             +-----+
     ----+----+----+----+----+----+----+
     * may represent up to 2 counts


                   Normal Probability Plot
7750+                                         ******+* *
    |                                           ++
    |                                         ++
    |                                       ++
    |                                     ++
    |                            *************
    |                          ***   ++
4250+                              ++
    |                            ++
    |                          ++
    |                        ++
    |                     +++
    |                   ++  ****
    |                 ++
 750+* * ********************
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

==
Univariate Procedure, Ponding Volume
==

The UNIVARIATE Procedure
Variable: X3
Poll = TCH

Moments			
N	107	Sum Weights	107
Mean	1574.57009	Sum Observations	168479
Std Deviation	1860.63037	Variance	3461945.38
Skewness	2.89275329	Kurtosis	6.81435957
Uncorrected SS	632248205	Corrected SS	366966210
Coeff Variation	118.167516	Std Error Mean	179.873927

Basic Statistical Measures			
Location		Variability	
Mean	1574.570	Std Deviation	1861
Median	812.000	Variance	3461945
Mode	812.000	Range	6788
		Interquartile Range	707.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	8.753743	Pr > |t|	<.0001
Sign	M	53.5	Pr >= |M|	<.0001
Signed Rank	S	2889	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	1519
75% Q3	1519
50% Median	812
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	530	7600	467
812	529	7600	515
812	527	7600	516
812	526	7600	518
812	525	7600	522

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = TCH

```
                  Histogram                      #             Boxplot
   7750+*****                                    9                *
       .
       .
       .
       .
       .
       .
   4250+
       .
       .
       .
       .
       .**************                          29             +--+--+
       .                                                       |     |
    750+**********************************      69             *-----*
        ----+----+----+----+----+----+----+
        * may represent up to 2 counts


                        Normal Probability Plot
         7750+                                    ***** * *  *
             |
             |
             |                                                ++
             |                                              ++
             |                                           +++
             |                                        +++
         4250+                                      ++
             |                                   +++
             |                                +++
             |                             +++
             |                           ++
             |                        +++ **********
             |                     +++
          750+*  * * *********************
              +----+----+----+----+----+----+----+----+----+----+
                  -2        -1         0        +1        +2
```

===

Univariate Procedure, Ponding Volume

===

The UNIVARIATE Procedure
Variable: X3
Poll = TCO

Moments			
N	177	Sum Weights	177
Mean	3183.99435	Sum Observations	563567
Std Deviation	2278.54461	Variance	5191765.54
Skewness	0.49594628	Kurtosis	-0.9717806
Uncorrected SS	2708144879	Corrected SS	913750735
Coeff Variation	71.5624577	Std Error Mean	171.265901

Basic Statistical Measures			
Location		Variability	
Mean	3183.994	Std Deviation	2279
Median	1953.000	Variance	5191766
Mode	812.000	Range	6788
		Interquartile Range	3789

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	18.59094	Pr > |t|	<.0001
Sign	M	88.5	Pr >= |M|	<.0001
Signed Rank	S	7876.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	7600
75% Q3	4601
50% Median	1953
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
812	818	7600	735
812	815	7600	746
812	813	7600	807
812	805	7600	810
812	804	7600	817

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = TCO

```
                Histogram                     #             Boxplot
      7750+**********                        19                |
          .                                                    |
          .                                                    |
          .                                                    |
          .                                                    |
          .********                          15                |
          .**************************        52             +-----+
      4250+                                                 |     |
          .                                                 |     |
          .                                                 |  +  |
          .                                                 |     |
          .                                                 |     |
          .*******************               37             *-----*
          .                                                 |     |
       750+****************************      54             +-----+
           ----+----+----+----+----+--
           * may represent up to 2 counts


                        Normal Probability Plot
        7750+                                      ********+* **
            |                                          ++
            |                                        ++
            |                                      ++
            |                                    ++
            |                                 +****
            |                         **********
        4250+                             ++
            |                           ++
            |                         ++
            |                      +++
            |                    ++
            |                  ++*******
            |                ++
         750+** * ****************
             +----+----+----+----+----+----+----+----+----+----+
                 -2        -1         0        +1        +2
```

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = TKN

Moments			
N	295	Sum Weights	295
Mean	2231.9661	Sum Observations	658430
Std Deviation	1993.97814	Variance	3975948.84
Skewness	1.44240004	Kurtosis	0.92929751
Uncorrected SS	2638522398	Corrected SS	1168928958
Coeff Variation	89.3372951	Std Error Mean	116.093896

Basic Statistical Measures			
Location		Variability	
Mean	2231.966	Std Deviation	1994
Median	1314.000	Variance	3975949
Mode	812.000	Range	6820
		Interquartile Range	3722

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	19.22553	Pr > |t|	<.0001
Sign	M	147.5	Pr >= |M|	<.0001
Signed Rank	S	21830	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	4601
75% Q3	4534
50% Median	1314
25% Q1	812

10%	812
5%	812
1%	780
0% Min	780

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
780	1973	7600	1875
780	1944	7600	1880
780	1943	7600	1882
780	1930	7600	1885
780	1922	7600	1993

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = TKN

```
                Histogram                  #              Boxplot
7750+*******                              19                 |
    .                                                        |
    .                                                        |
    .                                                        |
    .                                                        |
    .                                                        |
    .*********************                61              +-----+
4250+                                                     |     |
    .                                                     |     |
    .                                                     |     |
    .                                                     |     |
    .                                                     |  +  |
    .*********                            26              |     |
    .*********************************    97              *-----*
 750+*******************************      92              +-----+
     ----+----+----+----+----+----+---
     * may represent up to 3 counts


                        Normal Probability Plot
     7750+                                        ******** **
         |                                                 ++
         |                                               ++
         |                                            +++
         |                                          ++
         |                                       +++
         |                               **********
     4250+                                  +++
         |                                ++
         |                             +++
         |                           ++
         |                        +++
         |                      ++     ***
         |                   +**********
      750+** ******************
          +----+----+----+----+----+----+----+----+----+----+
              -2        -1         0        +1        +2
```

===

Univariate Procedure, Ponding Volume

===

The UNIVARIATE Procedure
Variable: X3
Poll = TL

Moments			
N	176	Sum Weights	176
Mean	2838.96023	Sum Observations	499657
Std Deviation	2185.89314	Variance	4778128.83
Skewness	0.55982495	Kurtosis	-1.1547784
Uncorrected SS	2254678895	Corrected SS	836172545
Coeff Variation	76.996258	Std Error Mean	164.767895

Basic Statistical Measures			
Location		Variability	
Mean	2838.960	Std Deviation	2186
Median	1519.000	Variance	4778129
Mode	812.000	Range	6788
		Interquartile Range	4288

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	17.23006	Pr > |t|	<.0001
Sign	M	88	Pr >= |M|	<.0001
Signed Rank	S	7788	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	5100
75% Q3	5100
50% Median	1519
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	1142	7600	1102
812	1140	7600	1103
812	1139	7600	1104
812	1136	7600	1107
812	1135	7600	1113

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = TL

```
                   Histogram                         #             Boxplot
   7750+*****                                        9                |
       .                                                              |
       .                                                              |
       .                                                              |
       .                                                              |
       .**************************                  53             +-----+
       .*****                                       10             |     |
   4250+                                                           |     |
       .                                                           |     |
       .                                                           |     |
       .                                                           |  +  |
       .                                                           |     |
       .******************                          37             *-----*
       .                                                           |     |
    750+*********************************           67             +-----+
        ----+----+----+----+----+----+----
        * may represent up to 2 counts


                          Normal Probability Plot
        7750+                                             **** *+**
            |                                                ++
            |                                             +++
            |                                           ++
            |                                         ++
            |                             *************
            |                           ***   ++
        4250+                               ++
            |                             ++
            |                          +++
            |                        ++
            |                      ++
            |                   +++******
            |                 ++
         750+** * *****************
             +----+----+----+----+----+----+----+----+----+----+
                 -2        -1         0        +1        +2
```

===

Univariate Procedure, Ponding Volume

===

The UNIVARIATE Procedure
Variable: X3
Poll = TN

Moments			
N	86	Sum Weights	86
Mean	1765.72093	Sum Observations	151852
Std Deviation	2148.98671	Variance	4618143.87
Skewness	2.35091832	Kurtosis	3.77751967
Uncorrected SS	660670484	Corrected SS	392542229
Coeff Variation	121.705909	Std Error Mean	231.731196

Basic Statistical Measures			
Location		Variability	
Mean	1765.721	Std Deviation	2149
Median	812.000	Variance	4618144
Mode	812.000	Range	6788
		Interquartile Range	707.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	7.619695	Pr > |t|	<.0001
Sign	M	43	Pr >= |M|	<.0001
Signed Rank	S	1870.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	7600
75% Q3	1519
50% Median	812
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	1338	7600	1278
812	1333	7600	1324
812	1332	7600	1326
812	1331	7600	1334
812	1330	7600	1337

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = TN

```
                 Histogram                     #             Boxplot
       7750+*****                             10                *
           .
           .
           .
           .
           .
           .
       4250+
           .
           .
           .
           .
           .**********                        20             +--+--+
           .                                                 |     |
        750+****************************      56             *-----*
            ----+----+----+----+----+---
            * may represent up to 2 counts


                         Normal Probability Plot
         7750+                                    ****** * *  *
             |                                                  +
             |                                                ++
             |                                             +++
             |                                           ++
             |                                         ++
             |                                      +++
         4250+                                    ++
             |                                  ++
             |                               +++
             |                             ++
             |                           ++
             |                        +++  *********
             |                      ++
          750+ *  * * *********************
              +----+----+----+----+----+----+----+----+----+----+
                  -2        -1         0        +1        +2
```

==

Univariate Procedure, Ponding Volume

==

The UNIVARIATE Procedure
Variable: X3
Poll = TNI

Moments			
N	172	Sum Weights	172
Mean	1234.4593	Sum Observations	212327
Std Deviation	321.09978	Variance	103105.069
Skewness	0.3231328	Kurtosis	-0.0753668
Uncorrected SS	279740007	Corrected SS	17630966.7
Coeff Variation	26.0113702	Std Error Mean	24.4836287

Basic Statistical Measures			
Location		Variability	
Mean	1234.459	Std Deviation	321.09978
Median	1314.000	Variance	103105
Mode	1314.000	Range	1173
		Interquartile Range	348.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	50.41979	Pr > |t|	<.0001
Sign	M	86	Pr >= |M|	<.0001
Signed Rank	S	7439	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	1953
99%	1953
95%	1953
90%	1519
75% Q3	1314
50% Median	1314
25% Q1	966

10%	780
5%	780
1%	780
0% Min	780

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
780	2138	1953	2071
780	2136	1953	2091
780	2131	1953	2134
780	2127	1953	2156
780	2126	1953	2157

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = TNI

```
                  Histogram                     #             Boxplot
       1975+*******                            13                0
           .
           .
           .
           .
           .
           .
           .
           .
           .*************                      26                |
           .                                                     |
           .                                                     |
       1375+                                                     |
           .**************************         52             +-----+
           .                                                  |     |
           .**********                         19             |  +  |
           .                                                  |     |
           .**********                         19             |     |
           .                                                  |     |
           .                                                  |     |
           .                                                  +-----+
           .                                                     |
           .                                                     |
           .************                       23                |
        775+**********                         20                |
            ----+----+----+----+----+-
            * may represent up to 2 counts
```

==

Univariate Procedure, Ponding Volume

==

The UNIVARIATE Procedure
Variable: X3
Poll = TNI

```
                  Normal Probability Plot
1975+                                        ****** ** *
    |                                              ++
    |                                             +
    |                                           ++
    |                                          +
    |                                        ++
    |                                      ++
    |                                     +
    |                                   ++
    |                                 *******
    |                                ++
    |                               +
1375+                             ++
    |                        *********
    |                          ++
    |                      ***+
    |                       +
    |                  ****+
    |                    +
    |                  ++
    |                 +
    |               ++
    |              +
    |            +******
 775+* ** *********
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

==

Univariate Procedure, Ponding Volume

==

The UNIVARIATE Procedure
Variable: X3
Poll = TP

Moments			
N	340	Sum Weights	340
Mean	2656.71471	Sum Observations	903283
Std Deviation	2063.87966	Variance	4259599.26
Skewness	0.8266184	Kurtosis	-0.6170668
Uncorrected SS	3843769379	Corrected SS	1444004149
Coeff Variation	77.6854081	Std Error Mean	111.92959

Basic Statistical Measures			
Location		Variability	
Mean	2656.715	Std Deviation	2064
Median	1314.000	Variance	4259599
Mode	812.000	Range	6820
		Interquartile Range	3448

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	23.73559	Pr > |t|	<.0001
Sign	M	170	Pr >= |M|	<.0001
Signed Rank	S	28985	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600.0
99%	7600.0
95%	7600.0
90%	5100.0
75% Q3	4567.5
50% Median	1314.0
25% Q1	1120.0

10%	812.0
5%	812.0
1%	780.0
0% Min	780.0

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
780	3000	7600	3034
780	2999	7600	3047
780	2989	7600	3064
780	2984	7600	3067
780	2982	7600	3078

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = TP

```
                   Histogram                          #     Boxplot
  7750+*********                                     18        |
      .                                                        |
      .                                                        |
      .                                                        |
      .                                                        |
      .**********************                        45        |
      .*******************************               64     +-----+
  4250+                                                     |     |
      .                                                     |     |
      .                                                     |     |
      .                                                     |  +  |
      .                                                     |     |
      .******************                            37     |     |
      .**********************************************  93     *-----*
   750+*****************************************     83        |
       ----+----+----+----+----+----+----+----+----+--
       * may represent up to 2 counts


                      Normal Probability Plot
         7750+                                        **********
             |                                              ++
             |                                           +++
             |                                         ++
             |                                      +++
             |                                 ********
             |                           *******++
         4250+                               ++
             |                             ++
             |                          +++
             |                        ++
             |                     +++
             |                   ++   ****
             |                +********
          750+******************
              +----+----+----+----+----+----+----+----+----+----+
                  -2        -1         0        +1        +2
```

==
Univariate Procedure, Ponding Volume
==

The UNIVARIATE Procedure
Variable: X3
Poll = TSS

Moments			
N	291	Sum Weights	291
Mean	3026.13058	Sum Observations	880604
Std Deviation	2143.691	Variance	4595411.1
Skewness	0.48941951	Kurtosis	-1.052221
Uncorrected SS	3997491916	Corrected SS	1332669219
Coeff Variation	70.8393422	Std Error Mean	125.665392

Basic Statistical Measures			
Location		Variability	
Mean	3026.131	Std Deviation	2144
Median	1519.000	Variance	4595411
Mode	812.000	Range	6788
		Interquartile Range	3481

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	24.08086	Pr > |t|	<.0001
Sign	M	145.5	Pr >= |M|	<.0001
Signed Rank	S	21243	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	5100
75% Q3	4601
50% Median	1519
25% Q1	1120

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	3397	7600	3275
812	3356	7600	3325
812	3353	7600	3333
812	3352	7600	3334
812	3350	7600	3351

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = TSS

```
                 Histogram                      #             Boxplot
  7750+**********                              19                |
      .                                                          |
      .                                                          |
      .                                                          |
      .                                                          |
      .**************************                51                |
      .*********************************         65             +-----+
  4250+                                                         |     |
      .                                                         |     |
      .                                                         |  +  |
      .                                                         |     |
      .                                                         |     |
      .******************                        36             *-----*
      .****************************              58             +-----+
   750+*******************************           62                |
       ----+----+----+----+----+----+---
       * may represent up to 2 counts


                          Normal Probability Plot
       7750+                                        ********+**
           |                                            ++
           |                                          ++
           |                                       +++
           |                                     ++
           |                                ********
           |                          *******++
       4250+                              ++
           |                            ++
           |                         +++
           |                       ++
           |                     ++
           |                  +++  ****
           |                +*******
        750+** **************
            +----+----+----+----+----+----+----+----+----+----+
                 -2        -1         0        +1        +2
```

===

Univariate Procedure, Ponding Volume

===

The UNIVARIATE Procedure
Variable: X3
Poll = TZ

Moments			
N	231	Sum Weights	231
Mean	3372.09524	Sum Observations	778954
Std Deviation	2205.43181	Variance	4863929.46
Skewness	0.20189414	Kurtosis	-1.1876129
Uncorrected SS	3745410850	Corrected SS	1118703776
Coeff Variation	65.4024176	Std Error Mean	145.10676

Basic Statistical Measures			
Location		Variability	
Mean	3372.095	Std Deviation	2205
Median	4534.000	Variance	4863929
Mode	812.000	Range	6788
		Interquartile Range	4288

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	23.23872	Pr > |t|	<.0001
Sign	M	115.5	Pr >= |M|	<.0001
Signed Rank	S	13398	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	7600
99%	7600
95%	7600
90%	5100
75% Q3	5100
50% Median	4534
25% Q1	812

10%	812
5%	812
1%	812
0% Min	812

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
812	1674	7600	1558
812	1673	7600	1629
812	1668	7600	1637
812	1661	7600	1652
812	1660	7600	1664

Univariate Procedure, Ponding Volume

The UNIVARIATE Procedure
Variable: X3
Poll = TZ

```
                 Histogram                         #             Boxplot
  7750+**********                                 19                |
      .                                                              |
      .                                                              |
      .                                                              |
      .                                                              |
      .**************************                 53              +-----+
      .**************************                 54              *-----*
  4250+                                                           |     |
      .                                                           |     |
      .                                                           |  +  |
      .                                                           |     |
      .                                                           |     |
      .*******************                        40              |     |
      .                                                           |     |
   750+********************************           65              +-----+
       ----+----+----+----+----+----+---
       * may represent up to 2 counts


                         Normal Probability Plot
       7750+                                          ********** *
           |                                             ++
           |                                           ++
           |                                        +++
           |                                      ++
           |                                 **********
           |                           *******++
       4250+                               +++
           |                             ++
           |                           ++
           |                         ++
           |                      +++
           |                    ++******
           |                  ++
        750+* *****************
            +----+----+----+----+----+----+----+----+----+----+
                 -2        -1         0        +1        +2
```

===

Univariate Procedure, Media Depth

===

The UNIVARIATE Procedure
Variable: X4
Poll = DCA

Moments			
N	117	Sum Weights	117
Mean	20.5641026	Sum Observations	2406
Std Deviation	2.98092966	Variance	8.88594164
Skewness	0.29754359	Kurtosis	-1.9450156
Uncorrected SS	50508	Corrected SS	1030.76923
Coeff Variation	14.4957926	Std Error Mean	0.27558704

Basic Statistical Measures			
Location		Variability	
Mean	20.56410	Std Deviation	2.98093
Median	18.00000	Variance	8.88594
Mode	18.00000	Range	6.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	74.61926	Pr > |t|	<.0001
Sign	M	58.5	Pr >= |M|	<.0001
Signed Rank	S	3451.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	24
99%	24
95%	24
90%	24
75% Q3	24
50% Median	18
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	158	24	194
18	157	24	195
18	155	24	196
18	154	24	197
18	153	24	198

```
                 Histogram                       #             Boxplot
   24.25+*************************              50             +-----+
        .                                                      |     |
        .                                                      |     |
        .                                                      |     |
        .                                                      |     |
        .                                                      |     |
   21.25+                                                      |     |
        .                                                      |  +  |
        .                                                      |     |
        .                                                      |     |
        .                                                      |     |
        .                                                      |     |
   18.25+**********************************     67             *-----*
         ----+----+----+----+----+----+----
         * may represent up to 2 counts


                         Normal Probability Plot
        24.25+                           ******************* *  *
             |                                   ++
             |                                  +
             |                                ++
             |                              ++
             |                             +
        21.25+                           ++
             |                         ++
             |                        +
             |                      ++
             |                    ++
```

```
         |                   +
    18.25+*  * **********************
          +----+----+----+----+----+----+----+----+----+----+
              -2        -1         0        +1        +2
```

===
Univariate Procedure, Media Depth
===

The UNIVARIATE Procedure
Variable: X4
Poll = DCH

Moments			
N	64	Sum Weights	64
Mean	18	Sum Observations	1152
Std Deviation	0	Variance	0
Skewness	.	Kurtosis	.
Uncorrected SS	20736	Corrected SS	0
Coeff Variation	0	Std Error Mean	0

Basic Statistical Measures			
Location		Variability	
Mean	18.00000	Std Deviation	0
Median	18.00000	Variance	0
Mode	18.00000	Range	0
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	.	Pr > |t|	.
Sign	M	32	Pr >= |M|	<.0001
Signed Rank	S	1040	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	18
99%	18
95%	18
90%	18
75% Q3	18
50% Median	18
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	423	18	419
18	422	18	420
18	421	18	421
18	420	18	422
18	419	18	423

==

Univariate Procedure, Media Depth

==

The UNIVARIATE Procedure
Variable: X4
Poll = DCO

Moments			
N	112	Sum Weights	112
Mean	20.8392857	Sum Observations	2334
Std Deviation	3.59818165	Variance	12.9469112
Skewness	1.89093294	Kurtosis	8.79798741
Uncorrected SS	50076	Corrected SS	1437.10714
Coeff Variation	17.2663387	Std Error Mean	0.33999621

Basic Statistical Measures			
Location		Variability	
Mean	20.83929	Std Deviation	3.59818
Median	18.00000	Variance	12.94691
Mode	18.00000	Range	24.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	61.2927	Pr > |t|	<.0001
Sign	M	56	Pr >= |M|	<.0001
Signed Rank	S	3164	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	42
99%	24
95%	24
90%	24
75% Q3	24
50% Median	18
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	642	24	635
18	638	24	639
18	637	24	640
18	636	24	641
18	625	42	611

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = DCO

```
                 Histogram                       #             Boxplot
   42.5+*                                        1                0
       .
       .
       .
       .
       .
       .
       .
       .
       .
       .
       .
   30.5+
       .
       .
       .
       .
       .
       .************************                49             +-----+
       .                                                        |     |
       .                                                        |     |
       .                                                        |     |
       .                                                        |  +  |
       .                                                        |     |
   18.5+******************************          62             *-----*
        ----+----+----+----+----+----+-
        * may represent up to 2 counts
```

==

Univariate Procedure, Media Depth

==

The UNIVARIATE Procedure
Variable: X4
Poll = DCO

```
                   Normal Probability Plot
42.5+                                                  *
    |
    |
    |
    |
    |
    |
    |
    |
    |
    |
    |
30.5+
    |                                                +++
    |                                             +++
    |                                           ++
    |                                        +++
    |                                     +++
    |                          *****************  * *
    |                                ++
    |                             +++
    |                          +++
    |                       +++
    |                    +++
18.5+*  * * ********************
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = DI

Moments			
N	66	Sum Weights	66
Mean	18	Sum Observations	1188
Std Deviation	0	Variance	0
Skewness	.	Kurtosis	.
Uncorrected SS	21384	Corrected SS	0
Coeff Variation	0	Std Error Mean	0

Basic Statistical Measures			
Location		Variability	
Mean	18.00000	Std Deviation	0
Median	18.00000	Variance	0
Mode	18.00000	Range	0
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	.	Pr > |t|	.
Sign	M	33	Pr >= |M|	<.0001
Signed Rank	S	1105.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	18
99%	18
95%	18
90%	18
75% Q3	18
50% Median	18
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	885	18	881
18	884	18	882
18	883	18	883
18	882	18	884
18	881	18	885

==
Univariate Procedure, Media Depth
==

The UNIVARIATE Procedure
Variable: X4
Poll = DL

Moments			
N	116	Sum Weights	116
Mean	18	Sum Observations	2088
Std Deviation	0	Variance	0
Skewness	.	Kurtosis	.
Uncorrected SS	37584	Corrected SS	0
Coeff Variation	0	Std Error Mean	0

Basic Statistical Measures			
Location		Variability	
Mean	18.00000	Std Deviation	0
Median	18.00000	Variance	0
Mode	18.00000	Range	0
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	.	Pr > |t|	.
Sign	M	58	Pr >= |M|	<.0001
Signed Rank	S	3393	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	18
99%	18
95%	18
90%	18
75% Q3	18
50% Median	18
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
18	1001	18	997
18	1000	18	998
18	999	18	999
18	998	18	1000
18	997	18	1001

==

Univariate Procedure, Media Depth

==

The UNIVARIATE Procedure
Variable: X4
Poll = DN

Moments			
N	75	Sum Weights	75
Mean	18.8	Sum Observations	1410
Std Deviation	2.05334269	Variance	4.21621622
Skewness	2.20155552	Kurtosis	2.92413066
Uncorrected SS	26820	Corrected SS	312
Coeff Variation	10.9220356	Std Error Mean	0.23709959

Basic Statistical Measures			
Location		Variability	
Mean	18.80000	Std Deviation	2.05334
Median	18.00000	Variance	4.21622
Mode	18.00000	Range	6.00000
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	79.29157	Pr > |t|	<.0001
Sign	M	37.5	Pr >= |M|	<.0001
Signed Rank	S	1425	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	24
99%	24
95%	24
90%	24
75% Q3	18
50% Median	18
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	1249	24	1188
18	1248	24	1228
18	1247	24	1250
18	1246	24	1251
18	1245	24	1252

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = DN

```
                  Histogram                         #             Boxplot
    24.25+*****                                    10                *
         .
         .
         .
         .
         .
    21.25+
         .
         .
         .
         .
         .
    18.25+*********************************        65             +--+--+
          ----+----+----+----+----+----+---
          * may represent up to 2 counts


                            Normal Probability Plot
         24.25+                                 ***** ** *   *
              |                                             +++
              |                                           ++
              |                                         ++
              |                                      +++
              |                                    ++
         21.25+                                 +++
              |                               ++
              |                            +++
              |                          ++
              |                       +++
              |                     ++
         18.25+ *   * ** **************************
               +----+----+----+----+----+----+----+----+----+----+
                   -2        -1         0        +1        +2
```

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = DP

Moments			
N	86	Sum Weights	86
Mean	18.9069767	Sum Observations	1626
Std Deviation	2.16185055	Variance	4.67359781
Skewness	1.98242856	Kurtosis	1.97542843
Uncorrected SS	31140	Corrected SS	397.255814
Coeff Variation	11.4341419	Std Error Mean	0.23311834

Basic Statistical Measures			
Location		Variability	
Mean	18.90698	Std Deviation	2.16185
Median	18.00000	Variance	4.67360
Mode	18.00000	Range	6.00000
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	81.10463	Pr > |t|	<.0001
Sign	M	43	Pr >= |M|	<.0001
Signed Rank	S	1870.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	24
99%	24
95%	24
90%	24
75% Q3	18
50% Median	18
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	2582	24	2568
18	2581	24	2569
18	2580	24	2570
18	2579	24	2571
18	2578	24	2572

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = DP

```
                   Histogram                       #             Boxplot
24.25+*******                                     13                *
     .
     .
     .
     .
     .
21.25+
     .
     .
     .
     .
     .
18.25+*************************************       73             +--+--+
      ----+----+----+----+----+----+----+--
      * may represent up to 2 counts


                        Normal Probability Plot
      24.25+                                    ******* * *  *+
           |                                                ++
           |                                             +++
           |                                           ++
           |                                         ++
           |                                      +++
      21.25+                                    ++
           |                                  ++
           |                                ++
           |                             +++
           |                           ++
           |                         ++
      18.25+ *  * * ****************************
            +----+----+----+----+----+----+----+----+----+----+
                 -2        -1         0        +1        +2
```

===

Univariate Procedure, Media Depth

===

The UNIVARIATE Procedure
Variable: X4
Poll = DZ

Moments			
N	132	Sum Weights	132
Mean	21	Sum Observations	2772
Std Deviation	3.01142861	Variance	9.06870229
Skewness	0	Kurtosis	-2.0310078
Uncorrected SS	59400	Corrected SS	1188
Coeff Variation	14.3401363	Std Error Mean	0.26211122

Basic Statistical Measures			
Location		Variability	
Mean	21.00000	Std Deviation	3.01143
Median	21.00000	Variance	9.06870
Mode	18.00000	Range	6.00000
		Interquartile Range	6.00000

Note: The mode displayed is the smallest of 2 modes with a count of 66.

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	80.11866	Pr > |t|	<.0001
Sign	M	66	Pr >= |M|	<.0001
Signed Rank	S	4389	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	24
99%	24
95%	24
90%	24
75% Q3	24

50% Median	21
25% Q1	18
10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	1409	24	1466
18	1408	24	1467
18	1407	24	1468
18	1406	24	1469
18	1405	24	1470

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = DZ

```
                  Histogram                          #             Boxplot
   24.25+*********************************          66             +-----+
        .                                                          |     |
        .                                                          |     |
        .                                                          |     |
        .                                                          |     |
        .                                                          |     |
   21.25+                                                          *--+--*
        .                                                          |     |
        .                                                          |     |
        .                                                          |     |
        .                                                          |     |
        .                                                          |     |
   18.25+*********************************          66             +-----+
         ----+----+----+----+----+----+---
         * may represent up to 2 counts


                          Normal Probability Plot
        24.25+                         ******************** **   *
             |                                 +
             |                               ++
             |                             ++
             |                            +
             |                          ++
        21.25+                        ++
             |                       +
             |                     ++
             |                    +
             |                  ++
             |                ++
        18.25+*  ** ********************
              +----+----+----+----+----+----+----+----+----+----+
                  -2        -1         0        +1        +2
```

==

Univariate Procedure, Media Depth

==

The UNIVARIATE Procedure
Variable: X4
Poll = EC

Moments			
N	96	Sum Weights	96
Mean	23.3541667	Sum Observations	2242
Std Deviation	10.0890552	Variance	101.789035
Skewness	1.83480222	Kurtosis	1.69625614
Uncorrected SS	62030	Corrected SS	9669.95833
Coeff Variation	43.2002364	Std Error Mean	1.02970989

Basic Statistical Measures			
Location		Variability	
Mean	23.35417	Std Deviation	10.08906
Median	18.00000	Variance	101.78904
Mode	18.00000	Range	29.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	22.68034	Pr > |t|	<.0001
Sign	M	48	Pr >= |M|	<.0001
Signed Rank	S	2328	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	47
75% Q3	24
50% Median	18
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
18	3490	47	3500
18	3489	47	3501
18	3488	47	3502
18	3487	47	3503
18	3486	47	3504

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = EC

```
                 Histogram                         #             Boxplot
    47+*******                                    14                *
      .
      .
      .
      .
      .
      .
    33+
      .
      .
      .
      .*********                                  18             +-----+
      .                                                          |  +  |
      .                                                          |     |
    19+*******************************************  64            *-----*
       ----+----+----+----+----+----+--
       * may represent up to 2 counts


                        Normal Probability Plot
        47+                                    ********* * ++*
          |                                                ++
          |                                              ++
          |                                            ++
          |                                          ++
          |                                        ++
          |                                      ++
        33+                                    ++
          |                                  ++
          |                                ++
          |                              ++
          |                            ++ *******
          |                          ++
          |                        ++
        19+*    * **********************
           +----+----+----+----+----+----+----+----+----+----+
               -2        -1         0        +1        +2
```

==
Univariate Procedure, Media Depth
==

The UNIVARIATE Procedure
Variable: X4
Poll = ENC

Moments			
N	10	Sum Weights	10
Mean	24	Sum Observations	240
Std Deviation	0	Variance	0
Skewness	.	Kurtosis	.
Uncorrected SS	5760	Corrected SS	0
Coeff Variation	0	Std Error Mean	0

Basic Statistical Measures			
Location		Variability	
Mean	24.00000	Std Deviation	0
Median	24.00000	Variance	0
Mode	24.00000	Range	0
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	.	Pr > |t|	.
Sign	M	5	Pr >= |M|	0.0020
Signed Rank	S	27.5	Pr >= |S|	0.0020

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	24
99%	24
95%	24
90%	24
75% Q3	24
50% Median	24
25% Q1	24

10%	24
5%	24
1%	24
0% Min	24

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
24	3539	24	3535
24	3538	24	3536
24	3537	24	3537
24	3536	24	3538
24	3535	24	3539

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = FC

Moments			
N	25	Sum Weights	25
Mean	40.56	Sum Observations	1014
Std Deviation	10.5399241	Variance	111.09
Skewness	-1.0436508	Kurtosis	-0.9975532
Uncorrected SS	43794	Corrected SS	2666.16
Coeff Variation	25.9860062	Std Error Mean	2.10798482

Basic Statistical Measures			
Location		Variability	
Mean	40.56000	Std Deviation	10.53992
Median	47.00000	Variance	111.09000
Mode	47.00000	Range	23.00000
		Interquartile Range	23.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	19.24113	Pr > |t|	<.0001
Sign	M	12.5	Pr >= |M|	<.0001
Signed Rank	S	162.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	47
75% Q3	47
50% Median	47
25% Q1	24

10%	24
5%	24
1%	24
0% Min	24

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
24	3511	47	3525
24	3510	47	3526
24	3509	47	3527
24	3508	47	3528
24	3507	47	3529

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = FC

```
Stem Leaf                        #             Boxplot
   4 777777777777777777         18             +-----+
   4                                           |  +  |
   3                                           |     |
   3                                           |     |
   2                                           |     |
   2 4444444                     7             +-----+
     ----+----+----+----+
 Multiply Stem.Leaf by 10**+1


                Normal Probability Plot
47.5+                    ************+** * * *    *
    |                         +++++
    |                    +++++
    |               +++++
    |           ++++
22.5+    *+++++* * * ** *
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

==

Univariate Procedure, Media Depth

==

The UNIVARIATE Procedure
Variable: X4
Poll = N2

Moments			
N	44	**Sum Weights**	44
Mean	28.0681818	**Sum Observations**	1235
Std Deviation	12.6388065	**Variance**	159.739429
Skewness	0.80922142	**Kurtosis**	-1.2526766
Uncorrected SS	41533	**Corrected SS**	6868.79545
Coeff Variation	45.0289462	**Std Error Mean**	1.90537177

Basic Statistical Measures			
Location		**Variability**	
Mean	28.06818	**Std Deviation**	12.63881
Median	24.00000	**Variance**	159.73943
Mode	18.00000	**Range**	29.00000
		Interquartile Range	29.00000

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	14.73108	**Pr > |t|**	<.0001
Sign	**M**	22	**Pr >= |M|**	<.0001
Signed Rank	**S**	495	**Pr >= |S|**	<.0001

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	47
99%	47
95%	47
90%	47
75% Q3	47
50% Median	24
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	2496	47	2489
18	2493	47	2490
18	2486	47	2491
18	2485	47	2494
18	2482	47	2495

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = N2

```
Stem Leaf                     #             Boxplot
  46 0000000000000           13             +-----+
  44                                        |     |
  42                                        |     |
  40                                        |     |
  38                                        |     |
  36                                        |     |
  34                                        |     |
  32                                        |     |
  30                                        |     |
  28                                        |  +  |
  26                                        |     |
  24 00000000000             11             *-----*
  22                                        |     |
  20                                        |     |
  18 00000000000000000000    20             +-----+
     ----+----+----+----+


                 Normal Probability Plot
47+                               ****** **+* *   *
  |                                      ++
  |                                     +
  |                                   ++
  |                                 ++
  |                                +
  |                              ++
33+                             +
  |                           ++
  |                         ++
  |                        +
  |                      ++*******
  |                     +
  |                   ++
19+   *   * * ** ***********
   +----+----+----+----+----+----+----+----+----+----+
       -2        -1         0        +1        +2
```

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = N3

Moments			
N	284	Sum Weights	284
Mean	26.1267606	Sum Observations	7420
Std Deviation	9.64776043	Variance	93.0792813
Skewness	1.2144121	Kurtosis	0.24763972
Uncorrected SS	220202	Corrected SS	26341.4366
Coeff Variation	36.926738	Std Error Mean	0.57248926

Basic Statistical Measures			
Location		Variability	
Mean	26.12676	Std Deviation	9.64776
Median	24.00000	Variance	93.07928
Mode	18.00000	Range	29.00000
		Interquartile Range	12.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	45.63712	Pr > |t|	<.0001
Sign	M	142	Pr >= |M|	<.0001
Signed Rank	S	20235	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	47
75% Q3	30
50% Median	24
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	2452	47	2393
18	2450	47	2400
18	2449	47	2411
18	2446	47	2422
18	2445	47	2447

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = N3

```
                 Histogram                       #             Boxplot
   47+*************                             38                |
     .                                                            |
     .                                                            |
     .                                                            |
     .                                                            |
     .*******                                   19                |
     .                                                            |
   33+                                                            |
     .*********                                 25             +-----+
     .                                                         |     |
     .                                                         |  +  |
     .********************************          94             *-----*
     .                                                         |     |
     .                                                         |     |
   19+************************************     108             +-----+
      ----+----+----+----+----+----+----+-
      * may represent up to 3 counts


                          Normal Probability Plot
         47+                                    ************ **
           |                                            ++
           |                                          ++
           |                                        ++
           |                                      ++
           |                                 ****+
           |                                  ++
         33+                                ++
           |                              +***
           |                           +++
           |                         ++
           |                      **********
           |                     ++
           |                   ++
         19+** *******************
            +----+----+----+----+----+----+----+----+----+----+
                -2        -1         0        +1        +2
```

===

Univariate Procedure, Media Depth

===

The UNIVARIATE Procedure
Variable: X4
Poll = OP

Moments			
N	195	Sum Weights	195
Mean	23.2358974	Sum Observations	4531
Std Deviation	6.48040214	Variance	41.9956119
Skewness	1.76299391	Kurtosis	3.34006976
Uncorrected SS	113429	Corrected SS	8147.14872
Coeff Variation	27.8896142	Std Error Mean	0.46407124

Basic Statistical Measures			
Location		Variability	
Mean	23.23590	Std Deviation	6.48040
Median	24.00000	Variance	41.99561
Mode	24.00000	Range	29.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	50.06968	Pr > |t|	<.0001
Sign	M	97.5	Pr >= |M|	<.0001
Signed Rank	S	9555	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	36
90%	36
75% Q3	24
50% Median	24
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
18	2776	47	2707
18	2774	47	2709
18	2772	47	2710
18	2769	47	2711
18	2768	47	2712

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = OP

```
                 Histogram                            #          Boxplot
  47+***                                              5             *
    .
    .
    .
    .
    .*********                                       17             0
    .
  33+
    .***                                              5             |
    .                                                               |
    .                                                               |
    .*******************************************     85          +-----+
    .                                                            |  +  |
    .                                                            |     |
  19+******************************************      83          +-----+
     ----+----+----+----+----+----+----+----+---
     * may represent up to 2 counts


                    Normal Probability Plot
         47+                                             *** **
           |
           |
           |
           |                                                +++
           |                                     ********+++
           |                                          +++
         33+                                       +++
           |                                    **+
           |                                 +++
           |                              +++
           |                       **************
           |                        +++
           |                     +++
         19+** ********************
           +----+----+----+----+----+----+----+----+----+----+
               -2        -1         0        +1        +2
```

==
Univariate Procedure, Media Depth
==

The UNIVARIATE Procedure
Variable: X4
Poll = TA

Moments			
N	81	Sum Weights	81
Mean	25.1604938	Sum Observations	2038
Std Deviation	12.58318	Variance	158.33642
Skewness	1.19609136	Kurtosis	-0.5844175
Uncorrected SS	63944	Corrected SS	12666.9136
Coeff Variation	50.0116576	Std Error Mean	1.39813111

Basic Statistical Measures			
Location		Variability	
Mean	25.16049	Std Deviation	12.58318
Median	18.00000	Variance	158.33642
Mode	18.00000	Range	29.00000
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	17.9958	Pr > |t|	<.0001
Sign	M	40.5	Pr >= |M|	<.0001
Signed Rank	S	1660.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	47
75% Q3	18
50% Median	18
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	81	47	39
18	80	47	40
18	79	47	41
18	78	47	42
18	77	47	43

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TA

```
                 Histogram                        #              Boxplot
    47+**********                                20                 *
      .
      .
      .
      .
      .
      .
    33+
      .
      .
      .
      .
      .
      .
    19+******************************            61              +--+--+
       ----+----+----+----+----+----+-
       * may represent up to 2 counts


                          Normal Probability Plot
        47+                             ************   *   *
          |                                     ++
          |                                    +
          |                                  ++
          |                                 +
          |                               ++
          |                              +
        33+                            ++
          |                          ++
          |                         +
          |                       ++
          |                      +
          |                    ++
          |                  ++
        19+ *  *  ************************
           +----+----+----+----+----+----+----+----+----+----+
               -2        -1         0        +1        +2
```

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TCA

Moments			
N	161	Sum Weights	161
Mean	24.2857143	Sum Observations	3910
Std Deviation	9.03149252	Variance	81.5678571
Skewness	1.86630049	Kurtosis	2.24021103
Uncorrected SS	108008	Corrected SS	13050.8571
Coeff Variation	37.1884986	Std Error Mean	0.71178132

Basic Statistical Measures			
Location		Variability	
Mean	24.28571	Std Deviation	9.03149
Median	24.00000	Variance	81.56786
Mode	24.00000	Range	29.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	34.11963	Pr > |t|	<.0001
Sign	M	80.5	Pr >= |M|	<.0001
Signed Rank	S	6520.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	47
75% Q3	24
50% Median	24
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
18	322	47	251
18	321	47	252
18	319	47	253
18	304	47	302
18	301	47	318

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TCA

```
                      Histogram                         #             Boxplot
       47+**********                                   20                *
          .
          .
          .
          .
          .
          .
       33+
          .
          .
          .
          .***********************************         72             +--+--+
          .                                                           |     |
          .                                                           |     |
       19+**********************************           69             +-----+
           ----+----+----+----+----+----+----+-
           * may represent up to 2 counts


                             Normal Probability Plot
             47+                                     ********** * *
               |                                               +++
               |                                             ++
               |                                           ++
               |                                         ++
               |                                      +++
               |                                    ++
             33+                                  ++
               |                                ++
               |                              ++
               |                           +++
               |                       *************
               |                       ++
               |                     ++
             19+* * *******************
                +----+----+----+----+----+----+----+----+----+----+
                    -2        -1         0        +1        +2
```

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TCH

Moments			
N	107	Sum Weights	107
Mean	26.364486	Sum Observations	2821
Std Deviation	12.7482093	Variance	162.51684
Skewness	0.99453038	Kurtosis	-0.9713799
Uncorrected SS	91601	Corrected SS	17226.785
Coeff Variation	48.3537183	Std Error Mean	1.23241591

Basic Statistical Measures			
Location		Variability	
Mean	26.36449	Std Deviation	12.74821
Median	18.00000	Variance	162.51684
Mode	18.00000	Range	29.00000
		Interquartile Range	29.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	21.39252	Pr > |t|	<.0001
Sign	M	53.5	Pr >= |M|	<.0001
Signed Rank	S	2889	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	47
75% Q3	47
50% Median	18
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	530	47	510
18	529	47	513
18	527	47	514
18	526	47	519
18	525	47	528

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TCH

```
                      Histogram                        #              Boxplot
   47+***************                                 29              +-----+
     .                                                                |     |
     .                                                                |     |
     .                                                                |     |
     .                                                                |     |
     .                                                                |     |
     .                                                                |     |
   33+                                                                |     |
     .                                                                |     |
     .                                                                |     |
     .                                                                |  +  |
     .*****                                            9              |     |
     .                                                                |     |
     .                                                                |     |
   19+***********************************             69              *-----*
      ----+----+----+----+----+----+----+
      * may represent up to 2 counts


                             Normal Probability Plot
         47+                             ************* *  *   *
           |                                     ++
           |                                    +
           |                                  ++
           |                                 +
           |                               ++
           |                             ++
         33+                            +
           |                          ++
           |                         +
           |                       ++
           |                      +    ***
           |                    ++
           |                   +
         19+*  * * **********************
            +----+----+----+----+----+----+----+----+----+----+
                -2        -1         0        +1        +2
```

==
Univariate Procedure, Media Depth
==

The UNIVARIATE Procedure
Variable: X4
Poll = TCO

Moments			
N	177	Sum Weights	177
Mean	26.6836158	Sum Observations	4723
Std Deviation	10.1293572	Variance	102.603878
Skewness	1.22036679	Kurtosis	-0.0800508
Uncorrected SS	144085	Corrected SS	18058.2825
Coeff Variation	37.9609619	Std Error Mean	0.76136911

Basic Statistical Measures			
Location		Variability	
Mean	26.68362	Std Deviation	10.12936
Median	24.00000	Variance	102.60388
Mode	24.00000	Range	29.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	35.04689	Pr > |t|	<.0001
Sign	M	88.5	Pr >= |M|	<.0001
Signed Rank	S	7876.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	47
75% Q3	24
50% Median	24
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	818	47	767
18	815	47	771
18	813	47	780
18	805	47	781
18	804	47	814

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TCO

```
                     Histogram                            #          Boxplot
    47+************                                      24             *
      .
      .*******                                           13             *
      .
      .
      .
      .
    33+
      .
      .
      .
      .******************************************        86          +-----+
      .                                                              |     |
      .                                                              |     |
    19+***************************                       54          +--+--+
       ----+----+----+----+----+----+----+----+---
       * may represent up to 2 counts


                          Normal Probability Plot
           47+                                ***********+* **
             |                                       ++
             |                             ****    ++
             |                                   ++
             |                                 ++
             |                               ++
             |                             ++
           33+                           ++
             |                         ++
             |                       ++
             |                     ++
             |                **************
             |                 ++
             |               ++
           19+** * ****************
              +----+----+----+----+----+----+----+----+----+----+
                  -2        -1         0        +1        +2
```

==

Univariate Procedure, Media Depth

==

The UNIVARIATE Procedure
Variable: X4
Poll = TKN

Moments			
N	295	Sum Weights	295
Mean	25.5762712	Sum Observations	7545
Std Deviation	9.68939983	Variance	93.884469
Skewness	1.32477338	Kurtosis	0.45648217
Uncorrected SS	220575	Corrected SS	27602.0339
Coeff Variation	37.8843333	Std Error Mean	0.56413867

Basic Statistical Measures			
Location		Variability	
Mean	25.57627	Std Deviation	9.68940
Median	24.00000	Variance	93.88447
Mode	18.00000	Range	29.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	45.33685	Pr > |t|	<.0001
Sign	M	147.5	Pr >= |M|	<.0001
Signed Rank	S	21830	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	47
75% Q3	24
50% Median	24
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	1995	47	1934
18	1992	47	1951
18	1991	47	1957
18	1990	47	1960
18	1987	47	1989

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TKN

```
                  Histogram                      #          Boxplot
   47+*************                             39             *
     .
     .
     .
     .
     .*******                                   19             0
     .
   33+
     .*****                                     14             |
     .                                                         |
     .                                                         |
     .*********************************         99          +--+--+
     .                                                      |     |
     .                                                      |     |
   19+******************************************  124       +-----+
      ----+----+----+----+----+----+----+----+--
      * may represent up to 3 counts


                        Normal Probability Plot
          47+                                      ************+**
            |                                               ++
            |                                            +++
            |                                          ++
            |                                        ++
            |                                    ***+
            |                                    ++
          33+                                  ++
            |                                ++**
            |                              ++
            |                            ++
            |                         **********
            |                        ++
            |                      ++
          19+** ********************
             +----+----+----+----+----+----+----+----+----+----+
                 -2        -1         0        +1        +2
```

===
Univariate Procedure, Media Depth
===

The UNIVARIATE Procedure
Variable: X4
Poll = TL

Moments			
N	176	Sum Weights	176
Mean	26.3238636	Sum Observations	4633
Std Deviation	10.5165284	Variance	110.59737
Skewness	1.21993159	Kurtosis	-0.1360779
Uncorrected SS	141313	Corrected SS	19354.5398
Coeff Variation	39.9505505	Std Error Mean	0.79271316

Basic Statistical Measures			
Location		Variability	
Mean	26.32386	Std Deviation	10.51653
Median	24.00000	Variance	110.59737
Mode	24.00000	Range	29.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	33.2073	Pr > |t|	<.0001
Sign	M	88	Pr >= |M|	<.0001
Signed Rank	S	7788	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	47
75% Q3	24
50% Median	24
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
18	1142	47	1108
18	1140	47	1109
18	1139	47	1116
18	1136	47	1120
18	1135	47	1134

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TL

```
               Histogram                      #             Boxplot
47+**************                            27                *
  .
  .*****                                     10                *
  .
  .
  .
  .
33+
  .
  .
  .
  .*************************************     72             +-----+
  .                                                         |     |
  .                                                         |     |
19+***********************************       67             +--+--+
   ----+----+----+----+----+----+----+-
   * may represent up to 2 counts


                        Normal Probability Plot
      47+                                     *********** * **
        |                                            ++
        |                                   ***    ++
        |                                         +
        |                                       ++
        |                                     ++
        |                                   ++
      33+                                 ++
        |                               ++
        |                             ++
        |                           ++
        |                        ************
        |                      ++
        |                    ++
      19+** * *****************
         +----+----+----+----+----+----+----+----+----+----+
             -2        -1         0        +1        +2
```

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TN

Moments			
N	86	Sum Weights	86
Mean	25.4418605	Sum Observations	2188
Std Deviation	12.0865551	Variance	146.084815
Skewness	1.20931389	Kurtosis	-0.4515471
Uncorrected SS	68084	Corrected SS	12417.2093
Coeff Variation	47.5065696	Std Error Mean	1.30332676

Basic Statistical Measures			
Location		Variability	
Mean	25.44186	Std Deviation	12.08656
Median	18.00000	Variance	146.08482
Mode	18.00000	Range	29.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	19.52071	Pr > |t|	<.0001
Sign	M	43	Pr >= |M|	<.0001
Signed Rank	S	1870.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	47
75% Q3	24
50% Median	18
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	1338	47	1314
18	1333	47	1327
18	1332	47	1329
18	1331	47	1335
18	1330	47	1336

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TN

```
                Histogram                          #             Boxplot
          47+**********                           20                *
            .
            .
            .
            .
            .
            .
          33+
            .
            .
            .
            .*****                                10             +--+--+
            .                                                    |     |
            .                                                    |     |
          19+****************************         56             *-----*
             ----+----+----+----+----+---
             * may represent up to 2 counts


                          Normal Probability Plot
            47+                              ***********+* *  *
              |                                         ++
              |                                       ++
              |                                      +
              |                                    ++
              |                                  ++
              |                                 +
            33+                               ++
              |                             ++
              |                            +
              |                          ++
              |                        ++   ****
              |                       +
              |                     ++
            19+ *   * * *********************
               +----+----+----+----+----+----+----+----+----+----+
                   -2        -1         0        +1        +2
```

==
Univariate Procedure, Media Depth
==

The UNIVARIATE Procedure
Variable: X4
Poll = TNI

Moments			
N	172	Sum Weights	172
Mean	32.1976744	Sum Observations	5538
Std Deviation	11.9412007	Variance	142.592275
Skewness	0.05857537	Kurtosis	-1.6435954
Uncorrected SS	202694	Corrected SS	24383.2791
Coeff Variation	37.0871529	Std Error Mean	0.91050802

Basic Statistical Measures			
Location		Variability	
Mean	32.19767	Std Deviation	11.94120
Median	30.00000	Variance	142.59228
Mode	18.00000	Range	29.00000
		Interquartile Range	29.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	35.36232	Pr > |t|	<.0001
Sign	M	86	Pr >= |M|	<.0001
Signed Rank	S	7439	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	47
75% Q3	47
50% Median	30
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
18	2168	47	2149
18	2166	47	2159
18	2165	47	2163
18	2162	47	2164
18	2161	47	2167

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TNI

```
                Histogram                       #             Boxplot
   47+*************************                49             +-----+
     .                                                        |     |
     .*******                                  13             |     |
     .                                                        |     |
     .                                                        |     |
     .**********                               19             |     |
     .                                                        |     |
   33+                                                        |  +  |
     .**********                               20             *-----*
     .                                                        |     |
     .                                                        |     |
     .**********                               19             |     |
     .                                                        |     |
     .                                                        |     |
   19+**************************               52             +-----+
      ----+----+----+----+----+-
      * may represent up to 2 counts


                         Normal Probability Plot
    47+                              *************** ** *
      |                                  ++
      |                            ***  +
      |                               ++
      |                             ++
      |                         ***+
      |                          ++
    33+                        ++
      |                      ****
      |                     ++
      |                   ++
      |                  +****
      |                ++
      |              ++
    19+* ** ***************
       +----+----+----+----+----+----+----+----+----+----+
           -2        -1         0        +1        +2
```

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TP

Moments			
N	340	Sum Weights	340
Mean	25.7764706	Sum Observations	8764
Std Deviation	9.37816012	Variance	87.9498872
Skewness	1.34201478	Kurtosis	0.5167689
Uncorrected SS	255720	Corrected SS	29815.0118
Coeff Variation	36.3826385	Std Error Mean	0.50860214

Basic Statistical Measures			
Location		Variability	
Mean	25.77647	Std Deviation	9.37816
Median	24.00000	Variance	87.94989
Mode	24.00000	Range	29.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	50.68101	Pr > |t|	<.0001
Sign	M	170	Pr >= |M|	<.0001
Signed Rank	S	28985	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	47
75% Q3	24
50% Median	24
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	3114	47	3032
18	3111	47	3059
18	3098	47	3083
18	3094	47	3097
18	3093	47	3113

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TP

```
                Histogram                             #             Boxplot
   47+**********                                     37                *
     .
     .***                                            11                *
     .
     .
     .*****                                          19                0
     .
   33+
     .**                                              7                |
     .                                                                 |
     .                                                                 |
     .************************************          145             +--+--+
     .                                                              |     |
     .                                                              |     |
   19+******************************                121             +-----+
      ----+----+----+----+----+----+----+--
      * may represent up to 4 counts


                       Normal Probability Plot
          47+                                      *************
            |                                              ++
            |                                     **     ++
            |                                          ++
            |                                        ++
            |                                   ***++
            |                                   ++
          33+                                 ++
            |                               ++ *
            |                             ++
            |                           ++
            |                    *************
            |                    +++
            |                  ++
          19+*********************
             +----+----+----+----+----+----+----+----+----+----+
                 -2        -1         0        +1        +2
```

===

Univariate Procedure, Media Depth

===

The UNIVARIATE Procedure
Variable: X4
Poll = TSS

Moments			
N	291	Sum Weights	291
Mean	25.814433	Sum Observations	7512
Std Deviation	8.76158925	Variance	76.7654461
Skewness	1.45807375	Kurtosis	0.99275073
Uncorrected SS	216180	Corrected SS	22261.9794
Coeff Variation	33.9406612	Std Error Mean	0.51361346

Basic Statistical Measures			
Location		Variability	
Mean	25.81443	Std Deviation	8.76159
Median	24.00000	Variance	76.76545
Mode	24.00000	Range	29.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	50.26043	Pr > |t|	<.0001
Sign	M	145.5	Pr >= |M|	<.0001
Signed Rank	S	21243	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	43
75% Q3	24
50% Median	24
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	3397	47	3327
18	3356	47	3354
18	3353	47	3375
18	3352	47	3380
18	3350	47	3384

==
Univariate Procedure, Media Depth
==

The UNIVARIATE Procedure
Variable: X4
Poll = TSS

```
                  Histogram                      #             Boxplot
   47+*******                                   27                *
     .
     .***                                        9                *
     .
     .
     .*****                                     19                0
     .
   33+
     .
     .
     .
     .***************************************  154             +--+--+
     .                                                         |     |
     .                                                         |     |
   19+*********************                     82             +-----+
      ----+----+----+----+----+----+----+----
      * may represent up to 4 counts


                         Normal Probability Plot
          47+                                          ********** **
            |                                                  +++
            |                                         **     ++
            |                                              ++
            |                                           +++
            |                                      ***++
            |                                       ++
          33+                                     ++
            |                                  +++
            |                                ++
            |                              ++
            |                       ****************
            |                         ++
            |                       ++
          19+** ****************
             +----+----+----+----+----+----+----+----+----+----+
                 -2        -1         0        +1        +2
```

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TZ

Moments			
N	231	Sum Weights	231
Mean	26.0865801	Sum Observations	6026
Std Deviation	9.43588626	Variance	89.0359496
Skewness	1.4546893	Kurtosis	0.68639199
Uncorrected SS	177676	Corrected SS	20478.2684
Coeff Variation	36.1714193	Std Error Mean	0.62083574

Basic Statistical Measures			
Location		Variability	
Mean	26.08658	Std Deviation	9.43589
Median	24.00000	Variance	89.03595
Mode	24.00000	Range	29.00000
		Interquartile Range	6.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	42.01849	Pr > |t|	<.0001
Sign	M	115.5	Pr >= |M|	<.0001
Signed Rank	S	13398	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	47
99%	47
95%	47
90%	47
75% Q3	24
50% Median	24
25% Q1	18

10%	18
5%	18
1%	18
0% Min	18

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
18	1674	47	1635
18	1673	47	1641
18	1668	47	1642
18	1661	47	1658
18	1660	47	1669

Univariate Procedure, Media Depth

The UNIVARIATE Procedure
Variable: X4
Poll = TZ

```
                   Histogram                          #          Boxplot
   47+**********                                     28             *
     .
     .****                                           12             *
     .
     .
     .
     .
   33+
     .
     .
     .
     .******************************************    126          +-----+
     .                                                           |     |
     .                                                           |     |
   19+**********************                         65          +--+--+
      ----+----+----+----+----+----+----+----+--
      * may represent up to 3 counts


                         Normal Probability Plot
          47+                                     ************ *
            |                                            +++
            |                                  ****    ++
            |                                        ++
            |                                      ++
            |                                    ++
            |                                  ++
          33+                                ++
            |                              ++
            |                            ++
            |                         +++
            |                   ****************
            |                     ++
            |                   ++
          19+*  *****************
             +----+----+----+----+----+----+----+----+----+----+
                 -2        -1         0        +1        +2
```

===

Univariate Procedure, Retention Time

===

The UNIVARIATE Procedure
Variable: X5
Poll = DCA

Moments			
N	67	Sum Weights	67
Mean	4.67	Sum Observations	312.89
Std Deviation	0	Variance	0
Skewness	.	Kurtosis	.
Uncorrected SS	1461.1963	Corrected SS	0
Coeff Variation	0	Std Error Mean	0

Basic Statistical Measures			
Location		Variability	
Mean	4.670000	Std Deviation	0
Median	4.670000	Variance	0
Mode	4.670000	Range	0
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	.	Pr > |t|	.
Sign	M	33.5	Pr >= |M|	<.0001
Signed Rank	S	1139	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	4.67
99%	4.67
95%	4.67
90%	4.67
75% Q3	4.67
50% Median	4.67
25% Q1	4.67

10%	4.67
5%	4.67
1%	4.67
0% Min	4.67

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
4.67	158	4.67	153
4.67	157	4.67	154
4.67	155	4.67	155
4.67	154	4.67	157
4.67	153	4.67	158

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	50	42.74	100.00

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = DCH

Moments			
N	64	Sum Weights	64
Mean	4.67	Sum Observations	298.88
Std Deviation	0	Variance	0
Skewness	.	Kurtosis	.
Uncorrected SS	1395.7696	Corrected SS	0
Coeff Variation	0	Std Error Mean	0

Basic Statistical Measures			
Location		Variability	
Mean	4.670000	Std Deviation	0
Median	4.670000	Variance	0
Mode	4.670000	Range	0
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	.	Pr > |t|	.
Sign	M	32	Pr >= |M|	<.0001
Signed Rank	S	1040	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	4.67
99%	4.67
95%	4.67
90%	4.67
75% Q3	4.67
50% Median	4.67
25% Q1	4.67

10%	4.67
5%	4.67
1%	4.67
0% Min	4.67

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
4.67	423	4.67	419
4.67	422	4.67	420
4.67	421	4.67	421
4.67	420	4.67	422
4.67	419	4.67	423

==
Univariate Procedure, Retention Time
==

The UNIVARIATE Procedure
Variable: X5
Poll = DCO

Moments			
N	80	**Sum Weights**	80
Mean	8.124875	**Sum Observations**	649.99
Std Deviation	6.4524669	**Variance**	41.6343291
Skewness	1.34244852	**Kurtosis**	-0.2034879
Uncorrected SS	8570.1995	**Corrected SS**	3289.112
Coeff Variation	79.416199	**Std Error Mean**	0.72140773

Basic Statistical Measures			
Location		**Variability**	
Mean	8.124875	**Std Deviation**	6.45247
Median	4.670000	**Variance**	41.63433
Mode	4.670000	**Range**	15.40000
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	11.26253	**Pr > |t|**	<.0001
Sign	**M**	40	**Pr >= |M|**	<.0001
Signed Rank	**S**	1620	**Pr >= |S|**	<.0001

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	20.07
99%	20.07
95%	20.07
90%	20.07
75% Q3	4.67
50% Median	4.67
25% Q1	4.67

10%	4.67
5%	4.67
1%	4.67
0% Min	4.67

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
4.67	642	20.07	592
4.67	638	20.07	593
4.67	637	20.07	594
4.67	636	20.07	595
4.67	625	20.07	626

Missing Values			
		Percent Of	
Missing Value	**Count**	**All Obs**	**Missing Obs**
.	32	28.57	100.00

```
                   Histogram                       #             Boxplot
   20.5+*****                                      9                *
       .*****                                      9                *
       .
       .
       .
       .
       .
       .
   12.5+
       .
       .
       .
       .
       .
       .
       .
    4.5+*******************************           62             +--+--+
        ----+----+----+----+----+----+-
        * may represent up to 2 counts


                           Normal Probability Plot
```

```
20.5+                                          *******+*    *
    |                                      *****     ++
    |                                               +
    |                                             ++
    |                                            +
    |                                          ++
    |                                         +
    |                                       ++
12.5+                                      +
    |                                    ++
    |                                  ++
    |                                 +
    |                               ++
    |                              +
    |                            ++
    |                           +
 4.5+ *   * *************************
     +----+----+----+----+----+----+----+----+----+----+
          -2        -1         0        +1        +2
```

==
Univariate Procedure, Retention Time
==

The UNIVARIATE Procedure
Variable: X5
Poll = DI

Moments			
N	66	Sum Weights	66
Mean	4.67	Sum Observations	308.22
Std Deviation	0	Variance	0
Skewness	.	Kurtosis	.
Uncorrected SS	1439.3874	Corrected SS	0
Coeff Variation	0	Std Error Mean	0

Basic Statistical Measures			
Location		Variability	
Mean	4.670000	Std Deviation	0
Median	4.670000	Variance	0
Mode	4.670000	Range	0
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	.	Pr > |t|	.
Sign	M	33	Pr >= |M|	<.0001
Signed Rank	S	1105.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	4.67
99%	4.67
95%	4.67
90%	4.67
75% Q3	4.67
50% Median	4.67
25% Q1	4.67

10%	4.67
5%	4.67
1%	4.67
0% Min	4.67

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
4.67	885	4.67	881
4.67	884	4.67	882
4.67	883	4.67	883
4.67	882	4.67	884
4.67	881	4.67	885

==
Univariate Procedure, Retention Time
==

The UNIVARIATE Procedure
Variable: X5
Poll = DL

Moments			
N	116	Sum Weights	116
Mean	4.67	Sum Observations	541.72
Std Deviation	0	Variance	0
Skewness	.	Kurtosis	.
Uncorrected SS	2529.8324	Corrected SS	0
Coeff Variation	0	Std Error Mean	0

Basic Statistical Measures			
Location		Variability	
Mean	4.670000	Std Deviation	0
Median	4.670000	Variance	0
Mode	4.670000	Range	0
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	.	Pr > |t|	.
Sign	M	58	Pr >= |M|	<.0001
Signed Rank	S	3393	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	4.67
99%	4.67
95%	4.67
90%	4.67
75% Q3	4.67
50% Median	4.67
25% Q1	4.67

10%	4.67
5%	4.67
1%	4.67
0% Min	4.67

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
4.67	1001	4.67	997
4.67	1000	4.67	998
4.67	999	4.67	999
4.67	998	4.67	1000
4.67	997	4.67	1001

===
Univariate Procedure, Retention Time
===

The UNIVARIATE Procedure
Variable: X5
Poll = DN

Moments			
N	75	**Sum Weights**	75
Mean	6.71133333	**Sum Observations**	503.35
Std Deviation	5.23944611	**Variance**	27.4517955
Skewness	2.20155552	**Kurtosis**	2.92413066
Uncorrected SS	5409.5825	**Corrected SS**	2031.43287
Coeff Variation	78.0686318	**Std Error Mean**	0.60499912

Basic Statistical Measures			
Location		**Variability**	
Mean	6.711333	**Std Deviation**	5.23945
Median	4.670000	**Variance**	27.45180
Mode	4.670000	**Range**	15.31000
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	**Statistic**		**p Value**	
Student's t	**t**	11.09313	**Pr > |t|**	<.0001
Sign	**M**	37.5	**Pr >= |M|**	<.0001
Signed Rank	**S**	1425	**Pr >= |S|**	<.0001

Quantiles (Definition 5)	
Quantile	**Estimate**
100% Max	19.98
99%	19.98
95%	19.98
90%	19.98
75% Q3	4.67
50% Median	4.67
25% Q1	4.67

10%	4.67
5%	4.67
1%	4.67
0% Min	4.67

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
4.67	1249	19.98	1188
4.67	1248	19.98	1228
4.67	1247	19.98	1250
4.67	1246	19.98	1251
4.67	1245	19.98	1252

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = DN

```
                 Histogram                     #             Boxplot
   19.5+*****                                 10                *
       .
       .
   16.5+
       .
       .
   13.5+
       .
       .
   10.5+
       .
       .
    7.5+
       .
       .
    4.5+*********************************     65             +--+--+
        ----+----+----+----+----+----+---
        * may represent up to 2 counts


                        Normal Probability Plot
        19.5+                                    ***** ** *   *+
            |                                                ++
            |                                              ++
        16.5+                                            ++
            |                                          ++
            |                                        ++
        13.5+                                       +
            |                                     ++
            |                                   ++
        10.5+                                 ++
            |                               ++
            |                             ++
         7.5+                           ++
            |                         ++
            |                       ++
         4.5+ *   * ** *************************
             +----+----+----+----+----+----+----+----+----+----+
```

-2 -1 0 +1 +2

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = DP

Moments			
N	86	Sum Weights	86
Mean	6.60604651	Sum Observations	568.12
Std Deviation	5.72597924	Variance	32.7868383
Skewness	1.92114335	Kurtosis	1.85349867
Uncorrected SS	6539.9084	Corrected SS	2786.88126
Coeff Variation	86.6778524	Std Error Mean	0.61744822

Basic Statistical Measures			
Location		Variability	
Mean	6.606047	Std Deviation	5.72598
Median	4.670000	Variance	32.78684
Mode	4.670000	Range	17.04000
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	10.69895	Pr > |t|	<.0001
Sign	M	43	Pr >= |M|	<.0001
Signed Rank	S	1870.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	20.07
99%	20.07
95%	19.98
90%	19.98
75% Q3	4.67
50% Median	4.67
25% Q1	4.67

10%	3.03
5%	3.03
1%	3.03
0% Min	3.03

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
3.03	2561	19.98	2571
3.03	2560	19.98	2572
3.03	2556	20.07	2550
3.03	2555	20.07	2551
3.03	2554	20.07	2552

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = DP

```
                 Histogram                      #             Boxplot
     20.5+**                                    3                *
         .*****                                10                *
         .
         .
         .
         .
         .
         .
         .
         .
         .
         .
         .
         .
         .
         .
         .**************************           53             +-----+
      3.5+**********                           20                *
          ----+----+----+----+----+--
          * may represent up to 2 counts


                         Normal Probability Plot
       20.5+                                                  *  *   *+
           |                                          *******    ++
           |                                                   ++
           |                                                  +
           |                                                ++
           |                                              ++
           |                                            ++
           |                                           +
           |                                         ++
           |                                       ++
           |                                     ++
           |                                    +
           |                                  ++
           |                                ++
           |                              ++
```

```
     |                       +
     |                  *****************
3.5+ *   * * ***********++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = DZ

Moments			
N	80	Sum Weights	80
Mean	7.34925	Sum Observations	587.94
Std Deviation	5.85399891	Variance	34.2693032
Skewness	1.74353751	Kurtosis	1.06594704
Uncorrected SS	7028.193	Corrected SS	2707.27495
Coeff Variation	79.6543717	Std Error Mean	0.65449698

Basic Statistical Measures			
Location		Variability	
Mean	7.349250	Std Deviation	5.85400
Median	4.670000	Variance	34.26930
Mode	4.670000	Range	15.31000
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	11.22885	Pr > |t|	<.0001
Sign	M	40	Pr >= |M|	<.0001
Signed Rank	S	1620	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	19.98
99%	19.98
95%	19.98
90%	19.98
75% Q3	4.67
50% Median	4.67
25% Q1	4.67

10%	4.67
5%	4.67
1%	4.67
0% Min	4.67

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
4.67	1409	19.98	1414
4.67	1408	19.98	1416
4.67	1407	19.98	1418
4.67	1406	19.98	1427
4.67	1405	19.98	1428

Missing Values			
		Percent Of	
Missing Value	**Count**	**All Obs**	**Missing Obs**
.	52	39.39	100.00

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = DZ

```
                 Histogram                          #              Boxplot
    19.5+*******                                   14                 *
         .
         .
    16.5+
         .
         .
    13.5+
         .
         .
    10.5+
         .
         .
     7.5+
         .
         .
     4.5+*********************************         66              +--+--+
         ----+----+----+----+----+----+---
         * may represent up to 2 counts


                            Normal Probability Plot
         19.5+                                  ********* *+   *
              |                                            +
              |                                          ++
         16.5+                                         ++
              |                                        +
              |                                      ++
         13.5+                                     ++
              |                                  ++
              |                                 +
         10.5+                                ++
              |                             ++
              |                            +
          7.5+                          ++
              |                       ++
              |                     ++
          4.5+ *   * *************************
               +----+----+----+----+----+----+----+----+----+----+
```

-2	-1	0	+1	+2

==
Univariate Procedure, Retention Time
==

The UNIVARIATE Procedure
Variable: X5
Poll = EC

Moments			
N	96	Sum Weights	96
Mean	6.456875	Sum Observations	619.86
Std Deviation	6.59707181	Variance	43.5213564
Skewness	1.60056223	Kurtosis	0.61545533
Uncorrected SS	8136.8874	Corrected SS	4134.52886
Coeff Variation	102.17128	Std Error Mean	0.67331082

Basic Statistical Measures			
Location		Variability	
Mean	6.456875	Std Deviation	6.59707
Median	3.030000	Variance	43.52136
Mode	3.030000	Range	17.04000
		Interquartile Range	1.59000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	9.589739	Pr > |t|	<.0001
Sign	M	48	Pr >= |M|	<.0001
Signed Rank	S	2328	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	20.07
99%	20.07
95%	20.07
90%	20.07
75% Q3	4.62
50% Median	3.03
25% Q1	3.03

10%	3.03
5%	3.03
1%	3.03
0% Min	3.03

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
3.03	3490	20.07	3422
3.03	3489	20.07	3423
3.03	3488	20.07	3424
3.03	3487	20.07	3425
3.03	3486	20.07	3426

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = EC

```
               Histogram                          #             Boxplot
    20.5+*********                               18                *
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .
        .*******                                 14             +-----+
     3.5+********************************        64             *--+--*
         ----+----+----+----+----+----+--
         * may represent up to 2 counts


                         Normal Probability Plot
        20.5+                              *********** *+  *
            |                                          +
            |                                        ++
            |                                      ++
            |                                     +
            |                                   ++
            |                                  +
            |                                ++
            |                               +
            |                             ++
            |                            +
            |                          ++
            |                         +
            |                       ++
            |                      +
```

```
   |                      ++
   |                     +      ******
3.5+*   * ************************
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

===

Univariate Procedure, Retention Time

===

The UNIVARIATE Procedure
Variable: X5
Poll = ENC

Moments			
N	10	Sum Weights	10
Mean	19.98	Sum Observations	199.8
Std Deviation	0	Variance	0
Skewness	.	Kurtosis	.
Uncorrected SS	3992.004	Corrected SS	0
Coeff Variation	0	Std Error Mean	0

Basic Statistical Measures			
Location		Variability	
Mean	19.98000	Std Deviation	0
Median	19.98000	Variance	0
Mode	19.98000	Range	0
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	.	Pr > |t|	.
Sign	M	5	Pr >= |M|	0.0020
Signed Rank	S	27.5	Pr >= |S|	0.0020

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	19.98
99%	19.98
95%	19.98
90%	19.98
75% Q3	19.98
50% Median	19.98
25% Q1	19.98

10%	19.98
5%	19.98
1%	19.98
0% Min	19.98

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
19.98	3539	19.98	3535
19.98	3538	19.98	3536
19.98	3537	19.98	3537
19.98	3536	19.98	3538
19.98	3535	19.98	3539

==
Univariate Procedure, Retention Time
==

The UNIVARIATE Procedure
Variable: X5
Poll = FC

Moments			
N	25	Sum Weights	25
Mean	8.9208	Sum Observations	223.02
Std Deviation	7.03883627	Variance	49.545216
Skewness	1.04365078	Kurtosis	-0.9975532
Uncorrected SS	3178.602	Corrected SS	1189.08518
Coeff Variation	78.9036439	Std Error Mean	1.40776725

Basic Statistical Measures			
Location		Variability	
Mean	8.920800	Std Deviation	7.03884
Median	4.620000	Variance	49.54522
Mode	4.620000	Range	15.36000
		Interquartile Range	15.36000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	6.336843	Pr > |t|	<.0001
Sign	M	12.5	Pr >= |M|	<.0001
Signed Rank	S	162.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	19.98
99%	19.98
95%	19.98
90%	19.98
75% Q3	19.98
50% Median	4.62
25% Q1	4.62

10%	4.62
5%	4.62
1%	4.62
0% Min	4.62

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
4.62	3529	19.98	3507
4.62	3528	19.98	3508
4.62	3527	19.98	3509
4.62	3526	19.98	3510
4.62	3525	19.98	3511

==
Univariate Procedure, Retention Time
==

The UNIVARIATE Procedure
Variable: X5
Poll = FC

```
Stem Leaf                          #              Boxplot
  20 0000000                       7              +-----+
  18                                              |     |
  16                                              |     |
  14                                              |     |
  12                                              |     |
  10                                              |     |
   8                                              |  +  |
   6                                              |     |
   4 666666666666666666           18              *-----*
     ----+----+----+----+


                     Normal Probability Plot
21+                                        +++
  |                              * ** * *+*    *
  |                                     ++
  |                                  +++
13+                               +++
  |                            +++
  |                         +++
  |                      +++
 5+    *    * * * ** ************
   +----+----+----+----+----+----+----+----+----+----+
       -2        -1         0        +1        +2
```

==
Univariate Procedure, Retention Time
==

The UNIVARIATE Procedure
Variable: X5
Poll = N2

Moments			
N	44	Sum Weights	44
Mean	7.75977273	Sum Observations	341.43
Std Deviation	7.22162434	Variance	52.1518581
Skewness	1.16453651	Kurtosis	-0.6268325
Uncorrected SS	4891.9491	Corrected SS	2242.5299
Coeff Variation	93.064895	Std Error Mean	1.08870083

Basic Statistical Measures			
Location		Variability	
Mean	7.759773	Std Deviation	7.22162
Median	4.620000	Variance	52.15186
Mode	3.030000	Range	17.04000
		Interquartile Range	9.31500

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	7.127553	Pr > |t|	<.0001
Sign	M	22	Pr >= |M|	<.0001
Signed Rank	S	495	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	20.070
99%	20.070
95%	20.070
90%	20.070
75% Q3	12.345
50% Median	4.620
25% Q1	3.030

10%	3.030
5%	3.030
1%	3.030
0% Min	3.030

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
3.03	2496	20.07	2467
3.03	2493	20.07	2476
3.03	2486	20.07	2479
3.03	2485	20.07	2480
3.03	2482	20.07	2492

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = N2

```
                    Stem Leaf                     #             Boxplot
                      20 11111111111             11                |
                      19                                           |
                      18                                           |
                      17                                           |
                      16                                           |
                      15                                           |
                      14                                           |
                      13                                           |
                      12                                        +-----+
                      11                                        |     |
                      10                                        |     |
                       9                                        |     |
                       8                                        |     |
                       7                                        |  +  |
                       6                                        |     |
                       5                                        |     |
                       4 6666666666666           13             *-----*
                       3 00000000000000000000    20             +-----+
                         ----+----+----+----+


                              Normal Probability Plot
                  20.5+                                  ***** ** *+*    *
                      |                                            +
                      |                                           +
                      |                                         ++
                      |                                        +
                      |                                       +
                      |                                     ++
                      |                                    +
                      |                                  ++
                      |                                 +
                      |                                +
                      |                              ++
                      |                             +
                      |                           ++
                      |                          +
                      |                         +
```

```
     |                        ++   ********
3.5+     *     * *  **  ***********
     +----+----+----+----+----+----+----+----+----+----+
          -2        -1        0        +1        +2
```

==
Univariate Procedure, Retention Time
==

The UNIVARIATE Procedure
Variable: X5
Poll = N3

Moments			
N	240	Sum Weights	240
Mean	6.09295833	Sum Observations	1462.31
Std Deviation	5.52571221	Variance	30.5334954
Skewness	1.99292862	Kurtosis	2.37573852
Uncorrected SS	16207.2993	Corrected SS	7297.5054
Coeff Variation	90.6901361	Std Error Mean	0.35668319

Basic Statistical Measures			
Location		Variability	
Mean	6.092958	Std Deviation	5.52571
Median	4.670000	Variance	30.53350
Mode	4.670000	Range	17.77000
		Interquartile Range	1.64000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	17.08227	Pr > |t|	<.0001
Sign	M	120	Pr >= |M|	<.0001
Signed Rank	S	14460	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	20.07
99%	20.07
95%	19.98
90%	19.98
75% Q3	4.67
50% Median	4.67
25% Q1	3.03

10%	2.30
5%	2.30
1%	2.30
0% Min	2.30

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
2.3	2378	20.07	2380
2.3	2377	20.07	2381
2.3	2376	20.07	2382
2.3	2374	20.07	2383
2.3	2366	20.07	2432

Missing Values			
Missing Value	**Count**	**Percent Of**	
		All Obs	**Missing Obs**
.	44	15.49	100.00

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = N3

```
                     Histogram                          #             Boxplot
 20.5+******                                           11                *
     .**********                                       20                *
     .
     .
     .
     .
     .
     .
     .
 11.5+
     .
     .
     .
     .
     .*************                                    25                +
     .                                                                   |
     .****************************************         78             +-----+
     .********************************                 62             +-----+
  2.5+**********************                           44                |
      ----+----+----+----+----+----+----+----
      * may represent up to 2 counts


                            Normal Probability Plot
        20.5+                                               ******* *
            |                                         *******      ++
            |                                                    ++
            |                                                  ++
            |                                                ++
            |                                               +
            |                                             ++
            |                                           ++
            |                                         ++
        11.5+                                       ++
            |                                      +
            |                                    ++
            |                                  ++
            |                                ++
```

```
         |                        ++      *****
         |                       +
         |                     ++*********
         |               ********
      2.5+* ************** ++
          +----+----+----+----+----+----+----+----+----+----+
               -2        -1         0        +1        +2
```

==

Univariate Procedure, Retention Time

==

The UNIVARIATE Procedure
Variable: X5
Poll = OP

Moments			
N	163	Sum Weights	163
Mean	7.36435583	Sum Observations	1200.39
Std Deviation	6.82520022	Variance	46.5833581
Skewness	1.2937793	Kurtosis	-0.2356781
Uncorrected SS	16386.6031	Corrected SS	7546.50401
Coeff Variation	92.6788491	Std Error Mean	0.53459094

Basic Statistical Measures			
Location		Variability	
Mean	7.364356	Std Deviation	6.82520
Median	4.670000	Variance	46.58336
Mode	4.670000	Range	17.77000
		Interquartile Range	3.91000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.77568	Pr > |t|	<.0001
Sign	M	81.5	Pr >= |M|	<.0001
Signed Rank	S	6683	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	20.07
99%	20.07
95%	20.07
90%	20.07
75% Q3	6.94
50% Median	4.67
25% Q1	3.03

10%	2.69
5%	2.69
1%	2.30
0% Min	2.30

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
2.3	2719	20.07	2729
2.3	2716	20.07	2730
2.3	2715	20.07	2731
2.3	2706	20.07	2732
2.3	2704	20.07	2733

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	32	16.41	100.00

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = OP

```
                    Histogram                     #             Boxplot
         20.5+*********                          18                *
             .*********                          18                *
             .
             .
             .
             .
             .
             .
             .
         11.5+
             .
             .
             .
             .
             .***                                 5             +-----+
             .                                                  |     |
             .************************           47             *-----*
             .***************************        53             +-----+
          2.5+***********                        22                +
              ----+----+----+----+----+--
              * may represent up to 2 counts


                            Normal Probability Plot
          20.5+                                      ********** * *
              |                                  *****     +
              |                                          ++
              |                                         +
              |                                       ++
              |                                      +
              |                                    ++
              |                                   +
              |                                 ++
          11.5+                                +
              |                              ++
              |                             +
              |                           ++
              |                          +
```

```
   |                        +       **
   |                      ++
   |                     +  *********
   |              ***********
2.5+* * ***********   +
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

===
Univariate Procedure, Retention Time
===

The UNIVARIATE Procedure
Variable: X5
Poll = TA

Moments			
N	81	Sum Weights	81
Mean	4.65765432	Sum Observations	377.27
Std Deviation	0.02169514	Variance	0.00047068
Skewness	-1.1960914	Kurtosis	-0.5844175
Uncorrected SS	1757.2309	Corrected SS	0.03765432
Coeff Variation	0.46579537	Std Error Mean	0.00241057

Basic Statistical Measures			
Location		Variability	
Mean	4.657654	Std Deviation	0.02170
Median	4.670000	Variance	0.0004707
Mode	4.670000	Range	0.05000
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	1932.179	Pr > |t|	<.0001
Sign	M	40.5	Pr >= |M|	<.0001
Signed Rank	S	1660.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	4.67
99%	4.67
95%	4.67
90%	4.67
75% Q3	4.67
50% Median	4.67
25% Q1	4.67

10%	4.62
5%	4.62
1%	4.62
0% Min	4.62

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
4.62	43	4.67	77
4.62	42	4.67	78
4.62	41	4.67	79
4.62	40	4.67	80
4.62	39	4.67	81

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TA

```
                Histogram                       #             Boxplot
   4.671+*******************************       61             +-----+
        .
        .
        .
        .
   4.661+
        .
        .                                                        +
        .
        .
   4.651+
        .
        .
        .
        .
   4.641+
        .
        .
        .
        .
   4.631+
        .
        .
        .
        .
   4.621+**********                            20                *
         ----+----+----+----+----+----+-
         * may represent up to 2 counts
```

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TA

```
                    Normal Probability Plot
4.671+                  *************************   *  *
     |                              +
     |                             +
     |                            +
     |
4.661+                           +
     |                          +
     |                         +
     |                        +
     |                       +
4.651+                      +
     |                     +
     |                    +
     |                   +
     |                  +
4.641+                 +
     |                +
     |
     |               +
     |              +
4.631+             +
     |            +
     |           +
     |          +
     |         +
4.621+ *  *  ************
      +----+----+----+----+----+----+----+----+----+----+
          -2        -1          0        +1        +2
```

==
Univariate Procedure, Retention Time
==

The UNIVARIATE Procedure
Variable: X5
Poll = TCA

Moments			
N	109	Sum Weights	109
Mean	7.47825688	Sum Observations	815.13
Std Deviation	5.97526039	Variance	35.7037367
Skewness	1.65836793	Kurtosis	0.7640065
Uncorrected SS	9951.7551	Corrected SS	3856.00357
Coeff Variation	79.9017804	Std Error Mean	0.57232615

Basic Statistical Measures			
Location		Variability	
Mean	7.478257	Std Deviation	5.97526
Median	4.670000	Variance	35.70374
Mode	4.670000	Range	15.45000
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.06643	Pr > |t|	<.0001
Sign	M	54.5	Pr >= |M|	<.0001
Signed Rank	S	2997.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	20.07
99%	20.07
95%	20.07
90%	19.98
75% Q3	4.67
50% Median	4.67
25% Q1	4.67

10%	4.62
5%	4.62
1%	4.62
0% Min	4.62

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
4.62	318	20.07	263
4.62	302	20.07	264
4.62	253	20.07	265
4.62	252	20.07	266
4.62	251	20.07	267

Missing Values			
Missing Value	**Count**	**Percent Of**	
		All Obs	**Missing Obs**
.	52	32.30	100.00

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TCA

```
                     Histogram                          #       Boxplot
   20.5+*****                                          10          *
       .*****                                          10          *
       .
       .
       .
       .
       .
       .
   12.5+
       .
       .
       .
       .
       .
       .
       .
    4.5+*********************************************  89       +--*--+
        ----+----+----+----+----+----+----+----+----
        * may represent up to 2 counts


                         Normal Probability Plot
          20.5+                                         ***** *+*  *
              |                                    *****      +
              |                                             ++
              |                                           ++
              |                                          +
              |                                        ++
              |                                      ++
              |                                     +
          12.5+                                   ++
              |                                 ++
              |                                +
              |                              ++
              |                            ++
              |                           +
              |                         ++
              |                       ++
```

```
4.5+*  * * ****************************
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

===
Univariate Procedure, Retention Time
===

The UNIVARIATE Procedure
Variable: X5
Poll = TCH

Moments			
N	107	Sum Weights	107
Mean	5.94420561	Sum Observations	636.03
Std Deviation	4.27356089	Variance	18.2633227
Skewness	3.03941895	Kurtosis	7.37596058
Uncorrected SS	5716.6053	Corrected SS	1935.91221
Coeff Variation	71.8945672	Std Error Mean	0.41314073

Basic Statistical Measures			
Location		Variability	
Mean	5.944206	Std Deviation	4.27356
Median	4.670000	Variance	18.26332
Mode	4.670000	Range	15.36000
		Interquartile Range	0.05000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	14.38785	Pr > |t|	<.0001
Sign	M	53.5	Pr >= |M|	<.0001
Signed Rank	S	2889	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	19.98
99%	19.98
95%	19.98
90%	4.67
75% Q3	4.67
50% Median	4.67
25% Q1	4.62

10%	4.62
5%	4.62
1%	4.62
0% Min	4.62

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
4.62	528	19.98	467
4.62	519	19.98	515
4.62	514	19.98	516
4.62	513	19.98	518
4.62	510	19.98	522

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TCH

```
                     Histogram                          #             Boxplot
     19.5+***                                           9                *
         .
         .
     16.5+
         .
         .
     13.5+
         .
         .
     10.5+
         .
         .
      7.5+
         .
         .
      4.5+*********************************            98             +--+--+
          ----+----+----+----+----+----+---
          * may represent up to 3 counts


                             Normal Probability Plot
          19.5+                                         ***** * *  *
              |
              |
          16.5+                                                     ++
              |                                                   ++
              |                                                +++
          13.5+                                              ++
              |                                            ++
              |                                         +++
          10.5+                                       ++
              |                                     ++
              |                                  +++
           7.5+                                ++
              |                              ++
              |                           +++
           4.5+*  * * *******************************
               +----+----+----+----+----+----+----+----+----+----+
```

-2	-1	0	+1	+2

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TCO

Moments			
N	115	Sum Weights	115
Mean	9.59947826	Sum Observations	1103.94
Std Deviation	7.21109888	Variance	51.9999471
Skewness	0.77333713	Kurtosis	-1.4269832
Uncorrected SS	16525.242	Corrected SS	5927.99397
Coeff Variation	75.119696	Std Error Mean	0.67243844

Basic Statistical Measures			
Location		Variability	
Mean	9.599478	Std Deviation	7.21110
Median	4.670000	Variance	51.99995
Mode	4.670000	Range	15.45000
		Interquartile Range	15.31000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	14.27562	Pr > |t|	<.0001
Sign	M	57.5	Pr >= |M|	<.0001
Signed Rank	S	3335	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	20.07
99%	20.07
95%	20.07
90%	20.07
75% Q3	19.98
50% Median	4.67
25% Q1	4.67

10%	4.62
5%	4.62
1%	4.62
0% Min	4.62

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
4.62	814	20.07	785
4.62	781	20.07	786
4.62	780	20.07	787
4.62	771	20.07	788
4.62	767	20.07	816

Missing Values			
Missing Value	**Count**	**Percent Of**	
		All Obs	**Missing Obs**
.	62	35.03	100.00

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TCO

```
                   Histogram                       #             Boxplot
 20.5+*********                                   18                |
     .**********                                  19             +-----+
     .                                                           |     |
     .                                                           |     |
     .                                                           |     |
     .                                                           |     |
     .                                                           |     |
     .                                                           |     |
 12.5+                                                           |     |
     .                                                           |     |
     .                                                           |     |
     .                                                           |  +  |
     .                                                           |     |
     .                                                           |     |
     .                                                           |     |
     .                                                           |     |
  4.5+***************************************     78             *-----*
      ----+----+----+----+----+----+----+----
      * may represent up to 2 counts


                       Normal Probability Plot
        20.5+                                  ******** ** *  *
            |                             ******   +
            |                                    ++
            |                                   +
            |                                ++
            |                               +
            |                              +
            |                            ++
        12.5+                           +
            |                        ++
            |                       +
            |                      +
            |                    ++
            |                   +
            |                  +
            |                ++
```

```
4.5+*  * ** **********************
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TKN

Moments			
N	254	Sum Weights	254
Mean	6.38944882	Sum Observations	1622.92
Std Deviation	5.91507658	Variance	34.9881309
Skewness	1.80567254	Kurtosis	1.48026012
Uncorrected SS	19221.5614	Corrected SS	8851.99712
Coeff Variation	92.5756939	Std Error Mean	0.37114491

Basic Statistical Measures			
Location		Variability	
Mean	6.389449	Std Deviation	5.91508
Median	4.620000	Variance	34.98813
Mode	4.670000	Range	17.77000
		Interquartile Range	1.64000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	17.21551	Pr > |t|	<.0001
Sign	M	127	Pr >= |M|	<.0001
Signed Rank	S	16192.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	20.07
99%	20.07
95%	20.07
90%	19.98
75% Q3	4.67
50% Median	4.62
25% Q1	3.03

10%	2.69
5%	2.30
1%	2.30
0% Min	2.30

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
2.3	1973	20.07	1937
2.3	1944	20.07	1938
2.3	1943	20.07	1939
2.3	1930	20.07	1940
2.3	1922	20.07	1988

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	41	13.90	100.00

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TKN

```
                       Histogram                         #     Boxplot
  20.5+**********                                       20        *
      .**********                                       19        *
      .
      .
      .
      .
      .
      .
      .
  11.5+
      .
      .
      .
      .
      .*******                                          13        +
      .                                                           |
      .**********************************************   91     +-----+
      .***************************************          78     +-----+
   2.5+*****************                                33        |
       ----+----+----+----+----+----+----+----+----+-
       * may represent up to 2 counts


                           Normal Probability Plot
         20.5+                                        **********+*
             |                                    *****       ++
             |                                              ++
             |                                            ++
             |                                           +
             |                                         ++
             |                                       ++
             |                                      +
             |                                    ++
         11.5+                                  ++
             |                                 +
             |                               ++
             |                             ++
             |                            +
```

```
     |                        ++       ***
     |                      ++
     |                    ++***********
     |             **********
  2.5+* *************    ++
      +----+----+----+----+----+----+----+----+----+----+
           -2        -1         0        +1        +2
```

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TL

Moments			
N	113	Sum Weights	113
Mean	7.24026549	Sum Observations	818.15
Std Deviation	5.77457829	Variance	33.3457544
Skewness	1.79863573	Kurtosis	1.25719948
Uncorrected SS	9658.3477	Corrected SS	3734.72449
Coeff Variation	79.756444	Std Error Mean	0.54322663

Basic Statistical Measures			
Location		Variability	
Mean	7.240265	Std Deviation	5.77458
Median	4.670000	Variance	33.34575
Mode	4.670000	Range	15.45000
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.32826	Pr > |t|	<.0001
Sign	M	56.5	Pr >= |M|	<.0001
Signed Rank	S	3220.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	20.07
99%	20.07
95%	20.07
90%	19.98
75% Q3	4.67
50% Median	4.67
25% Q1	4.67

10%	4.62
5%	4.62
1%	4.62
0% Min	4.62

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
4.62	1134	20.07	1086
4.62	1120	20.07	1087
4.62	1116	20.07	1088
4.62	1109	20.07	1089
4.62	1108	20.07	1091

Missing Values			
		Percent Of	
Missing Value	**Count**	**All Obs**	**Missing Obs**
.	63	35.80	100.00

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TL

```
                     Histogram                            #    Boplot
 20.5+*****                                              10       *
     .*****                                               9       *
     .
     .
     .
     .
     .
     .
 12.5+
     .
     .
     .
     .
     .
     .
     .
  4.5+***********************************************    94    +--*--+
      ----+----+----+----+----+----+----+----+----+--
      * may represent up to 2 counts


                        Normal Probability Plot
        20.5+                                         **** ** *+ *
            |                                     ****       ++
            |                                              ++
            |                                            ++
            |                                           +
            |                                         ++
            |                                       ++
            |                                     ++
        12.5+                                    +
            |                                  ++
            |                                ++
            |                               +
            |                             ++
            |                           ++
            |                         ++
            |                        +
```

```
4.5+*  * ** ***************************
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

==

Univariate Procedure, Retention Time

==

The UNIVARIATE Procedure
Variable: X5
Poll = TN

Moments			
N	86	Sum Weights	86
Mean	6.43860465	Sum Observations	553.72
Std Deviation	4.94083374	Variance	24.411838
Skewness	2.43669659	Kurtosis	4.03088973
Uncorrected SS	5640.1904	Corrected SS	2075.00623
Coeff Variation	76.7376475	Std Error Mean	0.5327838

Basic Statistical Measures			
Location		Variability	
Mean	6.438605	Std Deviation	4.94083
Median	4.670000	Variance	24.41184
Mode	4.670000	Range	15.36000
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	12.08484	Pr > |t|	<.0001
Sign	M	43	Pr >= |M|	<.0001
Signed Rank	S	1870.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	19.98
99%	19.98
95%	19.98
90%	19.98
75% Q3	4.67
50% Median	4.67
25% Q1	4.67

10%	4.62
5%	4.62
1%	4.62
0% Min	4.62

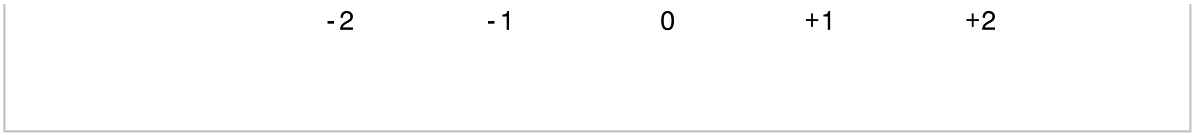
Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
4.62	1336	19.98	1278
4.62	1335	19.98	1324
4.62	1329	19.98	1326
4.62	1327	19.98	1334
4.62	1314	19.98	1337

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TN

```
                     Histogram                         #             Boxplot
   19.5+*****                                         10                *
       .
       .
   16.5+
       .
       .
   13.5+
       .
       .
   10.5+
       .
       .
    7.5+
       .
       .
    4.5+**************************************    76             +--*--+
        ----+----+----+----+----+----+----+---
        * may represent up to 2 counts


                             Normal Probability Plot
          19.5+                                     ****** * *  *
              |                                                ++
              |                                              ++
          16.5+                                            ++
              |                                          ++
              |                                        ++
          13.5+                                      ++
              |                                    ++
              |                                  ++
          10.5+                                ++
              |                              ++
              |                            ++
           7.5+                          ++
              |                        ++
              |                      ++
           4.5+ *  * * ****************************
               +----+----+----+----+----+----+----+----+----+----+
```


-2
-1
0
+1
+2

===

Univariate Procedure, Retention Time

===

The UNIVARIATE Procedure
Variable: X5
Poll = TNI

Moments			
N	159	Sum Weights	159
Mean	3.77572327	Sum Observations	600.34
Std Deviation	1.47868675	Variance	2.18651451
Skewness	1.25620966	Kurtosis	0.32013857
Uncorrected SS	2612.187	Corrected SS	345.469292
Coeff Variation	39.1630065	Std Error Mean	0.11726749

Basic Statistical Measures			
Location		Variability	
Mean	3.775723	Std Deviation	1.47869
Median	3.030000	Variance	2.18651
Mode	3.030000	Range	4.64000
		Interquartile Range	1.59000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	32.19753	Pr > |t|	<.0001
Sign	M	79.5	Pr >= |M|	<.0001
Signed Rank	S	6360	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	6.94
99%	6.94
95%	6.94
90%	6.94
75% Q3	4.62
50% Median	3.03
25% Q1	3.03

10%	2.30
5%	2.30
1%	2.30
0% Min	2.30

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
2.3	2138	6.94	2139
2.3	2136	6.94	2144
2.3	2131	6.94	2149
2.3	2127	6.94	2163
2.3	2126	6.94	2164

Missing Values			
		Percent Of	
Missing Value	**Count**	**All Obs**	**Missing Obs**
.	13	7.56	100.00

===
Univariate Procedure, Retention Time
===

The UNIVARIATE Procedure
Variable: X5
Poll = TNI

```
                  Histogram                    #             Boxplot
        6.9+************                      23                |
           .                                                    |
           .                                                    |
           .                                                    |
           .                                                    |
           .                                                    |
           .                                                    |
           .                                                    |
           .                                                    |
           .                                                    |
           .                                                    |
           .*************                     26             +-----+
           .                                                 |     |
           .                                                 |     |
           .                                                 |     |
           .                                                 |     |
           .                                                 |  +  |
           .**********                        19             |     |
           .                                                 |     |
           .**************************        52             *-----*
           .                                                    |
           .**********                        19                |
           .                                                    |
        2.3+**********                        20                |
            ----+----+----+----+----+-
            * may represent up to 2 counts
```

==

Univariate Procedure, Retention Time

==

The UNIVARIATE Procedure
Variable: X5
Poll = TNI

```
                  Normal Probability Plot
6.9+                                    *********** * *
   |                                             +
   |                                           ++
   |                                          +
   |                                         +
   |                                       ++
   |                                      +
   |                                    ++
   |                                   +
   |                                  +
   |                                ++
   |                              ******
   |                              +
   |                            ++
   |                           +
   |                          +
   |                        ++
   |                       +   ****
   |                      +
   |                  **********
   |                   +
   |              *****
   |                ++
2.3+* * ********** +
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

===

Univariate Procedure, Retention Time

===

The UNIVARIATE Procedure
Variable: X5
Poll = TP

Moments			
N	242	Sum Weights	242
Mean	6.61702479	Sum Observations	1601.32
Std Deviation	6.06461085	Variance	36.7795048
Skewness	1.70694418	Kurtosis	1.09372104
Uncorrected SS	19459.8348	Corrected SS	8863.86066
Coeff Variation	91.6516266	Std Error Mean	0.38984795

Basic Statistical Measures			
Location		Variability	
Mean	6.617025	Std Deviation	6.06461
Median	4.620000	Variance	36.77950
Mode	4.670000	Range	17.77000
		Interquartile Range	1.64000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	16.97335	Pr > |t|	<.0001
Sign	M	121	Pr >= |M|	<.0001
Signed Rank	S	14701.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	20.07
99%	20.07
95%	20.07
90%	19.98
75% Q3	4.67
50% Median	4.62
25% Q1	3.03

10%	2.69
5%	2.69
1%	2.30
0% Min	2.30

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
2.3	3000	20.07	3017
2.3	2999	20.07	3018
2.3	2989	20.07	3019
2.3	2984	20.07	3020
2.3	2982	20.07	3090

Missing Values			
Missing Value	**Count**	**Percent Of**	
		All Obs	**Missing Obs**
.	98	28.82	100.00

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TP

```
                     Histogram                          #     Boxplot
 20.5+***********                                      22        *
     .*********                                        18        *
     .
     .
     .
     .
     .
     .
     .
 11.5+
     .
     .
     .
     .
     .******                                           11        +
     .                                                           |
     .**********************************************   91     +-----+
     .**************************************           75     +-----+
  2.5+*************                                    25        |
      ----+----+----+----+----+----+----+----+----+-
      * may represent up to 2 counts


                         Normal Probability Plot
        20.5+                                      *********** *
            |                                   ****       ++
            |                                            ++
            |                                           +
            |                                         ++
            |                                       ++
            |                                      +
            |                                    ++
            |                                  ++
        11.5+                                 +
            |                               ++
            |                             ++
            |                            +
            |                          ++
```

```
    |                     ++       ***
    |                    +
    |                  ++***********
    |          ***********
 2.5+* ***********     ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TSS

Moments			
N	186	Sum Weights	186
Mean	7.38139785	Sum Observations	1372.94
Std Deviation	6.56980021	Variance	43.1622748
Skewness	1.39319119	Kurtosis	0.01632382
Uncorrected SS	18119.2372	Corrected SS	7985.02084
Coeff Variation	89.0048246	Std Error Mean	0.48172112

Basic Statistical Measures			
Location		Variability	
Mean	7.381398	Std Deviation	6.56980
Median	4.670000	Variance	43.16227
Mode	4.670000	Range	17.38000
		Interquartile Range	1.20000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	15.32297	Pr > |t|	<.0001
Sign	M	93	Pr >= |M|	<.0001
Signed Rank	S	8695.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	20.07
99%	20.07
95%	20.07
90%	20.07
75% Q3	4.67
50% Median	4.67
25% Q1	3.47

10%	2.69
5%	2.69
1%	2.69
0% Min	2.69

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
2.69	3282	20.07	3314
2.69	3281	20.07	3315
2.69	3280	20.07	3324
2.69	3279	20.07	3355
2.69	3278	20.07	3369

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	105	36.08	100.00

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TSS

```
                     Histogram                          #     Boxplot
 20.5+**********                                       20        *
     .**********                                       19        *
     .
     .
     .
     .
     .
     .
     .
 11.5+
     .
     .
     .
     .
     .
     .
     .*********************************************    89     +-----+
     .********************                             39     +-----+
  2.5+**********                                       19        +
      ----+----+----+----+----+----+----+----+----+
      * may represent up to 2 counts


                         Normal Probability Plot
        20.5+                                         ********** **
            |                                    *****     ++
            |                                             +
            |                                           ++
            |                                          +
            |                                        ++
            |                                       +
            |                                     ++
            |                                    +
        11.5+                                  ++
            |                                ++
            |                               +
            |                             ++
            |                            +
```

```
    |                       ++
    |                      +
    |                    **************
    |            *********
 2.5+** **********    ++
     +----+----+----+----+----+----+----+----+----+----+
         -2        -1         0        +1        +2
```

==
Univariate Procedure, Retention Time
==

The UNIVARIATE Procedure
Variable: X5
Poll = TZ

Moments			
N	122	Sum Weights	122
Mean	8.30516393	Sum Observations	1013.23
Std Deviation	6.56376042	Variance	43.0829508
Skewness	1.24776227	Kurtosis	-0.4506378
Uncorrected SS	13628.0783	Corrected SS	5213.03705
Coeff Variation	79.03228	Std Error Mean	0.59425495

Basic Statistical Measures			
Location		Variability	
Mean	8.305164	Std Deviation	6.56376
Median	4.670000	Variance	43.08295
Mode	4.670000	Range	15.45000
		Interquartile Range	0

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	13.97576	Pr > |t|	<.0001
Sign	M	61	Pr >= |M|	<.0001
Signed Rank	S	3751.5	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Quantile	Estimate
100% Max	20.07
99%	20.07
95%	20.07
90%	19.98
75% Q3	4.67
50% Median	4.67
25% Q1	4.67

10%	4.62
5%	4.62
1%	4.62
0% Min	4.62

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
4.62	1669	20.07	1592
4.62	1658	20.07	1593
4.62	1642	20.07	1594
4.62	1641	20.07	1595
4.62	1635	20.07	1656

Missing Values			
Missing Value	Count	Percent Of	
		All Obs	Missing Obs
.	109	47.19	100.00

Univariate Procedure, Retention Time

The UNIVARIATE Procedure
Variable: X5
Poll = TZ

```
                      Histogram                         #    Boxplot
 20.5+*****                                            10       *
     .**********                                       19       *
     .
     .
     .
     .
     .
     .
 12.5+
     .
     .
     .
     .
     .
     .
     .
  4.5+***********************************************  93    +--*--+
      ----+----+----+----+----+----+----+----+----+--
      * may represent up to 2 counts


                         Normal Probability Plot
        20.5+                                    ******* *  *
            |                             ********  +
            |                                     ++
            |                                    +
            |                                  ++
            |                                 +
            |                               ++
            |                              +
        12.5+                            ++
            |                           +
            |                         ++
            |                        +
            |                      ++
            |                     +
            |                   ++
            |                 ++
```

```
4.5+*  * ****************************
    +----+----+----+----+----+----+----+----+----+----+
        -2        -1         0        +1        +2
```

TEST OF HYPOTHESIS

===

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Dissolved Cadmium

===

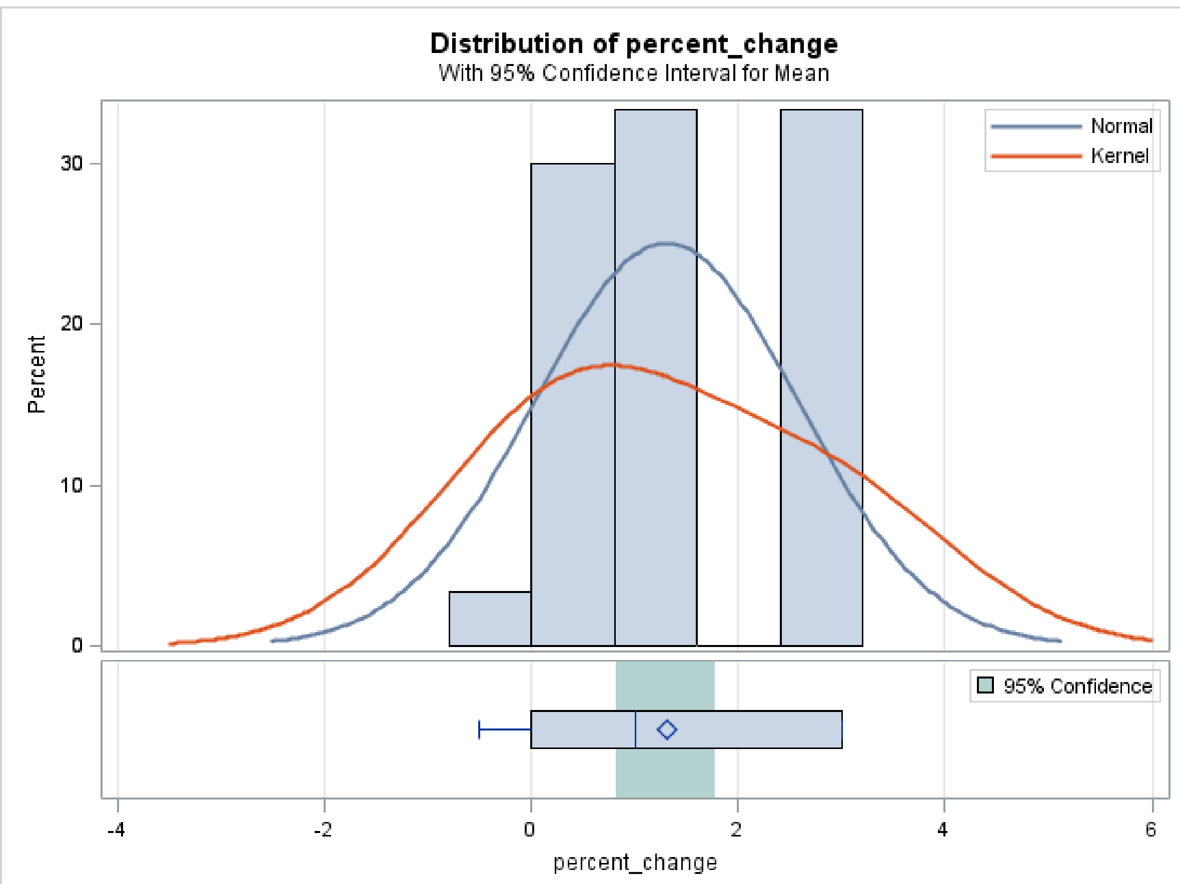
The TTEST Procedure

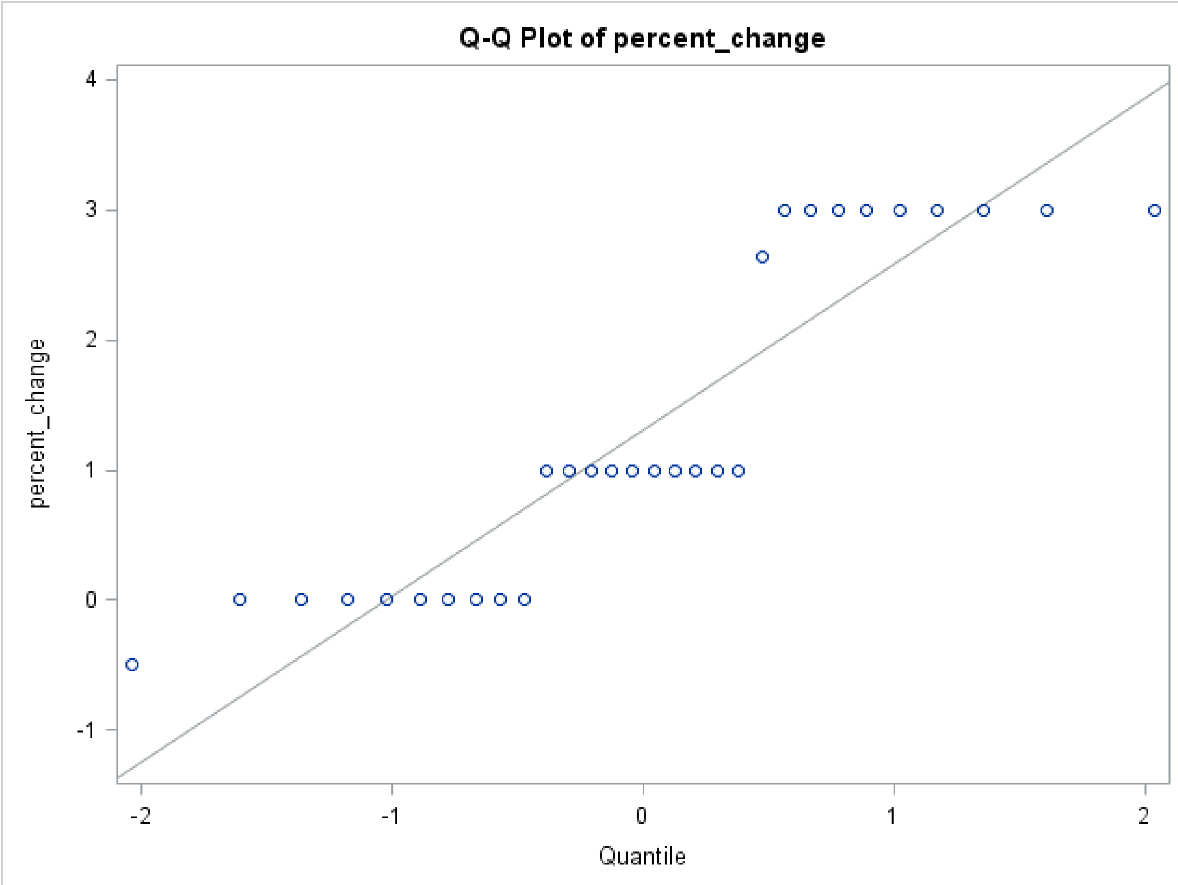
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
30	1.3045	1.2750	0.2328	-0.5000	3.0000

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
1.3045	0.8284	1.7807	1.2750	1.0154	1.7140

DF	t Value	Pr > |t|
29	6.68	<.0001




Q-Q Plot of percent_change
percent_change
Quantile
4
3
2
1
0
-1
-2
-1
0
1
2

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Dissolved Chromium

==

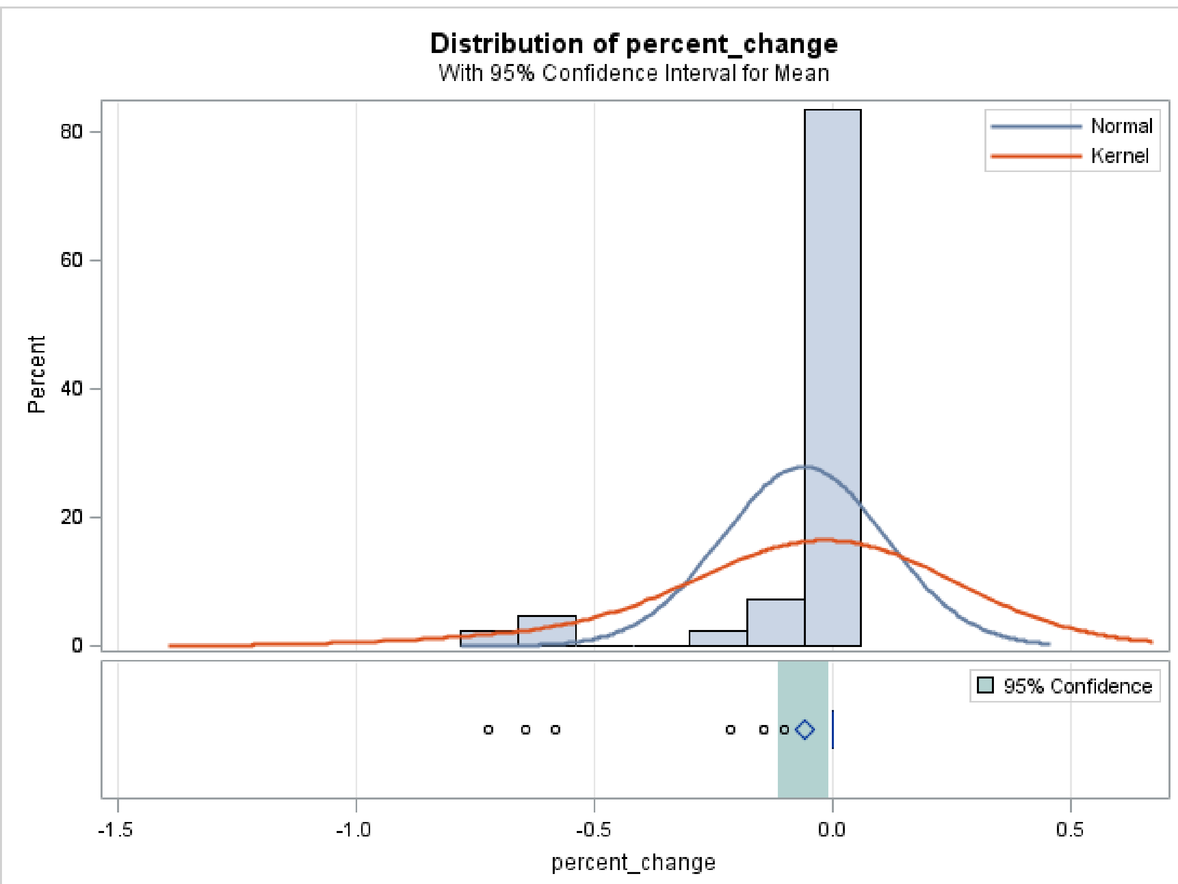
The TTEST Procedure

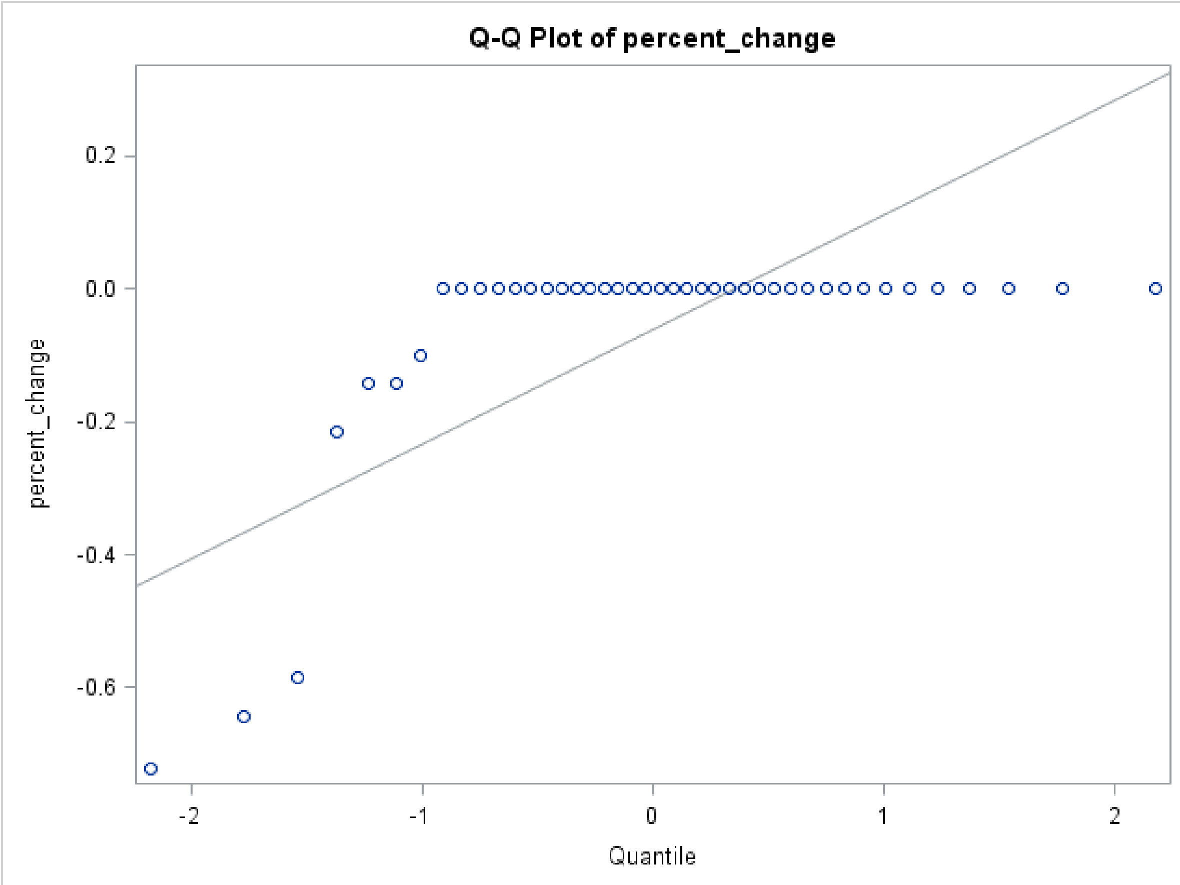
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
42	-0.0607	0.1723	0.0266	-0.7222	0

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
-0.0607	-0.1144	-0.00698	0.1723	0.1418	0.2197

DF	t Value	Pr > |t|
41	7.12	<.0001




Q-Q Plot of percent_change
0.2
0.0
-0.2
-0.4
-0.6
percent_change
-2
-1
0
1
2
Quantile

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Dissolved Copper

==

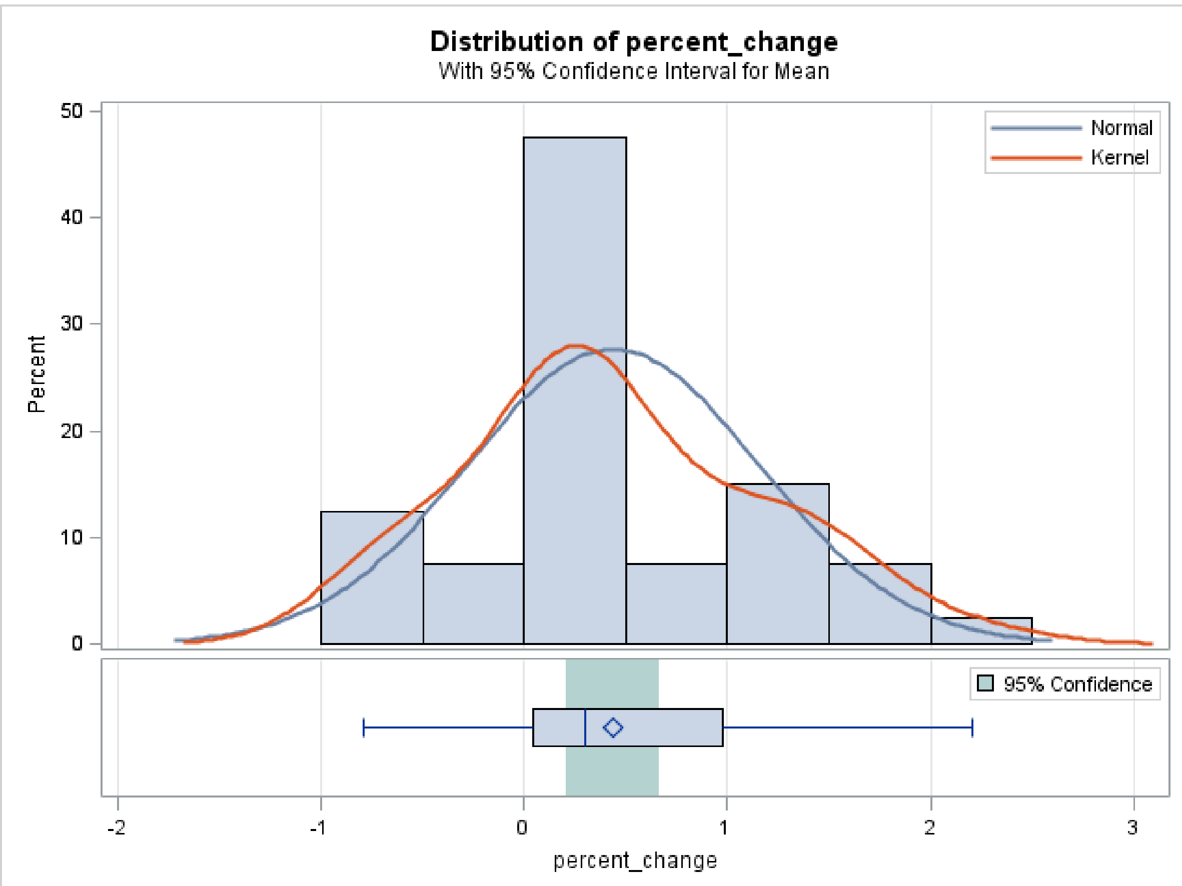
The TTEST Procedure

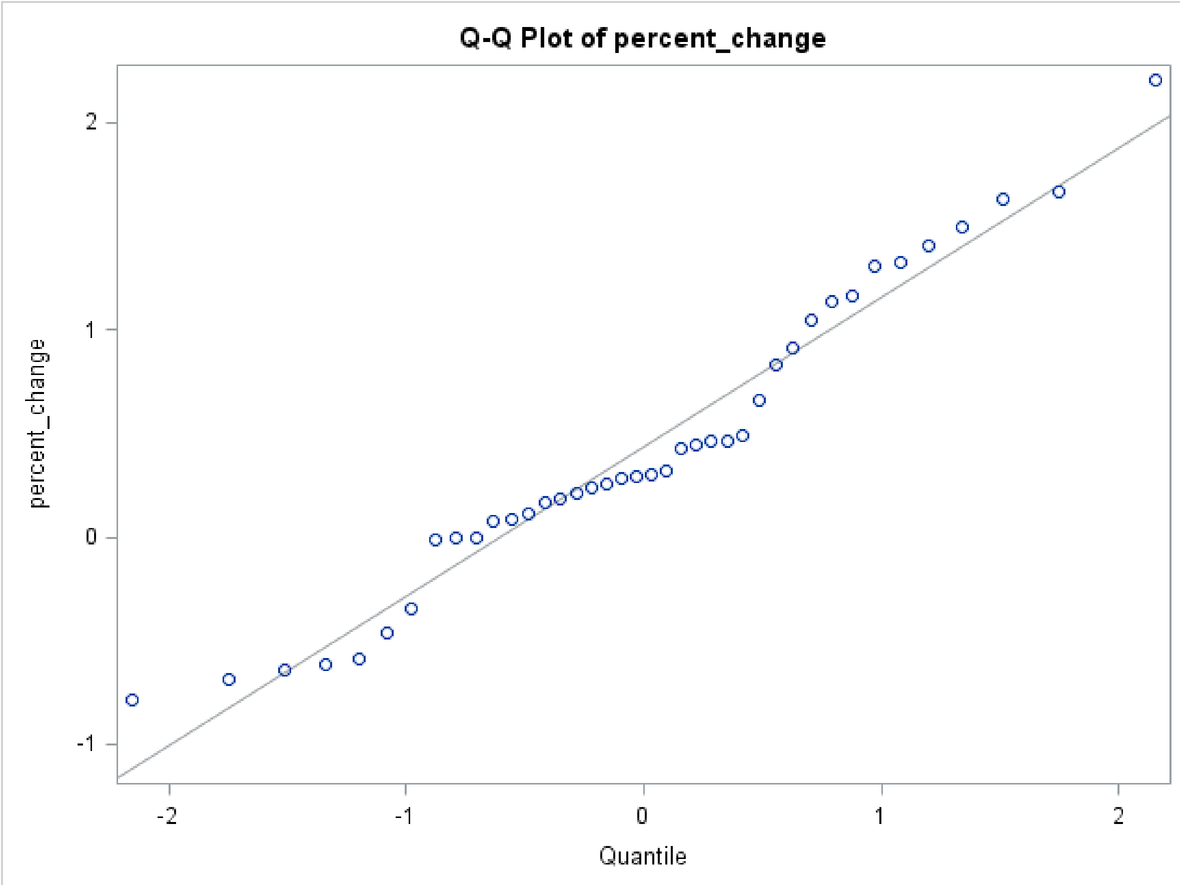
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
40	0.4373	0.7216	0.1141	-0.7863	2.2059

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
0.4373	0.2065	0.6681	0.7216	0.5911	0.9266

DF	t Value	Pr > |t|
39	6.02	<.0001




Q-Q Plot of percent_change
percent_change
Quantile
2
1
0
-1
-2
-1
0
1
2

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Dissolved Iron

==

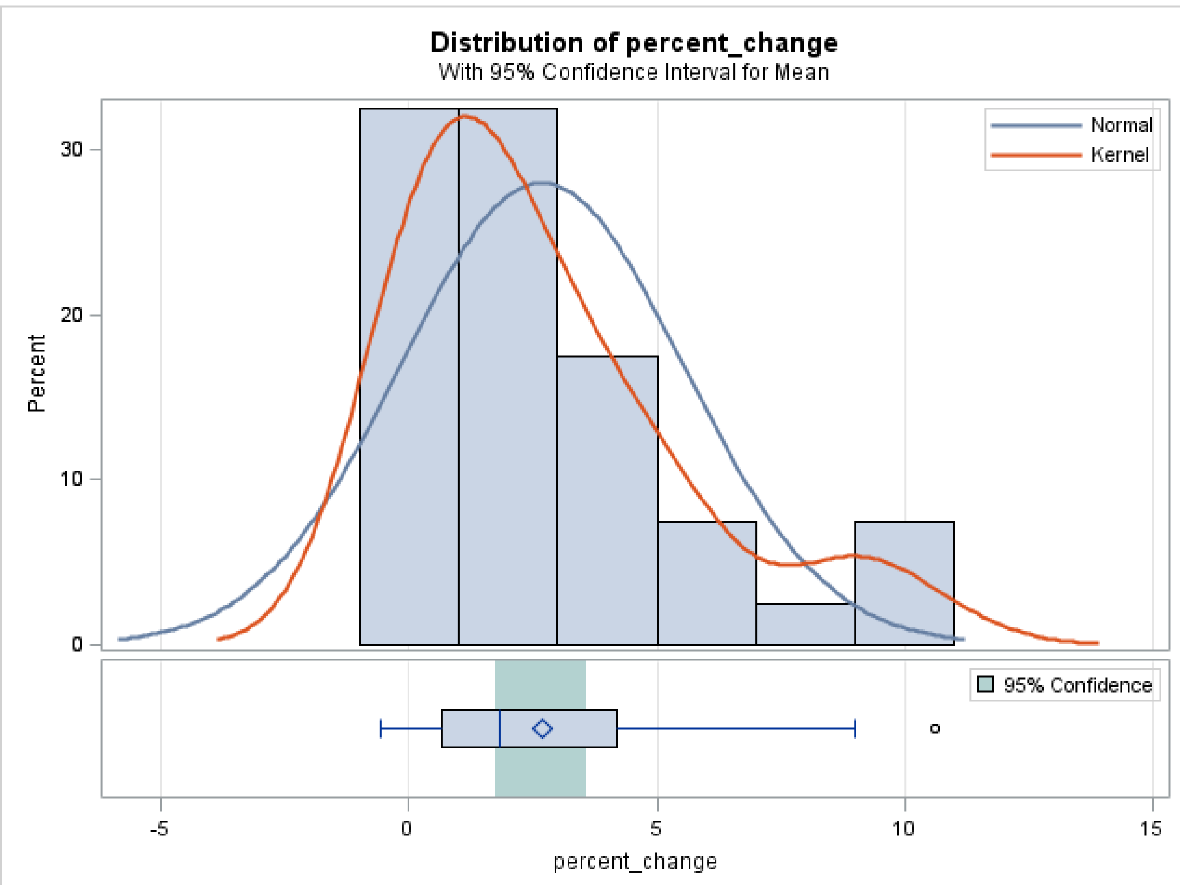
The TTEST Procedure

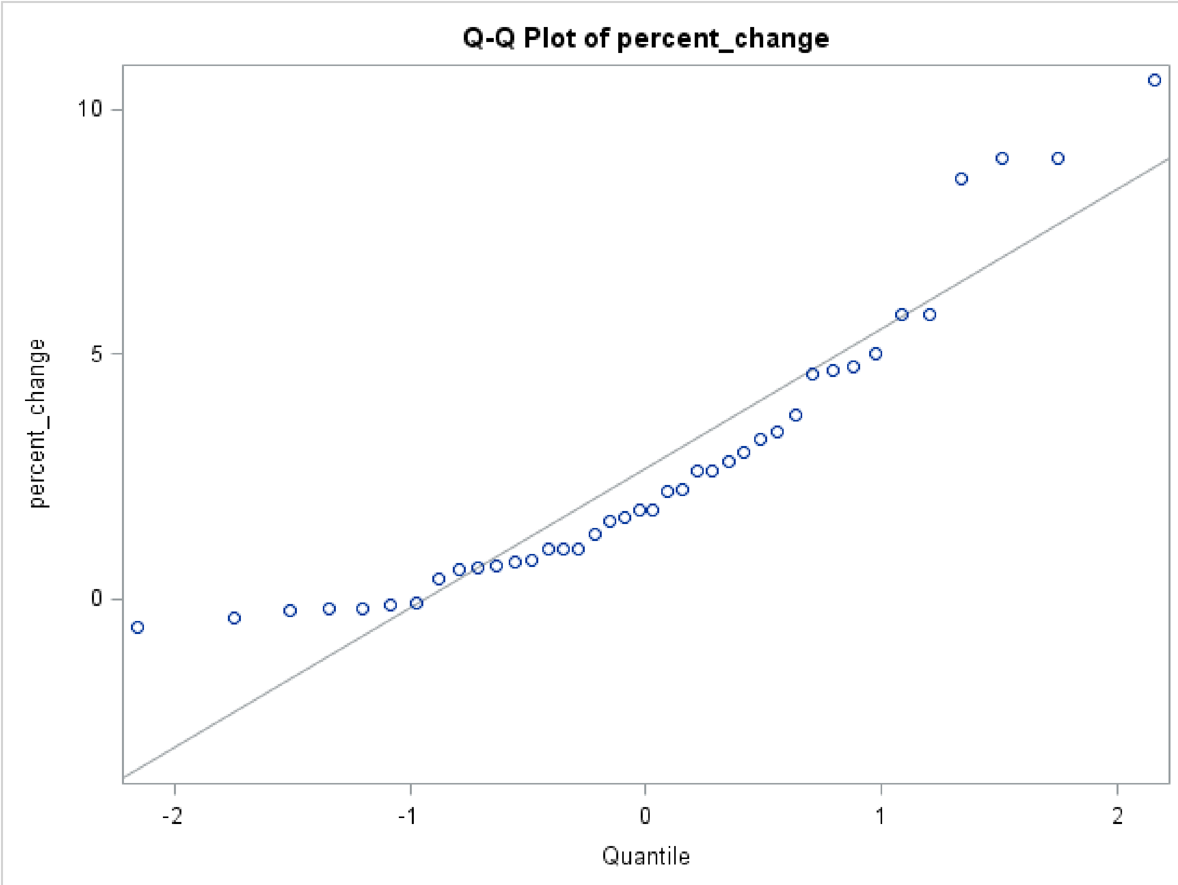
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
40	2.6722	2.8500	0.4506	-0.5833	10.6000

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
2.6722	1.7607	3.5837	2.8500	2.3346	3.6595

DF	t Value	Pr > |t|
39	6.48	<.0001




Q-Q Plot of percent_change
percent_change
Quantile
10
5
0
-2
-1
0
1
2

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Dissolved Nickel

==

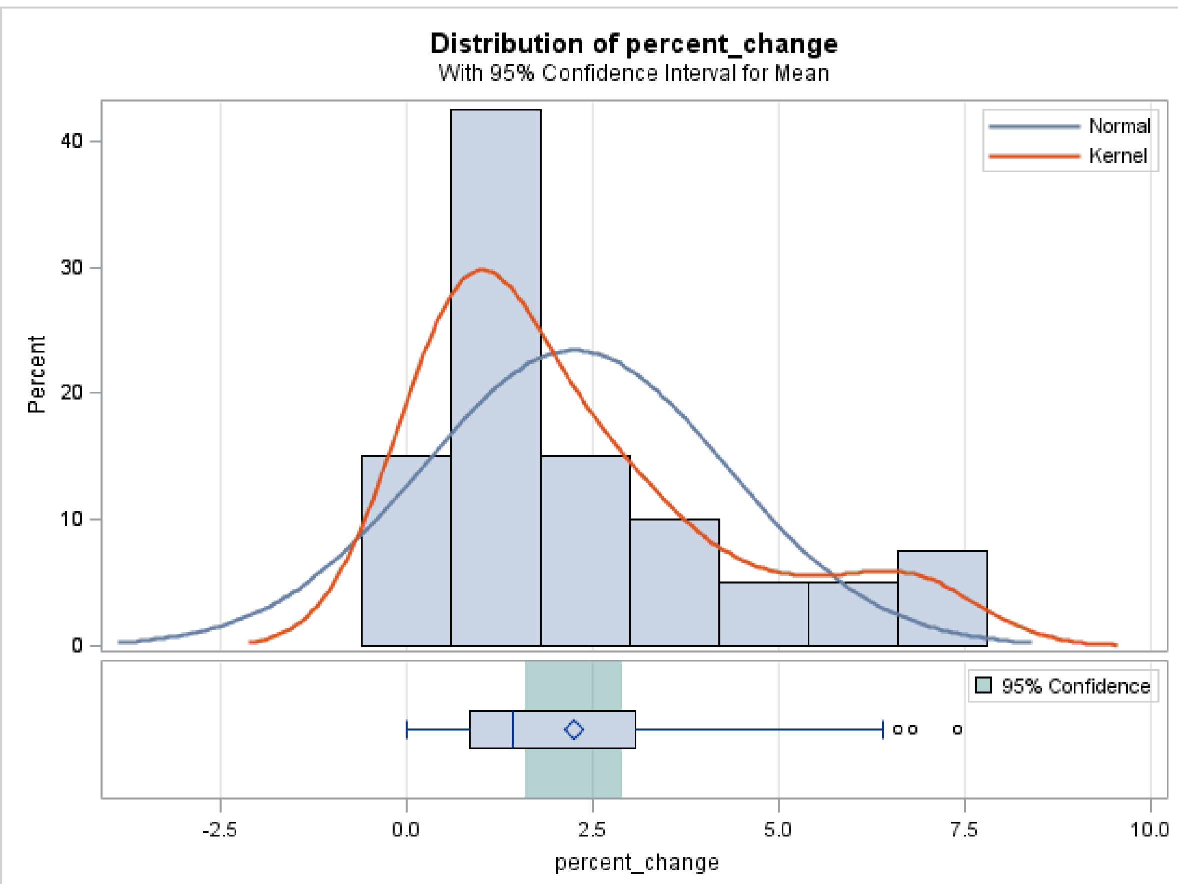
The TTEST Procedure

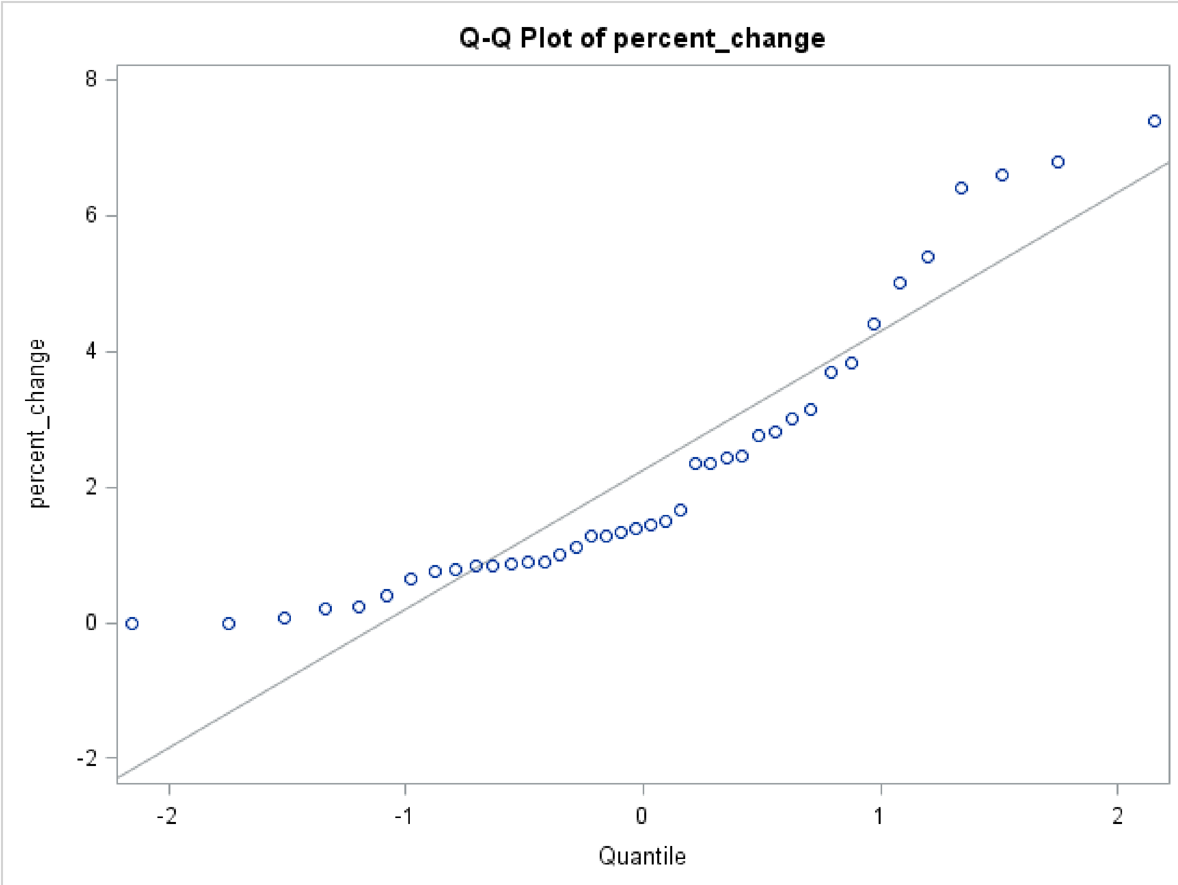
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
40	2.2532	2.0450	0.3233	0	7.4000

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
2.2532	1.5992	2.9072	2.0450	1.6752	2.6258

DF	t Value	Pr > |t|
39	7.74	<.0001




Q-Q Plot of percent_change
percent_change
Quantile
8
6
4
2
0
-2
-2
-1
0
1
2

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Dissolved Phosphorus

==

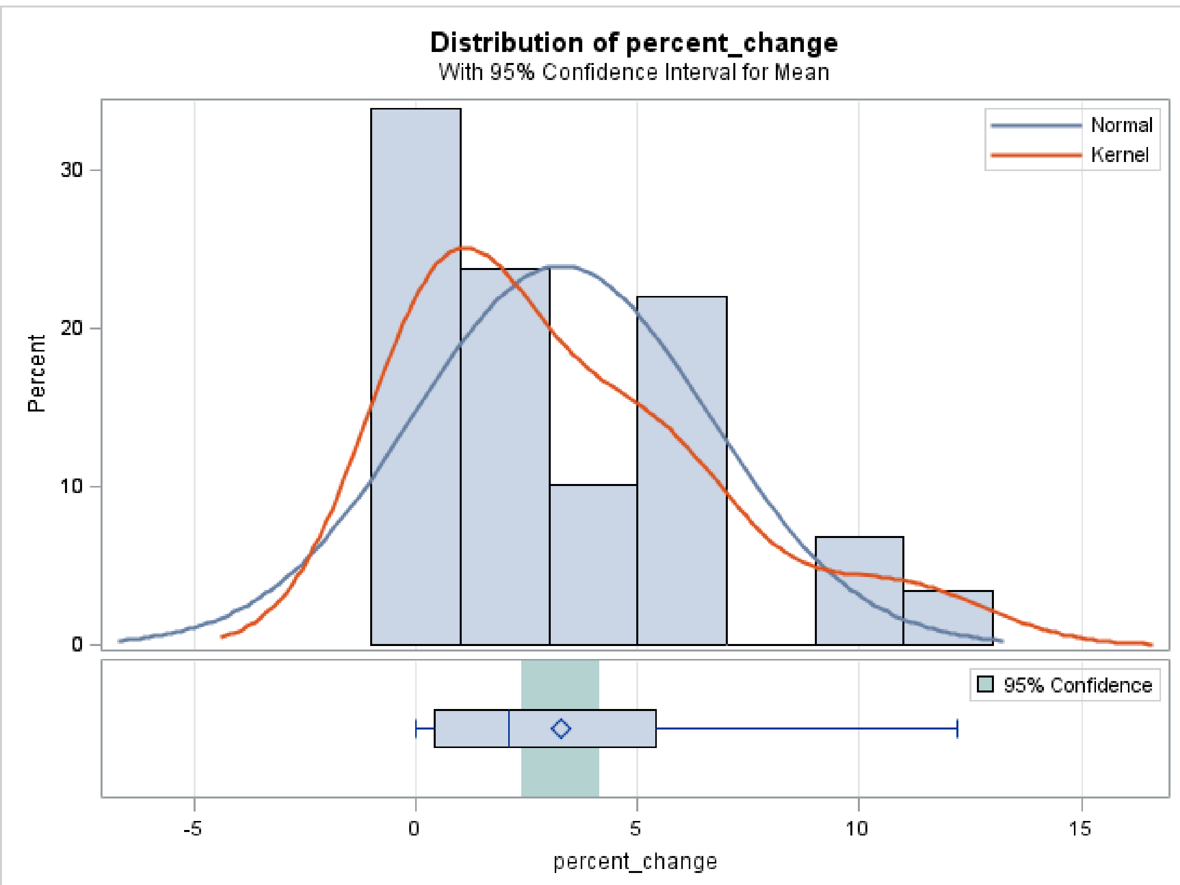
The TTEST Procedure

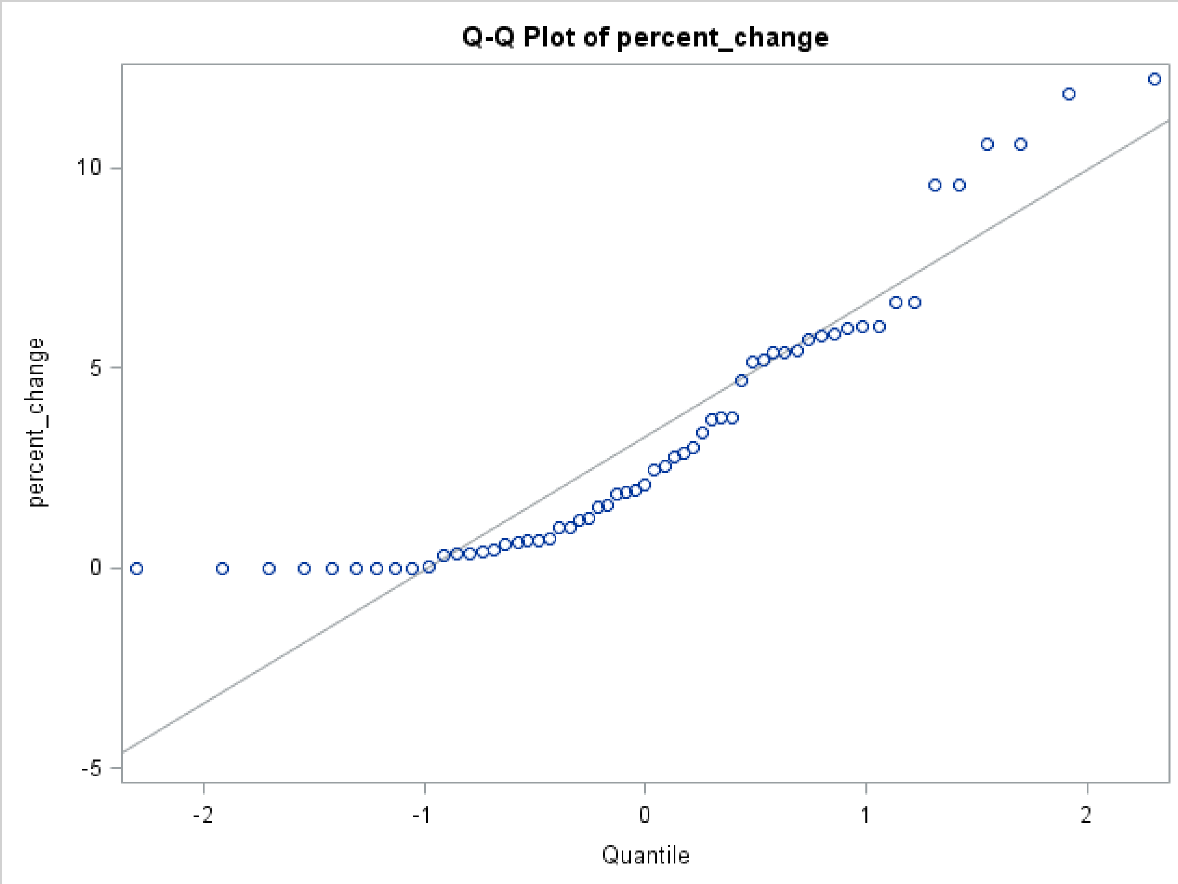
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
59	3.2724	3.3313	0.4337	0	12.2222

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
3.2724	2.4043	4.1406	3.3313	2.8201	4.0707

DF	t Value	Pr > |t|
58	8.12	<.0001




Q-Q Plot of percent_change
percent_change
Quantile
10
5
0
-5
-2
-1
0
1
2

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Dissolved Zinc

==

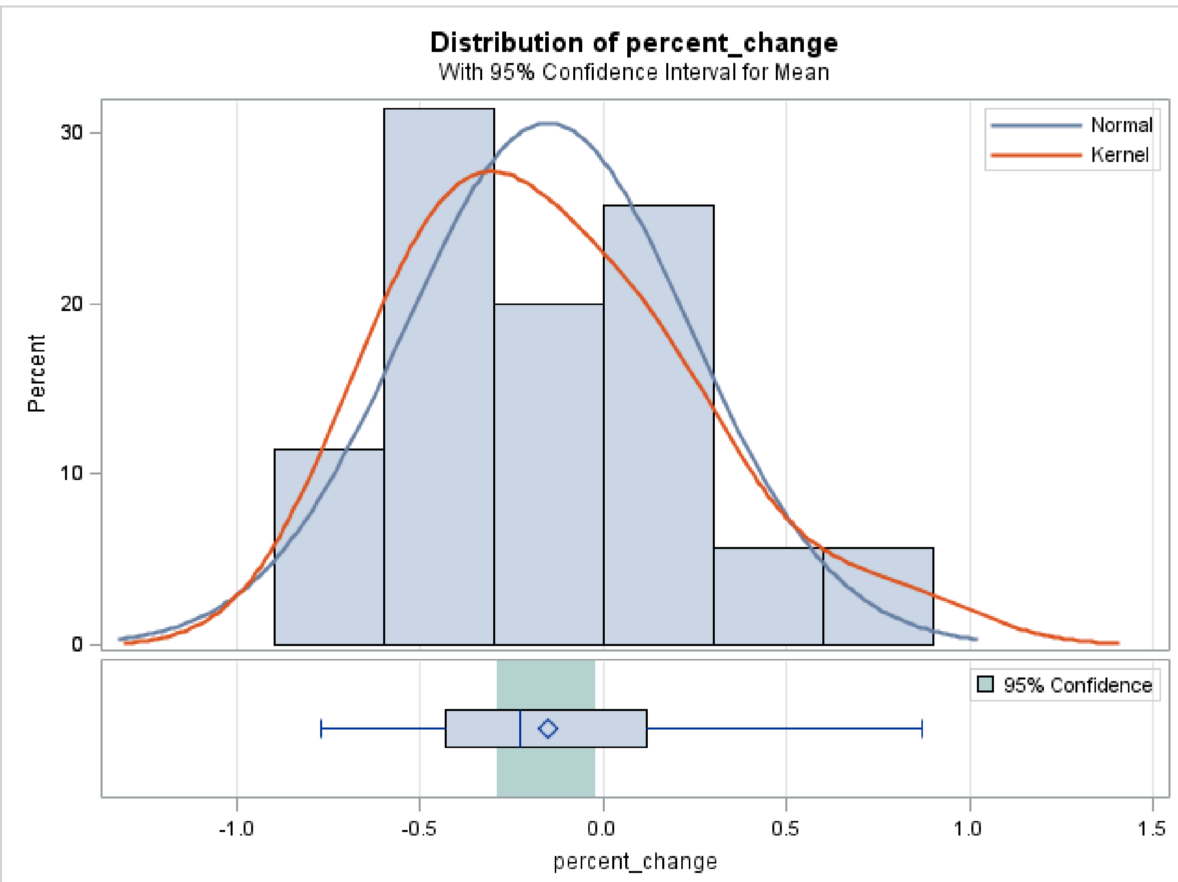
The TTEST Procedure

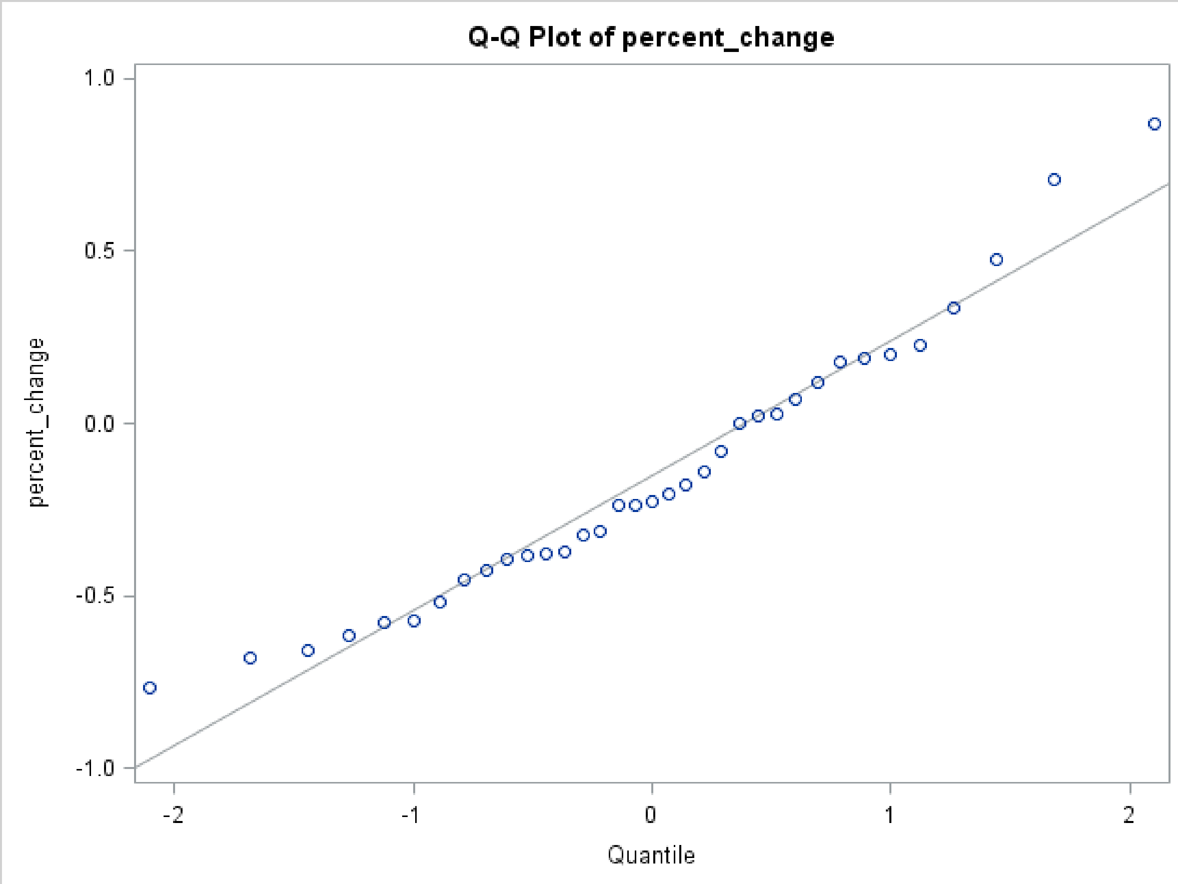
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
35	-0.1523	0.3911	0.0661	-0.7694	0.8716

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
-0.1523	-0.2867	-0.0179	0.3911	0.3164	0.5125

DF	t Value	Pr > |t|
34	1.48	0.1487




Q-Q Plot of percent_change
1.0
0.5
0.0
-0.5
-1.0
percent_change
-2
-1
0
1
2
Quantile

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = E. Coli

==

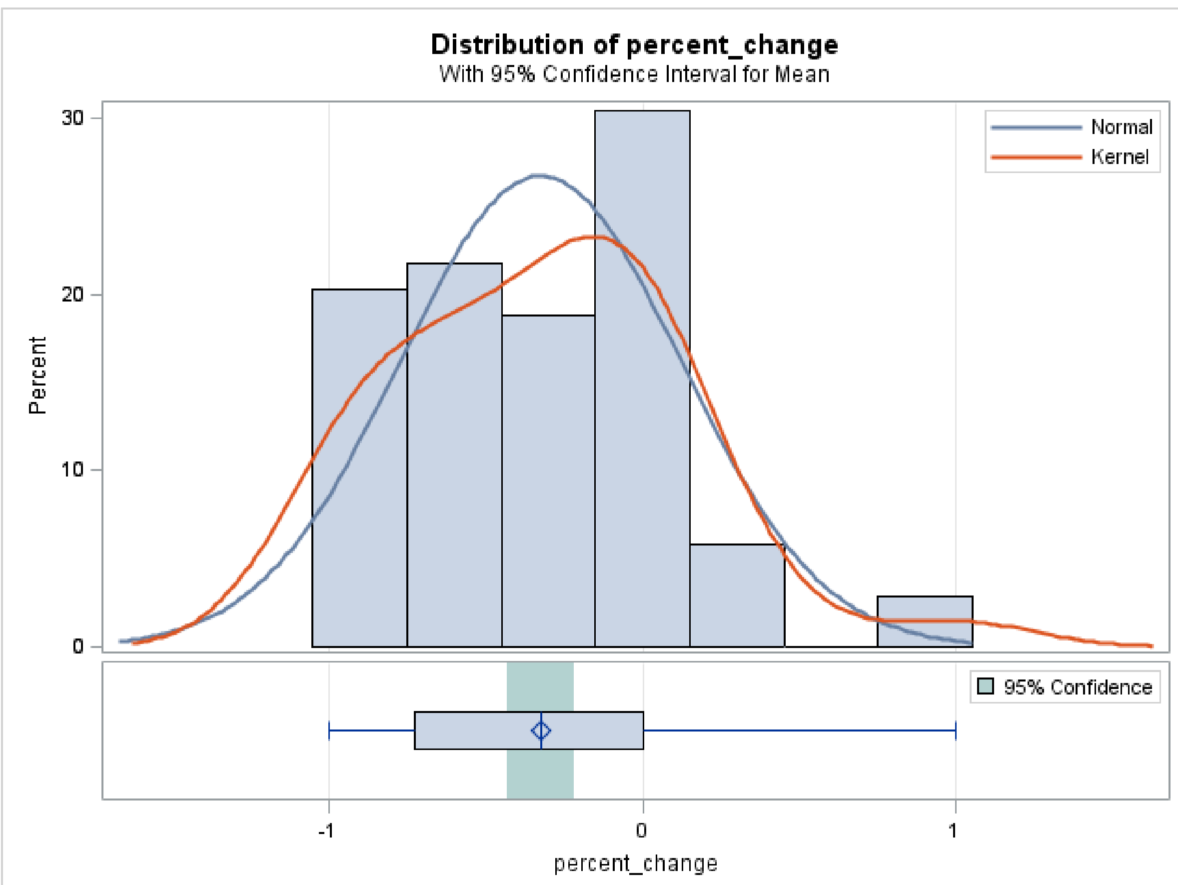
The TTEST Procedure

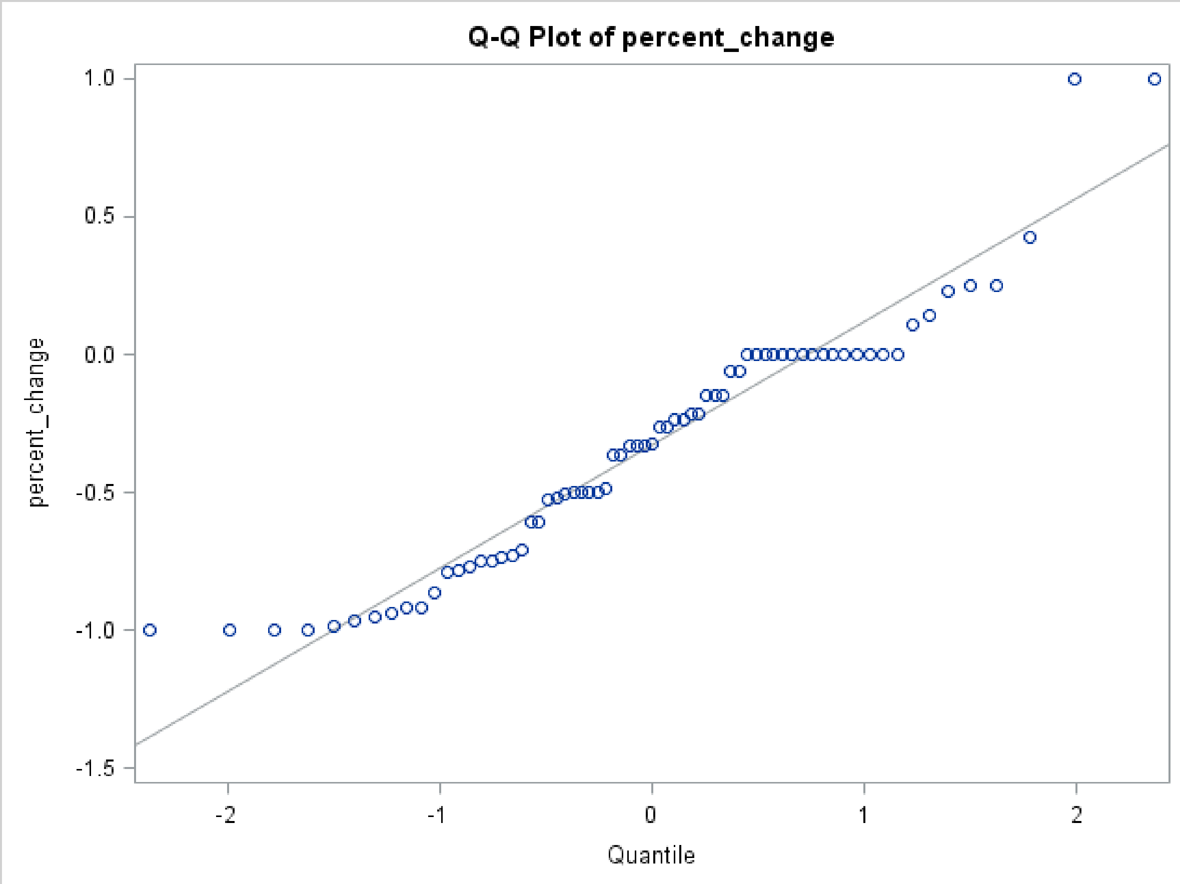
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
69	-0.3255	0.4477	0.0539	-1.0000	1.0000

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
-0.3255	-0.4331	-0.2180	0.4477	0.3835	0.5380

DF	t Value	Pr > |t|
68	-1.40	0.1656




Q-Q Plot of percent_change
1.0
0.5
0.0
-0.5
-1.0
-1.5
percent_change
-2
-1
0
1
2
Quantile

===

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Enterococcus

===

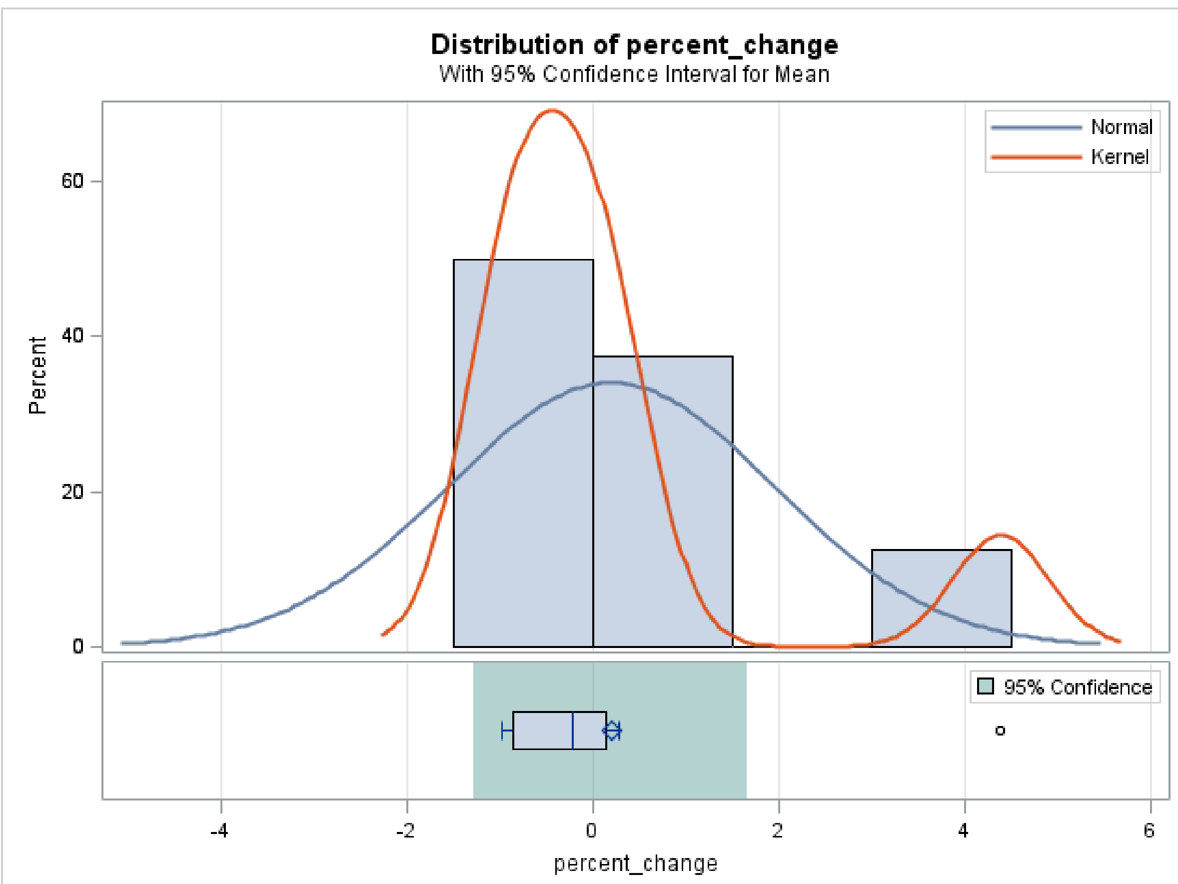
The TTEST Procedure

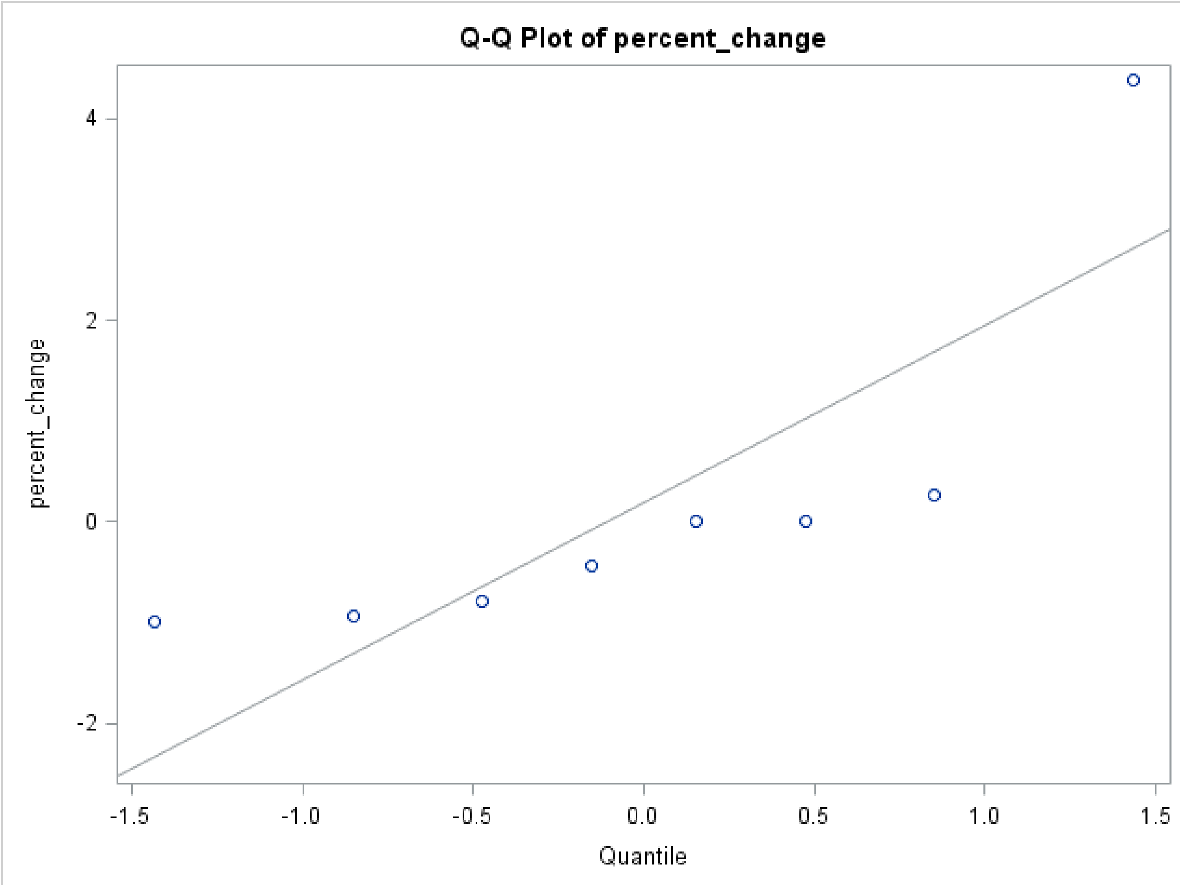
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
8	0.1884	1.7599	0.6222	-0.9856	4.3846

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
0.1884	-1.2829	1.6597	1.7599	1.1636	3.5818

DF	t Value	Pr > |t|
7	0.70	0.5038




Q-Q Plot of percent_change
percent_change
Quantile
4
2
0
-2
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Fecal Coliform

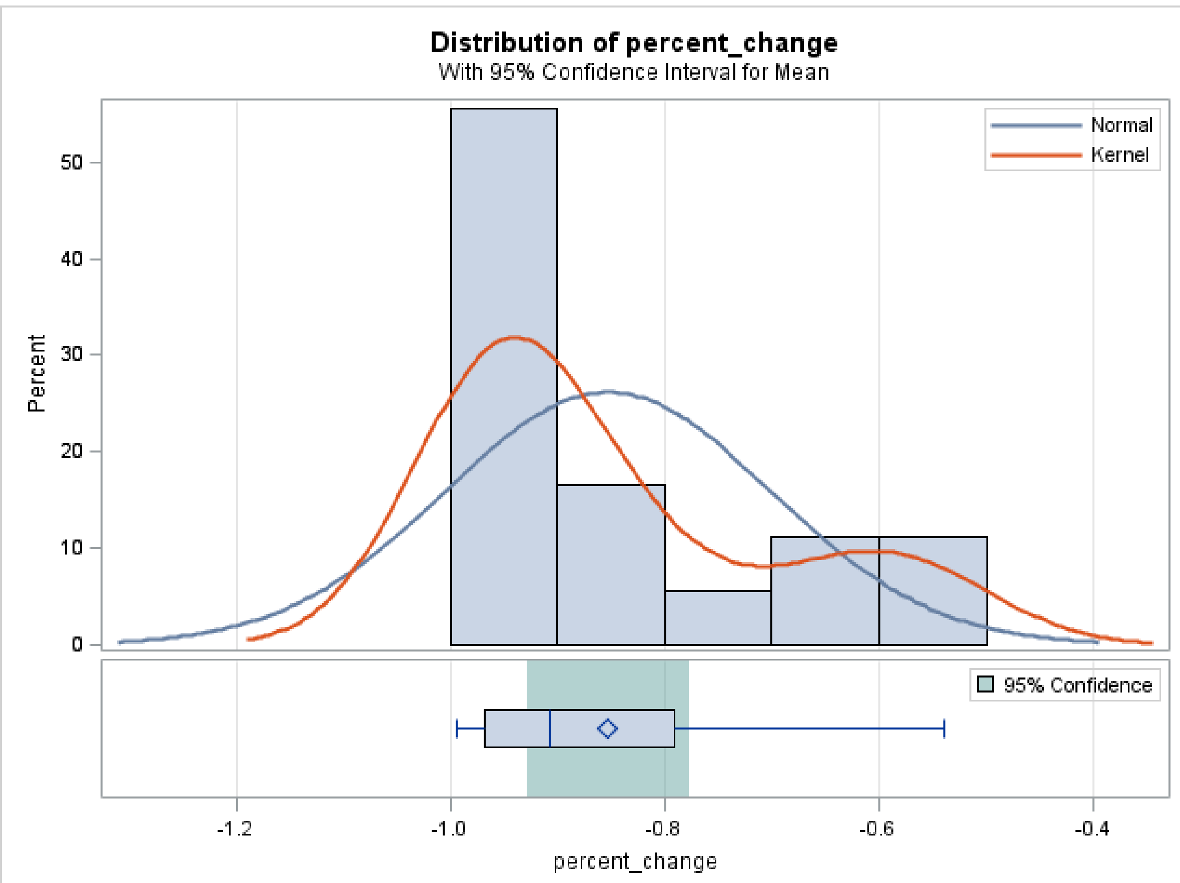
The TTEST Procedure

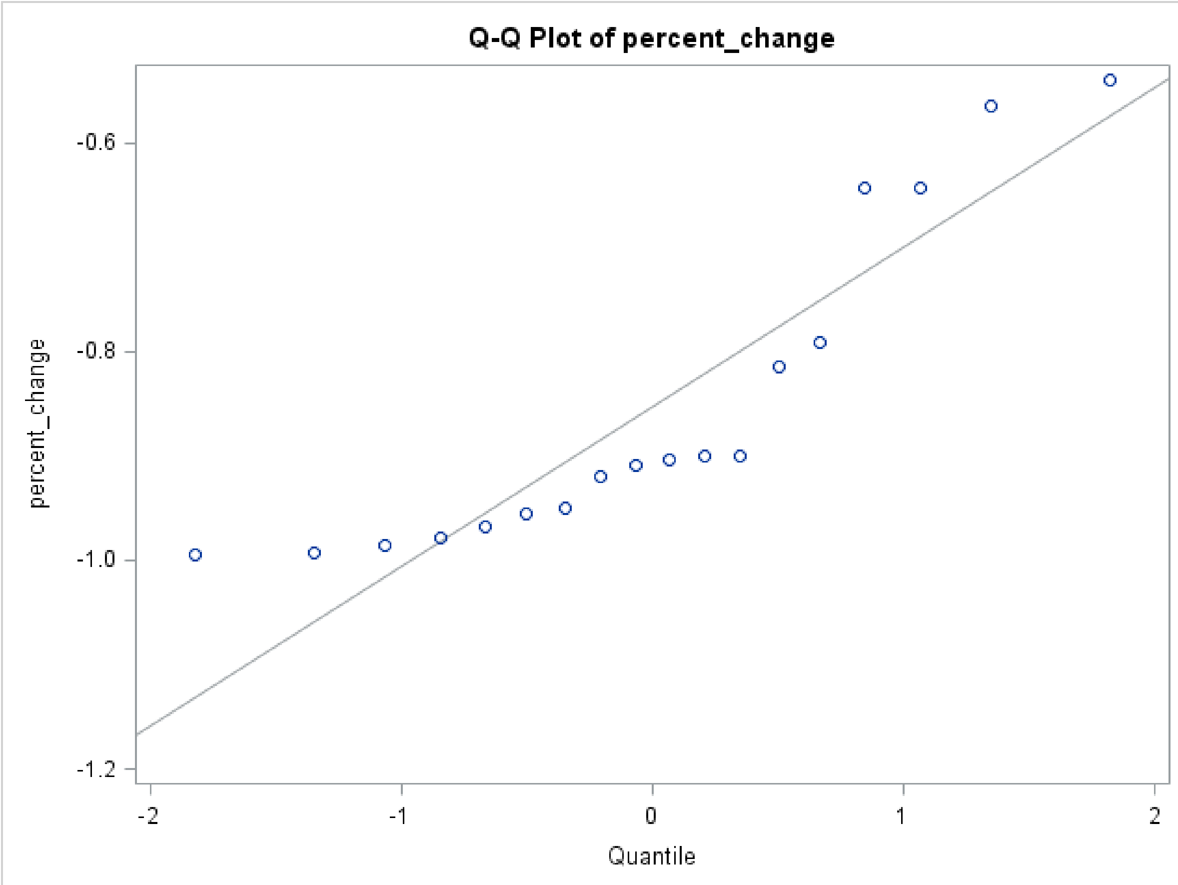
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
18	-0.8531	0.1525	0.0359	-0.9949	-0.5400

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
-0.8531	-0.9289	-0.7773	0.1525	0.1144	0.2286

DF	t Value	Pr > |t|
17	-16.78	<.0001




Q-Q Plot of percent_change
percent_change
-0.6
-0.8
-1.0
-1.2
-2
-1
0
1
2
Quantile

===

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Nitrogen and Nitrate

===

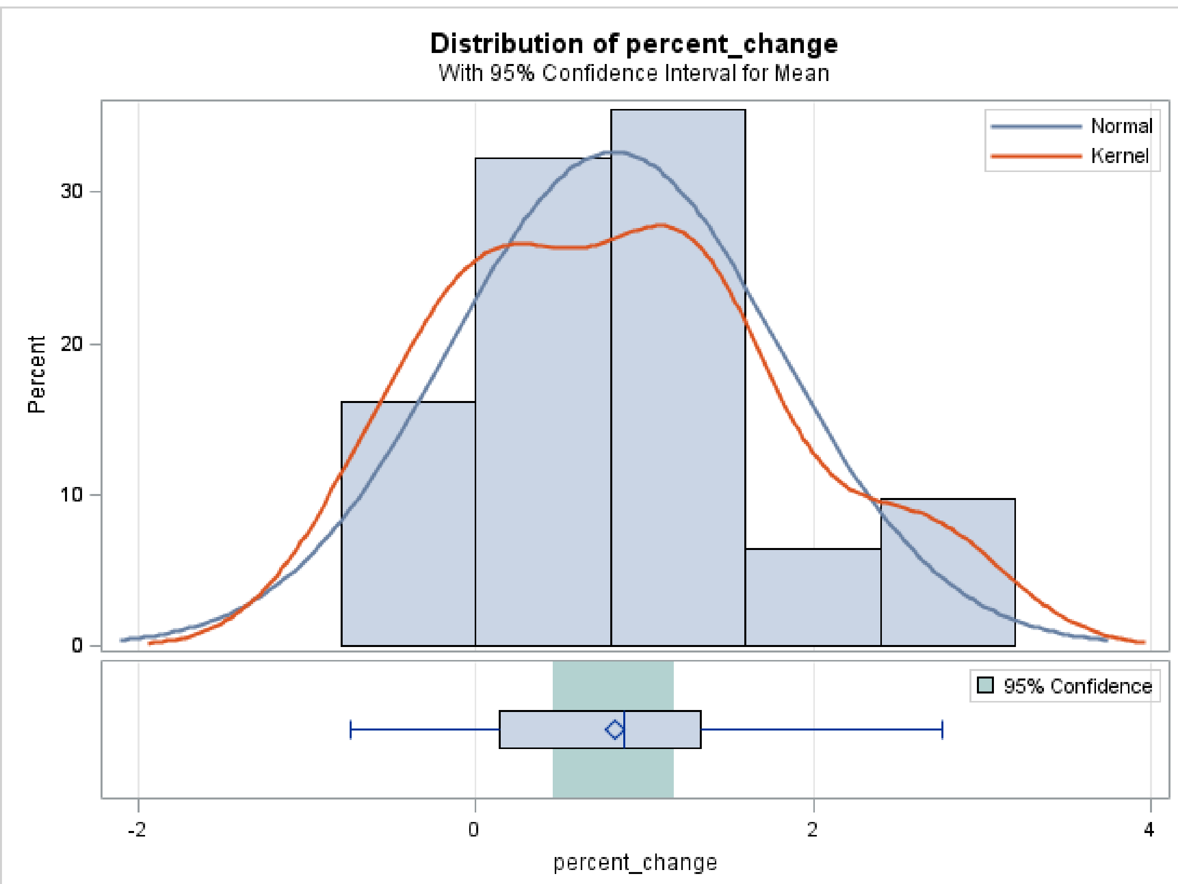
The TTEST Procedure

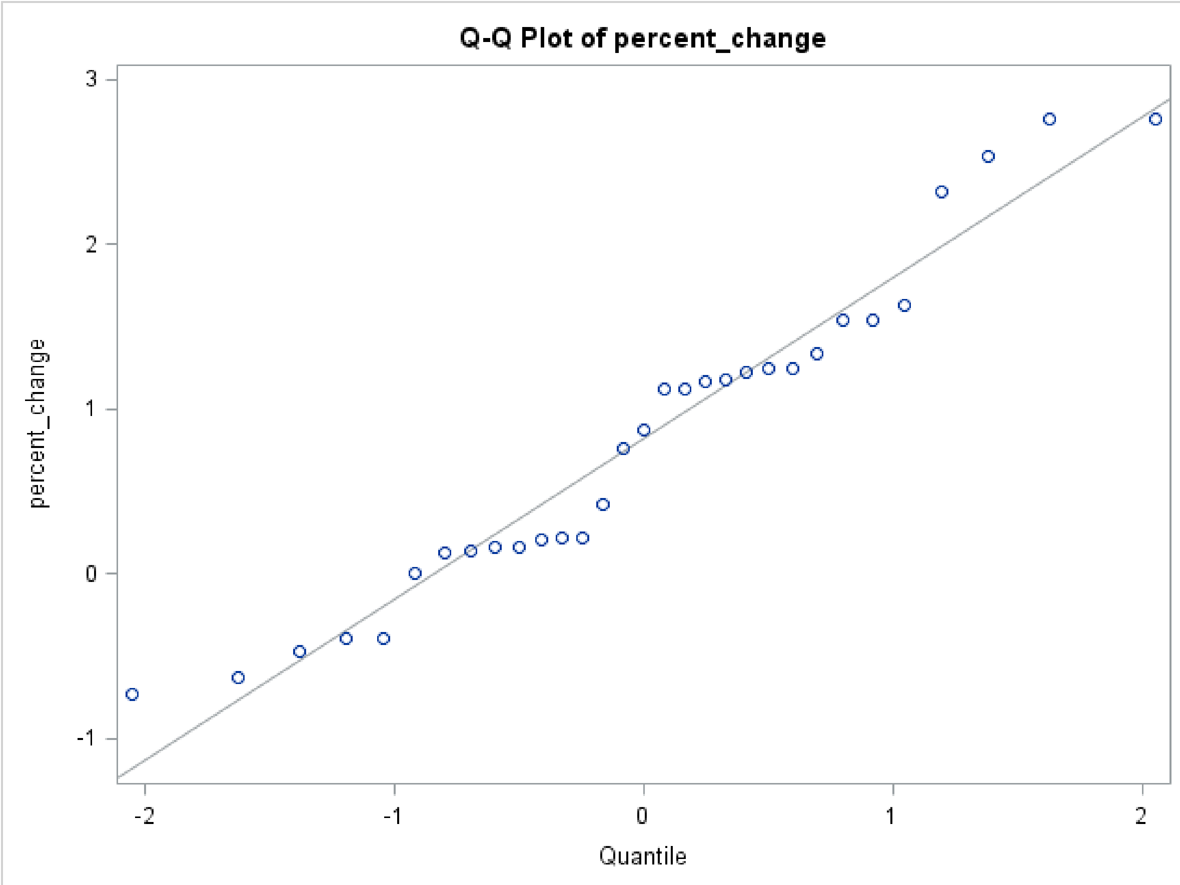
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
31	0.8186	0.9767	0.1754	-0.7385	2.7609

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
0.8186	0.4604	1.1769	0.9767	0.7805	1.3056

DF	t Value	Pr > |t|
30	6.09	<.0001




Q-Q Plot of percent_change
percent_change
Quantile
3
2
1
0
-1
-2
-1
0
1
2

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Nitrogen, Nitrite, and Nitrate

==

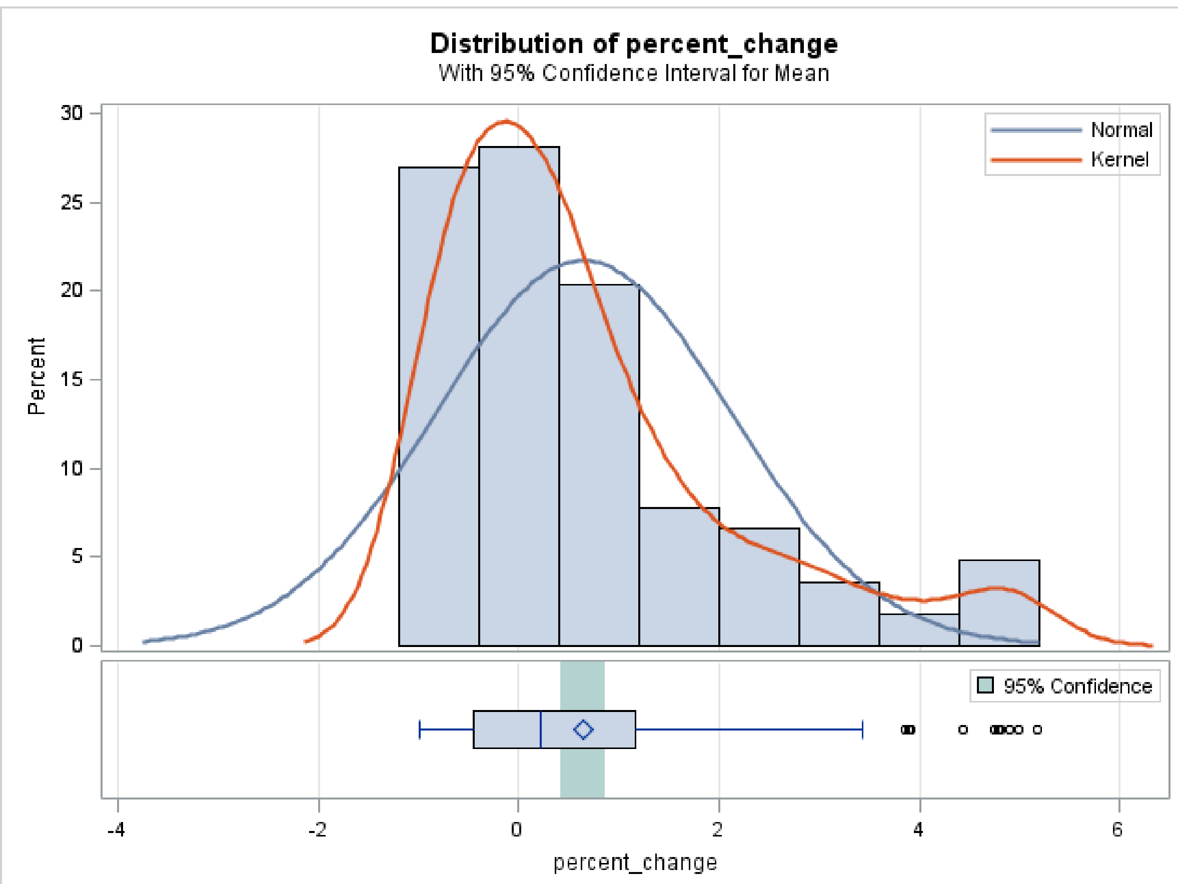
The TTEST Procedure

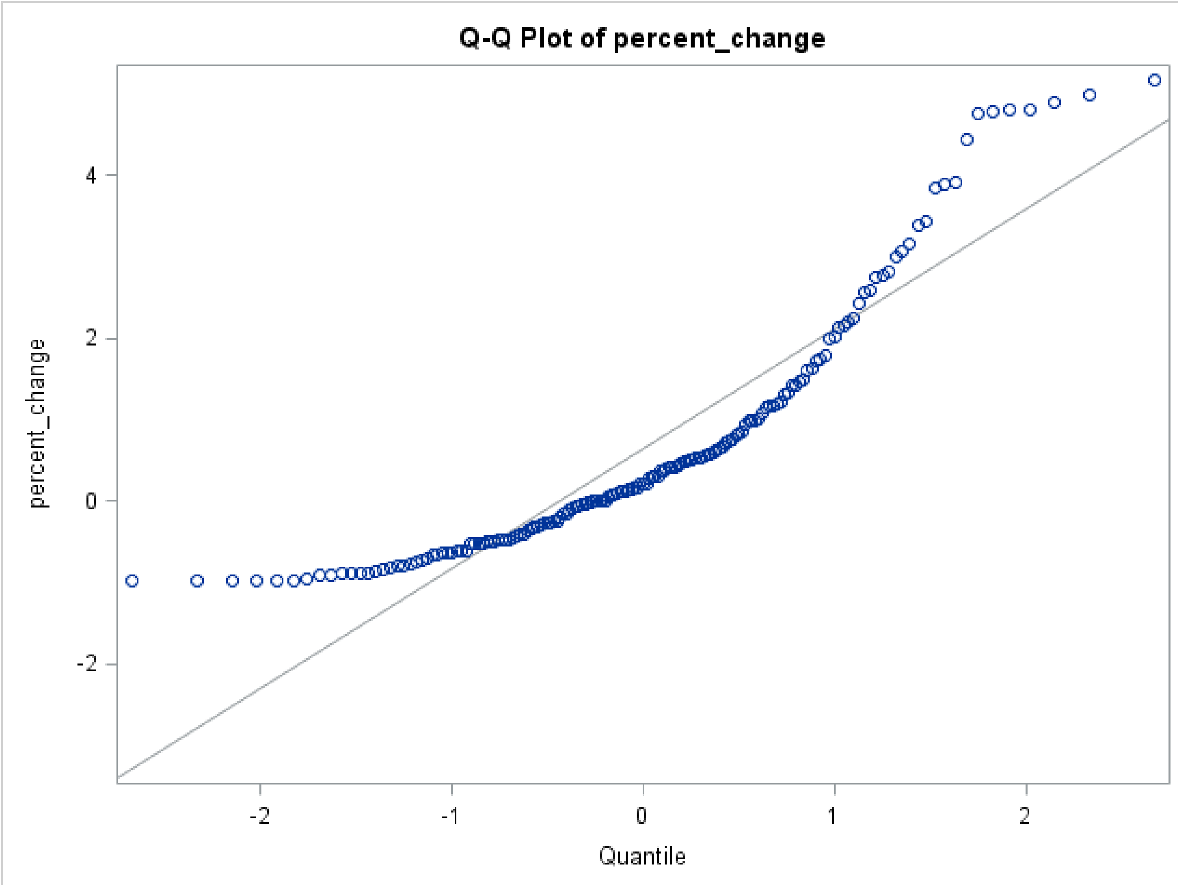
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
167	0.6446	1.4702	0.1138	-0.9857	5.1750

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
0.6446	0.4200	0.8692	1.4702	1.3276	1.6474

DF	t Value	Pr > |t|
166	7.86	<.0001




Q-Q Plot of percent_change
percent_change
4
2
0
-2
-2
-1
0
1
2
Quantile

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Orthophosphate

==

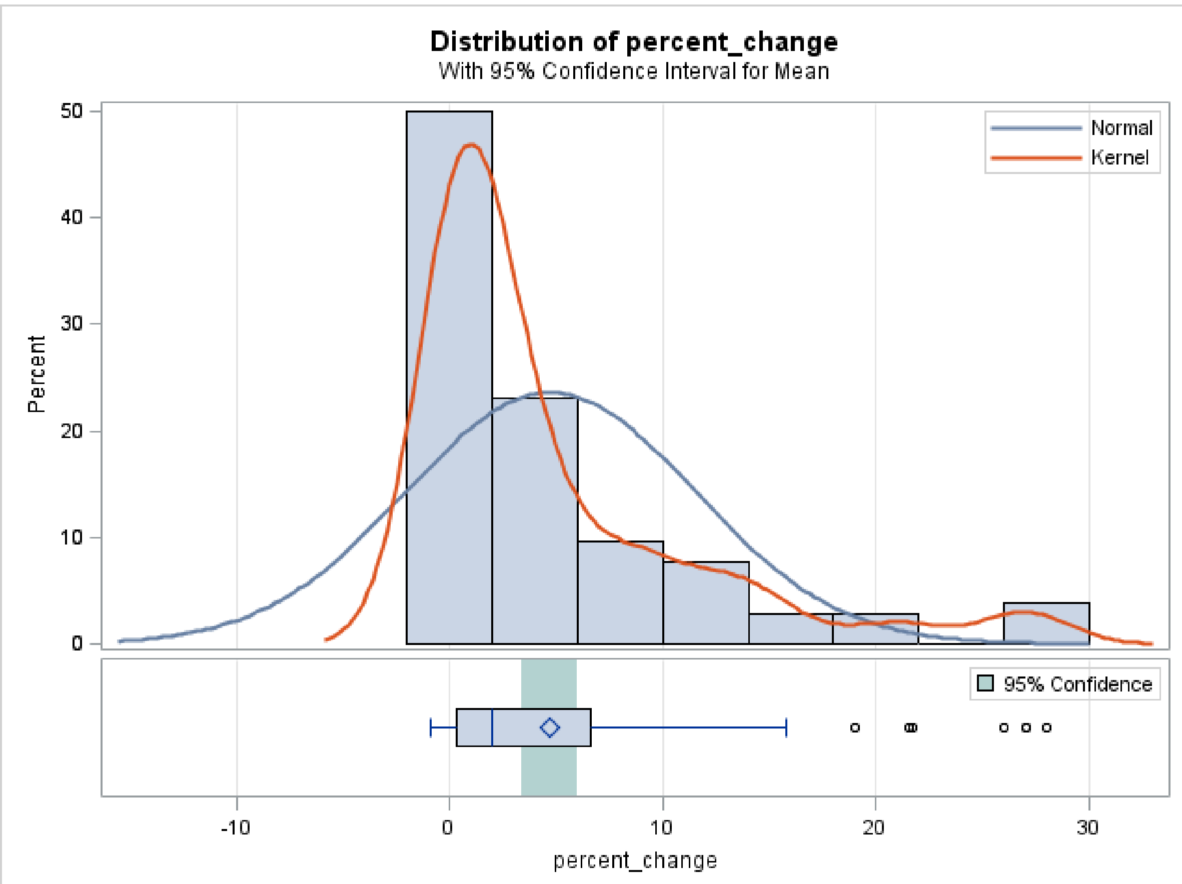
The TTEST Procedure

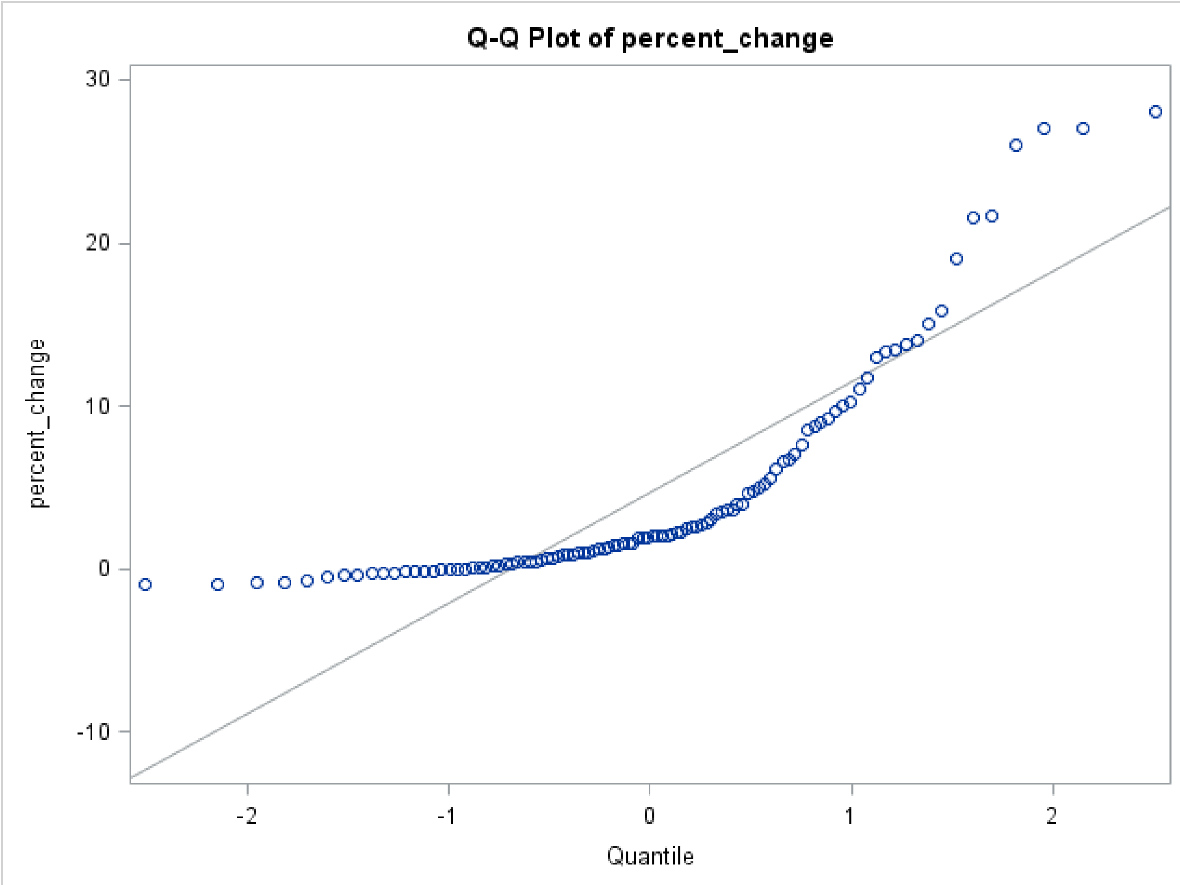
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
104	4.7246	6.7601	0.6629	-0.9000	28.0000

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
4.7246	3.4099	6.0393	6.7601	5.9496	7.8283

DF	t Value	Pr > |t|
103	7.50	<.0001




Q-Q Plot of percent_change
30
20
10
0
-10
percent_change
-2
-1
0
1
2
Quantile

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Total Arsenic

==

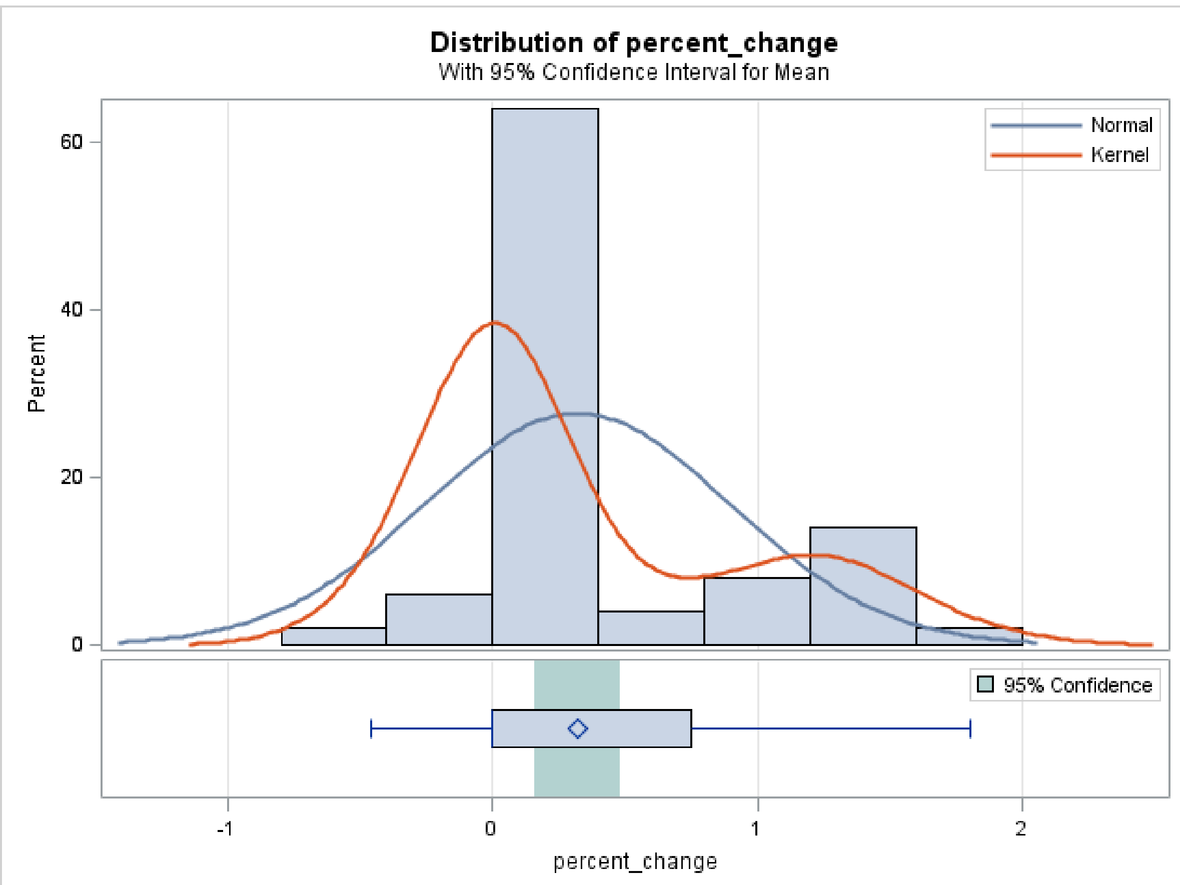
The TTEST Procedure

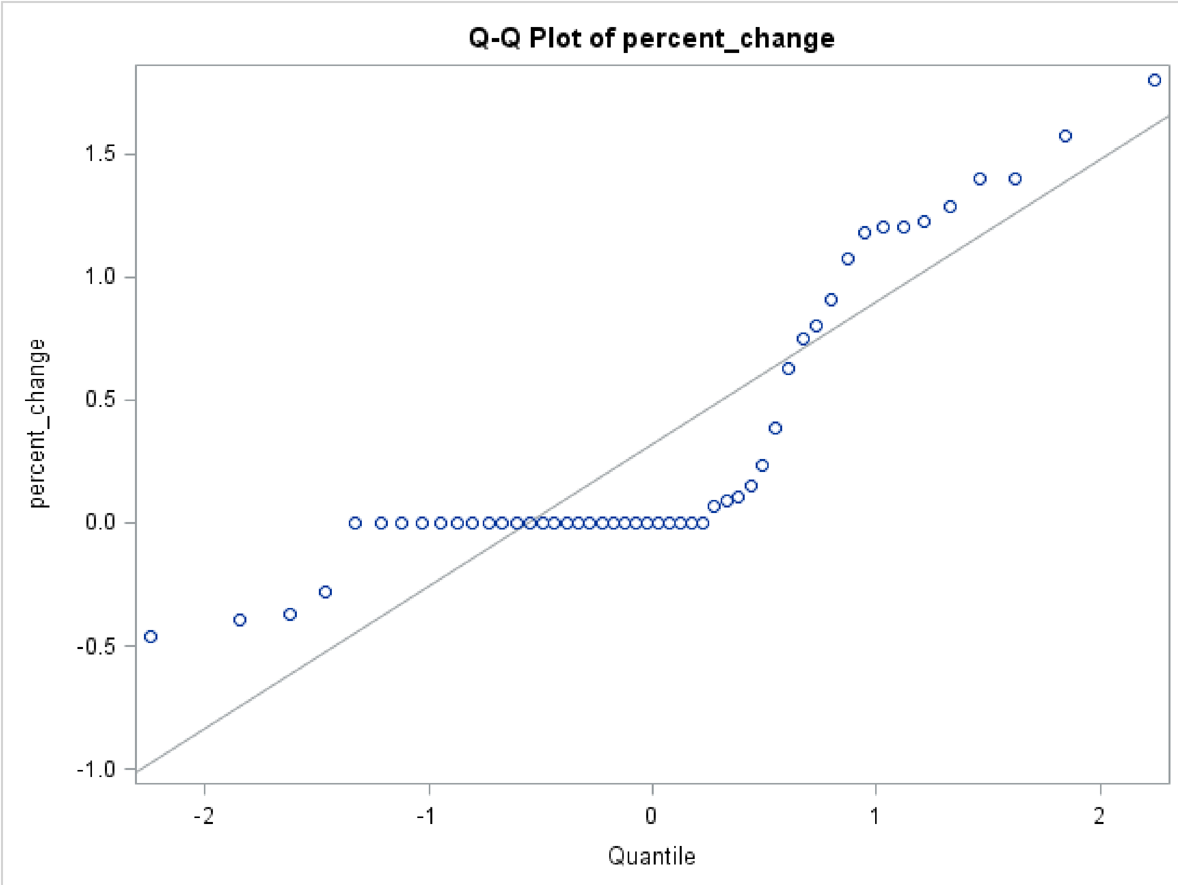
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
50	0.3191	0.5780	0.0817	-0.4615	1.8000

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
0.3191	0.1548	0.4833	0.5780	0.4829	0.7203

DF	t Value	Pr > |t|
49	6.96	<.0001




Q-Q Plot of percent_change
percent_change
Quantile
1.5
1.0
0.5
0.0
-0.5
-1.0
-2
-1
0
1
2

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Total Cadmium

==

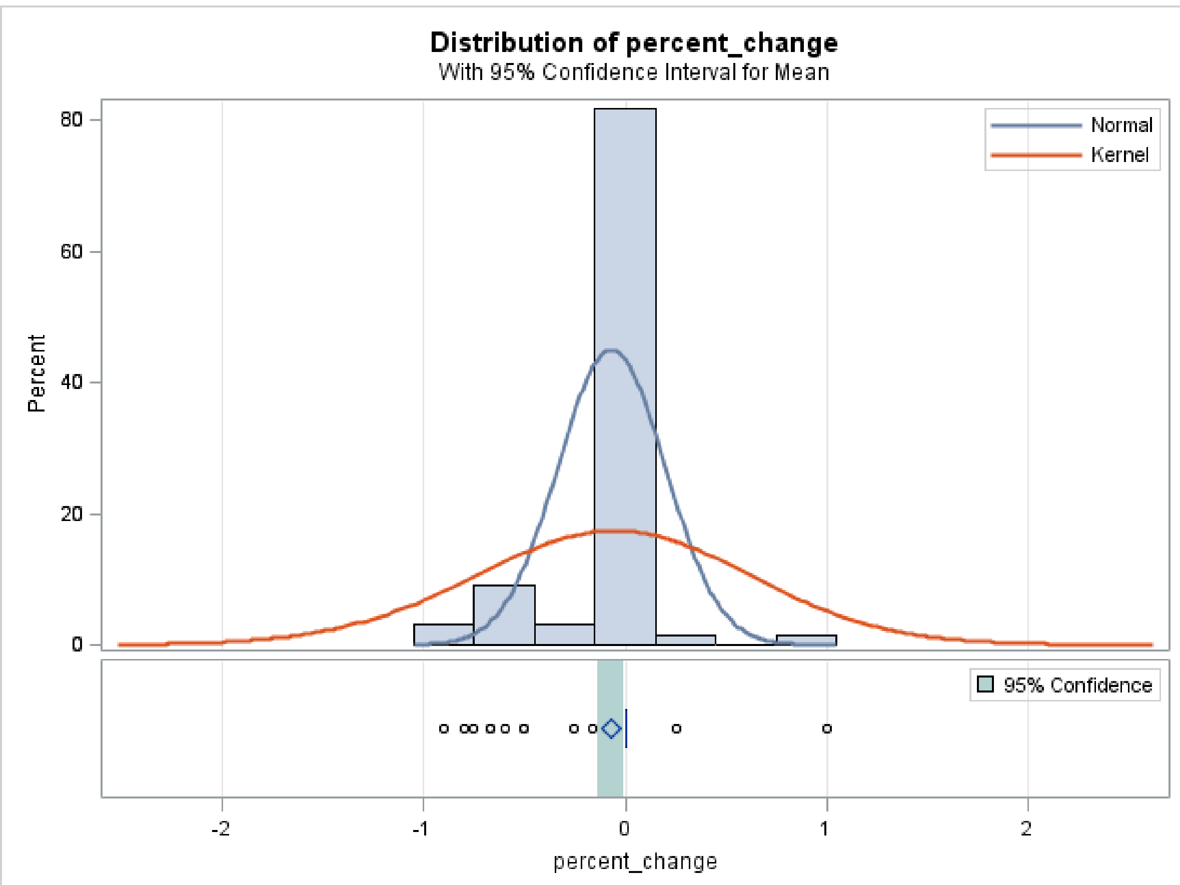
The TTEST Procedure

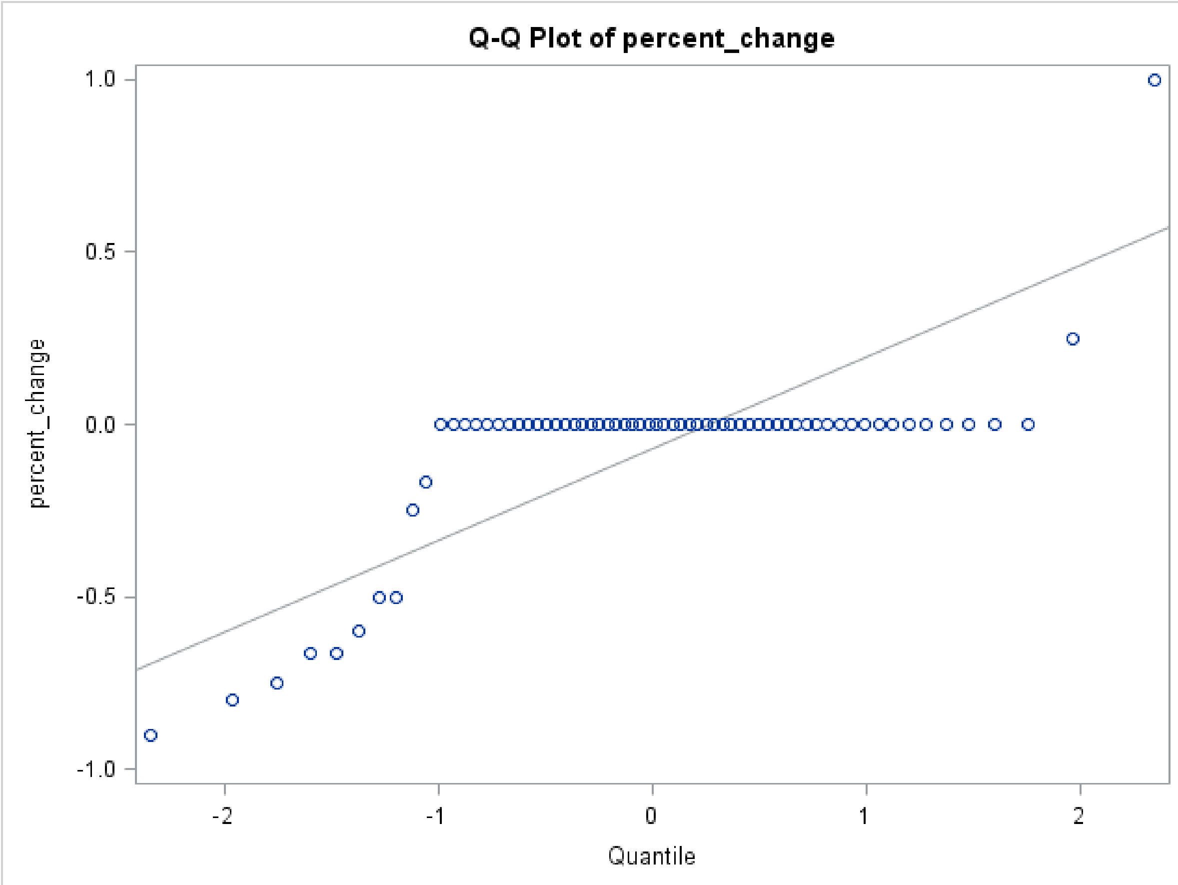
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
66	-0.0689	0.2660	0.0327	-0.9000	1.0000

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
-0.0689	-0.1343	-0.00354	0.2660	0.2271	0.3212

DF	t Value	Pr > |t|
65	5.53	<.0001




Q-Q Plot of percent_change
1.0
0.5
0.0
-0.5
-1.0
percent_change
-2
-1
0
1
2
Quantile

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Total Chromium

==

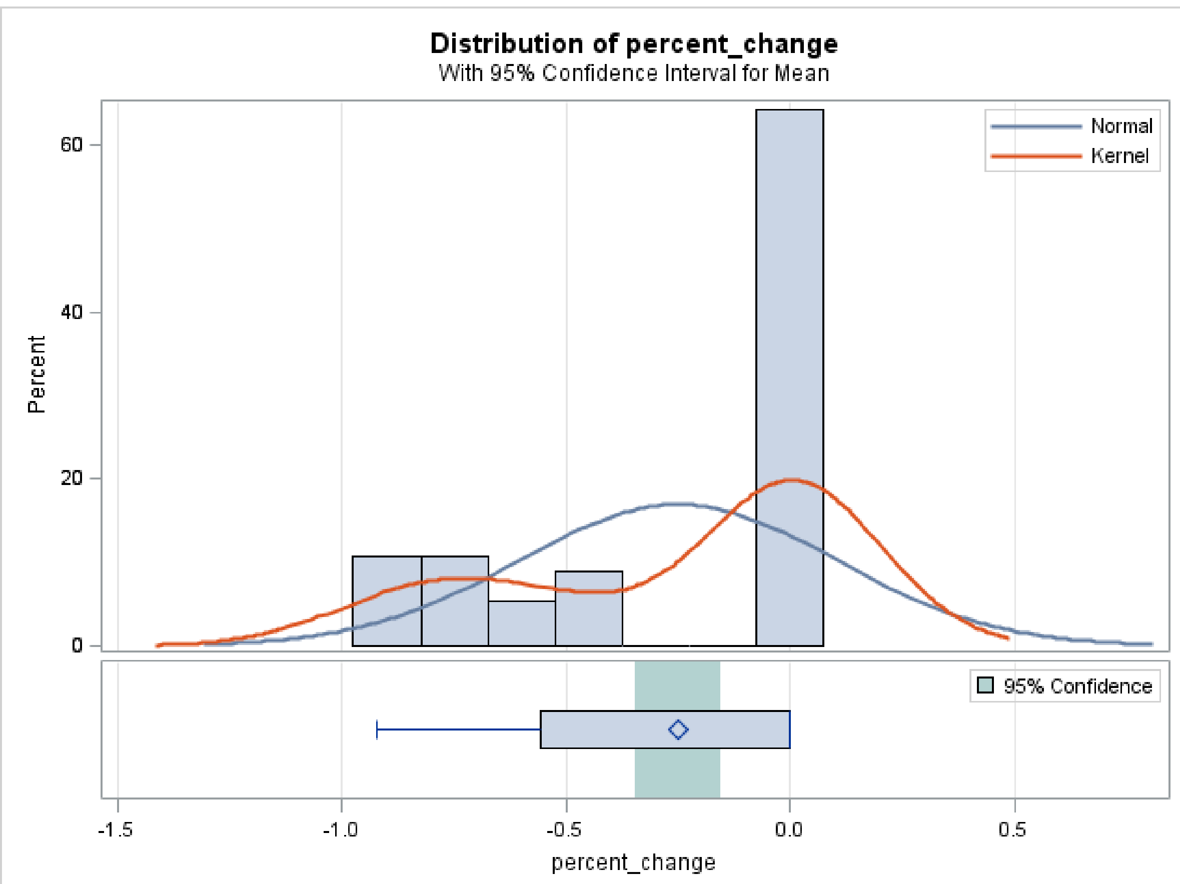
The TTEST Procedure

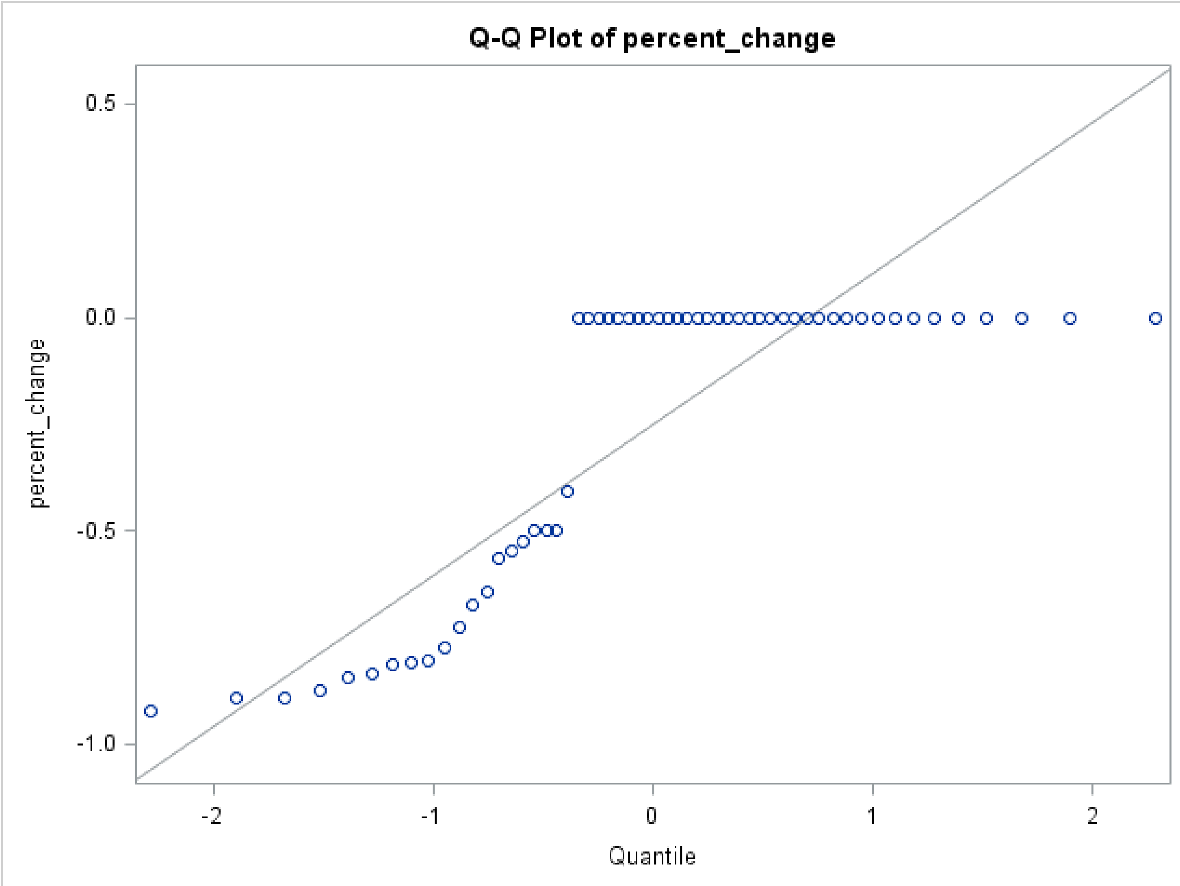
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
56	-0.2509	0.3532	0.0472	-0.9242	0

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
-0.2509	-0.3454	-0.1563	0.3532	0.2977	0.4341

DF	t Value	Pr > |t|
55	-0.02	0.9857




Q-Q Plot of percent_change
0.5
0.0
-0.5
-1.0
percent_change
-2
-1
0
1
2
Quantile

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Total Copper

==

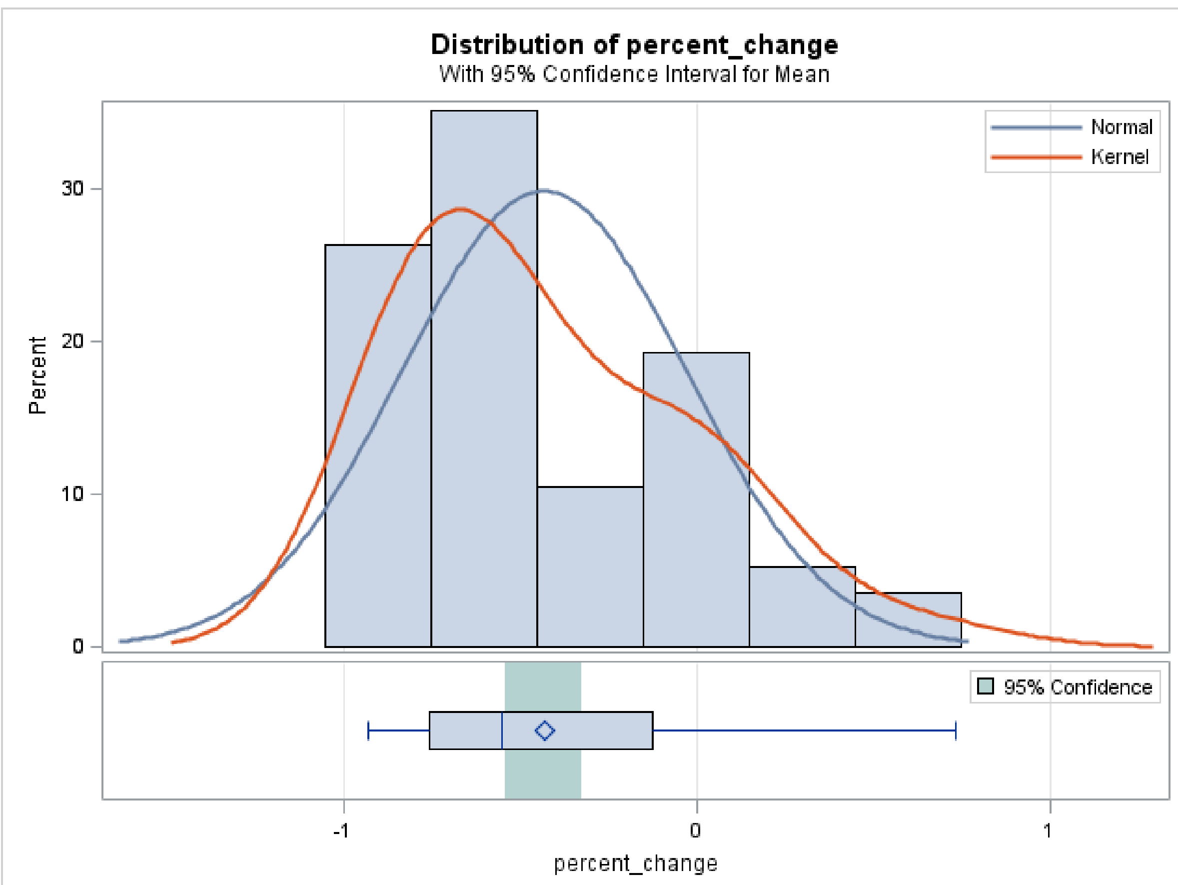
The TTEST Procedure

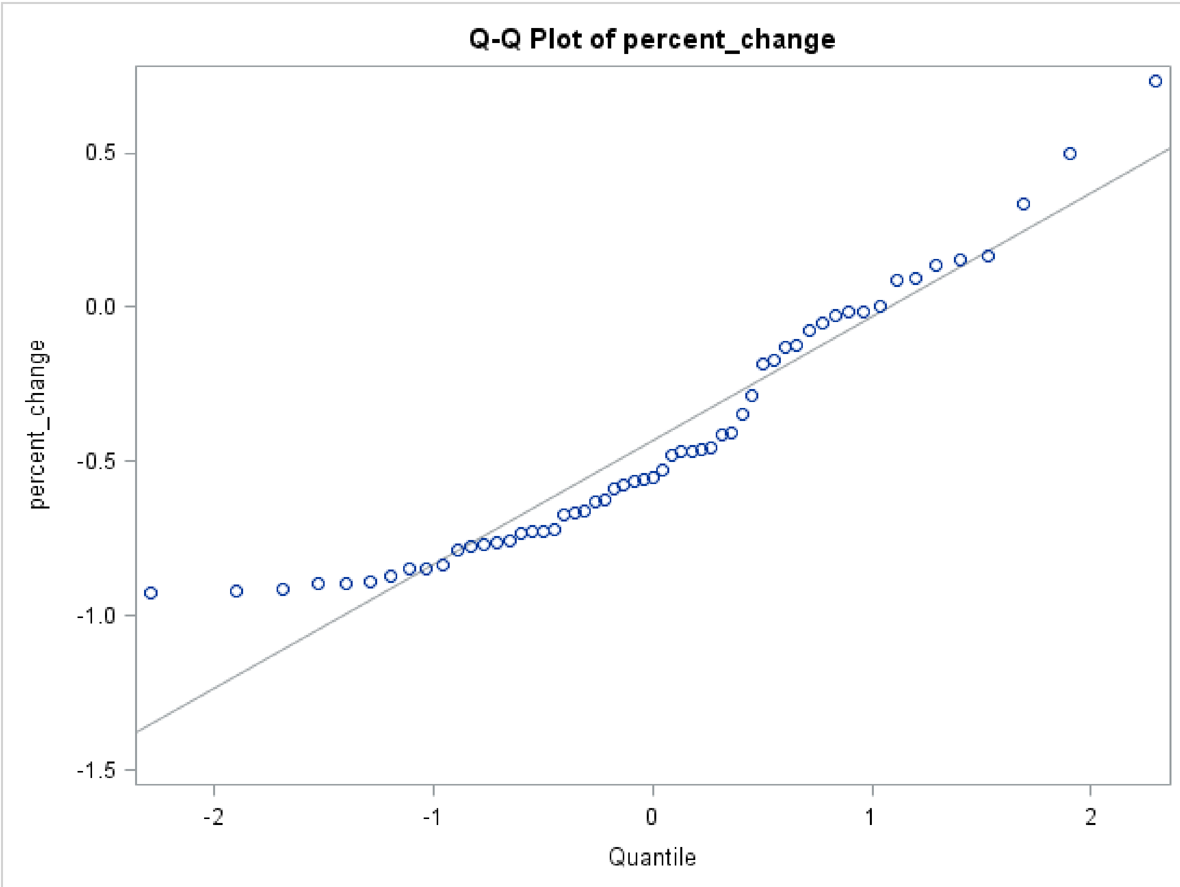
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
57	-0.4321	0.4013	0.0532	-0.9286	0.7333

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
-0.4321	-0.5385	-0.3256	0.4013	0.3388	0.4923

DF	t Value	Pr > |t|
56	-3.43	0.0012




Q-Q Plot of percent_change
0.5
0.0
-0.5
-1.0
-1.5
percent_change
-2
-1
0
1
2
Quantile

===
T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
===

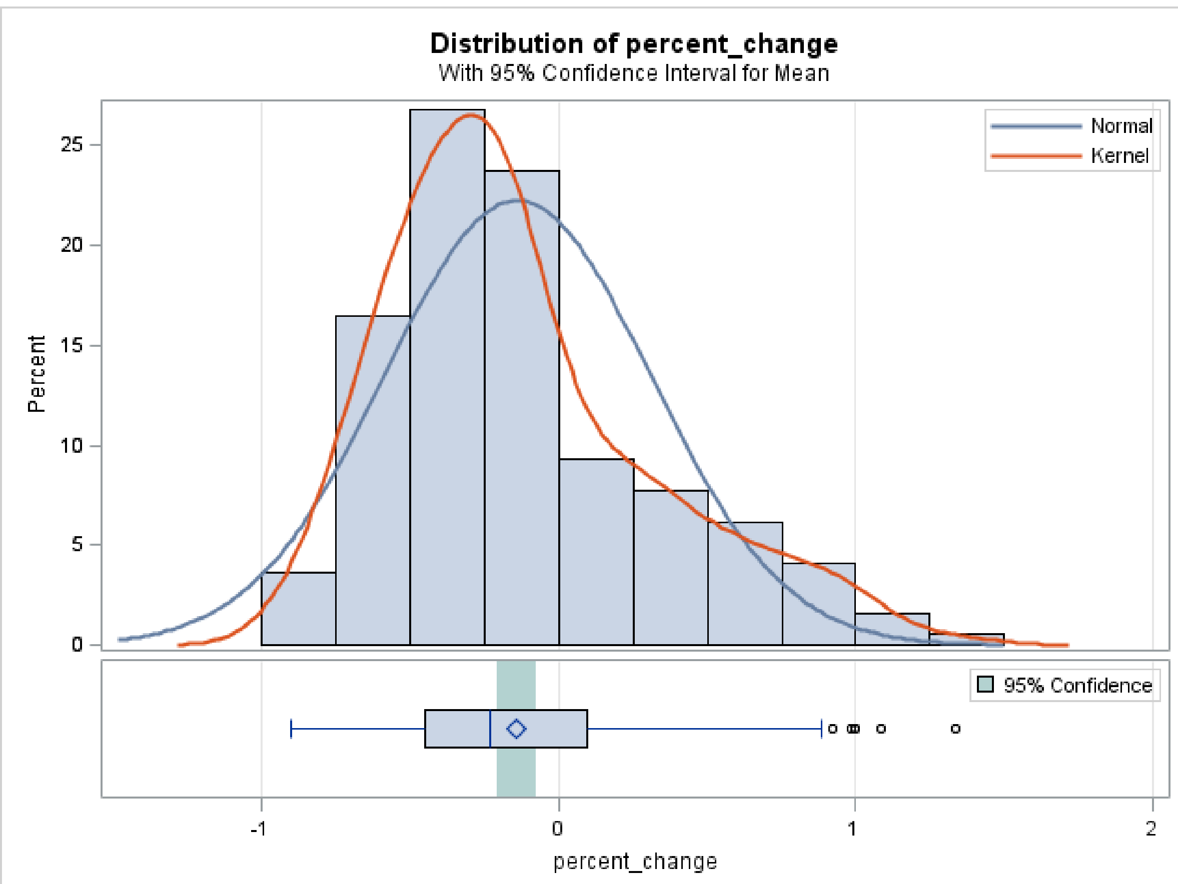
The TTEST Procedure

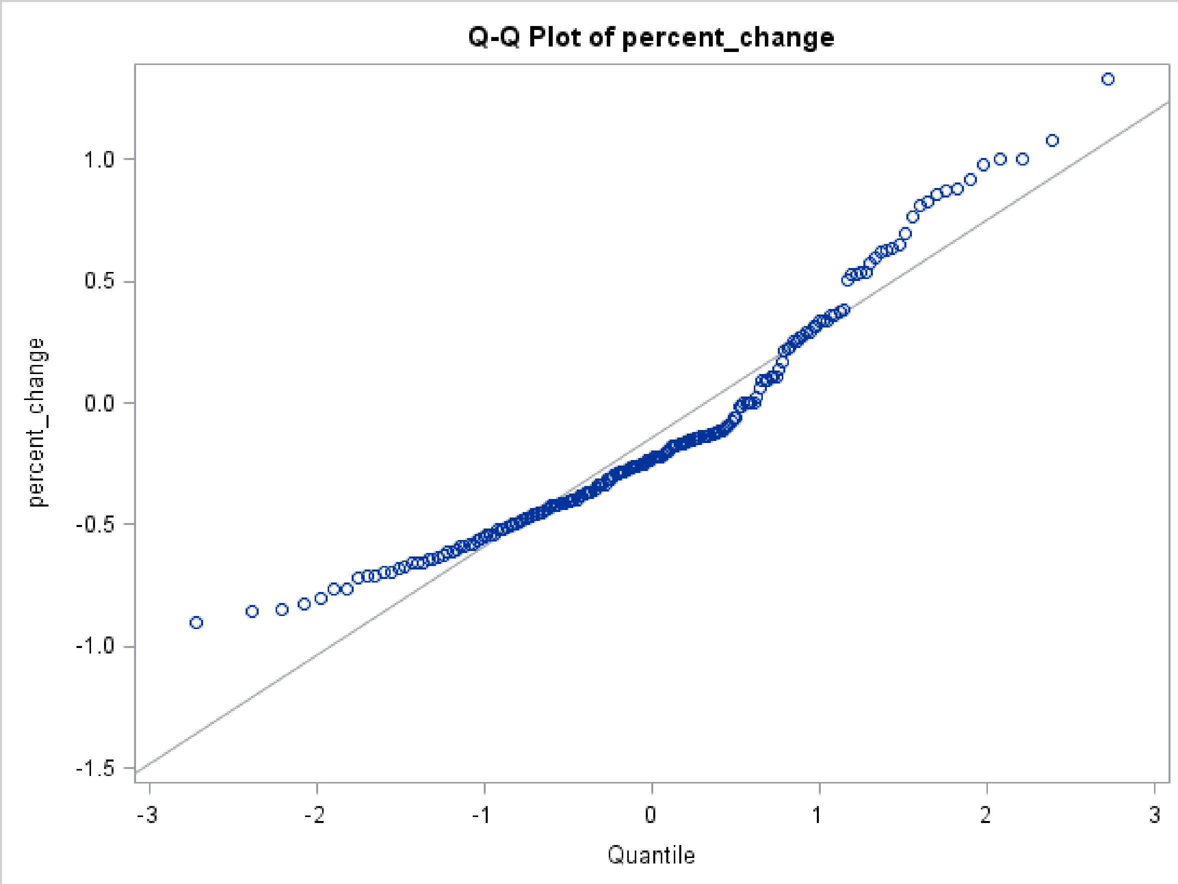
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
194	-0.1398	0.4482	0.0322	-0.8993	1.3333

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
-0.1398	-0.2033	-0.0764	0.4482	0.4076	0.4978

DF	t Value	Pr > |t|
193	3.42	0.0008





Q-Q Plot of percent_change
percent_change
1.0
0.5
0.0
-0.5
-1.0
-1.5
-3
-2
-1
0
1
2
3
Quantile

===

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants

===

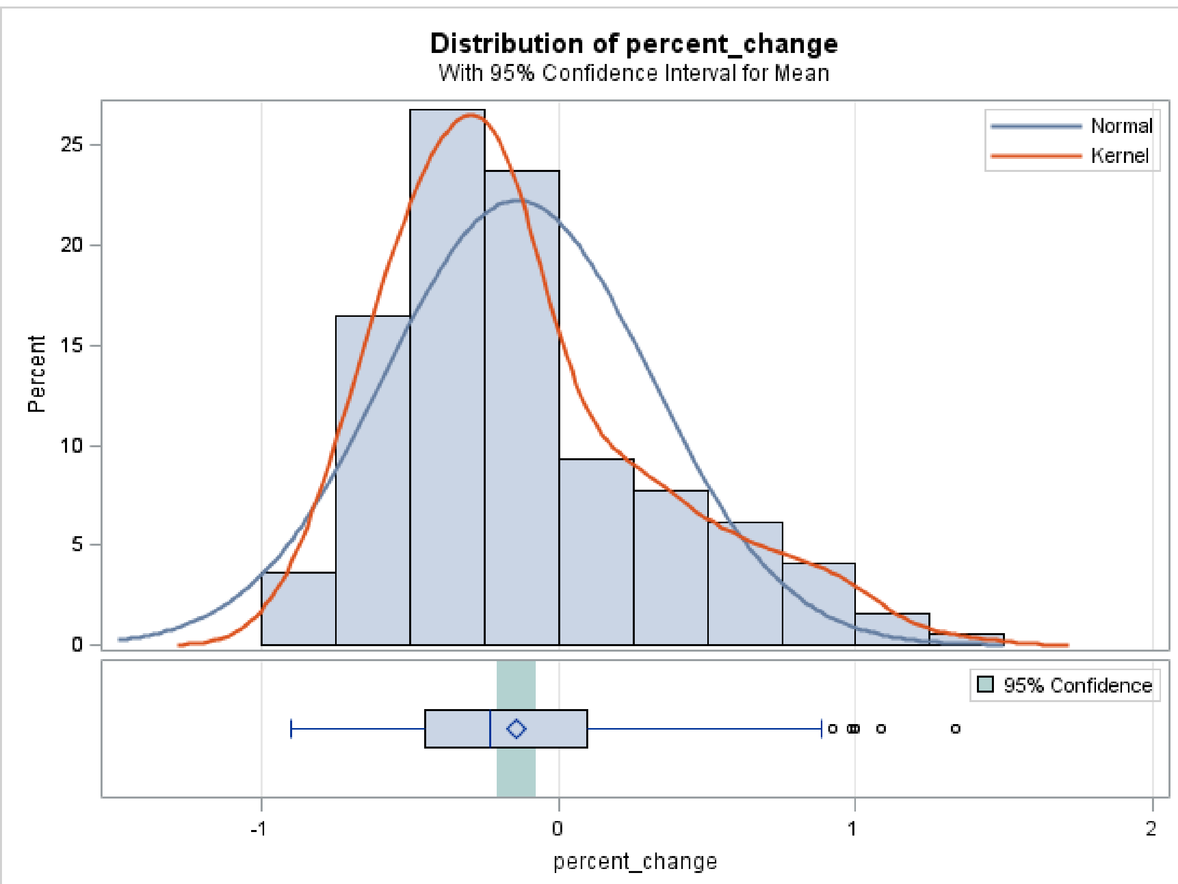
The TTEST Procedure

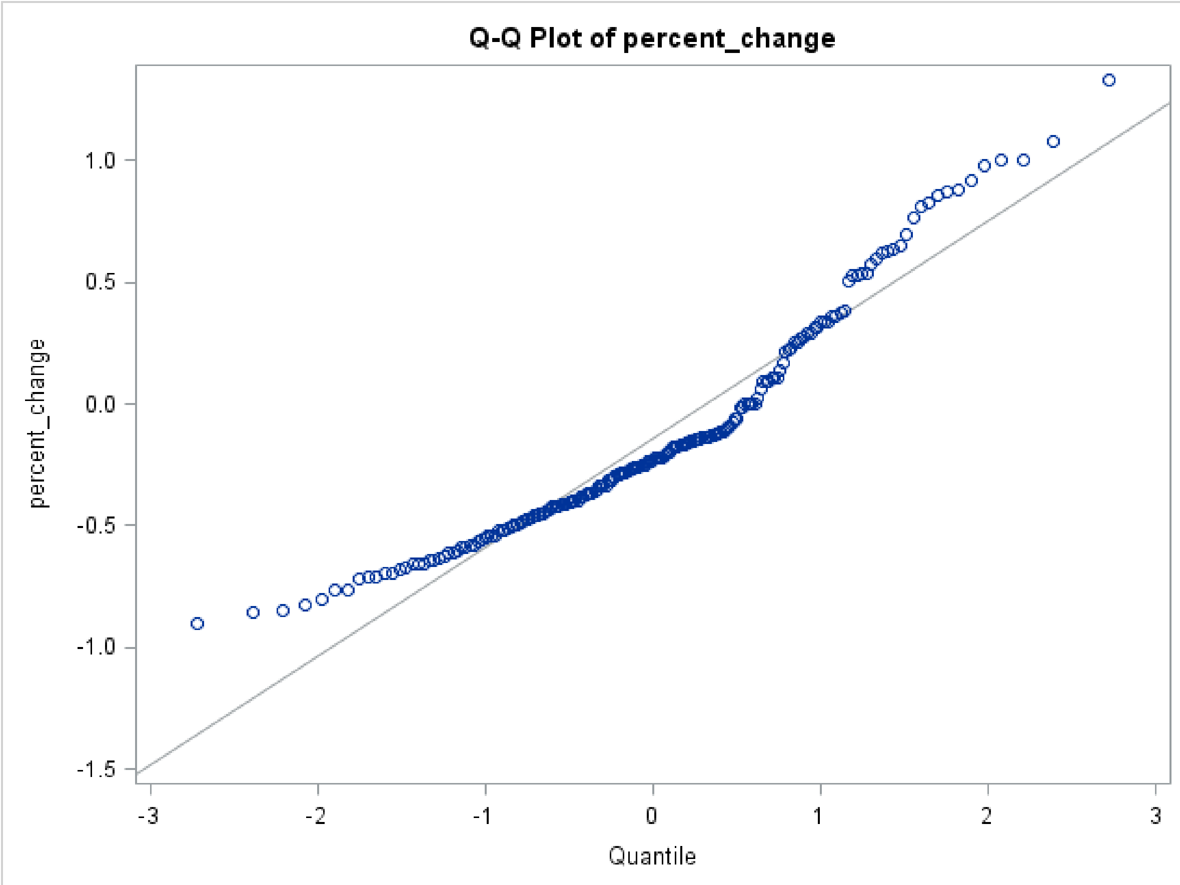
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
194	-0.1398	0.4482	0.0322	-0.8993	1.3333

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
-0.1398	-0.2033	-0.0764	0.4482	0.4076	0.4978

DF	t Value	Pr > |t|
193	3.42	0.0008




Q-Q Plot of percent_change
percent_change
1.0
0.5
0.0
-0.5
-1.0
-1.5
-3
-2
-1
0
1
2
3
Quantile

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Total Nickel

==

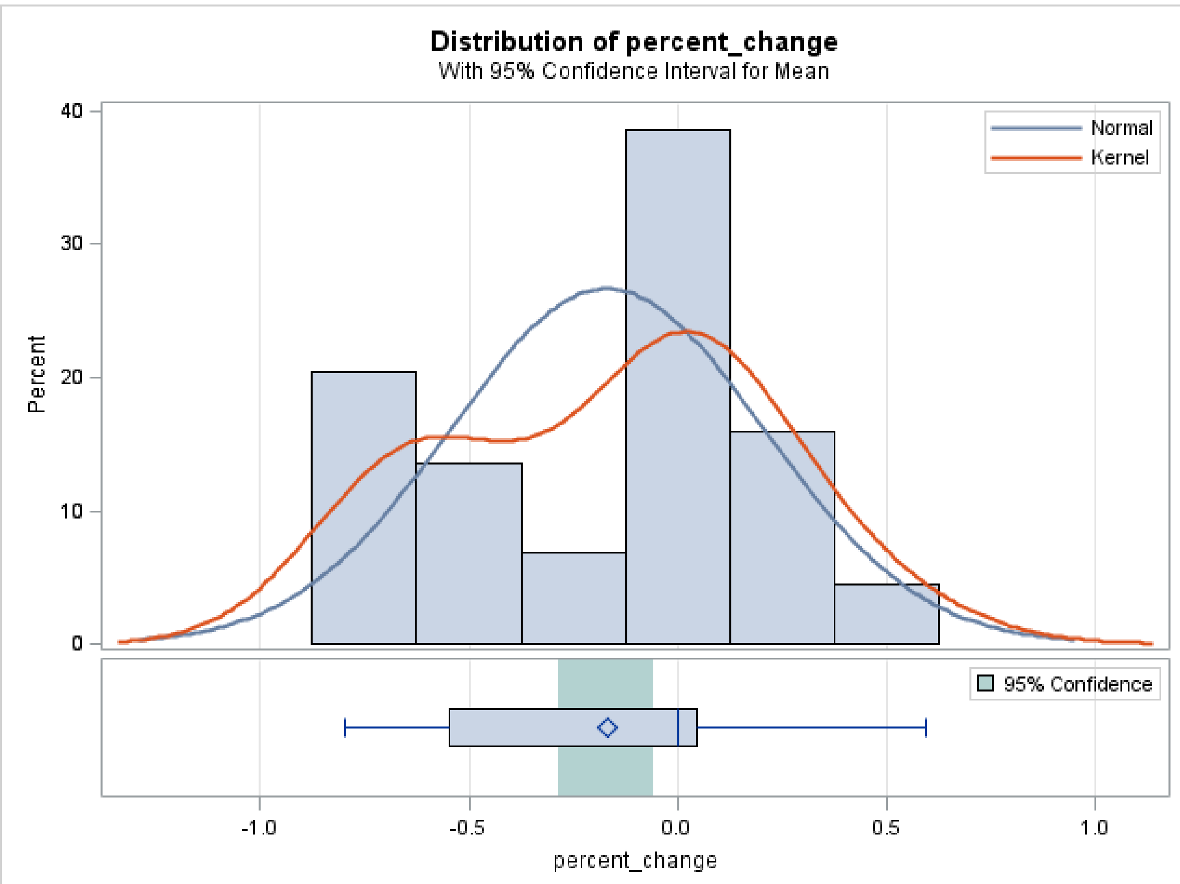
The TTEST Procedure

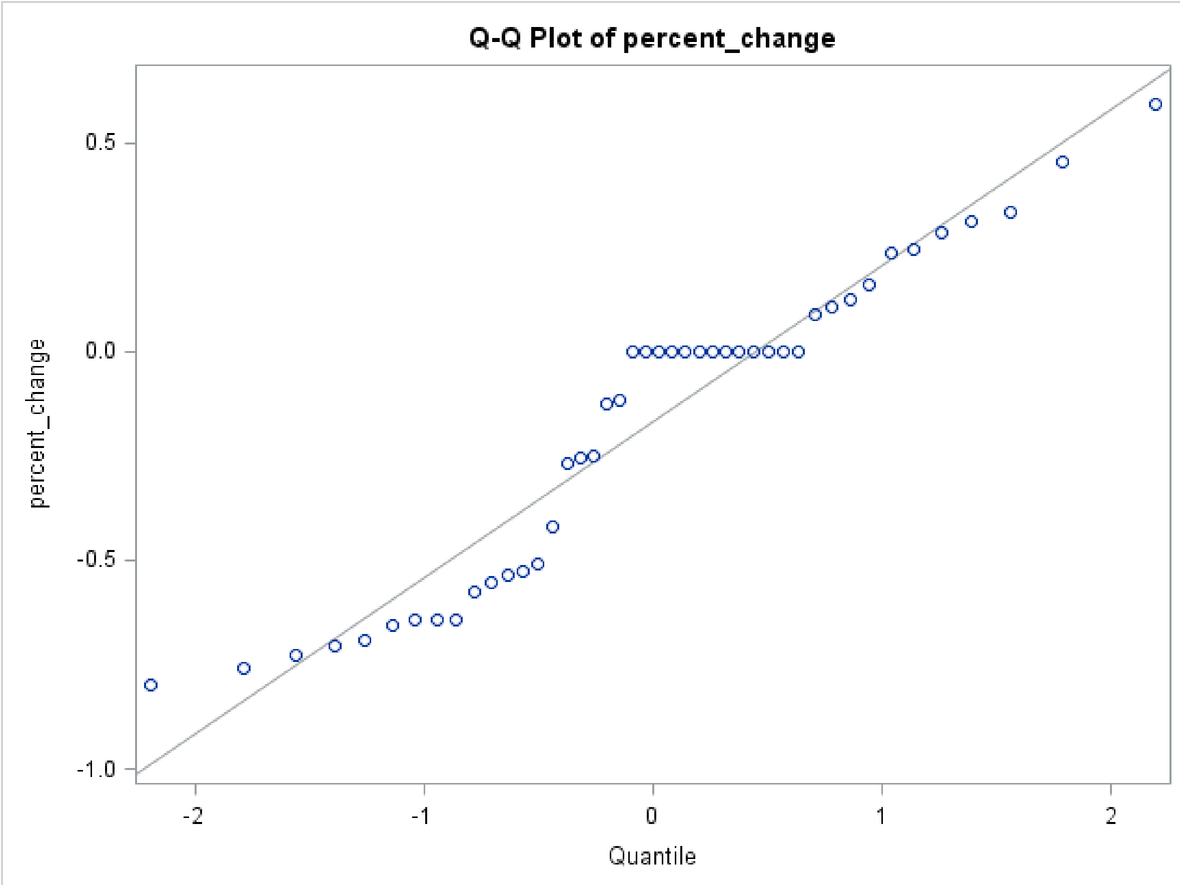
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
44	-0.1698	0.3739	0.0564	-0.7971	0.5938

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
-0.1698	-0.2835	-0.0561	0.3739	0.3089	0.4737

DF	t Value	Pr > |t|
43	1.42	0.1621




Q-Q Plot of percent_change
percent_change
0.5
0.0
-0.5
-1.0
-2
-1
0
1
2
Quantile

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Total Nitrogen

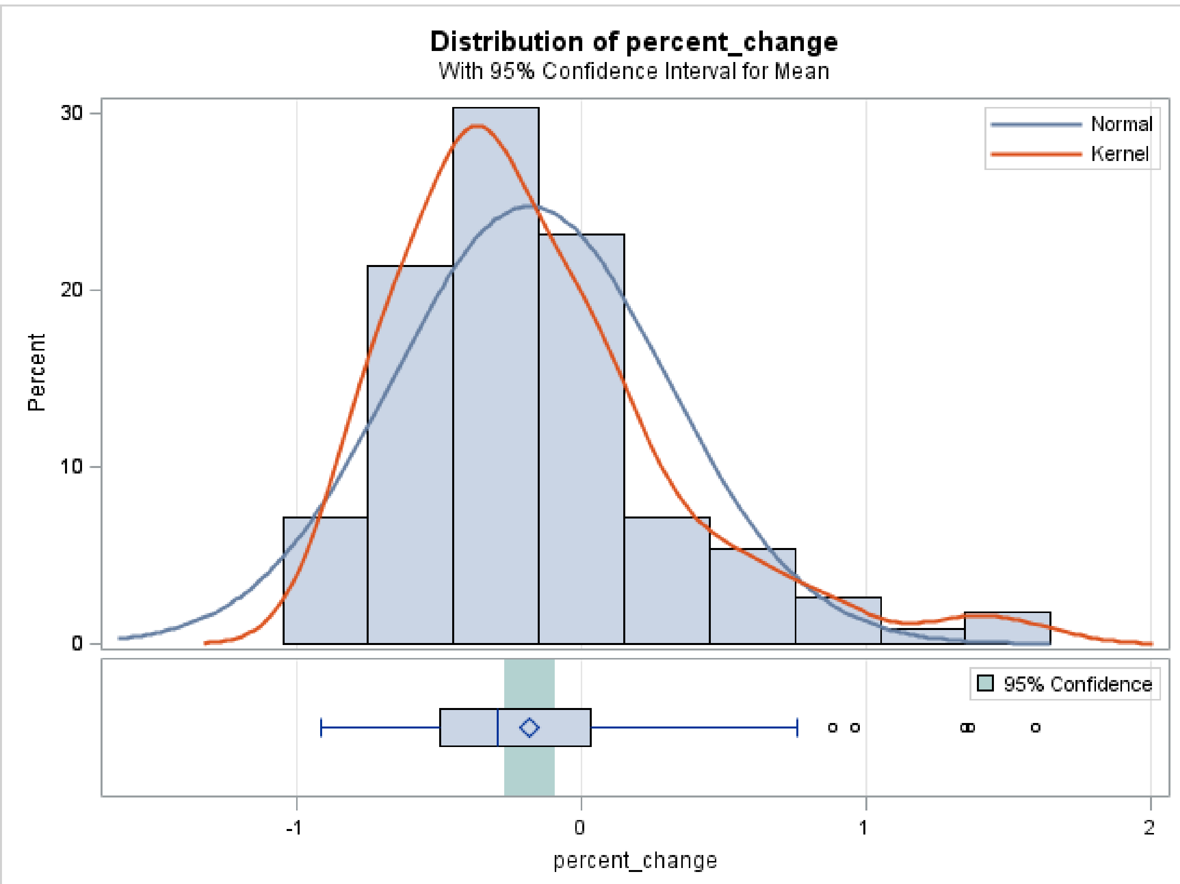
The TTEST Procedure

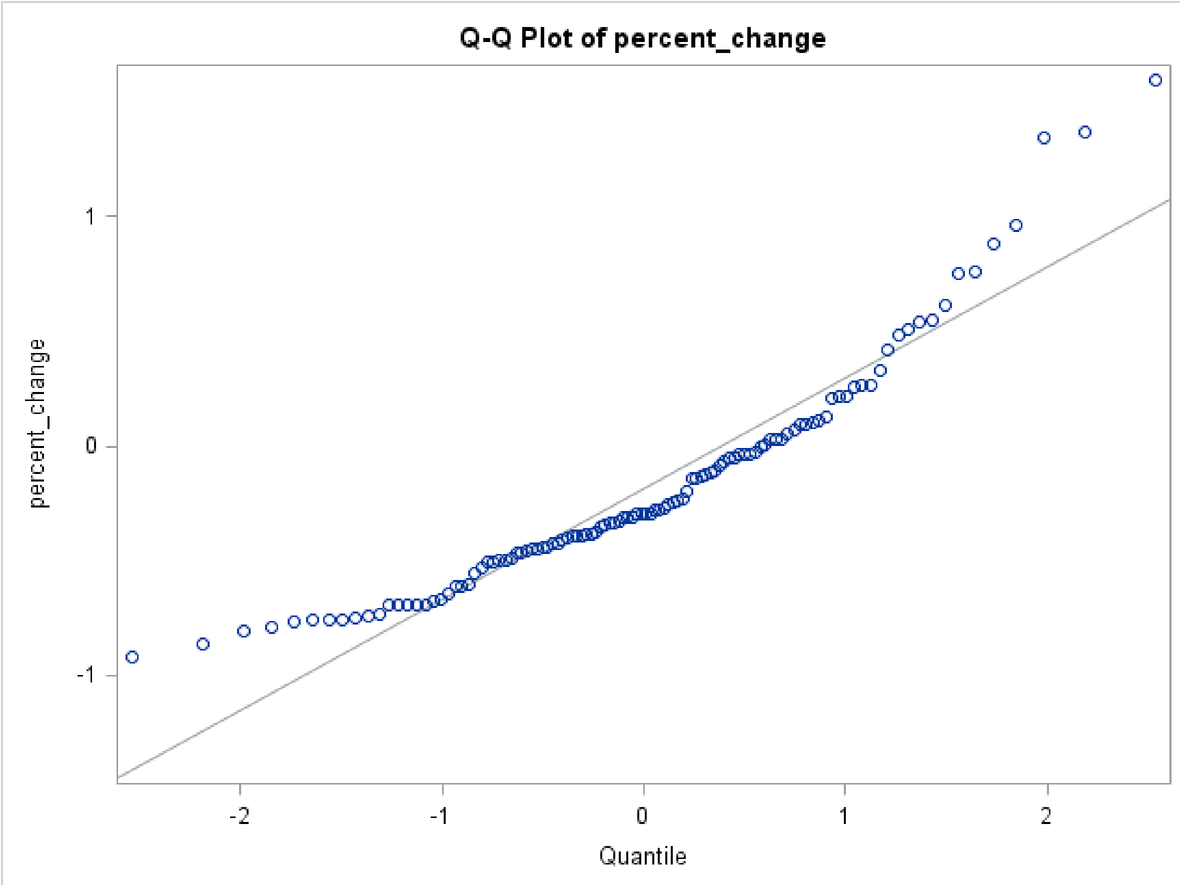
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
112	-0.1811	0.4828	0.0456	-0.9174	1.5958

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
-0.1811	-0.2715	-0.0907	0.4828	0.4268	0.5559

DF	t Value	Pr > |t|
111	1.51	0.1339




Q-Q Plot of percent_change
percent_change
1
0
-1
-2
-1
0
1
2
Quantile

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Total Phosphorus

==

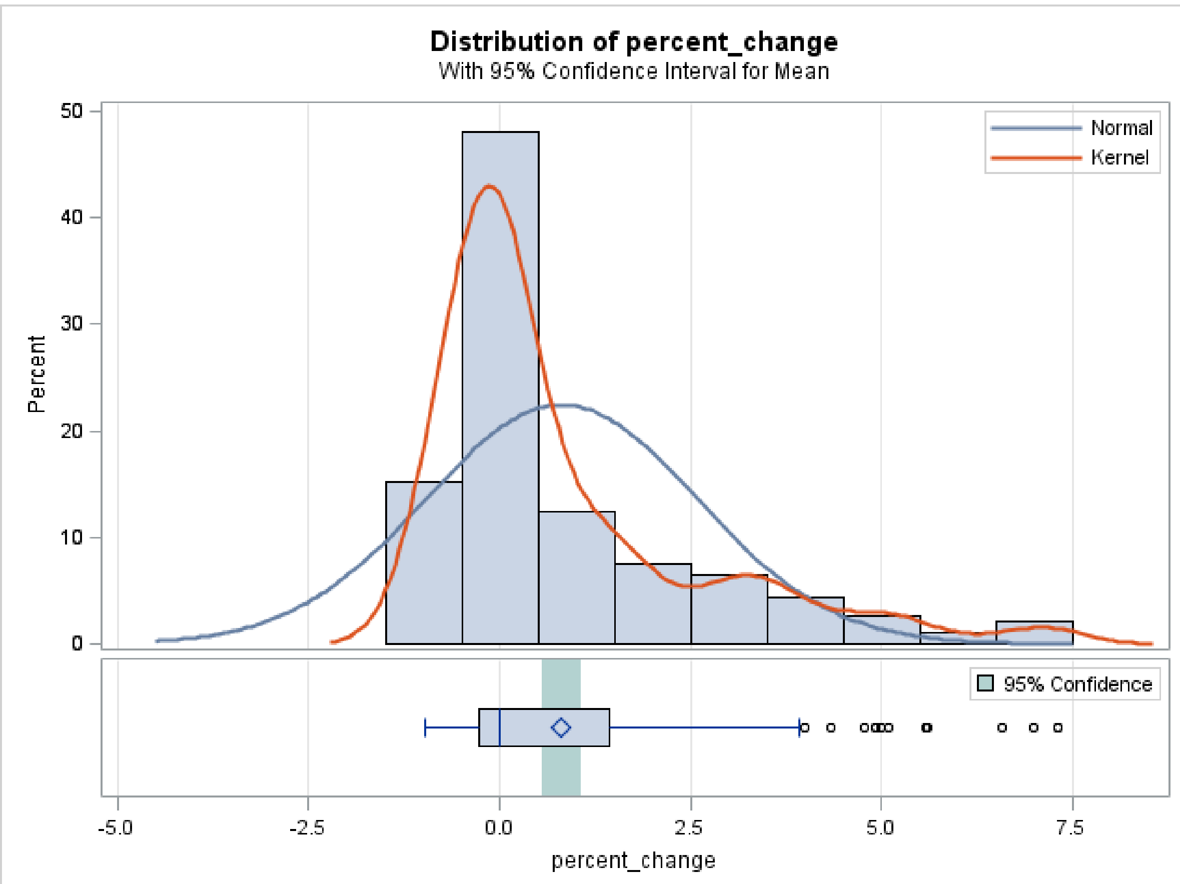
The TTEST Procedure

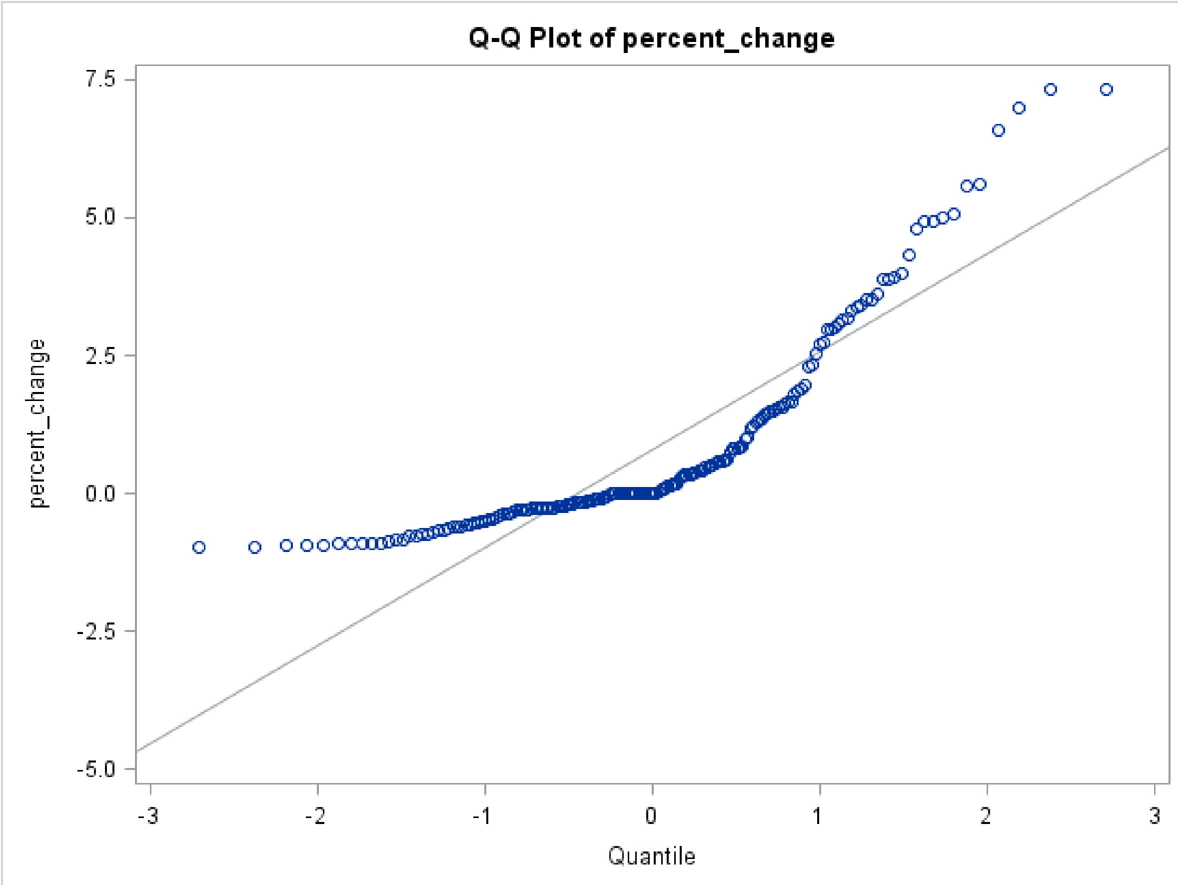
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
185	0.8081	1.7763	0.1306	-0.9847	7.3200

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
0.8081	0.5504	1.0658	1.7763	1.6119	1.9784

DF	t Value	Pr > |t|
184	8.10	<.0001




Q-Q Plot of percent_change
7.5
5.0
2.5
0.0
-2.5
-5.0
percent_change
-3
-2
-1
0
1
2
3
Quantile

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Total Suspended Solids

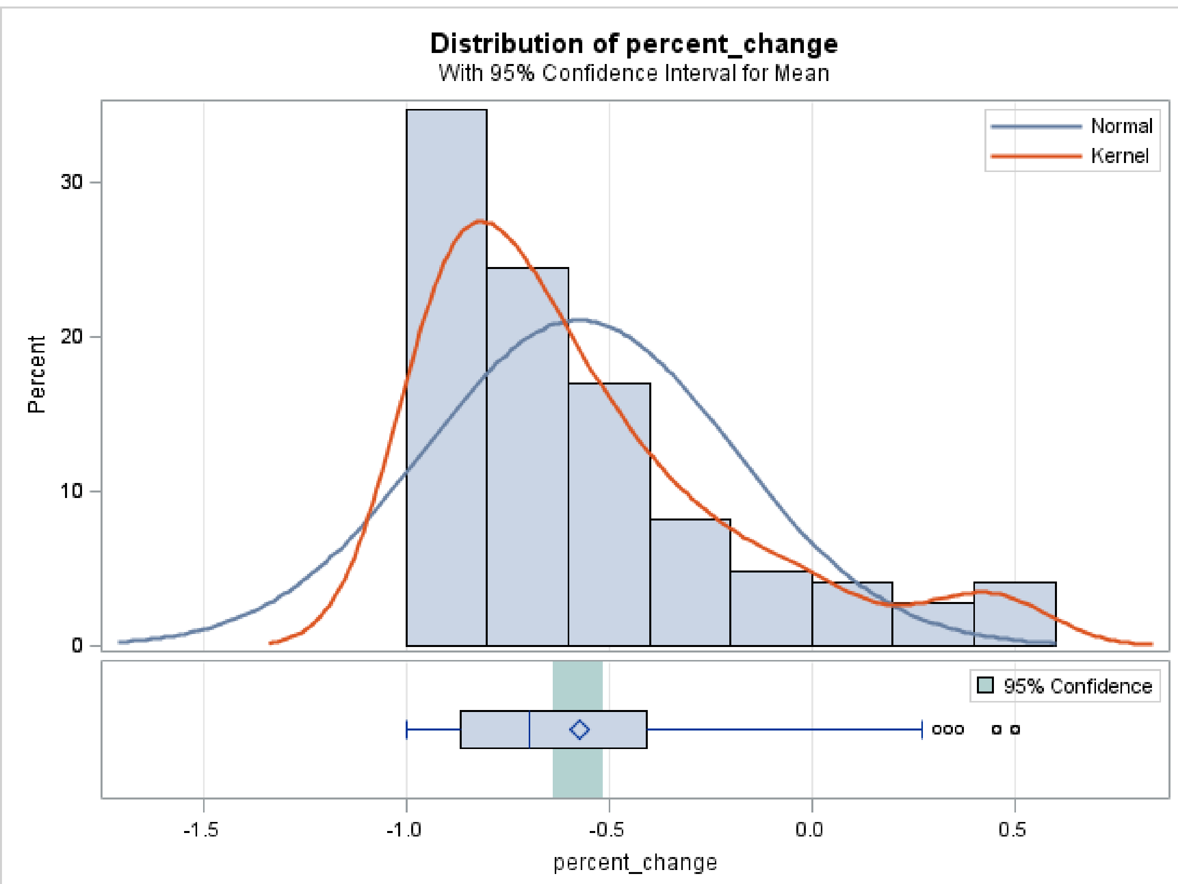
The TTEST Procedure

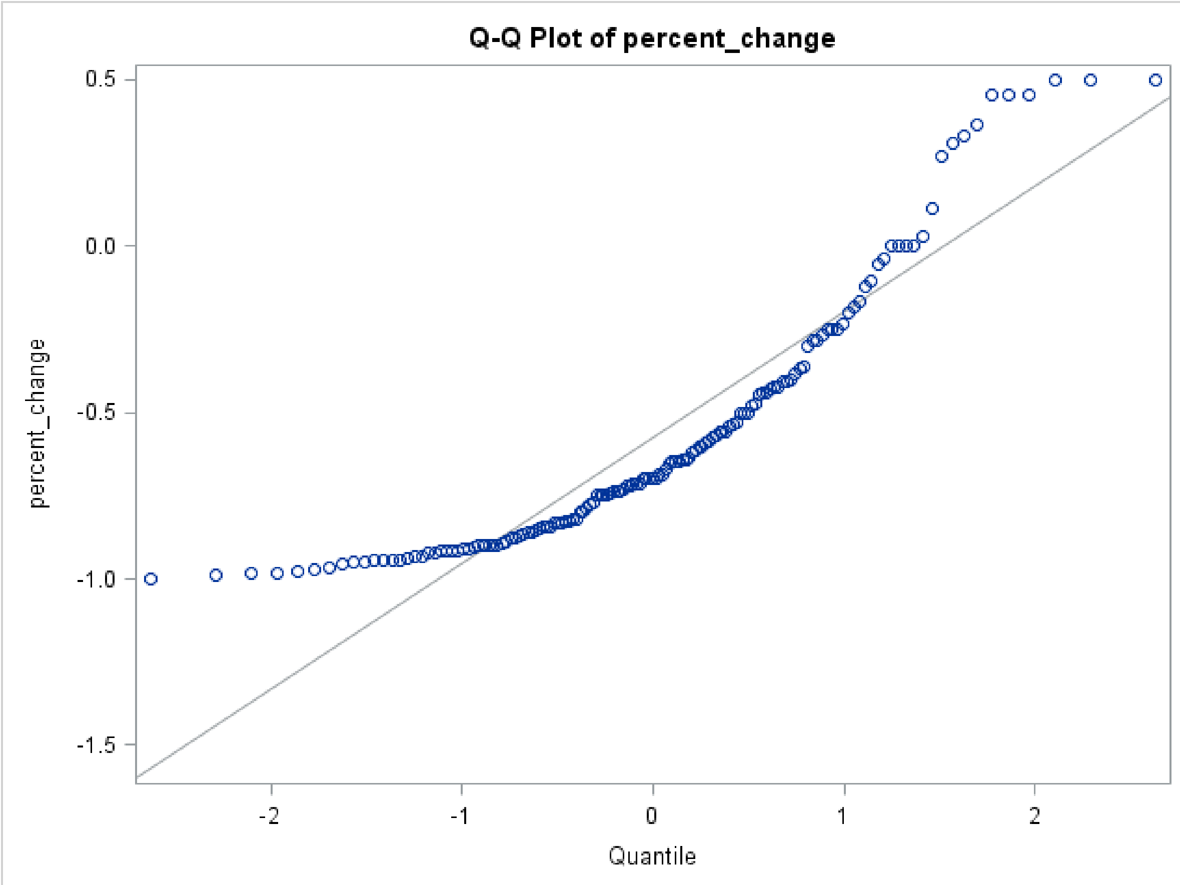
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
147	-0.5740	0.3787	0.0312	-1.0000	0.5000

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
-0.5740	-0.6358	-0.5123	0.3787	0.3398	0.4277

DF	t Value	Pr > |t|
146	-10.38	<.0001




Q-Q Plot of percent_change
0.5
0.0
-0.5
-1.0
-1.5
percent_change
-2
-1
0
1
2
Quantile

==

T.H. on Single C.T. against
H0: mu = -0.25 @ alpha=0.05 for all pollutants
Pollutant = Total Zinc

==

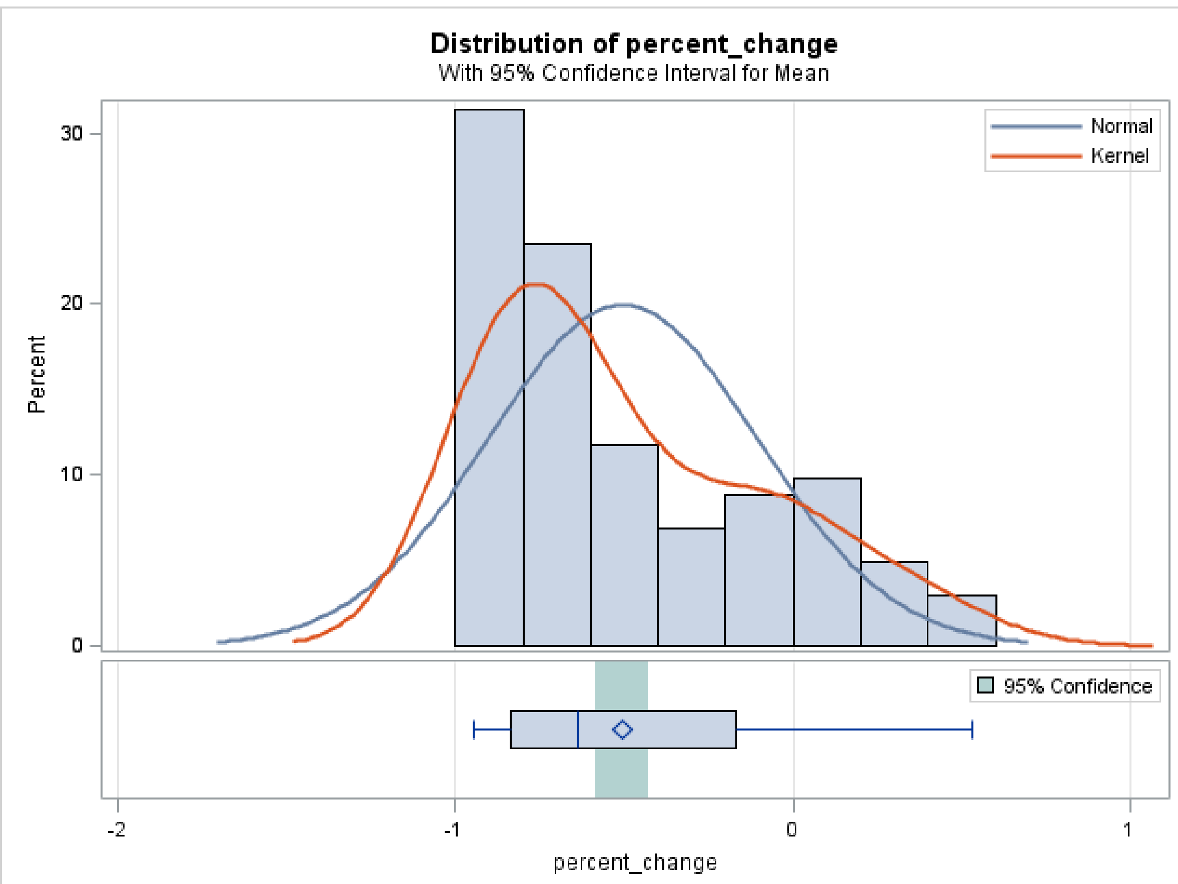
The TTEST Procedure

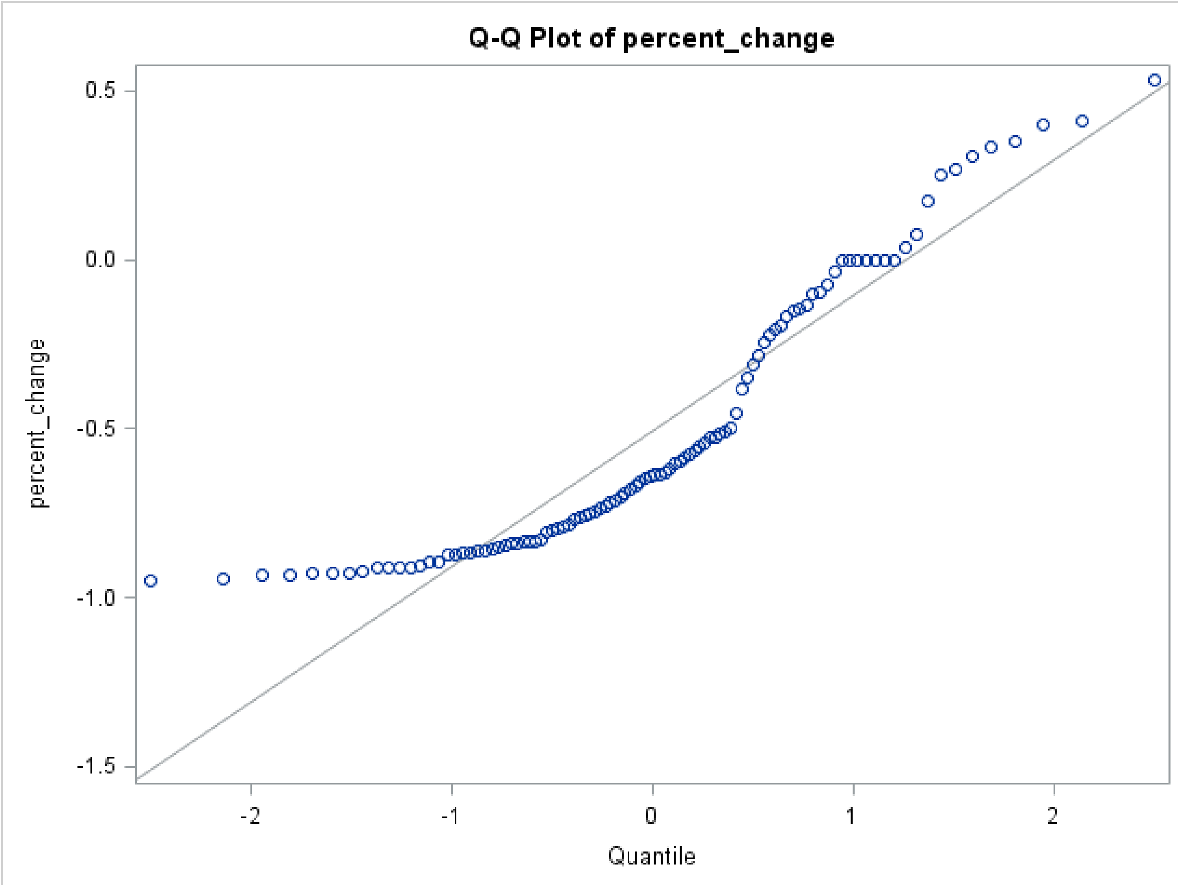
Variable: percent_change

N	Mean	Std Dev	Std Err	Minimum	Maximum
102	-0.5046	0.4004	0.0396	-0.9479	0.5333

Mean	95% CL Mean		Std Dev	95% CL Std Dev	
-0.5046	-0.5832	-0.4259	0.4004	0.3520	0.4644

DF	t Value	Pr > |t|
101	-6.42	<.0001




Q-Q Plot of percent_change
percent_change
Quantile
0.5
0.0
-0.5
-1.0
-1.5
-2
-1
0
1
2

FORWARD REGRESSION
Pollutant: Dissolved Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	117
Number of Observations Used	39
Number of Observations with Missing Values	78

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	0.0000	-0.0948
X2	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	0.0000	-0.0000	0.4507
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	.	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.
X1X2	-0.1976	0.9979	.	.	.	1.0000	-0.1976	-0.1976	-0.1976	0.9979	0.9979	0.9979	.	0.0000	-0.0000	0.4528
X1X3	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	0.0000	-0.0948
X1X4	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	-0.0000	-0.0948
X1X5	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	-0.0000	-0.0948
X2X3	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	-0.0000	-0.0000	0.4507
X2X4	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	0.0000	-0.0000	0.4507
X2X5	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	0.0000	0.0000	0.4507
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	0.0000	0.0000	.	.	.	0.0000	0.0000	0.0000	0.0000	-0.0000	0.0000	0.0000	.	1.0000	-10.1958	-0.0000
X4X5	0.0000	-0.0000	.	.	.	-0.0000	0.0000	-0.0000	-0.0000	-0.0000	-0.0000	0.0000	.	-10.1958	1.0000	0.0000
Y	-0.0948	0.4507	.	.	.	0.4528	-0.0948	-0.0948	-0.0948	0.4507	0.4507	0.4507	.	-0.0000	0.0000	1.0000

FORWARD REGRESSION
Pollutant: Dissolved Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	117
Number of Observations Used	39
Number of Observations with Missing Values	78

Forward Selection: Step 1

Variable X1X2 Entered: R-Square = 0.2051 and C(p) = 0.2322

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.012919E-7	1.012919E-7	9.54	0.0038
Error	37	3.926825E-7	1.061304E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00013250	0.00002216	3.794647E-7	35.75	<.0001
X1X2	1.68761	0.54627	1.012919E-7	9.54	0.0038

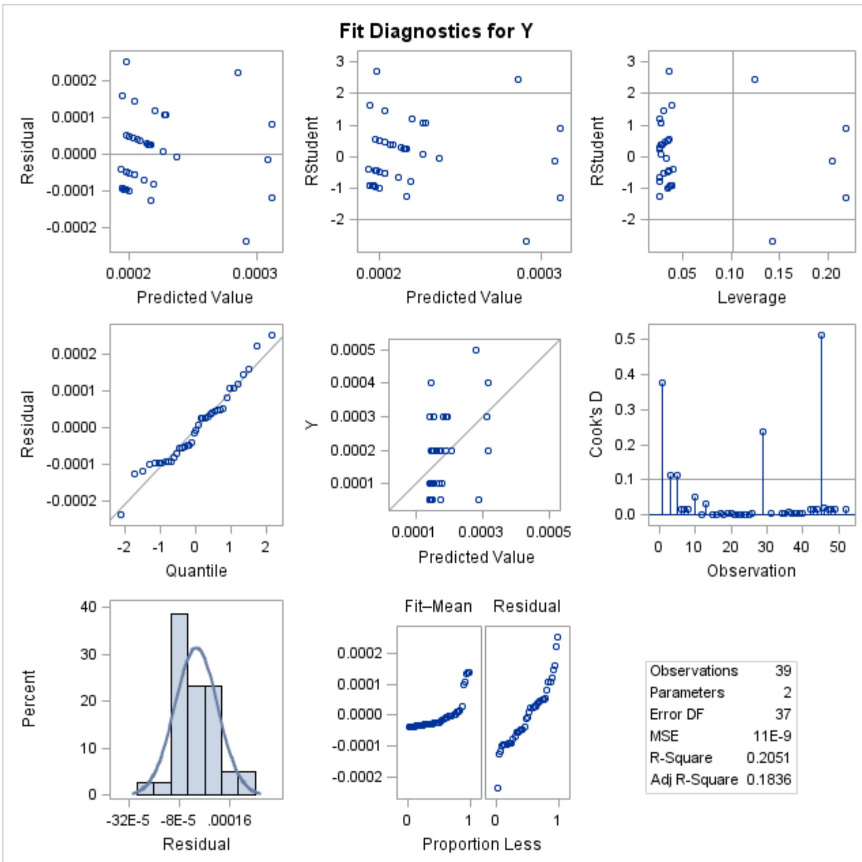
Bounds on condition number: 1, 1

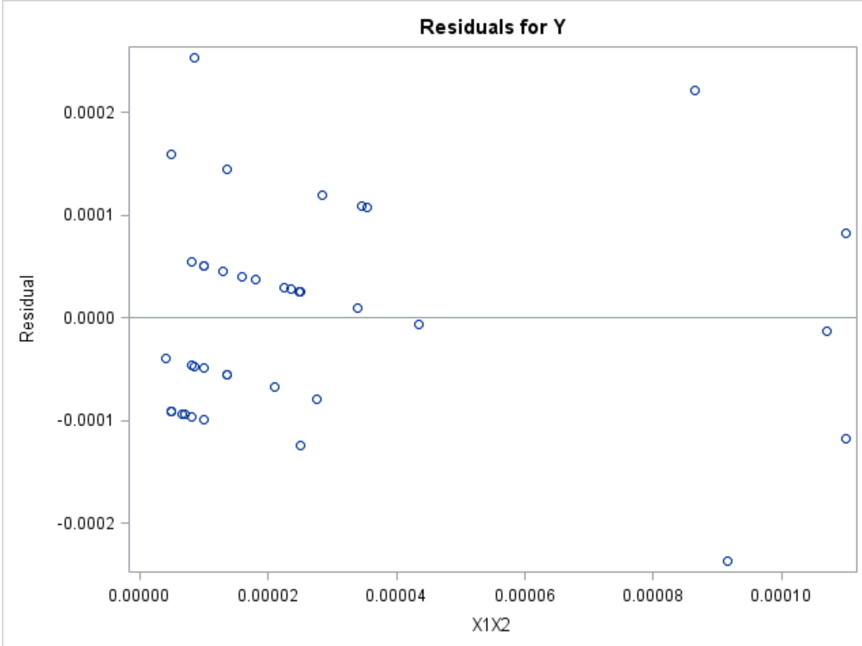
No other variable met the 0.5000 significance level for entry into the model.

Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1X2	1	0.2051	0.2051	0.2322	9.54	0.0038

FORWARD REGRESSION
Pollutant: Dissolved Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

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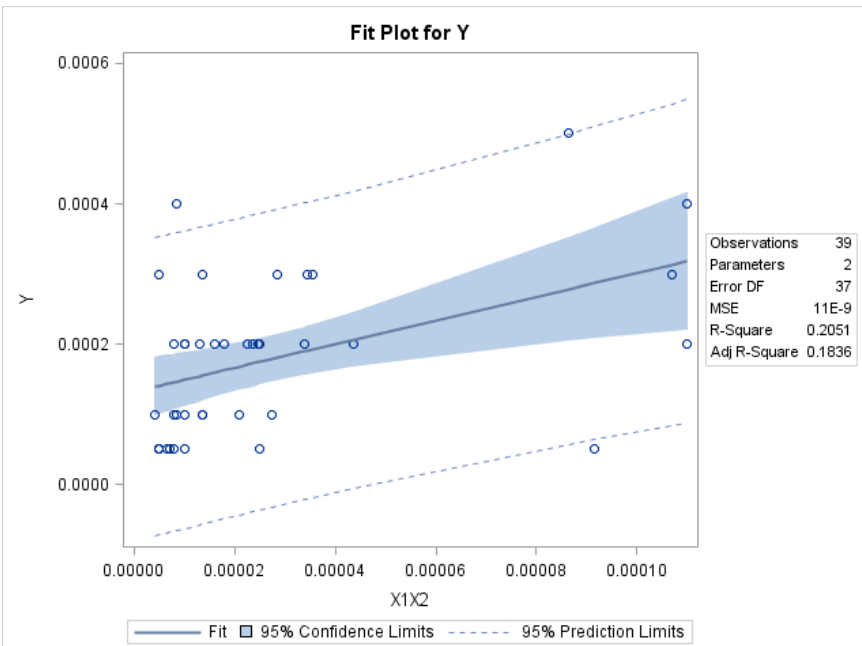
0.00008
0.00010
X1X2


Fit Plot for Y
Y
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0.0004
0.0002
0.0000
0.00000
0.00002
0.00004
0.00006
0.00008
0.00010
X1X2
Observations 39
Parameters 2
Error DF 37
MSE 11E-9
R-Square 0.2051
Adj R-Square 0.1836
Fit
95% Confidence Limits
95% Prediction Limits

BACKWARD REGRESSION
Pollutant: Dissolved Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	117
Number of Observations Used	39
Number of Observations with Missing Values	78

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	0.0000	-0.0948
X2	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	0.0000	-0.0000	0.4507
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	.	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.
X1X2	-0.1976	0.9979	.	.	.	1.0000	-0.1976	-0.1976	-0.1976	0.9979	0.9979	0.9979	.	0.0000	-0.0000	0.4528
X1X3	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	0.0000	-0.0948
X1X4	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	-0.0000	-0.0948
X1X5	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	-0.0000	-0.0948
X2X3	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	-0.0000	-0.0000	0.4507
X2X4	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	0.0000	-0.0000	0.4507
X2X5	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	0.0000	0.0000	0.4507
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	0.0000	0.0000	.	.	.	0.0000	0.0000	0.0000	0.0000	-0.0000	0.0000	0.0000	.	1.0000	-10.1958	-0.0000
X4X5	0.0000	-0.0000	.	.	.	-0.0000	0.0000	-0.0000	-0.0000	-0.0000	-0.0000	0.0000	.	-10.1958	1.0000	0.0000
Y	-0.0948	0.4507	.	.	.	0.4528	-0.0948	-0.0948	-0.0948	0.4507	0.4507	0.4507	.	-0.0000	0.0000	1.0000

BACKWARD REGRESSION
Pollutant: Dissolved Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	117
Number of Observations Used	39
Number of Observations with Missing Values	78

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.2103 and C(p) = 4.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1.038803E-7	3.462677E-8	3.11	0.0388
Error	35	3.90094E-7	1.114554E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00020910	0.00016808	1.724922E-8	1.55	0.2218
X1	-1.53175	3.27692	2.435257E-9	0.22	0.6431
X2	-0.00064423	0.00134	2.573849E-9	0.23	0.6338
X1X2	14.56020	26.80163	3.289375E-9	0.30	0.5904

Bounds on condition number: 2359.6, 13987

Backward Elimination: Step 1

Variable X1 Removed: R-Square = 0.2054 and C(p) = 2.2185

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	1.014451E-7	5.072253E-8	4.65	0.0160
Error	36	3.925293E-7	1.090359E-8		
Corrected Total	38	4.939744E-7			

	Parameter	Standard			

Variable	Estimate	Error	Type II SS	F Value	Pr > F
Intercept	0.00013138	0.00002436	3.171523E-7	29.09	<.0001
X2	-0.00004957	0.00041821	1.53181E-10	0.01	0.9063
X1X2	2.69094	8.48308	1.097164E-9	0.10	0.7529

Bounds on condition number: 234.73, 938.92

Backward Elimination: Step 2

Variable X1X3 Entered: R-Square = 0.2103 and C(p) = 4.0000
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1.038803E-7	3.462677E-8	3.11	0.0388
Error	35	3.90094E-7	1.114554E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00020910	0.00016808	1.724922E-8	1.55	0.2218
X2	-0.00064423	0.00134	2.573849E-9	0.23	0.6338
X1X2	14.56020	26.80163	3.289375E-9	0.30	0.5904
X1X3	-0.00189	0.00404	2.435257E-9	0.22	0.6431

Bounds on condition number: 2359.6, 13987

Backward Elimination: Step 3

Variable X1X3 Removed: R-Square = 0.2054 and C(p) = 2.2185

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	1.014451E-7	5.072253E-8	4.65	0.0160
Error	36	3.925293E-7	1.090359E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00013138	0.00002436	3.171523E-7	29.09	<.0001
X2	-0.00004957	0.00041821	1.53181E-10	0.01	0.9063
X1X2	2.69094	8.48308	1.097164E-9	0.10	0.7529

Bounds on condition number: 234.73, 938.92

Backward Elimination: Step 4

Variable X1X4 Entered: R-Square = 0.2103 and C(p) = 4.0000
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1.038803E-7	3.462677E-8	3.11	0.0388
Error	35	3.90094E-7	1.114554E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00020910	0.00016808	1.724922E-8	1.55	0.2218
X2	-0.00064423	0.00134	2.573849E-9	0.23	0.6338
X1X2	14.56020	26.80163	3.289375E-9	0.30	0.5904
X1X4	-0.08510	0.18205	2.435257E-9	0.22	0.6431

Bounds on condition number: 2359.6, 13987

Backward Elimination: Step 5

Variable X1X4 Removed: R-Square = 0.2054 and C(p) = 2.2185

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	1.014451E-7	5.072253E-8	4.65	0.0160
Error	36	3.925293E-7	1.090359E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00013138	0.00002436	3.171523E-7	29.09	<.0001
X2	-0.00004957	0.00041821	1.53181E-10	0.01	0.9063
X1X2	2.69094	8.48308	1.097164E-9	0.10	0.7529

Bounds on condition number: 234.73, 938.92

Backward Elimination: Step 6

Variable X1X5 Entered: R-Square = 0.2103 and C(p) = 4.0000
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1.038803E-7	3.462677E-8	3.11	0.0388
Error	35	3.90094E-7	1.114554E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00020910	0.00016808	1.724922E-8	1.55	0.2218
X2	-0.00064423	0.00134	2.573849E-9	0.23	0.6338
X1X2	14.56020	26.80163	3.289375E-9	0.30	0.5904
X1X5	-0.32800	0.70170	2.435257E-9	0.22	0.6431

Bounds on condition number: 2359.6, 13987

Backward Elimination: Step 7

Variable X1X5 Removed: R-Square = 0.2054 and C(p) = 2.2185

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	1.014451E-7	5.072253E-8	4.65	0.0160
Error	36	3.925293E-7	1.090359E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00013138	0.00002436	3.171523E-7	29.09	<.0001
X2	-0.00004957	0.00041821	1.53181E-10	0.01	0.9063
X1X2	2.69094	8.48308	1.097164E-9	0.10	0.7529

Bounds on condition number: 234.73, 938.92

Backward Elimination: Step 8

Variable X2 Removed: R-Square = 0.2051 and C(p) = 0.2322

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.012919E-7	1.012919E-7	9.54	0.0038

Error	37	3.926825E-7	1.061304E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00013250	0.00002216	3.794647E-7	35.75	<.0001
X1X2	1.68761	0.54627	1.012919E-7	9.54	0.0038

Bounds on condition number: 1, 1

Backward Elimination: Step 9

Variable X2X3 Entered: R-Square = 0.2054 and C(p) = 2.2185

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	1.014451E-7	5.072253E-8	4.65	0.0160
Error	36	3.925293E-7	1.090359E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00013138	0.00002436	3.171523E-7	29.09	<.0001
X1X2	2.69094	8.48308	1.097164E-9	0.10	0.7529
X2X3	-6.10457E-8	5.150357E-7	1.53181E-10	0.01	0.9063

Bounds on condition number: 234.73, 938.92

Backward Elimination: Step 10

Variable X2X3 Removed: R-Square = 0.2051 and C(p) = 0.2322

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.012919E-7	1.012919E-7	9.54	0.0038
Error	37	3.926825E-7	1.061304E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00013250	0.00002216	3.794647E-7	35.75	<.0001
X1X2	1.68761	0.54627	1.012919E-7	9.54	0.0038

Bounds on condition number: 1, 1

Backward Elimination: Step 11

Variable X2X4 Entered: R-Square = 0.2054 and C(p) = 2.2185

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	1.014451E-7	5.072253E-8	4.65	0.0160
Error	36	3.925293E-7	1.090359E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00013138	0.00002436	3.171523E-7	29.09	<.0001
X1X2	2.69094	8.48308	1.097164E-9	0.10	0.7529
X2X4	-0.00000275	0.00002323	1.53181E-10	0.01	0.9063

Bounds on condition number: 234.73, 938.92

Backward Elimination: Step 12

Variable X2X4 Removed: R-Square = 0.2051 and C(p) = 0.2322

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.012919E-7	1.012919E-7	9.54	0.0038
Error	37	3.926825E-7	1.061304E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00013250	0.00002216	3.794647E-7	35.75	<.0001
X1X2	1.68761	0.54627	1.012919E-7	9.54	0.0038

Bounds on condition number: 1, 1

Backward Elimination: Step 13

Variable X2X5 Entered: R-Square = 0.2054 and C(p) = 2.2185

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	1.014451E-7	5.072253E-8	4.65	0.0160
Error	36	3.925293E-7	1.090359E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00013138	0.00002436	3.171523E-7	29.09	<.0001
X1X2	2.69094	8.48308	1.097164E-9	0.10	0.7529
X2X5	-0.00001061	0.00008955	1.53181E-10	0.01	0.9063

Bounds on condition number: 234.73, 938.92

Backward Elimination: Step 14

Variable X2X5 Removed: R-Square = 0.2051 and C(p) = 0.2322

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	1	1.012919E-7	1.012919E-7	9.54	0.0038
Error	37	3.926825E-7	1.061304E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00013250	0.00002216	3.794647E-7	35.75	<.0001
X1X2	1.68761	0.54627	1.012919E-7	9.54	0.0038

Bounds on condition number: 1, 1

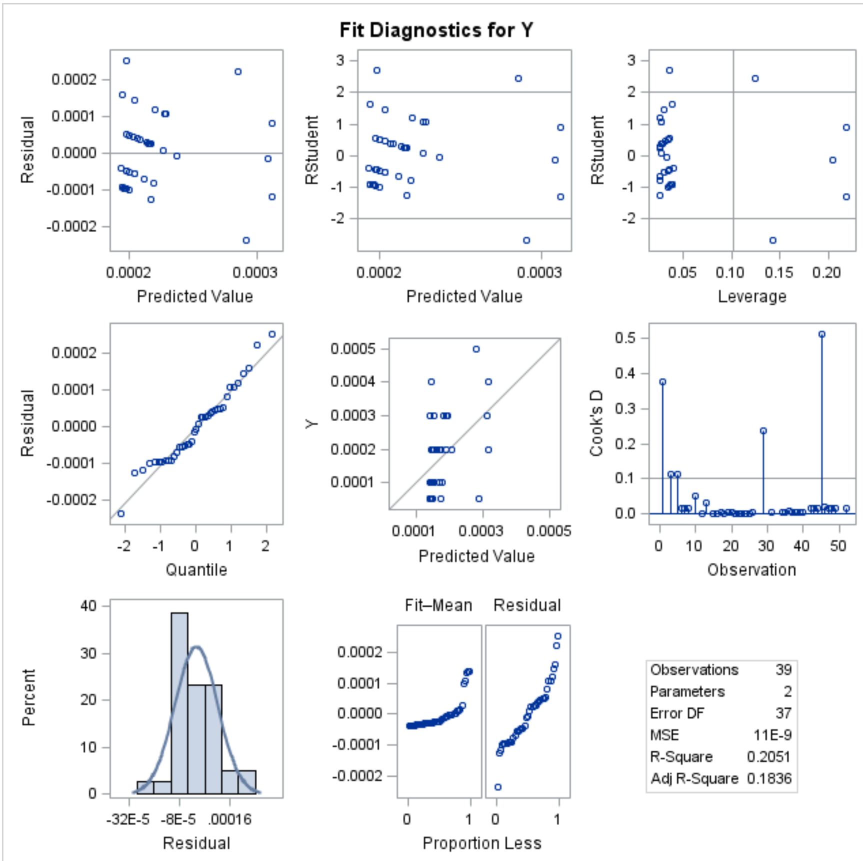
All variables left in the model are significant at the 0.1000 level.

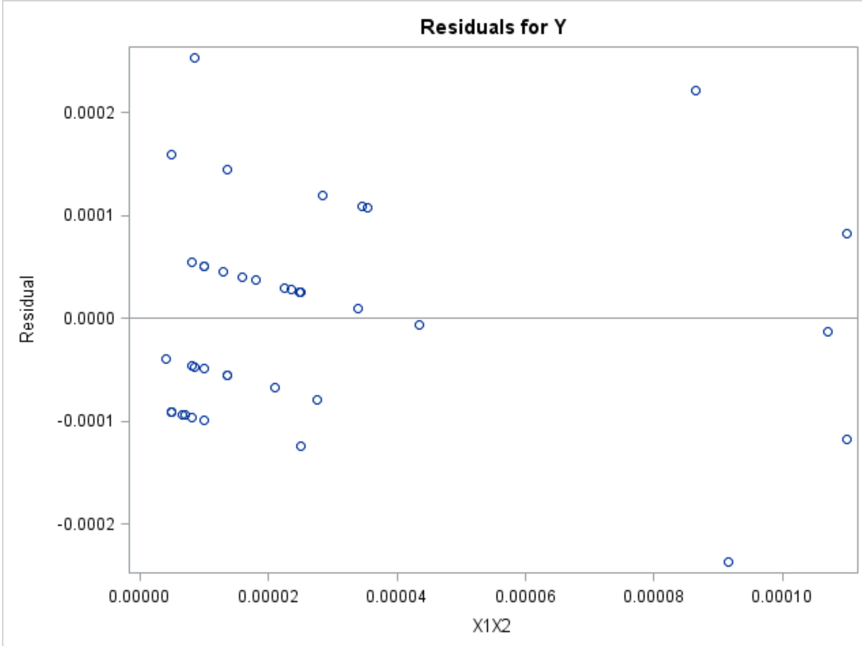
Summary of Backward Elimination								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1		X1	2	0.0049	0.2054	2.2185	0.22	0.6431
2	X1X3		3	0.0049	0.2103	4.0000	0.22	0.6431
3		X1X3	2	0.0049	0.2054	2.2185	0.22	0.6431
4	X1X4		3	0.0049	0.2103	4.0000	0.22	0.6431
5		X1X4	2	0.0049	0.2054	2.2185	0.22	0.6431
6	X1X5		3	0.0049	0.2103	4.0000	0.22	0.6431

7		X1X5	2	0.0049	0.2054	2.2185	0.22	0.6431
8		X2	1	0.0003	0.2051	0.2322	0.01	0.9063
9	X2X3		2	0.0003	0.2054	2.2185	0.01	0.9063
10		X2X3	1	0.0003	0.2051	0.2322	0.01	0.9063
11	X2X4		2	0.0003	0.2054	2.2185	0.01	0.9063
12		X2X4	1	0.0003	0.2051	0.2322	0.01	0.9063
13	X2X5		2	0.0003	0.2054	2.2185	0.01	0.9063
14		X2X5	1	0.0003	0.2051	0.2322	0.01	0.9063

BACKWARD REGRESSION
Pollutant: Dissolved Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

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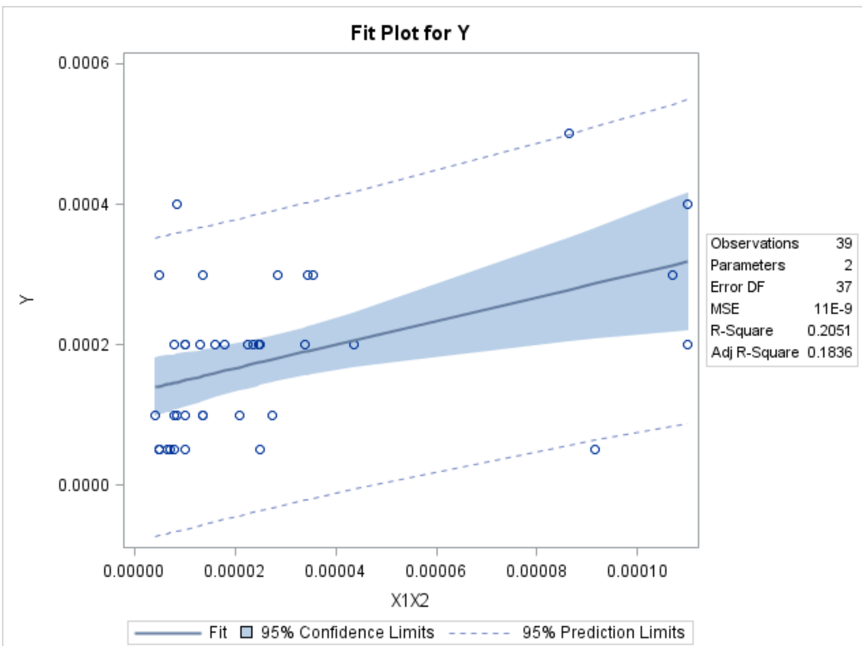
X1X2


Fit Plot for Y
Y
0.0006
0.0004
0.0002
0.0000
0.00000
0.00002
0.00004
0.00006
0.00008
0.00010
X1X2
Observations 39
Parameters 2
Error DF 37
MSE 11E-9
R-Square 0.2051
Adj R-Square 0.1836
Fit
95% Confidence Limits
95% Prediction Limits

STEPWISE REGRESSION
Pollutant: Dissolved Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	117
Number of Observations Used	39
Number of Observations with Missing Values	78

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	0.0000	-0.0948
X2	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	0.0000	-0.0000	0.4507
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	.	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.
X1X2	-0.1976	0.9979	.	.	.	1.0000	-0.1976	-0.1976	-0.1976	0.9979	0.9979	0.9979	.	0.0000	-0.0000	0.4528
X1X3	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	0.0000	-0.0948
X1X4	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	-0.0000	-0.0948
X1X5	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	-0.0000	-0.0948
X2X3	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	-0.0000	-0.0000	0.4507
X2X4	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	0.0000	-0.0000	0.4507
X2X5	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	0.0000	0.0000	0.4507
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	0.0000	0.0000	.	.	.	0.0000	0.0000	0.0000	0.0000	-0.0000	0.0000	0.0000	.	1.0000	-10.1958	-0.0000
X4X5	0.0000	-0.0000	.	.	.	-0.0000	0.0000	-0.0000	-0.0000	-0.0000	-0.0000	0.0000	.	-10.1958	1.0000	0.0000
Y	-0.0948	0.4507	.	.	.	0.4528	-0.0948	-0.0948	-0.0948	0.4507	0.4507	0.4507	.	-0.0000	0.0000	1.0000

STEPWISE REGRESSION
Pollutant: Dissolved Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	117
Number of Observations Used	39
Number of Observations with Missing Values	78

Stepwise Selection: Step 1

Variable X1X2 Entered: R-Square = 0.2051 and C(p) = 0.2322

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.012919E-7	1.012919E-7	9.54	0.0038
Error	37	3.926825E-7	1.061304E-8		
Corrected Total	38	4.939744E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00013250	0.00002216	3.794647E-7	35.75	<.0001
X1X2	1.68761	0.54627	1.012919E-7	9.54	0.0038

Bounds on condition number: 1, 1

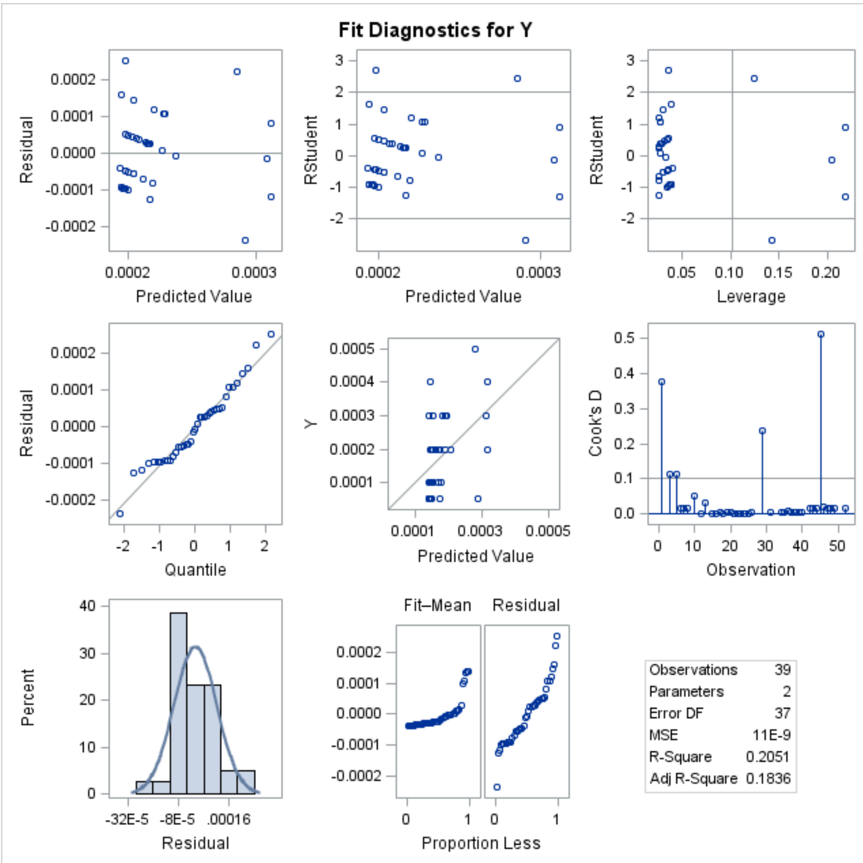
All variables left in the model are significant at the 0.1500 level.

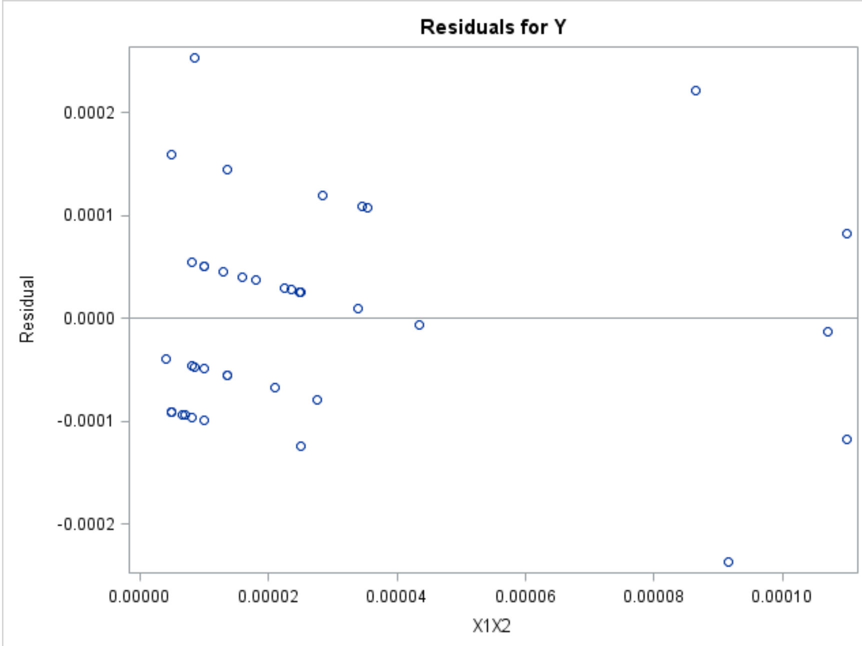
No other variable met the 0.1500 significance level for entry into the model.

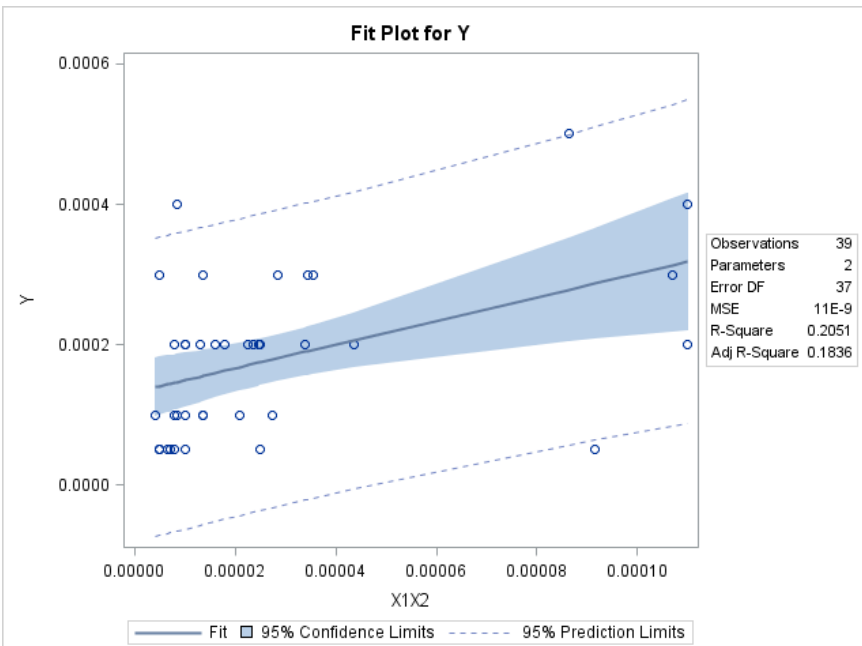
Summary of Stepwise Selection								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1X2		1	0.2051	0.2051	0.2322	9.54	0.0038

STEPWISE REGRESSION
Pollutant: Dissolved Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residuals for Y
Residual
0.0002
0.0001
0.0000
-0.0001
-0.0002
0.00000
0.00002
0.00004
0.00006
0.00008
0.00010
X1X2


Fit Plot for Y
Y
0.0006
0.0004
0.0002
0.0000
0.00000
0.00002
0.00004
0.00006
0.00008
0.00010
X1X2
Observations 39
Parameters 2
Error DF 37
MSE 11E-9
R-Square 0.2051
Adj R-Square 0.1836
Fit
95% Confidence Limits
95% Prediction Limits

===

MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Chromium

===

The REG Procedure

Number of Observations Read	117
Number of Observations Used	39
Number of Observations with Missing Values	78

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	0.0000	-0.0948
X2	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	0.0000	-0.0000	0.4507
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	.	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.
X1X2	-0.1976	0.9979	.	.	.	1.0000	-0.1976	-0.1976	-0.1976	0.9979	0.9979	0.9979	.	0.0000	-0.0000	0.4528
X1X3	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	0.0000	-0.0948
X1X4	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	-0.0000	-0.0948
X1X5	1.0000	-0.2579	.	.	.	-0.1976	1.0000	1.0000	1.0000	-0.2579	-0.2579	-0.2579	.	0.0000	-0.0000	-0.0948
X2X3	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	-0.0000	-0.0000	0.4507
X2X4	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	0.0000	-0.0000	0.4507
X2X5	-0.2579	1.0000	.	.	.	0.9979	-0.2579	-0.2579	-0.2579	1.0000	1.0000	1.0000	.	0.0000	0.0000	0.4507
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	0.0000	0.0000	.	.	.	0.0000	0.0000	0.0000	0.0000	-0.0000	0.0000	0.0000	.	1.0000	-10.1958	-0.0000
X4X5	0.0000	-0.0000	.	.	.	-0.0000	0.0000	-0.0000	-0.0000	-0.0000	-0.0000	0.0000	.	-10.1958	1.0000	0.0000
Y	-0.0948	0.4507	.	.	.	0.4528	-0.0948	-0.0948	-0.0948	0.4507	0.4507	0.4507	.	-0.0000	0.0000	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Chromium
==

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	117
Number of Observations Used	39
Number of Observations with Missing Values	78

Number in Model	R-Square	Variables in Model
1	0.2051	X1X2
1	0.2031	X2X4
1	0.2031	X2
1	0.2031	X2X5
1	0.2031	X2X3
1	0.0090	X1X5
1	0.0090	X1
1	0.0090	X1X3
1	0.0090	X1X4
2	0.2054	X1X2 X2X3
2	0.2054	X1X2 X2X5
2	0.2054	X2 X1X2
2	0.2054	X1X2 X2X4
2	0.2051	X1X2 X1X5
2	0.2051	X1 X1X2
2	0.2051	X1X2 X1X3
2	0.2051	X1X2 X1X4
2	0.2036	X1X4 X2X4
2	0.2036	X1X3 X2X4
2	0.2036	X1 X2X4
2	0.2036	X1X5 X2X4
2	0.2036	X2 X1X4
2	0.2036	X2 X1X3
2	0.2036	X1 X2
3	0.2103	X1 X1X2 X2X3
3	0.2103	X1X2 X1X5 X2X3
3	0.2103	X1X2 X1X4 X2X3
3	0.2103	X1X2 X1X3 X2X3
3	0.2103	X1 X1X2 X2X4
3	0.2103	X1X2 X1X3 X2X4
3	0.2103	X1X2 X1X5 X2X4
3	0.2103	X1X2 X1X4 X2X4
3	0.2103	X1X2 X1X5 X2X5
3	0.2103	X1X2 X1X3 X2X5
3	0.2103	X1 X1X2 X2X5
3	0.2103	X1X2 X1X4 X2X5

3	0.2103	X2 X1X2 X1X3
3	0.2103	X1 X2 X1X2
3	0.2103	X2 X1X2 X1X4

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Chromium

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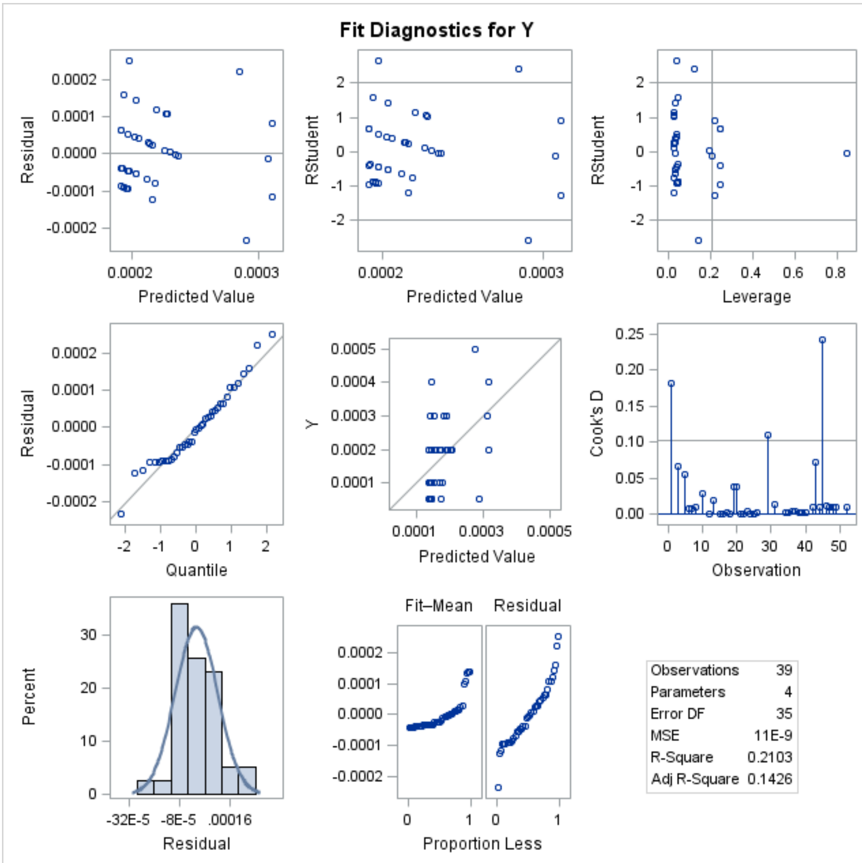
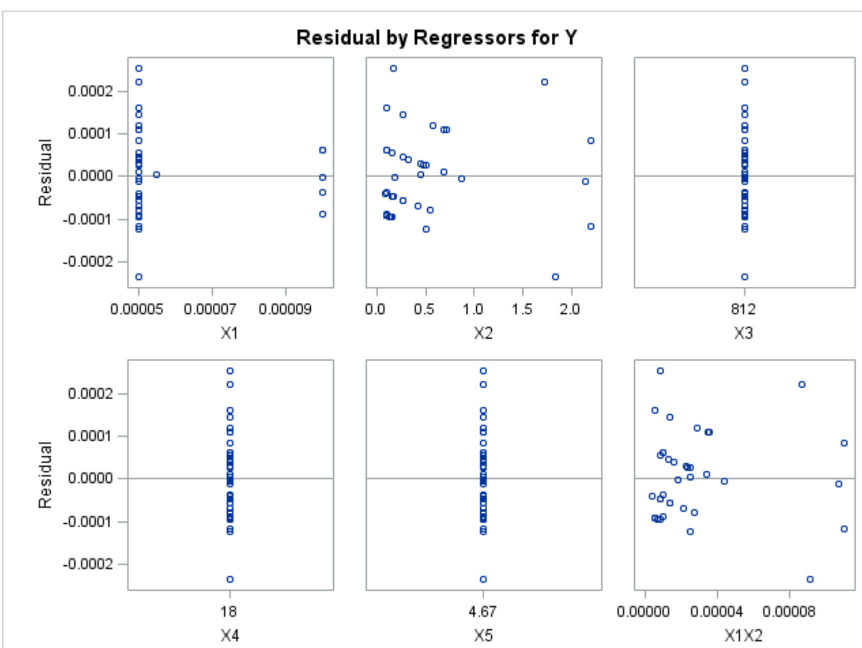
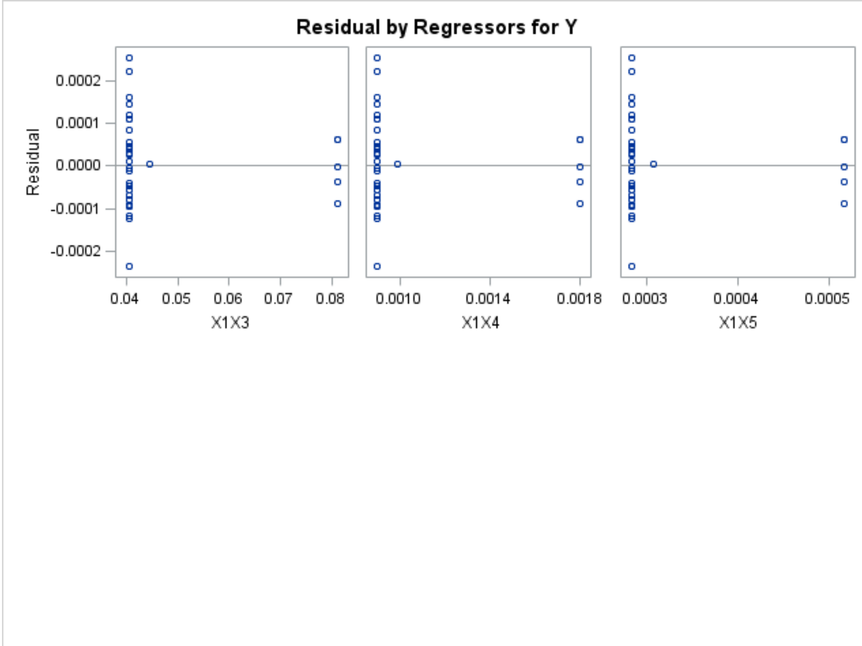
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
0.0002
0.0001
0.0000
-0.0001
-0.0002
0.04 0.05 0.06 0.07 0.08
X1X3
0.0010 0.0014 0.0018
X1X4
0.0003 0.0004 0.0005
X1X5

FORWARD REGRESSION
Pollutant: Dissolved Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	64
Number of Observations Used	42
Number of Observations with Missing Values	22

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	0.0000	0.0000	0.8446
X2	0.0745	1.0000	.	.	0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0079
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	0.0000	0.0000	.	.	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	.	-2.7898	-4.2430	0.0000
X1X2	0.5121	0.8507	.	.	0.0000	1.0000	0.5121	0.5121	0.5121	0.8507	0.8507	0.8507	.	-0.0000	-0.0000	0.3808
X1X3	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	0.0000	0.0000	0.8446
X1X4	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	-0.0000	-0.0000	0.8446
X1X5	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	-0.0000	0.0000	0.8446
X2X3	0.0745	1.0000	.	.	0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0079
X2X4	0.0745	1.0000	.	.	-0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	-0.0000	0.0000	-0.0079
X2X5	0.0745	1.0000	.	.	-0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0079
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	0.0000	0.0000	.	.	-2.7898	-0.0000	0.0000	-0.0000	-0.0000	0.0000	-0.0000	0.0000	.	1.0000	0.9500	0.0000
X4X5	0.0000	0.0000	.	.	-4.2430	-0.0000	0.0000	-0.0000	0.0000	0.0000	0.0000	0.0000	.	0.9500	1.0000	-0.0000
Y	0.8446	-0.0079	.	.	0.0000	0.3808	0.8446	0.8446	0.8446	-0.0079	-0.0079	-0.0079	.	0.0000	-0.0000	1.0000

FORWARD REGRESSION
Pollutant: Dissolved Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	64
Number of Observations Used	42
Number of Observations with Missing Values	22

Forward Selection: Step 1

Variable X1X3 Entered: R-Square = 0.7133 and C(p) = 0.7494

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00000127	0.00000127	99.51	<.0001
Error	40	5.110561E-7	1.27764E-8		
Corrected Total	41	0.00000178			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00011310	0.00003940	1.053109E-7	8.24	0.0065
X1X3	0.00083992	0.00008420	0.00000127	99.51	<.0001

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X2 Entered: R-Square = 0.7183 and C(p) = 2.0677

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00000128	6.40187E-7	49.73	<.0001
Error	39	5.020664E-7	1.28735E-8		
Corrected Total	41	0.00000178			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00012314	0.00004133	1.142879E-7	8.88	0.0049

X2	-0.00002700	0.00003231	8.989669E-9	0.70	0.4084
X1X3	0.00084519	0.00008475	0.00000128	99.45	<.0001

Bounds on condition number: 1.0056, 4.0223

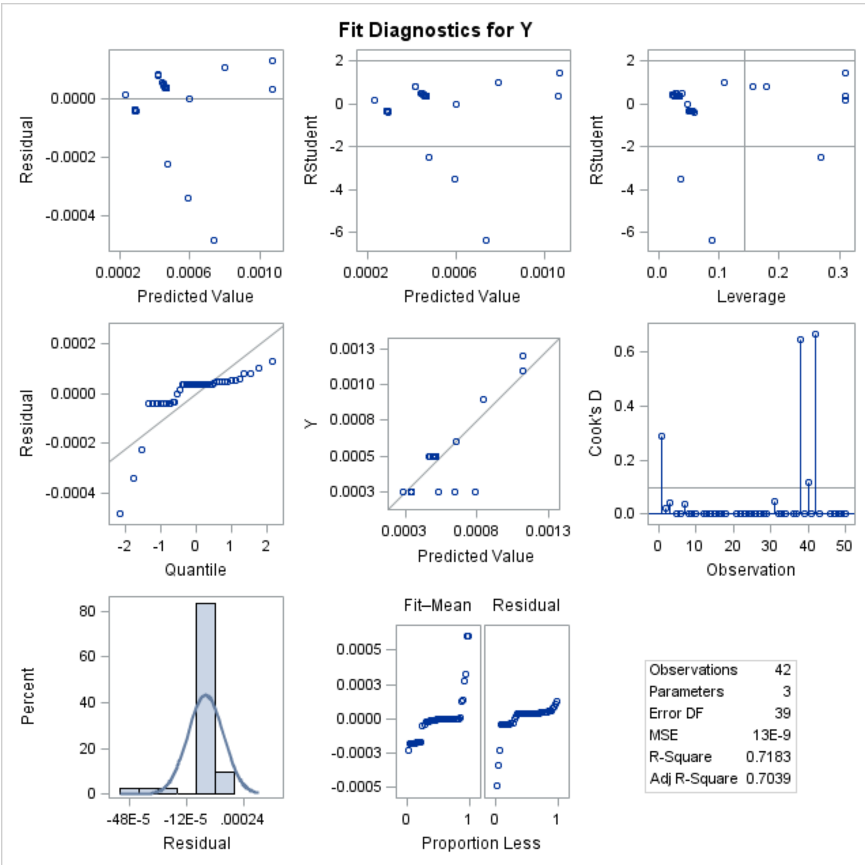
No other variable met the 0.5000 significance level for entry into the model.

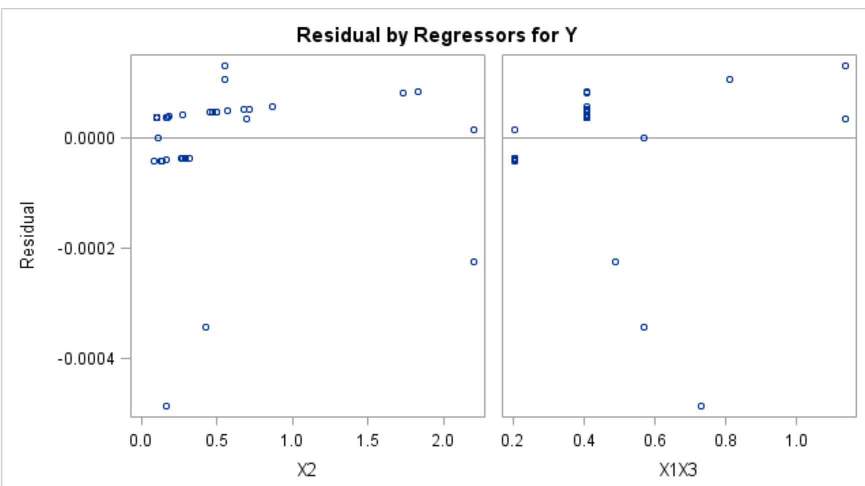
Summary of Forward Selection

Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1X3	1	0.7133	0.7133	0.7494	99.51	<.0001
2	X2	2	0.0050	0.7183	2.0677	0.70	0.4084

FORWARD REGRESSION
Pollutant: Dissolved Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y





BACKWARD REGRESSION
Pollutant: Dissolved Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	64
Number of Observations Used	42
Number of Observations with Missing Values	22

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	0.0000	0.0000	0.8446
X2	0.0745	1.0000	.	.	0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0079
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	0.0000	0.0000	.	.	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	.	-2.7898	-4.2430	0.0000
X1X2	0.5121	0.8507	.	.	0.0000	1.0000	0.5121	0.5121	0.5121	0.8507	0.8507	0.8507	.	-0.0000	-0.0000	0.3808
X1X3	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	0.0000	0.0000	0.8446
X1X4	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	-0.0000	-0.0000	0.8446
X1X5	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	-0.0000	0.0000	0.8446
X2X3	0.0745	1.0000	.	.	0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0079
X2X4	0.0745	1.0000	.	.	-0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	-0.0000	0.0000	-0.0079
X2X5	0.0745	1.0000	.	.	-0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0079
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	0.0000	0.0000	.	.	-2.7898	-0.0000	0.0000	-0.0000	-0.0000	0.0000	-0.0000	0.0000	.	1.0000	0.9500	0.0000
X4X5	0.0000	0.0000	.	.	-4.2430	-0.0000	0.0000	-0.0000	0.0000	0.0000	0.0000	0.0000	.	0.9500	1.0000	-0.0000
Y	0.8446	-0.0079	.	.	0.0000	0.3808	0.8446	0.8446	0.8446	-0.0079	-0.0079	-0.0079	.	0.0000	-0.0000	1.0000

BACKWARD REGRESSION
Pollutant: Dissolved Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	64
Number of Observations Used	42
Number of Observations with Missing Values	22

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.7188 and C(p) = 4.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00000128	4.270891E-7	32.38	<.0001
Error	38	5.011731E-7	1.318877E-8		
Corrected Total	41	0.00000178			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00013660	0.00006654	5.559156E-8	4.22	0.0470
X1	0.65626	0.13479	3.12647E-7	23.71	<.0001
X2	-0.00005252	0.00010338	3.40405E-9	0.26	0.6144
X1X2	0.05570	0.21402	8.93332E-10	0.07	0.7961

Bounds on condition number: 13.549, 82.095

Backward Elimination: Step 1

Variable X1X2 Removed: R-Square = 0.7183 and C(p) = 2.0677

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00000128	6.40187E-7	49.73	<.0001
Error	39	5.020664E-7	1.28735E-8		
Corrected Total	41	0.00000178			

	Parameter	Standard			

Variable	Estimate	Error	Type II SS	F Value	Pr > F
Intercept	0.00012314	0.00004133	1.142879E-7	8.88	0.0049
X1	0.68629	0.06882	0.00000128	99.45	<.0001
X2	-0.00002700	0.00003231	8.989669E-9	0.70	0.4084

Bounds on condition number: 1.0056, 4.0223

Backward Elimination: Step 2

Variable X2 Removed: R-Square = 0.7133 and C(p) = 0.7494

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00000127	0.00000127	99.51	<.0001
Error	40	5.110561E-7	1.27764E-8		
Corrected Total	41	0.00000178			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00011310	0.00003940	1.053109E-7	8.24	0.0065
X1	0.68201	0.06837	0.00000127	99.51	<.0001

Bounds on condition number: 1, 1

Backward Elimination: Step 3

Variable X2X3 Entered: R-Square = 0.7183 and C(p) = 2.0677

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

Note:

Note:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00000128	6.40187E-7	49.73	<.0001
Error	39	5.020664E-7	1.28735E-8		
Corrected Total	41	0.00000178			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00012314	0.00004133	1.142879E-7	8.88	0.0049
X1	0.68629	0.06882	0.00000128	99.45	<.0001
X2X3	-3.32489E-8	3.978819E-8	8.989669E-9	0.70	0.4084

Bounds on condition number: 1.0056, 4.0223

Backward Elimination: Step 4

Variable X2X3 Removed: R-Square = 0.7133 and C(p) = 0.7494

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00000127	0.00000127	99.51	<.0001
Error	40	5.110561E-7	1.27764E-8		
Corrected Total	41	0.00000178			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00011310	0.00003940	1.053109E-7	8.24	0.0065
X1	0.68201	0.06837	0.00000127	99.51	<.0001

Bounds on condition number: 1, 1

Backward Elimination: Step 5

Variable X2X4 Entered: R-Square = 0.7183 and C(p) = 2.0677
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Note:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00000128	6.40187E-7	49.73	<.0001
Error	39	5.020664E-7	1.28735E-8		
Corrected Total	41	0.00000178			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00012314	0.00004133	1.142879E-7	8.88	0.0049
X1	0.68629	0.06882	0.00000128	99.45	<.0001
X2X4	-0.00000150	0.00000179	8.989669E-9	0.70	0.4084

Bounds on condition number: 1.0056, 4.0223

Backward Elimination: Step 6

Variable X2X4 Removed: R-Square = 0.7133 and C(p) = 0.7494

Analysis of Variance					
		Sum of	Mean		

Source	DF	Squares	Square	F Value	Pr > F
Model	1	0.00000127	0.00000127	99.51	<.0001
Error	40	5.110561E-7	1.27764E-8		
Corrected Total	41	0.00000178			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00011310	0.00003940	1.053109E-7	8.24	0.0065
X1	0.68201	0.06837	0.00000127	99.51	<.0001

Bounds on condition number: 1, 1

Backward Elimination: Step 7

Variable X2X5 Entered: R-Square = 0.7183 and C(p) = 2.0677

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Note:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00000128	6.40187E-7	49.73	<.0001
Error	39	5.020664E-7	1.28735E-8		
Corrected Total	41	0.00000178			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00012314	0.00004133	1.142879E-7	8.88	0.0049
X1	0.68629	0.06882	0.00000128	99.45	<.0001
X2X5	-0.00000578	0.00000692	8.989669E-9	0.70	0.4084

Bounds on condition number: 1.0056, 4.0223

Backward Elimination: Step 8

Variable X2X5 Removed: R-Square = 0.7133 and C(p) = 0.7494

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00000127	0.00000127	99.51	<.0001
Error	40	5.110561E-7	1.27764E-8		
Corrected Total	41	0.00000178			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00011310	0.00003940	1.053109E-7	8.24	0.0065
X1	0.68201	0.06837	0.00000127	99.51	<.0001

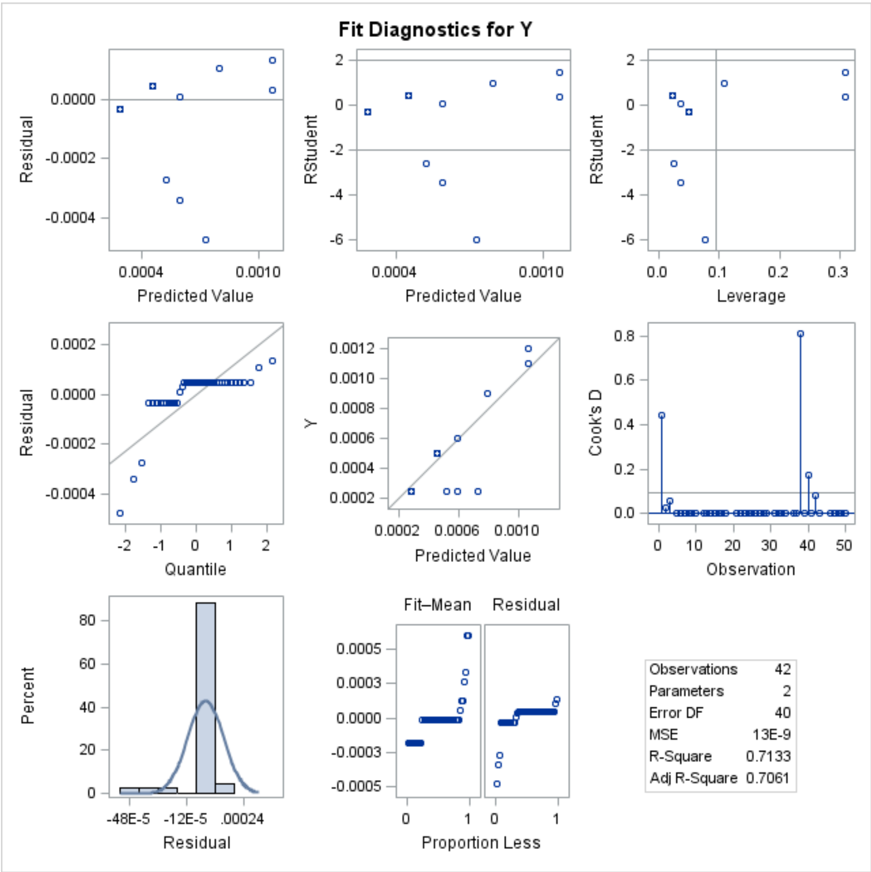
Bounds on condition number: 1, 1

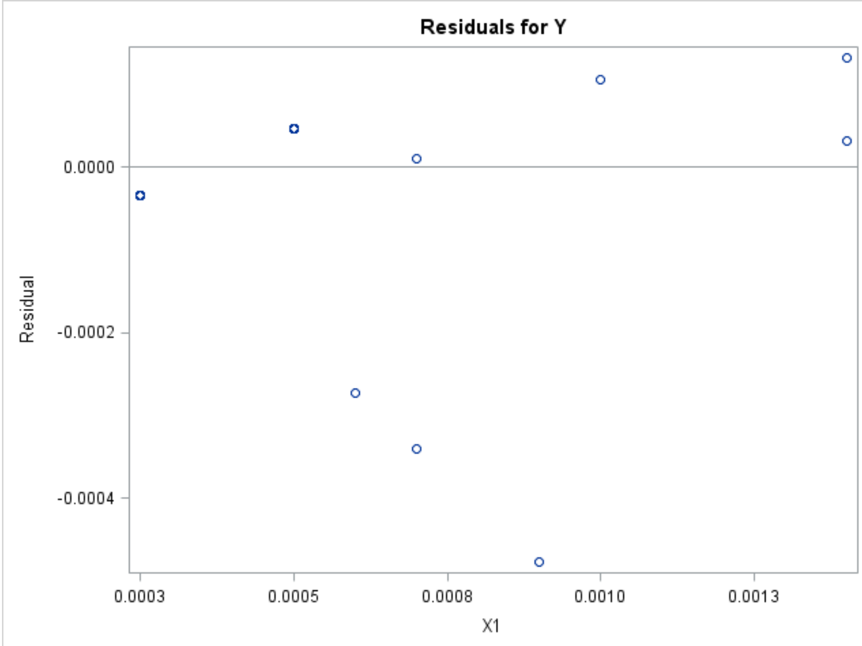
All variables left in the model are significant at the 0.1000 level.

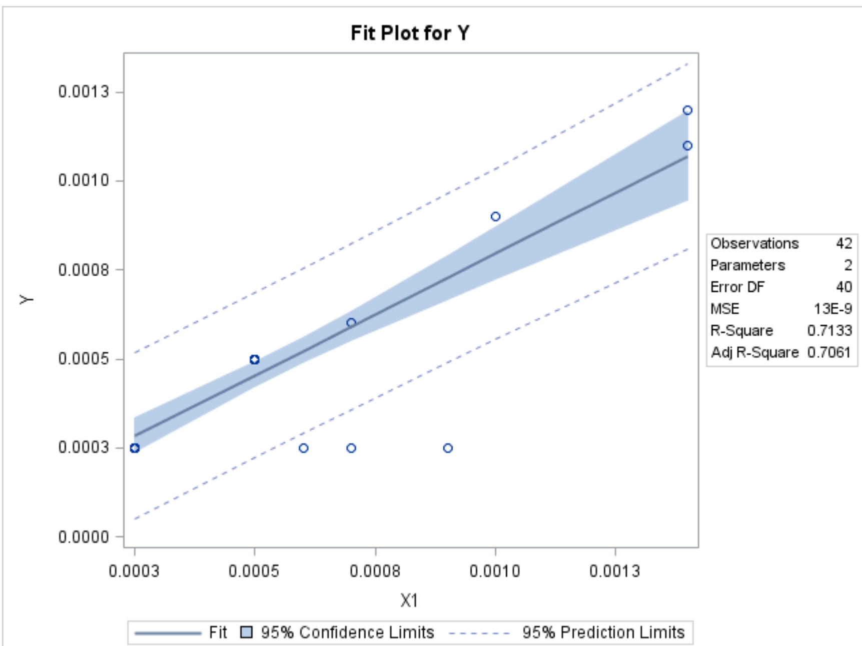
Summary of Backward Elimination								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1		X1X2	2	0.0005	0.7183	2.0677	0.07	0.7961
2		X2	1	0.0050	0.7133	0.7494	0.70	0.4084
3	X2X3		2	0.0050	0.7183	2.0677	0.70	0.4084
4		X2X3	1	0.0050	0.7133	0.7494	0.70	0.4084
5	X2X4		2	0.0050	0.7183	2.0677	0.70	0.4084
6		X2X4	1	0.0050	0.7133	0.7494	0.70	0.4084
7	X2X5		2	0.0050	0.7183	2.0677	0.70	0.4084
8		X2X5	1	0.0050	0.7133	0.7494	0.70	0.4084

BACKWARD REGRESSION
Pollutant: Dissolved Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residuals for Y
Residual
0.0000
-0.0002
-0.0004
0.0003
0.0005
0.0008
0.0010
0.0013
X1


Fit Plot for Y
Y
0.0013
0.0010
0.0008
0.0005
0.0003
0.0000
0.0003
0.0005
0.0008
0.0010
0.0013
X1
Observations 42
Parameters 2
Error DF 40
MSE 13E-9
R-Square 0.7133
Adj R-Square 0.7061
Fit
95% Confidence Limits
95% Prediction Limits

STEPWISE REGRESSION
Pollutant: Dissolved Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	64
Number of Observations Used	42
Number of Observations with Missing Values	22

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	0.0000	0.0000	0.8446
X2	0.0745	1.0000	.	.	0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0079
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	0.0000	0.0000	.	.	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	.	-2.7898	-4.2430	0.0000
X1X2	0.5121	0.8507	.	.	0.0000	1.0000	0.5121	0.5121	0.5121	0.8507	0.8507	0.8507	.	-0.0000	-0.0000	0.3808
X1X3	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	0.0000	0.0000	0.8446
X1X4	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	-0.0000	-0.0000	0.8446
X1X5	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	-0.0000	0.0000	0.8446
X2X3	0.0745	1.0000	.	.	0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0079
X2X4	0.0745	1.0000	.	.	-0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	-0.0000	0.0000	-0.0079
X2X5	0.0745	1.0000	.	.	-0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0079
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	0.0000	0.0000	.	.	-2.7898	-0.0000	0.0000	-0.0000	-0.0000	0.0000	-0.0000	0.0000	.	1.0000	0.9500	0.0000
X4X5	0.0000	0.0000	.	.	-4.2430	-0.0000	0.0000	-0.0000	0.0000	0.0000	0.0000	0.0000	.	0.9500	1.0000	-0.0000
Y	0.8446	-0.0079	.	.	0.0000	0.3808	0.8446	0.8446	0.8446	-0.0079	-0.0079	-0.0079	.	0.0000	-0.0000	1.0000

STEPWISE REGRESSION
Pollutant: Dissolved Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	64
Number of Observations Used	42
Number of Observations with Missing Values	22

Stepwise Selection: Step 1

Variable X1X3 Entered: R-Square = 0.7133 and C(p) = 0.7494

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00000127	0.00000127	99.51	<.0001
Error	40	5.110561E-7	1.27764E-8		
Corrected Total	41	0.00000178			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00011310	0.00003940	1.053109E-7	8.24	0.0065
X1X3	0.00083992	0.00008420	0.00000127	99.51	<.0001

Bounds on condition number: 1, 1

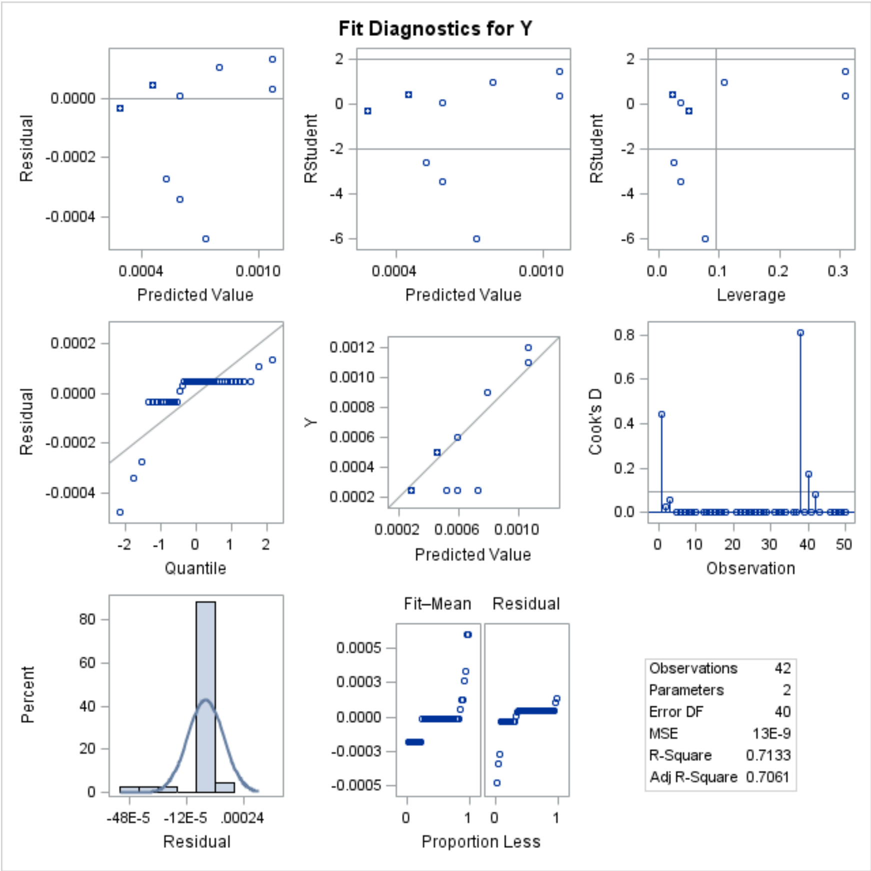
All variables left in the model are significant at the 0.1500 level.

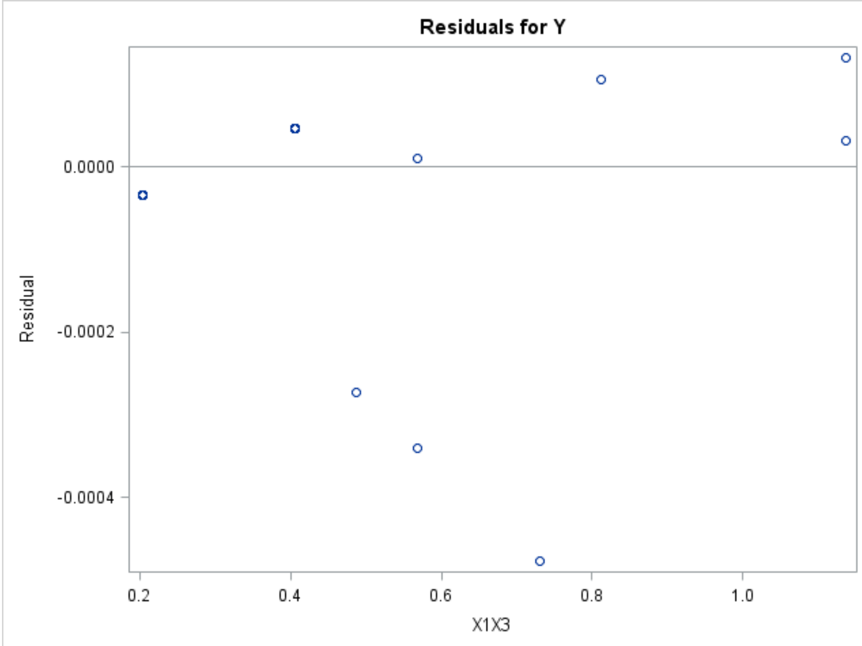
No other variable met the 0.1500 significance level for entry into the model.

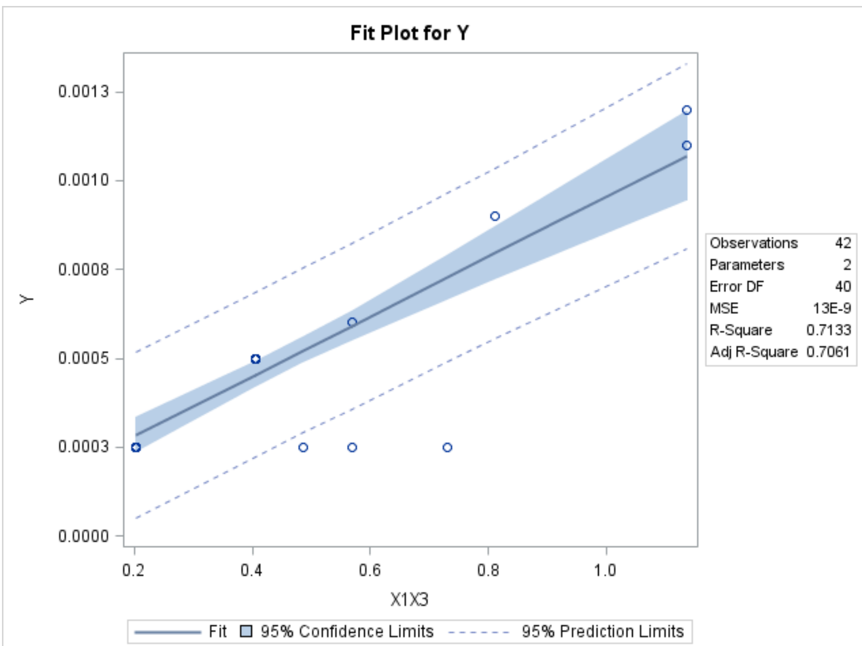
Summary of Stepwise Selection								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1X3		1	0.7133	0.7133	0.7494	99.51	<.0001

STEPWISE REGRESSION
Pollutant: Dissolved Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residuals for Y
Residual
0.0000
-0.0002
-0.0004
0.2
0.4
0.6
0.8
1.0
X1X3


Fit Plot for Y
Y
0.0013
0.0010
0.0008
0.0005
0.0003
0.0000
0.2
0.4
0.6
0.8
1.0
X1X3
Observations 42
Parameters 2
Error DF 40
MSE 13E-9
R-Square 0.7133
Adj R-Square 0.7061
Fit
95% Confidence Limits
95% Prediction Limits

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Copper

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The REG Procedure

Number of Observations Read	64
Number of Observations Used	42
Number of Observations with Missing Values	22

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	0.0000	0.0000	0.8446
X2	0.0745	1.0000	.	.	0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0079
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	0.0000	0.0000	.	.	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	.	-2.7898	-4.2430	0.0000
X1X2	0.5121	0.8507	.	.	0.0000	1.0000	0.5121	0.5121	0.5121	0.8507	0.8507	0.8507	.	-0.0000	-0.0000	0.3808
X1X3	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	0.0000	0.0000	0.8446
X1X4	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	-0.0000	-0.0000	0.8446
X1X5	1.0000	0.0745	.	.	0.0000	0.5121	1.0000	1.0000	1.0000	0.0745	0.0745	0.0745	.	-0.0000	0.0000	0.8446
X2X3	0.0745	1.0000	.	.	0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0079
X2X4	0.0745	1.0000	.	.	-0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	-0.0000	0.0000	-0.0079
X2X5	0.0745	1.0000	.	.	-0.0000	0.8507	0.0745	0.0745	0.0745	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0079
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	0.0000	0.0000	.	.	-2.7898	-0.0000	0.0000	-0.0000	-0.0000	0.0000	-0.0000	0.0000	.	1.0000	0.9500	0.0000
X4X5	0.0000	0.0000	.	.	-4.2430	-0.0000	0.0000	-0.0000	0.0000	0.0000	0.0000	0.0000	.	0.9500	1.0000	-0.0000
Y	0.8446	-0.0079	.	.	0.0000	0.3808	0.8446	0.8446	0.8446	-0.0079	-0.0079	-0.0079	.	0.0000	-0.0000	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Copper

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The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	64
Number of Observations Used	42
Number of Observations with Missing Values	22

Number in Model	R-Square	Variables in Model
1	0.7133	X1X3
1	0.7133	X1X5
1	0.7133	X1
1	0.7133	X1X4
1	0.1450	X1X2
1	0.0001	X2X4
1	0.0001	X2
1	0.0001	X2X3
1	0.0001	X2X5
2	0.7183	X2 X1X3
2	0.7183	X1X3 X2X4
2	0.7183	X1X3 X2X3
2	0.7183	X1X3 X2X5
2	0.7183	X2 X1X5
2	0.7183	X1X5 X2X4
2	0.7183	X1X5 X2X3
2	0.7183	X1X5 X2X5
2	0.7183	X1 X2X3
2	0.7183	X1 X2X4
2	0.7183	X1 X2
2	0.7183	X1 X2X5
2	0.7183	X1X4 X2X4
2	0.7183	X1X4 X2X3
2	0.7183	X2 X1X4
3	0.7188	X2 X1X2 X1X3
3	0.7188	X1X2 X1X3 X2X4
3	0.7188	X1X2 X1X3 X2X3
3	0.7188	X1X2 X1X3 X2X5
3	0.7188	X2 X1X2 X1X5
3	0.7188	X1X2 X1X5 X2X4
3	0.7188	X1X2 X1X5 X2X3
3	0.7188	X1X2 X1X5 X2X5
3	0.7188	X1 X1X2 X2X4
3	0.7188	X1 X1X2 X2X3
3	0.7188	X1 X2 X1X2
3	0.7188	X1 X1X2 X2X5

3	0.7188	X1X2 X1X4 X2X4
3	0.7188	X1X2 X1X4 X2X3
3	0.7188	X2 X1X2 X1X4

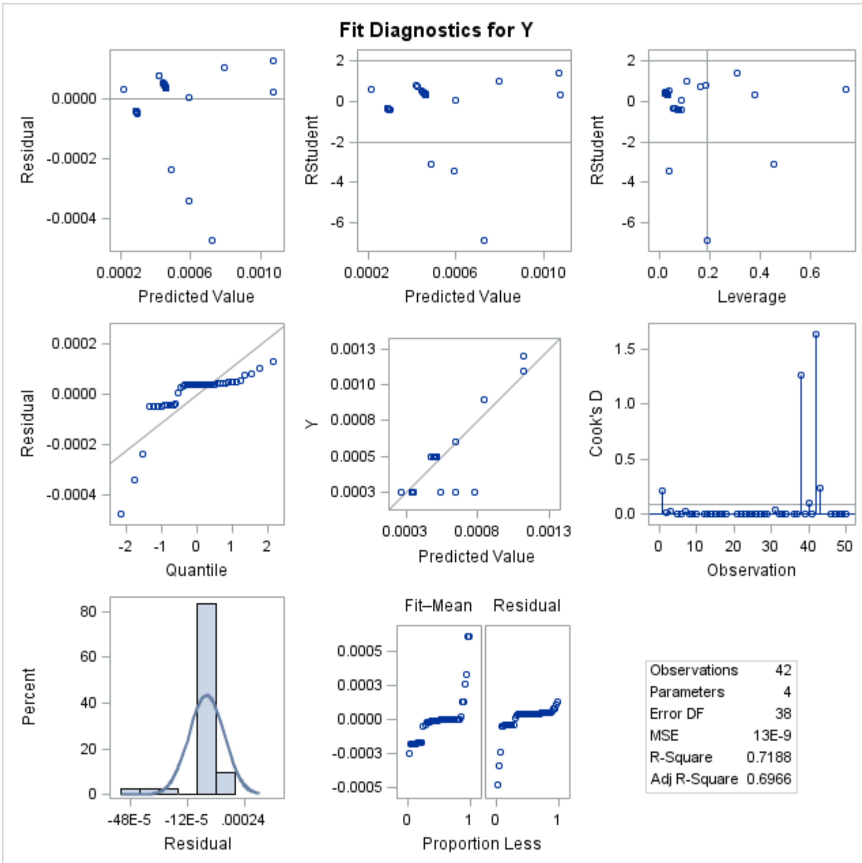
Note: Models of not full rank are not included.

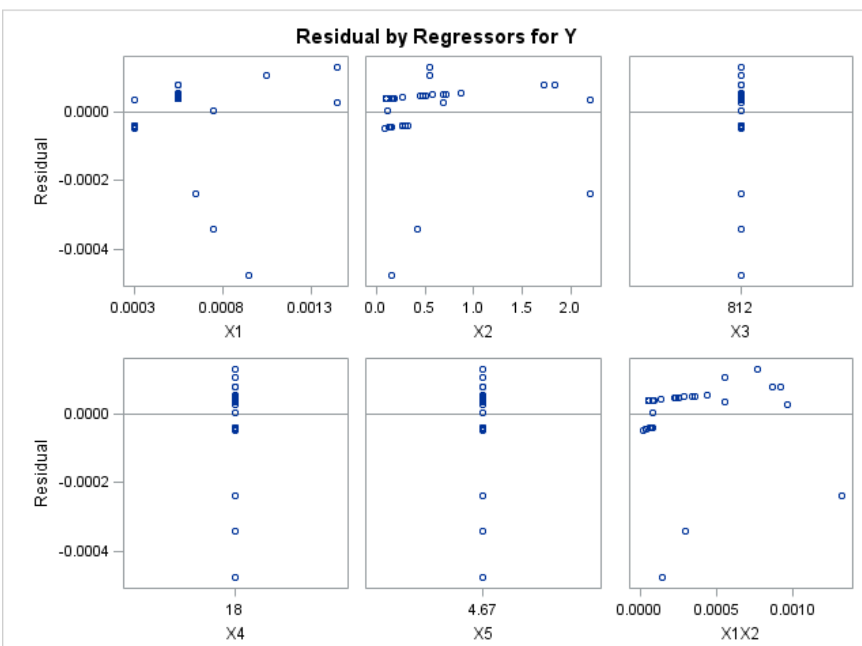
==

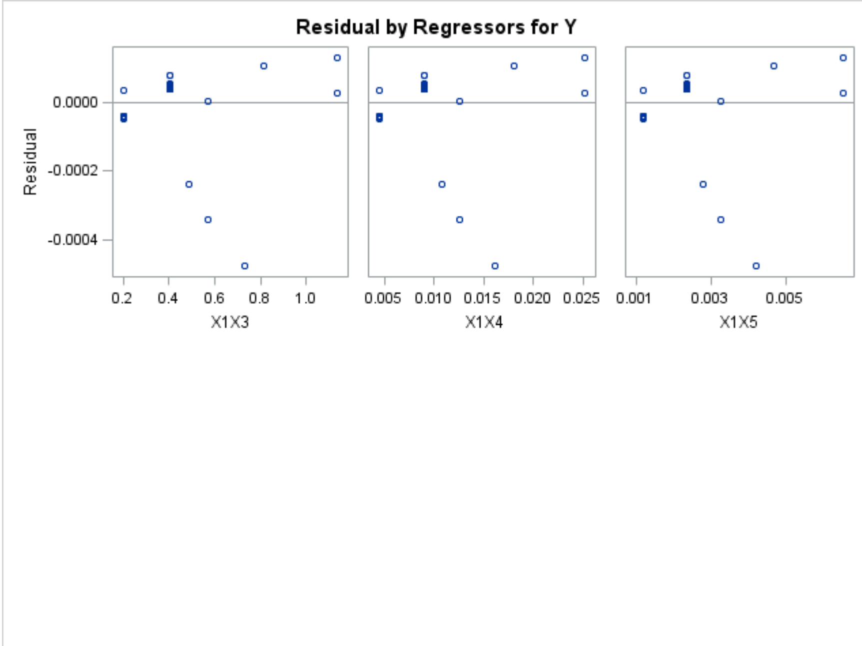
MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Copper

==

The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
0.0000
-0.0002
-0.0004
0.2 0.4 0.6 0.8 1.0
X1X3
0.005 0.010 0.015 0.020 0.025
X1X4
0.001 0.003 0.005
X1X5

FORWARD REGRESSION
Pollutant: Dissolved Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	56
Number of Observations Used	19
Number of Observations with Missing Values	37

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0949	-0.1126	-0.1127	-0.0619	0.5870	0.9981	0.8458	0.9586	-0.0957	-0.0974	-0.0996	-0.1127	-0.0940	-0.1223	-0.1768
X2	-0.0949	1.0000	0.9519	0.9510	0.0869	0.7232	-0.0361	0.4334	-0.0749	0.9999	0.9993	0.9888	0.9511	0.3997	0.9308	0.4187
X3	-0.1126	0.9519	1.0000	1.0000	0.0776	0.6243	-0.0552	0.4064	-0.0967	0.9555	0.9625	0.9289	1.0000	0.4031	0.9631	0.4715
X4	-0.1127	0.9510	1.0000	1.0000	0.0774	0.6230	-0.0554	0.4059	-0.0968	0.9546	0.9616	0.9278	1.0000	0.4029	0.9630	0.4718
X5	-0.0619	0.0869	0.0776	0.0774	1.0000	0.0269	-0.0575	-0.0151	0.1366	0.0867	0.0862	0.2280	0.0774	0.9435	0.3392	0.0331
X1X2	0.5870	0.7232	0.6243	0.6230	0.0269	1.0000	0.6330	0.9096	0.5777	0.7207	0.7151	0.7146	0.6231	0.2358	0.6055	0.1194
X1X3	0.9981	-0.0361	-0.0552	-0.0554	-0.0575	0.6330	1.0000	0.8767	0.9577	-0.0369	-0.0386	-0.0421	-0.0554	-0.0709	-0.0670	-0.1578
X1X4	0.8458	0.4334	0.4064	0.4059	-0.0151	0.9096	0.8767	1.0000	0.8188	0.4331	0.4324	0.4183	0.4059	0.1214	0.3796	0.0144
X1X5	0.9586	-0.0749	-0.0967	-0.0968	0.1366	0.5777	0.9577	0.8188	1.0000	-0.0758	-0.0778	-0.0515	-0.0968	0.0934	-0.0544	-0.0657
X2X3	-0.0957	0.9999	0.9555	0.9546	0.0867	0.7207	-0.0369	0.4331	-0.0758	1.0000	0.9997	0.9883	0.9547	0.4005	0.9337	0.4215
X2X4	-0.0974	0.9993	0.9625	0.9616	0.0862	0.7151	-0.0386	0.4324	-0.0778	0.9997	1.0000	0.9867	0.9617	0.4021	0.9393	0.4271
X2X5	-0.0996	0.9888	0.9289	0.9278	0.2280	0.7146	-0.0421	0.4183	-0.0515	0.9883	0.9867	1.0000	0.9279	0.5221	0.9482	0.4138
X3X4	-0.1127	0.9511	1.0000	1.0000	0.0774	0.6231	-0.0554	0.4059	-0.0968	0.9547	0.9617	0.9279	1.0000	0.4029	0.9630	0.4717
X3X5	-0.0940	0.3997	0.4031	0.4029	0.9435	0.2358	-0.0709	0.1214	0.0934	0.4005	0.4021	0.5221	0.4029	1.0000	0.6317	0.1898
X4X5	-0.1223	0.9308	0.9631	0.9630	0.3392	0.6055	-0.0670	0.3796	-0.0544	0.9337	0.9393	0.9482	0.9630	0.6317	1.0000	0.4620
Y	-0.1768	0.4187	0.4715	0.4718	0.0331	0.1194	-0.1578	0.0144	-0.0657	0.4215	0.4271	0.4138	0.4717	0.1898	0.4620	1.0000

FORWARD REGRESSION
Pollutant: Dissolved Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	56
Number of Observations Used	19
Number of Observations with Missing Values	37

Forward Selection: Step 1

Variable X4 Entered: R-Square = 0.2226 and C(p) = 14.9232

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00002597	0.00002597	4.87	0.0414
Error	17	0.00009071	0.00000534		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00469	0.00085507	0.00016040	30.06	<.0001
X4	0.00020860	0.00009456	0.00002597	4.87	0.0414

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X1X2 Entered: R-Square = 0.2723 and C(p) = 15.0074

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00003178	0.00001589	2.99	0.0786
Error	16	0.00008490	0.00000531		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00468	0.00085277	0.00015965	30.09	<.0001

X4	0.00028717	0.00012055	0.00003011	5.67	0.0300
X1X2	-0.00000150	0.00000144	0.00000581	1.09	0.3110

Bounds on condition number: 1.6344, 6.5376

Forward Selection: Step 3

Variable X1X5 Entered: R-Square = 0.3530 and C(p) = 13.9033

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	0.00004119	0.00001373	2.73	0.0808
Error	15	0.00007549	0.00000503		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00356	0.00117	0.00004697	9.33	0.0080
X4	0.00045152	0.00016802	0.00003635	7.22	0.0169
X1X2	-0.00000424	0.00000244	0.00001517	3.01	0.1030
X1X5	0.51023	0.37315	0.00000941	1.87	0.1917

Bounds on condition number: 4.9771, 34.196

Forward Selection: Step 4

Variable X2 Entered: R-Square = 0.5378 and C(p) = 8.7895

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	0.00006275	0.00001569	4.07	0.0215
Error	14	0.00005393	0.00000385		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00366	0.00102	0.00004956	12.87	0.0030
X2	0.00000375	0.00000158	0.00002157	5.60	0.0329
X4	-0.00021635	0.00031824	0.00000178	0.46	0.5077
X1X2	-0.00001293	0.00000425	0.00003566	9.26	0.0088
X1X5	1.55063	0.54764	0.00003088	8.02	0.0133

Bounds on condition number: 41.616, 342.75

Forward Selection: Step 5

Variable X4X5 Entered: R-Square = 0.6882 and C(p) = 5.0006

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00008030	0.00001606	5.74	0.0052
Error	13	0.00003638	0.00000280		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00296	0.00091400	0.00002926	10.46	0.0065
X2	0.00000652	0.00000175	0.00003903	13.95	0.0025
X4	0.00016038	0.00031018	7.481557E-7	0.27	0.6138
X1X2	-0.00002033	0.00000468	0.00005293	18.91	0.0008
X1X5	2.51873	0.60609	0.00004833	17.27	0.0011
X4X5	-0.10680	0.04265	0.00001755	6.27	0.0264

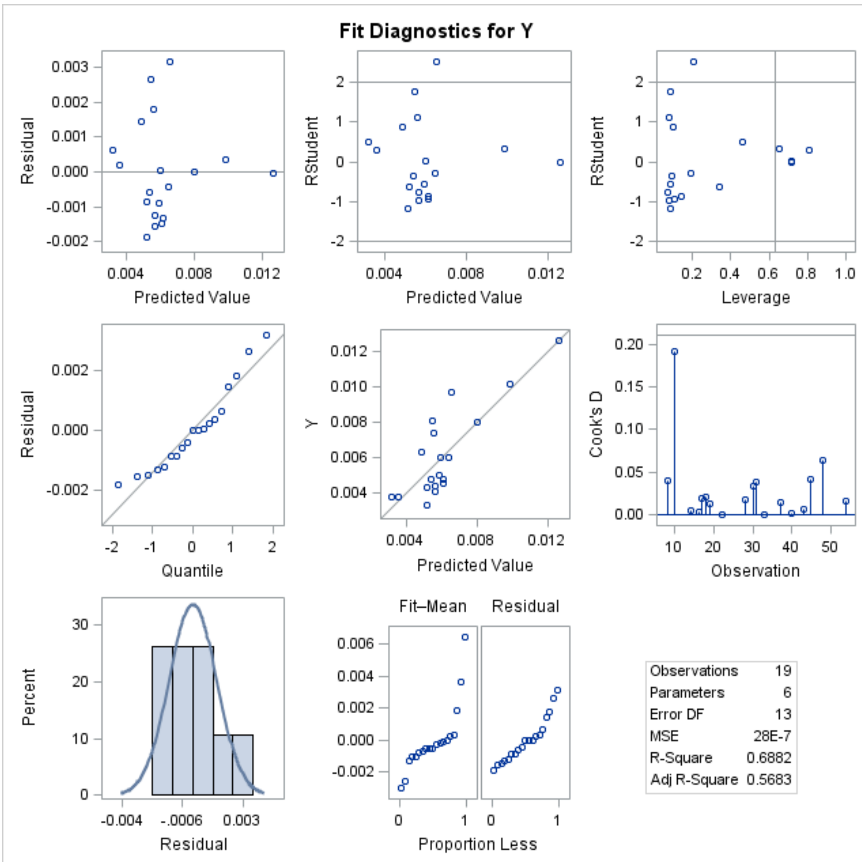
Bounds on condition number: 69.605, 808.72

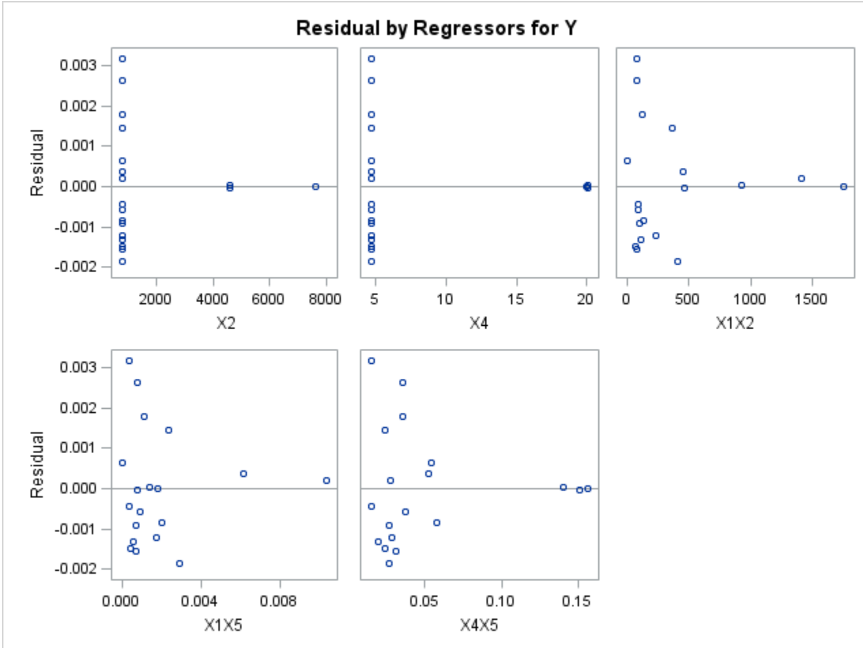
No other variable met the 0.5000 significance level for entry into the model.

Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X4	1	0.2226	0.2226	14.9232	4.87	0.0414
2	X1X2	2	0.0498	0.2723	15.0074	1.09	0.3110
3	X1X5	3	0.0806	0.3530	13.9033	1.87	0.1917
4	X2	4	0.1848	0.5378	8.7895	5.60	0.0329
5	X4X5	5	0.1504	0.6882	5.0006	6.27	0.0264

FORWARD REGRESSION
Pollutant: Dissolved Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
0.003
0.002
0.001
0.000
-0.001
-0.002
2000 4000 6000 8000
X2
5 10 15 20
X4
0 500 1000 1500
X1X2
0.000 0.004 0.008
X1X5
0.05 0.10 0.15
X4X5

BACKWARD REGRESSION
Pollutant: Dissolved Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	56
Number of Observations Used	19
Number of Observations with Missing Values	37

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0949	-0.1126	-0.1127	-0.0619	0.5870	0.9981	0.8458	0.9586	-0.0957	-0.0974	-0.0996	-0.1127	-0.0940	-0.1223	-0.1768
X2	-0.0949	1.0000	0.9519	0.9510	0.0869	0.7232	-0.0361	0.4334	-0.0749	0.9999	0.9993	0.9888	0.9511	0.3997	0.9308	0.4187
X3	-0.1126	0.9519	1.0000	1.0000	0.0776	0.6243	-0.0552	0.4064	-0.0967	0.9555	0.9625	0.9289	1.0000	0.4031	0.9631	0.4715
X4	-0.1127	0.9510	1.0000	1.0000	0.0774	0.6230	-0.0554	0.4059	-0.0968	0.9546	0.9616	0.9278	1.0000	0.4029	0.9630	0.4718
X5	-0.0619	0.0869	0.0776	0.0774	1.0000	0.0269	-0.0575	-0.0151	0.1366	0.0867	0.0862	0.2280	0.0774	0.9435	0.3392	0.0331
X1X2	0.5870	0.7232	0.6243	0.6230	0.0269	1.0000	0.6330	0.9096	0.5777	0.7207	0.7151	0.7146	0.6231	0.2358	0.6055	0.1194
X1X3	0.9981	-0.0361	-0.0552	-0.0554	-0.0575	0.6330	1.0000	0.8767	0.9577	-0.0369	-0.0386	-0.0421	-0.0554	-0.0709	-0.0670	-0.1578
X1X4	0.8458	0.4334	0.4064	0.4059	-0.0151	0.9096	0.8767	1.0000	0.8188	0.4331	0.4324	0.4183	0.4059	0.1214	0.3796	0.0144
X1X5	0.9586	-0.0749	-0.0967	-0.0968	0.1366	0.5777	0.9577	0.8188	1.0000	-0.0758	-0.0778	-0.0515	-0.0968	0.0934	-0.0544	-0.0657
X2X3	-0.0957	0.9999	0.9555	0.9546	0.0867	0.7207	-0.0369	0.4331	-0.0758	1.0000	0.9997	0.9883	0.9547	0.4005	0.9337	0.4215
X2X4	-0.0974	0.9993	0.9625	0.9616	0.0862	0.7151	-0.0386	0.4324	-0.0778	0.9997	1.0000	0.9867	0.9617	0.4021	0.9393	0.4271
X2X5	-0.0996	0.9888	0.9289	0.9278	0.2280	0.7146	-0.0421	0.4183	-0.0515	0.9883	0.9867	1.0000	0.9279	0.5221	0.9482	0.4138
X3X4	-0.1127	0.9511	1.0000	1.0000	0.0774	0.6231	-0.0554	0.4059	-0.0968	0.9547	0.9617	0.9279	1.0000	0.4029	0.9630	0.4717
X3X5	-0.0940	0.3997	0.4031	0.4029	0.9435	0.2358	-0.0709	0.1214	0.0934	0.4005	0.4021	0.5221	0.4029	1.0000	0.6317	0.1898
X4X5	-0.1223	0.9308	0.9631	0.9630	0.3392	0.6055	-0.0670	0.3796	-0.0544	0.9337	0.9393	0.9482	0.9630	0.6317	1.0000	0.4620
Y	-0.1768	0.4187	0.4715	0.4718	0.0331	0.1194	-0.1578	0.0144	-0.0657	0.4215	0.4271	0.4138	0.4717	0.1898	0.4620	1.0000

BACKWARD REGRESSION
Pollutant: Dissolved Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	56
Number of Observations Used	19
Number of Observations with Missing Values	37

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.6882 and C(p) = 7.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00008030	0.00001338	4.41	0.0138
Error	12	0.00003638	0.00000303		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02489	0.01563	0.00000769	2.54	0.1373
X1	-0.00195	0.00728	2.164688E-7	0.07	0.7938
X2	0.00000547	0.00000227	0.00001759	5.80	0.0330
X3	-0.00113	0.00095338	0.00000425	1.40	0.2594
X5	-0.50075	0.22176	0.00001546	5.10	0.0434
X1X2	-0.00001804	0.00000651	0.00002327	7.68	0.0169
X1X5	2.53122	0.80186	0.00003021	9.96	0.0083

Bounds on condition number: 108.62, 1599.1

Backward Elimination: Step 1

Variable X1 Removed: R-Square = 0.6864 and C(p) = 5.0714

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00008009	0.00001602	5.69	0.0054
Error	13	0.00003659	0.00000281		

Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02695	0.01309	0.00001193	4.24	0.0602
X2	0.00000588	0.00000161	0.00003762	13.36	0.0029
X3	-0.00127	0.00075978	0.00000789	2.80	0.1180
X5	-0.47424	0.19111	0.00001733	6.16	0.0275
X1X2	-0.00001927	0.00000444	0.00005300	18.83	0.0008
X1X5	2.38879	0.57728	0.00004820	17.12	0.0012

Bounds on condition number: 58.711, 607.73

Backward Elimination: Step 2

Variable X1X3 Entered: R-Square = 0.6882 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00008030	0.00001338	4.41	0.0138
Error	12	0.00003638	0.00000303		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02444	0.01652	0.00000664	2.19	0.1648
X2	0.00000542	0.00000238	0.00001575	5.19	0.0417
X3	-0.00110	0.00101	0.00000359	1.18	0.2981
X5	-0.50075	0.22176	0.00001546	5.10	0.0434
X1X2	-0.00001786	0.00000702	0.00001964	6.48	0.0257
X1X3	-0.00011637	0.00043549	2.164688E-7	0.07	0.7938
X1X5	2.53122	0.80186	0.00003021	9.96	0.0083

Bounds on condition number: 119.45, 1784

Backward Elimination: Step 3

Variable X1X3 Removed: R-Square = 0.6864 and C(p) = 5.0714

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00008009	0.00001602	5.69	0.0054
Error	13	0.00003659	0.00000281		

Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02695	0.01309	0.00001193	4.24	0.0602
X2	0.00000588	0.00000161	0.00003762	13.36	0.0029
X3	-0.00127	0.00075978	0.00000789	2.80	0.1180
X5	-0.47424	0.19111	0.00001733	6.16	0.0275
X1X2	-0.00001927	0.00000444	0.00005300	18.83	0.0008
X1X5	2.38879	0.57728	0.00004820	17.12	0.0012

Bounds on condition number: 58.711, 607.73

Backward Elimination: Step 4

Variable X1X4 Entered: R-Square = 0.6882 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00008030	0.00001338	4.41	0.0138
Error	12	0.00003638	0.00000303		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01077	0.06205	9.141003E-8	0.03	0.8650
X2	0.00000413	0.00000675	0.00000113	0.37	0.5522
X3	-0.00028426	0.00378	1.714917E-8	0.01	0.9413
X5	-0.50075	0.22176	0.00001546	5.10	0.0434
X1X2	-0.00001227	0.00002660	6.449688E-7	0.21	0.6529
X1X4	-0.00142	0.00531	2.164688E-7	0.07	0.7938
X1X5	2.53122	0.80186	0.00003021	9.96	0.0083

Bounds on condition number: 982.45, 18436

Backward Elimination: Step 5

Variable X3 Removed: R-Square = 0.6881 and C(p) = 5.0057

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00008029	0.00001606	5.74	0.0052
Error	13	0.00003640	0.00000280		

Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00611	0.00131	0.00006049	21.61	0.0005
X2	0.00000362	7.141923E-7	0.00007212	25.76	0.0002
X5	-0.50688	0.19823	0.00001830	6.54	0.0239
X1X2	-0.00001030	0.00000415	0.00001725	6.16	0.0275
X1X4	-0.00181	0.00107	0.00000809	2.89	0.1130
X1X5	2.56471	0.64084	0.00004484	16.02	0.0015

Bounds on condition number: 29.362, 424.16

Backward Elimination: Step 6

Variable X4 Entered: R-Square = 0.6882 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00008030	0.00001338	4.41	0.0138
Error	12	0.00003638	0.00000303		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00617	0.00162	0.00004408	14.54	0.0025
X2	0.00000413	0.00000671	0.00000115	0.38	0.5500
X4	-0.00010994	0.00146	1.714917E-8	0.01	0.9413
X5	-0.50075	0.22176	0.00001546	5.10	0.0434
X1X2	-0.00001227	0.00002660	6.449688E-7	0.21	0.6529
X1X4	-0.00142	0.00531	2.164688E-7	0.07	0.7938
X1X5	2.53122	0.80186	0.00003021	9.96	0.0083

Bounds on condition number: 982.45, 18314

Backward Elimination: Step 7

Variable X4 Removed: R-Square = 0.6881 and C(p) = 5.0057

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00008029	0.00001606	5.74	0.0052
Error	13	0.00003640	0.00000280		

Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00611	0.00131	0.00006049	21.61	0.0005
X2	0.00000362	7.141923E-7	0.00007212	25.76	0.0002
X5	-0.50688	0.19823	0.00001830	6.54	0.0239
X1X2	-0.00001030	0.00000415	0.00001725	6.16	0.0275
X1X4	-0.00181	0.00107	0.00000809	2.89	0.1130
X1X5	2.56471	0.64084	0.00004484	16.02	0.0015

Bounds on condition number: 29.362, 424.16

Backward Elimination: Step 8

Variable X2X3 Entered: R-Square = 0.6882 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Note:

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	6	0.00008030	0.00001338	4.41	0.0138
Error	12	0.00003638	0.00000303		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00395	0.02870	5.74798E-8	0.02	0.8928
X2	0.00001253	0.00011842	3.394713E-8	0.01	0.9175
X5	-0.50075	0.22176	0.00001546	5.10	0.0434
X1X2	-0.00001227	0.00002660	6.449688E-7	0.21	0.6529
X1X4	-0.00142	0.00531	2.164688E-7	0.07	0.7938
X1X5	2.53122	0.80186	0.00003021	9.96	0.0083
X2X3	-3.50078E-7	0.00000465	1.714917E-8	0.01	0.9413

Bounds on condition number: 295728, 3487221

Backward Elimination: Step 9

Variable X2X3 Removed: R-Square = 0.6881 and C(p) = 5.0057

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	5	0.00008029	0.00001606	5.74	0.0052
Error	13	0.00003640	0.00000280		

Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00611	0.00131	0.00006049	21.61	0.0005
X2	0.00000362	7.141923E-7	0.00007212	25.76	0.0002
X5	-0.50688	0.19823	0.00001830	6.54	0.0239
X1X2	-0.00001030	0.00000415	0.00001725	6.16	0.0275
X1X4	-0.00181	0.00107	0.00000809	2.89	0.1130
X1X5	2.56471	0.64084	0.00004484	16.02	0.0015

Bounds on condition number: 29.362, 424.16

Backward Elimination: Step 10

Variable X2X4 Entered: R-Square = 0.6882 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00008030	0.00001338	4.41	0.0138
Error	12	0.00003638	0.00000303		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00409	0.02693	6.98205E-8	0.02	0.8819
X2	0.00000666	0.00004037	8.251376E-8	0.03	0.8717
X5	-0.50075	0.22176	0.00001546	5.10	0.0434
X1X2	-0.00001227	0.00002660	6.449688E-7	0.21	0.6529
X1X4	-0.00142	0.00531	2.164688E-7	0.07	0.7938
X1X5	2.53122	0.80186	0.00003021	9.96	0.0083
X2X4	-1.27577E-7	0.00000170	1.714917E-8	0.01	0.9413

Bounds on condition number: 34375, 398787

Backward Elimination: Step 11

Variable X2X4 Removed: R-Square = 0.6881 and C(p) = 5.0057

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00008029	0.00001606	5.74	0.0052
Error	13	0.00003640	0.00000280		

Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00611	0.00131	0.00006049	21.61	0.0005
X2	0.00000362	7.141923E-7	0.00007212	25.76	0.0002
X5	-0.50688	0.19823	0.00001830	6.54	0.0239
X1X2	-0.00001030	0.00000415	0.00001725	6.16	0.0275
X1X4	-0.00181	0.00107	0.00000809	2.89	0.1130
X1X5	2.56471	0.64084	0.00004484	16.02	0.0015

Bounds on condition number: 29.362, 424.16

Backward Elimination: Step 12

Variable X2X5 Entered: R-Square = 0.6882 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Note:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00008030	0.00001338	4.41	0.0138
Error	12	0.00003638	0.00000303		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00661	0.00680	0.00000286	0.94	0.3502
X2	0.00000296	0.00000891	3.343036E-7	0.11	0.7456
X5	-0.57405	0.91660	0.00000119	0.39	0.5429
X1X2	-0.00001073	0.00000722	0.00000669	2.21	0.1631
X1X4	-0.00169	0.00198	0.00000220	0.73	0.4106
X1X5	2.53122	0.80186	0.00003021	9.96	0.0083
X2X5	0.00009026	0.00120	1.714917E-8	0.01	0.9413

Bounds on condition number: 1847.1, 22452

Backward Elimination: Step 13

Variable X2X5 Removed: R-Square = 0.6881 and C(p) = 5.0057

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00008029	0.00001606	5.74	0.0052
Error	13	0.00003640	0.00000280		

Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00611	0.00131	0.00006049	21.61	0.0005
X2	0.00000362	7.141923E-7	0.00007212	25.76	0.0002
X5	-0.50688	0.19823	0.00001830	6.54	0.0239
X1X2	-0.00001030	0.00000415	0.00001725	6.16	0.0275
X1X4	-0.00181	0.00107	0.00000809	2.89	0.1130
X1X5	2.56471	0.64084	0.00004484	16.02	0.0015

Bounds on condition number: 29.362, 424.16

Backward Elimination: Step 14

Variable X3X4 Entered: R-Square = 0.6882 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00008030	0.00001338	4.41	0.0138
Error	12	0.00003638	0.00000303		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00602	0.00182	0.00003316	10.94	0.0063
X2	0.00000413	0.00000671	0.00000115	0.38	0.5502
X5	-0.50075	0.22176	0.00001546	5.10	0.0434
X1X2	-0.00001227	0.00002660	6.449688E-7	0.21	0.6529
X1X4	-0.00142	0.00531	2.164688E-7	0.07	0.7938
X1X5	2.53122	0.80186	0.00003021	9.96	0.0083
X3X4	-0.00000426	0.00005664	1.714917E-8	0.01	0.9413

Bounds on condition number: 982.45, 18323

Backward Elimination: Step 15

Variable X3X4 Removed: R-Square = 0.6881 and C(p) = 5.0057

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00008029	0.00001606	5.74	0.0052
Error	13	0.00003640	0.00000280		

Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00611	0.00131	0.00006049	21.61	0.0005
X2	0.00000362	7.141923E-7	0.00007212	25.76	0.0002
X5	-0.50688	0.19823	0.00001830	6.54	0.0239
X1X2	-0.00001030	0.00000415	0.00001725	6.16	0.0275
X1X4	-0.00181	0.00107	0.00000809	2.89	0.1130
X1X5	2.56471	0.64084	0.00004484	16.02	0.0015

Bounds on condition number: 29.362, 424.16

Backward Elimination: Step 16

Variable X3X5 Entered: R-Square = 0.6882 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00008030	0.00001338	4.41	0.0138
Error	12	0.00003638	0.00000303		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00499	0.01492	3.392703E-7	0.11	0.7437
X2	0.00000495	0.00001764	2.387146E-7	0.08	0.7838
X5	1.30529	24.09467	8.896694E-9	0.00	0.9577
X1X2	-0.00001498	0.00006241	1.746207E-7	0.06	0.8144
X1X4	-0.00094910	0.01151	2.060404E-8	0.01	0.9357
X1X5	2.53122	0.80186	0.00003021	9.96	0.0083
X3X5	-0.10034	1.33402	1.714917E-8	0.01	0.9413

Bounds on condition number: 26821, 388110

Backward Elimination: Step 17

Variable X5 Removed: R-Square = 0.6882 and C(p) = 5.0029

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00008029	0.00001606	5.74	0.0052
Error	13	0.00003639	0.00000280		

Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00580	0.00122	0.00006324	22.60	0.0004
X2	0.00000400	7.937372E-7	0.00007094	25.34	0.0002
X1X2	-0.00001161	0.00000421	0.00002123	7.58	0.0164
X1X4	-0.00157	0.00103	0.00000656	2.34	0.1498
X1X5	2.55554	0.63847	0.00004484	16.02	0.0015
X3X5	-0.02807	0.01097	0.00001831	6.54	0.0238

Bounds on condition number: 27.223, 432.34

Backward Elimination: Step 18

Variable X4X5 Entered: R-Square = 0.6882 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

Note:

Note:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00008030	0.00001338	4.41	0.0138
Error	12	0.00003638	0.00000303		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00501	0.01462	3.558826E-7	0.12	0.7378
X2	0.00000493	0.00001727	2.471648E-7	0.08	0.7801
X1X2	-0.00001494	0.00006161	1.781429E-7	0.06	0.8126
X1X4	-0.00095665	0.01137	2.144658E-8	0.01	0.9344
X1X5	2.53122	0.80186	0.00003021	9.96	0.0083
X3X5	-0.01985	0.15224	5.15198E-8	0.02	0.8984
X4X5	-0.03073	0.56731	8.896694E-9	0.00	0.9577

Bounds on condition number: 6286.8, 113796

Backward Elimination: Step 19

Variable X4X5 Removed: R-Square = 0.6882 and C(p) = 5.0029

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00008029	0.00001606	5.74	0.0052
Error	13	0.00003639	0.00000280		

Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00580	0.00122	0.00006324	22.60	0.0004
X2	0.00000400	7.937372E-7	0.00007094	25.34	0.0002
X1X2	-0.00001161	0.00000421	0.00002123	7.58	0.0164
X1X4	-0.00157	0.00103	0.00000656	2.34	0.1498
X1X5	2.55554	0.63847	0.00004484	16.02	0.0015
X3X5	-0.02807	0.01097	0.00001831	6.54	0.0238

Bounds on condition number: 27.223, 432.34

Backward Elimination: Step 20

Variable X1X4 Removed: R-Square = 0.6319 and C(p) = 5.1662

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00007374	0.00001843	6.01	0.0050
Error	14	0.00004294	0.00000307		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00509	0.00118	0.00005692	18.56	0.0007
X2	0.00000381	8.208985E-7	0.00006599	21.51	0.0004
X1X2	-0.00001521	0.00000366	0.00005304	17.29	0.0010
X1X5	1.90024	0.49587	0.00004505	14.69	0.0018
X3X5	-0.02166	0.01062	0.00001276	4.16	0.0607

Bounds on condition number: 18.362, 171.97

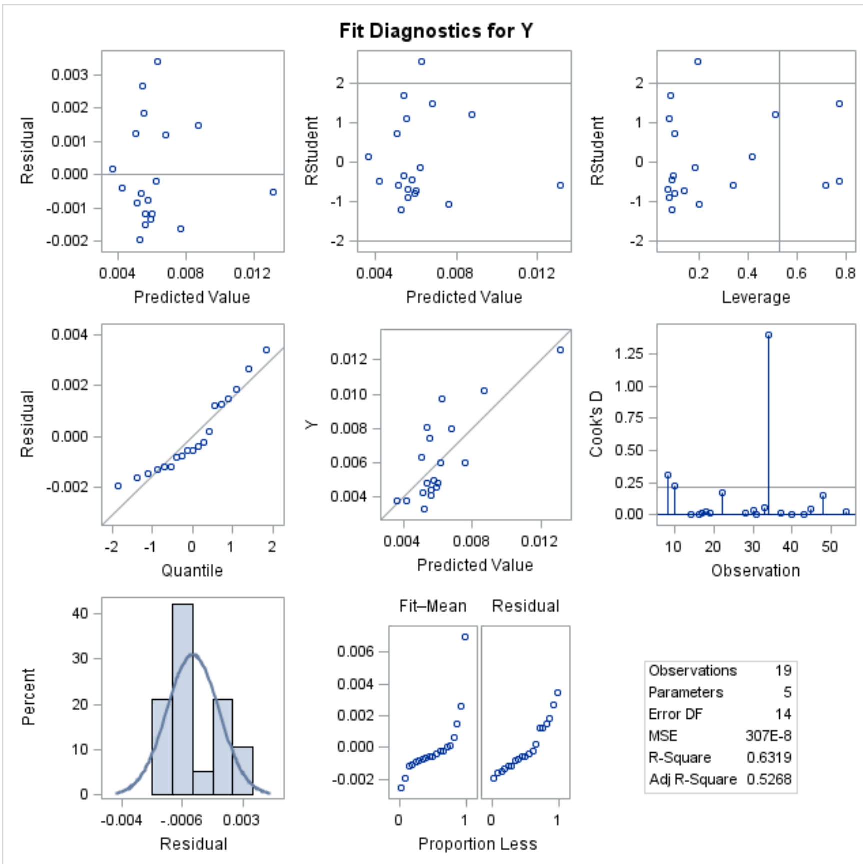
All variables left in the model are significant at the 0.1000 level.

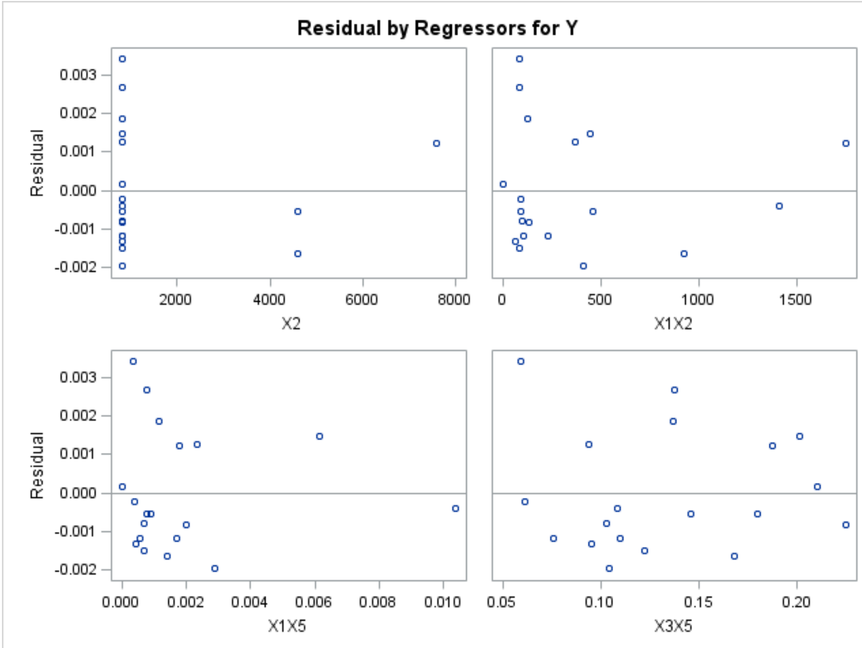
Summary of Backward Elimination								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1		X1	5	0.0019	0.6864	5.0714	0.07	0.7938
2	X1X3		6	0.0019	0.6882	7.0000	0.07	0.7938
3		X1X3	5	0.0019	0.6864	5.0714	0.07	0.7938
4	X1X4		6	0.0019	0.6882	7.0000	0.07	0.7938
5		X3	5	0.0001	0.6881	5.0057	0.01	0.9413
6	X4		6	0.0001	0.6882	7.0000	0.01	0.9413
7		X4	5	0.0001	0.6881	5.0057	0.01	0.9413

8	X2X3		6	0.0001	0.6882	7.0000	0.01	0.9413
9		X2X3	5	0.0001	0.6881	5.0057	0.01	0.9413
10	X2X4		6	0.0001	0.6882	7.0000	0.01	0.9413
11		X2X4	5	0.0001	0.6881	5.0057	0.01	0.9413
12	X2X5		6	0.0001	0.6882	7.0000	0.01	0.9413
13		X2X5	5	0.0001	0.6881	5.0057	0.01	0.9413
14	X3X4		6	0.0001	0.6882	7.0000	0.01	0.9413
15		X3X4	5	0.0001	0.6881	5.0057	0.01	0.9413
16	X3X5		6	0.0001	0.6882	7.0000	0.01	0.9413
17		X5	5	0.0001	0.6882	5.0029	0.00	0.9577
18	X4X5		6	0.0001	0.6882	7.0000	0.00	0.9577
19		X4X5	5	0.0001	0.6882	5.0029	0.00	0.9577
20		X1X4	4	0.0562	0.6319	5.1662	2.34	0.1498

BACKWARD REGRESSION
Pollutant: Dissolved Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
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0.002
0.001
0.000
-0.001
-0.002
2000
4000
6000
8000
X2
0
500
1000
1500
X1X2
0.000
0.002
0.004
0.006
0.008
0.010
X1X5
0.05
0.10
0.15
0.20
X3X5

STEPWISE REGRESSION
Pollutant: Dissolved Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	56
Number of Observations Used	19
Number of Observations with Missing Values	37

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0949	-0.1126	-0.1127	-0.0619	0.5870	0.9981	0.8458	0.9586	-0.0957	-0.0974	-0.0996	-0.1127	-0.0940	-0.1223	-0.1768
X2	-0.0949	1.0000	0.9519	0.9510	0.0869	0.7232	-0.0361	0.4334	-0.0749	0.9999	0.9993	0.9888	0.9511	0.3997	0.9308	0.4187
X3	-0.1126	0.9519	1.0000	1.0000	0.0776	0.6243	-0.0552	0.4064	-0.0967	0.9555	0.9625	0.9289	1.0000	0.4031	0.9631	0.4715
X4	-0.1127	0.9510	1.0000	1.0000	0.0774	0.6230	-0.0554	0.4059	-0.0968	0.9546	0.9616	0.9278	1.0000	0.4029	0.9630	0.4718
X5	-0.0619	0.0869	0.0776	0.0774	1.0000	0.0269	-0.0575	-0.0151	0.1366	0.0867	0.0862	0.2280	0.0774	0.9435	0.3392	0.0331
X1X2	0.5870	0.7232	0.6243	0.6230	0.0269	1.0000	0.6330	0.9096	0.5777	0.7207	0.7151	0.7146	0.6231	0.2358	0.6055	0.1194
X1X3	0.9981	-0.0361	-0.0552	-0.0554	-0.0575	0.6330	1.0000	0.8767	0.9577	-0.0369	-0.0386	-0.0421	-0.0554	-0.0709	-0.0670	-0.1578
X1X4	0.8458	0.4334	0.4064	0.4059	-0.0151	0.9096	0.8767	1.0000	0.8188	0.4331	0.4324	0.4183	0.4059	0.1214	0.3796	0.0144
X1X5	0.9586	-0.0749	-0.0967	-0.0968	0.1366	0.5777	0.9577	0.8188	1.0000	-0.0758	-0.0778	-0.0515	-0.0968	0.0934	-0.0544	-0.0657
X2X3	-0.0957	0.9999	0.9555	0.9546	0.0867	0.7207	-0.0369	0.4331	-0.0758	1.0000	0.9997	0.9883	0.9547	0.4005	0.9337	0.4215
X2X4	-0.0974	0.9993	0.9625	0.9616	0.0862	0.7151	-0.0386	0.4324	-0.0778	0.9997	1.0000	0.9867	0.9617	0.4021	0.9393	0.4271
X2X5	-0.0996	0.9888	0.9289	0.9278	0.2280	0.7146	-0.0421	0.4183	-0.0515	0.9883	0.9867	1.0000	0.9279	0.5221	0.9482	0.4138
X3X4	-0.1127	0.9511	1.0000	1.0000	0.0774	0.6231	-0.0554	0.4059	-0.0968	0.9547	0.9617	0.9279	1.0000	0.4029	0.9630	0.4717
X3X5	-0.0940	0.3997	0.4031	0.4029	0.9435	0.2358	-0.0709	0.1214	0.0934	0.4005	0.4021	0.5221	0.4029	1.0000	0.6317	0.1898
X4X5	-0.1223	0.9308	0.9631	0.9630	0.3392	0.6055	-0.0670	0.3796	-0.0544	0.9337	0.9393	0.9482	0.9630	0.6317	1.0000	0.4620
Y	-0.1768	0.4187	0.4715	0.4718	0.0331	0.1194	-0.1578	0.0144	-0.0657	0.4215	0.4271	0.4138	0.4717	0.1898	0.4620	1.0000

STEPWISE REGRESSION
Pollutant: Dissolved Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	56
Number of Observations Used	19
Number of Observations with Missing Values	37

Stepwise Selection: Step 1

Variable X4 Entered: R-Square = 0.2226 and C(p) = 14.9232

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00002597	0.00002597	4.87	0.0414
Error	17	0.00009071	0.00000534		
Corrected Total	18	0.00011668			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00469	0.00085507	0.00016040	30.06	<.0001
X4	0.00020860	0.00009456	0.00002597	4.87	0.0414

Bounds on condition number: 1, 1

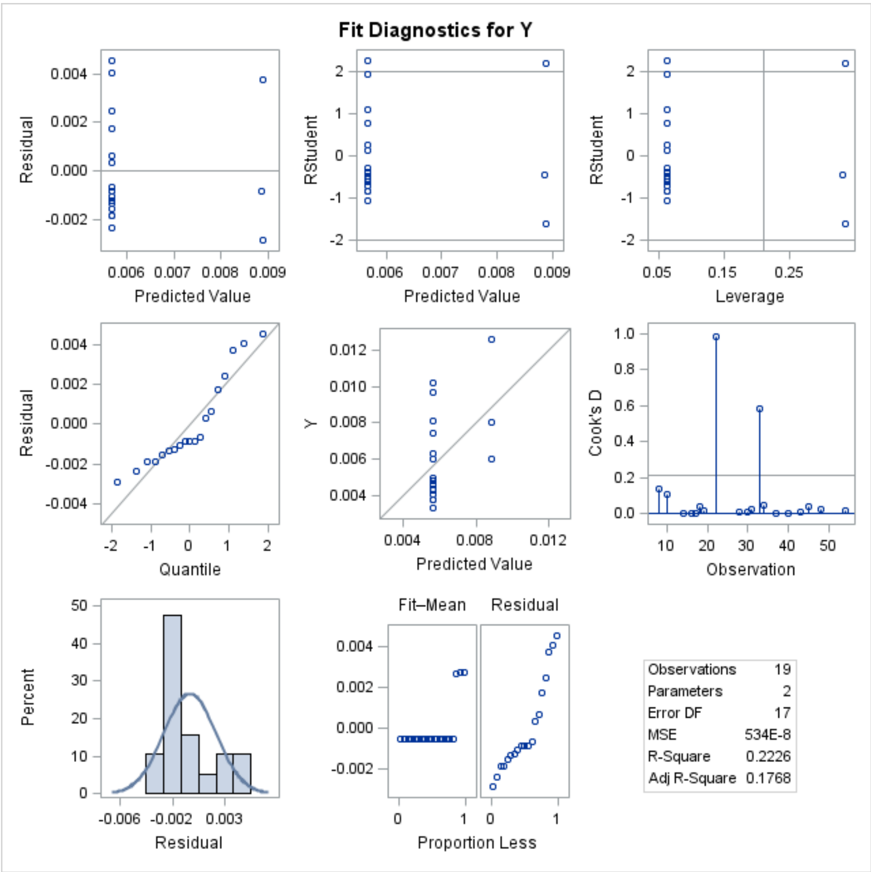
All variables left in the model are significant at the 0.1500 level.

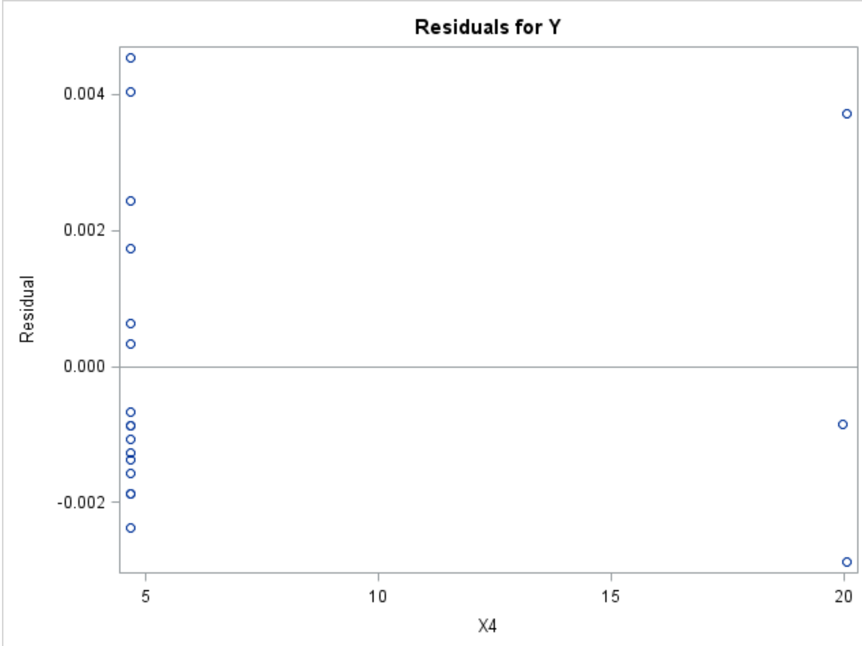
No other variable met the 0.1500 significance level for entry into the model.

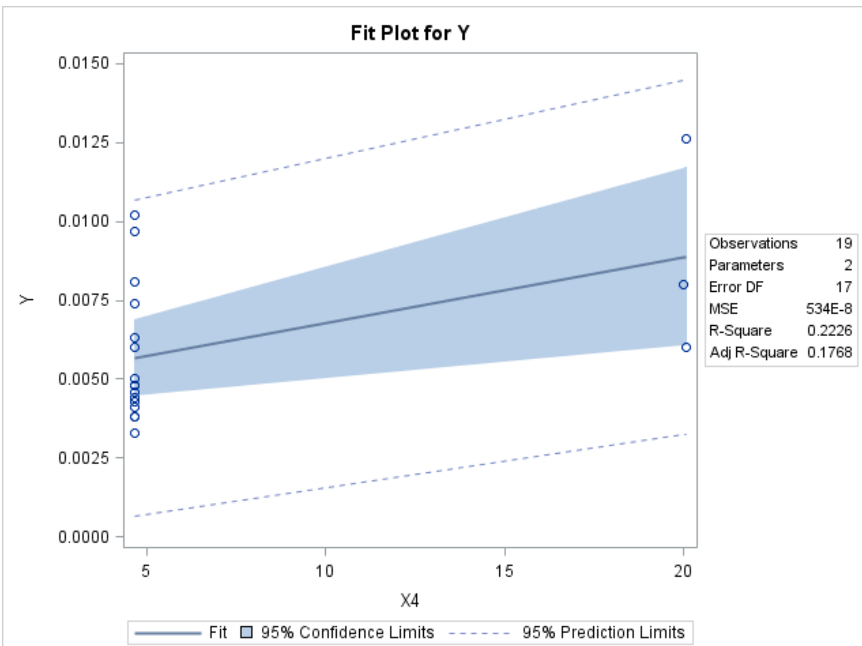
Summary of Stepwise Selection								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X4		1	0.2226	0.2226	14.9232	4.87	0.0414

STEPWISE REGRESSION
Pollutant: Dissolved Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residuals for Y
Residual
0.004
0.002
0.000
-0.002
5
10
15
20
X4


Fit Plot for Y
Y
0.0150
0.0125
0.0100
0.0075
0.0050
0.0025
0.0000
5
10
15
20
X4
Observations 19
Parameters 2
Error DF 17
MSE 534E-8
R-Square 0.2226
Adj R-Square 0.1768
Fit
95% Confidence Limits
95% Prediction Limits

==

MULTIPLE LEAST-SQUARE REGRESSION

Pollutant: Dissolved Iron

==

The REG Procedure

Number of Observations Read	56
Number of Observations Used	19
Number of Observations with Missing Values	37

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0949	-0.1126	-0.1127	-0.0619	0.5870	0.9981	0.8458	0.9586	-0.0957	-0.0974	-0.0996	-0.1127	-0.0940	-0.1223	-0.1768
X2	-0.0949	1.0000	0.9519	0.9510	0.0869	0.7232	-0.0361	0.4334	-0.0749	0.9999	0.9993	0.9888	0.9511	0.3997	0.9308	0.4187
X3	-0.1126	0.9519	1.0000	1.0000	0.0776	0.6243	-0.0552	0.4064	-0.0967	0.9555	0.9625	0.9289	1.0000	0.4031	0.9631	0.4715
X4	-0.1127	0.9510	1.0000	1.0000	0.0774	0.6230	-0.0554	0.4059	-0.0968	0.9546	0.9616	0.9278	1.0000	0.4029	0.9630	0.4718
X5	-0.0619	0.0869	0.0776	0.0774	1.0000	0.0269	-0.0575	-0.0151	0.1366	0.0867	0.0862	0.2280	0.0774	0.9435	0.3392	0.0331
X1X2	0.5870	0.7232	0.6243	0.6230	0.0269	1.0000	0.6330	0.9096	0.5777	0.7207	0.7151	0.7146	0.6231	0.2358	0.6055	0.1194
X1X3	0.9981	-0.0361	-0.0552	-0.0554	-0.0575	0.6330	1.0000	0.8767	0.9577	-0.0369	-0.0386	-0.0421	-0.0554	-0.0709	-0.0670	-0.1578
X1X4	0.8458	0.4334	0.4064	0.4059	-0.0151	0.9096	0.8767	1.0000	0.8188	0.4331	0.4324	0.4183	0.4059	0.1214	0.3796	0.0144
X1X5	0.9586	-0.0749	-0.0967	-0.0968	0.1366	0.5777	0.9577	0.8188	1.0000	-0.0758	-0.0778	-0.0515	-0.0968	0.0934	-0.0544	-0.0657
X2X3	-0.0957	0.9999	0.9555	0.9546	0.0867	0.7207	-0.0369	0.4331	-0.0758	1.0000	0.9997	0.9883	0.9547	0.4005	0.9337	0.4215
X2X4	-0.0974	0.9993	0.9625	0.9616	0.0862	0.7151	-0.0386	0.4324	-0.0778	0.9997	1.0000	0.9867	0.9617	0.4021	0.9393	0.4271
X2X5	-0.0996	0.9888	0.9289	0.9278	0.2280	0.7146	-0.0421	0.4183	-0.0515	0.9883	0.9867	1.0000	0.9279	0.5221	0.9482	0.4138
X3X4	-0.1127	0.9511	1.0000	1.0000	0.0774	0.6231	-0.0554	0.4059	-0.0968	0.9547	0.9617	0.9279	1.0000	0.4029	0.9630	0.4717
X3X5	-0.0940	0.3997	0.4031	0.4029	0.9435	0.2358	-0.0709	0.1214	0.0934	0.4005	0.4021	0.5221	0.4029	1.0000	0.6317	0.1898
X4X5	-0.1223	0.9308	0.9631	0.9630	0.3392	0.6055	-0.0670	0.3796	-0.0544	0.9337	0.9393	0.9482	0.9630	0.6317	1.0000	0.4620
Y	-0.1768	0.4187	0.4715	0.4718	0.0331	0.1194	-0.1578	0.0144	-0.0657	0.4215	0.4271	0.4138	0.4717	0.1898	0.4620	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Iron

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The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	56
Number of Observations Used	19
Number of Observations with Missing Values	37

Number in Model	R-Square	Variables in Model
1	0.2226	X4
1	0.2225	X3X4
1	0.2223	X3
1	0.2135	X4X5
1	0.1824	X2X4
1	0.1777	X2X3
1	0.1753	X2
1	0.1712	X2X5
1	0.0360	X3X5
1	0.0313	X1
1	0.0249	X1X3
1	0.0143	X1X2
1	0.0043	X1X5
1	0.0011	X5
1	0.0002	X1X4
2	0.2724	X3 X1X2
2	0.2723	X1X2 X3X4
2	0.2723	X4 X1X2
2	0.2601	X4 X1X4
2	0.2601	X1X4 X3X4
2	0.2599	X3 X1X4
2	0.2540	X1X2 X4X5
2	0.2532	X1X2 X2X4
2	0.2484	X1X2 X2X3
2	0.2459	X2 X1X2
2	0.2437	X1X4 X4X5
2	0.2400	X4 X1X3
2	0.2399	X1X3 X3X4
2	0.2397	X3 X1X3
2	0.2381	X1 X4
3	0.5226	X2 X1X2 X1X5
3	0.5173	X1X2 X1X5 X2X3
3	0.5051	X1X2 X1X5 X2X4
3	0.5012	X3 X1X4 X1X5
3	0.5005	X1X4 X1X5 X3X4
3	0.5005	X4 X1X4 X1X5

3	0.4309	X1X4 X1X5 X2X4
3	0.4128	X1X4 X1X5 X2X3
3	0.4035	X2 X1X4 X1X5
3	0.3931	X1 X2 X1X2
3	0.3873	X1 X1X2 X2X3
3	0.3858	X2 X1X2 X1X3
3	0.3817	X3 X1X3 X1X4
3	0.3815	X1 X3 X1X4
3	0.3803	X1X3 X1X4 X3X4
4	0.6869	X1X2 X1X5 X2X3 X4X5
4	0.6851	X1X2 X1X5 X2X4 X4X5
4	0.6818	X2 X1X2 X1X5 X4X5
4	0.6755	X1X2 X1X5 X2X5 X3X5
4	0.6697	X5 X1X4 X1X5 X3X5
4	0.6682	X5 X1X4 X1X5 X4X5
4	0.6679	X1X4 X1X5 X3X5 X4X5
4	0.6661	X1X4 X1X5 X2X4 X2X5
4	0.6574	X5 X1X2 X1X5 X2X5
4	0.6389	X1X4 X1X5 X2X3 X2X5
4	0.6385	X3 X5 X1X4 X1X5
4	0.6366	X5 X1X4 X1X5 X3X4
4	0.6365	X4 X5 X1X4 X1X5
4	0.6349	X3 X1X4 X1X5 X3X5
4	0.6328	X1X4 X1X5 X3X4 X3X5
5	0.6882	X2 X1X2 X1X5 X2X5 X4X5
5	0.6882	X1X2 X1X5 X2X3 X2X5 X4X5
5	0.6882	X1X2 X1X5 X2X4 X3X5 X4X5
5	0.6882	X5 X1X2 X1X5 X2X4 X4X5
5	0.6882	X1X2 X1X5 X2X4 X3X4 X4X5
5	0.6882	X1X2 X1X5 X2X3 X2X4 X4X5
5	0.6882	X1X2 X1X5 X2X3 X3X4 X4X5
5	0.6882	X2 X4 X1X2 X1X5 X4X5
5	0.6882	X2 X3 X1X2 X1X5 X4X5
5	0.6882	X2 X1X2 X1X5 X3X4 X4X5
5	0.6882	X2 X1X2 X1X5 X2X4 X4X5
5	0.6882	X2 X1X2 X1X5 X2X3 X4X5
5	0.6882	X4 X1X2 X1X5 X2X4 X4X5
5	0.6882	X3 X1X2 X1X5 X3X4 X4X5
5	0.6882	X5 X1X2 X1X5 X2X4 X3X5
6	0.6882	X3 X1X3 X1X4 X1X5 X2X5 X3X4
6	0.6882	X3 X1X3 X1X4 X1X5 X3X4 X3X5
6	0.6882	X1 X2 X5 X1X5 X2X3 X3X5
6	0.6882	X3 X5 X1X3 X1X4 X1X5 X3X4
6	0.6882	X2 X5 X1X3 X1X5 X2X3 X3X5
6	0.6882	X3 X5 X1X4 X1X5 X3X4 X3X5
6	0.6882	X5 X1X2 X1X3 X1X5 X2X5 X3X5
6	0.6882	X2 X1X4 X1X5 X2X4 X2X5 X4X5
6	0.6882	X2 X1X3 X1X5 X2X4 X2X5 X3X5
6	0.6882	X2 X5 X1X3 X1X5 X2X4 X3X5
6	0.6882	X2 X1X4 X1X5 X2X5 X3X4 X4X5
6	0.6882	X2 X3 X1X3 X1X5 X2X5 X3X5
6		

	0.6882	X2 X5 X1X3 X1X5 X2X4 X2X5
6	0.6882	X1 X2 X1X3 X1X5 X2X3 X3X5
6	0.6882	X2 X3 X5 X1X3 X1X5 X2X5

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Iron

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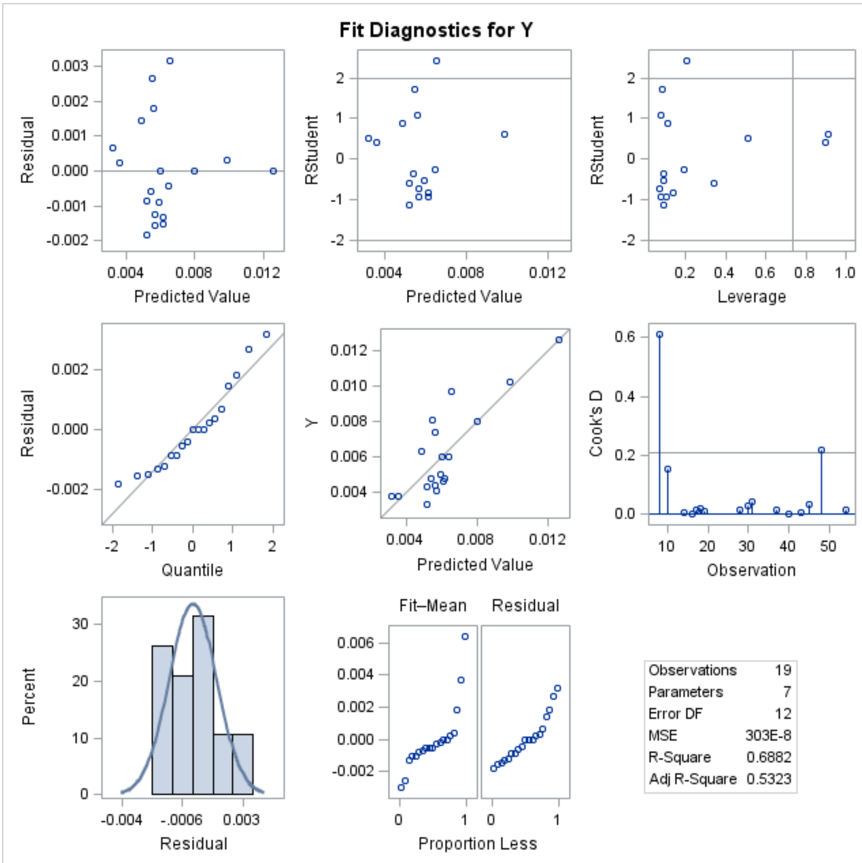
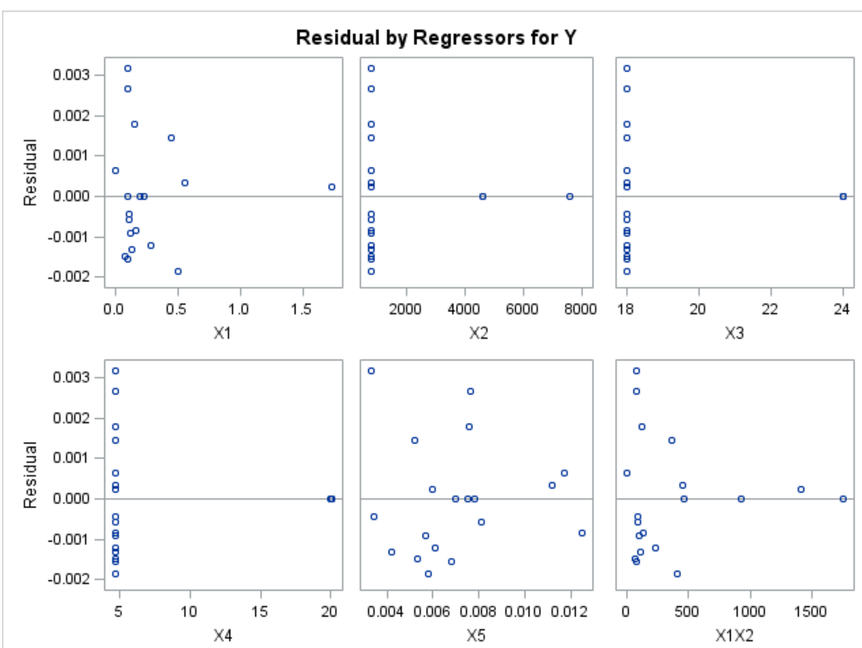
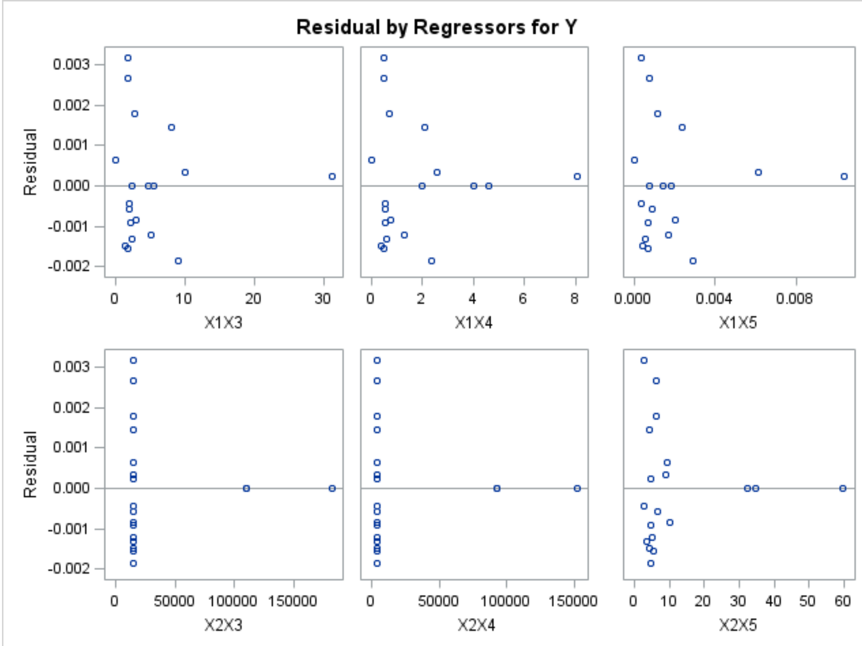
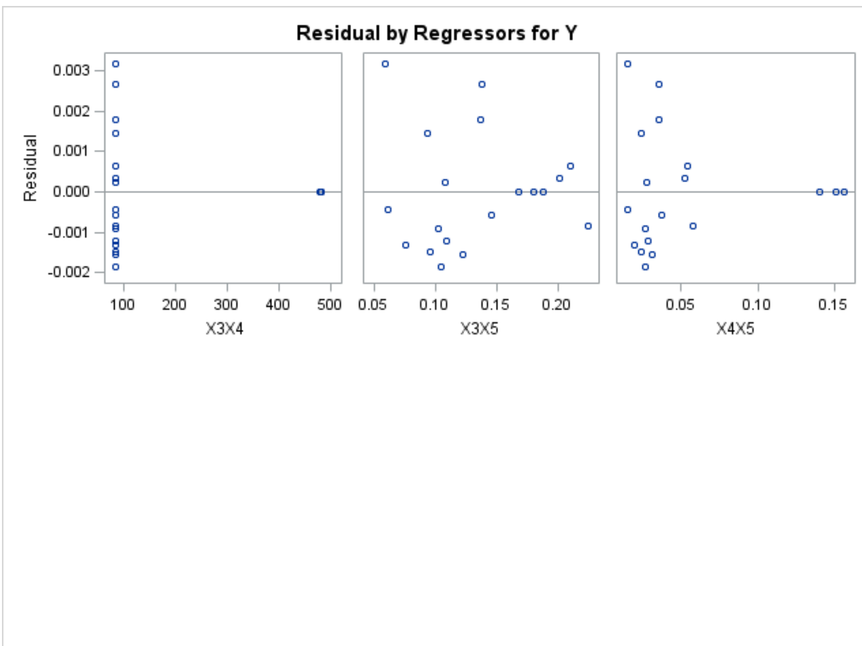
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
X1X3
X1X4
X1X5
X2X3
X2X4
X2X5


Residual by Regressors for Y
Residual
X3X4
X3X5
X4X5

FORWARD REGRESSION
Pollutant: Dissolved Iron
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	66
Number of Observations Used	41
Number of Observations with Missing Values	25

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1129	.	.	0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X2	-0.1129	1.0000	.	.	-0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	0.0000	-0.0000	.	.	1.0000	-0.0000	-0.0000	-0.0000	-0.0000	0.0000	-0.0000	-0.0000	.	.	.	-0.0000
X1X2	0.2327	0.8714	.	.	-0.0000	1.0000	0.2327	0.2327	0.2327	0.8714	0.8714	0.8714	.	.	.	0.1377
X1X3	1.0000	-0.1129	.	.	-0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X1X4	1.0000	-0.1129	.	.	-0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X1X5	1.0000	-0.1129	.	.	-0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X2X3	-0.1129	1.0000	.	.	0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X2X4	-0.1129	1.0000	.	.	-0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X2X5	-0.1129	1.0000	.	.	-0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.
X4X5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.
Y	-0.3016	0.3356	.	.	-0.0000	0.1377	-0.3016	-0.3016	-0.3016	0.3356	0.3356	0.3356	.	.	.	1.0000

FORWARD REGRESSION
Pollutant: Dissolved Iron
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	66
Number of Observations Used	41
Number of Observations with Missing Values	25

Forward Selection: Step 1

Variable X2 Entered: R-Square = 0.1126 and C(p) = 4.9325

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.02514	0.02514	4.95	0.0319
Error	39	0.19805	0.00508		
Corrected Total	40	0.22319			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.12762	0.01446	0.39552	77.89	<.0001
X2	0.05175	0.02326	0.02514	4.95	0.0319

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X1X2 Entered: R-Square = 0.2122 and C(p) = 2.2287

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.04736	0.02368	5.12	0.0108
Error	38	0.17583	0.00463		
Corrected Total	40	0.22319			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.13328	0.01404	0.41678	90.07	<.0001

X2	0.13813	0.04524	0.04313	9.32	0.0041
X1X2	-2.07755	0.94814	0.02222	4.80	0.0346

Bounds on condition number: 4.1542, 16.617

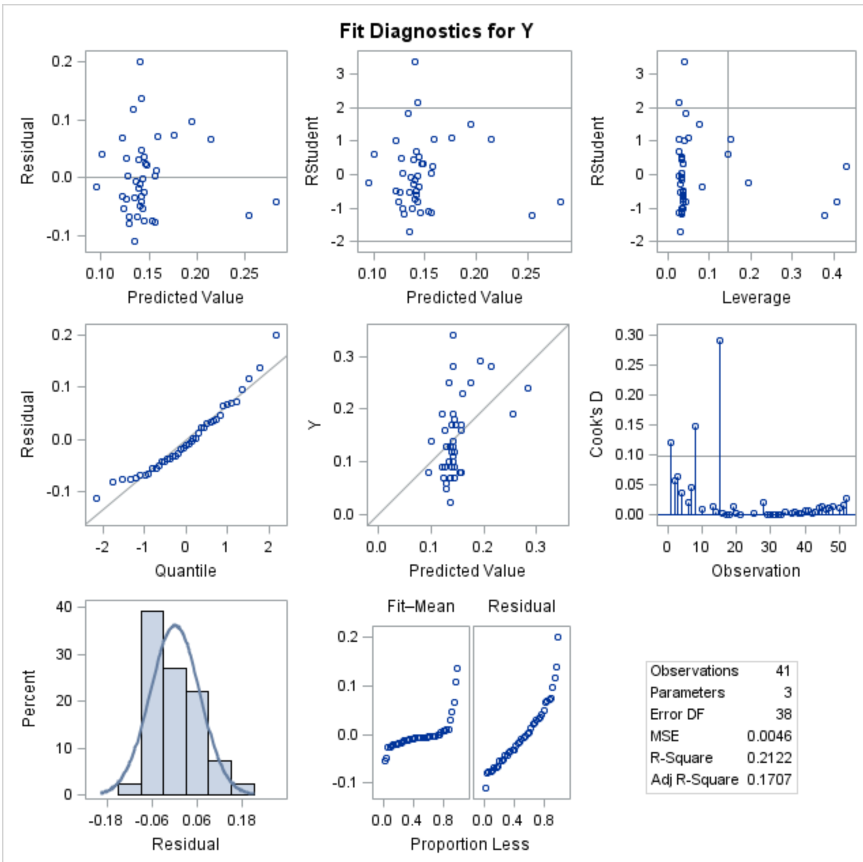
No other variable met the 0.5000 significance level for entry into the model.

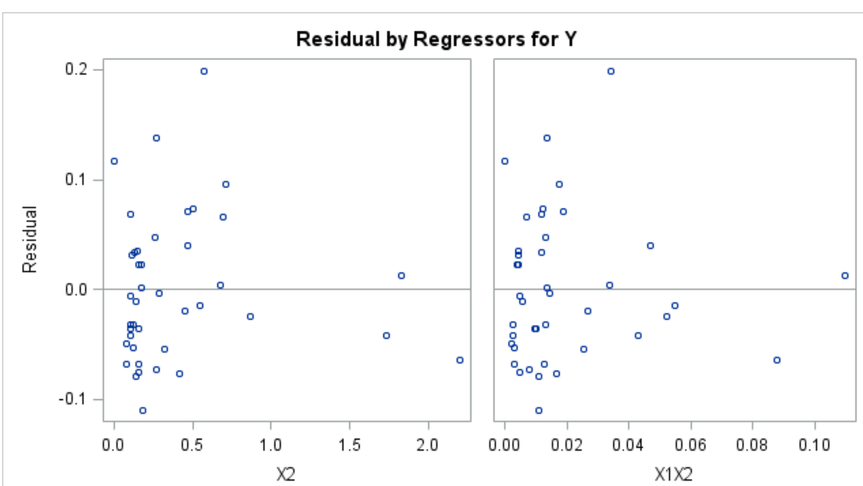
Summary of Forward Selection

Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X2	1	0.1126	0.1126	4.9325	4.95	0.0319
2	X1X2	2	0.0995	0.2122	2.2287	4.80	0.0346

FORWARD REGRESSION
Pollutant: Dissolved Iron
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y





BACKWARD REGRESSION
Pollutant: Dissolved Iron
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	66
Number of Observations Used	41
Number of Observations with Missing Values	25

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1129	.	.	0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X2	-0.1129	1.0000	.	.	-0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	0.0000	-0.0000	.	.	1.0000	-0.0000	-0.0000	-0.0000	-0.0000	0.0000	-0.0000	-0.0000	.	.	.	-0.0000
X1X2	0.2327	0.8714	.	.	-0.0000	1.0000	0.2327	0.2327	0.2327	0.8714	0.8714	0.8714	.	.	.	0.1377
X1X3	1.0000	-0.1129	.	.	-0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X1X4	1.0000	-0.1129	.	.	-0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X1X5	1.0000	-0.1129	.	.	-0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X2X3	-0.1129	1.0000	.	.	0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X2X4	-0.1129	1.0000	.	.	-0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X2X5	-0.1129	1.0000	.	.	-0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.
X4X5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.
Y	-0.3016	0.3356	.	.	-0.0000	0.1377	-0.3016	-0.3016	-0.3016	0.3356	0.3356	0.3356	.	.	.	1.0000

BACKWARD REGRESSION
Pollutant: Dissolved Iron
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	66
Number of Observations Used	41
Number of Observations with Missing Values	25

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.2170 and C(p) = 4.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.04844	0.01615	3.42	0.0271
Error	37	0.17475	0.00472		
Corrected Total	40	0.22319			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.14609	0.03032	0.10968	23.22	<.0001
X1	-0.25491	0.53308	0.00108	0.23	0.6353
X2	0.11884	0.06096	0.01795	3.80	0.0588
X1X2	-1.65364	1.30517	0.00758	1.61	0.2131

Bounds on condition number: 7.712, 50.943

Backward Elimination: Step 1

Variable X1 Removed: R-Square = 0.2122 and C(p) = 2.2287

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.04736	0.02368	5.12	0.0108
Error	38	0.17583	0.00463		
Corrected Total	40	0.22319			

	Parameter	Standard			

Variable	Estimate	Error	Type II SS	F Value	Pr > F
Intercept	0.13328	0.01404	0.41678	90.07	<.0001
X2	0.13813	0.04524	0.04313	9.32	0.0041
X1X2	-2.07755	0.94814	0.02222	4.80	0.0346

Bounds on condition number: 4.1542, 16.617

Backward Elimination: Step 2

Variable X1X3 Entered: R-Square = 0.2170 and C(p) = 4.0000
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.04844	0.01615	3.42	0.0271
Error	37	0.17475	0.00472		
Corrected Total	40	0.22319			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.14609	0.03032	0.10968	23.22	<.0001
X2	0.11884	0.06096	0.01795	3.80	0.0588
X1X2	-1.65364	1.30517	0.00758	1.61	0.2131
X1X3	-0.00031393	0.00065651	0.00108	0.23	0.6353

Bounds on condition number: 7.712, 50.943

Backward Elimination: Step 3

Variable X1X3 Removed: R-Square = 0.2122 and C(p) = 2.2287

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.04736	0.02368	5.12	0.0108
Error	38	0.17583	0.00463		
Corrected Total	40	0.22319			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.13328	0.01404	0.41678	90.07	<.0001
X2	0.13813	0.04524	0.04313	9.32	0.0041
X1X2	-2.07755	0.94814	0.02222	4.80	0.0346

Bounds on condition number: 4.1542, 16.617

Backward Elimination: Step 4

Variable X1X4 Entered: R-Square = 0.2170 and C(p) = 4.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.04844	0.01615	3.42	0.0271
Error	37	0.17475	0.00472		
Corrected Total	40	0.22319			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.14609	0.03032	0.10968	23.22	<.0001
X2	0.11884	0.06096	0.01795	3.80	0.0588
X1X2	-1.65364	1.30517	0.00758	1.61	0.2131
X1X4	-0.01416	0.02962	0.00108	0.23	0.6353

Bounds on condition number: 7.712, 50.943

Backward Elimination: Step 5

Variable X1X4 Removed: R-Square = 0.2122 and C(p) = 2.2287

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.04736	0.02368	5.12	0.0108
Error	38	0.17583	0.00463		
Corrected Total	40	0.22319			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.13328	0.01404	0.41678	90.07	<.0001
X2	0.13813	0.04524	0.04313	9.32	0.0041
X1X2	-2.07755	0.94814	0.02222	4.80	0.0346

Bounds on condition number: 4.1542, 16.617

Backward Elimination: Step 6

Variable X1X5 Entered: R-Square = 0.2170 and C(p) = 4.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.04844	0.01615	3.42	0.0271
Error	37	0.17475	0.00472		
Corrected Total	40	0.22319			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.14609	0.03032	0.10968	23.22	<.0001
X2	0.11884	0.06096	0.01795	3.80	0.0588
X1X2	-1.65364	1.30517	0.00758	1.61	0.2131
X1X5	-0.05458	0.11415	0.00108	0.23	0.6353

Bounds on condition number: 7.712, 50.943

Backward Elimination: Step 7

Variable X1X5 Removed: R-Square = 0.2122 and C(p) = 2.2287

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.04736	0.02368	5.12	0.0108
Error	38	0.17583	0.00463		
Corrected Total	40	0.22319			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.13328	0.01404	0.41678	90.07	<.0001
X2	0.13813	0.04524	0.04313	9.32	0.0041
X1X2	-2.07755	0.94814	0.02222	4.80	0.0346

Bounds on condition number: 4.1542, 16.617

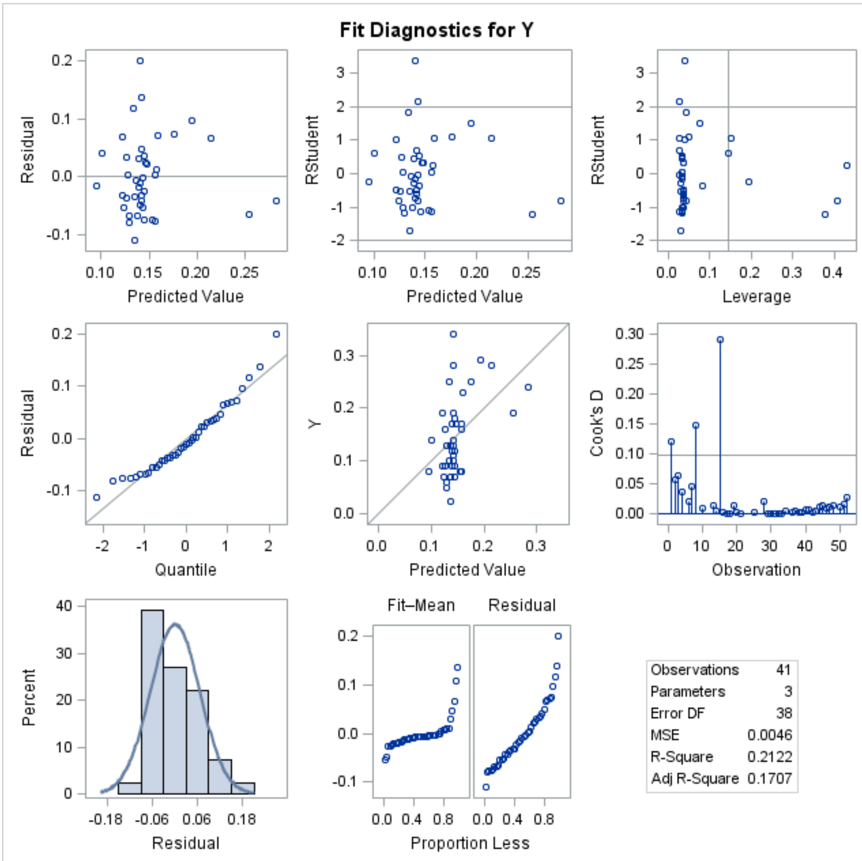
All variables left in the model are significant at the 0.1000 level.

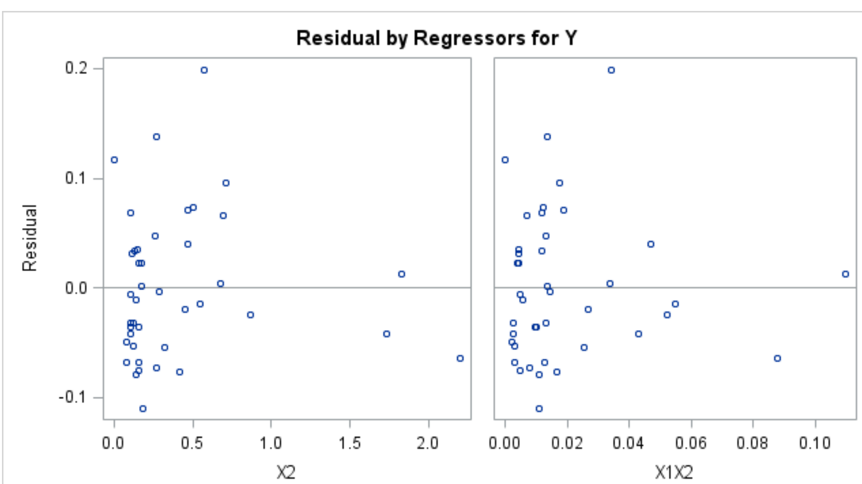
Summary of Backward Elimination								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1		X1	2	0.0048	0.2122	2.2287	0.23	0.6353
2	X1X3		3	0.0048	0.2170	4.0000	0.23	0.6353

3		X1X3	2	0.0048	0.2122	2.2287	0.23	0.6353
4	X1X4		3	0.0048	0.2170	4.0000	0.23	0.6353
5		X1X4	2	0.0048	0.2122	2.2287	0.23	0.6353
6	X1X5		3	0.0048	0.2170	4.0000	0.23	0.6353
7		X1X5	2	0.0048	0.2122	2.2287	0.23	0.6353

BACKWARD REGRESSION
Pollutant: Dissolved Iron
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y





STEPWISE REGRESSION
Pollutant: Dissolved Iron
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	66
Number of Observations Used	41
Number of Observations with Missing Values	25

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1129	.	.	0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X2	-0.1129	1.0000	.	.	-0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	0.0000	-0.0000	.	.	1.0000	-0.0000	-0.0000	-0.0000	-0.0000	0.0000	-0.0000	-0.0000	.	.	.	-0.0000
X1X2	0.2327	0.8714	.	.	-0.0000	1.0000	0.2327	0.2327	0.2327	0.8714	0.8714	0.8714	.	.	.	0.1377
X1X3	1.0000	-0.1129	.	.	-0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X1X4	1.0000	-0.1129	.	.	-0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X1X5	1.0000	-0.1129	.	.	-0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X2X3	-0.1129	1.0000	.	.	0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X2X4	-0.1129	1.0000	.	.	-0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X2X5	-0.1129	1.0000	.	.	-0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.
X4X5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.
Y	-0.3016	0.3356	.	.	-0.0000	0.1377	-0.3016	-0.3016	-0.3016	0.3356	0.3356	0.3356	.	.	.	1.0000

STEPWISE REGRESSION
Pollutant: Dissolved Iron
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	66
Number of Observations Used	41
Number of Observations with Missing Values	25

Stepwise Selection: Step 1

Variable X2 Entered: R-Square = 0.1126 and C(p) = 4.9325

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.02514	0.02514	4.95	0.0319
Error	39	0.19805	0.00508		
Corrected Total	40	0.22319			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.12762	0.01446	0.39552	77.89	<.0001
X2	0.05175	0.02326	0.02514	4.95	0.0319

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X1X2 Entered: R-Square = 0.2122 and C(p) = 2.2287

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.04736	0.02368	5.12	0.0108
Error	38	0.17583	0.00463		
Corrected Total	40	0.22319			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.13328	0.01404	0.41678	90.07	<.0001

X2	0.13813	0.04524	0.04313	9.32	0.0041
X1X2	-2.07755	0.94814	0.02222	4.80	0.0346

Bounds on condition number: 4.1542, 16.617

All variables left in the model are significant at the 0.1500 level.

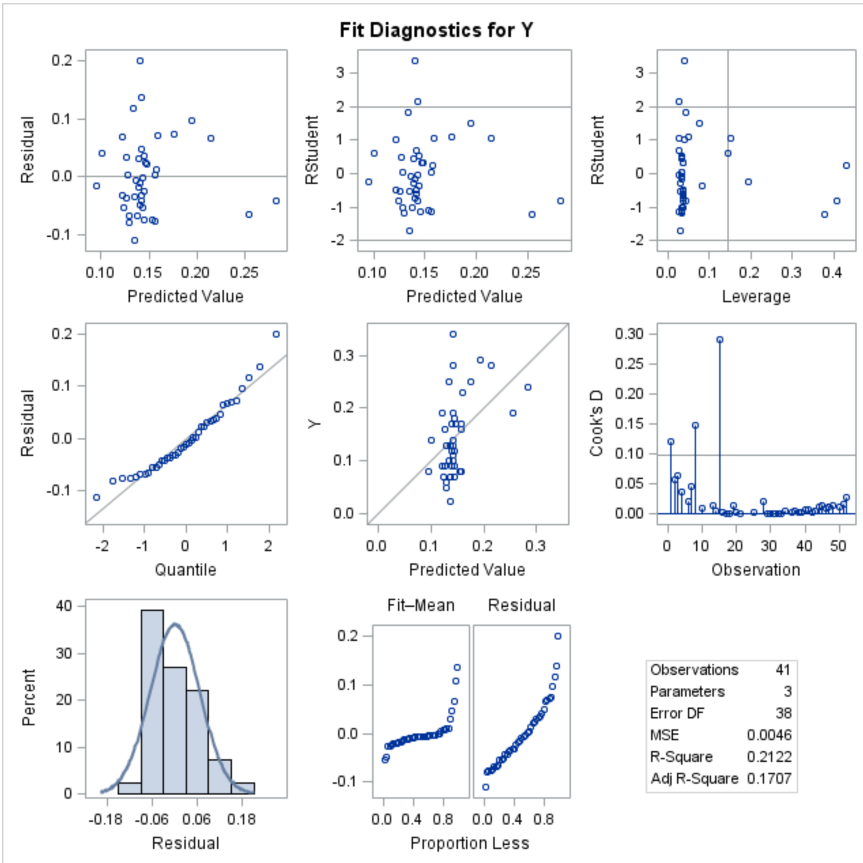
No other variable met the 0.1500 significance level for entry into the model.

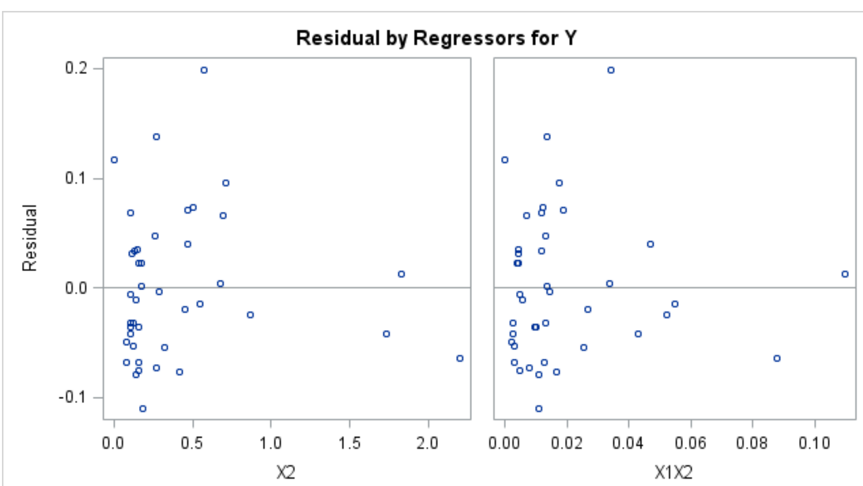
Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X2		1	0.1126	0.1126	4.9325	4.95	0.0319
2	X1X2		2	0.0995	0.2122	2.2287	4.80	0.0346

STEPWISE REGRESSION
Pollutant: Dissolved Iron
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y





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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Lead
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The REG Procedure

Number of Observations Read	66
Number of Observations Used	41
Number of Observations with Missing Values	25

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1129	.	.	0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X2	-0.1129	1.0000	.	.	-0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	0.0000	-0.0000	.	.	1.0000	-0.0000	-0.0000	-0.0000	-0.0000	0.0000	-0.0000	-0.0000	.	.	.	-0.0000
X1X2	0.2327	0.8714	.	.	-0.0000	1.0000	0.2327	0.2327	0.2327	0.8714	0.8714	0.8714	.	.	.	0.1377
X1X3	1.0000	-0.1129	.	.	-0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X1X4	1.0000	-0.1129	.	.	-0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X1X5	1.0000	-0.1129	.	.	-0.0000	0.2327	1.0000	1.0000	1.0000	-0.1129	-0.1129	-0.1129	.	.	.	-0.3016
X2X3	-0.1129	1.0000	.	.	0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X2X4	-0.1129	1.0000	.	.	-0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X2X5	-0.1129	1.0000	.	.	-0.0000	0.8714	-0.1129	-0.1129	-0.1129	1.0000	1.0000	1.0000	.	.	.	0.3356
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.
X4X5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.
Y	-0.3016	0.3356	.	.	-0.0000	0.1377	-0.3016	-0.3016	-0.3016	0.3356	0.3356	0.3356	.	.	.	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Lead

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The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	66
Number of Observations Used	41
Number of Observations with Missing Values	25

Number in Model	R-Square	Variables in Model
1	0.1126	X2
1	0.1126	X2X3
1	0.1126	X2X4
1	0.1126	X2X5
1	0.0909	X1X3
1	0.0909	X1
1	0.0909	X1X5
1	0.0909	X1X4
1	0.0190	X1X2
2	0.2122	X2 X1X2
2	0.2122	X1X2 X2X3
2	0.2122	X1X2 X2X5
2	0.2122	X1X2 X2X4
2	0.1831	X2 X1X3
2	0.1831	X1X3 X2X3
2	0.1831	X1X3 X2X4
2	0.1831	X1X3 X2X5
2	0.1831	X1 X2
2	0.1831	X2 X1X5
2	0.1831	X1 X2X4
2	0.1831	X1X5 X2X3
2	0.1831	X1 X2X3
2	0.1831	X1X5 X2X4
2	0.1831	X1 X2X5
3	0.2170	X2 X1X2 X1X3
3	0.2170	X1 X2 X1X2
3	0.2170	X2 X1X2 X1X5
3	0.2170	X1X2 X1X3 X2X3
3	0.2170	X2 X1X2 X1X4
3	0.2170	X1X2 X1X5 X2X3
3	0.2170	X1 X1X2 X2X3
3	0.2170	X1X2 X1X3 X2X5
3	0.2170	X1X2 X1X4 X2X3
3	0.2170	X1X2 X1X3 X2X4
3	0.2170	X1 X1X2 X2X5
3	0.2170	X1X2 X1X5 X2X5

3	0.2170	X1X2 X1X5 X2X4
3	0.2170	X1 X1X2 X2X4
3	0.2170	X1X2 X1X4 X2X5

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Lead

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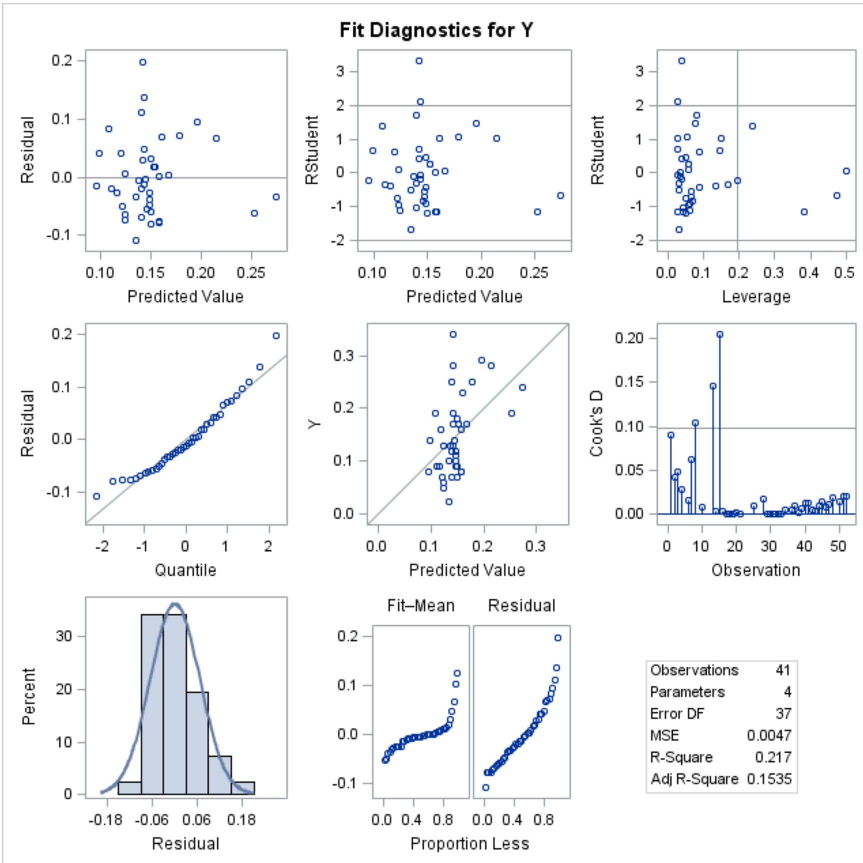
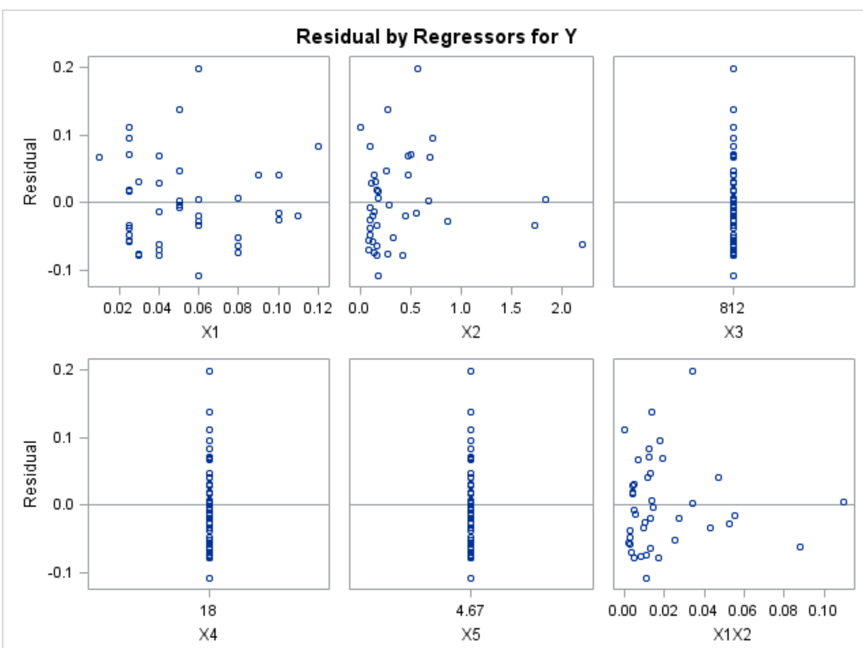
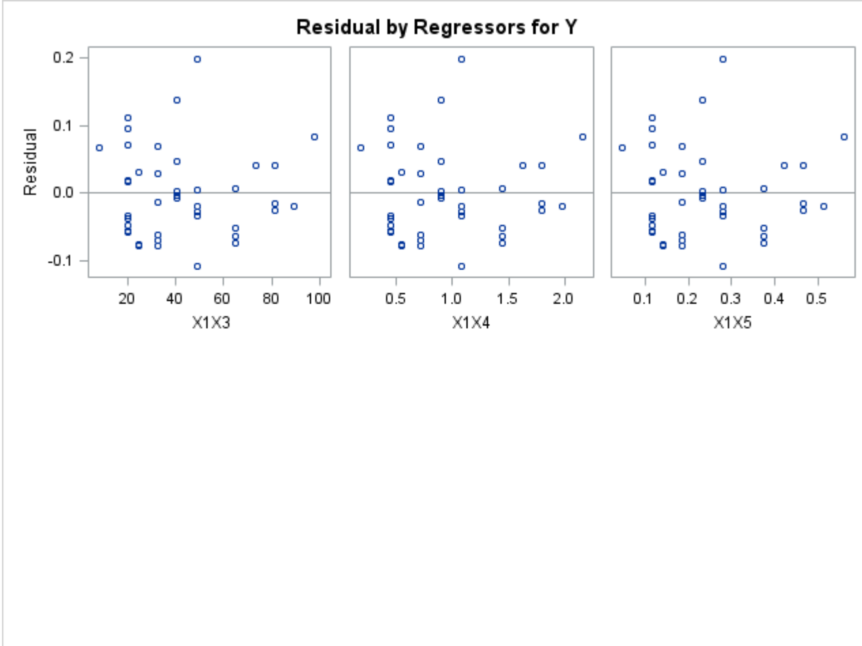
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
0.2
0.1
0.0
-0.1
20
40
60
80
100
X1X3
0.5
1.0
1.5
2.0
X1X4
0.1
0.2
0.3
0.4
0.5
X1X5

FORWARD REGRESSION
Pollutant: Dissolved Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	116
Number of Observations Used	42
Number of Observations with Missing Values	74

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0031	.	.	-0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	0.0000	1.0000
X2	-0.0031	1.0000	.	.	-0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0031
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	-0.0000	-0.0000	.	.	1.0000	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	.	-2.7898	-4.2430	-0.0000
X1X2	0.2415	0.9225	.	.	-0.0000	1.0000	0.2415	0.2415	0.2415	0.9225	0.9225	0.9225	.	0.0000	0.0000	0.2415
X1X3	1.0000	-0.0031	.	.	0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	0.0000	1.0000
X1X4	1.0000	-0.0031	.	.	0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	-0.0000	1.0000
X1X5	1.0000	-0.0031	.	.	0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	0.0000	1.0000
X2X3	-0.0031	1.0000	.	.	0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	-0.0000	-0.0000	-0.0031
X2X4	-0.0031	1.0000	.	.	0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	-0.0000	-0.0000	-0.0031
X2X5	-0.0031	1.0000	.	.	-0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	-0.0000	0.0000	-0.0031
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	-0.0000	0.0000	.	.	-2.7898	0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	.	1.0000	0.9500	0.0000
X4X5	0.0000	0.0000	.	.	-4.2430	0.0000	0.0000	-0.0000	0.0000	-0.0000	-0.0000	0.0000	.	0.9500	1.0000	0.0000
Y	1.0000	-0.0031	.	.	-0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	0.0000	0.0000	1.0000

FORWARD REGRESSION
Pollutant: Dissolved Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	116
Number of Observations Used	42
Number of Observations with Missing Values	74

Forward Selection: Step 1

Variable X1 Entered: R-Square = 1.0000 and C(p) = .

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	6.190476E-7	6.190476E-7	Infty	<.0001
Error	40	0	0		
Corrected Total	41	6.190476E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0	0	0	.	.
X1	1.00000	0	6.190476E-7	Infty	<.0001

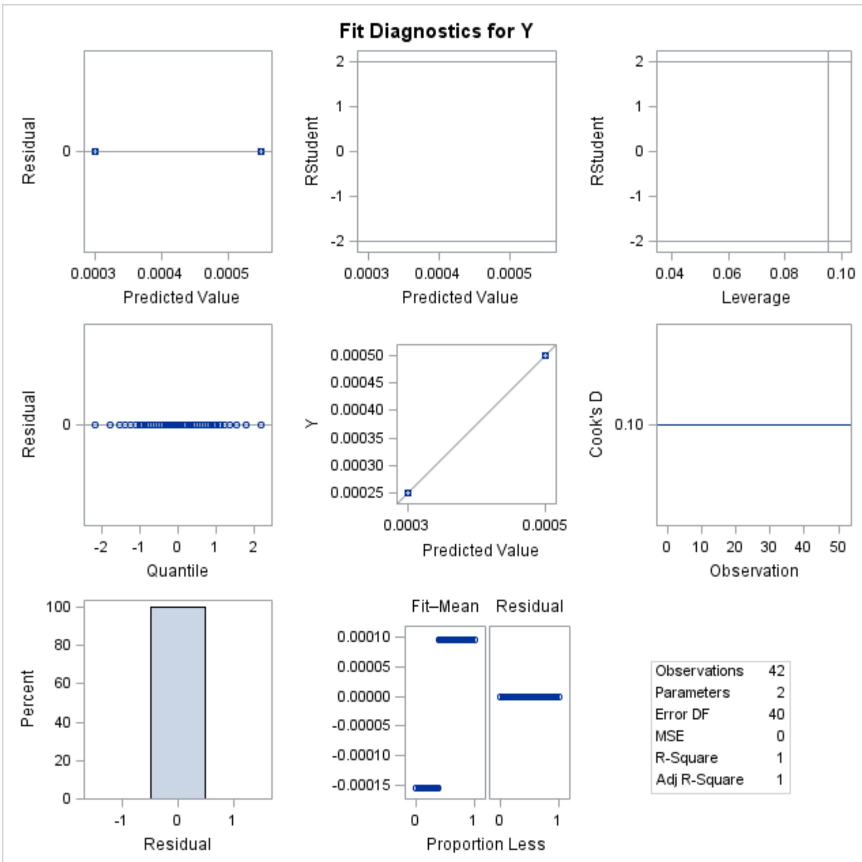
Bounds on condition number: 1, 1

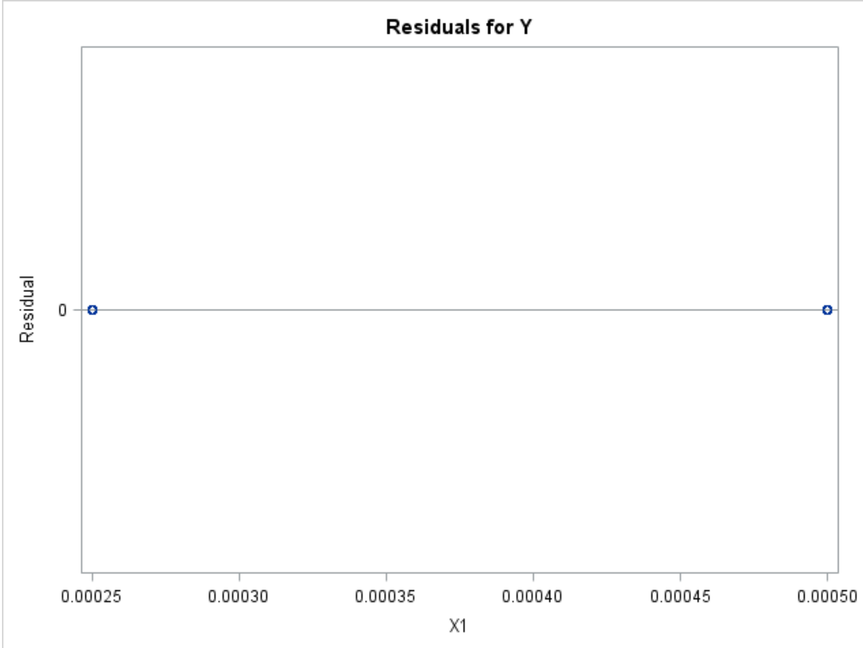
Variable selection terminated as the selected model is a perfect fit.

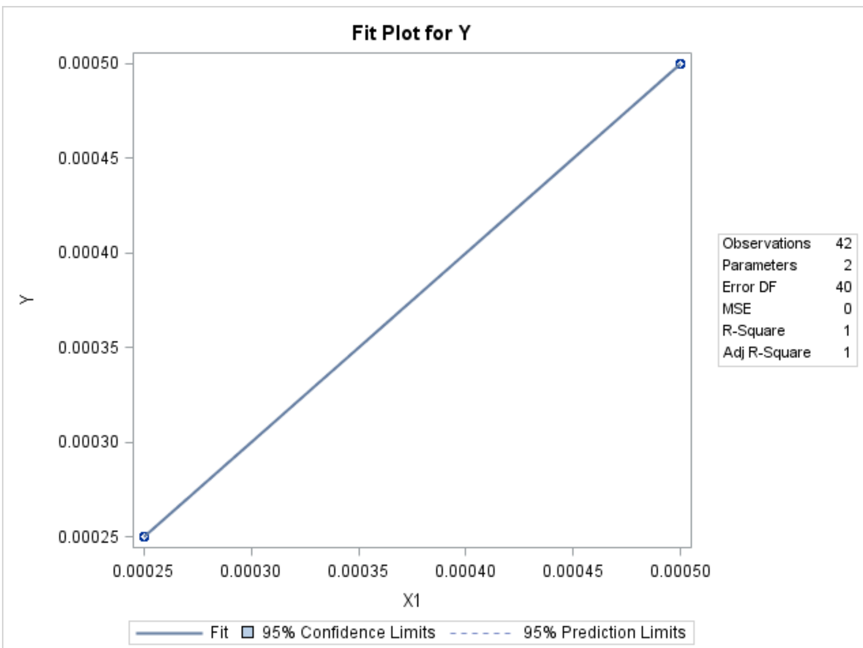
Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1	1	1.0000	1.0000	.	Infty	<.0001

FORWARD REGRESSION
Pollutant: Dissolved Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residuals for Y
Residual
0
0.00025
0.00030
0.00035
0.00040
0.00045
0.00050
X1


Fit Plot for Y
Y
0.00050
0.00045
0.00040
0.00035
0.00030
0.00025
X1
Observations 42
Parameters 2
Error DF 40
MSE 0
R-Square 1
Adj R-Square 1
Fit
95% Confidence Limits
95% Prediction Limits

BACKWARD REGRESSION
Pollutant: Dissolved Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	116
Number of Observations Used	42
Number of Observations with Missing Values	74

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0031	.	.	-0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	0.0000	1.0000
X2	-0.0031	1.0000	.	.	-0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0031
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	-0.0000	-0.0000	.	.	1.0000	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	.	-2.7898	-4.2430	-0.0000
X1X2	0.2415	0.9225	.	.	-0.0000	1.0000	0.2415	0.2415	0.2415	0.9225	0.9225	0.9225	.	0.0000	0.0000	0.2415
X1X3	1.0000	-0.0031	.	.	0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	0.0000	1.0000
X1X4	1.0000	-0.0031	.	.	0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	-0.0000	1.0000
X1X5	1.0000	-0.0031	.	.	0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	0.0000	1.0000
X2X3	-0.0031	1.0000	.	.	0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	-0.0000	-0.0000	-0.0031
X2X4	-0.0031	1.0000	.	.	0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	-0.0000	-0.0000	-0.0031
X2X5	-0.0031	1.0000	.	.	-0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	-0.0000	0.0000	-0.0031
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	-0.0000	0.0000	.	.	-2.7898	0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	.	1.0000	0.9500	0.0000
X4X5	0.0000	0.0000	.	.	-4.2430	0.0000	0.0000	-0.0000	0.0000	-0.0000	-0.0000	0.0000	.	0.9500	1.0000	0.0000
Y	1.0000	-0.0031	.	.	-0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	0.0000	0.0000	1.0000

BACKWARD REGRESSION
Pollutant: Dissolved Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	116
Number of Observations Used	42
Number of Observations with Missing Values	74

Backward Elimination: Step 0

All Variables Entered: R-Square = 1.0000 and C(p) = .
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	6.190476E-7	2.063492E-7	Infty	<.0001
Error	38	0	0		
Corrected Total	41	6.190476E-7			

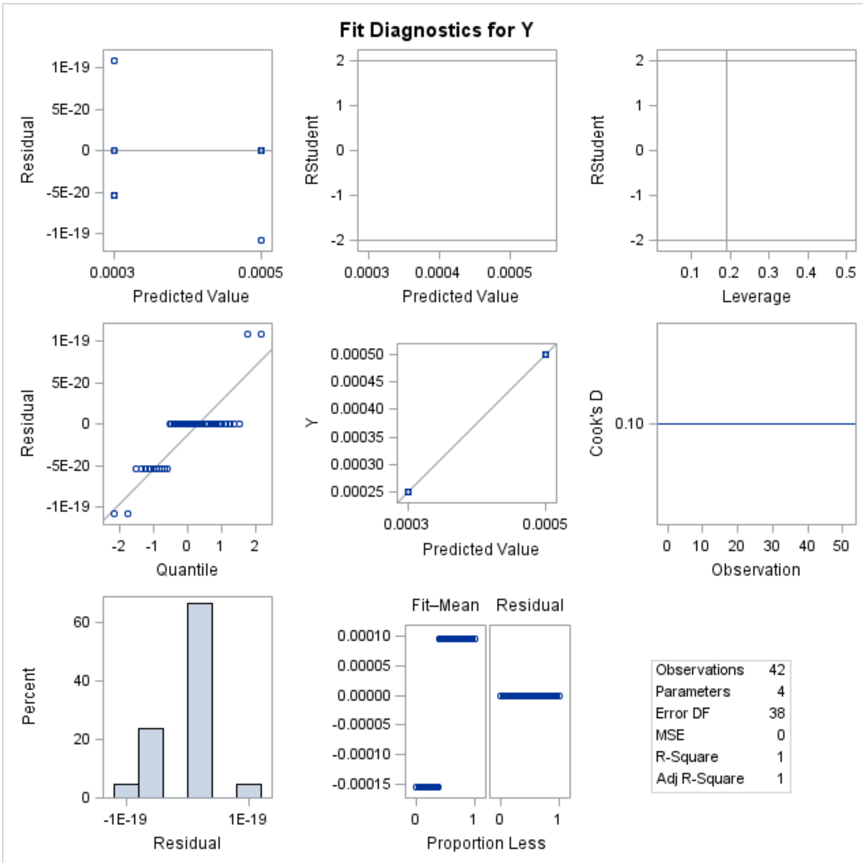
Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	8.29192E-20	0	1.4747E-38	Infty	<.0001
X1	1.00000	0	3.708814E-7	Infty	<.0001
X2	-1.6544E-19	0	3.86764E-38	Infty	<.0001
X1X2	3.88958E-16	0	3.50099E-38	Infty	<.0001

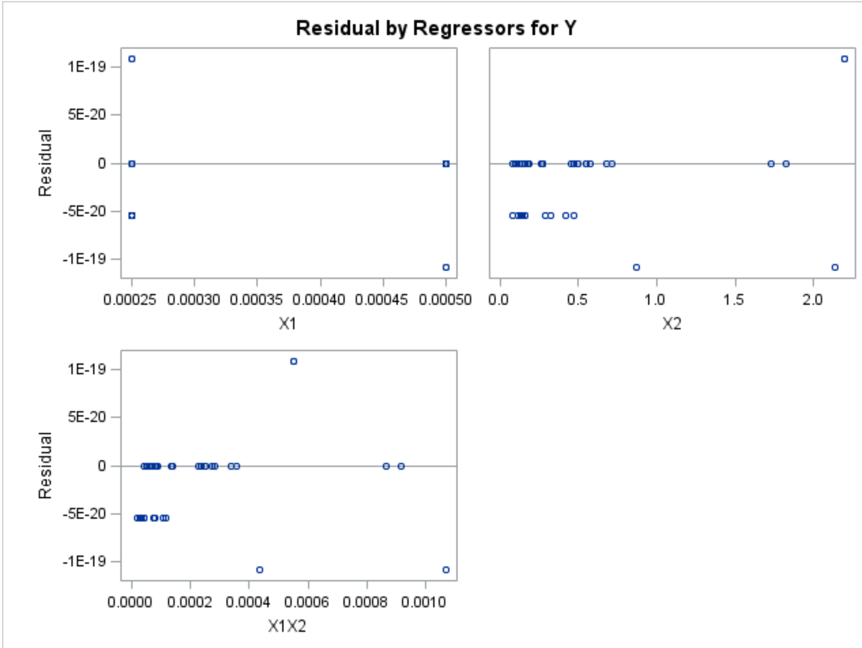
Bounds on condition number: 11.202, 70.259

Variable selection terminated as the selected model is a perfect fit.

BACKWARD REGRESSION
Pollutant: Dissolved Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
1E-19
5E-20
0
-5E-20
-1E-19
Residual
0.00025 0.00030 0.00035 0.00040 0.00045 0.00050
X1
0.0 0.5 1.0 1.5 2.0
X2
0.0000 0.0002 0.0004 0.0006 0.0008 0.0010
X1X2

STEPWISE REGRESSION
Pollutant: Dissolved Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	116
Number of Observations Used	42
Number of Observations with Missing Values	74

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0031	.	.	-0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	0.0000	1.0000
X2	-0.0031	1.0000	.	.	-0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0031
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	-0.0000	-0.0000	.	.	1.0000	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	.	-2.7898	-4.2430	-0.0000
X1X2	0.2415	0.9225	.	.	-0.0000	1.0000	0.2415	0.2415	0.2415	0.9225	0.9225	0.9225	.	0.0000	0.0000	0.2415
X1X3	1.0000	-0.0031	.	.	0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	0.0000	1.0000
X1X4	1.0000	-0.0031	.	.	0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	-0.0000	1.0000
X1X5	1.0000	-0.0031	.	.	0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	0.0000	1.0000
X2X3	-0.0031	1.0000	.	.	0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	-0.0000	-0.0000	-0.0031
X2X4	-0.0031	1.0000	.	.	0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	-0.0000	-0.0000	-0.0031
X2X5	-0.0031	1.0000	.	.	-0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	-0.0000	0.0000	-0.0031
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	-0.0000	0.0000	.	.	-2.7898	0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	.	1.0000	0.9500	0.0000
X4X5	0.0000	0.0000	.	.	-4.2430	0.0000	0.0000	-0.0000	0.0000	-0.0000	-0.0000	0.0000	.	0.9500	1.0000	0.0000
Y	1.0000	-0.0031	.	.	-0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	0.0000	0.0000	1.0000

STEPWISE REGRESSION
Pollutant: Dissolved Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	116
Number of Observations Used	42
Number of Observations with Missing Values	74

Stepwise Selection: Step 1

Variable X1 Entered: R-Square = 1.0000 and C(p) = .

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	6.190476E-7	6.190476E-7	Infty	<.0001
Error	40	0	0		
Corrected Total	41	6.190476E-7			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0	0	0	.	.
X1	1.00000	0	6.190476E-7	Infty	<.0001

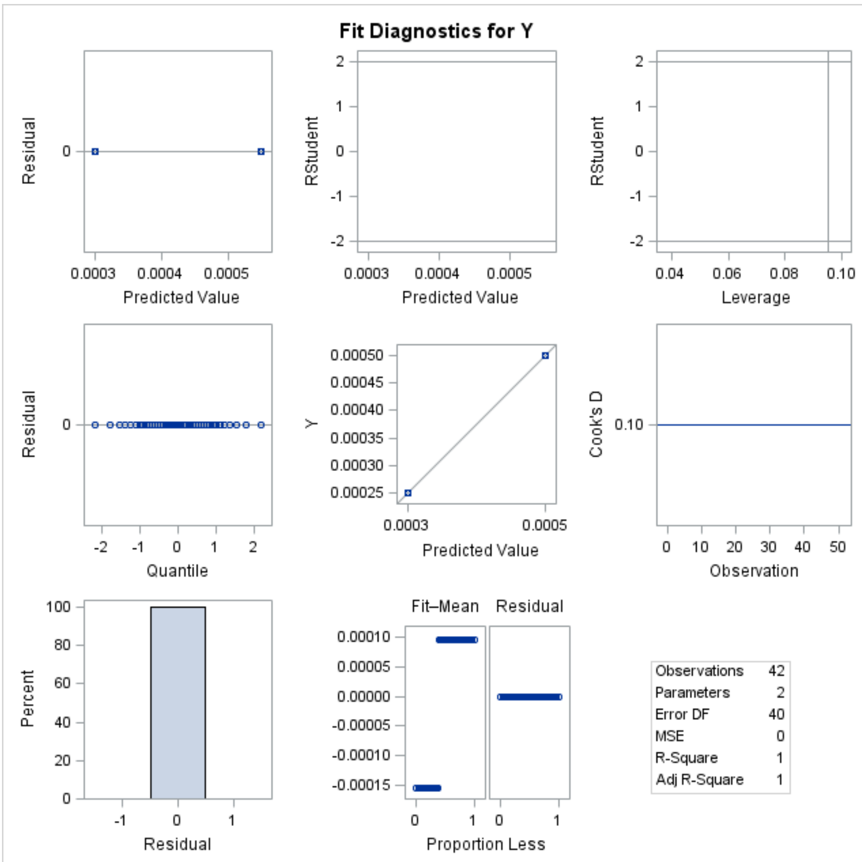
Bounds on condition number: 1, 1

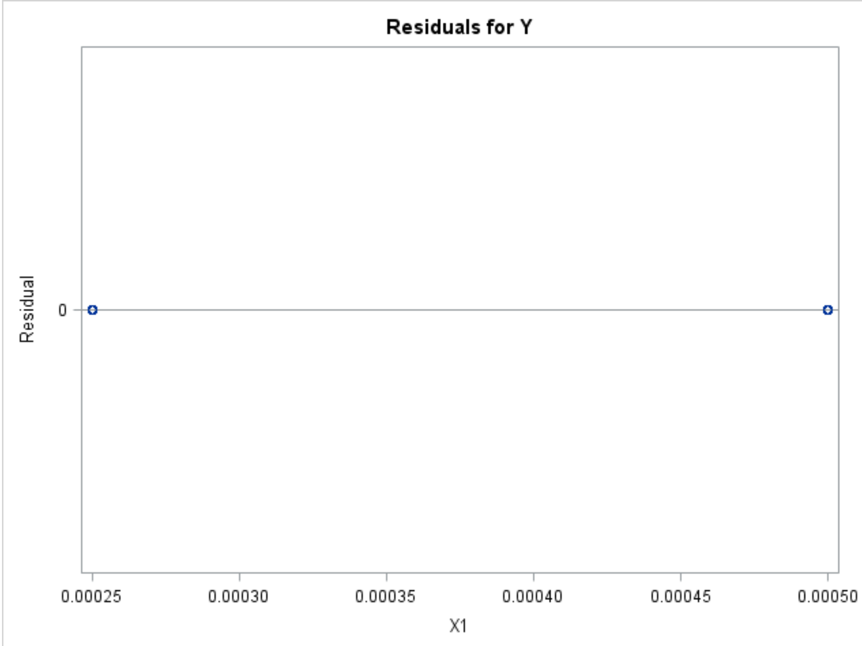
Variable selection terminated as the selected model is a perfect fit.

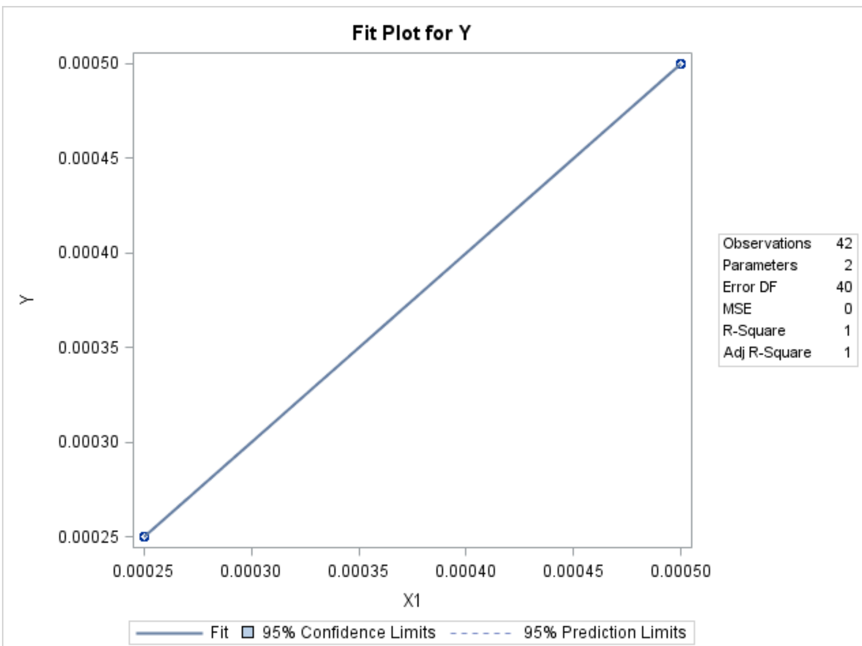
Summary of Stepwise Selection								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1		1	1.0000	1.0000	.	Infty	<.0001

STEPWISE REGRESSION
Pollutant: Dissolved Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residuals for Y
Residual
0
0.00025
0.00030
0.00035
0.00040
0.00045
0.00050
X1


Fit Plot for Y
0.00050
0.00045
0.00040
0.00035
0.00030
0.00025
Y
0.00025
0.00030
0.00035
0.00040
0.00045
0.00050
X1
Observations 42
Parameters 2
Error DF 40
MSE 0
R-Square 1
Adj R-Square 1
Fit
95% Confidence Limits
95% Prediction Limits

==

MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Nickel

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The REG Procedure

Number of Observations Read	116
Number of Observations Used	42
Number of Observations with Missing Values	74

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0031	.	.	-0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	0.0000	1.0000
X2	-0.0031	1.0000	.	.	-0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	0.0000	0.0000	-0.0031
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	-0.0000	-0.0000	.	.	1.0000	-0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	.	-2.7898	-4.2430	-0.0000
X1X2	0.2415	0.9225	.	.	-0.0000	1.0000	0.2415	0.2415	0.2415	0.9225	0.9225	0.9225	.	0.0000	0.0000	0.2415
X1X3	1.0000	-0.0031	.	.	0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	0.0000	1.0000
X1X4	1.0000	-0.0031	.	.	0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	-0.0000	1.0000
X1X5	1.0000	-0.0031	.	.	0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	-0.0000	0.0000	1.0000
X2X3	-0.0031	1.0000	.	.	0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	-0.0000	-0.0000	-0.0031
X2X4	-0.0031	1.0000	.	.	0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	-0.0000	-0.0000	-0.0031
X2X5	-0.0031	1.0000	.	.	-0.0000	0.9225	-0.0031	-0.0031	-0.0031	1.0000	1.0000	1.0000	.	-0.0000	0.0000	-0.0031
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	-0.0000	0.0000	.	.	-2.7898	0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	.	1.0000	0.9500	0.0000
X4X5	0.0000	0.0000	.	.	-4.2430	0.0000	0.0000	-0.0000	0.0000	-0.0000	-0.0000	0.0000	.	0.9500	1.0000	0.0000
Y	1.0000	-0.0031	.	.	-0.0000	0.2415	1.0000	1.0000	1.0000	-0.0031	-0.0031	-0.0031	.	0.0000	0.0000	1.0000

==
MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Nickel
==

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	116
Number of Observations Used	42
Number of Observations with Missing Values	74

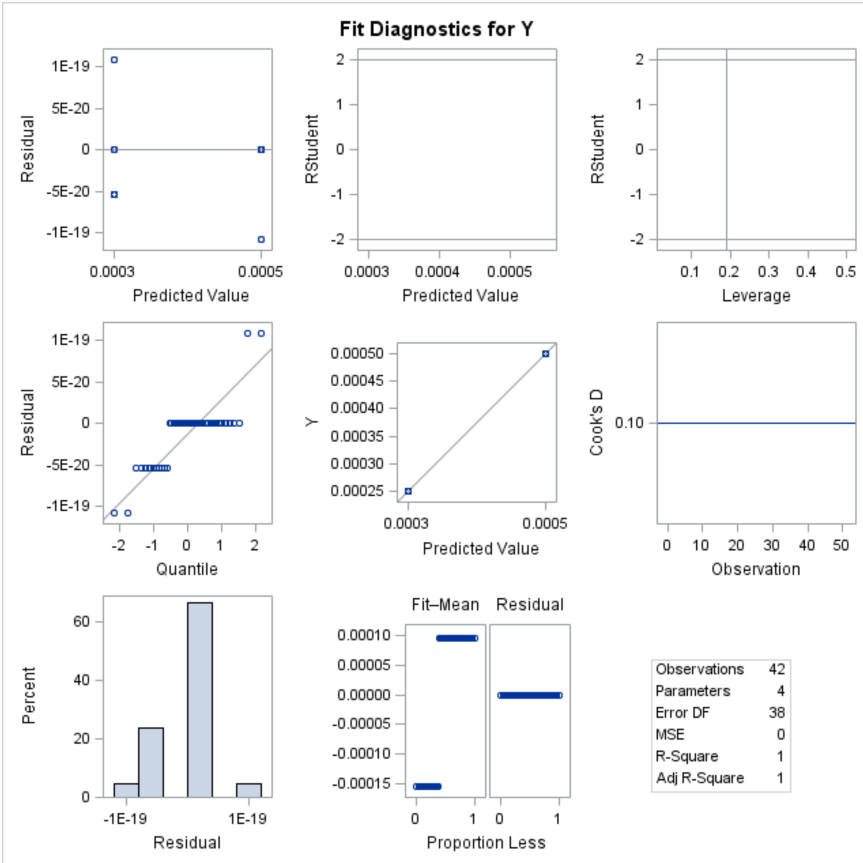
Number in Model	R-Square	Variables in Model
1	1.0000	X1
1	1.0000	X1X5
1	1.0000	X1X4
1	1.0000	X1X3
1	0.0583	X1X2
1	0.0000	X2X4
1	0.0000	X2X5
1	0.0000	X2
1	0.0000	X2X3
2	1.0000	X1 X2X5
2	1.0000	X1 X2
2	1.0000	X1 X2X3
2	1.0000	X1 X2X4
2	1.0000	X1 X1X2
2	1.0000	X2 X1X5
2	1.0000	X1X5 X2X3
2	1.0000	X1X5 X2X4
2	1.0000	X1X2 X1X5
2	1.0000	X1X5 X2X5
2	1.0000	X1X2 X1X4
2	1.0000	X1X4 X2X4
2	1.0000	X1X4 X2X3
2	1.0000	X2 X1X4
2	1.0000	X1X4 X2X5
3	1.0000	X1 X1X2 X2X5
3	1.0000	X1 X2 X1X2
3	1.0000	X1 X1X2 X2X3
3	1.0000	X1 X1X2 X2X4
3	1.0000	X2 X1X2 X1X5
3	1.0000	X1X2 X1X5 X2X3
3	1.0000	X1X2 X1X5 X2X4
3	1.0000	X1X2 X1X5 X2X5
3	1.0000	X1X2 X1X4 X2X4
3	1.0000	X1X2 X1X4 X2X5
3	1.0000	X2 X1X2 X1X4
3	1.0000	X1X2 X1X4 X2X3

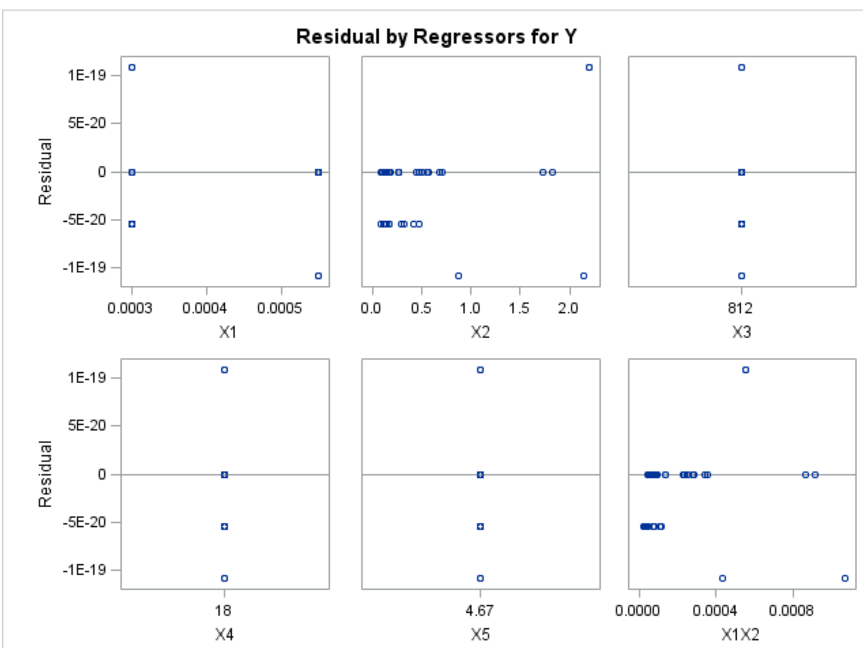
3	1.0000	X1X2 X1X3 X2X5
3	1.0000	X1X2 X1X3 X2X3
3	1.0000	X2 X1X2 X1X3

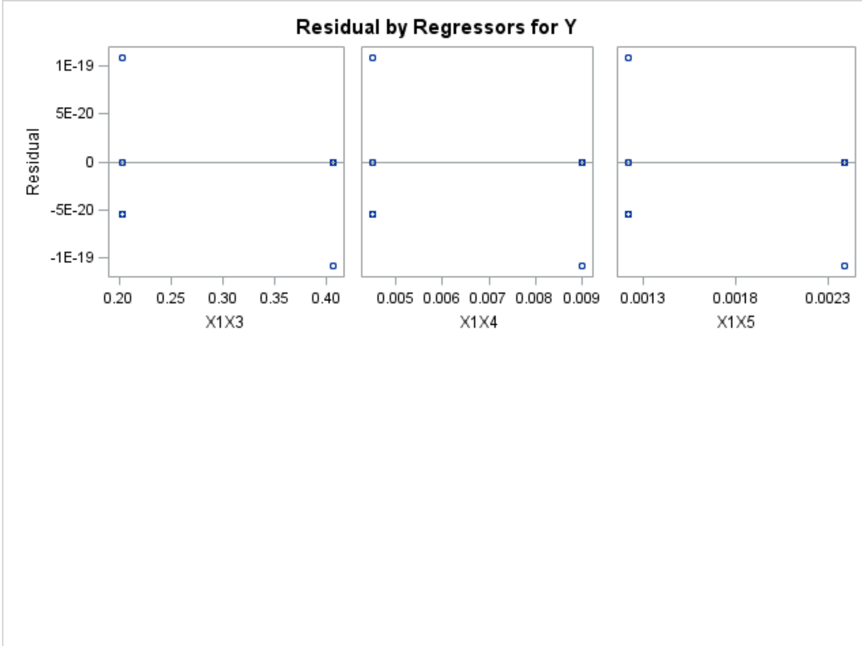
Note: Models of not full rank are not included.

===
MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Nickel
===

The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
1E-19
5E-20
0
-5E-20
-1E-19
0.20 0.25 0.30 0.35 0.40
X1X3
0.005 0.006 0.007 0.008 0.009
X1X4
0.0013 0.0018 0.0023
X1X5

FORWARD REGRESSION
Pollutant: Dissolved Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	75
Number of Observations Used	43
Number of Observations with Missing Values	32

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0056	-0.0308	-0.0308	-0.0308	0.2941	0.1980	0.9855	0.4906	-0.0194	0.0040	-0.0087	-0.0308	-0.0308	-0.0308	-0.1735
X2	0.0056	1.0000	-0.0718	-0.0718	-0.0718	0.9331	-0.0692	-0.0067	-0.0598	0.5509	0.9983	0.8642	-0.0718	-0.0718	-0.0718	0.2591
X3	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X4	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X5	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X1X2	0.2941	0.9331	-0.0745	-0.0745	-0.0745	1.0000	-0.0059	0.2787	0.0872	0.5064	0.9310	0.8018	-0.0745	-0.0745	-0.0745	0.1074
X1X3	0.1980	-0.0692	0.9736	0.9736	0.9736	-0.0059	1.0000	0.3614	0.9513	0.6730	-0.0193	0.3689	0.9736	0.9736	0.9736	-0.3884
X1X4	0.9855	-0.0067	0.1392	0.1392	0.1392	0.2787	0.3614	1.0000	0.6313	0.0980	0.0004	0.0555	0.1392	0.1392	0.1392	-0.2322
X1X5	0.4906	-0.0598	0.8559	0.8559	0.8559	0.0872	0.9513	0.6313	1.0000	0.5922	-0.0159	0.3252	0.8559	0.8559	0.8559	-0.3999
X2X3	-0.0194	0.5509	0.6907	0.6907	0.6907	0.5064	0.6730	0.0980	0.5922	1.0000	0.5987	0.8960	0.6907	0.6907	0.6907	-0.0776
X2X4	0.0040	0.9983	-0.0206	-0.0206	-0.0206	0.9310	-0.0193	0.0004	-0.0159	0.5987	1.0000	0.8921	-0.0206	-0.0206	-0.0206	0.2432
X2X5	-0.0087	0.8642	0.3782	0.3782	0.3782	0.8018	0.3689	0.0555	0.3252	0.8960	0.8921	1.0000	0.3782	0.3782	0.3782	0.0911
X3X4	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X3X5	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X4X5	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
Y	-0.1735	0.2591	-0.3557	-0.3557	-0.3557	0.1074	-0.3884	-0.2322	-0.3999	-0.0776	0.2432	0.0911	-0.3557	-0.3557	-0.3557	1.0000

FORWARD REGRESSION
Pollutant: Dissolved Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	75
Number of Observations Used	43
Number of Observations with Missing Values	32

Forward Selection: Step 1

Variable X1X5 Entered: R-Square = 0.1599 and C(p) = 10.4116

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00001340	0.00001340	7.80	0.0079
Error	41	0.00007039	0.00000172		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00390	0.00033423	0.00023315	135.81	<.0001
X1X5	-0.12478	0.04466	0.00001340	7.80	0.0079

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X2X4 Entered: R-Square = 0.2160 and C(p) = 9.1114

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00001810	0.00000905	5.51	0.0077
Error	40	0.00006569	0.00000164		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00360	0.00037127	0.00015416	93.87	<.0001

X1X5	-0.12360	0.04369	0.00001314	8.00	0.0073
X2X4	0.00003693	0.00002183	0.00000470	2.86	0.0984

Bounds on condition number: 1.0003, 4.001

Forward Selection: Step 3

Variable X1X2 Entered: R-Square = 0.2664 and C(p) = 8.1492

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	0.00002232	0.00000744	4.72	0.0066
Error	39	0.00006147	0.00000158		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00345	0.00037423	0.00013419	85.14	<.0001
X1X2	-1.56036	0.95360	0.00000422	2.68	0.1098
X1X5	-0.10321	0.04458	0.00000845	5.36	0.0260
X2X4	0.00013003	0.00006078	0.00000721	4.58	0.0387

Bounds on condition number: 8.1424, 51.93

Forward Selection: Step 4

Variable X4 Entered: R-Square = 0.3709 and C(p) = 4.0009

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	0.00003108	0.00000777	5.60	0.0012
Error	38	0.00005271	0.00000139		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01862	0.00605	0.00001316	9.48	0.0038
X4	-0.00092541	0.00036828	0.00000876	6.31	0.0163
X1X2	-4.42799	1.45005	0.00001293	9.32	0.0041
X1X5	0.20484	0.12953	0.00000347	2.50	0.1221
X2X4	0.00030002	0.00008848	0.00001595	11.50	0.0016

Bounds on condition number: 21.393, 244.34

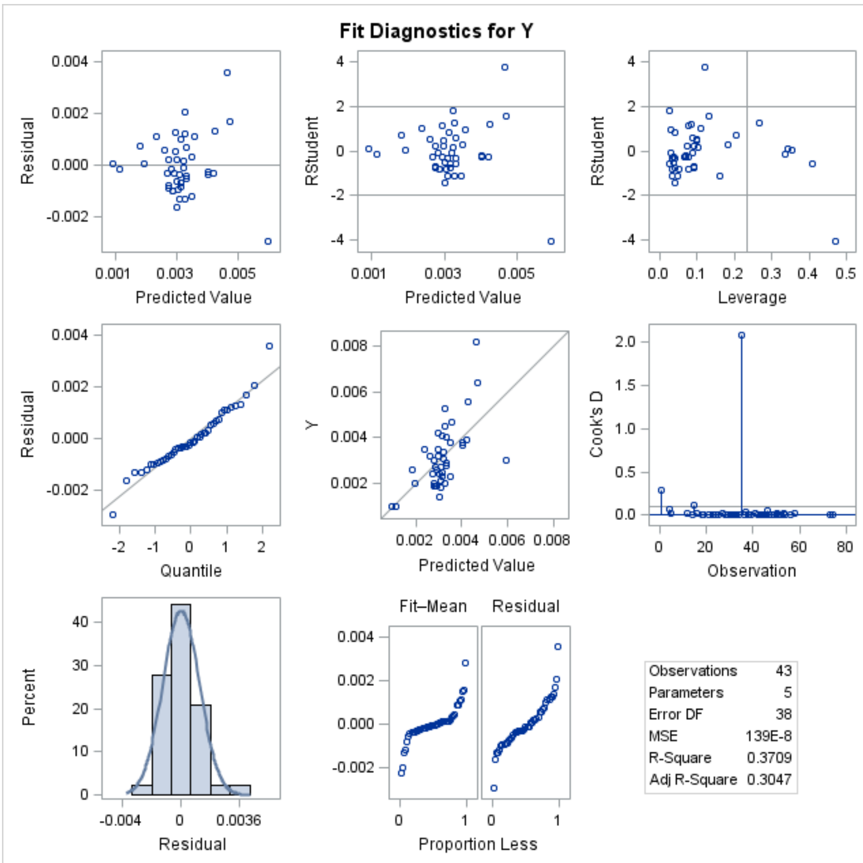
No other variable met the 0.5000 significance level for entry into the model.

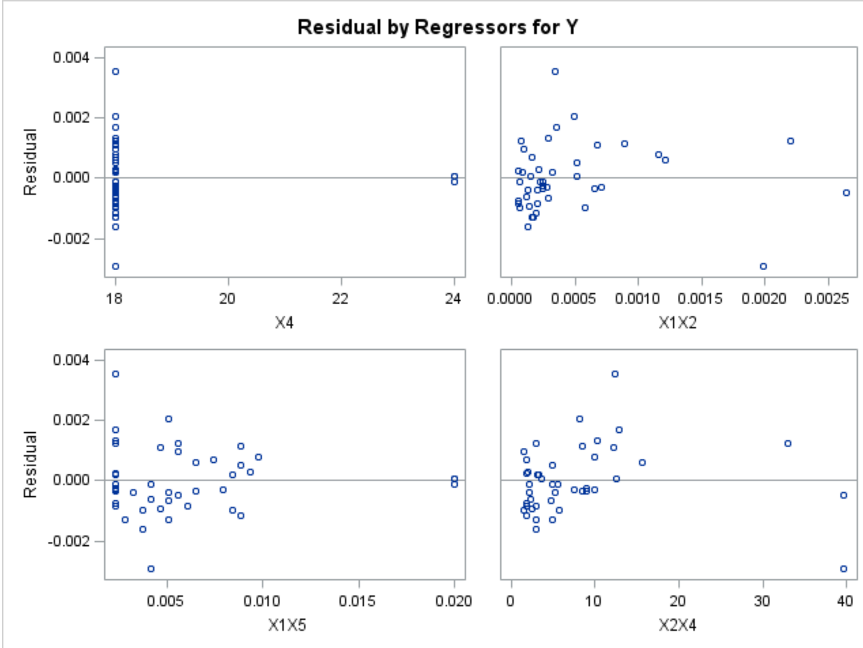
Summary of Forward Selection

Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1X5	1	0.1599	0.1599	10.4116	7.80	0.0079
2	X2X4	2	0.0561	0.2160	9.1114	2.86	0.0984
3	X1X2	3	0.0504	0.2664	8.1492	2.68	0.1098
4	X4	4	0.1045	0.3709	4.0009	6.31	0.0163

FORWARD REGRESSION
Pollutant: Dissolved Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
0.004
0.002
0.000
-0.002
18
20
22
24
X4
0.0000
0.0005
0.0010
0.0015
0.0020
0.0025
X1X2
0.005
0.010
0.015
0.020
X1X5
0
10
20
30
40
X2X4

BACKWARD REGRESSION
Pollutant: Dissolved Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	75
Number of Observations Used	43
Number of Observations with Missing Values	32

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0056	-0.0308	-0.0308	-0.0308	0.2941	0.1980	0.9855	0.4906	-0.0194	0.0040	-0.0087	-0.0308	-0.0308	-0.0308	-0.1735
X2	0.0056	1.0000	-0.0718	-0.0718	-0.0718	0.9331	-0.0692	-0.0067	-0.0598	0.5509	0.9983	0.8642	-0.0718	-0.0718	-0.0718	0.2591
X3	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X4	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X5	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X1X2	0.2941	0.9331	-0.0745	-0.0745	-0.0745	1.0000	-0.0059	0.2787	0.0872	0.5064	0.9310	0.8018	-0.0745	-0.0745	-0.0745	0.1074
X1X3	0.1980	-0.0692	0.9736	0.9736	0.9736	-0.0059	1.0000	0.3614	0.9513	0.6730	-0.0193	0.3689	0.9736	0.9736	0.9736	-0.3884
X1X4	0.9855	-0.0067	0.1392	0.1392	0.1392	0.2787	0.3614	1.0000	0.6313	0.0980	0.0004	0.0555	0.1392	0.1392	0.1392	-0.2322
X1X5	0.4906	-0.0598	0.8559	0.8559	0.8559	0.0872	0.9513	0.6313	1.0000	0.5922	-0.0159	0.3252	0.8559	0.8559	0.8559	-0.3999
X2X3	-0.0194	0.5509	0.6907	0.6907	0.6907	0.5064	0.6730	0.0980	0.5922	1.0000	0.5987	0.8960	0.6907	0.6907	0.6907	-0.0776
X2X4	0.0040	0.9983	-0.0206	-0.0206	-0.0206	0.9310	-0.0193	0.0004	-0.0159	0.5987	1.0000	0.8921	-0.0206	-0.0206	-0.0206	0.2432
X2X5	-0.0087	0.8642	0.3782	0.3782	0.3782	0.8018	0.3689	0.0555	0.3252	0.8960	0.8921	1.0000	0.3782	0.3782	0.3782	0.0911
X3X4	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X3X5	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X4X5	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
Y	-0.1735	0.2591	-0.3557	-0.3557	-0.3557	0.1074	-0.3884	-0.2322	-0.3999	-0.0776	0.2432	0.0911	-0.3557	-0.3557	-0.3557	1.0000

BACKWARD REGRESSION
Pollutant: Dissolved Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	75
Number of Observations Used	43
Number of Observations with Missing Values	32

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.3709 and C(p) = 6.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00003108	0.00000622	4.36	0.0032
Error	37	0.00005271	0.00000142		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00226	0.00074241	0.00001318	9.25	0.0043
X1	0.95443	0.61722	0.00000341	2.39	0.1305
X2	0.00516	0.00174	0.00001255	8.81	0.0052
X3	-3.61813E-7	2.199936E-7	0.00000385	2.70	0.1085
X1X2	-4.42141	1.48529	0.00001262	8.86	0.0051
X2X3	2.845791E-7	6.411472E-7	2.80647E-7	0.20	0.6597

Bounds on condition number: 22.577, 289.32

Backward Elimination: Step 1

Variable X2X3 Removed: R-Square = 0.3676 and C(p) = 4.1970

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00003080	0.00000770	5.52	0.0013
Error	38	0.00005299	0.00000139		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00218	0.00071167	0.00001304	9.35	0.0041
X1	0.95993	0.61054	0.00000345	2.47	0.1242
X2	0.00542	0.00162	0.00001567	11.24	0.0018
X3	-2.76147E-7	1.04456E-7	0.00000975	6.99	0.0119
X1X2	-4.43801	1.46904	0.00001273	9.13	0.0045

Bounds on condition number: 21.841, 182.53

Backward Elimination: Step 2

Variable X2X4 Entered: R-Square = 0.3709 and C(p) = 6.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00003108	0.00000622	4.36	0.0032
Error	37	0.00005271	0.00000142		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00226	0.00074241	0.00001318	9.25	0.0043
X1	0.95443	0.61722	0.00000341	2.39	0.1305
X2	-0.00040311	0.01323	1.32267E-9	0.00	0.9759
X3	-3.61813E-7	2.199936E-7	0.00000385	2.70	0.1085
X1X2	-4.42141	1.48529	0.00001262	8.86	0.0051
X2X4	0.00032195	0.00072535	2.80647E-7	0.20	0.6597

Bounds on condition number: 1306.4, 13045

Backward Elimination: Step 3

Variable X2 Removed: R-Square = 0.3709 and C(p) = 4.0009

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00003108	0.00000777	5.60	0.0012
Error	38	0.00005271	0.00000139		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F

Intercept	0.00225	0.00068937	0.00001478	10.66	0.0023
X1	0.95662	0.60490	0.00000347	2.50	0.1221
X3	-3.55968E-7	1.063004E-7	0.00001555	11.21	0.0018
X1X2	-4.42799	1.45005	0.00001293	9.32	0.0041
X2X4	0.00030002	0.00008848	0.00001595	11.50	0.0016

Bounds on condition number: 21.393, 178.75

Backward Elimination: Step 4

Variable X2X5 Entered: R-Square = 0.3709 and C(p) = 6.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Note:

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	5	0.00003108	0.00000622	4.36	0.0032
Error	37	0.00005271	0.00000142		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00226	0.00074241	0.00001318	9.25	0.0043
X1	0.95443	0.61722	0.00000341	2.39	0.1305
X3	-3.61813E-7	2.199936E-7	0.00000385	2.70	0.1085
X1X2	-4.42141	1.48529	0.00001262	8.86	0.0051
X2X4	0.00029702	0.00013308	0.00000710	4.98	0.0318
X2X5	0.00000977	0.00032063	1.32267E-9	0.00	0.9759

Bounds on condition number: 42.871, 468.78

Backward Elimination: Step 5

Variable X2X5 Removed: R-Square = 0.3709 and C(p) = 4.0009

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	0.00003108	0.00000777	5.60	0.0012
Error	38	0.00005271	0.00000139		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00225	0.00068937	0.00001478	10.66	0.0023
X1	0.95662	0.60490	0.00000347	2.50	0.1221

X3	-3.55968E-7	1.063004E-7	0.00001555	11.21	0.0018
X1X2	-4.42799	1.45005	0.00001293	9.32	0.0041
X2X4	0.00030002	0.00008848	0.00001595	11.50	0.0016

Bounds on condition number: 21.393, 178.75

Backward Elimination: Step 6

Variable X1 Removed: R-Square = 0.3295 and C(p) = 4.4362

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00002761	0.00000920	6.39	0.0013
Error	39	0.00005618	0.00000144		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00325	0.00028095	0.00019271	133.78	<.0001
X3	-3.30747E-7	1.071007E-7	0.00001374	9.54	0.0037
X1X2	-2.59217	0.88553	0.00001234	8.57	0.0057
X2X4	0.00019099	0.00005651	0.00001646	11.42	0.0017

Bounds on condition number: 7.6825, 49.049

Backward Elimination: Step 7

Variable X1X3 Entered: R-Square = 0.3709 and C(p) = 4.0009

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00003108	0.00000777	5.60	0.0012
Error	38	0.00005271	0.00000139		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00321	0.00027700	0.00018591	134.03	<.0001
X3	-0.00000153	7.681197E-7	0.00000553	3.99	0.0530
X1X2	-4.42799	1.45005	0.00001293	9.32	0.0041
X1X3	0.00118	0.00074495	0.00000347	2.50	0.1221
X2X4	0.00030002	0.00008848	0.00001595	11.50	0.0016

Bounds on condition number: 54.696, 596.17

Backward Elimination: Step 8

Variable X1X3 Removed: R-Square = 0.3295 and C(p) = 4.4362

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00002761	0.00000920	6.39	0.0013
Error	39	0.00005618	0.00000144		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00325	0.00028095	0.00019271	133.78	<.0001
X3	-3.30747E-7	1.071007E-7	0.00001374	9.54	0.0037
X1X2	-2.59217	0.88553	0.00001234	8.57	0.0057
X2X4	0.00019099	0.00005651	0.00001646	11.42	0.0017

Bounds on condition number: 7.6825, 49.049

Backward Elimination: Step 9

Variable X1X4 Entered: R-Square = 0.3709 and C(p) = 4.0009

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00003108	0.00000777	5.60	0.0012
Error	38	0.00005271	0.00000139		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00229	0.00066733	0.00001631	11.76	0.0015
X3	-4.02945E-7	1.145843E-7	0.00001715	12.37	0.0011
X1X2	-4.42799	1.45005	0.00001293	9.32	0.0041
X1X4	0.05315	0.03361	0.00000347	2.50	0.1221
X2X4	0.00030002	0.00008848	0.00001595	11.50	0.0016

Bounds on condition number: 21.393, 179.63

Backward Elimination: Step 10

Variable X1X4 Removed: R-Square = 0.3295 and C(p) = 4.4362

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00002761	0.00000920	6.39	0.0013
Error	39	0.00005618	0.00000144		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00325	0.00028095	0.00019271	133.78	<.0001
X3	-3.30747E-7	1.071007E-7	0.00001374	9.54	0.0037
X1X2	-2.59217	0.88553	0.00001234	8.57	0.0057
X2X4	0.00019099	0.00005651	0.00001646	11.42	0.0017

Bounds on condition number: 7.6825, 49.049

Backward Elimination: Step 11

Variable X1X5 Entered: R-Square = 0.3709 and C(p) = 4.0009
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Note:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00003108	0.00000777	5.60	0.0012
Error	38	0.00005271	0.00000139		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00263	0.00048138	0.00004126	29.75	<.0001
X3	-8.17985E-7	3.255252E-7	0.00000876	6.31	0.0163
X1X2	-4.42799	1.45005	0.00001293	9.32	0.0041
X1X5	0.20484	0.12953	0.00000347	2.50	0.1221
X2X4	0.00030002	0.00008848	0.00001595	11.50	0.0016

Bounds on condition number: 21.393, 244.34

Backward Elimination: Step 12

Variable X1X5 Removed: R-Square = 0.3295 and C(p) = 4.4362

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00002761	0.00000920	6.39	0.0013
Error	39	0.00005618	0.00000144		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00325	0.00028095	0.00019271	133.78	<.0001
X3	-3.30747E-7	1.071007E-7	0.00001374	9.54	0.0037
X1X2	-2.59217	0.88553	0.00001234	8.57	0.0057
X2X4	0.00019099	0.00005651	0.00001646	11.42	0.0017

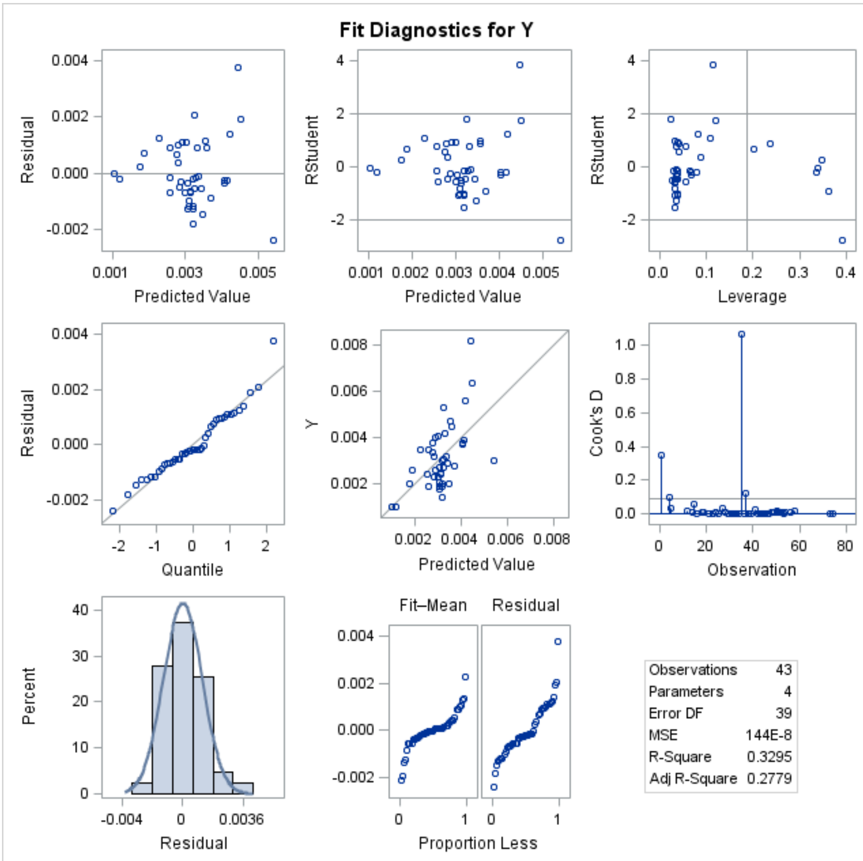
Bounds on condition number: 7.6825, 49.049

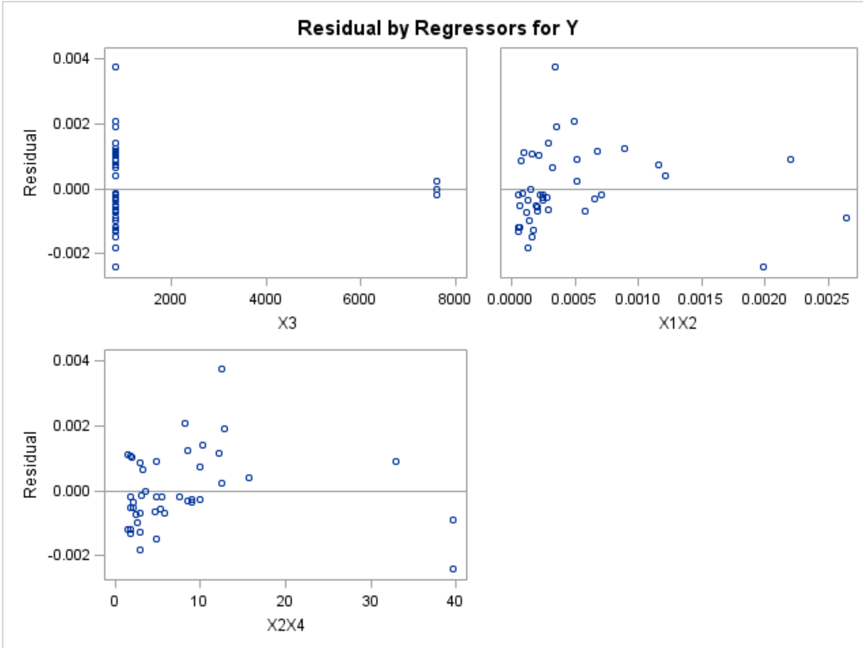
All variables left in the model are significant at the 0.1000 level.

Summary of Backward Elimination								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1		X2X3	4	0.0033	0.3676	4.1970	0.20	0.6597
2	X2X4		5	0.0033	0.3709	6.0000	0.20	0.6597
3		X2	4	0.0000	0.3709	4.0009	0.00	0.9759
4	X2X5		5	0.0000	0.3709	6.0000	0.00	0.9759
5		X2X5	4	0.0000	0.3709	4.0009	0.00	0.9759
6		X1	3	0.0414	0.3295	4.4362	2.50	0.1221
7	X1X3		4	0.0414	0.3709	4.0009	2.50	0.1221
8		X1X3	3	0.0414	0.3295	4.4362	2.50	0.1221
9	X1X4		4	0.0414	0.3709	4.0009	2.50	0.1221
10		X1X4	3	0.0414	0.3295	4.4362	2.50	0.1221
11	X1X5		4	0.0414	0.3709	4.0009	2.50	0.1221
12		X1X5	3	0.0414	0.3295	4.4362	2.50	0.1221

BACKWARD REGRESSION
Pollutant: Dissolved Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
0.004
0.002
0.000
-0.002
2000
4000
6000
8000
X3
0.0000
0.0005
0.0010
0.0015
0.0020
0.0025
X1X2
0
10
20
30
40
X2X4

STEPWISE REGRESSION
Pollutant: Dissolved Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	75
Number of Observations Used	43
Number of Observations with Missing Values	32

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0056	-0.0308	-0.0308	-0.0308	0.2941	0.1980	0.9855	0.4906	-0.0194	0.0040	-0.0087	-0.0308	-0.0308	-0.0308	-0.1735
X2	0.0056	1.0000	-0.0718	-0.0718	-0.0718	0.9331	-0.0692	-0.0067	-0.0598	0.5509	0.9983	0.8642	-0.0718	-0.0718	-0.0718	0.2591
X3	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X4	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X5	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X1X2	0.2941	0.9331	-0.0745	-0.0745	-0.0745	1.0000	-0.0059	0.2787	0.0872	0.5064	0.9310	0.8018	-0.0745	-0.0745	-0.0745	0.1074
X1X3	0.1980	-0.0692	0.9736	0.9736	0.9736	-0.0059	1.0000	0.3614	0.9513	0.6730	-0.0193	0.3689	0.9736	0.9736	0.9736	-0.3884
X1X4	0.9855	-0.0067	0.1392	0.1392	0.1392	0.2787	0.3614	1.0000	0.6313	0.0980	0.0004	0.0555	0.1392	0.1392	0.1392	-0.2322
X1X5	0.4906	-0.0598	0.8559	0.8559	0.8559	0.0872	0.9513	0.6313	1.0000	0.5922	-0.0159	0.3252	0.8559	0.8559	0.8559	-0.3999
X2X3	-0.0194	0.5509	0.6907	0.6907	0.6907	0.5064	0.6730	0.0980	0.5922	1.0000	0.5987	0.8960	0.6907	0.6907	0.6907	-0.0776
X2X4	0.0040	0.9983	-0.0206	-0.0206	-0.0206	0.9310	-0.0193	0.0004	-0.0159	0.5987	1.0000	0.8921	-0.0206	-0.0206	-0.0206	0.2432
X2X5	-0.0087	0.8642	0.3782	0.3782	0.3782	0.8018	0.3689	0.0555	0.3252	0.8960	0.8921	1.0000	0.3782	0.3782	0.3782	0.0911
X3X4	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X3X5	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X4X5	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
Y	-0.1735	0.2591	-0.3557	-0.3557	-0.3557	0.1074	-0.3884	-0.2322	-0.3999	-0.0776	0.2432	0.0911	-0.3557	-0.3557	-0.3557	1.0000

STEPWISE REGRESSION
Pollutant: Dissolved Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	75
Number of Observations Used	43
Number of Observations with Missing Values	32

Stepwise Selection: Step 1

Variable X1X5 Entered: R-Square = 0.1599 and C(p) = 10.4116

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00001340	0.00001340	7.80	0.0079
Error	41	0.00007039	0.00000172		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00390	0.00033423	0.00023315	135.81	<.0001
X1X5	-0.12478	0.04466	0.00001340	7.80	0.0079

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X2X4 Entered: R-Square = 0.2160 and C(p) = 9.1114

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00001810	0.00000905	5.51	0.0077
Error	40	0.00006569	0.00000164		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00360	0.00037127	0.00015416	93.87	<.0001

X1X5	-0.12360	0.04369	0.00001314	8.00	0.0073
X2X4	0.00003693	0.00002183	0.00000470	2.86	0.0984

Bounds on condition number: 1.0003, 4.001

Stepwise Selection: Step 3

Variable X1X2 Entered: R-Square = 0.2664 and C(p) = 8.1492

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	0.00002232	0.00000744	4.72	0.0066
Error	39	0.00006147	0.00000158		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00345	0.00037423	0.00013419	85.14	<.0001
X1X2	-1.56036	0.95360	0.00000422	2.68	0.1098
X1X5	-0.10321	0.04458	0.00000845	5.36	0.0260
X2X4	0.00013003	0.00006078	0.00000721	4.58	0.0387

Bounds on condition number: 8.1424, 51.93

Stepwise Selection: Step 4

Variable X4 Entered: R-Square = 0.3709 and C(p) = 4.0009

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	0.00003108	0.00000777	5.60	0.0012
Error	38	0.00005271	0.00000139		
Corrected Total	42	0.00008379			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01862	0.00605	0.00001316	9.48	0.0038
X4	-0.00092541	0.00036828	0.00000876	6.31	0.0163
X1X2	-4.42799	1.45005	0.00001293	9.32	0.0041
X1X5	0.20484	0.12953	0.00000347	2.50	0.1221
X2X4	0.00030002	0.00008848	0.00001595	11.50	0.0016

Bounds on condition number: 21.393, 244.34

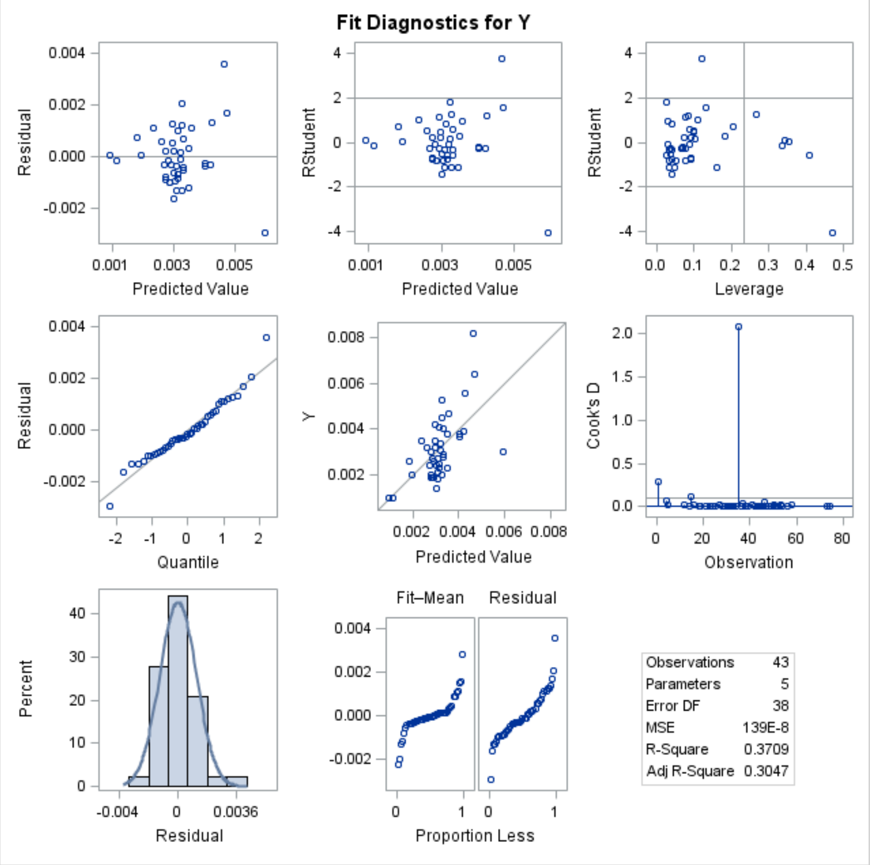
All variables left in the model are significant at the 0.1500 level.

No other variable met the 0.1500 significance level for entry into the model.

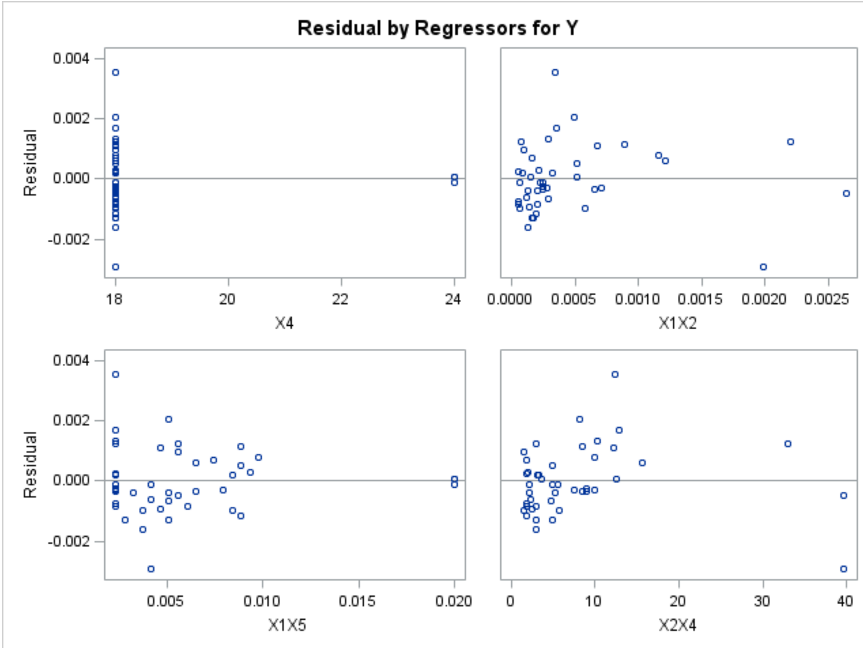
Summary of Stepwise Selection								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1X5		1	0.1599	0.1599	10.4116	7.80	0.0079
2	X2X4		2	0.0561	0.2160	9.1114	2.86	0.0984
3	X1X2		3	0.0504	0.2664	8.1492	2.68	0.1098
4	X4		4	0.1045	0.3709	4.0009	6.31	0.0163

STEPWISE REGRESSION
Pollutant: Dissolved Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Observations	43
Parameters	5
Error DF	38
MSE	139E-8
R-Square	0.3709
Adj R-Square	0.3047


Residual by Regressors for Y
Residual
X4
X1X2
X1X5
X2X4
0.004
0.002
0.000
-0.002
18
20
22
24
0.0000
0.0005
0.0010
0.0015
0.0020
0.0025
0.005
0.010
0.015
0.020
0
10
20
30
40

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Phosphorus

==

The REG Procedure

Number of Observations Read	75
Number of Observations Used	43
Number of Observations with Missing Values	32

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0056	-0.0308	-0.0308	-0.0308	0.2941	0.1980	0.9855	0.4906	-0.0194	0.0040	-0.0087	-0.0308	-0.0308	-0.0308	-0.1735
X2	0.0056	1.0000	-0.0718	-0.0718	-0.0718	0.9331	-0.0692	-0.0067	-0.0598	0.5509	0.9983	0.8642	-0.0718	-0.0718	-0.0718	0.2591
X3	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X4	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X5	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X1X2	0.2941	0.9331	-0.0745	-0.0745	-0.0745	1.0000	-0.0059	0.2787	0.0872	0.5064	0.9310	0.8018	-0.0745	-0.0745	-0.0745	0.1074
X1X3	0.1980	-0.0692	0.9736	0.9736	0.9736	-0.0059	1.0000	0.3614	0.9513	0.6730	-0.0193	0.3689	0.9736	0.9736	0.9736	-0.3884
X1X4	0.9855	-0.0067	0.1392	0.1392	0.1392	0.2787	0.3614	1.0000	0.6313	0.0980	0.0004	0.0555	0.1392	0.1392	0.1392	-0.2322
X1X5	0.4906	-0.0598	0.8559	0.8559	0.8559	0.0872	0.9513	0.6313	1.0000	0.5922	-0.0159	0.3252	0.8559	0.8559	0.8559	-0.3999
X2X3	-0.0194	0.5509	0.6907	0.6907	0.6907	0.5064	0.6730	0.0980	0.5922	1.0000	0.5987	0.8960	0.6907	0.6907	0.6907	-0.0776
X2X4	0.0040	0.9983	-0.0206	-0.0206	-0.0206	0.9310	-0.0193	0.0004	-0.0159	0.5987	1.0000	0.8921	-0.0206	-0.0206	-0.0206	0.2432
X2X5	-0.0087	0.8642	0.3782	0.3782	0.3782	0.8018	0.3689	0.0555	0.3252	0.8960	0.8921	1.0000	0.3782	0.3782	0.3782	0.0911
X3X4	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X3X5	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
X4X5	-0.0308	-0.0718	1.0000	1.0000	1.0000	-0.0745	0.9736	0.1392	0.8559	0.6907	-0.0206	0.3782	1.0000	1.0000	1.0000	-0.3557
Y	-0.1735	0.2591	-0.3557	-0.3557	-0.3557	0.1074	-0.3884	-0.2322	-0.3999	-0.0776	0.2432	0.0911	-0.3557	-0.3557	-0.3557	1.0000

===

MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Phosphorus

===

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	75
Number of Observations Used	43
Number of Observations with Missing Values	32

Number in Model	R-Square	Variables in Model
1	0.1599	X1X5
1	0.1509	X1X3
1	0.1265	X4
1	0.1265	X3X4
1	0.1265	X3
1	0.1265	X3X5
1	0.1265	X4X5
1	0.1265	X5
1	0.0671	X2
1	0.0592	X2X4
1	0.0539	X1X4
1	0.0301	X1
1	0.0115	X1X2
1	0.0083	X2X5
1	0.0060	X2X3
2	0.2160	X1X5 X2X4
2	0.2154	X2 X1X5
2	0.2146	X1X5 X2X5
2	0.2145	X1X3 X2X5
2	0.2126	X1X3 X2X3
2	0.2068	X2 X1X2
2	0.2065	X1X3 X2X4
2	0.2051	X2 X1X3
2	0.1989	X1X5 X2X3
2	0.1859	X4 X2X5
2	0.1859	X3 X2X5
2	0.1859	X2X5 X3X4
2	0.1859	X2X5 X3X5
2	0.1859	X2X5 X4X5
2	0.1859	X5 X2X5
3	0.3295	X4 X1X2 X2X4
3	0.3295	X3 X1X2 X2X4
3	0.3295	X1X2 X2X4 X3X4
3	0.3295	X1X2 X2X4 X3X5
3	0.3295	X1X2 X2X4 X4X5
3	0.3295	X5 X1X2 X2X4

3	0.3264	X2 X4 X1X2
3	0.3264	X2 X1X2 X3X4
3	0.3264	X2 X3 X1X2
3	0.3264	X2 X1X2 X3X5
3	0.3264	X2 X1X2 X4X5
3	0.3264	X2 X5 X1X2
3	0.3058	X2 X1X2 X1X3
3	0.3049	X1X2 X1X3 X2X4
3	0.2853	X4 X1X2 X2X5
4	0.3709	X4 X1X2 X1X3 X2X4
4	0.3709	X4 X1X2 X1X5 X2X4
4	0.3709	X4 X1X2 X1X4 X2X4
4	0.3709	X1 X4 X1X2 X2X4
4	0.3709	X1 X1X2 X1X4 X2X4
4	0.3709	X1X2 X1X3 X2X4 X3X5
4	0.3709	X1X2 X1X3 X2X4 X3X4
4	0.3709	X1 X1X2 X2X4 X3X5
4	0.3709	X1 X1X2 X2X4 X3X4
4	0.3709	X1X2 X1X4 X2X4 X4X5
4	0.3709	X1X2 X1X4 X2X4 X3X5
4	0.3709	X1X2 X1X4 X2X4 X3X4
4	0.3709	X1 X1X2 X1X3 X2X4
4	0.3709	X1X2 X1X3 X1X4 X2X4
4	0.3709	X1 X5 X1X2 X2X4
5	0.3709	X2 X4 X1X2 X1X3 X2X3
5	0.3709	X2 X4 X1X2 X1X3 X2X5
5	0.3709	X4 X1X2 X1X3 X2X3 X2X4
5	0.3709	X2 X4 X1X2 X1X3 X2X4
5	0.3709	X4 X1X2 X1X3 X2X4 X2X5
5	0.3709	X2 X4 X1X2 X1X5 X2X3
5	0.3709	X2 X4 X1X2 X1X5 X2X5
5	0.3709	X2 X4 X1X2 X1X5 X2X4
5	0.3709	X4 X1X2 X1X5 X2X3 X2X4
5	0.3709	X4 X1X2 X1X5 X2X4 X2X5
5	0.3709	X4 X1X2 X1X3 X2X3 X2X5
5	0.3709	X2 X4 X1X2 X1X4 X2X3
5	0.3709	X2 X4 X1X2 X1X4 X2X5
5	0.3709	X2 X4 X1X2 X1X4 X2X4
5	0.3709	X4 X1X2 X1X4 X2X3 X2X4

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Phosphorus

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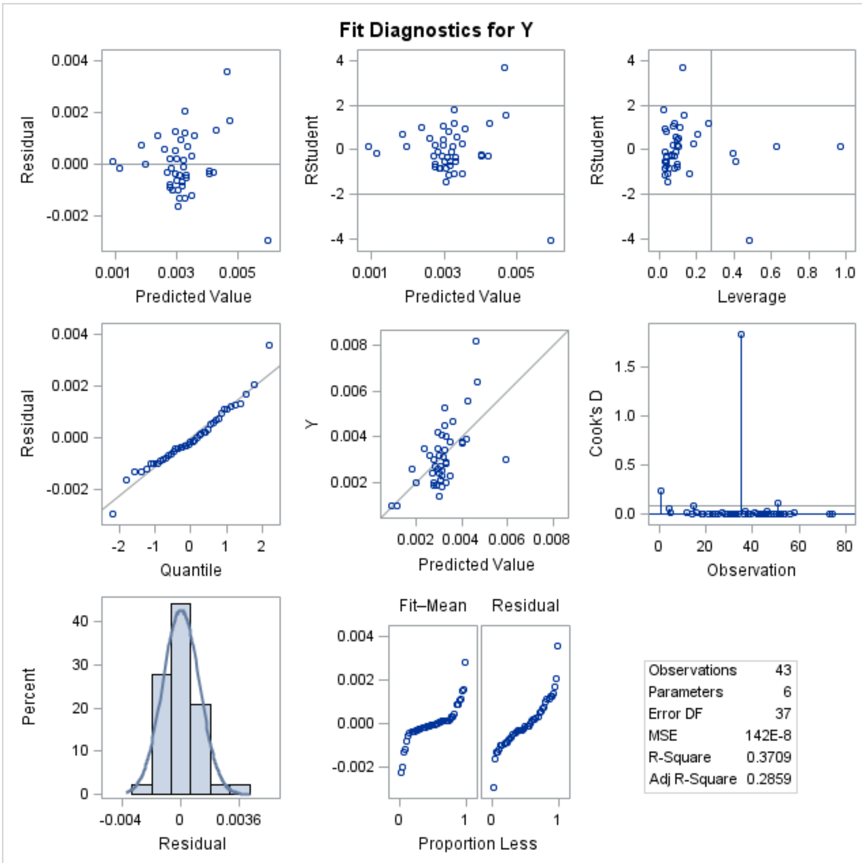
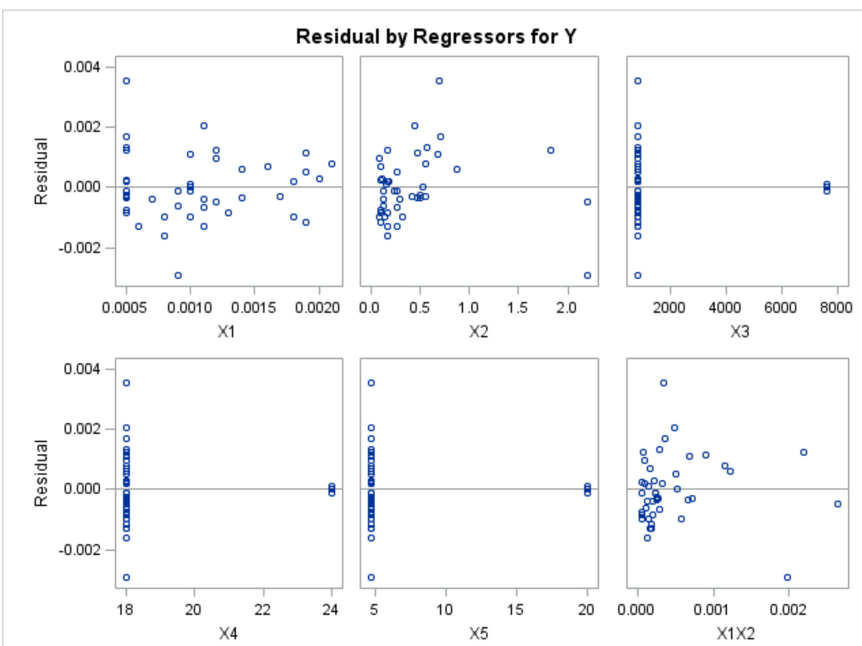
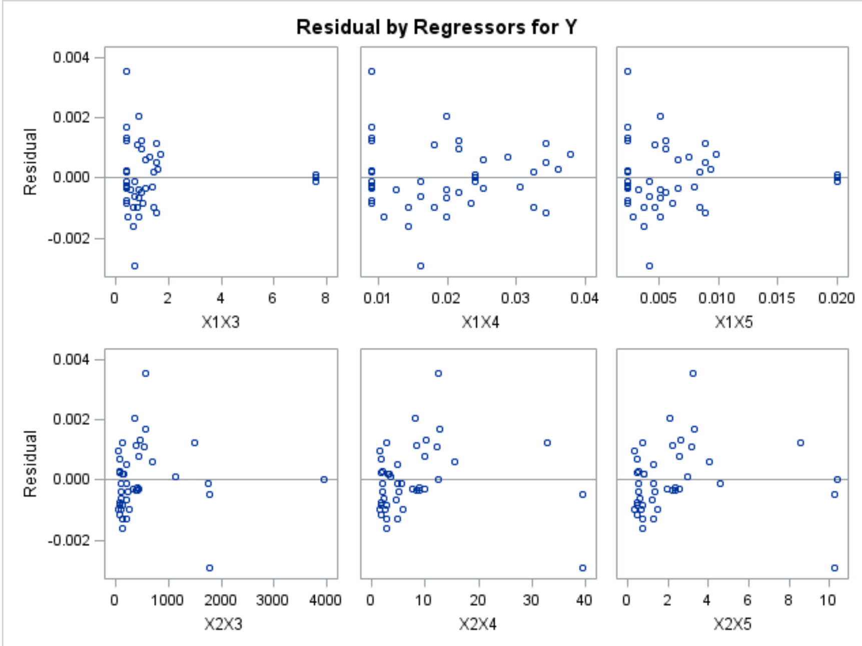
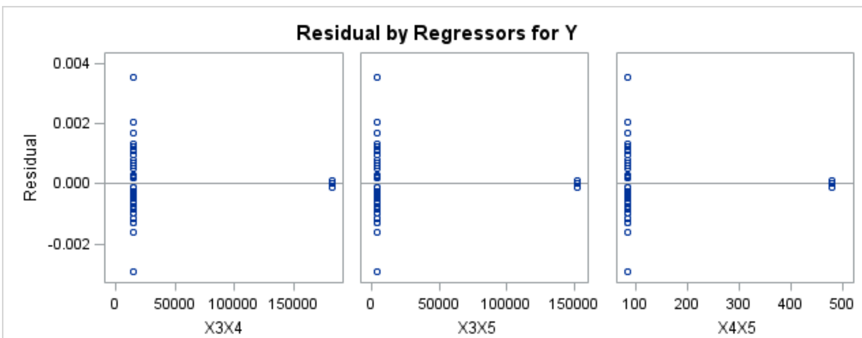
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
0.004
0.002
0.000
-0.002
X1X3
X1X4
X1X5
X2X3
X2X4
X2X5


Residual by Regressors for Y
Residual
0.004
0.002
0.000
-0.002
X3X4
X3X5
X4X5

FORWARD REGRESSION
Pollutant: Dissolved Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	86
Number of Observations Used	64
Number of Observations with Missing Values	22

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1429	-0.0448	0.0206	0.0005	0.4260	0.3944	0.9744	0.4947	-0.1885	-0.1650	-0.2382	-0.0465	-0.0518	0.0066	-0.1869
X2	-0.1429	1.0000	0.0150	-0.0565	-0.0764	0.7065	-0.1251	-0.1712	-0.2177	0.4328	0.9886	0.5670	0.0082	-0.0082	-0.0708	-0.0377
X3	-0.0448	0.0150	1.0000	0.9621	0.9410	-0.0795	0.7706	0.1229	0.6071	0.7739	0.1441	0.6999	0.9995	0.9943	0.9485	-0.3975
X4	0.0206	-0.0565	0.9621	1.0000	0.9922	-0.1416	0.8416	0.2160	0.7624	0.6610	0.0625	0.6111	0.9671	0.9750	0.9961	-0.4140
X5	0.0005	-0.0764	0.9410	0.9922	1.0000	-0.1839	0.8172	0.1961	0.7636	0.6385	0.0421	0.6087	0.9496	0.9665	0.9993	-0.4225
X1X2	0.4260	0.7065	-0.0795	-0.1416	-0.1839	1.0000	0.0317	0.3593	-0.0411	0.2166	0.6772	0.2401	-0.0909	-0.1190	-0.1718	-0.1350
X1X3	0.3944	-0.1251	0.7706	0.8416	0.8172	0.0317	1.0000	0.5792	0.9299	0.3669	-0.0516	0.3043	0.7726	0.7729	0.8258	-0.3617
X1X4	0.9744	-0.1712	0.1229	0.2160	0.1961	0.3593	0.5792	1.0000	0.6759	-0.1093	-0.1763	-0.1608	0.1232	0.1219	0.2026	-0.2461
X1X5	0.4947	-0.2177	0.6071	0.7624	0.7636	-0.0411	0.9299	0.6759	1.0000	0.1779	-0.1645	0.1553	0.6167	0.6361	0.7648	-0.3402
X2X3	-0.1885	0.4328	0.7739	0.6610	0.6385	0.2166	0.3669	-0.1093	0.1779	1.0000	0.5625	0.9612	0.7690	0.7546	0.6458	-0.3259
X2X4	-0.1650	0.9886	0.1441	0.0625	0.0421	0.6772	-0.0516	-0.1763	-0.1645	0.5625	1.0000	0.6830	0.1375	0.1212	0.0480	-0.0898
X2X5	-0.2382	0.5670	0.6999	0.6111	0.6087	0.2401	0.3043	-0.1608	0.1553	0.9612	0.6830	1.0000	0.6996	0.6970	0.6101	-0.3019
X3X4	-0.0465	0.0082	0.9995	0.9671	0.9496	-0.0909	0.7726	0.1232	0.6167	0.7690	0.1375	0.6996	1.0000	0.9971	0.9561	-0.4020
X3X5	-0.0518	-0.0082	0.9943	0.9750	0.9665	-0.1190	0.7729	0.1219	0.6361	0.7546	0.1212	0.6970	0.9971	1.0000	0.9704	-0.4115
X4X5	0.0066	-0.0708	0.9485	0.9961	0.9993	-0.1718	0.8258	0.2026	0.7648	0.6458	0.0480	0.6101	0.9561	0.9704	1.0000	-0.4207
Y	-0.1869	-0.0377	-0.3975	-0.4140	-0.4225	-0.1350	-0.3617	-0.2461	-0.3402	-0.3259	-0.0898	-0.3019	-0.4020	-0.4115	-0.4207	1.0000

FORWARD REGRESSION
Pollutant: Dissolved Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	86
Number of Observations Used	64
Number of Observations with Missing Values	22

Forward Selection: Step 1

Variable X5 Entered: R-Square = 0.1785 and C(p) = 5.6967

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.77164	1.77164	13.47	0.0005
Error	62	8.15220	0.13149		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.76070	0.06817	16.37471	124.53	<.0001
X5	-0.02851	0.00777	1.77164	13.47	0.0005

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X1X2 Entered: R-Square = 0.2253 and C(p) = 3.9522

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	2.23629	1.11814	8.87	0.0004
Error	61	7.68755	0.12603		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.86161	0.08495	12.96571	102.88	<.0001

X5	-0.03125	0.00774	2.05545	16.31	0.0002
X1X2	-1.07275	0.55868	0.46465	3.69	0.0595

Bounds on condition number: 1.035, 4.14

Forward Selection: Step 3

Variable X4X5 Entered: R-Square = 0.2401 and C(p) = 4.7709

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	2.38287	0.79429	6.32	0.0009
Error	60	7.54097	0.12568		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.16002	0.28904	2.02440	16.11	0.0002
X5	-0.26907	0.22035	0.18741	1.49	0.2268
X1X2	-1.28503	0.59153	0.59311	4.72	0.0338
X4X5	0.00934	0.00865	0.14659	1.17	0.2845

Bounds on condition number: 841.73, 5042.7

Forward Selection: Step 4

Variable X2 Entered: R-Square = 0.2578 and C(p) = 5.3576

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	2.55825	0.63956	5.12	0.0013
Error	59	7.36559	0.12484		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.17202	0.28825	2.06396	16.53	0.0001
X2	0.14397	0.12147	0.17537	1.40	0.2407
X5	-0.30223	0.22138	0.23267	1.86	0.1774
X1X2	-1.97706	0.82975	0.70876	5.68	0.0204
X4X5	0.01061	0.00868	0.18642	1.49	0.2266

Bounds on condition number: 855.39, 6843.1

Forward Selection: Step 5

Variable X1X5 Entered: R-Square = 0.2649 and C(p) = 6.7896

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	2.62873	0.52575	4.18	0.0026
Error	58	7.29512	0.12578		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.18030	0.28954	2.09017	16.62	0.0001
X2	0.19858	0.14209	0.24569	1.95	0.1675
X5	-0.31868	0.22330	0.25619	2.04	0.1589
X1X2	-2.31289	0.94601	0.75184	5.98	0.0175
X1X5	0.05392	0.07203	0.07048	0.56	0.4571
X4X5	0.01093	0.00873	0.19723	1.57	0.2155

Bounds on condition number: 863.76, 8629.4

Forward Selection: Step 6

Variable X1X4 Entered: R-Square = 0.2773 and C(p) = 7.7997

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	2.75156	0.45859	3.64	0.0039
Error	57	7.17228	0.12583		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.32392	0.32403	2.10057	16.69	0.0001
X2	0.09964	0.17386	0.04133	0.33	0.5688
X5	-0.32463	0.22342	0.26564	2.11	0.1517
X1X2	-1.41193	1.31409	0.14526	1.15	0.2871
X1X4	-0.07087	0.07173	0.12283	0.98	0.3273
X1X5	0.14948	0.12060	0.19330	1.54	0.2203
X4X5	0.01082	0.00873	0.19345	1.54	0.2201

Bounds on condition number: 864.39, 10462

Forward Selection: Step 7

Variable X1 Entered: R-Square = 0.3196 and C(p) = 6.4134

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	3.17176	0.45311	3.76	0.0021
Error	56	6.75208	0.12057		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.53014	0.71979	1.48980	12.36	0.0009
X1	78.12143	41.84703	0.42020	3.49	0.0672
X2	0.02872	0.17437	0.00327	0.03	0.8698
X5	-1.21802	0.52617	0.64611	5.36	0.0243
X1X2	-0.53261	1.36987	0.01823	0.15	0.6989
X1X4	-4.87721	2.57556	0.43237	3.59	0.0634
X1X5	1.98456	0.99005	0.48446	4.02	0.0499
X4X5	0.04567	0.02053	0.59674	4.95	0.0302

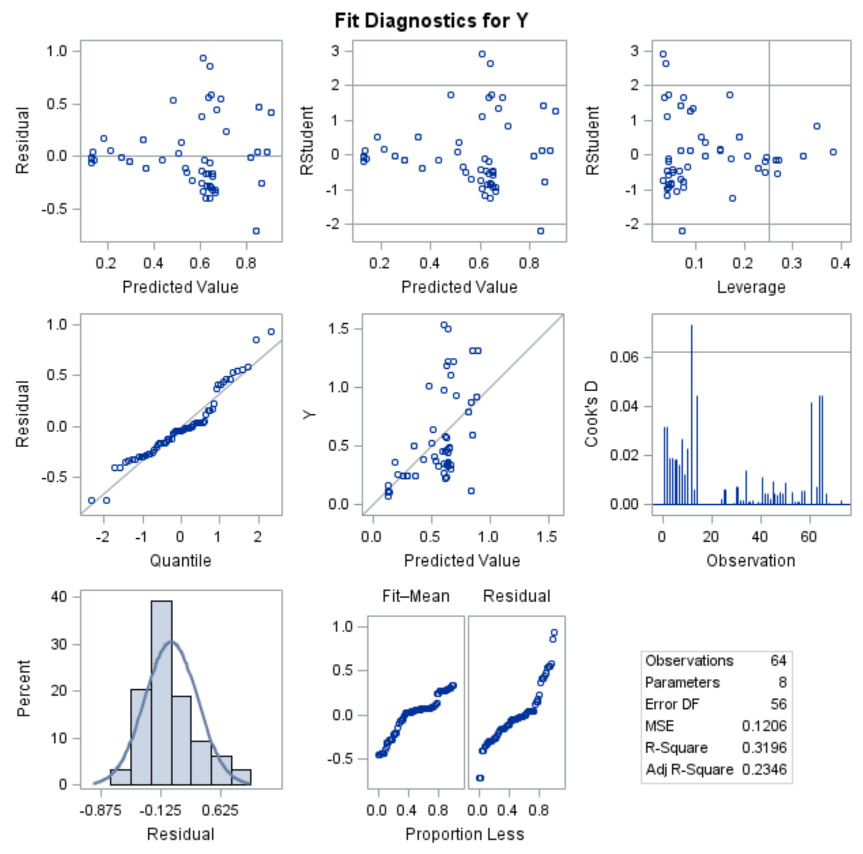
Bounds on condition number: 9181.4, 183145

No other variable met the 0.5000 significance level for entry into the model.

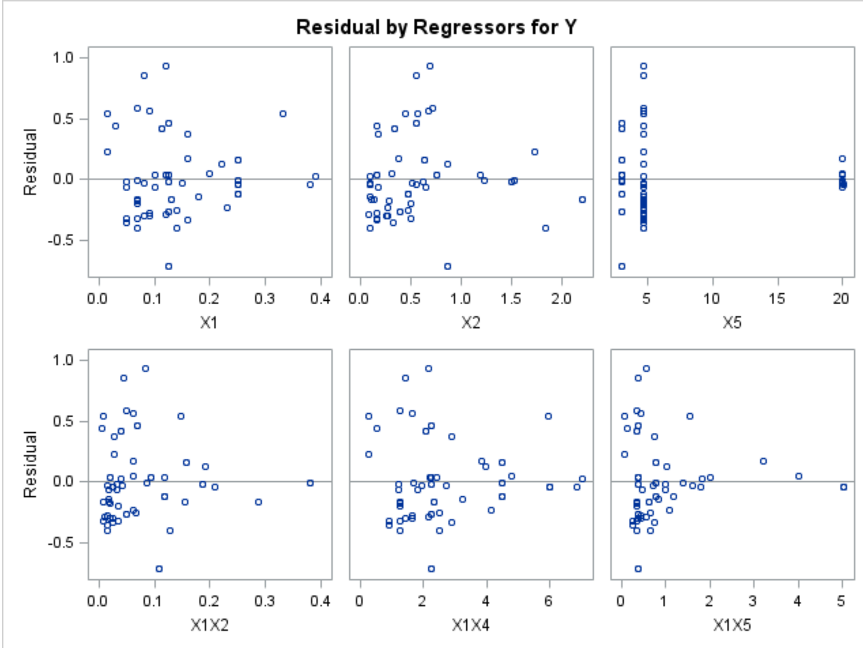
Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X5	1	0.1785	0.1785	5.6967	13.47	0.0005
2	X1X2	2	0.0468	0.2253	3.9522	3.69	0.0595
3	X4X5	3	0.0148	0.2401	4.7709	1.17	0.2845
4	X2	4	0.0177	0.2578	5.3576	1.40	0.2407
5	X1X5	5	0.0071	0.2649	6.7896	0.56	0.4571
6	X1X4	6	0.0124	0.2773	7.7997	0.98	0.3273
7	X1	7	0.0423	0.3196	6.4134	3.49	0.0672

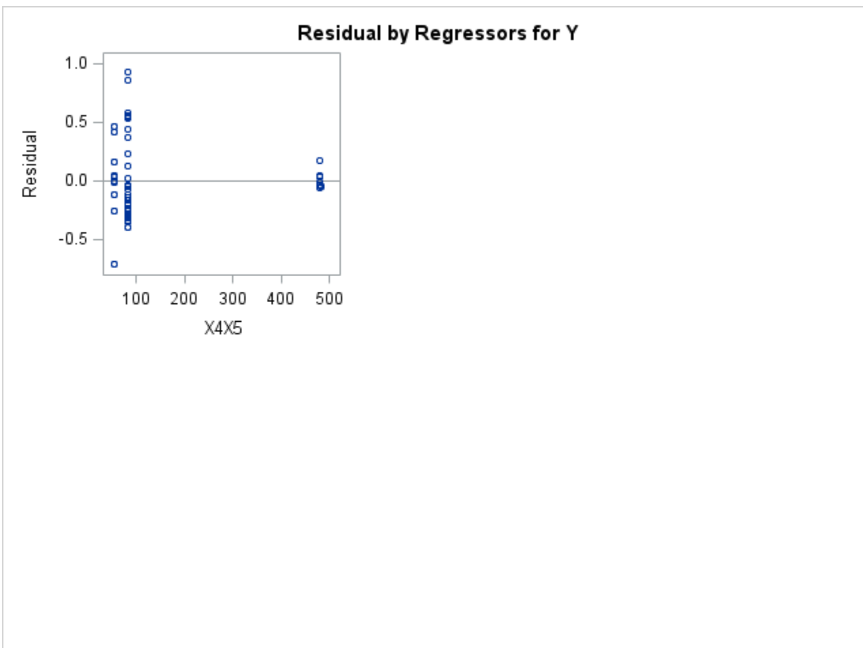
FORWARD REGRESSION
Pollutant: Dissolved Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Observations	64
Parameters	8
Error DF	56
MSE	0.1206
R-Square	0.3196
Adj R-Square	0.2346


Residual by Regressors for Y
Residual
X1
X2
X5
X1X2
X1X4
X1X5


Residual by Regressors for Y
Residual
X4X5

BACKWARD REGRESSION
Pollutant: Dissolved Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	86
Number of Observations Used	64
Number of Observations with Missing Values	22

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1429	-0.0448	0.0206	0.0005	0.4260	0.3944	0.9744	0.4947	-0.1885	-0.1650	-0.2382	-0.0465	-0.0518	0.0066	-0.1869
X2	-0.1429	1.0000	0.0150	-0.0565	-0.0764	0.7065	-0.1251	-0.1712	-0.2177	0.4328	0.9886	0.5670	0.0082	-0.0082	-0.0708	-0.0377
X3	-0.0448	0.0150	1.0000	0.9621	0.9410	-0.0795	0.7706	0.1229	0.6071	0.7739	0.1441	0.6999	0.9995	0.9943	0.9485	-0.3975
X4	0.0206	-0.0565	0.9621	1.0000	0.9922	-0.1416	0.8416	0.2160	0.7624	0.6610	0.0625	0.6111	0.9671	0.9750	0.9961	-0.4140
X5	0.0005	-0.0764	0.9410	0.9922	1.0000	-0.1839	0.8172	0.1961	0.7636	0.6385	0.0421	0.6087	0.9496	0.9665	0.9993	-0.4225
X1X2	0.4260	0.7065	-0.0795	-0.1416	-0.1839	1.0000	0.0317	0.3593	-0.0411	0.2166	0.6772	0.2401	-0.0909	-0.1190	-0.1718	-0.1350
X1X3	0.3944	-0.1251	0.7706	0.8416	0.8172	0.0317	1.0000	0.5792	0.9299	0.3669	-0.0516	0.3043	0.7726	0.7729	0.8258	-0.3617
X1X4	0.9744	-0.1712	0.1229	0.2160	0.1961	0.3593	0.5792	1.0000	0.6759	-0.1093	-0.1763	-0.1608	0.1232	0.1219	0.2026	-0.2461
X1X5	0.4947	-0.2177	0.6071	0.7624	0.7636	-0.0411	0.9299	0.6759	1.0000	0.1779	-0.1645	0.1553	0.6167	0.6361	0.7648	-0.3402
X2X3	-0.1885	0.4328	0.7739	0.6610	0.6385	0.2166	0.3669	-0.1093	0.1779	1.0000	0.5625	0.9612	0.7690	0.7546	0.6458	-0.3259
X2X4	-0.1650	0.9886	0.1441	0.0625	0.0421	0.6772	-0.0516	-0.1763	-0.1645	0.5625	1.0000	0.6830	0.1375	0.1212	0.0480	-0.0898
X2X5	-0.2382	0.5670	0.6999	0.6111	0.6087	0.2401	0.3043	-0.1608	0.1553	0.9612	0.6830	1.0000	0.6996	0.6970	0.6101	-0.3019
X3X4	-0.0465	0.0082	0.9995	0.9671	0.9496	-0.0909	0.7726	0.1232	0.6167	0.7690	0.1375	0.6996	1.0000	0.9971	0.9561	-0.4020
X3X5	-0.0518	-0.0082	0.9943	0.9750	0.9665	-0.1190	0.7729	0.1219	0.6361	0.7546	0.1212	0.6970	0.9971	1.0000	0.9704	-0.4115
X4X5	0.0066	-0.0708	0.9485	0.9961	0.9993	-0.1718	0.8258	0.2026	0.7648	0.6458	0.0480	0.6101	0.9561	0.9704	1.0000	-0.4207
Y	-0.1869	-0.0377	-0.3975	-0.4140	-0.4225	-0.1350	-0.3617	-0.2461	-0.3402	-0.3259	-0.0898	-0.3019	-0.4020	-0.4115	-0.4207	1.0000

BACKWARD REGRESSION
Pollutant: Dissolved Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	86
Number of Observations Used	64
Number of Observations with Missing Values	22

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.3373 and C(p) = 11.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	3.34715	0.33472	2.70	0.0095
Error	53	6.57669	0.12409		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	38.80956	21.07184	0.42092	3.39	0.0711
X1	-136.87466	64.04840	0.56671	4.57	0.0372
X2	-10.31819	9.60408	0.14323	1.15	0.2875
X3	0.00176	0.00083307	0.55524	4.47	0.0391
X4	-2.20850	1.23998	0.39364	3.17	0.0806
X5	0.04156	0.14873	0.00969	0.08	0.7810
X1X2	0.27358	1.62104	0.00353	0.03	0.8666
X1X3	-0.00664	0.00329	0.50692	4.09	0.0483
X1X4	7.86610	3.70499	0.55934	4.51	0.0384
X2X3	-0.00053320	0.00049180	0.14586	1.18	0.2832
X2X4	0.59758	0.55368	0.14455	1.16	0.2853

Bounds on condition number: 18461, 674142

Backward Elimination: Step 1

Variable X1X2 Removed: R-Square = 0.3369 and C(p) = 9.0285

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	3.34362	0.37151	3.05	0.0051
Error	54	6.58022	0.12186		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	37.77556	19.97929	0.43562	3.57	0.0640
X1	-132.95339	59.14602	0.61574	5.05	0.0287
X2	-9.47969	8.14483	0.16507	1.35	0.2496
X3	0.00171	0.00077406	0.59701	4.90	0.0311
X4	-2.14909	1.17822	0.40542	3.33	0.0737
X5	0.03989	0.14706	0.00897	0.07	0.7872
X1X3	-0.00645	0.00305	0.54502	4.47	0.0391
X1X4	7.64589	3.43628	0.60329	4.95	0.0303
X2X3	-0.00049146	0.00042127	0.16585	1.36	0.2485
X2X4	0.55050	0.47393	0.16441	1.35	0.2505

Bounds on condition number: 16171, 498009

Backward Elimination: Step 2

Variable X5 Removed: R-Square = 0.3360 and C(p) = 7.1007

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	3.33465	0.41683	3.48	0.0026
Error	55	6.58919	0.11980		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	33.14363	10.28294	1.24461	10.39	0.0021
X1	-121.38733	40.64055	1.06880	8.92	0.0042
X2	-10.79014	6.50169	0.32997	2.75	0.1027
X3	0.00156	0.00053163	1.03409	8.63	0.0048
X4	-1.87453	0.59791	1.17757	9.83	0.0028
X1X3	-0.00587	0.00216	0.88350	7.37	0.0088
X1X4	6.97433	2.36273	1.04387	8.71	0.0046
X2X3	-0.00055853	0.00033818	0.32680	2.73	0.1043
X2X4	0.62653	0.37891	0.32756	2.73	0.1039

Bounds on condition number: 7776.3, 233309

Backward Elimination: Step 3

Variable X1X5 Entered: R-Square = 0.3369 and C(p) = 9.0285

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	3.34362	0.37151	3.05	0.0051
Error	54	6.58022	0.12186		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	33.58198	10.49582	1.24746	10.24	0.0023
X1	-116.17908	45.26209	0.80285	6.59	0.0131
X2	-9.47969	8.14483	0.16507	1.35	0.2496
X3	0.00158	0.00054179	1.04030	8.54	0.0051
X4	-1.89988	0.61021	1.18126	9.69	0.0030
X1X3	-0.00593	0.00219	0.89245	7.32	0.0091
X1X4	6.64907	2.66761	0.75705	6.21	0.0158
X1X5	0.15955	0.58823	0.00897	0.07	0.7872
X2X3	-0.00049146	0.00042127	0.16585	1.36	0.2485
X2X4	0.55050	0.47393	0.16441	1.35	0.2505

Bounds on condition number: 11047, 360042

Backward Elimination: Step 4

Variable X1X5 Removed: R-Square = 0.3360 and C(p) = 7.1007

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	3.33465	0.41683	3.48	0.0026
Error	55	6.58919	0.11980		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	33.14363	10.28294	1.24461	10.39	0.0021
X1	-121.38733	40.64055	1.06880	8.92	0.0042
X2	-10.79014	6.50169	0.32997	2.75	0.1027
X3	0.00156	0.00053163	1.03409	8.63	0.0048
X4	-1.87453	0.59791	1.17757	9.83	0.0028
X1X3	-0.00587	0.00216	0.88350	7.37	0.0088
X1X4	6.97433	2.36273	1.04387	8.71	0.0046
X2X3	-0.00055853	0.00033818	0.32680	2.73	0.1043
X2X4	0.62653	0.37891	0.32756	2.73	0.1039

Bounds on condition number: 7776.3, 233309

Backward Elimination: Step 5

Variable X2X5 Entered: R-Square = 0.3369 and C(p) = 9.0285

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	3.34362	0.37151	3.05	0.0051
Error	54	6.58022	0.12186		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	33.58198	10.49582	1.24746	10.24	0.0023
X1	-132.95339	59.14602	0.61574	5.05	0.0287
X2	32.45609	159.57413	0.00504	0.04	0.8396
X3	0.00158	0.00054179	1.04030	8.54	0.0051
X4	-1.89988	0.61021	1.18126	9.69	0.0030
X1X3	-0.00645	0.00305	0.54502	4.47	0.0391
X1X4	7.64589	3.43628	0.60329	4.95	0.0303
X2X3	0.00081163	0.00506	0.00313	0.03	0.8732
X2X4	-1.94154	9.47562	0.00512	0.04	0.8384
X2X5	0.39888	1.47057	0.00897	0.07	0.7872

Bounds on condition number: 4416135, 73096310

Backward Elimination: Step 6

Variable X2X3 Removed: R-Square = 0.3366 and C(p) = 7.0537

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	3.34049	0.41756	3.49	0.0025
Error	55	6.58336	0.11970		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	33.38696	10.33232	1.24981	10.44	0.0021
X1	-126.33928	42.00141	1.08301	9.05	0.0040
X2	6.88575	4.51846	0.27798	2.32	0.1333

X3	0.00157	0.00053399	1.03985	8.69	0.0047
X4	-1.88864	0.60077	1.18295	9.88	0.0027
X1X3	-0.00612	0.00223	0.90435	7.56	0.0081
X1X4	7.26193	2.44211	1.05842	8.84	0.0044
X2X4	-0.42317	0.27224	0.28920	2.42	0.1258
X2X5	0.16367	0.09818	0.33264	2.78	0.1012

Bounds on condition number: 8315, 187674

Backward Elimination: Step 7

Variable X3X4 Entered: R-Square = 0.3369 and C(p) = 9.0285
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	9	3.34362	0.37151	3.05	0.0051
Error	54	6.58022	0.12186		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	35.41551	16.39547	0.56857	4.67	0.0352
X1	-132.95339	59.14602	0.61574	5.05	0.0287
X2	6.33641	5.70329	0.15041	1.23	0.2715
X3	0.00134	0.00154	0.09192	0.75	0.3889
X4	-2.00175	0.93020	0.56431	4.63	0.0359
X1X3	-0.00645	0.00305	0.54502	4.47	0.0391
X1X4	7.64589	3.43628	0.60329	4.95	0.0303
X2X4	-0.38937	0.34627	0.15408	1.26	0.2658
X2X5	0.15044	0.12895	0.16585	1.36	0.2485
X3X4	0.00001340	0.00008361	0.00313	0.03	0.8732

Bounds on condition number: 16171, 526648

Backward Elimination: Step 8

Variable X3X4 Removed: R-Square = 0.3366 and C(p) = 7.0537

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	8	3.34049	0.41756	3.49	0.0025
Error	55	6.58336	0.11970		

Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	33.38696	10.33232	1.24981	10.44	0.0021
X1	-126.33928	42.00141	1.08301	9.05	0.0040
X2	6.88575	4.51846	0.27798	2.32	0.1333
X3	0.00157	0.00053399	1.03985	8.69	0.0047
X4	-1.88864	0.60077	1.18295	9.88	0.0027
X1X3	-0.00612	0.00223	0.90435	7.56	0.0081
X1X4	7.26193	2.44211	1.05842	8.84	0.0044
X2X4	-0.42317	0.27224	0.28920	2.42	0.1258
X2X5	0.16367	0.09818	0.33264	2.78	0.1012

Bounds on condition number: 8315, 187674

Backward Elimination: Step 9

Variable X3X5 Entered: R-Square = 0.3369 and C(p) = 9.0285

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	3.34362	0.37151	3.05	0.0051
Error	54	6.58022	0.12186		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	35.37091	16.18172	0.58222	4.78	0.0332
X1	-132.95339	59.14602	0.61574	5.05	0.0287
X2	6.33641	5.70329	0.15041	1.23	0.2715
X3	0.00158	0.00054086	1.04186	8.55	0.0050
X4	-2.00007	0.92228	0.57307	4.70	0.0345
X1X3	-0.00645	0.00305	0.54502	4.47	0.0391
X1X4	7.64589	3.43628	0.60329	4.95	0.0303
X2X4	-0.38937	0.34627	0.15408	1.26	0.2658
X2X5	0.15044	0.12895	0.16585	1.36	0.2485
X3X5	0.00000413	0.00002577	0.00313	0.03	0.8732

Bounds on condition number: 16171, 392812

Backward Elimination: Step 10

Variable X3X5 Removed: R-Square = 0.3366 and C(p) = 7.0537

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	3.34049	0.41756	3.49	0.0025
Error	55	6.58336	0.11970		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	33.38696	10.33232	1.24981	10.44	0.0021
X1	-126.33928	42.00141	1.08301	9.05	0.0040
X2	6.88575	4.51846	0.27798	2.32	0.1333
X3	0.00157	0.00053399	1.03985	8.69	0.0047
X4	-1.88864	0.60077	1.18295	9.88	0.0027
X1X3	-0.00612	0.00223	0.90435	7.56	0.0081
X1X4	7.26193	2.44211	1.05842	8.84	0.0044
X2X4	-0.42317	0.27224	0.28920	2.42	0.1258
X2X5	0.16367	0.09818	0.33264	2.78	0.1012

Bounds on condition number: 8315, 187674

Backward Elimination: Step 11

Variable X4X5 Entered: R-Square = 0.3369 and C(p) = 9.0285

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	3.34362	0.37151	3.05	0.0051
Error	54	6.58022	0.12186		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	36.69997	23.14727	0.30632	2.51	0.1187
X1	-132.95339	59.14602	0.61574	5.05	0.0287
X2	6.33641	5.70329	0.15041	1.23	0.2715
X3	0.00166	0.00078067	0.55393	4.55	0.0376
X4	-2.08324	1.35688	0.28724	2.36	0.1305
X1X3	-0.00645	0.00305	0.54502	4.47	0.0391
X1X4	7.64589	3.43628	0.60329	4.95	0.0303
X2X4	-0.38937	0.34627	0.15408	1.26	0.2658
X2X5	0.15044	0.12895	0.16585	1.36	0.2485
X4X5	0.00138	0.00864	0.00313	0.03	0.8732

Bounds on condition number: 16171, 422359

Backward Elimination: Step 12

Variable X4X5 Removed: R-Square = 0.3366 and C(p) = 7.0537

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	3.34049	0.41756	3.49	0.0025
Error	55	6.58336	0.11970		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	33.38696	10.33232	1.24981	10.44	0.0021
X1	-126.33928	42.00141	1.08301	9.05	0.0040
X2	6.88575	4.51846	0.27798	2.32	0.1333
X3	0.00157	0.00053399	1.03985	8.69	0.0047
X4	-1.88864	0.60077	1.18295	9.88	0.0027
X1X3	-0.00612	0.00223	0.90435	7.56	0.0081
X1X4	7.26193	2.44211	1.05842	8.84	0.0044
X2X4	-0.42317	0.27224	0.28920	2.42	0.1258
X2X5	0.16367	0.09818	0.33264	2.78	0.1012

Bounds on condition number: 8315, 187674

Backward Elimination: Step 13

Variable X2 Removed: R-Square = 0.3086 and C(p) = 7.2939

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	3.06251	0.43750	3.57	0.0030
Error	56	6.86133	0.12252		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	25.54933	9.06652	0.97297	7.94	0.0067
X1	-97.69576	38.00188	0.80977	6.61	0.0128
X3	0.00113	0.00045391	0.76281	6.23	0.0156
X4	-1.42923	0.52576	0.90543	7.39	0.0087
X1X3	-0.00458	0.00201	0.63822	5.21	0.0263
X1X4	5.58318	2.20512	0.78545	6.41	0.0142
X2X4	-0.00854	0.00938	0.10149	0.83	0.3667
X2X5	0.02108	0.03009	0.06014	0.49	0.4865

Bounds on condition number: 6623.1, 92535

Backward Elimination: Step 14

Variable X2X5 Removed: R-Square = 0.3025 and C(p) = 5.7785

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	3.00237	0.50040	4.12	0.0017
Error	57	6.92147	0.12143		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	23.16849	8.36790	0.93086	7.67	0.0076
X1	-88.79400	35.65438	0.75312	6.20	0.0157
X3	0.00106	0.00043917	0.70433	5.80	0.0193
X4	-1.29353	0.48659	0.85813	7.07	0.0102
X1X3	-0.00428	0.00195	0.58402	4.81	0.0324
X1X4	5.07235	2.07176	0.72788	5.99	0.0175
X2X4	-0.00289	0.00478	0.04442	0.37	0.5477

Bounds on condition number: 5898.9, 70628

Backward Elimination: Step 15

Variable X2X4 Removed: R-Square = 0.2981 and C(p) = 4.1365

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	2.95795	0.59159	4.93	0.0008
Error	58	6.96589	0.12010		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	23.16673	8.32203	0.93072	7.75	0.0072
X1	-89.62602	35.43252	0.76844	6.40	0.0142
X3	0.00105	0.00043673	0.70065	5.83	0.0189
X4	-1.29517	0.48391	0.86034	7.16	0.0097
X1X3	-0.00431	0.00194	0.59255	4.93	0.0303
X1X4	5.12137	2.05883	0.74316	6.19	0.0158

Bounds on condition number: 5889.9, 58771

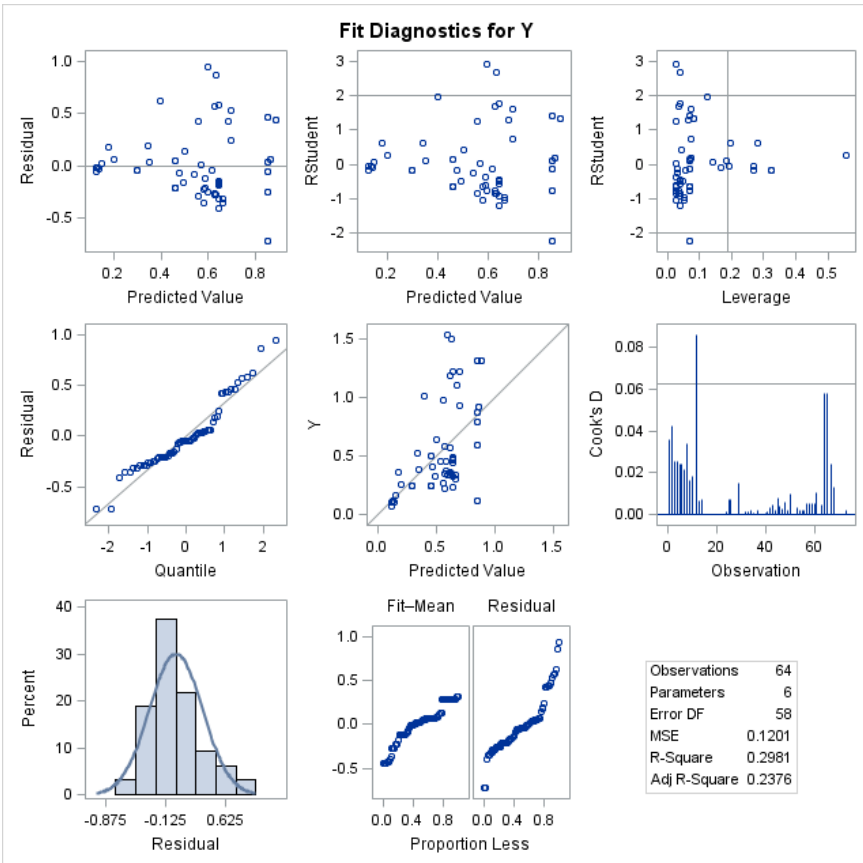
All variables left in the model are significant at the 0.1000 level.

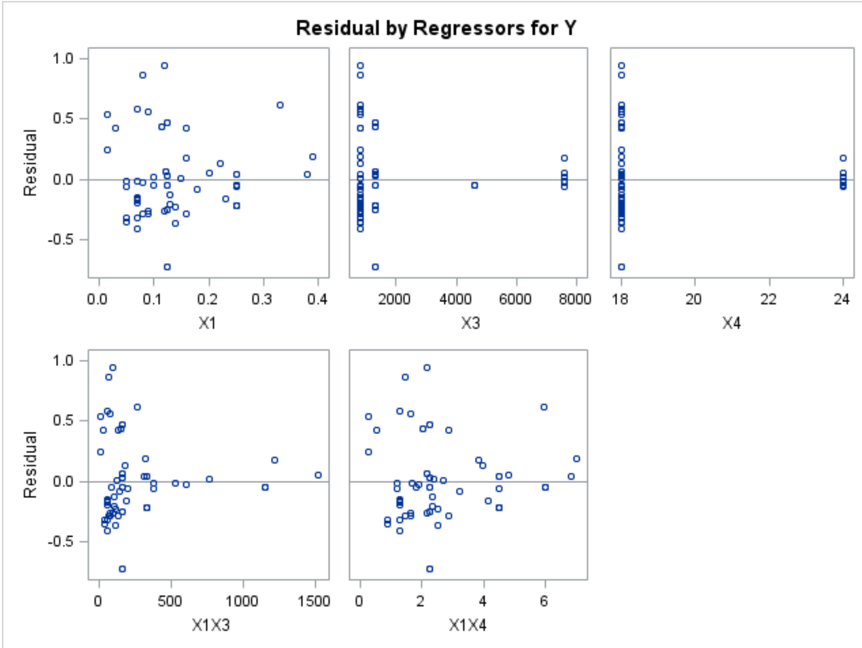
Summary of Backward Elimination

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1		X1X2	9	0.0004	0.3369	9.0285	0.03	0.8666
2		X5	8	0.0009	0.3360	7.1007	0.07	0.7872
3	X1X5		9	0.0009	0.3369	9.0285	0.07	0.7872
4		X1X5	8	0.0009	0.3360	7.1007	0.07	0.7872
5	X2X5		9	0.0009	0.3369	9.0285	0.07	0.7872
6		X2X3	8	0.0003	0.3366	7.0537	0.03	0.8732
7	X3X4		9	0.0003	0.3369	9.0285	0.03	0.8732
8		X3X4	8	0.0003	0.3366	7.0537	0.03	0.8732
9	X3X5		9	0.0003	0.3369	9.0285	0.03	0.8732
10		X3X5	8	0.0003	0.3366	7.0537	0.03	0.8732
11	X4X5		9	0.0003	0.3369	9.0285	0.03	0.8732
12		X4X5	8	0.0003	0.3366	7.0537	0.03	0.8732
13		X2	7	0.0280	0.3086	7.2939	2.32	0.1333
14		X2X5	6	0.0061	0.3025	5.7785	0.49	0.4865
15		X2X4	5	0.0045	0.2981	4.1365	0.37	0.5477

BACKWARD REGRESSION
Pollutant: Dissolved Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X1
X3
X4
X1X3
X1X4

STEPWISE REGRESSION
Pollutant: Dissolved Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	86
Number of Observations Used	64
Number of Observations with Missing Values	22

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1429	-0.0448	0.0206	0.0005	0.4260	0.3944	0.9744	0.4947	-0.1885	-0.1650	-0.2382	-0.0465	-0.0518	0.0066	-0.1869
X2	-0.1429	1.0000	0.0150	-0.0565	-0.0764	0.7065	-0.1251	-0.1712	-0.2177	0.4328	0.9886	0.5670	0.0082	-0.0082	-0.0708	-0.0377
X3	-0.0448	0.0150	1.0000	0.9621	0.9410	-0.0795	0.7706	0.1229	0.6071	0.7739	0.1441	0.6999	0.9995	0.9943	0.9485	-0.3975
X4	0.0206	-0.0565	0.9621	1.0000	0.9922	-0.1416	0.8416	0.2160	0.7624	0.6610	0.0625	0.6111	0.9671	0.9750	0.9961	-0.4140
X5	0.0005	-0.0764	0.9410	0.9922	1.0000	-0.1839	0.8172	0.1961	0.7636	0.6385	0.0421	0.6087	0.9496	0.9665	0.9993	-0.4225
X1X2	0.4260	0.7065	-0.0795	-0.1416	-0.1839	1.0000	0.0317	0.3593	-0.0411	0.2166	0.6772	0.2401	-0.0909	-0.1190	-0.1718	-0.1350
X1X3	0.3944	-0.1251	0.7706	0.8416	0.8172	0.0317	1.0000	0.5792	0.9299	0.3669	-0.0516	0.3043	0.7726	0.7729	0.8258	-0.3617
X1X4	0.9744	-0.1712	0.1229	0.2160	0.1961	0.3593	0.5792	1.0000	0.6759	-0.1093	-0.1763	-0.1608	0.1232	0.1219	0.2026	-0.2461
X1X5	0.4947	-0.2177	0.6071	0.7624	0.7636	-0.0411	0.9299	0.6759	1.0000	0.1779	-0.1645	0.1553	0.6167	0.6361	0.7648	-0.3402
X2X3	-0.1885	0.4328	0.7739	0.6610	0.6385	0.2166	0.3669	-0.1093	0.1779	1.0000	0.5625	0.9612	0.7690	0.7546	0.6458	-0.3259
X2X4	-0.1650	0.9886	0.1441	0.0625	0.0421	0.6772	-0.0516	-0.1763	-0.1645	0.5625	1.0000	0.6830	0.1375	0.1212	0.0480	-0.0898
X2X5	-0.2382	0.5670	0.6999	0.6111	0.6087	0.2401	0.3043	-0.1608	0.1553	0.9612	0.6830	1.0000	0.6996	0.6970	0.6101	-0.3019
X3X4	-0.0465	0.0082	0.9995	0.9671	0.9496	-0.0909	0.7726	0.1232	0.6167	0.7690	0.1375	0.6996	1.0000	0.9971	0.9561	-0.4020
X3X5	-0.0518	-0.0082	0.9943	0.9750	0.9665	-0.1190	0.7729	0.1219	0.6361	0.7546	0.1212	0.6970	0.9971	1.0000	0.9704	-0.4115
X4X5	0.0066	-0.0708	0.9485	0.9961	0.9993	-0.1718	0.8258	0.2026	0.7648	0.6458	0.0480	0.6101	0.9561	0.9704	1.0000	-0.4207
Y	-0.1869	-0.0377	-0.3975	-0.4140	-0.4225	-0.1350	-0.3617	-0.2461	-0.3402	-0.3259	-0.0898	-0.3019	-0.4020	-0.4115	-0.4207	1.0000

STEPWISE REGRESSION
Pollutant: Dissolved Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	86
Number of Observations Used	64
Number of Observations with Missing Values	22

Stepwise Selection: Step 1

Variable X5 Entered: R-Square = 0.1785 and C(p) = 5.6967

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.77164	1.77164	13.47	0.0005
Error	62	8.15220	0.13149		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.76070	0.06817	16.37471	124.53	<.0001
X5	-0.02851	0.00777	1.77164	13.47	0.0005

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X1X2 Entered: R-Square = 0.2253 and C(p) = 3.9522

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	2.23629	1.11814	8.87	0.0004
Error	61	7.68755	0.12603		
Corrected Total	63	9.92384			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.86161	0.08495	12.96571	102.88	<.0001

X5	-0.03125	0.00774	2.05545	16.31	0.0002
X1X2	-1.07275	0.55868	0.46465	3.69	0.0595

Bounds on condition number: 1.035, 4.14

All variables left in the model are significant at the 0.1500 level.

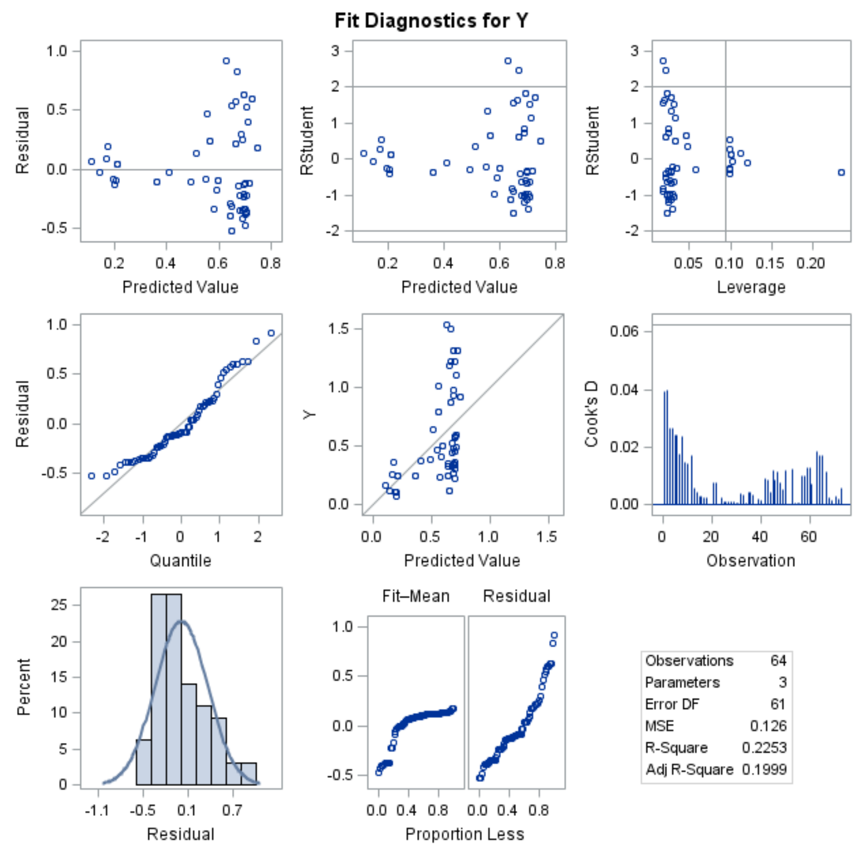
No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection

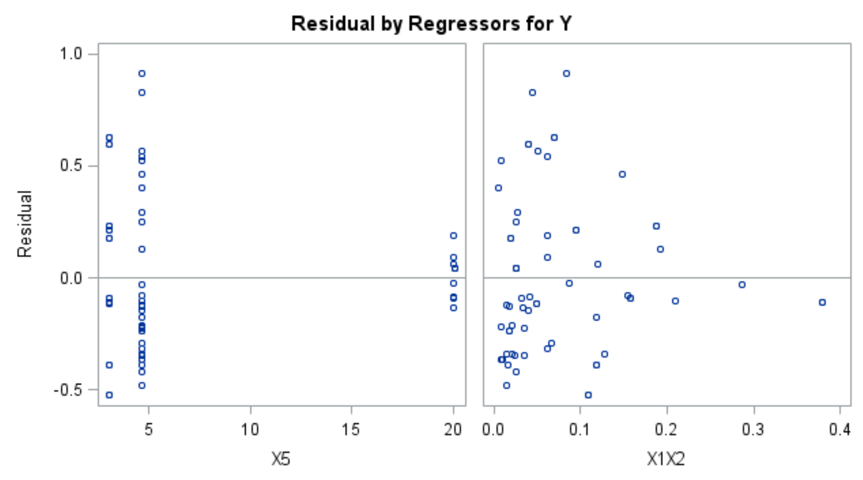
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X5		1	0.1785	0.1785	5.6967	13.47	0.0005
2	X1X2		2	0.0468	0.2253	3.9522	3.69	0.0595

STEPWISE REGRESSION
Pollutant: Dissolved Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Observations	64
Parameters	3
Error DF	61
MSE	0.126
R-Square	0.2253
Adj R-Square	0.1999



==
MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Zinc
==

The REG Procedure

Number of Observations Read	86
Number of Observations Used	64
Number of Observations with Missing Values	22

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1429	-0.0448	0.0206	0.0005	0.4260	0.3944	0.9744	0.4947	-0.1885	-0.1650	-0.2382	-0.0465	-0.0518	0.0066	-0.1869
X2	-0.1429	1.0000	0.0150	-0.0565	-0.0764	0.7065	-0.1251	-0.1712	-0.2177	0.4328	0.9886	0.5670	0.0082	-0.0082	-0.0708	-0.0377
X3	-0.0448	0.0150	1.0000	0.9621	0.9410	-0.0795	0.7706	0.1229	0.6071	0.7739	0.1441	0.6999	0.9995	0.9943	0.9485	-0.3975
X4	0.0206	-0.0565	0.9621	1.0000	0.9922	-0.1416	0.8416	0.2160	0.7624	0.6610	0.0625	0.6111	0.9671	0.9750	0.9961	-0.4140
X5	0.0005	-0.0764	0.9410	0.9922	1.0000	-0.1839	0.8172	0.1961	0.7636	0.6385	0.0421	0.6087	0.9496	0.9665	0.9993	-0.4225
X1X2	0.4260	0.7065	-0.0795	-0.1416	-0.1839	1.0000	0.0317	0.3593	-0.0411	0.2166	0.6772	0.2401	-0.0909	-0.1190	-0.1718	-0.1350
X1X3	0.3944	-0.1251	0.7706	0.8416	0.8172	0.0317	1.0000	0.5792	0.9299	0.3669	-0.0516	0.3043	0.7726	0.7729	0.8258	-0.3617
X1X4	0.9744	-0.1712	0.1229	0.2160	0.1961	0.3593	0.5792	1.0000	0.6759	-0.1093	-0.1763	-0.1608	0.1232	0.1219	0.2026	-0.2461
X1X5	0.4947	-0.2177	0.6071	0.7624	0.7636	-0.0411	0.9299	0.6759	1.0000	0.1779	-0.1645	0.1553	0.6167	0.6361	0.7648	-0.3402
X2X3	-0.1885	0.4328	0.7739	0.6610	0.6385	0.2166	0.3669	-0.1093	0.1779	1.0000	0.5625	0.9612	0.7690	0.7546	0.6458	-0.3259
X2X4	-0.1650	0.9886	0.1441	0.0625	0.0421	0.6772	-0.0516	-0.1763	-0.1645	0.5625	1.0000	0.6830	0.1375	0.1212	0.0480	-0.0898
X2X5	-0.2382	0.5670	0.6999	0.6111	0.6087	0.2401	0.3043	-0.1608	0.1553	0.9612	0.6830	1.0000	0.6996	0.6970	0.6101	-0.3019
X3X4	-0.0465	0.0082	0.9995	0.9671	0.9496	-0.0909	0.7726	0.1232	0.6167	0.7690	0.1375	0.6996	1.0000	0.9971	0.9561	-0.4020
X3X5	-0.0518	-0.0082	0.9943	0.9750	0.9665	-0.1190	0.7729	0.1219	0.6361	0.7546	0.1212	0.6970	0.9971	1.0000	0.9704	-0.4115
X4X5	0.0066	-0.0708	0.9485	0.9961	0.9993	-0.1718	0.8258	0.2026	0.7648	0.6458	0.0480	0.6101	0.9561	0.9704	1.0000	-0.4207
Y	-0.1869	-0.0377	-0.3975	-0.4140	-0.4225	-0.1350	-0.3617	-0.2461	-0.3402	-0.3259	-0.0898	-0.3019	-0.4020	-0.4115	-0.4207	1.0000

==
MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Zinc
==

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	86
Number of Observations Used	64
Number of Observations with Missing Values	22

Number in Model	R-Square	Variables in Model
1	0.1785	X5
1	0.1770	X4X5
1	0.1714	X4
1	0.1693	X3X5
1	0.1616	X3X4
1	0.1580	X3
1	0.1308	X1X3
1	0.1157	X1X5
1	0.1062	X2X3
1	0.0912	X2X5
1	0.0605	X1X4
1	0.0349	X1
1	0.0182	X1X2
1	0.0081	X2X4
1	0.0014	X2
2	0.2253	X5 X1X2
2	0.2212	X1X2 X4X5
2	0.2134	X1 X5
2	0.2128	X1 X3X5
2	0.2109	X1 X4X5
2	0.2096	X4 X1X2
2	0.2083	X1X4 X3X5
2	0.2062	X5 X1X4
2	0.2040	X1 X3X4
2	0.2039	X1X4 X4X5
2	0.2036	X1X2 X3X5
2	0.2032	X1 X4
2	0.2008	X1X4 X3X4
2	0.2000	X1 X3
2	0.1975	X3 X1X4
3	0.2461	X5 X1X4 X1X5
3	0.2458	X1 X5 X1X5
3	0.2421	X1 X5 X1X4
3	0.2402	X1 X1X5 X4X5
3	0.2401	X5 X1X2 X4X5
3	0.2401	X3 X1X2 X3X4

3	0.2400	X4 X5 X1X2
3	0.2400	X4 X1X2 X4X5
3	0.2399	X1X4 X1X5 X4X5
3	0.2397	X3 X1X2 X3X5
3	0.2396	X1X2 X3X4 X3X5
3	0.2390	X2 X5 X1X2
3	0.2375	X5 X1X2 X2X4
3	0.2360	X1 X5 X1X2
3	0.2343	X2 X1X2 X4X5
4	0.2628	X5 X1X4 X1X5 X3X4
4	0.2628	X3 X5 X1X4 X1X5
4	0.2622	X5 X1X4 X1X5 X3X5
4	0.2621	X3 X1X4 X1X5 X4X5
4	0.2614	X1X4 X1X5 X3X4 X4X5
4	0.2599	X2 X1X2 X3X4 X3X5
4	0.2598	X2 X3 X1X2 X3X5
4	0.2596	X2 X3 X1X2 X3X4
4	0.2595	X1 X5 X1X5 X3X4
4	0.2594	X1 X3 X5 X1X5
4	0.2594	X1 X5 X1X5 X3X5
4	0.2592	X1 X3 X1X5 X4X5
4	0.2588	X1 X1X5 X3X4 X4X5
4	0.2583	X1X2 X2X4 X3X4 X3X5
4	0.2583	X3 X1X2 X2X4 X3X5
5	0.3188	X1X3 X1X4 X1X5 X3X4 X4X5
5	0.3187	X1 X3 X1X4 X1X5 X3X4
5	0.3187	X1 X4 X1X3 X1X4 X3X4
5	0.3186	X1 X5 X1X3 X1X5 X3X5
5	0.3184	X1 X3 X1X4 X1X5 X3X5
5	0.3183	X1 X1X3 X1X5 X3X4 X4X5
5	0.3181	X1 X1X4 X1X5 X3X4 X3X5
5	0.3176	X5 X1X3 X1X4 X1X5 X3X5
5	0.3173	X1 X4 X1X4 X1X5 X4X5
5	0.3170	X1 X4 X5 X1X4 X1X5
5	0.3164	X1 X5 X1X4 X1X5 X4X5
5	0.3164	X3 X1X3 X1X4 X1X5 X4X5
5	0.3138	X1 X3 X1X3 X1X5 X4X5
5	0.3087	X5 X1X3 X1X4 X1X5 X3X4
5	0.3046	X1 X5 X1X3 X1X5 X3X4
6	0.3220	X1 X1X2 X1X3 X1X5 X3X4 X4X5
6	0.3219	X1 X4 X1X2 X1X3 X1X4 X3X4
6	0.3219	X1 X3 X1X2 X1X4 X1X5 X3X4
6	0.3218	X1X2 X1X3 X1X4 X1X5 X3X4 X4X5
6	0.3215	X1 X5 X1X2 X1X3 X1X5 X3X5
6	0.3214	X1 X3 X1X2 X1X4 X1X5 X3X5
6	0.3211	X1 X1X2 X1X4 X1X5 X3X4 X3X5
6	0.3202	X1 X4 X1X2 X1X4 X1X5 X4X5
6	0.3202	X1 X2 X4 X1X3 X1X4 X3X4
6	0.3201	X5 X1X2 X1X3 X1X4 X1X5 X3X5
6	0.3201	X1 X4 X1X3 X1X4 X2X4 X3X4
6	0.3201	X2 X1X3 X1X4 X1X5 X3X4 X4X5
6		

	0.3201	X1 X2 X3 X1X4 X1X5 X3X4
6	0.3201	X1X3 X1X4 X1X5 X2X4 X3X4 X4X5
6	0.3201	X1 X3 X1X4 X1X5 X2X4 X3X4
7	0.3236	X1 X3 X1X4 X1X5 X2X3 X2X5 X3X5
7	0.3236	X1 X3 X1X4 X1X5 X2X3 X2X5 X3X4
7	0.3236	X1 X1X3 X1X5 X2X3 X2X5 X3X4 X4X5
7	0.3235	X1 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5
7	0.3233	X1 X1X2 X1X3 X1X5 X2X5 X3X4 X4X5
7	0.3231	X3 X1X3 X1X4 X1X5 X2X3 X2X5 X4X5
7	0.3230	X1 X4 X1X3 X1X4 X2X3 X2X5 X3X4
7	0.3229	X1 X3 X1X2 X1X4 X1X5 X2X5 X3X4
7	0.3229	X1 X4 X1X2 X1X3 X1X4 X2X5 X3X4
7	0.3228	X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X4X5
7	0.3228	X1X2 X1X3 X1X4 X1X5 X2X5 X3X4 X4X5
7	0.3226	X1 X1X2 X1X3 X1X5 X2X4 X3X4 X4X5
7	0.3225	X1 X5 X1X2 X1X3 X1X5 X2X5 X3X5
7	0.3223	X1 X4 X1X2 X1X3 X1X4 X2X4 X3X4
7	0.3223	X1 X2 X4 X1X2 X1X3 X1X4 X3X4
8	0.3369	X1 X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
8	0.3369	X1 X2 X3 X1X4 X1X5 X2X3 X2X5 X3X4
8	0.3369	X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
8	0.3369	X2 X5 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4
8	0.3369	X1 X2 X3 X1X4 X1X5 X2X4 X2X5 X3X5
8	0.3369	X2 X5 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4
8	0.3368	X1 X2 X5 X1X3 X1X5 X2X4 X2X5 X3X4
8	0.3368	X1 X2 X3 X1X4 X1X5 X2X4 X2X5 X3X4
8	0.3368	X1 X2 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5
8	0.3367	X1 X2 X3 X1X3 X1X5 X2X3 X2X4 X4X5
8	0.3366	X1 X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5
8	0.3366	X1 X2 X3 X1X4 X1X5 X2X3 X2X5 X3X5
8	0.3366	X2 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4
8	0.3366	X1 X5 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4
8	0.3366	X1 X2 X3 X1X4 X1X5 X2X3 X2X4 X3X4
9	0.3373	X1 X2 X3 X1X2 X1X4 X1X5 X2X4 X2X5 X3X5
9	0.3373	X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
9	0.3373	X2 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4
9	0.3373	X1 X2 X3 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4
9	0.3373	X1 X3 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
9	0.3372	X1 X2 X1X2 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5
9	0.3372	X1 X2 X5 X1X2 X1X3 X1X5 X2X4 X2X5 X3X4
9	0.3372	X2 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4
9	0.3371	X1 X3 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5
9	0.3371	X1 X2 X3 X1X2 X1X4 X1X5 X2X3 X2X5 X3X5
9	0.3371	X1 X2 X3 X1X2 X1X4 X1X5 X2X4 X2X5 X3X4
9	0.3370	X1 X2 X3 X1X2 X1X4 X1X5 X2X3 X2X4 X3X4
9	0.3370	X1 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4
9	0.3370	X2 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4
9	0.3369	X1 X2 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4
10	0.3373	X1 X2 X1X2 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
10	0.3373	X1 X4 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
10	0.3373	X1 X3 X4 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5
10		

	0.3373	X1 X2 X3 X1X2 X1X4 X1X5 X2X3 X2X4 X3X4 X4X5
10	0.3373	X1 X3 X4 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
10	0.3373	X1 X3 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
10	0.3373	X1 X3 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5
10	0.3373	X1 X3 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
10	0.3373	X1 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
10	0.3373	X1 X2 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X4X5
10	0.3373	X2 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X4X5
10	0.3373	X1 X2 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
10	0.3373	X1 X2 X3 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X5
10	0.3373	X1 X2 X3 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4
10	0.3373	X1 X2 X4 X1X2 X1X3 X1X4 X2X4 X2X5 X3X5 X4X5

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Dissolved Zinc

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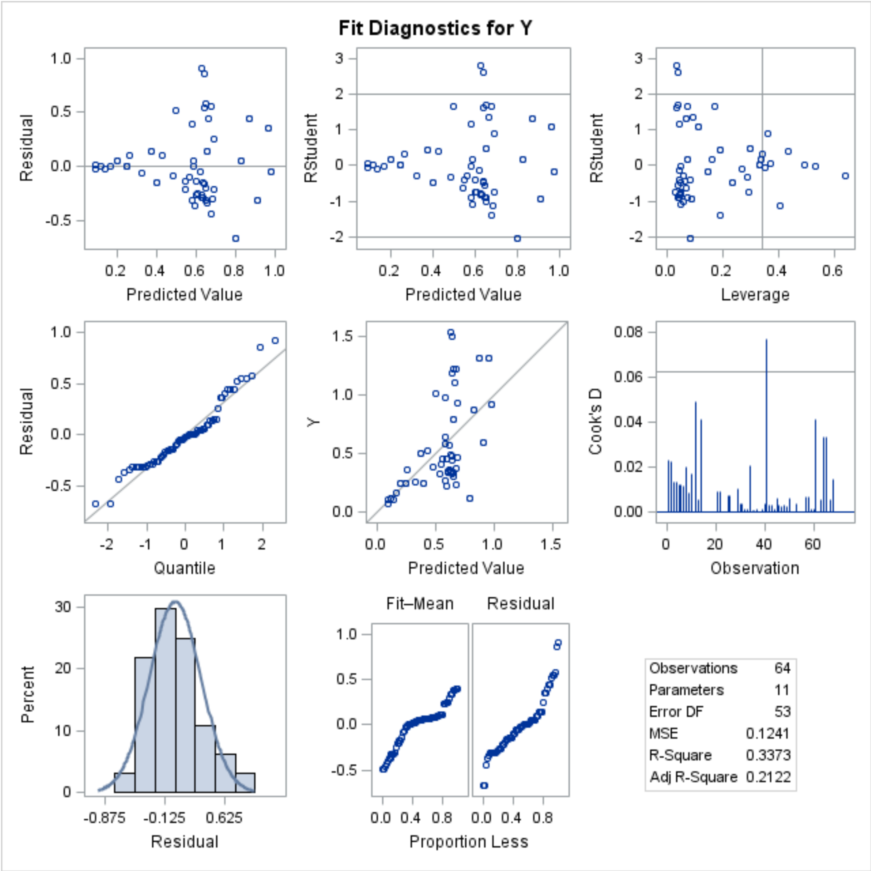
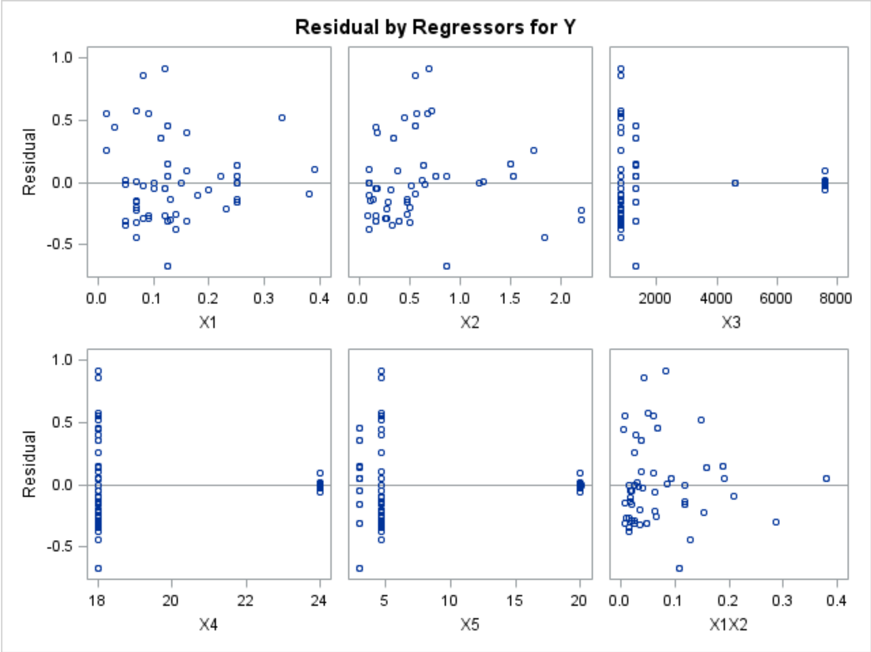
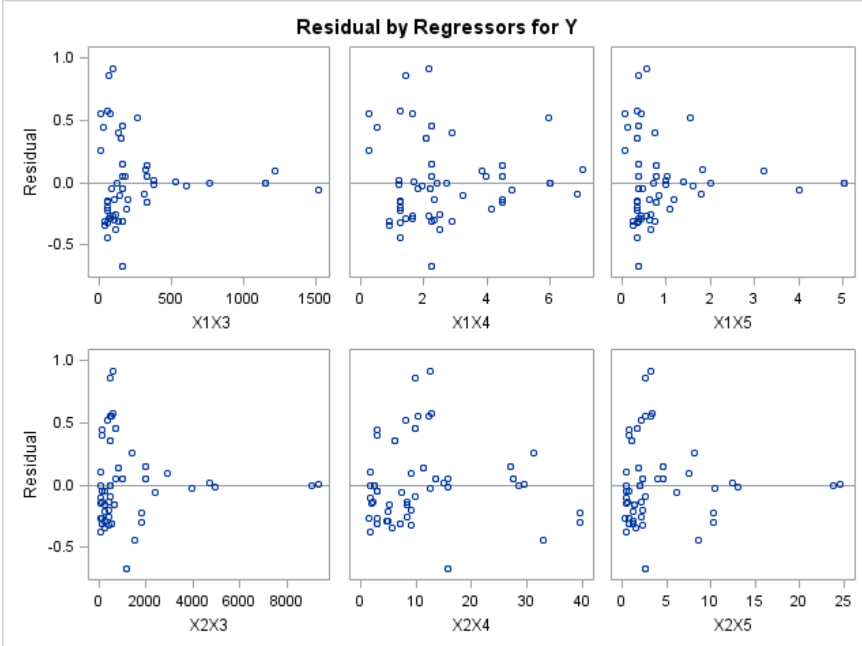
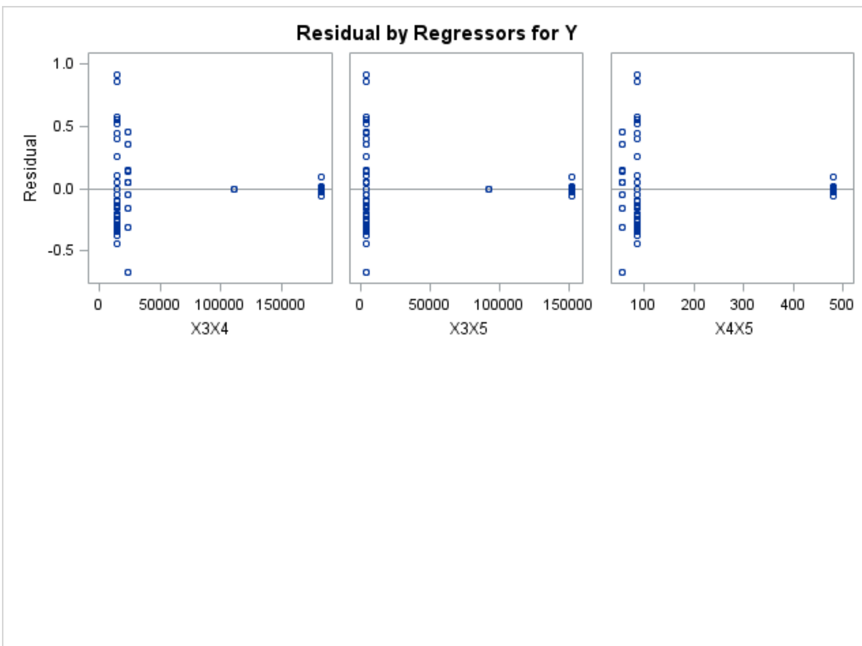
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
1.0
0.5
0.0
-0.5
0 500 1000 1500
X1X3
0 2 4 6
X1X4
0 1 2 3 4 5
X1X5
0 2000 4000 6000 8000
X2X3
0 10 20 30 40
X2X4
0 5 10 15 20 25
X2X5


Residual by Regressors for Y
Residual
1.0
0.5
0.0
-0.5
0 50000 100000 150000
X3X4
0 50000 100000 150000
X3X5
100 200 300 400 500
X4X5

FORWARD REGRESSION
Pollutant: Dissolved Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	131
Number of Observations Used	38
Number of Observations with Missing Values	93

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.7172	0.2875	-0.4145	0.1874	0.7176	0.3855	0.7024	0.4200	0.7477	0.7167	0.5136	0.3037	0.3361	0.2363	0.2679
X2	0.7172	1.0000	-0.1222	-0.8530	-0.2490	1.0000	-0.0682	0.0310	-0.1104	0.9665	0.9999	0.6319	-0.1008	-0.0575	-0.1881	0.1310
X3	0.2875	-0.1222	1.0000	0.6223	0.9917	-0.1217	0.9932	0.7014	0.9734	0.0338	-0.1228	0.1083	0.9998	0.9979	0.9978	0.5895
X4	-0.4145	-0.8530	0.6223	1.0000	0.7179	-0.8527	0.5761	0.3444	0.5990	-0.7438	-0.8532	-0.4389	0.6053	0.5701	0.6731	0.2060
X5	0.1874	-0.2490	0.9917	0.7179	1.0000	-0.2486	0.9780	0.6804	0.9642	-0.0923	-0.2496	0.0241	0.9887	0.9812	0.9981	0.5581
X1X2	0.7176	1.0000	-0.1217	-0.8527	-0.2486	1.0000	-0.0677	0.0316	-0.1099	0.9659	0.9999	0.6296	-0.1004	-0.0570	-0.1877	0.1321
X1X3	0.3855	-0.0682	0.9932	0.5761	0.9780	-0.0677	1.0000	0.7744	0.9907	0.0838	-0.0688	0.1380	0.9941	0.9946	0.9874	0.5866
X1X4	0.7024	0.0310	0.7014	0.3444	0.6804	0.0316	0.7744	1.0000	0.8443	0.1350	0.0304	0.1419	0.7038	0.7076	0.6920	0.3688
X1X5	0.4200	-0.1104	0.9734	0.5990	0.9642	-0.1099	0.9907	0.8443	1.0000	0.0388	-0.1111	0.1054	0.9734	0.9719	0.9707	0.5533
X2X3	0.7477	0.9665	0.0338	-0.7438	-0.0923	0.9659	0.0838	0.1350	0.0388	1.0000	0.9687	0.7904	0.0548	0.0972	-0.0314	0.1798
X2X4	0.7167	0.9999	-0.1228	-0.8532	-0.2496	0.9999	-0.0688	0.0304	-0.1111	0.9687	1.0000	0.6408	-0.1014	-0.0581	-0.1887	0.1280
X2X5	0.5136	0.6319	0.1083	-0.4389	0.0241	0.6296	0.1380	0.1419	0.1054	0.7904	0.6408	1.0000	0.1222	0.1501	0.0650	0.0389
X3X4	0.3037	-0.1008	0.9998	0.6053	0.9887	-0.1004	0.9941	0.7038	0.9734	0.0548	-0.1014	0.1222	1.0000	0.9991	0.9961	0.5938
X3X5	0.3361	-0.0575	0.9979	0.5701	0.9812	-0.0570	0.9946	0.7076	0.9719	0.0972	-0.0581	0.1501	0.9991	1.0000	0.9913	0.6016
X4X5	0.2363	-0.1881	0.9978	0.6731	0.9981	-0.1877	0.9874	0.6920	0.9707	-0.0314	-0.1887	0.0650	0.9961	0.9913	1.0000	0.5745
Y	0.2679	0.1310	0.5895	0.2060	0.5581	0.1321	0.5866	0.3688	0.5533	0.1798	0.1280	0.0389	0.5938	0.6016	0.5745	1.0000

FORWARD REGRESSION
Pollutant: Dissolved Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	131
Number of Observations Used	38
Number of Observations with Missing Values	93

Forward Selection: Step 1

Variable X3X5 Entered: R-Square = 0.3619 and C(p) = 13.1874

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00026981	0.00026981	20.42	<.0001
Error	36	0.00047572	0.00001321		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01571	0.00062421	0.00838	633.78	<.0001
X3X5	8.052739E-8	1.782151E-8	0.00026981	20.42	<.0001

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X4 Entered: R-Square = 0.3897 and C(p) = 13.1313

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00029054	0.00014527	11.17	0.0002
Error	35	0.00045500	0.00001300		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02184	0.00489	0.00025943	19.96	<.0001

X4	-0.00035075	0.00027776	0.00002073	1.59	0.2150
X3X5	9.601726E-8	2.151546E-8	0.00025890	19.92	<.0001

Bounds on condition number: 1.4816, 5.9263

Forward Selection: Step 3

Variable X2 Entered: R-Square = 0.4351 and C(p) = 11.7711

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	0.00032441	0.00010814	8.73	0.0002
Error	34	0.00042112	0.00001239		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.89950	1.13537	0.00003467	2.80	0.1035
X2	-0.00171	0.00103	0.00003388	2.74	0.1074
X4	-0.10551	0.06359	0.00003410	2.75	0.1063
X3X5	0.00000435	0.00000258	0.00003542	2.86	0.1000

Bounds on condition number: 81500, 476912

Forward Selection: Step 4

Variable X1X2 Entered: R-Square = 0.4652 and C(p) = 11.5518

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	0.00034679	0.00008670	7.17	0.0003
Error	33	0.00039875	0.00001208		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-8.97097	8.06687	0.00001494	1.24	0.2741
X2	-0.00457	0.00234	0.00004616	3.82	0.0592
X4	0.50361	0.45202	0.00001500	1.24	0.2733
X1X2	0.12750	0.09370	0.00002237	1.85	0.1828
X3X5	-0.00002034	0.00001832	0.00001489	1.23	0.2751

Bounds on condition number: 4663046, 41324048

Forward Selection: Step 5

Variable X1 Entered: R-Square = 0.5771 and C(p) = 5.2720

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00043026	0.00008605	8.73	<.0001
Error	32	0.00031527	0.00000985		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-31.45787	10.61803	0.00008648	8.78	0.0057
X1	-0.21417	0.07358	0.00008347	8.47	0.0065
X2	-0.01058	0.00295	0.00012644	12.83	0.0011
X4	1.76390	0.59504	0.00008658	8.79	0.0057
X1X2	0.39230	0.12424	0.00009824	9.97	0.0035
X3X5	-0.00007138	0.00002411	0.00008636	8.77	0.0057

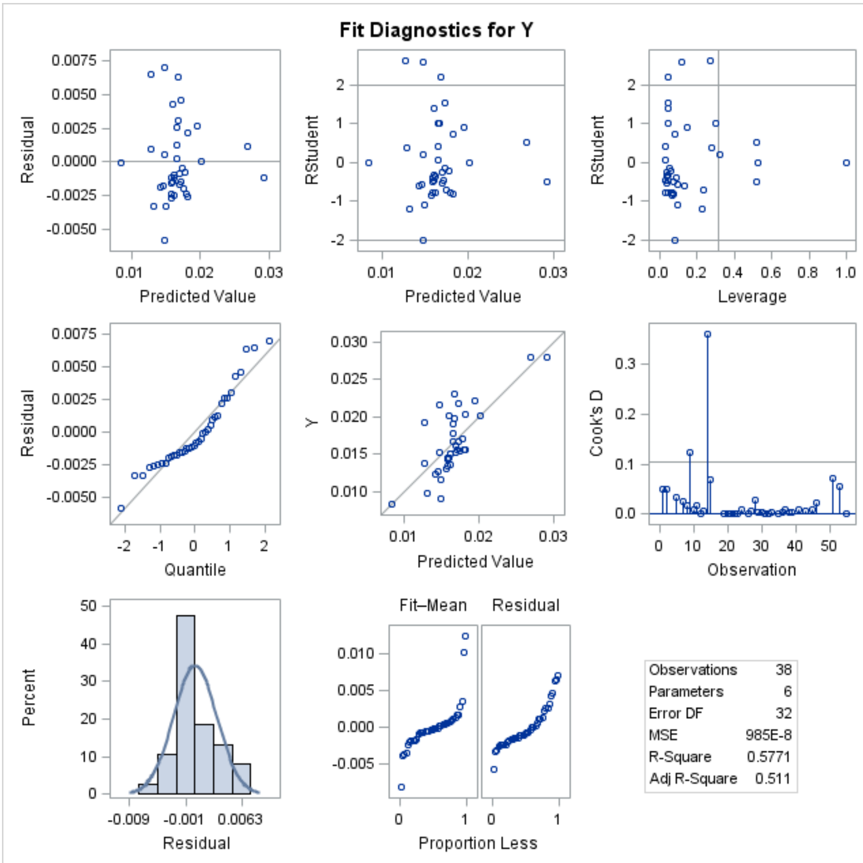
Bounds on condition number: 10054740, 110245437

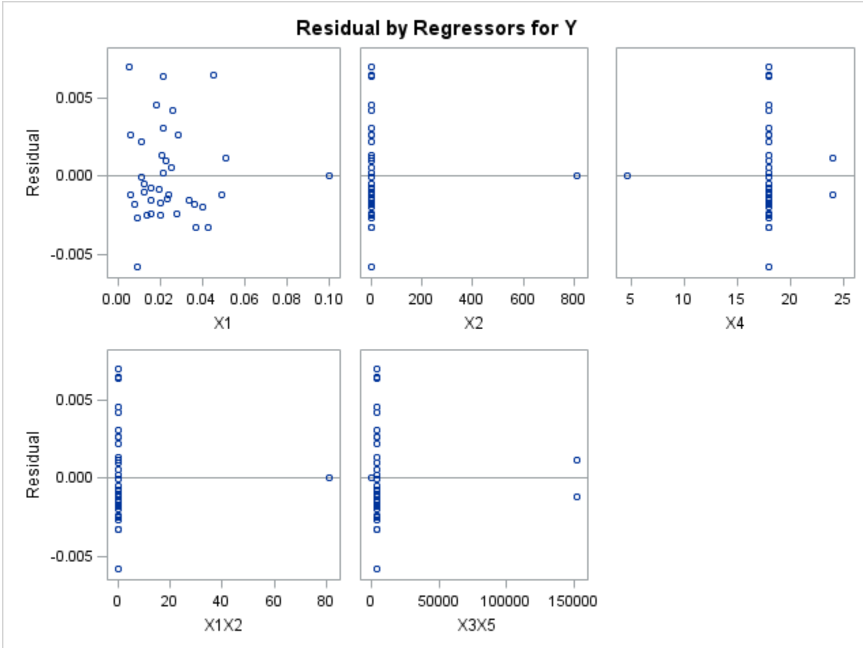
No other variable met the 0.5000 significance level for entry into the model.

Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X3X5	1	0.3619	0.3619	13.1874	20.42	<.0001
2	X4	2	0.0278	0.3897	13.1313	1.59	0.2150
3	X2	3	0.0454	0.4351	11.7711	2.74	0.1074
4	X1X2	4	0.0300	0.4652	11.5518	1.85	0.1828
5	X1	5	0.1120	0.5771	5.2720	8.47	0.0065

FORWARD REGRESSION
Pollutant: Dissolved Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
0.005
0.000
-0.005
0.00 0.02 0.04 0.06 0.08 0.10
X1
0 200 400 600 800
X2
5 10 15 20 25
X4
0 20 40 60 80
X1X2
0 50000 100000 150000
X3X5

BACKWARD REGRESSION
Pollutant: Dissolved Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	131
Number of Observations Used	38
Number of Observations with Missing Values	93

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.7172	0.2875	-0.4145	0.1874	0.7176	0.3855	0.7024	0.4200	0.7477	0.7167	0.5136	0.3037	0.3361	0.2363	0.2679
X2	0.7172	1.0000	-0.1222	-0.8530	-0.2490	1.0000	-0.0682	0.0310	-0.1104	0.9665	0.9999	0.6319	-0.1008	-0.0575	-0.1881	0.1310
X3	0.2875	-0.1222	1.0000	0.6223	0.9917	-0.1217	0.9932	0.7014	0.9734	0.0338	-0.1228	0.1083	0.9998	0.9979	0.9978	0.5895
X4	-0.4145	-0.8530	0.6223	1.0000	0.7179	-0.8527	0.5761	0.3444	0.5990	-0.7438	-0.8532	-0.4389	0.6053	0.5701	0.6731	0.2060
X5	0.1874	-0.2490	0.9917	0.7179	1.0000	-0.2486	0.9780	0.6804	0.9642	-0.0923	-0.2496	0.0241	0.9887	0.9812	0.9981	0.5581
X1X2	0.7176	1.0000	-0.1217	-0.8527	-0.2486	1.0000	-0.0677	0.0316	-0.1099	0.9659	0.9999	0.6296	-0.1004	-0.0570	-0.1877	0.1321
X1X3	0.3855	-0.0682	0.9932	0.5761	0.9780	-0.0677	1.0000	0.7744	0.9907	0.0838	-0.0688	0.1380	0.9941	0.9946	0.9874	0.5866
X1X4	0.7024	0.0310	0.7014	0.3444	0.6804	0.0316	0.7744	1.0000	0.8443	0.1350	0.0304	0.1419	0.7038	0.7076	0.6920	0.3688
X1X5	0.4200	-0.1104	0.9734	0.5990	0.9642	-0.1099	0.9907	0.8443	1.0000	0.0388	-0.1111	0.1054	0.9734	0.9719	0.9707	0.5533
X2X3	0.7477	0.9665	0.0338	-0.7438	-0.0923	0.9659	0.0838	0.1350	0.0388	1.0000	0.9687	0.7904	0.0548	0.0972	-0.0314	0.1798
X2X4	0.7167	0.9999	-0.1228	-0.8532	-0.2496	0.9999	-0.0688	0.0304	-0.1111	0.9687	1.0000	0.6408	-0.1014	-0.0581	-0.1887	0.1280
X2X5	0.5136	0.6319	0.1083	-0.4389	0.0241	0.6296	0.1380	0.1419	0.1054	0.7904	0.6408	1.0000	0.1222	0.1501	0.0650	0.0389
X3X4	0.3037	-0.1008	0.9998	0.6053	0.9887	-0.1004	0.9941	0.7038	0.9734	0.0548	-0.1014	0.1222	1.0000	0.9991	0.9961	0.5938
X3X5	0.3361	-0.0575	0.9979	0.5701	0.9812	-0.0570	0.9946	0.7076	0.9719	0.0972	-0.0581	0.1501	0.9991	1.0000	0.9913	0.6016
X4X5	0.2363	-0.1881	0.9978	0.6731	0.9981	-0.1877	0.9874	0.6920	0.9707	-0.0314	-0.1887	0.0650	0.9961	0.9913	1.0000	0.5745
Y	0.2679	0.1310	0.5895	0.2060	0.5581	0.1321	0.5866	0.3688	0.5533	0.1798	0.1280	0.0389	0.5938	0.6016	0.5745	1.0000

BACKWARD REGRESSION
Pollutant: Dissolved Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	131
Number of Observations Used	38
Number of Observations with Missing Values	93

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.5808 and C(p) = 7.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00043300	0.00007217	7.16	<.0001
Error	31	0.00031253	0.00001008		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-32.86249	11.04752	0.00008921	8.85	0.0056
X1	-0.36292	0.29474	0.00001529	1.52	0.2275
X2	-0.01084	0.00303	0.00012914	12.81	0.0012
X3	-0.00169	0.00056855	0.00008895	8.82	0.0057
X4	1.90308	0.63946	0.00008929	8.86	0.0056
X1X2	0.40472	0.12791	0.00010093	10.01	0.0035
X1X3	0.00017583	0.00033710	0.00000274	0.27	0.6057

Bounds on condition number: 10415571, 143785798

Backward Elimination: Step 1

Variable X1X3 Removed: R-Square = 0.5771 and C(p) = 5.2720

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00043026	0.00008605	8.73	<.0001
Error	32	0.00031527	0.00000985		

Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-31.78573	10.72876	0.00008648	8.78	0.0057
X1	-0.21417	0.07358	0.00008347	8.47	0.0065
X2	-0.01058	0.00295	0.00012644	12.83	0.0011
X3	-0.00162	0.00054870	0.00008636	8.77	0.0057
X4	1.84036	0.62086	0.00008657	8.79	0.0057
X1X2	0.39230	0.12424	0.00009824	9.97	0.0035

Bounds on condition number: 10054739, 115469458

Backward Elimination: Step 2

Variable X1X4 Entered: R-Square = 0.5808 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00043300	0.00007217	7.16	<.0001
Error	31	0.00031253	0.00001008		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-32.51871	10.94352	0.00008902	8.83	0.0057
X1	-3.80067	6.87663	0.00000308	0.31	0.5844
X2	-0.01084	0.00303	0.00012914	12.81	0.0012
X3	-0.00167	0.00056221	0.00008908	8.84	0.0057
X4	1.88319	0.63339	0.00008912	8.84	0.0057
X1X2	0.40472	0.12791	0.00010093	10.01	0.0035
X1X4	0.19892	0.38138	0.00000274	0.27	0.6057

Bounds on condition number: 10415571, 142789068

Backward Elimination: Step 3

Variable X1X4 Removed: R-Square = 0.5771 and C(p) = 5.2720

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00043026	0.00008605	8.73	<.0001
Error	32	0.00031527	0.00000985		

Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-31.78573	10.72876	0.00008648	8.78	0.0057
X1	-0.21417	0.07358	0.00008347	8.47	0.0065
X2	-0.01058	0.00295	0.00012644	12.83	0.0011
X3	-0.00162	0.00054870	0.00008636	8.77	0.0057
X4	1.84036	0.62086	0.00008657	8.79	0.0057
X1X2	0.39230	0.12424	0.00009824	9.97	0.0035

Bounds on condition number: 10054739, 115469458

Backward Elimination: Step 4

Variable X1X5 Entered: R-Square = 0.5808 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00043300	0.00007217	7.16	<.0001
Error	31	0.00031253	0.00001008		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-32.83198	11.03674	0.00008922	8.85	0.0056
X1	-0.58420	0.71333	0.00000676	0.67	0.4191
X2	-0.01084	0.00303	0.00012914	12.81	0.0012
X3	-0.00169	0.00056791	0.00008898	8.83	0.0057
X4	1.90132	0.63883	0.00008930	8.86	0.0056
X1X2	0.40472	0.12791	0.00010093	10.01	0.0035
X1X5	0.07796	0.14946	0.00000274	0.27	0.6057

Bounds on condition number: 10415571, 143635894

Backward Elimination: Step 5

Variable X1X5 Removed: R-Square = 0.5771 and C(p) = 5.2720

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00043026	0.00008605	8.73	<.0001
Error	32	0.00031527	0.00000985		

Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-31.78573	10.72876	0.00008648	8.78	0.0057
X1	-0.21417	0.07358	0.00008347	8.47	0.0065
X2	-0.01058	0.00295	0.00012644	12.83	0.0011
X3	-0.00162	0.00054870	0.00008636	8.77	0.0057
X4	1.84036	0.62086	0.00008657	8.79	0.0057
X1X2	0.39230	0.12424	0.00009824	9.97	0.0035

Bounds on condition number: 10054739, 115469458

Backward Elimination: Step 6

Variable X2X3 Entered: R-Square = 0.5808 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	6	0.00043300	0.00007217	7.16	<.0001
Error	31	0.00031253	0.00001008		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-34.22810	11.82002	0.00008454	8.39	0.0069
X1	-0.22014	0.07531	0.00008615	8.55	0.0064
X2	-0.00960	0.00353	0.00007435	7.37	0.0107
X3	-0.00175	0.00060419	0.00008448	8.38	0.0069
X4	1.98167	0.68399	0.00008462	8.39	0.0069
X1X2	0.40472	0.12791	0.00010093	10.01	0.0035
X2X3	-0.00000153	0.00000293	0.00000274	0.27	0.6057

Bounds on condition number: 11584821, 155994262

Backward Elimination: Step 7

Variable X2X3 Removed: R-Square = 0.5771 and C(p) = 5.2720

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	5	0.00043026	0.00008605	8.73	<.0001
Error	32	0.00031527	0.00000985		

Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-31.78573	10.72876	0.00008648	8.78	0.0057
X1	-0.21417	0.07358	0.00008347	8.47	0.0065
X2	-0.01058	0.00295	0.00012644	12.83	0.0011
X3	-0.00162	0.00054870	0.00008636	8.77	0.0057
X4	1.84036	0.62086	0.00008657	8.79	0.0057
X1X2	0.39230	0.12424	0.00009824	9.97	0.0035

Bounds on condition number: 10054739, 115469458

Backward Elimination: Step 8

Variable X2X4 Entered: R-Square = 0.5808 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00043300	0.00007217	7.16	<.0001
Error	31	0.00031253	0.00001008		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-58.50159	52.35830	0.00001259	1.25	0.2724
X1	-0.22014	0.07531	0.00008615	8.55	0.0064
X2	0.02030	0.05928	0.00000118	0.12	0.7344
X3	-0.00299	0.00268	0.00001258	1.25	0.2725
X4	3.38620	3.02959	0.00001259	1.25	0.2723
X1X2	0.40472	0.12791	0.00010093	10.01	0.0035
X2X4	-0.00173	0.00332	0.00000274	0.27	0.6057

Bounds on condition number: 227277272, 3235677709

Backward Elimination: Step 9

Variable X2X5 Entered: R-Square = 0.5808 and C(p) = 9.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F

Model	7	0.00043300	0.00006186	5.94	0.0002
Error	30	0.00031253	0.00001042		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	22.99450	73647	1.01556E-12	0.00	0.9998
X1	-0.22014	0.07655	0.00008615	8.27	0.0073
X2	-0.08275	93.12330	8.22644E-12	0.00	0.9993
X3	0.00118	3.76673	1.0183E-12	0.00	0.9998
X4	-1.32939	4261.43260	1.01383E-12	0.00	0.9998
X1X2	0.40472	0.13002	0.00010093	9.69	0.0041
X2X4	0.00464	5.75908	6.77151E-12	0.00	0.9994
X2X5	-0.00250	2.25699	1.27565E-11	0.00	0.9991

Bounds on condition number: 5.3377E+14, 7.9368E+15

Backward Elimination: Step 10

Variable X4 Removed: R-Square = 0.5808 and C(p) = 7.0000

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00043300	0.00007217	7.16	<.0001
Error	31	0.00031253	0.00001008		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01963	0.00168	0.00137	135.97	<.0001
X1	-0.22014	0.07531	0.00008615	8.55	0.0064
X2	-0.05370	0.01742	0.00009583	9.51	0.0043
X3	0.00000259	8.996803E-7	0.00008354	8.29	0.0072
X1X2	0.40472	0.12791	0.00010093	10.01	0.0035
X2X4	0.00285	0.00109	0.00006835	6.78	0.0140
X2X5	-0.00179	0.00160	0.00001259	1.25	0.2723

Bounds on condition number: 19297211, 188192065

Backward Elimination: Step 11

Variable X2X5 Removed: R-Square = 0.5639 and C(p) = 6.2493

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F

Model	5	0.00042041	0.00008408	8.28	<.0001
Error	32	0.00032512	0.00001016		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01982	0.00168	0.00141	138.80	<.0001
X1	-0.19507	0.07217	0.00007423	7.31	0.0109
X2	-0.04380	0.01506	0.00008598	8.46	0.0065
X3	0.00000170	4.140901E-7	0.00017047	16.78	0.0003
X1X2	0.34970	0.11852	0.00008846	8.71	0.0059
X2X4	0.00190	0.00069016	0.00007671	7.55	0.0098

Bounds on condition number: 14307754, 119171134

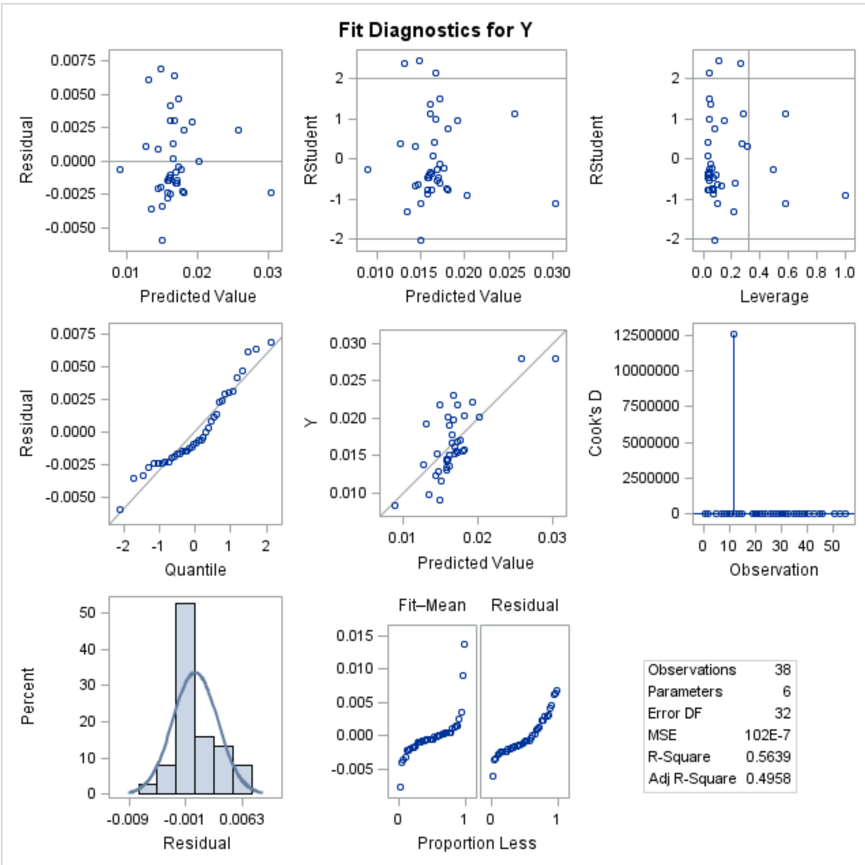
All variables left in the model are significant at the 0.1000 level.

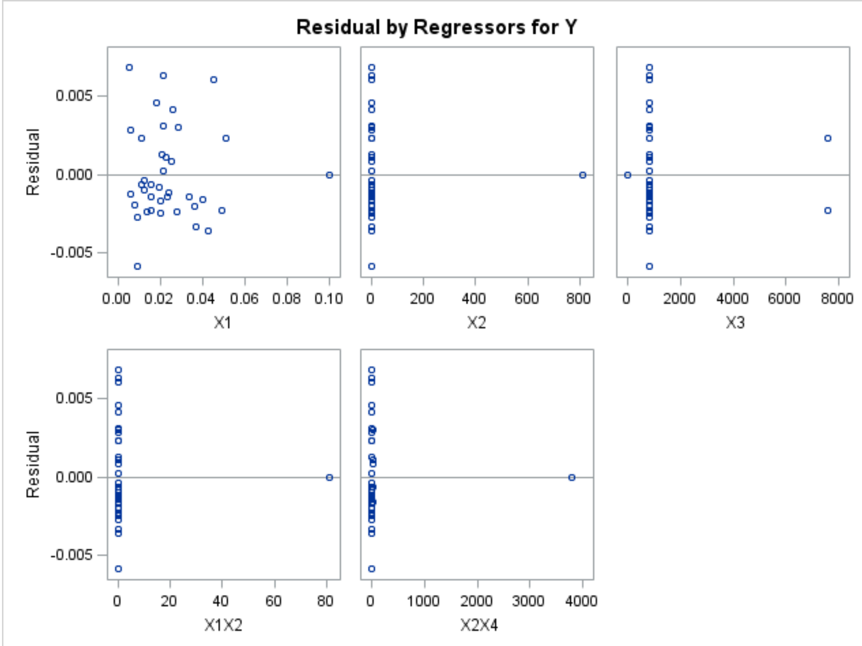
Summary of Backward Elimination

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1		X1X3	5	0.0037	0.5771	5.2720	0.27	0.6057
2	X1X4		6	0.0037	0.5808	7.0000	0.27	0.6057
3		X1X4	5	0.0037	0.5771	5.2720	0.27	0.6057
4	X1X5		6	0.0037	0.5808	7.0000	0.27	0.6057
5		X1X5	5	0.0037	0.5771	5.2720	0.27	0.6057
6	X2X3		6	0.0037	0.5808	7.0000	0.27	0.6057
7		X2X3	5	0.0037	0.5771	5.2720	0.27	0.6057
8	X2X4		6	0.0037	0.5808	7.0000	0.27	0.6057
9	X2X5		7	0.0000	0.5808	9.0000	0.00	0.9991
10		X4	6	0.0000	0.5808	7.0000	0.00	0.9998
11		X2X5	5	0.0169	0.5639	6.2493	1.25	0.2723

BACKWARD REGRESSION
Pollutant: Dissolved Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
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0.000
-0.005
0.00 0.02 0.04 0.06 0.08 0.10
X1
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X2
0 2000 4000 6000 8000
X3
0 20 40 60 80
X1X2
0 1000 2000 3000 4000
X2X4

STEPWISE REGRESSION
Pollutant: Dissolved Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	131
Number of Observations Used	38
Number of Observations with Missing Values	93

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.7172	0.2875	-0.4145	0.1874	0.7176	0.3855	0.7024	0.4200	0.7477	0.7167	0.5136	0.3037	0.3361	0.2363	0.2679
X2	0.7172	1.0000	-0.1222	-0.8530	-0.2490	1.0000	-0.0682	0.0310	-0.1104	0.9665	0.9999	0.6319	-0.1008	-0.0575	-0.1881	0.1310
X3	0.2875	-0.1222	1.0000	0.6223	0.9917	-0.1217	0.9932	0.7014	0.9734	0.0338	-0.1228	0.1083	0.9998	0.9979	0.9978	0.5895
X4	-0.4145	-0.8530	0.6223	1.0000	0.7179	-0.8527	0.5761	0.3444	0.5990	-0.7438	-0.8532	-0.4389	0.6053	0.5701	0.6731	0.2060
X5	0.1874	-0.2490	0.9917	0.7179	1.0000	-0.2486	0.9780	0.6804	0.9642	-0.0923	-0.2496	0.0241	0.9887	0.9812	0.9981	0.5581
X1X2	0.7176	1.0000	-0.1217	-0.8527	-0.2486	1.0000	-0.0677	0.0316	-0.1099	0.9659	0.9999	0.6296	-0.1004	-0.0570	-0.1877	0.1321
X1X3	0.3855	-0.0682	0.9932	0.5761	0.9780	-0.0677	1.0000	0.7744	0.9907	0.0838	-0.0688	0.1380	0.9941	0.9946	0.9874	0.5866
X1X4	0.7024	0.0310	0.7014	0.3444	0.6804	0.0316	0.7744	1.0000	0.8443	0.1350	0.0304	0.1419	0.7038	0.7076	0.6920	0.3688
X1X5	0.4200	-0.1104	0.9734	0.5990	0.9642	-0.1099	0.9907	0.8443	1.0000	0.0388	-0.1111	0.1054	0.9734	0.9719	0.9707	0.5533
X2X3	0.7477	0.9665	0.0338	-0.7438	-0.0923	0.9659	0.0838	0.1350	0.0388	1.0000	0.9687	0.7904	0.0548	0.0972	-0.0314	0.1798
X2X4	0.7167	0.9999	-0.1228	-0.8532	-0.2496	0.9999	-0.0688	0.0304	-0.1111	0.9687	1.0000	0.6408	-0.1014	-0.0581	-0.1887	0.1280
X2X5	0.5136	0.6319	0.1083	-0.4389	0.0241	0.6296	0.1380	0.1419	0.1054	0.7904	0.6408	1.0000	0.1222	0.1501	0.0650	0.0389
X3X4	0.3037	-0.1008	0.9998	0.6053	0.9887	-0.1004	0.9941	0.7038	0.9734	0.0548	-0.1014	0.1222	1.0000	0.9991	0.9961	0.5938
X3X5	0.3361	-0.0575	0.9979	0.5701	0.9812	-0.0570	0.9946	0.7076	0.9719	0.0972	-0.0581	0.1501	0.9991	1.0000	0.9913	0.6016
X4X5	0.2363	-0.1881	0.9978	0.6731	0.9981	-0.1877	0.9874	0.6920	0.9707	-0.0314	-0.1887	0.0650	0.9961	0.9913	1.0000	0.5745
Y	0.2679	0.1310	0.5895	0.2060	0.5581	0.1321	0.5866	0.3688	0.5533	0.1798	0.1280	0.0389	0.5938	0.6016	0.5745	1.0000

STEPWISE REGRESSION
Pollutant: Dissolved Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	131
Number of Observations Used	38
Number of Observations with Missing Values	93

Stepwise Selection: Step 1

Variable X3X5 Entered: R-Square = 0.3619 and C(p) = 13.1874

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00026981	0.00026981	20.42	<.0001
Error	36	0.00047572	0.00001321		
Corrected Total	37	0.00074553			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01571	0.00062421	0.00838	633.78	<.0001
X3X5	8.052739E-8	1.782151E-8	0.00026981	20.42	<.0001

Bounds on condition number: 1, 1

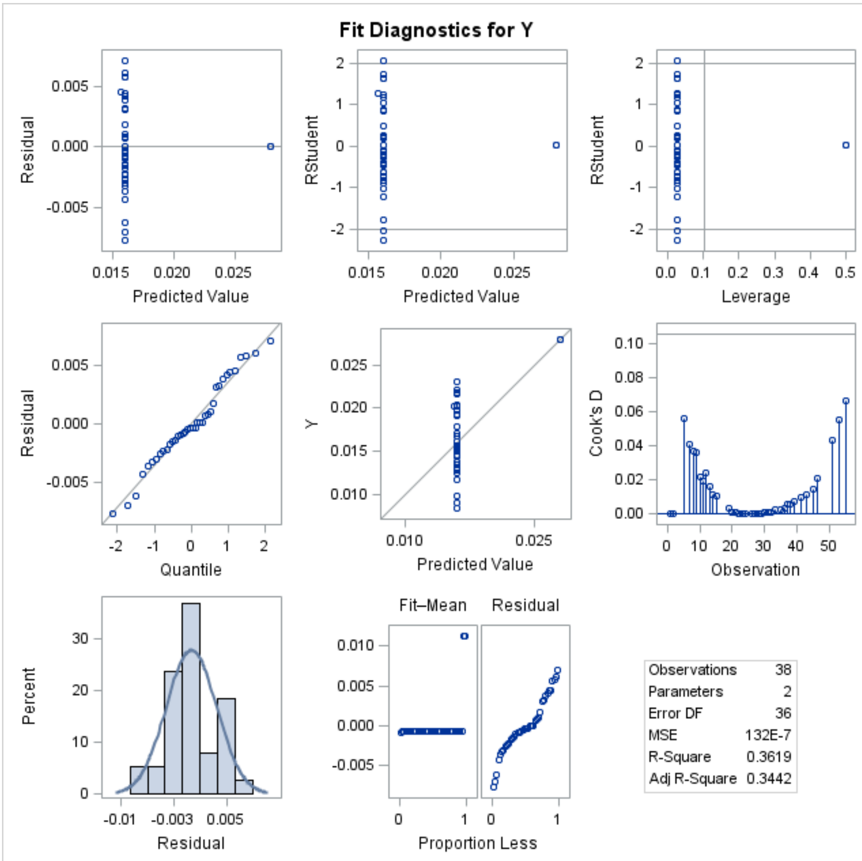
All variables left in the model are significant at the 0.1500 level.

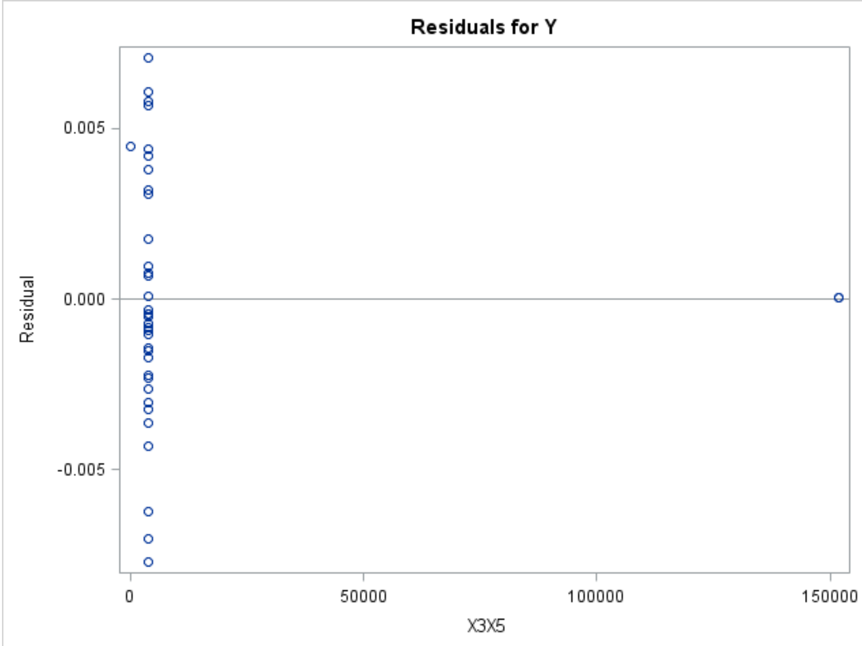
No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X3X5		1	0.3619	0.3619	13.1874	20.42	<.0001

STEPWISE REGRESSION
Pollutant: Dissolved Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

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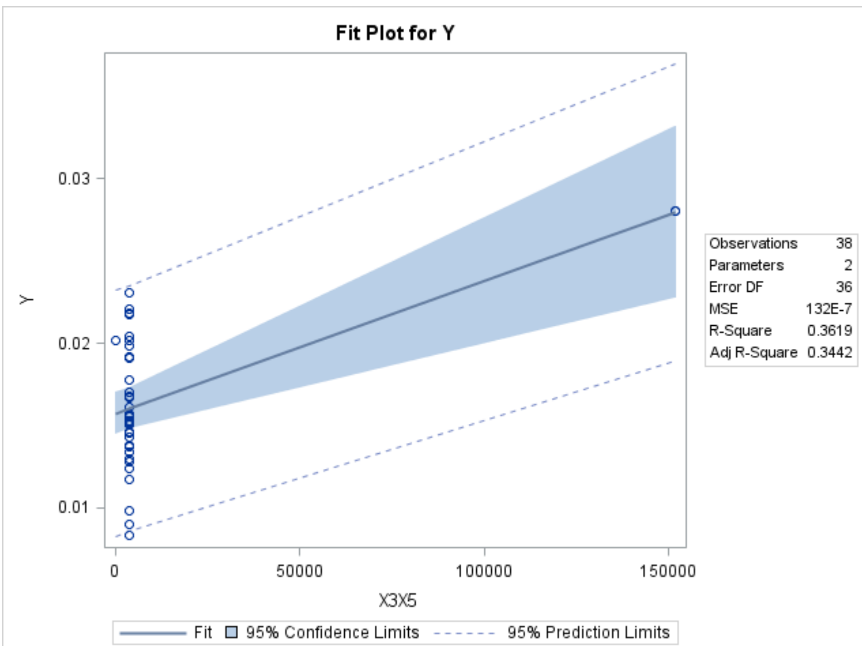
X3X5


Fit Plot for Y
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0.02
0.01
Y
0
50000
100000
150000
X3X5
Observations 38
Parameters 2
Error DF 36
MSE 132E-7
R-Square 0.3619
Adj R-Square 0.3442
Fit
95% Confidence Limits
95% Prediction Limits

==

MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: E. Coli

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The REG Procedure

Number of Observations Read	131
Number of Observations Used	38
Number of Observations with Missing Values	93

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.7172	0.2875	-0.4145	0.1874	0.7176	0.3855	0.7024	0.4200	0.7477	0.7167	0.5136	0.3037	0.3361	0.2363	0.2679
X2	0.7172	1.0000	-0.1222	-0.8530	-0.2490	1.0000	-0.0682	0.0310	-0.1104	0.9665	0.9999	0.6319	-0.1008	-0.0575	-0.1881	0.1310
X3	0.2875	-0.1222	1.0000	0.6223	0.9917	-0.1217	0.9932	0.7014	0.9734	0.0338	-0.1228	0.1083	0.9998	0.9979	0.9978	0.5895
X4	-0.4145	-0.8530	0.6223	1.0000	0.7179	-0.8527	0.5761	0.3444	0.5990	-0.7438	-0.8532	-0.4389	0.6053	0.5701	0.6731	0.2060
X5	0.1874	-0.2490	0.9917	0.7179	1.0000	-0.2486	0.9780	0.6804	0.9642	-0.0923	-0.2496	0.0241	0.9887	0.9812	0.9981	0.5581
X1X2	0.7176	1.0000	-0.1217	-0.8527	-0.2486	1.0000	-0.0677	0.0316	-0.1099	0.9659	0.9999	0.6296	-0.1004	-0.0570	-0.1877	0.1321
X1X3	0.3855	-0.0682	0.9932	0.5761	0.9780	-0.0677	1.0000	0.7744	0.9907	0.0838	-0.0688	0.1380	0.9941	0.9946	0.9874	0.5866
X1X4	0.7024	0.0310	0.7014	0.3444	0.6804	0.0316	0.7744	1.0000	0.8443	0.1350	0.0304	0.1419	0.7038	0.7076	0.6920	0.3688
X1X5	0.4200	-0.1104	0.9734	0.5990	0.9642	-0.1099	0.9907	0.8443	1.0000	0.0388	-0.1111	0.1054	0.9734	0.9719	0.9707	0.5533
X2X3	0.7477	0.9665	0.0338	-0.7438	-0.0923	0.9659	0.0838	0.1350	0.0388	1.0000	0.9687	0.7904	0.0548	0.0972	-0.0314	0.1798
X2X4	0.7167	0.9999	-0.1228	-0.8532	-0.2496	0.9999	-0.0688	0.0304	-0.1111	0.9687	1.0000	0.6408	-0.1014	-0.0581	-0.1887	0.1280
X2X5	0.5136	0.6319	0.1083	-0.4389	0.0241	0.6296	0.1380	0.1419	0.1054	0.7904	0.6408	1.0000	0.1222	0.1501	0.0650	0.0389
X3X4	0.3037	-0.1008	0.9998	0.6053	0.9887	-0.1004	0.9941	0.7038	0.9734	0.0548	-0.1014	0.1222	1.0000	0.9991	0.9961	0.5938
X3X5	0.3361	-0.0575	0.9979	0.5701	0.9812	-0.0570	0.9946	0.7076	0.9719	0.0972	-0.0581	0.1501	0.9991	1.0000	0.9913	0.6016
X4X5	0.2363	-0.1881	0.9978	0.6731	0.9981	-0.1877	0.9874	0.6920	0.9707	-0.0314	-0.1887	0.0650	0.9961	0.9913	1.0000	0.5745
Y	0.2679	0.1310	0.5895	0.2060	0.5581	0.1321	0.5866	0.3688	0.5533	0.1798	0.1280	0.0389	0.5938	0.6016	0.5745	1.0000

===

MULTIPLE LEAST-SQUARE REGRESSION

Pollutant: E. Coli

===

The REG Procedure
Model: MODEL1

Note: Near collinearity forces the use of a slow version of the leaps and bounds algorithm. The problem will require a large amount of computing time.

Note: Subsets with tolerances less than 1.110223E-7 have been encountered and omitted.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: E. Coli

==

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	131
Number of Observations Used	38
Number of Observations with Missing Values	93

Number in Model	R-Square	Variables in Model
1	0.3619	X3X5
1	0.3526	X3X4
1	0.3475	X3
1	0.3441	X1X3
1	0.3300	X4X5
1	0.3115	X5
1	0.3061	X1X5
1	0.1360	X1X4
1	0.0718	X1
1	0.0424	X4
1	0.0323	X2X3
1	0.0174	X1X2
1	0.0172	X2
1	0.0164	X2X4
1	0.0015	X2X5
2	0.3897	X5 X4X5
2	0.3897	X3 X5
2	0.3897	X4 X4X5
2	0.3897	X3 X4
2	0.3897	X3 X4X5
2	0.3897	X3 X3X5
2	0.3897	X4 X3X5
2	0.3897	X3X5 X4X5
2	0.3897	X5 X3X5
2	0.3897	X3X4 X3X5
2	0.3897	X5 X3X4
2	0.3897	X4 X3X4
2	0.3897	X3X4 X4X5
2	0.3897	X3 X3X4
2	0.3897	X4 X5
3	0.4452	X2 X4 X1X2
3	0.4451	X2 X5 X1X2
3	0.4450	X2 X1X2 X4X5
3	0.4450	X2 X3 X1X2
3	0.4450	X2 X1X2 X3X4
3	0.4450	X2 X1X2 X3X5

3	0.4374	X4 X1X2 X2X4
3	0.4373	X5 X1X2 X2X4
3	0.4373	X1X2 X2X4 X4X5
3	0.4373	X3 X1X2 X2X4
3	0.4373	X1X2 X2X4 X3X4
3	0.4373	X1X2 X2X4 X3X5
3	0.4355	X2 X3 X5
3	0.4352	X5 X2X4 X4X5
3	0.4352	X2 X4 X4X5
4	0.4654	X4 X1X2 X2X4 X3X4
4	0.4653	X2 X4 X1X2 X3X4
4	0.4652	X4 X1X2 X2X4 X3X5
4	0.4652	X3 X4 X1X2 X2X4
4	0.4652	X2 X4 X1X2 X3X5
4	0.4651	X2 X3 X4 X1X2
4	0.4643	X2 X4 X1X2 X4X5
4	0.4643	X2 X1X2 X2X4 X3X4
4	0.4643	X2 X1X2 X2X4 X3X5
4	0.4643	X4 X1X2 X2X4 X4X5
4	0.4643	X2 X3 X1X2 X2X4
4	0.4643	X2 X4 X1X2 X2X4
4	0.4643	X2 X1X2 X2X4 X4X5
4	0.4643	X2 X5 X1X2 X2X4
4	0.4629	X2 X4 X5 X1X2
5	0.5432	X2 X4 X5 X1X2 X1X3
5	0.4915	X1 X2 X1X2 X1X4 X2X5
5	0.4913	X1 X2 X1X2 X1X3 X2X5
5	0.4913	X1 X2 X1X2 X1X5 X2X5
5	0.4912	X2 X1X2 X1X3 X1X4 X2X5
5	0.4912	X2 X1X2 X1X3 X1X5 X2X5
5	0.4912	X2 X1X2 X1X4 X1X5 X2X5
5	0.4899	X4 X1X2 X1X5 X2X3 X3X5
5	0.4892	X1 X2 X4 X1X2 X2X5
5	0.4891	X1 X2 X1X2 X2X5 X3X4
5	0.4891	X1 X2 X1X2 X2X5 X3X5
5	0.4891	X1 X2 X3 X1X2 X2X5
5	0.4891	X1 X2 X5 X1X2 X2X5
5	0.4891	X1 X2 X1X2 X2X5 X4X5
5	0.4887	X2 X4 X1X2 X1X4 X2X5

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION

Pollutant: E. Coli

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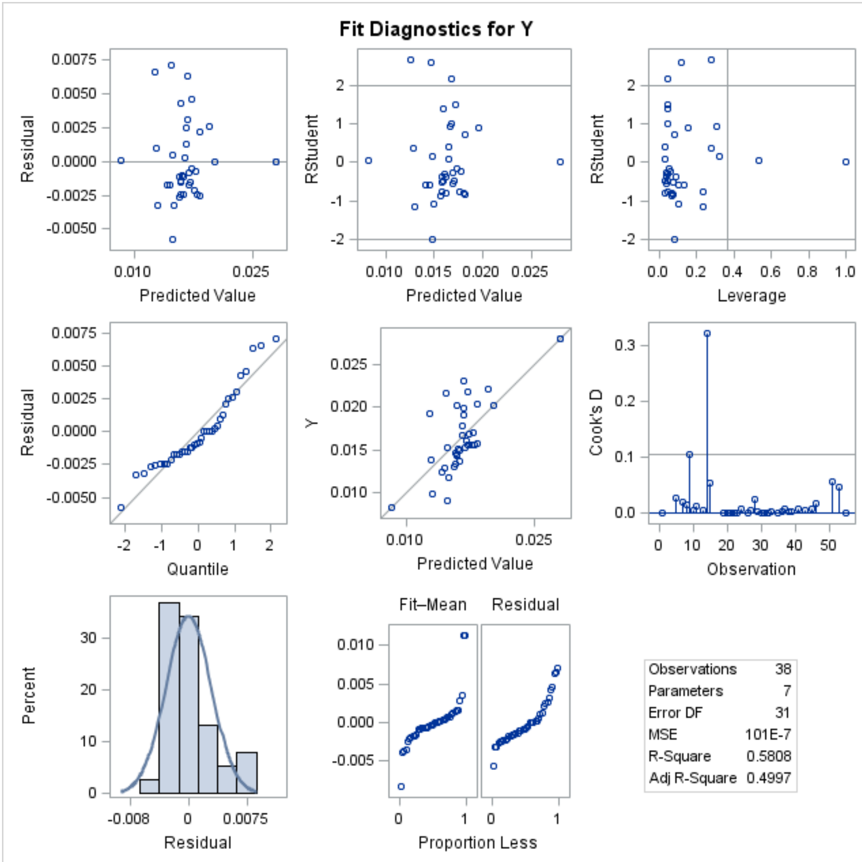
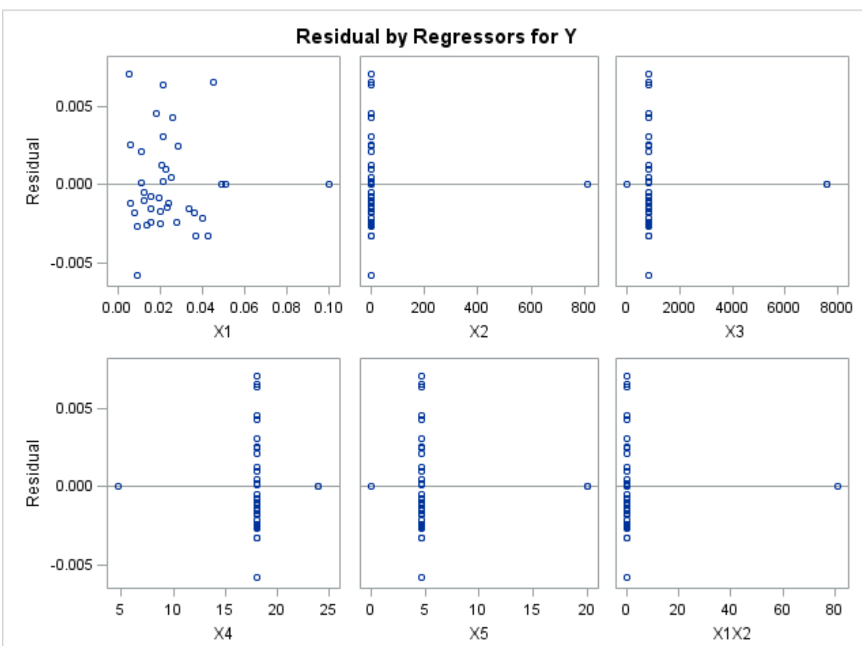
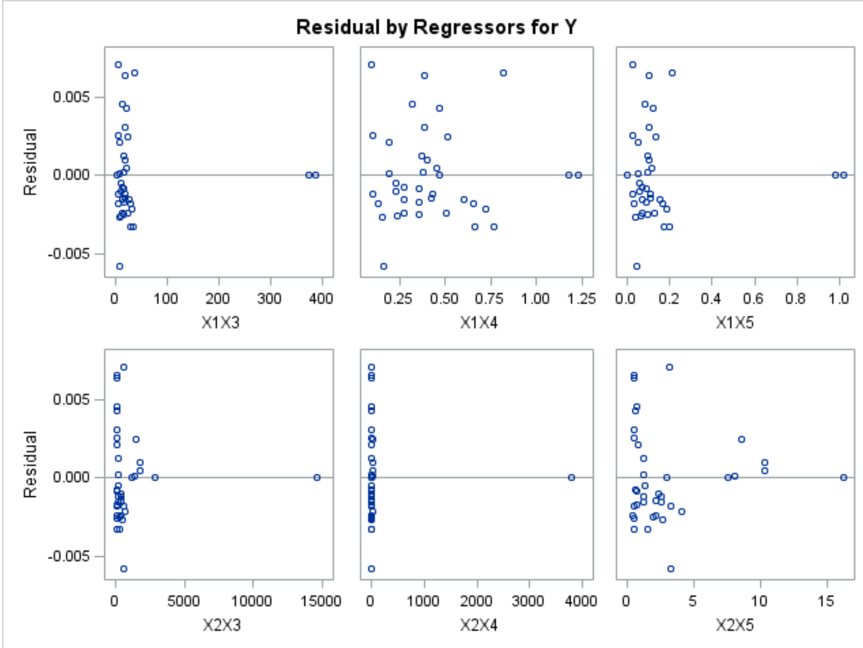
The REG Procedure

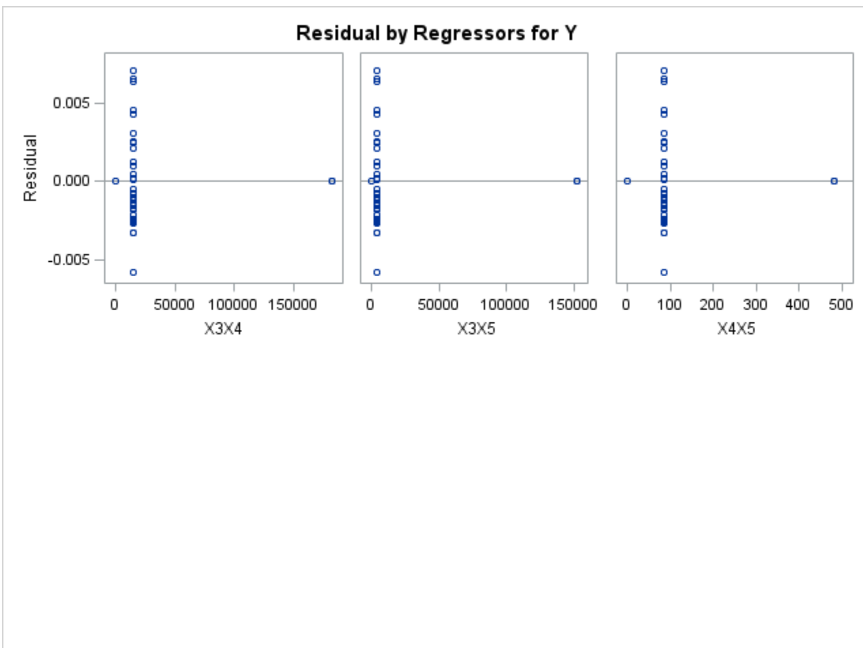
Model: MODEL1

Dependent Variable: Y






Residual by Regressors for Y
Residual
0.005
0.000
-0.005
0 100 200 300 400
X1X3
0.25 0.50 0.75 1.00 1.25
X1X4
0.0 0.2 0.4 0.6 0.8 1.0
X1X5
0 5000 10000 15000
X2X3
0 1000 2000 3000 4000
X2X4
0 5 10 15
X2X5


Residual by Regressors for Y
Residual
0.005
0.000
-0.005
0 50000 100000 150000
X3X4
0 50000 100000 150000
X3X5
0 100 200 300 400 500
X4X5

FORWARD REGRESSION
Pollutant: E. Coli
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	96
Number of Observations Used	91
Number of Observations with Missing Values	5

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1033	0.1370	0.1128	0.1399	0.6097	0.8807	0.9016	0.8327	-0.0290	-0.0442	0.0605	0.1680	0.1343	0.1611	0.5401
X2	-0.1033	1.0000	-0.5607	0.0328	-0.5583	0.4541	-0.2186	-0.0980	-0.2364	0.9491	0.7896	0.7488	-0.4716	-0.5625	-0.5135	-0.0193
X3	0.1370	-0.5607	1.0000	0.0766	0.9996	-0.2707	0.3917	0.1126	0.4327	-0.3061	-0.3432	0.0264	0.9002	0.9997	0.9557	-0.0254
X4	0.1128	0.0328	0.0766	1.0000	0.1052	0.0915	0.0622	0.4036	0.0599	0.1470	0.5426	0.3434	0.5032	0.0508	0.3667	-0.2169
X5	0.1399	-0.5583	0.9996	0.1052	1.0000	-0.2673	0.3925	0.1240	0.4333	-0.3011	-0.3267	0.0362	0.9123	0.9985	0.9638	-0.0316
X1X2	0.6097	0.4541	-0.2707	0.0915	-0.2673	1.0000	0.2956	0.5825	0.2247	0.4457	0.3925	0.3745	-0.1946	-0.2735	-0.2256	0.2731
X1X3	0.8807	-0.2186	0.3917	0.0622	0.3925	0.2956	1.0000	0.7366	0.9956	-0.0731	-0.1294	0.0986	0.3667	0.3908	0.3839	0.4878
X1X4	0.9016	-0.0980	0.1126	0.4036	0.1240	0.5825	0.7366	1.0000	0.6893	-0.0167	0.0938	0.1039	0.2739	0.1024	0.2242	0.4256
X1X5	0.8327	-0.2364	0.4327	0.0599	0.4333	0.2247	0.9956	0.6893	1.0000	-0.0798	-0.1390	0.1053	0.4012	0.4319	0.4215	0.4620
X2X3	-0.0290	0.9491	-0.3061	0.1470	-0.3011	0.4457	-0.0731	-0.0167	-0.0798	1.0000	0.8459	0.9170	-0.2011	-0.3104	-0.2423	-0.0331
X2X4	-0.0442	0.7896	-0.3432	0.5426	-0.3267	0.3925	-0.1294	0.0938	-0.1390	0.8459	1.0000	0.8465	-0.0604	-0.3578	-0.1601	-0.1749
X2X5	0.0605	0.7488	0.0264	0.3434	0.0362	0.3745	0.0986	0.1039	0.1053	0.9170	0.8465	1.0000	0.1729	0.0175	0.1260	-0.0733
X3X4	0.1680	-0.4716	0.9002	0.5032	0.9123	-0.1946	0.3667	0.2739	0.4012	-0.2011	-0.0604	0.1729	1.0000	0.8886	0.9885	-0.1167
X3X5	0.1343	-0.5625	0.9997	0.0508	0.9985	-0.2735	0.3908	0.1024	0.4319	-0.3104	-0.3578	0.0175	0.8886	1.0000	0.9478	-0.0198
X4X5	0.1611	-0.5135	0.9557	0.3667	0.9638	-0.2256	0.3839	0.2242	0.4215	-0.2423	-0.1601	0.1260	0.9885	0.9478	1.0000	-0.0877
Y	0.5401	-0.0193	-0.0254	-0.2169	-0.0316	0.2731	0.4878	0.4256	0.4620	-0.0331	-0.1749	-0.0733	-0.1167	-0.0198	-0.0877	1.0000

FORWARD REGRESSION
Pollutant: E. Coli
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	96
Number of Observations Used	91
Number of Observations with Missing Values	5

Forward Selection: Step 1

Variable X1 Entered: R-Square = 0.2917 and C(p) = 10.1025

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	7943180	7943180	36.65	<.0001
Error	89	19290543	216748		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	300.68593	63.04794	4929908	22.74	<.0001
X1	0.31735	0.05242	7943180	36.65	<.0001

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X4 Entered: R-Square = 0.3698 and C(p) = 1.3869

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	10071960	5035980	25.82	<.0001
Error	88	17161762	195020		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	640.83077	119.06235	5649591	28.97	<.0001

X1	0.33600	0.05005	8791132	45.08	<.0001
X4	-15.02597	4.54796	2128780	10.92	0.0014

Bounds on condition number: 1.0129, 4.0516

Forward Selection: Step 3

Variable X4X5 Entered: R-Square = 0.3767 and C(p) = 2.4403

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	10259998	3419999	17.53	<.0001
Error	87	16973724	195100		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	643.54241	119.11887	5694441	29.19	<.0001
X1	0.34242	0.05048	8977066	46.01	<.0001
X4	-13.32810	4.86657	1463349	7.50	0.0075
X4X5	-0.29896	0.30453	188038	0.96	0.3290

Bounds on condition number: 1.1751, 10.094

Forward Selection: Step 4

Variable X1X2 Entered: R-Square = 0.3895 and C(p) = 2.6933

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	10607059	2651765	13.72	<.0001
Error	86	16626663	193333		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	676.86431	121.15826	6033979	31.21	<.0001
X1	0.40391	0.06805	6810604	35.23	<.0001
X4	-11.95643	4.95148	1127302	5.83	0.0179
X1X2	-0.16847	0.12574	347061	1.80	0.1838
X4X5	-0.50589	0.34022	427471	2.21	0.1407

Bounds on condition number: 2.0064, 26.347

Forward Selection: Step 5

Variable X2 Entered: R-Square = 0.3955 and C(p) = 3.8743

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	10769774	2153955	11.12	<.0001
Error	85	16463948	193694		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	600.61622	147.06224	3230776	16.68	<.0001
X1	0.43351	0.07538	6405663	33.07	<.0001
X2	132.60423	144.67755	162715	0.84	0.3620
X4	-12.88628	5.05886	1256798	6.49	0.0127
X1X2	-0.24319	0.14996	509443	2.63	0.1086
X4X5	-0.37420	0.36961	198538	1.03	0.3142

Bounds on condition number: 2.8484, 51.298

Forward Selection: Step 6

Variable X1X4 Entered: R-Square = 0.4046 and C(p) = 4.6244

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	11018071	1836345	9.51	<.0001
Error	84	16215651	193043		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	712.34050	176.80308	3133652	16.23	0.0001
X1	0.28155	0.15367	648023	3.36	0.0705
X2	168.02489	147.77272	249582	1.29	0.2588
X4	-18.46590	7.05056	1324185	6.86	0.0105
X1X2	-0.27336	0.15205	623957	3.23	0.0758
X1X4	0.00613	0.00541	248297	1.29	0.2600
X4X5	-0.31715	0.37240	140014	0.73	0.3968

Bounds on condition number: 11.203, 181.29

Forward Selection: Step 7

Variable X2X4 Entered: R-Square = 0.4091 and C(p) = 6.0048

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	11141166	1591595	8.21	<.0001
Error	83	16092556	193886		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	537.02271	282.50394	700621	3.61	0.0608
X1	0.29465	0.15488	701711	3.62	0.0606
X2	362.77803	285.78595	312426	1.61	0.2078
X4	-12.21182	10.56100	259237	1.34	0.2509
X1X2	-0.25994	0.15331	557390	2.87	0.0937
X1X4	0.00532	0.00551	180295	0.93	0.3377
X2X4	-7.03714	8.83181	123095	0.63	0.4278
X4X5	-0.26325	0.37929	93400	0.48	0.4896

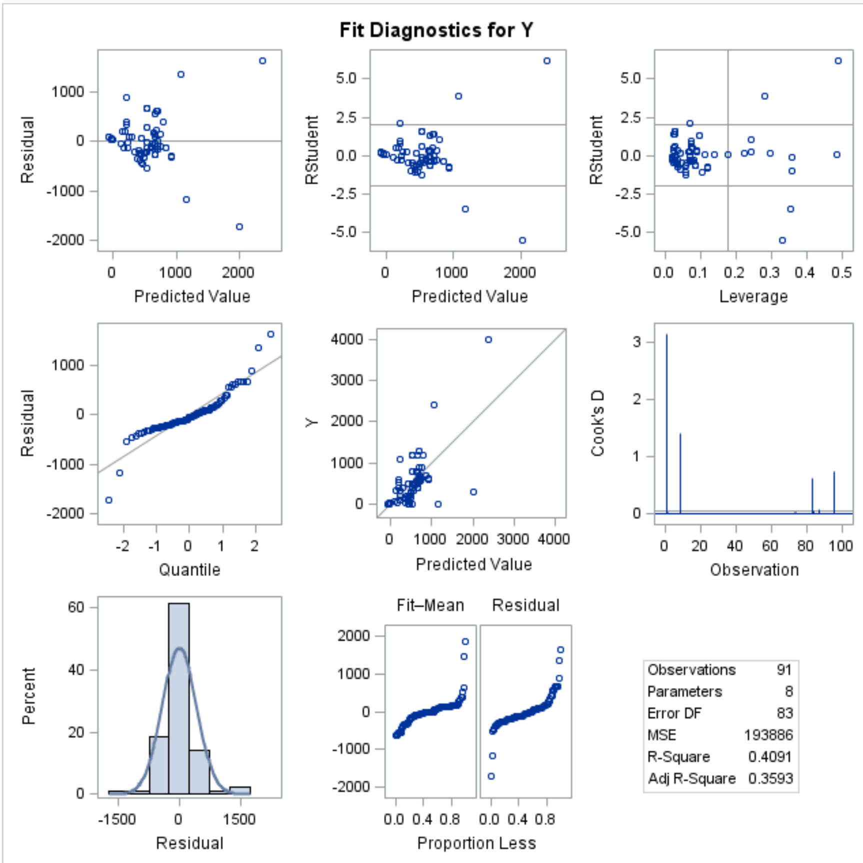
Bounds on condition number: 11.602, 348.29

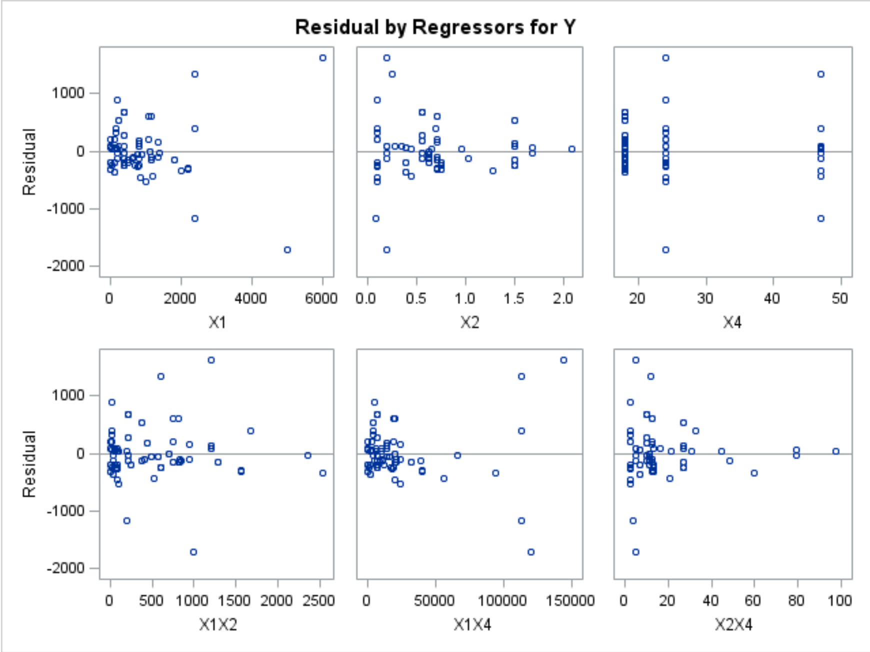
No other variable met the 0.5000 significance level for entry into the model.

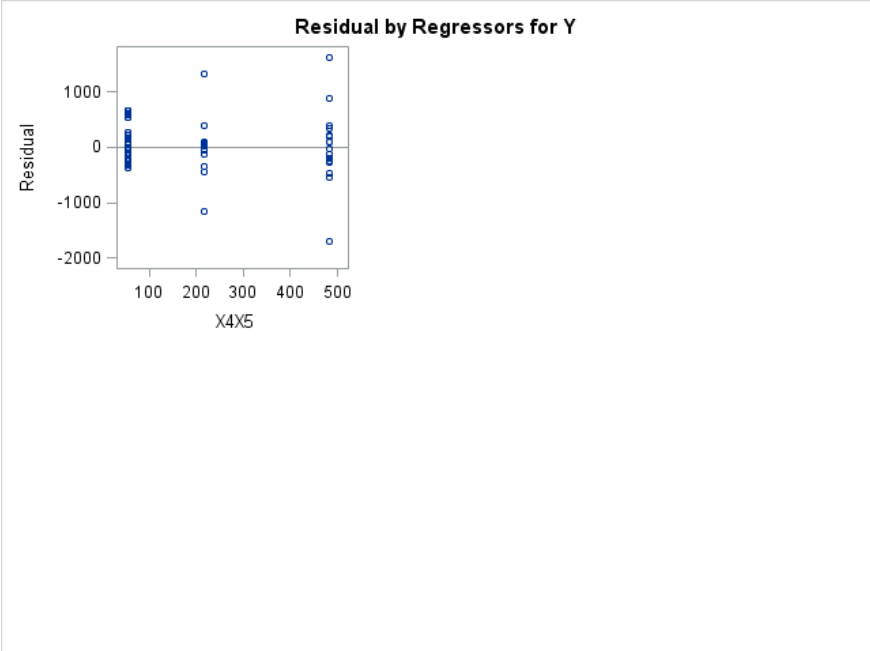
Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1	1	0.2917	0.2917	10.1025	36.65	<.0001
2	X4	2	0.0782	0.3698	1.3869	10.92	0.0014
3	X4X5	3	0.0069	0.3767	2.4403	0.96	0.3290
4	X1X2	4	0.0127	0.3895	2.6933	1.80	0.1838
5	X2	5	0.0060	0.3955	3.8743	0.84	0.3620
6	X1X4	6	0.0091	0.4046	4.6244	1.29	0.2600
7	X2X4	7	0.0045	0.4091	6.0048	0.63	0.4278

FORWARD REGRESSION
Pollutant: E. Coli
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X1
X2
X4
X1X2
X1X4
X2X4


Residual by Regressors for Y
Residual
X4X5

BACKWARD REGRESSION
Pollutant: E. Coli
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	96
Number of Observations Used	91
Number of Observations with Missing Values	5

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1033	0.1370	0.1128	0.1399	0.6097	0.8807	0.9016	0.8327	-0.0290	-0.0442	0.0605	0.1680	0.1343	0.1611	0.5401
X2	-0.1033	1.0000	-0.5607	0.0328	-0.5583	0.4541	-0.2186	-0.0980	-0.2364	0.9491	0.7896	0.7488	-0.4716	-0.5625	-0.5135	-0.0193
X3	0.1370	-0.5607	1.0000	0.0766	0.9996	-0.2707	0.3917	0.1126	0.4327	-0.3061	-0.3432	0.0264	0.9002	0.9997	0.9557	-0.0254
X4	0.1128	0.0328	0.0766	1.0000	0.1052	0.0915	0.0622	0.4036	0.0599	0.1470	0.5426	0.3434	0.5032	0.0508	0.3667	-0.2169
X5	0.1399	-0.5583	0.9996	0.1052	1.0000	-0.2673	0.3925	0.1240	0.4333	-0.3011	-0.3267	0.0362	0.9123	0.9985	0.9638	-0.0316
X1X2	0.6097	0.4541	-0.2707	0.0915	-0.2673	1.0000	0.2956	0.5825	0.2247	0.4457	0.3925	0.3745	-0.1946	-0.2735	-0.2256	0.2731
X1X3	0.8807	-0.2186	0.3917	0.0622	0.3925	0.2956	1.0000	0.7366	0.9956	-0.0731	-0.1294	0.0986	0.3667	0.3908	0.3839	0.4878
X1X4	0.9016	-0.0980	0.1126	0.4036	0.1240	0.5825	0.7366	1.0000	0.6893	-0.0167	0.0938	0.1039	0.2739	0.1024	0.2242	0.4256
X1X5	0.8327	-0.2364	0.4327	0.0599	0.4333	0.2247	0.9956	0.6893	1.0000	-0.0798	-0.1390	0.1053	0.4012	0.4319	0.4215	0.4620
X2X3	-0.0290	0.9491	-0.3061	0.1470	-0.3011	0.4457	-0.0731	-0.0167	-0.0798	1.0000	0.8459	0.9170	-0.2011	-0.3104	-0.2423	-0.0331
X2X4	-0.0442	0.7896	-0.3432	0.5426	-0.3267	0.3925	-0.1294	0.0938	-0.1390	0.8459	1.0000	0.8465	-0.0604	-0.3578	-0.1601	-0.1749
X2X5	0.0605	0.7488	0.0264	0.3434	0.0362	0.3745	0.0986	0.1039	0.1053	0.9170	0.8465	1.0000	0.1729	0.0175	0.1260	-0.0733
X3X4	0.1680	-0.4716	0.9002	0.5032	0.9123	-0.1946	0.3667	0.2739	0.4012	-0.2011	-0.0604	0.1729	1.0000	0.8886	0.9885	-0.1167
X3X5	0.1343	-0.5625	0.9997	0.0508	0.9985	-0.2735	0.3908	0.1024	0.4319	-0.3104	-0.3578	0.0175	0.8886	1.0000	0.9478	-0.0198
X4X5	0.1611	-0.5135	0.9557	0.3667	0.9638	-0.2256	0.3839	0.2242	0.4215	-0.2423	-0.1601	0.1260	0.9885	0.9478	1.0000	-0.0877
Y	0.5401	-0.0193	-0.0254	-0.2169	-0.0316	0.2731	0.4878	0.4256	0.4620	-0.0331	-0.1749	-0.0733	-0.1167	-0.0198	-0.0877	1.0000

BACKWARD REGRESSION
Pollutant: E. Coli
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	96
Number of Observations Used	91
Number of Observations with Missing Values	5

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.4091 and C(p) = 10.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	11142123	1238014	6.23	<.0001
Error	81	16091600	198662		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	575.47605	354.85960	522463	2.63	0.1088
X1	0.30474	0.29741	208571	1.05	0.3086
X2	415.76981	975.93640	36056	0.18	0.6712
X3	-0.02524	0.11212	10066	0.05	0.8225
X4	-13.53289	10.65176	320666	1.61	0.2075
X1X2	-0.26605	0.21154	314227	1.58	0.2121
X1X3	-0.00000149	0.00004833	188.00227	0.00	0.9755
X1X4	0.00525	0.00575	165742	0.83	0.3637
X2X3	-0.04255	0.77569	597.71789	0.00	0.9564
X2X4	-6.68411	10.50777	80386	0.40	0.5265

Bounds on condition number: 92.809, 2521.5

Backward Elimination: Step 1

Variable X1X3 Removed: R-Square = 0.4091 and C(p) = 8.0009

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	11141935	1392742	7.10	<.0001
Error	82	16091788	196241		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	578.22679	341.31062	563232	2.87	0.0940
X1	0.29705	0.16049	672295	3.43	0.0678
X2	420.08960	959.87979	37587	0.19	0.6628
X3	-0.02563	0.11069	10525	0.05	0.8174
X4	-13.50931	10.55922	321213	1.64	0.2044
X1X2	-0.26172	0.15684	546455	2.78	0.0990
X1X4	0.00530	0.00556	178319	0.91	0.3433
X2X3	-0.04729	0.75560	768.54013	0.00	0.9503
X2X4	-6.69431	10.43835	80712	0.41	0.5231

Bounds on condition number: 90.887, 1854.4

Backward Elimination: Step 2

Variable X1X5 Entered: R-Square = 0.4091 and C(p) = 10.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	11142123	1238014	6.23	<.0001
Error	81	16091600	198662		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	575.47605	354.85960	522463	2.63	0.1088
X1	0.30356	0.26615	258435	1.30	0.2574
X2	415.76981	975.93640	36056	0.18	0.6712
X3	-0.02524	0.11212	10066	0.05	0.8225
X4	-13.53289	10.65176	320666	1.61	0.2075
X1X2	-0.26605	0.21154	314227	1.58	0.2121
X1X4	0.00526	0.00571	168313	0.85	0.3601
X1X5	-0.00028867	0.00938	188.00227	0.00	0.9755
X2X3	-0.04255	0.77569	597.71789	0.00	0.9564
X2X4	-6.68411	10.50777	80386	0.40	0.5265

Bounds on condition number: 92.809, 2420.1

Backward Elimination: Step 3

Variable X1X5 Removed: R-Square = 0.4091 and C(p) = 8.0009

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	11141935	1392742	7.10	<.0001
Error	82	16091788	196241		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	578.22679	341.31062	563232	2.87	0.0940
X1	0.29705	0.16049	672295	3.43	0.0678
X2	420.08960	959.87979	37587	0.19	0.6628
X3	-0.02563	0.11069	10525	0.05	0.8174
X4	-13.50931	10.55922	321213	1.64	0.2044
X1X2	-0.26172	0.15684	546455	2.78	0.0990
X1X4	0.00530	0.00556	178319	0.91	0.3433
X2X3	-0.04729	0.75560	768.54013	0.00	0.9503
X2X4	-6.69431	10.43835	80712	0.41	0.5231

Bounds on condition number: 90.887, 1854.4

Backward Elimination: Step 4

Variable X2X3 Removed: R-Square = 0.4091 and C(p) = 6.0048

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	11141166	1591595	8.21	<.0001
Error	83	16092556	193886		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	587.12317	308.42861	702580	3.62	0.0604
X1	0.29465	0.15488	701711	3.62	0.0606
X2	362.77803	285.78595	312426	1.61	0.2078
X3	-0.03193	0.04600	93400	0.48	0.4896
X4	-13.46217	10.46893	320607	1.65	0.2020
X1X2	-0.25994	0.15331	557390	2.87	0.0937
X1X4	0.00532	0.00551	180295	0.93	0.3377
X2X4	-7.03714	8.83181	123095	0.63	0.4278

Bounds on condition number: 11.602, 345.96

Backward Elimination: Step 5

Variable X2X5 Entered: R-Square = 0.4091 and C(p) = 8.0009

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	11141935	1392742	7.10	<.0001
Error	82	16091788	196241		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	578.22679	341.31062	563232	2.87	0.0940
X1	0.29705	0.16049	672295	3.43	0.0678
X2	382.73054	429.32321	155958	0.79	0.3753
X3	-0.02563	0.11069	10525	0.05	0.8174
X4	-13.50931	10.55922	321213	1.64	0.2044
X1X2	-0.26172	0.15684	546455	2.78	0.0990
X1X4	0.00530	0.00556	178319	0.91	0.3433
X2X4	-6.52521	12.07758	57282	0.29	0.5905
X2X5	-9.18089	146.70555	768.54013	0.00	0.9503

Bounds on condition number: 24.527, 805.63

Backward Elimination: Step 6

Variable X2X5 Removed: R-Square = 0.4091 and C(p) = 6.0048

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	11141166	1591595	8.21	<.0001
Error	83	16092556	193886		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	587.12317	308.42861	702580	3.62	0.0604
X1	0.29465	0.15488	701711	3.62	0.0606
X2	362.77803	285.78595	312426	1.61	0.2078
X3	-0.03193	0.04600	93400	0.48	0.4896
X4	-13.46217	10.46893	320607	1.65	0.2020
X1X2	-0.25994	0.15331	557390	2.87	0.0937
X1X4	0.00532	0.00551	180295	0.93	0.3377
X2X4	-7.03714	8.83181	123095	0.63	0.4278

Bounds on condition number: 11.602, 345.96

Backward Elimination: Step 7

Variable X3 Removed: R-Square = 0.4057 and C(p) = 4.4750

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	11047766	1841294	9.56	<.0001
Error	84	16185956	192690		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	488.42189	272.84249	617483	3.20	0.0770
X1	0.27617	0.15210	635218	3.30	0.0730
X2	433.99713	265.90505	513310	2.66	0.1064
X4	-13.21001	10.43030	309081	1.60	0.2088
X1X2	-0.24613	0.15154	508310	2.64	0.1081
X1X4	0.00569	0.00547	208484	1.08	0.3012
X2X4	-8.13035	8.66338	169708	0.88	0.3507

Bounds on condition number: 11.492, 276.02

Backward Elimination: Step 8

Variable X5 Entered: R-Square = 0.4091 and C(p) = 6.0048
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	11141166	1591595	8.21	<.0001
Error	83	16092556	193886		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	561.89849	293.44919	710881	3.67	0.0590
X1	0.29465	0.15488	701711	3.62	0.0606
X2	362.77803	285.78595	312426	1.61	0.2078
X4	-13.34799	10.46451	315458	1.63	0.2057
X5	-6.19890	8.93130	93400	0.48	0.4896
X1X2	-0.25994	0.15331	557390	2.87	0.0937

X1X4	0.00532	0.00551	180295	0.93	0.3377
X2X4	-7.03714	8.83181	123095	0.63	0.4278

Bounds on condition number: 11.602, 345.99

Backward Elimination: Step 9

Variable X5 Removed: R-Square = 0.4057 and C(p) = 4.4750

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	6	11047766	1841294	9.56	<.0001
Error	84	16185956	192690		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	488.42189	272.84249	617483	3.20	0.0770
X1	0.27617	0.15210	635218	3.30	0.0730
X2	433.99713	265.90505	513310	2.66	0.1064
X4	-13.21001	10.43030	309081	1.60	0.2088
X1X2	-0.24613	0.15154	508310	2.64	0.1081
X1X4	0.00569	0.00547	208484	1.08	0.3012
X2X4	-8.13035	8.66338	169708	0.88	0.3507

Bounds on condition number: 11.492, 276.02

Backward Elimination: Step 10

Variable X3X4 Entered: R-Square = 0.4091 and C(p) = 6.0048
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	7	11141166	1591595	8.21	<.0001
Error	83	16092556	193886		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	541.17697	284.04672	703795	3.63	0.0602
X1	0.29465	0.15488	701711	3.62	0.0606
X2	362.77803	285.78595	312426	1.61	0.2078
X4	-11.47010	10.75875	220372	1.14	0.2895

X1X2	-0.25994	0.15331	557390	2.87	0.0937
X1X4	0.00532	0.00551	180295	0.93	0.3377
X2X4	-7.03714	8.83181	123095	0.63	0.4278
X3X4	-0.00135	0.00194	93400	0.48	0.4896

Bounds on condition number: 11.602, 351.79

Backward Elimination: Step 11

Variable X3X4 Removed: R-Square = 0.4057 and C(p) = 4.4750

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	11047766	1841294	9.56	<.0001
Error	84	16185956	192690		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	488.42189	272.84249	617483	3.20	0.0770
X1	0.27617	0.15210	635218	3.30	0.0730
X2	433.99713	265.90505	513310	2.66	0.1064
X4	-13.21001	10.43030	309081	1.60	0.2088
X1X2	-0.24613	0.15154	508310	2.64	0.1081
X1X4	0.00569	0.00547	208484	1.08	0.3012
X2X4	-8.13035	8.66338	169708	0.88	0.3507

Bounds on condition number: 11.492, 276.02

Backward Elimination: Step 12

Variable X3X5 Entered: R-Square = 0.4091 and C(p) = 6.0048
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	11141166	1591595	8.21	<.0001
Error	83	16092556	193886		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	551.70928	288.47818	709156	3.66	0.0593
X1	0.29465	0.15488	701711	3.62	0.0606

X2	362.77803	285.78595	312426	1.61	0.2078
X4	-13.56423	10.47506	325105	1.68	0.1989
X1X2	-0.25994	0.15331	557390	2.87	0.0937
X1X4	0.00532	0.00551	180295	0.93	0.3377
X2X4	-7.03714	8.83181	123095	0.63	0.4278
X3X5	-0.00118	0.00170	93400	0.48	0.4896

Bounds on condition number: 11.602, 345.97

Backward Elimination: Step 13

Variable X3X5 Removed: R-Square = 0.4057 and C(p) = 4.4750

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	11047766	1841294	9.56	<.0001
Error	84	16185956	192690		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	488.42189	272.84249	617483	3.20	0.0770
X1	0.27617	0.15210	635218	3.30	0.0730
X2	433.99713	265.90505	513310	2.66	0.1064
X4	-13.21001	10.43030	309081	1.60	0.2088
X1X2	-0.24613	0.15154	508310	2.64	0.1081
X1X4	0.00569	0.00547	208484	1.08	0.3012
X2X4	-8.13035	8.66338	169708	0.88	0.3507

Bounds on condition number: 11.492, 276.02

Backward Elimination: Step 14

Variable X4X5 Entered: R-Square = 0.4091 and C(p) = 6.0048

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	11141166	1591595	8.21	<.0001
Error	83	16092556	193886		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F

Intercept	537.02271	282.50394	700621	3.61	0.0608
X1	0.29465	0.15488	701711	3.62	0.0606
X2	362.77803	285.78595	312426	1.61	0.2078
X4	-12.21182	10.56100	259237	1.34	0.2509
X1X2	-0.25994	0.15331	557390	2.87	0.0937
X1X4	0.00532	0.00551	180295	0.93	0.3377
X2X4	-7.03714	8.83181	123095	0.63	0.4278
X4X5	-0.26325	0.37929	93400	0.48	0.4896

Bounds on condition number: 11.602, 348.29

Backward Elimination: Step 15

Variable X4X5 Removed: R-Square = 0.4057 and C(p) = 4.4750

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	11047766	1841294	9.56	<.0001
Error	84	16185956	192690		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	488.42189	272.84249	617483	3.20	0.0770
X1	0.27617	0.15210	635218	3.30	0.0730
X2	433.99713	265.90505	513310	2.66	0.1064
X4	-13.21001	10.43030	309081	1.60	0.2088
X1X2	-0.24613	0.15154	508310	2.64	0.1081
X1X4	0.00569	0.00547	208484	1.08	0.3012
X2X4	-8.13035	8.66338	169708	0.88	0.3507

Bounds on condition number: 11.492, 276.02

Backward Elimination: Step 16

Variable X2X4 Removed: R-Square = 0.3994 and C(p) = 3.3292

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	10878058	2175612	11.31	<.0001
Error	85	16355665	192420		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F

Intercept	685.75516	173.74401	2997559	15.58	0.0002
X1	0.25602	0.15048	557032	2.89	0.0925
X2	218.99760	134.89067	507182	2.64	0.1082
X4	-20.91689	6.42603	2038722	10.60	0.0016
X1X2	-0.25877	0.15084	566335	2.94	0.0899
X1X4	0.00675	0.00535	306822	1.59	0.2101

Bounds on condition number: 10.999, 135.3

Backward Elimination: Step 17

Variable X1X4 Removed: R-Square = 0.3882 and C(p) = 2.8737

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	10571236	2642809	13.64	<.0001
Error	86	16662487	193750		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	555.04598	140.02512	3044300	15.71	0.0002
X1	0.42135	0.07443	6208972	32.05	<.0001
X2	189.54580	133.31744	391648	2.02	0.1587
X4	-15.15172	4.53773	2160170	11.15	0.0012
X1X2	-0.22199	0.14851	432920	2.23	0.1386

Bounds on condition number: 2.7928, 31.355

Backward Elimination: Step 18

Variable X2 Removed: R-Square = 0.3738 and C(p) = 2.8451

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	10179588	3393196	17.31	<.0001
Error	87	17054135	196025		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	656.43346	121.21159	5749149	29.33	<.0001
X1	0.36431	0.06306	6542628	33.38	<.0001
X4	-14.92849	4.56156	2099501	10.71	0.0015
X1X2	-0.08359	0.11281	107628	0.55	0.4607

Bounds on condition number: 1.5999, 12.62

Backward Elimination: Step 19

Variable X1X2 Removed: R-Square = 0.3698 and C(p) = 1.3869

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	10071960	5035980	25.82	<.0001
Error	88	17161762	195020		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	640.83077	119.06235	5649591	28.97	<.0001
X1	0.33600	0.05005	8791132	45.08	<.0001
X4	-15.02597	4.54796	2128780	10.92	0.0014

Bounds on condition number: 1.0129, 4.0516

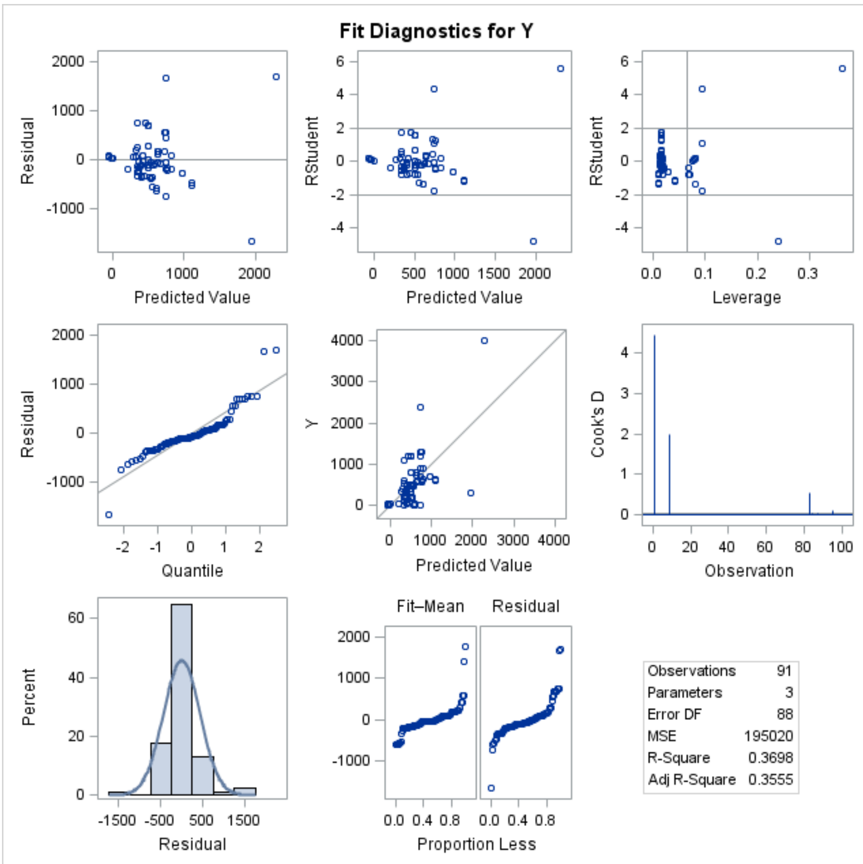
All variables left in the model are significant at the 0.1000 level.

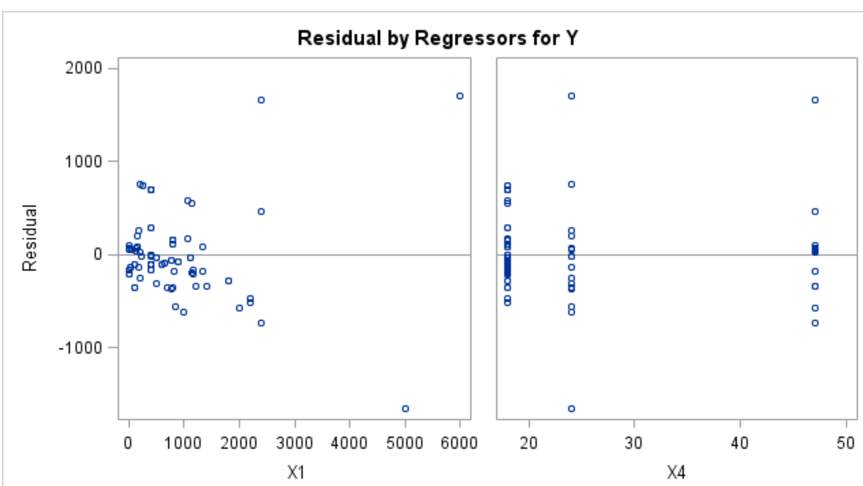
Summary of Backward Elimination								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1		X1X3	8	0.0000	0.4091	8.0009	0.00	0.9755
2	X1X5		9	0.0000	0.4091	10.0000	0.00	0.9755
3		X1X5	8	0.0000	0.4091	8.0009	0.00	0.9755
4		X2X3	7	0.0000	0.4091	6.0048	0.00	0.9503
5	X2X5		8	0.0000	0.4091	8.0009	0.00	0.9503
6		X2X5	7	0.0000	0.4091	6.0048	0.00	0.9503
7		X3	6	0.0034	0.4057	4.4750	0.48	0.4896
8	X5		7	0.0034	0.4091	6.0048	0.48	0.4896
9		X5	6	0.0034	0.4057	4.4750	0.48	0.4896
10	X3X4		7	0.0034	0.4091	6.0048	0.48	0.4896
11		X3X4	6	0.0034	0.4057	4.4750	0.48	0.4896
12	X3X5		7	0.0034	0.4091	6.0048	0.48	0.4896
13		X3X5	6	0.0034	0.4057	4.4750	0.48	0.4896
14	X4X5		7	0.0034	0.4091	6.0048	0.48	0.4896
15		X4X5	6	0.0034	0.4057	4.4750	0.48	0.4896
16		X2X4	5	0.0062	0.3994	3.3292	0.88	0.3507
17		X1X4	4	0.0113	0.3882	2.8737	1.59	0.2101
18		X2	3	0.0144	0.3738	2.8451	2.02	0.1587

19		X1X2	2	0.0040	0.3698	1.3869	0.55	0.4607

BACKWARD REGRESSION
Pollutant: E. Coli
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y





STEPWISE REGRESSION
Pollutant: E. Coli
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	96
Number of Observations Used	91
Number of Observations with Missing Values	5

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1033	0.1370	0.1128	0.1399	0.6097	0.8807	0.9016	0.8327	-0.0290	-0.0442	0.0605	0.1680	0.1343	0.1611	0.5401
X2	-0.1033	1.0000	-0.5607	0.0328	-0.5583	0.4541	-0.2186	-0.0980	-0.2364	0.9491	0.7896	0.7488	-0.4716	-0.5625	-0.5135	-0.0193
X3	0.1370	-0.5607	1.0000	0.0766	0.9996	-0.2707	0.3917	0.1126	0.4327	-0.3061	-0.3432	0.0264	0.9002	0.9997	0.9557	-0.0254
X4	0.1128	0.0328	0.0766	1.0000	0.1052	0.0915	0.0622	0.4036	0.0599	0.1470	0.5426	0.3434	0.5032	0.0508	0.3667	-0.2169
X5	0.1399	-0.5583	0.9996	0.1052	1.0000	-0.2673	0.3925	0.1240	0.4333	-0.3011	-0.3267	0.0362	0.9123	0.9985	0.9638	-0.0316
X1X2	0.6097	0.4541	-0.2707	0.0915	-0.2673	1.0000	0.2956	0.5825	0.2247	0.4457	0.3925	0.3745	-0.1946	-0.2735	-0.2256	0.2731
X1X3	0.8807	-0.2186	0.3917	0.0622	0.3925	0.2956	1.0000	0.7366	0.9956	-0.0731	-0.1294	0.0986	0.3667	0.3908	0.3839	0.4878
X1X4	0.9016	-0.0980	0.1126	0.4036	0.1240	0.5825	0.7366	1.0000	0.6893	-0.0167	0.0938	0.1039	0.2739	0.1024	0.2242	0.4256
X1X5	0.8327	-0.2364	0.4327	0.0599	0.4333	0.2247	0.9956	0.6893	1.0000	-0.0798	-0.1390	0.1053	0.4012	0.4319	0.4215	0.4620
X2X3	-0.0290	0.9491	-0.3061	0.1470	-0.3011	0.4457	-0.0731	-0.0167	-0.0798	1.0000	0.8459	0.9170	-0.2011	-0.3104	-0.2423	-0.0331
X2X4	-0.0442	0.7896	-0.3432	0.5426	-0.3267	0.3925	-0.1294	0.0938	-0.1390	0.8459	1.0000	0.8465	-0.0604	-0.3578	-0.1601	-0.1749
X2X5	0.0605	0.7488	0.0264	0.3434	0.0362	0.3745	0.0986	0.1039	0.1053	0.9170	0.8465	1.0000	0.1729	0.0175	0.1260	-0.0733
X3X4	0.1680	-0.4716	0.9002	0.5032	0.9123	-0.1946	0.3667	0.2739	0.4012	-0.2011	-0.0604	0.1729	1.0000	0.8886	0.9885	-0.1167
X3X5	0.1343	-0.5625	0.9997	0.0508	0.9985	-0.2735	0.3908	0.1024	0.4319	-0.3104	-0.3578	0.0175	0.8886	1.0000	0.9478	-0.0198
X4X5	0.1611	-0.5135	0.9557	0.3667	0.9638	-0.2256	0.3839	0.2242	0.4215	-0.2423	-0.1601	0.1260	0.9885	0.9478	1.0000	-0.0877
Y	0.5401	-0.0193	-0.0254	-0.2169	-0.0316	0.2731	0.4878	0.4256	0.4620	-0.0331	-0.1749	-0.0733	-0.1167	-0.0198	-0.0877	1.0000

STEPWISE REGRESSION
Pollutant: E. Coli
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	96
Number of Observations Used	91
Number of Observations with Missing Values	5

Stepwise Selection: Step 1

Variable X1 Entered: R-Square = 0.2917 and C(p) = 10.1025

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	7943180	7943180	36.65	<.0001
Error	89	19290543	216748		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	300.68593	63.04794	4929908	22.74	<.0001
X1	0.31735	0.05242	7943180	36.65	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X4 Entered: R-Square = 0.3698 and C(p) = 1.3869

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	10071960	5035980	25.82	<.0001
Error	88	17161762	195020		
Corrected Total	90	27233722			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	640.83077	119.06235	5649591	28.97	<.0001

X1	0.33600	0.05005	8791132	45.08	<.0001
X4	-15.02597	4.54796	2128780	10.92	0.0014

Bounds on condition number: 1.0129, 4.0516

All variables left in the model are significant at the 0.1500 level.

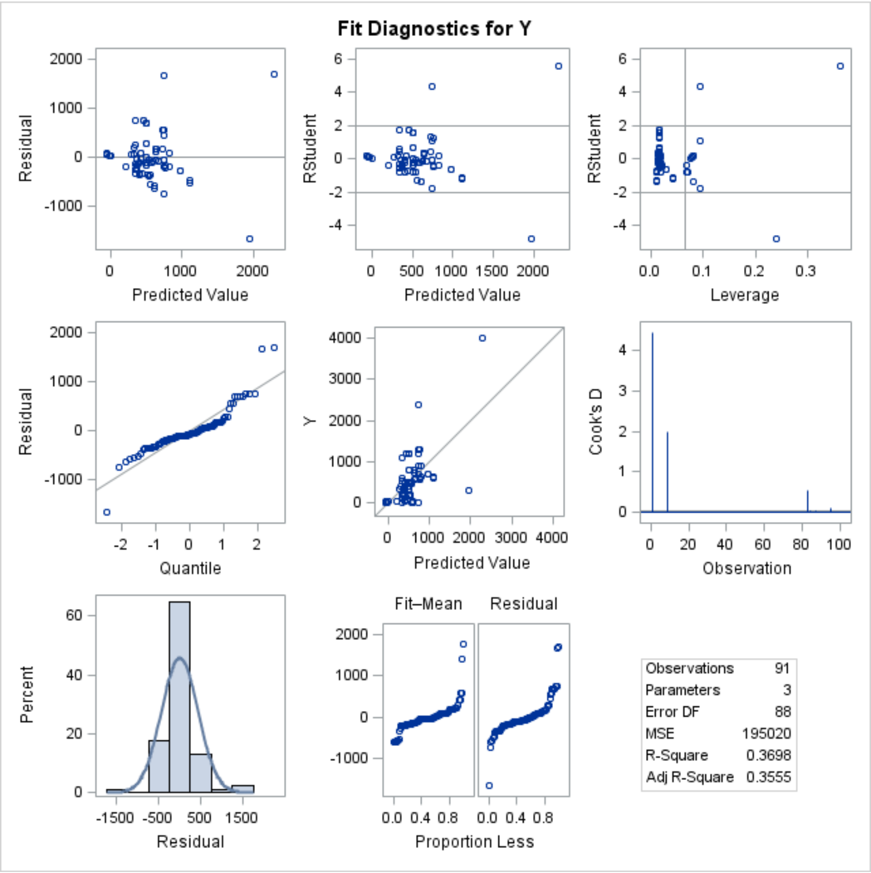
No other variable met the 0.1500 significance level for entry into the model.

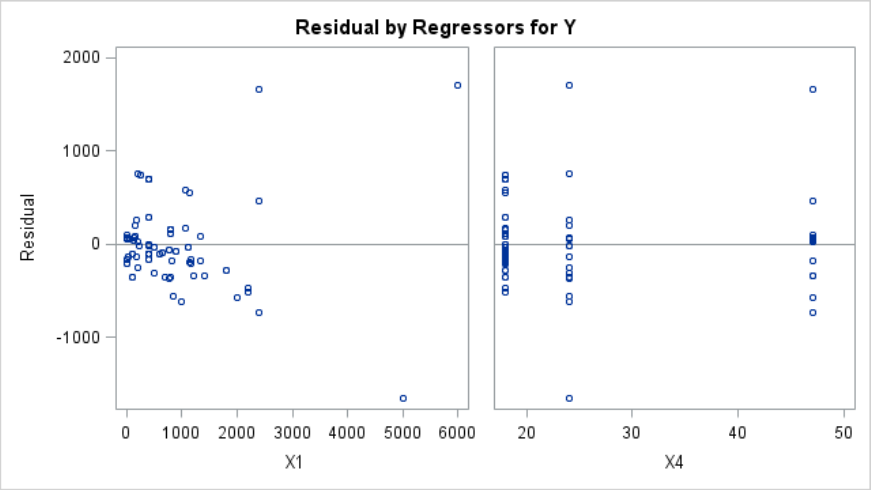
Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1		1	0.2917	0.2917	10.1025	36.65	<.0001
2	X4		2	0.0782	0.3698	1.3869	10.92	0.0014

STEPWISE REGRESSION
Pollutant: E. Coli
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y





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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Enterococcus

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The REG Procedure

Number of Observations Read	96
Number of Observations Used	91
Number of Observations with Missing Values	5

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1033	0.1370	0.1128	0.1399	0.6097	0.8807	0.9016	0.8327	-0.0290	-0.0442	0.0605	0.1680	0.1343	0.1611	0.5401
X2	-0.1033	1.0000	-0.5607	0.0328	-0.5583	0.4541	-0.2186	-0.0980	-0.2364	0.9491	0.7896	0.7488	-0.4716	-0.5625	-0.5135	-0.0193
X3	0.1370	-0.5607	1.0000	0.0766	0.9996	-0.2707	0.3917	0.1126	0.4327	-0.3061	-0.3432	0.0264	0.9002	0.9997	0.9557	-0.0254
X4	0.1128	0.0328	0.0766	1.0000	0.1052	0.0915	0.0622	0.4036	0.0599	0.1470	0.5426	0.3434	0.5032	0.0508	0.3667	-0.2169
X5	0.1399	-0.5583	0.9996	0.1052	1.0000	-0.2673	0.3925	0.1240	0.4333	-0.3011	-0.3267	0.0362	0.9123	0.9985	0.9638	-0.0316
X1X2	0.6097	0.4541	-0.2707	0.0915	-0.2673	1.0000	0.2956	0.5825	0.2247	0.4457	0.3925	0.3745	-0.1946	-0.2735	-0.2256	0.2731
X1X3	0.8807	-0.2186	0.3917	0.0622	0.3925	0.2956	1.0000	0.7366	0.9956	-0.0731	-0.1294	0.0986	0.3667	0.3908	0.3839	0.4878
X1X4	0.9016	-0.0980	0.1126	0.4036	0.1240	0.5825	0.7366	1.0000	0.6893	-0.0167	0.0938	0.1039	0.2739	0.1024	0.2242	0.4256
X1X5	0.8327	-0.2364	0.4327	0.0599	0.4333	0.2247	0.9956	0.6893	1.0000	-0.0798	-0.1390	0.1053	0.4012	0.4319	0.4215	0.4620
X2X3	-0.0290	0.9491	-0.3061	0.1470	-0.3011	0.4457	-0.0731	-0.0167	-0.0798	1.0000	0.8459	0.9170	-0.2011	-0.3104	-0.2423	-0.0331
X2X4	-0.0442	0.7896	-0.3432	0.5426	-0.3267	0.3925	-0.1294	0.0938	-0.1390	0.8459	1.0000	0.8465	-0.0604	-0.3578	-0.1601	-0.1749
X2X5	0.0605	0.7488	0.0264	0.3434	0.0362	0.3745	0.0986	0.1039	0.1053	0.9170	0.8465	1.0000	0.1729	0.0175	0.1260	-0.0733
X3X4	0.1680	-0.4716	0.9002	0.5032	0.9123	-0.1946	0.3667	0.2739	0.4012	-0.2011	-0.0604	0.1729	1.0000	0.8886	0.9885	-0.1167
X3X5	0.1343	-0.5625	0.9997	0.0508	0.9985	-0.2735	0.3908	0.1024	0.4319	-0.3104	-0.3578	0.0175	0.8886	1.0000	0.9478	-0.0198
X4X5	0.1611	-0.5135	0.9557	0.3667	0.9638	-0.2256	0.3839	0.2242	0.4215	-0.2423	-0.1601	0.1260	0.9885	0.9478	1.0000	-0.0877
Y	0.5401	-0.0193	-0.0254	-0.2169	-0.0316	0.2731	0.4878	0.4256	0.4620	-0.0331	-0.1749	-0.0733	-0.1167	-0.0198	-0.0877	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Enterococcus
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The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	96
Number of Observations Used	91
Number of Observations with Missing Values	5

Number in Model	R-Square	Variables in Model
1	0.2917	X1
1	0.2379	X1X3
1	0.2135	X1X5
1	0.1811	X1X4
1	0.0746	X1X2
1	0.0470	X4
1	0.0306	X2X4
1	0.0136	X3X4
1	0.0077	X4X5
1	0.0054	X2X5
1	0.0011	X2X3
1	0.0010	X5
1	0.0006	X3
1	0.0004	X3X5
1	0.0004	X2
2	0.3698	X1 X4
2	0.3616	X4 X1X4
2	0.3389	X1X3 X3X4
2	0.3360	X1 X3X4
2	0.3266	X1X3 X4X5
2	0.3230	X1 X4X5
2	0.3223	X1X5 X3X4
2	0.3145	X1 X2X4
2	0.3118	X1 X1X4
2	0.3105	X1X5 X4X5
2	0.3034	X1 X5
2	0.3029	X1 X2X5
2	0.3017	X1 X3
2	0.3009	X1X3 X1X5
2	0.3003	X1 X3X5
3	0.3794	X1 X2 X2X4
3	0.3767	X1 X3 X3X5
3	0.3767	X1 X3X4 X4X5
3	0.3767	X1 X3X5 X4X5
3	0.3767	X1 X3 X4X5
3	0.3767	X1 X5 X4X5

3	0.3767	X1 X5 X3X4
3	0.3767	X1 X4 X4X5
3	0.3767	X1 X3X4 X3X5
3	0.3767	X1 X3 X4
3	0.3767	X1 X4 X3X4
3	0.3767	X1 X4 X3X5
3	0.3767	X1 X4 X5
3	0.3767	X1 X3 X3X4
3	0.3767	X1 X5 X3X5
4	0.3934	X1 X2 X1X2 X2X4
4	0.3895	X3 X1X3 X1X4 X3X5
4	0.3895	X1X3 X1X4 X3X5 X4X5
4	0.3895	X1X3 X1X4 X3X4 X4X5
4	0.3895	X3 X1X3 X1X4 X4X5
4	0.3895	X5 X1X3 X1X4 X4X5
4	0.3895	X5 X1X3 X1X4 X3X4
4	0.3895	X4 X1X3 X1X4 X4X5
4	0.3895	X1X3 X1X4 X3X4 X3X5
4	0.3895	X3 X4 X1X3 X1X4
4	0.3895	X4 X1X3 X1X4 X3X4
4	0.3895	X4 X1X3 X1X4 X3X5
4	0.3895	X3 X1X3 X1X4 X3X4
4	0.3895	X4 X5 X1X3 X1X4
4	0.3895	X5 X1X3 X1X4 X3X5
5	0.4009	X1 X4 X1X2 X2X3 X2X5
5	0.3999	X1 X1X2 X2X3 X2X4 X3X4
5	0.3998	X1 X2 X1X2 X2X4 X3X4
5	0.3995	X1 X2 X4 X1X2 X2X5
5	0.3994	X1 X2 X4 X1X2 X1X4
5	0.3987	X1 X2 X1X2 X2X4 X4X5
5	0.3986	X1 X1X2 X2X3 X2X4 X4X5
5	0.3982	X1 X2 X4 X1X2 X2X3
5	0.3980	X1 X2 X4 X1X2 X2X4
5	0.3970	X1 X2 X5 X1X2 X2X4
5	0.3968	X1 X2 X3 X1X2 X2X4
5	0.3967	X1 X2 X1X2 X2X4 X3X5
5	0.3963	X1 X2 X1X2 X2X3 X2X5
5	0.3963	X1 X1X2 X2X3 X2X4 X2X5
5	0.3963	X1 X2 X1X2 X2X3 X2X4
6	0.4080	X1 X4 X1X2 X1X4 X2X3 X2X5
6	0.4070	X1 X2 X4 X1X2 X1X4 X2X5
6	0.4061	X1 X2 X4 X1X2 X1X4 X2X3
6	0.4057	X1 X2 X4 X1X2 X1X4 X2X4
6	0.4046	X1 X2 X3 X1X2 X1X4 X3X5
6	0.4046	X1 X2 X1X2 X1X4 X3X4 X4X5
6	0.4046	X1 X2 X1X2 X1X4 X3X5 X4X5
6	0.4046	X1 X2 X3 X1X2 X1X4 X4X5
6	0.4046	X1 X2 X5 X1X2 X1X4 X3X4
6	0.4046	X1 X2 X5 X1X2 X1X4 X4X5
6	0.4046	X1 X2 X1X2 X1X4 X3X4 X3X5
6	0.4046	X1 X2 X4 X1X2 X1X4 X4X5
6		

	0.4046	X1 X2 X3 X4 X1X2 X1X4
6	0.4046	X1 X2 X4 X1X2 X1X4 X3X4
6	0.4046	X1 X2 X3 X1X2 X1X4 X3X4
7	0.4091	X1 X2 X3 X1X2 X1X4 X2X4 X3X5
7	0.4091	X1 X2 X1X2 X1X4 X2X4 X3X4 X4X5
7	0.4091	X1 X2 X1X2 X1X4 X2X4 X3X5 X4X5
7	0.4091	X1 X2 X3 X1X2 X1X4 X2X4 X4X5
7	0.4091	X1 X2 X5 X1X2 X1X4 X2X4 X3X4
7	0.4091	X1 X2 X5 X1X2 X1X4 X2X4 X4X5
7	0.4091	X1 X2 X1X2 X1X4 X2X4 X3X4 X3X5
7	0.4091	X1 X2 X4 X1X2 X1X4 X2X4 X4X5
7	0.4091	X1 X2 X4 X1X2 X1X4 X2X4 X3X4
7	0.4091	X1 X2 X3 X4 X1X2 X1X4 X2X4
7	0.4091	X1 X2 X3 X1X2 X1X4 X2X4 X3X4
7	0.4091	X1 X2 X4 X5 X1X2 X1X4 X2X4
7	0.4091	X1 X2 X5 X1X2 X1X4 X2X4 X3X5
7	0.4091	X1 X2 X3 X5 X1X2 X1X4 X2X4
7	0.4087	X1 X2 X4 X1X2 X1X4 X2X3 X2X5
8	0.4091	X1 X2 X3 X1X2 X1X4 X2X3 X2X4 X3X5
8	0.4091	X1 X2 X3 X1X2 X1X4 X2X3 X2X5 X3X5
8	0.4091	X1 X2 X1X2 X1X4 X2X3 X2X5 X3X4 X4X5
8	0.4091	X1 X2 X3 X1X2 X1X4 X2X3 X2X5 X4X5
8	0.4091	X1 X2 X1X2 X1X4 X2X3 X2X5 X3X5 X4X5
8	0.4091	X1 X2 X1X2 X1X4 X2X3 X2X4 X3X4 X4X5
8	0.4091	X1 X2 X3 X1X2 X1X4 X2X3 X2X5 X3X4
8	0.4091	X1 X2 X5 X1X2 X1X4 X2X3 X2X5 X3X4
8	0.4091	X1 X2 X1X2 X1X4 X2X3 X2X5 X3X4 X3X5
8	0.4091	X1 X2 X4 X1X2 X1X4 X2X3 X2X5 X3X4
8	0.4091	X1 X2 X4 X1X2 X1X4 X2X3 X2X5 X4X5
8	0.4091	X1 X2 X4 X5 X1X2 X1X4 X2X3 X2X5
8	0.4091	X1 X2 X3 X4 X1X2 X1X4 X2X3 X2X5
8	0.4091	X1 X2 X1X2 X1X4 X2X3 X2X4 X3X5 X4X5
8	0.4091	X1 X2 X5 X1X2 X1X4 X2X3 X2X5 X4X5
9	0.4091	X1 X2 X3 X1X2 X1X4 X1X5 X2X3 X2X4 X3X5
9	0.4091	X1 X2 X3 X1X2 X1X3 X1X4 X2X3 X2X4 X3X5
9	0.4091	X1 X2 X3 X1X2 X1X4 X1X5 X2X3 X2X5 X3X5
9	0.4091	X1 X2 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X4X5
9	0.4091	X1 X2 X3 X1X2 X1X4 X1X5 X2X3 X2X5 X4X5
9	0.4091	X1 X2 X1X2 X1X4 X1X5 X2X3 X2X5 X3X5 X4X5
9	0.4091	X1 X2 X1X2 X1X3 X1X4 X2X3 X2X4 X3X4 X4X5
9	0.4091	X1 X2 X1X2 X1X4 X1X5 X2X3 X2X4 X3X4 X4X5
9	0.4091	X1 X2 X3 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4
9	0.4091	X1 X2 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4
9	0.4091	X1 X2 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5
9	0.4091	X1 X2 X4 X1X2 X1X3 X1X4 X2X3 X2X5 X3X4
9	0.4091	X1 X2 X4 X1X2 X1X3 X1X4 X2X3 X2X5 X4X5
9	0.4091	X1 X2 X4 X1X2 X1X4 X1X5 X2X3 X2X5 X4X5
9	0.4091	X1 X2 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X5

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION

Pollutant: Enterococcus

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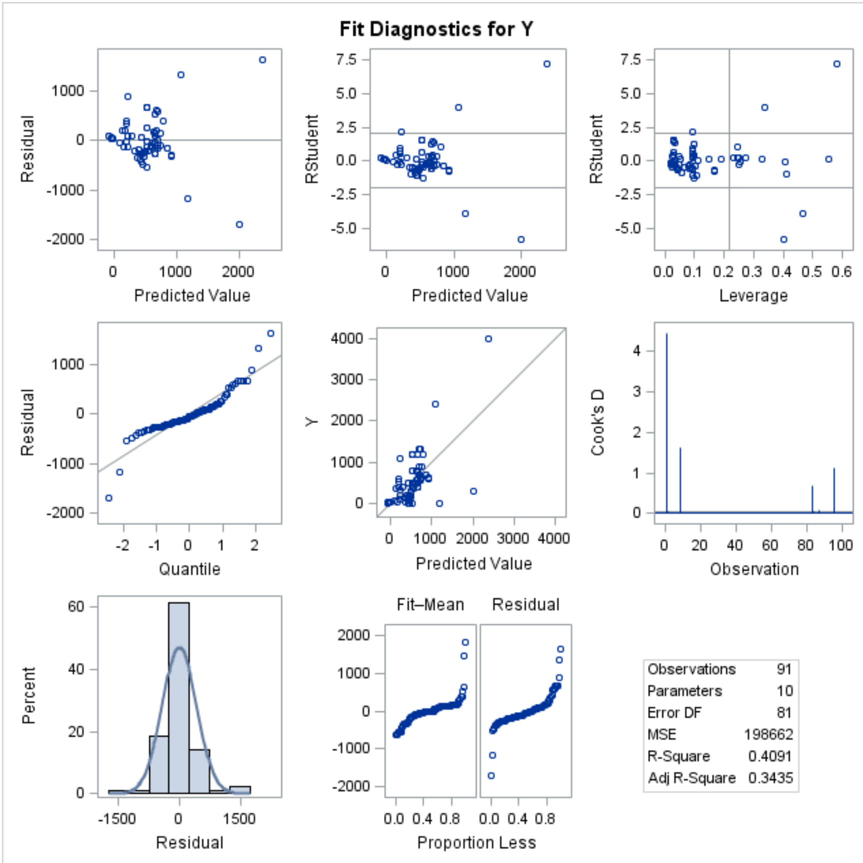
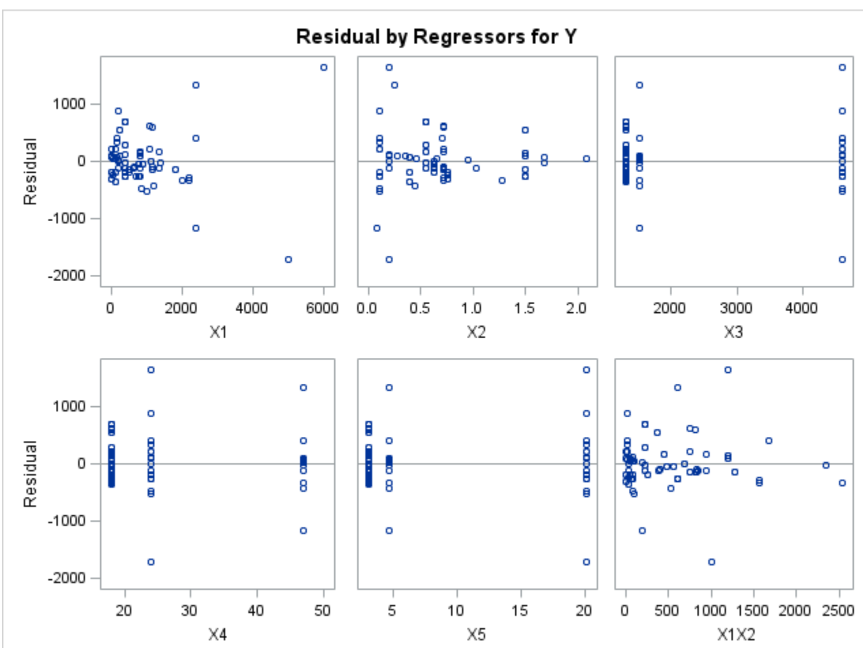
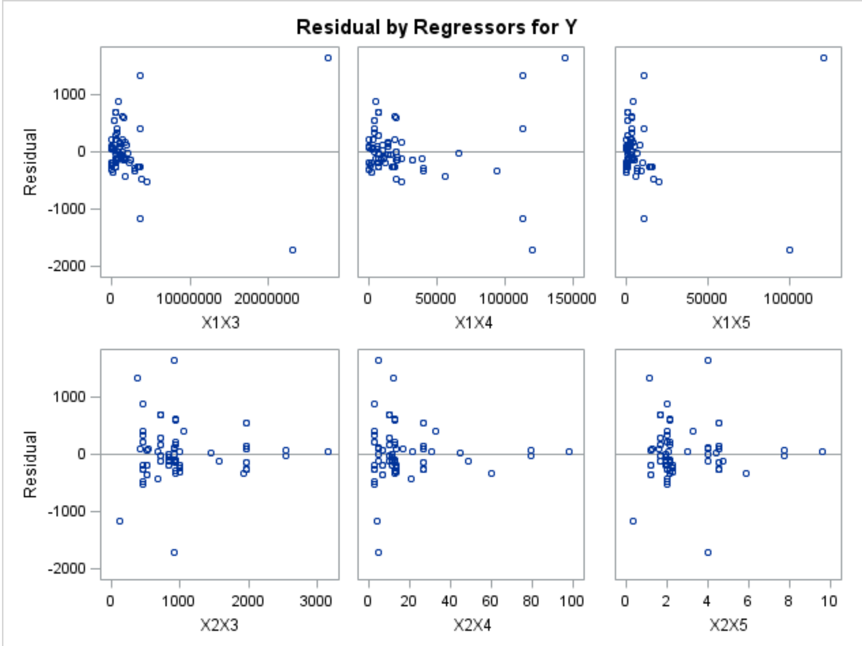
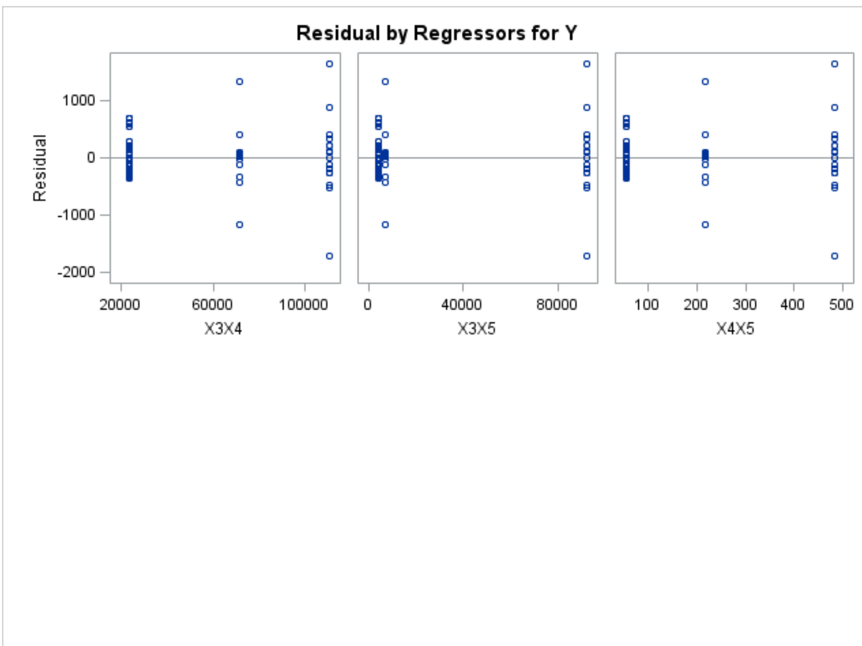
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
1000
0
-1000
-2000
0
10000000
20000000
X1X3
0
50000
100000
150000
X1X4
0
50000
100000
X1X5
0
1000
2000
3000
X2X3
0
20
40
60
80
100
X2X4
0
2
4
6
8
10
X2X5


Residual by Regressors for Y
Residual
1000
0
-1000
-2000
20000
60000
100000
X3X4
0
40000
80000
X3X5
100
200
300
400
500
X4X5

FORWARD REGRESSION
Pollutant: Enterococcus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	10
Number of Observations Used	9
Number of Observations with Missing Values	1

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X2	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	.	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.
X1X2	0.8392	0.2105	.	.	.	1.0000	0.8392	0.8392	0.8392	0.2105	0.2105	0.2105	.	.	.	0.4040
X1X3	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X1X4	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X1X5	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X2X3	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X2X4	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X2X5	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.
X4X5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.
Y	0.5004	-0.2529	.	.	.	0.4040	0.5004	0.5004	0.5004	-0.2529	-0.2529	-0.2529	.	.	.	1.0000

FORWARD REGRESSION
Pollutant: Enterococcus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	10
Number of Observations Used	9
Number of Observations with Missing Values	1

Forward Selection: Step 1

Variable X1X5 Entered: R-Square = 0.2504 and C(p) = 0.2933

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	6613942804	6613942804	2.34	0.1701
Error	7	19798272752	2828324679		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	24444	25056	2691935370	0.95	0.3618
X1X5	0.01963	0.01284	6613942804	2.34	0.1701

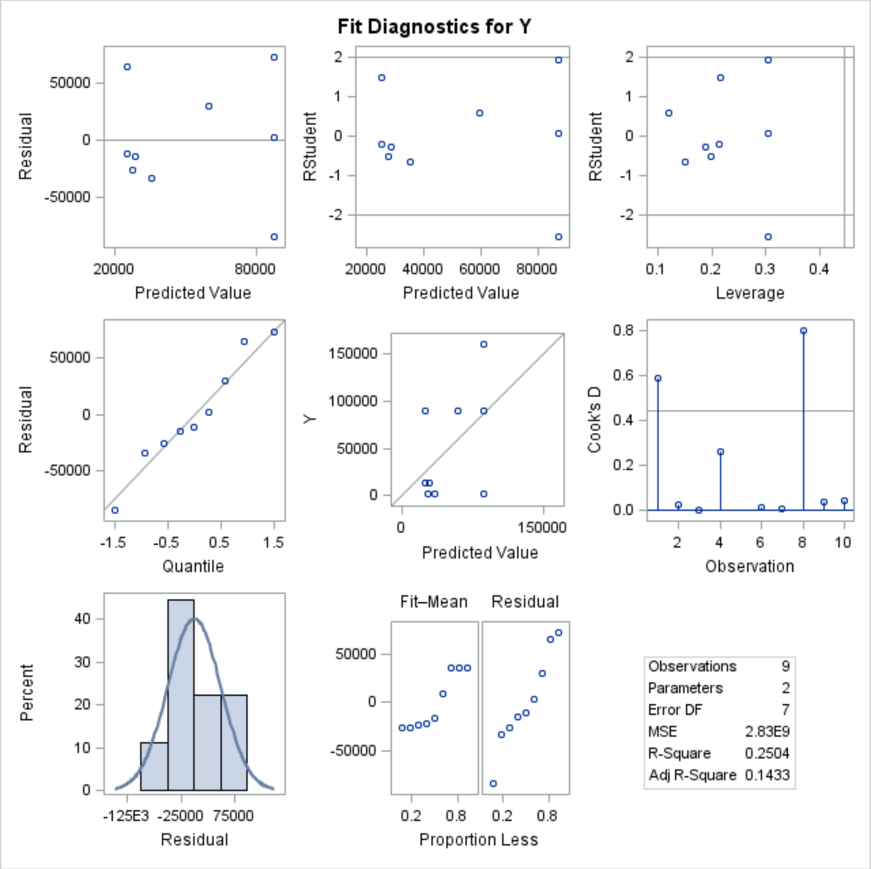
Bounds on condition number: 1, 1

No other variable met the 0.5000 significance level for entry into the model.

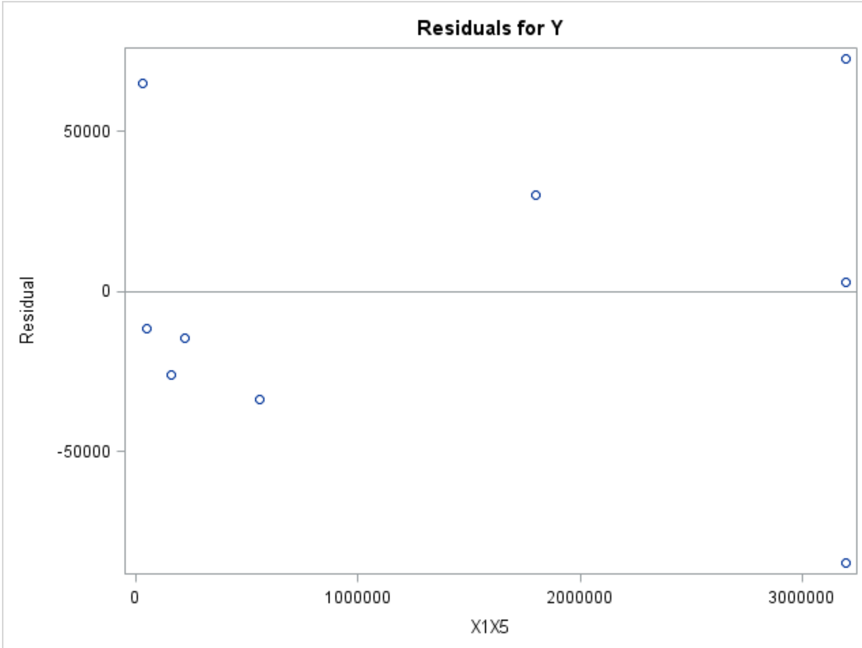
Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1X5	1	0.2504	0.2504	0.2933	2.34	0.1701

FORWARD REGRESSION
Pollutant: Enterococcus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

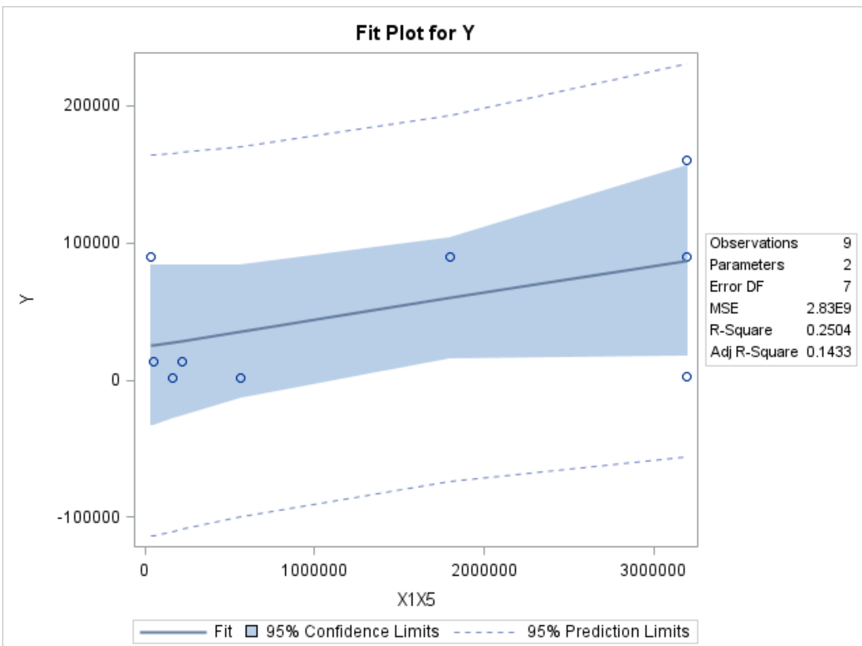
The REG Procedure
Model: MODEL1
Dependent Variable: Y



Observations	9
Parameters	2
Error DF	7
MSE	2.83E9
R-Square	0.2504
Adj R-Square	0.1433



Residuals for Y
Residual
50000
0
-50000
0
1000000
2000000
3000000
X1X5



Fit Plot for Y
Y
200000
100000
0
-100000
0
1000000
2000000
3000000
X1X5
Observations 9
Parameters 2
Error DF 7
MSE 2.83E9
R-Square 0.2504
Adj R-Square 0.1433
Fit
95% Confidence Limits
95% Prediction Limits

BACKWARD REGRESSION
Pollutant: Enterococcus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	10
Number of Observations Used	9
Number of Observations with Missing Values	1

Correlation															
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X2	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	.	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.
X1X2	0.8392	0.2105	.	.	.	1.0000	0.8392	0.8392	0.8392	0.2105	0.2105	0.2105	.	.	.	0.4040
X1X3	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X1X4	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X1X5	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X2X3	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X2X4	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X2X5	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.
X4X5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.
Y	0.5004	-0.2529	.	.	.	0.4040	0.5004	0.5004	0.5004	-0.2529	-0.2529	-0.2529	.	.	.	1.0000

BACKWARD REGRESSION
Pollutant: Enterococcus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	10
Number of Observations Used	9
Number of Observations with Missing Values	1

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.2919 and C(p) = 4.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	7711016194	2570338731	0.69	0.5975
Error	5	18701199362	3740239872		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	54399	62474	2835781240	0.76	0.4237
X1	0.18187	0.71053	245043583	0.07	0.8082
X2	-80537	150278	1074223487	0.29	0.6150
X1X2	0.59975	2.06045	316895277	0.08	0.7827

Bounds on condition number: 5.9027, 40.502

Backward Elimination: Step 1

Variable X1 Removed: R-Square = 0.2827 and C(p) = 2.0655

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	7465972611	3732986306	1.18	0.3691
Error	6	18946242944	3157707157		
Corrected Total	8	26412215556			

	Parameter	Standard			

Variable	Estimate	Error	Type II SS	F Value	Pr > F
Intercept	64993	42997	7215030812	2.28	0.1814
X2	-105382	105411	3155933279	1.00	0.3560
X1X2	1.07812	0.79710	5776689675	1.83	0.2249

Bounds on condition number: 1.0464, 4.1854

Backward Elimination: Step 2

Variable X1X3 Entered: R-Square = 0.2919 and C(p) = 4.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Note:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	7711016194	2570338731	0.69	0.5975
Error	5	18701199362	3740239872		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	54399	62474	2835781240	0.76	0.4237
X2	-80537	150278	1074223487	0.29	0.6150
X1X2	0.59975	2.06045	316895277	0.08	0.7827
X1X3	0.00002393	0.00009349	245043583	0.07	0.8082

Bounds on condition number: 5.9027, 40.502

Backward Elimination: Step 3

Variable X1X3 Removed: R-Square = 0.2827 and C(p) = 2.0655

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	7465972611	3732986306	1.18	0.3691
Error	6	18946242944	3157707157		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	64993	42997	7215030812	2.28	0.1814
X2	-105382	105411	3155933279	1.00	0.3560
X1X2	1.07812	0.79710	5776689675	1.83	0.2249

Bounds on condition number: 1.0464, 4.1854

Backward Elimination: Step 4

Variable X1X4 Entered: R-Square = 0.2919 and C(p) = 4.0000
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

Note:

Note:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	7711016194	2570338731	0.69	0.5975
Error	5	18701199362	3740239872		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	54399	62474	2835781240	0.76	0.4237
X2	-80537	150278	1074223487	0.29	0.6150
X1X2	0.59975	2.06045	316895277	0.08	0.7827
X1X4	0.00758	0.02961	245043583	0.07	0.8082

Bounds on condition number: 5.9027, 40.502

Backward Elimination: Step 5

Variable X1X4 Removed: R-Square = 0.2827 and C(p) = 2.0655

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	7465972611	3732986306	1.18	0.3691
Error	6	18946242944	3157707157		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	64993	42997	7215030812	2.28	0.1814
X2	-105382	105411	3155933279	1.00	0.3560
X1X2	1.07812	0.79710	5776689675	1.83	0.2249

Bounds on condition number: 1.0464, 4.1854

Backward Elimination: Step 6

Variable X1X5 Entered: R-Square = 0.2919 and C(p) = 4.0000
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Note:

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	7711016194	2570338731	0.69	0.5975
Error	5	18701199362	3740239872		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	54399	62474	2835781240	0.76	0.4237
X2	-80537	150278	1074223487	0.29	0.6150
X1X2	0.59975	2.06045	316895277	0.08	0.7827
X1X5	0.00910	0.03556	245043583	0.07	0.8082

Bounds on condition number: 5.9027, 40.502

Backward Elimination: Step 7

Variable X1X5 Removed: R-Square = 0.2827 and C(p) = 2.0655

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	7465972611	3732986306	1.18	0.3691
Error	6	18946242944	3157707157		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	64993	42997	7215030812	2.28	0.1814
X2	-105382	105411	3155933279	1.00	0.3560
X1X2	1.07812	0.79710	5776689675	1.83	0.2249

Bounds on condition number: 1.0464, 4.1854

Backward Elimination: Step 8

Variable X2 Removed: R-Square = 0.1632 and C(p) = 0.9093

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	1	4310039332	4310039332	1.37	0.2809

Error	7	22102176223	3157453746		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	30664	25875	4434405757	1.40	0.2747
X1X2	0.91039	0.77921	4310039332	1.37	0.2809

Bounds on condition number: 1, 1

Backward Elimination: Step 9

Variable X2X3 Entered: R-Square = 0.2827 and C(p) = 2.0655

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	7465972611	3732986306	1.18	0.3691
Error	6	18946242944	3157707157		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	64993	42997	7215030812	2.28	0.1814
X1X2	1.07812	0.79710	5776689675	1.83	0.2249
X2X3	-13.86603	13.86992	3155933279	1.00	0.3560

Bounds on condition number: 1.0464, 4.1854

Backward Elimination: Step 10

Variable X2X3 Removed: R-Square = 0.1632 and C(p) = 0.9093

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	4310039332	4310039332	1.37	0.2809
Error	7	22102176223	3157453746		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	30664	25875	4434405757	1.40	0.2747
X1X2	0.91039	0.77921	4310039332	1.37	0.2809

Bounds on condition number: 1, 1

Backward Elimination: Step 11

Variable X2X4 Entered: R-Square = 0.2827 and C(p) = 2.0655

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Note:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	7465972611	3732986306	1.18	0.3691
Error	6	18946242944	3157707157		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	64993	42997	7215030812	2.28	0.1814
X1X2	1.07812	0.79710	5776689675	1.83	0.2249
X2X4	-4390.90875	4392.14259	3155933279	1.00	0.3560

Bounds on condition number: 1.0464, 4.1854

Backward Elimination: Step 12

Variable X2X4 Removed: R-Square = 0.1632 and C(p) = 0.9093

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	4310039332	4310039332	1.37	0.2809
Error	7	22102176223	3157453746		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	30664	25875	4434405757	1.40	0.2747
X1X2	0.91039	0.77921	4310039332	1.37	0.2809

Bounds on condition number: 1, 1

Backward Elimination: Step 13

Variable X2X5 Entered: R-Square = 0.2827 and C(p) = 2.0655

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

Note:

Note:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	7465972611	3732986306	1.18	0.3691
Error	6	18946242944	3157707157		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	64993	42997	7215030812	2.28	0.1814
X1X2	1.07812	0.79710	5776689675	1.83	0.2249
X2X5	-5274.36486	5275.84695	3155933279	1.00	0.3560

Bounds on condition number: 1.0464, 4.1854

Backward Elimination: Step 14

Variable X2X5 Removed: R-Square = 0.1632 and C(p) = 0.9093

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	4310039332	4310039332	1.37	0.2809
Error	7	22102176223	3157453746		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	30664	25875	4434405757	1.40	0.2747
X1X2	0.91039	0.77921	4310039332	1.37	0.2809

Bounds on condition number: 1, 1

Backward Elimination: Step 15

Variable X1X2 Removed: R-Square = 0.0000 and C(p) = 0.0616

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	0	0	.	.	.
Error	8	26412215556	3301526944		
Corrected Total	8	26412215556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F

Intercept	51522	19153	23890854444	7.24	0.0275

Bounds on condition number: 0, 0

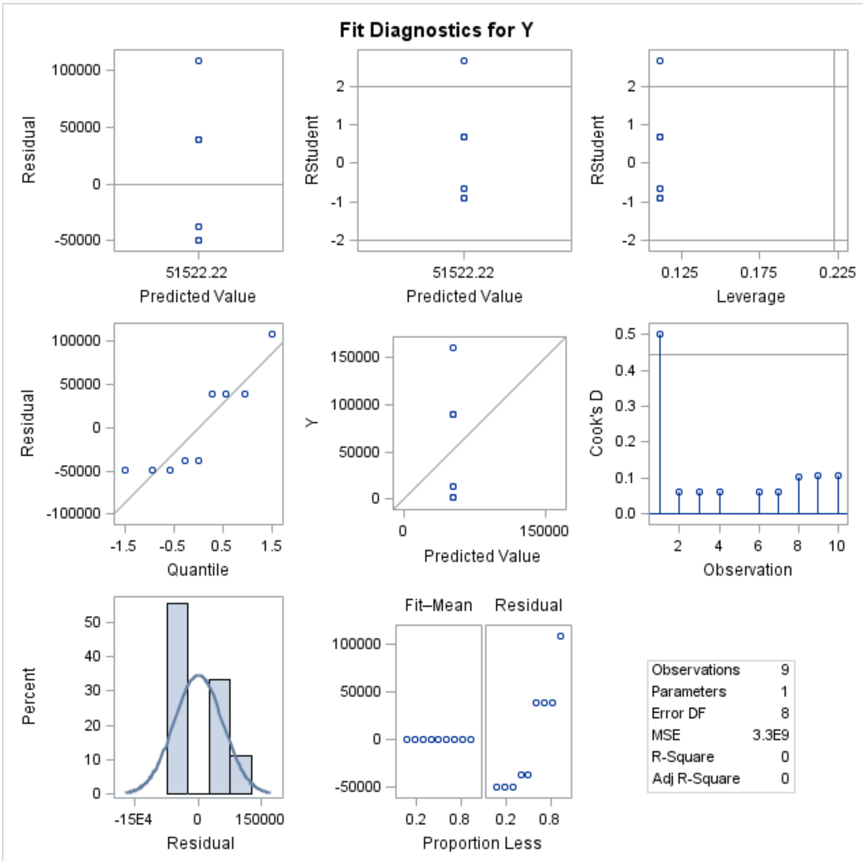
All variables left in the model are significant at the 0.1000 level.

Summary of Backward Elimination

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1		X1	2	0.0093	0.2827	2.0655	0.07	0.8082
2	X1X3		3	0.0093	0.2919	4.0000	0.07	0.8082
3		X1X3	2	0.0093	0.2827	2.0655	0.07	0.8082
4	X1X4		3	0.0093	0.2919	4.0000	0.07	0.8082
5		X1X4	2	0.0093	0.2827	2.0655	0.07	0.8082
6	X1X5		3	0.0093	0.2919	4.0000	0.07	0.8082
7		X1X5	2	0.0093	0.2827	2.0655	0.07	0.8082
8		X2	1	0.1195	0.1632	0.9093	1.00	0.3560
9	X2X3		2	0.1195	0.2827	2.0655	1.00	0.3560
10		X2X3	1	0.1195	0.1632	0.9093	1.00	0.3560
11	X2X4		2	0.1195	0.2827	2.0655	1.00	0.3560
12		X2X4	1	0.1195	0.1632	0.9093	1.00	0.3560
13	X2X5		2	0.1195	0.2827	2.0655	1.00	0.3560
14		X2X5	1	0.1195	0.1632	0.9093	1.00	0.3560
15		X1X2	0	0.1632	0.0000	0.0616	1.37	0.2809

BACKWARD REGRESSION
Pollutant: Enterococcus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Residual by Regressors for Y

STEPWISE REGRESSION
Pollutant: Enterococcus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	10
Number of Observations Used	9
Number of Observations with Missing Values	1

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X2	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	.	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.
X1X2	0.8392	0.2105	.	.	.	1.0000	0.8392	0.8392	0.8392	0.2105	0.2105	0.2105	.	.	.	0.4040
X1X3	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X1X4	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X1X5	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X2X3	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X2X4	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X2X5	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.
X4X5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.
Y	0.5004	-0.2529	.	.	.	0.4040	0.5004	0.5004	0.5004	-0.2529	-0.2529	-0.2529	.	.	.	1.0000

STEPWISE REGRESSION
Pollutant: Enterococcus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

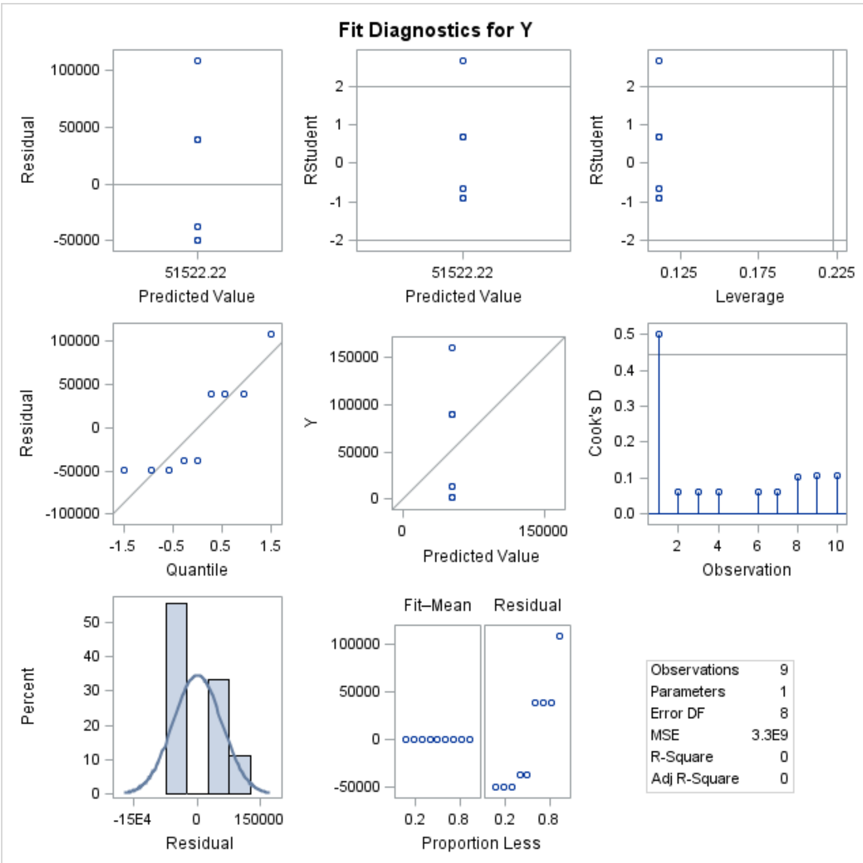
The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	10
Number of Observations Used	9
Number of Observations with Missing Values	1

No variable met the 0.1500 significance level for entry into the model.

STEPWISE REGRESSION
Pollutant: Enterococcus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Residual by Regressors for Y

==
MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Fecal Coliform
==

The REG Procedure

Number of Observations Read	10
Number of Observations Used	9
Number of Observations with Missing Values	1

Correlation															
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X2	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X3	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.	.
X4	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.	.
X5	.	.	.	.	1.0000	.	.	.	.	.	.	.	.	.	.	.
X1X2	0.8392	0.2105	.	.	.	1.0000	0.8392	0.8392	0.8392	0.2105	0.2105	0.2105	.	.	.	0.4040
X1X3	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X1X4	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X1X5	1.0000	-0.1667	.	.	.	0.8392	1.0000	1.0000	1.0000	-0.1667	-0.1667	-0.1667	.	.	.	0.5004
X2X3	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X2X4	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X2X5	-0.1667	1.0000	.	.	.	0.2105	-0.1667	-0.1667	-0.1667	1.0000	1.0000	1.0000	.	.	.	-0.2529
X3X4	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.	.
X3X5	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.	.
X4X5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0000	.
Y	0.5004	-0.2529	.	.	.	0.4040	0.5004	0.5004	0.5004	-0.2529	-0.2529	-0.2529	.	.	.	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Fecal Coliform

===

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	10
Number of Observations Used	9
Number of Observations with Missing Values	1

Number in Model	R-Square	Variables in Model
1	0.2504	X1X5
1	0.2504	X1X4
1	0.2504	X1X3
1	0.2504	X1
1	0.1632	X1X2
1	0.0640	X2X3
1	0.0640	X2X5
1	0.0640	X2
1	0.0640	X2X4
2	0.2827	X2 X1X2
2	0.2827	X1X2 X2X3
2	0.2827	X1X2 X2X5
2	0.2827	X1X2 X2X4
2	0.2800	X1X5 X2X5
2	0.2800	X1X5 X2X3
2	0.2800	X2 X1X5
2	0.2800	X1X5 X2X4
2	0.2800	X1X4 X2X3
2	0.2800	X1X4 X2X5
2	0.2800	X2 X1X4
2	0.2800	X1X4 X2X4
2	0.2800	X1X3 X2X3
2	0.2800	X1X3 X2X5
2	0.2800	X2 X1X3
3	0.2919	X1X2 X1X5 X2X5
3	0.2919	X1X2 X1X5 X2X3
3	0.2919	X2 X1X2 X1X5
3	0.2919	X1X2 X1X5 X2X4
3	0.2919	X1X2 X1X4 X2X3
3	0.2919	X1X2 X1X4 X2X5
3	0.2919	X2 X1X2 X1X4
3	0.2919	X1 X2 X1X2
3	0.2919	X1X2 X1X4 X2X4
3	0.2919	X1X2 X1X3 X2X3
3	0.2919	X1X2 X1X3 X2X5
3	0.2919	X2 X1X2 X1X3

3	0.2919	X1X2 X1X3 X2X4
3	0.2919	X1 X1X2 X2X5
3	0.2919	X1 X1X2 X2X3

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Fecal Coliform

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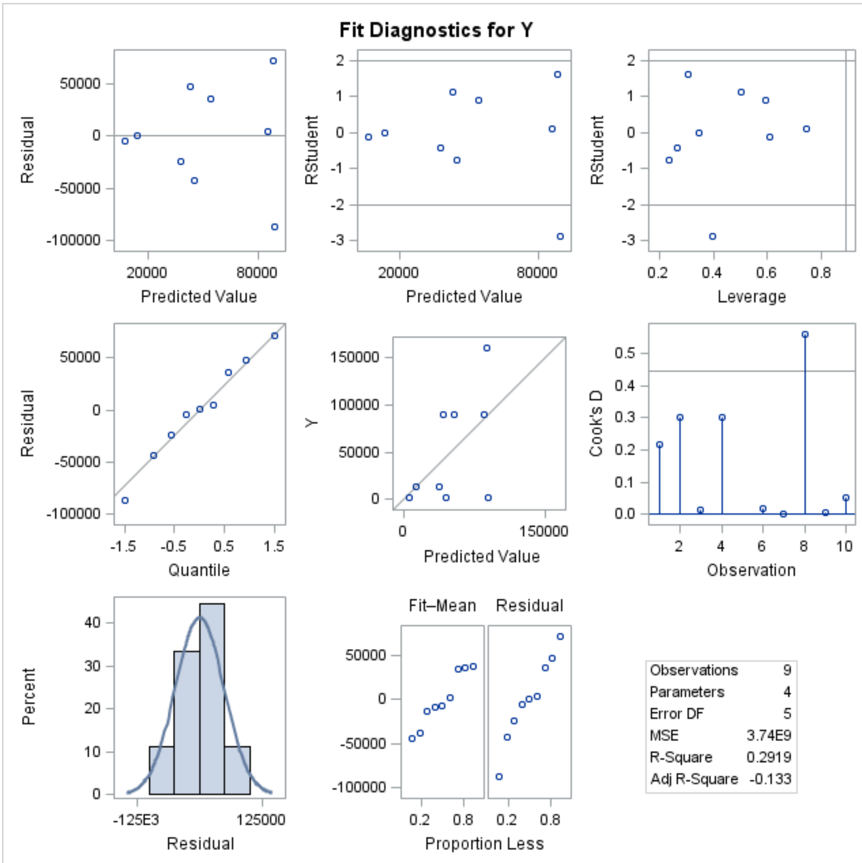
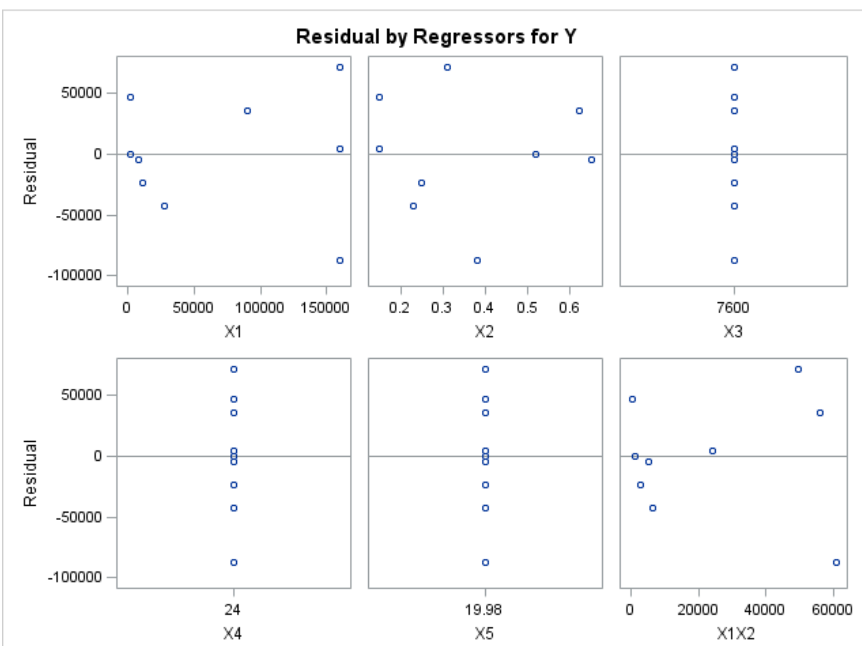
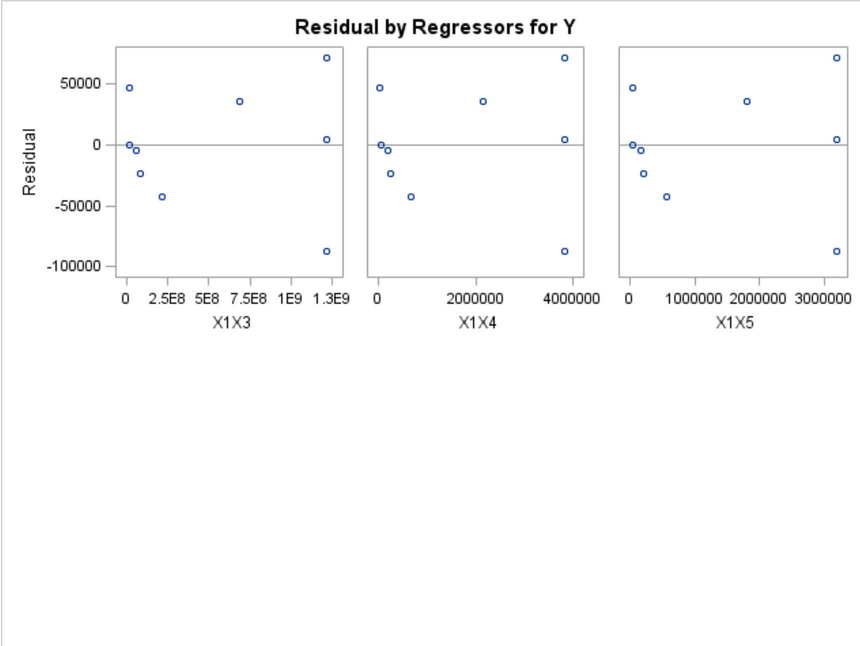
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
50000
0
-50000
-100000
0 2.5E8 5E8 7.5E8 1E9 1.3E9
X1X3
0 2000000 4000000
X1X4
0 1000000 2000000 3000000
X1X5

FORWARD REGRESSION
Pollutant: Fecal Coliform
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	25
Number of Observations Used	21
Number of Observations with Missing Values	4

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0978	0.2896	-0.2896	0.2896	0.8073	0.6694	0.9532	0.7040	0.1491	-0.1278	0.1252	0.2896	0.2896	0.2896	0.3847
X2	-0.0978	1.0000	-0.3848	0.3848	-0.3848	0.3645	-0.3104	0.0065	-0.3030	0.4559	0.9898	0.5611	-0.3848	-0.3848	-0.3848	-0.3200
X3	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X4	-0.2896	0.3848	-1.0000	1.0000	-1.0000	0.0364	-0.7914	-0.0328	-0.7751	-0.5596	0.4987	-0.4677	-1.0000	-1.0000	-1.0000	-0.9063
X5	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X1X2	0.8073	0.3645	-0.0364	0.0364	-0.0364	1.0000	0.2882	0.8722	0.3272	0.2627	0.3453	0.2943	-0.0364	-0.0364	-0.0364	0.0929
X1X3	0.6694	-0.3104	0.7914	-0.7914	0.7914	0.2882	1.0000	0.4134	0.9989	0.4011	-0.3942	0.3305	0.7914	0.7914	0.7914	0.7633
X1X4	0.9532	0.0065	0.0328	-0.0328	0.0328	0.8722	0.4134	1.0000	0.4562	0.0195	0.0038	0.0190	0.0328	0.0328	0.0328	0.1608
X1X5	0.7040	-0.3030	0.7751	-0.7751	0.7751	0.3272	0.9989	0.4562	1.0000	0.3930	-0.3851	0.3239	0.7751	0.7751	0.7751	0.7543
X2X3	0.1491	0.4559	0.5596	-0.5596	0.5596	0.2627	0.4011	0.0195	0.3930	1.0000	0.3242	0.9925	0.5596	0.5596	0.5596	0.6103
X2X4	-0.1278	0.9898	-0.4987	0.4987	-0.4987	0.3453	-0.3942	0.0038	-0.3851	0.3242	1.0000	0.4373	-0.4987	-0.4987	-0.4987	-0.4380
X2X5	0.1252	0.5611	0.4677	-0.4677	0.4677	0.2943	0.3305	0.0190	0.3239	0.9925	0.4373	1.0000	0.4677	0.4677	0.4677	0.5237
X3X4	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X3X5	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X4X5	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
Y	0.3847	-0.3200	0.9063	-0.9063	0.9063	0.0929	0.7633	0.1608	0.7543	0.6103	-0.4380	0.5237	0.9063	0.9063	0.9063	1.0000

FORWARD REGRESSION
Pollutant: Fecal Coliform
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	25
Number of Observations Used	21
Number of Observations with Missing Values	4

Forward Selection: Step 1

Variable X4X5 Entered: R-Square = 0.8214 and C(p) = 4.4983

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	29694914	29694914	87.40	<.0001
Error	19	6455381	339757		
Corrected Total	20	36150295			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-2122.48445	342.73035	13030233	38.35	<.0001
X4X5	10.64082	1.13820	29694914	87.40	<.0001

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X1X4 Entered: R-Square = 0.8386 and C(p) = 4.4276

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	30316702	15158351	46.77	<.0001
Error	18	5833593	324089		
Corrected Total	20	36150295			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-2217.81948	341.73720	13649964	42.12	<.0001

X1X4	0.00029659	0.00021412	621788	1.92	0.1829
X4X5	10.59025	1.11224	29381650	90.66	<.0001

Bounds on condition number: 1.0011, 4.0043

Forward Selection: Step 3

Variable X2X3 Entered: R-Square = 0.8541 and C(p) = 4.5697

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	30874584	10291528	33.16	<.0001
Error	17	5275712	310336		
Corrected Total	20	36150295			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-2228.77405	334.50768	13776916	44.39	<.0001
X1X4	0.00029622	0.00020953	620248	2.00	0.1755
X2X3	0.14929	0.11135	557881	1.80	0.1976
X4X5	9.60543	1.31305	16607392	53.51	<.0001

Bounds on condition number: 1.457, 11.742

Forward Selection: Step 4

Variable X2X5 Entered: R-Square = 0.8824 and C(p) = 3.1618

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	31897883	7974471	30.00	<.0001
Error	16	4252413	265776		
Corrected Total	20	36150295			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-1097.82187	654.24000	748350	2.82	0.1128
X1X4	0.00031180	0.00019407	686078	2.58	0.1277
X2X3	3.08930	1.50186	1124543	4.23	0.0564
X2X5	-1017.37503	518.48655	1023299	3.85	0.0674
X4X5	5.44198	2.44514	1316507	4.95	0.0408

Bounds on condition number: 309.3, 2352.5

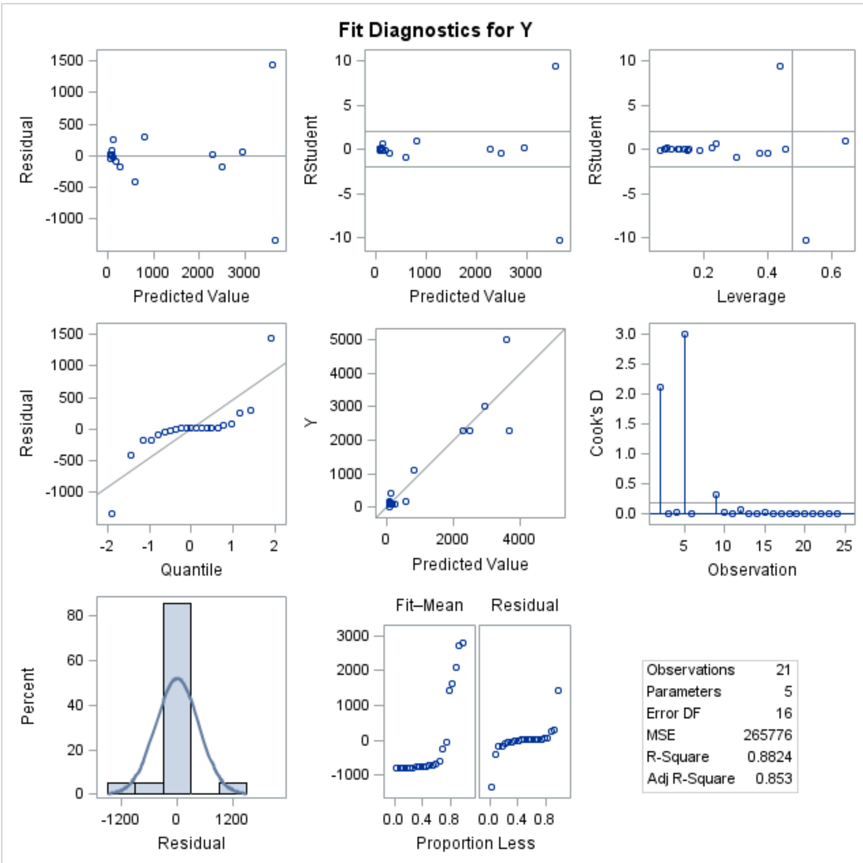
No other variable met the 0.5000 significance level for entry into the model.

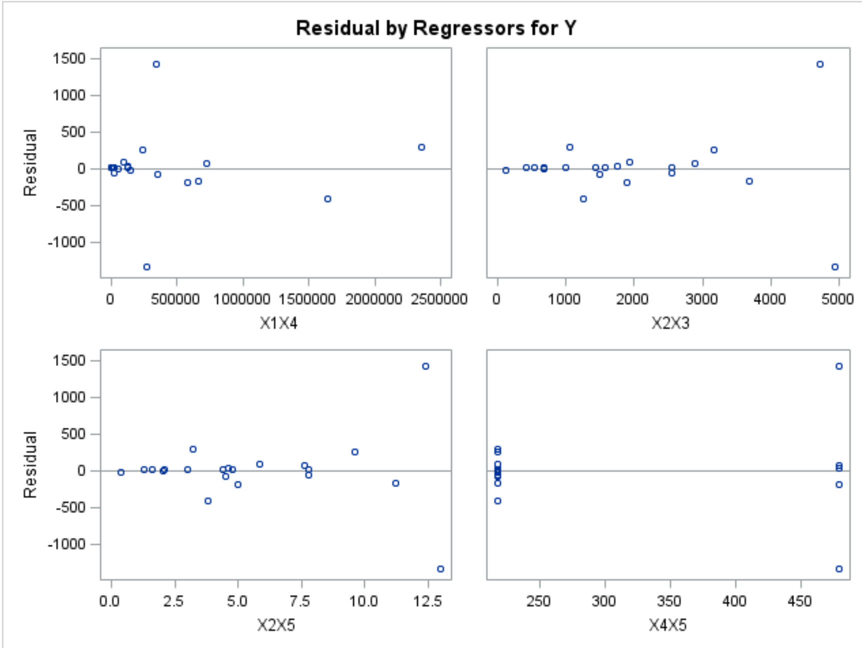
Summary of Forward Selection

Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X4X5	1	0.8214	0.8214	4.4983	87.40	<.0001
2	X1X4	2	0.0172	0.8386	4.4276	1.92	0.1829
3	X2X3	3	0.0154	0.8541	4.5697	1.80	0.1976
4	X2X5	4	0.0283	0.8824	3.1618	3.85	0.0674

FORWARD REGRESSION
Pollutant: Fecal Coliform
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
1500
1000
500
0
-500
-1000
0 500000 1000000 1500000 2000000 2500000
X1X4
0 1000 2000 3000 4000 5000
X2X3
0.0 2.5 5.0 7.5 10.0 12.5
X2X5
250 300 350 400 450
X4X5

BACKWARD REGRESSION
Pollutant: Fecal Coliform
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	25
Number of Observations Used	21
Number of Observations with Missing Values	4

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0978	0.2896	-0.2896	0.2896	0.8073	0.6694	0.9532	0.7040	0.1491	-0.1278	0.1252	0.2896	0.2896	0.2896	0.3847
X2	-0.0978	1.0000	-0.3848	0.3848	-0.3848	0.3645	-0.3104	0.0065	-0.3030	0.4559	0.9898	0.5611	-0.3848	-0.3848	-0.3848	-0.3200
X3	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X4	-0.2896	0.3848	-1.0000	1.0000	-1.0000	0.0364	-0.7914	-0.0328	-0.7751	-0.5596	0.4987	-0.4677	-1.0000	-1.0000	-1.0000	-0.9063
X5	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X1X2	0.8073	0.3645	-0.0364	0.0364	-0.0364	1.0000	0.2882	0.8722	0.3272	0.2627	0.3453	0.2943	-0.0364	-0.0364	-0.0364	0.0929
X1X3	0.6694	-0.3104	0.7914	-0.7914	0.7914	0.2882	1.0000	0.4134	0.9989	0.4011	-0.3942	0.3305	0.7914	0.7914	0.7914	0.7633
X1X4	0.9532	0.0065	0.0328	-0.0328	0.0328	0.8722	0.4134	1.0000	0.4562	0.0195	0.0038	0.0190	0.0328	0.0328	0.0328	0.1608
X1X5	0.7040	-0.3030	0.7751	-0.7751	0.7751	0.3272	0.9989	0.4562	1.0000	0.3930	-0.3851	0.3239	0.7751	0.7751	0.7751	0.7543
X2X3	0.1491	0.4559	0.5596	-0.5596	0.5596	0.2627	0.4011	0.0195	0.3930	1.0000	0.3242	0.9925	0.5596	0.5596	0.5596	0.6103
X2X4	-0.1278	0.9898	-0.4987	0.4987	-0.4987	0.3453	-0.3942	0.0038	-0.3851	0.3242	1.0000	0.4373	-0.4987	-0.4987	-0.4987	-0.4380
X2X5	0.1252	0.5611	0.4677	-0.4677	0.4677	0.2943	0.3305	0.0190	0.3239	0.9925	0.4373	1.0000	0.4677	0.4677	0.4677	0.5237
X3X4	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X3X5	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X4X5	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
Y	0.3847	-0.3200	0.9063	-0.9063	0.9063	0.0929	0.7633	0.1608	0.7543	0.6103	-0.4380	0.5237	0.9063	0.9063	0.9063	1.0000

BACKWARD REGRESSION
Pollutant: Fecal Coliform
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	25
Number of Observations Used	21
Number of Observations with Missing Values	4

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.8837 and C(p) = 7.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	31946462	5324410	17.73	<.0001
Error	14	4203834	300274		
Corrected Total	20	36150295			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-276.49119	421.98750	128908	0.43	0.5230
X1	0.02249	0.03355	134892	0.45	0.5136
X2	-761.69840	472.45732	780474	2.60	0.1292
X3	0.20952	0.14630	615846	2.05	0.1741
X1X2	-0.00978	0.03458	24040	0.08	0.7814
X1X3	-5.37745E-7	0.00000544	2928.97433	0.01	0.9227
X2X3	0.53952	0.23392	1597310	5.32	0.0369

Bounds on condition number: 14.328, 330.68

Backward Elimination: Step 1

Variable X1X3 Removed: R-Square = 0.8836 and C(p) = 5.0098

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	31943533	6388707	22.78	<.0001
Error	15	4206762	280451		

Corrected Total	20	36150295			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-254.47092	346.24986	151479	0.54	0.4737
X1	0.02016	0.02306	214301	0.76	0.3958
X2	-774.91584	437.89533	878264	3.13	0.0971
X3	0.20126	0.11600	844153	3.01	0.1032
X1X2	-0.00819	0.02957	21530	0.08	0.7855
X2X3	0.54135	0.22536	1618361	5.77	0.0297

Bounds on condition number: 7.74, 169.9

Backward Elimination: Step 2

Variable X1X4 Entered: R-Square = 0.8837 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	31946462	5324410	17.73	<.0001
Error	14	4203834	300274		
Corrected Total	20	36150295			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-276.49119	421.98750	128908	0.43	0.5230
X1	0.01499	0.05752	20392	0.07	0.7982
X2	-761.69840	472.45732	780474	2.60	0.1292
X3	0.20952	0.14630	615846	2.05	0.1741
X1X2	-0.00978	0.03458	24040	0.08	0.7814
X1X4	0.00014218	0.00144	2928.97433	0.01	0.9227
X2X3	0.53952	0.23392	1597310	5.32	0.0369

Bounds on condition number: 48.836, 741.82

Backward Elimination: Step 3

Variable X1X4 Removed: R-Square = 0.8836 and C(p) = 5.0098

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	31943533	6388707	22.78	<.0001
Error	15	4206762	280451		

Corrected Total	20	36150295			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-254.47092	346.24986	151479	0.54	0.4737
X1	0.02016	0.02306	214301	0.76	0.3958
X2	-774.91584	437.89533	878264	3.13	0.0971
X3	0.20126	0.11600	844153	3.01	0.1032
X1X2	-0.00819	0.02957	21530	0.08	0.7855
X2X3	0.54135	0.22536	1618361	5.77	0.0297

Bounds on condition number: 7.74, 169.9

Backward Elimination: Step 4

Variable X1X5 Entered: R-Square = 0.8837 and C(p) = 7.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Note:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	31946462	5324410	17.73	<.0001
Error	14	4203834	300274		
Corrected Total	20	36150295			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-276.49119	421.98750	128908	0.43	0.5230
X1	0.02266	0.03476	127554	0.42	0.5251
X2	-761.69840	472.45732	780474	2.60	0.1292
X3	0.20952	0.14630	615846	2.05	0.1741
X1X2	-0.00978	0.03458	24040	0.08	0.7814
X1X5	-0.00021289	0.00216	2928.97433	0.01	0.9227
X2X3	0.53952	0.23392	1597310	5.32	0.0369

Bounds on condition number: 15.378, 341.55

Backward Elimination: Step 5

Variable X1X5 Removed: R-Square = 0.8836 and C(p) = 5.0098

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	31943533	6388707	22.78	<.0001
Error	15	4206762	280451		

Corrected Total	20	36150295			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-254.47092	346.24986	151479	0.54	0.4737
X1	0.02016	0.02306	214301	0.76	0.3958
X2	-774.91584	437.89533	878264	3.13	0.0971
X3	0.20126	0.11600	844153	3.01	0.1032
X1X2	-0.00819	0.02957	21530	0.08	0.7855
X2X3	0.54135	0.22536	1618361	5.77	0.0297

Bounds on condition number: 7.74, 169.9

Backward Elimination: Step 6

Variable X1X2 Removed: R-Square = 0.8830 and C(p) = 3.0815

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	31922003	7980501	30.20	<.0001
Error	16	4228292	264268		
Corrected Total	20	36150295			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-234.58838	328.81425	134511	0.51	0.4859
X1	0.01427	0.00871	710199	2.69	0.1207
X2	-811.44460	405.35078	1059012	4.01	0.0626
X3	0.21141	0.10684	1034863	3.92	0.0653
X2X3	0.52932	0.21466	1606895	6.08	0.0254

Bounds on condition number: 6.3546, 74.631

Backward Elimination: Step 7

Variable X1 Removed: R-Square = 0.8634 and C(p) = 3.4466

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	31211804	10403935	35.81	<.0001
Error	17	4938491	290499		
Corrected Total	20	36150295			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F

Intercept	-181.69928	343.08377	81480	0.28	0.6032
X2	-770.06448	424.16760	957469	3.30	0.0871
X3	0.24306	0.11017	1413974	4.87	0.0414
X2X3	0.50733	0.22462	1481917	5.10	0.0373

Bounds on condition number: 6.3298, 51.955

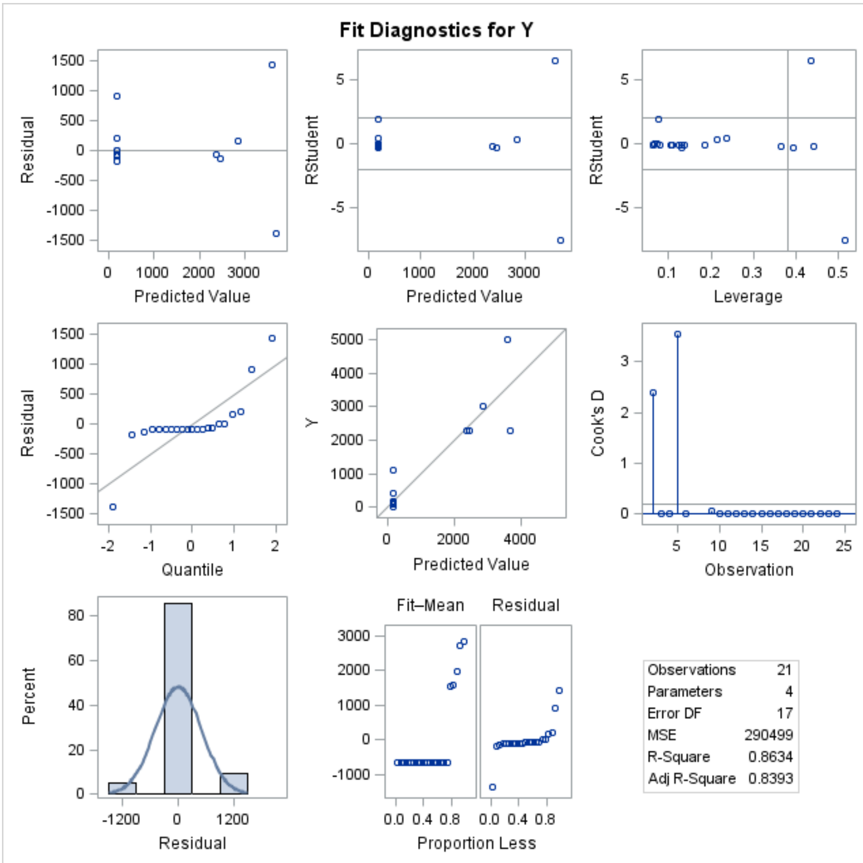
All variables left in the model are significant at the 0.1000 level.

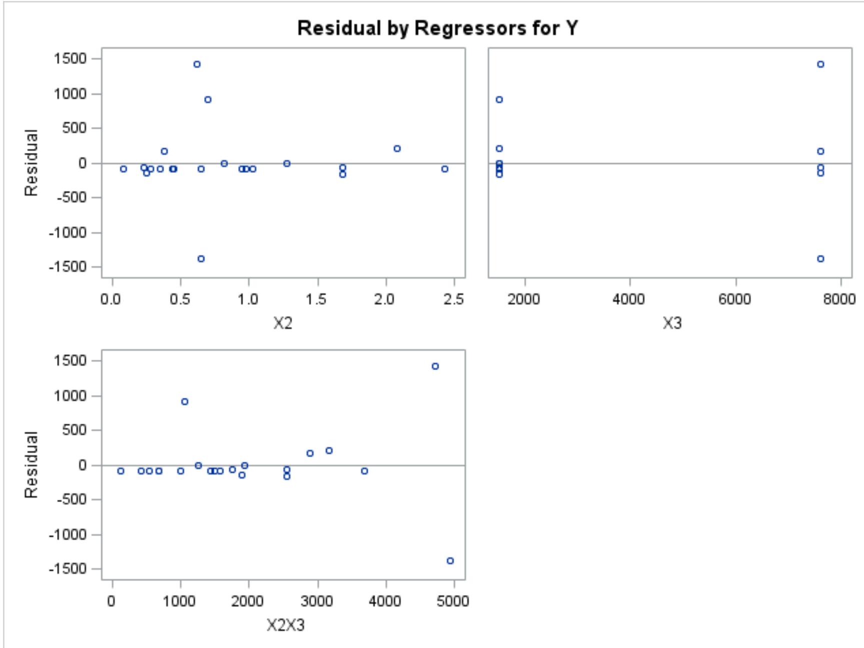
Summary of Backward Elimination

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1		X1X3	5	0.0001	0.8836	5.0098	0.01	0.9227
2	X1X4		6	0.0001	0.8837	7.0000	0.01	0.9227
3		X1X4	5	0.0001	0.8836	5.0098	0.01	0.9227
4	X1X5		6	0.0001	0.8837	7.0000	0.01	0.9227
5		X1X5	5	0.0001	0.8836	5.0098	0.01	0.9227
6		X1X2	4	0.0006	0.8830	3.0815	0.08	0.7855
7		X1	3	0.0196	0.8634	3.4466	2.69	0.1207

BACKWARD REGRESSION
Pollutant: Fecal Coliform
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X2
X3
X2X3
1500
1000
500
0
-500
-1000
-1500
0.0 0.5 1.0 1.5 2.0 2.5
2000 4000 6000 8000
0 1000 2000 3000 4000 5000

STEPWISE REGRESSION
Pollutant: Fecal Coliform
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	25
Number of Observations Used	21
Number of Observations with Missing Values	4

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0978	0.2896	-0.2896	0.2896	0.8073	0.6694	0.9532	0.7040	0.1491	-0.1278	0.1252	0.2896	0.2896	0.2896	0.3847
X2	-0.0978	1.0000	-0.3848	0.3848	-0.3848	0.3645	-0.3104	0.0065	-0.3030	0.4559	0.9898	0.5611	-0.3848	-0.3848	-0.3848	-0.3200
X3	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X4	-0.2896	0.3848	-1.0000	1.0000	-1.0000	0.0364	-0.7914	-0.0328	-0.7751	-0.5596	0.4987	-0.4677	-1.0000	-1.0000	-1.0000	-0.9063
X5	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X1X2	0.8073	0.3645	-0.0364	0.0364	-0.0364	1.0000	0.2882	0.8722	0.3272	0.2627	0.3453	0.2943	-0.0364	-0.0364	-0.0364	0.0929
X1X3	0.6694	-0.3104	0.7914	-0.7914	0.7914	0.2882	1.0000	0.4134	0.9989	0.4011	-0.3942	0.3305	0.7914	0.7914	0.7914	0.7633
X1X4	0.9532	0.0065	0.0328	-0.0328	0.0328	0.8722	0.4134	1.0000	0.4562	0.0195	0.0038	0.0190	0.0328	0.0328	0.0328	0.1608
X1X5	0.7040	-0.3030	0.7751	-0.7751	0.7751	0.3272	0.9989	0.4562	1.0000	0.3930	-0.3851	0.3239	0.7751	0.7751	0.7751	0.7543
X2X3	0.1491	0.4559	0.5596	-0.5596	0.5596	0.2627	0.4011	0.0195	0.3930	1.0000	0.3242	0.9925	0.5596	0.5596	0.5596	0.6103
X2X4	-0.1278	0.9898	-0.4987	0.4987	-0.4987	0.3453	-0.3942	0.0038	-0.3851	0.3242	1.0000	0.4373	-0.4987	-0.4987	-0.4987	-0.4380
X2X5	0.1252	0.5611	0.4677	-0.4677	0.4677	0.2943	0.3305	0.0190	0.3239	0.9925	0.4373	1.0000	0.4677	0.4677	0.4677	0.5237
X3X4	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X3X5	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X4X5	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
Y	0.3847	-0.3200	0.9063	-0.9063	0.9063	0.0929	0.7633	0.1608	0.7543	0.6103	-0.4380	0.5237	0.9063	0.9063	0.9063	1.0000

STEPWISE REGRESSION
Pollutant: Fecal Coliform
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	25
Number of Observations Used	21
Number of Observations with Missing Values	4

Stepwise Selection: Step 1

Variable X4X5 Entered: R-Square = 0.8214 and C(p) = 4.4983

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	29694914	29694914	87.40	<.0001
Error	19	6455381	339757		
Corrected Total	20	36150295			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-2122.48445	342.73035	13030233	38.35	<.0001
X4X5	10.64082	1.13820	29694914	87.40	<.0001

Bounds on condition number: 1, 1

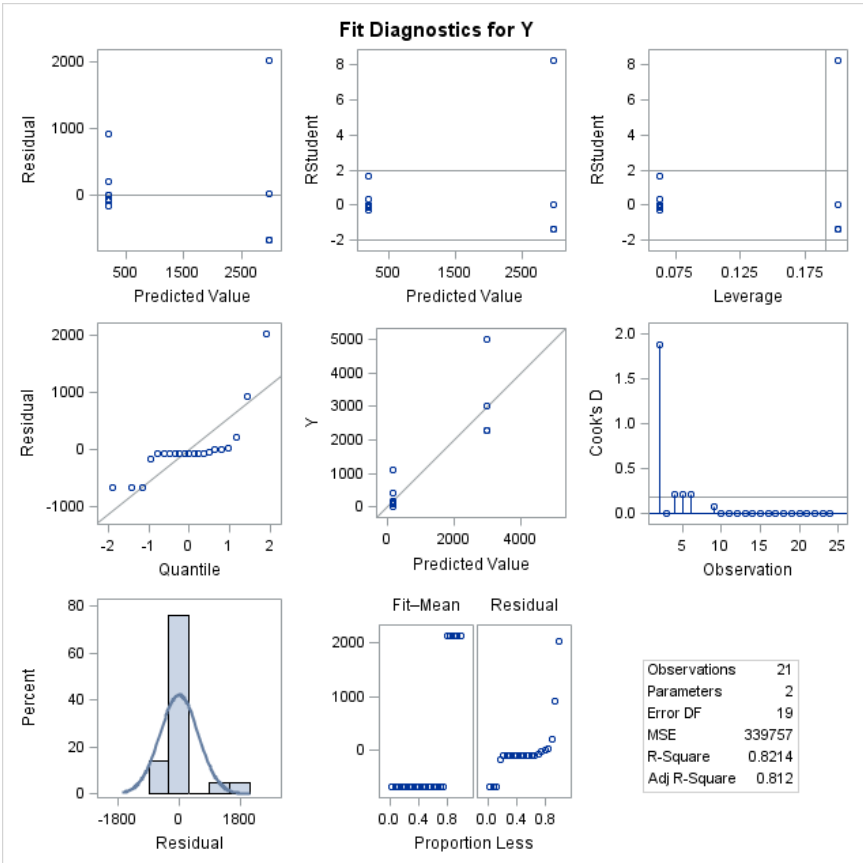
All variables left in the model are significant at the 0.1500 level.

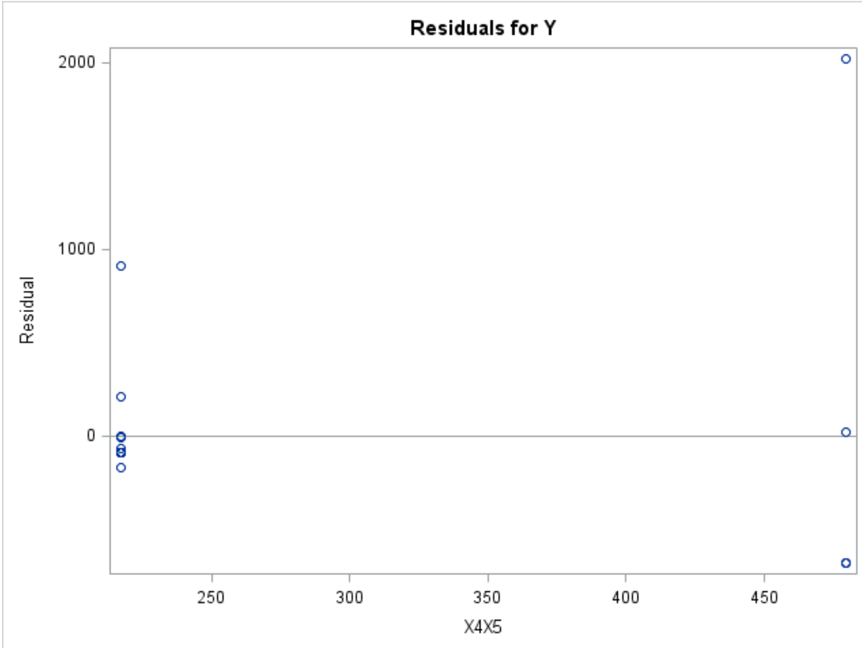
No other variable met the 0.1500 significance level for entry into the model.

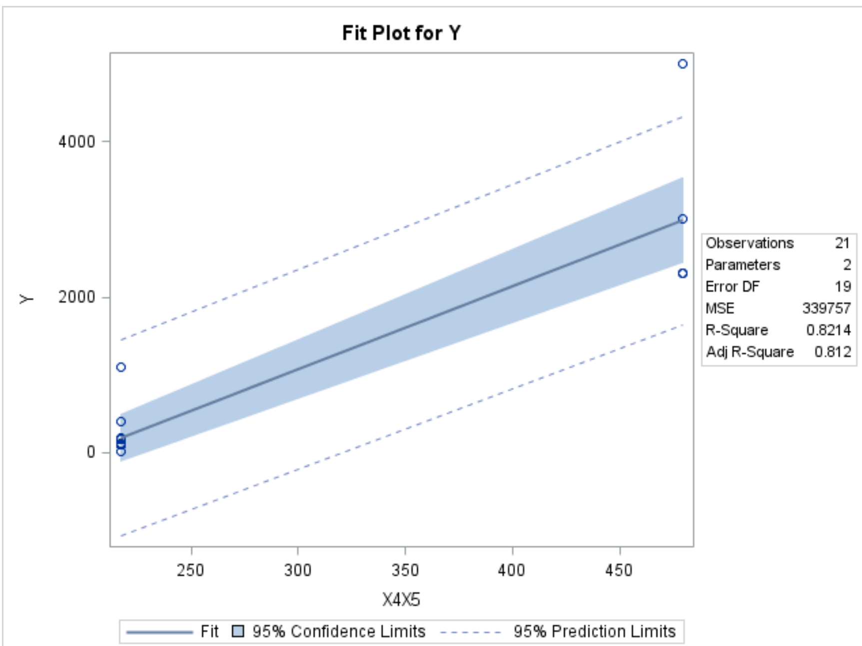
Summary of Stepwise Selection								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X4X5		1	0.8214	0.8214	4.4983	87.40	<.0001

STEPWISE REGRESSION
Pollutant: Fecal Coliform
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residuals for Y
2000
1000
0
Residual
250
300
350
400
450
X4X5


Fit Plot for Y
4000
2000
0
Y
250
300
350
400
450
X4X5
Observations 21
Parameters 2
Error DF 19
MSE 339757
R-Square 0.8214
Adj R-Square 0.812
Fit
95% Confidence Limits
95% Prediction Limits

==

MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Nitrogen and Nitrate

==

The REG Procedure

Number of Observations Read	25
Number of Observations Used	21
Number of Observations with Missing Values	4

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0978	0.2896	-0.2896	0.2896	0.8073	0.6694	0.9532	0.7040	0.1491	-0.1278	0.1252	0.2896	0.2896	0.2896	0.3847
X2	-0.0978	1.0000	-0.3848	0.3848	-0.3848	0.3645	-0.3104	0.0065	-0.3030	0.4559	0.9898	0.5611	-0.3848	-0.3848	-0.3848	-0.3200
X3	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X4	-0.2896	0.3848	-1.0000	1.0000	-1.0000	0.0364	-0.7914	-0.0328	-0.7751	-0.5596	0.4987	-0.4677	-1.0000	-1.0000	-1.0000	-0.9063
X5	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X1X2	0.8073	0.3645	-0.0364	0.0364	-0.0364	1.0000	0.2882	0.8722	0.3272	0.2627	0.3453	0.2943	-0.0364	-0.0364	-0.0364	0.0929
X1X3	0.6694	-0.3104	0.7914	-0.7914	0.7914	0.2882	1.0000	0.4134	0.9989	0.4011	-0.3942	0.3305	0.7914	0.7914	0.7914	0.7633
X1X4	0.9532	0.0065	0.0328	-0.0328	0.0328	0.8722	0.4134	1.0000	0.4562	0.0195	0.0038	0.0190	0.0328	0.0328	0.0328	0.1608
X1X5	0.7040	-0.3030	0.7751	-0.7751	0.7751	0.3272	0.9989	0.4562	1.0000	0.3930	-0.3851	0.3239	0.7751	0.7751	0.7751	0.7543
X2X3	0.1491	0.4559	0.5596	-0.5596	0.5596	0.2627	0.4011	0.0195	0.3930	1.0000	0.3242	0.9925	0.5596	0.5596	0.5596	0.6103
X2X4	-0.1278	0.9898	-0.4987	0.4987	-0.4987	0.3453	-0.3942	0.0038	-0.3851	0.3242	1.0000	0.4373	-0.4987	-0.4987	-0.4987	-0.4380
X2X5	0.1252	0.5611	0.4677	-0.4677	0.4677	0.2943	0.3305	0.0190	0.3239	0.9925	0.4373	1.0000	0.4677	0.4677	0.4677	0.5237
X3X4	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X3X5	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
X4X5	0.2896	-0.3848	1.0000	-1.0000	1.0000	-0.0364	0.7914	0.0328	0.7751	0.5596	-0.4987	0.4677	1.0000	1.0000	1.0000	0.9063
Y	0.3847	-0.3200	0.9063	-0.9063	0.9063	0.0929	0.7633	0.1608	0.7543	0.6103	-0.4380	0.5237	0.9063	0.9063	0.9063	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Nitrogen and Nitrate
===

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	25
Number of Observations Used	21
Number of Observations with Missing Values	4

Number in Model	R-Square	Variables in Model
1	0.8214	X4X5
1	0.8214	X5
1	0.8214	X4
1	0.8214	X3X4
1	0.8214	X3
1	0.8214	X3X5
1	0.5826	X1X3
1	0.5690	X1X5
1	0.3725	X2X3
1	0.2743	X2X5
1	0.1918	X2X4
1	0.1480	X1
1	0.1024	X2
1	0.0259	X1X4
1	0.0086	X1X2
2	0.8386	X5 X1X4
2	0.8386	X1X4 X4X5
2	0.8386	X4 X1X4
2	0.8386	X1X4 X3X4
2	0.8386	X1X4 X3X5
2	0.8386	X3 X1X4
2	0.8377	X1 X4X5
2	0.8377	X1 X5
2	0.8377	X1 X4
2	0.8377	X1 X3X4
2	0.8377	X1 X3
2	0.8377	X1 X3X5
2	0.8373	X1X2 X4X5
2	0.8373	X5 X1X2
2	0.8373	X4 X1X2
3	0.8652	X1X5 X2X3 X2X5
3	0.8652	X2 X1X5 X2X4
3	0.8652	X2 X1X5 X2X3
3	0.8652	X2 X1X5 X2X5
3	0.8643	X1X3 X2X3 X2X5
3	0.8643	X2 X1X3 X2X4

3	0.8643	X2 X1X3 X2X3
3	0.8643	X2 X1X3 X2X5
3	0.8634	X4 X2X3 X2X5
3	0.8634	X2X3 X2X5 X3X4
3	0.8634	X2X3 X2X5 X3X5
3	0.8634	X5 X2X3 X2X5
3	0.8634	X2 X2X4 X3X5
3	0.8634	X2 X2X4 X3X4
3	0.8634	X2 X3 X2X4
4	0.8830	X1 X2X3 X2X5 X4X5
4	0.8830	X1 X2 X2X4 X4X5
4	0.8830	X1 X2 X2X5 X4X5
4	0.8830	X1 X2 X2X3 X4X5
4	0.8830	X1 X2X4 X2X5 X4X5
4	0.8824	X2 X1X4 X2X4 X4X5
4	0.8824	X1X4 X2X3 X2X5 X4X5
4	0.8824	X2 X1X4 X2X5 X4X5
4	0.8824	X2 X1X4 X2X3 X4X5
4	0.8824	X1X4 X2X3 X2X4 X4X5
4	0.8824	X1X4 X2X4 X2X5 X4X5
4	0.8777	X4 X1X2 X2X3 X2X5
4	0.8777	X1X2 X2X3 X2X5 X3X4
4	0.8777	X1X2 X2X3 X2X5 X3X5
4	0.8777	X5 X1X2 X2X3 X2X5
5	0.8836	X1 X4 X1X2 X2X3 X2X5
5	0.8836	X1 X1X2 X2X3 X2X5 X3X4
5	0.8836	X1 X1X2 X2X3 X2X5 X3X5
5	0.8836	X1 X5 X1X2 X2X3 X2X5
5	0.8836	X1 X3 X1X2 X2X3 X2X5
5	0.8836	X1 X2 X3 X1X2 X2X4
5	0.8836	X1 X2 X5 X1X2 X2X4
5	0.8836	X1 X2 X1X2 X2X4 X3X4
5	0.8836	X1 X2 X1X2 X2X4 X3X5
5	0.8836	X1 X1X2 X2X3 X2X5 X4X5
5	0.8836	X1 X2 X1X2 X2X4 X4X5
5	0.8836	X1 X2 X4 X1X2 X2X4
5	0.8836	X1 X2 X5 X1X2 X2X3
5	0.8836	X1 X2 X4 X1X2 X2X3
5	0.8836	X1 X2 X1X2 X2X5 X4X5
6	0.8837	X4 X1X2 X1X4 X1X5 X2X3 X2X5
6	0.8837	X1 X4 X1X2 X1X5 X2X3 X2X5
6	0.8837	X4 X1X2 X1X3 X1X4 X2X3 X2X5
6	0.8837	X1 X4 X1X2 X1X3 X2X3 X2X5
6	0.8837	X1 X4 X1X2 X1X4 X2X3 X2X5
6	0.8837	X5 X1X2 X1X4 X1X5 X2X3 X2X5
6	0.8837	X1X2 X1X3 X1X4 X2X3 X2X5 X3X4
6	0.8837	X1 X1X2 X1X5 X2X3 X2X5 X3X4
6	0.8837	X1X2 X1X4 X1X5 X2X3 X2X5 X3X4
6	0.8837	X1 X1X2 X1X3 X2X3 X2X5 X3X4
6	0.8837	X1 X5 X1X2 X1X5 X2X3 X2X5
6	0.8837	X1 X1X2 X1X4 X2X3 X2X5 X3X4
6		

	0.8837	X5 X1X2 X1X3 X1X4 X2X3 X2X5
6	0.8837	X1 X5 X1X2 X1X3 X2X3 X2X5
6	0.8837	X1X2 X1X3 X1X4 X2X3 X2X5 X3X5

Note: Models of not full rank are not included.

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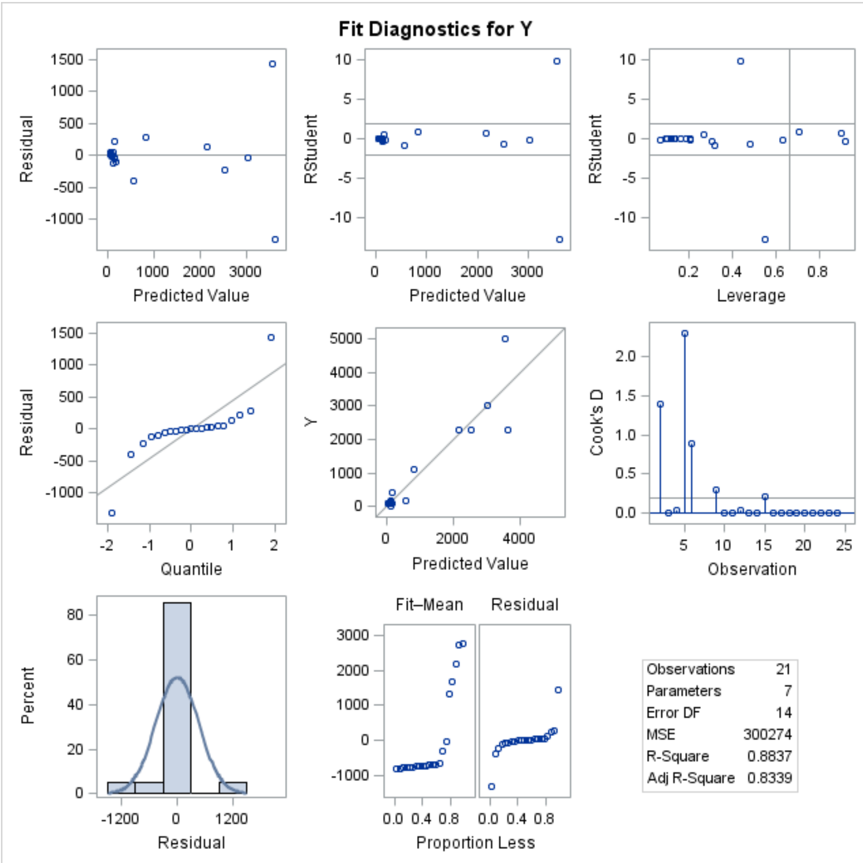
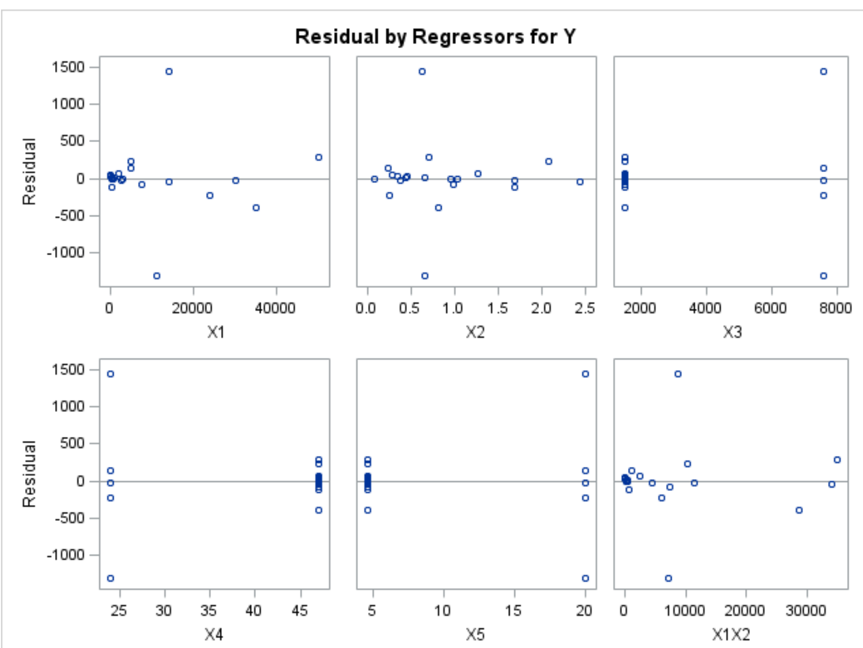
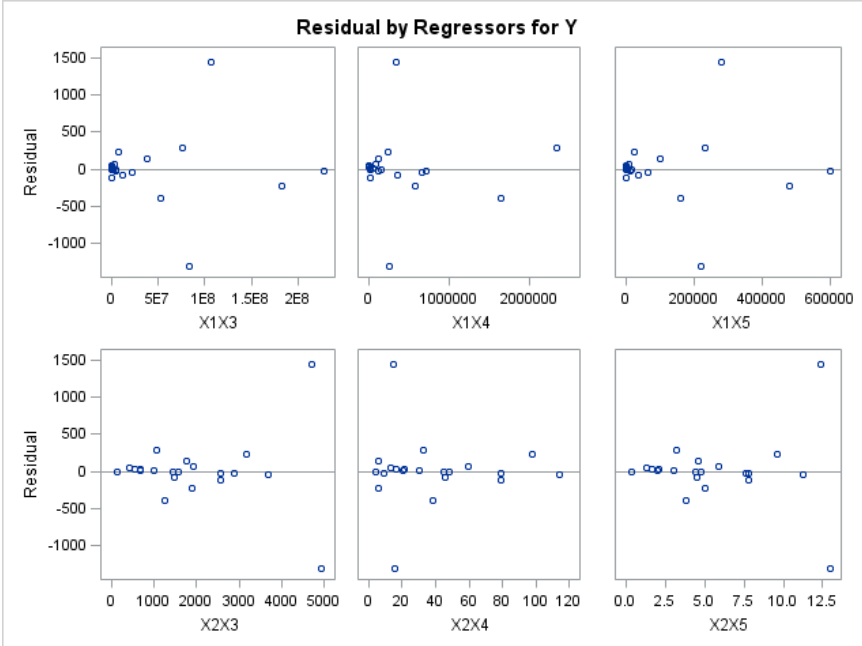
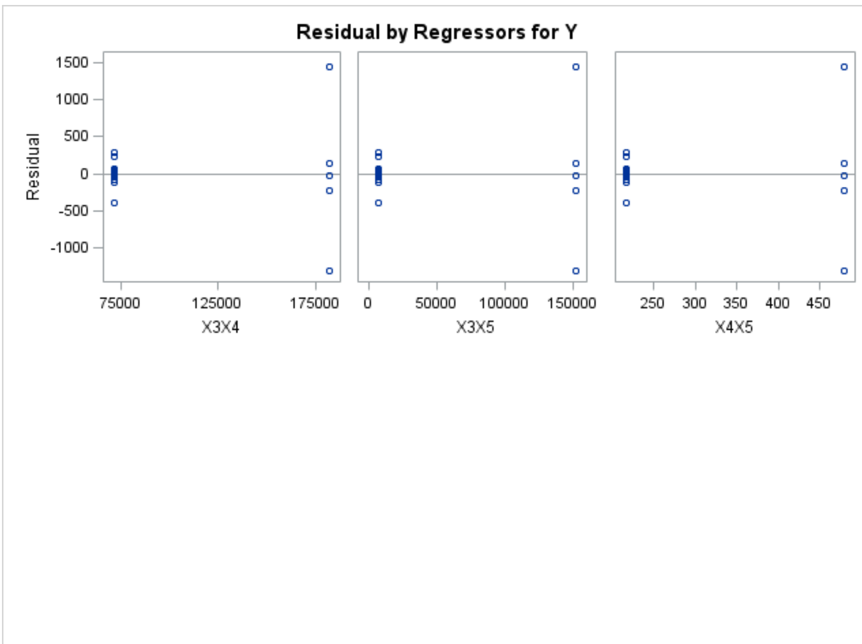
MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Nitrogen and Nitrate
===

The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
X1X3
X1X4
X1X5
X2X3
X2X4
X2X5


Residual by Regressors for Y
Residual
X3X4
X3X5
X4X5

FORWARD REGRESSION
Pollutant: Nitrogen and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	44
Number of Observations Used	34
Number of Observations with Missing Values	10

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.2612	0.2940	-0.1270	0.2915	0.2884	0.6953	0.6758	0.6233	-0.2865	-0.3236	-0.2773	0.2165	0.2959	0.2522	0.1615
X2	-0.2612	1.0000	-0.5337	0.2994	-0.5271	0.7237	-0.5091	-0.0898	-0.5186	0.8907	0.8815	0.6764	-0.3585	-0.5391	-0.4351	-0.3587
X3	0.2940	-0.5337	1.0000	-0.1678	0.9996	-0.4793	0.8418	0.0707	0.8770	-0.1938	-0.3868	0.0939	0.8691	0.9996	0.9454	0.3985
X4	-0.1270	0.2994	-0.1678	1.0000	-0.1383	0.0645	-0.1714	0.5845	-0.1507	0.3148	0.6323	0.3426	0.3418	-0.1939	0.1627	-0.5141
X5	0.2915	-0.5271	0.9996	-0.1383	1.0000	-0.4796	0.8405	0.0887	0.8765	-0.1851	-0.3694	0.1047	0.8835	0.9984	0.9547	0.3848
X1X2	0.2884	0.7237	-0.4793	0.0645	-0.4796	1.0000	-0.2813	0.2266	-0.3466	0.5662	0.4454	0.3331	-0.4246	-0.4788	-0.4584	-0.3163
X1X3	0.6953	-0.5091	0.8418	-0.1714	0.8405	-0.2813	1.0000	0.3514	0.9952	-0.3112	-0.4036	-0.1140	0.7165	0.8423	0.7858	0.4310
X1X4	0.6758	-0.0898	0.0707	0.5845	0.0887	0.2266	0.3514	1.0000	0.3072	-0.0980	0.1014	-0.0572	0.3607	0.0547	0.2640	-0.2396
X1X5	0.6233	-0.5186	0.8770	-0.1507	0.8765	-0.3466	0.9952	0.3072	1.0000	-0.2983	-0.3878	-0.0828	0.7604	0.8768	0.8280	0.4394
X2X3	-0.2865	0.8907	-0.1938	0.3148	-0.1851	0.5662	-0.3112	-0.0980	-0.2983	1.0000	0.8407	0.9353	-0.0268	-0.2013	-0.0899	-0.2011
X2X4	-0.3236	0.8815	-0.3868	0.6323	-0.3694	0.4454	-0.4036	0.1014	-0.3878	0.8407	1.0000	0.7223	-0.0514	-0.4019	-0.1780	-0.4388
X2X5	-0.2773	0.6764	0.0939	0.3426	0.1047	0.3331	-0.1140	-0.0572	-0.0828	0.9353	0.7223	1.0000	0.2614	0.0843	0.2073	-0.0791
X3X4	0.2165	-0.3585	0.8691	0.3418	0.8835	-0.4246	0.7165	0.3607	0.7604	-0.0268	-0.0514	0.2614	1.0000	0.8557	0.9829	0.1220
X3X5	0.2959	-0.5391	0.9996	-0.1939	0.9984	-0.4788	0.8423	0.0547	0.8768	-0.2013	-0.4019	0.0843	0.8557	1.0000	0.9364	0.4104
X4X5	0.2522	-0.4351	0.9454	0.1627	0.9547	-0.4584	0.7858	0.2640	0.8280	-0.0899	-0.1780	0.2073	0.9829	0.9364	1.0000	0.2289
Y	0.1615	-0.3587	0.3985	-0.5141	0.3848	-0.3163	0.4310	-0.2396	0.4394	-0.2011	-0.4388	-0.0791	0.1220	0.4104	0.2289	1.0000

FORWARD REGRESSION
Pollutant: Nitrogen and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	44
Number of Observations Used	34
Number of Observations with Missing Values	10

Forward Selection: Step 1

Variable X4 Entered: R-Square = 0.2643 and C(p) = 13.2540

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.64807	1.64807	11.50	0.0019
Error	32	4.58784	0.14337		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.20176	0.16257	7.83426	54.64	<.0001
X4	-0.01786	0.00527	1.64807	11.50	0.0019

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X1X5 Entered: R-Square = 0.3983 and C(p) = 7.3744

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	2.48385	1.24192	10.26	0.0004
Error	31	3.75207	0.12103		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.00707	0.16674	4.41543	36.48	<.0001

X4	-0.01592	0.00490	1.27990	10.57	0.0028
X1X5	0.04136	0.01574	0.83578	6.91	0.0132

Bounds on condition number: 1.0232, 4.093

Forward Selection: Step 3

Variable X1X2 Entered: R-Square = 0.4268 and C(p) = 7.6984

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	2.66161	0.88720	7.45	0.0007
Error	30	3.57430	0.11914		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.11080	0.18595	4.25158	35.68	<.0001
X4	-0.01584	0.00486	1.26710	10.64	0.0028
X1X2	-0.35184	0.28804	0.17776	1.49	0.2314
X1X5	0.03443	0.01661	0.51166	4.29	0.0469

Bounds on condition number: 1.1583, 9.9552

Forward Selection: Step 4

Variable X2X5 Entered: R-Square = 0.4607 and C(p) = 7.7045

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	2.87310	0.71828	6.19	0.0010
Error	29	3.36281	0.11596		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.10365	0.18352	4.19353	36.16	<.0001
X4	-0.01826	0.00512	1.47722	12.74	0.0013
X1X2	-0.49100	0.30227	0.30596	2.64	0.1151
X1X5	0.03243	0.01646	0.45034	3.88	0.0584
X2X5	0.03114	0.02306	0.21149	1.82	0.1873

Bounds on condition number: 1.2862, 19.614

Forward Selection: Step 5

Variable X3X5 Entered: R-Square = 0.5191 and C(p) = 6.2704

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	3.23735	0.64747	6.05	0.0006
Error	28	2.99856	0.10709		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.22270	0.18781	4.53898	42.38	<.0001
X4	-0.02218	0.00536	1.83632	17.15	0.0003
X1X2	-0.90133	0.36590	0.64982	6.07	0.0202
X1X5	0.09248	0.03620	0.69899	6.53	0.0163
X2X5	0.06273	0.02801	0.53728	5.02	0.0332
X3X5	-0.00000750	0.00000407	0.36425	3.40	0.0758

Bounds on condition number: 8.286, 99.401

Forward Selection: Step 6

Variable X2X4 Entered: R-Square = 0.5753 and C(p) = 4.9700

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	3.58741	0.59790	6.10	0.0004
Error	27	2.64851	0.09809		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.09635	0.19178	3.20561	32.68	<.0001
X4	-0.01579	0.00614	0.64851	6.61	0.0160
X1X2	-0.94804	0.35106	0.71535	7.29	0.0118
X1X5	0.11438	0.03653	0.96158	9.80	0.0042
X2X4	-0.00956	0.00506	0.35006	3.57	0.0697
X2X5	0.12831	0.04386	0.83957	8.56	0.0069
X3X5	-0.00001215	0.00000461	0.68260	6.96	0.0137

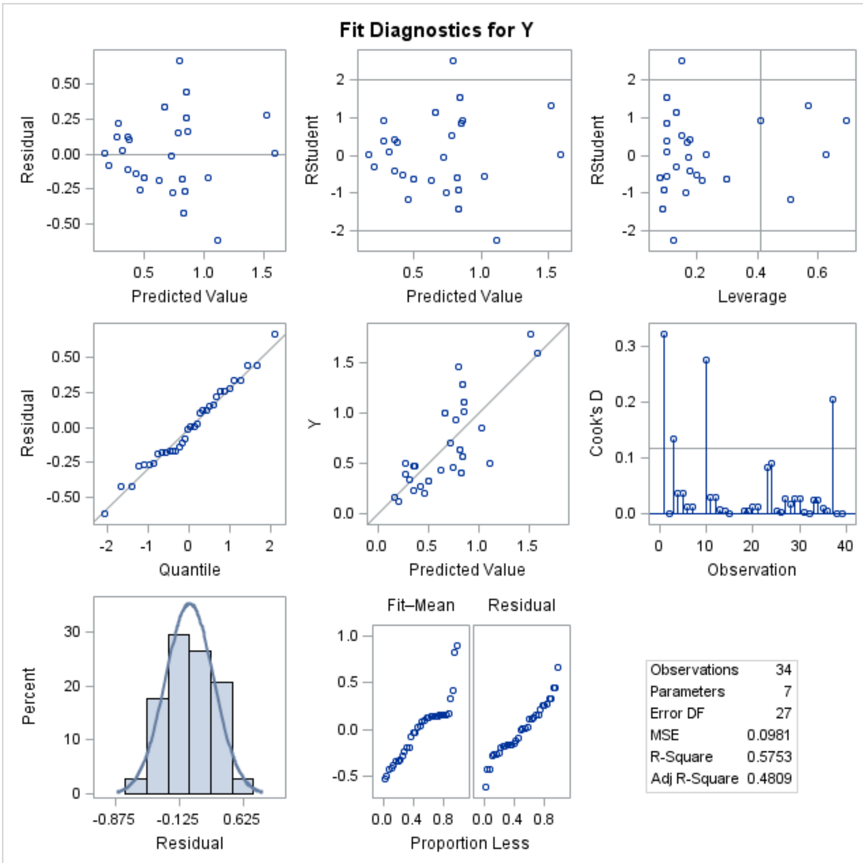
Bounds on condition number: 11.59, 207.53

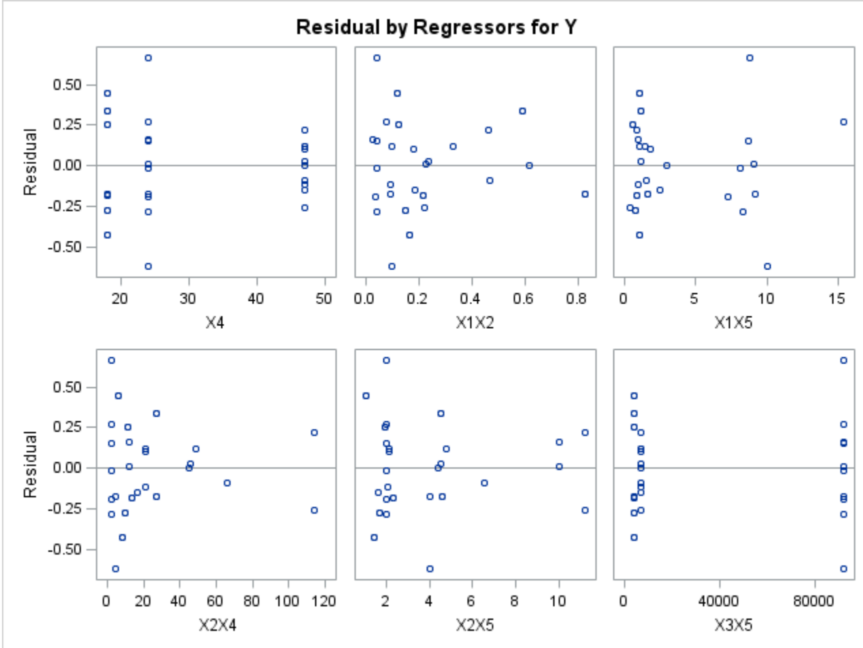
No other variable met the 0.5000 significance level for entry into the model.

Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X4	1	0.2643	0.2643	13.2540	11.50	0.0019
2	X1X5	2	0.1340	0.3983	7.3744	6.91	0.0132
3	X1X2	3	0.0285	0.4268	7.6984	1.49	0.2314
4	X2X5	4	0.0339	0.4607	7.7045	1.82	0.1873
5	X3X5	5	0.0584	0.5191	6.2704	3.40	0.0758
6	X2X4	6	0.0561	0.5753	4.9700	3.57	0.0697

FORWARD REGRESSION
Pollutant: Nitrogen and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
0.50
0.25
0.00
-0.25
-0.50
20
30
40
50
X4
0.0
0.2
0.4
0.6
0.8
X1X2
0
5
10
15
X1X5
0
20
40
60
80
100
120
X2X4
2
4
6
8
10
X2X5
0
40000
80000
X3X5

BACKWARD REGRESSION
Pollutant: Nitrogen and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	44
Number of Observations Used	34
Number of Observations with Missing Values	10

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.2612	0.2940	-0.1270	0.2915	0.2884	0.6953	0.6758	0.6233	-0.2865	-0.3236	-0.2773	0.2165	0.2959	0.2522	0.1615
X2	-0.2612	1.0000	-0.5337	0.2994	-0.5271	0.7237	-0.5091	-0.0898	-0.5186	0.8907	0.8815	0.6764	-0.3585	-0.5391	-0.4351	-0.3587
X3	0.2940	-0.5337	1.0000	-0.1678	0.9996	-0.4793	0.8418	0.0707	0.8770	-0.1938	-0.3868	0.0939	0.8691	0.9996	0.9454	0.3985
X4	-0.1270	0.2994	-0.1678	1.0000	-0.1383	0.0645	-0.1714	0.5845	-0.1507	0.3148	0.6323	0.3426	0.3418	-0.1939	0.1627	-0.5141
X5	0.2915	-0.5271	0.9996	-0.1383	1.0000	-0.4796	0.8405	0.0887	0.8765	-0.1851	-0.3694	0.1047	0.8835	0.9984	0.9547	0.3848
X1X2	0.2884	0.7237	-0.4793	0.0645	-0.4796	1.0000	-0.2813	0.2266	-0.3466	0.5662	0.4454	0.3331	-0.4246	-0.4788	-0.4584	-0.3163
X1X3	0.6953	-0.5091	0.8418	-0.1714	0.8405	-0.2813	1.0000	0.3514	0.9952	-0.3112	-0.4036	-0.1140	0.7165	0.8423	0.7858	0.4310
X1X4	0.6758	-0.0898	0.0707	0.5845	0.0887	0.2266	0.3514	1.0000	0.3072	-0.0980	0.1014	-0.0572	0.3607	0.0547	0.2640	-0.2396
X1X5	0.6233	-0.5186	0.8770	-0.1507	0.8765	-0.3466	0.9952	0.3072	1.0000	-0.2983	-0.3878	-0.0828	0.7604	0.8768	0.8280	0.4394
X2X3	-0.2865	0.8907	-0.1938	0.3148	-0.1851	0.5662	-0.3112	-0.0980	-0.2983	1.0000	0.8407	0.9353	-0.0268	-0.2013	-0.0899	-0.2011
X2X4	-0.3236	0.8815	-0.3868	0.6323	-0.3694	0.4454	-0.4036	0.1014	-0.3878	0.8407	1.0000	0.7223	-0.0514	-0.4019	-0.1780	-0.4388
X2X5	-0.2773	0.6764	0.0939	0.3426	0.1047	0.3331	-0.1140	-0.0572	-0.0828	0.9353	0.7223	1.0000	0.2614	0.0843	0.2073	-0.0791
X3X4	0.2165	-0.3585	0.8691	0.3418	0.8835	-0.4246	0.7165	0.3607	0.7604	-0.0268	-0.0514	0.2614	1.0000	0.8557	0.9829	0.1220
X3X5	0.2959	-0.5391	0.9996	-0.1939	0.9984	-0.4788	0.8423	0.0547	0.8768	-0.2013	-0.4019	0.0843	0.8557	1.0000	0.9364	0.4104
X4X5	0.2522	-0.4351	0.9454	0.1627	0.9547	-0.4584	0.7858	0.2640	0.8280	-0.0899	-0.1780	0.2073	0.9829	0.9364	1.0000	0.2289
Y	0.1615	-0.3587	0.3985	-0.5141	0.3848	-0.3163	0.4310	-0.2396	0.4394	-0.2011	-0.4388	-0.0791	0.1220	0.4104	0.2289	1.0000

BACKWARD REGRESSION
Pollutant: Nitrogen and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	44
Number of Observations Used	34
Number of Observations with Missing Values	10

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.5918 and C(p) = 10.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	3.69030	0.41003	3.87	0.0038
Error	24	2.54562	0.10607		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.83464	0.86743	0.47448	4.47	0.0450
X1	-2.62579	2.72982	0.09814	0.93	0.3457
X2	-0.09730	0.83954	0.00142	0.01	0.9087
X3	-0.00037529	0.00017005	0.51661	4.87	0.0371
X4	-0.02084	0.01705	0.15838	1.49	0.2336
X1X2	-0.89352	1.15422	0.06356	0.60	0.4464
X1X3	0.00086785	0.00044304	0.40699	3.84	0.0618
X1X4	0.03831	0.04601	0.07355	0.69	0.4132
X2X3	0.00059289	0.00024817	0.60540	5.71	0.0251
X2X4	-0.01445	0.01311	0.12884	1.21	0.2813

Bounds on condition number: 85.273, 2832.6

Backward Elimination: Step 1

Variable X2 Removed: R-Square = 0.5916 and C(p) = 8.0134

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	3.68887	0.46111	4.53	0.0017
Error	25	2.54704	0.10188		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.78643	0.74603	0.58420	5.73	0.0245
X1	-2.60040	2.66680	0.09687	0.95	0.3388
X3	-0.00036649	0.00014914	0.61525	6.04	0.0213
X4	-0.02046	0.01640	0.15859	1.56	0.2237
X1X2	-0.98879	0.79416	0.15794	1.55	0.2246
X1X3	0.00085666	0.00042378	0.41632	4.09	0.0541
X1X4	0.03988	0.04312	0.08715	0.86	0.3639
X2X3	0.00057890	0.00021251	0.75603	7.42	0.0116
X2X4	-0.01571	0.00714	0.49277	4.84	0.0373

Bounds on condition number: 52.049, 1424.5

Backward Elimination: Step 2

Variable X2X5 Entered: R-Square = 0.5918 and C(p) = 10.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	3.69030	0.41003	3.87	0.0038
Error	24	2.54562	0.10607		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.83464	0.86743	0.47448	4.47	0.0450
X1	-2.62579	2.72982	0.09814	0.93	0.3457
X3	-0.00037529	0.00017005	0.51661	4.87	0.0371
X4	-0.02084	0.01705	0.15838	1.49	0.2336
X1X2	-0.89352	1.15422	0.06356	0.60	0.4464
X1X3	0.00086785	0.00044304	0.40699	3.84	0.0618
X1X4	0.03831	0.04601	0.07355	0.69	0.4132
X2X3	0.00046974	0.00096655	0.02505	0.24	0.6314
X2X4	-0.01489	0.01017	0.22724	2.14	0.1563
X2X5	0.02391	0.20632	0.00142	0.01	0.9087

Bounds on condition number: 227.22, 4838.5

Backward Elimination: Step 3

Variable X2X5 Removed: R-Square = 0.5916 and C(p) = 8.0134

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	3.68887	0.46111	4.53	0.0017
Error	25	2.54704	0.10188		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.78643	0.74603	0.58420	5.73	0.0245
X1	-2.60040	2.66680	0.09687	0.95	0.3388
X3	-0.00036649	0.00014914	0.61525	6.04	0.0213
X4	-0.02046	0.01640	0.15859	1.56	0.2237
X1X2	-0.98879	0.79416	0.15794	1.55	0.2246
X1X3	0.00085666	0.00042378	0.41632	4.09	0.0541
X1X4	0.03988	0.04312	0.08715	0.86	0.3639
X2X3	0.00057890	0.00021251	0.75603	7.42	0.0116
X2X4	-0.01571	0.00714	0.49277	4.84	0.0373

Bounds on condition number: 52.049, 1424.5

Backward Elimination: Step 4

Variable X1X4 Removed: R-Square = 0.5776 and C(p) = 6.8351

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	3.60172	0.51453	5.08	0.0010
Error	26	2.63419	0.10132		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.19408	0.38151	0.99250	9.80	0.0043
X1	-0.53530	1.45414	0.01373	0.14	0.7158
X3	-0.00031054	0.00013594	0.52873	5.22	0.0308
X4	-0.00711	0.00776	0.08501	0.84	0.3681
X1X2	-1.26269	0.73482	0.29916	2.95	0.0976
X1X3	0.00062975	0.00034458	0.33840	3.34	0.0791
X2X3	0.00058716	0.00021173	0.77911	7.69	0.0101
X2X4	-0.01582	0.00712	0.49993	4.93	0.0352

Bounds on condition number: 26.455, 638.52

Backward Elimination: Step 5

Variable X1X5 Entered: R-Square = 0.5916 and C(p) = 8.0134

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	3.68887	0.46111	4.53	0.0017
Error	25	2.54704	0.10188		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.78643	0.74603	0.58420	5.73	0.0245
X1	6.20924	7.43664	0.07103	0.70	0.4117
X3	-0.00036649	0.00014914	0.61525	6.04	0.0213
X4	-0.02046	0.01640	0.15859	1.56	0.2237
X1X2	-0.98879	0.79416	0.15794	1.55	0.2246
X1X3	-0.01029	0.01182	0.07733	0.76	0.3919
X1X5	2.16495	2.34077	0.08715	0.86	0.3639
X2X3	0.00057890	0.00021251	0.75603	7.42	0.0116
X2X4	-0.01571	0.00714	0.49277	4.84	0.0373

Bounds on condition number: 30934, 466356

Backward Elimination: Step 6

Variable X1 Removed: R-Square = 0.5802 and C(p) = 6.6831

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	3.61784	0.51683	5.13	0.0009
Error	26	2.61807	0.10069		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.31162	0.48005	0.75170	7.47	0.0112
X3	-0.00032896	0.00014137	0.54522	5.41	0.0280
X4	-0.00813	0.00709	0.13228	1.31	0.2622
X1X2	-1.13645	0.76969	0.21952	2.18	0.1518
X1X3	-0.00057441	0.00201	0.00819	0.08	0.7778
X1X5	0.24846	0.45630	0.02985	0.30	0.5907
X2X3	0.00057853	0.00021127	0.75504	7.50	0.0110
X2X4	-0.01616	0.00708	0.52417	5.21	0.0309

Bounds on condition number: 1034, 13962

Backward Elimination: Step 7

Variable X1X3 Removed: R-Square = 0.5789 and C(p) = 4.7602

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	3.60966	0.60161	6.19	0.0004
Error	27	2.62625	0.09727		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.19304	0.23566	2.49291	25.63	<.0001
X3	-0.00030772	0.00011810	0.66040	6.79	0.0147
X4	-0.00816	0.00697	0.13335	1.37	0.2519
X1X2	-1.31979	0.41577	0.98010	10.08	0.0037
X1X5	0.11880	0.03707	0.99907	10.27	0.0035
X2X3	0.00059488	0.00019985	0.86182	8.86	0.0061
X2X4	-0.01564	0.00673	0.52574	5.41	0.0278

Bounds on condition number: 11.867, 272.5

Backward Elimination: Step 8

Variable X4 Removed: R-Square = 0.5575 and C(p) = 4.0175

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	3.47631	0.69526	7.05	0.0002
Error	28	2.75961	0.09856		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.02259	0.18654	2.96161	30.05	<.0001
X3	-0.00034653	0.00011410	0.90911	9.22	0.0051
X1X2	-1.37849	0.41547	1.08498	11.01	0.0025
X1X5	0.12696	0.03665	1.18266	12.00	0.0017
X2X3	0.00071572	0.00017227	1.70120	17.26	0.0003
X2X4	-0.02134	0.00467	2.05768	20.88	<.0001

Bounds on condition number: 9.5897, 163.39

Backward Elimination: Step 9

Variable X5 Entered: R-Square = 0.5789 and C(p) = 4.7602

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	3.60966	0.60161	6.19	0.0004
Error	27	2.62625	0.09727		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.61017	1.40672	0.01830	0.19	0.6679
X3	0.00197	0.00199	0.09619	0.99	0.3288
X5	-0.44314	0.37846	0.13335	1.37	0.2519
X1X2	-1.31979	0.41577	0.98010	10.08	0.0037
X1X5	0.11880	0.03707	0.99907	10.27	0.0035
X2X3	0.00059488	0.00019985	0.86182	8.86	0.0061
X2X4	-0.01564	0.00673	0.52574	5.41	0.0278

Bounds on condition number: 2942.7, 34709

Backward Elimination: Step 10

Variable X3 Removed: R-Square = 0.5634 and C(p) = 3.6671

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	3.51347	0.70269	7.23	0.0002
Error	28	2.72245	0.09723		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.78220	0.13597	3.21795	33.10	<.0001
X5	-0.06739	0.02160	0.94627	9.73	0.0042
X1X2	-1.38523	0.41045	1.10743	11.39	0.0022
X1X5	0.12758	0.03600	1.22149	12.56	0.0014
X2X3	0.00070398	0.00016701	1.72756	17.77	0.0002
X2X4	-0.02062	0.00448	2.06043	21.19	<.0001

Bounds on condition number: 9.1563, 156.58

Backward Elimination: Step 11

Variable X3X4 Entered: R-Square = 0.5789 and C(p) = 4.7602

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	3.60966	0.60161	6.19	0.0004
Error	27	2.62625	0.09727		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.87200	0.16324	2.77555	28.53	<.0001
X5	-0.03644	0.03789	0.08996	0.92	0.3447
X1X2	-1.31979	0.41577	0.98010	10.08	0.0037
X1X5	0.11880	0.03707	0.99907	10.27	0.0035
X2X3	0.00059488	0.00019985	0.86182	8.86	0.0061
X2X4	-0.01564	0.00673	0.52574	5.41	0.0278
X3X4	-0.00000507	0.00000509	0.09619	0.99	0.3288

Bounds on condition number: 28.157, 435.32

Backward Elimination: Step 12

Variable X5 Removed: R-Square = 0.5644 and C(p) = 3.6084

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	3.51969	0.70394	7.26	0.0002
Error	28	2.71622	0.09701		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.91078	0.15797	3.22476	33.24	<.0001
X1X2	-1.11826	0.35862	0.94324	9.72	0.0042
X1X5	0.09405	0.02664	1.20888	12.46	0.0015
X2X3	0.00044742	0.00012801	1.18510	12.22	0.0016
X2X4	-0.01035	0.00387	0.69364	7.15	0.0124
X3X4	-0.00000909	0.00000290	0.95250	9.82	0.0040

Bounds on condition number: 4.3577, 90.07

Backward Elimination: Step 13

Variable X3X5 Entered: R-Square = 0.5789 and C(p) = 4.7602

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	3.60966	0.60161	6.19	0.0004
Error	27	2.62625	0.09727		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.80571	0.19224	1.70861	17.57	0.0003
X1X2	-1.31979	0.41577	0.98010	10.08	0.0037
X1X5	0.11880	0.03707	0.99907	10.27	0.0035
X2X3	0.00059488	0.00019985	0.86182	8.86	0.0061
X2X4	-0.01564	0.00673	0.52574	5.41	0.0278
X3X4	-0.00000588	0.00000442	0.17216	1.77	0.1945
X3X5	-0.00000622	0.00000647	0.08996	0.92	0.3447

Bounds on condition number: 23.076, 387.14

Backward Elimination: Step 14

Variable X3X5 Removed: R-Square = 0.5644 and C(p) = 3.6084

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	3.51969	0.70394	7.26	0.0002
Error	28	2.71622	0.09701		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.91078	0.15797	3.22476	33.24	<.0001
X1X2	-1.11826	0.35862	0.94324	9.72	0.0042
X1X5	0.09405	0.02664	1.20888	12.46	0.0015
X2X3	0.00044742	0.00012801	1.18510	12.22	0.0016
X2X4	-0.01035	0.00387	0.69364	7.15	0.0124
X3X4	-0.00000909	0.00000290	0.95250	9.82	0.0040

Bounds on condition number: 4.3577, 90.07

Backward Elimination: Step 15

Variable X4X5 Entered: R-Square = 0.5789 and C(p) = 4.7602

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Note:

Note:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	3.60966	0.60161	6.19	0.0004
Error	27	2.62625	0.09727		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.68838	0.28018	0.58716	6.04	0.0207
X1X2	-1.31979	0.41577	0.98010	10.08	0.0037
X1X5	0.11880	0.03707	0.99907	10.27	0.0035
X2X3	0.00059488	0.00019985	0.86182	8.86	0.0061
X2X4	-0.01564	0.00673	0.52574	5.41	0.0278
X3X4	0.00000706	0.00001705	0.01670	0.17	0.6819
X4X5	-0.00392	0.00407	0.08996	0.92	0.3447

Bounds on condition number: 181.84, 2089.8

Backward Elimination: Step 16

Variable X3X4 Removed: R-Square = 0.5762 and C(p) = 2.9177

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	3.59296	0.71859	7.61	0.0001
Error	28	2.64295	0.09439		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.78988	0.13397	3.28105	34.76	<.0001
X1X2	-1.24740	0.37166	1.06327	11.26	0.0023
X1X5	0.10982	0.02962	1.29755	13.75	0.0009
X2X3	0.00053428	0.00013419	1.49632	15.85	0.0004
X2X4	-0.01333	0.00372	1.21223	12.84	0.0013
X4X5	-0.00225	0.00068386	1.02576	10.87	0.0027

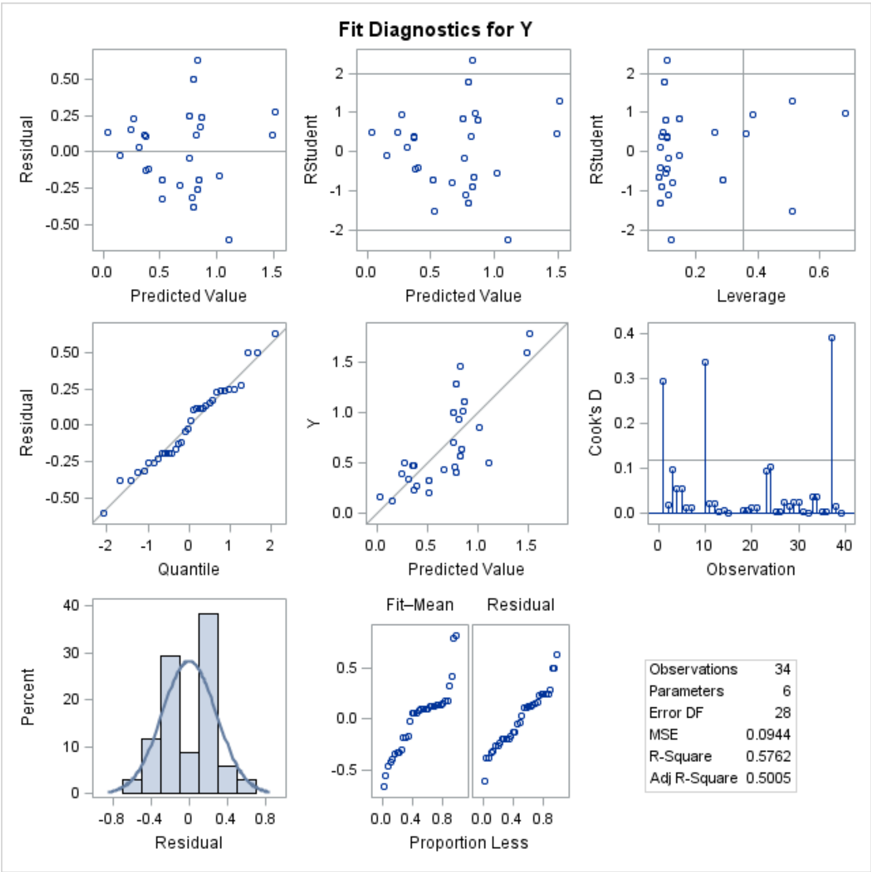
Bounds on condition number: 5.2812, 104.9

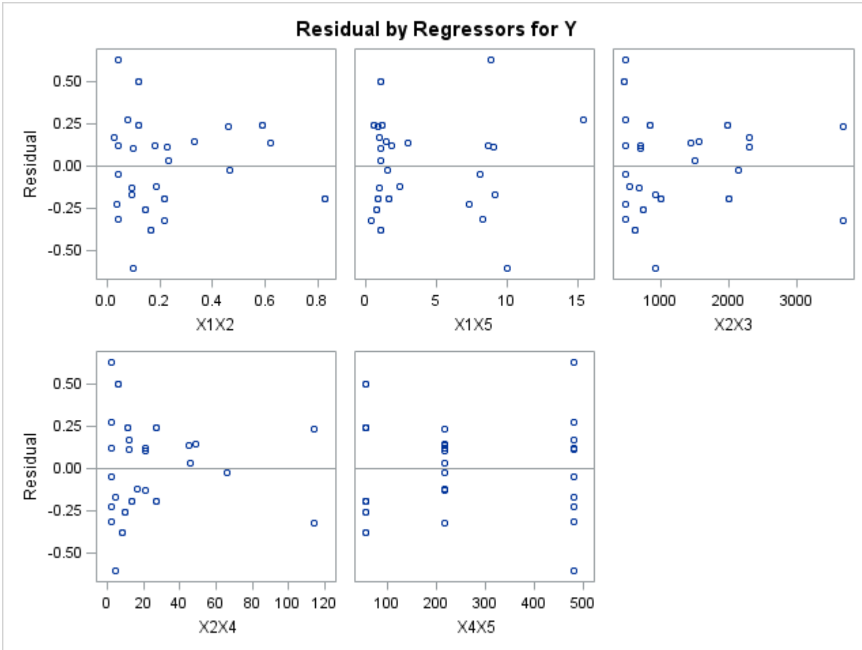
All variables left in the model are significant at the 0.1000 level.

Summary of Backward Elimination								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1		X2	8	0.0002	0.5916	8.0134	0.01	0.9087
2	X2X5		9	0.0002	0.5918	10.0000	0.01	0.9087
3		X2X5	8	0.0002	0.5916	8.0134	0.01	0.9087
4		X1X4	7	0.0140	0.5776	6.8351	0.86	0.3639
5	X1X5		8	0.0140	0.5916	8.0134	0.86	0.3639
6		X1	7	0.0114	0.5802	6.6831	0.70	0.4117
7		X1X3	6	0.0013	0.5789	4.7602	0.08	0.7778
8		X4	5	0.0214	0.5575	4.0175	1.37	0.2519
9	X5		6	0.0214	0.5789	4.7602	1.37	0.2519
10		X3	5	0.0154	0.5634	3.6671	0.99	0.3288
11	X3X4		6	0.0154	0.5789	4.7602	0.99	0.3288
12		X5	5	0.0144	0.5644	3.6084	0.92	0.3447
13	X3X5		6	0.0144	0.5789	4.7602	0.92	0.3447
14		X3X5	5	0.0144	0.5644	3.6084	0.92	0.3447
15	X4X5		6	0.0144	0.5789	4.7602	0.92	0.3447
16		X3X4	5	0.0027	0.5762	2.9177	0.17	0.6819

BACKWARD REGRESSION
Pollutant: Nitrogen and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X1X2
X1X5
X2X3
X2X4
X4X5

STEPWISE REGRESSION
Pollutant: Nitrogen and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	44
Number of Observations Used	34
Number of Observations with Missing Values	10

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.2612	0.2940	-0.1270	0.2915	0.2884	0.6953	0.6758	0.6233	-0.2865	-0.3236	-0.2773	0.2165	0.2959	0.2522	0.1615
X2	-0.2612	1.0000	-0.5337	0.2994	-0.5271	0.7237	-0.5091	-0.0898	-0.5186	0.8907	0.8815	0.6764	-0.3585	-0.5391	-0.4351	-0.3587
X3	0.2940	-0.5337	1.0000	-0.1678	0.9996	-0.4793	0.8418	0.0707	0.8770	-0.1938	-0.3868	0.0939	0.8691	0.9996	0.9454	0.3985
X4	-0.1270	0.2994	-0.1678	1.0000	-0.1383	0.0645	-0.1714	0.5845	-0.1507	0.3148	0.6323	0.3426	0.3418	-0.1939	0.1627	-0.5141
X5	0.2915	-0.5271	0.9996	-0.1383	1.0000	-0.4796	0.8405	0.0887	0.8765	-0.1851	-0.3694	0.1047	0.8835	0.9984	0.9547	0.3848
X1X2	0.2884	0.7237	-0.4793	0.0645	-0.4796	1.0000	-0.2813	0.2266	-0.3466	0.5662	0.4454	0.3331	-0.4246	-0.4788	-0.4584	-0.3163
X1X3	0.6953	-0.5091	0.8418	-0.1714	0.8405	-0.2813	1.0000	0.3514	0.9952	-0.3112	-0.4036	-0.1140	0.7165	0.8423	0.7858	0.4310
X1X4	0.6758	-0.0898	0.0707	0.5845	0.0887	0.2266	0.3514	1.0000	0.3072	-0.0980	0.1014	-0.0572	0.3607	0.0547	0.2640	-0.2396
X1X5	0.6233	-0.5186	0.8770	-0.1507	0.8765	-0.3466	0.9952	0.3072	1.0000	-0.2983	-0.3878	-0.0828	0.7604	0.8768	0.8280	0.4394
X2X3	-0.2865	0.8907	-0.1938	0.3148	-0.1851	0.5662	-0.3112	-0.0980	-0.2983	1.0000	0.8407	0.9353	-0.0268	-0.2013	-0.0899	-0.2011
X2X4	-0.3236	0.8815	-0.3868	0.6323	-0.3694	0.4454	-0.4036	0.1014	-0.3878	0.8407	1.0000	0.7223	-0.0514	-0.4019	-0.1780	-0.4388
X2X5	-0.2773	0.6764	0.0939	0.3426	0.1047	0.3331	-0.1140	-0.0572	-0.0828	0.9353	0.7223	1.0000	0.2614	0.0843	0.2073	-0.0791
X3X4	0.2165	-0.3585	0.8691	0.3418	0.8835	-0.4246	0.7165	0.3607	0.7604	-0.0268	-0.0514	0.2614	1.0000	0.8557	0.9829	0.1220
X3X5	0.2959	-0.5391	0.9996	-0.1939	0.9984	-0.4788	0.8423	0.0547	0.8768	-0.2013	-0.4019	0.0843	0.8557	1.0000	0.9364	0.4104
X4X5	0.2522	-0.4351	0.9454	0.1627	0.9547	-0.4584	0.7858	0.2640	0.8280	-0.0899	-0.1780	0.2073	0.9829	0.9364	1.0000	0.2289
Y	0.1615	-0.3587	0.3985	-0.5141	0.3848	-0.3163	0.4310	-0.2396	0.4394	-0.2011	-0.4388	-0.0791	0.1220	0.4104	0.2289	1.0000

STEPWISE REGRESSION
Pollutant: Nitrogen and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	44
Number of Observations Used	34
Number of Observations with Missing Values	10

Stepwise Selection: Step 1

Variable X4 Entered: R-Square = 0.2643 and C(p) = 13.2540

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.64807	1.64807	11.50	0.0019
Error	32	4.58784	0.14337		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.20176	0.16257	7.83426	54.64	<.0001
X4	-0.01786	0.00527	1.64807	11.50	0.0019

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X1X5 Entered: R-Square = 0.3983 and C(p) = 7.3744

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	2.48385	1.24192	10.26	0.0004
Error	31	3.75207	0.12103		
Corrected Total	33	6.23591			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.00707	0.16674	4.41543	36.48	<.0001

X4	-0.01592	0.00490	1.27990	10.57	0.0028
X1X5	0.04136	0.01574	0.83578	6.91	0.0132

Bounds on condition number: 1.0232, 4.093

All variables left in the model are significant at the 0.1500 level.

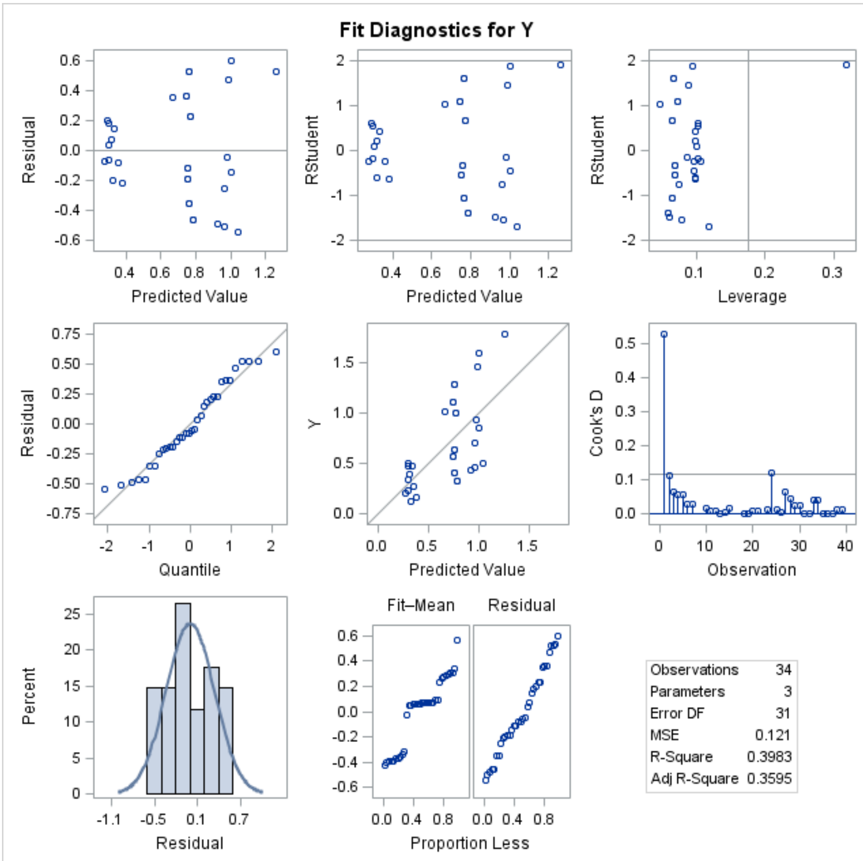
No other variable met the 0.1500 significance level for entry into the model.

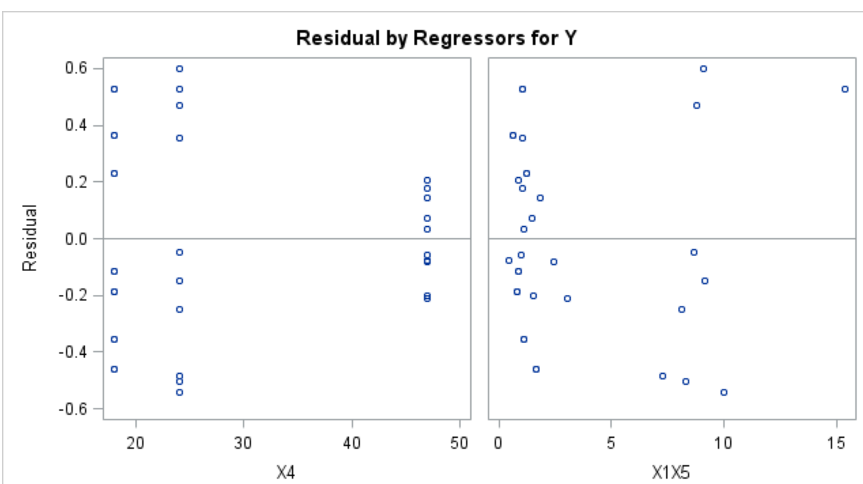
Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X4		1	0.2643	0.2643	13.2540	11.50	0.0019
2	X1X5		2	0.1340	0.3983	7.3744	6.91	0.0132

STEPWISE REGRESSION
Pollutant: Nitrogen and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y





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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Nitrogen, Nitrite, and Nitrate

==

The REG Procedure

Number of Observations Read	44
Number of Observations Used	34
Number of Observations with Missing Values	10

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.2612	0.2940	-0.1270	0.2915	0.2884	0.6953	0.6758	0.6233	-0.2865	-0.3236	-0.2773	0.2165	0.2959	0.2522	0.1615
X2	-0.2612	1.0000	-0.5337	0.2994	-0.5271	0.7237	-0.5091	-0.0898	-0.5186	0.8907	0.8815	0.6764	-0.3585	-0.5391	-0.4351	-0.3587
X3	0.2940	-0.5337	1.0000	-0.1678	0.9996	-0.4793	0.8418	0.0707	0.8770	-0.1938	-0.3868	0.0939	0.8691	0.9996	0.9454	0.3985
X4	-0.1270	0.2994	-0.1678	1.0000	-0.1383	0.0645	-0.1714	0.5845	-0.1507	0.3148	0.6323	0.3426	0.3418	-0.1939	0.1627	-0.5141
X5	0.2915	-0.5271	0.9996	-0.1383	1.0000	-0.4796	0.8405	0.0887	0.8765	-0.1851	-0.3694	0.1047	0.8835	0.9984	0.9547	0.3848
X1X2	0.2884	0.7237	-0.4793	0.0645	-0.4796	1.0000	-0.2813	0.2266	-0.3466	0.5662	0.4454	0.3331	-0.4246	-0.4788	-0.4584	-0.3163
X1X3	0.6953	-0.5091	0.8418	-0.1714	0.8405	-0.2813	1.0000	0.3514	0.9952	-0.3112	-0.4036	-0.1140	0.7165	0.8423	0.7858	0.4310
X1X4	0.6758	-0.0898	0.0707	0.5845	0.0887	0.2266	0.3514	1.0000	0.3072	-0.0980	0.1014	-0.0572	0.3607	0.0547	0.2640	-0.2396
X1X5	0.6233	-0.5186	0.8770	-0.1507	0.8765	-0.3466	0.9952	0.3072	1.0000	-0.2983	-0.3878	-0.0828	0.7604	0.8768	0.8280	0.4394
X2X3	-0.2865	0.8907	-0.1938	0.3148	-0.1851	0.5662	-0.3112	-0.0980	-0.2983	1.0000	0.8407	0.9353	-0.0268	-0.2013	-0.0899	-0.2011
X2X4	-0.3236	0.8815	-0.3868	0.6323	-0.3694	0.4454	-0.4036	0.1014	-0.3878	0.8407	1.0000	0.7223	-0.0514	-0.4019	-0.1780	-0.4388
X2X5	-0.2773	0.6764	0.0939	0.3426	0.1047	0.3331	-0.1140	-0.0572	-0.0828	0.9353	0.7223	1.0000	0.2614	0.0843	0.2073	-0.0791
X3X4	0.2165	-0.3585	0.8691	0.3418	0.8835	-0.4246	0.7165	0.3607	0.7604	-0.0268	-0.0514	0.2614	1.0000	0.8557	0.9829	0.1220
X3X5	0.2959	-0.5391	0.9996	-0.1939	0.9984	-0.4788	0.8423	0.0547	0.8768	-0.2013	-0.4019	0.0843	0.8557	1.0000	0.9364	0.4104
X4X5	0.2522	-0.4351	0.9454	0.1627	0.9547	-0.4584	0.7858	0.2640	0.8280	-0.0899	-0.1780	0.2073	0.9829	0.9364	1.0000	0.2289
Y	0.1615	-0.3587	0.3985	-0.5141	0.3848	-0.3163	0.4310	-0.2396	0.4394	-0.2011	-0.4388	-0.0791	0.1220	0.4104	0.2289	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Nitrogen, Nitrite, and Nitrate
==

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	44
Number of Observations Used	34
Number of Observations with Missing Values	10

Number in Model	R-Square	Variables in Model
1	0.2643	X4
1	0.1931	X1X5
1	0.1925	X2X4
1	0.1858	X1X3
1	0.1684	X3X5
1	0.1588	X3
1	0.1481	X5
1	0.1287	X2
1	0.1000	X1X2
1	0.0574	X1X4
1	0.0524	X4X5
1	0.0405	X2X3
1	0.0261	X1
1	0.0149	X3X4
1	0.0063	X2X5
2	0.3983	X4 X1X5
2	0.3854	X4 X1X3
2	0.3646	X3 X3X5
2	0.3646	X5 X3X5
2	0.3646	X3 X5
2	0.3646	X5 X3X4
2	0.3646	X3 X3X4
2	0.3646	X3 X4
2	0.3646	X4 X5
2	0.3646	X4 X3X4
2	0.3646	X4 X4X5
2	0.3646	X4 X3X5
2	0.3646	X3X4 X3X5
2	0.3646	X3X4 X4X5
2	0.3646	X3 X4X5
3	0.4292	X1 X1X3 X3X4
3	0.4286	X1 X1X5 X3X4
3	0.4268	X4 X1X2 X1X5
3	0.4266	X4 X1X3 X1X5
3	0.4249	X1 X4 X1X5
3	0.4244	X1 X4 X1X3

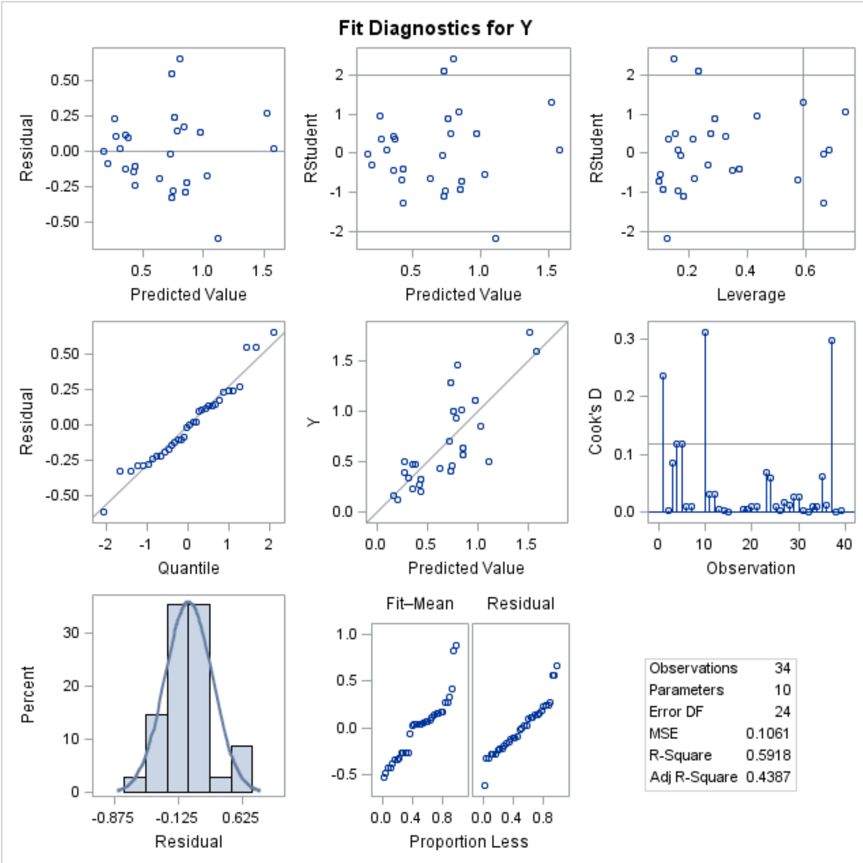
3	0.4237	X4 X1X2 X1X3
3	0.4230	X1X3 X1X5 X3X4
3	0.4130	X4 X1X4 X1X5
3	0.4117	X4 X1X5 X2X5
3	0.4111	X1X4 X1X5 X3X4
3	0.4104	X4 X2X3 X2X5
3	0.4085	X2 X4 X2X5
3	0.4072	X4 X1X3 X1X4
3	0.4025	X1X4 X1X5 X4X5
4	0.5092	X2 X1X5 X2X5 X3X4
4	0.5076	X2 X1X5 X2X3 X3X4
4	0.5027	X1X5 X2X3 X2X5 X3X4
4	0.4922	X1X2 X1X5 X2X5 X3X4
4	0.4909	X1X2 X1X3 X2X5 X3X4
4	0.4791	X2 X1X5 X2X3 X4X5
4	0.4789	X2 X1X3 X2X5 X3X4
4	0.4779	X2 X1X3 X2X3 X3X4
4	0.4760	X1 X4 X1X2 X2X3
4	0.4758	X1 X4 X1X2 X2X5
4	0.4711	X1X3 X2X3 X2X5 X3X4
4	0.4658	X2 X1X5 X2X5 X4X5
4	0.4635	X4 X1X2 X1X3 X2X5
4	0.4610	X4 X1X2 X1X3 X2X3
4	0.4607	X4 X1X2 X1X5 X2X5
5	0.5762	X1X2 X1X5 X2X3 X2X4 X4X5
5	0.5744	X1X2 X1X5 X2X4 X2X5 X4X5
5	0.5739	X1X2 X1X3 X2X3 X2X4 X4X5
5	0.5704	X1X2 X1X5 X2X4 X2X5 X3X4
5	0.5687	X1X3 X1X5 X2X4 X2X5 X4X5
5	0.5666	X1X2 X1X3 X2X4 X2X5 X3X4
5	0.5662	X1X2 X1X3 X2X4 X2X5 X4X5
5	0.5657	X2 X1X3 X1X5 X2X3 X3X4
5	0.5644	X1X2 X1X5 X2X3 X2X4 X3X4
5	0.5643	X1X2 X1X3 X2X3 X2X4 X3X4
5	0.5634	X5 X1X2 X1X5 X2X3 X2X4
5	0.5601	X1 X2 X1X5 X2X3 X3X4
5	0.5593	X1 X2 X1X5 X2X3 X4X5
5	0.5591	X5 X1X2 X1X3 X2X3 X2X4
5	0.5586	X1 X2 X1X5 X2X5 X3X4
6	0.5822	X1X2 X1X3 X1X5 X2X4 X2X5 X4X5
6	0.5809	X1X2 X1X4 X1X5 X2X3 X2X4 X4X5
6	0.5807	X1 X1X3 X1X4 X2X4 X2X5 X3X4
6	0.5807	X1 X1X4 X1X5 X2X4 X2X5 X3X4
6	0.5807	X1 X1X3 X1X5 X2X4 X2X5 X3X4
6	0.5798	X1 X1X2 X1X5 X2X4 X2X5 X4X5
6	0.5793	X2 X1X2 X1X5 X2X3 X2X4 X4X5
6	0.5793	X2 X1X2 X1X5 X2X3 X2X5 X4X5
6	0.5793	X1X2 X1X5 X2X3 X2X4 X2X5 X4X5
6	0.5793	X2 X1X2 X1X5 X2X4 X2X5 X4X5
6	0.5789	X3 X1X2 X1X5 X2X3 X2X4 X3X5
6	0.5789	X3 X5 X1X2 X1X5 X2X3 X2X4
6		

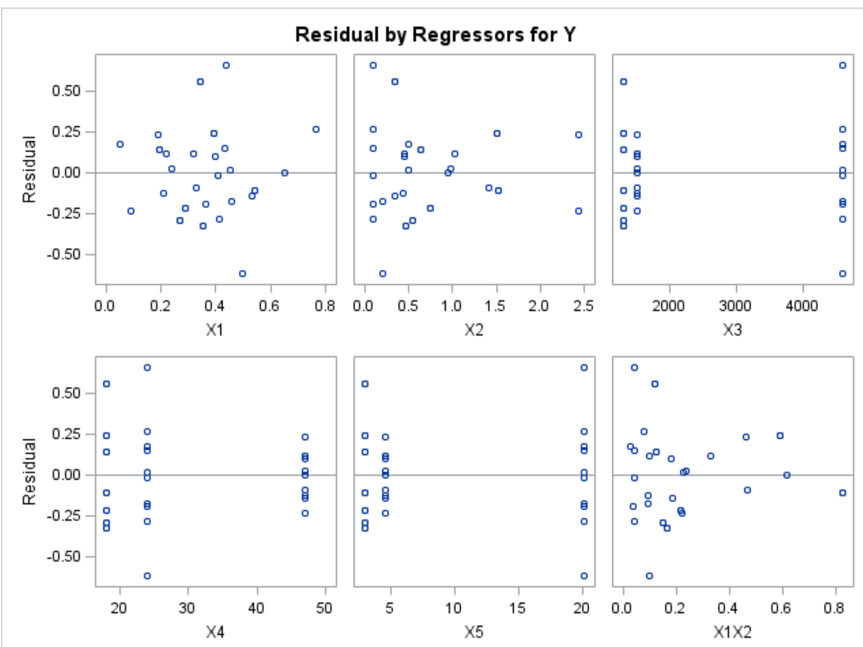
	0.5789	X5 X1X2 X1X5 X2X3 X2X4 X3X5
6	0.5789	X1X2 X1X5 X2X3 X2X4 X3X5 X4X5
6	0.5789	X4 X1X2 X1X5 X2X3 X2X4 X3X4
7	0.5912	X1 X1X2 X1X3 X1X4 X2X3 X2X4 X3X4
7	0.5912	X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4
7	0.5912	X1 X1X2 X1X3 X1X5 X2X3 X2X4 X3X4
7	0.5893	X1 X1X2 X1X3 X1X4 X2X3 X2X4 X4X5
7	0.5893	X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X4X5
7	0.5893	X1 X1X2 X1X3 X1X5 X2X3 X2X4 X4X5
7	0.5874	X1 X1X2 X1X3 X1X4 X2X4 X2X5 X3X4
7	0.5874	X1 X1X2 X1X4 X1X5 X2X4 X2X5 X3X4
7	0.5874	X1 X1X2 X1X3 X1X5 X2X4 X2X5 X3X4
7	0.5848	X1 X1X2 X1X3 X1X4 X2X4 X2X5 X4X5
7	0.5848	X1 X1X2 X1X4 X1X5 X2X4 X2X5 X4X5
7	0.5848	X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X4X5
7	0.5848	X1 X1X2 X1X3 X1X5 X2X4 X2X5 X4X5
7	0.5825	X2 X1X2 X1X3 X1X5 X2X3 X2X5 X4X5
7	0.5825	X2 X1X2 X1X3 X1X5 X2X4 X2X5 X4X5
8	0.5916	X1 X3 X5 X1X2 X1X3 X1X4 X2X3 X2X4
8	0.5916	X1 X3 X5 X1X2 X1X3 X1X5 X2X3 X2X4
8	0.5916	X1 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X3X4
8	0.5916	X1 X3 X1X2 X1X3 X1X4 X2X3 X2X4 X3X4
8	0.5916	X1 X1X2 X1X3 X1X4 X2X3 X2X4 X3X4 X4X5
8	0.5916	X1 X4 X1X2 X1X3 X1X5 X2X3 X2X4 X3X5
8	0.5916	X1 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4
8	0.5916	X1 X3 X4 X1X2 X1X3 X1X5 X2X3 X2X4
8	0.5916	X1 X4 X1X2 X1X3 X1X5 X2X3 X2X4 X4X5
8	0.5916	X1 X3 X1X2 X1X3 X1X5 X2X3 X2X4 X4X5
8	0.5916	X1 X4 X1X2 X1X3 X1X5 X2X3 X2X4 X3X4
8	0.5916	X1 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X4X5
8	0.5916	X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X5
8	0.5916	X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4
8	0.5916	X3 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4
9	0.5918	X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4
9	0.5918	X1 X2 X3 X5 X1X2 X1X3 X1X5 X2X3 X2X4
9	0.5918	X1 X2 X3 X5 X1X2 X1X3 X1X5 X2X3 X2X5
9	0.5918	X1 X2 X3 X5 X1X2 X1X3 X1X4 X2X3 X2X5
9	0.5918	X1 X2 X5 X1X2 X1X3 X1X4 X2X3 X2X5 X4X5
9	0.5918	X1 X2 X3 X5 X1X2 X1X3 X1X5 X2X4 X2X5
9	0.5918	X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5
9	0.5918	X1 X3 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5
9	0.5918	X1 X2 X3 X5 X1X2 X1X3 X1X4 X2X4 X2X5
9	0.5918	X1 X3 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5
9	0.5918	X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5
9	0.5918	X1 X2 X3 X5 X1X2 X1X4 X1X5 X2X4 X2X5
9	0.5918	X1 X3 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5
9	0.5918	X1 X2 X3 X5 X1X2 X1X4 X1X5 X2X3 X2X4
9	0.5918	X1 X2 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X4X5

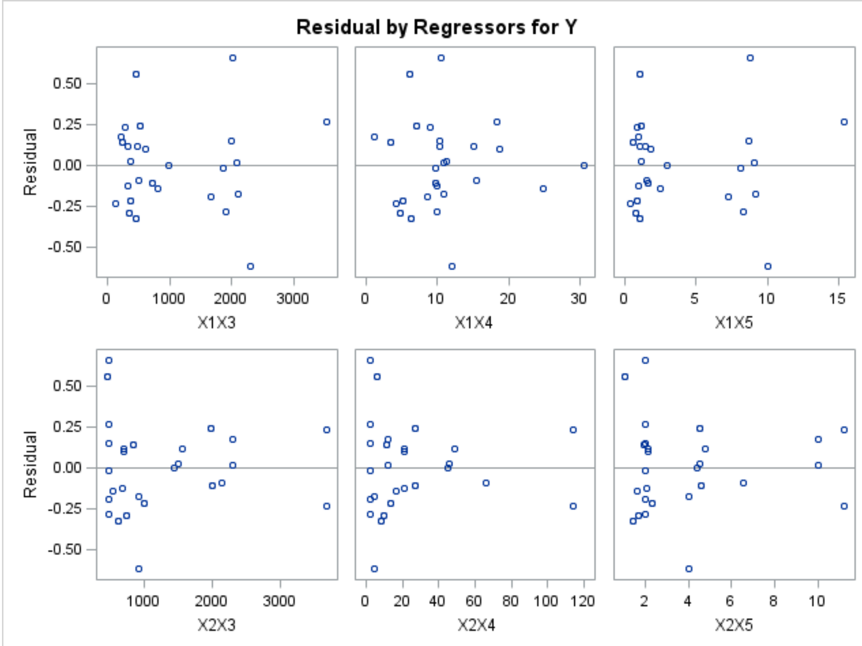
Note: Models of not full rank are not included.

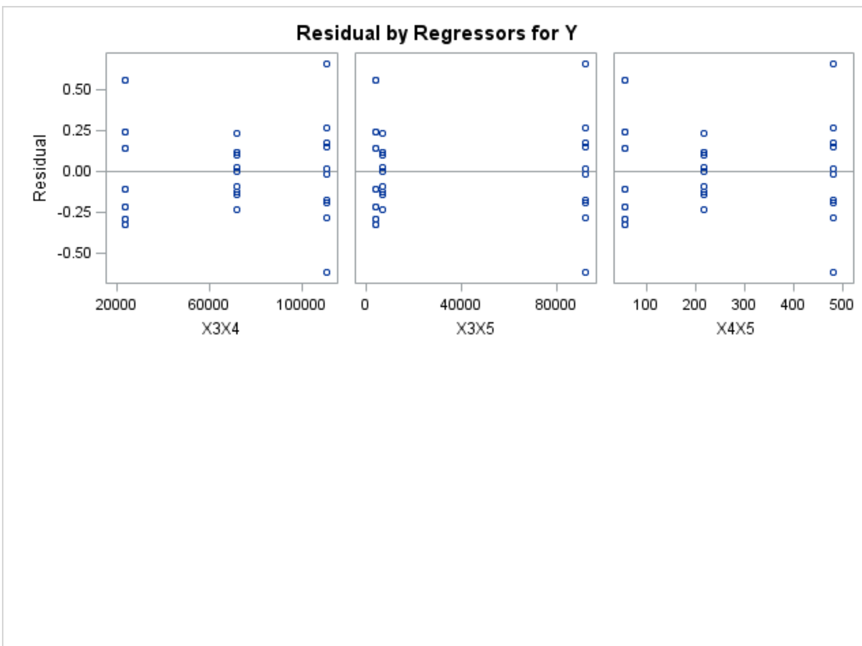
===
MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Nitrogen, Nitrite, and Nitrate
===

The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
0.50
0.25
0.00
-0.25
-0.50
0 1000 2000 3000
X1X3
0 10 20 30
X1X4
0 5 10 15
X1X5
1000 2000 3000
X2X3
0 20 40 60 80 100 120
X2X4
2 4 6 8 10
X2X5


Residual by Regressors for Y
Residual
0.50
0.25
0.00
-0.25
-0.50
20000 60000 100000
X3X4
0 40000 80000
X3X5
100 200 300 400 500
X4X5

FORWARD REGRESSION
Pollutant: Nitrogen, Nitrite, and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	283
Number of Observations Used	162
Number of Observations with Missing Values	121

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.1671	-0.1414	-0.2263	-0.0389	0.1701	0.3653	0.7341	0.5510	-0.0505	0.1487	0.0886	-0.1856	-0.0841	-0.1062	0.3920
X2	0.1671	1.0000	-0.0737	-0.1854	-0.0838	1.0000	-0.0545	-0.0867	-0.0656	0.7295	0.9977	0.9185	-0.0823	-0.0357	-0.0894	-0.0539
X3	-0.1414	-0.0737	1.0000	-0.1200	0.9004	-0.0735	0.6783	-0.1601	0.5551	0.3386	-0.0831	0.1255	0.9588	0.9897	0.7449	-0.1237
X4	-0.2263	-0.1854	-0.1200	1.0000	0.0028	-0.1856	-0.1269	0.4145	-0.0909	-0.1990	-0.1494	-0.1363	0.1504	-0.1155	0.4003	-0.2783
X5	-0.0389	-0.0838	0.9004	0.0028	1.0000	-0.0831	0.6263	-0.0082	0.6581	0.2947	-0.0890	0.1604	0.8841	0.9364	0.9073	-0.0528
X1X2	0.1701	1.0000	-0.0735	-0.1856	-0.0831	1.0000	-0.0530	-0.0843	-0.0636	0.7268	0.9974	0.9173	-0.0820	-0.0352	-0.0889	-0.0520
X1X3	0.3653	-0.0545	0.6783	-0.1269	0.6263	-0.0530	1.0000	0.2902	0.9134	0.1530	-0.0672	0.0538	0.6412	0.6845	0.5033	0.0419
X1X4	0.7341	-0.0867	-0.1601	0.4145	-0.0082	-0.0843	0.2902	1.0000	0.4601	-0.2326	-0.0812	-0.1068	-0.0411	-0.1160	0.1712	0.1215
X1X5	0.5510	-0.0656	0.5551	-0.0909	0.6581	-0.0636	0.9134	0.4601	1.0000	0.1005	-0.0773	0.0665	0.5233	0.5998	0.5665	0.1717
X2X3	-0.0505	0.7295	0.3386	-0.1990	0.2947	0.7268	0.1530	-0.2326	0.1005	1.0000	0.7468	0.9113	0.3109	0.3527	0.2295	-0.2083
X2X4	0.1487	0.9977	-0.0831	-0.1494	-0.0890	0.9974	-0.0672	-0.0812	-0.0773	0.7468	1.0000	0.9294	-0.0823	-0.0455	-0.0784	-0.0747
X2X5	0.0886	0.9185	0.1255	-0.1363	0.1604	0.9173	0.0538	-0.1068	0.0665	0.9113	0.9294	1.0000	0.1210	0.1690	0.1536	-0.1212
X3X4	-0.1856	-0.0823	0.9588	0.1504	0.8841	-0.0820	0.6412	-0.0411	0.5233	0.3109	-0.0823	0.1210	1.0000	0.9461	0.8346	-0.1868
X3X5	-0.0841	-0.0357	0.9897	-0.1155	0.9364	-0.0352	0.6845	-0.1160	0.5998	0.3527	-0.0455	0.1690	0.9461	1.0000	0.7854	-0.0939
X4X5	-0.1062	-0.0894	0.7449	0.4003	0.9073	-0.0889	0.5033	0.1712	0.5665	0.2295	-0.0784	0.1536	0.8346	0.7854	1.0000	-0.1609
Y	0.3920	-0.0539	-0.1237	-0.2783	-0.0528	-0.0520	0.0419	0.1215	0.1717	-0.2083	-0.0747	-0.1212	-0.1868	-0.0939	-0.1609	1.0000

FORWARD REGRESSION
Pollutant: Nitrogen, Nitrite, and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	283
Number of Observations Used	162
Number of Observations with Missing Values	121

Forward Selection: Step 1

Variable X1 Entered: R-Square = 0.1537 and C(p) = 47.6174

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	15.61730	15.61730	29.06	<.0001
Error	160	86.00031	0.53750		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.19960	0.10163	2.07338	3.86	0.0513
X1	1.27051	0.23570	15.61730	29.06	<.0001

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X1X4 Entered: R-Square = 0.2137 and C(p) = 35.0466

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	21.71159	10.85579	21.60	<.0001
Error	159	79.90602	0.50255		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.32541	0.10470	4.85485	9.66	0.0022

X1	2.12840	0.33561	20.21238	40.22	<.0001
X1X4	-0.04561	0.01310	6.09429	12.13	0.0006

Bounds on condition number: 2.1684, 8.6736

Forward Selection: Step 3

Variable X2X3 Entered: R-Square = 0.2870 and C(p) = 19.2234

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	29.16623	9.72208	21.20	<.0001
Error	158	72.45138	0.45855		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.52003	0.11105	10.05601	21.93	<.0001
X1	2.36782	0.32603	24.18569	52.74	<.0001
X1X4	-0.06080	0.01307	9.92951	21.65	<.0001
X2X3	-0.00009315	0.00002310	7.45464	16.26	<.0001

Bounds on condition number: 2.3651, 17.104

Forward Selection: Step 4

Variable X4X5 Entered: R-Square = 0.2926 and C(p) = 19.8709

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	29.73191	7.43298	16.23	<.0001
Error	157	71.88570	0.45787		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.46946	0.11993	7.01552	15.32	0.0001
X1	2.53616	0.35928	22.81606	49.83	<.0001
X1X4	-0.06843	0.01475	9.85394	21.52	<.0001
X2X3	-0.00010348	0.00002488	7.91717	17.29	<.0001
X4X5	0.00048574	0.00043701	0.56568	1.24	0.2680

Bounds on condition number: 3.0189, 33.509

Forward Selection: Step 5

Variable X1X3 Entered: R-Square = 0.3053 and C(p) = 18.7714

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	31.02829	6.20566	13.71	<.0001
Error	156	70.58932	0.45250		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.40951	0.12438	4.90548	10.84	0.0012
X1	2.86437	0.40640	22.47817	49.68	<.0001
X1X3	-0.00016868	0.00009966	1.29638	2.86	0.0925
X1X4	-0.07442	0.01509	11.01307	24.34	<.0001
X2X3	-0.00010502	0.00002475	8.14417	18.00	<.0001
X4X5	0.00103	0.00054070	1.64393	3.63	0.0585

Bounds on condition number: 3.5314, 59.862

Forward Selection: Step 6

Variable X1X5 Entered: R-Square = 0.3158 and C(p) = 18.2392

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	32.08738	5.34790	11.92	<.0001
Error	155	69.53023	0.44858		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.53599	0.14870	5.82844	12.99	0.0004
X1	2.23528	0.57564	6.76410	15.08	0.0002
X1X3	-0.00046987	0.00021970	2.05180	4.57	0.0340
X1X4	-0.06751	0.01568	8.31744	18.54	<.0001
X1X5	0.15198	0.09891	1.05909	2.36	0.1264
X2X3	-0.00009355	0.00002575	5.91917	13.20	0.0004
X4X5	0.00021055	0.00075806	0.03460	0.08	0.7816

Bounds on condition number: 18.33, 262.06

Forward Selection: Step 7

Variable X3X4 Entered: R-Square = 0.3214 and C(p) = 18.8786

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	32.65645	4.66521	10.42	<.0001
Error	154	68.96116	0.44780		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.52295	0.14902	5.51480	12.32	0.0006
X1	2.01157	0.60841	4.89509	10.93	0.0012
X1X3	-0.00076635	0.00034257	2.24101	5.00	0.0267
X1X4	-0.06009	0.01699	5.59967	12.50	0.0005
X1X5	0.24372	0.12802	1.62299	3.62	0.0588
X2X3	-0.00009243	0.00002575	5.77016	12.89	0.0004
X3X4	0.00000467	0.00000414	0.56907	1.27	0.2614
X4X5	-0.00109	0.00138	0.27971	0.62	0.4305

Bounds on condition number: 30.762, 636.41

Forward Selection: Step 8

Variable X3 Entered: R-Square = 0.3320 and C(p) = 18.2942

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	33.73741	4.21718	9.51	<.0001
Error	153	67.88020	0.44366		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.56033	0.15025	6.17059	13.91	0.0003
X1	2.46581	0.67188	5.97560	13.47	0.0003
X3	-0.00029427	0.00018852	1.08095	2.44	0.1206
X1X3	-0.00075759	0.00034103	2.18947	4.94	0.0278
X1X4	-0.08619	0.02378	5.82634	13.13	0.0004
X1X5	0.26238	0.12799	1.86462	4.20	0.0421
X2X3	-0.00009894	0.00002597	6.44049	14.52	0.0002
X3X4	0.00001644	0.00000860	1.62340	3.66	0.0576
X4X5	-0.00121	0.00138	0.34287	0.77	0.3807

Bounds on condition number: 45.541, 1354.4

Forward Selection: Step 9

Variable X4 Entered: R-Square = 0.3441 and C(p) = 17.3564

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	9	34.96617	3.88513	8.86	<.0001
Error	152	66.65144	0.43850		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.70455	0.69966	2.60262	5.94	0.0160
X1	1.86931	0.75707	2.67337	6.10	0.0147
X3	-0.00096219	0.00044083	2.08904	4.76	0.0306
X4	-0.04521	0.02701	1.22876	2.80	0.0962
X1X3	-0.00057127	0.00035684	1.12384	2.56	0.1115
X1X4	-0.06287	0.02744	2.30174	5.25	0.0233
X1X5	0.19710	0.13308	0.96185	2.19	0.1407
X2X3	-0.00011551	0.00002765	7.65339	17.45	<.0001
X3X4	0.00003947	0.00001620	2.60482	5.94	0.0160
X4X5	0.00041381	0.00168	0.02667	0.06	0.8056

Bounds on condition number: 205.35, 4540.6

Forward Selection: Step 10

Variable X3X5 Entered: R-Square = 0.3494 and C(p) = 18.0687

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	10	35.50474	3.55047	8.11	<.0001
Error	151	66.11287	0.43783		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.27922	0.87021	3.00355	6.86	0.0097
X1	1.51366	0.82165	1.48589	3.39	0.0674
X3	-0.00148	0.00064166	2.32822	5.32	0.0225
X4	-0.05147	0.02757	1.52593	3.49	0.0639
X1X3	-0.00054974	0.00035710	1.03763	2.37	0.1258
X1X4	-0.05434	0.02848	1.59430	3.64	0.0583
X1X5	0.19691	0.13298	0.95997	2.19	0.1408
X2X3	-0.00012056	0.00002800	8.11649	18.54	<.0001
X3X4	0.00004632	0.00001732	3.13114	7.15	0.0083

X3X5	0.00001760	0.00001587	0.53857	1.23	0.2692
X4X5	-0.00036859	0.00182	0.01797	0.04	0.8397

Bounds on condition number: 435.73, 9049.5

Forward Selection: Step 11

Variable X5 Entered: R-Square = 0.3547 and C(p) = 18.7790

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	36.04415	3.27674	7.50	<.0001
Error	150	65.57346	0.43716		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.32624	1.28239	2.94104	6.73	0.0104
X1	1.19091	0.87091	0.81742	1.87	0.1735
X3	-0.00183	0.00071559	2.86724	6.56	0.0114
X4	-0.08280	0.03942	1.92808	4.41	0.0374
X5	-0.13454	0.12112	0.53941	1.23	0.2684
X1X3	-0.00070511	0.00038326	1.47968	3.38	0.0678
X1X4	-0.05020	0.02870	1.33749	3.06	0.0823
X1X5	0.26154	0.14506	1.42112	3.25	0.0734
X2X3	-0.00013969	0.00003285	7.90270	18.08	<.0001
X3X4	0.00005721	0.00001989	3.61604	8.27	0.0046
X3X5	0.00002779	0.00001832	1.00597	2.30	0.1314
X4X5	0.00324	0.00372	0.33091	0.76	0.3857

Bounds on condition number: 542.77, 15339

Forward Selection: Step 12

Variable X2X4 Entered: R-Square = 0.3802 and C(p) = 14.5738

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	12	38.63952	3.21996	7.62	<.0001
Error	149	62.97809	0.42267		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	6.42620	1.77624	5.53230	13.09	0.0004

X1	1.37163	0.85946	1.07653	2.55	0.1126
X3	-0.00378	0.00105	5.42802	12.84	0.0005
X4	-0.17280	0.05312	4.47228	10.58	0.0014
X5	-0.39274	0.15825	2.60352	6.16	0.0142
X1X3	-0.00039871	0.00039662	0.42714	1.01	0.3164
X1X4	-0.06052	0.02853	1.90258	4.50	0.0355
X1X5	0.15586	0.14888	0.46324	1.10	0.2968
X2X3	-0.00006699	0.00004364	0.99591	2.36	0.1269
X2X4	-0.00129	0.00052151	2.59537	6.14	0.0143
X3X4	0.00010314	0.00002695	6.19219	14.65	0.0002
X3X5	0.00006896	0.00002451	3.34698	7.92	0.0056
X4X5	0.01184	0.00504	2.32993	5.51	0.0202

Bounds on condition number: 1218.8, 32817

Forward Selection: Step 13

Variable X2X5 Entered: R-Square = 0.3932 and C(p) = 13.4333

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	39.95302	3.07331	7.38	<.0001
Error	148	61.66459	0.41665		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	6.52819	1.76449	5.70325	13.69	0.0003
X1	1.51834	0.85731	1.30688	3.14	0.0786
X3	-0.00368	0.00105	5.13032	12.31	0.0006
X4	-0.17626	0.05278	4.64697	11.15	0.0011
X5	-0.44004	0.15936	3.17704	7.63	0.0065
X1X3	-0.00036770	0.00039418	0.36256	0.87	0.3524
X1X4	-0.06471	0.02842	2.16002	5.18	0.0242
X1X5	0.13535	0.14826	0.34723	0.83	0.3628
X2X3	-0.00025163	0.00011266	2.07860	4.99	0.0270
X2X4	-0.00302	0.00110	3.12845	7.51	0.0069
X2X5	0.06465	0.03641	1.31350	3.15	0.0779
X3X4	0.00010595	0.00002680	6.51075	15.63	0.0001
X3X5	0.00006714	0.00002435	3.16709	7.60	0.0066
X4X5	0.01196	0.00501	2.37547	5.70	0.0182

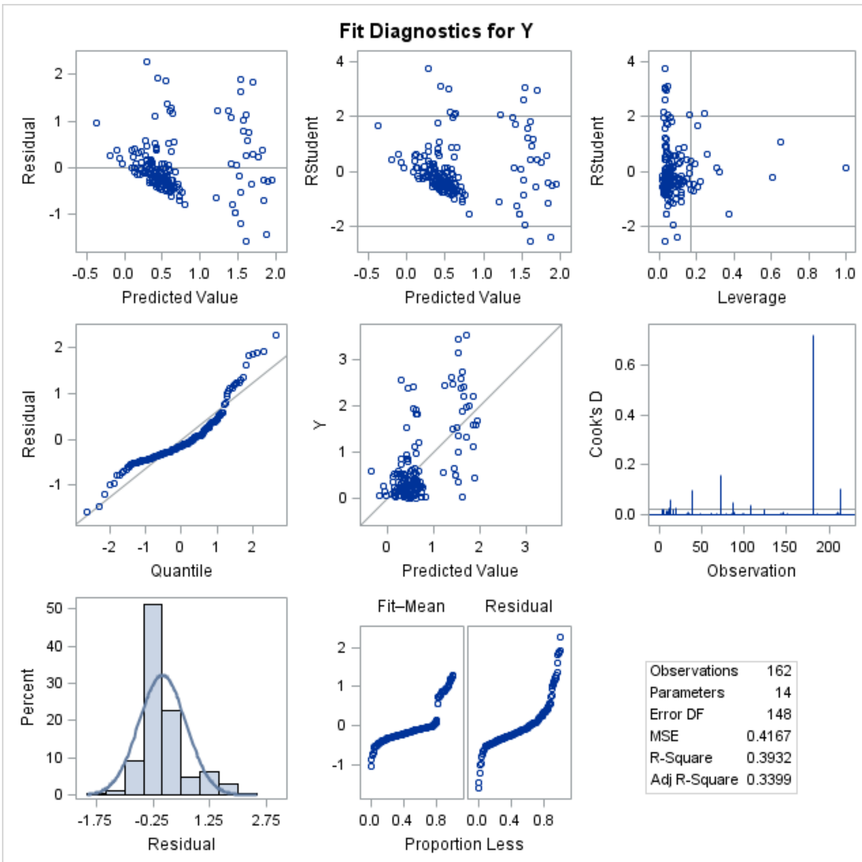
Bounds on condition number: 1222.3, 37865

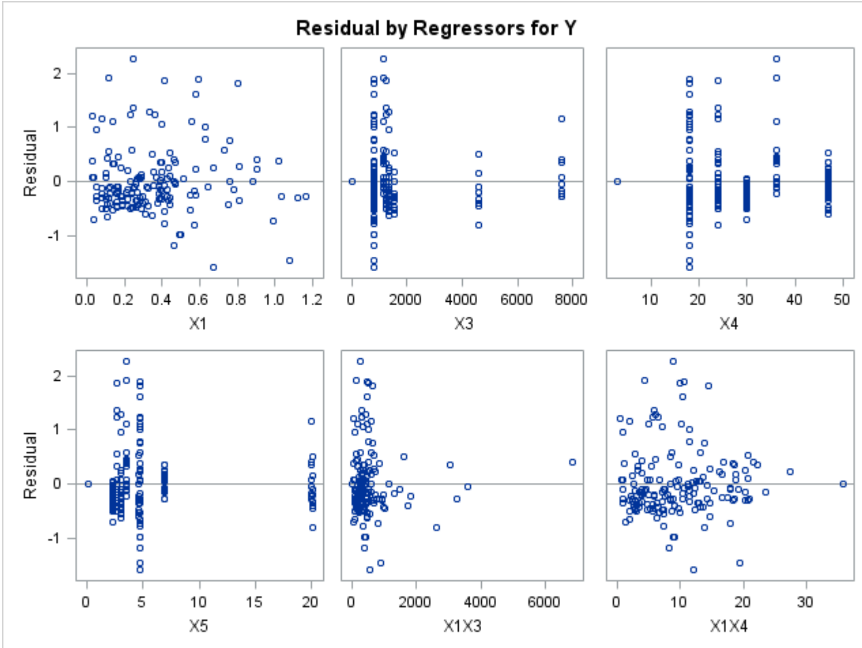
No other variable met the 0.5000 significance level for entry into the model.

Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1	1	0.1537	0.1537	47.6174	29.06	<.0001
2	X1X4	2	0.0600	0.2137	35.0466	12.13	0.0006
3	X2X3	3	0.0734	0.2870	19.2234	16.26	<.0001
4	X4X5	4	0.0056	0.2926	19.8709	1.24	0.2680
5	X1X3	5	0.0128	0.3053	18.7714	2.86	0.0925
6	X1X5	6	0.0104	0.3158	18.2392	2.36	0.1264
7	X3X4	7	0.0056	0.3214	18.8786	1.27	0.2614
8	X3	8	0.0106	0.3320	18.2942	2.44	0.1206
9	X4	9	0.0121	0.3441	17.3564	2.80	0.0962
10	X3X5	10	0.0053	0.3494	18.0687	1.23	0.2692
11	X5	11	0.0053	0.3547	18.7790	1.23	0.2684
12	X2X4	12	0.0255	0.3802	14.5738	6.14	0.0143
13	X2X5	13	0.0129	0.3932	13.4333	3.15	0.0779

FORWARD REGRESSION
Pollutant: Nitrogen, Nitrite, and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

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Residual
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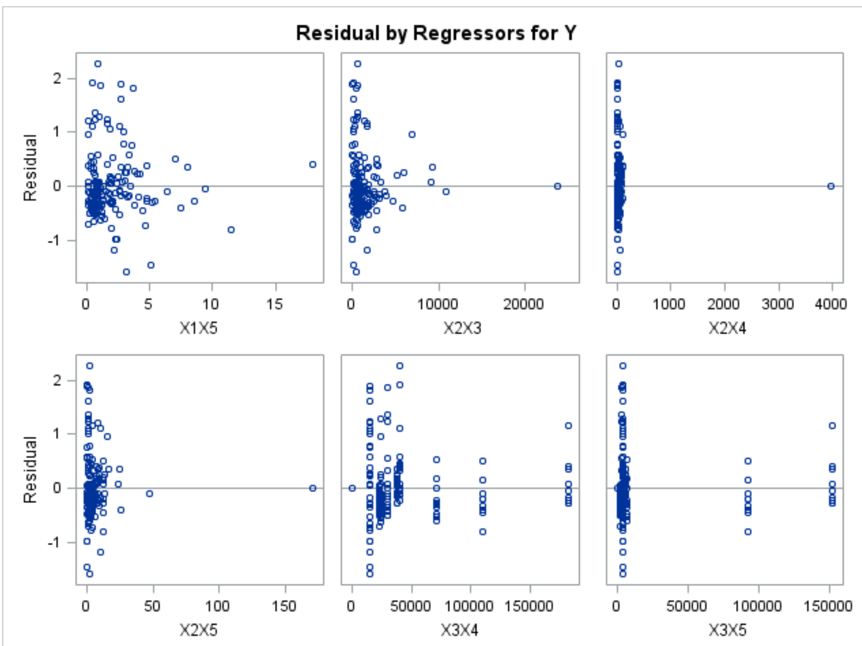
X3
X4
X5
X1X3
X1X4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Residual
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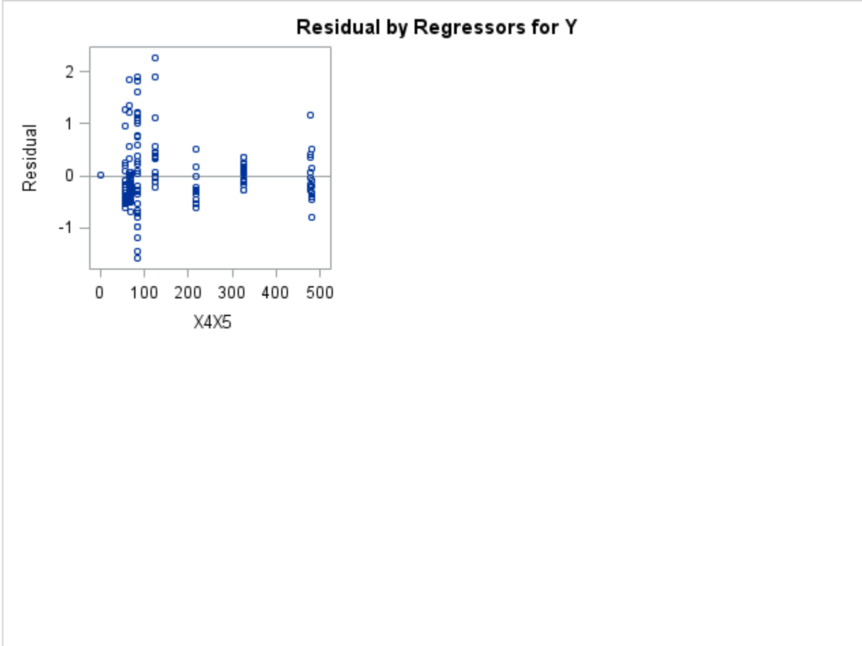
X2X3
X2X4
X2X5
X3X4
X3X5


Residual by Regressors for Y
Residual
2
1
0
-1
0
100
200
300
400
500
X4X5

BACKWARD REGRESSION
Pollutant: Nitrogen, Nitrite, and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	283
Number of Observations Used	162
Number of Observations with Missing Values	121

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.1671	-0.1414	-0.2263	-0.0389	0.1701	0.3653	0.7341	0.5510	-0.0505	0.1487	0.0886	-0.1856	-0.0841	-0.1062	0.3920
X2	0.1671	1.0000	-0.0737	-0.1854	-0.0838	1.0000	-0.0545	-0.0867	-0.0656	0.7295	0.9977	0.9185	-0.0823	-0.0357	-0.0894	-0.0539
X3	-0.1414	-0.0737	1.0000	-0.1200	0.9004	-0.0735	0.6783	-0.1601	0.5551	0.3386	-0.0831	0.1255	0.9588	0.9897	0.7449	-0.1237
X4	-0.2263	-0.1854	-0.1200	1.0000	0.0028	-0.1856	-0.1269	0.4145	-0.0909	-0.1990	-0.1494	-0.1363	0.1504	-0.1155	0.4003	-0.2783
X5	-0.0389	-0.0838	0.9004	0.0028	1.0000	-0.0831	0.6263	-0.0082	0.6581	0.2947	-0.0890	0.1604	0.8841	0.9364	0.9073	-0.0528
X1X2	0.1701	1.0000	-0.0735	-0.1856	-0.0831	1.0000	-0.0530	-0.0843	-0.0636	0.7268	0.9974	0.9173	-0.0820	-0.0352	-0.0889	-0.0520
X1X3	0.3653	-0.0545	0.6783	-0.1269	0.6263	-0.0530	1.0000	0.2902	0.9134	0.1530	-0.0672	0.0538	0.6412	0.6845	0.5033	0.0419
X1X4	0.7341	-0.0867	-0.1601	0.4145	-0.0082	-0.0843	0.2902	1.0000	0.4601	-0.2326	-0.0812	-0.1068	-0.0411	-0.1160	0.1712	0.1215
X1X5	0.5510	-0.0656	0.5551	-0.0909	0.6581	-0.0636	0.9134	0.4601	1.0000	0.1005	-0.0773	0.0665	0.5233	0.5998	0.5665	0.1717
X2X3	-0.0505	0.7295	0.3386	-0.1990	0.2947	0.7268	0.1530	-0.2326	0.1005	1.0000	0.7468	0.9113	0.3109	0.3527	0.2295	-0.2083
X2X4	0.1487	0.9977	-0.0831	-0.1494	-0.0890	0.9974	-0.0672	-0.0812	-0.0773	0.7468	1.0000	0.9294	-0.0823	-0.0455	-0.0784	-0.0747
X2X5	0.0886	0.9185	0.1255	-0.1363	0.1604	0.9173	0.0538	-0.1068	0.0665	0.9113	0.9294	1.0000	0.1210	0.1690	0.1536	-0.1212
X3X4	-0.1856	-0.0823	0.9588	0.1504	0.8841	-0.0820	0.6412	-0.0411	0.5233	0.3109	-0.0823	0.1210	1.0000	0.9461	0.8346	-0.1868
X3X5	-0.0841	-0.0357	0.9897	-0.1155	0.9364	-0.0352	0.6845	-0.1160	0.5998	0.3527	-0.0455	0.1690	0.9461	1.0000	0.7854	-0.0939
X4X5	-0.1062	-0.0894	0.7449	0.4003	0.9073	-0.0889	0.5033	0.1712	0.5665	0.2295	-0.0784	0.1536	0.8346	0.7854	1.0000	-0.1609
Y	0.3920	-0.0539	-0.1237	-0.2783	-0.0528	-0.0520	0.0419	0.1215	0.1717	-0.2083	-0.0747	-0.1212	-0.1868	-0.0939	-0.1609	1.0000

BACKWARD REGRESSION
Pollutant: Nitrogen, Nitrite, and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	283
Number of Observations Used	162
Number of Observations with Missing Values	121

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.3991 and C(p) = 16.0000

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	15	40.55252	2.70350	6.46	<.0001
Error	146	61.06509	0.41825		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	6.25620	1.78292	5.14986	12.31	0.0006
X1	1.85534	0.90557	1.75568	4.20	0.0423
X2	0.29933	0.25087	0.59544	1.42	0.2347
X3	-0.00365	0.00105	5.05507	12.09	0.0007
X4	-0.16856	0.05336	4.17372	9.98	0.0019
X5	-0.44941	0.16041	3.28309	7.85	0.0058
X1X2	-0.31751	0.26754	0.58910	1.41	0.2372
X1X3	-0.00036461	0.00039494	0.35648	0.85	0.3574
X1X4	-0.06799	0.02862	2.36122	5.65	0.0188
X1X5	0.12346	0.14898	0.28725	0.69	0.4086
X2X3	-0.00037447	0.00016395	2.18210	5.22	0.0238
X2X4	-0.01015	0.00701	0.87755	2.10	0.1496
X2X5	0.09444	0.04454	1.88064	4.50	0.0357
X3X4	0.00010714	0.00002689	6.63777	15.87	0.0001
X3X5	0.00006809	0.00002443	3.24782	7.77	0.0060
X4X5	0.01168	0.00504	2.24407	5.37	0.0219

Bounds on condition number: 257871, 7349500

Backward Elimination: Step 1

Variable X1X5 Removed: R-Square = 0.3962 and C(p) = 14.6868

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	14	40.26527	2.87609	6.89	<.0001
Error	147	61.35234	0.41736		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	6.35092	1.77736	5.32888	12.77	0.0005
X1	2.18666	0.81167	3.02916	7.26	0.0079
X2	0.31377	0.25000	0.65744	1.58	0.2114
X3	-0.00380	0.00103	5.65464	13.55	0.0003
X4	-0.17382	0.05293	4.50140	10.79	0.0013
X5	-0.43811	0.15966	3.14272	7.53	0.0068
X1X2	-0.33323	0.26658	0.65218	1.56	0.2133
X1X3	-0.00005658	0.00013335	0.07514	0.18	0.6720
X1X4	-0.07156	0.02826	2.67606	6.41	0.0124
X2X3	-0.00038251	0.00016348	2.28481	5.47	0.0206
X2X4	-0.01056	0.00698	0.95377	2.29	0.1328
X2X5	0.09834	0.04424	2.06223	4.94	0.0278
X3X4	0.00010927	0.00002674	6.96853	16.70	<.0001
X3X5	0.00006911	0.00002438	3.35437	8.04	0.0052
X4X5	0.01244	0.00496	2.62905	6.30	0.0132

Bounds on condition number: 256627, 6824144

Backward Elimination: Step 2

Variable X1X3 Removed: R-Square = 0.3955 and C(p) = 12.8664

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	40.19014	3.09155	7.45	<.0001
Error	148	61.42747	0.41505		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	6.53595	1.71825	6.00544	14.47	0.0002
X1	2.07486	0.76558	3.04861	7.35	0.0075
X2	0.29518	0.24545	0.60028	1.45	0.2310
X3	-0.00392	0.00099408	6.45725	15.56	0.0001
X4	-0.17794	0.05188	4.88251	11.76	0.0008
X5	-0.44482	0.15843	3.27182	7.88	0.0057

X1X2	-0.31288	0.26150	0.59418	1.43	0.2334
X1X4	-0.07168	0.02818	2.68550	6.47	0.0120
X2X3	-0.00036726	0.00015904	2.21323	5.33	0.0223
X2X4	-0.01030	0.00694	0.91452	2.20	0.1398
X2X5	0.09499	0.04341	1.98743	4.79	0.0302
X3X4	0.00011126	0.00002626	7.45154	17.95	<.0001
X3X5	0.00007110	0.00002386	3.68733	8.88	0.0034
X4X5	0.01274	0.00489	2.81443	6.78	0.0102

Bounds on condition number: 248741, 6137021

Backward Elimination: Step 3

Variable X1X2 Removed: R-Square = 0.3897 and C(p) = 12.2870

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	12	39.59596	3.29966	7.93	<.0001
Error	149	62.02165	0.41625		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	6.73099	1.71298	6.42706	15.44	0.0001
X1	1.81911	0.73620	2.54149	6.11	0.0146
X2	0.00188	0.01238	0.00956	0.02	0.8798
X3	-0.00391	0.00099545	6.41008	15.40	0.0001
X4	-0.18361	0.05174	5.24237	12.59	0.0005
X5	-0.43290	0.15835	3.11108	7.47	0.0070
X1X4	-0.06881	0.02812	2.49251	5.99	0.0156
X2X3	-0.00024278	0.00012047	1.69063	4.06	0.0457
X2X4	-0.00386	0.00439	0.32252	0.77	0.3801
X2X5	0.06624	0.03620	1.39339	3.35	0.0693
X3X4	0.00010908	0.00002623	7.19710	17.29	<.0001
X3X5	0.00006940	0.00002385	3.52511	8.47	0.0042
X4X5	0.01301	0.00489	2.94319	7.07	0.0087

Bounds on condition number: 1103.1, 47699

Backward Elimination: Step 4

Variable X2 Removed: R-Square = 0.3896 and C(p) = 10.3099

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	39.58640	3.59876	8.70	<.0001
Error	150	62.03121	0.41354		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	6.73408	1.70727	6.43388	15.56	0.0001
X1	1.81706	0.73367	2.53662	6.13	0.0144
X3	-0.00391	0.00099220	6.40963	15.50	0.0001
X4	-0.18430	0.05137	5.32274	12.87	0.0005
X5	-0.43104	0.15735	3.10305	7.50	0.0069
X1X4	-0.06863	0.02800	2.48408	6.01	0.0154
X2X3	-0.00024953	0.00011155	2.06931	5.00	0.0268
X2X4	-0.00322	0.00107	3.71042	8.97	0.0032
X2X5	0.06655	0.03602	1.41126	3.41	0.0667
X3X4	0.00010928	0.00002611	7.24371	17.52	<.0001
X3X5	0.00006929	0.00002376	3.51722	8.51	0.0041
X4X5	0.01295	0.00486	2.93543	7.10	0.0086

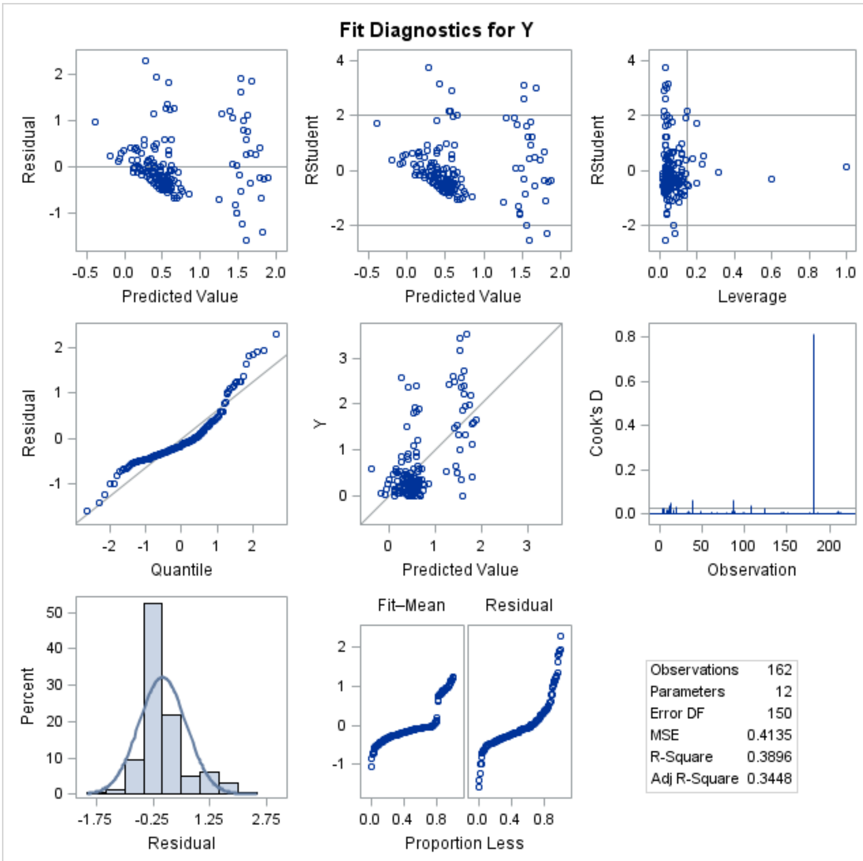
Bounds on condition number: 1103.1, 29193

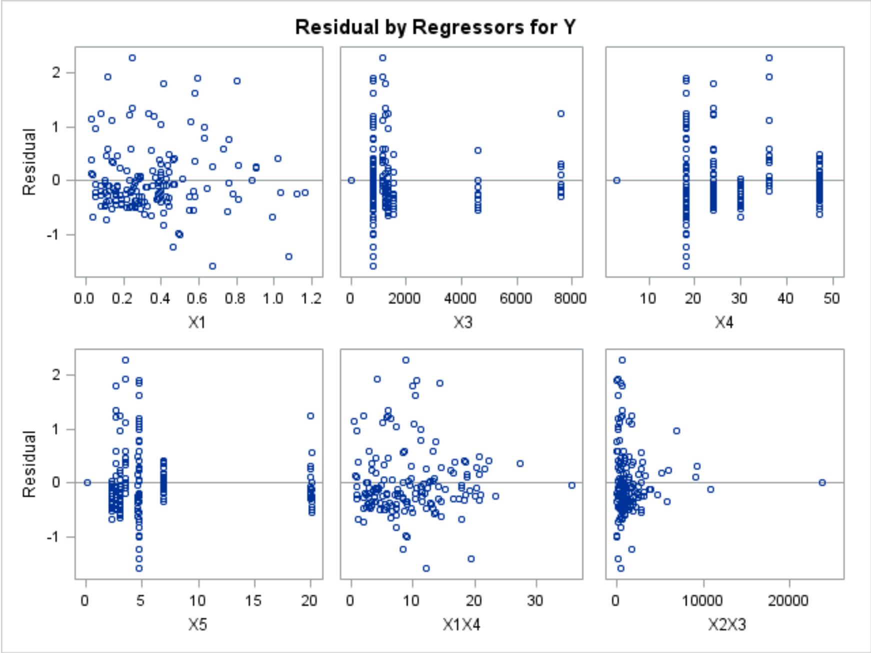
All variables left in the model are significant at the 0.1000 level.

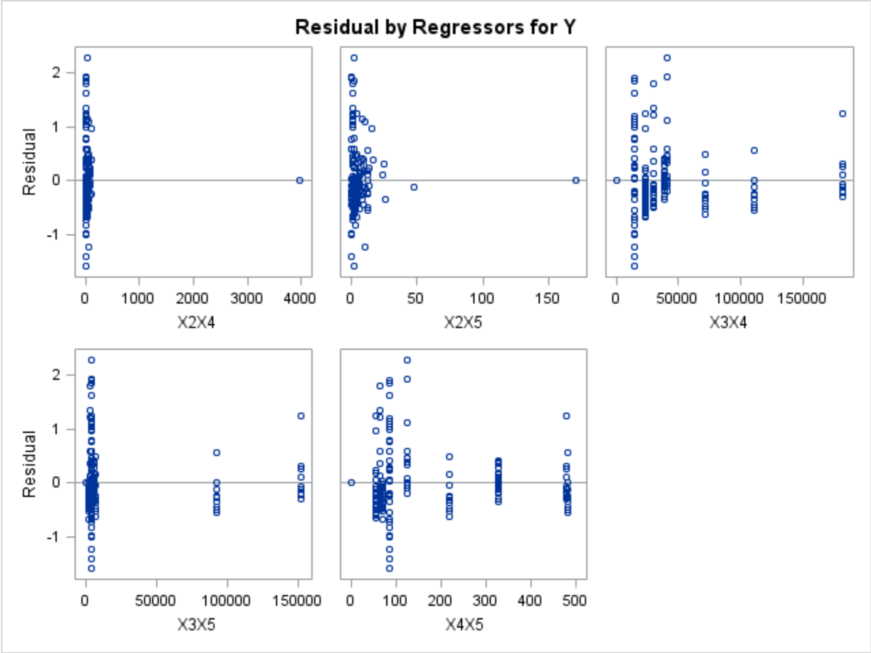
Summary of Backward Elimination							
Step	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	X1X5	14	0.0028	0.3962	14.6868	0.69	0.4086
2	X1X3	13	0.0007	0.3955	12.8664	0.18	0.6720
3	X1X2	12	0.0058	0.3897	12.2870	1.43	0.2334
4	X2	11	0.0001	0.3896	10.3099	0.02	0.8798

BACKWARD REGRESSION
Pollutant: Nitrogen, Nitrite, and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X1
X3
X4
X5
X1X4
X2X3


Residual by Regressors for Y
Residual
X2X4
X2X5
X3X4
X3X5
X4X5

STEPWISE REGRESSION
Pollutant: Nitrogen, Nitrite, and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	283
Number of Observations Used	162
Number of Observations with Missing Values	121

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.1671	-0.1414	-0.2263	-0.0389	0.1701	0.3653	0.7341	0.5510	-0.0505	0.1487	0.0886	-0.1856	-0.0841	-0.1062	0.3920
X2	0.1671	1.0000	-0.0737	-0.1854	-0.0838	1.0000	-0.0545	-0.0867	-0.0656	0.7295	0.9977	0.9185	-0.0823	-0.0357	-0.0894	-0.0539
X3	-0.1414	-0.0737	1.0000	-0.1200	0.9004	-0.0735	0.6783	-0.1601	0.5551	0.3386	-0.0831	0.1255	0.9588	0.9897	0.7449	-0.1237
X4	-0.2263	-0.1854	-0.1200	1.0000	0.0028	-0.1856	-0.1269	0.4145	-0.0909	-0.1990	-0.1494	-0.1363	0.1504	-0.1155	0.4003	-0.2783
X5	-0.0389	-0.0838	0.9004	0.0028	1.0000	-0.0831	0.6263	-0.0082	0.6581	0.2947	-0.0890	0.1604	0.8841	0.9364	0.9073	-0.0528
X1X2	0.1701	1.0000	-0.0735	-0.1856	-0.0831	1.0000	-0.0530	-0.0843	-0.0636	0.7268	0.9974	0.9173	-0.0820	-0.0352	-0.0889	-0.0520
X1X3	0.3653	-0.0545	0.6783	-0.1269	0.6263	-0.0530	1.0000	0.2902	0.9134	0.1530	-0.0672	0.0538	0.6412	0.6845	0.5033	0.0419
X1X4	0.7341	-0.0867	-0.1601	0.4145	-0.0082	-0.0843	0.2902	1.0000	0.4601	-0.2326	-0.0812	-0.1068	-0.0411	-0.1160	0.1712	0.1215
X1X5	0.5510	-0.0656	0.5551	-0.0909	0.6581	-0.0636	0.9134	0.4601	1.0000	0.1005	-0.0773	0.0665	0.5233	0.5998	0.5665	0.1717
X2X3	-0.0505	0.7295	0.3386	-0.1990	0.2947	0.7268	0.1530	-0.2326	0.1005	1.0000	0.7468	0.9113	0.3109	0.3527	0.2295	-0.2083
X2X4	0.1487	0.9977	-0.0831	-0.1494	-0.0890	0.9974	-0.0672	-0.0812	-0.0773	0.7468	1.0000	0.9294	-0.0823	-0.0455	-0.0784	-0.0747
X2X5	0.0886	0.9185	0.1255	-0.1363	0.1604	0.9173	0.0538	-0.1068	0.0665	0.9113	0.9294	1.0000	0.1210	0.1690	0.1536	-0.1212
X3X4	-0.1856	-0.0823	0.9588	0.1504	0.8841	-0.0820	0.6412	-0.0411	0.5233	0.3109	-0.0823	0.1210	1.0000	0.9461	0.8346	-0.1868
X3X5	-0.0841	-0.0357	0.9897	-0.1155	0.9364	-0.0352	0.6845	-0.1160	0.5998	0.3527	-0.0455	0.1690	0.9461	1.0000	0.7854	-0.0939
X4X5	-0.1062	-0.0894	0.7449	0.4003	0.9073	-0.0889	0.5033	0.1712	0.5665	0.2295	-0.0784	0.1536	0.8346	0.7854	1.0000	-0.1609
Y	0.3920	-0.0539	-0.1237	-0.2783	-0.0528	-0.0520	0.0419	0.1215	0.1717	-0.2083	-0.0747	-0.1212	-0.1868	-0.0939	-0.1609	1.0000

STEPWISE REGRESSION
Pollutant: Nitrogen, Nitrite, and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	283
Number of Observations Used	162
Number of Observations with Missing Values	121

Stepwise Selection: Step 1

Variable X1 Entered: R-Square = 0.1537 and C(p) = 47.6174

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	15.61730	15.61730	29.06	<.0001
Error	160	86.00031	0.53750		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.19960	0.10163	2.07338	3.86	0.0513
X1	1.27051	0.23570	15.61730	29.06	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X1X4 Entered: R-Square = 0.2137 and C(p) = 35.0466

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	21.71159	10.85579	21.60	<.0001
Error	159	79.90602	0.50255		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.32541	0.10470	4.85485	9.66	0.0022

X1	2.12840	0.33561	20.21238	40.22	<.0001
X1X4	-0.04561	0.01310	6.09429	12.13	0.0006

Bounds on condition number: 2.1684, 8.6736

Stepwise Selection: Step 3

Variable X2X3 Entered: R-Square = 0.2870 and C(p) = 19.2234

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	29.16623	9.72208	21.20	<.0001
Error	158	72.45138	0.45855		
Corrected Total	161	101.61761			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.52003	0.11105	10.05601	21.93	<.0001
X1	2.36782	0.32603	24.18569	52.74	<.0001
X1X4	-0.06080	0.01307	9.92951	21.65	<.0001
X2X3	-0.00009315	0.00002310	7.45464	16.26	<.0001

Bounds on condition number: 2.3651, 17.104

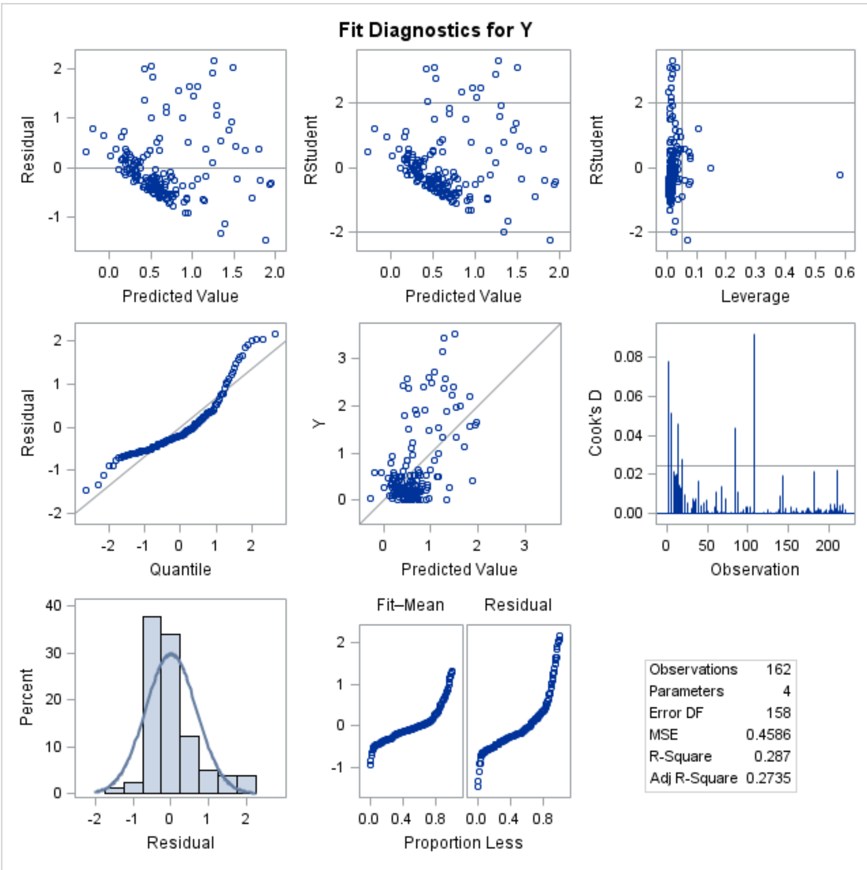
All variables left in the model are significant at the 0.1500 level.

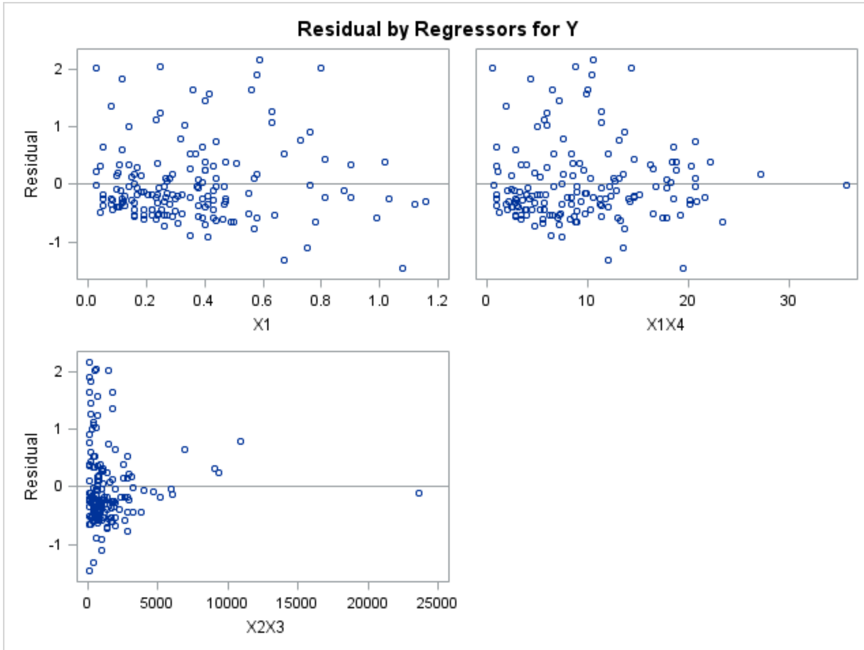
No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	X1		1	0.1537	0.1537	47.6174	29.06	<.0001
2	X1X4		2	0.0600	0.2137	35.0466	12.13	0.0006
3	X2X3		3	0.0734	0.2870	19.2234	16.26	<.0001

STEPWISE REGRESSION
Pollutant: Nitrogen, Nitrite, and Nitrate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X1
X1X4
X2X3
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0
10
20
30
5000
10000
15000
20000
25000
2
1
-1

==
MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Orthophosphate
==

The REG Procedure

Number of Observations Read	283
Number of Observations Used	162
Number of Observations with Missing Values	121

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.1671	-0.1414	-0.2263	-0.0389	0.1701	0.3653	0.7341	0.5510	-0.0505	0.1487	0.0886	-0.1856	-0.0841	-0.1062	0.3920
X2	0.1671	1.0000	-0.0737	-0.1854	-0.0838	1.0000	-0.0545	-0.0867	-0.0656	0.7295	0.9977	0.9185	-0.0823	-0.0357	-0.0894	-0.0539
X3	-0.1414	-0.0737	1.0000	-0.1200	0.9004	-0.0735	0.6783	-0.1601	0.5551	0.3386	-0.0831	0.1255	0.9588	0.9897	0.7449	-0.1237
X4	-0.2263	-0.1854	-0.1200	1.0000	0.0028	-0.1856	-0.1269	0.4145	-0.0909	-0.1990	-0.1494	-0.1363	0.1504	-0.1155	0.4003	-0.2783
X5	-0.0389	-0.0838	0.9004	0.0028	1.0000	-0.0831	0.6263	-0.0082	0.6581	0.2947	-0.0890	0.1604	0.8841	0.9364	0.9073	-0.0528
X1X2	0.1701	1.0000	-0.0735	-0.1856	-0.0831	1.0000	-0.0530	-0.0843	-0.0636	0.7268	0.9974	0.9173	-0.0820	-0.0352	-0.0889	-0.0520
X1X3	0.3653	-0.0545	0.6783	-0.1269	0.6263	-0.0530	1.0000	0.2902	0.9134	0.1530	-0.0672	0.0538	0.6412	0.6845	0.5033	0.0419
X1X4	0.7341	-0.0867	-0.1601	0.4145	-0.0082	-0.0843	0.2902	1.0000	0.4601	-0.2326	-0.0812	-0.1068	-0.0411	-0.1160	0.1712	0.1215
X1X5	0.5510	-0.0656	0.5551	-0.0909	0.6581	-0.0636	0.9134	0.4601	1.0000	0.1005	-0.0773	0.0665	0.5233	0.5998	0.5665	0.1717
X2X3	-0.0505	0.7295	0.3386	-0.1990	0.2947	0.7268	0.1530	-0.2326	0.1005	1.0000	0.7468	0.9113	0.3109	0.3527	0.2295	-0.2083
X2X4	0.1487	0.9977	-0.0831	-0.1494	-0.0890	0.9974	-0.0672	-0.0812	-0.0773	0.7468	1.0000	0.9294	-0.0823	-0.0455	-0.0784	-0.0747
X2X5	0.0886	0.9185	0.1255	-0.1363	0.1604	0.9173	0.0538	-0.1068	0.0665	0.9113	0.9294	1.0000	0.1210	0.1690	0.1536	-0.1212
X3X4	-0.1856	-0.0823	0.9588	0.1504	0.8841	-0.0820	0.6412	-0.0411	0.5233	0.3109	-0.0823	0.1210	1.0000	0.9461	0.8346	-0.1868
X3X5	-0.0841	-0.0357	0.9897	-0.1155	0.9364	-0.0352	0.6845	-0.1160	0.5998	0.3527	-0.0455	0.1690	0.9461	1.0000	0.7854	-0.0939
X4X5	-0.1062	-0.0894	0.7449	0.4003	0.9073	-0.0889	0.5033	0.1712	0.5665	0.2295	-0.0784	0.1536	0.8346	0.7854	1.0000	-0.1609
Y	0.3920	-0.0539	-0.1237	-0.2783	-0.0528	-0.0520	0.0419	0.1215	0.1717	-0.2083	-0.0747	-0.1212	-0.1868	-0.0939	-0.1609	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Orthophosphate

===

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	283
Number of Observations Used	162
Number of Observations with Missing Values	121

Number in Model	R-Square	Variables in Model
1	0.1537	X1
1	0.0775	X4
1	0.0434	X2X3
1	0.0349	X3X4
1	0.0295	X1X5
1	0.0259	X4X5
1	0.0153	X3
1	0.0148	X1X4
1	0.0147	X2X5
1	0.0088	X3X5
1	0.0056	X2X4
1	0.0029	X2
1	0.0028	X5
1	0.0027	X1X2
1	0.0018	X1X3
2	0.2137	X1 X1X4
2	0.1916	X1 X4
2	0.1893	X1 X2X3
2	0.1782	X1 X2X5
2	0.1718	X1 X2X4
2	0.1684	X1 X2
2	0.1682	X1 X1X2
2	0.1681	X1 X4X5
2	0.1672	X1 X3X4
2	0.1655	X1 X1X3
2	0.1584	X1 X3
2	0.1574	X1 X3X5
2	0.1565	X1 X1X5
2	0.1551	X1 X5
2	0.1498	X4 X2X3
3	0.2870	X1 X1X4 X2X3
3	0.2648	X1 X1X4 X2X5
3	0.2589	X1 X1X4 X2X4
3	0.2570	X1 X2 X1X4
3	0.2567	X1 X1X2 X1X4
3	0.2475	X1 X4 X2X3

3	0.2244	X1 X4 X2X5
3	0.2237	X1 X1X3 X1X4
3	0.2217	X1 X3 X1X4
3	0.2204	X1 X1X4 X3X4
3	0.2202	X1 X1X4 X3X5
3	0.2169	X1 X4 X2X4
3	0.2155	X1 X4 X1X4
3	0.2152	X1X3 X1X5 X4X5
3	0.2149	X1 X2 X4
4	0.2926	X1 X1X4 X2X3 X4X5
4	0.2912	X1 X4 X1X4 X2X3
4	0.2904	X1 X5 X1X4 X2X3
4	0.2899	X1 X1X4 X2X3 X2X5
4	0.2892	X1 X1X3 X1X4 X2X3
4	0.2875	X1 X1X4 X1X5 X2X3
4	0.2874	X1 X1X4 X2X3 X3X4
4	0.2873	X1 X2 X1X4 X2X3
4	0.2873	X1 X1X4 X2X3 X2X4
4	0.2873	X1 X1X2 X1X4 X2X3
4	0.2872	X1 X1X4 X2X3 X3X5
4	0.2870	X1 X3 X1X4 X2X3
4	0.2754	X1 X1X3 X1X4 X2X4
4	0.2738	X1 X4 X1X4 X2X5
4	0.2735	X1 X1X3 X1X4 X2X5
5	0.3154	X1 X1X3 X1X4 X1X5 X2X3
5	0.3148	X1 X1X4 X2X3 X2X4 X2X5
5	0.3141	X1 X2 X1X4 X2X3 X2X5
5	0.3141	X1 X1X2 X1X4 X2X3 X2X5
5	0.3058	X1 X3 X5 X1X4 X2X3
5	0.3053	X1 X1X3 X1X4 X2X3 X4X5
5	0.3047	X1 X5 X1X4 X2X3 X3X5
5	0.3039	X1 X3 X1X4 X2X3 X4X5
5	0.3037	X1 X5 X1X3 X1X4 X2X3
5	0.3029	X1 X1X4 X2X3 X3X5 X4X5
5	0.3020	X1 X1X3 X1X4 X1X5 X2X5
5	0.3014	X3 X4 X2X3 X3X4 X3X5
5	0.2994	X1 X3 X1X4 X2X3 X3X4
5	0.2983	X3 X4 X2X5 X3X4 X3X5
5	0.2983	X1 X1X4 X2X3 X3X4 X4X5
6	0.3186	X1 X1X3 X1X4 X1X5 X2X3 X3X4
6	0.3183	X1 X1X3 X1X4 X2X3 X2X4 X2X5
6	0.3177	X1 X3 X5 X1X4 X2X3 X3X4
6	0.3171	X3 X4 X1X3 X1X5 X2X3 X3X4
6	0.3169	X1 X4 X1X4 X2X3 X2X4 X2X5
6	0.3165	X1 X4 X1X3 X1X4 X1X5 X2X3
6	0.3164	X1 X2 X1X3 X1X4 X2X3 X2X5
6	0.3162	X1 X1X4 X1X5 X2X3 X2X4 X2X5
6	0.3162	X1 X1X2 X1X3 X1X4 X2X3 X2X5
6	0.3160	X1 X3 X1X3 X1X4 X1X5 X2X3
6	0.3160	X1 X1X3 X1X4 X1X5 X2X3 X2X5
6	0.3160	X1 X1X3 X1X4 X1X5 X2X3 X3X5
6		

	0.3158	X1 X1X3 X1X4 X1X5 X2X3 X4X5
6	0.3158	X1 X5 X1X3 X1X4 X1X5 X2X3
6	0.3154	X1 X1X2 X1X3 X1X4 X1X5 X2X3
7	0.3418	X3 X4 X5 X2X4 X3X4 X3X5 X4X5
7	0.3353	X1 X3 X4 X1X4 X2X4 X3X4 X3X5
7	0.3336	X2 X3 X4 X5 X3X4 X3X5 X4X5
7	0.3330	X1 X3 X4 X1X4 X2X3 X3X4 X4X5
7	0.3324	X3 X4 X5 X1X2 X3X4 X3X5 X4X5
7	0.3321	X1 X3 X1X4 X2X3 X2X4 X2X5 X3X4
7	0.3319	X1 X3 X4 X5 X1X4 X2X3 X3X4
7	0.3315	X3 X4 X1X3 X1X5 X2X3 X3X4 X3X5
7	0.3314	X1 X2 X3 X4 X1X4 X3X4 X3X5
7	0.3311	X1 X3 X4 X1X4 X2X5 X3X4 X3X5
7	0.3309	X1 X3 X4 X1X2 X1X4 X3X4 X3X5
7	0.3306	X1 X3 X4 X1X4 X2X3 X3X4 X3X5
7	0.3299	X3 X4 X5 X2X5 X3X4 X3X5 X4X5
7	0.3288	X1 X3 X1X2 X1X4 X2X3 X2X5 X3X4
7	0.3288	X1 X2 X3 X1X4 X2X3 X2X5 X3X4
8	0.3520	X3 X4 X5 X2X3 X2X4 X3X4 X3X5 X4X5
8	0.3511	X2 X3 X4 X5 X2X3 X3X4 X3X5 X4X5
8	0.3509	X3 X4 X5 X1X2 X2X3 X3X4 X3X5 X4X5
8	0.3497	X2 X3 X4 X5 X1X2 X3X4 X3X5 X4X5
8	0.3493	X1 X3 X4 X1X4 X2X3 X2X4 X2X5 X3X4
8	0.3483	X1 X3 X4 X1X2 X1X4 X2X3 X2X5 X3X4
8	0.3482	X1 X2 X3 X4 X1X4 X2X3 X2X5 X3X4
8	0.3481	X3 X4 X5 X1X2 X2X4 X3X4 X3X5 X4X5
8	0.3477	X2 X3 X4 X5 X2X4 X3X4 X3X5 X4X5
8	0.3460	X1 X3 X4 X1X4 X2X3 X2X4 X3X4 X3X5
8	0.3458	X1 X2 X3 X4 X1X4 X2X3 X3X4 X3X5
8	0.3458	X1 X3 X4 X1X2 X1X4 X2X3 X3X4 X3X5
8	0.3446	X3 X4 X5 X1X5 X2X4 X3X4 X3X5 X4X5
8	0.3445	X3 X4 X5 X2X4 X2X5 X3X4 X3X5 X4X5
8	0.3443	X1 X3 X4 X5 X2X4 X3X4 X3X5 X4X5
9	0.3678	X1 X3 X4 X5 X1X4 X2X4 X3X4 X3X5 X4X5
9	0.3638	X3 X4 X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
9	0.3614	X2 X3 X4 X5 X2X3 X2X5 X3X4 X3X5 X4X5
9	0.3613	X3 X4 X5 X1X2 X2X3 X2X5 X3X4 X3X5 X4X5
9	0.3605	X1 X2 X3 X4 X5 X1X4 X3X4 X3X5 X4X5
9	0.3596	X1 X3 X4 X5 X1X2 X1X4 X3X4 X3X5 X4X5
9	0.3589	X1 X3 X4 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5
9	0.3585	X1 X3 X4 X1X2 X1X4 X2X3 X2X5 X3X4 X3X5
9	0.3584	X1 X2 X3 X4 X1X4 X2X3 X2X5 X3X4 X3X5
9	0.3541	X3 X4 X5 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
9	0.3538	X1 X3 X4 X5 X2X3 X2X4 X3X4 X3X5 X4X5
9	0.3532	X2 X3 X4 X5 X1X5 X2X3 X3X4 X3X5 X4X5
9	0.3531	X3 X4 X5 X1X2 X1X5 X2X3 X3X4 X3X5 X4X5
9	0.3530	X1 X2 X3 X4 X5 X2X3 X3X4 X3X5 X4X5
9	0.3529	X1 X3 X4 X5 X1X4 X2X5 X3X4 X3X5 X4X5
10	0.3757	X1 X3 X4 X5 X1X4 X2X3 X2X4 X3X4 X3X5 X4X5
10	0.3745	X1 X2 X3 X4 X5 X1X4 X2X3 X3X4 X3X5 X4X5
10	0.3744	X1 X3 X4 X5 X1X2 X1X4 X2X3 X3X4 X3X5 X4X5
10		

	0.3731	X1 X3 X4 X5 X1X2 X1X4 X2X4 X3X4 X3X5 X4X5
10	0.3730	X1 X2 X3 X4 X5 X1X4 X2X4 X3X4 X3X5 X4X5
10	0.3723	X1 X2 X3 X4 X5 X1X2 X1X4 X3X4 X3X5 X4X5
10	0.3692	X1 X3 X4 X5 X1X4 X2X4 X2X5 X3X4 X3X5 X4X5
10	0.3682	X1 X3 X4 X5 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
10	0.3678	X1 X3 X4 X5 X1X3 X1X4 X2X4 X3X4 X3X5 X4X5
10	0.3661	X1 X2 X3 X4 X5 X1X4 X2X5 X3X4 X3X5 X4X5
10	0.3658	X1 X3 X4 X5 X1X2 X1X4 X2X5 X3X4 X3X5 X4X5
10	0.3651	X1 X3 X4 X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
10	0.3650	X3 X4 X5 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
10	0.3646	X3 X4 X5 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
10	0.3639	X3 X4 X5 X1X3 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.3896	X1 X3 X4 X5 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.3865	X1 X3 X4 X5 X1X2 X1X4 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.3865	X1 X2 X3 X4 X5 X1X4 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.3760	X1 X3 X4 X5 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
11	0.3759	X1 X3 X4 X5 X1X2 X1X4 X2X3 X2X4 X3X4 X3X5 X4X5
11	0.3759	X1 X2 X3 X4 X5 X1X4 X2X3 X2X4 X3X4 X3X5 X4X5
11	0.3757	X1 X3 X4 X5 X1X3 X1X4 X2X3 X2X4 X3X4 X3X5 X4X5
11	0.3752	X1 X2 X3 X4 X5 X1X2 X1X4 X2X3 X3X4 X3X5 X4X5
11	0.3748	X1 X2 X3 X4 X5 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
11	0.3747	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
11	0.3745	X1 X2 X3 X4 X5 X1X3 X1X4 X2X3 X3X4 X3X5 X4X5
11	0.3745	X1 X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X3X4 X3X5 X4X5
11	0.3737	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
11	0.3736	X1 X2 X3 X4 X5 X1X2 X1X4 X2X4 X3X4 X3X5 X4X5
11	0.3736	X1 X2 X3 X4 X5 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
12	0.3898	X1 X3 X4 X5 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.3897	X1 X2 X3 X4 X5 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.3896	X1 X3 X4 X5 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.3896	X1 X3 X4 X5 X1X2 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.3868	X1 X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.3868	X1 X2 X3 X4 X5 X1X3 X1X4 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.3865	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.3865	X1 X2 X3 X4 X5 X1X2 X1X4 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.3865	X1 X2 X3 X4 X5 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.3803	X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.3802	X1 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
12	0.3792	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
12	0.3791	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
12	0.3777	X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.3776	X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
13	0.3955	X1 X2 X3 X4 X5 X1X2 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3932	X1 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3904	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
13	0.3904	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
13	0.3898	X1 X2 X3 X4 X5 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3898	X1 X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3897	X1 X2 X3 X4 X5 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3896	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3869	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X5 X3X4 X3X5 X4X5
13		

	0.3865	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
13	0.3806	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
13	0.3806	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
13	0.3805	X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3804	X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3799	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
14	0.3962	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3956	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3933	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3932	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3904	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
14	0.3818	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3806	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
14	0.3776	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3770	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
14	0.3758	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3671	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
14	0.3668	X1 X2 X3 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3580	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3493	X1 X2 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3337	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
15	0.3991	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Orthophosphate

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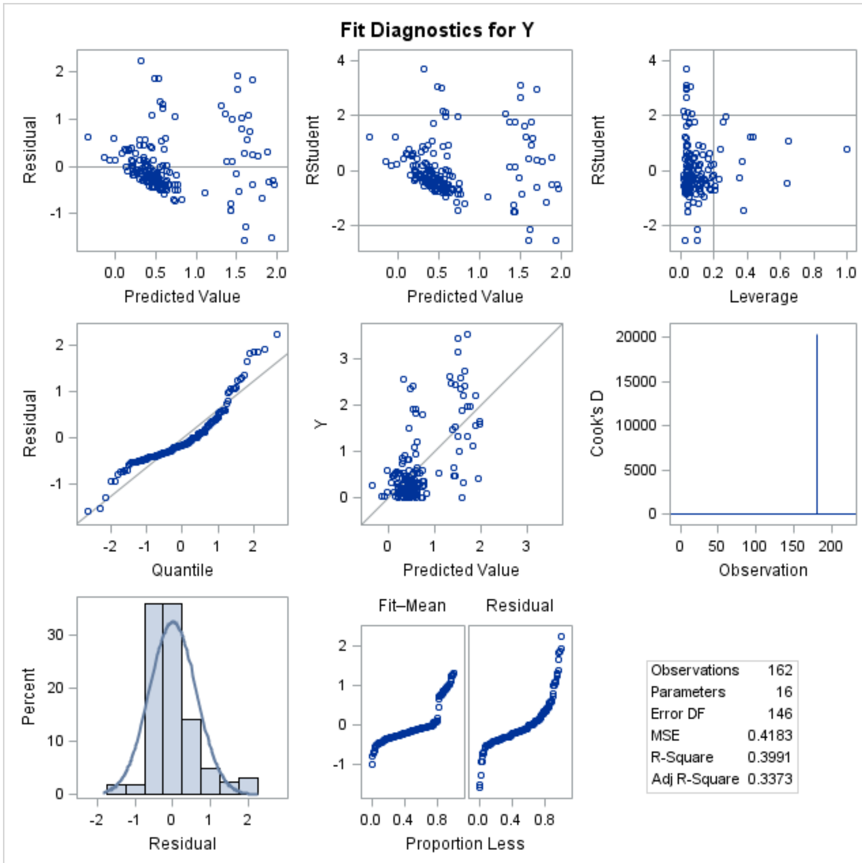
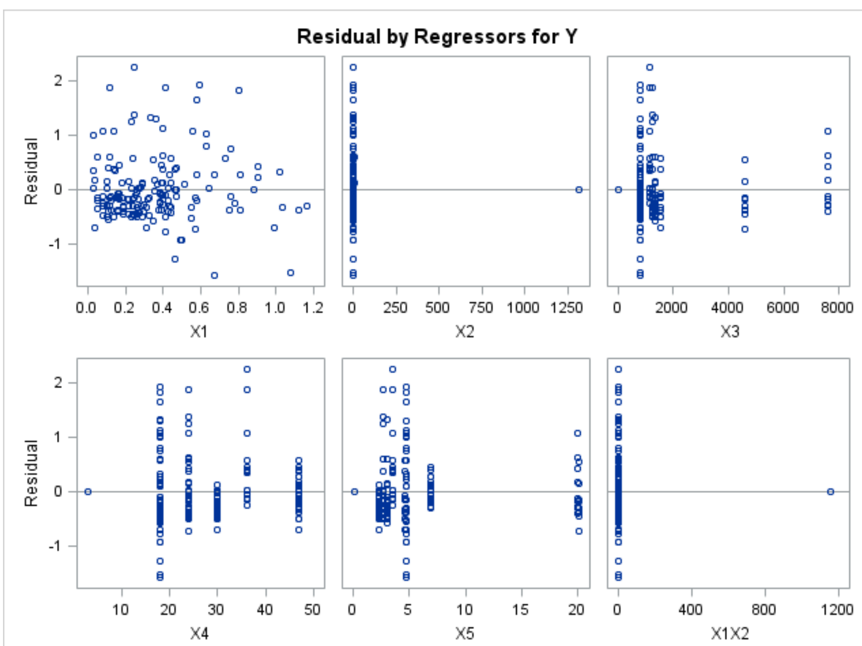
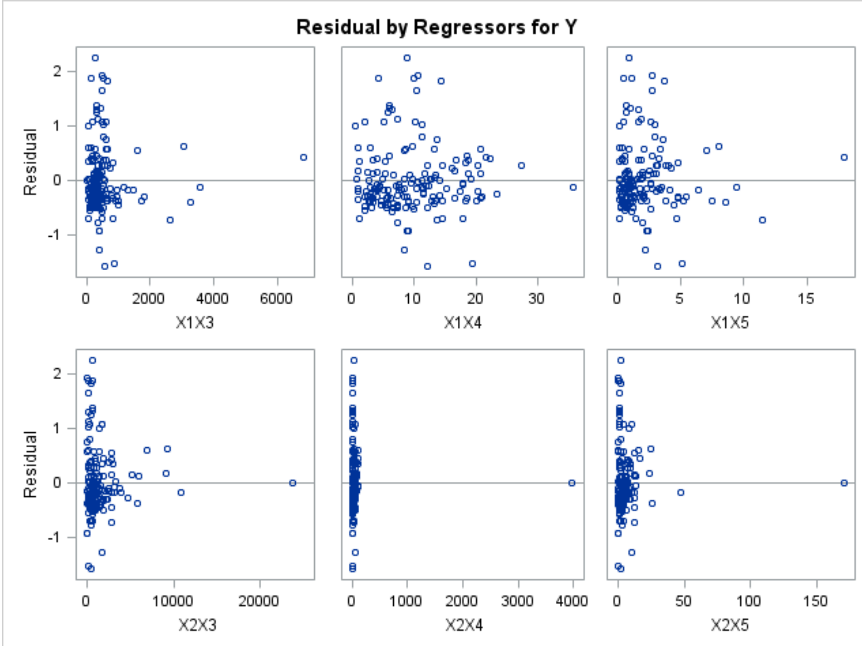
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
X1X3
X1X4
X1X5
X2X3
X2X4
X2X5


Residual by Regressors for Y
Residual
X3X4
X3X5
X4X5

FORWARD REGRESSION
Pollutant: Orthophosphate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	195
Number of Observations Used	107
Number of Observations with Missing Values	88

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.2273	0.4106	-0.3268	0.4963	0.4218	0.8055	0.9859	0.8632	0.0440	-0.3120	0.0429	0.3621	0.4464	0.4123	0.3652
X2	-0.2273	1.0000	-0.1156	0.0592	-0.1736	0.4528	-0.1744	-0.2244	-0.2160	0.5804	0.8860	0.4955	-0.1174	-0.1440	-0.1411	0.0812
X3	0.4106	-0.1156	1.0000	-0.0497	0.9187	0.1554	0.7243	0.4926	0.6483	0.5684	-0.1462	0.5169	0.9882	0.9942	0.8780	-0.0904
X4	-0.3268	0.0592	-0.0497	1.0000	-0.0157	-0.1960	-0.0874	-0.2388	-0.1054	-0.0406	0.4286	0.0771	0.1014	-0.0426	0.2098	-0.5694
X5	0.4963	-0.1736	0.9187	-0.0157	1.0000	0.1296	0.7017	0.5745	0.7069	0.4799	-0.1633	0.5499	0.9127	0.9495	0.9713	-0.0341
X1X2	0.4218	0.4528	0.1554	-0.1960	0.1296	1.0000	0.3167	0.3899	0.2676	0.4625	0.2768	0.3967	0.1207	0.1490	0.0910	0.2084
X1X3	0.8055	-0.1744	0.7243	-0.0874	0.7017	0.3167	1.0000	0.8803	0.9614	0.2676	-0.2013	0.2203	0.7086	0.7321	0.6610	0.1381
X1X4	0.9859	-0.2244	0.4926	-0.2388	0.5745	0.3899	0.8803	1.0000	0.9335	0.0839	-0.2809	0.0868	0.4564	0.5261	0.5076	0.3176
X1X5	0.8632	-0.2160	0.6483	-0.1054	0.7069	0.2676	0.9614	0.9335	1.0000	0.1757	-0.2400	0.1740	0.6308	0.6710	0.6621	0.2137
X2X3	0.0440	0.5804	0.5684	-0.0406	0.4799	0.4625	0.2676	0.0839	0.1757	1.0000	0.4730	0.9196	0.5541	0.5473	0.4623	-0.0450
X2X4	-0.3120	0.8860	-0.1462	0.4286	-0.1633	0.2768	-0.2013	-0.2809	-0.2400	0.4730	1.0000	0.4799	-0.0915	-0.1594	-0.0447	-0.1496
X2X5	0.0429	0.4955	0.5169	0.0771	0.5499	0.3967	0.2203	0.0868	0.1740	0.9196	0.4799	1.0000	0.5209	0.5258	0.5641	-0.0837
X3X4	0.3621	-0.1174	0.9882	0.1014	0.9127	0.1207	0.7086	0.4564	0.6308	0.5541	-0.0915	0.5209	1.0000	0.9840	0.9045	-0.1832
X3X5	0.4464	-0.1440	0.9942	-0.0426	0.9495	0.1490	0.7321	0.5261	0.6710	0.5473	-0.1594	0.5258	0.9840	1.0000	0.9105	-0.0870
X4X5	0.4123	-0.1411	0.8780	0.2098	0.9713	0.0910	0.6610	0.5076	0.6621	0.4623	-0.0447	0.5641	0.9045	0.9105	1.0000	-0.1416
Y	0.3652	0.0812	-0.0904	-0.5694	-0.0341	0.2084	0.1381	0.3176	0.2137	-0.0450	-0.1496	-0.0837	-0.1832	-0.0870	-0.1416	1.0000

FORWARD REGRESSION
Pollutant: Orthophosphate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	195
Number of Observations Used	107
Number of Observations with Missing Values	88

Forward Selection: Step 1

Variable X4 Entered: R-Square = 0.3243 and C(p) = 30.1883

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	2.26667	2.26667	50.38	<.0001
Error	105	4.72382	0.04499		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.69412	0.06835	4.63988	103.13	<.0001
X4	-0.01875	0.00264	2.26667	50.38	<.0001

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X1 Entered: R-Square = 0.3602 and C(p) = 25.1122

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	2.51764	1.25882	29.27	<.0001
Error	104	4.47285	0.04301		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.60041	0.07727	2.59666	60.38	<.0001

X1	0.60917	0.25218	0.25097	5.84	0.0175
X4	-0.01659	0.00273	1.58546	36.86	<.0001

Bounds on condition number: 1.1196, 4.4783

Forward Selection: Step 3

Variable X3X4 Entered: R-Square = 0.4116 and C(p) = 16.9802

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	2.87699	0.95900	24.01	<.0001
Error	103	4.11349	0.03994		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.59426	0.07449	2.54178	63.65	<.0001
X1	0.94692	0.26782	0.49923	12.50	0.0006
X4	-0.01456	0.00272	1.14450	28.66	<.0001
X3X4	-0.00000131	4.356724E-7	0.35936	9.00	0.0034

Bounds on condition number: 1.3599, 11.343

Forward Selection: Step 4

Variable X3 Entered: R-Square = 0.4890 and C(p) = 3.7234

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	3.41811	0.85453	24.40	<.0001
Error	102	3.57238	0.03502		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.59479	0.31044	0.12857	3.67	0.0582
X1	1.04302	0.25200	0.60000	17.13	<.0001
X3	0.00123	0.00031302	0.54111	15.45	0.0002
X4	0.03479	0.01281	0.25832	7.38	0.0078
X3X4	-0.00005262	0.00001306	0.56847	16.23	0.0001

Bounds on condition number: 1257.9, 10137

Forward Selection: Step 5

Variable X1X5 Entered: R-Square = 0.5055 and C(p) = 2.4713

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	3.53345	0.70669	20.65	<.0001
Error	101	3.45704	0.03423		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.45786	0.31584	0.07193	2.10	0.1502
X1	0.18105	0.53155	0.00397	0.12	0.7341
X3	0.00117	0.00031138	0.48058	14.04	0.0003
X4	0.03087	0.01284	0.19775	5.78	0.0181
X1X5	0.05999	0.03268	0.11534	3.37	0.0693
X3X4	-0.00005061	0.00001296	0.52194	15.25	0.0002

Bounds on condition number: 1267, 12863

Forward Selection: Step 6

Variable X1X3 Entered: R-Square = 0.5178 and C(p) = 2.0495

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	3.61935	0.60322	17.89	<.0001
Error	100	3.37114	0.03371		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.51854	0.31574	0.09093	2.70	0.1037
X1	0.22453	0.52822	0.00609	0.18	0.6717
X3	0.00122	0.00031052	0.51638	15.32	0.0002
X4	0.03266	0.01280	0.21966	6.52	0.0122
X1X3	-0.00027262	0.00017079	0.08589	2.55	0.1136
X1X5	0.12276	0.05097	0.19553	5.80	0.0179
X3X4	-0.00005219	0.00001290	0.55186	16.37	0.0001

Bounds on condition number: 1274.6, 15730

Forward Selection: Step 7

Variable X2 Entered: R-Square = 0.5225 and C(p) = 3.1160

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	3.65245	0.52178	15.48	<.0001
Error	99	3.33803	0.03372		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.41602	0.33229	0.05285	1.57	0.2135
X1	0.23688	0.52842	0.00678	0.20	0.6549
X2	0.02288	0.02309	0.03311	0.98	0.3241
X3	0.00109	0.00033666	0.35115	10.41	0.0017
X4	0.02745	0.01383	0.13279	3.94	0.0500
X1X3	-0.00029021	0.00017172	0.09630	2.86	0.0942
X1X5	0.12897	0.05136	0.21261	6.31	0.0137
X3X4	-0.00004680	0.00001400	0.37663	11.17	0.0012

Bounds on condition number: 1501.5, 21551

Forward Selection: Step 8

Variable X2X4 Entered: R-Square = 0.5279 and C(p) = 4.0471

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	3.69037	0.46130	13.70	<.0001
Error	98	3.30012	0.03367		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.55036	0.35539	0.08076	2.40	0.1247
X1	0.32289	0.53427	0.01230	0.37	0.5470
X2	0.09300	0.07000	0.05944	1.77	0.1871
X3	0.00114	0.00034028	0.37829	11.23	0.0011
X4	0.03331	0.01489	0.16862	5.01	0.0275
X1X3	-0.00029571	0.00017169	0.09989	2.97	0.0882
X1X5	0.12590	0.05141	0.20194	6.00	0.0161
X2X4	-0.00329	0.00310	0.03791	1.13	0.2913
X3X4	-0.00004905	0.00001415	0.40449	12.01	0.0008

Bounds on condition number: 1536.2, 25428

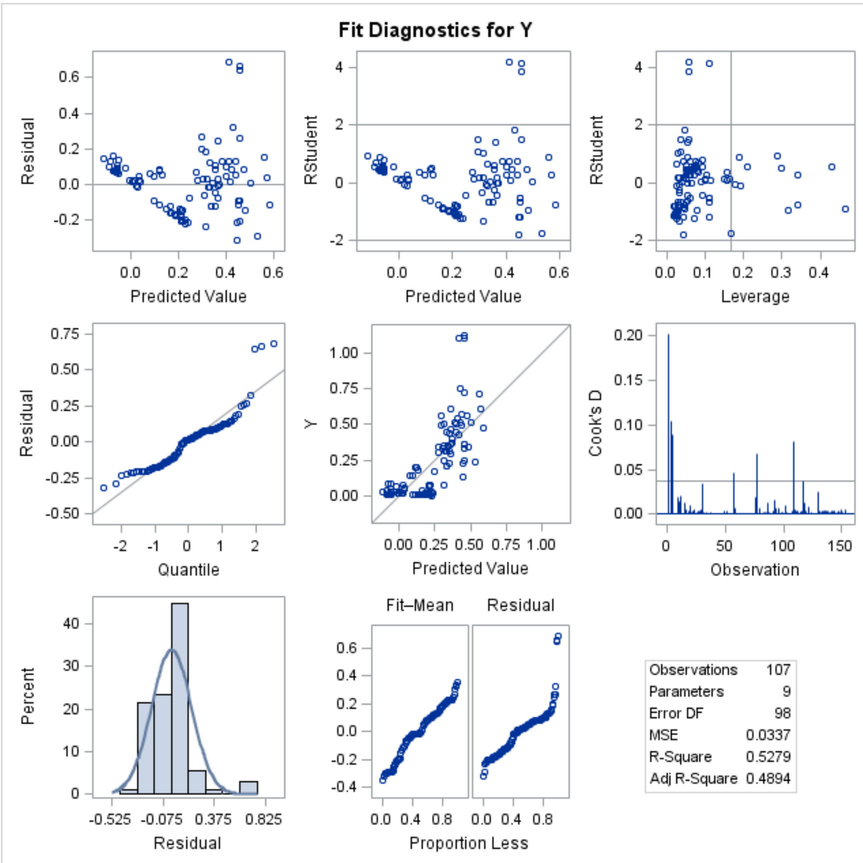
No other variable met the 0.5000 significance level for entry into the model.

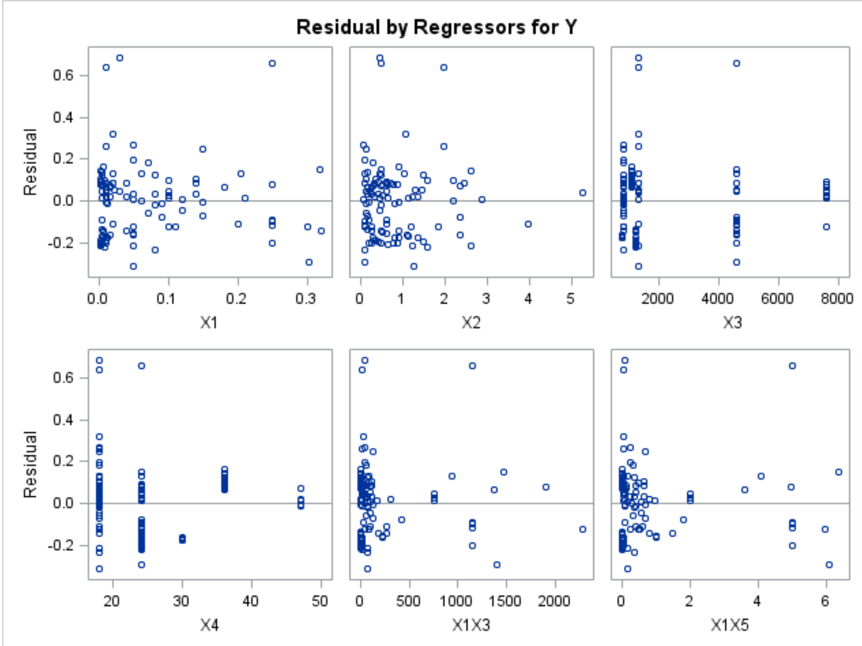
Summary of Forward Selection

Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X4	1	0.3243	0.3243	30.1883	50.38	<.0001
2	X1	2	0.0359	0.3602	25.1122	5.84	0.0175
3	X3X4	3	0.0514	0.4116	16.9802	9.00	0.0034
4	X3	4	0.0774	0.4890	3.7234	15.45	0.0002
5	X1X5	5	0.0165	0.5055	2.4713	3.37	0.0693
6	X1X3	6	0.0123	0.5178	2.0495	2.55	0.1136
7	X2	7	0.0047	0.5225	3.1160	0.98	0.3241
8	X2X4	8	0.0054	0.5279	4.0471	1.13	0.2913

FORWARD REGRESSION
Pollutant: Orthophosphate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
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0.4
0.2
0.0
-0.2
0.0 0.1 0.2 0.3
X1
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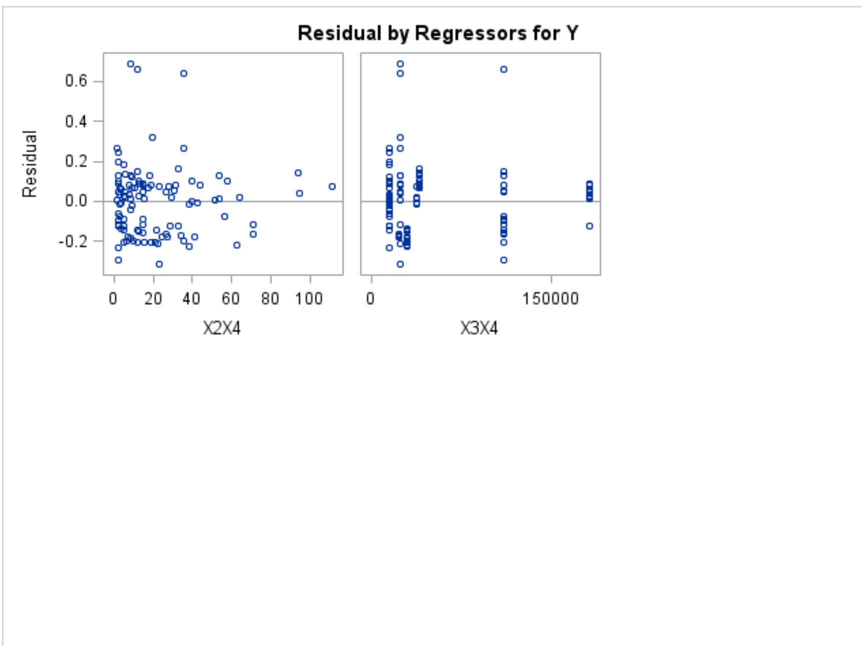
X2
2000 4000 6000 8000
X3
20 30 40 50
X4
0 500 1000 1500 2000
X1X3
0 2 4 6
X1X5


Residual by Regressors for Y
Residual
0.6
0.4
0.2
0.0
-0.2
0 20 40 60 80 100
X2X4
0 150000
X3X4

BACKWARD REGRESSION
Pollutant: Orthophosphate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	195
Number of Observations Used	107
Number of Observations with Missing Values	88

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.2273	0.4106	-0.3268	0.4963	0.4218	0.8055	0.9859	0.8632	0.0440	-0.3120	0.0429	0.3621	0.4464	0.4123	0.3652
X2	-0.2273	1.0000	-0.1156	0.0592	-0.1736	0.4528	-0.1744	-0.2244	-0.2160	0.5804	0.8860	0.4955	-0.1174	-0.1440	-0.1411	0.0812
X3	0.4106	-0.1156	1.0000	-0.0497	0.9187	0.1554	0.7243	0.4926	0.6483	0.5684	-0.1462	0.5169	0.9882	0.9942	0.8780	-0.0904
X4	-0.3268	0.0592	-0.0497	1.0000	-0.0157	-0.1960	-0.0874	-0.2388	-0.1054	-0.0406	0.4286	0.0771	0.1014	-0.0426	0.2098	-0.5694
X5	0.4963	-0.1736	0.9187	-0.0157	1.0000	0.1296	0.7017	0.5745	0.7069	0.4799	-0.1633	0.5499	0.9127	0.9495	0.9713	-0.0341
X1X2	0.4218	0.4528	0.1554	-0.1960	0.1296	1.0000	0.3167	0.3899	0.2676	0.4625	0.2768	0.3967	0.1207	0.1490	0.0910	0.2084
X1X3	0.8055	-0.1744	0.7243	-0.0874	0.7017	0.3167	1.0000	0.8803	0.9614	0.2676	-0.2013	0.2203	0.7086	0.7321	0.6610	0.1381
X1X4	0.9859	-0.2244	0.4926	-0.2388	0.5745	0.3899	0.8803	1.0000	0.9335	0.0839	-0.2809	0.0868	0.4564	0.5261	0.5076	0.3176
X1X5	0.8632	-0.2160	0.6483	-0.1054	0.7069	0.2676	0.9614	0.9335	1.0000	0.1757	-0.2400	0.1740	0.6308	0.6710	0.6621	0.2137
X2X3	0.0440	0.5804	0.5684	-0.0406	0.4799	0.4625	0.2676	0.0839	0.1757	1.0000	0.4730	0.9196	0.5541	0.5473	0.4623	-0.0450
X2X4	-0.3120	0.8860	-0.1462	0.4286	-0.1633	0.2768	-0.2013	-0.2809	-0.2400	0.4730	1.0000	0.4799	-0.0915	-0.1594	-0.0447	-0.1496
X2X5	0.0429	0.4955	0.5169	0.0771	0.5499	0.3967	0.2203	0.0868	0.1740	0.9196	0.4799	1.0000	0.5209	0.5258	0.5641	-0.0837
X3X4	0.3621	-0.1174	0.9882	0.1014	0.9127	0.1207	0.7086	0.4564	0.6308	0.5541	-0.0915	0.5209	1.0000	0.9840	0.9045	-0.1832
X3X5	0.4464	-0.1440	0.9942	-0.0426	0.9495	0.1490	0.7321	0.5261	0.6710	0.5473	-0.1594	0.5258	0.9840	1.0000	0.9105	-0.0870
X4X5	0.4123	-0.1411	0.8780	0.2098	0.9713	0.0910	0.6610	0.5076	0.6621	0.4623	-0.0447	0.5641	0.9045	0.9105	1.0000	-0.1416
Y	0.3652	0.0812	-0.0904	-0.5694	-0.0341	0.2084	0.1381	0.3176	0.2137	-0.0450	-0.1496	-0.0837	-0.1832	-0.0870	-0.1416	1.0000

BACKWARD REGRESSION
Pollutant: Orthophosphate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	195
Number of Observations Used	107
Number of Observations with Missing Values	88

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.5383 and C(p) = 16.0000

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	15	3.76297	0.25086	7.07	<.0001
Error	91	3.22752	0.03547		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.04206	0.98623	0.00006451	0.00	0.9661
X1	4.72007	10.47688	0.00720	0.20	0.6534
X2	0.11797	0.09681	0.05267	1.48	0.2261
X3	0.00079508	0.00068322	0.04803	1.35	0.2476
X4	0.00450	0.04098	0.00042802	0.01	0.9128
X5	-0.06252	0.07555	0.02429	0.68	0.4101
X1X2	-0.15547	0.36983	0.00627	0.18	0.6752
X1X3	-0.00028845	0.00027843	0.03807	1.07	0.3029
X1X4	-0.25931	0.64425	0.00575	0.16	0.6883
X1X5	0.22084	0.26597	0.02445	0.69	0.4085
X2X3	-0.00001601	0.00004783	0.00397	0.11	0.7387
X2X4	-0.00364	0.00386	0.03158	0.89	0.3479
X2X5	0.00396	0.01261	0.00349	0.10	0.7544
X3X4	-0.00003024	0.00002865	0.03951	1.11	0.2940
X3X5	-0.00000461	0.00000913	0.00904	0.25	0.6148
X4X5	0.00262	0.00281	0.03102	0.87	0.3522

Bounds on condition number: 5978.2, 325031

Backward Elimination: Step 1

Variable X4 Removed: R-Square = 0.5382 and C(p) = 14.0121

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	14	3.76254	0.26875	7.66	<.0001
Error	92	3.22795	0.03509		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.14773	0.21653	0.01633	0.47	0.4968
X1	4.27357	9.60439	0.00695	0.20	0.6574
X2	0.11885	0.09595	0.05383	1.53	0.2186
X3	0.00072321	0.00019575	0.47892	13.65	0.0004
X5	-0.06895	0.04751	0.07391	2.11	0.1501
X1X2	-0.15427	0.36768	0.00618	0.18	0.6758
X1X3	-0.00029323	0.00027353	0.04032	1.15	0.2865
X1X4	-0.23361	0.59703	0.00537	0.15	0.6965
X1X5	0.21365	0.25641	0.02436	0.69	0.4069
X2X3	-0.00001551	0.00004736	0.00376	0.11	0.7441
X2X4	-0.00365	0.00384	0.03171	0.90	0.3443
X2X5	0.00378	0.01244	0.00324	0.09	0.7618
X3X4	-0.00002717	0.00000601	0.71604	20.41	<.0001
X3X5	-0.00000467	0.00000907	0.00931	0.27	0.6077
X4X5	0.00289	0.00145	0.13835	3.94	0.0500

Bounds on condition number: 3852.3, 116174

Backward Elimination: Step 2

Variable X2X5 Removed: R-Square = 0.5378 and C(p) = 12.1035

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	3.75930	0.28918	8.32	<.0001
Error	93	3.23119	0.03474		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.15048	0.21528	0.01697	0.49	0.4863
X1	4.16943	9.55134	0.00662	0.19	0.6635
X2	0.10933	0.09026	0.05098	1.47	0.2288
X3	0.00071600	0.00019336	0.47641	13.71	0.0004
X5	-0.06649	0.04658	0.07078	2.04	0.1568
X1X2	-0.14132	0.36342	0.00525	0.15	0.6983

X1X3	-0.00028396	0.00027049	0.03829	1.10	0.2965
X1X4	-0.22869	0.59389	0.00515	0.15	0.7011
X1X5	0.20868	0.25463	0.02334	0.67	0.4146
X2X3	-0.00000255	0.00002058	0.00053483	0.02	0.9015
X2X4	-0.00332	0.00366	0.02852	0.82	0.3673
X3X4	-0.00002738	0.00000594	0.73748	21.23	<.0001
X3X5	-0.00000452	0.00000901	0.00876	0.25	0.6169
X4X5	0.00290	0.00145	0.13995	4.03	0.0477

Bounds on condition number: 3849.5, 106869

Backward Elimination: Step 3

Variable X2X3 Removed: R-Square = 0.5377 and C(p) = 10.1186

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	12	3.75877	0.31323	9.11	<.0001
Error	94	3.23172	0.03438		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.15206	0.21377	0.01739	0.51	0.4787
X1	3.95223	9.34022	0.00616	0.18	0.6732
X2	0.10754	0.08862	0.05062	1.47	0.2280
X3	0.00071538	0.00019228	0.47590	13.84	0.0003
X5	-0.06675	0.04629	0.07150	2.08	0.1526
X1X2	-0.15407	0.34677	0.00679	0.20	0.6578
X1X3	-0.00028598	0.00026858	0.03898	1.13	0.2897
X1X4	-0.21486	0.58027	0.00471	0.14	0.7120
X1X5	0.20446	0.25102	0.02281	0.66	0.4174
X2X4	-0.00338	0.00361	0.03023	0.88	0.3508
X3X4	-0.00002740	0.00000591	0.73908	21.50	<.0001
X3X5	-0.00000453	0.00000896	0.00877	0.26	0.6147
X4X5	0.00291	0.00144	0.14040	4.08	0.0461

Bounds on condition number: 3713.8, 96025

Backward Elimination: Step 4

Variable X1X4 Removed: R-Square = 0.5370 and C(p) = 8.2515

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	3.75405	0.34128	10.02	<.0001
Error	95	3.23644	0.03407		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.12649	0.20139	0.01344	0.39	0.5315
X1	0.50378	0.70464	0.01741	0.51	0.4764
X2	0.11503	0.08589	0.06110	1.79	0.1837
X3	0.00071882	0.00019118	0.48162	14.14	0.0003
X5	-0.05718	0.03822	0.07625	2.24	0.1379
X1X2	-0.19259	0.32928	0.01165	0.34	0.5600
X1X3	-0.00027542	0.00026585	0.03656	1.07	0.3028
X1X5	0.11690	0.08380	0.06630	1.95	0.1663
X2X4	-0.00372	0.00347	0.03914	1.15	0.2865
X3X4	-0.00002706	0.00000581	0.73853	21.68	<.0001
X3X5	-0.00000521	0.00000873	0.01212	0.36	0.5523
X4X5	0.00259	0.00115	0.17320	5.08	0.0264

Bounds on condition number: 540.01, 19368

Backward Elimination: Step 5

Variable X1X2 Removed: R-Square = 0.5354 and C(p) = 6.5801

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	3.74240	0.37424	11.06	<.0001
Error	96	3.24809	0.03383		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.15885	0.19298	0.02292	0.68	0.4125
X1	0.27484	0.58390	0.00750	0.22	0.6389
X2	0.09420	0.07789	0.04949	1.46	0.2295
X3	0.00071805	0.00019052	0.48061	14.20	0.0003
X5	-0.05981	0.03783	0.08460	2.50	0.1171
X1X3	-0.00032885	0.00024881	0.05911	1.75	0.1894
X1X5	0.13863	0.07485	0.11606	3.43	0.0671
X2X4	-0.00325	0.00337	0.03157	0.93	0.3365
X3X4	-0.00002766	0.00000570	0.79627	23.53	<.0001
X3X5	-0.00000421	0.00000853	0.00823	0.24	0.6230
X4X5	0.00259	0.00114	0.17319	5.12	0.0259

Bounds on condition number: 519.38, 17038

Backward Elimination: Step 6

Variable X1 Removed: R-Square = 0.5343 and C(p) = 4.7914

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	3.73490	0.41499	12.36	<.0001
Error	97	3.25559	0.03356		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.20782	0.16188	0.05532	1.65	0.2023
X2	0.09709	0.07733	0.05290	1.58	0.2123
X3	0.00069937	0.00018559	0.47660	14.20	0.0003
X5	-0.06268	0.03718	0.09536	2.84	0.0951
X1X3	-0.00032975	0.00024780	0.05943	1.77	0.1864
X1X5	0.15352	0.06757	0.17327	5.16	0.0253
X2X4	-0.00338	0.00334	0.03422	1.02	0.3151
X3X4	-0.00002836	0.00000549	0.89686	26.72	<.0001
X3X5	-0.00000248	0.00000767	0.00351	0.10	0.7471
X4X5	0.00261	0.00114	0.17639	5.26	0.0240

Bounds on condition number: 456.58, 13942

Backward Elimination: Step 7

Variable X3X5 Removed: R-Square = 0.5338 and C(p) = 2.8903

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	3.73139	0.46642	14.03	<.0001
Error	98	3.25910	0.03326		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.25887	0.03557	1.76150	52.97	<.0001
X2	0.10603	0.07189	0.07234	2.18	0.1435
X3	0.00066089	0.00014174	0.72299	21.74	<.0001
X5	-0.06984	0.02973	0.18357	5.52	0.0208
X1X3	-0.00035655	0.00023246	0.07824	2.35	0.1283
X1X5	0.16062	0.06360	0.21208	6.38	0.0132
X2X4	-0.00371	0.00316	0.04579	1.38	0.2435
X3X4	-0.00002852	0.00000544	0.91561	27.53	<.0001

X4X5	0.00272	0.00108	0.20955	6.30	0.0137

Bounds on condition number: 268.77, 6707.8

Backward Elimination: Step 8

Variable X2X4 Removed: R-Square = 0.5272 and C(p) = 2.1814

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	3.68560	0.52651	15.77	<.0001
Error	99	3.30488	0.03338		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.24946	0.03472	1.72333	51.62	<.0001
X2	0.02574	0.02210	0.04529	1.36	0.2469
X3	0.00070432	0.00013708	0.88123	26.40	<.0001
X5	-0.06003	0.02858	0.14726	4.41	0.0382
X1X3	-0.00037804	0.00023217	0.08850	2.65	0.1066
X1X5	0.16700	0.06349	0.23095	6.92	0.0099
X3X4	-0.00003009	0.00000528	1.08373	32.46	<.0001
X4X5	0.00225	0.00101	0.16600	4.97	0.0280

Bounds on condition number: 250.44, 5272.4

Backward Elimination: Step 9

Variable X2 Removed: R-Square = 0.5208 and C(p) = 1.4583

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	3.64032	0.60672	18.11	<.0001
Error	100	3.35017	0.03350		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.27403	0.02763	3.29591	98.38	<.0001
X3	0.00074915	0.00013180	1.08230	32.31	<.0001
X5	-0.06962	0.02742	0.21599	6.45	0.0127
X1X3	-0.00037642	0.00023258	0.08775	2.62	0.1087
X1X5	0.16434	0.06356	0.22396	6.69	0.0112
X3X4	-0.00003179	0.00000508	1.30951	39.09	<.0001

X4X5	0.00259	0.00096491	0.24149	7.21	0.0085

Bounds on condition number: 230.7, 4182.1

Backward Elimination: Step 10

Variable X1X3 Removed: R-Square = 0.5082 and C(p) = 1.9324

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	5	3.55256	0.71051	20.87	<.0001
Error	101	3.43792	0.03404		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.28353	0.02721	3.69484	108.55	<.0001
X3	0.00068201	0.00012610	0.99563	29.25	<.0001
X5	-0.05081	0.02503	0.14024	4.12	0.0450
X1X5	0.06495	0.01652	0.52609	15.46	0.0002
X3X4	-0.00003078	0.00000509	1.24671	36.63	<.0001
X4X5	0.00225	0.00094988	0.19183	5.64	0.0195

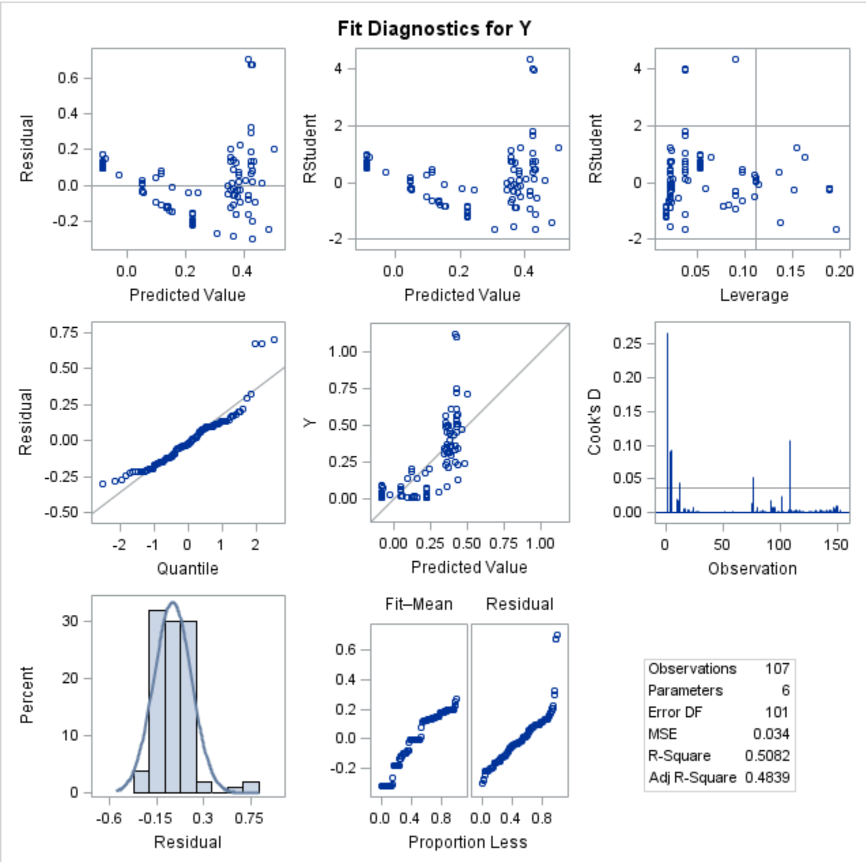
Bounds on condition number: 207.84, 2925.8

All variables left in the model are significant at the 0.1000 level.

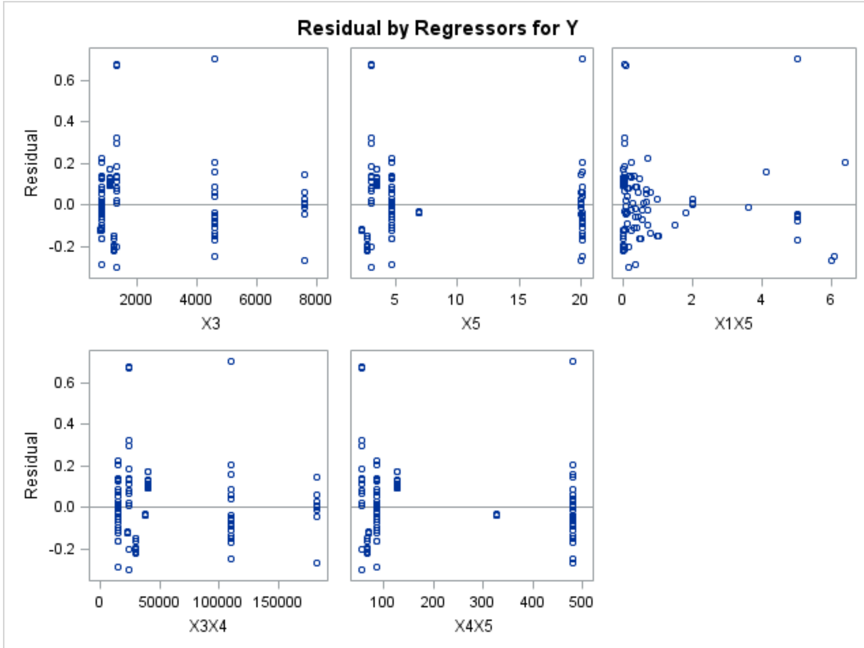
Summary of Backward Elimination							
Step	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	X4	14	0.0001	0.5382	14.0121	0.01	0.9128
2	X2X5	13	0.0005	0.5378	12.1035	0.09	0.7618
3	X2X3	12	0.0001	0.5377	10.1186	0.02	0.9015
4	X1X4	11	0.0007	0.5370	8.2515	0.14	0.7120
5	X1X2	10	0.0017	0.5354	6.5801	0.34	0.5600
6	X1	9	0.0011	0.5343	4.7914	0.22	0.6389
7	X3X5	8	0.0005	0.5338	2.8903	0.10	0.7471
8	X2X4	7	0.0066	0.5272	2.1814	1.38	0.2435
9	X2	6	0.0065	0.5208	1.4583	1.36	0.2469
10	X1X3	5	0.0126	0.5082	1.9324	2.62	0.1087

BACKWARD REGRESSION
Pollutant: Orthophosphate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Observations	107
Parameters	6
Error DF	101
MSE	0.034
R-Square	0.5082
Adj R-Square	0.4839


Residual by Regressors for Y
Residual
0.6
0.4
0.2
0.0
-0.2
2000 4000 6000 8000
X3
5 10 15 20
X5
0 2 4 6
X1X5
0 50000 100000 150000
X3X4
100 200 300 400 500
X4X5

STEPWISE REGRESSION
Pollutant: Orthophosphate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	195
Number of Observations Used	107
Number of Observations with Missing Values	88

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.2273	0.4106	-0.3268	0.4963	0.4218	0.8055	0.9859	0.8632	0.0440	-0.3120	0.0429	0.3621	0.4464	0.4123	0.3652
X2	-0.2273	1.0000	-0.1156	0.0592	-0.1736	0.4528	-0.1744	-0.2244	-0.2160	0.5804	0.8860	0.4955	-0.1174	-0.1440	-0.1411	0.0812
X3	0.4106	-0.1156	1.0000	-0.0497	0.9187	0.1554	0.7243	0.4926	0.6483	0.5684	-0.1462	0.5169	0.9882	0.9942	0.8780	-0.0904
X4	-0.3268	0.0592	-0.0497	1.0000	-0.0157	-0.1960	-0.0874	-0.2388	-0.1054	-0.0406	0.4286	0.0771	0.1014	-0.0426	0.2098	-0.5694
X5	0.4963	-0.1736	0.9187	-0.0157	1.0000	0.1296	0.7017	0.5745	0.7069	0.4799	-0.1633	0.5499	0.9127	0.9495	0.9713	-0.0341
X1X2	0.4218	0.4528	0.1554	-0.1960	0.1296	1.0000	0.3167	0.3899	0.2676	0.4625	0.2768	0.3967	0.1207	0.1490	0.0910	0.2084
X1X3	0.8055	-0.1744	0.7243	-0.0874	0.7017	0.3167	1.0000	0.8803	0.9614	0.2676	-0.2013	0.2203	0.7086	0.7321	0.6610	0.1381
X1X4	0.9859	-0.2244	0.4926	-0.2388	0.5745	0.3899	0.8803	1.0000	0.9335	0.0839	-0.2809	0.0868	0.4564	0.5261	0.5076	0.3176
X1X5	0.8632	-0.2160	0.6483	-0.1054	0.7069	0.2676	0.9614	0.9335	1.0000	0.1757	-0.2400	0.1740	0.6308	0.6710	0.6621	0.2137
X2X3	0.0440	0.5804	0.5684	-0.0406	0.4799	0.4625	0.2676	0.0839	0.1757	1.0000	0.4730	0.9196	0.5541	0.5473	0.4623	-0.0450
X2X4	-0.3120	0.8860	-0.1462	0.4286	-0.1633	0.2768	-0.2013	-0.2809	-0.2400	0.4730	1.0000	0.4799	-0.0915	-0.1594	-0.0447	-0.1496
X2X5	0.0429	0.4955	0.5169	0.0771	0.5499	0.3967	0.2203	0.0868	0.1740	0.9196	0.4799	1.0000	0.5209	0.5258	0.5641	-0.0837
X3X4	0.3621	-0.1174	0.9882	0.1014	0.9127	0.1207	0.7086	0.4564	0.6308	0.5541	-0.0915	0.5209	1.0000	0.9840	0.9045	-0.1832
X3X5	0.4464	-0.1440	0.9942	-0.0426	0.9495	0.1490	0.7321	0.5261	0.6710	0.5473	-0.1594	0.5258	0.9840	1.0000	0.9105	-0.0870
X4X5	0.4123	-0.1411	0.8780	0.2098	0.9713	0.0910	0.6610	0.5076	0.6621	0.4623	-0.0447	0.5641	0.9045	0.9105	1.0000	-0.1416
Y	0.3652	0.0812	-0.0904	-0.5694	-0.0341	0.2084	0.1381	0.3176	0.2137	-0.0450	-0.1496	-0.0837	-0.1832	-0.0870	-0.1416	1.0000

STEPWISE REGRESSION
Pollutant: Orthophosphate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	195
Number of Observations Used	107
Number of Observations with Missing Values	88

Stepwise Selection: Step 1

Variable X4 Entered: R-Square = 0.3243 and C(p) = 30.1883

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	2.26667	2.26667	50.38	<.0001
Error	105	4.72382	0.04499		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.69412	0.06835	4.63988	103.13	<.0001
X4	-0.01875	0.00264	2.26667	50.38	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X1 Entered: R-Square = 0.3602 and C(p) = 25.1122

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	2.51764	1.25882	29.27	<.0001
Error	104	4.47285	0.04301		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.60041	0.07727	2.59666	60.38	<.0001

X1	0.60917	0.25218	0.25097	5.84	0.0175
X4	-0.01659	0.00273	1.58546	36.86	<.0001

Bounds on condition number: 1.1196, 4.4783

Stepwise Selection: Step 3

Variable X3X4 Entered: R-Square = 0.4116 and C(p) = 16.9802

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	2.87699	0.95900	24.01	<.0001
Error	103	4.11349	0.03994		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.59426	0.07449	2.54178	63.65	<.0001
X1	0.94692	0.26782	0.49923	12.50	0.0006
X4	-0.01456	0.00272	1.14450	28.66	<.0001
X3X4	-0.00000131	4.356724E-7	0.35936	9.00	0.0034

Bounds on condition number: 1.3599, 11.343

Stepwise Selection: Step 4

Variable X3 Entered: R-Square = 0.4890 and C(p) = 3.7234

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	3.41811	0.85453	24.40	<.0001
Error	102	3.57238	0.03502		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.59479	0.31044	0.12857	3.67	0.0582
X1	1.04302	0.25200	0.60000	17.13	<.0001
X3	0.00123	0.00031302	0.54111	15.45	0.0002
X4	0.03479	0.01281	0.25832	7.38	0.0078
X3X4	-0.00005262	0.00001306	0.56847	16.23	0.0001

Bounds on condition number: 1257.9, 10137

Stepwise Selection: Step 5

Variable X1X5 Entered: R-Square = 0.5055 and C(p) = 2.4713

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	3.53345	0.70669	20.65	<.0001
Error	101	3.45704	0.03423		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.45786	0.31584	0.07193	2.10	0.1502
X1	0.18105	0.53155	0.00397	0.12	0.7341
X3	0.00117	0.00031138	0.48058	14.04	0.0003
X4	0.03087	0.01284	0.19775	5.78	0.0181
X1X5	0.05999	0.03268	0.11534	3.37	0.0693
X3X4	-0.00005061	0.00001296	0.52194	15.25	0.0002

Bounds on condition number: 1267, 12863

Stepwise Selection: Step 6

Variable X1 Removed: R-Square = 0.5049 and C(p) = 0.5833

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	3.52948	0.88237	26.00	<.0001
Error	102	3.46101	0.03393		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.42567	0.30005	0.06829	2.01	0.1591
X3	0.00115	0.00030682	0.47797	14.09	0.0003
X4	0.02988	0.01245	0.19528	5.76	0.0183
X1X5	0.06982	0.01525	0.71138	20.97	<.0001
X3X4	-0.00005005	0.00001280	0.51877	15.29	0.0002

Bounds on condition number: 1246.8, 10049

Stepwise Selection: Step 7

Variable X1X3 Entered: R-Square = 0.5169 and C(p) = 0.2212

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	5	3.61326	0.72265	21.61	<.0001
Error	101	3.37723	0.03344		
Corrected Total	106	6.99049			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.47789	0.29969	0.08503	2.54	0.1139
X3	0.00120	0.00030586	0.51109	15.28	0.0002
X4	0.03141	0.01240	0.21450	6.41	0.0129
X1X3	-0.00026887	0.00016987	0.08377	2.51	0.1166
X1X5	0.13406	0.04332	0.32030	9.58	0.0025
X3X4	-0.00005148	0.00001274	0.54612	16.33	0.0001

Bounds on condition number: 1253.1, 12796

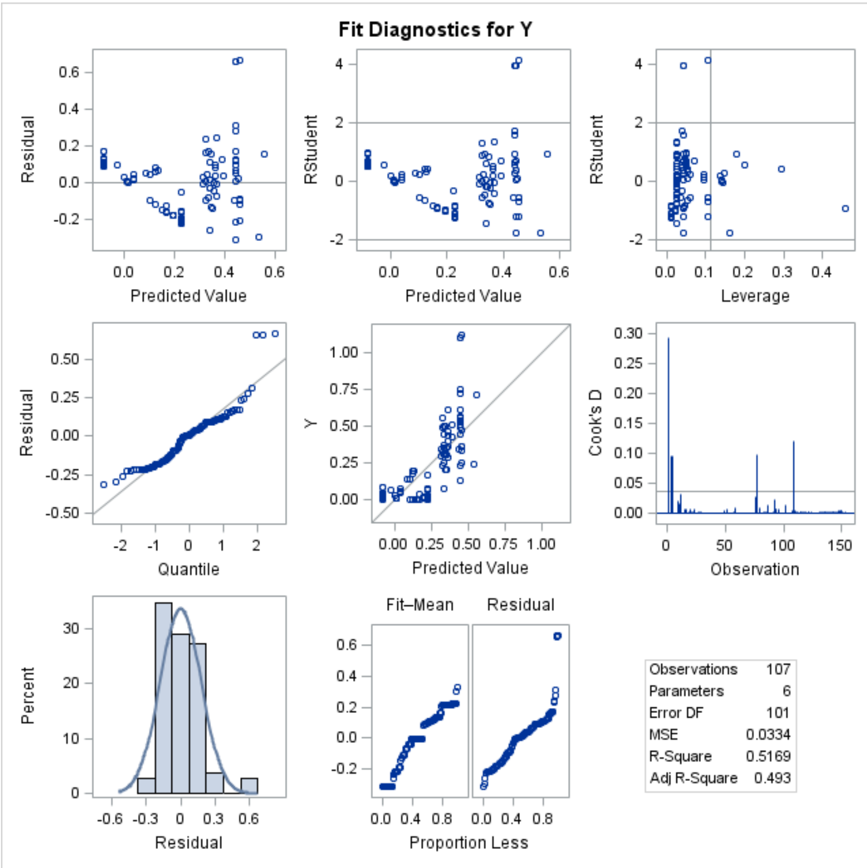
All variables left in the model are significant at the 0.1500 level.

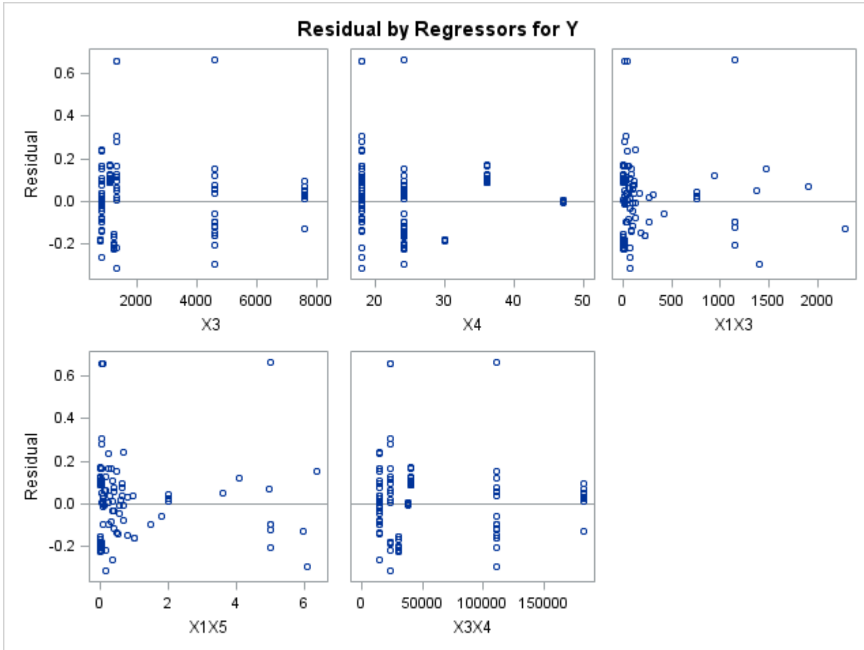
No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	X4		1	0.3243	0.3243	30.1883	50.38	<.0001
2	X1		2	0.0359	0.3602	25.1122	5.84	0.0175
3	X3X4		3	0.0514	0.4116	16.9802	9.00	0.0034
4	X3		4	0.0774	0.4890	3.7234	15.45	0.0002
5	X1X5		5	0.0165	0.5055	2.4713	3.37	0.0693
6		X1	4	0.0006	0.5049	0.5833	0.12	0.7341
7	X1X3		5	0.0120	0.5169	0.2212	2.51	0.1166

STEPWISE REGRESSION
Pollutant: Orthophosphate
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X3
X4
X1X3
X1X5
X3X4

==

MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Arsenic

==

The REG Procedure

Number of Observations Read	195
Number of Observations Used	107
Number of Observations with Missing Values	88

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.2273	0.4106	-0.3268	0.4963	0.4218	0.8055	0.9859	0.8632	0.0440	-0.3120	0.0429	0.3621	0.4464	0.4123	0.3652
X2	-0.2273	1.0000	-0.1156	0.0592	-0.1736	0.4528	-0.1744	-0.2244	-0.2160	0.5804	0.8860	0.4955	-0.1174	-0.1440	-0.1411	0.0812
X3	0.4106	-0.1156	1.0000	-0.0497	0.9187	0.1554	0.7243	0.4926	0.6483	0.5684	-0.1462	0.5169	0.9882	0.9942	0.8780	-0.0904
X4	-0.3268	0.0592	-0.0497	1.0000	-0.0157	-0.1960	-0.0874	-0.2388	-0.1054	-0.0406	0.4286	0.0771	0.1014	-0.0426	0.2098	-0.5694
X5	0.4963	-0.1736	0.9187	-0.0157	1.0000	0.1296	0.7017	0.5745	0.7069	0.4799	-0.1633	0.5499	0.9127	0.9495	0.9713	-0.0341
X1X2	0.4218	0.4528	0.1554	-0.1960	0.1296	1.0000	0.3167	0.3899	0.2676	0.4625	0.2768	0.3967	0.1207	0.1490	0.0910	0.2084
X1X3	0.8055	-0.1744	0.7243	-0.0874	0.7017	0.3167	1.0000	0.8803	0.9614	0.2676	-0.2013	0.2203	0.7086	0.7321	0.6610	0.1381
X1X4	0.9859	-0.2244	0.4926	-0.2388	0.5745	0.3899	0.8803	1.0000	0.9335	0.0839	-0.2809	0.0868	0.4564	0.5261	0.5076	0.3176
X1X5	0.8632	-0.2160	0.6483	-0.1054	0.7069	0.2676	0.9614	0.9335	1.0000	0.1757	-0.2400	0.1740	0.6308	0.6710	0.6621	0.2137
X2X3	0.0440	0.5804	0.5684	-0.0406	0.4799	0.4625	0.2676	0.0839	0.1757	1.0000	0.4730	0.9196	0.5541	0.5473	0.4623	-0.0450
X2X4	-0.3120	0.8860	-0.1462	0.4286	-0.1633	0.2768	-0.2013	-0.2809	-0.2400	0.4730	1.0000	0.4799	-0.0915	-0.1594	-0.0447	-0.1496
X2X5	0.0429	0.4955	0.5169	0.0771	0.5499	0.3967	0.2203	0.0868	0.1740	0.9196	0.4799	1.0000	0.5209	0.5258	0.5641	-0.0837
X3X4	0.3621	-0.1174	0.9882	0.1014	0.9127	0.1207	0.7086	0.4564	0.6308	0.5541	-0.0915	0.5209	1.0000	0.9840	0.9045	-0.1832
X3X5	0.4464	-0.1440	0.9942	-0.0426	0.9495	0.1490	0.7321	0.5261	0.6710	0.5473	-0.1594	0.5258	0.9840	1.0000	0.9105	-0.0870
X4X5	0.4123	-0.1411	0.8780	0.2098	0.9713	0.0910	0.6610	0.5076	0.6621	0.4623	-0.0447	0.5641	0.9045	0.9105	1.0000	-0.1416
Y	0.3652	0.0812	-0.0904	-0.5694	-0.0341	0.2084	0.1381	0.3176	0.2137	-0.0450	-0.1496	-0.0837	-0.1832	-0.0870	-0.1416	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Arsenic
==

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	195
Number of Observations Used	107
Number of Observations with Missing Values	88

Number in Model	R-Square	Variables in Model
1	0.3243	X4
1	0.1333	X1
1	0.1009	X1X4
1	0.0457	X1X5
1	0.0434	X1X2
1	0.0335	X3X4
1	0.0224	X2X4
1	0.0201	X4X5
1	0.0191	X1X3
1	0.0082	X3
1	0.0076	X3X5
1	0.0070	X2X5
1	0.0066	X2
1	0.0020	X2X3
1	0.0012	X5
2	0.3825	X3 X3X4
2	0.3602	X1 X4
2	0.3593	X4 X1X4
2	0.3481	X4 X1X5
2	0.3401	X4 X3X4
2	0.3384	X3 X4
2	0.3375	X2 X4
2	0.3366	X4 X3X5
2	0.3352	X4 X2X4
2	0.3340	X4 X1X2
2	0.3321	X4 X1X3
2	0.3289	X4 X2X3
2	0.3261	X4 X5
2	0.3258	X4 X2X5
2	0.3248	X4 X4X5
3	0.4770	X3 X1X5 X3X4
3	0.4634	X3 X1X4 X3X4
3	0.4520	X1 X3 X3X4
3	0.4471	X3 X1X3 X3X4
3	0.4365	X4 X1X5 X3X4
3	0.4322	X4 X1X5 X3X5

3	0.4307	X3 X4 X1X5
3	0.4246	X3 X3X4 X4X5
3	0.4231	X4 X1X4 X3X4
3	0.4212	X4 X1X4 X3X5
3	0.4186	X3 X4 X1X4
3	0.4126	X3 X5 X3X4
3	0.4116	X1 X4 X3X4
3	0.4098	X1 X4 X3X5
3	0.4082	X4 X1X3 X3X4
4	0.5049	X3 X4 X1X5 X3X4
4	0.4964	X3 X4 X1X4 X3X4
4	0.4910	X2 X3 X1X5 X3X4
4	0.4890	X1 X3 X4 X3X4
4	0.4885	X3 X1X5 X2X4 X3X4
4	0.4881	X3 X1X5 X3X4 X4X5
4	0.4862	X3 X1X3 X1X5 X3X4
4	0.4835	X3 X1X5 X2X5 X3X4
4	0.4821	X3 X1X5 X2X3 X3X4
4	0.4811	X1 X3 X1X4 X3X4
4	0.4808	X3 X5 X1X5 X3X4
4	0.4779	X3 X1X2 X1X5 X3X4
4	0.4775	X2 X3 X1X4 X3X4
4	0.4775	X3 X1X3 X3X4 X4X5
4	0.4773	X3 X1X5 X3X4 X3X5
5	0.5169	X3 X4 X1X3 X1X5 X3X4
5	0.5130	X3 X1X4 X3X4 X3X5 X4X5
5	0.5123	X3 X1X5 X3X4 X3X5 X4X5
5	0.5089	X3 X4 X1X5 X3X4 X4X5
5	0.5084	X3 X4 X5 X1X5 X3X4
5	0.5082	X3 X5 X1X5 X3X4 X4X5
5	0.5082	X1 X3 X3X4 X3X5 X4X5
5	0.5081	X2 X3 X4 X1X5 X3X4
5	0.5080	X4 X5 X1X3 X1X5 X4X5
5	0.5067	X3 X4 X1X5 X2X5 X3X4
5	0.5061	X3 X4 X1X5 X2X3 X3X4
5	0.5059	X3 X4 X1X5 X2X4 X3X4
5	0.5055	X1 X3 X4 X1X5 X3X4
5	0.5053	X3 X4 X1X4 X1X5 X3X4
5	0.5049	X3 X4 X1X2 X1X5 X3X4
6	0.5221	X2 X4 X5 X1X3 X1X5 X4X5
6	0.5215	X2 X3 X4 X1X3 X1X5 X3X4
6	0.5208	X3 X5 X1X3 X1X5 X3X4 X4X5
6	0.5190	X3 X4 X1X3 X1X5 X3X4 X3X5
6	0.5189	X3 X4 X1X3 X1X5 X2X3 X3X4
6	0.5186	X3 X4 X1X3 X1X5 X2X4 X3X4
6	0.5183	X3 X4 X1X2 X1X3 X1X5 X3X4
6	0.5178	X3 X4 X1X3 X1X5 X2X5 X3X4
6	0.5178	X1 X3 X4 X1X3 X1X5 X3X4
6	0.5177	X2 X3 X1X5 X3X4 X3X5 X4X5
6	0.5176	X3 X4 X1X3 X1X4 X1X5 X3X4
6	0.5175	X3 X5 X1X5 X3X4 X3X5 X4X5
6		

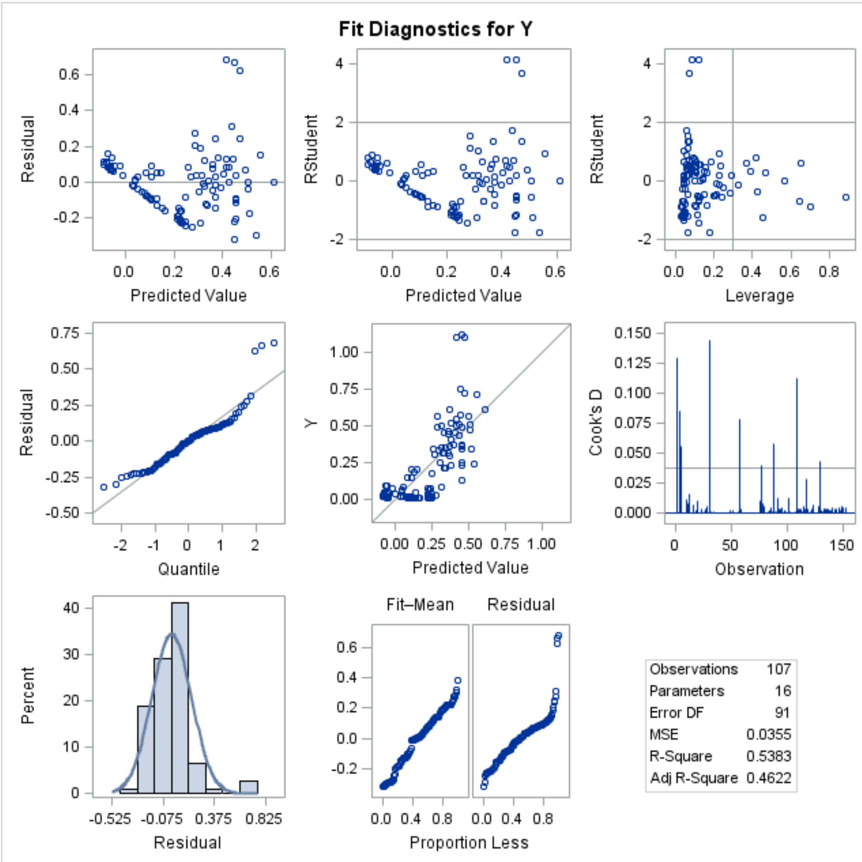
	0.5172	X3 X4 X5 X1X3 X1X5 X3X4
6	0.5171	X2 X3 X1X4 X3X4 X3X5 X4X5
6	0.5170	X3 X4 X1X3 X1X5 X3X4 X4X5
7	0.5293	X2 X4 X5 X1X3 X1X5 X2X4 X4X5
7	0.5272	X2 X3 X5 X1X3 X1X5 X3X4 X4X5
7	0.5262	X2 X3 X4 X1X3 X1X5 X2X4 X3X4
7	0.5247	X3 X5 X1X3 X1X5 X3X4 X3X5 X4X5
7	0.5240	X3 X5 X1X3 X1X5 X2X3 X3X4 X4X5
7	0.5234	X3 X5 X1X3 X1X5 X2X4 X3X4 X4X5
7	0.5231	X3 X5 X1X3 X1X5 X2X5 X3X4 X4X5
7	0.5228	X2 X3 X4 X1X3 X1X5 X3X4 X3X5
7	0.5228	X3 X5 X1X2 X1X3 X1X5 X3X4 X4X5
7	0.5227	X2 X4 X5 X1X3 X1X5 X2X5 X4X5
7	0.5226	X2 X3 X5 X1X5 X2X4 X3X4 X4X5
7	0.5225	X2 X4 X5 X1X3 X1X5 X3X5 X4X5
7	0.5225	X2 X4 X5 X1X3 X1X5 X2X3 X4X5
7	0.5225	X2 X3 X1X2 X1X4 X3X4 X3X5 X4X5
7	0.5225	X1 X2 X3 X4 X1X3 X1X5 X3X4
8	0.5338	X2 X3 X5 X1X3 X1X5 X2X4 X3X4 X4X5
8	0.5300	X2 X4 X5 X1X3 X1X5 X2X4 X3X5 X4X5
8	0.5298	X2 X4 X5 X1X2 X1X3 X1X5 X2X4 X4X5
8	0.5297	X2 X4 X5 X1X3 X1X5 X2X4 X3X4 X4X5
8	0.5297	X2 X4 X5 X1X3 X1X5 X2X3 X2X4 X4X5
8	0.5295	X2 X3 X4 X5 X1X3 X1X5 X2X4 X4X5
8	0.5294	X2 X3 X5 X1X3 X1X5 X3X4 X3X5 X4X5
8	0.5294	X2 X4 X5 X1X3 X1X5 X2X4 X2X5 X4X5
8	0.5293	X2 X4 X5 X1X3 X1X4 X1X5 X2X4 X4X5
8	0.5293	X1 X2 X4 X5 X1X3 X1X5 X2X4 X4X5
8	0.5279	X1 X2 X3 X4 X1X3 X1X5 X2X4 X3X4
8	0.5277	X2 X3 X4 X1X3 X1X4 X1X5 X2X4 X3X4
8	0.5275	X2 X3 X4 X5 X1X3 X1X5 X3X4 X4X5
8	0.5274	X1 X2 X3 X5 X1X3 X1X5 X3X4 X4X5
8	0.5274	X2 X3 X5 X1X3 X1X5 X2X5 X3X4 X4X5
9	0.5343	X2 X3 X5 X1X3 X1X5 X2X4 X3X4 X3X5 X4X5
9	0.5342	X1 X2 X3 X5 X1X3 X1X5 X2X4 X3X4 X4X5
9	0.5341	X2 X3 X5 X1X2 X1X3 X1X5 X2X4 X3X4 X4X5
9	0.5341	X2 X3 X5 X1X3 X1X4 X1X5 X2X4 X3X4 X4X5
9	0.5340	X2 X3 X4 X5 X1X3 X1X5 X2X4 X3X4 X4X5
9	0.5339	X2 X3 X5 X1X3 X1X5 X2X3 X2X4 X3X4 X4X5
9	0.5338	X2 X3 X5 X1X3 X1X5 X2X4 X2X5 X3X4 X4X5
9	0.5310	X1 X2 X3 X5 X1X3 X1X4 X1X5 X3X4 X4X5
9	0.5310	X2 X3 X4 X5 X1X3 X1X5 X2X4 X3X5 X4X5
9	0.5308	X1 X2 X3 X5 X1X3 X1X5 X3X4 X3X5 X4X5
9	0.5308	X2 X4 X5 X1X2 X1X3 X1X5 X2X4 X3X5 X4X5
9	0.5306	X2 X3 X5 X1X3 X1X4 X1X5 X3X4 X3X5 X4X5
9	0.5305	X2 X3 X5 X1X2 X1X4 X2X4 X3X4 X3X5 X4X5
9	0.5305	X2 X4 X5 X1X2 X1X3 X1X5 X2X4 X3X4 X4X5
9	0.5303	X2 X3 X4 X1X2 X1X4 X2X4 X3X4 X3X5 X4X5
10	0.5359	X1 X2 X3 X5 X1X3 X1X4 X1X5 X2X4 X3X4 X4X5
10	0.5354	X1 X2 X3 X5 X1X3 X1X5 X2X4 X3X4 X3X5 X4X5
10	0.5353	X1 X2 X3 X5 X1X2 X1X3 X1X5 X2X4 X3X4 X4X5
10		

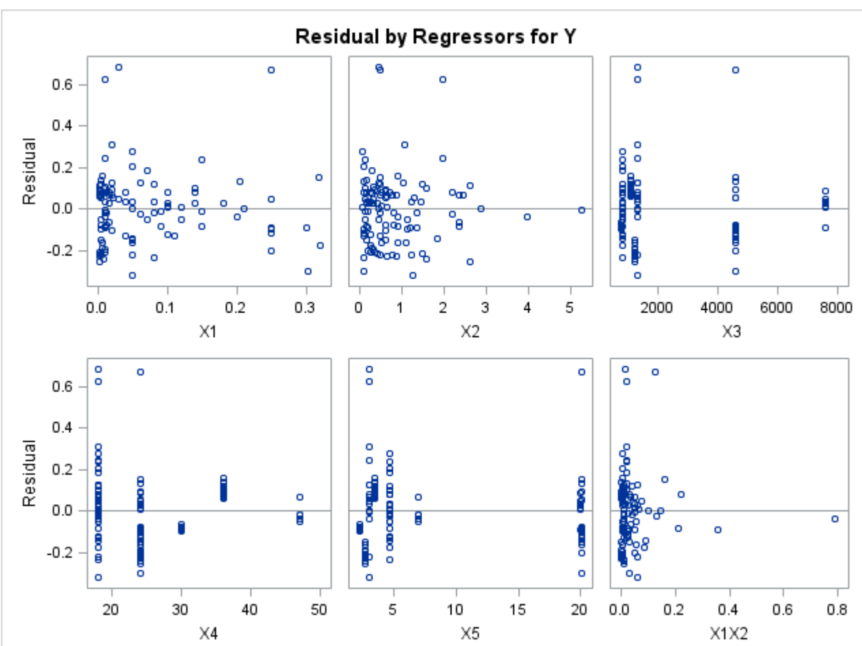
	0.5352	X2 X3 X5 X1X3 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
10	0.5351	X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X3X4 X4X5
10	0.5347	X2 X3 X4 X5 X1X3 X1X5 X2X4 X3X4 X3X5 X4X5
10	0.5345	X2 X3 X5 X1X2 X1X3 X1X5 X2X4 X3X4 X3X5 X4X5
10	0.5344	X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X4 X3X4 X4X5
10	0.5344	X2 X3 X5 X1X3 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
10	0.5343	X2 X3 X5 X1X3 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
10	0.5343	X1 X2 X3 X5 X1X3 X1X5 X2X3 X2X4 X3X4 X4X5
10	0.5343	X1 X2 X3 X4 X5 X1X3 X1X5 X2X4 X3X4 X4X5
10	0.5342	X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X4 X3X4 X4X5
10	0.5342	X1 X2 X3 X5 X1X3 X1X5 X2X4 X2X5 X3X4 X4X5
10	0.5342	X2 X3 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X4X5
11	0.5370	X1 X2 X3 X5 X1X2 X1X3 X1X5 X2X4 X3X4 X3X5 X4X5
11	0.5368	X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
11	0.5367	X1 X2 X3 X5 X1X3 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
11	0.5364	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X3X4 X4X5
11	0.5361	X1 X2 X3 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X4X5
11	0.5360	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X4 X3X4 X4X5
11	0.5359	X1 X2 X3 X5 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X4X5
11	0.5355	X1 X2 X3 X5 X1X3 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
11	0.5354	X1 X2 X3 X4 X5 X1X3 X1X5 X2X4 X3X4 X3X5 X4X5
11	0.5354	X1 X2 X3 X5 X1X3 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.5354	X2 X3 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
11	0.5353	X1 X2 X3 X5 X1X2 X1X3 X1X5 X2X4 X2X5 X3X4 X4X5
11	0.5353	X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
11	0.5353	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X4 X3X4 X4X5
11	0.5353	X1 X2 X3 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X3X4 X4X5
12	0.5377	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
12	0.5371	X1 X2 X3 X5 X1X2 X1X3 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.5370	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X4 X3X4 X3X5 X4X5
12	0.5370	X1 X2 X3 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
12	0.5370	X1 X2 X3 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
12	0.5369	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
12	0.5369	X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.5368	X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
12	0.5368	X1 X2 X3 X5 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.5368	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
12	0.5365	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X4X5
12	0.5365	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X3X4 X4X5
12	0.5364	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X4X5
12	0.5364	X1 X2 X3 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
12	0.5362	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X4X5
13	0.5378	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
13	0.5377	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
13	0.5377	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.5375	X1 X2 X3 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.5374	X1 X2 X3 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.5372	X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.5371	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.5371	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
13	0.5370	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
13		

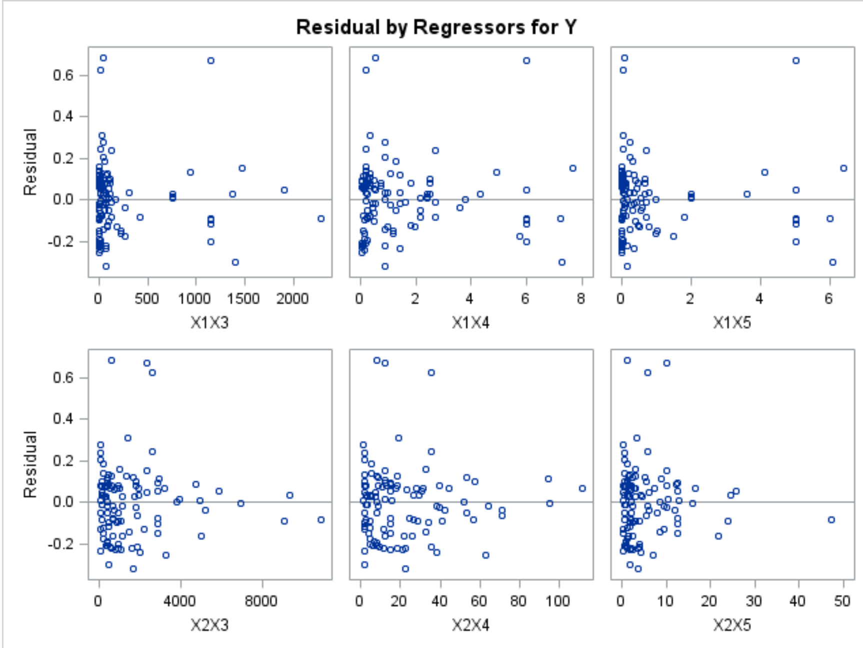
	0.5369	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
13	0.5369	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.5369	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
13	0.5368	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.5366	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X4X5
13	0.5365	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
14	0.5382	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.5378	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
14	0.5377	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.5375	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.5374	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.5373	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.5370	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
14	0.5348	X1 X2 X3 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.5348	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.5339	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
14	0.5338	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
14	0.5329	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.5326	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
14	0.5314	X1 X2 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.5308	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
15	0.5383	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5

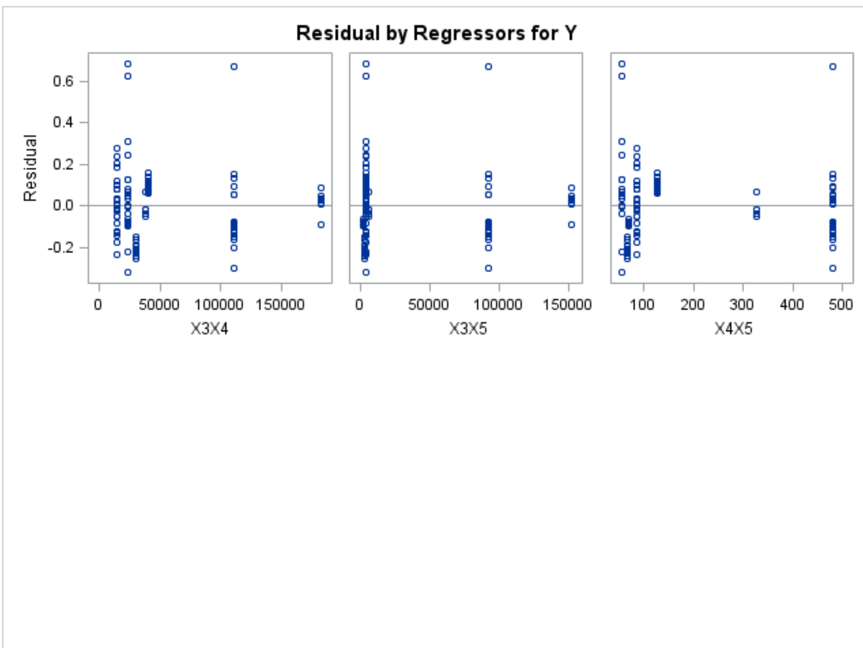
MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Arsenic

The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
X1X3
X1X4
X1X5
X2X3
X2X4
X2X5


Residual by Regressors for Y
Residual
X3X4
X3X5
X4X5

FORWARD REGRESSION
Pollutant: Total Arsenic
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	81
Number of Observations Used	55
Number of Observations with Missing Values	26

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0604	0.5135	0.5135	-0.5135	0.3695	0.8225	0.7263	0.9999	0.2285	0.2827	0.0567	0.5135	0.5135	0.5135	0.1910
X2	0.0604	1.0000	0.4672	0.4672	-0.4672	0.8725	0.3388	0.3933	0.0529	0.9458	0.9016	1.0000	0.4672	0.4672	0.4672	0.0089
X3	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X4	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X5	-0.5135	-0.4672	-1.0000	-1.0000	1.0000	-0.6696	-0.9104	-0.9628	-0.5009	-0.6494	-0.6976	-0.4628	-1.0000	-1.0000	-1.0000	-0.0296
X1X2	0.3695	0.8725	0.6696	0.6696	-0.6696	1.0000	0.6220	0.6527	0.3613	0.9721	0.9822	0.8693	0.6696	0.6696	0.6696	0.0538
X1X3	0.8225	0.3388	0.9104	0.9104	-0.9104	0.6220	1.0000	0.9883	0.8141	0.5406	0.5987	0.3341	0.9104	0.9104	0.9104	0.1117
X1X4	0.7263	0.3933	0.9628	0.9628	-0.9628	0.6527	0.9883	1.0000	0.7162	0.5922	0.6478	0.3886	0.9628	0.9628	0.9628	0.0839
X1X5	0.9999	0.0529	0.5009	0.5009	-0.5009	0.3613	0.8141	0.7162	1.0000	0.2194	0.2732	0.0493	0.5009	0.5009	0.5009	0.1921
X2X3	0.2285	0.9458	0.6494	0.6494	-0.6494	0.9721	0.5406	0.5922	0.2194	1.0000	0.9932	0.9435	0.6494	0.6494	0.6494	0.0164
X2X4	0.2827	0.9016	0.6976	0.6976	-0.6976	0.9822	0.5987	0.6478	0.2732	0.9932	1.0000	0.8986	0.6976	0.6976	0.6976	0.0186
X2X5	0.0567	1.0000	0.4628	0.4628	-0.4628	0.8693	0.3341	0.3886	0.0493	0.9435	0.8986	1.0000	0.4628	0.4628	0.4628	0.0087
X3X4	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X3X5	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X4X5	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
Y	0.1910	0.0089	0.0296	0.0296	-0.0296	0.0538	0.1117	0.0839	0.1921	0.0164	0.0186	0.0087	0.0296	0.0296	0.0296	1.0000

FORWARD REGRESSION
Pollutant: Total Arsenic
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	81
Number of Observations Used	55
Number of Observations with Missing Values	26

Forward Selection: Step 1

Variable X1X5 Entered: R-Square = 0.0369 and C(p) = -1.1139

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00000123	0.00000123	2.03	0.1599
Error	53	0.00003219	6.073641E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00207	0.00029865	0.00002909	47.90	<.0001
X1X5	0.04421	0.03102	0.00000123	2.03	0.1599

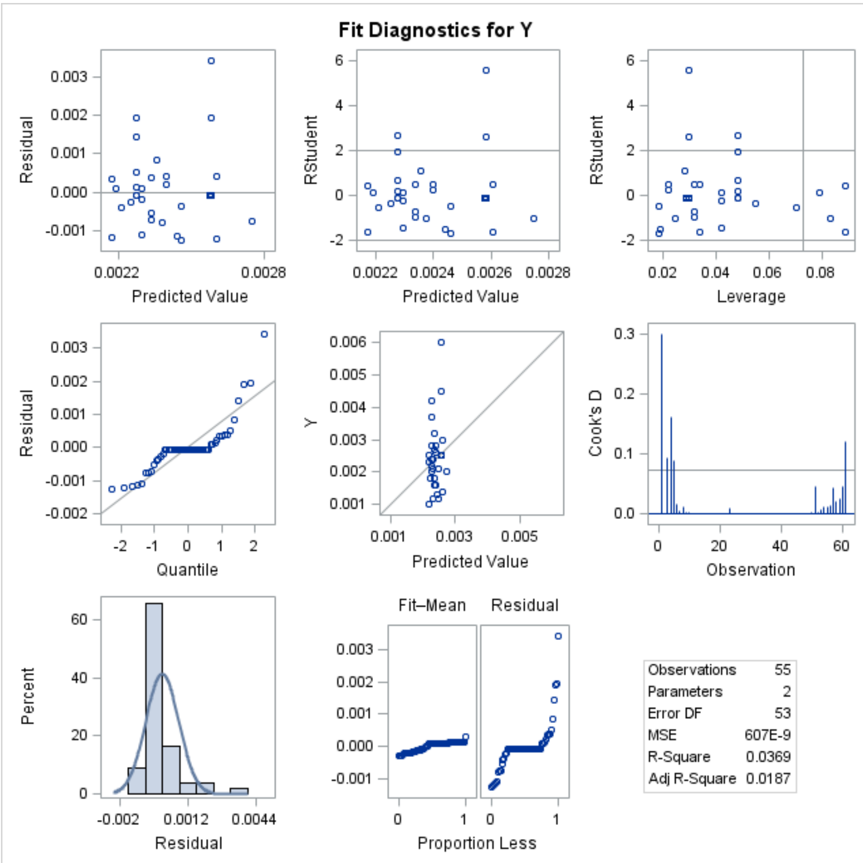
Bounds on condition number: 1, 1

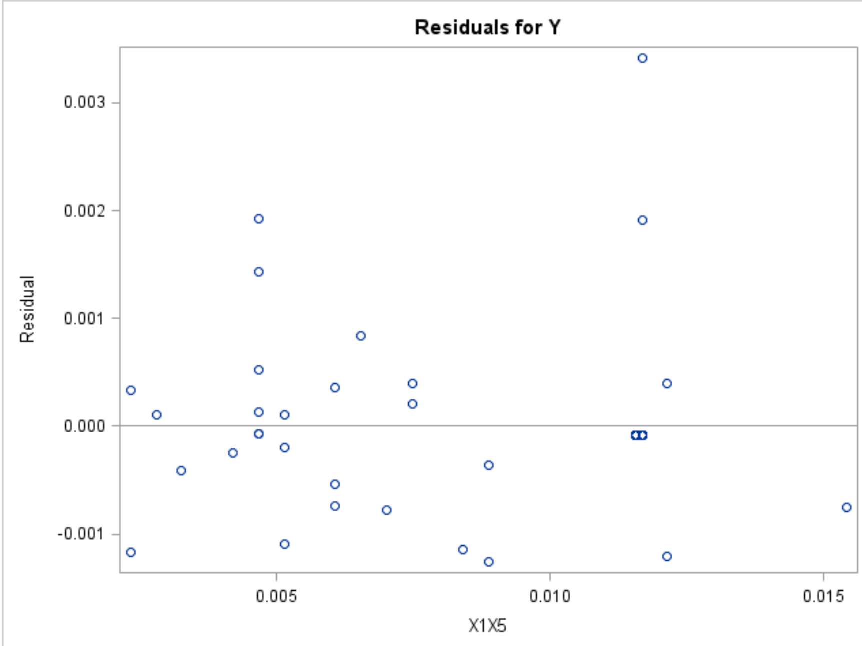
No other variable met the 0.5000 significance level for entry into the model.

Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1X5	1	0.0369	0.0369	-1.1139	2.03	0.1599

FORWARD REGRESSION
Pollutant: Total Arsenic
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residuals for Y
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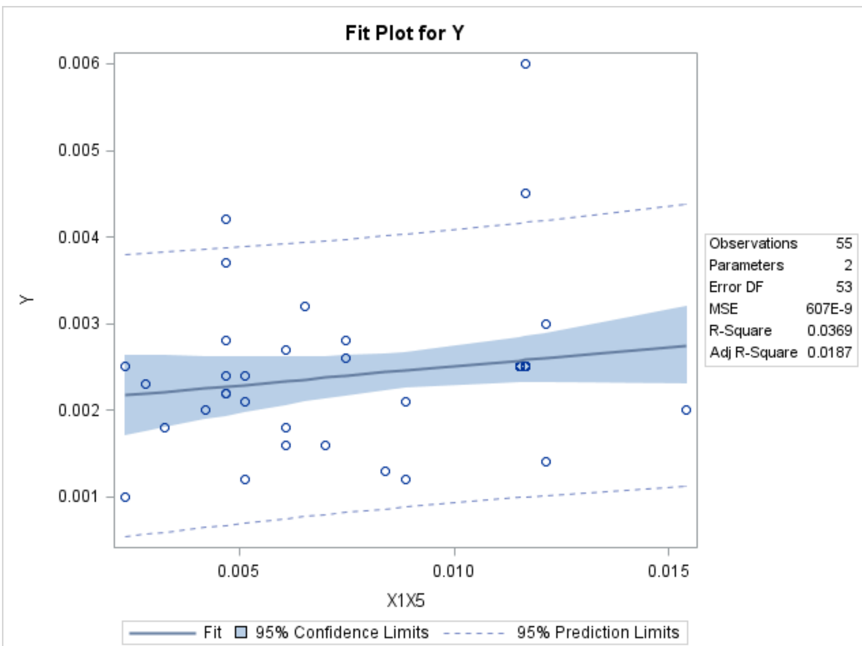
0.002
0.001
0.000
-0.001
Residual
0.005
0.010
0.015
X1X5


Fit Plot for Y
0.006
0.005
0.004
0.003
0.002
0.001
Y
0.005
0.010
0.015
X1X5
Observations 55
Parameters 2
Error DF 53
MSE 607E-9
R-Square 0.0369
Adj R-Square 0.0187
Fit
95% Confidence Limits
95% Prediction Limits

BACKWARD REGRESSION
Pollutant: Total Arsenic
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	81
Number of Observations Used	55
Number of Observations with Missing Values	26

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0604	0.5135	0.5135	-0.5135	0.3695	0.8225	0.7263	0.9999	0.2285	0.2827	0.0567	0.5135	0.5135	0.5135	0.1910
X2	0.0604	1.0000	0.4672	0.4672	-0.4672	0.8725	0.3388	0.3933	0.0529	0.9458	0.9016	1.0000	0.4672	0.4672	0.4672	0.0089
X3	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X4	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X5	-0.5135	-0.4672	-1.0000	-1.0000	1.0000	-0.6696	-0.9104	-0.9628	-0.5009	-0.6494	-0.6976	-0.4628	-1.0000	-1.0000	-1.0000	-0.0296
X1X2	0.3695	0.8725	0.6696	0.6696	-0.6696	1.0000	0.6220	0.6527	0.3613	0.9721	0.9822	0.8693	0.6696	0.6696	0.6696	0.0538
X1X3	0.8225	0.3388	0.9104	0.9104	-0.9104	0.6220	1.0000	0.9883	0.8141	0.5406	0.5987	0.3341	0.9104	0.9104	0.9104	0.1117
X1X4	0.7263	0.3933	0.9628	0.9628	-0.9628	0.6527	0.9883	1.0000	0.7162	0.5922	0.6478	0.3886	0.9628	0.9628	0.9628	0.0839
X1X5	0.9999	0.0529	0.5009	0.5009	-0.5009	0.3613	0.8141	0.7162	1.0000	0.2194	0.2732	0.0493	0.5009	0.5009	0.5009	0.1921
X2X3	0.2285	0.9458	0.6494	0.6494	-0.6494	0.9721	0.5406	0.5922	0.2194	1.0000	0.9932	0.9435	0.6494	0.6494	0.6494	0.0164
X2X4	0.2827	0.9016	0.6976	0.6976	-0.6976	0.9822	0.5987	0.6478	0.2732	0.9932	1.0000	0.8986	0.6976	0.6976	0.6976	0.0186
X2X5	0.0567	1.0000	0.4628	0.4628	-0.4628	0.8693	0.3341	0.3886	0.0493	0.9435	0.8986	1.0000	0.4628	0.4628	0.4628	0.0087
X3X4	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X3X5	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X4X5	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
Y	0.1910	0.0089	0.0296	0.0296	-0.0296	0.0538	0.1117	0.0839	0.1921	0.0164	0.0186	0.0087	0.0296	0.0296	0.0296	1.0000

BACKWARD REGRESSION
Pollutant: Total Arsenic
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	81
Number of Observations Used	55
Number of Observations with Missing Values	26

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.0540 and C(p) = 6.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00000181	3.611699E-7	0.56	0.7302
Error	49	0.00003162	6.452758E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00057865	0.00000789	12.23	0.0010
X1	0.19430	0.22996	4.606381E-7	0.71	0.4023
X2	0.00061379	0.00090028	2.999409E-7	0.46	0.4986
X3	-6.01238E-9	6.372476E-7	5.74409E-11	0.00	0.9925
X1X2	0.35550	0.57666	2.452307E-7	0.38	0.5404
X2X3	-9.8916E-7	0.00000143	3.081319E-7	0.48	0.4928

Bounds on condition number: 120.2, 1000.9

Backward Elimination: Step 1

Variable X3 Removed: R-Square = 0.0540 and C(p) = 4.0001

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00000181	4.51448E-7	0.71	0.5864
Error	50	0.00003162	6.323714E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00038978	0.00001697	26.84	<.0001
X1	0.19325	0.19954	5.931216E-7	0.94	0.3375
X2	0.00061893	0.00070958	4.811298E-7	0.76	0.3872
X1X2	0.35799	0.50715	3.150974E-7	0.50	0.4835
X2X3	-9.97844E-7	0.00000109	5.345876E-7	0.85	0.3623

Bounds on condition number: 70.506, 507.34

Backward Elimination: Step 2

Variable X4 Entered: R-Square = 0.0540 and C(p) = 6.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00000181	3.611699E-7	0.56	0.7302
Error	49	0.00003162	6.452758E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00043556	0.00001389	21.53	<.0001
X1	0.19430	0.22996	4.606381E-7	0.71	0.4023
X2	0.00061379	0.00090028	2.999409E-7	0.46	0.4986
X4	-1.46578E-7	0.00001554	5.74409E-11	0.00	0.9925
X1X2	0.35550	0.57666	2.452307E-7	0.38	0.5404
X2X3	-9.8916E-7	0.00000143	3.081319E-7	0.48	0.4928

Bounds on condition number: 120.2, 1000.9

Backward Elimination: Step 3

Variable X4 Removed: R-Square = 0.0540 and C(p) = 4.0001

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00000181	4.51448E-7	0.71	0.5864
Error	50	0.00003162	6.323714E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F

Intercept	0.00202	0.00038978	0.00001697	26.84	<.0001
X1	0.19325	0.19954	5.931216E-7	0.94	0.3375
X2	0.00061893	0.00070958	4.811298E-7	0.76	0.3872
X1X2	0.35799	0.50715	3.150974E-7	0.50	0.4835
X2X3	-9.97844E-7	0.00000109	5.345876E-7	0.85	0.3623

Bounds on condition number: 70.506, 507.34

Backward Elimination: Step 4

Variable X5 Entered: R-Square = 0.0540 and C(p) = 6.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00000181	3.611699E-7	0.56	0.7302
Error	49	0.00003162	6.452758E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00162	0.04218	9.53811E-10	0.00	0.9695
X1	0.19430	0.22996	4.606381E-7	0.71	0.4023
X2	0.00061379	0.00090028	2.999409E-7	0.46	0.4986
X5	0.00008502	0.00901	5.74409E-11	0.00	0.9925
X1X2	0.35550	0.57666	2.452307E-7	0.38	0.5404
X2X3	-9.8916E-7	0.00000143	3.081319E-7	0.48	0.4928

Bounds on condition number: 120.2, 1000.9

Backward Elimination: Step 5

Variable X5 Removed: R-Square = 0.0540 and C(p) = 4.0001

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00000181	4.51448E-7	0.71	0.5864
Error	50	0.00003162	6.323714E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00038978	0.00001697	26.84	<.0001
X1	0.19325	0.19954	5.931216E-7	0.94	0.3375

X2	0.00061893	0.00070958	4.811298E-7	0.76	0.3872
X1X2	0.35799	0.50715	3.150974E-7	0.50	0.4835
X2X3	-9.97844E-7	0.00000109	5.345876E-7	0.85	0.3623

Bounds on condition number: 70.506, 507.34

Backward Elimination: Step 6

Variable X1X3 Entered: R-Square = 0.0540 and C(p) = 6.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	5	0.00000181	3.611699E-7	0.56	0.7302
Error	49	0.00003162	6.452758E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00040467	0.00001606	24.88	<.0001
X1	0.19625	0.37622	1.755766E-7	0.27	0.6043
X2	0.00061379	0.00090028	2.999409E-7	0.46	0.4986
X1X2	0.35550	0.57666	2.452307E-7	0.38	0.5404
X1X3	-0.00000240	0.00025490	5.74409E-11	0.00	0.9925
X2X3	-9.8916E-7	0.00000143	3.081319E-7	0.48	0.4928

Bounds on condition number: 120.2, 1044.7

Backward Elimination: Step 7

Variable X1X3 Removed: R-Square = 0.0540 and C(p) = 4.0001

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	0.00000181	4.51448E-7	0.71	0.5864
Error	50	0.00003162	6.323714E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00038978	0.00001697	26.84	<.0001
X1	0.19325	0.19954	5.931216E-7	0.94	0.3375
X2	0.00061893	0.00070958	4.811298E-7	0.76	0.3872
X1X2	0.35799	0.50715	3.150974E-7	0.50	0.4835

X2X3	-9.97844E-7	0.00000109	5.345876E-7	0.85	0.3623

Bounds on condition number: 70.506, 507.34

Backward Elimination: Step 8

Variable X1X4 Entered: R-Square = 0.0540 and C(p) = 6.0000
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	5	0.00000181	3.611699E-7	0.56	0.7302
Error	49	0.00003162	6.452758E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00040467	0.00001606	24.88	<.0001
X1	0.19535	0.30026	2.731331E-7	0.42	0.5183
X2	0.00061379	0.00090028	2.999409E-7	0.46	0.4986
X1X2	0.35550	0.57666	2.452307E-7	0.38	0.5404
X1X4	-0.00005863	0.00621	5.74409E-11	0.00	0.9925
X2X3	-9.8916E-7	0.00000143	3.081319E-7	0.48	0.4928

Bounds on condition number: 120.2, 1019.7

Backward Elimination: Step 9

Variable X1X4 Removed: R-Square = 0.0540 and C(p) = 4.0001

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	0.00000181	4.51448E-7	0.71	0.5864
Error	50	0.00003162	6.323714E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00038978	0.00001697	26.84	<.0001
X1	0.19325	0.19954	5.931216E-7	0.94	0.3375
X2	0.00061893	0.00070958	4.811298E-7	0.76	0.3872
X1X2	0.35799	0.50715	3.150974E-7	0.50	0.4835
X2X3	-9.97844E-7	0.00000109	5.345876E-7	0.85	0.3623

Bounds on condition number: 70.506, 507.34

Backward Elimination: Step 10

Variable X1X5 Entered: R-Square = 0.0540 and C(p) = 6.0000
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00000181	3.611699E-7	0.56	0.7302
Error	49	0.00003162	6.452758E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00040467	0.00001606	24.88	<.0001
X1	0.03549	16.72248	2.90592E-12	0.00	0.9983
X2	0.00061379	0.00090028	2.999409E-7	0.46	0.4986
X1X2	0.35550	0.57666	2.452307E-7	0.38	0.5404
X1X5	0.03401	3.60427	5.74409E-11	0.00	0.9925
X2X3	-9.8916E-7	0.00000143	3.081319E-7	0.48	0.4928

Bounds on condition number: 12763, 128330

Backward Elimination: Step 11

Variable X1 Removed: R-Square = 0.0540 and C(p) = 4.0000

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00000181	4.514616E-7	0.71	0.5863
Error	50	0.00003162	6.323703E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00039077	0.00001687	26.68	<.0001
X2	0.00061263	0.00070857	4.727275E-7	0.75	0.3914
X1X2	0.35494	0.50873	3.078325E-7	0.49	0.4886
X1X5	0.04165	0.04301	5.931762E-7	0.94	0.3374
X2X3	-9.87214E-7	0.00000109	5.205551E-7	0.82	0.3686

Bounds on condition number: 70.872, 509.56

Backward Elimination: Step 12

Variable X3X4 Entered: R-Square = 0.0540 and C(p) = 6.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00000181	3.611699E-7	0.56	0.7302
Error	49	0.00003162	6.452758E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00039560	0.00001680	26.03	<.0001
X2	0.00061379	0.00090028	2.999409E-7	0.46	0.4986
X1X2	0.35550	0.57666	2.452307E-7	0.38	0.5404
X1X5	0.04160	0.04924	4.606381E-7	0.71	0.4023
X2X3	-9.8916E-7	0.00000143	3.081319E-7	0.48	0.4928
X3X4	1.67298E-11	7.883541E-9	2.90592E-12	0.00	0.9983

Bounds on condition number: 120.2, 1000.5

Backward Elimination: Step 13

Variable X3X4 Removed: R-Square = 0.0540 and C(p) = 4.0000

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00000181	4.514616E-7	0.71	0.5863
Error	50	0.00003162	6.323703E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00039077	0.00001687	26.68	<.0001
X2	0.00061263	0.00070857	4.727275E-7	0.75	0.3914
X1X2	0.35494	0.50873	3.078325E-7	0.49	0.4886
X1X5	0.04165	0.04301	5.931762E-7	0.94	0.3374
X2X3	-9.87214E-7	0.00000109	5.205551E-7	0.82	0.3686

Bounds on condition number: 70.872, 509.56

Backward Elimination: Step 14

Variable X3X5 Entered: R-Square = 0.0540 and C(p) = 6.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00000181	3.611699E-7	0.56	0.7302
Error	49	0.00003162	6.452758E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00058895	0.00000757	11.73	0.0013
X2	0.00061379	0.00090028	2.999409E-7	0.46	0.4986
X1X2	0.35550	0.57666	2.452307E-7	0.38	0.5404
X1X5	0.04160	0.04924	4.606381E-7	0.71	0.4023
X2X3	-9.8916E-7	0.00000143	3.081319E-7	0.48	0.4928
X3X5	2.94465E-10	1.3876E-7	2.90592E-12	0.00	0.9983

Bounds on condition number: 120.2, 1000.5

Backward Elimination: Step 15

Variable X3X5 Removed: R-Square = 0.0540 and C(p) = 4.0000

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00000181	4.514616E-7	0.71	0.5863
Error	50	0.00003162	6.323703E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00039077	0.00001687	26.68	<.0001
X2	0.00061263	0.00070857	4.727275E-7	0.75	0.3914
X1X2	0.35494	0.50873	3.078325E-7	0.49	0.4886
X1X5	0.04165	0.04301	5.931762E-7	0.94	0.3374
X2X3	-9.87214E-7	0.00000109	5.205551E-7	0.82	0.3686

Bounds on condition number: 70.872, 509.56

Backward Elimination: Step 16

Variable X4X5 Entered: R-Square = 0.0540 and C(p) = 6.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00000181	3.611699E-7	0.56	0.7302
Error	49	0.00003162	6.452758E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00043967	0.00001359	21.06	<.0001
X2	0.00061379	0.00090028	2.999409E-7	0.46	0.4986
X1X2	0.35550	0.57666	2.452307E-7	0.38	0.5404
X1X5	0.04160	0.04924	4.606381E-7	0.71	0.4023
X2X3	-9.8916E-7	0.00000143	3.081319E-7	0.48	0.4928
X4X5	7.137564E-9	0.00000336	2.90592E-12	0.00	0.9983

Bounds on condition number: 120.2, 1000.5

Backward Elimination: Step 17

Variable X4X5 Removed: R-Square = 0.0540 and C(p) = 4.0000

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00000181	4.514616E-7	0.71	0.5863
Error	50	0.00003162	6.323703E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00202	0.00039077	0.00001687	26.68	<.0001
X2	0.00061263	0.00070857	4.727275E-7	0.75	0.3914
X1X2	0.35494	0.50873	3.078325E-7	0.49	0.4886
X1X5	0.04165	0.04301	5.931762E-7	0.94	0.3374
X2X3	-9.87214E-7	0.00000109	5.205551E-7	0.82	0.3686

Bounds on condition number: 70.872, 509.56

Backward Elimination: Step 18

Variable X1X2 Removed: R-Square = 0.0448 and C(p) = 2.4771

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	0.00000150	4.99338E-7	0.80	0.5009
Error	51	0.00003193	6.260069E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00194	0.00037172	0.00001702	27.19	<.0001
X2	0.00039040	0.00062974	2.405812E-7	0.38	0.5381
X1X5	0.05676	0.03697	0.00000148	2.36	0.1309
X2X3	-3.01369E-7	4.641648E-7	2.638946E-7	0.42	0.5191

Bounds on condition number: 13.028, 80.528

Backward Elimination: Step 19

Variable X2 Removed: R-Square = 0.0376 and C(p) = 0.8499

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	0.00000126	6.287165E-7	1.02	0.3690
Error	52	0.00003217	6.185948E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00207	0.00030214	0.00002907	46.99	<.0001
X1X5	0.04558	0.03208	0.00000125	2.02	0.1614
X2X3	-2.54653E-8	1.310252E-7	2.336648E-8	0.04	0.8467

Bounds on condition number: 1.0506, 4.2023

Backward Elimination: Step 20

Variable X2X4 Entered: R-Square = 0.0448 and C(p) = 2.4771
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	0.00000150	4.99338E-7	0.80	0.5009

Error	51	0.00003193	6.260069E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00194	0.00037172	0.00001702	27.19	<.0001
X1X5	0.05676	0.03697	0.00000148	2.36	0.1309
X2X3	7.447856E-7	0.00000125	2.224332E-7	0.36	0.5538
X2X4	-0.00002550	0.00004114	2.405812E-7	0.38	0.5381

Bounds on condition number: 97.108, 578.67

Backward Elimination: Step 21

Variable X2X3 Removed: R-Square = 0.0382 and C(p) = 0.8218

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00000128	6.377905E-7	1.03	0.3636
Error	52	0.00003215	6.182458E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00207	0.00030132	0.00002908	47.04	<.0001
X1X5	0.04652	0.03253	0.00000126	2.04	0.1587
X2X4	-0.00000112	0.00000431	4.151445E-8	0.07	0.7966

Bounds on condition number: 1.0807, 4.3227

Backward Elimination: Step 22

Variable X2X5 Entered: R-Square = 0.0448 and C(p) = 2.4771
Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00000150	4.99338E-7	0.80	0.5009
Error	51	0.00003193	6.260069E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00194	0.00037172	0.00001702	27.19	<.0001
X1X5	0.05676	0.03697	0.00000148	2.36	0.1309

X2X4	-0.00000725	0.00001116	2.639294E-7	0.42	0.5190
X2X5	0.00005912	0.00009918	2.224332E-7	0.36	0.5538

Bounds on condition number: 7.1433, 45.444

Backward Elimination: Step 23

Variable X2X5 Removed: R-Square = 0.0382 and C(p) = 0.8218

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00000128	6.377905E-7	1.03	0.3636
Error	52	0.00003215	6.182458E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00207	0.00030132	0.00002908	47.04	<.0001
X1X5	0.04652	0.03253	0.00000126	2.04	0.1587
X2X4	-0.00000112	0.00000431	4.151445E-8	0.07	0.7966

Bounds on condition number: 1.0807, 4.3227

Backward Elimination: Step 24

Variable X2X4 Removed: R-Square = 0.0369 and C(p) = -1.1139

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00000123	0.00000123	2.03	0.1599
Error	53	0.00003219	6.073641E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00207	0.00029865	0.00002909	47.90	<.0001
X1X5	0.04421	0.03102	0.00000123	2.03	0.1599

Bounds on condition number: 1, 1

Backward Elimination: Step 25

Variable X1X5 Removed: R-Square = 0.0000 and C(p) = -1.2014

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	0	0	.	.	.
Error	54	0.00003342	6.189697E-7		
Corrected Total	54	0.00003342			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00247	0.00010608	0.00033432	540.12	<.0001

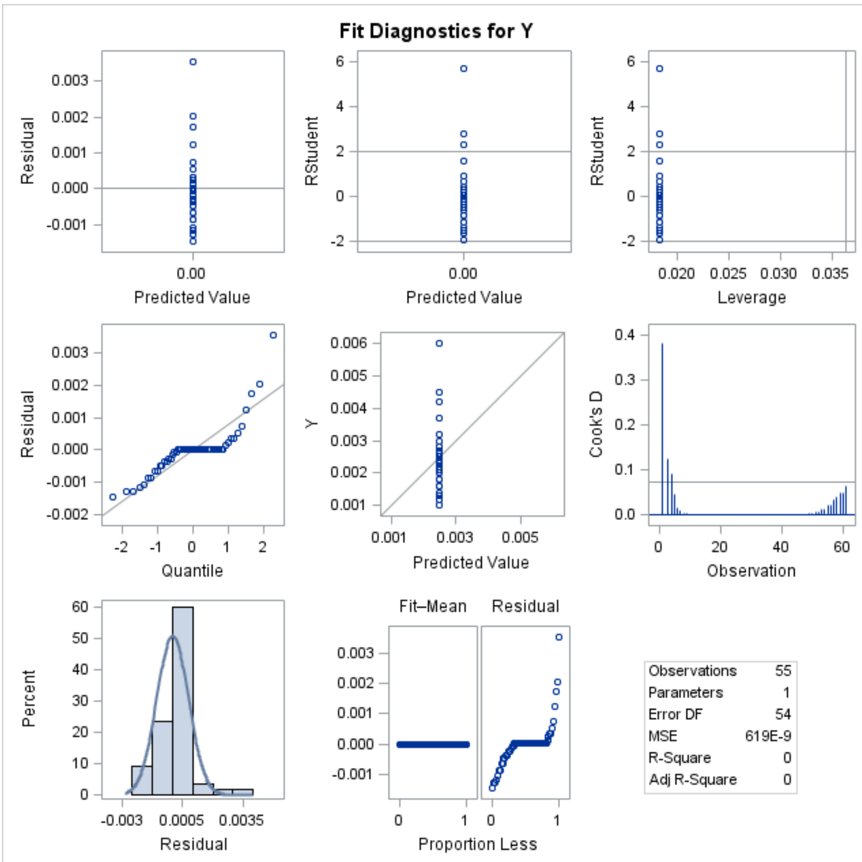
Bounds on condition number: 0, 0

All variables left in the model are significant at the 0.1000 level.

Summary of Backward Elimination								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1		X3	4	0.0000	0.0540	4.0001	0.00	0.9925
2	X4		5	0.0000	0.0540	6.0000	0.00	0.9925
3		X4	4	0.0000	0.0540	4.0001	0.00	0.9925
4	X5		5	0.0000	0.0540	6.0000	0.00	0.9925
5		X5	4	0.0000	0.0540	4.0001	0.00	0.9925
6	X1X3		5	0.0000	0.0540	6.0000	0.00	0.9925
7		X1X3	4	0.0000	0.0540	4.0001	0.00	0.9925
8	X1X4		5	0.0000	0.0540	6.0000	0.00	0.9925
9		X1X4	4	0.0000	0.0540	4.0001	0.00	0.9925
10	X1X5		5	0.0000	0.0540	6.0000	0.00	0.9925
11		X1	4	0.0000	0.0540	4.0000	0.00	0.9983
12	X3X4		5	0.0000	0.0540	6.0000	0.00	0.9983
13		X3X4	4	0.0000	0.0540	4.0000	0.00	0.9983
14	X3X5		5	0.0000	0.0540	6.0000	0.00	0.9983
15		X3X5	4	0.0000	0.0540	4.0000	0.00	0.9983
16	X4X5		5	0.0000	0.0540	6.0000	0.00	0.9983
17		X4X5	4	0.0000	0.0540	4.0000	0.00	0.9983
18		X1X2	3	0.0092	0.0448	2.4771	0.49	0.4886
19		X2	2	0.0072	0.0376	0.8499	0.38	0.5381
20	X2X4		3	0.0072	0.0448	2.4771	0.38	0.5381
21		X2X3	2	0.0067	0.0382	0.8218	0.36	0.5538
22	X2X5		3	0.0067	0.0448	2.4771	0.36	0.5538
23		X2X5	2	0.0067	0.0382	0.8218	0.36	0.5538
24		X2X4	1	0.0012	0.0369	-1.1139	0.07	0.7966
25		X1X5	0	0.0369	0.0000	-1.2014	2.03	0.1599

BACKWARD REGRESSION
Pollutant: Total Arsenic
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Residual by Regressors for Y

STEPWISE REGRESSION
Pollutant: Total Arsenic
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	81
Number of Observations Used	55
Number of Observations with Missing Values	26

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0604	0.5135	0.5135	-0.5135	0.3695	0.8225	0.7263	0.9999	0.2285	0.2827	0.0567	0.5135	0.5135	0.5135	0.1910
X2	0.0604	1.0000	0.4672	0.4672	-0.4672	0.8725	0.3388	0.3933	0.0529	0.9458	0.9016	1.0000	0.4672	0.4672	0.4672	0.0089
X3	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X4	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X5	-0.5135	-0.4672	-1.0000	-1.0000	1.0000	-0.6696	-0.9104	-0.9628	-0.5009	-0.6494	-0.6976	-0.4628	-1.0000	-1.0000	-1.0000	-0.0296
X1X2	0.3695	0.8725	0.6696	0.6696	-0.6696	1.0000	0.6220	0.6527	0.3613	0.9721	0.9822	0.8693	0.6696	0.6696	0.6696	0.0538
X1X3	0.8225	0.3388	0.9104	0.9104	-0.9104	0.6220	1.0000	0.9883	0.8141	0.5406	0.5987	0.3341	0.9104	0.9104	0.9104	0.1117
X1X4	0.7263	0.3933	0.9628	0.9628	-0.9628	0.6527	0.9883	1.0000	0.7162	0.5922	0.6478	0.3886	0.9628	0.9628	0.9628	0.0839
X1X5	0.9999	0.0529	0.5009	0.5009	-0.5009	0.3613	0.8141	0.7162	1.0000	0.2194	0.2732	0.0493	0.5009	0.5009	0.5009	0.1921
X2X3	0.2285	0.9458	0.6494	0.6494	-0.6494	0.9721	0.5406	0.5922	0.2194	1.0000	0.9932	0.9435	0.6494	0.6494	0.6494	0.0164
X2X4	0.2827	0.9016	0.6976	0.6976	-0.6976	0.9822	0.5987	0.6478	0.2732	0.9932	1.0000	0.8986	0.6976	0.6976	0.6976	0.0186
X2X5	0.0567	1.0000	0.4628	0.4628	-0.4628	0.8693	0.3341	0.3886	0.0493	0.9435	0.8986	1.0000	0.4628	0.4628	0.4628	0.0087
X3X4	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X3X5	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X4X5	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
Y	0.1910	0.0089	0.0296	0.0296	-0.0296	0.0538	0.1117	0.0839	0.1921	0.0164	0.0186	0.0087	0.0296	0.0296	0.0296	1.0000

STEPWISE REGRESSION
Pollutant: Total Arsenic
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

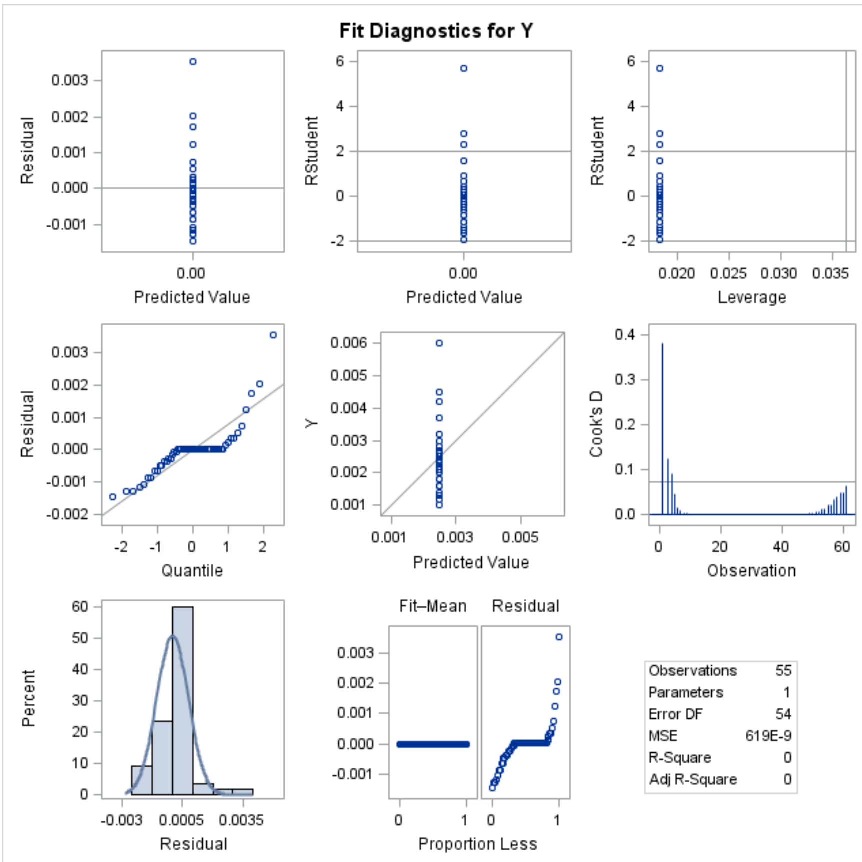
The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	81
Number of Observations Used	55
Number of Observations with Missing Values	26

No variable met the 0.1500 significance level for entry into the model.

STEPWISE REGRESSION
Pollutant: Total Arsenic
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Residual by Regressors for Y

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Cadmium

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The REG Procedure

Number of Observations Read	81
Number of Observations Used	55
Number of Observations with Missing Values	26

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0604	0.5135	0.5135	-0.5135	0.3695	0.8225	0.7263	0.9999	0.2285	0.2827	0.0567	0.5135	0.5135	0.5135	0.1910
X2	0.0604	1.0000	0.4672	0.4672	-0.4672	0.8725	0.3388	0.3933	0.0529	0.9458	0.9016	1.0000	0.4672	0.4672	0.4672	0.0089
X3	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X4	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X5	-0.5135	-0.4672	-1.0000	-1.0000	1.0000	-0.6696	-0.9104	-0.9628	-0.5009	-0.6494	-0.6976	-0.4628	-1.0000	-1.0000	-1.0000	-0.0296
X1X2	0.3695	0.8725	0.6696	0.6696	-0.6696	1.0000	0.6220	0.6527	0.3613	0.9721	0.9822	0.8693	0.6696	0.6696	0.6696	0.0538
X1X3	0.8225	0.3388	0.9104	0.9104	-0.9104	0.6220	1.0000	0.9883	0.8141	0.5406	0.5987	0.3341	0.9104	0.9104	0.9104	0.1117
X1X4	0.7263	0.3933	0.9628	0.9628	-0.9628	0.6527	0.9883	1.0000	0.7162	0.5922	0.6478	0.3886	0.9628	0.9628	0.9628	0.0839
X1X5	0.9999	0.0529	0.5009	0.5009	-0.5009	0.3613	0.8141	0.7162	1.0000	0.2194	0.2732	0.0493	0.5009	0.5009	0.5009	0.1921
X2X3	0.2285	0.9458	0.6494	0.6494	-0.6494	0.9721	0.5406	0.5922	0.2194	1.0000	0.9932	0.9435	0.6494	0.6494	0.6494	0.0164
X2X4	0.2827	0.9016	0.6976	0.6976	-0.6976	0.9822	0.5987	0.6478	0.2732	0.9932	1.0000	0.8986	0.6976	0.6976	0.6976	0.0186
X2X5	0.0567	1.0000	0.4628	0.4628	-0.4628	0.8693	0.3341	0.3886	0.0493	0.9435	0.8986	1.0000	0.4628	0.4628	0.4628	0.0087
X3X4	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X3X5	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
X4X5	0.5135	0.4672	1.0000	1.0000	-1.0000	0.6696	0.9104	0.9628	0.5009	0.6494	0.6976	0.4628	1.0000	1.0000	1.0000	0.0296
Y	0.1910	0.0089	0.0296	0.0296	-0.0296	0.0538	0.1117	0.0839	0.1921	0.0164	0.0186	0.0087	0.0296	0.0296	0.0296	1.0000

==
MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Cadmium
==

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	81
Number of Observations Used	55
Number of Observations with Missing Values	26

Number in Model	R-Square	Variables in Model
1	0.0369	X1X5
1	0.0365	X1
1	0.0125	X1X3
1	0.0070	X1X4
1	0.0029	X1X2
1	0.0009	X4
1	0.0009	X3
1	0.0009	X3X4
1	0.0009	X3X5
1	0.0009	X4X5
1	0.0009	X5
1	0.0003	X2X4
1	0.0003	X2X3
1	0.0001	X2
1	0.0001	X2X5
2	0.0428	X1 X1X5
2	0.0428	X1X5 X4X5
2	0.0428	X1X5 X3X5
2	0.0428	X1X4 X1X5
2	0.0428	X1X5 X3X4
2	0.0428	X1X3 X1X5
2	0.0428	X4 X1X5
2	0.0428	X3 X1X5
2	0.0428	X1 X4X5
2	0.0428	X1 X3X5
2	0.0428	X1 X3X4
2	0.0428	X1 X4
2	0.0428	X1 X1X4
2	0.0428	X1 X3
2	0.0428	X1 X1X3
3	0.0489	X1X2 X1X5 X2X4
3	0.0489	X1 X1X2 X2X4
3	0.0448	X2 X1X5 X2X5
3	0.0448	X1X5 X2X3 X2X4
3	0.0448	X2 X1X5 X2X4
3	0.0448	X2 X1X5 X2X3

3	0.0448	X1X5 X2X4 X2X5
3	0.0448	X1X5 X2X3 X2X5
3	0.0448	X1 X1X5 X2X5
3	0.0448	X1X5 X2X5 X4X5
3	0.0448	X1X5 X2X5 X3X5
3	0.0448	X1X4 X1X5 X2X5
3	0.0448	X1X3 X1X5 X2X5
3	0.0448	X1X5 X2X5 X3X4
3	0.0448	X4 X1X5 X2X5
4	0.0540	X2 X1X2 X1X5 X2X5
4	0.0540	X2 X1X2 X1X5 X2X3
4	0.0540	X1X2 X1X5 X2X3 X2X4
4	0.0540	X2 X1X2 X1X5 X2X4
4	0.0540	X1X2 X1X5 X2X4 X2X5
4	0.0540	X1X2 X1X5 X2X3 X2X5
4	0.0540	X1 X2 X1X2 X2X5
4	0.0540	X1 X1X2 X2X3 X2X4
4	0.0540	X1 X2 X1X2 X2X4
4	0.0540	X1 X2 X1X2 X2X3
4	0.0540	X1 X1X2 X2X4 X2X5
4	0.0540	X1 X1X2 X2X3 X2X5
4	0.0497	X1 X1X2 X1X5 X2X4
4	0.0497	X1X2 X1X3 X2X4 X3X5
4	0.0497	X1X2 X1X3 X1X4 X2X4
5	0.0540	X1 X2 X1X2 X2X5 X3X4
5	0.0540	X1 X2 X3 X1X2 X2X5
5	0.0540	X1 X2 X1X2 X1X3 X2X5
5	0.0540	X1 X2 X1X2 X1X4 X2X5
5	0.0540	X1 X2 X5 X1X2 X2X5
5	0.0540	X1 X2 X4 X1X2 X2X5
5	0.0540	X2 X5 X1X2 X1X5 X2X5
5	0.0540	X2 X1X2 X1X5 X2X5 X3X5
5	0.0540	X2 X1X2 X1X3 X1X5 X2X5
5	0.0540	X2 X1X2 X1X4 X1X5 X2X5
5	0.0540	X2 X1X2 X1X5 X2X5 X3X4
5	0.0540	X2 X1X2 X1X5 X2X5 X4X5
5	0.0540	X2 X4 X1X2 X1X5 X2X5
5	0.0540	X2 X3 X1X2 X1X5 X2X5
5	0.0540	X1 X2 X1X2 X1X5 X2X5

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Cadmium

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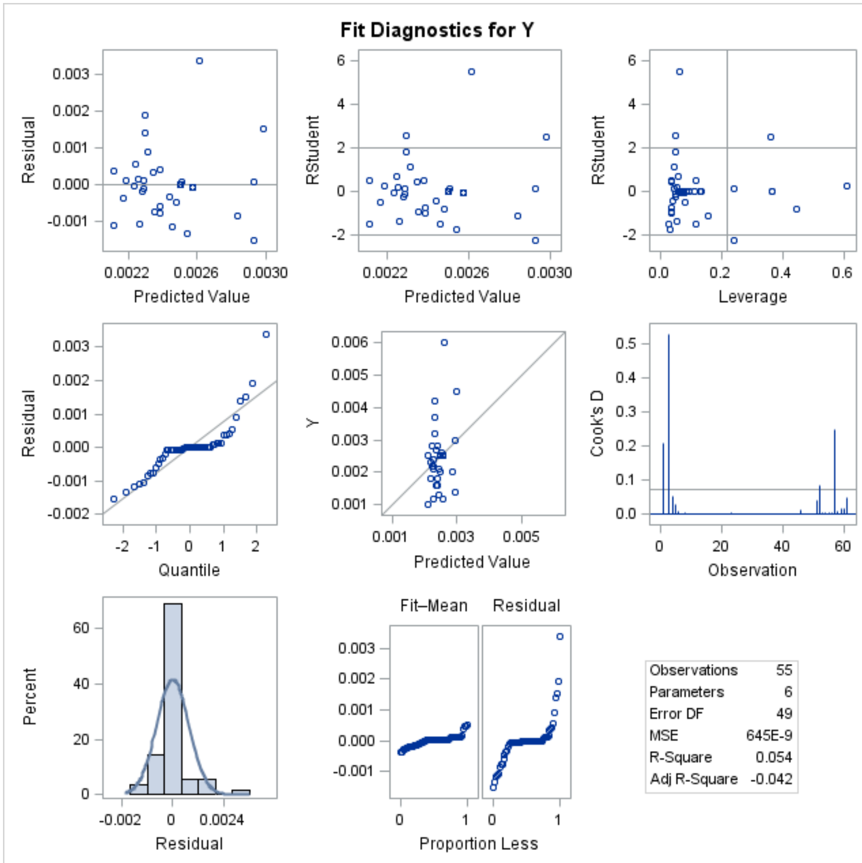
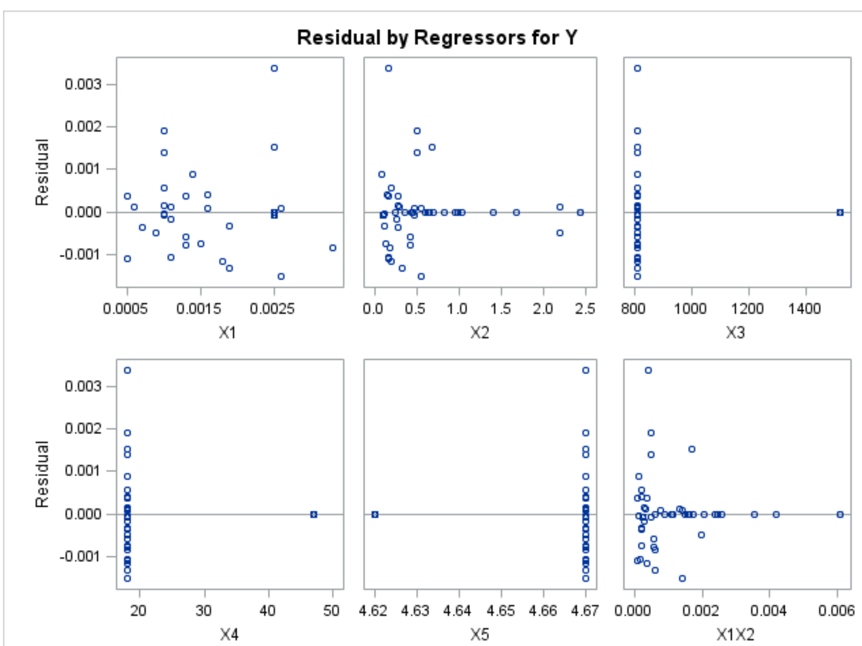
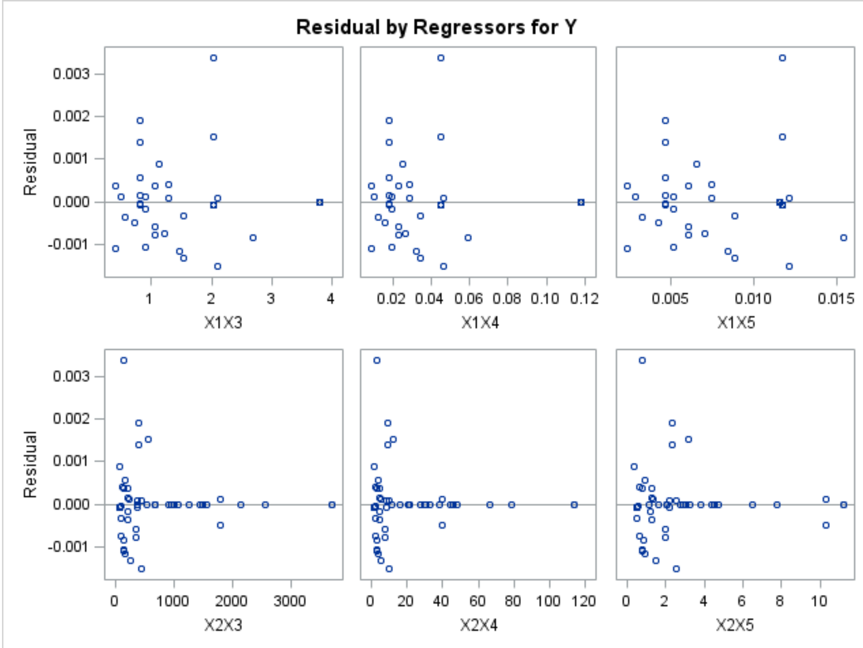
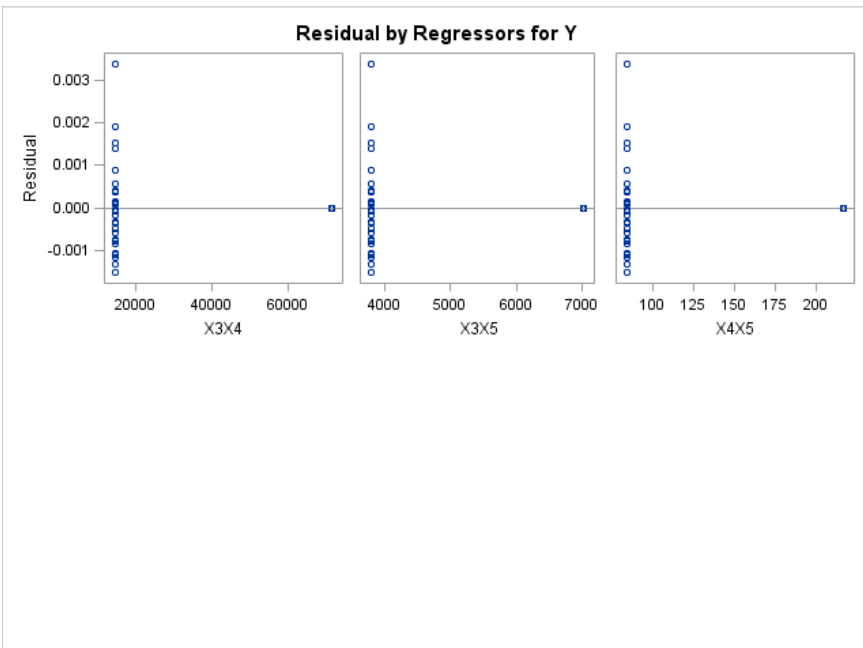
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
0.003
0.002
0.001
0.000
-0.001
X1X3
X1X4
X1X5
X2X3
X2X4
X2X5


Residual by Regressors for Y
Residual
X3X4
X3X5
X4X5

FORWARD REGRESSION
Pollutant: Total Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	161
Number of Observations Used	70
Number of Observations with Missing Values	91

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0917	0.1789	0.6838	-0.0770	0.5709	0.5547	0.8969	0.5538	0.0417	0.3889	-0.1037	0.4182	0.0658	0.1969	0.5930
X2	0.0917	1.0000	0.0596	0.2955	0.0622	0.7371	-0.0063	0.2299	-0.0117	0.6556	0.8538	0.6594	0.1620	0.0268	0.1757	0.1079
X3	0.1789	0.0596	1.0000	0.1048	0.9339	0.0299	0.8117	0.0936	0.8534	0.5736	0.0534	0.4989	0.9282	0.9893	0.9274	0.1310
X4	0.6838	0.2955	0.1048	1.0000	-0.0746	0.6305	0.2488	0.9120	0.2096	0.2139	0.6390	0.0816	0.4671	-0.0342	0.3240	0.5305
X5	-0.0770	0.0622	0.9339	-0.0746	1.0000	-0.0944	0.5595	-0.1355	0.6343	0.6296	-0.0264	0.6104	0.7997	0.9620	0.9192	-0.0824
X1X2	0.5709	0.7371	0.0299	0.6305	-0.0944	1.0000	0.1857	0.6796	0.1686	0.4235	0.9369	0.3097	0.2628	-0.0597	0.1593	0.4271
X1X3	0.5547	-0.0063	0.8117	0.2488	0.5595	0.1857	1.0000	0.3866	0.9885	0.2819	0.0926	0.1482	0.8193	0.7558	0.6290	0.4169
X1X4	0.8969	0.2299	0.0936	0.9120	-0.1355	0.6796	0.3866	1.0000	0.3560	0.1180	0.5751	-0.0275	0.4261	-0.0426	0.2315	0.6372
X1X5	0.5538	-0.0117	0.8534	0.2096	0.6343	0.1686	0.9885	0.3560	1.0000	0.3307	0.0721	0.2060	0.8410	0.8072	0.6845	0.3679
X2X3	0.0417	0.6556	0.5736	0.2139	0.6296	0.4235	0.2819	0.1180	0.3307	1.0000	0.5664	0.9768	0.5867	0.5633	0.6817	0.0262
X2X4	0.3889	0.8538	0.0534	0.6390	-0.0264	0.9369	0.0926	0.5751	0.0721	0.5664	1.0000	0.4770	0.2855	-0.0306	0.2272	0.3273
X2X5	-0.1037	0.6594	0.4989	0.0816	0.6104	0.3097	0.1482	-0.0275	0.2060	0.9768	0.4770	1.0000	0.4700	0.5110	0.6113	-0.0881
X3X4	0.4182	0.1620	0.9282	0.4671	0.7997	0.2628	0.8193	0.4261	0.8410	0.5867	0.2855	0.4700	1.0000	0.8664	0.9431	0.3179
X3X5	0.0658	0.0268	0.9893	-0.0342	0.9620	-0.0597	0.7558	-0.0426	0.8072	0.5633	-0.0306	0.5110	0.8664	1.0000	0.8992	0.0411
X4X5	0.1969	0.1757	0.9274	0.3240	0.9192	0.1593	0.6290	0.2315	0.6845	0.6817	0.2272	0.6113	0.9431	0.8992	1.0000	0.1313
Y	0.5930	0.1079	0.1310	0.5305	-0.0824	0.4271	0.4169	0.6372	0.3679	0.0262	0.3273	-0.0881	0.3179	0.0411	0.1313	1.0000

FORWARD REGRESSION
Pollutant: Total Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	161
Number of Observations Used	70
Number of Observations with Missing Values	91

Forward Selection: Step 1

Variable X1X4 Entered: R-Square = 0.4060 and C(p) = 3.7804

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00000360	0.00000360	46.49	<.0001
Error	68	0.00000527	7.749406E-8		
Corrected Total	69	0.00000887			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00029616	0.00004674	0.00000311	40.15	<.0001
X1X4	0.01418	0.00208	0.00000360	46.49	<.0001

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X1X3 Entered: R-Square = 0.4402 and C(p) = 1.7630

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00000391	0.00000195	26.35	<.0001
Error	67	0.00000497	7.41226E-8		
Corrected Total	69	0.00000887			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00027737	0.00004665	0.00000262	35.35	<.0001

X1X3	0.00004779	0.00002362	3.033821E-7	4.09	0.0471
X1X4	0.01246	0.00221	0.00000236	31.89	<.0001

Bounds on condition number: 1.1757, 4.7027

Forward Selection: Step 3

Variable X1X5 Entered: R-Square = 0.4795 and C(p) = -0.8461

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00000425	0.00000142	20.26	<.0001
Error	66	0.00000462	6.997204E-8		
Corrected Total	69	0.00000887			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00041449	0.00007638	0.00000206	29.45	<.0001
X1X3	0.00036505	0.00014409	4.491341E-7	6.42	0.0137
X1X4	0.01155	0.00218	0.00000196	28.01	<.0001
X1X5	-0.12390	0.05555	3.480599E-7	4.97	0.0291

Bounds on condition number: 46.33, 278.02

Forward Selection: Step 4

Variable X4 Entered: R-Square = 0.4929 and C(p) = -0.4239

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00000437	0.00000109	15.79	<.0001
Error	65	0.00000450	6.921538E-8		
Corrected Total	69	0.00000887			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00056686	0.00013877	0.00000115	16.69	0.0001
X4	-0.00000882	0.00000672	1.191545E-7	1.72	0.1941
X1X3	0.00039279	0.00014486	5.089093E-7	7.35	0.0086
X1X4	0.01783	0.00526	7.958162E-7	11.50	0.0012
X1X5	-0.13813	0.05631	4.16553E-7	6.02	0.0169

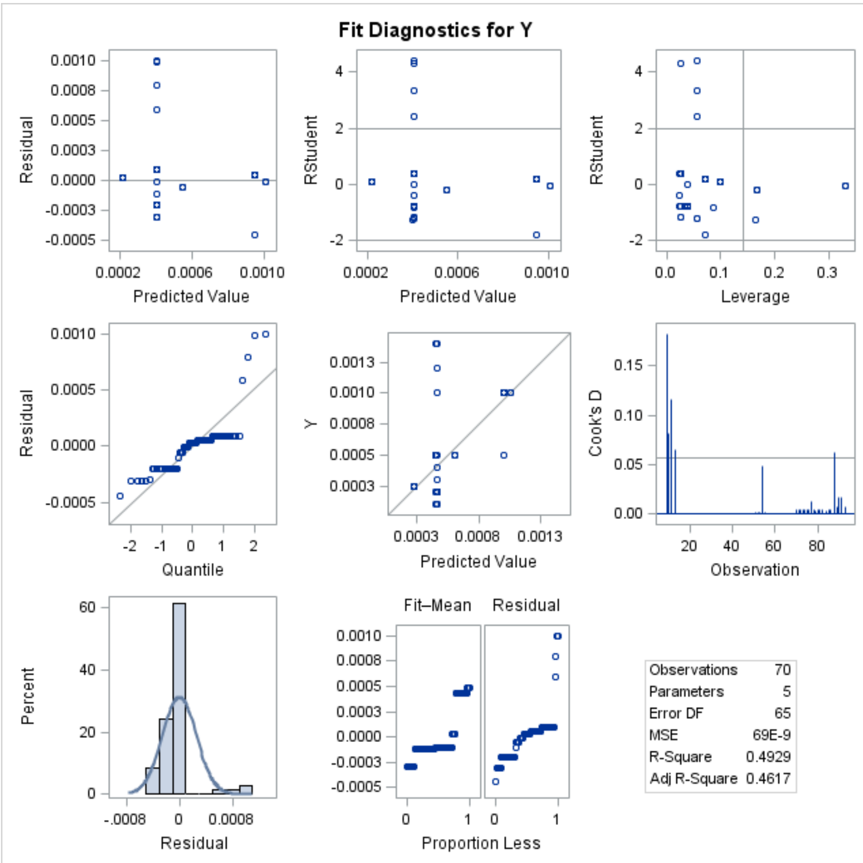
Bounds on condition number: 47.338, 432.12

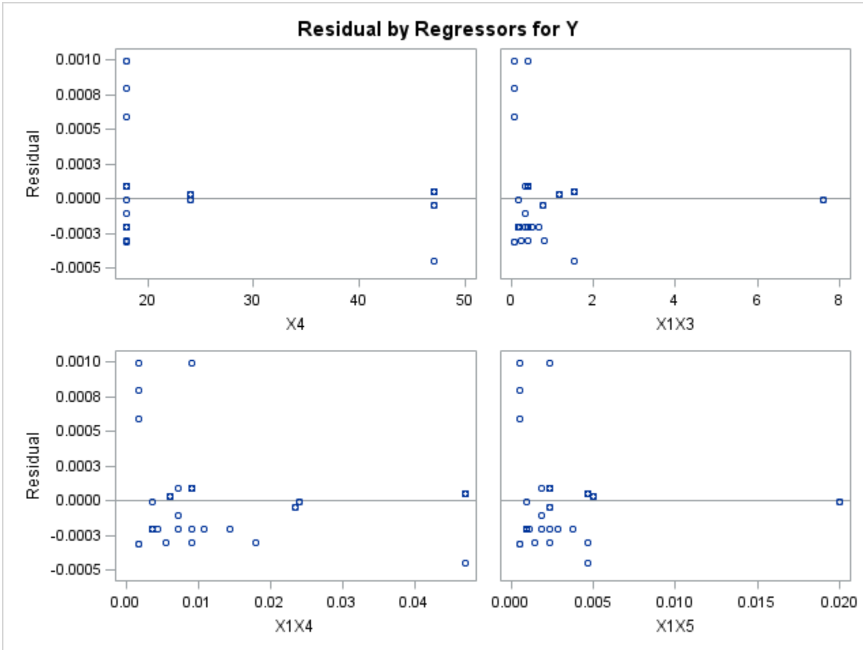
No other variable met the 0.5000 significance level for entry into the model.

Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1X4	1	0.4060	0.4060	3.7804	46.49	<.0001
2	X1X3	2	0.0342	0.4402	1.7630	4.09	0.0471
3	X1X5	3	0.0392	0.4795	-0.8461	4.97	0.0291
4	X4	4	0.0134	0.4929	-0.4239	1.72	0.1941

FORWARD REGRESSION
Pollutant: Total Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X4
X1X3
X1X4
X1X5

BACKWARD REGRESSION
Pollutant: Total Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	161
Number of Observations Used	70
Number of Observations with Missing Values	91

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0917	0.1789	0.6838	-0.0770	0.5709	0.5547	0.8969	0.5538	0.0417	0.3889	-0.1037	0.4182	0.0658	0.1969	0.5930
X2	0.0917	1.0000	0.0596	0.2955	0.0622	0.7371	-0.0063	0.2299	-0.0117	0.6556	0.8538	0.6594	0.1620	0.0268	0.1757	0.1079
X3	0.1789	0.0596	1.0000	0.1048	0.9339	0.0299	0.8117	0.0936	0.8534	0.5736	0.0534	0.4989	0.9282	0.9893	0.9274	0.1310
X4	0.6838	0.2955	0.1048	1.0000	-0.0746	0.6305	0.2488	0.9120	0.2096	0.2139	0.6390	0.0816	0.4671	-0.0342	0.3240	0.5305
X5	-0.0770	0.0622	0.9339	-0.0746	1.0000	-0.0944	0.5595	-0.1355	0.6343	0.6296	-0.0264	0.6104	0.7997	0.9620	0.9192	-0.0824
X1X2	0.5709	0.7371	0.0299	0.6305	-0.0944	1.0000	0.1857	0.6796	0.1686	0.4235	0.9369	0.3097	0.2628	-0.0597	0.1593	0.4271
X1X3	0.5547	-0.0063	0.8117	0.2488	0.5595	0.1857	1.0000	0.3866	0.9885	0.2819	0.0926	0.1482	0.8193	0.7558	0.6290	0.4169
X1X4	0.8969	0.2299	0.0936	0.9120	-0.1355	0.6796	0.3866	1.0000	0.3560	0.1180	0.5751	-0.0275	0.4261	-0.0426	0.2315	0.6372
X1X5	0.5538	-0.0117	0.8534	0.2096	0.6343	0.1686	0.9885	0.3560	1.0000	0.3307	0.0721	0.2060	0.8410	0.8072	0.6845	0.3679
X2X3	0.0417	0.6556	0.5736	0.2139	0.6296	0.4235	0.2819	0.1180	0.3307	1.0000	0.5664	0.9768	0.5867	0.5633	0.6817	0.0262
X2X4	0.3889	0.8538	0.0534	0.6390	-0.0264	0.9369	0.0926	0.5751	0.0721	0.5664	1.0000	0.4770	0.2855	-0.0306	0.2272	0.3273
X2X5	-0.1037	0.6594	0.4989	0.0816	0.6104	0.3097	0.1482	-0.0275	0.2060	0.9768	0.4770	1.0000	0.4700	0.5110	0.6113	-0.0881
X3X4	0.4182	0.1620	0.9282	0.4671	0.7997	0.2628	0.8193	0.4261	0.8410	0.5867	0.2855	0.4700	1.0000	0.8664	0.9431	0.3179
X3X5	0.0658	0.0268	0.9893	-0.0342	0.9620	-0.0597	0.7558	-0.0426	0.8072	0.5633	-0.0306	0.5110	0.8664	1.0000	0.8992	0.0411
X4X5	0.1969	0.1757	0.9274	0.3240	0.9192	0.1593	0.6290	0.2315	0.6845	0.6817	0.2272	0.6113	0.9431	0.8992	1.0000	0.1313
Y	0.5930	0.1079	0.1310	0.5305	-0.0824	0.4271	0.4169	0.6372	0.3679	0.0262	0.3273	-0.0881	0.3179	0.0411	0.1313	1.0000

BACKWARD REGRESSION
Pollutant: Total Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	161
Number of Observations Used	70
Number of Observations with Missing Values	91

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.4978 and C(p) = 11.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	0.00000442	4.416504E-7	5.85	<.0001
Error	59	0.00000446	7.551688E-8		
Corrected Total	69	0.00000887			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.00063952	0.00048941	1.289436E-7	1.71	0.1964
X1	-1.24328	0.59376	3.311026E-7	4.38	0.0406
X2	-0.00005792	0.00030056	2.804213E-9	0.04	0.8479
X3	-0.00000237	0.00000115	3.19365E-7	4.23	0.0442
X4	0.00004607	0.00001756	5.199656E-7	6.89	0.0110
X5	0.00046947	0.00024091	2.867766E-7	3.80	0.0561
X1X2	0.09266	0.38217	4.439564E-9	0.06	0.8093
X1X3	0.00137	0.00059746	3.966152E-7	5.25	0.0255
X2X3	-2.29614E-8	3.474003E-7	3.29898E-10	0.00	0.9475
X2X4	-6.47413E-8	0.00001106	2.58883E-12	0.00	0.9953
X2X5	0.00000707	0.00008543	5.17626E-10	0.01	0.9343

Bounds on condition number: 3611.8, 69020

Backward Elimination: Step 1

Variable X2X4 Removed: R-Square = 0.4978 and C(p) = 9.0000

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	9	0.00000442	4.907224E-7	6.61	<.0001
Error	60	0.00000446	7.425831E-8		
Corrected Total	69	0.00000887			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.00063961	0.00048506	1.291185E-7	1.74	0.1923
X1	-1.24348	0.58788	3.322308E-7	4.47	0.0386
X2	-0.00005915	0.00021332	5.708676E-9	0.08	0.7825
X3	-0.00000237	0.00000113	3.276693E-7	4.41	0.0399
X4	0.00004606	0.00001738	5.217512E-7	7.03	0.0103
X5	0.00046968	0.00023623	2.935419E-7	3.95	0.0514
X1X2	0.09147	0.32080	6.037309E-9	0.08	0.7765
X1X3	0.00137	0.00057936	4.152004E-7	5.59	0.0213
X2X3	-2.41325E-8	2.816682E-7	5.45096E-10	0.01	0.9320
X2X5	0.00000734	0.00007108	7.92948E-10	0.01	0.9180

Bounds on condition number: 3523.4, 58027

Backward Elimination: Step 2

Variable X2X3 Removed: R-Square = 0.4977 and C(p) = 7.0073

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	8	0.00000442	5.519946E-7	7.56	<.0001
Error	61	0.00000446	7.304989E-8		
Corrected Total	69	0.00000887			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.00065530	0.00044550	1.580492E-7	2.16	0.1465
X1	-1.24710	0.58157	3.359072E-7	4.60	0.0360
X2	-0.00004483	0.00013152	8.487296E-9	0.12	0.7344
X3	-0.00000241	0.00000104	3.917948E-7	5.36	0.0239
X4	0.00004639	0.00001683	5.551197E-7	7.60	0.0077
X5	0.00047758	0.00021571	3.58078E-7	4.90	0.0306
X1X2	0.06847	0.17410	1.129731E-8	0.15	0.6955
X1X3	0.00138	0.00054944	4.638376E-7	6.35	0.0144
X2X5	0.00000132	0.00001060	1.140623E-9	0.02	0.9010

Bounds on condition number: 3036.7, 41367

Backward Elimination: Step 3

Variable X2X5 Removed: R-Square = 0.4976 and C(p) = 5.0224

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	0.00000441	6.30688E-7	8.77	<.0001
Error	62	0.00000446	7.189007E-8		
Corrected Total	69	0.00000887			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.00066657	0.00043279	1.705287E-7	2.37	0.1286
X1	-1.24373	0.57631	3.348143E-7	4.66	0.0348
X2	-0.00003346	0.00009423	9.065797E-9	0.13	0.7237
X3	-0.00000241	0.00000103	3.940515E-7	5.48	0.0225
X4	0.00004647	0.00001668	5.582557E-7	7.77	0.0071
X5	0.00047987	0.00021322	3.641281E-7	5.07	0.0280
X1X2	0.06313	0.16743	1.021958E-8	0.14	0.7074
X1X3	0.00139	0.00054503	4.643031E-7	6.46	0.0136

Bounds on condition number: 3032.1, 36028

Backward Elimination: Step 4

Variable X2 Removed: R-Square = 0.4966 and C(p) = 3.1424

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00000441	7.342917E-7	10.36	<.0001
Error	63	0.00000447	7.089285E-8		
Corrected Total	69	0.00000887			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.00070457	0.00041644	2.029262E-7	2.86	0.0956
X1	-1.23527	0.57181	3.308406E-7	4.67	0.0346
X3	-0.00000246	0.00000101	4.161744E-7	5.87	0.0183
X4	0.00004725	0.00001642	5.868938E-7	8.28	0.0055
X5	0.00048905	0.00021017	3.838567E-7	5.41	0.0232
X1X2	0.01417	0.09433	1.598811E-9	0.02	0.8811
X1X3	0.00141	0.00053689	4.887017E-7	6.89	0.0108

Bounds on condition number: 2982.9, 30351

Backward Elimination: Step 5

Variable X1X2 Removed: R-Square = 0.4964 and C(p) = 1.1636

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00000440	8.808303E-7	12.62	<.0001
Error	64	0.00000447	6.981014E-8		
Corrected Total	69	0.00000887			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-0.00072443	0.00039185	2.385976E-7	3.42	0.0691
X1	-1.24809	0.56107	3.45436E-7	4.95	0.0297
X3	-0.00000250	9.739814E-7	4.587795E-7	6.57	0.0127
X4	0.00004806	0.00001537	6.824777E-7	9.78	0.0027
X5	0.00049710	0.00020167	4.241763E-7	6.08	0.0164
X1X3	0.00143	0.00051661	5.344052E-7	7.66	0.0074

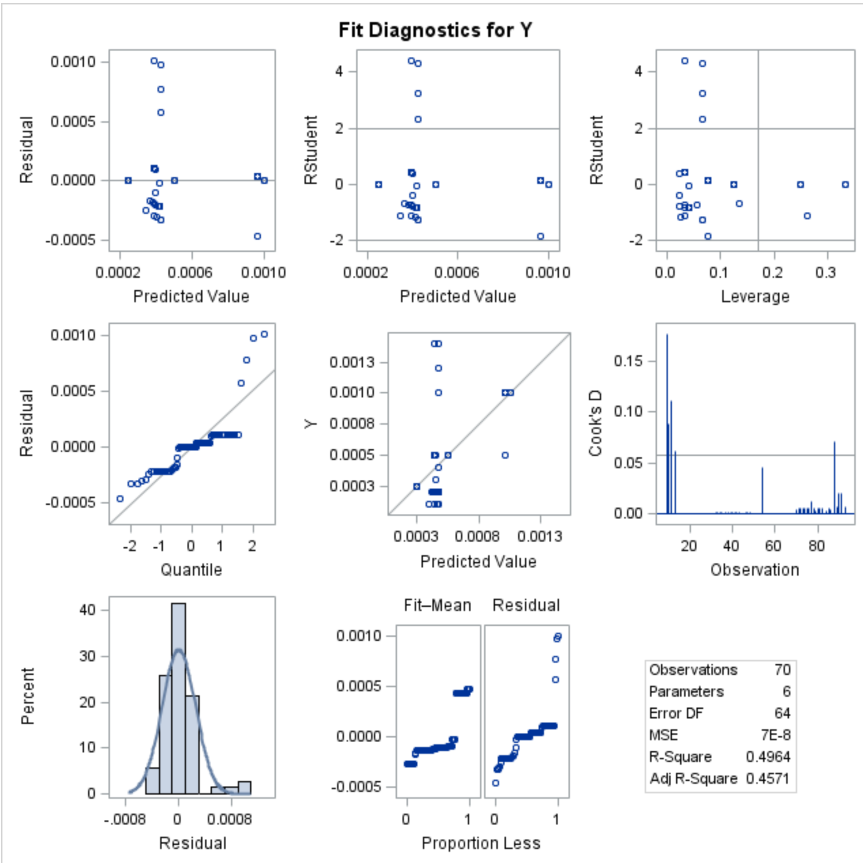
Bounds on condition number: 2791.5, 23667

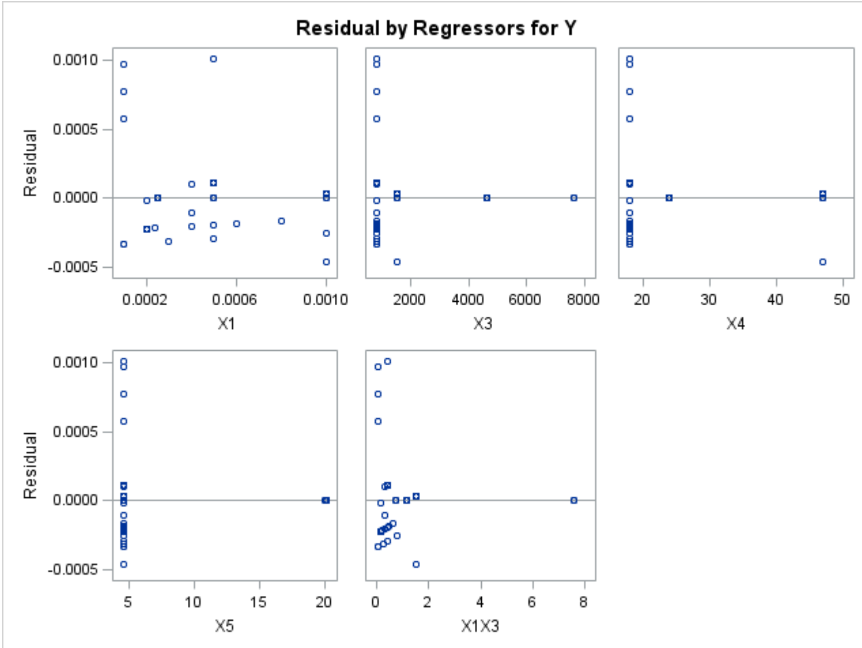
All variables left in the model are significant at the 0.1000 level.

Summary of Backward Elimination							
Step	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X2X4	9	0.0000	0.4978	9.0000	0.00	0.9953
2	X2X3	8	0.0001	0.4977	7.0073	0.01	0.9320
3	X2X5	7	0.0001	0.4976	5.0224	0.02	0.9010
4	X2	6	0.0010	0.4966	3.1424	0.13	0.7237
5	X1X2	5	0.0002	0.4964	1.1636	0.02	0.8811

BACKWARD REGRESSION
Pollutant: Total Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
0.0010
0.0005
0.0000
-0.0005
0.0002
0.0006
0.0010
X1
2000
4000
6000
8000
X3
20
30
40
50
X4
5
10
15
20
X5
0
2
4
6
8
X1X3

STEPWISE REGRESSION
Pollutant: Total Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	161
Number of Observations Used	70
Number of Observations with Missing Values	91

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0917	0.1789	0.6838	-0.0770	0.5709	0.5547	0.8969	0.5538	0.0417	0.3889	-0.1037	0.4182	0.0658	0.1969	0.5930
X2	0.0917	1.0000	0.0596	0.2955	0.0622	0.7371	-0.0063	0.2299	-0.0117	0.6556	0.8538	0.6594	0.1620	0.0268	0.1757	0.1079
X3	0.1789	0.0596	1.0000	0.1048	0.9339	0.0299	0.8117	0.0936	0.8534	0.5736	0.0534	0.4989	0.9282	0.9893	0.9274	0.1310
X4	0.6838	0.2955	0.1048	1.0000	-0.0746	0.6305	0.2488	0.9120	0.2096	0.2139	0.6390	0.0816	0.4671	-0.0342	0.3240	0.5305
X5	-0.0770	0.0622	0.9339	-0.0746	1.0000	-0.0944	0.5595	-0.1355	0.6343	0.6296	-0.0264	0.6104	0.7997	0.9620	0.9192	-0.0824
X1X2	0.5709	0.7371	0.0299	0.6305	-0.0944	1.0000	0.1857	0.6796	0.1686	0.4235	0.9369	0.3097	0.2628	-0.0597	0.1593	0.4271
X1X3	0.5547	-0.0063	0.8117	0.2488	0.5595	0.1857	1.0000	0.3866	0.9885	0.2819	0.0926	0.1482	0.8193	0.7558	0.6290	0.4169
X1X4	0.8969	0.2299	0.0936	0.9120	-0.1355	0.6796	0.3866	1.0000	0.3560	0.1180	0.5751	-0.0275	0.4261	-0.0426	0.2315	0.6372
X1X5	0.5538	-0.0117	0.8534	0.2096	0.6343	0.1686	0.9885	0.3560	1.0000	0.3307	0.0721	0.2060	0.8410	0.8072	0.6845	0.3679
X2X3	0.0417	0.6556	0.5736	0.2139	0.6296	0.4235	0.2819	0.1180	0.3307	1.0000	0.5664	0.9768	0.5867	0.5633	0.6817	0.0262
X2X4	0.3889	0.8538	0.0534	0.6390	-0.0264	0.9369	0.0926	0.5751	0.0721	0.5664	1.0000	0.4770	0.2855	-0.0306	0.2272	0.3273
X2X5	-0.1037	0.6594	0.4989	0.0816	0.6104	0.3097	0.1482	-0.0275	0.2060	0.9768	0.4770	1.0000	0.4700	0.5110	0.6113	-0.0881
X3X4	0.4182	0.1620	0.9282	0.4671	0.7997	0.2628	0.8193	0.4261	0.8410	0.5867	0.2855	0.4700	1.0000	0.8664	0.9431	0.3179
X3X5	0.0658	0.0268	0.9893	-0.0342	0.9620	-0.0597	0.7558	-0.0426	0.8072	0.5633	-0.0306	0.5110	0.8664	1.0000	0.8992	0.0411
X4X5	0.1969	0.1757	0.9274	0.3240	0.9192	0.1593	0.6290	0.2315	0.6845	0.6817	0.2272	0.6113	0.9431	0.8992	1.0000	0.1313
Y	0.5930	0.1079	0.1310	0.5305	-0.0824	0.4271	0.4169	0.6372	0.3679	0.0262	0.3273	-0.0881	0.3179	0.0411	0.1313	1.0000

STEPWISE REGRESSION
Pollutant: Total Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	161
Number of Observations Used	70
Number of Observations with Missing Values	91

Stepwise Selection: Step 1

Variable X1X4 Entered: R-Square = 0.4060 and C(p) = 3.7804

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00000360	0.00000360	46.49	<.0001
Error	68	0.00000527	7.749406E-8		
Corrected Total	69	0.00000887			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00029616	0.00004674	0.00000311	40.15	<.0001
X1X4	0.01418	0.00208	0.00000360	46.49	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X1X3 Entered: R-Square = 0.4402 and C(p) = 1.7630

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00000391	0.00000195	26.35	<.0001
Error	67	0.00000497	7.41226E-8		
Corrected Total	69	0.00000887			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00027737	0.00004665	0.00000262	35.35	<.0001

X1X3	0.00004779	0.00002362	3.033821E-7	4.09	0.0471
X1X4	0.01246	0.00221	0.00000236	31.89	<.0001

Bounds on condition number: 1.1757, 4.7027

Stepwise Selection: Step 3

Variable X1X5 Entered: R-Square = 0.4795 and C(p) = -0.8461

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	0.00000425	0.00000142	20.26	<.0001
Error	66	0.00000462	6.997204E-8		
Corrected Total	69	0.00000887			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00041449	0.00007638	0.00000206	29.45	<.0001
X1X3	0.00036505	0.00014409	4.491341E-7	6.42	0.0137
X1X4	0.01155	0.00218	0.00000196	28.01	<.0001
X1X5	-0.12390	0.05555	3.480599E-7	4.97	0.0291

Bounds on condition number: 46.33, 278.02

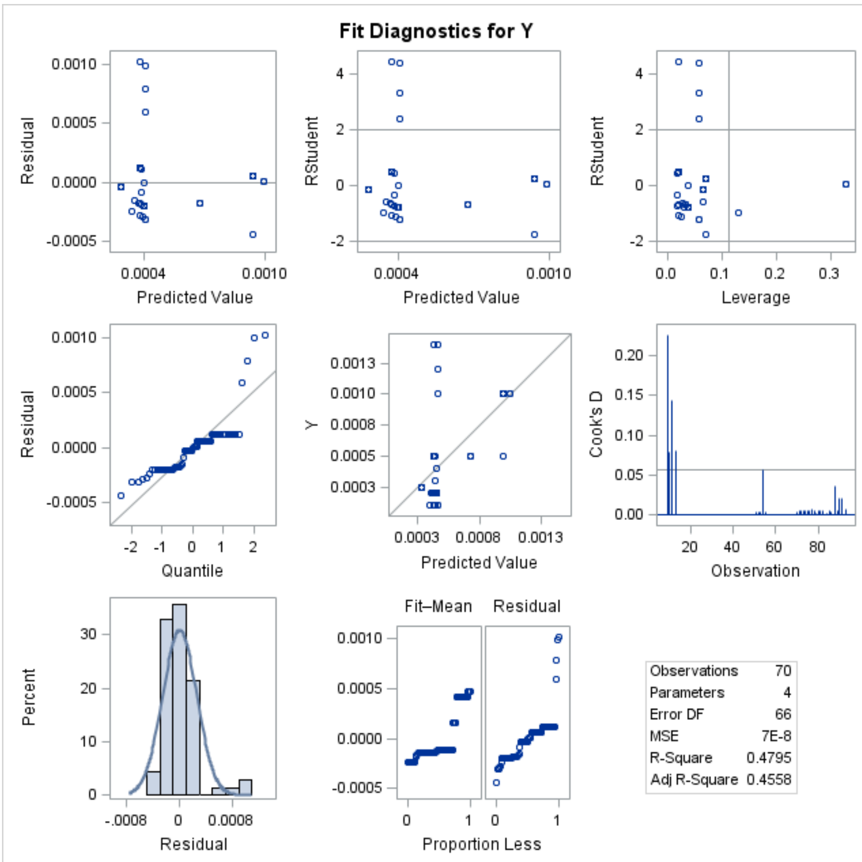
All variables left in the model are significant at the 0.1500 level.

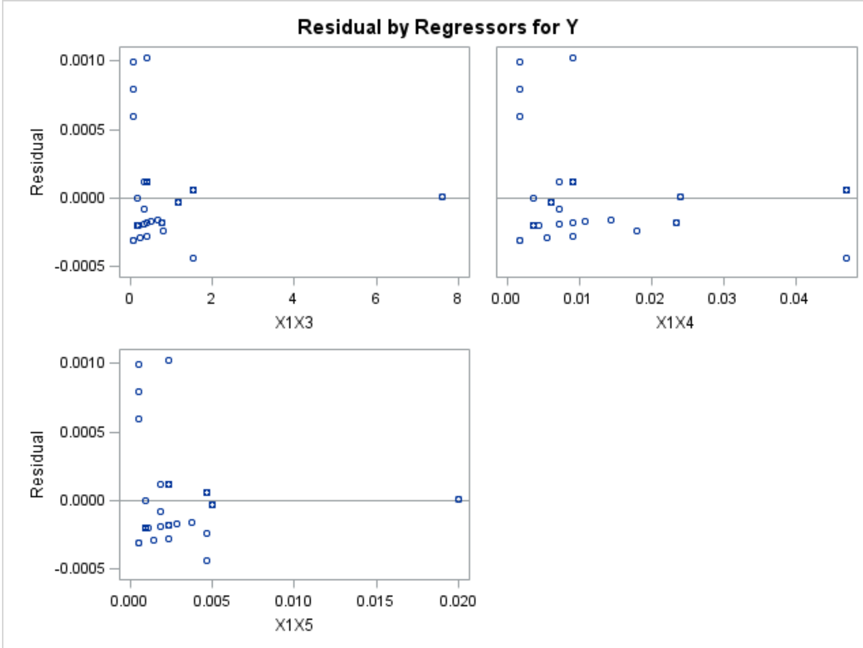
No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	X1X4		1	0.4060	0.4060	3.7804	46.49	<.0001
2	X1X3		2	0.0342	0.4402	1.7630	4.09	0.0471
3	X1X5		3	0.0392	0.4795	-0.8461	4.97	0.0291

STEPWISE REGRESSION
Pollutant: Total Cadmium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
0.0010
0.0005
0.0000
-0.0005
0 2 4 6 8
X1X3
0.00 0.01 0.02 0.03 0.04
X1X4
0.000 0.005 0.010 0.015 0.020
X1X5

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Chromium

===

The REG Procedure

Number of Observations Read	161
Number of Observations Used	70
Number of Observations with Missing Values	91

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.0917	0.1789	0.6838	-0.0770	0.5709	0.5547	0.8969	0.5538	0.0417	0.3889	-0.1037	0.4182	0.0658	0.1969	0.5930
X2	0.0917	1.0000	0.0596	0.2955	0.0622	0.7371	-0.0063	0.2299	-0.0117	0.6556	0.8538	0.6594	0.1620	0.0268	0.1757	0.1079
X3	0.1789	0.0596	1.0000	0.1048	0.9339	0.0299	0.8117	0.0936	0.8534	0.5736	0.0534	0.4989	0.9282	0.9893	0.9274	0.1310
X4	0.6838	0.2955	0.1048	1.0000	-0.0746	0.6305	0.2488	0.9120	0.2096	0.2139	0.6390	0.0816	0.4671	-0.0342	0.3240	0.5305
X5	-0.0770	0.0622	0.9339	-0.0746	1.0000	-0.0944	0.5595	-0.1355	0.6343	0.6296	-0.0264	0.6104	0.7997	0.9620	0.9192	-0.0824
X1X2	0.5709	0.7371	0.0299	0.6305	-0.0944	1.0000	0.1857	0.6796	0.1686	0.4235	0.9369	0.3097	0.2628	-0.0597	0.1593	0.4271
X1X3	0.5547	-0.0063	0.8117	0.2488	0.5595	0.1857	1.0000	0.3866	0.9885	0.2819	0.0926	0.1482	0.8193	0.7558	0.6290	0.4169
X1X4	0.8969	0.2299	0.0936	0.9120	-0.1355	0.6796	0.3866	1.0000	0.3560	0.1180	0.5751	-0.0275	0.4261	-0.0426	0.2315	0.6372
X1X5	0.5538	-0.0117	0.8534	0.2096	0.6343	0.1686	0.9885	0.3560	1.0000	0.3307	0.0721	0.2060	0.8410	0.8072	0.6845	0.3679
X2X3	0.0417	0.6556	0.5736	0.2139	0.6296	0.4235	0.2819	0.1180	0.3307	1.0000	0.5664	0.9768	0.5867	0.5633	0.6817	0.0262
X2X4	0.3889	0.8538	0.0534	0.6390	-0.0264	0.9369	0.0926	0.5751	0.0721	0.5664	1.0000	0.4770	0.2855	-0.0306	0.2272	0.3273
X2X5	-0.1037	0.6594	0.4989	0.0816	0.6104	0.3097	0.1482	-0.0275	0.2060	0.9768	0.4770	1.0000	0.4700	0.5110	0.6113	-0.0881
X3X4	0.4182	0.1620	0.9282	0.4671	0.7997	0.2628	0.8193	0.4261	0.8410	0.5867	0.2855	0.4700	1.0000	0.8664	0.9431	0.3179
X3X5	0.0658	0.0268	0.9893	-0.0342	0.9620	-0.0597	0.7558	-0.0426	0.8072	0.5633	-0.0306	0.5110	0.8664	1.0000	0.8992	0.0411
X4X5	0.1969	0.1757	0.9274	0.3240	0.9192	0.1593	0.6290	0.2315	0.6845	0.6817	0.2272	0.6113	0.9431	0.8992	1.0000	0.1313
Y	0.5930	0.1079	0.1310	0.5305	-0.0824	0.4271	0.4169	0.6372	0.3679	0.0262	0.3273	-0.0881	0.3179	0.0411	0.1313	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Chromium
===

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	161
Number of Observations Used	70
Number of Observations with Missing Values	91

Number in Model	R-Square	Variables in Model
1	0.4060	X1X4
1	0.3516	X1
1	0.2815	X4
1	0.1824	X1X2
1	0.1738	X1X3
1	0.1354	X1X5
1	0.1071	X2X4
1	0.1011	X3X4
1	0.0172	X4X5
1	0.0172	X3
1	0.0116	X2
1	0.0078	X2X5
1	0.0068	X5
1	0.0017	X3X5
1	0.0007	X2X3
2	0.4402	X1X3 X1X4
2	0.4288	X1X4 X1X5
2	0.4213	X4 X1X4
2	0.4155	X5 X3X4
2	0.4112	X3 X1X4
2	0.4110	X1X4 X2X5
2	0.4107	X1X4 X3X5
2	0.4087	X1X4 X3X4
2	0.4085	X1X4 X2X3
2	0.4084	X1 X1X4
2	0.4083	X1X4 X2X4
2	0.4076	X2 X1X4
2	0.4063	X1X4 X4X5
2	0.4061	X1X2 X1X4
2	0.4061	X5 X1X4
3	0.4795	X1X3 X1X4 X1X5
3	0.4682	X5 X1X4 X3X5
3	0.4670	X3 X1X4 X4X5
3	0.4663	X5 X1X3 X1X4
3	0.4659	X1X3 X1X4 X4X5
3	0.4655	X1X3 X1X4 X3X5

3	0.4652	X3 X1X3 X1X4
3	0.4642	X3 X5 X1X4
3	0.4636	X1X4 X3X4 X4X5
3	0.4631	X1X3 X1X4 X3X4
3	0.4625	X1X4 X3X5 X4X5
3	0.4592	X1 X1X3 X1X5
3	0.4575	X3 X1X3 X4X5
3	0.4542	X1X3 X3X5 X4X5
3	0.4541	X5 X1X4 X1X5
4	0.4963	X1 X1X4 X3X5 X4X5
4	0.4962	X1 X1X4 X1X5 X3X4
4	0.4958	X1 X5 X1X3 X3X5
4	0.4957	X3 X1X4 X1X5 X4X5
4	0.4932	X1 X1X3 X1X4 X3X4
4	0.4929	X4 X1X3 X1X4 X1X5
4	0.4925	X1 X3 X1X4 X4X5
4	0.4923	X5 X1X3 X1X5 X3X5
4	0.4903	X1 X1X4 X1X5 X4X5
4	0.4885	X1 X3 X1X4 X1X5
4	0.4881	X1 X1X3 X1X4 X4X5
4	0.4858	X1 X3 X1X3 X1X4
4	0.4853	X1X3 X1X4 X1X5 X3X4
4	0.4835	X1X3 X1X4 X1X5 X4X5
4	0.4829	X1 X1X4 X1X5 X3X5
5	0.4965	X1 X1X2 X1X4 X3X5 X4X5
5	0.4964	X1 X3 X1X5 X3X5 X4X5
5	0.4964	X4 X1X3 X1X4 X3X4 X3X5
5	0.4964	X1 X5 X1X3 X3X4 X4X5
5	0.4964	X1 X1X3 X1X4 X1X5 X3X5
5	0.4964	X1 X3 X1X3 X1X5 X4X5
5	0.4964	X5 X1X3 X1X5 X3X4 X4X5
5	0.4964	X1 X4 X1X3 X1X5 X3X4
5	0.4964	X1 X1X3 X1X5 X3X5 X4X5
5	0.4964	X1 X4 X1X3 X1X5 X3X5
5	0.4964	X1 X3 X1X3 X1X5 X3X4
5	0.4964	X1 X4 X1X3 X1X5 X4X5
5	0.4964	X1 X1X3 X1X5 X3X4 X3X5
5	0.4964	X1 X4 X5 X1X3 X1X5
5	0.4964	X1 X5 X1X3 X1X5 X3X4
6	0.4976	X1 X2 X1X2 X1X4 X3X5 X4X5
6	0.4975	X1 X2 X1X2 X1X4 X1X5 X3X4
6	0.4972	X1 X2 X5 X1X3 X2X4 X3X5
6	0.4972	X2 X3 X1X2 X1X4 X1X5 X4X5
6	0.4972	X1 X1X2 X1X4 X1X5 X2X4 X3X4
6	0.4971	X1 X1X2 X1X4 X2X4 X3X5 X4X5
6	0.4971	X3 X1X2 X1X4 X1X5 X2X4 X4X5
6	0.4970	X1 X2 X1X4 X2X4 X3X5 X4X5
6	0.4968	X1 X2 X1X4 X1X5 X2X4 X3X4
6	0.4967	X1 X1X4 X2X3 X2X5 X3X5 X4X5
6	0.4967	X1 X1X2 X1X4 X2X5 X3X5 X4X5
6	0.4966	X1 X1X4 X1X5 X2X3 X2X5 X3X4
6		

	0.4966	X1 X1X2 X1X4 X2X3 X3X5 X4X5
6	0.4966	X1 X1X2 X1X3 X1X4 X1X5 X3X5
6	0.4966	X4 X1X2 X1X4 X1X5 X3X4 X3X5
7	0.4977	X1 X2 X1X2 X1X4 X2X5 X3X5 X4X5
7	0.4977	X1 X2 X1X2 X1X4 X1X5 X2X5 X3X4
7	0.4977	X1 X2 X1X2 X1X4 X2X3 X3X5 X4X5
7	0.4976	X1 X2 X1X2 X1X4 X1X5 X2X3 X3X4
7	0.4976	X1 X2 X3 X4 X5 X1X2 X1X5
7	0.4976	X1 X2 X4 X5 X1X2 X1X5 X3X5
7	0.4976	X1 X2 X1X2 X1X3 X1X4 X1X5 X3X5
7	0.4976	X2 X4 X1X2 X1X4 X1X5 X3X4 X3X5
7	0.4976	X1 X2 X3 X4 X1X2 X1X3 X1X5
7	0.4976	X1 X2 X4 X1X2 X1X3 X1X5 X3X5
7	0.4976	X1 X2 X4 X1X2 X1X3 X1X5 X4X5
7	0.4976	X1 X2 X4 X5 X1X2 X1X3 X1X5
7	0.4976	X2 X3 X4 X5 X1X2 X1X3 X1X4
7	0.4976	X2 X5 X1X2 X1X4 X1X5 X3X4 X4X5
7	0.4976	X1 X2 X5 X1X2 X1X4 X1X5 X3X5
8	0.4978	X1 X2 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4
8	0.4978	X1 X2 X1X2 X1X4 X2X3 X2X5 X3X5 X4X5
8	0.4978	X1 X2 X1X2 X1X4 X1X5 X2X4 X2X5 X3X4
8	0.4978	X2 X3 X1X2 X1X4 X1X5 X2X3 X2X5 X4X5
8	0.4977	X1 X2 X3 X4 X5 X1X2 X1X5 X2X5
8	0.4977	X1 X2 X4 X5 X1X2 X1X5 X2X5 X3X5
8	0.4977	X1 X2 X1X2 X1X3 X1X4 X1X5 X2X5 X3X5
8	0.4977	X2 X4 X1X2 X1X4 X1X5 X2X5 X3X4 X3X5
8	0.4977	X1 X2 X3 X4 X1X2 X1X3 X1X5 X2X5
8	0.4977	X1 X2 X4 X1X2 X1X3 X1X5 X2X5 X3X5
8	0.4977	X1 X2 X4 X1X2 X1X3 X1X5 X2X5 X4X5
8	0.4977	X1 X2 X4 X5 X1X2 X1X3 X1X5 X2X5
8	0.4977	X2 X3 X4 X5 X1X2 X1X3 X1X4 X2X5
8	0.4977	X2 X5 X1X2 X1X4 X1X5 X2X5 X3X4 X4X5
8	0.4977	X1 X2 X5 X1X2 X1X4 X1X5 X2X5 X3X5
9	0.4978	X1 X2 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
9	0.4978	X1 X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X5
9	0.4978	X1 X2 X3 X5 X1X2 X1X5 X2X3 X2X5 X3X4
9	0.4978	X1 X2 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X5
9	0.4978	X1 X2 X3 X5 X1X2 X1X5 X2X3 X2X5 X4X5
9	0.4978	X1 X2 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X5
9	0.4978	X1 X2 X3 X1X2 X1X3 X1X5 X2X3 X2X5 X4X5
9	0.4978	X2 X4 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5
9	0.4978	X1 X2 X3 X4 X1X2 X1X3 X1X5 X2X3 X2X5
9	0.4978	X1 X2 X3 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4
9	0.4978	X1 X2 X4 X1X2 X1X3 X1X5 X2X3 X2X5 X3X5
9	0.4978	X1 X2 X4 X1X2 X1X3 X1X5 X2X3 X2X5 X4X5
9	0.4978	X1 X2 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5
9	0.4978	X1 X2 X3 X1X2 X1X3 X1X5 X2X3 X2X5 X3X5
9	0.4978	X1 X2 X3 X5 X1X2 X1X3 X1X5 X2X3 X2X5
10	0.4978	X1 X2 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
10	0.4978	X1 X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5
10	0.4978	X1 X2 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4
10		

	0.4978	X1 X2 X4 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
10	0.4978	X1 X2 X3 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4
10	0.4978	X1 X2 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X5
10	0.4978	X1 X2 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
10	0.4978	X1 X2 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
10	0.4978	X1 X2 X3 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X4X5
10	0.4978	X1 X2 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5
10	0.4978	X2 X4 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
10	0.4978	X2 X3 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4
10	0.4978	X1 X2 X4 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4
10	0.4978	X1 X2 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
10	0.4978	X1 X2 X4 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X5

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Chromium

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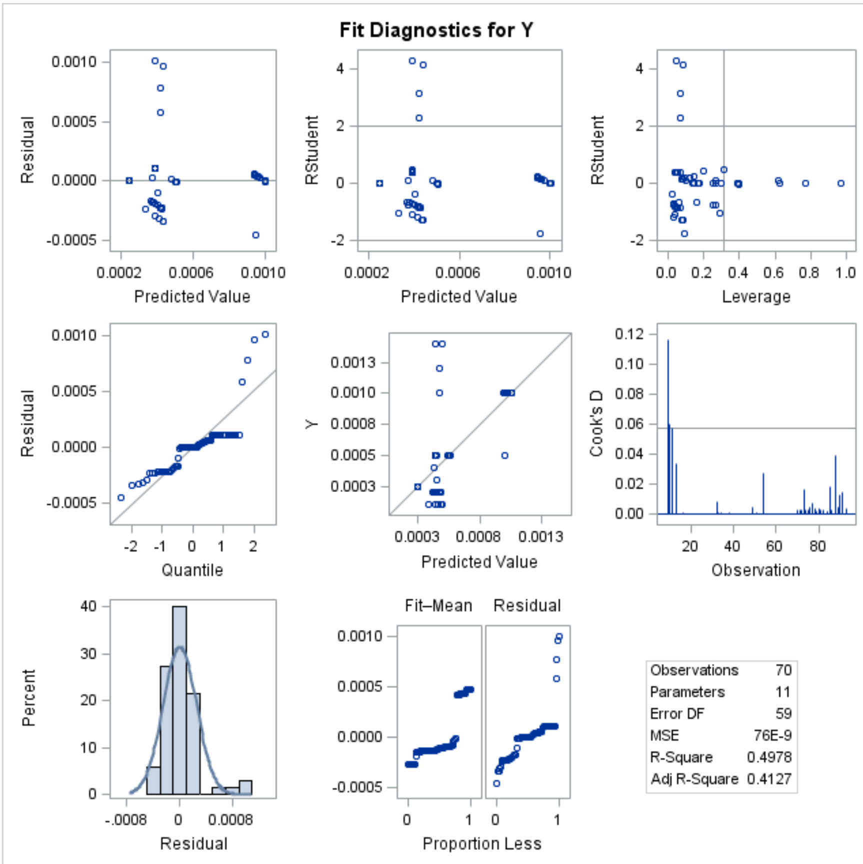
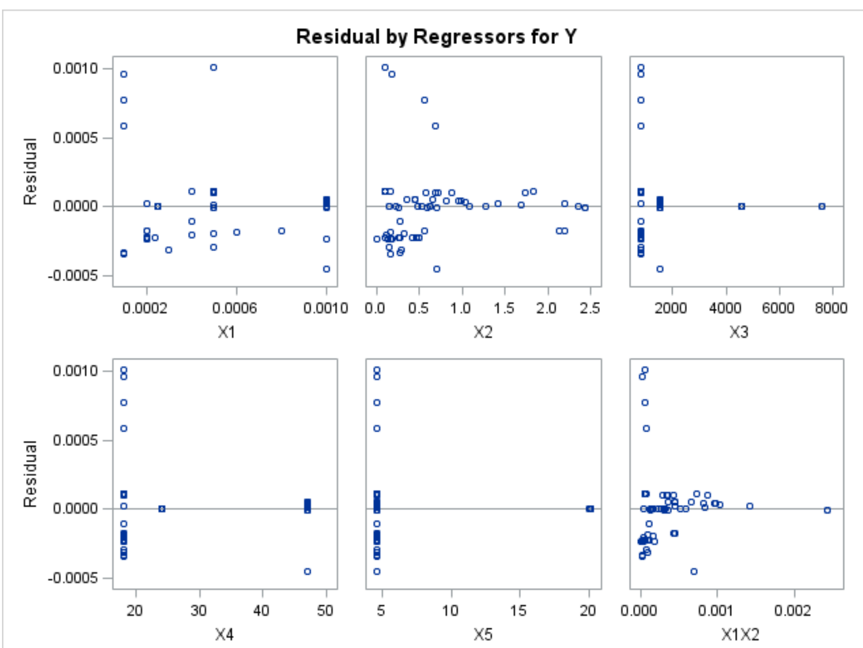
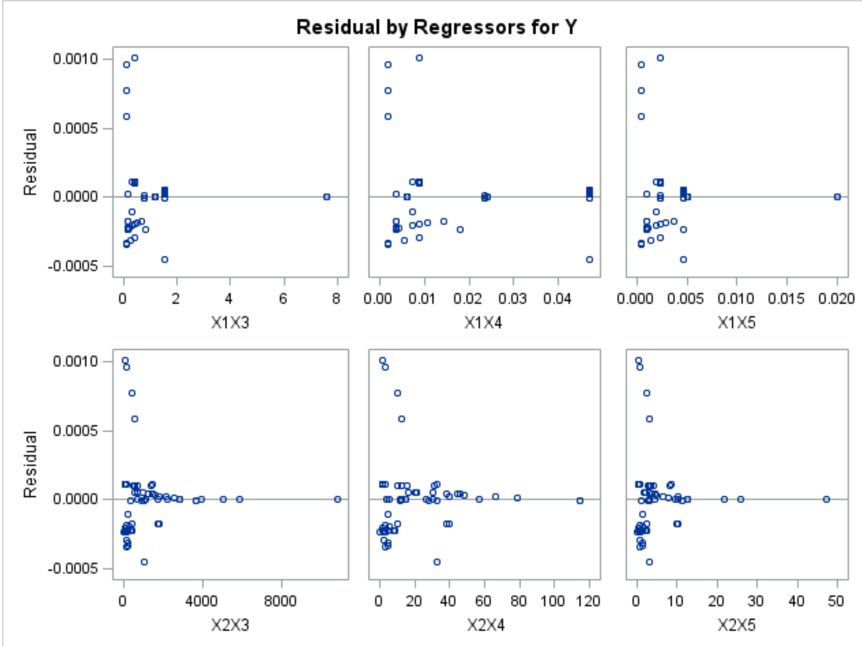
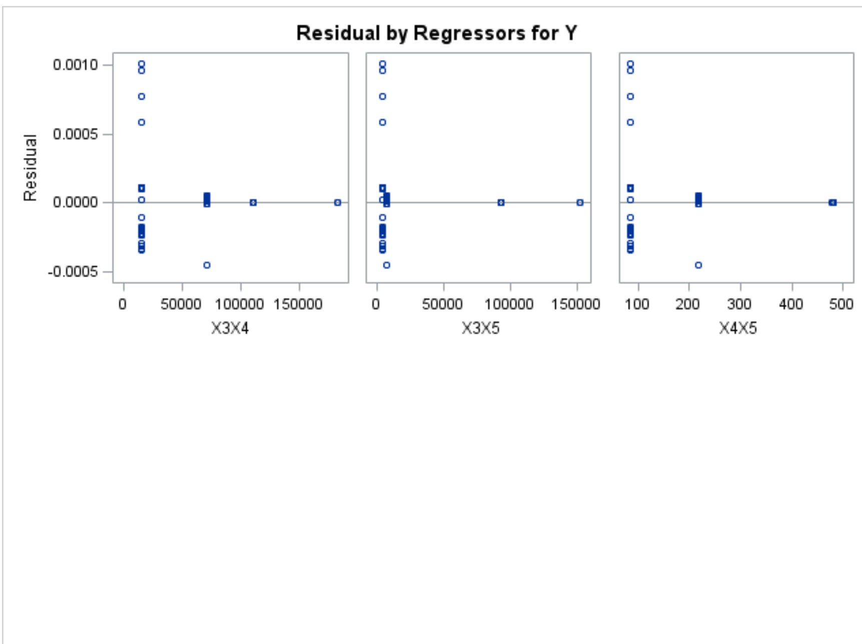
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
0.0010
0.0005
0.0000
-0.0005
X1X3
X1X4
X1X5
X2X3
X2X4
X2X5


Residual by Regressors for Y
Residual
0.0010
0.0005
0.0000
-0.0005
X3X4
X3X5
X4X5

FORWARD REGRESSION
Pollutant: Total Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	107
Number of Observations Used	56
Number of Observations with Missing Values	51

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1768	0.1743	-0.2167	0.2175	0.3372	0.4173	0.6703	0.6101	0.0947	-0.1952	0.0471	0.0642	0.2083	0.0651	0.0064
X2	-0.1768	1.0000	0.0718	0.3528	0.0019	0.7290	0.0281	0.1136	-0.0454	0.5603	0.8617	0.7200	0.2058	0.0180	0.2049	0.1142
X3	0.1743	0.0718	1.0000	0.1047	0.9804	0.2739	0.9194	0.2707	0.8354	0.7252	0.0680	0.6172	0.9150	0.9883	0.9162	0.5648
X4	-0.2167	0.3528	0.1047	1.0000	-0.0935	0.2312	-0.0262	0.5314	-0.1556	0.2459	0.6707	0.1744	0.4970	-0.0482	0.4944	0.4203
X5	0.2175	0.0019	0.9804	-0.0935	1.0000	0.2283	0.9257	0.1656	0.8672	0.6772	-0.0649	0.5833	0.8175	0.9990	0.8192	0.4821
X1X2	0.3372	0.7290	0.2739	0.2312	0.2283	1.0000	0.3908	0.4901	0.3952	0.6684	0.6233	0.7419	0.3327	0.2396	0.3325	0.2310
X1X3	0.4173	0.0281	0.9194	-0.0262	0.9257	0.3908	1.0000	0.3902	0.9703	0.7198	-0.0147	0.6162	0.7916	0.9275	0.7930	0.4784
X1X4	0.6703	0.1136	0.2707	0.5314	0.1656	0.4901	0.3902	1.0000	0.4413	0.2974	0.3145	0.2048	0.4517	0.1903	0.4506	0.3328
X1X5	0.6101	-0.0454	0.8354	-0.1556	0.8672	0.3952	0.9703	0.4413	1.0000	0.6305	-0.1128	0.5347	0.6658	0.8629	0.6675	0.3849
X2X3	0.0947	0.5603	0.7252	0.2459	0.6772	0.6684	0.7198	0.2974	0.6305	1.0000	0.5138	0.9617	0.7325	0.6906	0.7329	0.5120
X2X4	-0.1952	0.8617	0.0680	0.6707	-0.0649	0.6233	-0.0147	0.3145	-0.1128	0.5138	1.0000	0.5622	0.3313	-0.0346	0.3296	0.2604
X2X5	0.0471	0.7200	0.6172	0.1744	0.5833	0.7419	0.6162	0.2048	0.5347	0.9617	0.5622	1.0000	0.6093	0.5931	0.6097	0.4006
X3X4	0.0642	0.2058	0.9150	0.4970	0.8175	0.3327	0.7916	0.4517	0.6658	0.7325	0.3313	0.6093	1.0000	0.8428	1.0000	0.6633
X3X5	0.2083	0.0180	0.9883	-0.0482	0.9990	0.2396	0.9275	0.1903	0.8629	0.6906	-0.0346	0.5931	0.8428	1.0000	0.8444	0.5028
X4X5	0.0651	0.2049	0.9162	0.4944	0.8192	0.3325	0.7930	0.4506	0.6675	0.7329	0.3296	0.6097	1.0000	0.8444	1.0000	0.6630
Y	0.0064	0.1142	0.5648	0.4203	0.4821	0.2310	0.4784	0.3328	0.3849	0.5120	0.2604	0.4006	0.6633	0.5028	0.6630	1.0000

FORWARD REGRESSION
Pollutant: Total Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	107
Number of Observations Used	56
Number of Observations with Missing Values	51

Forward Selection: Step 1

Variable X3X4 Entered: R-Square = 0.4400 and C(p) = -2.2021

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00002005	0.00002005	42.43	<.0001
Error	54	0.00002551	4.724863E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00145	0.00012953	0.00005949	125.91	<.0001
X3X4	1.296937E-8	1.991153E-9	0.00002005	42.43	<.0001

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X4X5 Entered: R-Square = 0.4509 and C(p) = -1.1722

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00002054	0.00001027	21.76	<.0001
Error	53	0.00002502	4.720226E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01593	0.01411	6.018179E-7	1.27	0.2639

X3X4	7.014935E-7	6.709601E-7	5.159608E-7	1.09	0.3005
X4X5	-0.00029250	0.00028504	4.970632E-7	1.05	0.3095

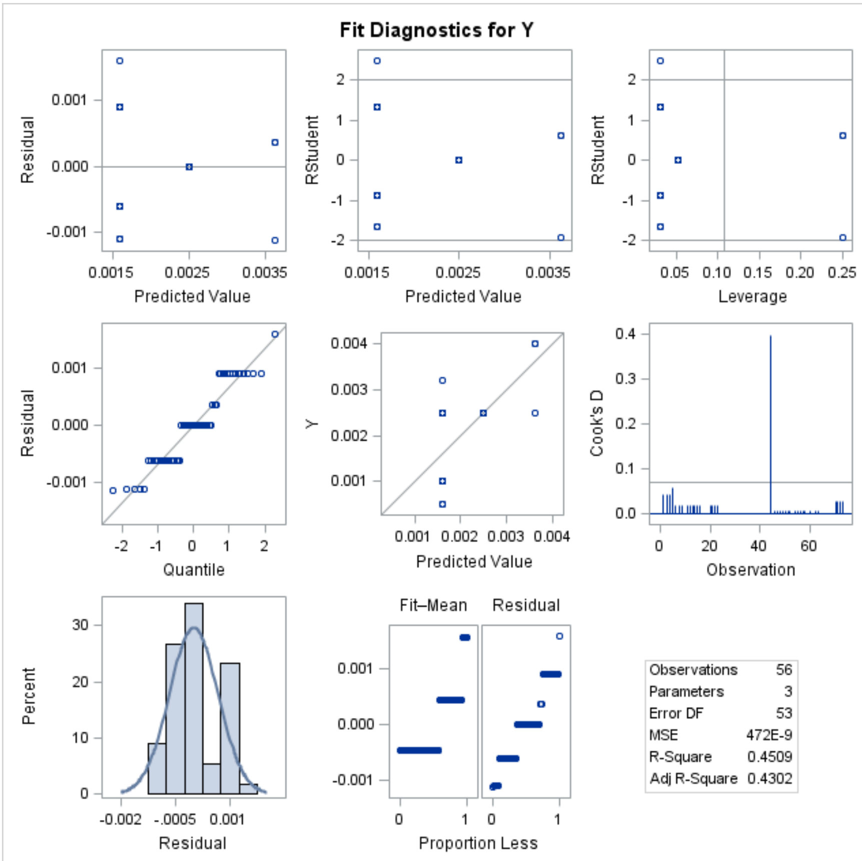
Bounds on condition number: 113661, 454643

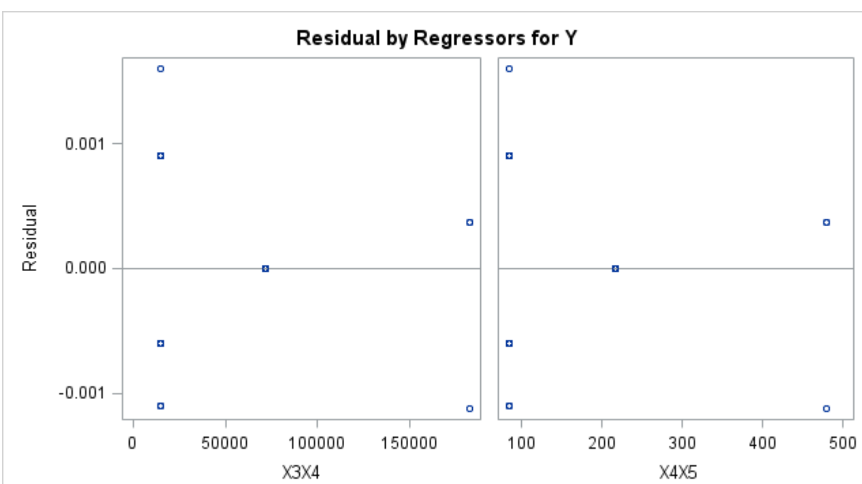
No other variable met the 0.5000 significance level for entry into the model.

Summary of Forward Selection							
Step	**Variable Entered**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	X3X4	1	0.4400	0.4400	-2.2021	42.43	<.0001
2	X4X5	2	0.0109	0.4509	-1.1722	1.05	0.3095

FORWARD REGRESSION
Pollutant: Total Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y





BACKWARD REGRESSION
Pollutant: Total Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	107
Number of Observations Used	56
Number of Observations with Missing Values	51

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1768	0.1743	-0.2167	0.2175	0.3372	0.4173	0.6703	0.6101	0.0947	-0.1952	0.0471	0.0642	0.2083	0.0651	0.0064
X2	-0.1768	1.0000	0.0718	0.3528	0.0019	0.7290	0.0281	0.1136	-0.0454	0.5603	0.8617	0.7200	0.2058	0.0180	0.2049	0.1142
X3	0.1743	0.0718	1.0000	0.1047	0.9804	0.2739	0.9194	0.2707	0.8354	0.7252	0.0680	0.6172	0.9150	0.9883	0.9162	0.5648
X4	-0.2167	0.3528	0.1047	1.0000	-0.0935	0.2312	-0.0262	0.5314	-0.1556	0.2459	0.6707	0.1744	0.4970	-0.0482	0.4944	0.4203
X5	0.2175	0.0019	0.9804	-0.0935	1.0000	0.2283	0.9257	0.1656	0.8672	0.6772	-0.0649	0.5833	0.8175	0.9990	0.8192	0.4821
X1X2	0.3372	0.7290	0.2739	0.2312	0.2283	1.0000	0.3908	0.4901	0.3952	0.6684	0.6233	0.7419	0.3327	0.2396	0.3325	0.2310
X1X3	0.4173	0.0281	0.9194	-0.0262	0.9257	0.3908	1.0000	0.3902	0.9703	0.7198	-0.0147	0.6162	0.7916	0.9275	0.7930	0.4784
X1X4	0.6703	0.1136	0.2707	0.5314	0.1656	0.4901	0.3902	1.0000	0.4413	0.2974	0.3145	0.2048	0.4517	0.1903	0.4506	0.3328
X1X5	0.6101	-0.0454	0.8354	-0.1556	0.8672	0.3952	0.9703	0.4413	1.0000	0.6305	-0.1128	0.5347	0.6658	0.8629	0.6675	0.3849
X2X3	0.0947	0.5603	0.7252	0.2459	0.6772	0.6684	0.7198	0.2974	0.6305	1.0000	0.5138	0.9617	0.7325	0.6906	0.7329	0.5120
X2X4	-0.1952	0.8617	0.0680	0.6707	-0.0649	0.6233	-0.0147	0.3145	-0.1128	0.5138	1.0000	0.5622	0.3313	-0.0346	0.3296	0.2604
X2X5	0.0471	0.7200	0.6172	0.1744	0.5833	0.7419	0.6162	0.2048	0.5347	0.9617	0.5622	1.0000	0.6093	0.5931	0.6097	0.4006
X3X4	0.0642	0.2058	0.9150	0.4970	0.8175	0.3327	0.7916	0.4517	0.6658	0.7325	0.3313	0.6093	1.0000	0.8428	1.0000	0.6633
X3X5	0.2083	0.0180	0.9883	-0.0482	0.9990	0.2396	0.9275	0.1903	0.8629	0.6906	-0.0346	0.5931	0.8428	1.0000	0.8444	0.5028
X4X5	0.0651	0.2049	0.9162	0.4944	0.8192	0.3325	0.7930	0.4506	0.6675	0.7329	0.3296	0.6097	1.0000	0.8444	1.0000	0.6630
Y	0.0064	0.1142	0.5648	0.4203	0.4821	0.2310	0.4784	0.3328	0.3849	0.5120	0.2604	0.4006	0.6633	0.5028	0.6630	1.0000

BACKWARD REGRESSION
Pollutant: Total Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	107
Number of Observations Used	56
Number of Observations with Missing Values	51

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.4827 and C(p) = 10.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	0.00002199	0.00000244	4.77	0.0002
Error	46	0.00002357	5.123561E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00121	0.00057734	0.00000223	4.36	0.0424
X1	-0.01883	0.14366	8.805713E-9	0.02	0.8963
X2	-0.00050615	0.00041600	7.584794E-7	1.48	0.2299
X3	2.609734E-7	1.933089E-7	9.338147E-7	1.82	0.1836
X4	0.00002219	0.00002426	4.287287E-7	0.84	0.3651
X1X2	0.05876	0.09870	1.816295E-7	0.35	0.5545
X1X3	-0.00001976	0.00003932	1.294459E-7	0.25	0.6176
X1X4	-0.00014682	0.00724	2.10736E-10	0.00	0.9839
X2X3	1.586019E-7	1.358455E-7	6.983904E-7	1.36	0.2490
X2X4	0.00000240	0.00001091	2.481314E-8	0.05	0.8268

Bounds on condition number: 17.343, 909.27

Backward Elimination: Step 1

Variable X1X4 Removed: R-Square = 0.4827 and C(p) = 8.0004

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	0.00002199	0.00000275	5.48	<.0001
Error	47	0.00002357	5.014594E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00121	0.00043203	0.00000395	7.88	0.0072
X1	-0.02139	0.06854	4.88099E-8	0.10	0.7564
X2	-0.00050560	0.00041066	7.601116E-7	1.52	0.2244
X3	2.613229E-7	1.904807E-7	9.438186E-7	1.88	0.1766
X4	0.00002177	0.00001232	0.00000157	3.12	0.0837
X1X2	0.05832	0.09521	1.881411E-7	0.38	0.5431
X1X3	-0.00001991	0.00003827	1.356738E-7	0.27	0.6054
X2X3	1.589166E-7	1.33514E-7	7.104284E-7	1.42	0.2399
X2X4	0.00000241	0.00001079	2.497416E-8	0.05	0.8244

Bounds on condition number: 16.786, 528.81

Backward Elimination: Step 2

Variable X1X5 Entered: R-Square = 0.4827 and C(p) = 10.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	0.00002199	0.00000244	4.77	0.0002
Error	46	0.00002357	5.123561E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00121	0.00057734	0.00000223	4.36	0.0424
X1	-0.02856	0.36054	3.215231E-9	0.01	0.9372
X2	-0.00050615	0.00041600	7.584794E-7	1.48	0.2299
X3	2.609734E-7	1.933089E-7	9.338147E-7	1.82	0.1836
X4	0.00002219	0.00002426	4.287287E-7	0.84	0.3651
X1X2	0.05876	0.09870	1.816295E-7	0.35	0.5545
X1X3	-0.00002561	0.00028372	4.173361E-9	0.01	0.9285
X1X5	0.00253	0.12490	2.10736E-10	0.00	0.9839
X2X3	1.586019E-7	1.358455E-7	6.983904E-7	1.36	0.2490
X2X4	0.00000240	0.00001091	2.481314E-8	0.05	0.8268

Bounds on condition number: 1195.6, 20017

Backward Elimination: Step 3

Variable X1X5 Removed: R-Square = 0.4827 and C(p) = 8.0004

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	0.00002199	0.00000275	5.48	<.0001
Error	47	0.00002357	5.014594E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00121	0.00043203	0.00000395	7.88	0.0072
X1	-0.02139	0.06854	4.88099E-8	0.10	0.7564
X2	-0.00050560	0.00041066	7.601116E-7	1.52	0.2244
X3	2.613229E-7	1.904807E-7	9.438186E-7	1.88	0.1766
X4	0.00002177	0.00001232	0.00000157	3.12	0.0837
X1X2	0.05832	0.09521	1.881411E-7	0.38	0.5431
X1X3	-0.00001991	0.00003827	1.356738E-7	0.27	0.6054
X2X3	1.589166E-7	1.33514E-7	7.104284E-7	1.42	0.2399
X2X4	0.00000241	0.00001079	2.497416E-8	0.05	0.8244

Bounds on condition number: 16.786, 528.81

Backward Elimination: Step 4

Variable X2X4 Removed: R-Square = 0.4821 and C(p) = 6.0492

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	0.00002197	0.00000314	6.38	<.0001
Error	48	0.00002359	4.915326E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00116	0.00035308	0.00000529	10.77	0.0019
X1	-0.01914	0.06713	3.996613E-8	0.08	0.7768
X2	-0.00044301	0.00029699	0.00000109	2.23	0.1423
X3	2.613236E-7	1.88586E-7	9.438238E-7	1.92	0.1722
X4	0.00002385	0.00000796	0.00000441	8.97	0.0043
X1X2	0.05766	0.09422	1.840597E-7	0.37	0.5435
X1X3	-0.00002110	0.00003751	1.555382E-7	0.32	0.5764
X2X3	1.659781E-7	1.284199E-7	8.210874E-7	1.67	0.2024

Bounds on condition number: 16.457, 342.01

Backward Elimination: Step 5

Variable X2X5 Entered: R-Square = 0.4827 and C(p) = 8.0004

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	8	0.00002199	0.00000275	5.48	<.0001
Error	47	0.00002357	5.014594E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00121	0.00043203	0.00000395	7.88	0.0072
X1	-0.02139	0.06854	4.88099E-8	0.10	0.7564
X2	-0.00034601	0.00052810	2.152754E-7	0.43	0.5155
X3	2.613229E-7	1.904807E-7	9.438186E-7	1.88	0.1766
X4	0.00002177	0.00001232	0.00000157	3.12	0.0837
X1X2	0.05832	0.09521	1.881411E-7	0.38	0.5431
X1X3	-0.00001991	0.00003827	1.356738E-7	0.27	0.6054
X2X3	2.547712E-7	4.184887E-7	1.858527E-7	0.37	0.5456
X2X5	-0.00004156	0.00018621	2.497416E-8	0.05	0.8244

Bounds on condition number: 97.66, 1732.8

Backward Elimination: Step 6

Variable X2X5 Removed: R-Square = 0.4821 and C(p) = 6.0492

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	7	0.00002197	0.00000314	6.38	<.0001
Error	48	0.00002359	4.915326E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00116	0.00035308	0.00000529	10.77	0.0019
X1	-0.01914	0.06713	3.996613E-8	0.08	0.7768
X2	-0.00044301	0.00029699	0.00000109	2.23	0.1423
X3	2.613236E-7	1.88586E-7	9.438238E-7	1.92	0.1722
X4	0.00002385	0.00000796	0.00000441	8.97	0.0043
X1X2	0.05766	0.09422	1.840597E-7	0.37	0.5435
X1X3	-0.00002110	0.00003751	1.555382E-7	0.32	0.5764
X2X3	1.659781E-7	1.284199E-7	8.210874E-7	1.67	0.2024

Bounds on condition number: 16.457, 342.01

Backward Elimination: Step 7

Variable X1 Removed: R-Square = 0.4813 and C(p) = 4.1272

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00002193	0.00000365	7.58	<.0001
Error	49	0.00002363	4.823169E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00109	0.00025124	0.00000905	18.77	<.0001
X2	-0.00041672	0.00027966	0.00000107	2.22	0.1426
X3	2.773195E-7	1.783536E-7	0.00000117	2.42	0.1264
X4	0.00002395	0.00000788	0.00000446	9.24	0.0038
X1X2	0.04504	0.08240	1.440966E-7	0.30	0.5871
X1X3	-0.00002544	0.00003397	2.705129E-7	0.56	0.4575
X2X3	1.753619E-7	1.229627E-7	9.809718E-7	2.03	0.1602

Bounds on condition number: 13.751, 242.8

Backward Elimination: Step 8

Variable X1X2 Removed: R-Square = 0.4781 and C(p) = 2.4084

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00002178	0.00000436	9.16	<.0001
Error	50	0.00002378	4.755525E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00111	0.00024756	0.00000948	19.94	<.0001
X2	-0.00031805	0.00021209	0.00000107	2.25	0.1400
X3	2.231327E-7	1.472198E-7	0.00000109	2.30	0.1359
X4	0.00002463	0.00000773	0.00000483	10.16	0.0025
X1X3	-0.00001414	0.00002676	1.327247E-7	0.28	0.5996
X2X3	1.835225E-7	1.21194E-7	0.00000109	2.29	0.1362

Bounds on condition number: 8.6564, 128.35

Backward Elimination: Step 9

Variable X1X3 Removed: R-Square = 0.4752 and C(p) = 0.6675

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00002165	0.00000541	11.54	<.0001
Error	51	0.00002391	4.688304E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00108	0.00024114	0.00000941	20.06	<.0001
X2	-0.00028419	0.00020074	9.396287E-7	2.00	0.1629
X3	1.64442E-7	9.591558E-8	0.00000138	2.94	0.0925
X4	0.00002594	0.00000727	0.00000597	12.74	0.0008
X2X3	1.569979E-7	1.095224E-7	9.633801E-7	2.05	0.1578

Bounds on condition number: 4.6617, 45.643

Backward Elimination: Step 10

Variable X2 Removed: R-Square = 0.4546 and C(p) = 0.5014

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00002071	0.00000690	14.45	<.0001
Error	52	0.00002485	4.778842E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00095957	0.00022777	0.00000848	17.75	0.0001
X3	2.434058E-7	7.877988E-8	0.00000456	9.55	0.0032
X4	0.00002334	0.00000710	0.00000517	10.81	0.0018
X2X3	4.541549E-8	7.677598E-8	1.672168E-7	0.35	0.5567

Bounds on condition number: 2.2474, 16.379

Backward Elimination: Step 11

Variable X2X3 Removed: R-Square = 0.4509 and C(p) = -1.1722

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	2	0.00002054	0.00001027	21.76	<.0001
Error	53	0.00002502	4.720226E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00093302	0.00022193	0.00000834	17.67	0.0001
X3	2.772166E-7	5.388112E-8	0.00001249	26.47	<.0001
X4	0.00002438	0.00000683	0.00000601	12.73	0.0008

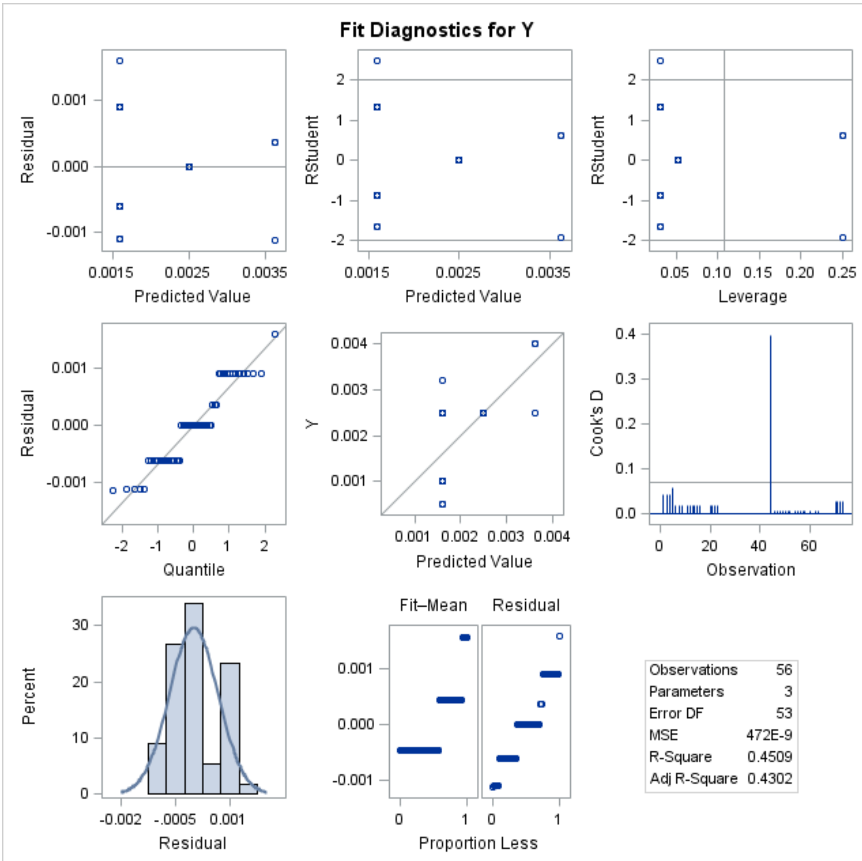
Bounds on condition number: 1.0111, 4.0444

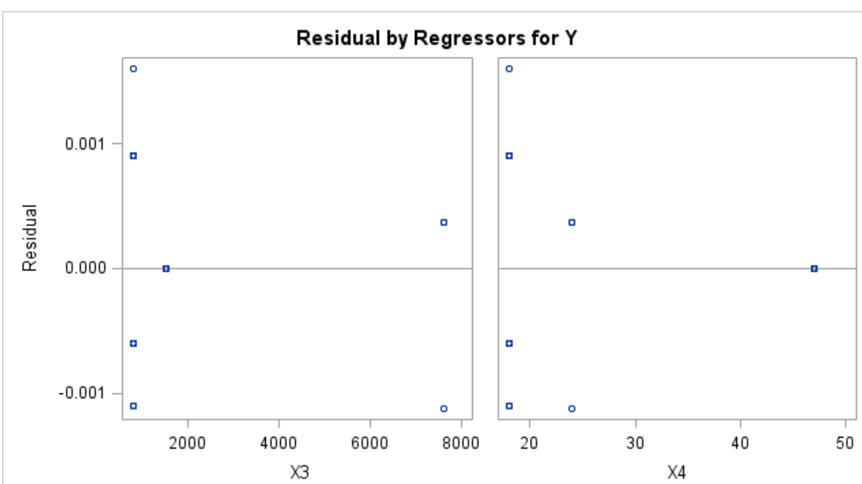
All variables left in the model are significant at the 0.1000 level.

Summary of Backward Elimination								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1		X1X4	8	0.0000	0.4827	8.0004	0.00	0.9839
2	X1X5		9	0.0000	0.4827	10.0000	0.00	0.9839
3		X1X5	8	0.0000	0.4827	8.0004	0.00	0.9839
4		X2X4	7	0.0005	0.4821	6.0492	0.05	0.8244
5	X2X5		8	0.0005	0.4827	8.0004	0.05	0.8244
6		X2X5	7	0.0005	0.4821	6.0492	0.05	0.8244
7		X1	6	0.0009	0.4813	4.1272	0.08	0.7768
8		X1X2	5	0.0032	0.4781	2.4084	0.30	0.5871
9		X1X3	4	0.0029	0.4752	0.6675	0.28	0.5996
10		X2	3	0.0206	0.4546	0.5014	2.00	0.1629
11		X2X3	2	0.0037	0.4509	-1.1722	0.35	0.5567

BACKWARD REGRESSION
Pollutant: Total Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y





STEPWISE REGRESSION
Pollutant: Total Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	107
Number of Observations Used	56
Number of Observations with Missing Values	51

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1768	0.1743	-0.2167	0.2175	0.3372	0.4173	0.6703	0.6101	0.0947	-0.1952	0.0471	0.0642	0.2083	0.0651	0.0064
X2	-0.1768	1.0000	0.0718	0.3528	0.0019	0.7290	0.0281	0.1136	-0.0454	0.5603	0.8617	0.7200	0.2058	0.0180	0.2049	0.1142
X3	0.1743	0.0718	1.0000	0.1047	0.9804	0.2739	0.9194	0.2707	0.8354	0.7252	0.0680	0.6172	0.9150	0.9883	0.9162	0.5648
X4	-0.2167	0.3528	0.1047	1.0000	-0.0935	0.2312	-0.0262	0.5314	-0.1556	0.2459	0.6707	0.1744	0.4970	-0.0482	0.4944	0.4203
X5	0.2175	0.0019	0.9804	-0.0935	1.0000	0.2283	0.9257	0.1656	0.8672	0.6772	-0.0649	0.5833	0.8175	0.9990	0.8192	0.4821
X1X2	0.3372	0.7290	0.2739	0.2312	0.2283	1.0000	0.3908	0.4901	0.3952	0.6684	0.6233	0.7419	0.3327	0.2396	0.3325	0.2310
X1X3	0.4173	0.0281	0.9194	-0.0262	0.9257	0.3908	1.0000	0.3902	0.9703	0.7198	-0.0147	0.6162	0.7916	0.9275	0.7930	0.4784
X1X4	0.6703	0.1136	0.2707	0.5314	0.1656	0.4901	0.3902	1.0000	0.4413	0.2974	0.3145	0.2048	0.4517	0.1903	0.4506	0.3328
X1X5	0.6101	-0.0454	0.8354	-0.1556	0.8672	0.3952	0.9703	0.4413	1.0000	0.6305	-0.1128	0.5347	0.6658	0.8629	0.6675	0.3849
X2X3	0.0947	0.5603	0.7252	0.2459	0.6772	0.6684	0.7198	0.2974	0.6305	1.0000	0.5138	0.9617	0.7325	0.6906	0.7329	0.5120
X2X4	-0.1952	0.8617	0.0680	0.6707	-0.0649	0.6233	-0.0147	0.3145	-0.1128	0.5138	1.0000	0.5622	0.3313	-0.0346	0.3296	0.2604
X2X5	0.0471	0.7200	0.6172	0.1744	0.5833	0.7419	0.6162	0.2048	0.5347	0.9617	0.5622	1.0000	0.6093	0.5931	0.6097	0.4006
X3X4	0.0642	0.2058	0.9150	0.4970	0.8175	0.3327	0.7916	0.4517	0.6658	0.7325	0.3313	0.6093	1.0000	0.8428	1.0000	0.6633
X3X5	0.2083	0.0180	0.9883	-0.0482	0.9990	0.2396	0.9275	0.1903	0.8629	0.6906	-0.0346	0.5931	0.8428	1.0000	0.8444	0.5028
X4X5	0.0651	0.2049	0.9162	0.4944	0.8192	0.3325	0.7930	0.4506	0.6675	0.7329	0.3296	0.6097	1.0000	0.8444	1.0000	0.6630
Y	0.0064	0.1142	0.5648	0.4203	0.4821	0.2310	0.4784	0.3328	0.3849	0.5120	0.2604	0.4006	0.6633	0.5028	0.6630	1.0000

STEPWISE REGRESSION
Pollutant: Total Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	107
Number of Observations Used	56
Number of Observations with Missing Values	51

Stepwise Selection: Step 1

Variable X3X4 Entered: R-Square = 0.4400 and C(p) = -2.2021

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00002005	0.00002005	42.43	<.0001
Error	54	0.00002551	4.724863E-7		
Corrected Total	55	0.00004556			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00145	0.00012953	0.00005949	125.91	<.0001
X3X4	1.296937E-8	1.991153E-9	0.00002005	42.43	<.0001

Bounds on condition number: 1, 1

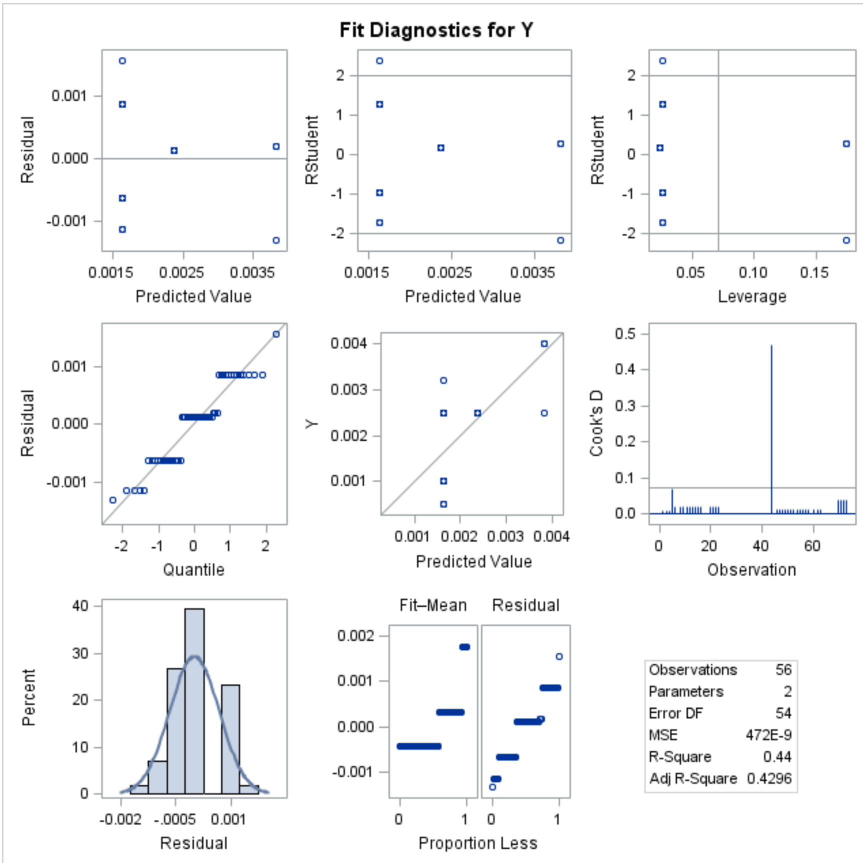
All variables left in the model are significant at the 0.1500 level.

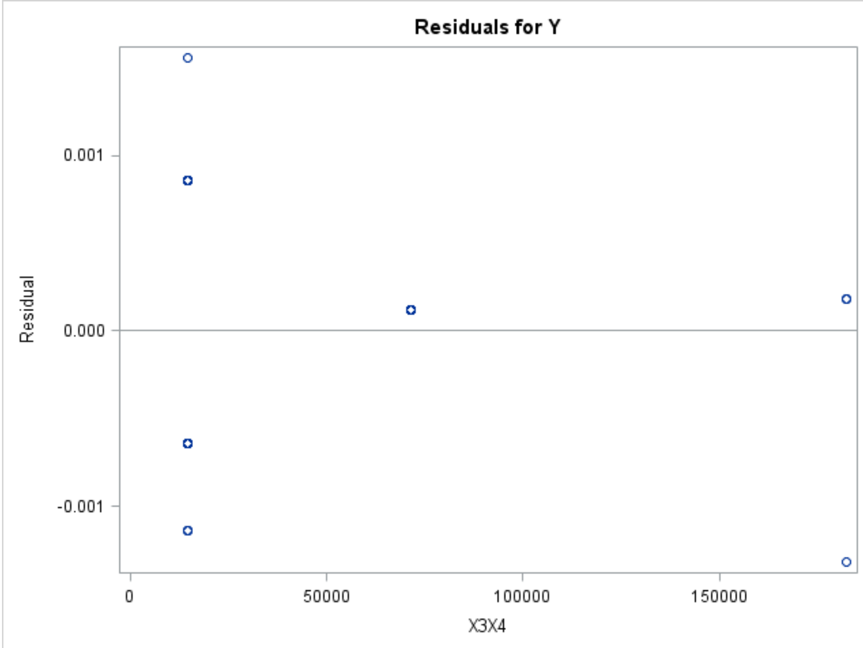
No other variable met the 0.1500 significance level for entry into the model.

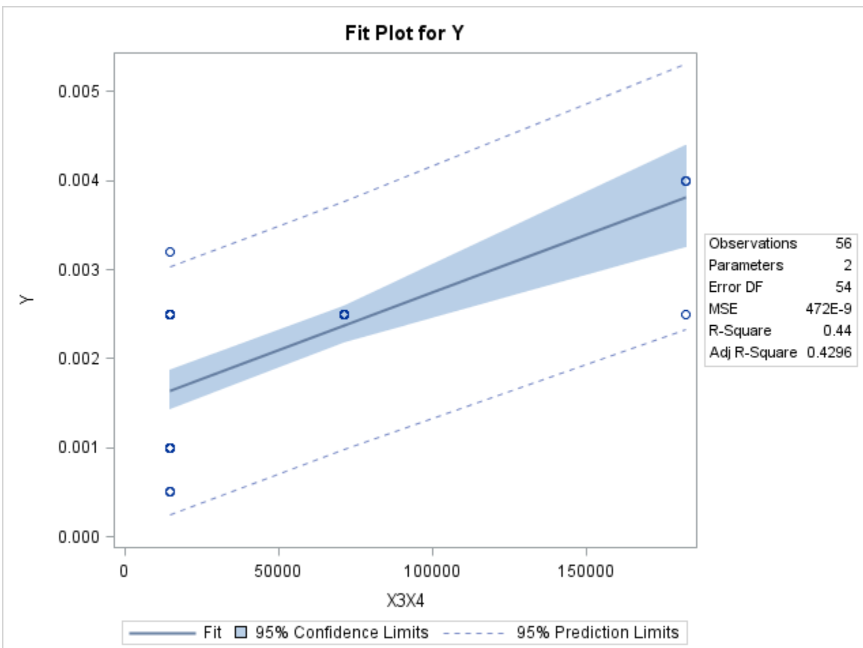
Summary of Stepwise Selection								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X3X4		1	0.4400	0.4400	-2.2021	42.43	<.0001

STEPWISE REGRESSION
Pollutant: Total Chromium
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residuals for Y
Residual
0.001
0.000
-0.001
0
50000
100000
150000
X3X4


Fit Plot for Y
Y
0.005
0.004
0.003
0.002
0.001
0.000
0
50000
100000
150000
X3X4
Observations 56
Parameters 2
Error DF 54
MSE 472E-9
R-Square 0.44
Adj R-Square 0.4296
Fit
95% Confidence Limits
95% Prediction Limits

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Copper

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The REG Procedure

Number of Observations Read	107
Number of Observations Used	56
Number of Observations with Missing Values	51

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1768	0.1743	-0.2167	0.2175	0.3372	0.4173	0.6703	0.6101	0.0947	-0.1952	0.0471	0.0642	0.2083	0.0651	0.0064
X2	-0.1768	1.0000	0.0718	0.3528	0.0019	0.7290	0.0281	0.1136	-0.0454	0.5603	0.8617	0.7200	0.2058	0.0180	0.2049	0.1142
X3	0.1743	0.0718	1.0000	0.1047	0.9804	0.2739	0.9194	0.2707	0.8354	0.7252	0.0680	0.6172	0.9150	0.9883	0.9162	0.5648
X4	-0.2167	0.3528	0.1047	1.0000	-0.0935	0.2312	-0.0262	0.5314	-0.1556	0.2459	0.6707	0.1744	0.4970	-0.0482	0.4944	0.4203
X5	0.2175	0.0019	0.9804	-0.0935	1.0000	0.2283	0.9257	0.1656	0.8672	0.6772	-0.0649	0.5833	0.8175	0.9990	0.8192	0.4821
X1X2	0.3372	0.7290	0.2739	0.2312	0.2283	1.0000	0.3908	0.4901	0.3952	0.6684	0.6233	0.7419	0.3327	0.2396	0.3325	0.2310
X1X3	0.4173	0.0281	0.9194	-0.0262	0.9257	0.3908	1.0000	0.3902	0.9703	0.7198	-0.0147	0.6162	0.7916	0.9275	0.7930	0.4784
X1X4	0.6703	0.1136	0.2707	0.5314	0.1656	0.4901	0.3902	1.0000	0.4413	0.2974	0.3145	0.2048	0.4517	0.1903	0.4506	0.3328
X1X5	0.6101	-0.0454	0.8354	-0.1556	0.8672	0.3952	0.9703	0.4413	1.0000	0.6305	-0.1128	0.5347	0.6658	0.8629	0.6675	0.3849
X2X3	0.0947	0.5603	0.7252	0.2459	0.6772	0.6684	0.7198	0.2974	0.6305	1.0000	0.5138	0.9617	0.7325	0.6906	0.7329	0.5120
X2X4	-0.1952	0.8617	0.0680	0.6707	-0.0649	0.6233	-0.0147	0.3145	-0.1128	0.5138	1.0000	0.5622	0.3313	-0.0346	0.3296	0.2604
X2X5	0.0471	0.7200	0.6172	0.1744	0.5833	0.7419	0.6162	0.2048	0.5347	0.9617	0.5622	1.0000	0.6093	0.5931	0.6097	0.4006
X3X4	0.0642	0.2058	0.9150	0.4970	0.8175	0.3327	0.7916	0.4517	0.6658	0.7325	0.3313	0.6093	1.0000	0.8428	1.0000	0.6633
X3X5	0.2083	0.0180	0.9883	-0.0482	0.9990	0.2396	0.9275	0.1903	0.8629	0.6906	-0.0346	0.5931	0.8428	1.0000	0.8444	0.5028
X4X5	0.0651	0.2049	0.9162	0.4944	0.8192	0.3325	0.7930	0.4506	0.6675	0.7329	0.3296	0.6097	1.0000	0.8444	1.0000	0.6630
Y	0.0064	0.1142	0.5648	0.4203	0.4821	0.2310	0.4784	0.3328	0.3849	0.5120	0.2604	0.4006	0.6633	0.5028	0.6630	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Copper

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The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	107
Number of Observations Used	56
Number of Observations with Missing Values	51

Number in Model	R-Square	Variables in Model
1	0.4400	X3X4
1	0.4396	X4X5
1	0.3190	X3
1	0.2622	X2X3
1	0.2528	X3X5
1	0.2324	X5
1	0.2289	X1X3
1	0.1766	X4
1	0.1605	X2X5
1	0.1482	X1X5
1	0.1107	X1X4
1	0.0678	X2X4
1	0.0534	X1X2
1	0.0130	X2
1	0.0000	X1
2	0.4509	X3X4 X4X5
2	0.4509	X5 X3X5
2	0.4509	X3 X5
2	0.4509	X3 X4X5
2	0.4509	X3X5 X4X5
2	0.4509	X3 X3X5
2	0.4509	X5 X4X5
2	0.4509	X5 X3X4
2	0.4509	X3 X4
2	0.4509	X3X4 X3X5
2	0.4509	X4 X4X5
2	0.4509	X4 X3X4
2	0.4509	X3 X3X4
2	0.4509	X4 X3X5
2	0.4509	X4 X5
3	0.4607	X2X3 X2X5 X3X4
3	0.4603	X2X3 X2X5 X4X5
3	0.4555	X2 X2X4 X3X4
3	0.4554	X2 X2X4 X4X5
3	0.4546	X2X3 X3X4 X4X5
3	0.4546	X5 X2X3 X3X5

3	0.4546	X3 X5 X2X3
3	0.4546	X3 X2X3 X4X5
3	0.4546	X2X3 X3X5 X4X5
3	0.4546	X3 X2X3 X3X5
3	0.4546	X5 X2X3 X4X5
3	0.4546	X4 X2X3 X4X5
3	0.4546	X5 X2X3 X3X4
3	0.4546	X2X3 X3X4 X3X5
3	0.4546	X3 X4 X2X3
4	0.4752	X2 X2X3 X3X4 X4X5
4	0.4752	X2 X5 X2X3 X3X5
4	0.4752	X2 X3 X5 X2X3
4	0.4752	X2 X3 X2X3 X4X5
4	0.4752	X2 X2X3 X3X5 X4X5
4	0.4752	X2 X5 X2X3 X3X4
4	0.4752	X2 X3 X2X3 X3X5
4	0.4752	X2 X5 X2X3 X4X5
4	0.4752	X2 X2X3 X3X4 X3X5
4	0.4752	X2 X3 X4 X2X3
4	0.4752	X2 X4 X2X3 X4X5
4	0.4752	X2 X4 X2X3 X3X4
4	0.4752	X2 X3 X2X3 X3X4
4	0.4752	X2 X4 X2X3 X3X5
4	0.4752	X2 X4 X5 X2X3
5	0.4790	X2 X1X2 X1X5 X2X3 X3X4
5	0.4789	X2 X1X2 X1X5 X2X3 X4X5
5	0.4785	X2 X1X2 X1X3 X2X3 X3X4
5	0.4784	X2 X1X2 X1X3 X2X3 X4X5
5	0.4781	X2 X1X3 X2X3 X3X4 X4X5
5	0.4781	X2 X5 X1X3 X2X3 X3X5
5	0.4781	X2 X3 X5 X1X3 X2X3
5	0.4781	X2 X3 X1X3 X2X3 X4X5
5	0.4781	X2 X1X3 X2X3 X3X5 X4X5
5	0.4781	X2 X3 X1X3 X2X3 X3X5
5	0.4781	X2 X5 X1X3 X2X3 X3X4
5	0.4781	X2 X5 X1X3 X2X3 X4X5
5	0.4781	X2 X3 X4 X1X3 X2X3
5	0.4781	X2 X1X3 X2X3 X3X4 X3X5
5	0.4781	X2 X4 X1X3 X2X3 X3X4
6	0.4820	X2 X1X2 X1X5 X2X3 X3X4 X4X5
6	0.4820	X2 X5 X1X2 X1X5 X2X3 X3X5
6	0.4820	X2 X3 X5 X1X2 X1X5 X2X3
6	0.4820	X2 X3 X1X2 X1X5 X2X3 X3X5
6	0.4820	X2 X5 X1X2 X1X5 X2X3 X4X5
6	0.4820	X2 X5 X1X2 X1X5 X2X3 X3X4
6	0.4820	X2 X1X2 X1X5 X2X3 X3X5 X4X5
6	0.4820	X2 X1X2 X1X5 X2X3 X3X4 X3X5
6	0.4820	X2 X3 X4 X1X2 X1X5 X2X3
6	0.4820	X2 X4 X1X2 X1X5 X2X3 X4X5
6	0.4820	X2 X4 X1X2 X1X5 X2X3 X3X4
6	0.4820	X2 X3 X1X2 X1X5 X2X3 X4X5
6		

	0.4820	X2 X3 X1X2 X1X5 X2X3 X3X4
6	0.4820	X2 X4 X1X2 X1X5 X2X3 X3X5
6	0.4820	X2 X4 X5 X1X2 X1X5 X2X3
7	0.4826	X2 X1X2 X1X5 X2X4 X2X5 X3X4 X4X5
7	0.4826	X2 X1X2 X1X5 X2X3 X2X4 X3X4 X4X5
7	0.4826	X2 X1X2 X1X5 X2X3 X2X5 X3X4 X4X5
7	0.4826	X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
7	0.4826	X2 X5 X1X2 X1X5 X2X4 X2X5 X3X5
7	0.4826	X2 X5 X1X2 X1X5 X2X3 X2X4 X3X5
7	0.4826	X2 X5 X1X2 X1X5 X2X3 X2X5 X3X5
7	0.4826	X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X5
7	0.4826	X2 X3 X5 X1X2 X1X5 X2X4 X2X5
7	0.4826	X2 X3 X5 X1X2 X1X5 X2X3 X2X4
7	0.4826	X2 X3 X5 X1X2 X1X5 X2X3 X2X5
7	0.4826	X3 X5 X1X2 X1X5 X2X3 X2X4 X2X5
7	0.4826	X2 X3 X1X2 X1X5 X2X4 X2X5 X3X5
7	0.4826	X2 X3 X1X2 X1X5 X2X3 X2X4 X3X5
7	0.4826	X2 X3 X1X2 X1X5 X2X3 X2X5 X3X5
8	0.4827	X1 X2 X1X2 X1X3 X2X4 X2X5 X3X4 X4X5
8	0.4827	X1 X2 X1X2 X1X3 X2X3 X2X4 X3X4 X4X5
8	0.4827	X1 X2 X1X2 X1X3 X2X3 X2X5 X3X4 X4X5
8	0.4827	X1 X1X2 X1X3 X2X3 X2X4 X2X5 X3X4 X4X5
8	0.4827	X1 X2 X5 X1X2 X1X3 X2X4 X2X5 X3X5
8	0.4827	X1 X2 X5 X1X2 X1X3 X2X3 X2X4 X3X5
8	0.4827	X1 X5 X1X2 X1X3 X2X3 X2X4 X2X5 X3X5
8	0.4827	X1 X2 X3 X5 X1X2 X1X3 X2X4 X2X5
8	0.4827	X1 X2 X3 X5 X1X2 X1X3 X2X3 X2X4
8	0.4827	X1 X3 X5 X1X2 X1X3 X2X3 X2X4 X2X5
8	0.4827	X1 X2 X3 X1X2 X1X3 X2X4 X2X5 X3X5
8	0.4827	X1 X5 X1X2 X1X3 X2X3 X2X4 X2X5 X4X5
8	0.4827	X1 X2 X5 X1X2 X1X3 X2X3 X2X4 X4X5
8	0.4827	X1 X2 X3 X1X2 X1X3 X2X3 X2X4 X3X5
8	0.4827	X1 X2 X5 X1X2 X1X3 X2X4 X2X5 X4X5
9	0.4827	X1 X2 X1X2 X1X3 X1X5 X2X4 X2X5 X3X4 X4X5
9	0.4827	X1 X2 X1X2 X1X3 X1X4 X2X4 X2X5 X3X4 X4X5
9	0.4827	X1 X2 X1X2 X1X3 X1X5 X2X3 X2X4 X3X4 X4X5
9	0.4827	X2 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X4X5
9	0.4827	X1 X2 X1X2 X1X3 X1X4 X2X3 X2X4 X3X4 X4X5
9	0.4827	X1 X2 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X4X5
9	0.4827	X1 X2 X1X2 X1X4 X1X5 X2X4 X2X5 X3X4 X4X5
9	0.4827	X1 X2 X1X2 X1X3 X1X4 X2X3 X2X5 X3X4 X4X5
9	0.4827	X2 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X4X5
9	0.4827	X1 X2 X1X2 X1X4 X1X5 X2X3 X2X4 X3X4 X4X5
9	0.4827	X2 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X4X5
9	0.4827	X1 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
9	0.4827	X1 X2 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X4X5
9	0.4827	X1 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X4X5
9	0.4827	X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Copper
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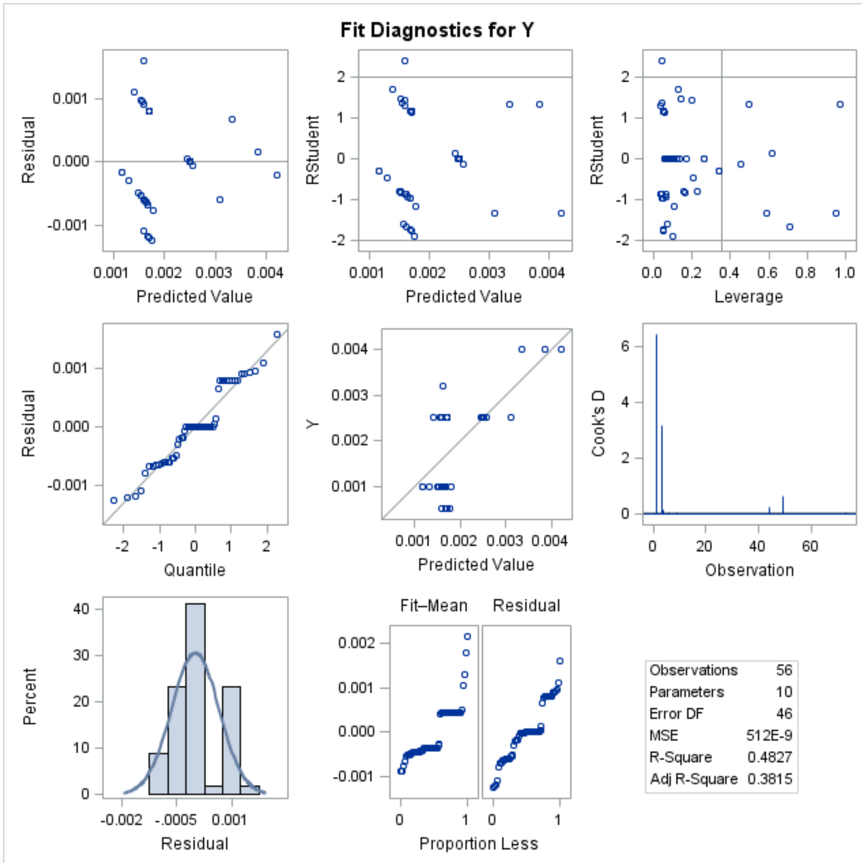
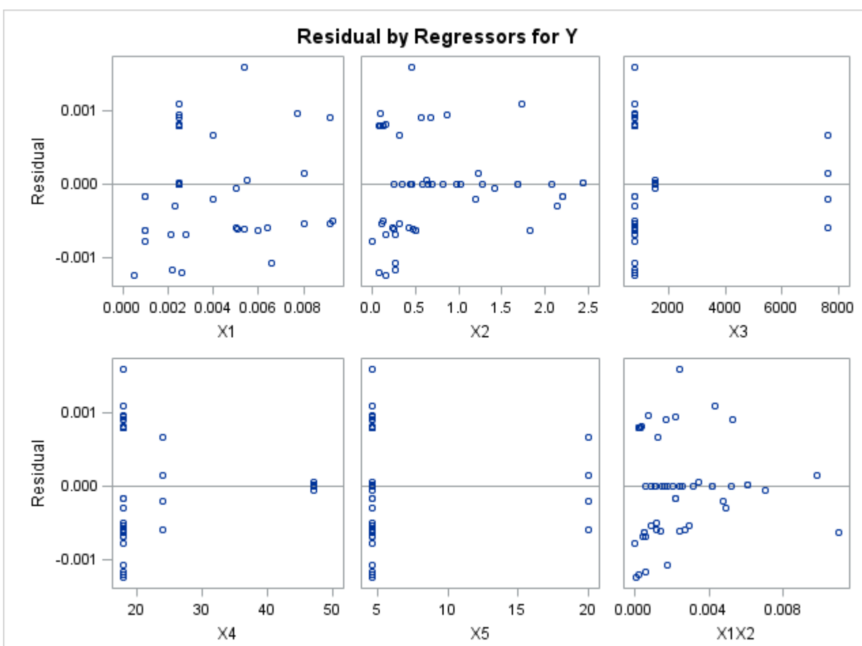
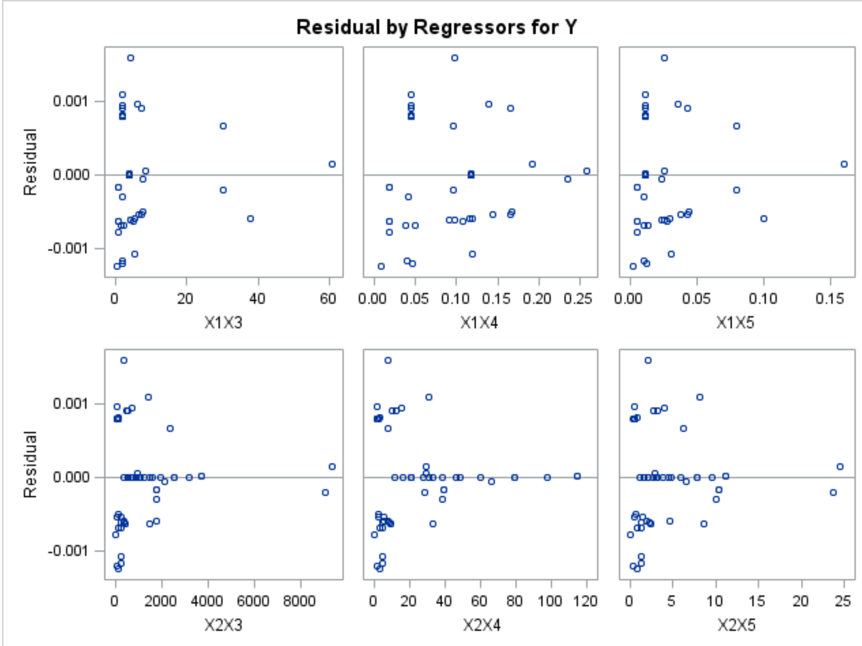
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
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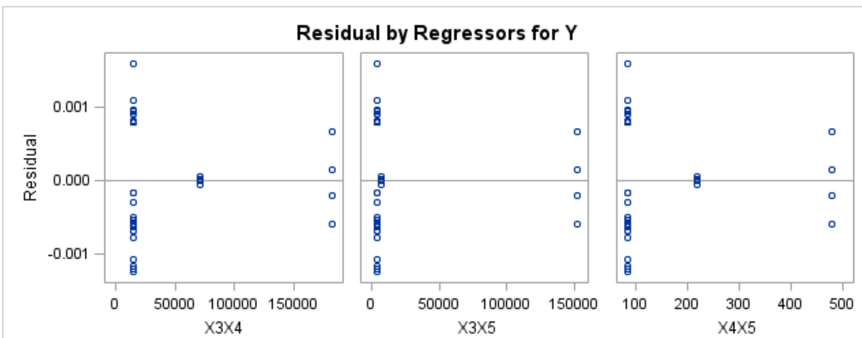
0.000
-0.001
0 20 40 60
X1X3
0.00 0.05 0.10 0.15 0.20 0.25
X1X4
0.00 0.05 0.10 0.15
X1X5
0 2000 4000 6000 8000
X2X3
0 20 40 60 80 100 120
X2X4
0 5 10 15 20 25
X2X5


Residual by Regressors for Y
Residual
0.001
0.000
-0.001
0 50000 100000 150000
X3X4
0 50000 100000 150000
X3X5
100 200 300 400 500
X4X5

FORWARD REGRESSION
Pollutant: Total Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	177
Number of Observations Used	49
Number of Observations with Missing Values	128

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1128	-0.0747	-0.1948	0.0185	0.2873	0.3197	0.6042	0.4589	-0.1185	-0.1597	-0.0530	-0.1223	-0.0495	-0.0410	0.1183
X2	-0.1128	1.0000	0.0796	0.4407	-0.0001	0.8656	0.0281	0.2485	-0.0379	0.5287	0.8770	0.6010	0.1875	0.0383	0.1336	-0.2490
X3	-0.0747	0.0796	1.0000	0.0183	0.9425	0.0451	0.8295	-0.0112	0.7051	0.7236	-0.0026	0.6785	0.9682	0.9956	0.9314	0.3707
X4	-0.1948	0.4407	0.0183	1.0000	-0.0956	0.3133	-0.0204	0.6140	-0.1236	0.1488	0.7295	0.1132	0.2678	-0.0678	0.2096	-0.3575
X5	0.0185	-0.0001	0.9425	-0.0956	1.0000	0.0249	0.8428	-0.0227	0.8284	0.6275	-0.1061	0.6424	0.8819	0.9601	0.9533	0.3592
X1X2	0.2873	0.8656	0.0451	0.3133	0.0249	1.0000	0.1675	0.5022	0.1751	0.4432	0.6892	0.5576	0.1213	0.0201	0.1196	-0.1534
X1X3	0.3197	0.0281	0.8295	-0.0204	0.8428	0.1675	1.0000	0.2728	0.9366	0.5471	-0.0454	0.5572	0.7928	0.8358	0.8217	0.3845
X1X4	0.6042	0.2485	-0.0112	0.6140	-0.0227	0.5022	0.2728	1.0000	0.2908	0.0422	0.4291	0.0677	0.1414	-0.0570	0.1640	-0.1459
X1X5	0.4589	-0.0379	0.7051	-0.1236	0.8284	0.1751	0.9366	0.2908	1.0000	0.4237	-0.1312	0.4972	0.6449	0.7319	0.7762	0.3186
X2X3	-0.1185	0.5287	0.7236	0.1488	0.6275	0.4432	0.5471	0.0422	0.4237	1.0000	0.3831	0.9672	0.7354	0.7039	0.6615	0.0475
X2X4	-0.1597	0.8770	-0.0026	0.7295	-0.1061	0.6892	-0.0454	0.4291	-0.1312	0.3831	1.0000	0.4011	0.1805	-0.0679	0.1172	-0.3570
X2X5	-0.0530	0.6010	0.6785	0.1132	0.6424	0.5576	0.5572	0.0677	0.4972	0.9672	0.4011	1.0000	0.6817	0.6685	0.6654	-0.0095
X3X4	-0.1223	0.1875	0.9682	0.2678	0.8819	0.1213	0.7928	0.1414	0.6449	0.7354	0.1805	0.6817	1.0000	0.9421	0.9475	0.2685
X3X5	-0.0495	0.0383	0.9956	-0.0678	0.9601	0.0201	0.8358	-0.0570	0.7319	0.7039	-0.0679	0.6685	0.9421	1.0000	0.9225	0.3965
X4X5	-0.0410	0.1336	0.9314	0.2096	0.9533	0.1196	0.8217	0.1640	0.7762	0.6615	0.1172	0.6654	0.9475	0.9225	1.0000	0.2444
Y	0.1183	-0.2490	0.3707	-0.3575	0.3592	-0.1534	0.3845	-0.1459	0.3186	0.0475	-0.3570	-0.0095	0.2685	0.3965	0.2444	1.0000

FORWARD REGRESSION
Pollutant: Total Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	177
Number of Observations Used	49
Number of Observations with Missing Values	128

Forward Selection: Step 1

Variable X3X5 Entered: R-Square = 0.1572 and C(p) = 20.4610

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00032316	0.00032316	8.77	0.0048
Error	47	0.00173	0.00003685		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01107	0.00105	0.00407	110.39	<.0001
X3X5	4.491971E-8	1.516914E-8	0.00032316	8.77	0.0048

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X2X5 Entered: R-Square = 0.2936 and C(p) = 11.8723

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00060334	0.00030167	9.56	0.0003
Error	46	0.00145	0.00003156		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01228	0.00106	0.00427	135.23	<.0001

X2X5	-0.00066921	0.00022462	0.00028017	8.88	0.0046
X3X5	8.251868E-8	1.887686E-8	0.00060315	19.11	<.0001

Bounds on condition number: 1.8081, 7.2325

Forward Selection: Step 3

Variable X4 Entered: R-Square = 0.3604 and C(p) = 8.6843

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00074061	0.00024687	8.45	0.0001
Error	45	0.00131	0.00002921		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01613	0.00205	0.00181	62.05	<.0001
X4	-0.00015443	0.00007124	0.00013728	4.70	0.0355
X2X5	-0.00056678	0.00022120	0.00019180	6.57	0.0138
X3X5	7.472736E-8	1.851306E-8	0.00047599	16.29	0.0002

Bounds on condition number: 1.8946, 14.478

Forward Selection: Step 4

Variable X1X2 Entered: R-Square = 0.4123 and C(p) = 6.6463

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00084745	0.00021186	7.72	<.0001
Error	44	0.00121	0.00002745		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01546	0.00201	0.00162	58.91	<.0001
X4	-0.00018796	0.00007112	0.00019174	6.99	0.0113
X1X2	0.24267	0.12300	0.00010684	3.89	0.0548
X2X5	-0.00100	0.00030749	0.00029125	10.61	0.0022
X3X5	9.792853E-8	2.145536E-8	0.00057185	20.83	<.0001

Bounds on condition number: 3.8962, 39.933

Forward Selection: Step 5

Variable X2X3 Entered: R-Square = 0.4750 and C(p) = 3.7789

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00097624	0.00019525	7.78	<.0001
Error	43	0.00108	0.00002509		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01703	0.00205	0.00174	69.23	<.0001
X4	-0.00024534	0.00007256	0.00028689	11.43	0.0015
X1X2	0.37344	0.13100	0.00020390	8.13	0.0067
X2X3	0.00000444	0.00000196	0.00012879	5.13	0.0286
X2X5	-0.00264	0.00078182	0.00028673	11.43	0.0015
X3X5	9.455777E-8	2.056752E-8	0.00053037	21.14	<.0001

Bounds on condition number: 27.554, 283.64

Forward Selection: Step 6

Variable X3X4 Entered: R-Square = 0.4894 and C(p) = 4.6577

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00101	0.00016765	6.71	<.0001
Error	42	0.00105	0.00002498		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00763	0.00887	0.00001848	0.74	0.3946
X4	0.00055050	0.00073392	0.00001406	0.56	0.4574
X1X2	0.43941	0.14406	0.00023244	9.30	0.0040
X2X3	0.00000706	0.00000310	0.00012962	5.19	0.0279
X2X5	-0.00360	0.00118	0.00023445	9.38	0.0038
X3X4	-4.47686E-7	4.108416E-7	0.00002967	1.19	0.2821
X3X5	5.58081E-7	4.258698E-7	0.00004290	1.72	0.1972

Bounds on condition number: 1260, 16053

Forward Selection: Step 7

Variable X1 Entered: R-Square = 0.4982 and C(p) = 5.9756

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	0.00102	0.00014628	5.82	0.0001
Error	41	0.00103	0.00002515		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00695	0.00893	0.00001523	0.61	0.4409
X1	-0.07975	0.09415	0.00001805	0.72	0.4019
X4	0.00075667	0.00077559	0.00002394	0.95	0.3350
X1X2	0.52361	0.17543	0.00022408	8.91	0.0048
X2X3	0.00000780	0.00000323	0.00014666	5.83	0.0203
X2X5	-0.00399	0.00126	0.00025013	9.94	0.0030
X3X4	-5.76626E-7	4.394375E-7	0.00004331	1.72	0.1968
X3X5	6.968058E-7	4.576192E-7	0.00005832	2.32	0.1355

Bounds on condition number: 1431.9, 21346

Forward Selection: Step 8

Variable X1X3 Entered: R-Square = 0.5138 and C(p) = 6.7686

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	0.00106	0.00013199	5.28	0.0002
Error	40	0.00099935	0.00002498		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00890	0.00907	0.00002410	0.96	0.3320
X1	-0.15818	0.11669	0.00004591	1.84	0.1828
X4	0.00072772	0.00077339	0.00002212	0.89	0.3524
X1X2	0.52703	0.17486	0.00022695	9.08	0.0045
X1X3	0.00003298	0.00002917	0.00003194	1.28	0.2649
X2X3	0.00000829	0.00000325	0.00016274	6.51	0.0146
X2X5	-0.00414	0.00127	0.00026656	10.67	0.0022
X3X4	-5.75018E-7	4.37956E-7	0.00004307	1.72	0.1967
X3X5	6.617354E-7	4.571275E-7	0.00005235	2.10	0.1555

Bounds on condition number: 1431.9, 24522

Forward Selection: Step 9

Variable X2X4 Entered: R-Square = 0.5223 and C(p) = 8.1036

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	0.00107	0.00011928	4.74	0.0003
Error	39	0.00098175	0.00002517		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00791	0.00918	0.00001869	0.74	0.3941
X1	-0.19110	0.12357	0.00006020	2.39	0.1301
X4	0.00083608	0.00078707	0.00002841	1.13	0.2946
X1X2	0.62388	0.21031	0.00022153	8.80	0.0051
X1X3	0.00003297	0.00002928	0.00003192	1.27	0.2670
X2X3	0.00000882	0.00000332	0.00017741	7.05	0.0114
X2X4	-0.00008834	0.00010566	0.00001760	0.70	0.4082
X2X5	-0.00429	0.00128	0.00028053	11.14	0.0019
X3X4	-6.0188E-7	4.407856E-7	0.00004694	1.86	0.1799
X3X5	6.853258E-7	4.597239E-7	0.00005594	2.22	0.1441

Bounds on condition number: 1439.5, 27847

Forward Selection: Step 10

Variable X2 Entered: R-Square = 0.5354 and C(p) = 9.0858

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	0.00110	0.00011004	4.38	0.0004
Error	38	0.00095482	0.00002513		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00033912	0.01173	2.100513E-8	0.00	0.9771
X1	-0.12367	0.13958	0.00001973	0.79	0.3812
X2	0.01067	0.01030	0.00002693	1.07	0.3071
X4	0.00126	0.00088502	0.00005065	2.02	0.1638
X1X2	0.42165	0.28689	0.00005428	2.16	0.1499
X1X3	0.00003723	0.00002954	0.00003990	1.59	0.2153
X2X3	0.00001022	0.00000358	0.00020429	8.13	0.0070
X2X4	-0.00025095	0.00018925	0.00004418	1.76	0.1927
X2X5	-0.00490	0.00141	0.00030232	12.03	0.0013

X3X4	-7.95097E-7	4.782967E-7	0.00006944	2.76	0.1047
X3X5	8.829037E-7	4.973737E-7	0.00007918	3.15	0.0839

Bounds on condition number: 1698.1, 37062

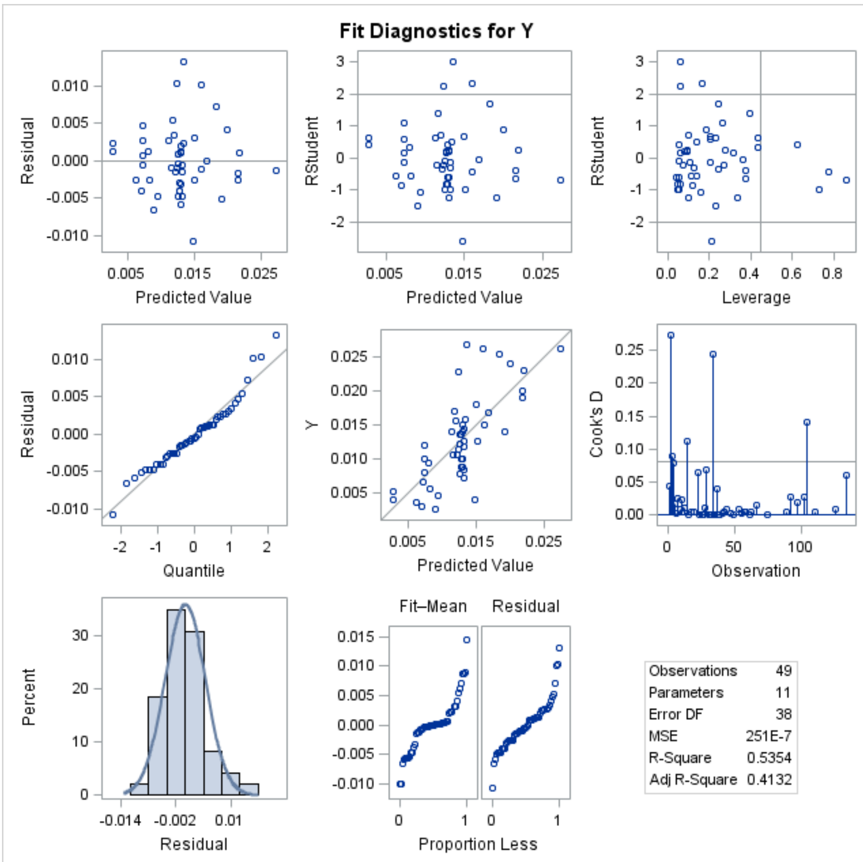
No other variable met the 0.5000 significance level for entry into the model.

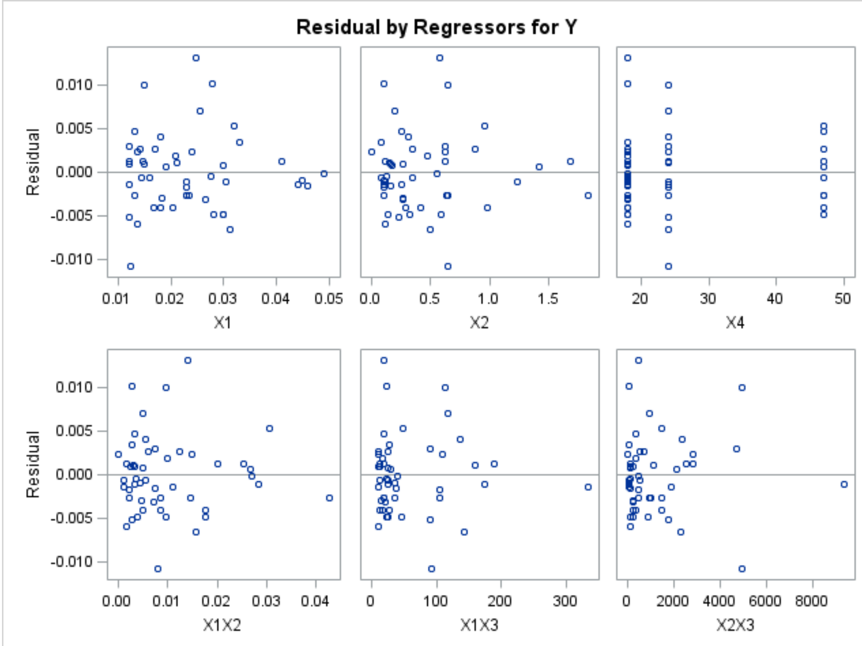
Summary of Forward Selection

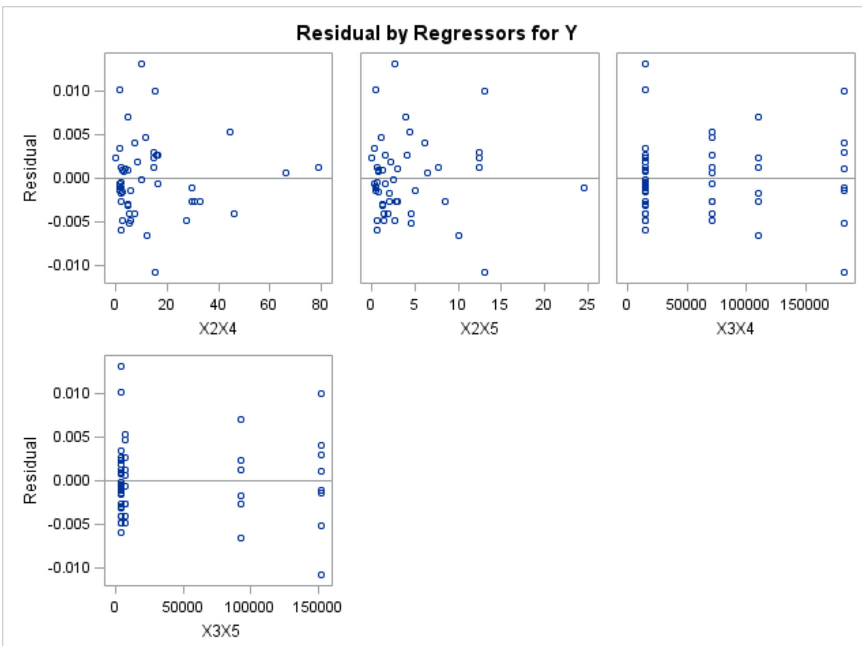
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X3X5	1	0.1572	0.1572	20.4610	8.77	0.0048
2	X2X5	2	0.1363	0.2936	11.8723	8.88	0.0046
3	X4	3	0.0668	0.3604	8.6843	4.70	0.0355
4	X1X2	4	0.0520	0.4123	6.6463	3.89	0.0548
5	X2X3	5	0.0627	0.4750	3.7789	5.13	0.0286
6	X3X4	6	0.0144	0.4894	4.6577	1.19	0.2821
7	X1	7	0.0088	0.4982	5.9756	0.72	0.4019
8	X1X3	8	0.0155	0.5138	6.7686	1.28	0.2649
9	X2X4	9	0.0086	0.5223	8.1036	0.70	0.4082
10	X2	10	0.0131	0.5354	9.0858	1.07	0.3071

FORWARD REGRESSION
Pollutant: Total Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X1
X2
X4
X1X2
X1X3
X2X3


Residual by Regressors for Y
Residual
X2X4
X2X5
X3X4
X3X5

BACKWARD REGRESSION
Pollutant: Total Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	177
Number of Observations Used	49
Number of Observations with Missing Values	128

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1128	-0.0747	-0.1948	0.0185	0.2873	0.3197	0.6042	0.4589	-0.1185	-0.1597	-0.0530	-0.1223	-0.0495	-0.0410	0.1183
X2	-0.1128	1.0000	0.0796	0.4407	-0.0001	0.8656	0.0281	0.2485	-0.0379	0.5287	0.8770	0.6010	0.1875	0.0383	0.1336	-0.2490
X3	-0.0747	0.0796	1.0000	0.0183	0.9425	0.0451	0.8295	-0.0112	0.7051	0.7236	-0.0026	0.6785	0.9682	0.9956	0.9314	0.3707
X4	-0.1948	0.4407	0.0183	1.0000	-0.0956	0.3133	-0.0204	0.6140	-0.1236	0.1488	0.7295	0.1132	0.2678	-0.0678	0.2096	-0.3575
X5	0.0185	-0.0001	0.9425	-0.0956	1.0000	0.0249	0.8428	-0.0227	0.8284	0.6275	-0.1061	0.6424	0.8819	0.9601	0.9533	0.3592
X1X2	0.2873	0.8656	0.0451	0.3133	0.0249	1.0000	0.1675	0.5022	0.1751	0.4432	0.6892	0.5576	0.1213	0.0201	0.1196	-0.1534
X1X3	0.3197	0.0281	0.8295	-0.0204	0.8428	0.1675	1.0000	0.2728	0.9366	0.5471	-0.0454	0.5572	0.7928	0.8358	0.8217	0.3845
X1X4	0.6042	0.2485	-0.0112	0.6140	-0.0227	0.5022	0.2728	1.0000	0.2908	0.0422	0.4291	0.0677	0.1414	-0.0570	0.1640	-0.1459
X1X5	0.4589	-0.0379	0.7051	-0.1236	0.8284	0.1751	0.9366	0.2908	1.0000	0.4237	-0.1312	0.4972	0.6449	0.7319	0.7762	0.3186
X2X3	-0.1185	0.5287	0.7236	0.1488	0.6275	0.4432	0.5471	0.0422	0.4237	1.0000	0.3831	0.9672	0.7354	0.7039	0.6615	0.0475
X2X4	-0.1597	0.8770	-0.0026	0.7295	-0.1061	0.6892	-0.0454	0.4291	-0.1312	0.3831	1.0000	0.4011	0.1805	-0.0679	0.1172	-0.3570
X2X5	-0.0530	0.6010	0.6785	0.1132	0.6424	0.5576	0.5572	0.0677	0.4972	0.9672	0.4011	1.0000	0.6817	0.6685	0.6654	-0.0095
X3X4	-0.1223	0.1875	0.9682	0.2678	0.8819	0.1213	0.7928	0.1414	0.6449	0.7354	0.1805	0.6817	1.0000	0.9421	0.9475	0.2685
X3X5	-0.0495	0.0383	0.9956	-0.0678	0.9601	0.0201	0.8358	-0.0570	0.7319	0.7039	-0.0679	0.6685	0.9421	1.0000	0.9225	0.3965
X4X5	-0.0410	0.1336	0.9314	0.2096	0.9533	0.1196	0.8217	0.1640	0.7762	0.6615	0.1172	0.6654	0.9475	0.9225	1.0000	0.2444
Y	0.1183	-0.2490	0.3707	-0.3575	0.3592	-0.1534	0.3845	-0.1459	0.3186	0.0475	-0.3570	-0.0095	0.2685	0.3965	0.2444	1.0000

BACKWARD REGRESSION
Pollutant: Total Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	177
Number of Observations Used	49
Number of Observations with Missing Values	128

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.5365 and C(p) = 13.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	12	0.00110	0.00009189	3.47	0.0019
Error	36	0.00095255	0.00002646		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01218	0.00827	0.00005740	2.17	0.1495
X1	-0.03452	0.34111	2.709863E-7	0.01	0.9200
X2	0.00822	0.01349	0.00000982	0.37	0.5461
X3	-0.00000225	0.00000378	0.00000937	0.35	0.5555
X4	-0.00010043	0.00026411	0.00000383	0.14	0.7060
X5	0.00136	0.00153	0.00002105	0.80	0.3783
X1X2	0.48662	0.38366	0.00004257	1.61	0.2128
X1X3	0.00007049	0.00015706	0.00000533	0.20	0.6563
X1X4	-0.00351	0.01286	0.00000197	0.07	0.7864
X1X5	-0.01351	0.06445	0.00000116	0.04	0.8351
X2X3	0.00000982	0.00000438	0.00013322	5.03	0.0311
X2X4	-0.00022447	0.00021547	0.00002872	1.09	0.3045
X2X5	-0.00472	0.00178	0.00018544	7.01	0.0120

Bounds on condition number: 294.46, 15163

Backward Elimination: Step 1

Variable X1 Removed: R-Square = 0.5364 and C(p) = 11.0102

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	11	0.00110	0.00010022	3.89	0.0009
Error	37	0.00095282	0.00002575		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01145	0.00399	0.00021206	8.23	0.0068
X2	0.00767	0.01217	0.00001022	0.40	0.5326
X3	-0.00000250	0.00000286	0.00001969	0.76	0.3875
X4	-0.00008073	0.00017611	0.00000541	0.21	0.6494
X5	0.00147	0.00108	0.00004794	1.86	0.1807
X1X2	0.49647	0.36611	0.00004736	1.84	0.1833
X1X3	0.00008194	0.00010745	0.00001498	0.58	0.4506
X1X4	-0.00451	0.00808	0.00000804	0.31	0.5796
X1X5	-0.01843	0.04172	0.00000503	0.20	0.6612
X2X3	0.00000965	0.00000399	0.00015096	5.86	0.0205
X2X4	-0.00021781	0.00020243	0.00002982	1.16	0.2889
X2X5	-0.00465	0.00160	0.00021636	8.40	0.0063

Bounds on condition number: 126.79, 8057

Backward Elimination: Step 2

Variable X1X5 Removed: R-Square = 0.5339 and C(p) = 9.2002

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	10	0.00110	0.00010974	4.35	0.0004
Error	38	0.00095785	0.00002521		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01137	0.00394	0.00020951	8.31	0.0064
X2	0.00909	0.01161	0.00001547	0.61	0.4383
X3	-0.00000152	0.00000178	0.00001830	0.73	0.3996
X4	-0.00005005	0.00016012	0.00000246	0.10	0.7563
X5	0.00108	0.00060569	0.00007985	3.17	0.0831
X1X2	0.48924	0.36185	0.00004608	1.83	0.1844
X1X3	0.00003634	0.00002959	0.00003801	1.51	0.2270
X1X4	-0.00595	0.00731	0.00001670	0.66	0.4208
X2X3	0.00001036	0.00000361	0.00020694	8.21	0.0068
X2X4	-0.00023861	0.00019478	0.00003783	1.50	0.2281
X2X5	-0.00496	0.00143	0.00030479	12.09	0.0013

Bounds on condition number: 91.235, 3488.7

Backward Elimination: Step 3

Variable X4 Removed: R-Square = 0.5328 and C(p) = 7.2933

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	0.00109	0.00012166	4.94	0.0002
Error	39	0.00096031	0.00002462		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01081	0.00347	0.00023916	9.71	0.0034
X2	0.00898	0.01147	0.00001510	0.61	0.4383
X3	-0.00000173	0.00000163	0.00002761	1.12	0.2962
X5	0.00113	0.00057777	0.00009379	3.81	0.0582
X1X2	0.53360	0.32897	0.00006479	2.63	0.1129
X1X3	0.00003962	0.00002735	0.00005169	2.10	0.1554
X1X4	-0.00731	0.00581	0.00003908	1.59	0.2153
X2X3	0.00001068	0.00000343	0.00023925	9.72	0.0034
X2X4	-0.00026340	0.00017583	0.00005526	2.24	0.1422
X2X5	-0.00508	0.00136	0.00034547	14.03	0.0006

Bounds on condition number: 84.477, 2800.4

Backward Elimination: Step 4

Variable X3X4 Entered: R-Square = 0.5339 and C(p) = 9.2002

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	0.00110	0.00010974	4.35	0.0004
Error	38	0.00095785	0.00002521		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01033	0.00383	0.00018352	7.28	0.0103
X2	0.00909	0.01161	0.00001547	0.61	0.4383
X3	-6.44426E-7	0.00000384	7.08571E-7	0.03	0.8677

X5	0.00107	0.00061280	0.00007687	3.05	0.0888
X1X2	0.48924	0.36185	0.00004608	1.83	0.1844
X1X3	0.00003634	0.00002959	0.00003801	1.51	0.2270
X1X4	-0.00595	0.00731	0.00001670	0.66	0.4208
X2X3	0.00001036	0.00000361	0.00020694	8.21	0.0068
X2X4	-0.00023861	0.00019478	0.00003783	1.50	0.2281
X2X5	-0.00496	0.00143	0.00030479	12.09	0.0013
X3X4	-3.64659E-8	1.166657E-7	0.00000246	0.10	0.7563

Bounds on condition number: 184.84, 5892.8

Backward Elimination: Step 5

Variable X3 Removed: R-Square = 0.5336 and C(p) = 7.2270

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	0.00110	0.00012185	4.96	0.0002
Error	39	0.00095856	0.00002458		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01019	0.00369	0.00018780	7.64	0.0087
X2	0.00886	0.01138	0.00001490	0.61	0.4409
X5	0.00101	0.00046856	0.00011310	4.60	0.0382
X1X2	0.47079	0.34040	0.00004701	1.91	0.1745
X1X3	0.00003418	0.00002631	0.00004148	1.69	0.2016
X1X4	-0.00532	0.00619	0.00001815	0.74	0.3954
X2X3	0.00001001	0.00000291	0.00029150	11.86	0.0014
X2X4	-0.00022352	0.00017057	0.00004221	1.72	0.1977
X2X5	-0.00483	0.00118	0.00041145	16.74	0.0002
X3X4	-5.41268E-8	4.952337E-8	0.00002936	1.19	0.2811

Bounds on condition number: 64.075, 2204.8

Backward Elimination: Step 6

Variable X3X5 Entered: R-Square = 0.5339 and C(p) = 9.2002

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F

Model	10	0.00110	0.00010974	4.35	0.0004
Error	38	0.00095785	0.00002521		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00989	0.00414	0.00014406	5.72	0.0219
X2	0.00909	0.01161	0.00001547	0.61	0.4383
X5	0.00109	0.00070824	0.00006007	2.38	0.1310
X1X2	0.48924	0.36185	0.00004608	1.83	0.1844
X1X3	0.00003634	0.00002959	0.00003801	1.51	0.2270
X1X4	-0.00595	0.00731	0.00001670	0.66	0.4208
X2X3	0.00001036	0.00000361	0.00020694	8.21	0.0068
X2X4	-0.00023861	0.00019478	0.00003783	1.50	0.2281
X2X5	-0.00496	0.00143	0.00030479	12.09	0.0013
X3X4	-4.30815E-8	8.279603E-8	0.00000682	0.27	0.6059
X3X5	-2.44411E-8	1.457758E-7	7.08571E-7	0.03	0.8677

Bounds on condition number: 135.02, 5012.8

Backward Elimination: Step 7

Variable X3X5 Removed: R-Square = 0.5336 and C(p) = 7.2270

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	0.00110	0.00012185	4.96	0.0002
Error	39	0.00095856	0.00002458		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01019	0.00369	0.00018780	7.64	0.0087
X2	0.00886	0.01138	0.00001490	0.61	0.4409
X5	0.00101	0.00046856	0.00011310	4.60	0.0382
X1X2	0.47079	0.34040	0.00004701	1.91	0.1745
X1X3	0.00003418	0.00002631	0.00004148	1.69	0.2016
X1X4	-0.00532	0.00619	0.00001815	0.74	0.3954
X2X3	0.00001001	0.00000291	0.00029150	11.86	0.0014
X2X4	-0.00022352	0.00017057	0.00004221	1.72	0.1977
X2X5	-0.00483	0.00118	0.00041145	16.74	0.0002
X3X4	-5.41268E-8	4.952337E-8	0.00002936	1.19	0.2811

Bounds on condition number: 64.075, 2204.8

Backward Elimination: Step 8

Variable X4X5 Entered: R-Square = 0.5339 and C(p) = 9.2002

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

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Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	0.00110	0.00010974	4.35	0.0004
Error	38	0.00095785	0.00002521		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01045	0.00405	0.00016792	6.66	0.0138
X2	0.00909	0.01161	0.00001547	0.61	0.4383
X5	0.00087314	0.00091925	0.00002274	0.90	0.3482
X1X2	0.48924	0.36185	0.00004608	1.83	0.1844
X1X3	0.00003634	0.00002959	0.00003801	1.51	0.2270
X1X4	-0.00595	0.00731	0.00001670	0.66	0.4208
X2X3	0.00001036	0.00000361	0.00020694	8.21	0.0068
X2X4	-0.00023861	0.00019478	0.00003783	1.50	0.2281
X2X5	-0.00496	0.00143	0.00030479	12.09	0.0013
X3X4	-6.33244E-8	7.432821E-8	0.00001830	0.73	0.3996
X4X5	0.00000796	0.00004748	7.08571E-7	0.03	0.8677

Bounds on condition number: 126.19, 5147.6

Backward Elimination: Step 9

Variable X4X5 Removed: R-Square = 0.5336 and C(p) = 7.2270

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	0.00110	0.00012185	4.96	0.0002
Error	39	0.00095856	0.00002458		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01019	0.00369	0.00018780	7.64	0.0087
X2	0.00886	0.01138	0.00001490	0.61	0.4409
X5	0.00101	0.00046856	0.00011310	4.60	0.0382
X1X2	0.47079	0.34040	0.00004701	1.91	0.1745
X1X3	0.00003418	0.00002631	0.00004148	1.69	0.2016
X1X4	-0.00532	0.00619	0.00001815	0.74	0.3954
X2X3	0.00001001	0.00000291	0.00029150	11.86	0.0014
X2X4	-0.00022352	0.00017057	0.00004221	1.72	0.1977
X2X5	-0.00483	0.00118	0.00041145	16.74	0.0002

X3X4	-5.41268E-8	4.952337E-8	0.00002936	1.19	0.2811

Bounds on condition number: 64.075, 2204.8

Backward Elimination: Step 10

Variable X2 Removed: R-Square = 0.5264 and C(p) = 5.7902

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	0.00108	0.00013522	5.56	<.0001
Error	40	0.00097346	0.00002434		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01237	0.00238	0.00065636	26.97	<.0001
X5	0.00089556	0.00044472	0.00009869	4.06	0.0508
X1X2	0.69357	0.18351	0.00034763	14.28	0.0005
X1X3	0.00003453	0.00002618	0.00004233	1.74	0.1947
X1X4	-0.00916	0.00372	0.00014763	6.07	0.0182
X2X3	0.00000942	0.00000279	0.00027697	11.38	0.0017
X2X4	-0.00010758	0.00008278	0.00004110	1.69	0.2012
X2X5	-0.00456	0.00112	0.00040116	16.48	0.0002
X3X4	-4.16366E-8	4.662221E-8	0.00001941	0.80	0.3772

Bounds on condition number: 58.625, 1269.1

Backward Elimination: Step 11

Variable X3X4 Removed: R-Square = 0.5169 and C(p) = 4.5237

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	0.00106	0.00015177	6.27	<.0001
Error	41	0.00099287	0.00002422		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01316	0.00221	0.00086098	35.55	<.0001
X5	0.00057969	0.00026892	0.00011252	4.65	0.0370
X1X2	0.69851	0.18297	0.00035292	14.57	0.0004
X1X3	0.00003196	0.00002596	0.00003672	1.52	0.2252
X1X4	-0.00973	0.00366	0.00017161	7.09	0.0110

X2X3	0.00000777	0.00000209	0.00033454	13.81	0.0006
X2X4	-0.00014867	0.00006865	0.00011358	4.69	0.0362
X2X5	-0.00399	0.00091903	0.00045558	18.81	<.0001

Bounds on condition number: 39.453, 622.76

Backward Elimination: Step 12

Variable X1X3 Removed: R-Square = 0.4990 and C(p) = 3.9115

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00103	0.00017094	6.97	<.0001
Error	42	0.00103	0.00002451		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01165	0.00185	0.00097405	39.73	<.0001
X5	0.00082499	0.00018176	0.00050505	20.60	<.0001
X1X2	0.74319	0.18044	0.00041586	16.96	0.0002
X1X4	-0.00773	0.00329	0.00013495	5.51	0.0238
X2X3	0.00000828	0.00000206	0.00039599	16.15	0.0002
X2X4	-0.00017367	0.00006598	0.00016986	6.93	0.0118
X2X5	-0.00418	0.00091108	0.00051584	21.04	<.0001

Bounds on condition number: 38.303, 459.21

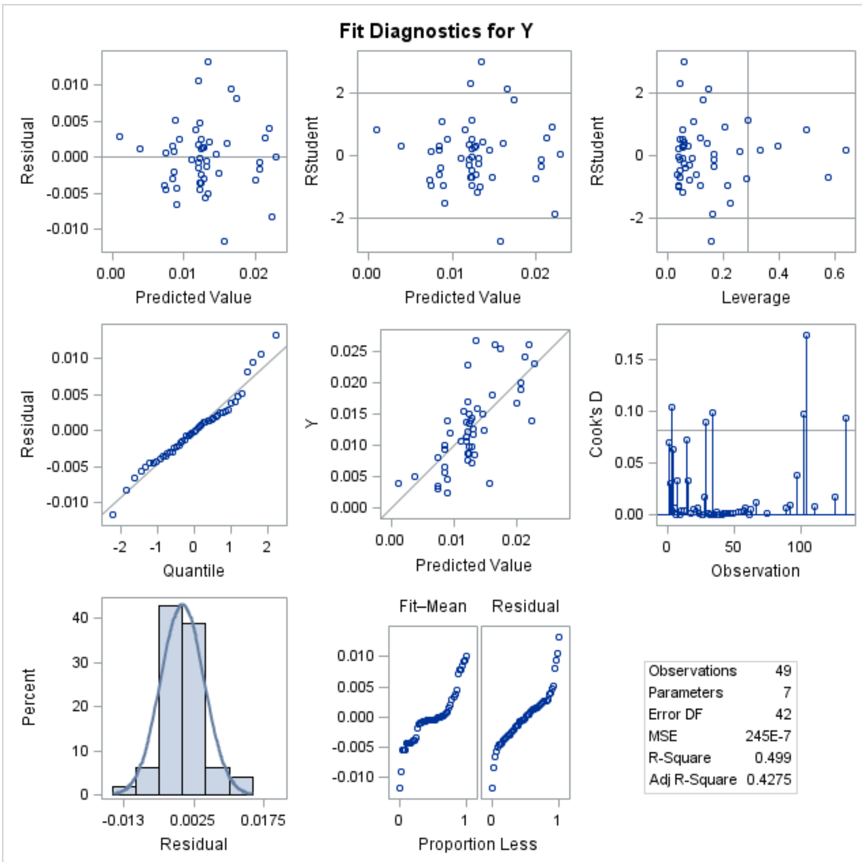
All variables left in the model are significant at the 0.1000 level.

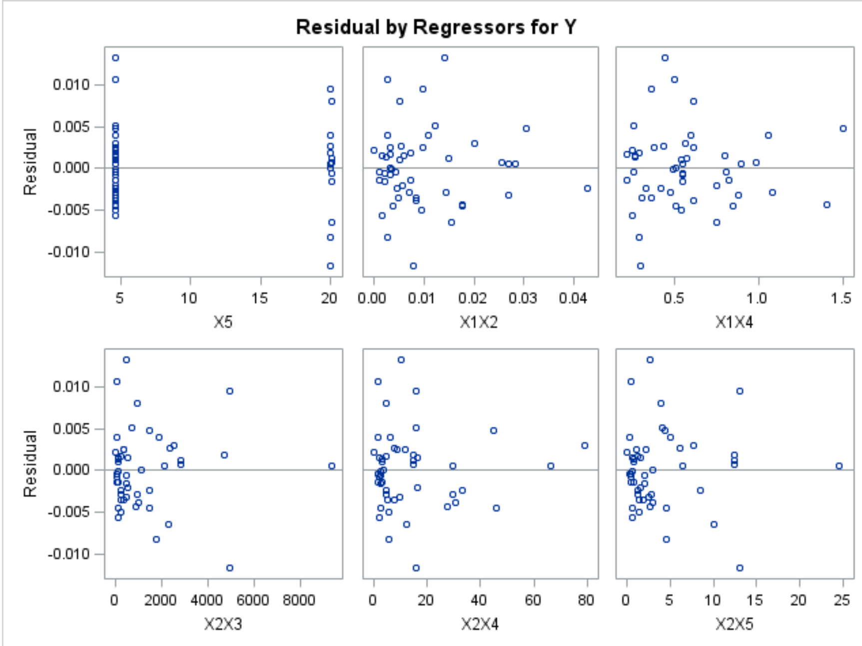
Summary of Backward Elimination								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1		X1	11	0.0001	0.5364	11.0102	0.01	0.9200
2		X1X5	10	0.0024	0.5339	9.2002	0.20	0.6612
3		X4	9	0.0012	0.5328	7.2933	0.10	0.7563
4	X3X4		10	0.0012	0.5339	9.2002	0.10	0.7563
5		X3	9	0.0003	0.5336	7.2270	0.03	0.8677
6	X3X5		10	0.0003	0.5339	9.2002	0.03	0.8677
7		X3X5	9	0.0003	0.5336	7.2270	0.03	0.8677
8	X4X5		10	0.0003	0.5339	9.2002	0.03	0.8677
9		X4X5	9	0.0003	0.5336	7.2270	0.03	0.8677
10		X2	8	0.0073	0.5264	5.7902	0.61	0.4409
11		X3X4	7	0.0094	0.5169	4.5237	0.80	0.3772

12		X1X3	6	0.0179	0.4990	3.9115	1.52	0.2252

BACKWARD REGRESSION
Pollutant: Total Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
0.010
0.005
0.000
-0.005
-0.010
5 10 15 20
X5
0.00 0.01 0.02 0.03 0.04
X1X2
0.5 1.0 1.5
X1X4
0 2000 4000 6000 8000
X2X3
0 20 40 60 80
X2X4
0 5 10 15 20 25
X2X5

STEPWISE REGRESSION
Pollutant: Total Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	177
Number of Observations Used	49
Number of Observations with Missing Values	128

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1128	-0.0747	-0.1948	0.0185	0.2873	0.3197	0.6042	0.4589	-0.1185	-0.1597	-0.0530	-0.1223	-0.0495	-0.0410	0.1183
X2	-0.1128	1.0000	0.0796	0.4407	-0.0001	0.8656	0.0281	0.2485	-0.0379	0.5287	0.8770	0.6010	0.1875	0.0383	0.1336	-0.2490
X3	-0.0747	0.0796	1.0000	0.0183	0.9425	0.0451	0.8295	-0.0112	0.7051	0.7236	-0.0026	0.6785	0.9682	0.9956	0.9314	0.3707
X4	-0.1948	0.4407	0.0183	1.0000	-0.0956	0.3133	-0.0204	0.6140	-0.1236	0.1488	0.7295	0.1132	0.2678	-0.0678	0.2096	-0.3575
X5	0.0185	-0.0001	0.9425	-0.0956	1.0000	0.0249	0.8428	-0.0227	0.8284	0.6275	-0.1061	0.6424	0.8819	0.9601	0.9533	0.3592
X1X2	0.2873	0.8656	0.0451	0.3133	0.0249	1.0000	0.1675	0.5022	0.1751	0.4432	0.6892	0.5576	0.1213	0.0201	0.1196	-0.1534
X1X3	0.3197	0.0281	0.8295	-0.0204	0.8428	0.1675	1.0000	0.2728	0.9366	0.5471	-0.0454	0.5572	0.7928	0.8358	0.8217	0.3845
X1X4	0.6042	0.2485	-0.0112	0.6140	-0.0227	0.5022	0.2728	1.0000	0.2908	0.0422	0.4291	0.0677	0.1414	-0.0570	0.1640	-0.1459
X1X5	0.4589	-0.0379	0.7051	-0.1236	0.8284	0.1751	0.9366	0.2908	1.0000	0.4237	-0.1312	0.4972	0.6449	0.7319	0.7762	0.3186
X2X3	-0.1185	0.5287	0.7236	0.1488	0.6275	0.4432	0.5471	0.0422	0.4237	1.0000	0.3831	0.9672	0.7354	0.7039	0.6615	0.0475
X2X4	-0.1597	0.8770	-0.0026	0.7295	-0.1061	0.6892	-0.0454	0.4291	-0.1312	0.3831	1.0000	0.4011	0.1805	-0.0679	0.1172	-0.3570
X2X5	-0.0530	0.6010	0.6785	0.1132	0.6424	0.5576	0.5572	0.0677	0.4972	0.9672	0.4011	1.0000	0.6817	0.6685	0.6654	-0.0095
X3X4	-0.1223	0.1875	0.9682	0.2678	0.8819	0.1213	0.7928	0.1414	0.6449	0.7354	0.1805	0.6817	1.0000	0.9421	0.9475	0.2685
X3X5	-0.0495	0.0383	0.9956	-0.0678	0.9601	0.0201	0.8358	-0.0570	0.7319	0.7039	-0.0679	0.6685	0.9421	1.0000	0.9225	0.3965
X4X5	-0.0410	0.1336	0.9314	0.2096	0.9533	0.1196	0.8217	0.1640	0.7762	0.6615	0.1172	0.6654	0.9475	0.9225	1.0000	0.2444
Y	0.1183	-0.2490	0.3707	-0.3575	0.3592	-0.1534	0.3845	-0.1459	0.3186	0.0475	-0.3570	-0.0095	0.2685	0.3965	0.2444	1.0000

STEPWISE REGRESSION
Pollutant: Total Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	177
Number of Observations Used	49
Number of Observations with Missing Values	128

Stepwise Selection: Step 1

Variable X3X5 Entered: R-Square = 0.1572 and C(p) = 20.4610

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00032316	0.00032316	8.77	0.0048
Error	47	0.00173	0.00003685		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01107	0.00105	0.00407	110.39	<.0001
X3X5	4.491971E-8	1.516914E-8	0.00032316	8.77	0.0048

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X2X5 Entered: R-Square = 0.2936 and C(p) = 11.8723

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00060334	0.00030167	9.56	0.0003
Error	46	0.00145	0.00003156		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01228	0.00106	0.00427	135.23	<.0001

X2X5	-0.00066921	0.00022462	0.00028017	8.88	0.0046
X3X5	8.251868E-8	1.887686E-8	0.00060315	19.11	<.0001

Bounds on condition number: 1.8081, 7.2325

Stepwise Selection: Step 3

Variable X4 Entered: R-Square = 0.3604 and C(p) = 8.6843

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00074061	0.00024687	8.45	0.0001
Error	45	0.00131	0.00002921		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01613	0.00205	0.00181	62.05	<.0001
X4	-0.00015443	0.00007124	0.00013728	4.70	0.0355
X2X5	-0.00056678	0.00022120	0.00019180	6.57	0.0138
X3X5	7.472736E-8	1.851306E-8	0.00047599	16.29	0.0002

Bounds on condition number: 1.8946, 14.478

Stepwise Selection: Step 4

Variable X1X2 Entered: R-Square = 0.4123 and C(p) = 6.6463

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00084745	0.00021186	7.72	<.0001
Error	44	0.00121	0.00002745		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01546	0.00201	0.00162	58.91	<.0001
X4	-0.00018796	0.00007112	0.00019174	6.99	0.0113
X1X2	0.24267	0.12300	0.00010684	3.89	0.0548
X2X5	-0.00100	0.00030749	0.00029125	10.61	0.0022
X3X5	9.792853E-8	2.145536E-8	0.00057185	20.83	<.0001

Bounds on condition number: 3.8962, 39.933

Stepwise Selection: Step 5

Variable X2X3 Entered: R-Square = 0.4750 and C(p) = 3.7789

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00097624	0.00019525	7.78	<.0001
Error	43	0.00108	0.00002509		
Corrected Total	48	0.00206			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01703	0.00205	0.00174	69.23	<.0001
X4	-0.00024534	0.00007256	0.00028689	11.43	0.0015
X1X2	0.37344	0.13100	0.00020390	8.13	0.0067
X2X3	0.00000444	0.00000196	0.00012879	5.13	0.0286
X2X5	-0.00264	0.00078182	0.00028673	11.43	0.0015
X3X5	9.455777E-8	2.056752E-8	0.00053037	21.14	<.0001

Bounds on condition number: 27.554, 283.64

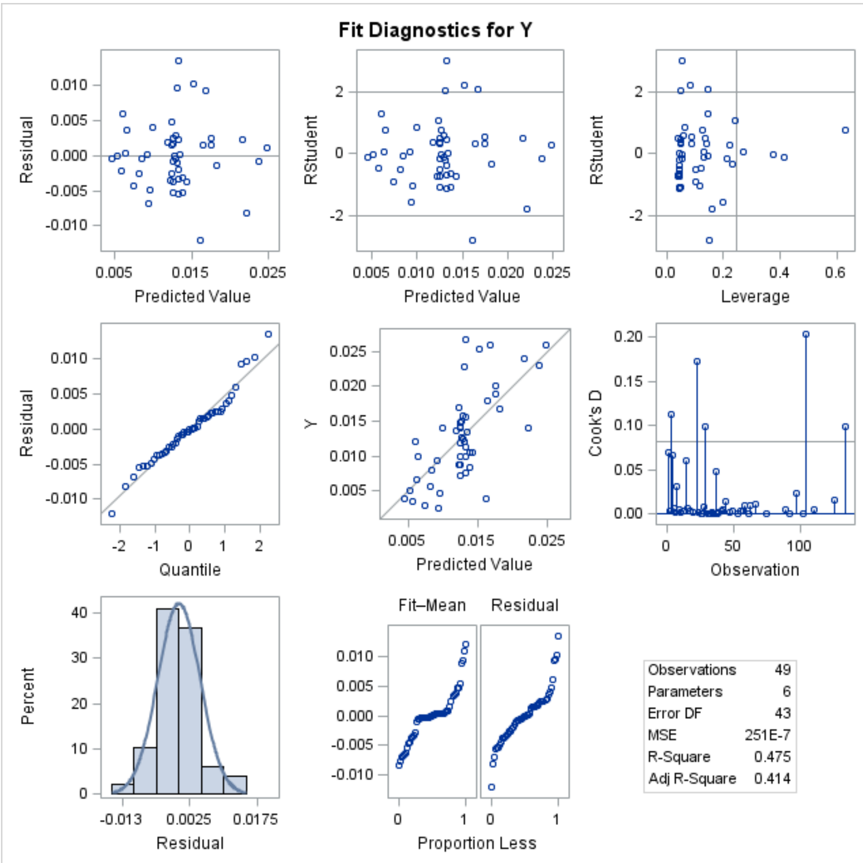
All variables left in the model are significant at the 0.1500 level.

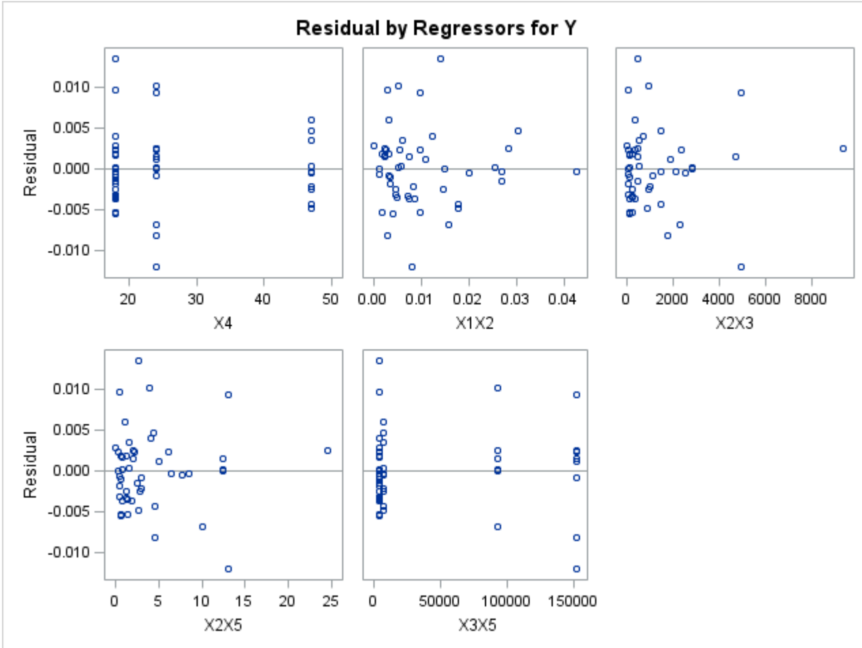
No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X3X5		1	0.1572	0.1572	20.4610	8.77	0.0048
2	X2X5		2	0.1363	0.2936	11.8723	8.88	0.0046
3	X4		3	0.0668	0.3604	8.6843	4.70	0.0355
4	X1X2		4	0.0520	0.4123	6.6463	3.89	0.0548
5	X2X3		5	0.0627	0.4750	3.7789	5.13	0.0286

STEPWISE REGRESSION
Pollutant: Total Copper
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
0.010
0.005
0.000
-0.005
-0.010
X4
X1X2
X2X3
X2X5
X3X5
20 30 40 50
0.00 0.01 0.02 0.03 0.04
0 2000 4000 6000 8000
0 5 10 15 20 25
0 50000 100000 150000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Kjeldahl Nitrogen

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The REG Procedure

Number of Observations Read	177
Number of Observations Used	49
Number of Observations with Missing Values	128

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1128	-0.0747	-0.1948	0.0185	0.2873	0.3197	0.6042	0.4589	-0.1185	-0.1597	-0.0530	-0.1223	-0.0495	-0.0410	0.1183
X2	-0.1128	1.0000	0.0796	0.4407	-0.0001	0.8656	0.0281	0.2485	-0.0379	0.5287	0.8770	0.6010	0.1875	0.0383	0.1336	-0.2490
X3	-0.0747	0.0796	1.0000	0.0183	0.9425	0.0451	0.8295	-0.0112	0.7051	0.7236	-0.0026	0.6785	0.9682	0.9956	0.9314	0.3707
X4	-0.1948	0.4407	0.0183	1.0000	-0.0956	0.3133	-0.0204	0.6140	-0.1236	0.1488	0.7295	0.1132	0.2678	-0.0678	0.2096	-0.3575
X5	0.0185	-0.0001	0.9425	-0.0956	1.0000	0.0249	0.8428	-0.0227	0.8284	0.6275	-0.1061	0.6424	0.8819	0.9601	0.9533	0.3592
X1X2	0.2873	0.8656	0.0451	0.3133	0.0249	1.0000	0.1675	0.5022	0.1751	0.4432	0.6892	0.5576	0.1213	0.0201	0.1196	-0.1534
X1X3	0.3197	0.0281	0.8295	-0.0204	0.8428	0.1675	1.0000	0.2728	0.9366	0.5471	-0.0454	0.5572	0.7928	0.8358	0.8217	0.3845
X1X4	0.6042	0.2485	-0.0112	0.6140	-0.0227	0.5022	0.2728	1.0000	0.2908	0.0422	0.4291	0.0677	0.1414	-0.0570	0.1640	-0.1459
X1X5	0.4589	-0.0379	0.7051	-0.1236	0.8284	0.1751	0.9366	0.2908	1.0000	0.4237	-0.1312	0.4972	0.6449	0.7319	0.7762	0.3186
X2X3	-0.1185	0.5287	0.7236	0.1488	0.6275	0.4432	0.5471	0.0422	0.4237	1.0000	0.3831	0.9672	0.7354	0.7039	0.6615	0.0475
X2X4	-0.1597	0.8770	-0.0026	0.7295	-0.1061	0.6892	-0.0454	0.4291	-0.1312	0.3831	1.0000	0.4011	0.1805	-0.0679	0.1172	-0.3570
X2X5	-0.0530	0.6010	0.6785	0.1132	0.6424	0.5576	0.5572	0.0677	0.4972	0.9672	0.4011	1.0000	0.6817	0.6685	0.6654	-0.0095
X3X4	-0.1223	0.1875	0.9682	0.2678	0.8819	0.1213	0.7928	0.1414	0.6449	0.7354	0.1805	0.6817	1.0000	0.9421	0.9475	0.2685
X3X5	-0.0495	0.0383	0.9956	-0.0678	0.9601	0.0201	0.8358	-0.0570	0.7319	0.7039	-0.0679	0.6685	0.9421	1.0000	0.9225	0.3965
X4X5	-0.0410	0.1336	0.9314	0.2096	0.9533	0.1196	0.8217	0.1640	0.7762	0.6615	0.1172	0.6654	0.9475	0.9225	1.0000	0.2444
Y	0.1183	-0.2490	0.3707	-0.3575	0.3592	-0.1534	0.3845	-0.1459	0.3186	0.0475	-0.3570	-0.0095	0.2685	0.3965	0.2444	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Kjeldahl Nitrogen

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The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	177
Number of Observations Used	49
Number of Observations with Missing Values	128

Number in Model	R-Square	Variables in Model
1	0.1572	X3X5
1	0.1478	X1X3
1	0.1374	X3
1	0.1290	X5
1	0.1278	X4
1	0.1275	X2X4
1	0.1015	X1X5
1	0.0721	X3X4
1	0.0620	X2
1	0.0597	X4X5
1	0.0235	X1X2
1	0.0213	X1X4
1	0.0140	X1
1	0.0023	X2X3
1	0.0001	X2X5
2	0.2936	X2X5 X3X5
2	0.2707	X4 X3X4
2	0.2701	X4 X1X3
2	0.2701	X3 X4
2	0.2678	X3 X3X4
2	0.2670	X4 X3X5
2	0.2667	X2X4 X3X5
2	0.2642	X3 X2X4
2	0.2636	X2X3 X3X5
2	0.2636	X3 X2X5
2	0.2634	X1X3 X2X4
2	0.2563	X3X5 X4X5
2	0.2553	X3X4 X3X5
2	0.2421	X2X4 X3X4
2	0.2396	X3 X2X3
3	0.3659	X4 X2X5 X3X4
3	0.3651	X3 X4 X2X5
3	0.3634	X3 X2X5 X3X4
3	0.3604	X4 X2X5 X3X5
3	0.3590	X2X5 X3X5 X4X5
3	0.3539	X2X3 X3X5 X4X5

3	0.3519	X2X5 X3X4 X3X5
3	0.3357	X4 X2X3 X3X4
3	0.3342	X3 X4 X2X3
3	0.3313	X3 X2X3 X3X4
3	0.3301	X3 X2X5 X3X5
3	0.3265	X4 X2X3 X3X5
3	0.3256	X3 X2X3 X4X5
3	0.3246	X4 X1X3 X1X5
3	0.3190	X1X2 X2X5 X3X5
4	0.4203	X4 X1X2 X2X5 X3X4
4	0.4191	X3 X4 X1X2 X2X5
4	0.4169	X3 X1X2 X2X5 X3X4
4	0.4123	X4 X1X2 X2X5 X3X5
4	0.4059	X1X2 X2X5 X3X5 X4X5
4	0.4008	X1X2 X2X5 X3X4 X3X5
4	0.3932	X2 X4 X2X5 X3X4
4	0.3927	X2 X3 X4 X2X5
4	0.3914	X2 X3 X2X5 X3X4
4	0.3889	X2 X4 X2X5 X3X5
4	0.3854	X1X3 X2X5 X3X5 X4X5
4	0.3852	X4 X1X3 X2X3 X2X5
4	0.3843	X1X5 X2X5 X3X5 X4X5
4	0.3798	X2 X2X5 X3X4 X3X5
4	0.3789	X4 X1X3 X2X5 X3X4
5	0.4892	X3 X1X2 X2X3 X2X5 X3X5
5	0.4887	X4 X1X2 X2X3 X2X5 X4X5
5	0.4887	X4 X5 X1X2 X2X3 X2X5
5	0.4887	X5 X1X2 X2X3 X2X5 X4X5
5	0.4826	X1X2 X2X3 X2X5 X3X4 X3X5
5	0.4750	X4 X1X2 X2X3 X2X5 X3X5
5	0.4723	X3 X1X2 X2X3 X2X5 X3X4
5	0.4697	X3 X4 X1X2 X2X3 X2X5
5	0.4686	X4 X1X2 X2X3 X2X5 X3X4
5	0.4522	X2 X1X5 X2X3 X2X4 X2X5
5	0.4478	X1X2 X1X4 X1X5 X2X3 X2X5
5	0.4471	X2 X5 X2X3 X2X4 X2X5
5	0.4335	X2 X1X3 X2X3 X2X4 X2X5
5	0.4334	X5 X1X2 X2X3 X2X4 X2X5
5	0.4324	X1X2 X2X3 X2X4 X2X5 X3X5
6	0.4990	X5 X1X2 X1X4 X2X3 X2X4 X2X5
6	0.4982	X1 X4 X1X2 X2X3 X2X5 X4X5
6	0.4982	X1 X4 X5 X1X2 X2X3 X2X5
6	0.4982	X1 X5 X1X2 X2X3 X2X5 X4X5
6	0.4982	X1 X3 X1X2 X2X3 X2X5 X3X5
6	0.4979	X5 X1X2 X1X4 X2X3 X2X5 X4X5
6	0.4979	X4 X5 X1X2 X1X4 X2X3 X2X5
6	0.4979	X4 X1X2 X1X4 X2X3 X2X5 X4X5
6	0.4964	X3 X1X2 X1X4 X2X3 X2X5 X3X5
6	0.4930	X2 X5 X1X5 X2X3 X2X4 X2X5
6	0.4919	X3 X1X2 X2X3 X2X4 X2X5 X3X5
6	0.4912	X4 X1X2 X2X3 X2X4 X2X5 X4X5
6		

	0.4912	X4 X5 X1X2 X2X3 X2X4 X2X5
6	0.4912	X5 X1X2 X2X3 X2X4 X2X5 X4X5
6	0.4911	X4 X1X2 X1X3 X2X3 X2X5 X4X5
7	0.5185	X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5
7	0.5169	X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5
7	0.5137	X1 X3 X1X2 X1X3 X2X3 X2X5 X3X5
7	0.5121	X2 X5 X1X2 X2X3 X2X4 X2X5 X4X5
7	0.5121	X2 X4 X5 X1X2 X2X3 X2X4 X2X5
7	0.5121	X2 X4 X1X2 X2X3 X2X4 X2X5 X4X5
7	0.5118	X1 X5 X1X2 X1X3 X2X3 X2X5 X4X5
7	0.5118	X1 X4 X5 X1X2 X1X3 X2X3 X2X5
7	0.5118	X1 X4 X1X2 X1X3 X2X3 X2X5 X4X5
7	0.5111	X5 X1X2 X1X3 X1X4 X2X3 X2X5 X4X5
7	0.5111	X4 X5 X1X2 X1X3 X1X4 X2X3 X2X5
7	0.5111	X4 X1X2 X1X3 X1X4 X2X3 X2X5 X4X5
7	0.5107	X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X4X5
7	0.5105	X1 X4 X1X2 X1X5 X2X3 X2X5 X4X5
7	0.5105	X1 X4 X5 X1X2 X1X5 X2X3 X2X5
8	0.5264	X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4
8	0.5254	X3 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5
8	0.5249	X2 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5
8	0.5248	X2 X5 X1X2 X1X3 X2X3 X2X4 X2X5 X3X4
8	0.5240	X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X5
8	0.5216	X1 X3 X1X2 X1X3 X2X3 X2X4 X2X5 X3X5
8	0.5213	X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X4X5
8	0.5213	X4 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5
8	0.5213	X4 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X4X5
8	0.5200	X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
8	0.5198	X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X4X5
8	0.5198	X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5
8	0.5198	X4 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X4X5
8	0.5194	X2 X5 X1X2 X1X3 X2X3 X2X4 X2X5 X4X5
8	0.5194	X2 X4 X5 X1X2 X1X3 X2X3 X2X4 X2X5
9	0.5336	X2 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4
9	0.5335	X1 X2 X5 X1X2 X1X3 X2X3 X2X4 X2X5 X3X4
9	0.5328	X2 X3 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5
9	0.5324	X2 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4
9	0.5322	X1 X2 X3 X1X2 X1X5 X2X3 X2X4 X2X5 X3X5
9	0.5314	X1 X2 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X4X5
9	0.5314	X1 X2 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5
9	0.5314	X1 X2 X4 X1X2 X1X5 X2X3 X2X4 X2X5 X4X5
9	0.5307	X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
9	0.5306	X2 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X5
9	0.5291	X2 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
9	0.5285	X1 X2 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4
9	0.5283	X2 X3 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5
9	0.5282	X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5
9	0.5277	X1 X2 X3 X1X2 X1X3 X2X3 X2X4 X2X5 X3X5
10	0.5358	X1 X2 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4
10	0.5355	X2 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
10	0.5354	X1 X2 X4 X1X2 X1X3 X2X3 X2X4 X2X5 X3X4 X3X5
10		

	0.5354	X1 X2 X3 X1X2 X1X3 X2X3 X2X4 X2X5 X3X4 X4X5
10	0.5354	X1 X2 X3 X5 X1X2 X1X3 X2X3 X2X4 X2X5 X4X5
10	0.5354	X1 X2 X5 X1X2 X1X3 X2X3 X2X4 X2X5 X3X5 X4X5
10	0.5354	X1 X2 X1X2 X1X3 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
10	0.5354	X1 X2 X4 X5 X1X2 X1X3 X2X3 X2X4 X2X5 X3X5
10	0.5354	X1 X2 X3 X4 X5 X1X2 X1X3 X2X3 X2X4 X2X5
10	0.5354	X1 X2 X4 X1X2 X1X3 X2X3 X2X4 X2X5 X3X5 X4X5
10	0.5354	X1 X2 X4 X5 X1X2 X1X3 X2X3 X2X4 X2X5 X3X4
10	0.5354	X1 X2 X5 X1X2 X1X3 X2X3 X2X4 X2X5 X3X4 X4X5
10	0.5354	X1 X2 X4 X1X2 X1X3 X2X3 X2X4 X2X5 X3X4 X4X5
10	0.5354	X1 X2 X5 X1X2 X1X3 X2X3 X2X4 X2X5 X3X4 X3X5
10	0.5354	X1 X2 X3 X5 X1X2 X1X3 X2X3 X2X4 X2X5 X3X4
11	0.5365	X1 X2 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
11	0.5364	X2 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
11	0.5364	X2 X3 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
11	0.5364	X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X4X5
11	0.5364	X2 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
11	0.5364	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5
11	0.5364	X2 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5
11	0.5364	X2 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.5364	X2 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
11	0.5364	X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
11	0.5364	X2 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
11	0.5364	X2 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
11	0.5364	X2 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
11	0.5364	X2 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
11	0.5364	X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5
12	0.5365	X1 X2 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
12	0.5365	X1 X2 X3 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
12	0.5365	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X4X5
12	0.5365	X1 X2 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
12	0.5365	X1 X2 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.5365	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5
12	0.5365	X1 X2 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5
12	0.5365	X1 X2 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
12	0.5365	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
12	0.5365	X1 X2 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
12	0.5365	X1 X2 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
12	0.5365	X1 X2 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
12	0.5365	X1 X2 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
12	0.5365	X1 X2 X3 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X4X5
12	0.5365	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Kjeldahl Nitrogen

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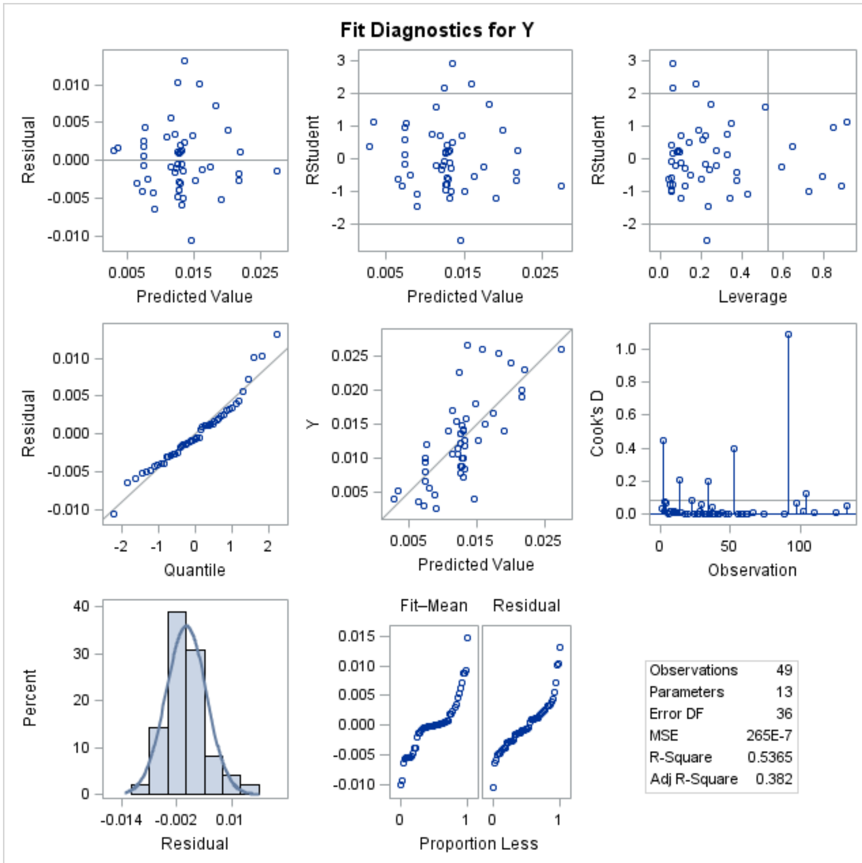
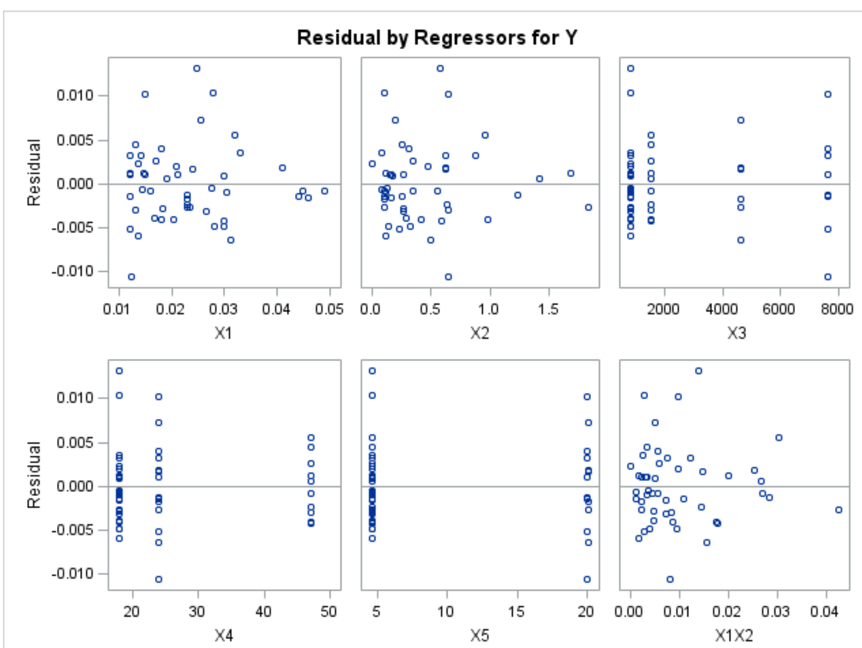
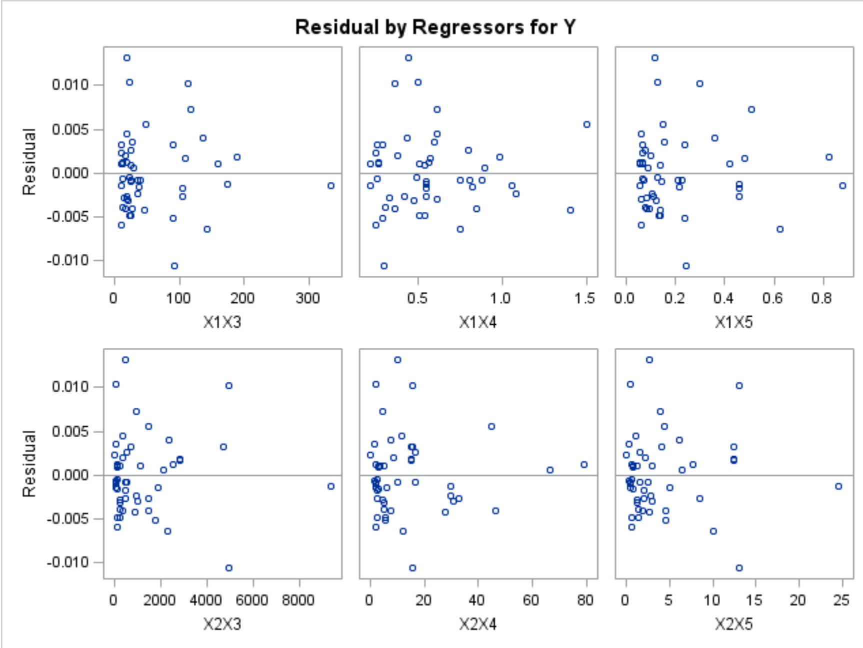
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
X1X3
X1X4
X1X5
X2X3
X2X4
X2X5


Residual by Regressors for Y
Residual
X3X4
X3X5
X4X5

FORWARD REGRESSION
Pollutant: Total Kjeldahl Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	294
Number of Observations Used	187
Number of Observations with Missing Values	107

Correlation															
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0645	0.1527	-0.3962	0.2117	-0.0533	0.5588	0.8434	0.6196	-0.1141	-0.0951	-0.0770	0.0571	0.1713	0.0705	0.4179
X2	-0.0645	1.0000	-0.0734	-0.1663	-0.0759	0.9998	-0.0499	-0.1018	-0.0518	0.7750	0.9964	0.9876	-0.0801	-0.0411	-0.0849	-0.0616
X3	0.1527	-0.0734	1.0000	-0.0994	0.9173	-0.0731	0.7699	0.1863	0.6880	0.3059	-0.0871	0.0074	0.9606	0.9921	0.8353	0.1287
X4	-0.3962	-0.1663	-0.0994	1.0000	-0.0591	-0.1709	-0.1736	0.0611	-0.1891	-0.1405	-0.1173	-0.1525	0.1681	-0.1216	0.2735	-0.4789
X5	0.2117	-0.0759	0.9173	-0.0591	1.0000	-0.0757	0.7500	0.2436	0.7771	0.2508	-0.0892	0.0117	0.8839	0.9479	0.9387	0.0889
X1X2	-0.0533	0.9998	-0.0731	-0.1709	-0.0757	1.0000	-0.0454	-0.0920	-0.0477	0.7775	0.9963	0.9880	-0.0808	-0.0410	-0.0861	-0.0544
X1X3	0.5588	-0.0499	0.7699	-0.1736	0.7500	-0.0454	1.0000	0.5605	0.9467	0.1332	-0.0706	-0.0098	0.7149	0.7750	0.6550	0.2899
X1X4	0.8434	-0.1018	0.1863	0.0611	0.2436	-0.0920	0.5605	1.0000	0.6016	-0.1179	-0.1115	-0.1046	0.2210	0.1863	0.2460	0.2154
X1X5	0.6196	-0.0518	0.6880	-0.1891	0.7771	-0.0477	0.9467	0.6016	1.0000	0.0882	-0.0747	-0.0121	0.6302	0.7178	0.6768	0.2805
X2X3	-0.1141	0.7750	0.3059	-0.1405	0.2508	0.7775	0.1332	-0.1179	0.0882	1.0000	0.7934	0.8560	0.2938	0.3185	0.2264	0.0396
X2X4	-0.0951	0.9964	-0.0871	-0.1173	-0.0892	0.9963	-0.0706	-0.1115	-0.0747	0.7934	1.0000	0.9896	-0.0810	-0.0566	-0.0804	-0.0787
X2X5	-0.0770	0.9876	0.0074	-0.1525	0.0117	0.9880	-0.0098	-0.1046	-0.0121	0.8560	0.9896	1.0000	0.0018	0.0412	0.0050	-0.0551
X3X4	0.0571	-0.0801	0.9606	0.1681	0.8839	-0.0808	0.7149	0.2210	0.6302	0.2938	-0.0810	0.0018	1.0000	0.9444	0.8894	-0.0035
X3X5	0.1713	-0.0411	0.9921	-0.1216	0.9479	-0.0410	0.7750	0.1863	0.7178	0.3185	-0.0566	0.0412	0.9444	1.0000	0.8609	0.1145
X4X5	0.0705	-0.0849	0.8353	0.2735	0.9387	-0.0861	0.6550	0.2460	0.6768	0.2264	-0.0804	0.0050	0.8894	0.8609	1.0000	-0.0613
Y	0.4179	-0.0616	0.1287	-0.4789	0.0889	-0.0544	0.2899	0.2154	0.2805	0.0396	-0.0787	-0.0551	-0.0035	0.1145	-0.0613	1.0000

FORWARD REGRESSION
Pollutant: Total Kjeldahl Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	294
Number of Observations Used	187
Number of Observations with Missing Values	107

Forward Selection: Step 1

Variable X4 Entered: R-Square = 0.2294 and C(p) = 64.3674

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	61.50972	61.50972	55.07	<.0001
Error	185	206.64060	1.11698		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.86493	0.21026	207.37322	185.66	<.0001
X4	-0.05303	0.00715	61.50972	55.07	<.0001

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X1 Entered: R-Square = 0.2911 and C(p) = 46.5502

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	78.06415	39.03208	37.78	<.0001
Error	184	190.08616	1.03308		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.10646	0.27711	59.69520	57.78	<.0001

X1	0.26246	0.06557	16.55443	16.02	<.0001
X4	-0.04116	0.00749	31.23516	30.24	<.0001

Bounds on condition number: 1.1862, 4.7449

Forward Selection: Step 3

Variable X2 Entered: R-Square = 0.3029 and C(p) = 44.7647

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	81.22643	27.07548	26.51	<.0001
Error	183	186.92389	1.02144		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.22168	0.28322	62.85431	61.53	<.0001
X1	0.24577	0.06588	14.21503	13.92	0.0003
X2	-0.00147	0.00083801	3.16228	3.10	0.0802
X4	-0.04396	0.00761	34.07388	33.36	<.0001

Bounds on condition number: 1.2406, 10.506

Forward Selection: Step 4

Variable X1X2 Entered: R-Square = 0.3292 and C(p) = 38.3360

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	88.26742	22.06685	22.33	<.0001
Error	182	179.88290	0.98837		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.26623	0.27909	65.16630	65.93	<.0001
X1	0.13529	0.07690	3.05964	3.10	0.0802
X2	-0.13703	0.05080	7.19310	7.28	0.0076
X4	-0.04388	0.00749	33.93765	34.34	<.0001
X1X2	0.22594	0.08465	7.04099	7.12	0.0083

Bounds on condition number: 3987.8, 31893

Forward Selection: Step 5

Variable X1X3 Entered: R-Square = 0.3416 and C(p) = 36.3353

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	5	91.60943	18.32189	18.78	<.0001
Error	181	176.54088	0.97536		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.31217	0.27836	67.29609	69.00	<.0001
X1	0.04848	0.08964	0.28528	0.29	0.5893
X2	-0.14951	0.05091	8.41271	8.63	0.0037
X4	-0.04471	0.00745	35.11219	36.00	<.0001
X1X2	0.24675	0.08484	8.25024	8.46	0.0041
X1X3	0.00002957	0.00001597	3.34201	3.43	0.0658

Bounds on condition number: 4058.9, 40589

Forward Selection: Step 6

Variable X3X5 Entered: R-Square = 0.3521 and C(p) = 34.9781

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	6	94.41388	15.73565	16.30	<.0001
Error	180	173.73644	0.96520		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.49629	0.29723	68.08123	70.54	<.0001
X1	-0.03250	0.10103	0.09986	0.10	0.7481
X2	-0.14911	0.05064	8.36712	8.67	0.0037
X4	-0.04745	0.00759	37.77226	39.13	<.0001
X1X2	0.24591	0.08440	8.19336	8.49	0.0040
X1X3	0.00007093	0.00002901	5.77209	5.98	0.0154
X3X5	-0.00000499	0.00000293	2.80444	2.91	0.0900

Bounds on condition number: 4059, 48754

Forward Selection: Step 7

Variable X3 Entered: R-Square = 0.3734 and C(p) = 30.1386

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	100.12732	14.30390	15.24	<.0001
Error	179	168.02299	0.93868		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.74832	0.42170	16.13406	17.19	<.0001
X1	0.03954	0.10383	0.13616	0.15	0.7038
X2	-0.11687	0.05162	4.81070	5.12	0.0248
X3	0.00077156	0.00031274	5.71344	6.09	0.0146
X4	-0.04825	0.00749	38.97309	41.52	<.0001
X1X2	0.19310	0.08594	4.73884	5.05	0.0259
X1X3	0.00005885	0.00002902	3.85940	4.11	0.0441
X3X5	-0.00003720	0.00001337	7.26532	7.74	0.0060

Bounds on condition number: 4336.9, 61741

Forward Selection: Step 8

Variable X4X5 Entered: R-Square = 0.4034 and C(p) = 22.5150

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	108.16652	13.52081	15.04	<.0001
Error	178	159.98380	0.89879		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.47857	0.42239	11.01329	12.25	0.0006
X1	0.01673	0.10188	0.02425	0.03	0.8697
X2	-0.10018	0.05082	3.49208	3.89	0.0503
X3	0.00154	0.00039993	13.35493	14.86	0.0002
X4	-0.08207	0.01347	33.34030	37.09	<.0001
X1X2	0.16575	0.08459	3.45079	3.84	0.0516
X1X3	0.00005820	0.00002840	3.77465	4.20	0.0419
X3X5	-0.00008657	0.00002106	15.18134	16.89	<.0001
X4X5	0.00525	0.00176	8.03920	8.94	0.0032

Bounds on condition number: 4389.9, 72936

Forward Selection: Step 9

Variable X5 Entered: R-Square = 0.4265 and C(p) = 17.0958

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	114.36420	12.70713	14.63	<.0001
Error	177	153.78611	0.86885		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.21862	0.77261	15.07854	17.35	<.0001
X1	0.04122	0.10059	0.14588	0.17	0.6825
X2	-0.08941	0.05013	2.76389	3.18	0.0762
X3	0.00136	0.00039931	10.01847	11.53	0.0008
X4	-0.14022	0.02549	26.29650	30.27	<.0001
X5	-0.36547	0.13684	6.19769	7.13	0.0083
X1X2	0.14584	0.08350	2.65019	3.05	0.0825
X1X3	0.00005820	0.00002792	3.77540	4.35	0.0385
X3X5	-0.00006969	0.00002165	9.00057	10.36	0.0015
X4X5	0.01768	0.00496	11.02375	12.69	0.0005

Bounds on condition number: 4418.4, 85441

Forward Selection: Step 10

Variable X1X5 Entered: R-Square = 0.4392 and C(p) = 15.0114

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	117.77609	11.77761	13.78	<.0001
Error	176	150.37422	0.85440		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.92044	0.84282	18.48670	21.64	<.0001
X1	-0.03940	0.10760	0.11456	0.13	0.7147
X2	-0.11468	0.05130	4.27056	5.00	0.0266
X3	0.00150	0.00040220	11.83204	13.85	0.0003
X4	-0.15831	0.02685	29.70828	34.77	<.0001
X5	-0.58563	0.17479	9.59131	11.23	0.0010
X1X2	0.18723	0.08536	4.11080	4.81	0.0296
X1X3	-0.00008447	0.00007658	1.03962	1.22	0.2715
X1X5	0.04940	0.02472	3.41189	3.99	0.0472

X3X5	-0.00006128	0.00002188	6.70200	7.84	0.0057
X4X5	0.02206	0.00539	14.32102	16.76	<.0001

Bounds on condition number: 4704.3, 102835

Forward Selection: Step 11

Variable X2X3 Entered: R-Square = 0.4493 and C(p) = 13.7711

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	11	120.48295	10.95300	12.98	<.0001
Error	175	147.66736	0.84381		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.81495	0.83965	17.41911	20.64	<.0001
X1	0.01435	0.11106	0.01410	0.02	0.8973
X2	-0.06811	0.05723	1.19518	1.42	0.2356
X3	0.00138	0.00040510	9.77162	11.58	0.0008
X4	-0.15569	0.02672	28.64628	33.95	<.0001
X5	-0.56594	0.17405	8.92169	10.57	0.0014
X1X2	0.10545	0.09634	1.01097	1.20	0.2752
X1X3	-0.00006157	0.00007717	0.53709	0.64	0.4261
X1X5	0.04508	0.02469	2.81326	3.33	0.0696
X2X3	0.00010583	0.00005909	2.70686	3.21	0.0750
X3X5	-0.00006037	0.00002175	6.50012	7.70	0.0061
X4X5	0.02151	0.00536	13.57566	16.09	<.0001

Bounds on condition number: 6041.3, 141656

Forward Selection: Step 12

Variable X2X5 Entered: R-Square = 0.4660 and C(p) = 10.4129

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	12	124.95898	10.41325	12.65	<.0001
Error	174	143.19133	0.82294		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.97738	0.83212	18.80135	22.85	<.0001

X1	0.02339	0.10975	0.03739	0.05	0.8315
X2	-0.03651	0.05812	0.32479	0.39	0.5307
X3	0.00091303	0.00044709	3.43191	4.17	0.0426
X4	-0.15763	0.02640	29.33583	35.65	<.0001
X5	-0.51066	0.17351	7.12835	8.66	0.0037
X1X2	0.11259	0.09519	1.15144	1.40	0.2385
X1X3	-0.00001968	0.00007830	0.05199	0.06	0.8018
X1X5	0.03089	0.02513	1.24321	1.51	0.2207
X2X3	0.00046499	0.00016469	6.56058	7.97	0.0053
X2X5	-0.11447	0.04908	4.47603	5.44	0.0208
X3X5	-0.00005130	0.00002183	4.54545	5.52	0.0199
X4X5	0.02274	0.00532	15.02037	18.25	<.0001

Bounds on condition number: 6269.2, 168049

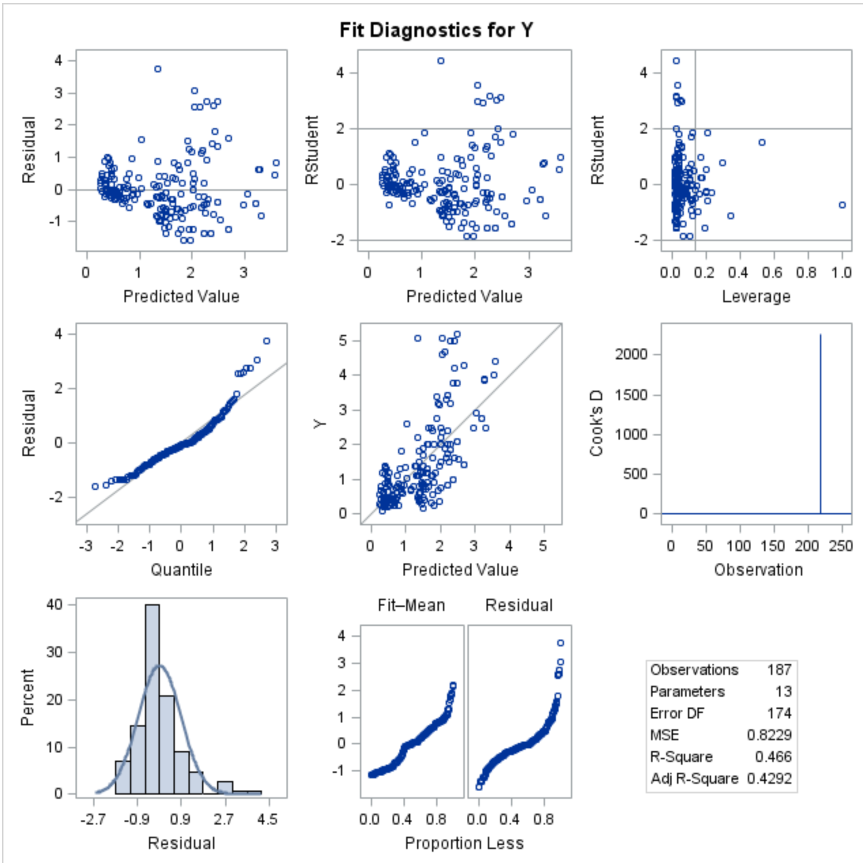
No other variable met the 0.5000 significance level for entry into the model.

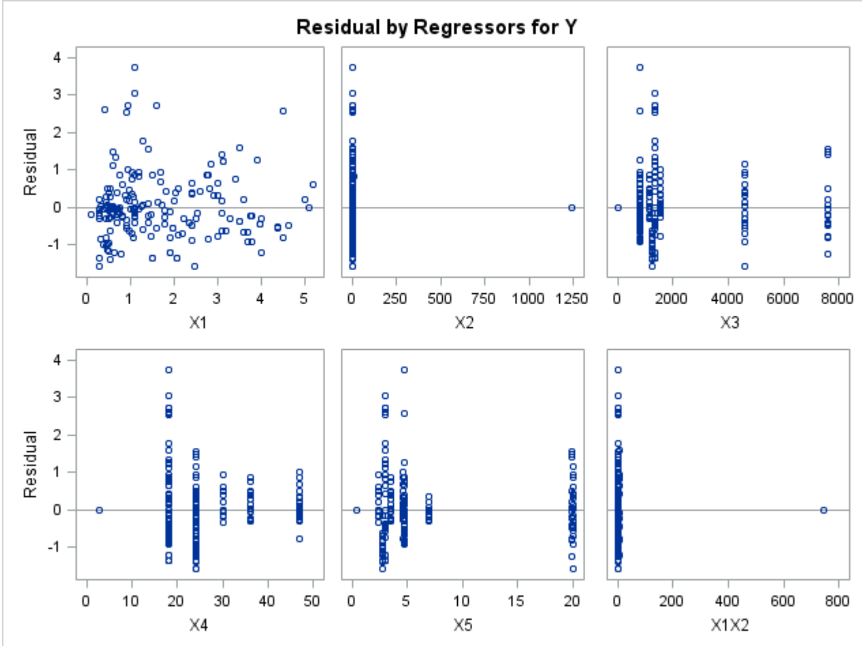
Summary of Forward Selection

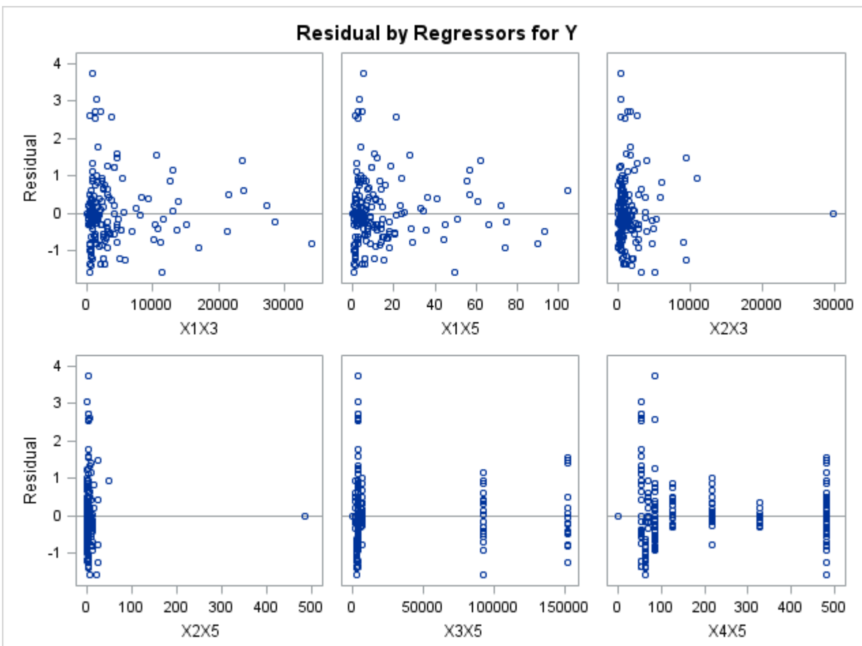
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X4	1	0.2294	0.2294	64.3674	55.07	<.0001
2	X1	2	0.0617	0.2911	46.5502	16.02	<.0001
3	X2	3	0.0118	0.3029	44.7647	3.10	0.0802
4	X1X2	4	0.0263	0.3292	38.3360	7.12	0.0083
5	X1X3	5	0.0125	0.3416	36.3353	3.43	0.0658
6	X3X5	6	0.0105	0.3521	34.9781	2.91	0.0900
7	X3	7	0.0213	0.3734	30.1386	6.09	0.0146
8	X4X5	8	0.0300	0.4034	22.5150	8.94	0.0032
9	X5	9	0.0231	0.4265	17.0958	7.13	0.0083
10	X1X5	10	0.0127	0.4392	15.0114	3.99	0.0472
11	X2X3	11	0.0101	0.4493	13.7711	3.21	0.0750
12	X2X5	12	0.0167	0.4660	10.4129	5.44	0.0208

FORWARD REGRESSION
Pollutant: Total Kjeldahl Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X1
X2
X3
X4
X5
X1X2


Residual by Regressors for Y
Residual
X1X3
X1X5
X2X3
X2X5
X3X5
X4X5

BACKWARD REGRESSION
Pollutant: Total Kjeldahl Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	294
Number of Observations Used	187
Number of Observations with Missing Values	107

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0645	0.1527	-0.3962	0.2117	-0.0533	0.5588	0.8434	0.6196	-0.1141	-0.0951	-0.0770	0.0571	0.1713	0.0705	0.4179
X2	-0.0645	1.0000	-0.0734	-0.1663	-0.0759	0.9998	-0.0499	-0.1018	-0.0518	0.7750	0.9964	0.9876	-0.0801	-0.0411	-0.0849	-0.0616
X3	0.1527	-0.0734	1.0000	-0.0994	0.9173	-0.0731	0.7699	0.1863	0.6880	0.3059	-0.0871	0.0074	0.9606	0.9921	0.8353	0.1287
X4	-0.3962	-0.1663	-0.0994	1.0000	-0.0591	-0.1709	-0.1736	0.0611	-0.1891	-0.1405	-0.1173	-0.1525	0.1681	-0.1216	0.2735	-0.4789
X5	0.2117	-0.0759	0.9173	-0.0591	1.0000	-0.0757	0.7500	0.2436	0.7771	0.2508	-0.0892	0.0117	0.8839	0.9479	0.9387	0.0889
X1X2	-0.0533	0.9998	-0.0731	-0.1709	-0.0757	1.0000	-0.0454	-0.0920	-0.0477	0.7775	0.9963	0.9880	-0.0808	-0.0410	-0.0861	-0.0544
X1X3	0.5588	-0.0499	0.7699	-0.1736	0.7500	-0.0454	1.0000	0.5605	0.9467	0.1332	-0.0706	-0.0098	0.7149	0.7750	0.6550	0.2899
X1X4	0.8434	-0.1018	0.1863	0.0611	0.2436	-0.0920	0.5605	1.0000	0.6016	-0.1179	-0.1115	-0.1046	0.2210	0.1863	0.2460	0.2154
X1X5	0.6196	-0.0518	0.6880	-0.1891	0.7771	-0.0477	0.9467	0.6016	1.0000	0.0882	-0.0747	-0.0121	0.6302	0.7178	0.6768	0.2805
X2X3	-0.1141	0.7750	0.3059	-0.1405	0.2508	0.7775	0.1332	-0.1179	0.0882	1.0000	0.7934	0.8560	0.2938	0.3185	0.2264	0.0396
X2X4	-0.0951	0.9964	-0.0871	-0.1173	-0.0892	0.9963	-0.0706	-0.1115	-0.0747	0.7934	1.0000	0.9896	-0.0810	-0.0566	-0.0804	-0.0787
X2X5	-0.0770	0.9876	0.0074	-0.1525	0.0117	0.9880	-0.0098	-0.1046	-0.0121	0.8560	0.9896	1.0000	0.0018	0.0412	0.0050	-0.0551
X3X4	0.0571	-0.0801	0.9606	0.1681	0.8839	-0.0808	0.7149	0.2210	0.6302	0.2938	-0.0810	0.0018	1.0000	0.9444	0.8894	-0.0035
X3X5	0.1713	-0.0411	0.9921	-0.1216	0.9479	-0.0410	0.7750	0.1863	0.7178	0.3185	-0.0566	0.0412	0.9444	1.0000	0.8609	0.1145
X4X5	0.0705	-0.0849	0.8353	0.2735	0.9387	-0.0861	0.6550	0.2460	0.6768	0.2264	-0.0804	0.0050	0.8894	0.8609	1.0000	-0.0613
Y	0.4179	-0.0616	0.1287	-0.4789	0.0889	-0.0544	0.2899	0.2154	0.2805	0.0396	-0.0787	-0.0551	-0.0035	0.1145	-0.0613	1.0000

BACKWARD REGRESSION
Pollutant: Total Kjeldahl Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	294
Number of Observations Used	187
Number of Observations with Missing Values	107

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.4673 and C(p) = 16.0000

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	15	125.30389	8.35359	10.00	<.0001
Error	171	142.84642	0.83536		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	4.77387	1.99114	4.80189	5.75	0.0176
X1	-0.01812	0.21936	0.00570	0.01	0.9343
X2	-0.03665	0.05948	0.31704	0.38	0.5387
X3	0.00047751	0.00108	0.16248	0.19	0.6598
X4	-0.18100	0.06496	6.48479	7.76	0.0059
X5	-0.57816	0.22115	5.70926	6.83	0.0097
X1X2	0.12459	0.09856	1.33494	1.60	0.2079
X1X3	-0.00001753	0.00007917	0.04096	0.05	0.8250
X1X4	0.00042197	0.00847	0.00208	0.00	0.9603
X1X5	0.03228	0.02541	1.34778	1.61	0.2057
X2X3	0.00049077	0.00017522	6.55337	7.84	0.0057
X2X4	-0.00295	0.00595	0.20547	0.25	0.6206
X2X5	-0.11521	0.04956	4.51458	5.40	0.0213
X3X4	0.00001215	0.00003014	0.13569	0.16	0.6874
X3X5	-0.00004449	0.00002641	2.37140	2.84	0.0938
X4X5	0.02501	0.00704	10.53224	12.61	0.0005

Bounds on condition number: 6470.4, 252623

Backward Elimination: Step 1

Variable X1X4 Removed: R-Square = 0.4673 and C(p) = 14.0025

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	14	125.30181	8.95013	10.78	<.0001
Error	172	142.84850	0.83051		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	4.75478	1.94829	4.94654	5.96	0.0157
X1	-0.00910	0.12360	0.00450	0.01	0.9414
X2	-0.03690	0.05909	0.32383	0.39	0.5332
X3	0.00047802	0.00108	0.16284	0.20	0.6585
X4	-0.18043	0.06375	6.65268	8.01	0.0052
X5	-0.57668	0.21852	5.78427	6.96	0.0091
X1X2	0.12515	0.09765	1.36419	1.64	0.2017
X1X3	-0.00001729	0.00007879	0.03999	0.05	0.8266
X1X5	0.03226	0.02533	1.34657	1.62	0.2046
X2X3	0.00049102	0.00017464	6.56555	7.91	0.0055
X2X4	-0.00297	0.00592	0.20879	0.25	0.6167
X2X5	-0.11527	0.04940	4.52300	5.45	0.0208
X3X4	0.00001228	0.00002994	0.13977	0.17	0.6821
X3X5	-0.00004470	0.00002600	2.45578	2.96	0.0873
X4X5	0.02496	0.00696	10.66976	12.85	0.0004

Bounds on condition number: 6422.9, 233220

Backward Elimination: Step 2

Variable X1 Removed: R-Square = 0.4673 and C(p) = 12.0079

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	125.29731	9.63825	11.67	<.0001
Error	173	142.85300	0.82574		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	4.68047	1.66166	6.55149	7.93	0.0054
X2	-0.03456	0.04967	0.39981	0.48	0.4875
X3	0.00050858	0.00099373	0.21628	0.26	0.6095
X4	-0.17840	0.05730	8.00283	9.69	0.0022
X5	-0.57031	0.20008	6.70918	8.13	0.0049
X1X2	0.12098	0.07937	1.91878	2.32	0.1292

X1X3	-0.00001655	0.00007792	0.03724	0.05	0.8321
X1X5	0.03156	0.02342	1.49933	1.82	0.1796
X2X3	0.00049175	0.00017386	6.60583	8.00	0.0052
X2X4	-0.00288	0.00579	0.20488	0.25	0.6190
X2X5	-0.11539	0.04923	4.53644	5.49	0.0202
X3X4	0.00001138	0.00002724	0.14413	0.17	0.6766
X3X5	-0.00004525	0.00002483	2.74401	3.32	0.0700
X4X5	0.02478	0.00649	12.03891	14.58	0.0002

Bounds on condition number: 4563, 159525

Backward Elimination: Step 3

Variable X1X3 Removed: R-Square = 0.4671 and C(p) = 10.0525

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	12	125.26007	10.43834	12.71	<.0001
Error	174	142.89024	0.82121		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	4.67528	1.65691	6.53839	7.96	0.0053
X2	-0.03196	0.04800	0.36403	0.44	0.5064
X3	0.00045626	0.00096007	0.18547	0.23	0.6352
X4	-0.17822	0.05714	7.98864	9.73	0.0021
X5	-0.55203	0.18013	7.71306	9.39	0.0025
X1X2	0.11804	0.07793	1.88401	2.29	0.1317
X1X5	0.02681	0.00692	12.32517	15.01	0.0002
X2X3	0.00050119	0.00016761	7.34260	8.94	0.0032
X2X4	-0.00294	0.00577	0.21277	0.26	0.6114
X2X5	-0.11775	0.04782	4.97828	6.06	0.0148
X3X4	0.00001207	0.00002697	0.16450	0.20	0.6550
X3X5	-0.00004547	0.00002474	2.77420	3.38	0.0678
X4X5	0.02451	0.00634	12.26073	14.93	0.0002

Bounds on condition number: 4285.4, 139304

Backward Elimination: Step 4

Variable X3X4 Removed: R-Square = 0.4665 and C(p) = 8.2494

Analysis of Variance					

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	125.09557	11.37232	13.91	<.0001
Error	175	143.05474	0.81746		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	4.01417	0.74891	23.48550	28.73	<.0001
X2	-0.03405	0.04766	0.41728	0.51	0.4759
X3	0.00084075	0.00042765	3.15950	3.87	0.0509
X4	-0.15526	0.02510	31.26803	38.25	<.0001
X5	-0.50137	0.13981	10.51307	12.86	0.0004
X1X2	0.12369	0.07673	2.12445	2.60	0.1087
X1X5	0.02684	0.00690	12.35283	15.11	0.0001
X2X3	0.00050347	0.00016715	7.41635	9.07	0.0030
X2X4	-0.00314	0.00574	0.24434	0.30	0.5853
X2X5	-0.11865	0.04767	5.06294	6.19	0.0138
X3X5	-0.00005081	0.00002161	4.51872	5.53	0.0198
X4X5	0.02278	0.00503	16.77046	20.52	<.0001

Bounds on condition number: 4244.6, 110828

Backward Elimination: Step 5

Variable X2X4 Removed: R-Square = 0.4656 and C(p) = 6.5419

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	124.85123	12.48512	15.33	<.0001
Error	176	143.29909	0.81420		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.98175	0.74507	23.25348	28.56	<.0001
X2	-0.04039	0.04614	0.62406	0.77	0.3825
X3	0.00087227	0.00042290	3.46382	4.25	0.0406
X4	-0.15665	0.02492	32.16056	39.50	<.0001
X5	-0.48825	0.13746	10.27274	12.62	0.0005
X1X2	0.12063	0.07637	2.03145	2.50	0.1160
X1X5	0.02645	0.00685	12.12668	14.89	0.0002
X2X3	0.00047267	0.00015706	7.37430	9.06	0.0030
X2X5	-0.11736	0.04752	4.96581	6.10	0.0145
X3X5	-0.00005169	0.00002151	4.70100	5.77	0.0173
X4X5	0.02234	0.00496	16.55302	20.33	<.0001

Bounds on condition number: 3993.4, 93396

Backward Elimination: Step 6

Variable X2 Removed: R-Square = 0.4633 and C(p) = 5.2889

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	9	124.22717	13.80302	16.98	<.0001
Error	177	143.92314	0.81313		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	4.07673	0.73664	24.90396	30.63	<.0001
X3	0.00088852	0.00042222	3.60096	4.43	0.0368
X4	-0.16115	0.02437	35.54255	43.71	<.0001
X5	-0.50213	0.13645	11.01139	13.54	0.0003
X1X2	0.05733	0.02456	4.43076	5.45	0.0207
X1X5	0.02867	0.00637	16.48822	20.28	<.0001
X2X3	0.00051816	0.00014812	9.95066	12.24	0.0006
X2X5	-0.12647	0.04634	6.05744	7.45	0.0070
X3X5	-0.00005383	0.00002136	5.16720	6.35	0.0126
X4X5	0.02306	0.00488	18.13617	22.30	<.0001

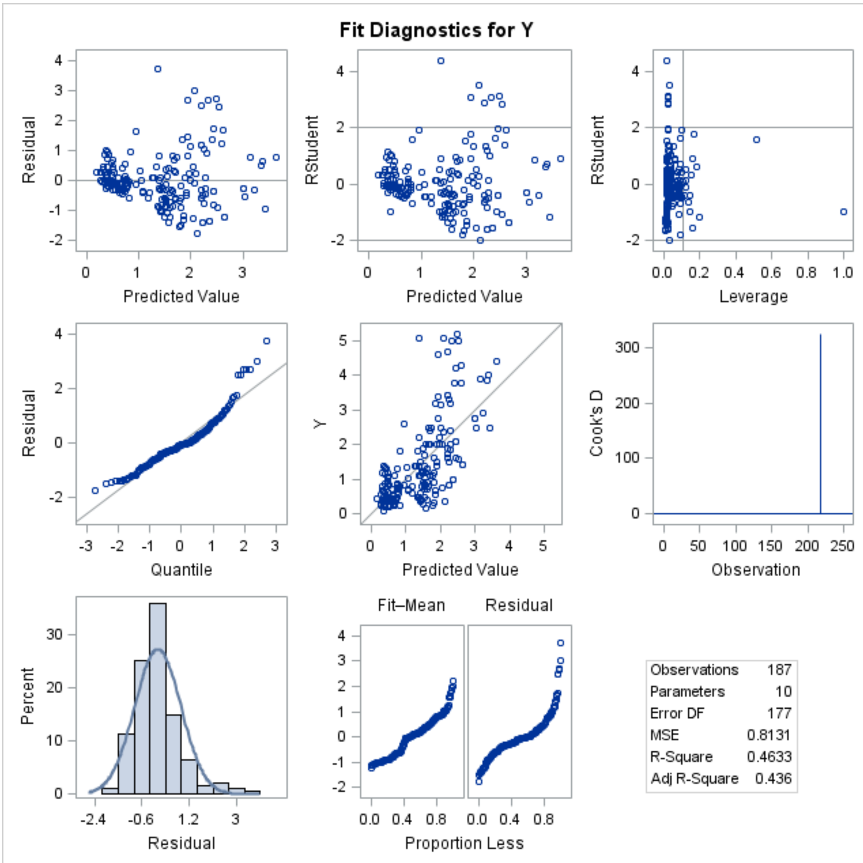
Bounds on condition number: 618.62, 15954

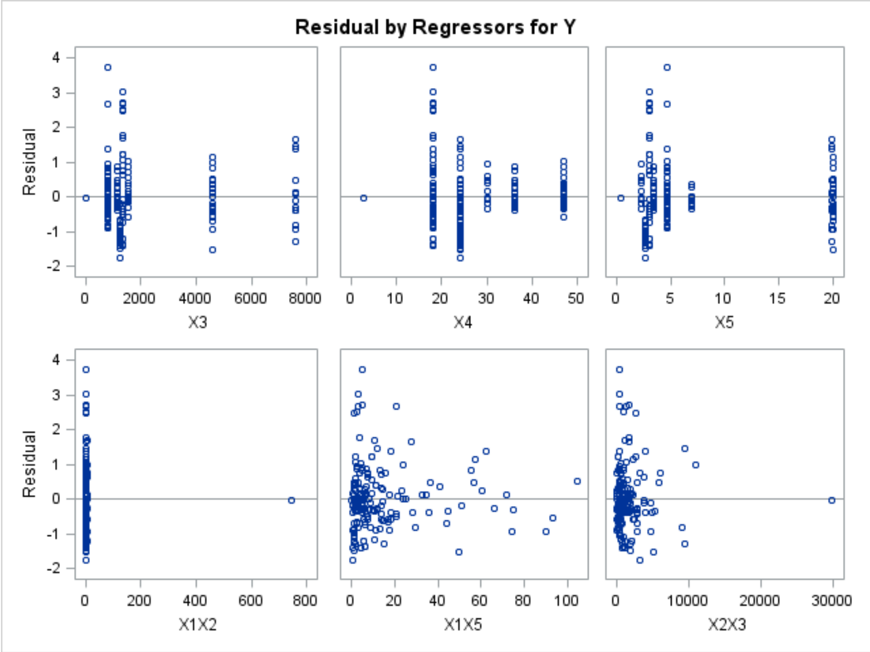
All variables left in the model are significant at the 0.1000 level.

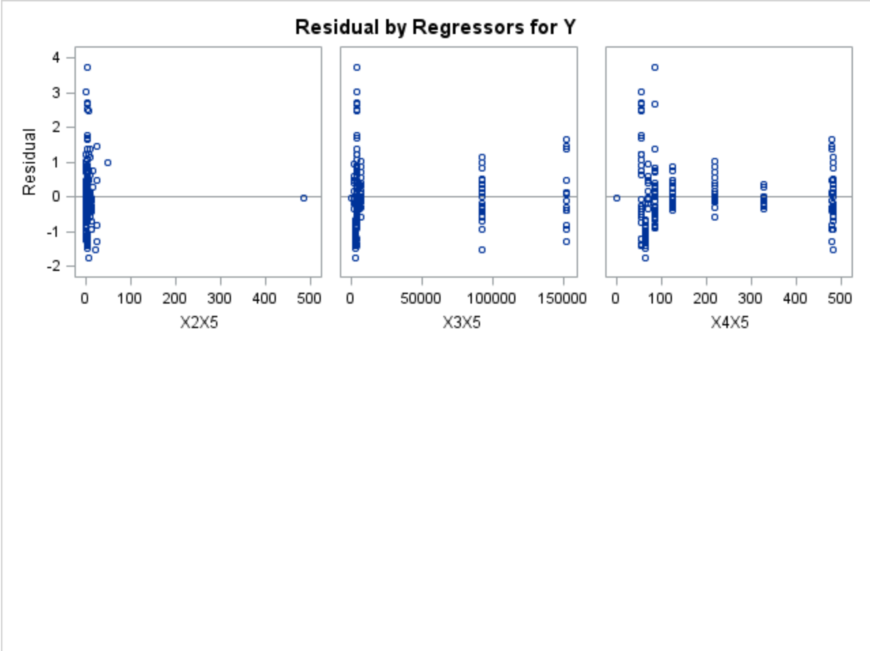
Summary of Backward Elimination							
Step	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	X1X4	14	0.0000	0.4673	14.0025	0.00	0.9603
2	X1	13	0.0000	0.4673	12.0079	0.01	0.9414
3	X1X3	12	0.0001	0.4671	10.0525	0.05	0.8321
4	X3X4	11	0.0006	0.4665	8.2494	0.20	0.6550
5	X2X4	10	0.0009	0.4656	6.5419	0.30	0.5853
6	X2	9	0.0023	0.4633	5.2889	0.77	0.3825

BACKWARD REGRESSION
Pollutant: Total Kjeldahl Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X3
X4
X5
X1X2
X1X5
X2X3


Residual by Regressors for Y
Residual
X2X5
X3X5
X4X5

STEPWISE REGRESSION
Pollutant: Total Kjeldahl Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	294
Number of Observations Used	187
Number of Observations with Missing Values	107

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0645	0.1527	-0.3962	0.2117	-0.0533	0.5588	0.8434	0.6196	-0.1141	-0.0951	-0.0770	0.0571	0.1713	0.0705	0.4179
X2	-0.0645	1.0000	-0.0734	-0.1663	-0.0759	0.9998	-0.0499	-0.1018	-0.0518	0.7750	0.9964	0.9876	-0.0801	-0.0411	-0.0849	-0.0616
X3	0.1527	-0.0734	1.0000	-0.0994	0.9173	-0.0731	0.7699	0.1863	0.6880	0.3059	-0.0871	0.0074	0.9606	0.9921	0.8353	0.1287
X4	-0.3962	-0.1663	-0.0994	1.0000	-0.0591	-0.1709	-0.1736	0.0611	-0.1891	-0.1405	-0.1173	-0.1525	0.1681	-0.1216	0.2735	-0.4789
X5	0.2117	-0.0759	0.9173	-0.0591	1.0000	-0.0757	0.7500	0.2436	0.7771	0.2508	-0.0892	0.0117	0.8839	0.9479	0.9387	0.0889
X1X2	-0.0533	0.9998	-0.0731	-0.1709	-0.0757	1.0000	-0.0454	-0.0920	-0.0477	0.7775	0.9963	0.9880	-0.0808	-0.0410	-0.0861	-0.0544
X1X3	0.5588	-0.0499	0.7699	-0.1736	0.7500	-0.0454	1.0000	0.5605	0.9467	0.1332	-0.0706	-0.0098	0.7149	0.7750	0.6550	0.2899
X1X4	0.8434	-0.1018	0.1863	0.0611	0.2436	-0.0920	0.5605	1.0000	0.6016	-0.1179	-0.1115	-0.1046	0.2210	0.1863	0.2460	0.2154
X1X5	0.6196	-0.0518	0.6880	-0.1891	0.7771	-0.0477	0.9467	0.6016	1.0000	0.0882	-0.0747	-0.0121	0.6302	0.7178	0.6768	0.2805
X2X3	-0.1141	0.7750	0.3059	-0.1405	0.2508	0.7775	0.1332	-0.1179	0.0882	1.0000	0.7934	0.8560	0.2938	0.3185	0.2264	0.0396
X2X4	-0.0951	0.9964	-0.0871	-0.1173	-0.0892	0.9963	-0.0706	-0.1115	-0.0747	0.7934	1.0000	0.9896	-0.0810	-0.0566	-0.0804	-0.0787
X2X5	-0.0770	0.9876	0.0074	-0.1525	0.0117	0.9880	-0.0098	-0.1046	-0.0121	0.8560	0.9896	1.0000	0.0018	0.0412	0.0050	-0.0551
X3X4	0.0571	-0.0801	0.9606	0.1681	0.8839	-0.0808	0.7149	0.2210	0.6302	0.2938	-0.0810	0.0018	1.0000	0.9444	0.8894	-0.0035
X3X5	0.1713	-0.0411	0.9921	-0.1216	0.9479	-0.0410	0.7750	0.1863	0.7178	0.3185	-0.0566	0.0412	0.9444	1.0000	0.8609	0.1145
X4X5	0.0705	-0.0849	0.8353	0.2735	0.9387	-0.0861	0.6550	0.2460	0.6768	0.2264	-0.0804	0.0050	0.8894	0.8609	1.0000	-0.0613
Y	0.4179	-0.0616	0.1287	-0.4789	0.0889	-0.0544	0.2899	0.2154	0.2805	0.0396	-0.0787	-0.0551	-0.0035	0.1145	-0.0613	1.0000

STEPWISE REGRESSION
Pollutant: Total Kjeldahl Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	294
Number of Observations Used	187
Number of Observations with Missing Values	107

Stepwise Selection: Step 1

Variable X4 Entered: R-Square = 0.2294 and C(p) = 64.3674

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	61.50972	61.50972	55.07	<.0001
Error	185	206.64060	1.11698		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.86493	0.21026	207.37322	185.66	<.0001
X4	-0.05303	0.00715	61.50972	55.07	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X1 Entered: R-Square = 0.2911 and C(p) = 46.5502

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	78.06415	39.03208	37.78	<.0001
Error	184	190.08616	1.03308		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.10646	0.27711	59.69520	57.78	<.0001

X1	0.26246	0.06557	16.55443	16.02	<.0001
X4	-0.04116	0.00749	31.23516	30.24	<.0001

Bounds on condition number: 1.1862, 4.7449

Stepwise Selection: Step 3

Variable X2 Entered: R-Square = 0.3029 and C(p) = 44.7647

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	81.22643	27.07548	26.51	<.0001
Error	183	186.92389	1.02144		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.22168	0.28322	62.85431	61.53	<.0001
X1	0.24577	0.06588	14.21503	13.92	0.0003
X2	-0.00147	0.00083801	3.16228	3.10	0.0802
X4	-0.04396	0.00761	34.07388	33.36	<.0001

Bounds on condition number: 1.2406, 10.506

Stepwise Selection: Step 4

Variable X1X2 Entered: R-Square = 0.3292 and C(p) = 38.3360

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	88.26742	22.06685	22.33	<.0001
Error	182	179.88290	0.98837		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.26623	0.27909	65.16630	65.93	<.0001
X1	0.13529	0.07690	3.05964	3.10	0.0802
X2	-0.13703	0.05080	7.19310	7.28	0.0076
X4	-0.04388	0.00749	33.93765	34.34	<.0001
X1X2	0.22594	0.08465	7.04099	7.12	0.0083

Bounds on condition number: 3987.8, 31893

Stepwise Selection: Step 5

Variable X1X3 Entered: R-Square = 0.3416 and C(p) = 36.3353

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	91.60943	18.32189	18.78	<.0001
Error	181	176.54088	0.97536		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.31217	0.27836	67.29609	69.00	<.0001
X1	0.04848	0.08964	0.28528	0.29	0.5893
X2	-0.14951	0.05091	8.41271	8.63	0.0037
X4	-0.04471	0.00745	35.11219	36.00	<.0001
X1X2	0.24675	0.08484	8.25024	8.46	0.0041
X1X3	0.00002957	0.00001597	3.34201	3.43	0.0658

Bounds on condition number: 4058.9, 40589

Stepwise Selection: Step 6

Variable X1 Removed: R-Square = 0.3406 and C(p) = 34.6768

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	91.32415	22.83104	23.50	<.0001
Error	182	176.82616	0.97157		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.39765	0.22869	106.79564	109.92	<.0001
X2	-0.16398	0.04323	13.98199	14.39	0.0002
X4	-0.04603	0.00703	41.63476	42.85	<.0001
X1X2	0.27080	0.07212	13.69724	14.10	0.0002
X1X3	0.00003409	0.00001359	6.11638	6.30	0.0130

Bounds on condition number: 2940.7, 23523

Stepwise Selection: Step 7

Variable X3X5 Entered: R-Square = 0.3517 and C(p) = 33.0977

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	94.31402	18.86280	19.64	<.0001
Error	181	173.83629	0.96042		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.43532	0.22837	109.21480	113.72	<.0001
X2	-0.14159	0.04481	9.58773	9.98	0.0019
X4	-0.04652	0.00700	42.47159	44.22	<.0001
X1X2	0.23343	0.07477	9.36093	9.75	0.0021
X1X3	0.00006490	0.00002208	8.29956	8.64	0.0037
X3X5	-0.00000455	0.00000258	2.98987	3.11	0.0794

Bounds on condition number: 3197.3, 31990

Stepwise Selection: Step 8

Variable X3 Entered: R-Square = 0.3729 and C(p) = 28.3016

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	99.99116	16.66519	17.84	<.0001
Error	180	168.15915	0.93422		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.84911	0.32754	29.77511	31.87	<.0001
X2	-0.12670	0.04461	7.53594	8.07	0.0050
X3	0.00073806	0.00029940	5.67714	6.08	0.0146
X4	-0.04925	0.00699	46.40645	49.67	<.0001
X1X2	0.20938	0.07438	7.40171	7.92	0.0054
X1X3	0.00006613	0.00002178	8.61148	9.22	0.0028
X3X5	-0.00003630	0.00001313	7.14135	7.64	0.0063

Bounds on condition number: 3253.7, 39924

Stepwise Selection: Step 9

Variable X4X5 Entered: R-Square = 0.4033 and C(p) = 20.5440

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	108.14227	15.44890	17.28	<.0001
Error	179	160.00805	0.89390		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.51988	0.33843	18.02831	20.17	<.0001
X2	-0.10424	0.04426	4.95784	5.55	0.0196
X3	0.00153	0.00039328	13.54116	15.15	0.0001
X4	-0.08263	0.01300	36.13679	40.43	<.0001
X1X2	0.17249	0.07378	4.88570	5.47	0.0205
X1X3	0.00006126	0.00002137	7.34816	8.22	0.0046
X3X5	-0.00008640	0.00002098	15.15898	16.96	<.0001
X4X5	0.00527	0.00175	8.15111	9.12	0.0029

Bounds on condition number: 3348.1, 49260

Stepwise Selection: Step 10

Variable X5 Entered: R-Square = 0.4259 and C(p) = 15.2704

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	114.21832	14.27729	16.51	<.0001
Error	178	153.93199	0.86479		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.29519	0.74792	16.78644	19.41	<.0001
X2	-0.09950	0.04357	4.50881	5.21	0.0236
X3	0.00133	0.00039403	9.87986	11.42	0.0009
X4	-0.14078	0.02539	26.58456	30.74	<.0001
X5	-0.36036	0.13595	6.07606	7.03	0.0088
X1X2	0.16257	0.07267	4.32865	5.01	0.0265
X1X3	0.00006568	0.00002108	8.39449	9.71	0.0021
X3X5	-0.00006950	0.00002160	8.95439	10.35	0.0015
X4X5	0.01756	0.00494	10.91197	12.62	0.0005

Bounds on condition number: 3353.8, 58912

Stepwise Selection: Step 11

Variable X1X5 Entered: R-Square = 0.4388 and C(p) = 13.1486

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	9	117.66154	13.07350	15.38	<.0001
Error	177	150.48877	0.85022		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.80932	0.78437	20.05332	23.59	<.0001
X2	-0.10466	0.04328	4.97167	5.85	0.0166
X3	0.00151	0.00040026	12.04980	14.17	0.0002
X4	-0.15661	0.02638	29.97282	35.25	<.0001
X5	-0.57470	0.17180	9.51406	11.19	0.0010
X1X2	0.17064	0.07216	4.75414	5.59	0.0191
X1X3	-0.00008081	0.00007574	0.96800	1.14	0.2874
X1X5	0.04601	0.02286	3.44322	4.05	0.0457
X3X5	-0.00006202	0.00002173	6.92341	8.14	0.0048
X4X5	0.02186	0.00535	14.20873	16.71	<.0001

Bounds on condition number: 3365.7, 68412

Stepwise Selection: Step 12

Variable X1X3 Removed: R-Square = 0.4352 and C(p) = 12.3074

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	8	116.69354	14.58669	17.14	<.0001
Error	178	151.45677	0.85088		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.55692	0.74814	19.23317	22.60	<.0001
X2	-0.09792	0.04283	4.44665	5.23	0.0234
X3	0.00141	0.00039045	11.13012	13.08	0.0004
X4	-0.14872	0.02533	29.33353	34.47	<.0001
X5	-0.46861	0.14016	9.51137	11.18	0.0010
X1X2	0.15967	0.07145	4.24890	4.99	0.0267
X1X5	0.02256	0.00631	10.86971	12.77	0.0005
X3X5	-0.00006597	0.00002143	8.06636	9.48	0.0024
X4X5	0.01974	0.00497	13.44201	15.80	0.0001

Bounds on condition number: 3296, 58101

Stepwise Selection: Step 13

Variable X2X3 Entered: R-Square = 0.4471 and C(p) = 10.4864

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	119.88542	13.32060	15.90	<.0001
Error	177	148.26489	0.83765		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.66277	0.74428	20.28666	24.22	<.0001
X2	-0.06535	0.04566	1.71570	2.05	0.1541
X3	0.00130	0.00039187	9.17715	10.96	0.0011
X4	-0.15022	0.02514	29.90229	35.70	<.0001
X5	-0.48805	0.13942	10.26414	12.25	0.0006
X1X2	0.10085	0.07703	1.43573	1.71	0.1922
X1X5	0.02827	0.00691	14.01109	16.73	<.0001
X2X3	0.00010976	0.00005623	3.19188	3.81	0.0525
X3X5	-0.00006307	0.00002131	7.33692	8.76	0.0035
X4X5	0.01994	0.00493	13.71609	16.37	<.0001

Bounds on condition number: 3891.3, 75390

Stepwise Selection: Step 14

Variable X1X2 Removed: R-Square = 0.4417 and C(p) = 10.2051

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	118.44969	14.80621	17.61	<.0001
Error	178	149.70062	0.84101		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.78361	0.74001	21.98549	26.14	<.0001
X2	-0.00560	0.00155	10.93156	13.00	0.0004
X3	0.00137	0.00038896	10.39191	12.36	0.0006
X4	-0.15666	0.02471	33.81253	40.20	<.0001
X5	-0.51148	0.13855	11.46233	13.63	0.0003
X1X5	0.03201	0.00631	21.67986	25.78	<.0001
X2X3	0.00013855	0.00005185	6.00505	7.14	0.0082
X3X5	-0.00006748	0.00002108	8.61433	10.24	0.0016
X4X5	0.02082	0.00489	15.23146	18.11	<.0001

Bounds on condition number: 208.22, 5381

Stepwise Selection: Step 15

Variable X2X5 Entered: R-Square = 0.4580 and C(p) = 6.9737

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	122.81977	13.64664	16.62	<.0001
Error	177	145.33054	0.82108		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	4.10331	0.74421	24.96124	30.40	<.0001
X2	0.02861	0.01491	3.02336	3.68	0.0566
X3	0.00098380	0.00041872	4.53257	5.52	0.0199
X4	-0.16383	0.02461	36.38912	44.32	<.0001
X5	-0.51596	0.13691	11.66155	14.20	0.0002
X1X5	0.03100	0.00625	20.23358	24.64	<.0001
X2X3	0.00048239	0.00015760	7.69253	9.37	0.0026
X2X5	-0.10949	0.04746	4.37008	5.32	0.0222
X3X5	-0.00005767	0.00002126	6.03916	7.36	0.0073
X4X5	0.02322	0.00494	18.10569	22.05	<.0001

Bounds on condition number: 642.64, 16205

Stepwise Selection: Step 16

Variable X1X2 Entered: R-Square = 0.4656 and C(p) = 6.5419

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	124.85123	12.48512	15.33	<.0001
Error	176	143.29909	0.81420		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.98175	0.74507	23.25348	28.56	<.0001
X2	-0.04039	0.04614	0.62406	0.77	0.3825
X3	0.00087227	0.00042290	3.46382	4.25	0.0406
X4	-0.15665	0.02492	32.16056	39.50	<.0001
X5	-0.48825	0.13746	10.27274	12.62	0.0005

X1X2	0.12063	0.07637	2.03145	2.50	0.1160
X1X5	0.02645	0.00685	12.12668	14.89	0.0002
X2X3	0.00047267	0.00015706	7.37430	9.06	0.0030
X2X5	-0.11736	0.04752	4.96581	6.10	0.0145
X3X5	-0.00005169	0.00002151	4.70100	5.77	0.0173
X4X5	0.02234	0.00496	16.55302	20.33	<.0001

Bounds on condition number: 3993.4, 93396

Stepwise Selection: Step 17

Variable X2 Removed: R-Square = 0.4633 and C(p) = 5.2889

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	9	124.22717	13.80302	16.98	<.0001
Error	177	143.92314	0.81313		
Corrected Total	186	268.15031			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	4.07673	0.73664	24.90396	30.63	<.0001
X3	0.00088852	0.00042222	3.60096	4.43	0.0368
X4	-0.16115	0.02437	35.54255	43.71	<.0001
X5	-0.50213	0.13645	11.01139	13.54	0.0003
X1X2	0.05733	0.02456	4.43076	5.45	0.0207
X1X5	0.02867	0.00637	16.48822	20.28	<.0001
X2X3	0.00051816	0.00014812	9.95066	12.24	0.0006
X2X5	-0.12647	0.04634	6.05744	7.45	0.0070
X3X5	-0.00005383	0.00002136	5.16720	6.35	0.0126
X4X5	0.02306	0.00488	18.13617	22.30	<.0001

Bounds on condition number: 618.62, 15954

All variables left in the model are significant at the 0.1500 level.

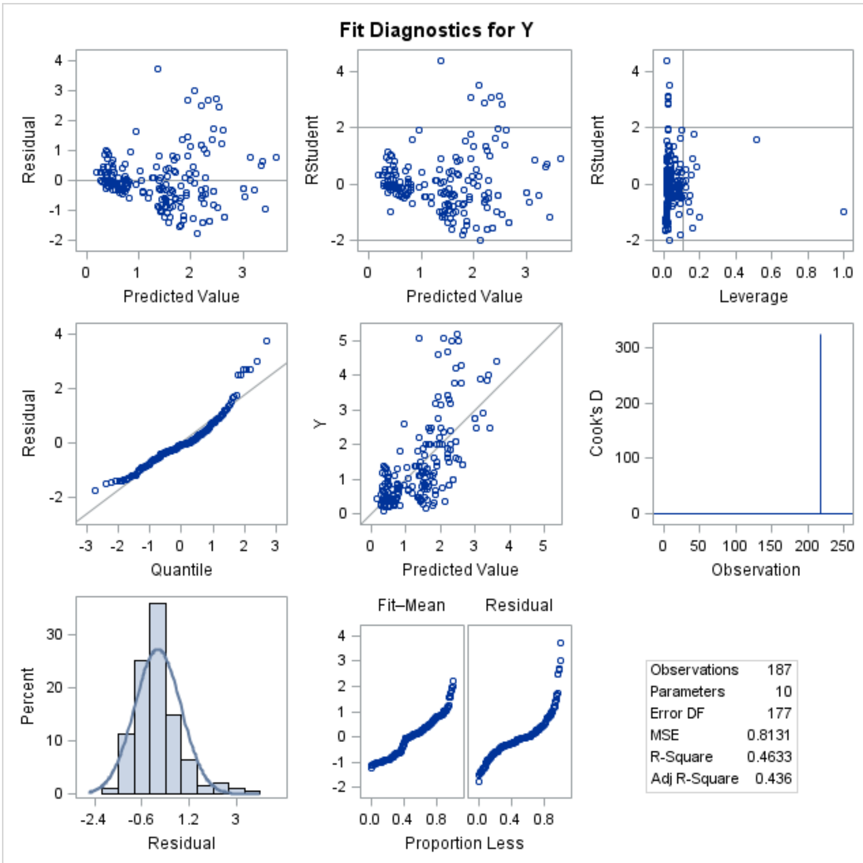
No other variable met the 0.1500 significance level for entry into the model.

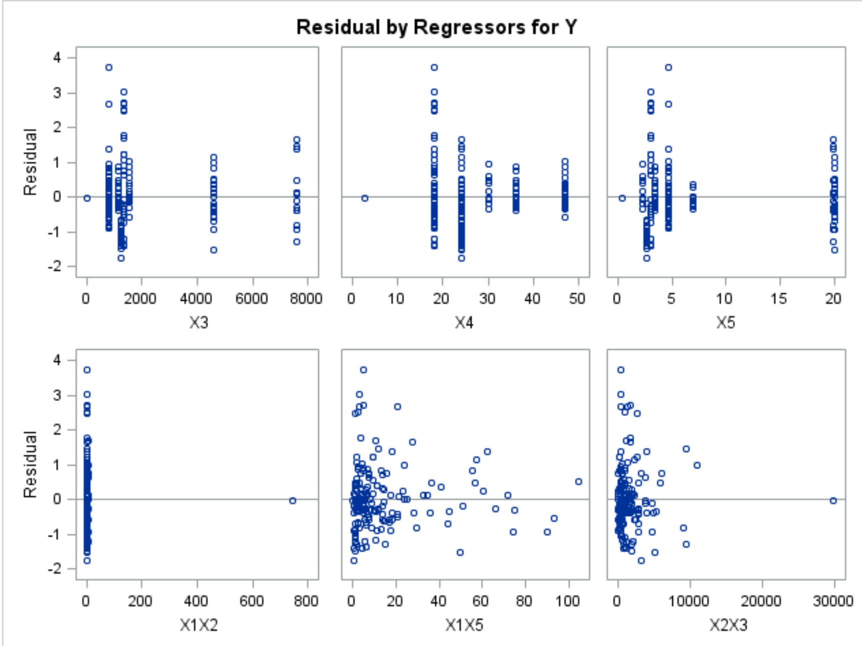
Summary of Stepwise Selection								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	X4		1	0.2294	0.2294	64.3674	55.07	<.0001
2	X1		2	0.0617	0.2911	46.5502	16.02	<.0001
3	X2		3	0.0118	0.3029	44.7647	3.10	0.0802

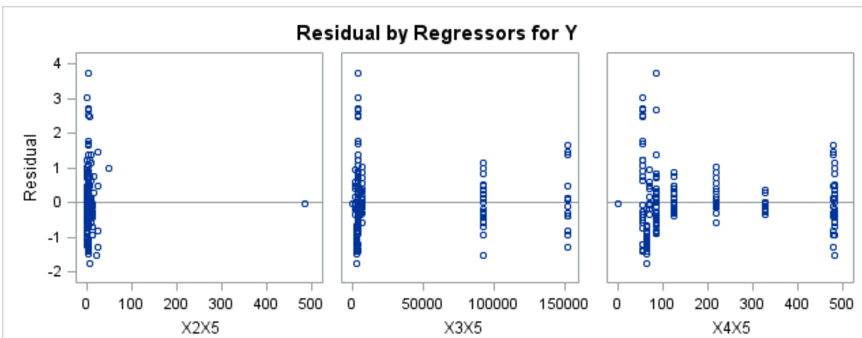
4	X1X2		4	0.0263	0.3292	38.3360	7.12	0.0083
5	X1X3		5	0.0125	0.3416	36.3353	3.43	0.0658
6		X1	4	0.0011	0.3406	34.6768	0.29	0.5893
7	X3X5		5	0.0111	0.3517	33.0977	3.11	0.0794
8	X3		6	0.0212	0.3729	28.3016	6.08	0.0146
9	X4X5		7	0.0304	0.4033	20.5440	9.12	0.0029
10	X5		8	0.0227	0.4259	15.2704	7.03	0.0088
11	X1X5		9	0.0128	0.4388	13.1486	4.05	0.0457
12		X1X3	8	0.0036	0.4352	12.3074	1.14	0.2874
13	X2X3		9	0.0119	0.4471	10.4864	3.81	0.0525
14		X1X2	8	0.0054	0.4417	10.2051	1.71	0.1922
15	X2X5		9	0.0163	0.4580	6.9737	5.32	0.0222
16	X1X2		10	0.0076	0.4656	6.5419	2.50	0.1160
17		X2	9	0.0023	0.4633	5.2889	0.77	0.3825

STEPWISE REGRESSION
Pollutant: Total Kjeldahl Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X3
X4
X5
X1X2
X1X5
X2X3


Residual by Regressors for Y
Residual
X2X5
X3X5
X4X5

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Lead

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The REG Procedure

Number of Observations Read	294
Number of Observations Used	187
Number of Observations with Missing Values	107

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0645	0.1527	-0.3962	0.2117	-0.0533	0.5588	0.8434	0.6196	-0.1141	-0.0951	-0.0770	0.0571	0.1713	0.0705	0.4179
X2	-0.0645	1.0000	-0.0734	-0.1663	-0.0759	0.9998	-0.0499	-0.1018	-0.0518	0.7750	0.9964	0.9876	-0.0801	-0.0411	-0.0849	-0.0616
X3	0.1527	-0.0734	1.0000	-0.0994	0.9173	-0.0731	0.7699	0.1863	0.6880	0.3059	-0.0871	0.0074	0.9606	0.9921	0.8353	0.1287
X4	-0.3962	-0.1663	-0.0994	1.0000	-0.0591	-0.1709	-0.1736	0.0611	-0.1891	-0.1405	-0.1173	-0.1525	0.1681	-0.1216	0.2735	-0.4789
X5	0.2117	-0.0759	0.9173	-0.0591	1.0000	-0.0757	0.7500	0.2436	0.7771	0.2508	-0.0892	0.0117	0.8839	0.9479	0.9387	0.0889
X1X2	-0.0533	0.9998	-0.0731	-0.1709	-0.0757	1.0000	-0.0454	-0.0920	-0.0477	0.7775	0.9963	0.9880	-0.0808	-0.0410	-0.0861	-0.0544
X1X3	0.5588	-0.0499	0.7699	-0.1736	0.7500	-0.0454	1.0000	0.5605	0.9467	0.1332	-0.0706	-0.0098	0.7149	0.7750	0.6550	0.2899
X1X4	0.8434	-0.1018	0.1863	0.0611	0.2436	-0.0920	0.5605	1.0000	0.6016	-0.1179	-0.1115	-0.1046	0.2210	0.1863	0.2460	0.2154
X1X5	0.6196	-0.0518	0.6880	-0.1891	0.7771	-0.0477	0.9467	0.6016	1.0000	0.0882	-0.0747	-0.0121	0.6302	0.7178	0.6768	0.2805
X2X3	-0.1141	0.7750	0.3059	-0.1405	0.2508	0.7775	0.1332	-0.1179	0.0882	1.0000	0.7934	0.8560	0.2938	0.3185	0.2264	0.0396
X2X4	-0.0951	0.9964	-0.0871	-0.1173	-0.0892	0.9963	-0.0706	-0.1115	-0.0747	0.7934	1.0000	0.9896	-0.0810	-0.0566	-0.0804	-0.0787
X2X5	-0.0770	0.9876	0.0074	-0.1525	0.0117	0.9880	-0.0098	-0.1046	-0.0121	0.8560	0.9896	1.0000	0.0018	0.0412	0.0050	-0.0551
X3X4	0.0571	-0.0801	0.9606	0.1681	0.8839	-0.0808	0.7149	0.2210	0.6302	0.2938	-0.0810	0.0018	1.0000	0.9444	0.8894	-0.0035
X3X5	0.1713	-0.0411	0.9921	-0.1216	0.9479	-0.0410	0.7750	0.1863	0.7178	0.3185	-0.0566	0.0412	0.9444	1.0000	0.8609	0.1145
X4X5	0.0705	-0.0849	0.8353	0.2735	0.9387	-0.0861	0.6550	0.2460	0.6768	0.2264	-0.0804	0.0050	0.8894	0.8609	1.0000	-0.0613
Y	0.4179	-0.0616	0.1287	-0.4789	0.0889	-0.0544	0.2899	0.2154	0.2805	0.0396	-0.0787	-0.0551	-0.0035	0.1145	-0.0613	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Lead

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The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	294
Number of Observations Used	187
Number of Observations with Missing Values	107

Number in Model	R-Square	Variables in Model
1	0.2294	X4
1	0.1746	X1
1	0.0840	X1X3
1	0.0787	X1X5
1	0.0464	X1X4
1	0.0166	X3
1	0.0131	X3X5
1	0.0079	X5
1	0.0062	X2X4
1	0.0038	X2
1	0.0038	X4X5
1	0.0030	X2X5
1	0.0030	X1X2
1	0.0016	X2X3
1	0.0000	X3X4
2	0.2911	X1 X4
2	0.2895	X4 X1X4
2	0.2735	X4 X1X3
2	0.2668	X4 X1X5
2	0.2499	X2 X4
2	0.2485	X4 X1X2
2	0.2478	X4 X2X4
2	0.2462	X4 X2X5
2	0.2397	X1 X1X4
2	0.2360	X3 X4
2	0.2355	X4 X3X4
2	0.2346	X4 X4X5
2	0.2331	X4 X5
2	0.2326	X4 X3X5
2	0.2302	X4 X2X3
3	0.3178	X2 X4 X1X2
3	0.3041	X2 X4 X1X4
3	0.3035	X4 X1X2 X1X4
3	0.3029	X1 X2 X4
3	0.3023	X1 X4 X1X2
3	0.3017	X4 X1X4 X2X4

3	0.3008	X1 X4 X2X4
3	0.3008	X4 X1X4 X2X5
3	0.3008	X4 X1X3 X3X5
3	0.2998	X1 X4 X2X5
3	0.2991	X1 X4 X1X3
3	0.2983	X3 X1X4 X3X4
3	0.2982	X1 X3 X3X4
3	0.2963	X4 X1X3 X1X4
3	0.2953	X4 X5 X1X3
4	0.3664	X3 X1X5 X3X4 X3X5
4	0.3602	X1 X3 X3X4 X3X5
4	0.3555	X3 X1X4 X3X4 X3X5
4	0.3519	X3 X4 X1X5 X3X5
4	0.3465	X3 X1X3 X3X4 X3X5
4	0.3416	X1 X3 X4 X3X5
4	0.3406	X2 X4 X1X2 X1X3
4	0.3384	X3 X4 X1X3 X3X5
4	0.3370	X2 X4 X1X2 X1X5
4	0.3341	X1 X4 X2X3 X2X5
4	0.3327	X3 X4 X3X5 X4X5
4	0.3309	X3 X4 X1X4 X3X5
4	0.3301	X4 X1X4 X2X3 X2X5
4	0.3300	X2 X4 X1X2 X1X4
4	0.3292	X1 X2 X4 X1X2
5	0.3861	X1 X3 X3X4 X3X5 X4X5
5	0.3820	X3 X4 X1X3 X3X5 X4X5
5	0.3788	X3 X1X4 X3X4 X3X5 X4X5
5	0.3782	X3 X1X5 X3X4 X3X5 X4X5
5	0.3780	X1 X3 X4 X3X5 X4X5
5	0.3775	X3 X1X5 X2X3 X3X4 X3X5
5	0.3766	X1 X3 X1X5 X3X4 X3X5
5	0.3763	X1 X3 X5 X3X4 X3X5
5	0.3761	X3 X4 X1X5 X3X5 X4X5
5	0.3743	X3 X1X4 X1X5 X3X4 X3X5
5	0.3717	X3 X5 X1X5 X3X4 X3X5
5	0.3709	X3 X5 X1X4 X3X4 X3X5
5	0.3708	X3 X1X3 X3X4 X3X5 X4X5
5	0.3698	X3 X4 X1X4 X3X5 X4X5
5	0.3687	X3 X5 X1X3 X3X4 X3X5
6	0.4139	X4 X5 X1X5 X2X3 X2X5 X4X5
6	0.4034	X1 X3 X2X3 X3X4 X3X5 X4X5
6	0.4030	X4 X5 X1X5 X2X3 X2X4 X4X5
6	0.4008	X2 X4 X5 X1X5 X2X3 X4X5
6	0.4003	X3 X4 X5 X1X5 X3X5 X4X5
6	0.3989	X4 X5 X1X2 X1X5 X2X3 X4X5
6	0.3988	X4 X5 X1X3 X2X3 X2X5 X4X5
6	0.3955	X3 X1X5 X2X3 X3X4 X3X5 X4X5
6	0.3952	X3 X1X5 X2X3 X2X5 X3X4 X3X5
6	0.3952	X3 X1X4 X2X3 X3X4 X3X5 X4X5
6	0.3941	X2 X3 X1X2 X1X5 X3X4 X3X5
6	0.3939	X3 X4 X5 X1X3 X3X5 X4X5
6		

	0.3938	X2 X3 X1X5 X2X3 X3X4 X3X5
6	0.3938	X3 X1X5 X2X3 X2X4 X3X4 X3X5
6	0.3935	X1 X3 X4 X5 X3X5 X4X5
7	0.4409	X4 X5 X1X2 X1X5 X2X3 X2X5 X4X5
7	0.4338	X2 X4 X5 X1X5 X2X3 X2X5 X4X5
7	0.4218	X4 X5 X1X5 X2X3 X2X4 X2X5 X4X5
7	0.4211	X4 X5 X1X5 X2X3 X2X5 X3X4 X4X5
7	0.4203	X4 X5 X1X4 X1X5 X2X3 X2X5 X4X5
7	0.4199	X4 X5 X1X2 X1X4 X2X3 X2X5 X4X5
7	0.4193	X2 X3 X4 X5 X1X5 X3X5 X4X5
7	0.4188	X4 X1X2 X1X3 X2X3 X2X5 X3X5 X4X5
7	0.4186	X3 X4 X5 X1X2 X1X5 X3X5 X4X5
7	0.4178	X3 X4 X5 X1X5 X2X3 X2X5 X4X5
7	0.4175	X1 X4 X5 X1X2 X2X3 X2X5 X4X5
7	0.4174	X2 X4 X5 X1X5 X3X4 X3X5 X4X5
7	0.4172	X3 X4 X5 X1X5 X2X4 X3X5 X4X5
7	0.4170	X1 X4 X5 X1X5 X2X3 X2X5 X4X5
7	0.4163	X2 X4 X5 X1X4 X2X3 X2X5 X4X5
8	0.4498	X4 X5 X1X2 X1X5 X2X3 X2X5 X3X5 X4X5
8	0.4490	X4 X5 X1X2 X1X3 X2X3 X2X5 X3X5 X4X5
8	0.4484	X4 X5 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
8	0.4468	X3 X4 X5 X1X5 X2X3 X2X5 X3X5 X4X5
8	0.4464	X2 X4 X5 X1X2 X1X5 X2X3 X2X5 X4X5
8	0.4447	X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X4X5
8	0.4440	X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X4X5
8	0.4439	X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X4X5
8	0.4433	X1 X4 X5 X1X2 X1X5 X2X3 X2X5 X4X5
8	0.4430	X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X4X5
8	0.4421	X3 X4 X5 X1X5 X2X3 X2X4 X3X5 X4X5
8	0.4420	X4 X5 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
8	0.4420	X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X4X5
8	0.4419	X2 X4 X5 X1X5 X2X3 X3X4 X3X5 X4X5
8	0.4417	X2 X3 X4 X5 X1X5 X2X3 X3X5 X4X5
9	0.4638	X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
9	0.4633	X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X5 X4X5
9	0.4594	X4 X5 X1X2 X1X3 X2X3 X2X5 X3X4 X3X5 X4X5
9	0.4592	X2 X4 X5 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
9	0.4580	X2 X3 X4 X5 X1X5 X2X3 X2X5 X3X5 X4X5
9	0.4579	X3 X4 X5 X1X2 X1X3 X2X3 X2X5 X3X5 X4X5
9	0.4546	X2 X4 X5 X1X3 X2X3 X2X5 X3X4 X3X5 X4X5
9	0.4534	X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X4X5
9	0.4531	X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
9	0.4527	X2 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X5 X4X5
9	0.4523	X2 X3 X4 X5 X1X3 X2X3 X2X5 X3X5 X4X5
9	0.4522	X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X5 X4X5
9	0.4521	X4 X5 X1X2 X1X3 X1X4 X2X3 X2X5 X3X5 X4X5
9	0.4519	X4 X5 X1X2 X1X3 X2X3 X2X4 X2X5 X3X5 X4X5
9	0.4519	X4 X5 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
10	0.4657	X2 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
10	0.4656	X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X5 X4X5
10	0.4652	X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
10		

	0.4650	X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
10	0.4648	X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X5 X4X5
10	0.4648	X1 X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X5 X4X5
10	0.4643	X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
10	0.4642	X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
10	0.4641	X1 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
10	0.4639	X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
10	0.4633	X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X5 X4X5
10	0.4617	X1 X2 X3 X4 X5 X1X5 X2X3 X2X5 X3X5 X4X5
10	0.4617	X2 X3 X4 X5 X1X4 X1X5 X2X3 X2X5 X3X5 X4X5
10	0.4611	X1 X3 X4 X5 X1X2 X1X3 X2X3 X2X5 X3X5 X4X5
10	0.4609	X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X5 X3X5 X4X5
11	0.4665	X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
11	0.4664	X2 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.4663	X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.4659	X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X5 X4X5
11	0.4658	X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X5 X4X5
11	0.4658	X1 X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X5 X4X5
11	0.4658	X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.4657	X1 X2 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.4657	X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
11	0.4657	X1 X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
11	0.4657	X2 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.4657	X2 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.4653	X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.4653	X1 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.4652	X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.4671	X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.4667	X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
12	0.4666	X1 X2 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.4666	X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
12	0.4666	X1 X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
12	0.4665	X2 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.4665	X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.4665	X2 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.4664	X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.4663	X1 X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.4661	X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.4661	X1 X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.4660	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X5 X4X5
12	0.4660	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X5 X4X5
12	0.4658	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X5 X4X5
13	0.4673	X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.4671	X1 X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.4671	X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.4668	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
13	0.4668	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
13	0.4667	X1 X2 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.4666	X1 X2 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.4666	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
13	0.4666	X2 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13		

	0.4665	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
13	0.4665	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
13	0.4664	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
13	0.4661	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.4661	X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.4661	X1 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4673	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4673	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4671	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4668	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
14	0.4667	X1 X2 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4665	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
14	0.4661	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4623	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4623	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4584	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
14	0.4505	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
14	0.4460	X1 X2 X3 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4431	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4429	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4280	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
15	0.4673	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5

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MULTIPLE LEAST-SQUARE REGRESSION

Pollutant: Total Lead

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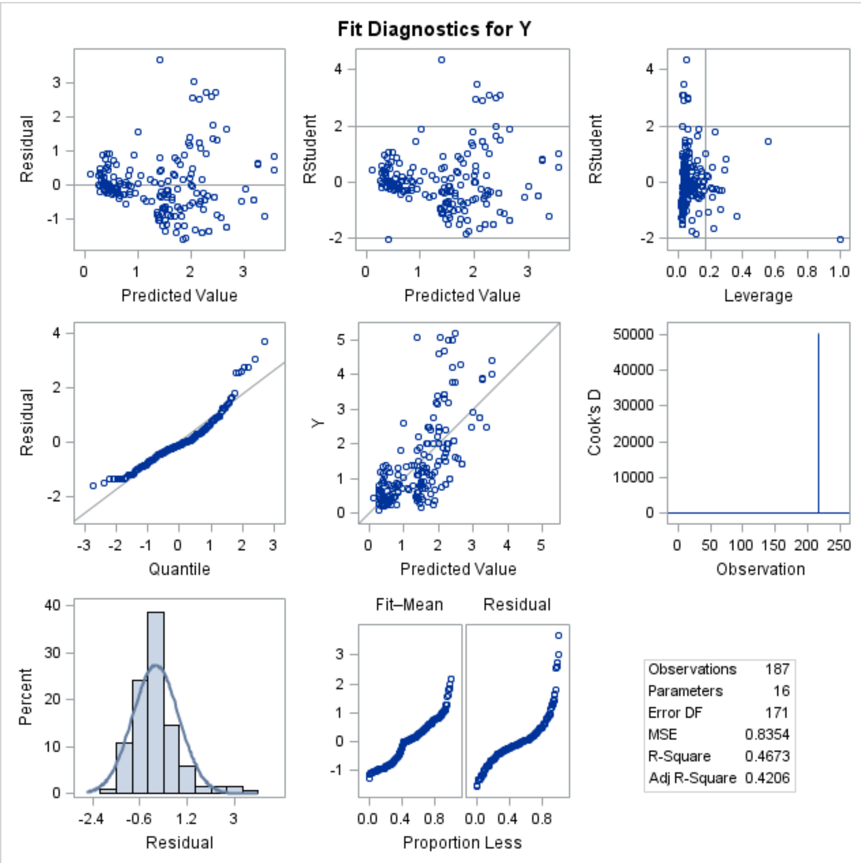
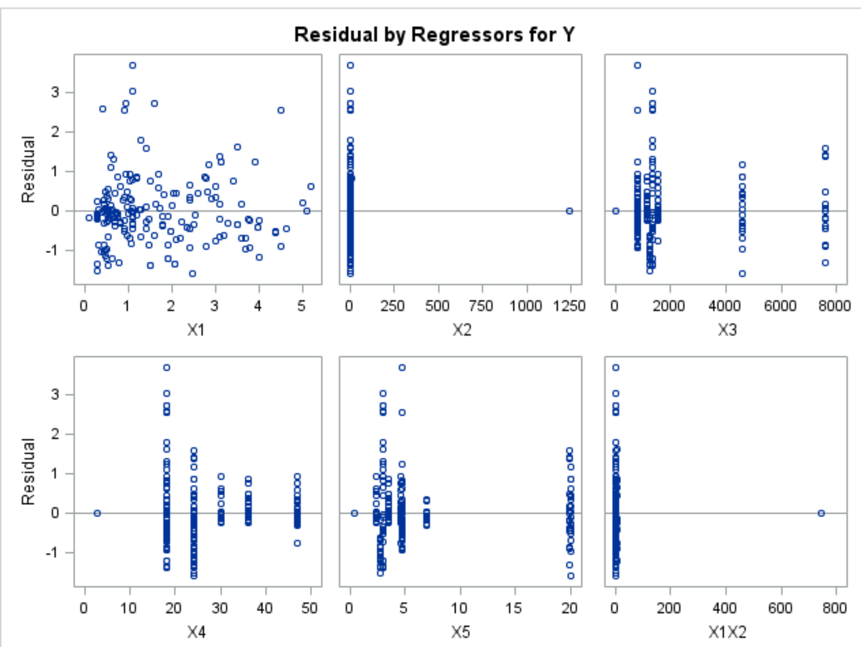
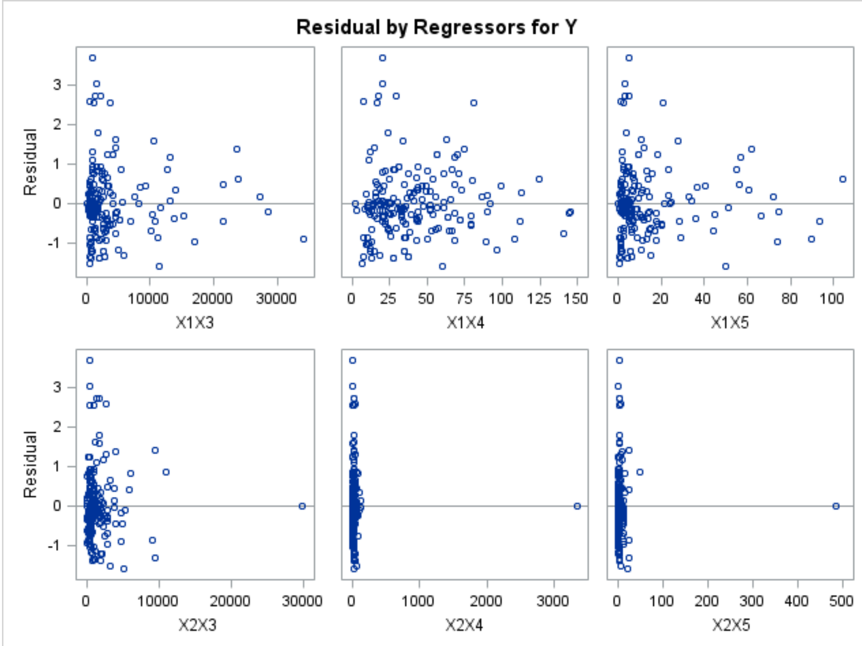
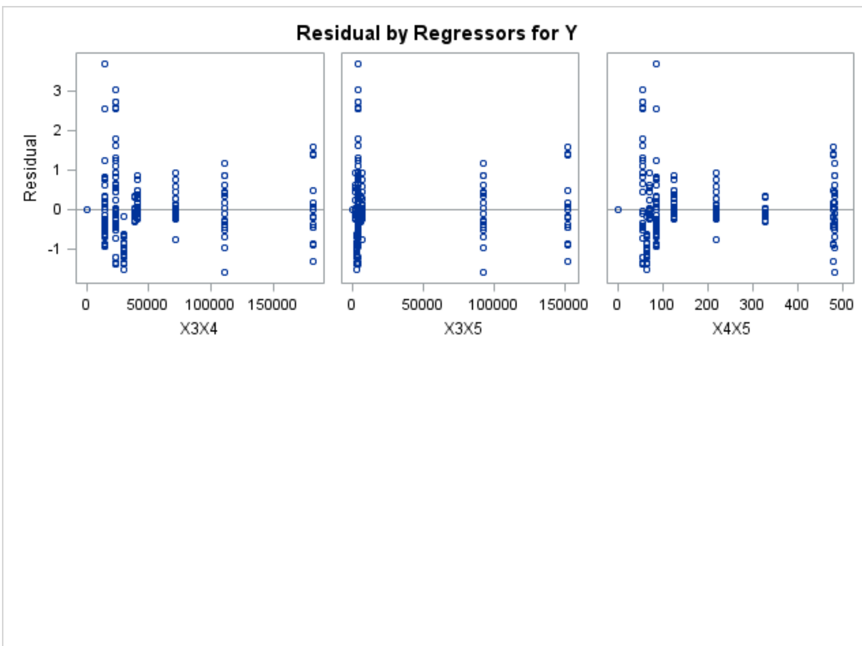
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
X1X3
X1X4
X1X5
X2X3
X2X4
X2X5


Residual by Regressors for Y
Residual
X3X4
X3X5
X4X5

FORWARD REGRESSION
Pollutant: Total Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	176
Number of Observations Used	69
Number of Observations with Missing Values	107

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1192	-0.1572	-0.1917	-0.1348	0.5042	0.5218	0.7989	0.6497	-0.2065	-0.1536	-0.1814	-0.2170	-0.1328	-0.2107	0.1023
X2	-0.1192	1.0000	0.0227	0.3194	0.0144	0.5620	-0.0707	0.0485	-0.0921	0.6366	0.8635	0.6348	0.1411	-0.0141	0.1443	0.2009
X3	-0.1572	0.0227	1.0000	0.0130	0.9300	-0.0915	0.5605	-0.1068	0.3793	0.5898	-0.0133	0.5027	0.9247	0.9896	0.9201	0.1583
X4	-0.1917	0.3194	0.0130	1.0000	-0.1667	0.1048	-0.0459	0.3171	-0.1617	0.1715	0.6415	0.0392	0.3927	-0.1240	0.2436	0.2775
X5	-0.1348	0.0144	0.9300	-0.1667	1.0000	-0.1008	0.5139	-0.1735	0.4147	0.6243	-0.0997	0.6082	0.7890	0.9593	0.9157	-0.0380
X1X2	0.5042	0.5620	-0.0915	0.1048	-0.1008	1.0000	0.2950	0.5821	0.3306	0.1758	0.4384	0.1892	-0.0443	-0.1046	-0.0564	0.3858
X1X3	0.5218	-0.0707	0.5605	-0.0459	0.5139	0.2950	1.0000	0.5010	0.9574	0.2086	-0.0829	0.1534	0.4984	0.5595	0.4868	0.1759
X1X4	0.7989	0.0485	-0.1068	0.3171	-0.1735	0.5821	0.5010	1.0000	0.5246	-0.0853	0.1721	-0.1281	0.0230	-0.1517	-0.0414	0.3438
X1X5	0.6497	-0.0921	0.3793	-0.1617	0.4147	0.3306	0.9574	0.5246	1.0000	0.1255	-0.1428	0.1199	0.2864	0.4027	0.3420	0.0359
X2X3	-0.2065	0.6366	0.5898	0.1715	0.6243	0.1758	0.2086	-0.0853	0.1255	1.0000	0.5275	0.9686	0.6049	0.5760	0.6840	0.0708
X2X4	-0.1536	0.8635	-0.0133	0.6415	-0.0997	0.4384	-0.0829	0.1721	-0.1428	0.5275	1.0000	0.4334	0.2312	-0.0972	0.1634	0.2641
X2X5	-0.1814	0.6348	0.5027	0.0392	0.6082	0.1892	0.1534	-0.1281	0.1199	0.9686	0.4334	1.0000	0.4732	0.5136	0.6142	-0.0277
X3X4	-0.2170	0.1411	0.9247	0.3927	0.7890	-0.0443	0.4984	0.0230	0.2864	0.6049	0.2312	0.4732	1.0000	0.8625	0.9361	0.2550
X3X5	-0.1328	-0.0141	0.9896	-0.1240	0.9593	-0.1046	0.5595	-0.1517	0.4027	0.5760	-0.0972	0.5136	0.8625	1.0000	0.8930	0.0998
X4X5	-0.2107	0.1443	0.9201	0.2436	0.9157	-0.0564	0.4868	-0.0414	0.3420	0.6840	0.1634	0.6142	0.9361	0.8930	1.0000	0.0757
Y	0.1023	0.2009	0.1583	0.2775	-0.0380	0.3858	0.1759	0.3438	0.0359	0.0708	0.2641	-0.0277	0.2550	0.0998	0.0757	1.0000

FORWARD REGRESSION
Pollutant: Total Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	176
Number of Observations Used	69
Number of Observations with Missing Values	107

Forward Selection: Step 1

Variable X1X2 Entered: R-Square = 0.1489 and C(p) = 30.5484

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00003245	0.00003245	11.72	0.0011
Error	67	0.00018555	0.00000277		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00190	0.00024242	0.00016925	61.11	<.0001
X1X2	0.11892	0.03474	0.00003245	11.72	0.0011

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X3X4 Entered: R-Square = 0.2230 and C(p) = 24.2208

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00004862	0.00002431	9.47	0.0002
Error	66	0.00016938	0.00000257		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00132	0.00032792	0.00004138	16.12	0.0002

X1X2	0.12264	0.03348	0.00003445	13.42	0.0005
X3X4	1.025993E-8	4.087156E-9	0.00001617	6.30	0.0145

Bounds on condition number: 1.002, 4.0079

Forward Selection: Step 3

Variable X4X5 Entered: R-Square = 0.4230 and C(p) = 3.7685

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00009222	0.00003074	15.89	<.0001
Error	65	0.00012578	0.00000194		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00198	0.00031689	0.00007531	38.92	<.0001
X1X2	0.11677	0.02909	0.00003117	16.11	0.0002
X3X4	5.507558E-8	1.008616E-8	0.00005770	29.82	<.0001
X4X5	-0.00001540	0.00000324	0.00004360	22.53	<.0001

Bounds on condition number: 8.1025, 51.597

Forward Selection: Step 4

Variable X1X5 Entered: R-Square = 0.4302 and C(p) = 4.9679

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00009378	0.00002344	12.08	<.0001
Error	64	0.00012422	0.00000194		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00197	0.00031757	0.00007446	38.36	<.0001
X1X2	0.12740	0.03147	0.00003182	16.39	0.0001
X1X5	-0.00290	0.00324	0.00000155	0.80	0.3741
X3X4	5.398343E-8	1.017508E-8	0.00005463	28.15	<.0001
X4X5	-0.00001464	0.00000336	0.00003693	19.03	<.0001

Bounds on condition number: 8.6499, 77.463

Forward Selection: Step 5

Variable X1X3 Entered: R-Square = 0.4721 and C(p) = 2.2606

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00010292	0.00002058	11.27	<.0001
Error	63	0.00011508	0.00000183		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00236	0.00035535	0.00008078	44.22	<.0001
X1X2	0.13018	0.03055	0.00003317	18.16	<.0001
X1X3	0.00023327	0.00010428	0.00000914	5.00	0.0288
X1X5	-0.05607	0.02397	0.00000999	5.47	0.0225
X3X4	1.03368E-8	2.186578E-8	4.082315E-7	0.22	0.6380
X4X5	-0.00000554	0.00000521	0.00000206	1.13	0.2919

Bounds on condition number: 89.808, 1154.2

Forward Selection: Step 6

Variable X1X4 Entered: R-Square = 0.4891 and C(p) = 2.3581

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00010662	0.00001777	9.89	<.0001
Error	62	0.00011139	0.00000180		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00211	0.00039561	0.00005088	28.32	<.0001
X1X2	0.10612	0.03464	0.00001686	9.39	0.0032
X1X3	0.00025172	0.00010421	0.00001048	5.83	0.0187
X1X4	0.00239	0.00167	0.00000369	2.06	0.1566
X1X5	-0.06296	0.02426	0.00001210	6.74	0.0118
X3X4	2.562069E-9	2.235221E-8	2.360387E-8	0.01	0.9091
X4X5	-0.00000310	0.00000544	5.849443E-7	0.33	0.5703

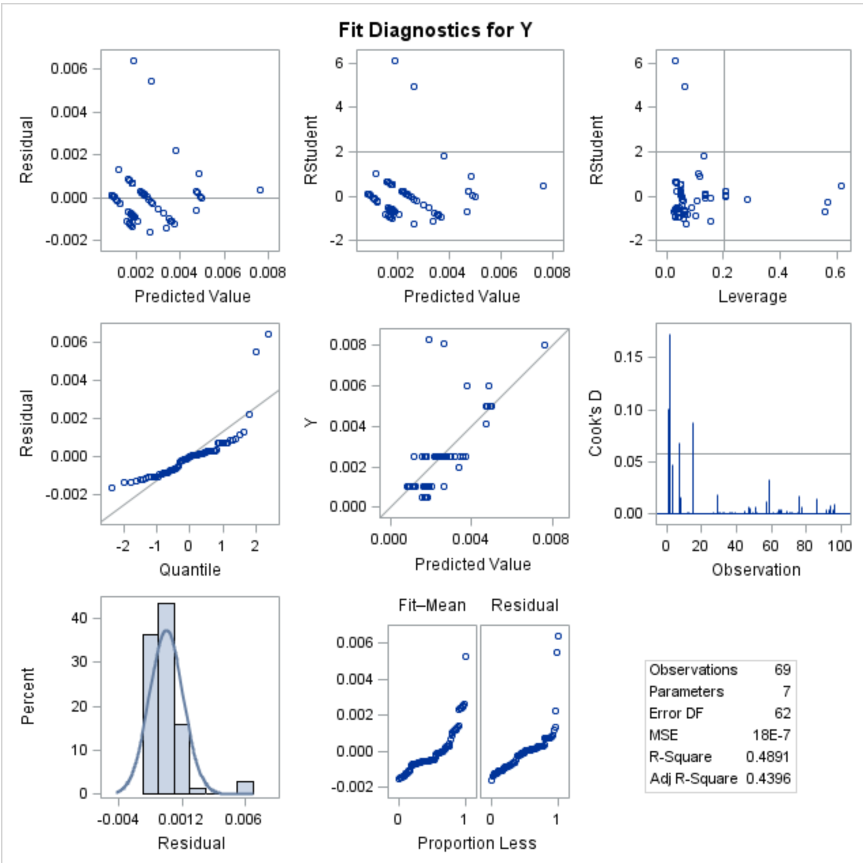
Bounds on condition number: 91.198, 1456.9

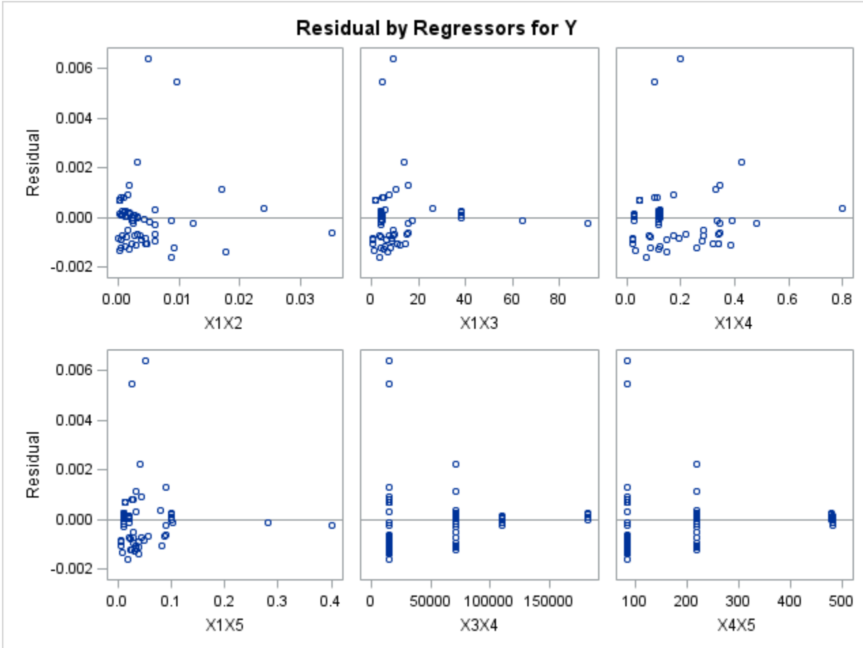
No other variable met the 0.5000 significance level for entry into the model.

Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1X2	1	0.1489	0.1489	30.5484	11.72	0.0011
2	X3X4	2	0.0742	0.2230	24.2208	6.30	0.0145
3	X4X5	3	0.2000	0.4230	3.7685	22.53	<.0001
4	X1X5	4	0.0071	0.4302	4.9679	0.80	0.3741
5	X1X3	5	0.0419	0.4721	2.2606	5.00	0.0288
6	X1X4	6	0.0169	0.4891	2.3581	2.06	0.1566

FORWARD REGRESSION
Pollutant: Total Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
0.006
0.004
0.002
0.000
-0.002
0.00 0.01 0.02 0.03
X1X2
0 20 40 60 80
X1X3
0.0 0.2 0.4 0.6 0.8
X1X4
0.0 0.1 0.2 0.3 0.4
X1X5
0 50000 100000 150000
X3X4
100 200 300 400 500
X4X5

BACKWARD REGRESSION
Pollutant: Total Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	176
Number of Observations Used	69
Number of Observations with Missing Values	107

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1192	-0.1572	-0.1917	-0.1348	0.5042	0.5218	0.7989	0.6497	-0.2065	-0.1536	-0.1814	-0.2170	-0.1328	-0.2107	0.1023
X2	-0.1192	1.0000	0.0227	0.3194	0.0144	0.5620	-0.0707	0.0485	-0.0921	0.6366	0.8635	0.6348	0.1411	-0.0141	0.1443	0.2009
X3	-0.1572	0.0227	1.0000	0.0130	0.9300	-0.0915	0.5605	-0.1068	0.3793	0.5898	-0.0133	0.5027	0.9247	0.9896	0.9201	0.1583
X4	-0.1917	0.3194	0.0130	1.0000	-0.1667	0.1048	-0.0459	0.3171	-0.1617	0.1715	0.6415	0.0392	0.3927	-0.1240	0.2436	0.2775
X5	-0.1348	0.0144	0.9300	-0.1667	1.0000	-0.1008	0.5139	-0.1735	0.4147	0.6243	-0.0997	0.6082	0.7890	0.9593	0.9157	-0.0380
X1X2	0.5042	0.5620	-0.0915	0.1048	-0.1008	1.0000	0.2950	0.5821	0.3306	0.1758	0.4384	0.1892	-0.0443	-0.1046	-0.0564	0.3858
X1X3	0.5218	-0.0707	0.5605	-0.0459	0.5139	0.2950	1.0000	0.5010	0.9574	0.2086	-0.0829	0.1534	0.4984	0.5595	0.4868	0.1759
X1X4	0.7989	0.0485	-0.1068	0.3171	-0.1735	0.5821	0.5010	1.0000	0.5246	-0.0853	0.1721	-0.1281	0.0230	-0.1517	-0.0414	0.3438
X1X5	0.6497	-0.0921	0.3793	-0.1617	0.4147	0.3306	0.9574	0.5246	1.0000	0.1255	-0.1428	0.1199	0.2864	0.4027	0.3420	0.0359
X2X3	-0.2065	0.6366	0.5898	0.1715	0.6243	0.1758	0.2086	-0.0853	0.1255	1.0000	0.5275	0.9686	0.6049	0.5760	0.6840	0.0708
X2X4	-0.1536	0.8635	-0.0133	0.6415	-0.0997	0.4384	-0.0829	0.1721	-0.1428	0.5275	1.0000	0.4334	0.2312	-0.0972	0.1634	0.2641
X2X5	-0.1814	0.6348	0.5027	0.0392	0.6082	0.1892	0.1534	-0.1281	0.1199	0.9686	0.4334	1.0000	0.4732	0.5136	0.6142	-0.0277
X3X4	-0.2170	0.1411	0.9247	0.3927	0.7890	-0.0443	0.4984	0.0230	0.2864	0.6049	0.2312	0.4732	1.0000	0.8625	0.9361	0.2550
X3X5	-0.1328	-0.0141	0.9896	-0.1240	0.9593	-0.1046	0.5595	-0.1517	0.4027	0.5760	-0.0972	0.5136	0.8625	1.0000	0.8930	0.0998
X4X5	-0.2107	0.1443	0.9201	0.2436	0.9157	-0.0564	0.4868	-0.0414	0.3420	0.6840	0.1634	0.6142	0.9361	0.8930	1.0000	0.0757
Y	0.1023	0.2009	0.1583	0.2775	-0.0380	0.3858	0.1759	0.3438	0.0359	0.0708	0.2641	-0.0277	0.2550	0.0998	0.0757	1.0000

BACKWARD REGRESSION
Pollutant: Total Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	176
Number of Observations Used	69
Number of Observations with Missing Values	107

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.4922 and C(p) = 12.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	0.00010731	0.00000976	5.02	<.0001
Error	57	0.00011069	0.00000194		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00347	0.00106	0.00002094	10.78	0.0018
X1	-0.18120	0.08420	0.00000899	4.63	0.0356
X2	-0.00027028	0.00133	8.038897E-8	0.04	0.8395
X3	0.00000153	5.682502E-7	0.00001400	7.21	0.0095
X4	-0.00005125	0.00003157	0.00000512	2.64	0.1100
X5	-0.00040827	0.00016750	0.00001154	5.94	0.0179
X1X2	0.11245	0.05746	0.00000744	3.83	0.0552
X1X3	-0.00002223	0.00002155	0.00000207	1.06	0.3066
X1X4	0.00891	0.00362	0.00001176	6.05	0.0169
X2X3	-1.48991E-7	0.00000116	3.214521E-8	0.02	0.8981
X2X4	0.00000751	0.00003539	8.757771E-8	0.05	0.8326
X2X5	0.00003303	0.00029173	2.489911E-8	0.01	0.9102

Bounds on condition number: 158.52, 5228.4

Backward Elimination: Step 1

Variable X2X5 Removed: R-Square = 0.4921 and C(p) = 10.0128

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	10	0.00010729	0.00001073	5.62	<.0001
Error	58	0.00011072	0.00000191		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00342	0.00093661	0.00002546	13.34	0.0006
X1	-0.18112	0.08348	0.00000899	4.71	0.0341
X2	-0.00015265	0.00082090	6.600801E-8	0.03	0.8531
X3	0.00000147	2.997114E-7	0.00004599	24.09	<.0001
X4	-0.00004997	0.00002920	0.00000559	2.93	0.0924
X5	-0.00039306	0.00009911	0.00003003	15.73	0.0002
X1X2	0.11160	0.05648	0.00000745	3.90	0.0529
X1X3	-0.00002240	0.00002131	0.00000211	1.11	0.2974
X1X4	0.00893	0.00358	0.00001187	6.22	0.0155
X2X3	-2.03397E-8	2.220709E-7	1.601358E-8	0.01	0.9273
X2X4	0.00000421	0.00001984	8.597598E-8	0.05	0.8327

Bounds on condition number: 12.862, 806.2

Backward Elimination: Step 2

Variable X2X3 Removed: R-Square = 0.4921 and C(p) = 8.0211

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	9	0.00010727	0.00001192	6.35	<.0001
Error	59	0.00011073	0.00000188		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00345	0.00087782	0.00002896	15.43	0.0002
X1	-0.18126	0.08276	0.00000900	4.80	0.0325
X2	-0.00018835	0.00071635	1.297566E-7	0.07	0.7935
X3	0.00000147	2.97179E-7	0.00004599	24.50	<.0001
X4	-0.00004986	0.00002893	0.00000557	2.97	0.0900
X5	-0.00039716	0.00008763	0.00003855	20.54	<.0001
X1X2	0.11328	0.05298	0.00000858	4.57	0.0367
X1X3	-0.00002211	0.00002089	0.00000210	1.12	0.2941
X1X4	0.00888	0.00351	0.00001201	6.40	0.0141
X2X4	0.00000405	0.00001959	8.018739E-8	0.04	0.8370

Bounds on condition number: 11.247, 621.37

Backward Elimination: Step 3

Variable X2X4 Removed: R-Square = 0.4917 and C(p) = 6.0624

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	0.00010719	0.00001340	7.25	<.0001
Error	60	0.00011081	0.00000185		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00337	0.00079285	0.00003343	18.10	<.0001
X1	-0.18101	0.08209	0.00000898	4.86	0.0313
X2	-0.00006351	0.00038208	5.102881E-8	0.03	0.8685
X3	0.00000147	2.944721E-7	0.00004627	25.05	<.0001
X4	-0.00004677	0.00002458	0.00000669	3.62	0.0619
X5	-0.00039907	0.00008644	0.00003936	21.31	<.0001
X1X2	0.11176	0.05205	0.00000851	4.61	0.0358
X1X3	-0.00002197	0.00002071	0.00000208	1.13	0.2931
X1X4	0.00890	0.00348	0.00001208	6.54	0.0131

Bounds on condition number: 11.222, 410.79

Backward Elimination: Step 4

Variable X2 Removed: R-Square = 0.4915 and C(p) = 4.0886

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	0.00010714	0.00001531	8.42	<.0001
Error	61	0.00011086	0.00000182		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00338	0.00078599	0.00003357	18.47	<.0001
X1	-0.18113	0.08143	0.00000899	4.95	0.0298
X3	0.00000148	2.903224E-7	0.00004719	25.96	<.0001
X4	-0.00004829	0.00002265	0.00000826	4.55	0.0370
X5	-0.00040167	0.00008434	0.00004122	22.68	<.0001
X1X2	0.10537	0.03486	0.00001660	9.13	0.0037
X1X3	-0.00002165	0.00002046	0.00000204	1.12	0.2940
X1X4	0.00906	0.00333	0.00001347	7.41	0.0084

Bounds on condition number: 11.085, 317.21

Backward Elimination: Step 5

Variable X1X3 Removed: R-Square = 0.4821 and C(p) = 3.1370

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	6	0.00010510	0.00001752	9.62	<.0001
Error	62	0.00011290	0.00000182		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00355	0.00077000	0.00003868	21.24	<.0001
X1	-0.20234	0.07900	0.00001195	6.56	0.0129
X3	0.00000136	2.685292E-7	0.00004684	25.72	<.0001
X4	-0.00004615	0.00002258	0.00000761	4.18	0.0452
X5	-0.00039987	0.00008440	0.00004087	22.44	<.0001
X1X2	0.10519	0.03490	0.00001654	9.09	0.0037
X1X4	0.00838	0.00327	0.00001198	6.58	0.0128

Bounds on condition number: 9.7794, 236.48

Backward Elimination: Step 6

Variable X1X5 Entered: R-Square = 0.4915 and C(p) = 4.0886

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	7	0.00010714	0.00001531	8.42	<.0001
Error	61	0.00011086	0.00000182		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00330	0.00080488	0.00003052	16.79	0.0001
X1	-0.16515	0.08639	0.00000664	3.65	0.0606
X3	0.00000137	2.684108E-7	0.00004742	26.09	<.0001
X4	-0.00004560	0.00002256	0.00000742	4.09	0.0477
X5	-0.00037608	0.00008727	0.00003375	18.57	<.0001
X1X2	0.10537	0.03486	0.00001660	9.13	0.0037
X1X4	0.00852	0.00327	0.00001236	6.80	0.0114
X1X5	-0.00512	0.00484	0.00000204	1.12	0.2940

Bounds on condition number: 10.474, 313.08

Backward Elimination: Step 7

Variable X1X5 Removed: R-Square = 0.4821 and C(p) = 3.1370

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00010510	0.00001752	9.62	<.0001
Error	62	0.00011290	0.00000182		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00355	0.00077000	0.00003868	21.24	<.0001
X1	-0.20234	0.07900	0.00001195	6.56	0.0129
X3	0.00000136	2.685292E-7	0.00004684	25.72	<.0001
X4	-0.00004615	0.00002258	0.00000761	4.18	0.0452
X5	-0.00039987	0.00008440	0.00004087	22.44	<.0001
X1X2	0.10519	0.03490	0.00001654	9.09	0.0037
X1X4	0.00838	0.00327	0.00001198	6.58	0.0128

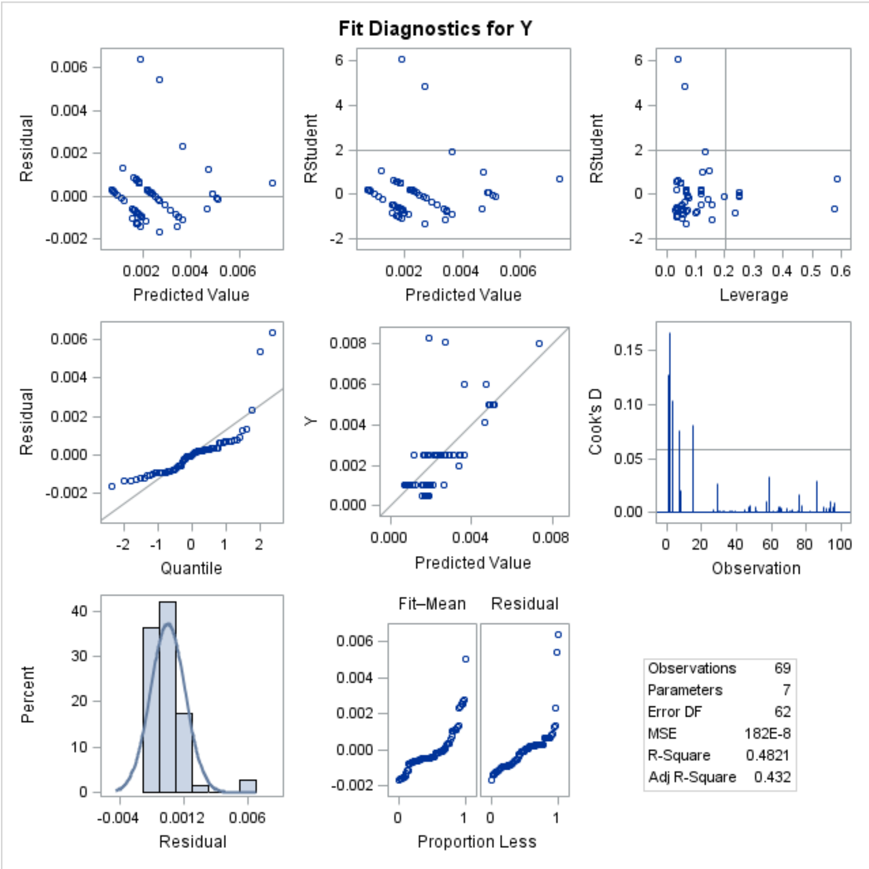
Bounds on condition number: 9.7794, 236.48

All variables left in the model are significant at the 0.1000 level.

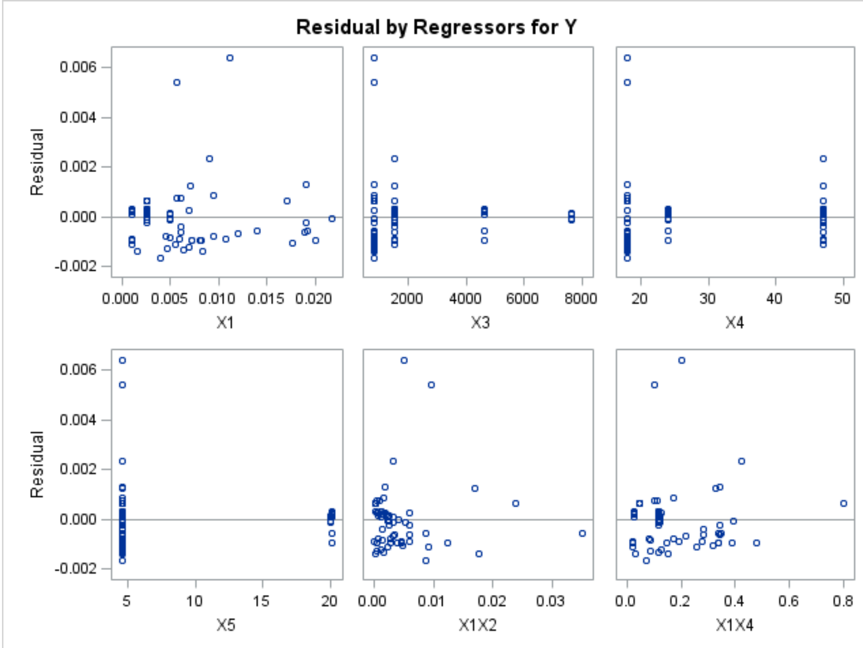
Summary of Backward Elimination								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1		X2X5	10	0.0001	0.4921	10.0128	0.01	0.9102
2		X2X3	9	0.0001	0.4921	8.0211	0.01	0.9273
3		X2X4	8	0.0004	0.4917	6.0624	0.04	0.8370
4		X2	7	0.0002	0.4915	4.0886	0.03	0.8685
5		X1X3	6	0.0093	0.4821	3.1370	1.12	0.2940
6	X1X5		7	0.0093	0.4915	4.0886	1.12	0.2940
7		X1X5	6	0.0093	0.4821	3.1370	1.12	0.2940

BACKWARD REGRESSION
Pollutant: Total Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Observations	69
Parameters	7
Error DF	62
MSE	182E-8
R-Square	0.4821
Adj R-Square	0.432


Residual by Regressors for Y
Residual
0.006
0.004
0.002
0.000
-0.002
0.000 0.005 0.010 0.015 0.020
X1
2000 4000 6000 8000
X3
20 30 40 50
X4
5 10 15 20
X5
0.00 0.01 0.02 0.03
X1X2
0.0 0.2 0.4 0.6 0.8
X1X4

STEPWISE REGRESSION
Pollutant: Total Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	176
Number of Observations Used	69
Number of Observations with Missing Values	107

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1192	-0.1572	-0.1917	-0.1348	0.5042	0.5218	0.7989	0.6497	-0.2065	-0.1536	-0.1814	-0.2170	-0.1328	-0.2107	0.1023
X2	-0.1192	1.0000	0.0227	0.3194	0.0144	0.5620	-0.0707	0.0485	-0.0921	0.6366	0.8635	0.6348	0.1411	-0.0141	0.1443	0.2009
X3	-0.1572	0.0227	1.0000	0.0130	0.9300	-0.0915	0.5605	-0.1068	0.3793	0.5898	-0.0133	0.5027	0.9247	0.9896	0.9201	0.1583
X4	-0.1917	0.3194	0.0130	1.0000	-0.1667	0.1048	-0.0459	0.3171	-0.1617	0.1715	0.6415	0.0392	0.3927	-0.1240	0.2436	0.2775
X5	-0.1348	0.0144	0.9300	-0.1667	1.0000	-0.1008	0.5139	-0.1735	0.4147	0.6243	-0.0997	0.6082	0.7890	0.9593	0.9157	-0.0380
X1X2	0.5042	0.5620	-0.0915	0.1048	-0.1008	1.0000	0.2950	0.5821	0.3306	0.1758	0.4384	0.1892	-0.0443	-0.1046	-0.0564	0.3858
X1X3	0.5218	-0.0707	0.5605	-0.0459	0.5139	0.2950	1.0000	0.5010	0.9574	0.2086	-0.0829	0.1534	0.4984	0.5595	0.4868	0.1759
X1X4	0.7989	0.0485	-0.1068	0.3171	-0.1735	0.5821	0.5010	1.0000	0.5246	-0.0853	0.1721	-0.1281	0.0230	-0.1517	-0.0414	0.3438
X1X5	0.6497	-0.0921	0.3793	-0.1617	0.4147	0.3306	0.9574	0.5246	1.0000	0.1255	-0.1428	0.1199	0.2864	0.4027	0.3420	0.0359
X2X3	-0.2065	0.6366	0.5898	0.1715	0.6243	0.1758	0.2086	-0.0853	0.1255	1.0000	0.5275	0.9686	0.6049	0.5760	0.6840	0.0708
X2X4	-0.1536	0.8635	-0.0133	0.6415	-0.0997	0.4384	-0.0829	0.1721	-0.1428	0.5275	1.0000	0.4334	0.2312	-0.0972	0.1634	0.2641
X2X5	-0.1814	0.6348	0.5027	0.0392	0.6082	0.1892	0.1534	-0.1281	0.1199	0.9686	0.4334	1.0000	0.4732	0.5136	0.6142	-0.0277
X3X4	-0.2170	0.1411	0.9247	0.3927	0.7890	-0.0443	0.4984	0.0230	0.2864	0.6049	0.2312	0.4732	1.0000	0.8625	0.9361	0.2550
X3X5	-0.1328	-0.0141	0.9896	-0.1240	0.9593	-0.1046	0.5595	-0.1517	0.4027	0.5760	-0.0972	0.5136	0.8625	1.0000	0.8930	0.0998
X4X5	-0.2107	0.1443	0.9201	0.2436	0.9157	-0.0564	0.4868	-0.0414	0.3420	0.6840	0.1634	0.6142	0.9361	0.8930	1.0000	0.0757
Y	0.1023	0.2009	0.1583	0.2775	-0.0380	0.3858	0.1759	0.3438	0.0359	0.0708	0.2641	-0.0277	0.2550	0.0998	0.0757	1.0000

STEPWISE REGRESSION
Pollutant: Total Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	176
Number of Observations Used	69
Number of Observations with Missing Values	107

Stepwise Selection: Step 1

Variable X1X2 Entered: R-Square = 0.1489 and C(p) = 30.5484

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00003245	0.00003245	11.72	0.0011
Error	67	0.00018555	0.00000277		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00190	0.00024242	0.00016925	61.11	<.0001
X1X2	0.11892	0.03474	0.00003245	11.72	0.0011

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X3X4 Entered: R-Square = 0.2230 and C(p) = 24.2208

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00004862	0.00002431	9.47	0.0002
Error	66	0.00016938	0.00000257		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00132	0.00032792	0.00004138	16.12	0.0002

X1X2	0.12264	0.03348	0.00003445	13.42	0.0005
X3X4	1.025993E-8	4.087156E-9	0.00001617	6.30	0.0145

Bounds on condition number: 1.002, 4.0079

Stepwise Selection: Step 3

Variable X4X5 Entered: R-Square = 0.4230 and C(p) = 3.7685

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	0.00009222	0.00003074	15.89	<.0001
Error	65	0.00012578	0.00000194		
Corrected Total	68	0.00021800			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00198	0.00031689	0.00007531	38.92	<.0001
X1X2	0.11677	0.02909	0.00003117	16.11	0.0002
X3X4	5.507558E-8	1.008616E-8	0.00005770	29.82	<.0001
X4X5	-0.00001540	0.00000324	0.00004360	22.53	<.0001

Bounds on condition number: 8.1025, 51.597

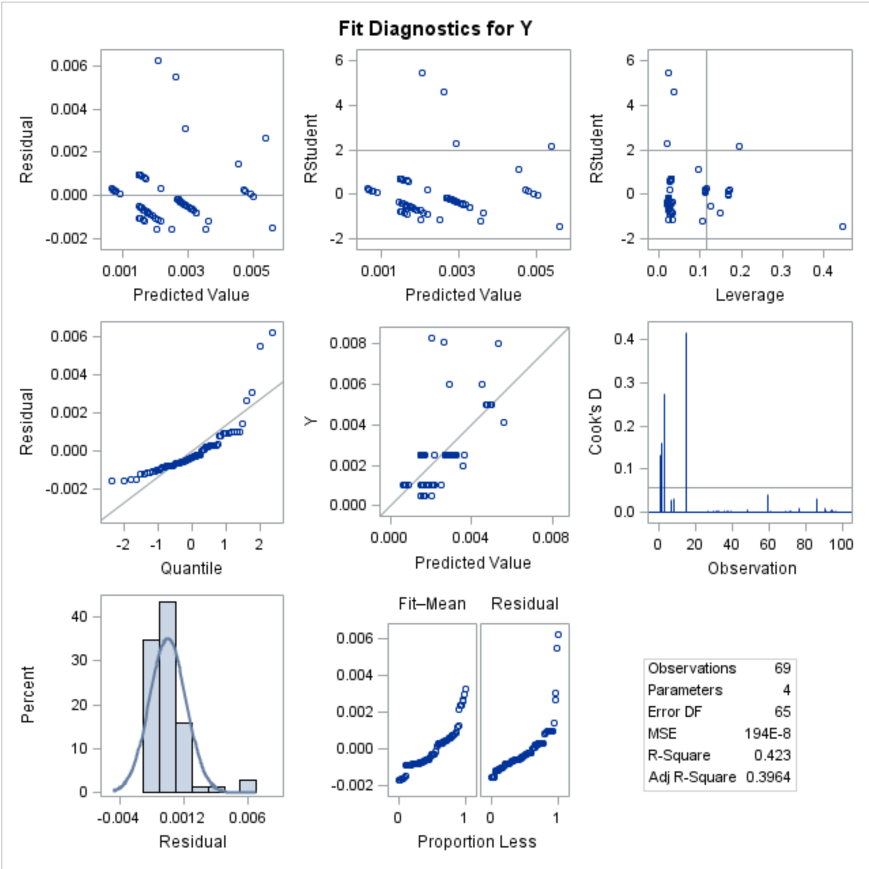
All variables left in the model are significant at the 0.1500 level.

No other variable met the 0.1500 significance level for entry into the model.

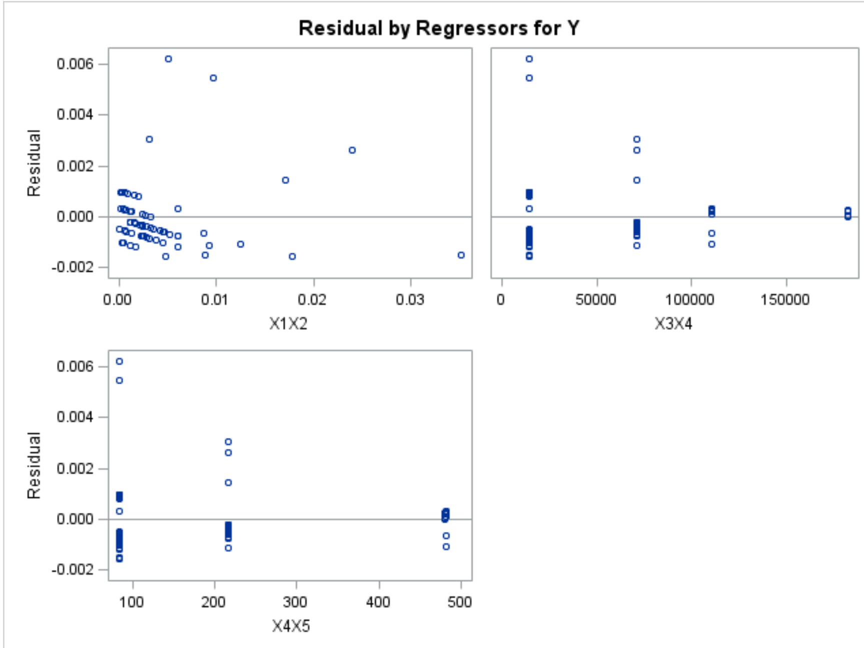
Summary of Stepwise Selection								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	X1X2		1	0.1489	0.1489	30.5484	11.72	0.0011
2	X3X4		2	0.0742	0.2230	24.2208	6.30	0.0145
3	X4X5		3	0.2000	0.4230	3.7685	22.53	<.0001

STEPWISE REGRESSION
Pollutant: Total Lead
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Observations	69
Parameters	4
Error DF	65
MSE	194E-8
R-Square	0.423
Adj R-Square	0.3964


Residual by Regressors for Y
Residual
0.006
0.004
0.002
0.000
-0.002
0.00
0.01
0.02
0.03
X1X2
0
50000
100000
150000
X3X4
100
200
300
400
500
X4X5

===

MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Nickel

===

The REG Procedure

Number of Observations Read	176
Number of Observations Used	69
Number of Observations with Missing Values	107

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1192	-0.1572	-0.1917	-0.1348	0.5042	0.5218	0.7989	0.6497	-0.2065	-0.1536	-0.1814	-0.2170	-0.1328	-0.2107	0.1023
X2	-0.1192	1.0000	0.0227	0.3194	0.0144	0.5620	-0.0707	0.0485	-0.0921	0.6366	0.8635	0.6348	0.1411	-0.0141	0.1443	0.2009
X3	-0.1572	0.0227	1.0000	0.0130	0.9300	-0.0915	0.5605	-0.1068	0.3793	0.5898	-0.0133	0.5027	0.9247	0.9896	0.9201	0.1583
X4	-0.1917	0.3194	0.0130	1.0000	-0.1667	0.1048	-0.0459	0.3171	-0.1617	0.1715	0.6415	0.0392	0.3927	-0.1240	0.2436	0.2775
X5	-0.1348	0.0144	0.9300	-0.1667	1.0000	-0.1008	0.5139	-0.1735	0.4147	0.6243	-0.0997	0.6082	0.7890	0.9593	0.9157	-0.0380
X1X2	0.5042	0.5620	-0.0915	0.1048	-0.1008	1.0000	0.2950	0.5821	0.3306	0.1758	0.4384	0.1892	-0.0443	-0.1046	-0.0564	0.3858
X1X3	0.5218	-0.0707	0.5605	-0.0459	0.5139	0.2950	1.0000	0.5010	0.9574	0.2086	-0.0829	0.1534	0.4984	0.5595	0.4868	0.1759
X1X4	0.7989	0.0485	-0.1068	0.3171	-0.1735	0.5821	0.5010	1.0000	0.5246	-0.0853	0.1721	-0.1281	0.0230	-0.1517	-0.0414	0.3438
X1X5	0.6497	-0.0921	0.3793	-0.1617	0.4147	0.3306	0.9574	0.5246	1.0000	0.1255	-0.1428	0.1199	0.2864	0.4027	0.3420	0.0359
X2X3	-0.2065	0.6366	0.5898	0.1715	0.6243	0.1758	0.2086	-0.0853	0.1255	1.0000	0.5275	0.9686	0.6049	0.5760	0.6840	0.0708
X2X4	-0.1536	0.8635	-0.0133	0.6415	-0.0997	0.4384	-0.0829	0.1721	-0.1428	0.5275	1.0000	0.4334	0.2312	-0.0972	0.1634	0.2641
X2X5	-0.1814	0.6348	0.5027	0.0392	0.6082	0.1892	0.1534	-0.1281	0.1199	0.9686	0.4334	1.0000	0.4732	0.5136	0.6142	-0.0277
X3X4	-0.2170	0.1411	0.9247	0.3927	0.7890	-0.0443	0.4984	0.0230	0.2864	0.6049	0.2312	0.4732	1.0000	0.8625	0.9361	0.2550
X3X5	-0.1328	-0.0141	0.9896	-0.1240	0.9593	-0.1046	0.5595	-0.1517	0.4027	0.5760	-0.0972	0.5136	0.8625	1.0000	0.8930	0.0998
X4X5	-0.2107	0.1443	0.9201	0.2436	0.9157	-0.0564	0.4868	-0.0414	0.3420	0.6840	0.1634	0.6142	0.9361	0.8930	1.0000	0.0757
Y	0.1023	0.2009	0.1583	0.2775	-0.0380	0.3858	0.1759	0.3438	0.0359	0.0708	0.2641	-0.0277	0.2550	0.0998	0.0757	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Nickel

==

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	176
Number of Observations Used	69
Number of Observations with Missing Values	107

Number in Model	R-Square	Variables in Model
1	0.1489	X1X2
1	0.1182	X1X4
1	0.0770	X4
1	0.0697	X2X4
1	0.0650	X3X4
1	0.0404	X2
1	0.0309	X1X3
1	0.0251	X3
1	0.0105	X1
1	0.0100	X3X5
1	0.0057	X4X5
1	0.0050	X2X3
1	0.0014	X5
1	0.0013	X1X5
1	0.0008	X2X5
2	0.2801	X3X4 X4X5
2	0.2413	X1X3 X1X5
2	0.2343	X5 X3X5
2	0.2230	X1X2 X3X4
2	0.2167	X5 X3X4
2	0.2057	X4 X1X2
2	0.2003	X1 X1X4
2	0.1867	X3 X1X2
2	0.1806	X3 X3X5
2	0.1793	X1X4 X3X4
2	0.1703	X1X2 X1X4
2	0.1687	X1X2 X3X5
2	0.1615	X1X4 X2X4
2	0.1603	X1 X1X2
2	0.1600	X1X2 X2X4
3	0.4316	X1X2 X1X3 X1X5
3	0.4241	X3 X5 X1X2
3	0.4230	X1X2 X3X4 X4X5
3	0.3924	X5 X1X2 X3X5
3	0.3889	X1X3 X1X4 X1X5
3	0.3767	X1 X1X3 X1X5

3	0.3499	X3 X5 X1X4
3	0.3472	X1X4 X3X4 X4X5
3	0.3447	X5 X1X2 X3X4
3	0.3362	X5 X1X3 X1X5
3	0.3349	X5 X1X4 X3X5
3	0.3338	X1X3 X1X5 X3X5
3	0.3338	X3 X1X3 X1X5
3	0.3234	X1X2 X2X3 X2X5
3	0.3151	X1X3 X1X5 X4X5
4	0.4739	X1 X1X2 X1X3 X1X5
4	0.4704	X5 X1X2 X1X3 X1X5
4	0.4702	X1X2 X1X3 X1X5 X4X5
4	0.4671	X3 X1X2 X1X3 X1X5
4	0.4669	X1X2 X1X3 X1X4 X1X5
4	0.4649	X1X2 X1X3 X1X5 X3X5
4	0.4629	X1X2 X1X3 X1X5 X2X5
4	0.4626	X1X2 X1X3 X1X5 X3X4
4	0.4600	X1X2 X1X3 X1X5 X2X3
4	0.4494	X2 X1X2 X1X3 X1X5
4	0.4359	X1X2 X1X3 X1X5 X2X4
4	0.4338	X3 X5 X1X2 X1X5
4	0.4318	X4 X1X2 X1X3 X1X5
4	0.4302	X1X2 X1X5 X3X4 X4X5
4	0.4294	X3 X5 X1X2 X1X3
5	0.4907	X1 X3 X1X2 X1X3 X1X5
5	0.4893	X1 X1X2 X1X3 X1X5 X3X5
5	0.4889	X1X2 X1X3 X1X4 X1X5 X4X5
5	0.4889	X1 X5 X1X2 X1X3 X1X5
5	0.4878	X1 X1X2 X1X3 X1X5 X4X5
5	0.4875	X1 X1X2 X1X3 X1X5 X3X4
5	0.4864	X1X2 X1X3 X1X4 X1X5 X3X4
5	0.4833	X1 X1X2 X1X3 X1X5 X2X5
5	0.4828	X1 X1X2 X1X3 X1X5 X2X3
5	0.4808	X5 X1X2 X1X3 X1X4 X1X5
5	0.4802	X1X2 X1X3 X1X4 X1X5 X2X5
5	0.4798	X1X2 X1X3 X1X4 X1X5 X2X3
5	0.4783	X3 X1X2 X1X3 X1X4 X1X5
5	0.4771	X2 X5 X1X2 X1X3 X1X5
5	0.4767	X1 X1X2 X1X3 X1X4 X1X5
6	0.4914	X1 X1X2 X1X3 X1X4 X1X5 X4X5
6	0.4913	X3 X1X2 X1X3 X1X4 X1X5 X4X5
6	0.4913	X1 X3 X1X2 X1X3 X1X5 X3X5
6	0.4913	X1 X2 X3 X1X2 X1X3 X1X5
6	0.4912	X1 X4 X1X2 X1X3 X1X5 X3X4
6	0.4912	X1 X3 X1X2 X1X3 X1X5 X3X4
6	0.4912	X1 X3 X4 X1X2 X1X3 X1X5
6	0.4911	X1 X1X2 X1X3 X1X5 X3X4 X3X5
6	0.4911	X1 X3 X5 X1X2 X1X3 X1X5
6	0.4911	X1 X3 X1X2 X1X3 X1X5 X2X3
6	0.4911	X1 X3 X1X2 X1X3 X1X5 X2X5
6	0.4910	X1 X3 X1X2 X1X3 X1X5 X2X4
6		

	0.4910	X1 X4 X1X2 X1X3 X1X5 X3X5
6	0.4910	X1X2 X1X3 X1X4 X1X5 X3X5 X4X5
6	0.4909	X1 X3 X1X2 X1X3 X1X5 X4X5
7	0.4917	X3 X1X2 X1X3 X1X4 X1X5 X2X5 X4X5
7	0.4917	X1 X1X2 X1X3 X1X4 X1X5 X2X5 X4X5
7	0.4917	X1 X2 X1X2 X1X3 X1X4 X1X5 X4X5
7	0.4917	X1 X1X2 X1X3 X1X4 X1X5 X2X3 X4X5
7	0.4916	X1 X3 X5 X1X2 X1X3 X1X5 X2X5
7	0.4916	X3 X1X2 X1X3 X1X4 X1X5 X2X3 X4X5
7	0.4916	X1 X2 X3 X1X2 X1X3 X1X5 X3X5
7	0.4916	X1 X3 X5 X1X2 X1X3 X1X5 X2X3
7	0.4916	X1 X3 X1X2 X1X3 X1X5 X2X5 X3X5
7	0.4916	X1 X2 X4 X1X2 X1X3 X1X5 X3X4
7	0.4915	X1 X3 X1X2 X1X3 X1X5 X2X3 X3X5
7	0.4915	X1 X2 X3 X1X2 X1X3 X1X5 X3X4
7	0.4915	X1 X2 X3 X4 X1X2 X1X3 X1X5
7	0.4915	X1 X2 X3 X5 X1X2 X1X3 X1X5
7	0.4915	X2 X3 X1X2 X1X3 X1X4 X1X5 X4X5
8	0.4920	X2 X3 X1X2 X1X3 X1X4 X1X5 X2X4 X4X5
8	0.4920	X1 X2 X3 X1X2 X1X3 X1X5 X2X4 X3X5
8	0.4919	X1 X2 X4 X1X2 X1X3 X1X5 X2X4 X3X4
8	0.4919	X1 X2 X1X2 X1X3 X1X4 X1X5 X2X4 X4X5
8	0.4919	X1 X2 X3 X1X2 X1X3 X1X5 X2X4 X3X4
8	0.4919	X1 X2 X3 X4 X1X2 X1X3 X1X5 X2X4
8	0.4919	X1 X2 X1X2 X1X3 X1X4 X1X5 X2X4 X3X4
8	0.4919	X2 X1X2 X1X3 X1X4 X1X5 X2X4 X3X5 X4X5
8	0.4918	X1 X2 X1X2 X1X3 X1X5 X2X4 X3X4 X3X5
8	0.4918	X3 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X4X5
8	0.4918	X1 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4
8	0.4918	X3 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X4X5
8	0.4918	X1 X3 X4 X5 X1X2 X1X3 X1X4 X2X5
8	0.4918	X1 X3 X5 X1X2 X1X4 X1X5 X2X5 X3X4
8	0.4918	X1 X5 X1X2 X1X3 X1X4 X2X5 X3X4 X4X5
9	0.4921	X2 X3 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X4X5
9	0.4921	X2 X3 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X4X5
9	0.4921	X1 X2 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4
9	0.4921	X1 X2 X3 X1X2 X1X3 X1X5 X2X3 X2X4 X3X5
9	0.4921	X1 X2 X3 X4 X1X2 X1X4 X1X5 X2X4 X3X4
9	0.4921	X1 X2 X3 X5 X1X2 X1X4 X1X5 X2X4 X3X4
9	0.4921	X1 X2 X5 X1X2 X1X3 X1X4 X2X4 X3X4 X4X5
9	0.4921	X1 X2 X4 X5 X1X2 X1X4 X1X5 X2X4 X3X4
9	0.4921	X1 X2 X5 X1X2 X1X4 X1X5 X2X4 X3X4 X4X5
9	0.4921	X1 X2 X4 X1X2 X1X4 X1X5 X2X4 X3X4 X3X5
9	0.4921	X1 X2 X4 X1X2 X1X3 X1X4 X2X4 X3X4 X4X5
9	0.4921	X1 X2 X4 X1X2 X1X4 X1X5 X2X4 X3X4 X4X5
9	0.4921	X1 X2 X3 X1X2 X1X3 X1X4 X2X4 X3X4 X4X5
9	0.4921	X1 X2 X3 X1X2 X1X4 X1X5 X2X4 X3X4 X4X5
9	0.4921	X2 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X3X4
10	0.4922	X1 X2 X3 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X5
10	0.4922	X2 X3 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X4X5
10	0.4922	X1 X2 X4 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4
10		

	0.4922	X1 X2 X3 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4
10	0.4922	X1 X2 X3 X4 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5
10	0.4922	X1 X2 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
10	0.4922	X1 X2 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
10	0.4922	X1 X2 X4 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X5
10	0.4921	X1 X2 X3 X4 X1X2 X1X4 X1X5 X2X3 X2X4 X3X4
10	0.4921	X1 X2 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X5
10	0.4921	X1 X2 X3 X4 X1X2 X1X3 X1X4 X2X3 X2X4 X3X4
10	0.4921	X1 X2 X3 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X3X4
10	0.4921	X1 X2 X3 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X3X4
10	0.4921	X1 X2 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X3X4
10	0.4921	X1 X2 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X3X4 X4X5
11	0.4922	X1 X2 X3 X4 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
11	0.4922	X1 X2 X3 X4 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4
11	0.4922	X2 X3 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
11	0.4922	X1 X2 X3 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4
11	0.4922	X1 X2 X3 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
11	0.4922	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5
11	0.4922	X1 X2 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X4X5
11	0.4922	X1 X2 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4
11	0.4922	X1 X2 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4
11	0.4922	X1 X2 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
11	0.4922	X2 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
11	0.4922	X1 X2 X4 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X4X5
11	0.4922	X1 X2 X4 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
11	0.4922	X1 X2 X4 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
11	0.4922	X1 X2 X4 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Nickel

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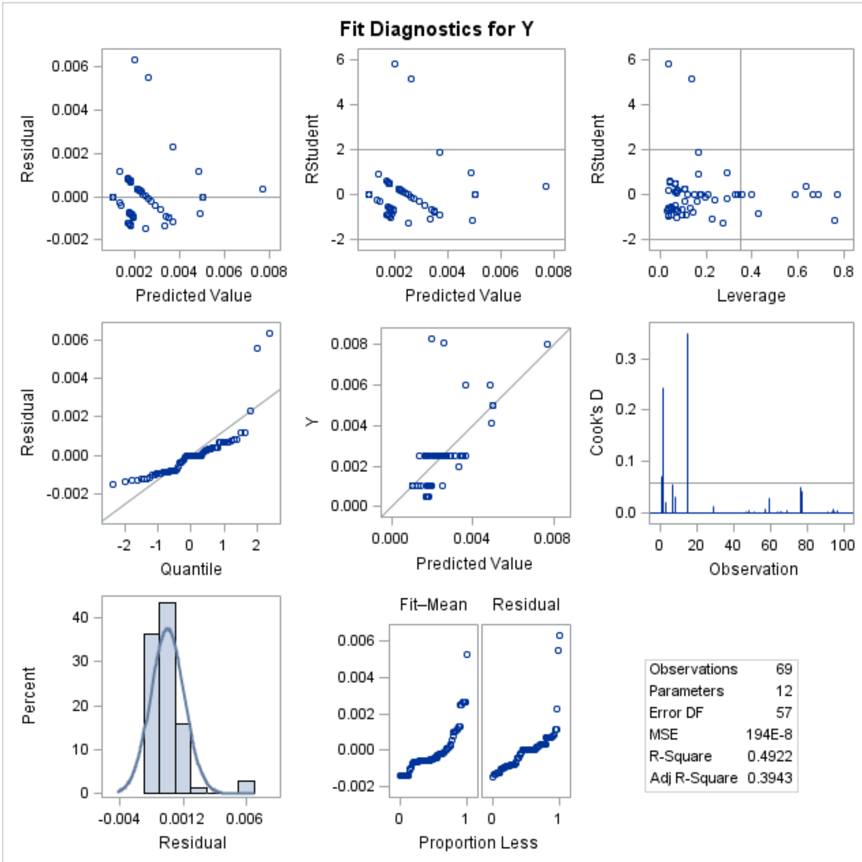
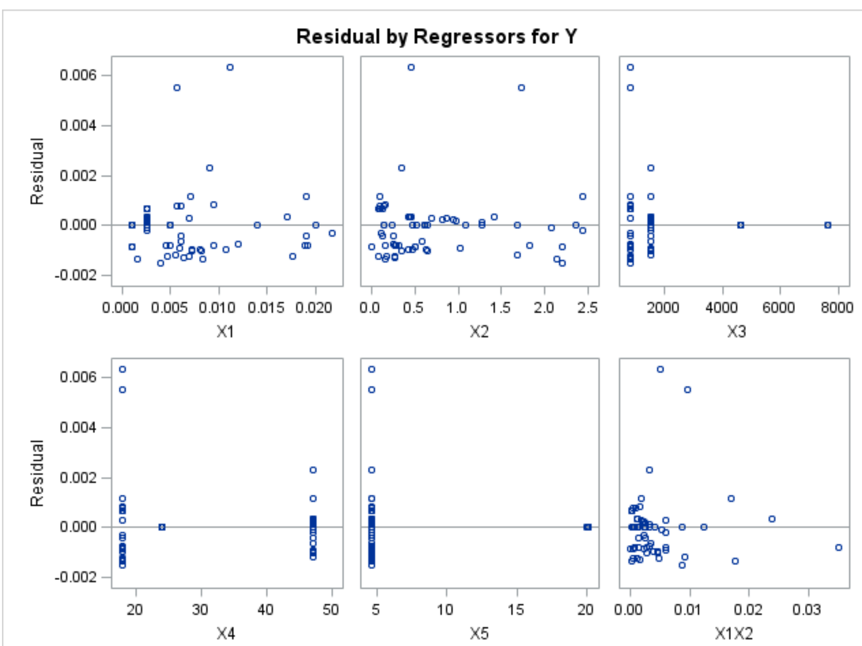
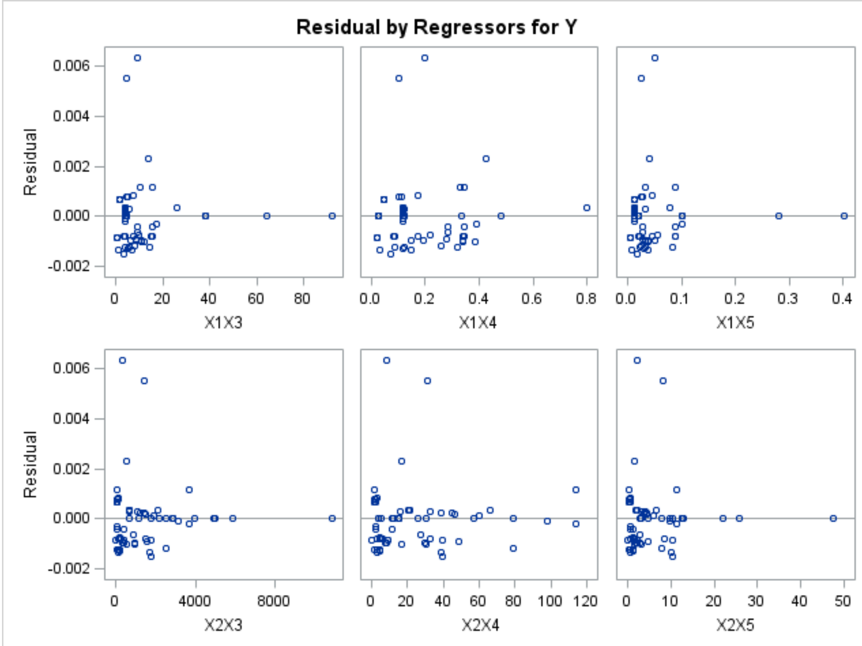
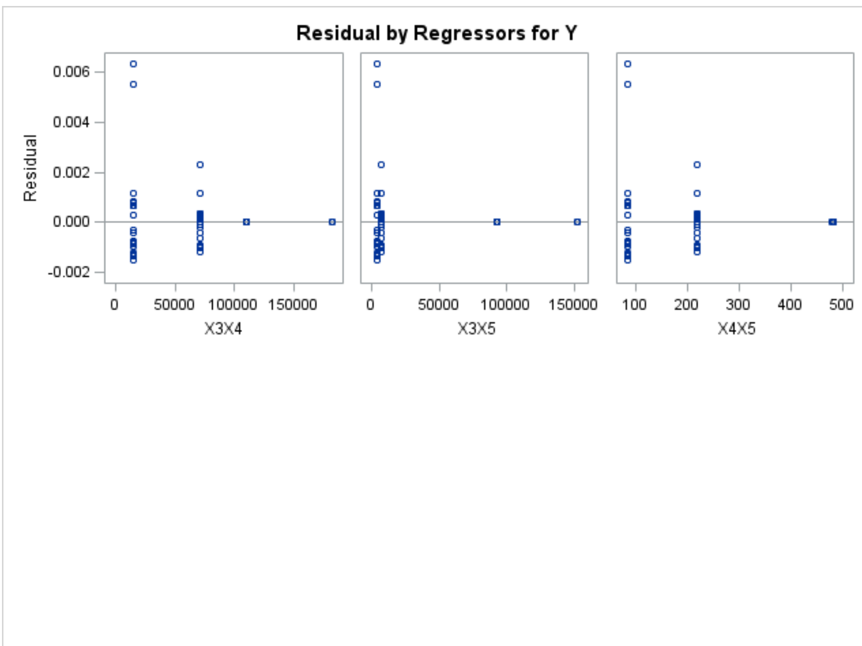
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
0.006
0.004
0.002
0.000
-0.002
0 20 40 60 80
X1X3
0.0 0.2 0.4 0.6 0.8
X1X4
0.0 0.1 0.2 0.3 0.4
X1X5
0 4000 8000
X2X3
0 20 40 60 80 100 120
X2X4
0 10 20 30 40 50
X2X5


Residual by Regressors for Y
Residual
0.006
0.004
0.002
0.000
-0.002
0 50000 100000 150000
X3X4
0 50000 100000 150000
X3X5
100 200 300 400 500
X4X5

FORWARD REGRESSION
Pollutant: Total Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	85
Number of Observations Used	47
Number of Observations with Missing Values	38

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.9897	-0.1398	-0.2855	-0.2033	0.9899	-0.0599	0.6698	-0.1096	0.7786	0.9868	0.0804	-0.1709	-0.0712	-0.2300	0.2637
X2	0.9897	1.0000	-0.1265	-0.2478	-0.1983	1.0000	-0.0903	0.6106	-0.1782	0.8019	0.9990	0.1048	-0.1435	-0.0629	-0.2036	0.2398
X3	-0.1398	-0.1265	1.0000	0.1002	0.9813	-0.1264	0.9241	-0.0759	0.7961	0.2479	-0.1264	0.4643	0.9252	0.9882	0.9242	0.2076
X4	-0.2855	-0.2478	0.1002	1.0000	-0.0554	-0.2498	0.0125	0.2519	-0.1770	-0.0257	-0.2176	0.1981	0.4647	-0.0511	0.4726	-0.4240
X5	-0.2033	-0.1983	0.9813	-0.0554	1.0000	-0.1978	0.9183	-0.1938	0.8375	0.1534	-0.2036	0.4086	0.8428	0.9898	0.8474	0.2538
X1X2	0.9899	1.0000	-0.1264	-0.2498	-0.1978	1.0000	-0.0900	0.6102	-0.1774	0.8001	0.9988	0.1012	-0.1443	-0.0626	-0.2043	0.2398
X1X3	-0.0599	-0.0903	0.9241	0.0125	0.9183	-0.0900	1.0000	0.1145	0.9411	0.2682	-0.0939	0.4590	0.8254	0.9255	0.8233	0.2992
X1X4	0.6698	0.6106	-0.0759	0.2519	-0.1938	0.6102	0.1145	1.0000	0.0673	0.5266	0.6181	0.0914	0.0715	-0.0954	0.0321	0.0578
X1X5	-0.1096	-0.1782	0.7961	-0.1770	0.8375	-0.1774	0.9411	0.0673	1.0000	0.1143	-0.1886	0.3370	0.6308	0.8216	0.6366	0.3415
X2X3	0.7786	0.8019	0.2479	-0.0257	0.1534	0.8001	0.2682	0.5266	0.1143	1.0000	0.8153	0.6579	0.2650	0.2759	0.2129	0.3574
X2X4	0.9868	0.9990	-0.1264	-0.2176	-0.2036	0.9988	-0.0939	0.6181	-0.1886	0.8153	1.0000	0.1297	-0.1317	-0.0672	-0.1919	0.2302
X2X5	0.0804	0.1048	0.4643	0.1981	0.4086	0.1012	0.4590	0.0914	0.3370	0.6579	0.1297	1.0000	0.4996	0.4414	0.4880	0.3295
X3X4	-0.1709	-0.1435	0.9252	0.4647	0.8428	-0.1443	0.8254	0.0715	0.6308	0.2650	-0.1317	0.4996	1.0000	0.8596	0.9981	0.0356
X3X5	-0.0712	-0.0629	0.9882	-0.0511	0.9898	-0.0626	0.9255	-0.0954	0.8216	0.2759	-0.0672	0.4414	0.8596	1.0000	0.8557	0.2772
X4X5	-0.2300	-0.2036	0.9242	0.4726	0.8474	-0.2043	0.8233	0.0321	0.6366	0.2129	-0.1919	0.4880	0.9981	0.8557	1.0000	0.0217
Y	0.2637	0.2398	0.2076	-0.4240	0.2538	0.2398	0.2992	0.0578	0.3415	0.3574	0.2302	0.3295	0.0356	0.2772	0.0217	1.0000

FORWARD REGRESSION
Pollutant: Total Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	85
Number of Observations Used	47
Number of Observations with Missing Values	38

Forward Selection: Step 1

Variable X4 Entered: R-Square = 0.1798 and C(p) = 14.7664

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00004951	0.00004951	9.86	0.0030
Error	45	0.00022588	0.00000502		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00625	0.00074024	0.00035781	71.28	<.0001
X4	-0.00007424	0.00002364	0.00004951	9.86	0.0030

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X2X5 Entered: R-Square = 0.3577 and C(p) = 4.2330

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00009852	0.00004926	12.25	<.0001
Error	44	0.00017687	0.00000402		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00572	0.00067965	0.00028464	70.81	<.0001

X4	-0.00008917	0.00002158	0.00006862	17.07	0.0002
X2X5	0.00025625	0.00007339	0.00004901	12.19	0.0011

Bounds on condition number: 1.0409, 4.1634

Forward Selection: Step 3

Variable X1X4 Entered: R-Square = 0.3808 and C(p) = 4.6101

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00010486	0.00003495	8.81	0.0001
Error	43	0.00017053	0.00000397		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00539	0.00072270	0.00022081	55.68	<.0001
X4	-0.00009585	0.00002208	0.00007475	18.85	<.0001
X1X4	0.00346	0.00274	0.00000635	1.60	0.2127
X2X5	0.00025221	0.00007296	0.00004738	11.95	0.0012

Bounds on condition number: 1.1042, 9.6506

Forward Selection: Step 4

Variable X1X3 Entered: R-Square = 0.3921 and C(p) = 5.8124

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00010798	0.00002700	6.77	0.0003
Error	42	0.00016741	0.00000399		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00525	0.00074347	0.00019839	49.77	<.0001
X4	-0.00009362	0.00002228	0.00007039	17.66	0.0001
X1X3	0.00003066	0.00003466	0.00000312	0.78	0.3814
X1X4	0.00320	0.00276	0.00000536	1.35	0.2527
X2X5	0.00021829	0.00008259	0.00002784	6.99	0.0115

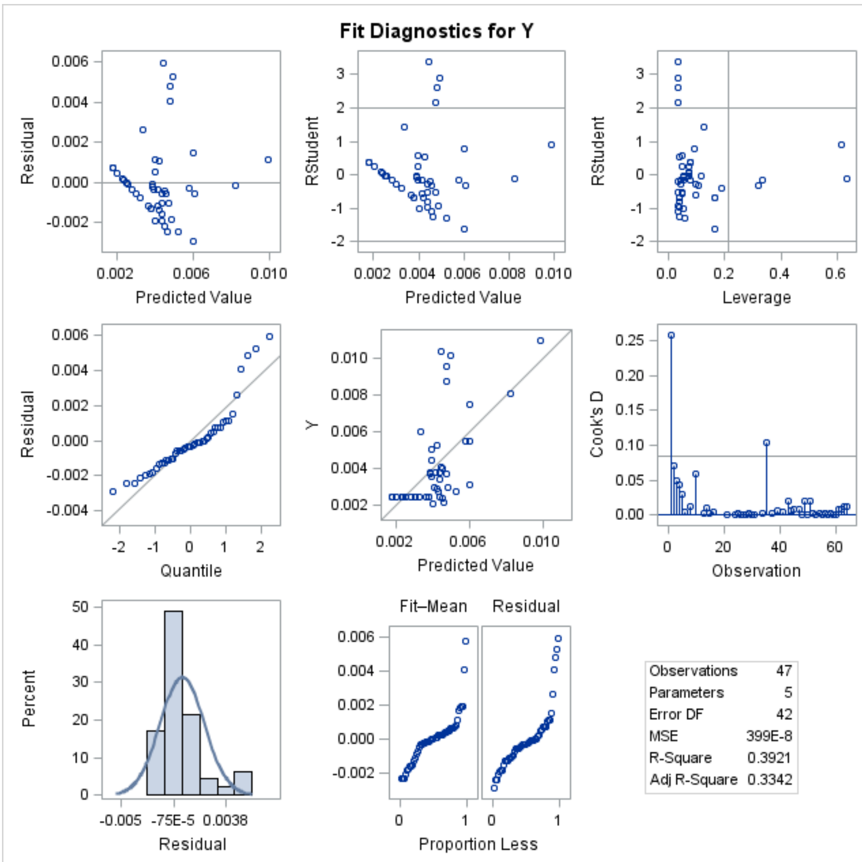
Bounds on condition number: 1.3294, 19.289

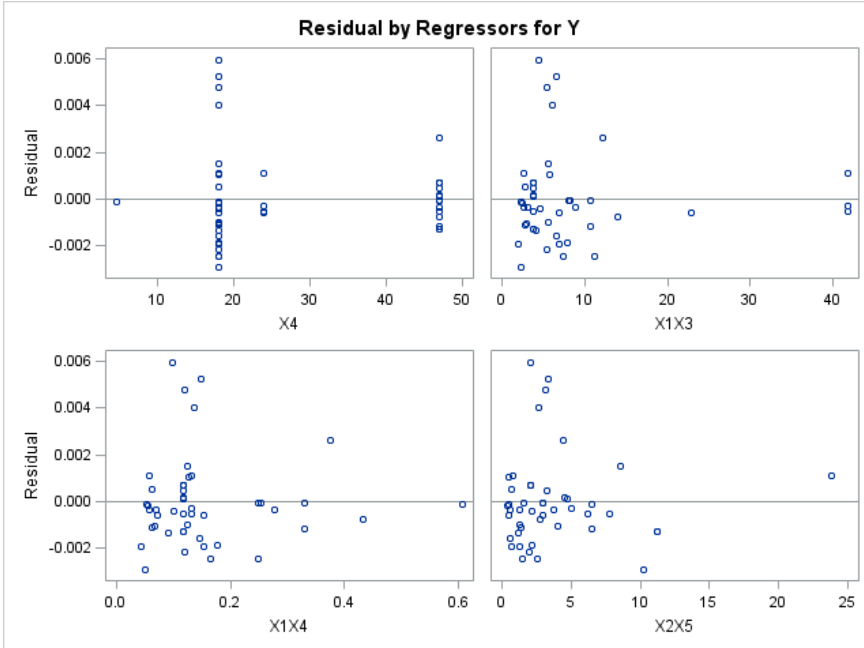
No other variable met the 0.5000 significance level for entry into the model.

Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X4	1	0.1798	0.1798	14.7664	9.86	0.0030
2	X2X5	2	0.1780	0.3577	4.2330	12.19	0.0011
3	X1X4	3	0.0230	0.3808	4.6101	1.60	0.2127
4	X1X3	4	0.0113	0.3921	5.8124	0.78	0.3814

FORWARD REGRESSION
Pollutant: Total Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
0.006
0.004
0.002
0.000
-0.002
X4
X1X3
X1X4
X2X5
10
20
30
40
50
0
0.0
0.2
0.4
0.6
5
15
25

BACKWARD REGRESSION
Pollutant: Total Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	85
Number of Observations Used	47
Number of Observations with Missing Values	38

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.9897	-0.1398	-0.2855	-0.2033	0.9899	-0.0599	0.6698	-0.1096	0.7786	0.9868	0.0804	-0.1709	-0.0712	-0.2300	0.2637
X2	0.9897	1.0000	-0.1265	-0.2478	-0.1983	1.0000	-0.0903	0.6106	-0.1782	0.8019	0.9990	0.1048	-0.1435	-0.0629	-0.2036	0.2398
X3	-0.1398	-0.1265	1.0000	0.1002	0.9813	-0.1264	0.9241	-0.0759	0.7961	0.2479	-0.1264	0.4643	0.9252	0.9882	0.9242	0.2076
X4	-0.2855	-0.2478	0.1002	1.0000	-0.0554	-0.2498	0.0125	0.2519	-0.1770	-0.0257	-0.2176	0.1981	0.4647	-0.0511	0.4726	-0.4240
X5	-0.2033	-0.1983	0.9813	-0.0554	1.0000	-0.1978	0.9183	-0.1938	0.8375	0.1534	-0.2036	0.4086	0.8428	0.9898	0.8474	0.2538
X1X2	0.9899	1.0000	-0.1264	-0.2498	-0.1978	1.0000	-0.0900	0.6102	-0.1774	0.8001	0.9988	0.1012	-0.1443	-0.0626	-0.2043	0.2398
X1X3	-0.0599	-0.0903	0.9241	0.0125	0.9183	-0.0900	1.0000	0.1145	0.9411	0.2682	-0.0939	0.4590	0.8254	0.9255	0.8233	0.2992
X1X4	0.6698	0.6106	-0.0759	0.2519	-0.1938	0.6102	0.1145	1.0000	0.0673	0.5266	0.6181	0.0914	0.0715	-0.0954	0.0321	0.0578
X1X5	-0.1096	-0.1782	0.7961	-0.1770	0.8375	-0.1774	0.9411	0.0673	1.0000	0.1143	-0.1886	0.3370	0.6308	0.8216	0.6366	0.3415
X2X3	0.7786	0.8019	0.2479	-0.0257	0.1534	0.8001	0.2682	0.5266	0.1143	1.0000	0.8153	0.6579	0.2650	0.2759	0.2129	0.3574
X2X4	0.9868	0.9990	-0.1264	-0.2176	-0.2036	0.9988	-0.0939	0.6181	-0.1886	0.8153	1.0000	0.1297	-0.1317	-0.0672	-0.1919	0.2302
X2X5	0.0804	0.1048	0.4643	0.1981	0.4086	0.1012	0.4590	0.0914	0.3370	0.6579	0.1297	1.0000	0.4996	0.4414	0.4880	0.3295
X3X4	-0.1709	-0.1435	0.9252	0.4647	0.8428	-0.1443	0.8254	0.0715	0.6308	0.2650	-0.1317	0.4996	1.0000	0.8596	0.9981	0.0356
X3X5	-0.0712	-0.0629	0.9882	-0.0511	0.9898	-0.0626	0.9255	-0.0954	0.8216	0.2759	-0.0672	0.4414	0.8596	1.0000	0.8557	0.2772
X4X5	-0.2300	-0.2036	0.9242	0.4726	0.8474	-0.2043	0.8233	0.0321	0.6366	0.2129	-0.1919	0.4880	0.9981	0.8557	1.0000	0.0217
Y	0.2637	0.2398	0.2076	-0.4240	0.2538	0.2398	0.2992	0.0578	0.3415	0.3574	0.2302	0.3295	0.0356	0.2772	0.0217	1.0000

BACKWARD REGRESSION
Pollutant: Total Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	85
Number of Observations Used	47
Number of Observations with Missing Values	38

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.4888 and C(p) = 11.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	0.00013462	0.00001346	3.44	0.0030
Error	36	0.00014077	0.00000391		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-74.70376	32.79928	0.00002028	5.19	0.0288
X1	-0.19623	0.29001	0.00000179	0.46	0.5030
X2	-0.00216	0.00218	0.00000385	0.98	0.3277
X3	-0.04488	0.01970	0.00002029	5.19	0.0288
X4	1.12753	0.49504	0.00002028	5.19	0.0288
X5	19.45445	8.54109	0.00002029	5.19	0.0288
X1X2	0.68141	0.30371	0.00001968	5.03	0.0311
X1X3	0.00007092	0.00015609	8.072614E-7	0.21	0.6523
X1X4	-0.00650	0.01056	0.00000148	0.38	0.5423
X2X3	6.316921E-7	4.153545E-7	0.00000904	2.31	0.1370
X2X4	-0.00001521	0.00004266	4.969113E-7	0.13	0.7236

Bounds on condition number: 16663088826, 336391840983

Backward Elimination: Step 1

Variable X2X4 Removed: R-Square = 0.4870 and C(p) = 9.1271

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	9	0.00013412	0.00001490	3.90	0.0015
Error	37	0.00014126	0.00000382		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-79.35164	29.73935	0.00002718	7.12	0.0113
X1	-0.22063	0.27848	0.00000240	0.63	0.4333
X2	-0.00278	0.00129	0.00001769	4.63	0.0380
X3	-0.04767	0.01786	0.00002719	7.12	0.0112
X4	1.19767	0.44887	0.00002718	7.12	0.0113
X5	20.66486	7.74417	0.00002719	7.12	0.0112
X1X2	0.72698	0.27223	0.00002723	7.13	0.0112
X1X3	0.00007882	0.00015268	0.00000102	0.27	0.6088
X1X4	-0.00670	0.01042	0.00000158	0.41	0.5241
X2X3	6.038104E-7	4.030834E-7	0.00000857	2.24	0.1426

Bounds on condition number: 14029698439, 254858731710

Backward Elimination: Step 2

Variable X2X5 Entered: R-Square = 0.4888 and C(p) = 11.0000

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	10	0.00013462	0.00001346	3.44	0.0030
Error	36	0.00014077	0.00000391		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-73.88566	33.77756	0.00001871	4.78	0.0353
X1	-0.19623	0.29001	0.00000179	0.46	0.5030
X2	-0.00317	0.00170	0.00001358	3.47	0.0706
X3	-0.04438	0.02029	0.00001871	4.79	0.0353
X4	1.11518	0.50981	0.00001871	4.78	0.0353
X5	19.24142	8.79584	0.00001871	4.79	0.0353
X1X2	0.68141	0.30371	0.00001968	5.03	0.0311
X1X3	0.00007092	0.00015609	8.07268E-7	0.21	0.6523
X1X4	-0.00650	0.01056	0.00000148	0.38	0.5423
X2X3	2.643076E-8	0.00000167	9.79106E-10	0.00	0.9875
X2X5	0.00026239	0.00073610	4.968677E-7	0.13	0.7236

Bounds on condition number: 17671937014, 3.566E+11

Backward Elimination: Step 3

Variable X2X3 Removed: R-Square = 0.4888 and C(p) = 9.0003

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	0.00013462	0.00001496	3.93	0.0014
Error	37	0.00014077	0.00000380		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-73.65971	30.19465	0.00002264	5.95	0.0196
X1	-0.19528	0.27985	0.00000185	0.49	0.4897
X2	-0.00318	0.00140	0.00001953	5.13	0.0294
X3	-0.04425	0.01814	0.00002265	5.95	0.0196
X4	1.11177	0.45574	0.00002264	5.95	0.0196
X5	19.18258	7.86274	0.00002264	5.95	0.0196
X1X2	0.67952	0.27535	0.00002317	6.09	0.0183
X1X3	0.00007084	0.00015388	8.062892E-7	0.21	0.6480
X1X4	-0.00649	0.01041	0.00000148	0.39	0.5367
X2X5	0.00027369	0.00017733	0.00000906	2.38	0.1312

Bounds on condition number: 14513539603, 263633725993

Backward Elimination: Step 4

Variable X1X3 Removed: R-Square = 0.4859 and C(p) = 7.2065

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	0.00013381	0.00001673	4.49	0.0007
Error	38	0.00014158	0.00000373		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-72.01601	29.67027	0.00002195	5.89	0.0201
X1	-0.15728	0.26461	0.00000132	0.35	0.5558
X2	-0.00330	0.00137	0.00002161	5.80	0.0210
X3	-0.04326	0.01782	0.00002195	5.89	0.0201
X4	1.08695	0.44782	0.00002195	5.89	0.0201
X5	18.75451	7.72618	0.00002195	5.89	0.0201
X1X2	0.66572	0.27086	0.00002251	6.04	0.0187

X1X4	-0.00467	0.00953	8.937845E-7	0.24	0.6271
X2X5	0.00031003	0.00015713	0.00001450	3.89	0.0558

Bounds on condition number: 14310554005, 231066295099

Backward Elimination: Step 5

Variable X1X5 Entered: R-Square = 0.4888 and C(p) = 9.0003

Note: The variable which previously had small tolerance is now allowed to enter after removal of some variables from the model.

Note:

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Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	9	0.00013462	0.00001496	3.93	0.0014
Error	37	0.00014077	0.00000380		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-73.64438	30.19073	0.00002264	5.95	0.0196
X1	-0.31322	0.43155	0.00000200	0.53	0.4725
X2	-0.00318	0.00140	0.00001953	5.13	0.0294
X3	-0.04424	0.01813	0.00002264	5.95	0.0196
X4	1.11154	0.45568	0.00002264	5.95	0.0196
X5	19.17858	7.86172	0.00002264	5.95	0.0196
X1X2	0.67952	0.27535	0.00002317	6.09	0.0183
X1X4	-0.00471	0.00963	9.118887E-7	0.24	0.6273
X1X5	0.03071	0.06671	8.062883E-7	0.21	0.6480
X2X5	0.00027369	0.00017733	0.00000906	2.38	0.1312

Bounds on condition number: 14509770633, 263565766227

Backward Elimination: Step 6

Variable X1X5 Removed: R-Square = 0.4859 and C(p) = 7.2065

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	8	0.00013381	0.00001673	4.49	0.0007
Error	38	0.00014158	0.00000373		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-72.01601	29.67027	0.00002195	5.89	0.0201

X1	-0.15728	0.26461	0.00000132	0.35	0.5558
X2	-0.00330	0.00137	0.00002161	5.80	0.0210
X3	-0.04326	0.01782	0.00002195	5.89	0.0201
X4	1.08695	0.44782	0.00002195	5.89	0.0201
X5	18.75451	7.72618	0.00002195	5.89	0.0201
X1X2	0.66572	0.27086	0.00002251	6.04	0.0187
X1X4	-0.00467	0.00953	8.937845E-7	0.24	0.6271
X2X5	0.00031003	0.00015713	0.00001450	3.89	0.0558

Bounds on condition number: 14310554005, 231066295099

Backward Elimination: Step 7

Variable X1X4 Removed: R-Square = 0.4827 and C(p) = 5.4350

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	0.00013292	0.00001899	5.20	0.0003
Error	39	0.00014247	0.00000365		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-66.21010	26.93315	0.00002208	6.04	0.0185
X1	-0.25036	0.18233	0.00000689	1.89	0.1776
X2	-0.00306	0.00127	0.00002123	5.81	0.0207
X3	-0.03977	0.01618	0.00002208	6.04	0.0185
X4	0.99931	0.40650	0.00002208	6.04	0.0185
X5	17.24278	7.01355	0.00002208	6.04	0.0185
X1X2	0.61242	0.24561	0.00002271	6.22	0.0170
X2X5	0.00031243	0.00015551	0.00001474	4.04	0.0515

Bounds on condition number: 12026822870, 169914977319

Backward Elimination: Step 8

Variable X1 Removed: R-Square = 0.4577 and C(p) = 5.1964

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00012603	0.00002101	5.63	0.0003
Error	40	0.00014936	0.00000373		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-37.46087	17.12756	0.00001786	4.78	0.0346
X2	-0.00210	0.00107	0.00001435	3.84	0.0570
X3	-0.02250	0.01029	0.00001787	4.79	0.0346
X4	0.56539	0.25850	0.00001786	4.78	0.0346
X5	9.75613	4.45995	0.00001787	4.79	0.0346
X1X2	0.34916	0.15519	0.00001890	5.06	0.0300
X2X5	0.00032456	0.00015697	0.00001596	4.28	0.0452

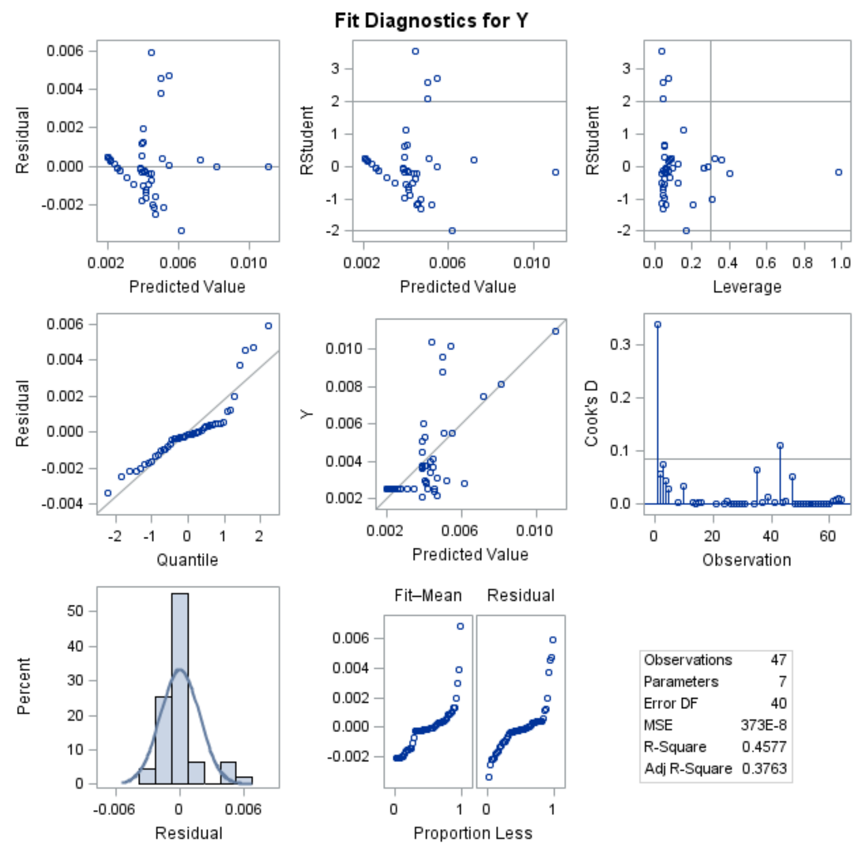
Bounds on condition number: 4758034879, 57613428055

All variables left in the model are significant at the 0.1000 level.

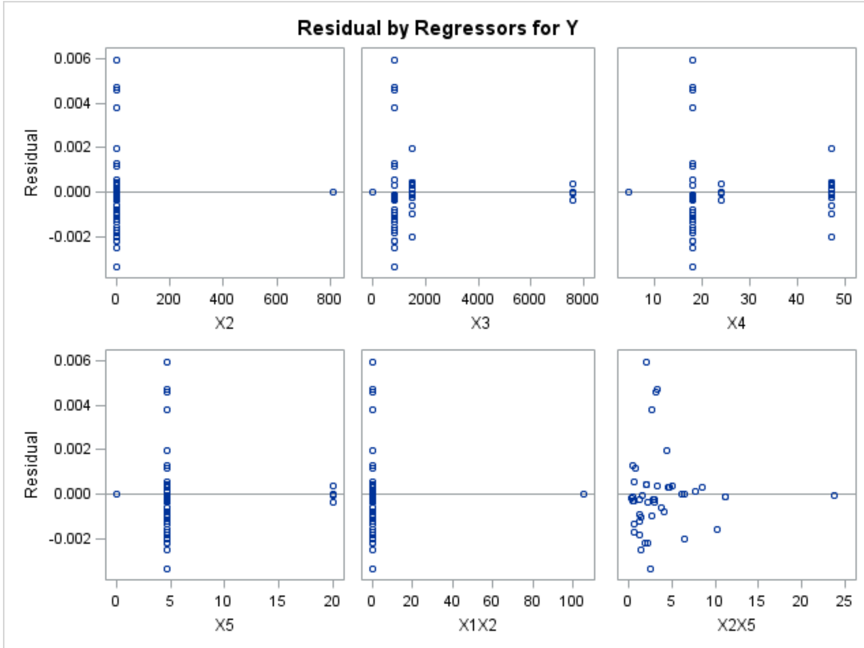
Summary of Backward Elimination								
Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1		X2X4	9	0.0018	0.4870	9.1271	0.13	0.7236
2	X2X5		10	0.0018	0.4888	11.0000	0.13	0.7236
3		X2X3	9	0.0000	0.4888	9.0003	0.00	0.9875
4		X1X3	8	0.0029	0.4859	7.2065	0.21	0.6480
5	X1X5		9	0.0029	0.4888	9.0003	0.21	0.6480
6		X1X5	8	0.0029	0.4859	7.2065	0.21	0.6480
7		X1X4	7	0.0032	0.4827	5.4350	0.24	0.6271
8		X1	6	0.0250	0.4577	5.1964	1.89	0.1776

BACKWARD REGRESSION
Pollutant: Total Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Observations	47
Parameters	7
Error DF	40
MSE	373E-8
R-Square	0.4577
Adj R-Square	0.3763


Residual by Regressors for Y
Residual
0.006
0.004
0.002
0.000
-0.002
X2
X3
X4
X5
X1X2
X2X5

STEPWISE REGRESSION
Pollutant: Total Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	85
Number of Observations Used	47
Number of Observations with Missing Values	38

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.9897	-0.1398	-0.2855	-0.2033	0.9899	-0.0599	0.6698	-0.1096	0.7786	0.9868	0.0804	-0.1709	-0.0712	-0.2300	0.2637
X2	0.9897	1.0000	-0.1265	-0.2478	-0.1983	1.0000	-0.0903	0.6106	-0.1782	0.8019	0.9990	0.1048	-0.1435	-0.0629	-0.2036	0.2398
X3	-0.1398	-0.1265	1.0000	0.1002	0.9813	-0.1264	0.9241	-0.0759	0.7961	0.2479	-0.1264	0.4643	0.9252	0.9882	0.9242	0.2076
X4	-0.2855	-0.2478	0.1002	1.0000	-0.0554	-0.2498	0.0125	0.2519	-0.1770	-0.0257	-0.2176	0.1981	0.4647	-0.0511	0.4726	-0.4240
X5	-0.2033	-0.1983	0.9813	-0.0554	1.0000	-0.1978	0.9183	-0.1938	0.8375	0.1534	-0.2036	0.4086	0.8428	0.9898	0.8474	0.2538
X1X2	0.9899	1.0000	-0.1264	-0.2498	-0.1978	1.0000	-0.0900	0.6102	-0.1774	0.8001	0.9988	0.1012	-0.1443	-0.0626	-0.2043	0.2398
X1X3	-0.0599	-0.0903	0.9241	0.0125	0.9183	-0.0900	1.0000	0.1145	0.9411	0.2682	-0.0939	0.4590	0.8254	0.9255	0.8233	0.2992
X1X4	0.6698	0.6106	-0.0759	0.2519	-0.1938	0.6102	0.1145	1.0000	0.0673	0.5266	0.6181	0.0914	0.0715	-0.0954	0.0321	0.0578
X1X5	-0.1096	-0.1782	0.7961	-0.1770	0.8375	-0.1774	0.9411	0.0673	1.0000	0.1143	-0.1886	0.3370	0.6308	0.8216	0.6366	0.3415
X2X3	0.7786	0.8019	0.2479	-0.0257	0.1534	0.8001	0.2682	0.5266	0.1143	1.0000	0.8153	0.6579	0.2650	0.2759	0.2129	0.3574
X2X4	0.9868	0.9990	-0.1264	-0.2176	-0.2036	0.9988	-0.0939	0.6181	-0.1886	0.8153	1.0000	0.1297	-0.1317	-0.0672	-0.1919	0.2302
X2X5	0.0804	0.1048	0.4643	0.1981	0.4086	0.1012	0.4590	0.0914	0.3370	0.6579	0.1297	1.0000	0.4996	0.4414	0.4880	0.3295
X3X4	-0.1709	-0.1435	0.9252	0.4647	0.8428	-0.1443	0.8254	0.0715	0.6308	0.2650	-0.1317	0.4996	1.0000	0.8596	0.9981	0.0356
X3X5	-0.0712	-0.0629	0.9882	-0.0511	0.9898	-0.0626	0.9255	-0.0954	0.8216	0.2759	-0.0672	0.4414	0.8596	1.0000	0.8557	0.2772
X4X5	-0.2300	-0.2036	0.9242	0.4726	0.8474	-0.2043	0.8233	0.0321	0.6366	0.2129	-0.1919	0.4880	0.9981	0.8557	1.0000	0.0217
Y	0.2637	0.2398	0.2076	-0.4240	0.2538	0.2398	0.2992	0.0578	0.3415	0.3574	0.2302	0.3295	0.0356	0.2772	0.0217	1.0000

STEPWISE REGRESSION
Pollutant: Total Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	85
Number of Observations Used	47
Number of Observations with Missing Values	38

Stepwise Selection: Step 1

Variable X4 Entered: R-Square = 0.1798 and C(p) = 14.7664

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00004951	0.00004951	9.86	0.0030
Error	45	0.00022588	0.00000502		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00625	0.00074024	0.00035781	71.28	<.0001
X4	-0.00007424	0.00002364	0.00004951	9.86	0.0030

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X2X5 Entered: R-Square = 0.3577 and C(p) = 4.2330

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00009852	0.00004926	12.25	<.0001
Error	44	0.00017687	0.00000402		
Corrected Total	46	0.00027539			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.00572	0.00067965	0.00028464	70.81	<.0001

X4	-0.00008917	0.00002158	0.00006862	17.07	0.0002
X2X5	0.00025625	0.00007339	0.00004901	12.19	0.0011

Bounds on condition number: 1.0409, 4.1634

All variables left in the model are significant at the 0.1500 level.

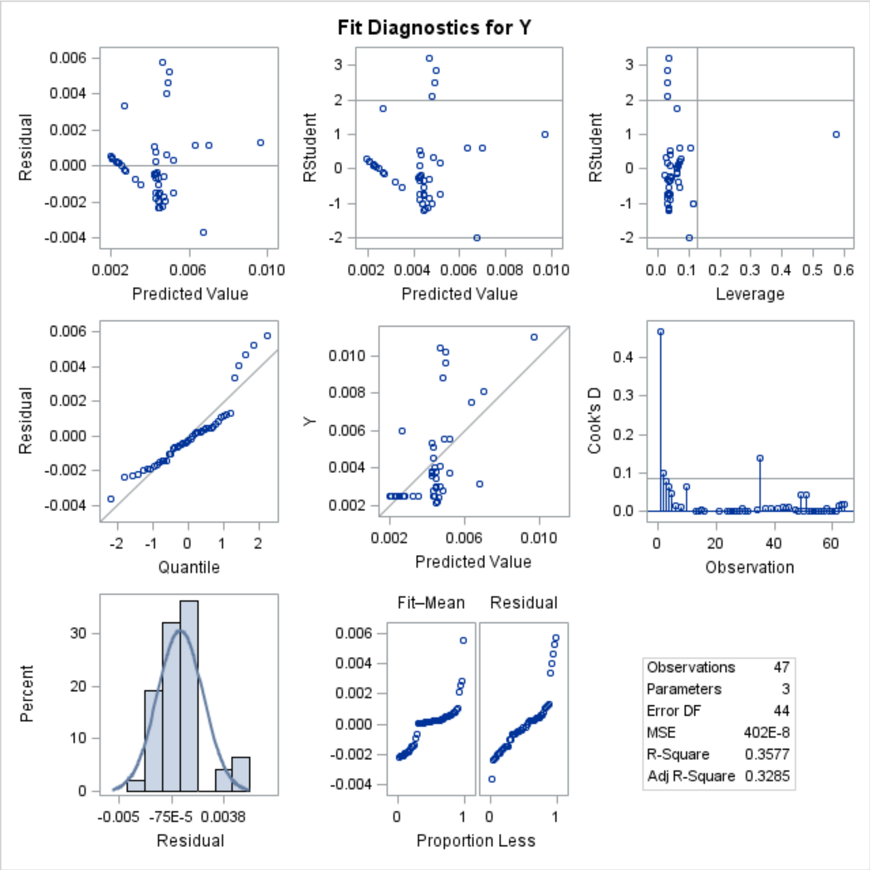
No other variable met the 0.1500 significance level for entry into the model.

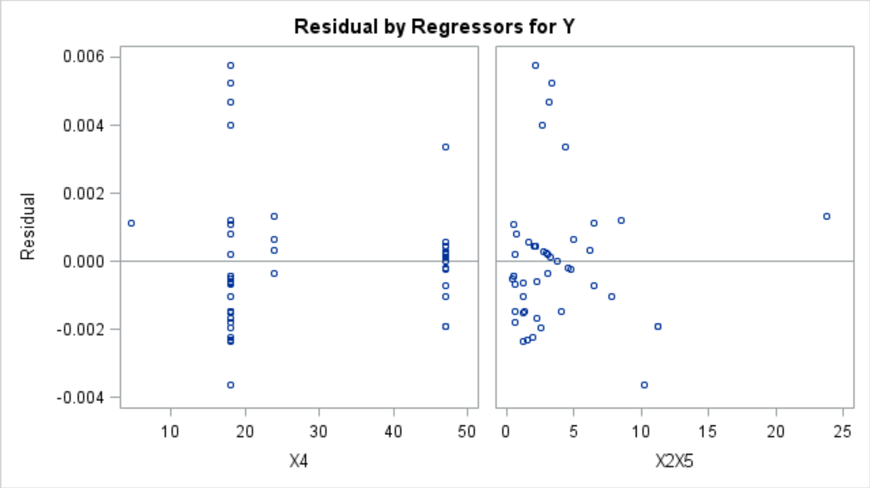
Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X4		1	0.1798	0.1798	14.7664	9.86	0.0030
2	X2X5		2	0.1780	0.3577	4.2330	12.19	0.0011

STEPWISE REGRESSION
Pollutant: Total Nickel
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y





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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Nitrogen

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The REG Procedure

Number of Observations Read	85
Number of Observations Used	47
Number of Observations with Missing Values	38

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	0.9897	-0.1398	-0.2855	-0.2033	0.9899	-0.0599	0.6698	-0.1096	0.7786	0.9868	0.0804	-0.1709	-0.0712	-0.2300	0.2637
X2	0.9897	1.0000	-0.1265	-0.2478	-0.1983	1.0000	-0.0903	0.6106	-0.1782	0.8019	0.9990	0.1048	-0.1435	-0.0629	-0.2036	0.2398
X3	-0.1398	-0.1265	1.0000	0.1002	0.9813	-0.1264	0.9241	-0.0759	0.7961	0.2479	-0.1264	0.4643	0.9252	0.9882	0.9242	0.2076
X4	-0.2855	-0.2478	0.1002	1.0000	-0.0554	-0.2498	0.0125	0.2519	-0.1770	-0.0257	-0.2176	0.1981	0.4647	-0.0511	0.4726	-0.4240
X5	-0.2033	-0.1983	0.9813	-0.0554	1.0000	-0.1978	0.9183	-0.1938	0.8375	0.1534	-0.2036	0.4086	0.8428	0.9898	0.8474	0.2538
X1X2	0.9899	1.0000	-0.1264	-0.2498	-0.1978	1.0000	-0.0900	0.6102	-0.1774	0.8001	0.9988	0.1012	-0.1443	-0.0626	-0.2043	0.2398
X1X3	-0.0599	-0.0903	0.9241	0.0125	0.9183	-0.0900	1.0000	0.1145	0.9411	0.2682	-0.0939	0.4590	0.8254	0.9255	0.8233	0.2992
X1X4	0.6698	0.6106	-0.0759	0.2519	-0.1938	0.6102	0.1145	1.0000	0.0673	0.5266	0.6181	0.0914	0.0715	-0.0954	0.0321	0.0578
X1X5	-0.1096	-0.1782	0.7961	-0.1770	0.8375	-0.1774	0.9411	0.0673	1.0000	0.1143	-0.1886	0.3370	0.6308	0.8216	0.6366	0.3415
X2X3	0.7786	0.8019	0.2479	-0.0257	0.1534	0.8001	0.2682	0.5266	0.1143	1.0000	0.8153	0.6579	0.2650	0.2759	0.2129	0.3574
X2X4	0.9868	0.9990	-0.1264	-0.2176	-0.2036	0.9988	-0.0939	0.6181	-0.1886	0.8153	1.0000	0.1297	-0.1317	-0.0672	-0.1919	0.2302
X2X5	0.0804	0.1048	0.4643	0.1981	0.4086	0.1012	0.4590	0.0914	0.3370	0.6579	0.1297	1.0000	0.4996	0.4414	0.4880	0.3295
X3X4	-0.1709	-0.1435	0.9252	0.4647	0.8428	-0.1443	0.8254	0.0715	0.6308	0.2650	-0.1317	0.4996	1.0000	0.8596	0.9981	0.0356
X3X5	-0.0712	-0.0629	0.9882	-0.0511	0.9898	-0.0626	0.9255	-0.0954	0.8216	0.2759	-0.0672	0.4414	0.8596	1.0000	0.8557	0.2772
X4X5	-0.2300	-0.2036	0.9242	0.4726	0.8474	-0.2043	0.8233	0.0321	0.6366	0.2129	-0.1919	0.4880	0.9981	0.8557	1.0000	0.0217
Y	0.2637	0.2398	0.2076	-0.4240	0.2538	0.2398	0.2992	0.0578	0.3415	0.3574	0.2302	0.3295	0.0356	0.2772	0.0217	1.0000

===
MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Nitrogen
===

The REG Procedure
Model: MODEL1

Note: Near collinearity forces the use of a slow version of the leaps and bounds algorithm. The problem will require a large amount of computing time.

Note: Subsets with tolerances less than 1.110223E-7 have been encountered and omitted.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Nitrogen
===

The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	85
Number of Observations Used	47
Number of Observations with Missing Values	38

Number in Model	R-Square	Variables in Model
1	0.1798	X4
1	0.1277	X2X3
1	0.1166	X1X5
1	0.1086	X2X5
1	0.0895	X1X3
1	0.0768	X3X5
1	0.0695	X1
1	0.0644	X5
1	0.0575	X1X2
1	0.0575	X2
1	0.0530	X2X4
1	0.0431	X3
1	0.0033	X1X4
1	0.0013	X3X4
1	0.0005	X4X5
2	0.3577	X4 X2X5
2	0.2999	X4 X2X3
2	0.2725	X4 X1X3
2	0.2635	X3 X3X5
2	0.2530	X4 X1X5
2	0.2501	X3X5 X4X5
2	0.2488	X4 X3X4
2	0.2460	X1X3 X4X5
2	0.2452	X4 X3X5
2	0.2433	X4 X4X5
2	0.2430	X3 X4
2	0.2415	X3 X4X5
2	0.2342	X3X4 X3X5
2	0.2330	X4 X5
2	0.2297	X1X3 X3X4
3	0.3808	X4 X1X4 X2X5
3	0.3766	X2 X2X4 X2X5
3	0.3726	X4 X1X3 X2X5
3	0.3717	X1X2 X2X4 X2X5
3	0.3714	X4 X1X5 X2X5
3	0.3698	X3 X2X5 X3X5

3	0.3687	X4 X2X3 X2X4
3	0.3655	X1 X4 X2X5
3	0.3654	X2X5 X3X5 X4X5
3	0.3652	X2 X4 X2X3
3	0.3650	X4 X1X2 X2X3
3	0.3646	X4 X2X3 X2X5
3	0.3641	X3 X5 X2X3
3	0.3631	X4 X2X5 X3X4
3	0.3630	X4 X1X2 X2X5
4	0.4056	X2 X4 X2X4 X2X5
4	0.4053	X4 X1X2 X2X4 X2X5
4	0.3945	X2 X1X2 X2X3 X2X5
4	0.3922	X2 X2X4 X2X5 X3X4
4	0.3922	X2 X2X4 X2X5 X4X5
4	0.3921	X4 X1X3 X1X4 X2X5
4	0.3917	X3 X1X3 X2X5 X3X5
4	0.3915	X2 X4 X1X2 X2X5
4	0.3914	X1X2 X2X4 X2X5 X3X4
4	0.3913	X1X2 X2X4 X2X5 X4X5
4	0.3910	X4 X1X4 X1X5 X2X5
4	0.3901	X1X4 X2X5 X3X4 X3X5
4	0.3897	X3 X1X4 X2X5 X3X4
4	0.3892	X4 X5 X1X4 X2X5
4	0.3891	X1 X2 X2X4 X2X5
5	0.4165	X2 X4 X1X4 X2X4 X2X5
5	0.4163	X4 X1X2 X1X4 X2X4 X2X5
5	0.4147	X1 X2 X4 X2X4 X2X5
5	0.4144	X1 X4 X1X2 X2X4 X2X5
5	0.4121	X2 X4 X1X2 X2X3 X2X5
5	0.4108	X2 X1X3 X2X4 X2X5 X3X4
5	0.4107	X2 X1X3 X2X4 X2X5 X4X5
5	0.4105	X2 X1X5 X2X4 X2X5 X3X4
5	0.4104	X2 X1X5 X2X4 X2X5 X4X5
5	0.4100	X1X2 X1X3 X2X4 X2X5 X3X4
5	0.4099	X1X2 X1X3 X2X4 X2X5 X4X5
5	0.4097	X1X2 X1X5 X2X4 X2X5 X3X4
5	0.4097	X1X2 X1X5 X2X4 X2X5 X4X5
5	0.4078	X2 X4 X1X5 X2X4 X2X5
5	0.4071	X4 X1X2 X1X5 X2X4 X2X5
6	0.4202	X2 X4 X1X2 X1X4 X2X3 X2X5
6	0.4188	X1 X2 X4 X1X2 X2X3 X2X5
6	0.4169	X1X2 X1X4 X2X4 X2X5 X3X4 X4X5
6	0.4169	X4 X1X2 X1X4 X2X3 X2X4 X2X5
6	0.4168	X2 X1X4 X2X4 X2X5 X3X4 X4X5
6	0.4168	X2 X5 X1X4 X2X4 X2X5 X3X5
6	0.4168	X5 X1X2 X1X4 X2X4 X2X5 X3X5
6	0.4167	X2 X3 X5 X1X4 X2X4 X2X5
6	0.4167	X2 X5 X1X4 X2X4 X2X5 X3X4
6	0.4167	X2 X4 X1X4 X2X4 X2X5 X3X4
6	0.4167	X2 X4 X1X4 X2X4 X2X5 X3X5
6	0.4167	X2 X4 X1X4 X2X4 X2X5 X4X5
6		

	0.4167	X2 X3 X4 X1X4 X2X4 X2X5
6	0.4167	X2 X4 X5 X1X4 X2X4 X2X5
6	0.4167	X2 X5 X1X4 X2X4 X2X5 X4X5
7	0.4206	X2 X1X2 X1X4 X2X3 X2X5 X3X4 X4X5
7	0.4204	X2 X5 X1X2 X1X4 X2X3 X2X5 X3X5
7	0.4204	X2 X3 X5 X1X2 X1X4 X2X3 X2X5
7	0.4204	X2 X5 X1X2 X1X4 X2X3 X2X5 X3X4
7	0.4204	X2 X5 X1X2 X1X4 X2X3 X2X5 X4X5
7	0.4204	X2 X3 X1X2 X1X4 X2X3 X2X5 X3X4
7	0.4204	X2 X4 X1X2 X1X4 X2X3 X2X5 X3X4
7	0.4204	X2 X4 X1X2 X1X4 X2X3 X2X5 X3X5
7	0.4204	X2 X4 X1X2 X1X4 X2X3 X2X5 X4X5
7	0.4204	X2 X3 X4 X1X2 X1X4 X2X3 X2X5
7	0.4204	X2 X4 X5 X1X2 X1X4 X2X3 X2X5
7	0.4204	X2 X1X2 X1X4 X2X3 X2X5 X3X4 X3X5
7	0.4204	X2 X3 X1X2 X1X4 X2X3 X2X5 X4X5
7	0.4204	X2 X1X2 X1X4 X2X3 X2X5 X3X5 X4X5
7	0.4204	X2 X3 X1X2 X1X4 X2X3 X2X5 X3X5
8	0.4210	X2 X1X2 X1X3 X1X4 X2X3 X2X5 X3X4 X4X5
8	0.4209	X2 X5 X1X2 X1X3 X1X4 X2X3 X2X5 X3X5
8	0.4209	X2 X3 X5 X1X2 X1X3 X1X4 X2X3 X2X5
8	0.4209	X2 X5 X1X2 X1X3 X1X4 X2X3 X2X5 X3X4
8	0.4209	X2 X3 X1X2 X1X3 X1X4 X2X3 X2X5 X3X4
8	0.4209	X2 X5 X1X2 X1X3 X1X4 X2X3 X2X5 X4X5
8	0.4209	X2 X4 X1X2 X1X3 X1X4 X2X3 X2X5 X3X4
8	0.4209	X2 X4 X1X2 X1X3 X1X4 X2X3 X2X5 X3X5
8	0.4209	X2 X4 X1X2 X1X3 X1X4 X2X3 X2X5 X4X5
8	0.4209	X2 X3 X4 X1X2 X1X3 X1X4 X2X3 X2X5
8	0.4209	X2 X1X2 X1X3 X1X4 X2X3 X2X5 X3X4 X3X5
8	0.4209	X2 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X5
8	0.4209	X2 X3 X1X2 X1X3 X1X4 X2X3 X2X5 X4X5
8	0.4209	X2 X1X2 X1X3 X1X4 X2X3 X2X5 X3X5 X4X5
8	0.4209	X2 X3 X1X2 X1X3 X1X4 X2X3 X2X5 X3X5
9	0.4211	X1 X2 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X4X5
9	0.4210	X1 X2 X1X2 X1X3 X1X4 X2X3 X2X5 X3X4 X4X5
9	0.4210	X2 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X4X5
9	0.4210	X1 X2 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X4X5
9	0.4209	X1 X2 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X5
9	0.4209	X1 X2 X5 X1X2 X1X3 X1X4 X2X3 X2X5 X3X5
9	0.4209	X2 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X5
9	0.4209	X1 X2 X3 X5 X1X2 X1X4 X1X5 X2X3 X2X5
9	0.4209	X1 X2 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4
9	0.4209	X1 X2 X3 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4
9	0.4209	X1 X2 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X4X5
9	0.4209	X1 X2 X4 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4
9	0.4209	X1 X2 X4 X1X2 X1X4 X1X5 X2X3 X2X5 X3X5
9	0.4209	X1 X2 X4 X1X2 X1X4 X1X5 X2X3 X2X5 X4X5
9	0.4209	X1 X2 X3 X4 X1X2 X1X4 X1X5 X2X3 X2X5

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Nitrogen

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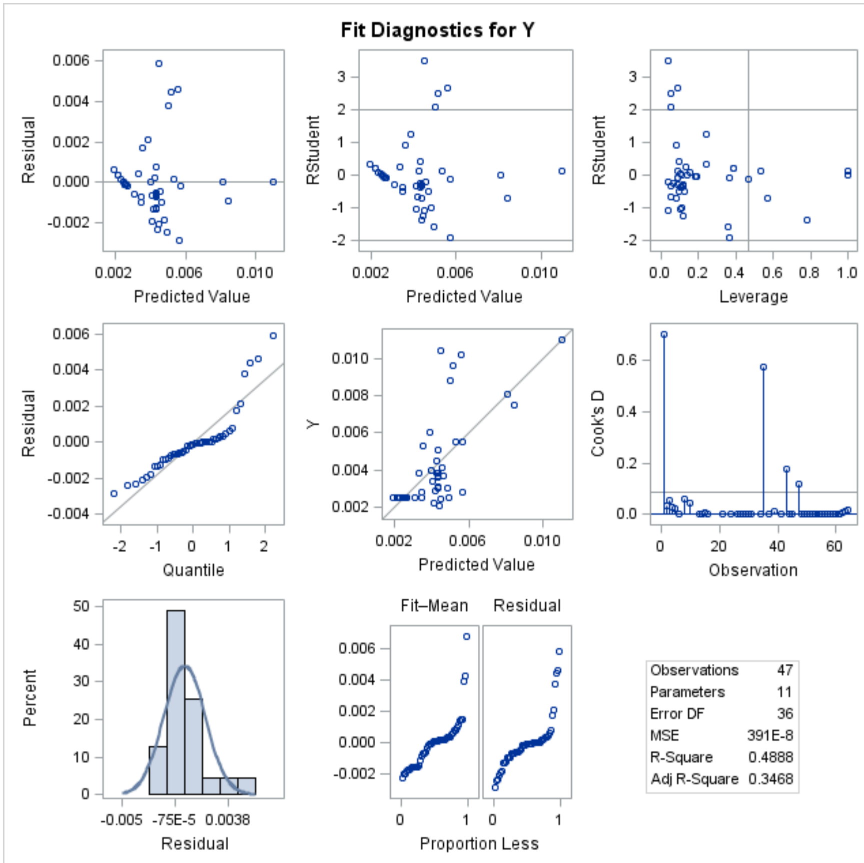
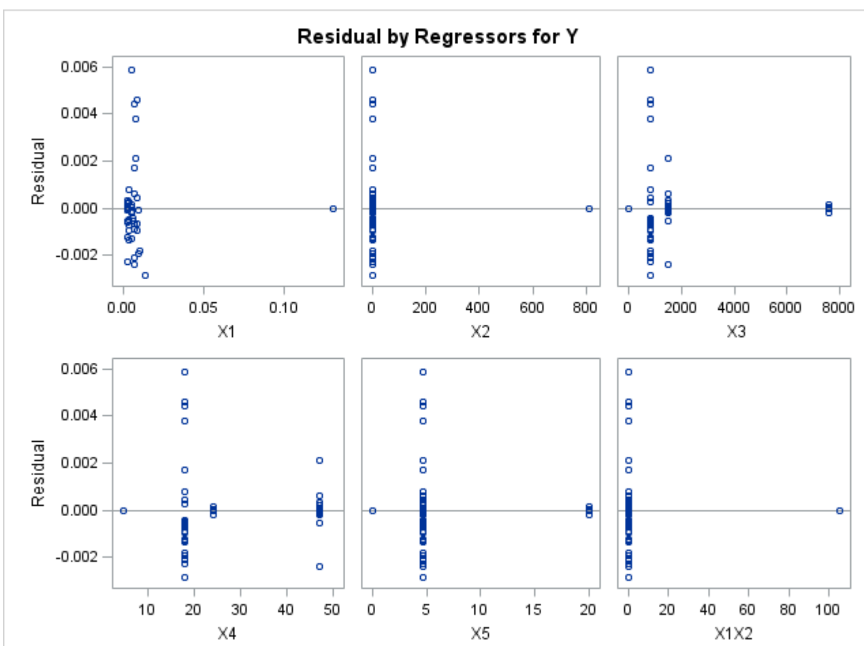
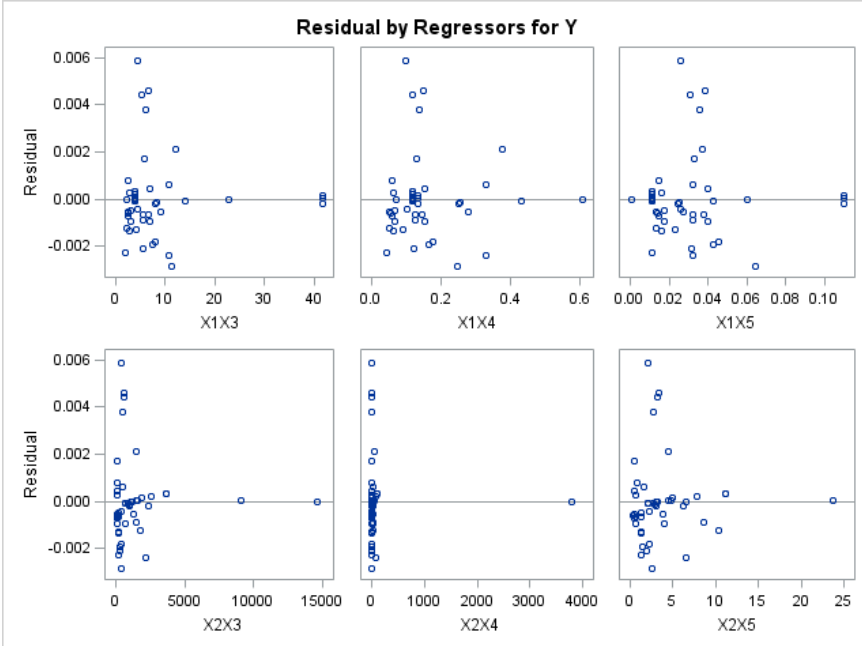
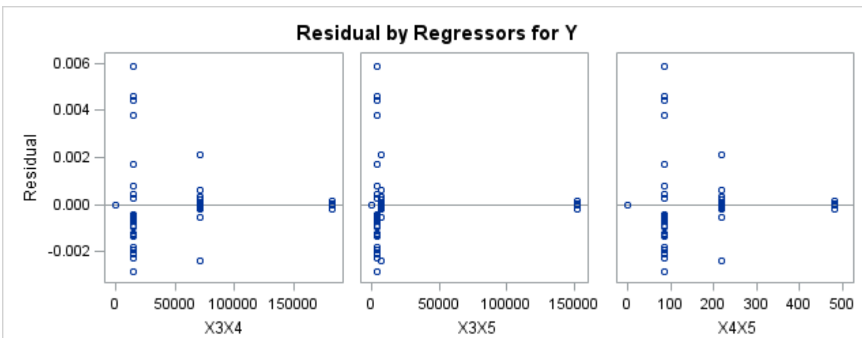
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
0.006
0.004
0.002
0.000
-0.002
X1X3
X1X4
X1X5
X2X3
X2X4
X2X5


Residual by Regressors for Y
Residual
X3X4
X3X5
X4X5

FORWARD REGRESSION
Pollutant: Total Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	172
Number of Observations Used	123
Number of Observations with Missing Values	49

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0980	0.1764	-0.1985	-0.0964	0.5631	0.9483	0.7767	0.8393	-0.0436	-0.1796	-0.1235	-0.0565	0.0358	-0.1418	0.3265
X2	-0.0980	1.0000	0.0058	-0.0306	0.0770	0.6351	-0.0860	-0.1104	-0.0469	0.9443	0.8079	0.8279	-0.0358	0.0601	0.0425	0.0701
X3	0.1764	0.0058	1.0000	-0.0656	-0.1204	0.1188	0.4388	0.1530	0.1548	0.2885	-0.0534	-0.0826	0.5550	0.5551	-0.1350	0.3448
X4	-0.1985	-0.0306	-0.0656	1.0000	0.7706	-0.1589	-0.1837	0.3689	0.2243	-0.0633	0.4598	0.3587	0.7818	0.6914	0.8962	-0.5209
X5	-0.0964	0.0770	-0.1204	0.7706	1.0000	0.0005	-0.0918	0.2750	0.3895	0.0162	0.4485	0.5628	0.4756	0.7382	0.9716	-0.2288
X1X2	0.5631	0.6351	0.1188	-0.1589	0.0005	1.0000	0.5518	0.3970	0.5114	0.6321	0.4194	0.4954	-0.0725	0.0678	-0.0593	0.2961
X1X3	0.9483	-0.0860	0.4388	-0.1837	-0.0918	0.5518	1.0000	0.7445	0.8158	0.0366	-0.1720	-0.1251	0.1116	0.2091	-0.1414	0.3956
X1X4	0.7767	-0.1104	0.1530	0.3689	0.2750	0.3970	0.7445	1.0000	0.9022	-0.0723	0.0671	0.0460	0.4084	0.3908	0.3237	0.0072
X1X5	0.8393	-0.0469	0.1548	0.2243	0.3895	0.5114	0.8158	0.9022	1.0000	-0.0186	0.0667	0.1573	0.2422	0.4252	0.3475	0.1655
X2X3	-0.0436	0.9443	0.2885	-0.0633	0.0162	0.6321	0.0366	-0.0723	-0.0186	1.0000	0.7320	0.7450	0.1123	0.1962	-0.0197	0.1740
X2X4	-0.1796	0.8079	-0.0534	0.4598	0.4485	0.4194	-0.1720	0.0671	0.0667	0.7320	1.0000	0.9240	0.3320	0.3737	0.4799	-0.2367
X2X5	-0.1235	0.8279	-0.0826	0.3587	0.5628	0.4954	-0.1251	0.0460	0.1573	0.7450	0.9240	1.0000	0.1904	0.3981	0.5214	-0.0733
X3X4	-0.0565	-0.0358	0.5550	0.7818	0.4756	-0.0725	0.1116	0.4084	0.2422	0.1123	0.3320	0.1904	1.0000	0.8574	0.5975	-0.2591
X3X5	0.0358	0.0601	0.5551	0.6914	0.7382	0.0678	0.2091	0.3908	0.4252	0.1962	0.3737	0.3981	0.8574	1.0000	0.7446	-0.0393
X4X5	-0.1418	0.0425	-0.1350	0.8962	0.9716	-0.0593	-0.1414	0.3237	0.3475	-0.0197	0.4799	0.5214	0.5975	0.7446	1.0000	-0.3684
Y	0.3265	0.0701	0.3448	-0.5209	-0.2288	0.2961	0.3956	0.0072	0.1655	0.1740	-0.2367	-0.0733	-0.2591	-0.0393	-0.3684	1.0000

FORWARD REGRESSION
Pollutant: Total Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	172
Number of Observations Used	123
Number of Observations with Missing Values	49

Forward Selection: Step 1

Variable X4 Entered: R-Square = 0.2714 and C(p) = 108.6560

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	73.61736	73.61736	45.07	<.0001
Error	121	197.65355	1.63350		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.91328	0.35721	196.04698	120.02	<.0001
X4	-0.06851	0.01021	73.61736	45.07	<.0001

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X3X5 Entered: R-Square = 0.4685 and C(p) = 49.0548

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	127.10025	63.55012	52.90	<.0001
Error	120	144.17066	1.20142		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.42319	0.31503	141.86089	118.08	<.0001

X4	-0.12439	0.01211	126.68037	105.44	<.0001
X3X5	0.00054108	0.00008110	53.48289	44.52	<.0001

Bounds on condition number: 1.9156, 7.6624

Forward Selection: Step 3

Variable X1X5 Entered: R-Square = 0.4852 and C(p) = 45.8341

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	131.63292	43.87764	37.39	<.0001
Error	119	139.63799	1.17343		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.32897	0.31500	131.05208	111.68	<.0001
X4	-0.12187	0.01204	120.21593	102.45	<.0001
X1X5	0.05278	0.02685	4.53267	3.86	0.0517
X3X5	0.00047563	0.00008679	35.24230	30.03	<.0001

Bounds on condition number: 2.2463, 16.256

Forward Selection: Step 4

Variable X3X4 Entered: R-Square = 0.4910 and C(p) = 46.0302

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	133.19905	33.29976	28.46	<.0001
Error	118	138.07186	1.17010		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.23356	0.32519	115.69575	98.88	<.0001
X4	-0.11382	0.01389	78.58589	67.16	<.0001
X1X5	0.04498	0.02765	3.09723	2.65	0.1064
X3X4	-0.00001522	0.00001316	1.56613	1.34	0.2496
X3X5	0.00057976	0.00012495	25.19073	21.53	<.0001

Bounds on condition number: 5.4113, 55.916

Forward Selection: Step 5

Variable X4X5 Entered: R-Square = 0.6013 and C(p) = 13.5707

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	163.11720	32.62344	35.29	<.0001
Error	117	108.15371	0.92439		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-10.71692	2.46914	17.41422	18.84	<.0001
X4	0.65509	0.13572	21.53648	23.30	<.0001
X1X5	0.02677	0.02478	1.07896	1.17	0.2822
X3X4	-0.00044978	0.00007728	31.31672	33.88	<.0001
X3X5	0.00446	0.00069130	38.50233	41.65	<.0001
X4X5	-0.08434	0.01483	29.91815	32.37	<.0001

Bounds on condition number: 312.52, 5032.1

Forward Selection: Step 6

Variable X1X4 Entered: R-Square = 0.6362 and C(p) = 4.6592

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	172.59073	28.76512	33.81	<.0001
Error	116	98.68018	0.85069		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-11.76246	2.38930	20.61710	24.24	<.0001
X4	0.70377	0.13101	24.54807	28.86	<.0001
X1X4	0.03743	0.01122	9.47353	11.14	0.0011
X1X5	-0.29462	0.09920	7.50360	8.82	0.0036
X3X4	-0.00053338	0.00007825	39.52620	46.46	<.0001
X3X5	0.00527	0.00070578	47.38487	55.70	<.0001
X4X5	-0.09061	0.01435	33.93531	39.89	<.0001

Bounds on condition number: 316.45, 6656.5

Forward Selection: Step 7

Variable X3 Entered: R-Square = 0.6408 and C(p) = 5.2276

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	173.83365	24.83338	29.31	<.0001
Error	115	97.43726	0.84728		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-17.42237	5.24627	9.34417	11.03	0.0012
X3	0.00466	0.00385	1.24292	1.47	0.2283
X4	0.85647	0.18163	18.83957	22.24	<.0001
X1X4	0.04006	0.01140	10.45927	12.34	0.0006
X1X5	-0.30865	0.09968	8.12420	9.59	0.0025
X3X4	-0.00063015	0.00011172	26.95434	31.81	<.0001
X3X5	0.00504	0.00072980	40.34807	47.62	<.0001
X4X5	-0.09163	0.01434	34.58410	40.82	<.0001

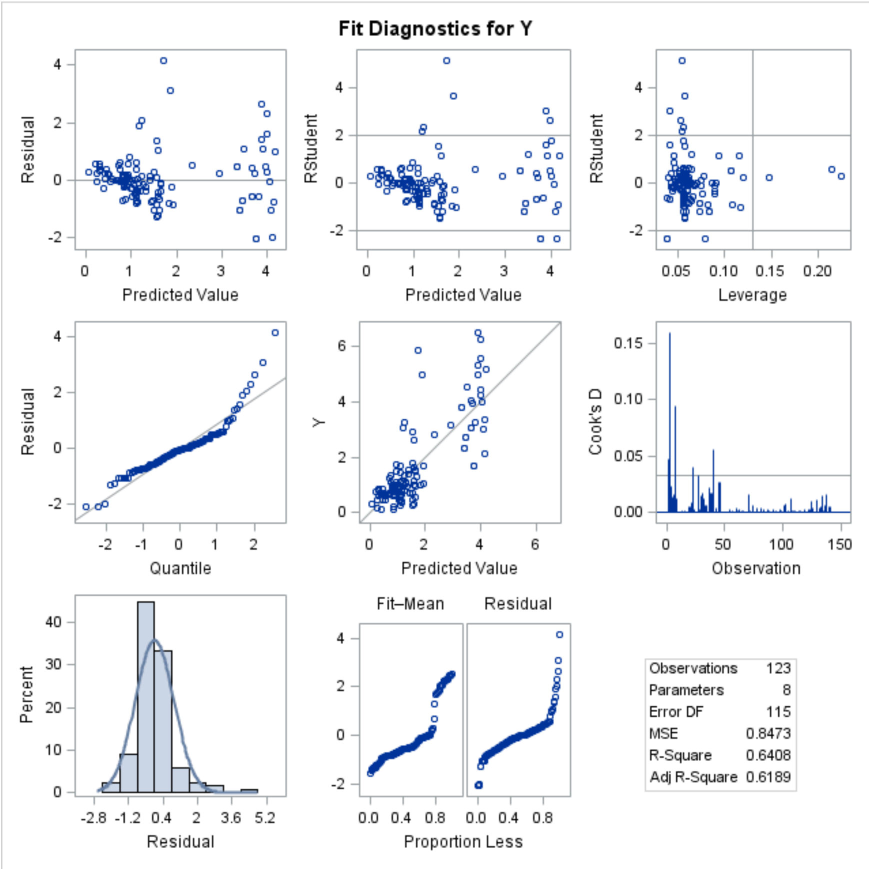
Bounds on condition number: 610.68, 12950

No other variable met the 0.5000 significance level for entry into the model.

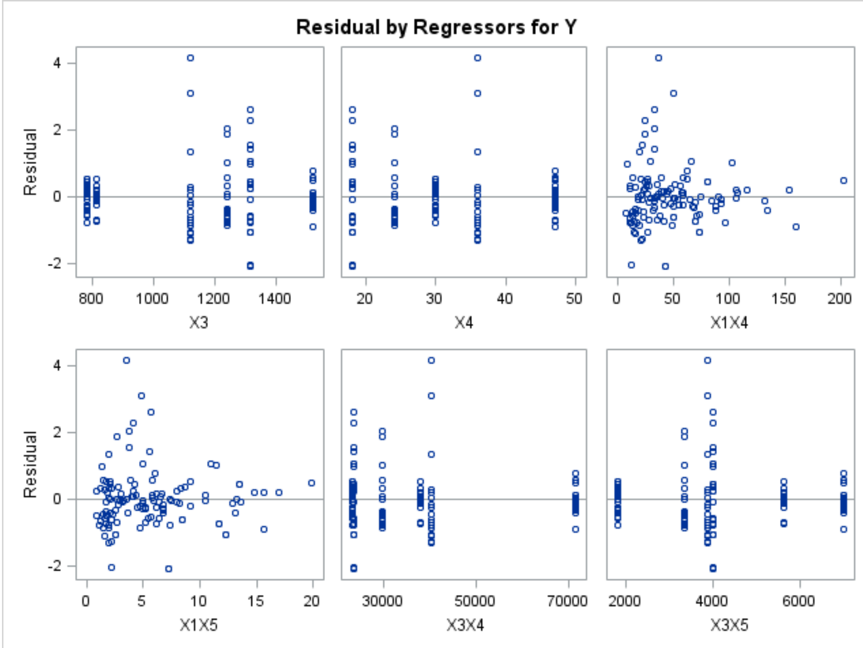
Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X4	1	0.2714	0.2714	108.656	45.07	<.0001
2	X3X5	2	0.1972	0.4685	49.0548	44.52	<.0001
3	X1X5	3	0.0167	0.4852	45.8341	3.86	0.0517
4	X3X4	4	0.0058	0.4910	46.0302	1.34	0.2496
5	X4X5	5	0.1103	0.6013	13.5707	32.37	<.0001
6	X1X4	6	0.0349	0.6362	4.6592	11.14	0.0011
7	X3	7	0.0046	0.6408	5.2276	1.47	0.2283

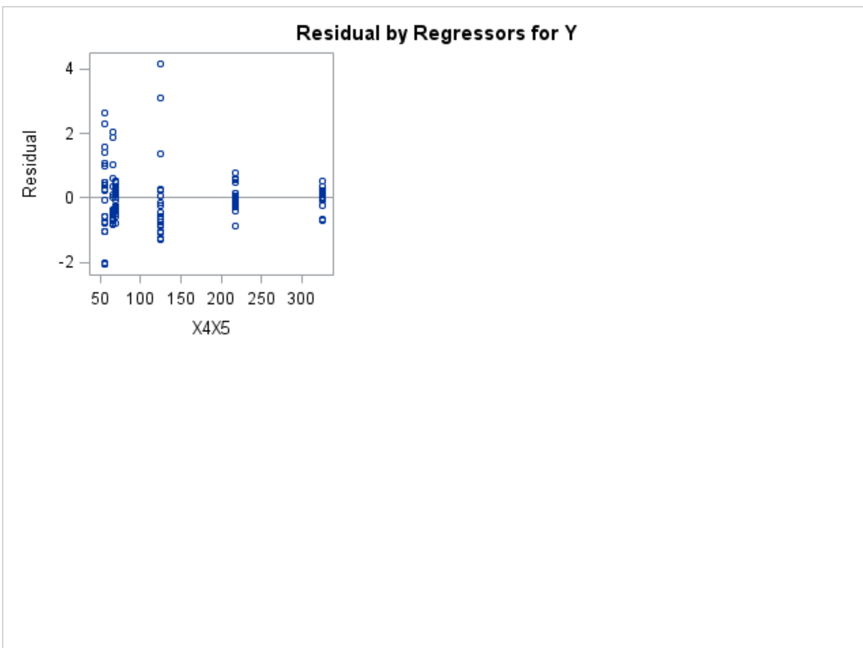
FORWARD REGRESSION
Pollutant: Total Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Observations	123
Parameters	8
Error DF	115
MSE	0.8473
R-Square	0.6408
Adj R-Square	0.6189


Residual by Regressors for Y
Residual
X3
X4
X1X4
X1X5
X3X4
X3X5


Residual by Regressors for Y
Residual
X4X5

BACKWARD REGRESSION
Pollutant: Total Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	172
Number of Observations Used	123
Number of Observations with Missing Values	49

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0980	0.1764	-0.1985	-0.0964	0.5631	0.9483	0.7767	0.8393	-0.0436	-0.1796	-0.1235	-0.0565	0.0358	-0.1418	0.3265
X2	-0.0980	1.0000	0.0058	-0.0306	0.0770	0.6351	-0.0860	-0.1104	-0.0469	0.9443	0.8079	0.8279	-0.0358	0.0601	0.0425	0.0701
X3	0.1764	0.0058	1.0000	-0.0656	-0.1204	0.1188	0.4388	0.1530	0.1548	0.2885	-0.0534	-0.0826	0.5550	0.5551	-0.1350	0.3448
X4	-0.1985	-0.0306	-0.0656	1.0000	0.7706	-0.1589	-0.1837	0.3689	0.2243	-0.0633	0.4598	0.3587	0.7818	0.6914	0.8962	-0.5209
X5	-0.0964	0.0770	-0.1204	0.7706	1.0000	0.0005	-0.0918	0.2750	0.3895	0.0162	0.4485	0.5628	0.4756	0.7382	0.9716	-0.2288
X1X2	0.5631	0.6351	0.1188	-0.1589	0.0005	1.0000	0.5518	0.3970	0.5114	0.6321	0.4194	0.4954	-0.0725	0.0678	-0.0593	0.2961
X1X3	0.9483	-0.0860	0.4388	-0.1837	-0.0918	0.5518	1.0000	0.7445	0.8158	0.0366	-0.1720	-0.1251	0.1116	0.2091	-0.1414	0.3956
X1X4	0.7767	-0.1104	0.1530	0.3689	0.2750	0.3970	0.7445	1.0000	0.9022	-0.0723	0.0671	0.0460	0.4084	0.3908	0.3237	0.0072
X1X5	0.8393	-0.0469	0.1548	0.2243	0.3895	0.5114	0.8158	0.9022	1.0000	-0.0186	0.0667	0.1573	0.2422	0.4252	0.3475	0.1655
X2X3	-0.0436	0.9443	0.2885	-0.0633	0.0162	0.6321	0.0366	-0.0723	-0.0186	1.0000	0.7320	0.7450	0.1123	0.1962	-0.0197	0.1740
X2X4	-0.1796	0.8079	-0.0534	0.4598	0.4485	0.4194	-0.1720	0.0671	0.0667	0.7320	1.0000	0.9240	0.3320	0.3737	0.4799	-0.2367
X2X5	-0.1235	0.8279	-0.0826	0.3587	0.5628	0.4954	-0.1251	0.0460	0.1573	0.7450	0.9240	1.0000	0.1904	0.3981	0.5214	-0.0733
X3X4	-0.0565	-0.0358	0.5550	0.7818	0.4756	-0.0725	0.1116	0.4084	0.2422	0.1123	0.3320	0.1904	1.0000	0.8574	0.5975	-0.2591
X3X5	0.0358	0.0601	0.5551	0.6914	0.7382	0.0678	0.2091	0.3908	0.4252	0.1962	0.3737	0.3981	0.8574	1.0000	0.7446	-0.0393
X4X5	-0.1418	0.0425	-0.1350	0.8962	0.9716	-0.0593	-0.1414	0.3237	0.3475	-0.0197	0.4799	0.5214	0.5975	0.7446	1.0000	-0.3684
Y	0.3265	0.0701	0.3448	-0.5209	-0.2288	0.2961	0.3956	0.0072	0.1655	0.1740	-0.2367	-0.0733	-0.2591	-0.0393	-0.3684	1.0000

BACKWARD REGRESSION
Pollutant: Total Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	172
Number of Observations Used	123
Number of Observations with Missing Values	49

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.6543 and C(p) = 15.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	14	177.50409	12.67886	14.60	<.0001
Error	108	93.76682	0.86821		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-37.45441	7.86165	19.70625	22.70	<.0001
X1	-0.39682	0.55273	0.44749	0.52	0.4744
X2	-0.48467	0.80123	0.31768	0.37	0.5465
X3	0.02913	0.00597	20.67752	23.82	<.0001
X4	2.06332	0.35517	29.30096	33.75	<.0001
X5	-10.15589	1.64210	33.20948	38.25	<.0001
X1X2	0.19901	0.13636	1.84916	2.13	0.1474
X1X3	0.00005655	0.00040482	0.01694	0.02	0.8892
X1X4	0.04325	0.01250	10.39555	11.97	0.0008
X1X5	-0.30089	0.12748	4.83671	5.57	0.0201
X2X3	-0.00003834	0.00053885	0.00440	0.01	0.9434
X2X4	-0.01111	0.01600	0.41881	0.48	0.4888
X2X5	0.14769	0.15870	0.75192	0.87	0.3541
X3X4	-0.00174	0.00027598	34.63445	39.89	<.0001
X3X5	0.00973	0.00149	36.78727	42.37	<.0001

Bounds on condition number: 3209.2, 110995

Backward Elimination: Step 1

Variable X2X3 Removed: R-Square = 0.6543 and C(p) = 13.0051

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	177.49969	13.65382	15.87	<.0001
Error	109	93.77122	0.86029		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-37.36017	7.71382	20.18002	23.46	<.0001
X1	-0.40497	0.53825	0.48699	0.57	0.4534
X2	-0.53240	0.43617	1.28175	1.49	0.2249
X3	0.02906	0.00586	21.17172	24.61	<.0001
X4	2.06140	0.35253	29.41608	34.19	<.0001
X5	-10.14745	1.63031	33.32838	38.74	<.0001
X1X2	0.19866	0.13565	1.84508	2.14	0.1459
X1X3	0.00006148	0.00039700	0.02063	0.02	0.8772
X1X4	0.04321	0.01243	10.39803	12.09	0.0007
X1X5	-0.29976	0.12592	4.87550	5.67	0.0190
X2X4	-0.01098	0.01581	0.41454	0.48	0.4891
X2X5	0.14692	0.15761	0.74758	0.87	0.3533
X3X4	-0.00174	0.00027400	34.75852	40.40	<.0001
X3X5	0.00972	0.00148	36.91681	42.91	<.0001

Bounds on condition number: 3192.6, 101385

Backward Elimination: Step 2

Variable X1X3 Removed: R-Square = 0.6543 and C(p) = 11.0288

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	12	177.47906	14.78992	17.35	<.0001
Error	110	93.79185	0.85265		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-37.53318	7.59856	20.80371	24.40	<.0001
X1	-0.33773	0.31670	0.96968	1.14	0.2886
X2	-0.53029	0.43402	1.27285	1.49	0.2244
X3	0.02919	0.00577	21.83808	25.61	<.0001
X4	2.06503	0.35018	29.65081	34.77	<.0001
X5	-10.16400	1.61957	33.58154	39.38	<.0001
X1X2	0.20155	0.13377	1.93556	2.27	0.1348
X1X4	0.04302	0.01231	10.40913	12.21	0.0007

X1X5	-0.29666	0.12376	4.89942	5.75	0.0182
X2X4	-0.01075	0.01568	0.40111	0.47	0.4942
X2X5	0.14312	0.15499	0.72703	0.85	0.3578
X3X4	-0.00174	0.00027212	35.04600	41.10	<.0001
X3X5	0.00974	0.00147	37.26465	43.70	<.0001

Bounds on condition number: 3177.1, 92136

Backward Elimination: Step 3

Variable X2X4 Removed: R-Square = 0.6528 and C(p) = 9.4908

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	11	177.07795	16.09800	18.97	<.0001
Error	111	94.19296	0.84859		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-38.35726	7.48505	22.28444	26.26	<.0001
X1	-0.36949	0.31254	1.18596	1.40	0.2397
X2	-0.58406	0.42586	1.59615	1.88	0.1730
X3	0.02988	0.00567	23.58735	27.80	<.0001
X4	2.09304	0.34696	30.88070	36.39	<.0001
X5	-10.23179	1.61269	34.15819	40.25	<.0001
X1X2	0.22233	0.12998	2.48264	2.93	0.0900
X1X4	0.04541	0.01178	12.61870	14.87	0.0002
X1X5	-0.31254	0.12128	5.63545	6.64	0.0113
X2X5	0.06383	0.10300	0.32593	0.38	0.5367
X3X4	-0.00178	0.00026730	37.51253	44.21	<.0001
X3X5	0.00987	0.00146	39.07683	46.05	<.0001

Bounds on condition number: 3080.2, 82194

Backward Elimination: Step 4

Variable X2X5 Removed: R-Square = 0.6516 and C(p) = 7.8662

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	10	176.75202	17.67520	20.94	<.0001
Error	112	94.51889	0.84392		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-38.21672	7.46101	22.14177	26.24	<.0001
X1	-0.35067	0.31021	1.07842	1.28	0.2607
X2	-0.35437	0.20917	2.42207	2.87	0.0930
X3	0.02963	0.00564	23.31017	27.62	<.0001
X4	2.06737	0.34353	30.56342	36.22	<.0001
X5	-10.01296	1.56923	34.35983	40.71	<.0001
X1X2	0.21602	0.12923	2.35819	2.79	0.0974
X1X4	0.04477	0.01170	12.35915	14.64	0.0002
X1X5	-0.30962	0.12085	5.53918	6.56	0.0117
X3X4	-0.00176	0.00026427	37.24098	44.13	<.0001
X3X5	0.00973	0.00143	38.96233	46.17	<.0001

Bounds on condition number: 3027.3, 72936

Backward Elimination: Step 5

Variable X1 Removed: R-Square = 0.6476 and C(p) = 7.1084

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	175.67359	19.51929	23.07	<.0001
Error	113	95.59732	0.84599		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-38.28237	7.46995	22.21925	26.26	<.0001
X2	-0.27882	0.19845	1.66988	1.97	0.1628
X3	0.02945	0.00564	23.05704	27.25	<.0001
X4	2.01837	0.34121	29.60308	34.99	<.0001
X5	-9.56188	1.51951	33.49994	39.60	<.0001
X1X2	0.17342	0.12376	1.66104	1.96	0.1639
X1X4	0.04232	0.01151	11.43555	13.52	0.0004
X1X5	-0.37035	0.10839	9.87601	11.67	0.0009
X3X4	-0.00171	0.00026113	36.16560	42.75	<.0001
X3X5	0.00932	0.00139	38.16745	45.12	<.0001

Bounds on condition number: 2948.6, 63454

Backward Elimination: Step 6

Variable X1X2 Removed: R-Square = 0.6415 and C(p) = 7.0215

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	8	174.01255	21.75157	25.50	<.0001
Error	114	97.25836	0.85314		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-38.14885	7.50084	22.06812	25.87	<.0001
X2	-0.05347	0.11677	0.17890	0.21	0.6479
X3	0.02929	0.00566	22.80967	26.74	<.0001
X4	2.02617	0.34260	29.84027	34.98	<.0001
X5	-9.71180	1.52213	34.73089	40.71	<.0001
X1X4	0.04004	0.01144	10.44593	12.24	0.0007
X1X5	-0.31077	0.10013	8.21870	9.63	0.0024
X3X4	-0.00171	0.00026218	36.47352	42.75	<.0001
X3X5	0.00942	0.00139	39.08721	45.82	<.0001

Bounds on condition number: 2947.6, 56250

Backward Elimination: Step 7

Variable X2 Removed: R-Square = 0.6408 and C(p) = 5.2276

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	7	173.83365	24.83338	29.31	<.0001
Error	115	97.43726	0.84728		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-38.38662	7.45709	22.45164	26.50	<.0001
X3	0.02949	0.00563	23.26861	27.46	<.0001
X4	2.02338	0.34137	29.76763	35.13	<.0001
X5	-9.64069	1.50898	34.58410	40.82	<.0001
X1X4	0.04006	0.01140	10.45927	12.34	0.0006
X1X5	-0.30865	0.09968	8.12420	9.59	0.0025
X3X4	-0.00171	0.00026105	36.32356	42.87	<.0001
X3X5	0.00932	0.00137	39.22223	46.29	<.0001

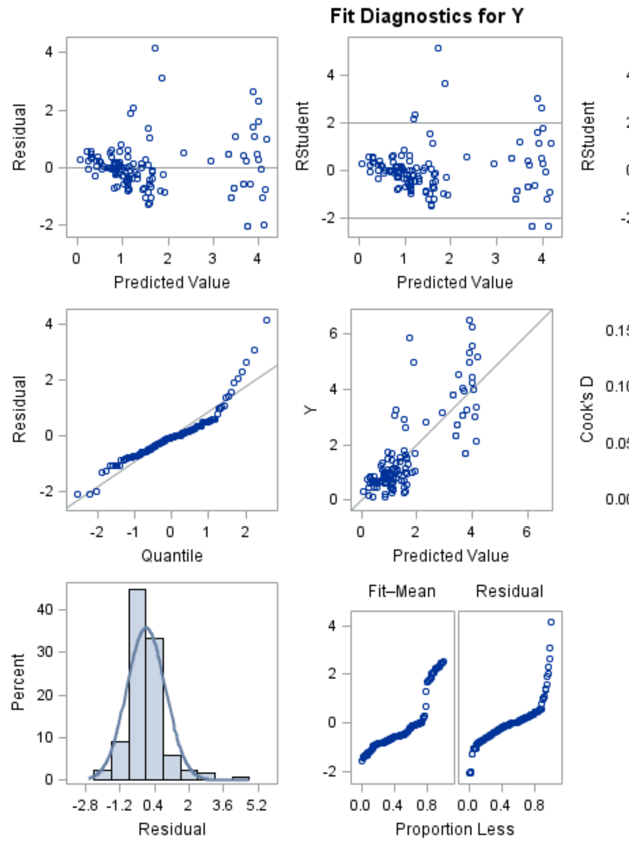
Bounds on condition number: 2942.4, 48965

All variables left in the model are significant at the 0.1000 level.

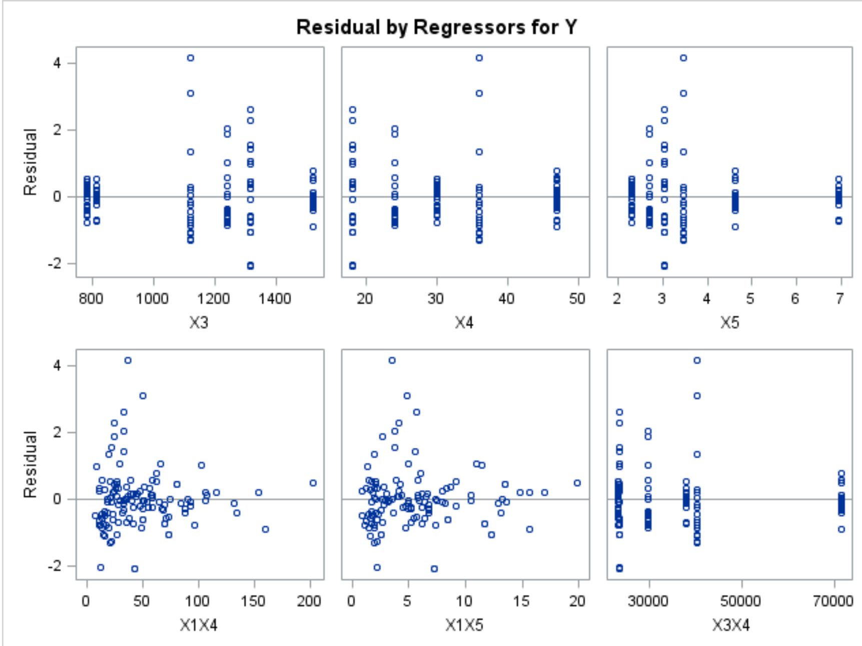
Summary of Backward Elimination							
Step	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X2X3	13	0.0000	0.6543	13.0051	0.01	0.9434
2	X1X3	12	0.0001	0.6543	11.0288	0.02	0.8772
3	X2X4	11	0.0015	0.6528	9.4908	0.47	0.4942
4	X2X5	10	0.0012	0.6516	7.8662	0.38	0.5367
5	X1	9	0.0040	0.6476	7.1084	1.28	0.2607
6	X1X2	8	0.0061	0.6415	7.0215	1.96	0.1639
7	X2	7	0.0007	0.6408	5.2276	0.21	0.6479

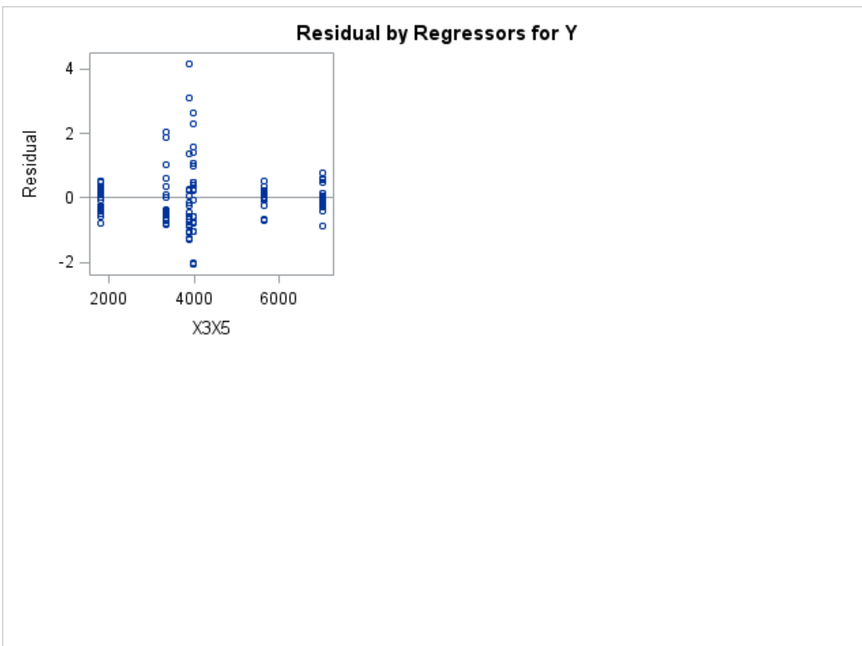
BACKWARD REGRESSION
Pollutant: Total Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Observations	123
Parameters	8
Error DF	115
MSE	0.8473
R-Square	0.6408
Adj R-Square	0.6189


Residual by Regressors for Y
Residual
X3
X4
X5
X1X4
X1X5
X3X4


Residual by Regressors for Y
Residual
X3X5

STEPWISE REGRESSION
Pollutant: Total Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	172
Number of Observations Used	123
Number of Observations with Missing Values	49

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0980	0.1764	-0.1985	-0.0964	0.5631	0.9483	0.7767	0.8393	-0.0436	-0.1796	-0.1235	-0.0565	0.0358	-0.1418	0.3265
X2	-0.0980	1.0000	0.0058	-0.0306	0.0770	0.6351	-0.0860	-0.1104	-0.0469	0.9443	0.8079	0.8279	-0.0358	0.0601	0.0425	0.0701
X3	0.1764	0.0058	1.0000	-0.0656	-0.1204	0.1188	0.4388	0.1530	0.1548	0.2885	-0.0534	-0.0826	0.5550	0.5551	-0.1350	0.3448
X4	-0.1985	-0.0306	-0.0656	1.0000	0.7706	-0.1589	-0.1837	0.3689	0.2243	-0.0633	0.4598	0.3587	0.7818	0.6914	0.8962	-0.5209
X5	-0.0964	0.0770	-0.1204	0.7706	1.0000	0.0005	-0.0918	0.2750	0.3895	0.0162	0.4485	0.5628	0.4756	0.7382	0.9716	-0.2288
X1X2	0.5631	0.6351	0.1188	-0.1589	0.0005	1.0000	0.5518	0.3970	0.5114	0.6321	0.4194	0.4954	-0.0725	0.0678	-0.0593	0.2961
X1X3	0.9483	-0.0860	0.4388	-0.1837	-0.0918	0.5518	1.0000	0.7445	0.8158	0.0366	-0.1720	-0.1251	0.1116	0.2091	-0.1414	0.3956
X1X4	0.7767	-0.1104	0.1530	0.3689	0.2750	0.3970	0.7445	1.0000	0.9022	-0.0723	0.0671	0.0460	0.4084	0.3908	0.3237	0.0072
X1X5	0.8393	-0.0469	0.1548	0.2243	0.3895	0.5114	0.8158	0.9022	1.0000	-0.0186	0.0667	0.1573	0.2422	0.4252	0.3475	0.1655
X2X3	-0.0436	0.9443	0.2885	-0.0633	0.0162	0.6321	0.0366	-0.0723	-0.0186	1.0000	0.7320	0.7450	0.1123	0.1962	-0.0197	0.1740
X2X4	-0.1796	0.8079	-0.0534	0.4598	0.4485	0.4194	-0.1720	0.0671	0.0667	0.7320	1.0000	0.9240	0.3320	0.3737	0.4799	-0.2367
X2X5	-0.1235	0.8279	-0.0826	0.3587	0.5628	0.4954	-0.1251	0.0460	0.1573	0.7450	0.9240	1.0000	0.1904	0.3981	0.5214	-0.0733
X3X4	-0.0565	-0.0358	0.5550	0.7818	0.4756	-0.0725	0.1116	0.4084	0.2422	0.1123	0.3320	0.1904	1.0000	0.8574	0.5975	-0.2591
X3X5	0.0358	0.0601	0.5551	0.6914	0.7382	0.0678	0.2091	0.3908	0.4252	0.1962	0.3737	0.3981	0.8574	1.0000	0.7446	-0.0393
X4X5	-0.1418	0.0425	-0.1350	0.8962	0.9716	-0.0593	-0.1414	0.3237	0.3475	-0.0197	0.4799	0.5214	0.5975	0.7446	1.0000	-0.3684
Y	0.3265	0.0701	0.3448	-0.5209	-0.2288	0.2961	0.3956	0.0072	0.1655	0.1740	-0.2367	-0.0733	-0.2591	-0.0393	-0.3684	1.0000

STEPWISE REGRESSION
Pollutant: Total Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	172
Number of Observations Used	123
Number of Observations with Missing Values	49

Stepwise Selection: Step 1

Variable X4 Entered: R-Square = 0.2714 and C(p) = 108.6560

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	73.61736	73.61736	45.07	<.0001
Error	121	197.65355	1.63350		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.91328	0.35721	196.04698	120.02	<.0001
X4	-0.06851	0.01021	73.61736	45.07	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X3X5 Entered: R-Square = 0.4685 and C(p) = 49.0548

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	127.10025	63.55012	52.90	<.0001
Error	120	144.17066	1.20142		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.42319	0.31503	141.86089	118.08	<.0001

X4	-0.12439	0.01211	126.68037	105.44	<.0001
X3X5	0.00054108	0.00008110	53.48289	44.52	<.0001

Bounds on condition number: 1.9156, 7.6624

Stepwise Selection: Step 3

Variable X1X5 Entered: R-Square = 0.4852 and C(p) = 45.8341

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	131.63292	43.87764	37.39	<.0001
Error	119	139.63799	1.17343		
Corrected Total	122	271.27091			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.32897	0.31500	131.05208	111.68	<.0001
X4	-0.12187	0.01204	120.21593	102.45	<.0001
X1X5	0.05278	0.02685	4.53267	3.86	0.0517
X3X5	0.00047563	0.00008679	35.24230	30.03	<.0001

Bounds on condition number: 2.2463, 16.256

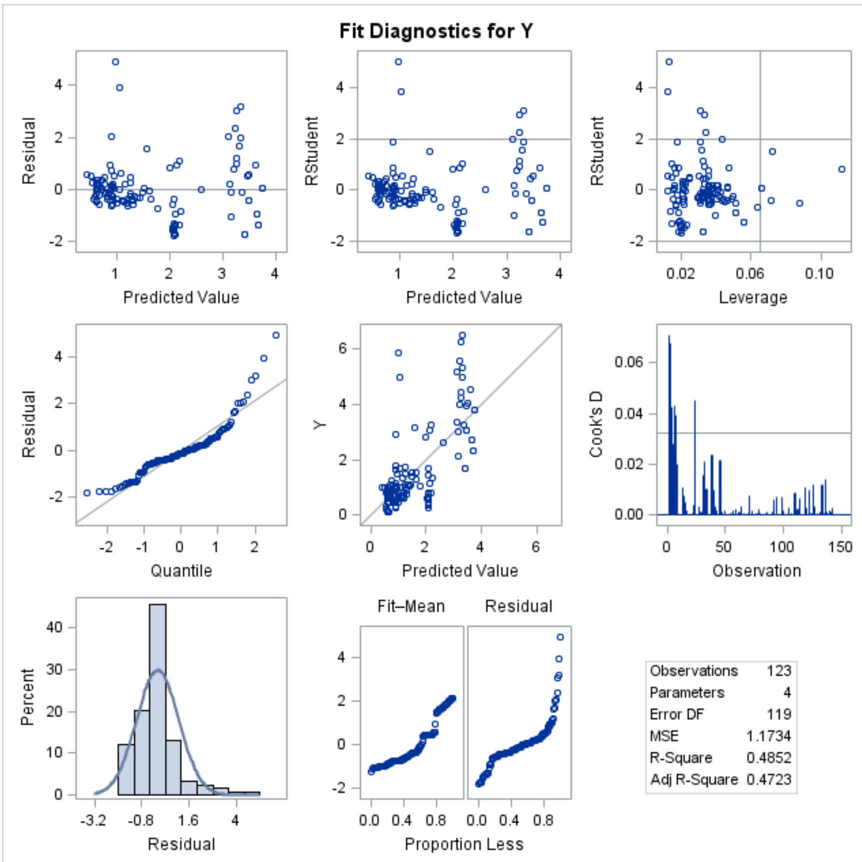
All variables left in the model are significant at the 0.1500 level.

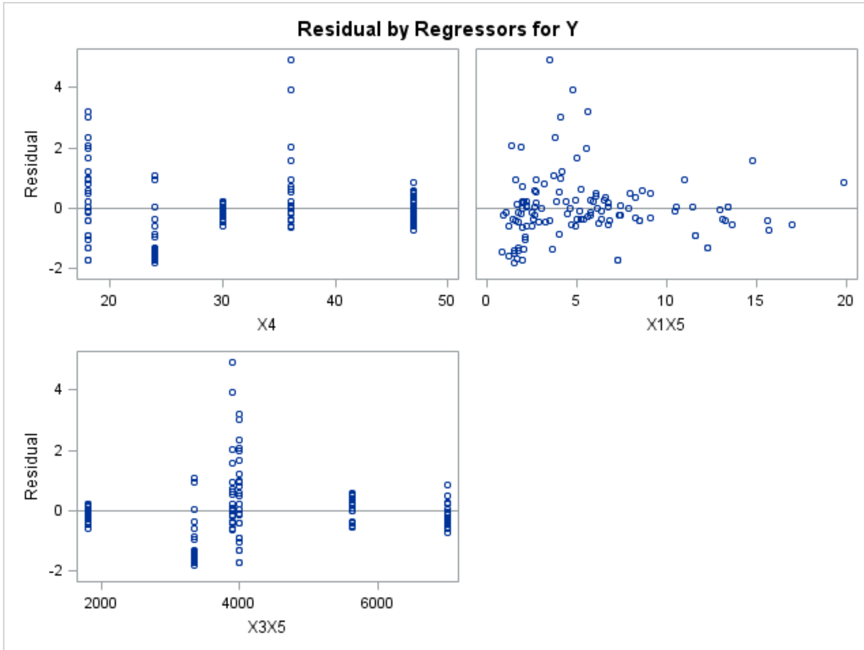
No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	X4		1	0.2714	0.2714	108.656	45.07	<.0001
2	X3X5		2	0.1972	0.4685	49.0548	44.52	<.0001
3	X1X5		3	0.0167	0.4852	45.8341	3.86	0.0517

STEPWISE REGRESSION
Pollutant: Total Nitrogen
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X4
X1X5
X3X5

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Phosphorus

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The REG Procedure

Number of Observations Read	172
Number of Observations Used	123
Number of Observations with Missing Values	49

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0980	0.1764	-0.1985	-0.0964	0.5631	0.9483	0.7767	0.8393	-0.0436	-0.1796	-0.1235	-0.0565	0.0358	-0.1418	0.3265
X2	-0.0980	1.0000	0.0058	-0.0306	0.0770	0.6351	-0.0860	-0.1104	-0.0469	0.9443	0.8079	0.8279	-0.0358	0.0601	0.0425	0.0701
X3	0.1764	0.0058	1.0000	-0.0656	-0.1204	0.1188	0.4388	0.1530	0.1548	0.2885	-0.0534	-0.0826	0.5550	0.5551	-0.1350	0.3448
X4	-0.1985	-0.0306	-0.0656	1.0000	0.7706	-0.1589	-0.1837	0.3689	0.2243	-0.0633	0.4598	0.3587	0.7818	0.6914	0.8962	-0.5209
X5	-0.0964	0.0770	-0.1204	0.7706	1.0000	0.0005	-0.0918	0.2750	0.3895	0.0162	0.4485	0.5628	0.4756	0.7382	0.9716	-0.2288
X1X2	0.5631	0.6351	0.1188	-0.1589	0.0005	1.0000	0.5518	0.3970	0.5114	0.6321	0.4194	0.4954	-0.0725	0.0678	-0.0593	0.2961
X1X3	0.9483	-0.0860	0.4388	-0.1837	-0.0918	0.5518	1.0000	0.7445	0.8158	0.0366	-0.1720	-0.1251	0.1116	0.2091	-0.1414	0.3956
X1X4	0.7767	-0.1104	0.1530	0.3689	0.2750	0.3970	0.7445	1.0000	0.9022	-0.0723	0.0671	0.0460	0.4084	0.3908	0.3237	0.0072
X1X5	0.8393	-0.0469	0.1548	0.2243	0.3895	0.5114	0.8158	0.9022	1.0000	-0.0186	0.0667	0.1573	0.2422	0.4252	0.3475	0.1655
X2X3	-0.0436	0.9443	0.2885	-0.0633	0.0162	0.6321	0.0366	-0.0723	-0.0186	1.0000	0.7320	0.7450	0.1123	0.1962	-0.0197	0.1740
X2X4	-0.1796	0.8079	-0.0534	0.4598	0.4485	0.4194	-0.1720	0.0671	0.0667	0.7320	1.0000	0.9240	0.3320	0.3737	0.4799	-0.2367
X2X5	-0.1235	0.8279	-0.0826	0.3587	0.5628	0.4954	-0.1251	0.0460	0.1573	0.7450	0.9240	1.0000	0.1904	0.3981	0.5214	-0.0733
X3X4	-0.0565	-0.0358	0.5550	0.7818	0.4756	-0.0725	0.1116	0.4084	0.2422	0.1123	0.3320	0.1904	1.0000	0.8574	0.5975	-0.2591
X3X5	0.0358	0.0601	0.5551	0.6914	0.7382	0.0678	0.2091	0.3908	0.4252	0.1962	0.3737	0.3981	0.8574	1.0000	0.7446	-0.0393
X4X5	-0.1418	0.0425	-0.1350	0.8962	0.9716	-0.0593	-0.1414	0.3237	0.3475	-0.0197	0.4799	0.5214	0.5975	0.7446	1.0000	-0.3684
Y	0.3265	0.0701	0.3448	-0.5209	-0.2288	0.2961	0.3956	0.0072	0.1655	0.1740	-0.2367	-0.0733	-0.2591	-0.0393	-0.3684	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Phosphorus

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The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	172
Number of Observations Used	123
Number of Observations with Missing Values	49

Number in Model	R-Square	Variables in Model
1	0.2714	X4
1	0.1565	X1X3
1	0.1357	X4X5
1	0.1189	X3
1	0.1066	X1
1	0.0877	X1X2
1	0.0671	X3X4
1	0.0560	X2X4
1	0.0524	X5
1	0.0303	X2X3
1	0.0274	X1X5
1	0.0054	X2X5
1	0.0049	X2
1	0.0015	X3X5
1	0.0001	X1X4
2	0.4685	X4 X3X5
2	0.4330	X5 X4X5
2	0.4122	X3 X3X4
2	0.3683	X3 X4
2	0.3645	X4 X1X3
2	0.3553	X4 X1X5
2	0.3448	X4 X5
2	0.3418	X1X3 X1X4
2	0.3278	X4 X3X4
2	0.3232	X1 X4
2	0.3207	X4 X4X5
2	0.3181	X4 X1X2
2	0.3174	X4 X1X4
2	0.3159	X2X3 X2X4
2	0.2914	X4 X2X3
3	0.5248	X5 X3X4 X4X5
3	0.5245	X5 X3X5 X4X5
3	0.5191	X4 X5 X4X5
3	0.5117	X3X4 X3X5 X4X5
3	0.5075	X3 X5 X4X5
3	0.5011	X5 X3X4 X3X5

3	0.4934	X5 X1X3 X4X5
3	0.4876	X5 X1X4 X4X5
3	0.4852	X4 X1X5 X3X5
3	0.4848	X4 X1X4 X3X5
3	0.4836	X1 X4 X3X5
3	0.4804	X4 X1X2 X3X5
3	0.4802	X4 X1X3 X3X5
3	0.4797	X3 X4 X3X5
3	0.4796	X4 X3X4 X3X5
4	0.5973	X4 X3X4 X3X5 X4X5
4	0.5736	X3 X5 X3X5 X4X5
4	0.5691	X3 X5 X3X4 X4X5
4	0.5653	X4 X5 X1X4 X4X5
4	0.5571	X4 X5 X1X3 X4X5
4	0.5535	X5 X1X4 X3X4 X4X5
4	0.5510	X1 X4 X5 X4X5
4	0.5506	X4 X5 X1X5 X4X5
4	0.5504	X5 X1X4 X3X5 X4X5
4	0.5484	X3 X3X4 X3X5 X4X5
4	0.5469	X4 X5 X3X5 X4X5
4	0.5434	X1 X5 X3X4 X4X5
4	0.5413	X4 X5 X1X2 X4X5
4	0.5413	X5 X1X5 X3X4 X4X5
4	0.5410	X5 X1X3 X3X4 X4X5
5	0.6086	X4 X1X4 X3X4 X3X5 X4X5
5	0.6013	X4 X1X5 X3X4 X3X5 X4X5
5	0.6012	X4 X2X4 X3X4 X3X5 X4X5
5	0.6005	X1 X4 X3X4 X3X5 X4X5
5	0.6003	X4 X1X3 X3X4 X3X5 X4X5
5	0.5990	X2 X4 X3X4 X3X5 X4X5
5	0.5987	X4 X2X3 X3X4 X3X5 X4X5
5	0.5985	X4 X2X5 X3X4 X3X5 X4X5
5	0.5984	X4 X1X2 X3X4 X3X5 X4X5
5	0.5975	X3 X4 X5 X3X4 X3X5
5	0.5975	X3 X4 X3X4 X3X5 X4X5
5	0.5975	X4 X5 X3X4 X3X5 X4X5
5	0.5975	X3 X4 X5 X3X4 X4X5
5	0.5975	X3 X4 X5 X3X5 X4X5
5	0.5975	X3 X5 X3X4 X3X5 X4X5
6	0.6362	X4 X1X4 X1X5 X3X4 X3X5 X4X5
6	0.6245	X1 X4 X1X4 X3X4 X3X5 X4X5
6	0.6215	X4 X1X3 X1X4 X3X4 X3X5 X4X5
6	0.6191	X3 X5 X1X4 X1X5 X3X5 X4X5
6	0.6189	X3 X5 X1X4 X1X5 X3X4 X4X5
6	0.6109	X4 X1X4 X2X4 X3X4 X3X5 X4X5
6	0.6109	X3 X4 X5 X1X4 X3X4 X3X5
6	0.6109	X3 X4 X1X4 X3X4 X3X5 X4X5
6	0.6109	X4 X5 X1X4 X3X4 X3X5 X4X5
6	0.6109	X3 X4 X5 X1X4 X3X5 X4X5
6	0.6109	X3 X4 X5 X1X4 X3X4 X4X5
6	0.6109	X3 X5 X1X4 X3X4 X3X5 X4X5
6		

	0.6108	X4 X2X4 X2X5 X3X4 X3X5 X4X5
6	0.6093	X2 X4 X1X4 X3X4 X3X5 X4X5
6	0.6091	X4 X1X4 X2X3 X3X4 X3X5 X4X5
7	0.6408	X3 X4 X5 X1X4 X1X5 X3X4 X3X5
7	0.6408	X3 X4 X1X4 X1X5 X3X4 X3X5 X4X5
7	0.6408	X4 X5 X1X4 X1X5 X3X4 X3X5 X4X5
7	0.6408	X3 X4 X5 X1X4 X1X5 X3X4 X4X5
7	0.6408	X3 X4 X5 X1X4 X1X5 X3X5 X4X5
7	0.6408	X3 X5 X1X4 X1X5 X3X4 X3X5 X4X5
7	0.6384	X1 X4 X1X4 X1X5 X3X4 X3X5 X4X5
7	0.6384	X4 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
7	0.6378	X2 X4 X1X4 X1X5 X3X4 X3X5 X4X5
7	0.6376	X4 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
7	0.6370	X4 X1X4 X1X5 X2X5 X3X4 X3X5 X4X5
7	0.6370	X4 X1X3 X1X4 X1X5 X3X4 X3X5 X4X5
7	0.6363	X4 X1X2 X1X4 X1X5 X3X4 X3X5 X4X5
7	0.6272	X1 X4 X1X4 X2X4 X3X4 X3X5 X4X5
7	0.6263	X1 X2 X4 X1X4 X3X4 X3X5 X4X5
8	0.6430	X2 X4 X1X2 X1X4 X1X5 X3X4 X3X5 X4X5
8	0.6428	X4 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
8	0.6422	X4 X1X2 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
8	0.6422	X4 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
8	0.6419	X1 X3 X4 X5 X1X4 X1X5 X3X4 X3X5
8	0.6419	X1 X3 X4 X1X4 X1X5 X3X4 X3X5 X4X5
8	0.6419	X1 X4 X5 X1X4 X1X5 X3X4 X3X5 X4X5
8	0.6419	X1 X3 X4 X5 X1X4 X1X5 X3X4 X4X5
8	0.6419	X1 X3 X4 X5 X1X4 X1X5 X3X5 X4X5
8	0.6419	X1 X3 X5 X1X4 X1X5 X3X4 X3X5 X4X5
8	0.6419	X3 X4 X5 X1X4 X1X5 X2X4 X3X4 X3X5
8	0.6419	X3 X4 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
8	0.6419	X4 X5 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
8	0.6419	X3 X4 X5 X1X4 X1X5 X2X4 X3X4 X4X5
8	0.6419	X3 X4 X5 X1X4 X1X5 X2X4 X3X5 X4X5
9	0.6488	X1 X2 X4 X1X2 X1X4 X1X5 X3X4 X3X5 X4X5
9	0.6476	X2 X3 X4 X5 X1X2 X1X4 X1X5 X3X4 X3X5
9	0.6476	X2 X3 X4 X1X2 X1X4 X1X5 X3X4 X3X5 X4X5
9	0.6476	X2 X4 X5 X1X2 X1X4 X1X5 X3X4 X3X5 X4X5
9	0.6476	X2 X3 X4 X5 X1X2 X1X4 X1X5 X3X4 X4X5
9	0.6476	X2 X3 X4 X5 X1X2 X1X4 X1X5 X3X5 X4X5
9	0.6476	X2 X3 X5 X1X2 X1X4 X1X5 X3X4 X3X5 X4X5
9	0.6473	X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5
9	0.6473	X3 X4 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
9	0.6473	X4 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
9	0.6473	X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X4X5
9	0.6473	X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X3X5 X4X5
9	0.6473	X3 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
9	0.6473	X1 X4 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
9	0.6466	X3 X4 X5 X1X2 X1X4 X1X5 X2X4 X3X4 X3X5
10	0.6516	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X3X4 X3X5
10	0.6516	X1 X2 X3 X4 X1X2 X1X4 X1X5 X3X4 X3X5 X4X5
10	0.6516	X1 X2 X4 X5 X1X2 X1X4 X1X5 X3X4 X3X5 X4X5
10		

	0.6516	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X3X4 X4X5
10	0.6516	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X3X5 X4X5
10	0.6516	X1 X2 X3 X5 X1X2 X1X4 X1X5 X3X4 X3X5 X4X5
10	0.6507	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5
10	0.6507	X1 X3 X4 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
10	0.6507	X1 X4 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
10	0.6507	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X4X5
10	0.6507	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X3X5 X4X5
10	0.6507	X1 X3 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
10	0.6504	X1 X2 X4 X1X2 X1X4 X1X5 X2X5 X3X4 X3X5 X4X5
10	0.6502	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X3X4 X3X5
10	0.6502	X2 X3 X4 X1X2 X1X3 X1X4 X1X5 X3X4 X3X5 X4X5
11	0.6528	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X5 X3X4 X3X5
11	0.6528	X1 X2 X3 X4 X1X2 X1X4 X1X5 X2X5 X3X4 X3X5 X4X5
11	0.6528	X1 X2 X4 X5 X1X2 X1X4 X1X5 X2X5 X3X4 X3X5 X4X5
11	0.6528	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X5 X3X4 X4X5
11	0.6528	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X5 X3X5 X4X5
11	0.6528	X1 X2 X3 X5 X1X2 X1X4 X1X5 X2X5 X3X4 X3X5 X4X5
11	0.6526	X1 X2 X4 X1X2 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.6516	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5
11	0.6516	X1 X2 X3 X4 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
11	0.6516	X1 X2 X4 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
11	0.6516	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X4X5
11	0.6516	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X3X5 X4X5
11	0.6516	X1 X2 X3 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
11	0.6516	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X3X4 X3X5
11	0.6516	X1 X2 X3 X4 X1X2 X1X3 X1X4 X1X5 X3X4 X3X5 X4X5
12	0.6543	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5
12	0.6543	X1 X2 X3 X4 X1X2 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.6543	X1 X2 X4 X5 X1X2 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.6543	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X4 X2X5 X3X4 X4X5
12	0.6543	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X4 X2X5 X3X5 X4X5
12	0.6543	X1 X2 X3 X5 X1X2 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.6532	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
12	0.6532	X1 X3 X4 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.6532	X1 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.6532	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
12	0.6532	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
12	0.6532	X1 X3 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.6528	X1 X2 X4 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.6528	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X5 X3X4 X3X5
12	0.6528	X1 X2 X3 X4 X1X2 X1X3 X1X4 X1X5 X2X5 X3X4 X3X5 X4X5
13	0.6543	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5
13	0.6543	X1 X2 X3 X4 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.6543	X1 X2 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.6543	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X4X5
13	0.6543	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X5 X4X5
13	0.6543	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.6543	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
13	0.6543	X1 X2 X3 X4 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.6543	X1 X2 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13		

	0.6543	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
13	0.6543	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
13	0.6543	X1 X2 X3 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.6532	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
13	0.6532	X1 X3 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.6532	X1 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.6543	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
14	0.6543	X1 X2 X3 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.6543	X1 X2 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.6543	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
14	0.6543	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
14	0.6543	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5

Note: Models of not full rank are not included.

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Phosphorus

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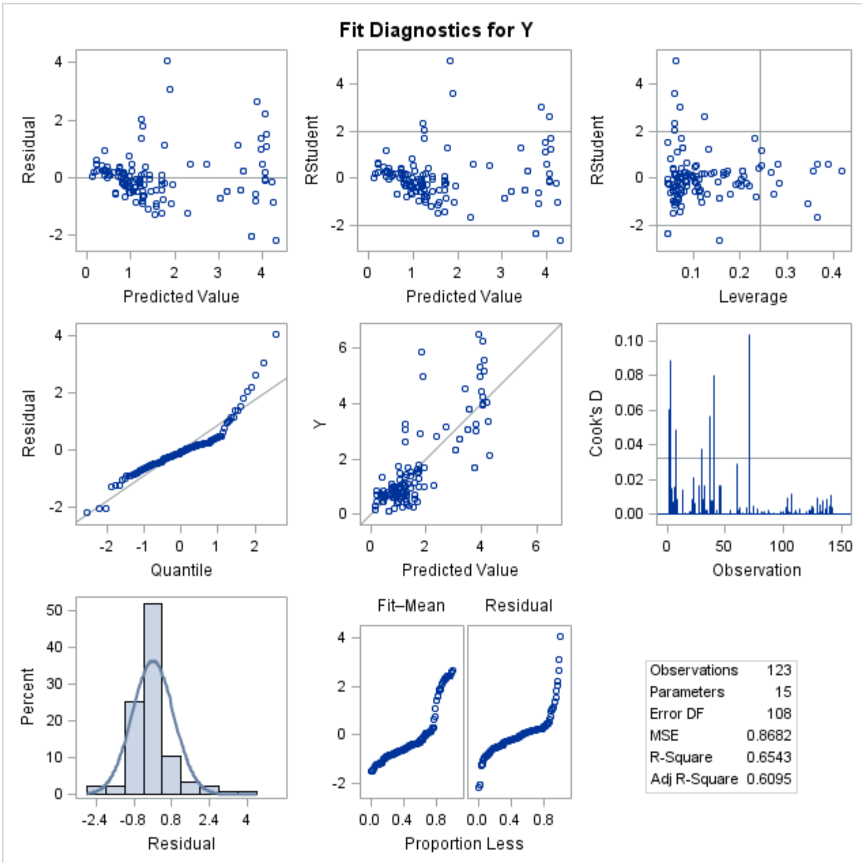
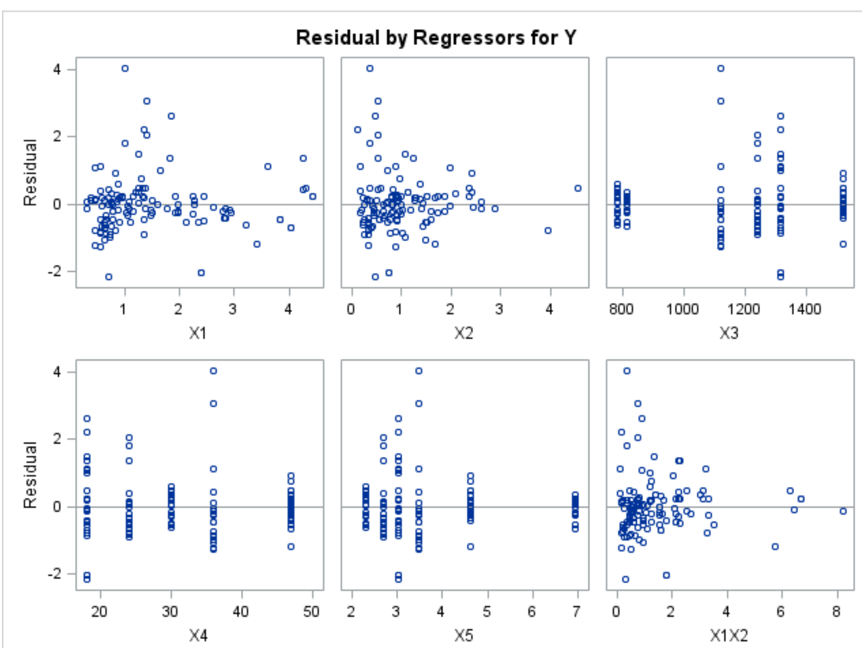
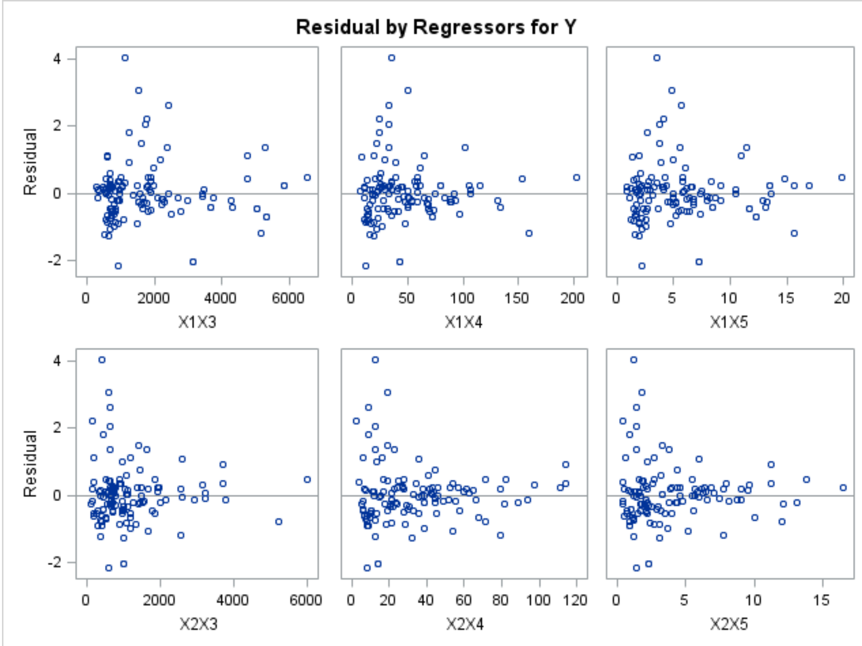
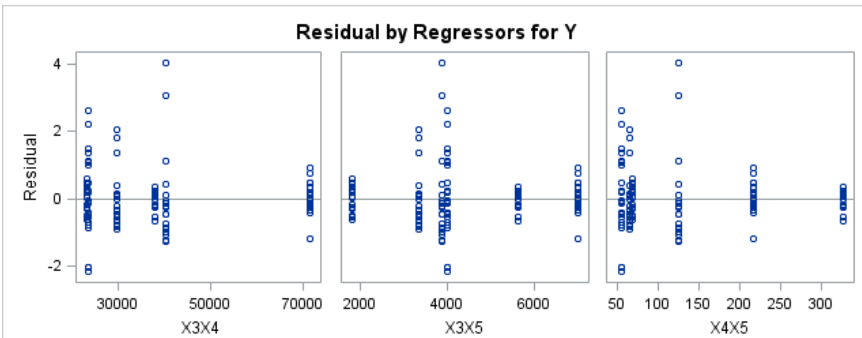
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
X1X3
X1X4
X1X5
X2X3
X2X4
X2X5


Residual by Regressors for Y
Residual
X3X4
X3X5
X4X5

FORWARD REGRESSION
Pollutant: Total Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	340
Number of Observations Used	178
Number of Observations with Missing Values	162

Correlation																
Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1525	0.0484	-0.3196	0.0807	0.4600	0.5718	0.8848	0.6450	-0.1112	-0.2543	-0.1069	-0.0235	0.0700	-0.0269	0.3118
X2	-0.1525	1.0000	-0.1303	0.1102	-0.1851	0.5919	-0.1595	-0.1281	-0.2028	0.6092	0.8384	0.5454	-0.1052	-0.1578	-0.1283	0.0744
X3	0.0484	-0.1303	1.0000	-0.0882	0.9154	-0.0679	0.6412	0.0875	0.5632	0.5247	-0.1599	0.4596	0.9580	0.9922	0.8394	0.0021
X4	-0.3196	0.1102	-0.0882	1.0000	-0.0566	-0.1455	-0.1380	0.0241	-0.1703	0.0002	0.5351	0.0960	0.1915	-0.1089	0.2761	-0.5184
X5	0.0807	-0.1851	0.9154	-0.0566	1.0000	-0.0950	0.5779	0.1069	0.5913	0.4197	-0.1728	0.4751	0.8785	0.9487	0.9400	-0.0195
X1X2	0.4600	0.5919	-0.0679	-0.1455	-0.0950	1.0000	0.1582	0.4029	0.1510	0.3295	0.3466	0.2726	-0.1007	-0.0798	-0.1308	0.2797
X1X3	0.5718	-0.1595	0.6412	-0.1380	0.5779	0.1582	1.0000	0.5842	0.9498	0.1747	-0.1978	0.1385	0.5950	0.6401	0.5044	0.1611
X1X4	0.8848	-0.1281	0.0875	0.0241	0.1069	0.4029	0.5842	1.0000	0.6313	-0.0785	-0.0985	-0.0665	0.1171	0.0904	0.1064	0.1536
X1X5	0.6450	-0.2028	0.5632	-0.1703	0.5913	0.1510	0.9498	0.6313	1.0000	0.1046	-0.2368	0.1181	0.5110	0.5852	0.5069	0.1961
X2X3	-0.1112	0.6092	0.5247	0.0002	0.4197	0.3295	0.1747	-0.0785	0.1046	1.0000	0.4769	0.9186	0.5148	0.4981	0.4026	0.0679
X2X4	-0.2543	0.8384	-0.1599	0.5351	-0.1728	0.3466	-0.1978	-0.0985	-0.2368	0.4769	1.0000	0.4979	-0.0146	-0.1842	0.0244	-0.1887
X2X5	-0.1069	0.5454	0.4596	0.0960	0.4751	0.2726	0.1385	-0.0665	0.1181	0.9186	0.4979	1.0000	0.4690	0.4646	0.4991	-0.0087
X3X4	-0.0235	-0.1052	0.9580	0.1915	0.8785	-0.1007	0.5950	0.1171	0.5110	0.5148	-0.0146	0.4690	1.0000	0.9415	0.8928	-0.1369
X3X5	0.0700	-0.1578	0.9922	-0.1089	0.9487	-0.0798	0.6401	0.0904	0.5852	0.4981	-0.1842	0.4646	0.9415	1.0000	0.8666	0.0015
X4X5	-0.0269	-0.1283	0.8394	0.2761	0.9400	-0.1308	0.5044	0.1064	0.5069	0.4026	0.0244	0.4991	0.8928	0.8666	1.0000	-0.1745
Y	0.3118	0.0744	0.0021	-0.5184	-0.0195	0.2797	0.1611	0.1536	0.1961	0.0679	-0.1887	-0.0087	-0.1369	0.0015	-0.1745	1.0000

FORWARD REGRESSION
Pollutant: Total Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	340
Number of Observations Used	178
Number of Observations with Missing Values	162

Forward Selection: Step 1

Variable X4 Entered: R-Square = 0.2687 and C(p) = 27.4589

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	8.74169	8.74169	64.68	<.0001
Error	176	23.78625	0.13515		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.94154	0.07514	21.21957	157.01	<.0001
X4	-0.02080	0.00259	8.74169	64.68	<.0001

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X1X2 Entered: R-Square = 0.3114 and C(p) = 17.7154

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	10.12824	5.06412	39.56	<.0001
Error	175	22.39970	0.12800		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.85734	0.07747	15.67544	122.47	<.0001

X4	-0.01958	0.00254	7.58389	59.25	<.0001
X1X2	0.33820	0.10276	1.38655	10.83	0.0012

Bounds on condition number: 1.0216, 4.0865

Forward Selection: Step 3

Variable X1X4 Entered: R-Square = 0.3193 and C(p) = 17.5244

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	10.38694	3.46231	27.21	<.0001
Error	174	22.14100	0.12725		
Corrected Total	177	32.52794			

Variable	**Parameter Estimate**	**Standard Error**	**Type II SS**	**F Value**	**Pr > F**
Intercept	0.83428	0.07892	14.22079	111.76	<.0001
X4	-0.01991	0.00255	7.77754	61.12	<.0001
X1X2	0.27236	0.11238	0.74738	5.87	0.0164
X1X4	0.00815	0.00572	0.25869	2.03	0.1557

Bounds on condition number: 1.2292, 10.39

Forward Selection: Step 4

Variable X2 Entered: R-Square = 0.3234 and C(p) = 18.3960

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	10.52017	2.63004	20.67	<.0001
Error	173	22.00777	0.12721		
Corrected Total	177	32.52794			

Variable	**Parameter Estimate**	**Standard Error**	**Type II SS**	**F Value**	**Pr > F**
Intercept	0.81768	0.08056	13.10637	103.03	<.0001
X2	0.05129	0.05011	0.13323	1.05	0.3076
X4	-0.02085	0.00271	7.55391	59.38	<.0001
X1X2	0.14433	0.16816	0.09371	0.74	0.3919
X1X4	0.01189	0.00678	0.39078	3.07	0.0814

Bounds on condition number: 2.7528, 31.669

Forward Selection: Step 5

Variable X3X5 Entered: R-Square = 0.3256 and C(p) = 19.7990

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	10.59065	2.11813	16.61	<.0001
Error	172	21.93729	0.12754		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.83496	0.08394	12.61850	98.94	<.0001
X2	0.04983	0.05022	0.12558	0.98	0.3225
X4	-0.02108	0.00273	7.62147	59.76	<.0001
X1X2	0.13531	0.16881	0.08194	0.64	0.4239
X1X4	0.01241	0.00683	0.42163	3.31	0.0708
X3X5	-4.53656E-7	6.102682E-7	0.07048	0.55	0.4583

Bounds on condition number: 2.7671, 45.076

Forward Selection: Step 6

Variable X1X5 Entered: R-Square = 0.3330 and C(p) = 19.7662

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	10.83067	1.80511	14.23	<.0001
Error	171	21.69727	0.12688		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.82922	0.08383	12.41491	97.84	<.0001
X2	0.04612	0.05016	0.10728	0.85	0.3591
X4	-0.02012	0.00281	6.51448	51.34	<.0001
X1X2	0.16472	0.16973	0.11951	0.94	0.3332
X1X4	0.00401	0.00915	0.02440	0.19	0.6616
X1X5	0.02509	0.01824	0.24002	1.89	0.1708
X3X5	-0.00000122	8.232692E-7	0.27684	2.18	0.1415

Bounds on condition number: 3.3537, 88.464

Forward Selection: Step 7

Variable X3 Entered: R-Square = 0.3400 and C(p) = 19.8264

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	11.05970	1.57996	12.51	<.0001
Error	170	21.46824	0.12628		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.70441	0.12484	4.02088	31.84	<.0001
X2	0.03550	0.05066	0.06202	0.49	0.4844
X3	0.00015762	0.00011704	0.22903	1.81	0.1799
X4	-0.02043	0.00281	6.66979	52.82	<.0001
X1X2	0.17250	0.16942	0.13090	1.04	0.3101
X1X4	0.00231	0.00921	0.00791	0.06	0.8026
X1X5	0.03000	0.01856	0.32997	2.61	0.1079
X3X5	-0.00000811	0.00000518	0.30900	2.45	0.1196

Bounds on condition number: 76.234, 1125.2

Forward Selection: Step 8

Variable X4X5 Entered: R-Square = 0.3582 and C(p) = 16.8227

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	11.65049	1.45631	11.79	<.0001
Error	169	20.87745	0.12354		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.59370	0.13344	2.44528	19.79	<.0001
X2	0.03250	0.05012	0.05195	0.42	0.5175
X3	0.00038708	0.00015623	0.75827	6.14	0.0142
X4	-0.02976	0.00509	4.21715	34.14	<.0001
X1X2	0.15723	0.16772	0.10857	0.88	0.3499
X1X4	0.00271	0.00911	0.01091	0.09	0.7667
X1X5	0.02802	0.01838	0.28714	2.32	0.1292
X3X5	-0.00002268	0.00000841	0.89899	7.28	0.0077
X4X5	0.00152	0.00069377	0.59079	4.78	0.0301

Bounds on condition number: 204.88, 2946.1

Forward Selection: Step 9

Variable X5 Entered: R-Square = 0.3749 and C(p) = 14.2197

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	12.19396	1.35488	11.19	<.0001
Error	168	20.33398	0.12104		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.15540	0.29616	1.84213	15.22	0.0001
X2	0.02152	0.04988	0.02252	0.19	0.6668
X3	0.00033013	0.00015696	0.53543	4.42	0.0369
X4	-0.04833	0.01011	2.76614	22.85	<.0001
X5	-0.11497	0.05426	0.54348	4.49	0.0356
X1X2	0.15437	0.16602	0.10464	0.86	0.3538
X1X4	0.00323	0.00903	0.01550	0.13	0.7209
X1X5	0.02849	0.01819	0.29688	2.45	0.1192
X3X5	-0.00001763	0.00000865	0.50238	4.15	0.0432
X4X5	0.00550	0.00200	0.91443	7.56	0.0066

Bounds on condition number: 221.65, 6309.5

Forward Selection: Step 10

Variable X3X4 Entered: R-Square = 0.3920 and C(p) = 11.4949

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	12.75182	1.27518	10.77	<.0001
Error	167	19.77612	0.11842		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.49383	0.68270	1.58013	13.34	0.0003
X2	0.02552	0.04937	0.03164	0.27	0.6059
X3	-0.00044957	0.00039135	0.15627	1.32	0.2523
X4	-0.09482	0.02364	1.90541	16.09	<.0001
X5	-0.21659	0.07122	1.09522	9.25	0.0027
X1X2	0.16589	0.16430	0.12073	1.02	0.3141
X1X4	-0.00461	0.00963	0.02710	0.23	0.6330
X1X5	0.03664	0.01838	0.47042	3.97	0.0479
X3X4	0.00002512	0.00001157	0.55786	4.71	0.0314

X3X5	-0.00000787	0.00000967	0.07835	0.66	0.4171
X4X5	0.00903	0.00256	1.47133	12.42	0.0005

Bounds on condition number: 851.58, 22314

Forward Selection: Step 11

Variable X1X3 Entered: R-Square = 0.3984 and C(p) = 11.7304

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	12.96015	1.17820	10.00	<.0001
Error	166	19.56779	0.11788		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.43257	0.68270	1.49660	12.70	0.0005
X2	0.02048	0.04941	0.02025	0.17	0.6791
X3	-0.00032948	0.00040077	0.07967	0.68	0.4122
X4	-0.09322	0.02362	1.83662	15.58	0.0001
X5	-0.24016	0.07324	1.26765	10.75	0.0013
X1X2	0.18432	0.16451	0.14798	1.26	0.2641
X1X3	-0.00021006	0.00015801	0.20833	1.77	0.1855
X1X4	-0.00420	0.00961	0.02245	0.19	0.6631
X1X5	0.09544	0.04788	0.46830	3.97	0.0479
X3X4	0.00002279	0.00001168	0.44916	3.81	0.0526
X3X5	-0.00000834	0.00000966	0.08799	0.75	0.3888
X4X5	0.00944	0.00257	1.58350	13.43	0.0003

Bounds on condition number: 897.16, 25924

Forward Selection: Step 12

Variable X1 Entered: R-Square = 0.4027 and C(p) = 12.5547

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	12	13.09897	1.09158	9.27	<.0001
Error	165	19.42897	0.11775		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.69861	0.72499	1.63148	13.86	0.0003

X1	-0.46814	0.43115	0.13882	1.18	0.2792
X2	0.00822	0.05066	0.00310	0.03	0.8713
X3	-0.00042499	0.00041009	0.12646	1.07	0.3016
X4	-0.09968	0.02434	1.97455	16.77	<.0001
X5	-0.25862	0.07514	1.39476	11.85	0.0007
X1X2	0.24719	0.17432	0.23678	2.01	0.1581
X1X3	-0.00022302	0.00015837	0.23351	1.98	0.1609
X1X4	0.01049	0.01659	0.04710	0.40	0.5280
X1X5	0.10556	0.04876	0.55192	4.69	0.0318
X3X4	0.00002406	0.00001173	0.49548	4.21	0.0418
X3X5	-0.00000499	0.00001013	0.02862	0.24	0.6227
X4X5	0.00995	0.00262	1.70280	14.46	0.0002

Bounds on condition number: 940.42, 29858

Forward Selection: Step 13

Variable X2X4 Entered: R-Square = 0.4049 and C(p) = 13.9399

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	13.17155	1.01320	8.58	<.0001
Error	164	19.35639	0.11803		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.73237	0.72711	1.66669	14.12	0.0002
X1	-0.40322	0.43952	0.09934	0.84	0.3603
X2	0.08857	0.11433	0.07084	0.60	0.4396
X3	-0.00049191	0.00041935	0.16240	1.38	0.2425
X4	-0.10024	0.02438	1.99531	16.91	<.0001
X5	-0.26808	0.07619	1.46109	12.38	0.0006
X1X2	0.19991	0.18464	0.13836	1.17	0.2805
X1X3	-0.00021852	0.00015866	0.22389	1.90	0.1703
X1X4	0.00884	0.01674	0.03293	0.28	0.5981
X1X5	0.10382	0.04886	0.53284	4.51	0.0351
X2X4	-0.00298	0.00380	0.07258	0.61	0.4341
X3X4	0.00002580	0.00001195	0.55018	4.66	0.0323
X3X5	-0.00000378	0.00001026	0.01601	0.14	0.7131
X4X5	0.01030	0.00266	1.77333	15.02	0.0002

Bounds on condition number: 981.04, 33706

Forward Selection: Step 14

Variable X2X3 Entered: R-Square = 0.4066 and C(p) = 15.4694

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	14	13.22711	0.94479	7.98	<.0001
Error	163	19.30083	0.11841		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.72161	0.72846	1.65282	13.96	0.0003
X1	-0.42535	0.44142	0.10995	0.93	0.3367
X2	0.05422	0.12501	0.02227	0.19	0.6651
X3	-0.00048831	0.00042006	0.16001	1.35	0.2467
X4	-0.09907	0.02448	1.93917	16.38	<.0001
X5	-0.26428	0.07652	1.41248	11.93	0.0007
X1X2	0.21251	0.18585	0.15482	1.31	0.2545
X1X3	-0.00019780	0.00016177	0.17701	1.49	0.2232
X1X4	0.00867	0.01677	0.03161	0.27	0.6061
X1X5	0.10177	0.04904	0.51002	4.31	0.0395
X2X3	0.00002114	0.00003086	0.05556	0.47	0.4943
X2X4	-0.00299	0.00380	0.07317	0.62	0.4330
X3X4	0.00002515	0.00001201	0.51924	4.39	0.0378
X3X5	-0.00000421	0.00001030	0.01978	0.17	0.6833
X4X5	0.01023	0.00266	1.74497	14.74	0.0002

Bounds on condition number: 981.2, 36513

Forward Selection: Step 15

Variable X2X5 Entered: R-Square = 0.4120 and C(p) = 16.0000

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	15	13.40060	0.89337	7.57	<.0001
Error	162	19.12734	0.11807		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.77173	0.72859	1.70874	14.47	0.0002
X1	-0.43818	0.44091	0.11661	0.99	0.3218
X2	0.01466	0.12903	0.00152	0.01	0.9097
X3	-0.00054641	0.00042219	0.19777	1.68	0.1974
X4	-0.09923	0.02445	1.94559	16.48	<.0001
X5	-0.26105	0.07645	1.37656	11.66	0.0008
X1X2	0.22203	0.18575	0.16869	1.43	0.2337

X1X3	-0.00015962	0.00016458	0.11106	0.94	0.3336
X1X4	0.00876	0.01675	0.03230	0.27	0.6017
X1X5	0.09244	0.04957	0.41071	3.48	0.0640
X2X3	0.00010191	0.00007342	0.22752	1.93	0.1670
X2X4	-0.00213	0.00386	0.03591	0.30	0.5821
X2X5	-0.02252	0.01857	0.17349	1.47	0.2272
X3X4	0.00002393	0.00001203	0.46687	3.95	0.0484
X3X5	-0.00000253	0.00001037	0.00702	0.06	0.8077
X4X5	0.01062	0.00268	1.85318	15.70	0.0001

Bounds on condition number: 994.01, 40150

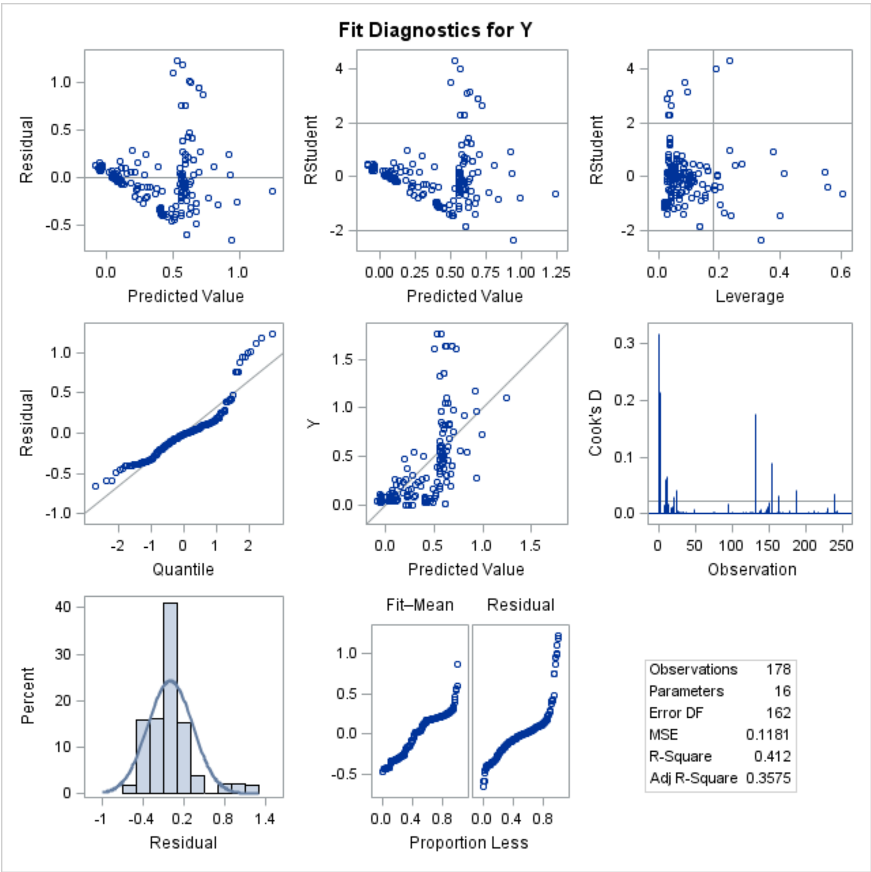
All variables have been entered into the model.

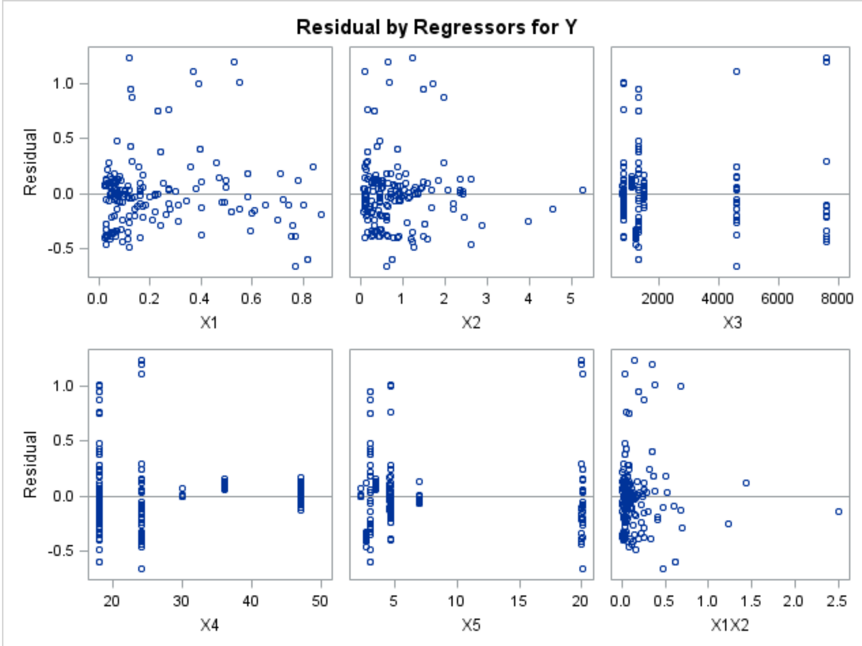
Summary of Forward Selection

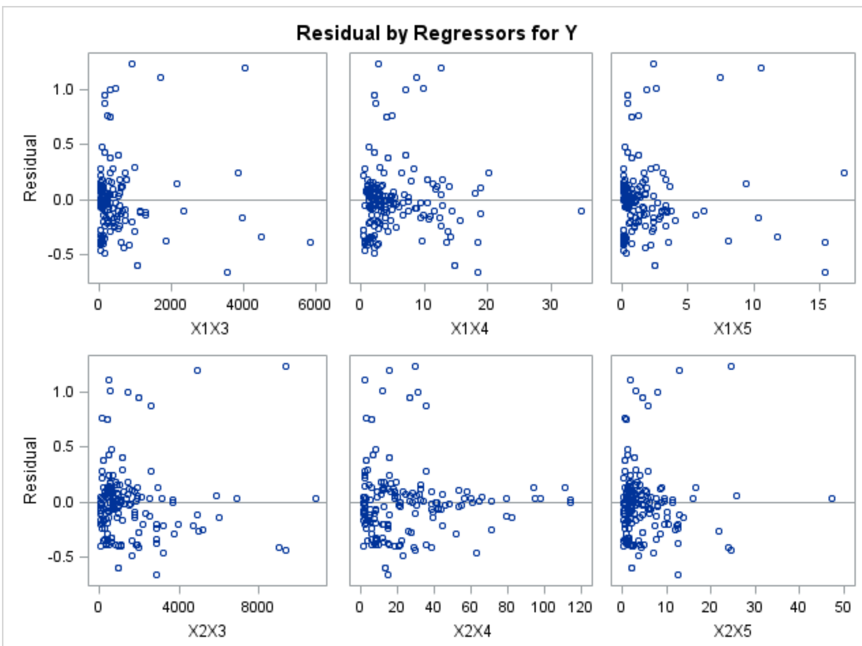
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X4	1	0.2687	0.2687	27.4589	64.68	<.0001
2	X1X2	2	0.0426	0.3114	17.7154	10.83	0.0012
3	X1X4	3	0.0080	0.3193	17.5244	2.03	0.1557
4	X2	4	0.0041	0.3234	18.3960	1.05	0.3076
5	X3X5	5	0.0022	0.3256	19.7990	0.55	0.4583
6	X1X5	6	0.0074	0.3330	19.7662	1.89	0.1708
7	X3	7	0.0070	0.3400	19.8264	1.81	0.1799
8	X4X5	8	0.0182	0.3582	16.8227	4.78	0.0301
9	X5	9	0.0167	0.3749	14.2197	4.49	0.0356
10	X3X4	10	0.0172	0.3920	11.4949	4.71	0.0314
11	X1X3	11	0.0064	0.3984	11.7304	1.77	0.1855
12	X1	12	0.0043	0.4027	12.5547	1.18	0.2792
13	X2X4	13	0.0022	0.4049	13.9399	0.61	0.4341
14	X2X3	14	0.0017	0.4066	15.4694	0.47	0.4943
15	X2X5	15	0.0053	0.4120	16.0000	1.47	0.2272

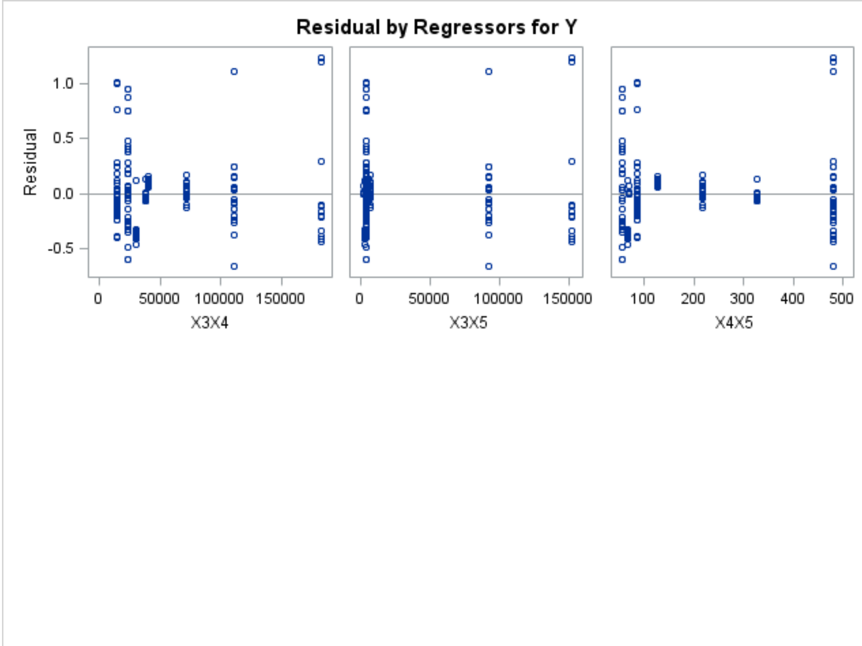
FORWARD REGRESSION
Pollutant: Total Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
1.0
0.5
0.0
-0.5
0.0 0.2 0.4 0.6 0.8
X1
0 1 2 3 4 5
X2
2000 4000 6000 8000
X3
20 30 40 50
X4
5 10 15 20
X5
0.0 0.5 1.0 1.5 2.0 2.5
X1X2


Residual by Regressors for Y
Residual
1.0
0.5
0.0
-0.5
0 2000 4000 6000
X1X3
0 10 20 30
X1X4
0 5 10 15
X1X5
0 4000 8000
X2X3
0 20 40 60 80 100 120
X2X4
0 10 20 30 40 50
X2X5


Residual by Regressors for Y
Residual
1.0
0.5
0.0
-0.5
0
50000
100000
150000
X3X4
X3X5
100
200
300
400
500
X4X5

BACKWARD REGRESSION
Pollutant: Total Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	340
Number of Observations Used	178
Number of Observations with Missing Values	162

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1525	0.0484	-0.3196	0.0807	0.4600	0.5718	0.8848	0.6450	-0.1112	-0.2543	-0.1069	-0.0235	0.0700	-0.0269	0.3118
X2	-0.1525	1.0000	-0.1303	0.1102	-0.1851	0.5919	-0.1595	-0.1281	-0.2028	0.6092	0.8384	0.5454	-0.1052	-0.1578	-0.1283	0.0744
X3	0.0484	-0.1303	1.0000	-0.0882	0.9154	-0.0679	0.6412	0.0875	0.5632	0.5247	-0.1599	0.4596	0.9580	0.9922	0.8394	0.0021
X4	-0.3196	0.1102	-0.0882	1.0000	-0.0566	-0.1455	-0.1380	0.0241	-0.1703	0.0002	0.5351	0.0960	0.1915	-0.1089	0.2761	-0.5184
X5	0.0807	-0.1851	0.9154	-0.0566	1.0000	-0.0950	0.5779	0.1069	0.5913	0.4197	-0.1728	0.4751	0.8785	0.9487	0.9400	-0.0195
X1X2	0.4600	0.5919	-0.0679	-0.1455	-0.0950	1.0000	0.1582	0.4029	0.1510	0.3295	0.3466	0.2726	-0.1007	-0.0798	-0.1308	0.2797
X1X3	0.5718	-0.1595	0.6412	-0.1380	0.5779	0.1582	1.0000	0.5842	0.9498	0.1747	-0.1978	0.1385	0.5950	0.6401	0.5044	0.1611
X1X4	0.8848	-0.1281	0.0875	0.0241	0.1069	0.4029	0.5842	1.0000	0.6313	-0.0785	-0.0985	-0.0665	0.1171	0.0904	0.1064	0.1536
X1X5	0.6450	-0.2028	0.5632	-0.1703	0.5913	0.1510	0.9498	0.6313	1.0000	0.1046	-0.2368	0.1181	0.5110	0.5852	0.5069	0.1961
X2X3	-0.1112	0.6092	0.5247	0.0002	0.4197	0.3295	0.1747	-0.0785	0.1046	1.0000	0.4769	0.9186	0.5148	0.4981	0.4026	0.0679
X2X4	-0.2543	0.8384	-0.1599	0.5351	-0.1728	0.3466	-0.1978	-0.0985	-0.2368	0.4769	1.0000	0.4979	-0.0146	-0.1842	0.0244	-0.1887
X2X5	-0.1069	0.5454	0.4596	0.0960	0.4751	0.2726	0.1385	-0.0665	0.1181	0.9186	0.4979	1.0000	0.4690	0.4646	0.4991	-0.0087
X3X4	-0.0235	-0.1052	0.9580	0.1915	0.8785	-0.1007	0.5950	0.1171	0.5110	0.5148	-0.0146	0.4690	1.0000	0.9415	0.8928	-0.1369
X3X5	0.0700	-0.1578	0.9922	-0.1089	0.9487	-0.0798	0.6401	0.0904	0.5852	0.4981	-0.1842	0.4646	0.9415	1.0000	0.8666	0.0015
X4X5	-0.0269	-0.1283	0.8394	0.2761	0.9400	-0.1308	0.5044	0.1064	0.5069	0.4026	0.0244	0.4991	0.8928	0.8666	1.0000	-0.1745
Y	0.3118	0.0744	0.0021	-0.5184	-0.0195	0.2797	0.1611	0.1536	0.1961	0.0679	-0.1887	-0.0087	-0.1369	0.0015	-0.1745	1.0000

BACKWARD REGRESSION
Pollutant: Total Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	340
Number of Observations Used	178
Number of Observations with Missing Values	162

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.4120 and C(p) = 16.0000

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	15	13.40060	0.89337	7.57	<.0001
Error	162	19.12734	0.11807		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.77173	0.72859	1.70874	14.47	0.0002
X1	-0.43818	0.44091	0.11661	0.99	0.3218
X2	0.01466	0.12903	0.00152	0.01	0.9097
X3	-0.00054641	0.00042219	0.19777	1.68	0.1974
X4	-0.09923	0.02445	1.94559	16.48	<.0001
X5	-0.26105	0.07645	1.37656	11.66	0.0008
X1X2	0.22203	0.18575	0.16869	1.43	0.2337
X1X3	-0.00015962	0.00016458	0.11106	0.94	0.3336
X1X4	0.00876	0.01675	0.03230	0.27	0.6017
X1X5	0.09244	0.04957	0.41071	3.48	0.0640
X2X3	0.00010191	0.00007342	0.22752	1.93	0.1670
X2X4	-0.00213	0.00386	0.03591	0.30	0.5821
X2X5	-0.02252	0.01857	0.17349	1.47	0.2272
X3X4	0.00002393	0.00001203	0.46687	3.95	0.0484
X3X5	-0.00000253	0.00001037	0.00702	0.06	0.8077
X4X5	0.01062	0.00268	1.85318	15.70	0.0001

Bounds on condition number: 994.01, 40150

Backward Elimination: Step 1

Variable X2 Removed: R-Square = 0.4119 and C(p) = 14.0129

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	14	13.39908	0.95708	8.16	<.0001
Error	163	19.12886	0.11735		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.77085	0.72634	1.70785	14.55	0.0002
X1	-0.45168	0.42332	0.13361	1.14	0.2875
X3	-0.00053909	0.00041597	0.19710	1.68	0.1968
X4	-0.09912	0.02435	1.94432	16.57	<.0001
X5	-0.26004	0.07570	1.38478	11.80	0.0008
X1X2	0.23430	0.15069	0.28370	2.42	0.1219
X1X3	-0.00015855	0.00016381	0.10993	0.94	0.3345
X1X4	0.00891	0.01664	0.03366	0.29	0.5930
X1X5	0.09259	0.04940	0.41227	3.51	0.0627
X2X3	0.00010519	0.00006732	0.28650	2.44	0.1201
X2X4	-0.00177	0.00217	0.07761	0.66	0.4173
X2X5	-0.02305	0.01792	0.19424	1.66	0.2001
X3X4	0.00002365	0.00001173	0.47649	4.06	0.0455
X3X5	-0.00000267	0.00001027	0.00791	0.07	0.7955
X4X5	0.01059	0.00266	1.85623	15.82	0.0001

Bounds on condition number: 970.83, 36242

Backward Elimination: Step 2

Variable X3X5 Removed: R-Square = 0.4117 and C(p) = 12.0799

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	13	13.39116	1.03009	8.83	<.0001
Error	164	19.13678	0.11669		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.89736	0.53714	3.39511	29.10	<.0001
X1	-0.48543	0.40172	0.17039	1.46	0.2286
X3	-0.00062275	0.00026230	0.65777	5.64	0.0187
X4	-0.10185	0.02191	2.52030	21.60	<.0001
X5	-0.26983	0.06544	1.98377	17.00	<.0001
X1X2	0.24044	0.14840	0.30631	2.63	0.1071

X1X3	-0.00015692	0.00016323	0.10785	0.92	0.3378
X1X4	0.00973	0.01630	0.04156	0.36	0.5515
X1X5	0.09255	0.04926	0.41195	3.53	0.0620
X2X3	0.00010790	0.00006632	0.30892	2.65	0.1056
X2X4	-0.00179	0.00217	0.08005	0.69	0.4087
X2X5	-0.02384	0.01761	0.21394	1.83	0.1776
X3X4	0.00002505	0.00001039	0.67793	5.81	0.0170
X4X5	0.01083	0.00249	2.20733	18.92	<.0001

Bounds on condition number: 388.22, 18821

Backward Elimination: Step 3

Variable X1X4 Removed: R-Square = 0.4104 and C(p) = 10.4319

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	12	13.34960	1.11247	9.57	<.0001
Error	165	19.17834	0.11623		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.91387	0.53538	3.44305	29.62	<.0001
X1	-0.28842	0.22846	0.18524	1.59	0.2086
X3	-0.00066272	0.00025311	0.79684	6.86	0.0097
X4	-0.10252	0.02184	2.56021	22.03	<.0001
X5	-0.27166	0.06524	2.01508	17.34	<.0001
X1X2	0.24528	0.14789	0.31973	2.75	0.0991
X1X3	-0.00014748	0.00016214	0.09616	0.83	0.3644
X1X5	0.09175	0.04914	0.40518	3.49	0.0637
X2X3	0.00011060	0.00006603	0.32611	2.81	0.0958
X2X4	-0.00194	0.00215	0.09488	0.82	0.3676
X2X5	-0.02436	0.01755	0.22402	1.93	0.1669
X3X4	0.00002666	0.00001001	0.82348	7.08	0.0085
X4X5	0.01092	0.00248	2.24891	19.35	<.0001

Bounds on condition number: 362.92, 16522

Backward Elimination: Step 4

Variable X2X4 Removed: R-Square = 0.4075 and C(p) = 9.2355

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	13.25473	1.20498	10.38	<.0001
Error	166	19.27321	0.11610		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.89165	0.53452	3.39791	29.27	<.0001
X1	-0.23604	0.22086	0.13261	1.14	0.2867
X3	-0.00064790	0.00025244	0.76482	6.59	0.0112
X4	-0.10325	0.02182	2.60061	22.40	<.0001
X5	-0.26561	0.06486	1.94686	16.77	<.0001
X1X2	0.20151	0.13965	0.24174	2.08	0.1509
X1X3	-0.00015805	0.00016163	0.11102	0.96	0.3296
X1X5	0.09117	0.04911	0.40009	3.45	0.0652
X2X3	0.00009278	0.00006298	0.25197	2.17	0.1426
X2X5	-0.02383	0.01753	0.21450	1.85	0.1759
X3X4	0.00002668	0.00001001	0.82493	7.11	0.0084
X4X5	0.01063	0.00246	2.16859	18.68	<.0001

Bounds on condition number: 361.39, 14984

Backward Elimination: Step 5

Variable X1X3 Removed: R-Square = 0.4041 and C(p) = 8.1758

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	13.14370	1.31437	11.32	<.0001
Error	167	19.38424	0.11607		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.90176	0.53435	3.42300	29.49	<.0001
X1	-0.22608	0.22060	0.12191	1.05	0.3069
X3	-0.00072163	0.00024088	1.04171	8.97	0.0032
X4	-0.10332	0.02181	2.60397	22.43	<.0001
X5	-0.24494	0.06132	1.85234	15.96	<.0001
X1X2	0.17590	0.13716	0.19091	1.64	0.2014
X1X5	0.04682	0.01883	0.71716	6.18	0.0139
X2X3	0.00010697	0.00006128	0.35371	3.05	0.0827
X2X5	-0.02680	0.01726	0.27988	2.41	0.1224
X3X4	0.00002764	0.00000996	0.89404	7.70	0.0061
X4X5	0.01031	0.00244	2.07641	17.89	<.0001

Bounds on condition number: 335.48, 12442

Backward Elimination: Step 6

Variable X1 Removed: R-Square = 0.4003 and C(p) = 7.2083

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	13.02179	1.44687	12.46	<.0001
Error	168	19.50615	0.11611		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.68528	0.49090	3.47425	29.92	<.0001
X3	-0.00063487	0.00022555	0.91990	7.92	0.0055
X4	-0.09590	0.02058	2.52113	21.71	<.0001
X5	-0.23271	0.06015	1.73779	14.97	0.0002
X1X2	0.11028	0.12131	0.09595	0.83	0.3646
X1X5	0.03336	0.01351	0.70814	6.10	0.0145
X2X3	0.00011879	0.00006019	0.45222	3.89	0.0501
X2X5	-0.02895	0.01714	0.33128	2.85	0.0930
X3X4	0.00002406	0.00000933	0.77248	6.65	0.0108
X4X5	0.00987	0.00240	1.96417	16.92	<.0001

Bounds on condition number: 294.23, 10176

Backward Elimination: Step 7

Variable X1X2 Removed: R-Square = 0.3974 and C(p) = 6.0210

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	12.92584	1.61573	13.93	<.0001
Error	169	19.60210	0.11599		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	2.77431	0.48078	3.86219	33.30	<.0001
X3	-0.00066912	0.00022227	1.05115	9.06	0.0030
X4	-0.09902	0.02028	2.76504	23.84	<.0001
X5	-0.24058	0.05949	1.89668	16.35	<.0001
X1X5	0.03806	0.01248	1.07895	9.30	0.0027
X2X3	0.00013457	0.00005761	0.63288	5.46	0.0207
X2X5	-0.03081	0.01700	0.38078	3.28	0.0718
X3X4	0.00002506	0.00000926	0.84925	7.32	0.0075

X4X5	0.01021	0.00237	2.15254	18.56	<.0001

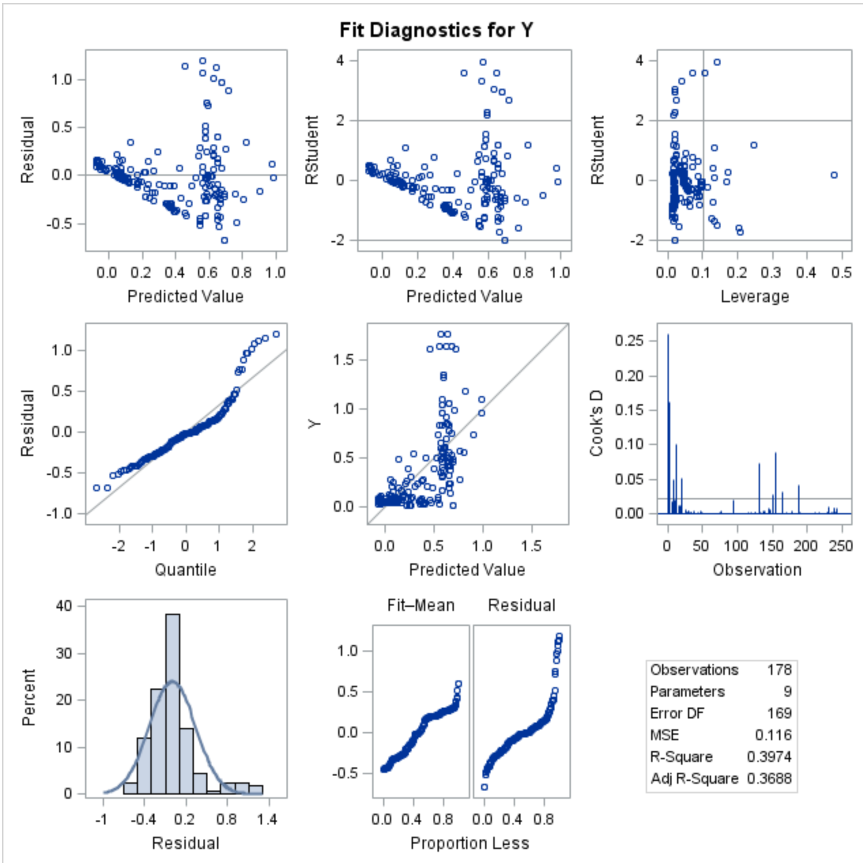
Bounds on condition number: 290.2, 8825.5

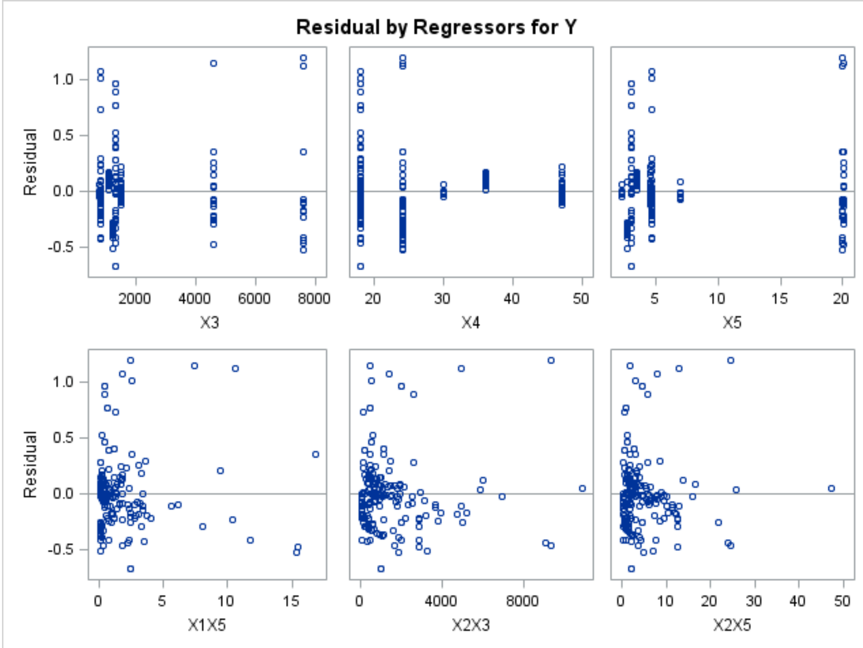
All variables left in the model are significant at the 0.1000 level.

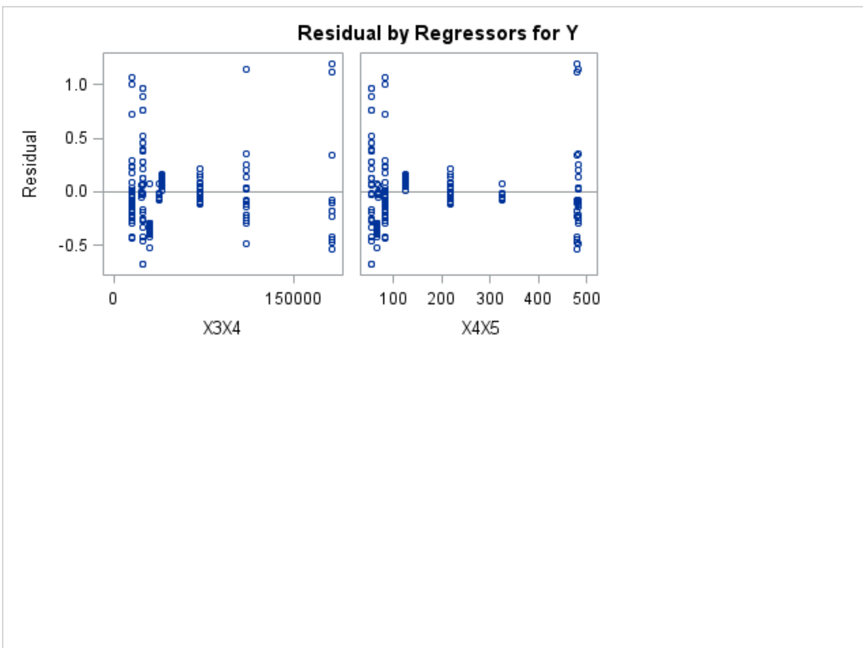
Summary of Backward Elimination							
Step	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	X2	14	0.0000	0.4119	14.0129	0.01	0.9097
2	X3X5	13	0.0002	0.4117	12.0799	0.07	0.7955
3	X1X4	12	0.0013	0.4104	10.4319	0.36	0.5515
4	X2X4	11	0.0029	0.4075	9.2355	0.82	0.3676
5	X1X3	10	0.0034	0.4041	8.1758	0.96	0.3296
6	X1	9	0.0037	0.4003	7.2083	1.05	0.3069
7	X1X2	8	0.0029	0.3974	6.0210	0.83	0.3646

BACKWARD REGRESSION
Pollutant: Total Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X3
X4
X5
X1X5
X2X3
X2X5


Residual by Regressors for Y
Residual
X3X4
X4X5

STEPWISE REGRESSION
Pollutant: Total Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	340
Number of Observations Used	178
Number of Observations with Missing Values	162

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1525	0.0484	-0.3196	0.0807	0.4600	0.5718	0.8848	0.6450	-0.1112	-0.2543	-0.1069	-0.0235	0.0700	-0.0269	0.3118
X2	-0.1525	1.0000	-0.1303	0.1102	-0.1851	0.5919	-0.1595	-0.1281	-0.2028	0.6092	0.8384	0.5454	-0.1052	-0.1578	-0.1283	0.0744
X3	0.0484	-0.1303	1.0000	-0.0882	0.9154	-0.0679	0.6412	0.0875	0.5632	0.5247	-0.1599	0.4596	0.9580	0.9922	0.8394	0.0021
X4	-0.3196	0.1102	-0.0882	1.0000	-0.0566	-0.1455	-0.1380	0.0241	-0.1703	0.0002	0.5351	0.0960	0.1915	-0.1089	0.2761	-0.5184
X5	0.0807	-0.1851	0.9154	-0.0566	1.0000	-0.0950	0.5779	0.1069	0.5913	0.4197	-0.1728	0.4751	0.8785	0.9487	0.9400	-0.0195
X1X2	0.4600	0.5919	-0.0679	-0.1455	-0.0950	1.0000	0.1582	0.4029	0.1510	0.3295	0.3466	0.2726	-0.1007	-0.0798	-0.1308	0.2797
X1X3	0.5718	-0.1595	0.6412	-0.1380	0.5779	0.1582	1.0000	0.5842	0.9498	0.1747	-0.1978	0.1385	0.5950	0.6401	0.5044	0.1611
X1X4	0.8848	-0.1281	0.0875	0.0241	0.1069	0.4029	0.5842	1.0000	0.6313	-0.0785	-0.0985	-0.0665	0.1171	0.0904	0.1064	0.1536
X1X5	0.6450	-0.2028	0.5632	-0.1703	0.5913	0.1510	0.9498	0.6313	1.0000	0.1046	-0.2368	0.1181	0.5110	0.5852	0.5069	0.1961
X2X3	-0.1112	0.6092	0.5247	0.0002	0.4197	0.3295	0.1747	-0.0785	0.1046	1.0000	0.4769	0.9186	0.5148	0.4981	0.4026	0.0679
X2X4	-0.2543	0.8384	-0.1599	0.5351	-0.1728	0.3466	-0.1978	-0.0985	-0.2368	0.4769	1.0000	0.4979	-0.0146	-0.1842	0.0244	-0.1887
X2X5	-0.1069	0.5454	0.4596	0.0960	0.4751	0.2726	0.1385	-0.0665	0.1181	0.9186	0.4979	1.0000	0.4690	0.4646	0.4991	-0.0087
X3X4	-0.0235	-0.1052	0.9580	0.1915	0.8785	-0.1007	0.5950	0.1171	0.5110	0.5148	-0.0146	0.4690	1.0000	0.9415	0.8928	-0.1369
X3X5	0.0700	-0.1578	0.9922	-0.1089	0.9487	-0.0798	0.6401	0.0904	0.5852	0.4981	-0.1842	0.4646	0.9415	1.0000	0.8666	0.0015
X4X5	-0.0269	-0.1283	0.8394	0.2761	0.9400	-0.1308	0.5044	0.1064	0.5069	0.4026	0.0244	0.4991	0.8928	0.8666	1.0000	-0.1745
Y	0.3118	0.0744	0.0021	-0.5184	-0.0195	0.2797	0.1611	0.1536	0.1961	0.0679	-0.1887	-0.0087	-0.1369	0.0015	-0.1745	1.0000

STEPWISE REGRESSION
Pollutant: Total Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	340
Number of Observations Used	178
Number of Observations with Missing Values	162

Stepwise Selection: Step 1

Variable X4 Entered: R-Square = 0.2687 and C(p) = 27.4589

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	8.74169	8.74169	64.68	<.0001
Error	176	23.78625	0.13515		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.94154	0.07514	21.21957	157.01	<.0001
X4	-0.02080	0.00259	8.74169	64.68	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X1X2 Entered: R-Square = 0.3114 and C(p) = 17.7154

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	10.12824	5.06412	39.56	<.0001
Error	175	22.39970	0.12800		
Corrected Total	177	32.52794			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.85734	0.07747	15.67544	122.47	<.0001

X4	-0.01958	0.00254	7.58389	59.25	<.0001
X1X2	0.33820	0.10276	1.38655	10.83	0.0012

Bounds on condition number: 1.0216, 4.0865

All variables left in the model are significant at the 0.1500 level.

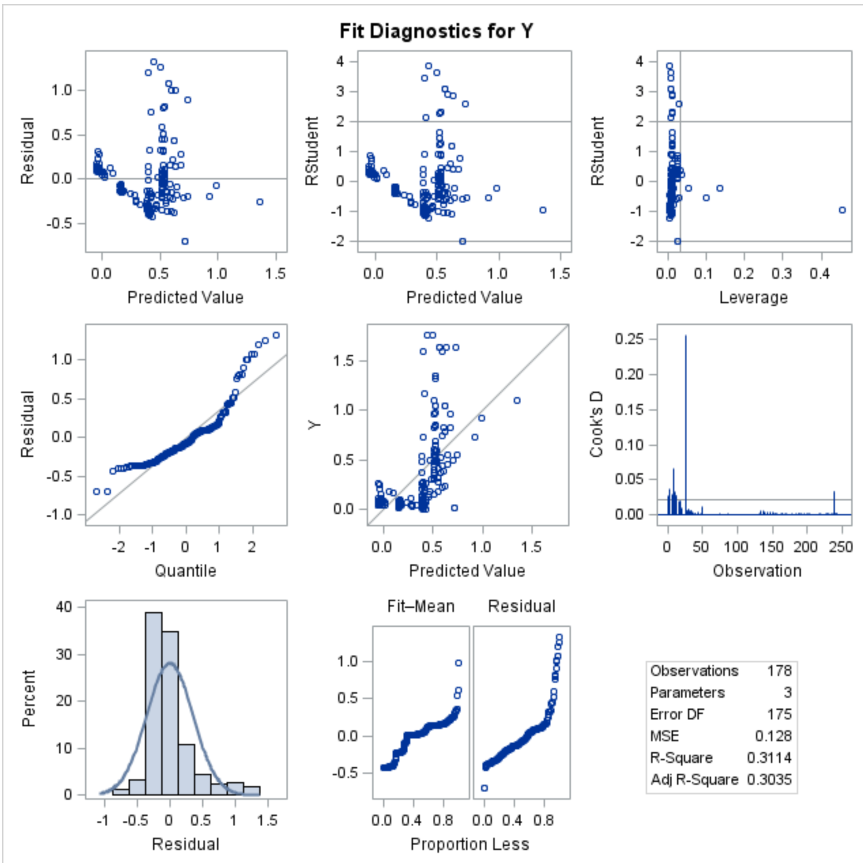
No other variable met the 0.1500 significance level for entry into the model.

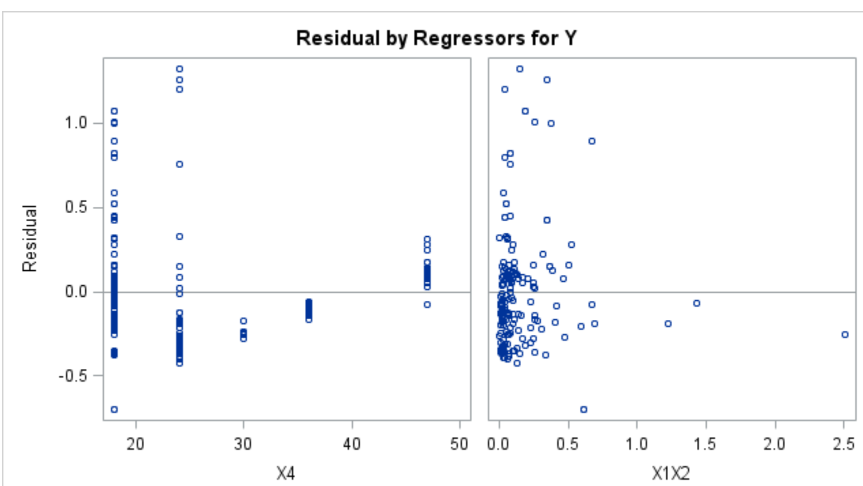
Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X4		1	0.2687	0.2687	27.4589	64.68	<.0001
2	X1X2		2	0.0426	0.3114	17.7154	10.83	0.0012

STEPWISE REGRESSION
Pollutant: Total Phosphorus
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y





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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Suspended Solids

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The REG Procedure

Number of Observations Read	340
Number of Observations Used	178
Number of Observations with Missing Values	162

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.1525	0.0484	-0.3196	0.0807	0.4600	0.5718	0.8848	0.6450	-0.1112	-0.2543	-0.1069	-0.0235	0.0700	-0.0269	0.3118
X2	-0.1525	1.0000	-0.1303	0.1102	-0.1851	0.5919	-0.1595	-0.1281	-0.2028	0.6092	0.8384	0.5454	-0.1052	-0.1578	-0.1283	0.0744
X3	0.0484	-0.1303	1.0000	-0.0882	0.9154	-0.0679	0.6412	0.0875	0.5632	0.5247	-0.1599	0.4596	0.9580	0.9922	0.8394	0.0021
X4	-0.3196	0.1102	-0.0882	1.0000	-0.0566	-0.1455	-0.1380	0.0241	-0.1703	0.0002	0.5351	0.0960	0.1915	-0.1089	0.2761	-0.5184
X5	0.0807	-0.1851	0.9154	-0.0566	1.0000	-0.0950	0.5779	0.1069	0.5913	0.4197	-0.1728	0.4751	0.8785	0.9487	0.9400	-0.0195
X1X2	0.4600	0.5919	-0.0679	-0.1455	-0.0950	1.0000	0.1582	0.4029	0.1510	0.3295	0.3466	0.2726	-0.1007	-0.0798	-0.1308	0.2797
X1X3	0.5718	-0.1595	0.6412	-0.1380	0.5779	0.1582	1.0000	0.5842	0.9498	0.1747	-0.1978	0.1385	0.5950	0.6401	0.5044	0.1611
X1X4	0.8848	-0.1281	0.0875	0.0241	0.1069	0.4029	0.5842	1.0000	0.6313	-0.0785	-0.0985	-0.0665	0.1171	0.0904	0.1064	0.1536
X1X5	0.6450	-0.2028	0.5632	-0.1703	0.5913	0.1510	0.9498	0.6313	1.0000	0.1046	-0.2368	0.1181	0.5110	0.5852	0.5069	0.1961
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X2X4	-0.2543	0.8384	-0.1599	0.5351	-0.1728	0.3466	-0.1978	-0.0985	-0.2368	0.4769	1.0000	0.4979	-0.0146	-0.1842	0.0244	-0.1887
X2X5	-0.1069	0.5454	0.4596	0.0960	0.4751	0.2726	0.1385	-0.0665	0.1181	0.9186	0.4979	1.0000	0.4690	0.4646	0.4991	-0.0087
X3X4	-0.0235	-0.1052	0.9580	0.1915	0.8785	-0.1007	0.5950	0.1171	0.5110	0.5148	-0.0146	0.4690	1.0000	0.9415	0.8928	-0.1369
X3X5	0.0700	-0.1578	0.9922	-0.1089	0.9487	-0.0798	0.6401	0.0904	0.5852	0.4981	-0.1842	0.4646	0.9415	1.0000	0.8666	0.0015
X4X5	-0.0269	-0.1283	0.8394	0.2761	0.9400	-0.1308	0.5044	0.1064	0.5069	0.4026	0.0244	0.4991	0.8928	0.8666	1.0000	-0.1745
Y	0.3118	0.0744	0.0021	-0.5184	-0.0195	0.2797	0.1611	0.1536	0.1961	0.0679	-0.1887	-0.0087	-0.1369	0.0015	-0.1745	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Suspended Solids
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The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	340
Number of Observations Used	178
Number of Observations with Missing Values	162

Number in Model	R-Square	Variables in Model
1	0.2687	X4
1	0.0972	X1
1	0.0782	X1X2
1	0.0384	X1X5
1	0.0356	X2X4
1	0.0305	X4X5
1	0.0260	X1X3
1	0.0236	X1X4
1	0.0188	X3X4
1	0.0055	X2
1	0.0046	X2X3
1	0.0004	X5
1	0.0001	X2X5
1	0.0000	X3
1	0.0000	X3X5
2	0.3114	X4 X1X2
2	0.2963	X4 X1X4
2	0.2925	X1 X4
2	0.2863	X2 X4
2	0.2807	X4 X1X5
2	0.2798	X4 X2X4
2	0.2769	X4 X1X3
2	0.2734	X4 X2X3
2	0.2718	X4 X3X5
2	0.2711	X4 X5
2	0.2707	X3 X4
2	0.2704	X4 X2X5
2	0.2702	X4 X3X4
2	0.2698	X4 X4X5
2	0.2347	X3 X3X4
3	0.3205	X2 X4 X1X4
3	0.3193	X4 X1X2 X1X4
3	0.3183	X4 X1X2 X1X5
3	0.3163	X1 X4 X1X2
3	0.3159	X1 X2 X4
3	0.3152	X4 X1X2 X1X3

3	0.3127	X4 X1X4 X2X4
3	0.3126	X4 X1X2 X3X5
3	0.3121	X4 X5 X1X2
3	0.3121	X3 X4 X1X2
3	0.3119	X4 X1X2 X3X4
3	0.3118	X4 X1X2 X2X5
3	0.3115	X4 X1X2 X4X5
3	0.3114	X2 X4 X1X2
3	0.3114	X4 X1X2 X2X3
4	0.3368	X4 X5 X1X2 X4X5
4	0.3350	X4 X5 X1X5 X4X5
4	0.3348	X4 X5 X1X4 X4X5
4	0.3297	X4 X1X2 X1X5 X3X5
4	0.3282	X4 X5 X1X2 X1X5
4	0.3278	X4 X1X5 X2X3 X3X5
4	0.3267	X3 X4 X1X2 X1X5
4	0.3263	X4 X5 X1X3 X4X5
4	0.3262	X1 X4 X5 X4X5
4	0.3259	X4 X1X2 X1X5 X3X4
4	0.3254	X4 X1X2 X1X3 X3X5
4	0.3247	X4 X1X2 X1X5 X4X5
4	0.3240	X2 X4 X1X5 X3X5
4	0.3234	X2 X4 X1X2 X1X4
4	0.3233	X3 X4 X1X2 X1X3
5	0.3564	X4 X5 X1X2 X1X5 X4X5
5	0.3532	X4 X5 X1X5 X2X3 X4X5
5	0.3499	X4 X5 X1X4 X2X3 X4X5
5	0.3494	X2 X4 X5 X1X4 X4X5
5	0.3493	X4 X5 X1X2 X1X3 X4X5
5	0.3491	X4 X5 X1X2 X1X4 X4X5
5	0.3490	X2 X4 X5 X1X5 X4X5
5	0.3480	X3 X4 X5 X3X4 X4X5
5	0.3432	X1 X4 X5 X1X2 X4X5
5	0.3424	X4 X5 X1X5 X2X5 X4X5
5	0.3424	X4 X5 X1X4 X2X4 X4X5
5	0.3423	X4 X5 X3X4 X3X5 X4X5
5	0.3419	X4 X5 X1X5 X2X4 X4X5
5	0.3415	X1 X4 X5 X2X3 X4X5
5	0.3411	X4 X5 X1X2 X3X4 X4X5
6	0.3732	X4 X5 X1X5 X3X4 X3X5 X4X5
6	0.3716	X3 X4 X5 X1X5 X3X4 X4X5
6	0.3705	X3 X4 X5 X1X2 X3X4 X4X5
6	0.3657	X4 X5 X1X2 X3X4 X3X5 X4X5
6	0.3645	X3 X4 X5 X1X3 X3X4 X4X5
6	0.3636	X4 X5 X1X3 X3X4 X3X5 X4X5
6	0.3631	X4 X5 X1X4 X3X4 X3X5 X4X5
6	0.3616	X4 X5 X1X2 X1X5 X2X3 X4X5
6	0.3614	X4 X5 X1X5 X2X3 X2X5 X4X5
6	0.3613	X1 X4 X5 X3X4 X3X5 X4X5
6	0.3602	X3 X4 X5 X1X4 X3X4 X4X5
6	0.3600	X4 X5 X1X4 X2X3 X2X5 X4X5
6		

	0.3600	X4 X5 X1X2 X1X5 X3X4 X4X5
6	0.3587	X2 X3 X4 X5 X3X4 X4X5
6	0.3586	X3 X4 X5 X1X5 X3X5 X4X5
7	0.3861	X4 X5 X1X2 X1X5 X3X4 X3X5 X4X5
7	0.3858	X2 X3 X4 X5 X1X5 X3X4 X4X5
7	0.3857	X3 X4 X5 X1X5 X2X3 X3X4 X4X5
7	0.3856	X3 X4 X5 X1X2 X1X5 X3X4 X4X5
7	0.3854	X4 X5 X1X5 X2X3 X3X4 X3X5 X4X5
7	0.3829	X2 X4 X5 X1X5 X3X4 X3X5 X4X5
7	0.3807	X4 X5 X1X3 X1X5 X3X4 X3X5 X4X5
7	0.3797	X3 X4 X5 X1X2 X1X3 X3X4 X4X5
7	0.3794	X4 X5 X1X5 X2X5 X3X4 X3X5 X4X5
7	0.3782	X2 X3 X4 X5 X1X3 X3X4 X4X5
7	0.3781	X3 X4 X5 X1X3 X2X3 X3X4 X4X5
7	0.3780	X4 X5 X1X2 X1X3 X3X4 X3X5 X4X5
7	0.3780	X4 X5 X1X5 X2X4 X3X4 X3X5 X4X5
7	0.3779	X3 X4 X5 X1X5 X2X5 X3X4 X4X5
7	0.3777	X3 X4 X5 X1X5 X2X4 X3X4 X4X5
8	0.3974	X3 X4 X5 X1X5 X2X3 X2X5 X3X4 X4X5
8	0.3950	X4 X5 X1X2 X1X3 X1X5 X3X4 X3X5 X4X5
8	0.3930	X1 X3 X4 X5 X1X2 X1X5 X3X4 X4X5
8	0.3929	X4 X5 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
8	0.3928	X2 X3 X4 X5 X1X5 X2X4 X3X4 X4X5
8	0.3926	X3 X4 X5 X1X2 X1X3 X1X5 X3X4 X4X5
8	0.3910	X2 X3 X4 X5 X1X3 X1X5 X3X4 X4X5
8	0.3910	X3 X4 X5 X1X3 X2X3 X2X5 X3X4 X4X5
8	0.3909	X4 X5 X1X3 X1X5 X2X3 X3X4 X3X5 X4X5
8	0.3906	X2 X4 X5 X1X3 X1X5 X3X4 X3X5 X4X5
8	0.3901	X3 X4 X5 X1X2 X1X5 X2X3 X3X4 X4X5
8	0.3898	X4 X5 X1X2 X1X5 X2X3 X3X4 X3X5 X4X5
8	0.3894	X3 X4 X5 X1X5 X2X3 X3X4 X3X5 X4X5
8	0.3892	X3 X4 X5 X1X3 X1X5 X2X3 X3X4 X4X5
8	0.3891	X3 X4 X5 X1X2 X1X5 X3X4 X3X5 X4X5
9	0.4003	X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X4X5
9	0.3997	X1 X3 X4 X5 X1X2 X1X3 X1X5 X3X4 X4X5
9	0.3993	X3 X4 X5 X1X3 X1X5 X2X3 X2X5 X3X4 X4X5
9	0.3990	X3 X4 X5 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
9	0.3982	X2 X3 X4 X5 X1X3 X1X5 X2X4 X3X4 X4X5
9	0.3982	X1 X3 X4 X5 X1X5 X2X3 X2X5 X3X4 X4X5
9	0.3980	X3 X4 X5 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
9	0.3976	X2 X3 X4 X5 X1X5 X2X3 X2X5 X3X4 X4X5
9	0.3974	X3 X4 X5 X1X4 X1X5 X2X3 X2X5 X3X4 X4X5
9	0.3973	X1 X4 X5 X1X2 X1X3 X1X5 X3X4 X3X5 X4X5
9	0.3971	X4 X5 X1X3 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
9	0.3971	X4 X5 X1X2 X1X3 X1X5 X2X3 X3X4 X3X5 X4X5
9	0.3963	X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
9	0.3963	X3 X4 X5 X1X2 X1X3 X1X5 X3X4 X3X5 X4X5
9	0.3958	X2 X4 X5 X1X2 X1X3 X1X5 X3X4 X3X5 X4X5
10	0.4041	X1 X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X4X5
10	0.4034	X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X4X5
10	0.4020	X2 X3 X4 X5 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
10		

	0.4020	X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
10	0.4019	X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
10	0.4018	X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
10	0.4017	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X3X4 X4X5
10	0.4013	X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X4X5
10	0.4012	X3 X4 X5 X1X3 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
10	0.4012	X1 X3 X4 X5 X1X2 X1X3 X1X5 X3X4 X3X5 X4X5
10	0.4009	X1 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X3X4 X4X5
10	0.4005	X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X4X5
10	0.4001	X1 X3 X4 X5 X1X3 X1X5 X2X3 X2X5 X3X4 X4X5
10	0.4000	X1 X3 X4 X5 X1X2 X1X3 X1X5 X2X4 X3X4 X4X5
10	0.3999	X2 X3 X4 X5 X1X3 X1X5 X2X3 X2X5 X3X4 X4X5
11	0.4075	X1 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X4X5
11	0.4074	X1 X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
11	0.4059	X1 X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X4X5
11	0.4054	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X4X5
11	0.4051	X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.4047	X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
11	0.4046	X2 X3 X4 X5 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
11	0.4046	X1 X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.4043	X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X4X5
11	0.4038	X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
11	0.4035	X1 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X3X4 X4X5
11	0.4035	X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X4X5
11	0.4035	X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.4033	X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.4033	X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
12	0.4104	X1 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
12	0.4092	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X4X5
12	0.4089	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X4X5
12	0.4084	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
12	0.4081	X1 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.4078	X1 X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.4075	X1 X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
12	0.4072	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X4X5
12	0.4065	X1 X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.4065	X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
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12	0.4064	X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
12	0.4058	X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.4056	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.4055	X2 X3 X4 X5 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.4117	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
13	0.4109	X1 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.4106	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
13	0.4105	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X4X5
13	0.4096	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
13	0.4095	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
13	0.4085	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.4084	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
13	0.4078	X1 X2 X3 X4 X5 X1X2 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13		

	0.4078	X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.4075	X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.4075	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
13	0.4074	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
13	0.4064	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
13	0.4063	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
14	0.4119	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4118	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
14	0.4110	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4109	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
14	0.4086	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4084	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4068	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4066	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
14	0.4059	X1 X2 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.4050	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3993	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3976	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
14	0.3697	X1 X2 X3 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3550	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
14	0.3522	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
15	0.4120	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Suspended Solids

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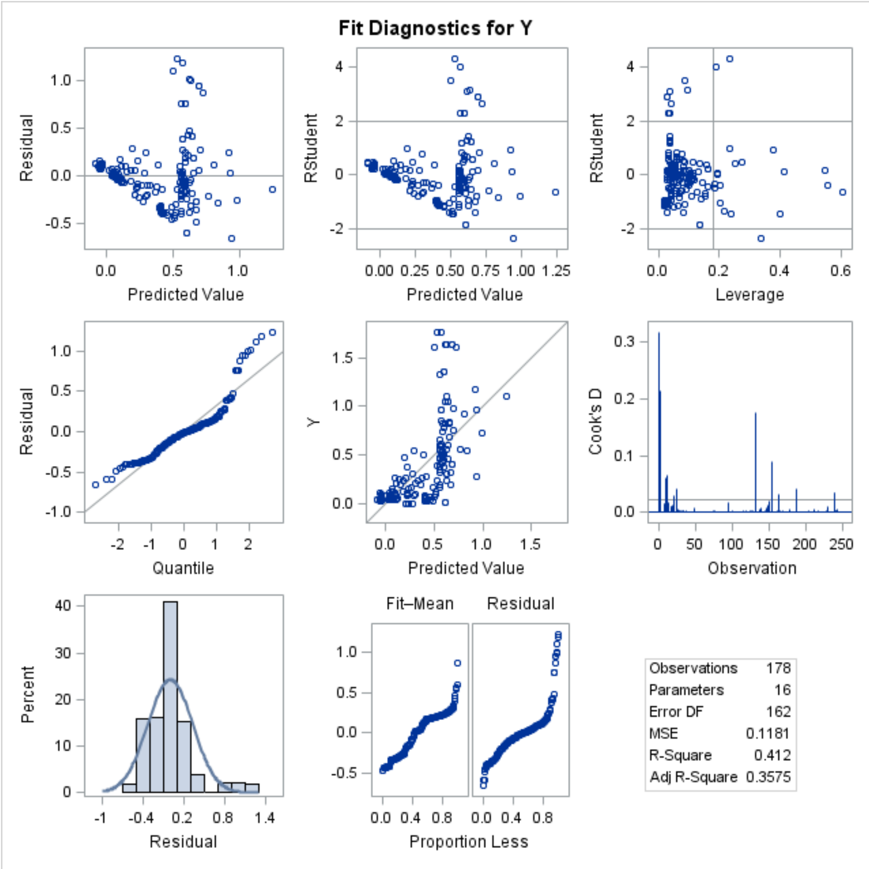
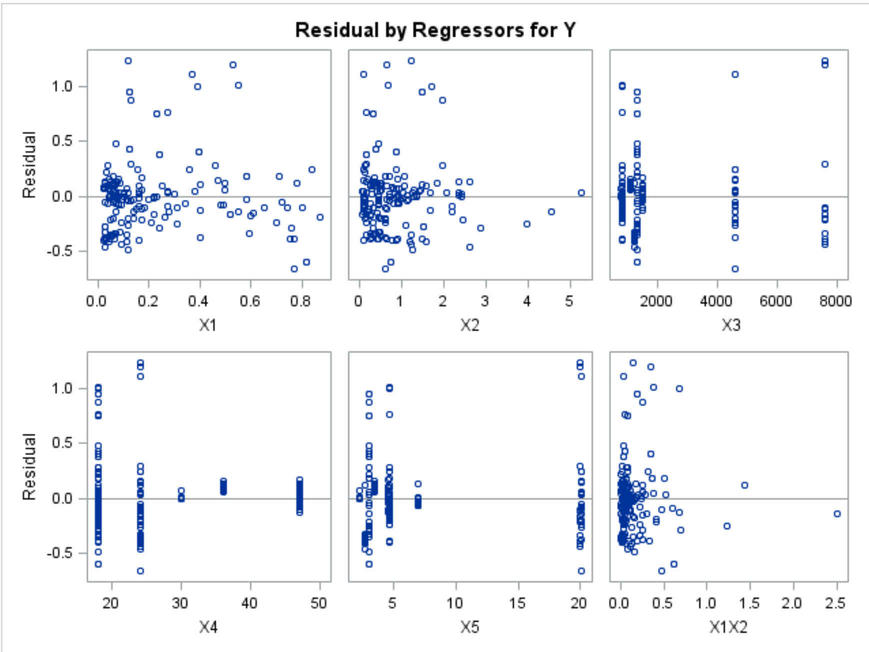
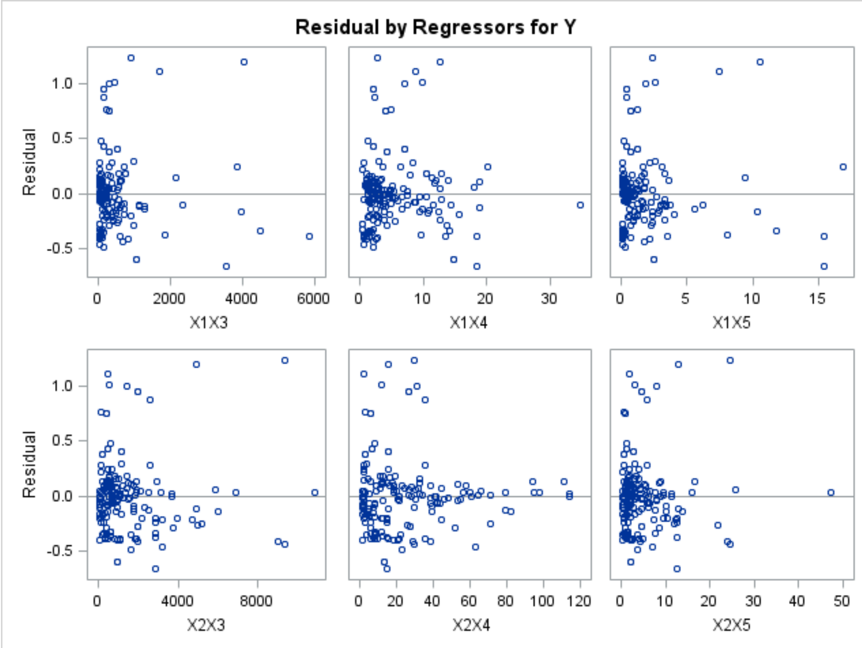
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
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0.5
0.0
-0.5
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X1X3
0 10 20 30
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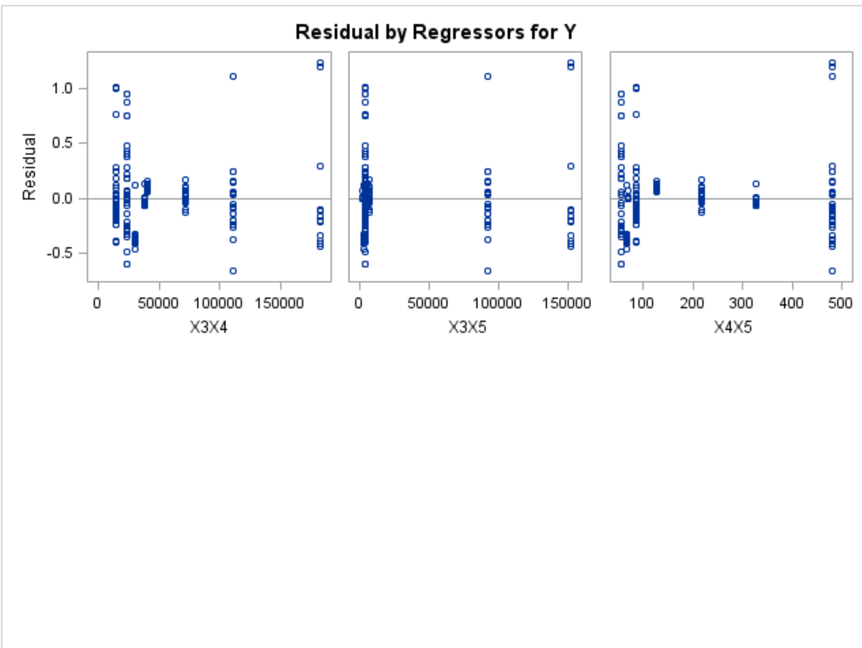
0 10 20 30 40 50
X2X5


Residual by Regressors for Y
Residual
1.0
0.5
0.0
-0.5
0 50000 100000 150000
X3X4
0 50000 100000 150000
X3X5
100 200 300 400 500
X4X5

FORWARD REGRESSION
Pollutant: Total Suspended Solids
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	290
Number of Observations Used	126
Number of Observations with Missing Values	164

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0987	0.0039	-0.1818	0.0304	0.4996	0.5380	0.8397	0.6485	-0.0953	-0.1077	-0.0980	-0.0342	0.0261	-0.0137	0.1949
X2	-0.0987	1.0000	-0.0947	-0.1925	0.0030	0.2244	-0.0552	-0.0994	-0.0594	0.5314	0.9982	1.0000	-0.1048	-0.0565	-0.0879	-0.0389
X3	0.0039	-0.0947	1.0000	-0.1081	0.9270	-0.0572	0.6482	-0.0017	0.5651	0.4352	-0.1033	-0.0883	0.9635	0.9944	0.9066	0.3897
X4	-0.1818	-0.1925	-0.1081	1.0000	-0.1639	0.0212	-0.1083	0.2619	-0.1533	-0.0663	-0.1553	-0.1944	0.1560	-0.1613	0.1177	-0.0462
X5	0.0304	0.0030	0.9270	-0.1639	1.0000	-0.0556	0.5759	-0.0041	0.5724	0.4376	-0.0079	0.0100	0.8817	0.9539	0.9591	0.2600
X1X2	0.4996	0.2244	-0.0572	0.0212	-0.0556	1.0000	0.3075	0.5383	0.3218	0.3833	0.2502	0.2230	-0.0330	-0.0526	-0.0546	0.1113
X1X3	0.5380	-0.0552	0.6482	-0.1083	0.5759	0.3075	1.0000	0.4949	0.9528	0.2961	-0.0626	-0.0511	0.6182	0.6450	0.5524	0.4443
X1X4	0.8397	-0.0994	-0.0017	0.2619	-0.0041	0.5383	0.4949	1.0000	0.5582	-0.0539	-0.0927	-0.0994	0.0806	-0.0079	0.0765	0.2461
X1X5	0.6485	-0.0594	0.5651	-0.1533	0.5724	0.3218	0.9528	0.5582	1.0000	0.2207	-0.0691	-0.0554	0.5253	0.5810	0.5352	0.3684
X2X3	-0.0953	0.5314	0.4352	-0.0663	0.4376	0.3833	0.2961	-0.0539	0.2207	1.0000	0.5506	0.5364	0.4385	0.4448	0.4039	0.1288
X2X4	-0.1077	0.9982	-0.1033	-0.1553	-0.0079	0.2502	-0.0626	-0.0927	-0.0691	0.5506	1.0000	0.9980	-0.1031	-0.0673	-0.0882	-0.0450
X2X5	-0.0980	1.0000	-0.0883	-0.1944	0.0100	0.2230	-0.0511	-0.0994	-0.0554	0.5364	0.9980	1.0000	-0.0989	-0.0498	-0.0814	-0.0372
X3X4	-0.0342	-0.1048	0.9635	0.1560	0.8817	-0.0330	0.6182	0.0806	0.5253	0.4385	-0.1031	-0.0989	1.0000	0.9454	0.9349	0.3780
X3X5	0.0261	-0.0565	0.9944	-0.1613	0.9539	-0.0526	0.6450	-0.0079	0.5810	0.4448	-0.0673	-0.0498	0.9454	1.0000	0.9159	0.3632
X4X5	-0.0137	-0.0879	0.9066	0.1177	0.9591	-0.0546	0.5524	0.0765	0.5352	0.4039	-0.0882	-0.0814	0.9349	0.9159	1.0000	0.2571
Y	0.1949	-0.0389	0.3897	-0.0462	0.2600	0.1113	0.4443	0.2461	0.3684	0.1288	-0.0450	-0.0372	0.3780	0.3632	0.2571	1.0000

FORWARD REGRESSION
Pollutant: Total Suspended Solids
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	290
Number of Observations Used	126
Number of Observations with Missing Values	164

Forward Selection: Step 1

Variable X1X3 Entered: R-Square = 0.1974 and C(p) = 13.1335

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	2027.66802	2027.66802	30.50	<.0001
Error	124	8243.91333	66.48317		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	9.38847	0.85029	8105.25529	121.91	<.0001
X1X3	0.00002036	0.00000369	2027.66802	30.50	<.0001

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X1X5 Entered: R-Square = 0.2301 and C(p) = 9.6236

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	2363.80066	1181.90033	18.38	<.0001
Error	123	7907.78069	64.29090		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	9.78516	0.85396	8441.27337	131.30	<.0001

X1X3	0.00004639	0.00001194	969.67265	15.08	0.0002
X1X5	-0.00882	0.00386	336.13264	5.23	0.0239

Bounds on condition number: 10.849, 43.397

Forward Selection: Step 3

Variable X1X4 Entered: R-Square = 0.2391 and C(p) = 10.1052

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	2456.43029	818.81010	12.78	<.0001
Error	122	7815.15105	64.05862		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	9.01189	1.06777	4563.04374	71.23	<.0001
X1X3	0.00004851	0.00001205	1037.83390	16.20	<.0001
X1X4	0.00088734	0.00073791	92.62963	1.45	0.2315
X1X5	-0.01043	0.00408	419.37106	6.55	0.0117

Bounds on condition number: 12.163, 74.207

Forward Selection: Step 4

Variable X3 Entered: R-Square = 0.2628 and C(p) = 8.1216

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	2699.45579	674.86395	10.78	<.0001
Error	121	7572.12556	62.57955		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	6.90743	1.50141	1324.55348	21.17	<.0001
X3	0.00093974	0.00047687	243.02549	3.88	0.0510
X1X3	0.00003757	0.00001314	511.38765	8.17	0.0050
X1X4	0.00161	0.00081608	243.21056	3.89	0.0510
X1X5	-0.00978	0.00404	366.42453	5.86	0.0170

Bounds on condition number: 13.497, 119.51

Forward Selection: Step 5

Variable X4X5 Entered: R-Square = 0.2995 and C(p) = 3.9466

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	3076.16239	615.23248	10.26	<.0001
Error	120	7195.41895	59.96182		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	6.94296	1.46974	1338.08996	22.32	<.0001
X3	0.00326	0.00104	592.71001	9.88	0.0021
X1X3	0.00001881	0.00001488	95.81556	1.60	0.2086
X1X4	0.00214	0.00082654	402.25362	6.71	0.0108
X1X5	-0.00514	0.00437	82.95554	1.38	0.2418
X4X5	-0.02916	0.01163	376.70661	6.28	0.0135

Bounds on condition number: 18.064, 270.39

Forward Selection: Step 6

Variable X1 Entered: R-Square = 0.3160 and C(p) = 3.1728

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	3245.38500	540.89750	9.16	<.0001
Error	119	7026.19635	59.04367		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	8.15360	1.62432	1487.73872	25.20	<.0001
X1	-0.07024	0.04149	169.22260	2.87	0.0931
X3	0.00414	0.00115	761.52249	12.90	0.0005
X1X3	0.00000279	0.00001754	1.49499	0.03	0.8738
X1X4	0.00402	0.00138	501.30309	8.49	0.0043
X1X5	0.00155	0.00586	4.10661	0.07	0.7924
X4X5	-0.04382	0.01443	544.39319	9.22	0.0029

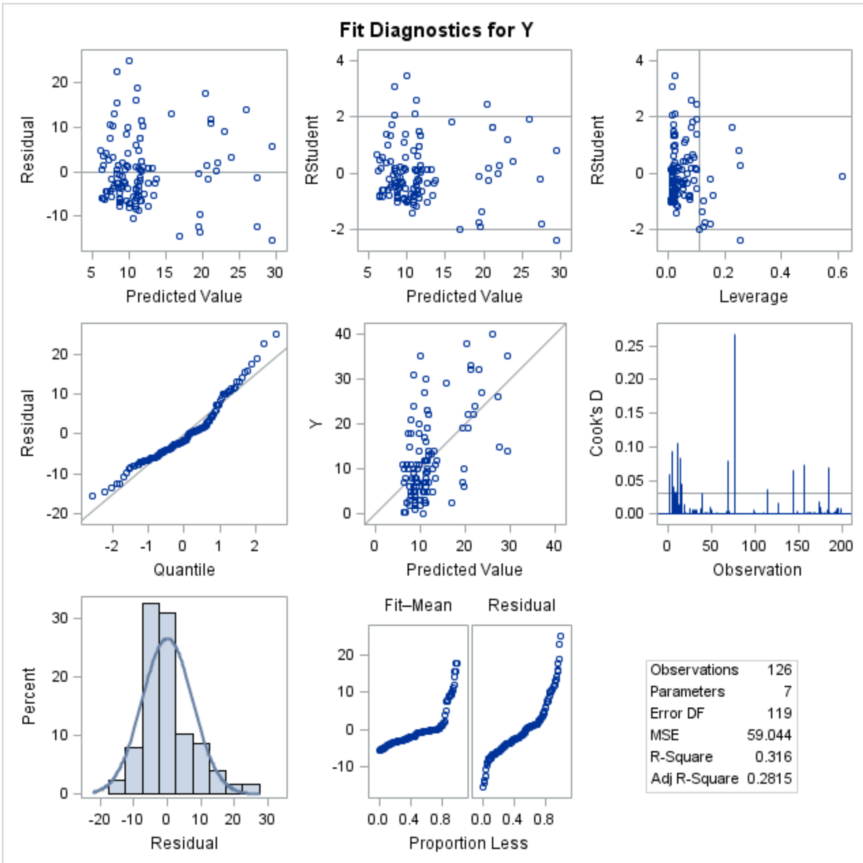
Bounds on condition number: 27.312, 556.05

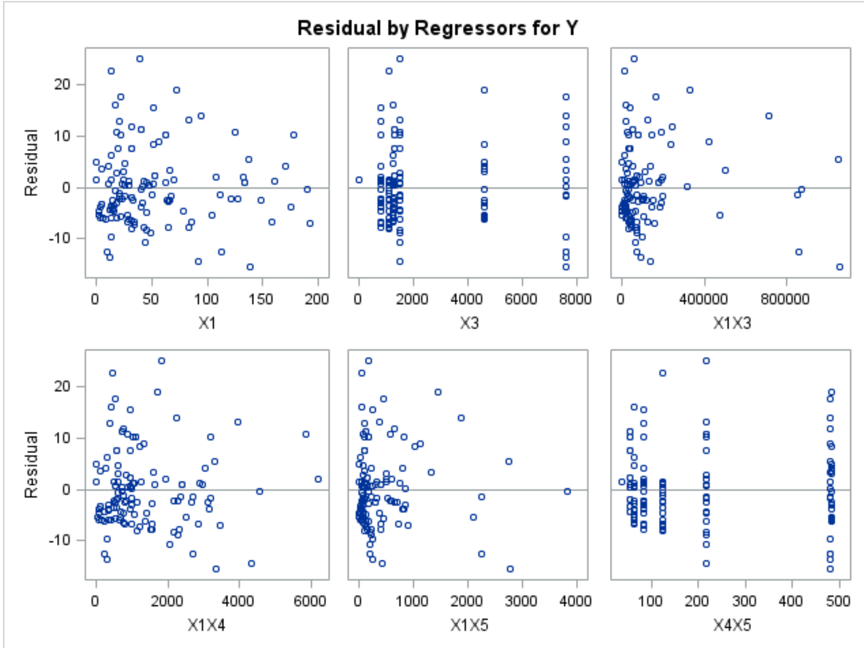
No other variable met the 0.5000 significance level for entry into the model.

Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1X3	1	0.1974	0.1974	13.1335	30.50	<.0001
2	X1X5	2	0.0327	0.2301	9.6236	5.23	0.0239
3	X1X4	3	0.0090	0.2391	10.1052	1.45	0.2315
4	X3	4	0.0237	0.2628	8.1216	3.88	0.0510
5	X4X5	5	0.0367	0.2995	3.9466	6.28	0.0135
6	X1	6	0.0165	0.3160	3.1728	2.87	0.0931

FORWARD REGRESSION
Pollutant: Total Suspended Solids
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X1
X3
X1X3
X1X4
X1X5
X4X5

BACKWARD REGRESSION
Pollutant: Total Suspended Solids
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	290
Number of Observations Used	126
Number of Observations with Missing Values	164

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0987	0.0039	-0.1818	0.0304	0.4996	0.5380	0.8397	0.6485	-0.0953	-0.1077	-0.0980	-0.0342	0.0261	-0.0137	0.1949
X2	-0.0987	1.0000	-0.0947	-0.1925	0.0030	0.2244	-0.0552	-0.0994	-0.0594	0.5314	0.9982	1.0000	-0.1048	-0.0565	-0.0879	-0.0389
X3	0.0039	-0.0947	1.0000	-0.1081	0.9270	-0.0572	0.6482	-0.0017	0.5651	0.4352	-0.1033	-0.0883	0.9635	0.9944	0.9066	0.3897
X4	-0.1818	-0.1925	-0.1081	1.0000	-0.1639	0.0212	-0.1083	0.2619	-0.1533	-0.0663	-0.1553	-0.1944	0.1560	-0.1613	0.1177	-0.0462
X5	0.0304	0.0030	0.9270	-0.1639	1.0000	-0.0556	0.5759	-0.0041	0.5724	0.4376	-0.0079	0.0100	0.8817	0.9539	0.9591	0.2600
X1X2	0.4996	0.2244	-0.0572	0.0212	-0.0556	1.0000	0.3075	0.5383	0.3218	0.3833	0.2502	0.2230	-0.0330	-0.0526	-0.0546	0.1113
X1X3	0.5380	-0.0552	0.6482	-0.1083	0.5759	0.3075	1.0000	0.4949	0.9528	0.2961	-0.0626	-0.0511	0.6182	0.6450	0.5524	0.4443
X1X4	0.8397	-0.0994	-0.0017	0.2619	-0.0041	0.5383	0.4949	1.0000	0.5582	-0.0539	-0.0927	-0.0994	0.0806	-0.0079	0.0765	0.2461
X1X5	0.6485	-0.0594	0.5651	-0.1533	0.5724	0.3218	0.9528	0.5582	1.0000	0.2207	-0.0691	-0.0554	0.5253	0.5810	0.5352	0.3684
X2X3	-0.0953	0.5314	0.4352	-0.0663	0.4376	0.3833	0.2961	-0.0539	0.2207	1.0000	0.5506	0.5364	0.4385	0.4448	0.4039	0.1288
X2X4	-0.1077	0.9982	-0.1033	-0.1553	-0.0079	0.2502	-0.0626	-0.0927	-0.0691	0.5506	1.0000	0.9980	-0.1031	-0.0673	-0.0882	-0.0450
X2X5	-0.0980	1.0000	-0.0883	-0.1944	0.0100	0.2230	-0.0511	-0.0994	-0.0554	0.5364	0.9980	1.0000	-0.0989	-0.0498	-0.0814	-0.0372
X3X4	-0.0342	-0.1048	0.9635	0.1560	0.8817	-0.0330	0.6182	0.0806	0.5253	0.4385	-0.1031	-0.0989	1.0000	0.9454	0.9349	0.3780
X3X5	0.0261	-0.0565	0.9944	-0.1613	0.9539	-0.0526	0.6450	-0.0079	0.5810	0.4448	-0.0673	-0.0498	0.9454	1.0000	0.9159	0.3632
X4X5	-0.0137	-0.0879	0.9066	0.1177	0.9591	-0.0546	0.5524	0.0765	0.5352	0.4039	-0.0882	-0.0814	0.9349	0.9159	1.0000	0.2571
Y	0.1949	-0.0389	0.3897	-0.0462	0.2600	0.1113	0.4443	0.2461	0.3684	0.1288	-0.0450	-0.0372	0.3780	0.3632	0.2571	1.0000

BACKWARD REGRESSION
Pollutant: Total Suspended Solids
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	290
Number of Observations Used	126
Number of Observations with Missing Values	164

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.3467 and C(p) = 16.0000

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	15	3560.95292	237.39686	3.89	<.0001
Error	110	6710.62843	61.00571		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	101.26278	78.74185	100.89253	1.65	0.2011
X1	-0.07971	0.05689	119.75836	1.96	0.1640
X2	-0.76809	3.66825	2.67470	0.04	0.8345
X3	0.00679	0.01250	18.01859	0.30	0.5879
X4	-2.42151	1.72335	120.44751	1.97	0.1628
X5	-26.66782	23.25795	80.20522	1.31	0.2540
X1X2	0.00612	0.03416	1.95581	0.03	0.8582
X1X3	0.00000121	0.00001930	0.23972	0.00	0.9501
X1X4	0.00376	0.00202	212.53971	3.48	0.0646
X1X5	0.00276	0.00645	11.18689	0.18	0.6693
X2X3	-0.00064513	0.00130	15.08868	0.25	0.6200
X2X4	-0.00628	0.10357	0.22457	0.00	0.9517
X2X5	0.11549	0.41515	4.72146	0.08	0.7814
X3X4	-0.00129	0.00143	49.48559	0.81	0.3697
X3X5	0.00143	0.00162	47.49908	0.78	0.3795
X4X5	0.99176	0.88510	76.59343	1.26	0.2649

Bounds on condition number: 144045, 5887388

Backward Elimination: Step 1

Variable X2X4 Removed: R-Square = 0.3467 and C(p) = 14.0037

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	14	3560.72834	254.33774	4.21	<.0001
Error	111	6710.85301	60.45814		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	101.13884	78.36128	100.71349	1.67	0.1995
X1	-0.08010	0.05627	122.52905	2.03	0.1574
X2	-0.94339	2.25004	10.62807	0.18	0.6758
X3	0.00694	0.01220	19.58290	0.32	0.5704
X4	-2.41868	1.71497	120.25427	1.99	0.1612
X5	-26.63678	23.14773	80.05735	1.32	0.2523
X1X2	0.00605	0.03398	1.91357	0.03	0.8591
X1X3	0.00000121	0.00001921	0.23981	0.00	0.9499
X1X4	0.00378	0.00199	218.64732	3.62	0.0598
X1X5	0.00277	0.00642	11.26673	0.19	0.6668
X2X3	-0.00070758	0.00078603	48.99233	0.81	0.3700
X2X5	0.13387	0.28271	13.55553	0.22	0.6368
X3X4	-0.00129	0.00142	49.67813	0.82	0.3666
X3X5	0.00143	0.00162	47.33173	0.78	0.3782
X4X5	0.99021	0.88076	76.41778	1.26	0.2633

Bounds on condition number: 55272, 3326866

Backward Elimination: Step 2

Variable X1X3 Removed: R-Square = 0.3466 and C(p) = 12.0076

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	13	3560.48854	273.88373	4.57	<.0001
Error	112	6711.09281	59.92047		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	101.54157	77.75189	102.19769	1.71	0.1942
X1	-0.08091	0.05451	132.01400	2.20	0.1405
X2	-0.96299	2.21846	11.29070	0.19	0.6651
X3	0.00707	0.01197	20.94360	0.35	0.5556
X4	-2.42723	1.70197	121.86960	2.03	0.1566
X5	-26.79089	22.91544	81.90176	1.37	0.2448

X1X2	0.00631	0.03357	2.11850	0.04	0.8512
X1X4	0.00380	0.00196	223.94291	3.74	0.0557
X1X5	0.00315	0.00236	106.58324	1.78	0.1850
X2X3	-0.00070968	0.00078182	49.37282	0.82	0.3660
X2X5	0.13642	0.27854	14.37341	0.24	0.6253
X3X4	-0.00130	0.00141	50.97093	0.85	0.3584
X3X5	0.00144	0.00160	48.14781	0.80	0.3720
X4X5	0.99544	0.87291	77.92342	1.30	0.2566

Bounds on condition number: 54134, 3043536

Backward Elimination: Step 3

Variable X1X2 Removed: R-Square = 0.3464 and C(p) = 10.0423

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	12	3558.37003	296.53084	4.99	<.0001
Error	113	6713.21132	59.40895		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	101.76585	77.41019	102.67381	1.73	0.1913
X1	-0.08025	0.05417	130.39824	2.19	0.1412
X2	-0.69953	1.71261	9.91181	0.17	0.6837
X3	0.00692	0.01189	20.13712	0.34	0.5616
X4	-2.43347	1.69436	122.54373	2.06	0.1537
X5	-26.83296	22.81633	82.16699	1.38	0.2420
X1X4	0.00391	0.00187	259.36739	4.37	0.0389
X1X5	0.00315	0.00235	106.52740	1.79	0.1832
X2X3	-0.00060115	0.00052506	77.87432	1.31	0.2547
X2X5	0.10338	0.21520	13.71029	0.23	0.6319
X3X4	-0.00130	0.00140	51.23847	0.86	0.3550
X3X5	0.00145	0.00160	48.85280	0.82	0.3664
X4X5	0.99723	0.86913	78.21246	1.32	0.2536

Bounds on condition number: 53370, 2293632

Backward Elimination: Step 4

Variable X2 Removed: R-Square = 0.3455 and C(p) = 8.2048

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	3548.45823	322.58711	5.47	<.0001
Error	114	6723.12312	58.97476		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	101.53012	77.12466	102.20438	1.73	0.1907
X1	-0.08036	0.05397	130.75446	2.22	0.1392
X3	0.00653	0.01181	18.04902	0.31	0.5812
X4	-2.43191	1.68816	122.38695	2.08	0.1524
X5	-26.73547	22.73156	81.57995	1.38	0.2420
X1X4	0.00394	0.00186	264.44265	4.48	0.0364
X1X5	0.00309	0.00234	102.92904	1.75	0.1891
X2X3	-0.00049736	0.00045780	69.60707	1.18	0.2796
X2X5	0.01564	0.01286	87.21953	1.48	0.2265
X3X4	-0.00130	0.00140	50.97522	0.86	0.3545
X3X5	0.00146	0.00159	49.76129	0.84	0.3603
X4X5	0.99468	0.86592	77.81681	1.32	0.2531

Bounds on condition number: 53364, 1390339

Backward Elimination: Step 5

Variable X3 Removed: R-Square = 0.3437 and C(p) = 6.5007

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	3530.40921	353.04092	6.02	<.0001
Error	115	6741.17214	58.61889		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	105.04672	76.62999	110.15521	1.88	0.1731
X1	-0.09095	0.05030	191.60079	3.27	0.0732
X4	-2.56170	1.66672	138.47361	2.36	0.1270
X5	-25.40019	22.53475	74.47424	1.27	0.2620
X1X4	0.00408	0.00184	287.96594	4.91	0.0286
X1X5	0.00341	0.00226	134.31762	2.29	0.1328
X2X3	-0.00048408	0.00045579	66.12156	1.13	0.2904
X2X5	0.01386	0.01242	73.09379	1.25	0.2665
X3X4	-0.00103	0.00131	36.50629	0.62	0.4316
X3X5	0.00147	0.00159	50.46493	0.86	0.3554
X4X5	0.93682	0.85699	70.04933	1.19	0.2766

Bounds on condition number: 52763, 1222191

Backward Elimination: Step 6

Variable X3X4 Removed: R-Square = 0.3402 and C(p) = 5.0991

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	9	3493.90292	388.21144	6.64	<.0001
Error	116	6777.67843	58.42826		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	45.47480	13.16011	697.66260	11.94	0.0008
X1	-0.08038	0.04841	161.07812	2.76	0.0995
X4	-1.31712	0.53832	349.77747	5.99	0.0159
X5	-7.78225	3.06298	377.17713	6.46	0.0124
X1X4	0.00388	0.00182	265.41566	4.54	0.0352
X1X5	0.00313	0.00222	115.66307	1.98	0.1621
X2X3	-0.00045299	0.00045335	58.33742	1.00	0.3198
X2X5	0.00423	0.00228	201.39860	3.45	0.0659
X3X5	0.00022051	0.00004781	1242.65624	21.27	<.0001
X4X5	0.26800	0.12691	260.55472	4.46	0.0369

Bounds on condition number: 977.96, 18430

Backward Elimination: Step 7

Variable X2X3 Removed: R-Square = 0.3345 and C(p) = 4.0553

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	8	3435.56550	429.44569	7.35	<.0001
Error	117	6836.01585	58.42749		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	43.66205	13.03438	655.60854	11.22	0.0011
X1	-0.08066	0.04841	162.20413	2.78	0.0984
X4	-1.26049	0.53533	323.93906	5.54	0.0202
X5	-7.35830	3.03343	343.79858	5.88	0.0168
X1X4	0.00394	0.00182	274.48562	4.70	0.0322
X1X5	0.00307	0.00222	111.31791	1.91	0.1701
X2X5	0.00301	0.00193	143.06395	2.45	0.1203
X3X5	0.00020739	0.00004598	1188.83168	20.35	<.0001

X4X5	0.25163	0.12585	233.58500	4.00	0.0479

Bounds on condition number: 959.2, 16065

Backward Elimination: Step 8

Variable X1X5 Removed: R-Square = 0.3236 and C(p) = 3.8801

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	3324.24759	474.89251	8.07	<.0001
Error	118	6947.33376	58.87571		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	41.22951	12.96414	595.47742	10.11	0.0019
X1	-0.05682	0.04540	92.23611	1.57	0.2132
X4	-1.19871	0.53549	295.02419	5.01	0.0271
X5	-7.01637	3.03487	314.68737	5.34	0.0225
X1X4	0.00404	0.00182	289.69343	4.92	0.0285
X2X5	0.00300	0.00193	141.28834	2.40	0.1240
X3X5	0.00022310	0.00004472	1465.56622	24.89	<.0001
X4X5	0.23897	0.12600	211.79734	3.60	0.0603

Bounds on condition number: 952.8, 13931

Backward Elimination: Step 9

Variable X1 Removed: R-Square = 0.3147 and C(p) = 3.3920

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	3232.01148	538.66858	9.11	<.0001
Error	119	7039.56986	59.15605		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	41.73962	12.98854	610.90738	10.33	0.0017
X4	-1.24307	0.53559	318.66013	5.39	0.0220
X5	-7.90791	2.95712	423.04455	7.15	0.0085
X1X4	0.00189	0.00061119	567.44925	9.59	0.0024
X2X5	0.00383	0.00182	263.09830	4.45	0.0370
X3X5	0.00022681	0.00004472	1521.40589	25.72	<.0001

X4X5	0.27567	0.12283	297.98364	5.04	0.0267

Bounds on condition number: 900.32, 11208

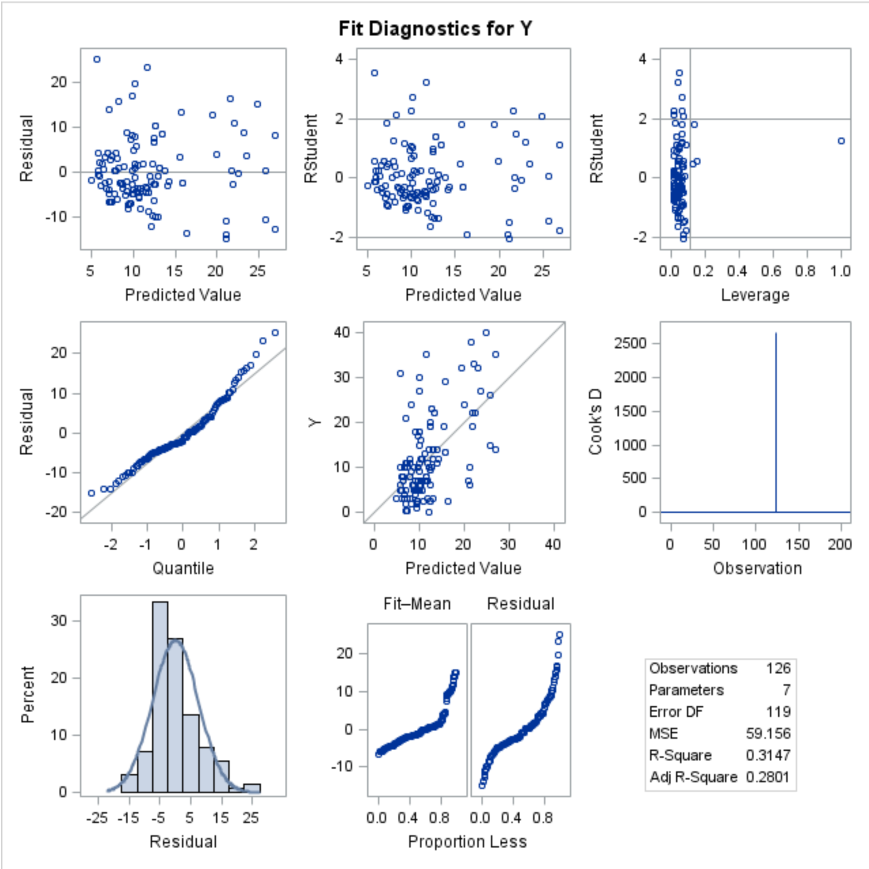
All variables left in the model are significant at the 0.1000 level.

Summary of Backward Elimination

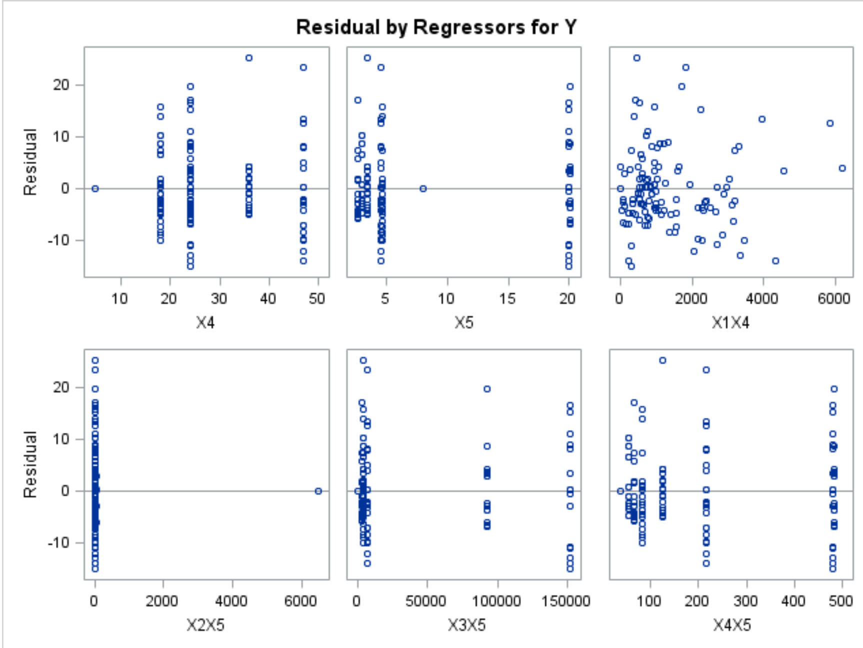
Step	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X2X4	14	0.0000	0.3467	14.0037	0.00	0.9517
2	X1X3	13	0.0000	0.3466	12.0076	0.00	0.9499
3	X1X2	12	0.0002	0.3464	10.0423	0.04	0.8512
4	X2	11	0.0010	0.3455	8.2048	0.17	0.6837
5	X3	10	0.0018	0.3437	6.5007	0.31	0.5812
6	X3X4	9	0.0036	0.3402	5.0991	0.62	0.4316
7	X2X3	8	0.0057	0.3345	4.0553	1.00	0.3198
8	X1X5	7	0.0108	0.3236	3.8801	1.91	0.1701
9	X1	6	0.0090	0.3147	3.3920	1.57	0.2132

BACKWARD REGRESSION
Pollutant: Total Suspended Solids
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y



Observations	126
Parameters	7
Error DF	119
MSE	59.156
R-Square	0.3147
Adj R-Square	0.2801


Residual by Regressors for Y
Residual
X4
X5
X1X4
X2X5
X3X5
X4X5

STEPWISE REGRESSION
Pollutant: Total Suspended Solids
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	290
Number of Observations Used	126
Number of Observations with Missing Values	164

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0987	0.0039	-0.1818	0.0304	0.4996	0.5380	0.8397	0.6485	-0.0953	-0.1077	-0.0980	-0.0342	0.0261	-0.0137	0.1949
X2	-0.0987	1.0000	-0.0947	-0.1925	0.0030	0.2244	-0.0552	-0.0994	-0.0594	0.5314	0.9982	1.0000	-0.1048	-0.0565	-0.0879	-0.0389
X3	0.0039	-0.0947	1.0000	-0.1081	0.9270	-0.0572	0.6482	-0.0017	0.5651	0.4352	-0.1033	-0.0883	0.9635	0.9944	0.9066	0.3897
X4	-0.1818	-0.1925	-0.1081	1.0000	-0.1639	0.0212	-0.1083	0.2619	-0.1533	-0.0663	-0.1553	-0.1944	0.1560	-0.1613	0.1177	-0.0462
X5	0.0304	0.0030	0.9270	-0.1639	1.0000	-0.0556	0.5759	-0.0041	0.5724	0.4376	-0.0079	0.0100	0.8817	0.9539	0.9591	0.2600
X1X2	0.4996	0.2244	-0.0572	0.0212	-0.0556	1.0000	0.3075	0.5383	0.3218	0.3833	0.2502	0.2230	-0.0330	-0.0526	-0.0546	0.1113
X1X3	0.5380	-0.0552	0.6482	-0.1083	0.5759	0.3075	1.0000	0.4949	0.9528	0.2961	-0.0626	-0.0511	0.6182	0.6450	0.5524	0.4443
X1X4	0.8397	-0.0994	-0.0017	0.2619	-0.0041	0.5383	0.4949	1.0000	0.5582	-0.0539	-0.0927	-0.0994	0.0806	-0.0079	0.0765	0.2461
X1X5	0.6485	-0.0594	0.5651	-0.1533	0.5724	0.3218	0.9528	0.5582	1.0000	0.2207	-0.0691	-0.0554	0.5253	0.5810	0.5352	0.3684
X2X3	-0.0953	0.5314	0.4352	-0.0663	0.4376	0.3833	0.2961	-0.0539	0.2207	1.0000	0.5506	0.5364	0.4385	0.4448	0.4039	0.1288
X2X4	-0.1077	0.9982	-0.1033	-0.1553	-0.0079	0.2502	-0.0626	-0.0927	-0.0691	0.5506	1.0000	0.9980	-0.1031	-0.0673	-0.0882	-0.0450
X2X5	-0.0980	1.0000	-0.0883	-0.1944	0.0100	0.2230	-0.0511	-0.0994	-0.0554	0.5364	0.9980	1.0000	-0.0989	-0.0498	-0.0814	-0.0372
X3X4	-0.0342	-0.1048	0.9635	0.1560	0.8817	-0.0330	0.6182	0.0806	0.5253	0.4385	-0.1031	-0.0989	1.0000	0.9454	0.9349	0.3780
X3X5	0.0261	-0.0565	0.9944	-0.1613	0.9539	-0.0526	0.6450	-0.0079	0.5810	0.4448	-0.0673	-0.0498	0.9454	1.0000	0.9159	0.3632
X4X5	-0.0137	-0.0879	0.9066	0.1177	0.9591	-0.0546	0.5524	0.0765	0.5352	0.4039	-0.0882	-0.0814	0.9349	0.9159	1.0000	0.2571
Y	0.1949	-0.0389	0.3897	-0.0462	0.2600	0.1113	0.4443	0.2461	0.3684	0.1288	-0.0450	-0.0372	0.3780	0.3632	0.2571	1.0000

STEPWISE REGRESSION
Pollutant: Total Suspended Solids
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	290
Number of Observations Used	126
Number of Observations with Missing Values	164

Stepwise Selection: Step 1

Variable X1X3 Entered: R-Square = 0.1974 and C(p) = 13.1335

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	2027.66802	2027.66802	30.50	<.0001
Error	124	8243.91333	66.48317		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	9.38847	0.85029	8105.25529	121.91	<.0001
X1X3	0.00002036	0.00000369	2027.66802	30.50	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X1X5 Entered: R-Square = 0.2301 and C(p) = 9.6236

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	2363.80066	1181.90033	18.38	<.0001
Error	123	7907.78069	64.29090		
Corrected Total	125	10272			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	9.78516	0.85396	8441.27337	131.30	<.0001

X1X3	0.00004639	0.00001194	969.67265	15.08	0.0002
X1X5	-0.00882	0.00386	336.13264	5.23	0.0239

Bounds on condition number: 10.849, 43.397

All variables left in the model are significant at the 0.1500 level.

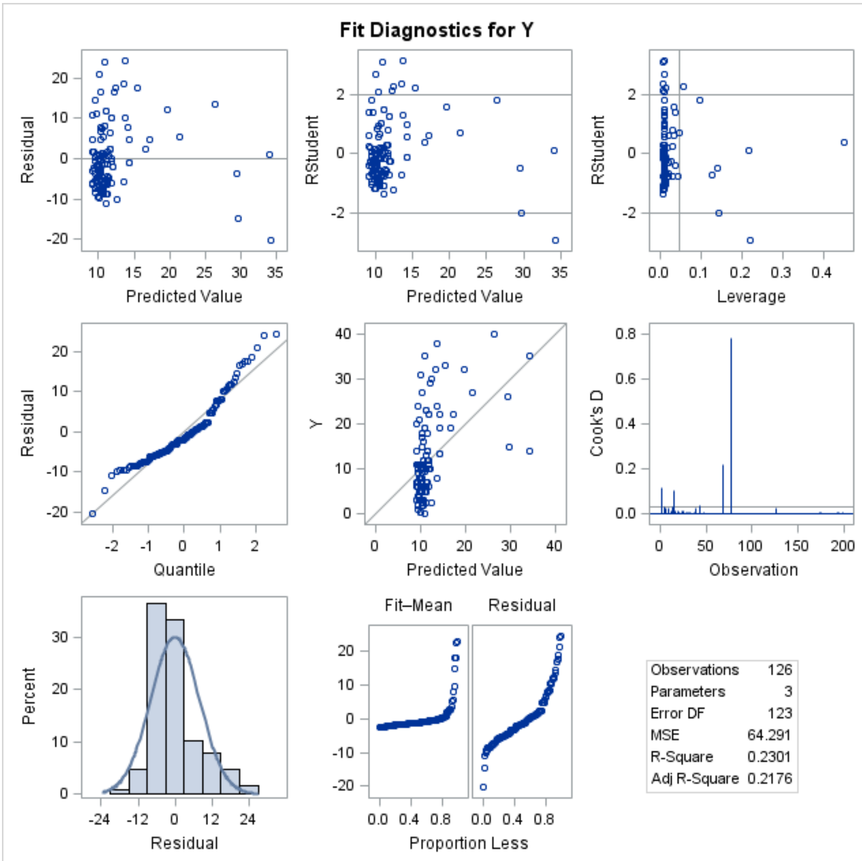
No other variable met the 0.1500 significance level for entry into the model.

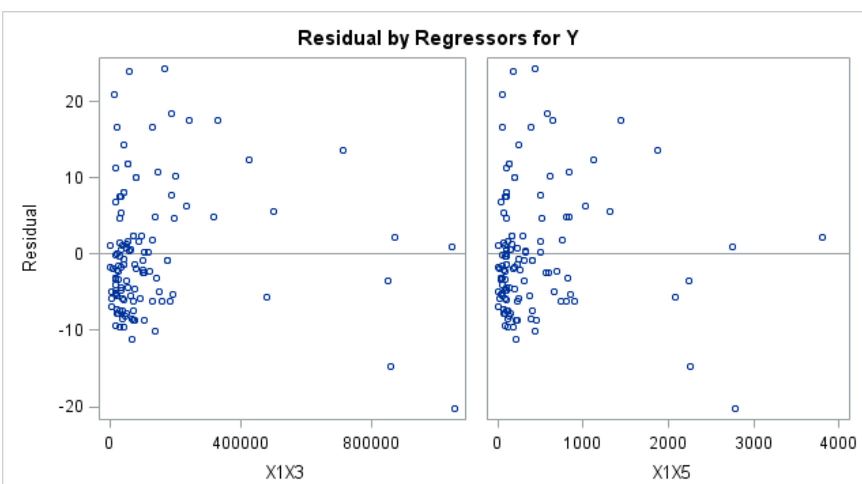
Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1X3		1	0.1974	0.1974	13.1335	30.50	<.0001
2	X1X5		2	0.0327	0.2301	9.6236	5.23	0.0239

STEPWISE REGRESSION
Pollutant: Total Suspended Solids
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y





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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Zinc

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The REG Procedure

Number of Observations Read	290
Number of Observations Used	126
Number of Observations with Missing Values	164

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0987	0.0039	-0.1818	0.0304	0.4996	0.5380	0.8397	0.6485	-0.0953	-0.1077	-0.0980	-0.0342	0.0261	-0.0137	0.1949
X2	-0.0987	1.0000	-0.0947	-0.1925	0.0030	0.2244	-0.0552	-0.0994	-0.0594	0.5314	0.9982	1.0000	-0.1048	-0.0565	-0.0879	-0.0389
X3	0.0039	-0.0947	1.0000	-0.1081	0.9270	-0.0572	0.6482	-0.0017	0.5651	0.4352	-0.1033	-0.0883	0.9635	0.9944	0.9066	0.3897
X4	-0.1818	-0.1925	-0.1081	1.0000	-0.1639	0.0212	-0.1083	0.2619	-0.1533	-0.0663	-0.1553	-0.1944	0.1560	-0.1613	0.1177	-0.0462
X5	0.0304	0.0030	0.9270	-0.1639	1.0000	-0.0556	0.5759	-0.0041	0.5724	0.4376	-0.0079	0.0100	0.8817	0.9539	0.9591	0.2600
X1X2	0.4996	0.2244	-0.0572	0.0212	-0.0556	1.0000	0.3075	0.5383	0.3218	0.3833	0.2502	0.2230	-0.0330	-0.0526	-0.0546	0.1113
X1X3	0.5380	-0.0552	0.6482	-0.1083	0.5759	0.3075	1.0000	0.4949	0.9528	0.2961	-0.0626	-0.0511	0.6182	0.6450	0.5524	0.4443
X1X4	0.8397	-0.0994	-0.0017	0.2619	-0.0041	0.5383	0.4949	1.0000	0.5582	-0.0539	-0.0927	-0.0994	0.0806	-0.0079	0.0765	0.2461
X1X5	0.6485	-0.0594	0.5651	-0.1533	0.5724	0.3218	0.9528	0.5582	1.0000	0.2207	-0.0691	-0.0554	0.5253	0.5810	0.5352	0.3684
X2X3	-0.0953	0.5314	0.4352	-0.0663	0.4376	0.3833	0.2961	-0.0539	0.2207	1.0000	0.5506	0.5364	0.4385	0.4448	0.4039	0.1288
X2X4	-0.1077	0.9982	-0.1033	-0.1553	-0.0079	0.2502	-0.0626	-0.0927	-0.0691	0.5506	1.0000	0.9980	-0.1031	-0.0673	-0.0882	-0.0450
X2X5	-0.0980	1.0000	-0.0883	-0.1944	0.0100	0.2230	-0.0511	-0.0994	-0.0554	0.5364	0.9980	1.0000	-0.0989	-0.0498	-0.0814	-0.0372
X3X4	-0.0342	-0.1048	0.9635	0.1560	0.8817	-0.0330	0.6182	0.0806	0.5253	0.4385	-0.1031	-0.0989	1.0000	0.9454	0.9349	0.3780
X3X5	0.0261	-0.0565	0.9944	-0.1613	0.9539	-0.0526	0.6450	-0.0079	0.5810	0.4448	-0.0673	-0.0498	0.9454	1.0000	0.9159	0.3632
X4X5	-0.0137	-0.0879	0.9066	0.1177	0.9591	-0.0546	0.5524	0.0765	0.5352	0.4039	-0.0882	-0.0814	0.9349	0.9159	1.0000	0.2571
Y	0.1949	-0.0389	0.3897	-0.0462	0.2600	0.1113	0.4443	0.2461	0.3684	0.1288	-0.0450	-0.0372	0.3780	0.3632	0.2571	1.0000

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Zinc

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The REG Procedure
Model: MODEL1
Dependent Variable: Y

R-Square Selection Method

Number of Observations Read	290
Number of Observations Used	126
Number of Observations with Missing Values	164

Number in Model	R-Square	Variables in Model
1	0.1974	X1X3
1	0.1518	X3
1	0.1429	X3X4
1	0.1357	X1X5
1	0.1319	X3X5
1	0.0676	X5
1	0.0661	X4X5
1	0.0606	X1X4
1	0.0380	X1
1	0.0166	X2X3
1	0.0124	X1X2
1	0.0021	X4
1	0.0020	X2X4
1	0.0015	X2
1	0.0014	X2X5
2	0.2301	X1X3 X1X5
2	0.2247	X3 X5
2	0.2163	X3X4 X4X5
2	0.2152	X3 X1X3
2	0.2149	X5 X3X5
2	0.2147	X1X3 X3X4
2	0.2127	X3 X1X4
2	0.2075	X1X3 X3X5
2	0.2050	X3 X3X5
2	0.2037	X3 X4X5
2	0.2001	X1 X1X3
2	0.1983	X1X3 X1X4
2	0.1981	X1X2 X1X3
2	0.1977	X1X3 X2X4
2	0.1976	X1X3 X2X5
3	0.2901	X3 X1X4 X4X5
3	0.2847	X3 X5 X1X4
3	0.2785	X5 X1X4 X3X5
3	0.2772	X3 X5 X1X3
3	0.2760	X1X3 X3X4 X4X5
3	0.2753	X3 X5 X1X5

3	0.2748	X1X5 X3X4 X4X5
3	0.2702	X1 X3 X5
3	0.2690	X3 X1X3 X3X5
3	0.2673	X5 X1X3 X3X5
3	0.2663	X1 X3 X3X5
3	0.2657	X1 X3X4 X4X5
3	0.2636	X1X4 X3X4 X4X5
3	0.2613	X5 X1X5 X3X5
3	0.2606	X3 X1X5 X3X5
4	0.3090	X1 X3 X1X4 X4X5
4	0.3069	X3 X1X4 X3X5 X4X5
4	0.3056	X3 X4 X1X4 X3X5
4	0.3048	X4 X5 X1X4 X3X4
4	0.2998	X4 X1X4 X3X4 X4X5
4	0.2993	X3 X4 X5 X1X4
4	0.2979	X3 X1X4 X3X4 X4X5
4	0.2977	X4 X1X4 X3X4 X3X5
4	0.2976	X3 X5 X1X4 X4X5
4	0.2961	X4 X1X3 X3X4 X3X5
4	0.2957	X3 X4 X1X4 X4X5
4	0.2954	X3 X1X4 X3X4 X3X5
4	0.2951	X3 X5 X1X4 X3X4
4	0.2931	X5 X1X4 X3X4 X4X5
4	0.2931	X3 X5 X1X3 X1X4
5	0.3177	X1 X4 X5 X1X4 X3X4
5	0.3169	X2 X3 X4 X1X4 X3X5
5	0.3168	X3 X4 X1X4 X2X5 X3X5
5	0.3161	X3 X4 X1X4 X2X4 X3X5
5	0.3158	X1 X3 X1X4 X1X5 X4X5
5	0.3156	X1 X3 X1X3 X1X4 X4X5
5	0.3152	X2 X3 X1X4 X3X4 X3X5
5	0.3151	X3 X1X4 X2X5 X3X4 X3X5
5	0.3145	X1 X3 X4 X5 X1X4
5	0.3141	X3 X1X4 X2X4 X3X4 X3X5
5	0.3134	X2 X3 X1X4 X3X5 X4X5
5	0.3134	X3 X1X4 X2X5 X3X5 X4X5
5	0.3133	X4 X5 X1X4 X3X4 X3X5
5	0.3127	X3 X1X4 X2X4 X3X5 X4X5
5	0.3125	X1 X3 X4 X1X4 X3X5
6	0.3264	X1 X4 X5 X1X4 X1X5 X3X4
6	0.3257	X1 X4 X5 X1X3 X1X4 X3X4
6	0.3225	X3 X4 X1X4 X2X3 X2X5 X3X5
6	0.3224	X2 X3 X4 X1X4 X2X3 X3X5
6	0.3222	X1 X3 X4 X5 X1X4 X1X5
6	0.3221	X1 X3 X4 X5 X1X3 X1X4
6	0.3221	X2 X3 X4 X1X4 X2X4 X3X5
6	0.3220	X3 X4 X1X4 X2X3 X2X4 X3X5
6	0.3213	X3 X4 X1X4 X2X4 X2X5 X3X5
6	0.3212	X1 X4 X5 X1X4 X3X4 X3X5
6	0.3211	X2 X3 X1X4 X2X4 X3X5 X4X5
6	0.3210	X1 X3 X4 X1X3 X1X4 X3X5
6		

	0.3207	X3 X1X4 X2X3 X2X5 X3X4 X3X5
6	0.3207	X2 X3 X1X4 X2X3 X3X4 X3X5
6	0.3205	X1 X4 X5 X1X4 X2X3 X3X4
7	0.3308	X1 X4 X5 X1X4 X1X5 X3X4 X3X5
7	0.3301	X1 X4 X5 X1X4 X1X5 X3X4 X4X5
7	0.3301	X1 X4 X5 X1X3 X1X4 X3X4 X3X5
7	0.3298	X1 X4 X5 X1X4 X1X5 X2X3 X3X4
7	0.3297	X1 X4 X5 X1X3 X1X4 X3X4 X4X5
7	0.3297	X1 X4 X5 X1X3 X1X4 X2X3 X3X4
7	0.3282	X1 X4 X5 X1X2 X1X4 X1X5 X3X4
7	0.3281	X1 X4 X1X4 X1X5 X3X4 X3X5 X4X5
7	0.3278	X1 X4 X5 X1X2 X1X3 X1X4 X3X4
7	0.3278	X1 X4 X1X3 X1X4 X3X4 X3X5 X4X5
7	0.3268	X1 X3 X4 X5 X1X3 X1X4 X3X5
7	0.3267	X1 X3 X4 X1X3 X1X4 X3X5 X4X5
7	0.3267	X1 X3 X4 X1X4 X1X5 X3X5 X4X5
7	0.3267	X1 X3 X4 X5 X1X4 X1X5 X3X5
7	0.3265	X1 X4 X5 X1X4 X1X5 X2X4 X3X4
8	0.3367	X1 X4 X1X3 X1X4 X2X3 X3X4 X3X5 X4X5
8	0.3367	X1 X4 X5 X1X3 X1X4 X2X3 X3X4 X3X5
8	0.3365	X1 X4 X5 X1X4 X1X5 X2X3 X3X4 X3X5
8	0.3365	X1 X4 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
8	0.3347	X1 X2 X3 X4 X5 X1X4 X1X5 X4X5
8	0.3347	X1 X3 X4 X5 X1X4 X1X5 X2X5 X4X5
8	0.3345	X1 X2 X4 X5 X1X4 X1X5 X3X5 X4X5
8	0.3345	X1 X4 X5 X1X4 X1X5 X2X5 X3X5 X4X5
8	0.3338	X1 X2 X3 X4 X5 X1X3 X1X4 X4X5
8	0.3338	X1 X3 X4 X5 X1X3 X1X4 X2X5 X4X5
8	0.3337	X1 X2 X4 X5 X1X3 X1X4 X3X5 X4X5
8	0.3336	X1 X4 X5 X1X3 X1X4 X2X5 X3X5 X4X5
8	0.3336	X1 X3 X4 X5 X1X4 X1X5 X2X4 X4X5
8	0.3335	X1 X4 X5 X1X2 X1X4 X1X5 X3X4 X3X5
8	0.3333	X1 X2 X4 X5 X1X4 X1X5 X3X4 X4X5
9	0.3404	X1 X3 X4 X5 X1X4 X1X5 X2X3 X2X5 X4X5
9	0.3403	X1 X2 X3 X4 X5 X1X4 X1X5 X2X3 X4X5
9	0.3402	X1 X3 X4 X5 X1X3 X1X4 X2X3 X2X5 X4X5
9	0.3402	X1 X2 X3 X4 X5 X1X3 X1X4 X2X3 X4X5
9	0.3402	X1 X4 X5 X1X4 X1X5 X2X3 X2X5 X3X5 X4X5
9	0.3401	X1 X4 X5 X1X3 X1X4 X2X3 X2X5 X3X5 X4X5
9	0.3401	X1 X2 X4 X5 X1X4 X1X5 X2X3 X3X5 X4X5
9	0.3400	X1 X2 X4 X5 X1X3 X1X4 X2X3 X3X5 X4X5
9	0.3397	X1 X3 X4 X5 X1X4 X1X5 X2X3 X2X4 X4X5
9	0.3397	X1 X2 X3 X4 X5 X1X4 X1X5 X2X4 X4X5
9	0.3397	X1 X3 X4 X5 X1X3 X1X4 X2X3 X2X4 X4X5
9	0.3396	X1 X2 X4 X5 X1X4 X1X5 X2X4 X3X5 X4X5
9	0.3394	X1 X4 X5 X1X3 X1X4 X2X3 X2X4 X3X5 X4X5
9	0.3394	X1 X4 X5 X1X4 X1X5 X2X3 X2X4 X3X5 X4X5
9	0.3391	X1 X3 X4 X5 X1X4 X1X5 X2X4 X2X5 X4X5
10	0.3437	X1 X4 X5 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
10	0.3434	X1 X2 X4 X5 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
10	0.3432	X1 X4 X5 X1X3 X1X4 X2X3 X2X5 X3X4 X3X5 X4X5
10		

	0.3432	X1 X2 X4 X5 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
10	0.3430	X1 X2 X4 X5 X1X3 X1X4 X2X3 X3X4 X3X5 X4X5
10	0.3421	X1 X4 X5 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
10	0.3421	X1 X2 X4 X5 X1X3 X1X4 X2X4 X3X4 X3X5 X4X5
10	0.3414	X1 X2 X3 X4 X5 X1X4 X1X5 X2X3 X2X5 X4X5
10	0.3412	X1 X3 X4 X5 X1X4 X1X5 X2X3 X2X4 X2X5 X4X5
10	0.3411	X1 X2 X3 X4 X5 X1X4 X1X5 X2X3 X2X4 X4X5
10	0.3411	X1 X4 X5 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
10	0.3410	X1 X2 X3 X4 X5 X1X3 X1X4 X2X3 X2X5 X4X5
10	0.3410	X1 X2 X4 X5 X1X4 X1X5 X2X3 X2X4 X3X5 X4X5
10	0.3410	X1 X2 X4 X5 X1X4 X1X5 X2X3 X2X5 X3X5 X4X5
10	0.3410	X1 X4 X5 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
11	0.3455	X1 X3 X4 X5 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.3451	X1 X2 X3 X4 X5 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
11	0.3447	X1 X3 X4 X5 X1X3 X1X4 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.3446	X1 X4 X5 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.3446	X1 X2 X4 X5 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
11	0.3445	X1 X2 X3 X4 X5 X1X4 X1X5 X2X4 X3X4 X3X5 X4X5
11	0.3445	X1 X2 X4 X5 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.3444	X1 X2 X3 X4 X5 X1X3 X1X4 X2X3 X3X4 X3X5 X4X5
11	0.3440	X1 X4 X5 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.3439	X1 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.3439	X1 X2 X4 X5 X1X3 X1X4 X2X3 X2X4 X3X4 X3X5 X4X5
11	0.3439	X1 X2 X4 X5 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
11	0.3438	X1 X2 X4 X5 X1X3 X1X4 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.3438	X1 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
11	0.3437	X1 X2 X4 X5 X1X3 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
12	0.3464	X1 X2 X3 X4 X5 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.3463	X1 X3 X4 X5 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.3461	X1 X2 X3 X4 X5 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
12	0.3455	X1 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.3455	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.3455	X1 X2 X3 X4 X5 X1X3 X1X4 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.3454	X1 X3 X4 X5 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.3453	X1 X2 X3 X4 X5 X1X3 X1X4 X2X3 X2X4 X3X4 X3X5 X4X5
12	0.3452	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
12	0.3452	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
12	0.3452	X1 X2 X3 X4 X5 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.3448	X1 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
12	0.3448	X1 X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X5 X3X4 X3X5 X4X5
12	0.3447	X1 X2 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
12	0.3447	X1 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3466	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
13	0.3465	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
13	0.3464	X1 X2 X3 X4 X5 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3464	X1 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3463	X1 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3462	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
13	0.3462	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
13	0.3456	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
13	0.3456	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X5 X3X4 X3X5 X4X5
13		

	0.3455	X1 X2 X3 X4 X5 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3454	X1 X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3453	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X3X4 X3X5 X4X5
13	0.3453	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X3X4 X3X5 X4X5
13	0.3452	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
13	0.3452	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3467	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X5 X3X4 X3X5 X4X5
14	0.3467	X1 X2 X3 X4 X5 X1X2 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3465	X1 X2 X3 X4 X5 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3464	X1 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3462	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X3X4 X3X5 X4X5
14	0.3456	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3452	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3449	X1 X2 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3421	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X4X5
14	0.3419	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X5 X4X5
14	0.3392	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5
14	0.3389	X1 X2 X3 X4 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3350	X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3350	X1 X2 X3 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
14	0.3260	X1 X2 X3 X4 X5 X1X2 X1X3 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5
15	0.3467	X1 X2 X3 X4 X5 X1X2 X1X3 X1X4 X1X5 X2X3 X2X4 X2X5 X3X4 X3X5 X4X5

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MULTIPLE LEAST-SQUARE REGRESSION
Pollutant: Total Zinc

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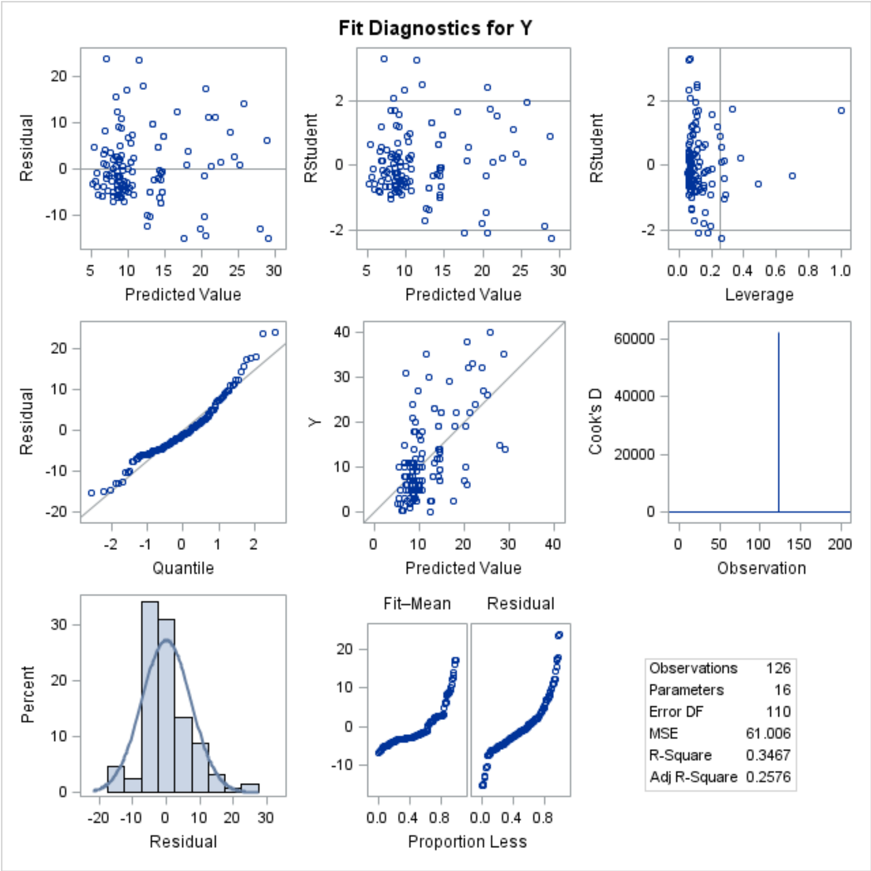
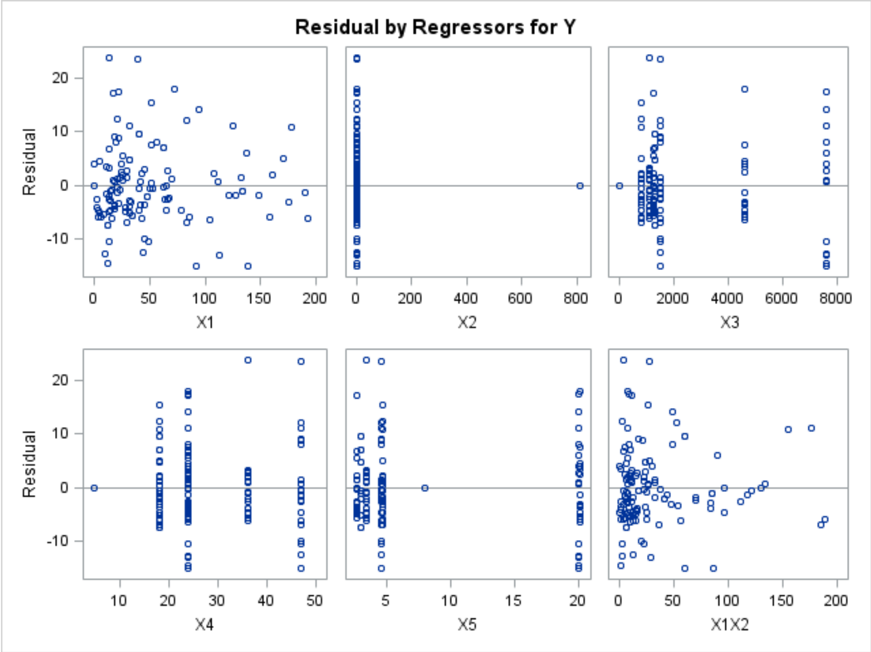
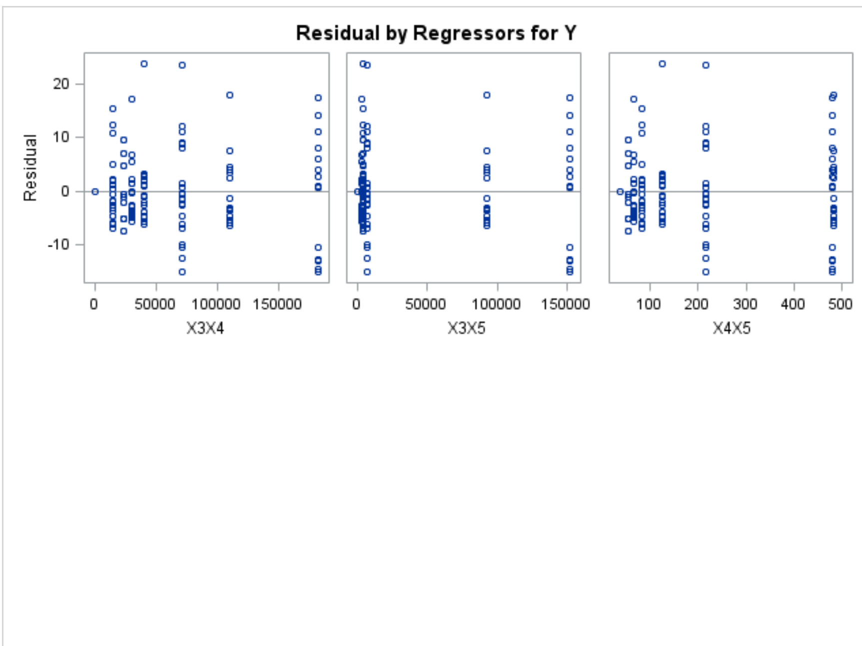
The REG Procedure
Model: MODEL1
Dependent Variable: Y






Residual by Regressors for Y
Residual
X1X3
X1X4
X1X5
X2X3
X2X4
X2X5


Residual by Regressors for Y
Residual
X3X4
X3X5
X4X5

FORWARD REGRESSION
Pollutant: Total Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	231
Number of Observations Used	72
Number of Observations with Missing Values	159

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0893	-0.1108	-0.1499	-0.1334	0.5041	0.3779	0.7215	0.5216	-0.1276	-0.1442	-0.1386	-0.1487	-0.1016	-0.1860	0.2302
X2	-0.0893	1.0000	-0.0465	0.3024	-0.0630	0.6629	-0.0621	0.0753	-0.0806	0.4691	0.8562	0.5623	0.0350	-0.0710	0.0375	-0.0448
X3	-0.1108	-0.0465	1.0000	-0.0945	0.9454	-0.0855	0.7307	-0.1264	0.6423	0.6828	-0.1092	0.5878	0.9634	0.9953	0.9299	0.4717
X4	-0.1499	0.3024	-0.0945	1.0000	-0.2157	0.1152	-0.0934	0.5133	-0.1962	0.0512	0.6414	-0.0156	0.1759	-0.1837	0.1164	-0.3131
X5	-0.1334	-0.0630	0.9454	-0.2157	1.0000	-0.1076	0.6565	-0.2241	0.6320	0.6578	-0.1757	0.6461	0.8745	0.9631	0.9447	0.4110
X1X2	0.5041	0.6629	-0.0855	0.1152	-0.1076	1.0000	0.1918	0.4789	0.2564	0.2654	0.4953	0.3263	-0.0532	-0.0964	-0.0707	0.2193
X1X3	0.3779	-0.0621	0.7307	-0.0934	0.6565	0.1918	1.0000	0.2991	0.9584	0.4758	-0.1146	0.3819	0.6983	0.7250	0.6364	0.5122
X1X4	0.7215	0.0753	-0.1264	0.5133	-0.2241	0.4789	0.2991	1.0000	0.3374	-0.0734	0.2375	-0.1280	0.0142	-0.1760	-0.0556	0.0419
X1X5	0.5216	-0.0806	0.6423	-0.1962	0.6320	0.2564	0.9584	0.3374	1.0000	0.4174	-0.1721	0.3756	0.5821	0.6524	0.5770	0.5105
X2X3	-0.1276	0.4691	0.6828	0.0512	0.6578	0.2654	0.4758	-0.0734	0.4174	1.0000	0.3430	0.9475	0.6883	0.6724	0.6863	0.3190
X2X4	-0.1442	0.8562	-0.1092	0.6414	-0.1757	0.4953	-0.1146	0.2375	-0.1721	0.3430	1.0000	0.3562	0.0646	-0.1648	0.0367	-0.2081
X2X5	-0.1386	0.5623	0.5878	-0.0156	0.6461	0.3263	0.3819	-0.1280	0.3756	0.9475	0.3562	1.0000	0.5747	0.5928	0.6520	0.2457
X3X4	-0.1487	0.0350	0.9634	0.1759	0.8745	-0.0532	0.6983	0.0142	0.5821	0.6883	0.0646	0.5747	1.0000	0.9344	0.9486	0.3838
X3X5	-0.1016	-0.0710	0.9953	-0.1837	0.9631	-0.0964	0.7250	-0.1760	0.6524	0.6724	-0.1648	0.5928	0.9344	1.0000	0.9179	0.4855
X4X5	-0.1860	0.0375	0.9299	0.1164	0.9447	-0.0707	0.6364	-0.0556	0.5770	0.6863	0.0367	0.6520	0.9486	0.9179	1.0000	0.3129
Y	0.2302	-0.0448	0.4717	-0.3131	0.4110	0.2193	0.5122	0.0419	0.5105	0.3190	-0.2081	0.2457	0.3838	0.4855	0.3129	1.0000

FORWARD REGRESSION
Pollutant: Total Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	231
Number of Observations Used	72
Number of Observations with Missing Values	159

Forward Selection: Step 1

Variable X1X3 Entered: R-Square = 0.2624 and C(p) = 19.7645

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00370	0.00370	24.90	<.0001
Error	70	0.01040	0.00014861		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01530	0.00181	0.01058	71.21	<.0001
X1X3	0.00002812	0.00000564	0.00370	24.90	<.0001

Bounds on condition number: 1, 1

Forward Selection: Step 2

Variable X4 Entered: R-Square = 0.3333 and C(p) = 13.3232

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00470	0.00235	17.25	<.0001
Error	69	0.00940	0.00013627		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02419	0.00371	0.00579	42.48	<.0001

X4	-0.00030901	0.00011404	0.00100	7.34	0.0085
X1X3	0.00002675	0.00000542	0.00332	24.35	<.0001

Bounds on condition number: 1.0088, 4.0352

Forward Selection: Step 3

Variable X1X2 Entered: R-Square = 0.3593 and C(p) = 12.2352

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	3	0.00507	0.00169	12.71	<.0001
Error	68	0.00904	0.00013289		
Corrected Total	71	0.01410			

Variable	**Parameter Estimate**	**Standard Error**	**Type II SS**	**F Value**	**Pr > F**
Intercept	0.02313	0.00372	0.00514	38.67	<.0001
X4	-0.00033471	0.00011367	0.00115	8.67	0.0044
X1X2	0.04537	0.02733	0.00036603	2.75	0.1016
X1X3	0.00002489	0.00000547	0.00275	20.71	<.0001

Bounds on condition number: 1.0579, 9.4162

Forward Selection: Step 4

Variable X3X4 Entered: R-Square = 0.3993 and C(p) = 9.4707

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	4	0.00563	0.00141	11.13	<.0001
Error	67	0.00847	0.00012644		
Corrected Total	71	0.01410			

Variable	**Parameter Estimate**	**Standard Error**	**Type II SS**	**F Value**	**Pr > F**
Intercept	0.02238	0.00365	0.00477	37.69	<.0001
X4	-0.00043468	0.00012055	0.00164	13.00	0.0006
X1X2	0.06542	0.02830	0.00067561	5.34	0.0239
X1X3	0.00001159	0.00000825	0.00024921	1.97	0.1650
X3X4	7.064034E-8	3.342518E-8	0.00056475	4.47	0.0383

Bounds on condition number: 2.5197, 29.639

Forward Selection: Step 5

Variable X4X5 Entered: R-Square = 0.4371 and C(p) = 6.9733

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	0.00616	0.00123	10.25	<.0001
Error	66	0.00794	0.00012028		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02653	0.00407	0.00512	42.58	<.0001
X4	-0.00048731	0.00012020	0.00198	16.44	0.0001
X1X2	0.06684	0.02761	0.00070477	5.86	0.0183
X1X3	0.00000864	0.00000817	0.00013444	1.12	0.2943
X3X4	2.152899E-7	7.605116E-8	0.00096391	8.01	0.0061
X4X5	-0.00005298	0.00002516	0.00053309	4.43	0.0391

Bounds on condition number: 13.514, 145.77

Forward Selection: Step 6

Variable X2X4 Entered: R-Square = 0.4542 and C(p) = 6.9350

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.00641	0.00107	9.02	<.0001
Error	65	0.00770	0.00011842		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02413	0.00437	0.00361	30.49	<.0001
X4	-0.00035880	0.00014940	0.00068302	5.77	0.0192
X1X2	0.09704	0.03461	0.00093105	7.86	0.0066
X1X3	0.00000483	0.00000853	0.00003790	0.32	0.5735
X2X4	-0.00013347	0.00009344	0.00024161	2.04	0.1580
X3X4	2.246651E-7	7.574368E-8	0.00104	8.80	0.0042
X4X5	-0.00005237	0.00002497	0.00052080	4.40	0.0399

Bounds on condition number: 13.616, 202.21

Forward Selection: Step 7

Variable X1X5 Entered: R-Square = 0.4605 and C(p) = 8.1870

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	0.00650	0.00092786	7.81	<.0001
Error	64	0.00761	0.00011888		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02313	0.00453	0.00310	26.08	<.0001
X4	-0.00034928	0.00015009	0.00064379	5.42	0.0231
X1X2	0.08474	0.03748	0.00060760	5.11	0.0272
X1X3	-0.00002032	0.00003035	0.00005329	0.45	0.5056
X1X5	0.00896	0.01038	0.00008867	0.75	0.3910
X2X4	-0.00011369	0.00009639	0.00016540	1.39	0.2425
X3X4	2.850295E-7	1.031754E-7	0.00090727	7.63	0.0075
X4X5	-0.00007135	0.00003330	0.00054570	4.59	0.0360

Bounds on condition number: 36.239, 831.97

Forward Selection: Step 8

Variable X1 Entered: R-Square = 0.4797 and C(p) = 7.9018

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	0.00677	0.00084574	7.26	<.0001
Error	63	0.00734	0.00011647		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02661	0.00503	0.00326	27.98	<.0001
X1	-0.09063	0.05943	0.00027088	2.33	0.1323
X4	-0.00024551	0.00016341	0.00026291	2.26	0.1380
X1X2	0.11222	0.04125	0.00086219	7.40	0.0084
X1X3	-0.00005139	0.00003629	0.00023348	2.00	0.1617
X1X5	0.02410	0.01428	0.00033157	2.85	0.0965
X2X4	-0.00017159	0.00010268	0.00032525	2.79	0.0997
X3X4	3.563004E-7	1.123082E-7	0.00117	10.06	0.0023
X4X5	-0.00010787	0.00004074	0.00081641	7.01	0.0102

Bounds on condition number: 61.088, 1496.2

Forward Selection: Step 9

Variable X1X4 Entered: R-Square = 0.4973 and C(p) = 7.8124

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	0.00701	0.00077928	6.81	<.0001
Error	62	0.00709	0.00011435		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.03523	0.00769	0.00240	20.98	<.0001
X1	-0.20300	0.09642	0.00050682	4.43	0.0393
X4	-0.00065515	0.00032202	0.00047332	4.14	0.0462
X1X2	0.10098	0.04158	0.00067458	5.90	0.0181
X1X3	-0.00006543	0.00003721	0.00035362	3.09	0.0836
X1X4	0.00526	0.00357	0.00024766	2.17	0.1462
X1X5	0.02846	0.01446	0.00044310	3.87	0.0535
X2X4	-0.00012641	0.00010627	0.00016179	1.41	0.2388
X3X4	3.915189E-7	1.138275E-7	0.00135	11.83	0.0010
X4X5	-0.00011813	0.00004097	0.00095071	8.31	0.0054

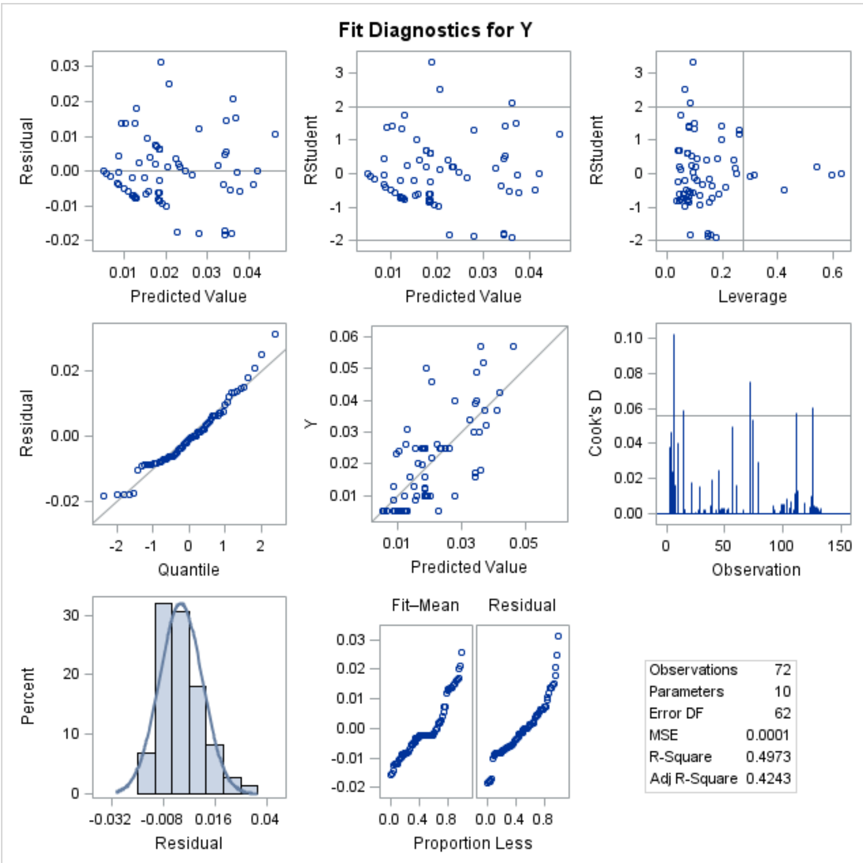
Bounds on condition number: 63.77, 2040.7

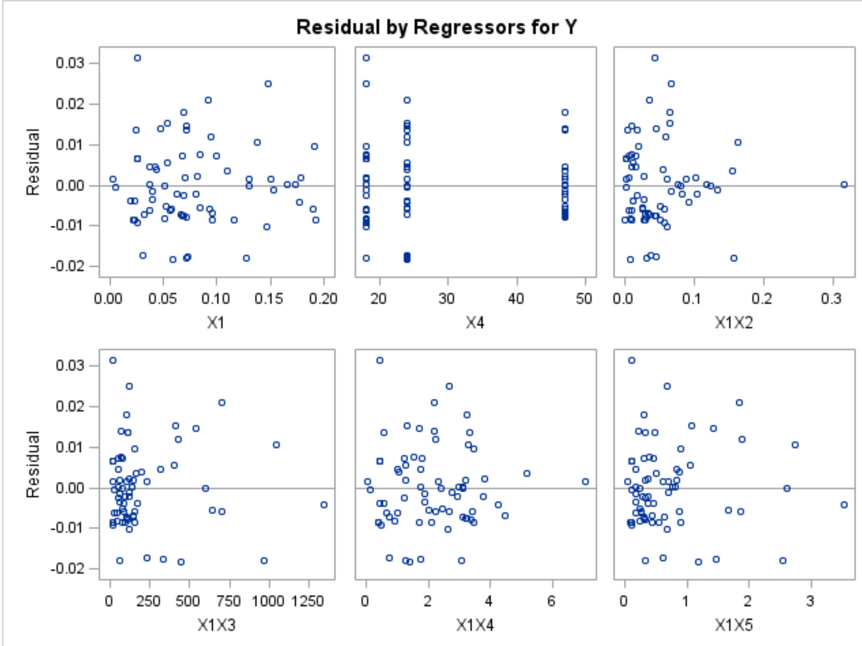
No other variable met the 0.5000 significance level for entry into the model.

Summary of Forward Selection							
Step	Variable Entered	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	X1X3	1	0.2624	0.2624	19.7645	24.90	<.0001
2	X4	2	0.0709	0.3333	13.3232	7.34	0.0085
3	X1X2	3	0.0260	0.3593	12.2352	2.75	0.1016
4	X3X4	4	0.0400	0.3993	9.4707	4.47	0.0383
5	X4X5	5	0.0378	0.4371	6.9733	4.43	0.0391
6	X2X4	6	0.0171	0.4542	6.9350	2.04	0.1580
7	X1X5	7	0.0063	0.4605	8.1870	0.75	0.3910
8	X1	8	0.0192	0.4797	7.9018	2.33	0.1323
9	X1X4	9	0.0176	0.4973	7.8124	2.17	0.1462

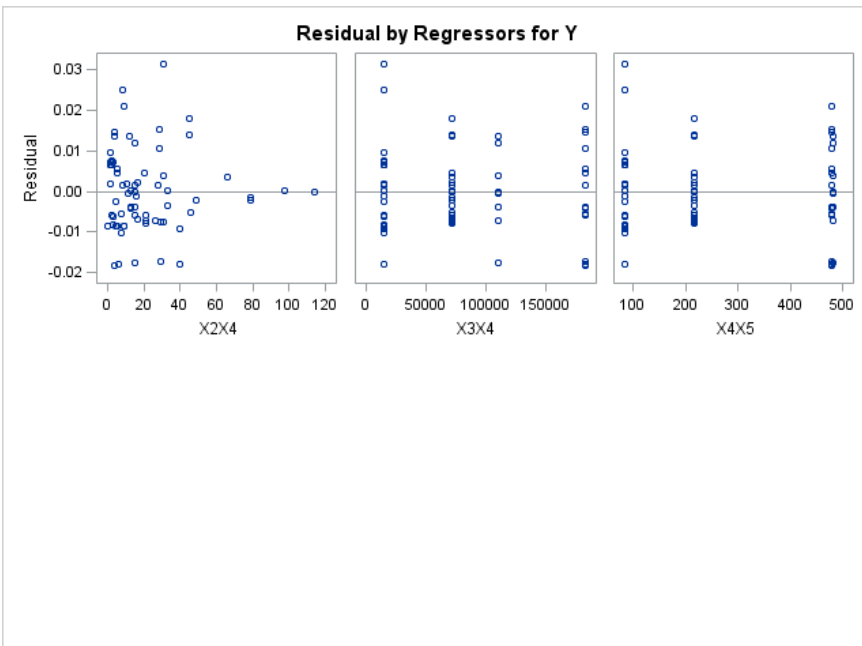
FORWARD REGRESSION
Pollutant: Total Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y





Residual by Regressors for Y
Residual
X1
X4
X1X2
X1X3
X1X4
X1X5



Residual by Regressors for Y
Residual
X2X4
X3X4
X4X5

BACKWARD REGRESSION
Pollutant: Total Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	231
Number of Observations Used	72
Number of Observations with Missing Values	159

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0893	-0.1108	-0.1499	-0.1334	0.5041	0.3779	0.7215	0.5216	-0.1276	-0.1442	-0.1386	-0.1487	-0.1016	-0.1860	0.2302
X2	-0.0893	1.0000	-0.0465	0.3024	-0.0630	0.6629	-0.0621	0.0753	-0.0806	0.4691	0.8562	0.5623	0.0350	-0.0710	0.0375	-0.0448
X3	-0.1108	-0.0465	1.0000	-0.0945	0.9454	-0.0855	0.7307	-0.1264	0.6423	0.6828	-0.1092	0.5878	0.9634	0.9953	0.9299	0.4717
X4	-0.1499	0.3024	-0.0945	1.0000	-0.2157	0.1152	-0.0934	0.5133	-0.1962	0.0512	0.6414	-0.0156	0.1759	-0.1837	0.1164	-0.3131
X5	-0.1334	-0.0630	0.9454	-0.2157	1.0000	-0.1076	0.6565	-0.2241	0.6320	0.6578	-0.1757	0.6461	0.8745	0.9631	0.9447	0.4110
X1X2	0.5041	0.6629	-0.0855	0.1152	-0.1076	1.0000	0.1918	0.4789	0.2564	0.2654	0.4953	0.3263	-0.0532	-0.0964	-0.0707	0.2193
X1X3	0.3779	-0.0621	0.7307	-0.0934	0.6565	0.1918	1.0000	0.2991	0.9584	0.4758	-0.1146	0.3819	0.6983	0.7250	0.6364	0.5122
X1X4	0.7215	0.0753	-0.1264	0.5133	-0.2241	0.4789	0.2991	1.0000	0.3374	-0.0734	0.2375	-0.1280	0.0142	-0.1760	-0.0556	0.0419
X1X5	0.5216	-0.0806	0.6423	-0.1962	0.6320	0.2564	0.9584	0.3374	1.0000	0.4174	-0.1721	0.3756	0.5821	0.6524	0.5770	0.5105
X2X3	-0.1276	0.4691	0.6828	0.0512	0.6578	0.2654	0.4758	-0.0734	0.4174	1.0000	0.3430	0.9475	0.6883	0.6724	0.6863	0.3190
X2X4	-0.1442	0.8562	-0.1092	0.6414	-0.1757	0.4953	-0.1146	0.2375	-0.1721	0.3430	1.0000	0.3562	0.0646	-0.1648	0.0367	-0.2081
X2X5	-0.1386	0.5623	0.5878	-0.0156	0.6461	0.3263	0.3819	-0.1280	0.3756	0.9475	0.3562	1.0000	0.5747	0.5928	0.6520	0.2457
X3X4	-0.1487	0.0350	0.9634	0.1759	0.8745	-0.0532	0.6983	0.0142	0.5821	0.6883	0.0646	0.5747	1.0000	0.9344	0.9486	0.3838
X3X5	-0.1016	-0.0710	0.9953	-0.1837	0.9631	-0.0964	0.7250	-0.1760	0.6524	0.6724	-0.1648	0.5928	0.9344	1.0000	0.9179	0.4855
X4X5	-0.1860	0.0375	0.9299	0.1164	0.9447	-0.0707	0.6364	-0.0556	0.5770	0.6863	0.0367	0.6520	0.9486	0.9179	1.0000	0.3129
Y	0.2302	-0.0448	0.4717	-0.3131	0.4110	0.2193	0.5122	0.0419	0.5105	0.3190	-0.2081	0.2457	0.3838	0.4855	0.3129	1.0000

BACKWARD REGRESSION
Pollutant: Total Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	231
Number of Observations Used	72
Number of Observations with Missing Values	159

Backward Elimination: Step 0

All Variables Entered: R-Square = 0.5041 and C(p) = 13.0000
The model is not of full rank. A subset of the model which is of full rank is chosen.

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	12	0.00711	0.00059249	5.00	<.0001
Error	59	0.00699	0.00011853		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.03563	0.01073	0.00131	11.02	0.0015
X1	-0.20989	0.09975	0.00052482	4.43	0.0396
X2	0.00217	0.01067	0.00000489	0.04	0.8397
X3	0.00000709	0.00000407	0.00035965	3.03	0.0867
X4	-0.00065533	0.00034650	0.00042398	3.58	0.0635
X5	-0.00204	0.00157	0.00020190	1.70	0.1969
X1X2	0.10932	0.05320	0.00050044	4.22	0.0443
X1X3	-0.00006637	0.00003791	0.00036332	3.07	0.0852
X1X4	0.00536	0.00364	0.00025646	2.16	0.1466
X1X5	0.02880	0.01473	0.00045305	3.82	0.0553
X2X3	0.00000365	0.00000468	0.00007209	0.61	0.4386
X2X4	-0.00015336	0.00022000	0.00005760	0.49	0.4885
X2X5	-0.00134	0.00181	0.00006481	0.55	0.4626

Bounds on condition number: 77.652, 5790.2

Backward Elimination: Step 1

Variable X2 Removed: R-Square = 0.5038 and C(p) = 11.0413

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	0.00710	0.00064590	5.54	<.0001
Error	60	0.00700	0.00011664		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.03690	0.00865	0.00212	18.18	<.0001
X1	-0.21215	0.09834	0.00054289	4.65	0.0350
X3	0.00000751	0.00000349	0.00053871	4.62	0.0357
X4	-0.00067855	0.00032451	0.00050998	4.37	0.0408
X5	-0.00222	0.00130	0.00033822	2.90	0.0938
X1X2	0.11468	0.04584	0.00073008	6.26	0.0151
X1X3	-0.00006629	0.00003760	0.00036252	3.11	0.0830
X1X4	0.00534	0.00361	0.00025520	2.19	0.1443
X1X5	0.02873	0.01461	0.00045106	3.87	0.0539
X2X3	0.00000302	0.00000347	0.00008805	0.75	0.3884
X2X4	-0.00011585	0.00011875	0.00011102	0.95	0.3332
X2X5	-0.00107	0.00122	0.00008973	0.77	0.3839

Bounds on condition number: 63.816, 3734.4

Backward Elimination: Step 2

Variable X2X3 Removed: R-Square = 0.4975 and C(p) = 9.7841

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	0.00702	0.00070169	6.04	<.0001
Error	61	0.00709	0.00011617		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.03722	0.00863	0.00216	18.62	<.0001
X1	-0.20482	0.09778	0.00050976	4.39	0.0404
X3	0.00000936	0.00000276	0.00134	11.50	0.0012
X4	-0.00067332	0.00032380	0.00050233	4.32	0.0418
X5	-0.00287	0.00106	0.00084211	7.25	0.0091
X1X2	0.10314	0.04378	0.00064467	5.55	0.0217
X1X3	-0.00006563	0.00003752	0.00035543	3.06	0.0853
X1X4	0.00529	0.00360	0.00025007	2.15	0.1475
X1X5	0.02852	0.01458	0.00044451	3.83	0.0550
X2X4	-0.00011780	0.00011849	0.00011482	0.99	0.3241
X2X5	-0.00006670	0.00039219	0.00000336	0.03	0.8655

Bounds on condition number: 63.798, 2384.3

Backward Elimination: Step 3

Variable X2X5 Removed: R-Square = 0.4973 and C(p) = 7.8124

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	0.00701	0.00077928	6.81	<.0001
Error	62	0.00709	0.00011435		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.03722	0.00856	0.00216	18.90	<.0001
X1	-0.20300	0.09642	0.00050682	4.43	0.0393
X3	0.00000939	0.00000273	0.00135	11.83	0.0010
X4	-0.00066476	0.00031735	0.00050176	4.39	0.0403
X5	-0.00292	0.00101	0.00096245	8.42	0.0051
X1X2	0.10098	0.04158	0.00067458	5.90	0.0181
X1X3	-0.00006543	0.00003721	0.00035362	3.09	0.0836
X1X4	0.00526	0.00357	0.00024766	2.17	0.1462
X1X5	0.02846	0.01446	0.00044310	3.87	0.0535
X2X4	-0.00012641	0.00010627	0.00016179	1.41	0.2388

Bounds on condition number: 63.77, 2067.3

Backward Elimination: Step 4

Variable X2X4 Removed: R-Square = 0.4858 and C(p) = 7.1774

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	0.00685	0.00085647	7.44	<.0001
Error	63	0.00725	0.00011510		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.03951	0.00837	0.00257	22.30	<.0001
X1	-0.20444	0.09673	0.00051414	4.47	0.0385
X3	0.00000938	0.00000274	0.00135	11.71	0.0011
X4	-0.00086977	0.00026735	0.00122	10.58	0.0018
X5	-0.00288	0.00101	0.00093605	8.13	0.0059

X1X2	0.06598	0.02946	0.00057713	5.01	0.0287
X1X3	-0.00006470	0.00003732	0.00034583	3.00	0.0879
X1X4	0.00648	0.00343	0.00041112	3.57	0.0634
X1X5	0.02790	0.01450	0.00042617	3.70	0.0589

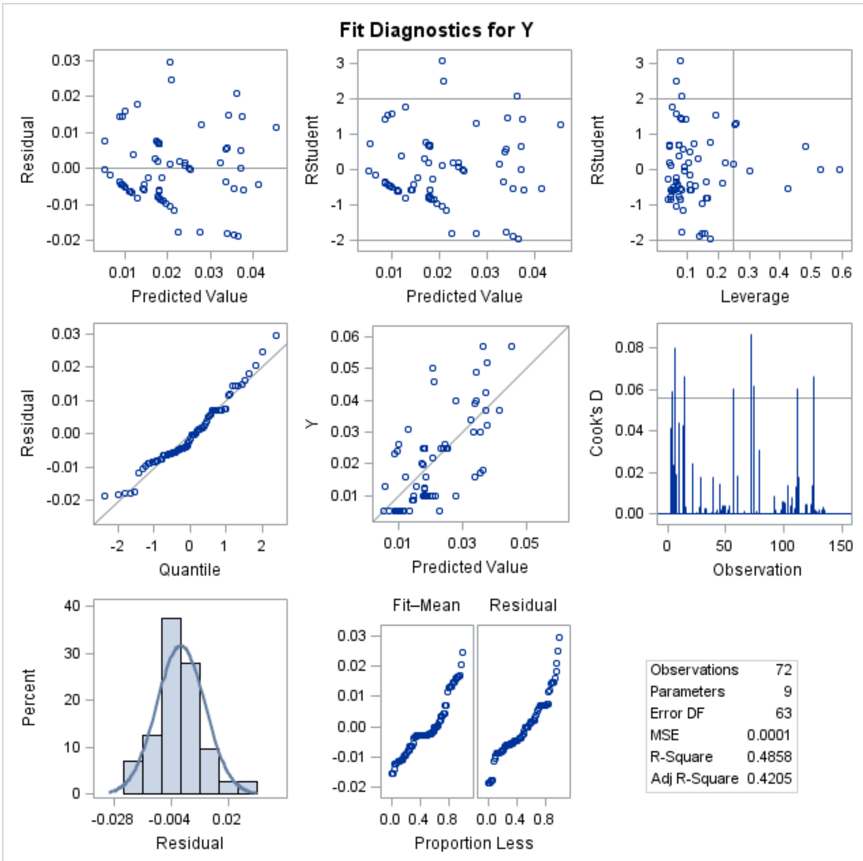
Bounds on condition number: 63.702, 1764.4

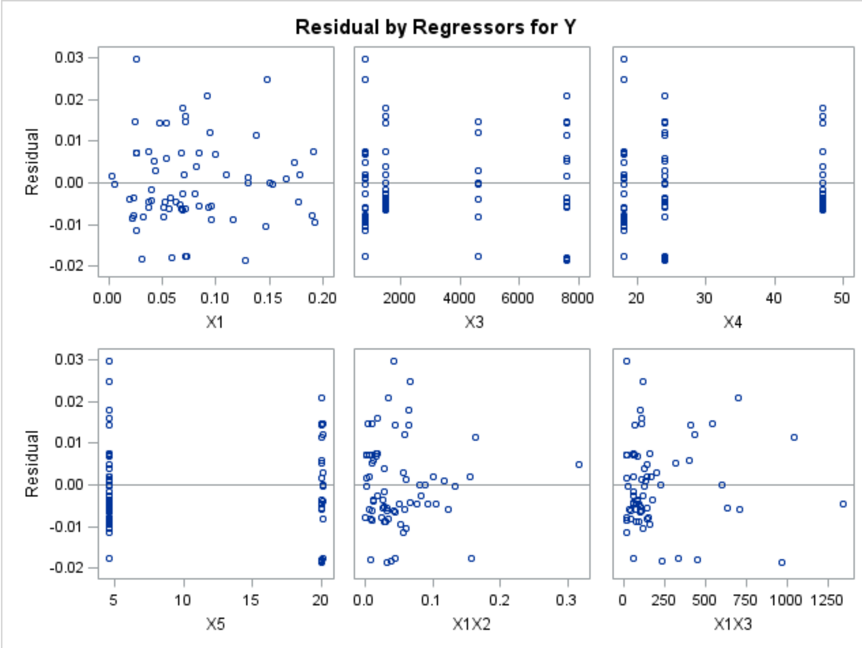
All variables left in the model are significant at the 0.1000 level.

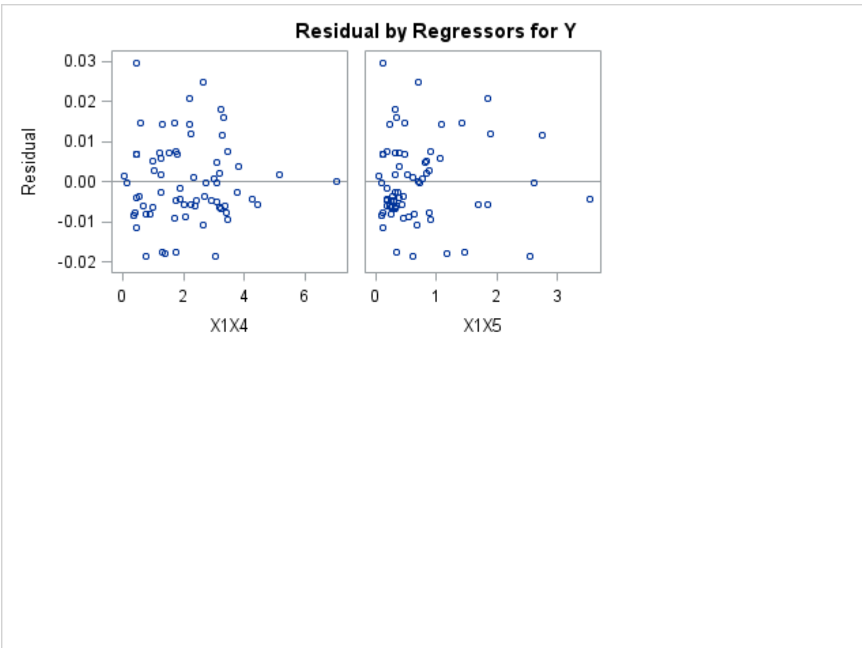
Summary of Backward Elimination							
Step	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	X2	11	0.0003	0.5038	11.0413	0.04	0.8397
2	X2X3	10	0.0062	0.4975	9.7841	0.75	0.3884
3	X2X5	9	0.0002	0.4973	7.8124	0.03	0.8655
4	X2X4	8	0.0115	0.4858	7.1774	1.41	0.2388

BACKWARD REGRESSION
Pollutant: Total Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
X1
X3
X4
X5
X1X2
X1X3


Residual by Regressors for Y
Residual
X1X4
X1X5

STEPWISE REGRESSION
Pollutant: Total Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure

Number of Observations Read	231
Number of Observations Used	72
Number of Observations with Missing Values	159

Correlation

Variable	X1	X2	X3	X4	X5	X1X2	X1X3	X1X4	X1X5	X2X3	X2X4	X2X5	X3X4	X3X5	X4X5	Y
X1	1.0000	-0.0893	-0.1108	-0.1499	-0.1334	0.5041	0.3779	0.7215	0.5216	-0.1276	-0.1442	-0.1386	-0.1487	-0.1016	-0.1860	0.2302
X2	-0.0893	1.0000	-0.0465	0.3024	-0.0630	0.6629	-0.0621	0.0753	-0.0806	0.4691	0.8562	0.5623	0.0350	-0.0710	0.0375	-0.0448
X3	-0.1108	-0.0465	1.0000	-0.0945	0.9454	-0.0855	0.7307	-0.1264	0.6423	0.6828	-0.1092	0.5878	0.9634	0.9953	0.9299	0.4717
X4	-0.1499	0.3024	-0.0945	1.0000	-0.2157	0.1152	-0.0934	0.5133	-0.1962	0.0512	0.6414	-0.0156	0.1759	-0.1837	0.1164	-0.3131
X5	-0.1334	-0.0630	0.9454	-0.2157	1.0000	-0.1076	0.6565	-0.2241	0.6320	0.6578	-0.1757	0.6461	0.8745	0.9631	0.9447	0.4110
X1X2	0.5041	0.6629	-0.0855	0.1152	-0.1076	1.0000	0.1918	0.4789	0.2564	0.2654	0.4953	0.3263	-0.0532	-0.0964	-0.0707	0.2193
X1X3	0.3779	-0.0621	0.7307	-0.0934	0.6565	0.1918	1.0000	0.2991	0.9584	0.4758	-0.1146	0.3819	0.6983	0.7250	0.6364	0.5122
X1X4	0.7215	0.0753	-0.1264	0.5133	-0.2241	0.4789	0.2991	1.0000	0.3374	-0.0734	0.2375	-0.1280	0.0142	-0.1760	-0.0556	0.0419
X1X5	0.5216	-0.0806	0.6423	-0.1962	0.6320	0.2564	0.9584	0.3374	1.0000	0.4174	-0.1721	0.3756	0.5821	0.6524	0.5770	0.5105
X2X3	-0.1276	0.4691	0.6828	0.0512	0.6578	0.2654	0.4758	-0.0734	0.4174	1.0000	0.3430	0.9475	0.6883	0.6724	0.6863	0.3190
X2X4	-0.1442	0.8562	-0.1092	0.6414	-0.1757	0.4953	-0.1146	0.2375	-0.1721	0.3430	1.0000	0.3562	0.0646	-0.1648	0.0367	-0.2081
X2X5	-0.1386	0.5623	0.5878	-0.0156	0.6461	0.3263	0.3819	-0.1280	0.3756	0.9475	0.3562	1.0000	0.5747	0.5928	0.6520	0.2457
X3X4	-0.1487	0.0350	0.9634	0.1759	0.8745	-0.0532	0.6983	0.0142	0.5821	0.6883	0.0646	0.5747	1.0000	0.9344	0.9486	0.3838
X3X5	-0.1016	-0.0710	0.9953	-0.1837	0.9631	-0.0964	0.7250	-0.1760	0.6524	0.6724	-0.1648	0.5928	0.9344	1.0000	0.9179	0.4855
X4X5	-0.1860	0.0375	0.9299	0.1164	0.9447	-0.0707	0.6364	-0.0556	0.5770	0.6863	0.0367	0.6520	0.9486	0.9179	1.0000	0.3129
Y	0.2302	-0.0448	0.4717	-0.3131	0.4110	0.2193	0.5122	0.0419	0.5105	0.3190	-0.2081	0.2457	0.3838	0.4855	0.3129	1.0000

STEPWISE REGRESSION
Pollutant: Total Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y

Number of Observations Read	231
Number of Observations Used	72
Number of Observations with Missing Values	159

Stepwise Selection: Step 1

Variable X1X3 Entered: R-Square = 0.2624 and C(p) = 19.7645

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00370	0.00370	24.90	<.0001
Error	70	0.01040	0.00014861		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.01530	0.00181	0.01058	71.21	<.0001
X1X3	0.00002812	0.00000564	0.00370	24.90	<.0001

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable X4 Entered: R-Square = 0.3333 and C(p) = 13.3232

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	0.00470	0.00235	17.25	<.0001
Error	69	0.00940	0.00013627		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02419	0.00371	0.00579	42.48	<.0001

X4	-0.00030901	0.00011404	0.00100	7.34	0.0085
X1X3	0.00002675	0.00000542	0.00332	24.35	<.0001

Bounds on condition number: 1.0088, 4.0352

Stepwise Selection: Step 3

Variable X1X2 Entered: R-Square = 0.3593 and C(p) = 12.2352

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00507	0.00169	12.71	<.0001
Error	68	0.00904	0.00013289		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02313	0.00372	0.00514	38.67	<.0001
X4	-0.00033471	0.00011367	0.00115	8.67	0.0044
X1X2	0.04537	0.02733	0.00036603	2.75	0.1016
X1X3	0.00002489	0.00000547	0.00275	20.71	<.0001

Bounds on condition number: 1.0579, 9.4162

Stepwise Selection: Step 4

Variable X3X4 Entered: R-Square = 0.3993 and C(p) = 9.4707

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00563	0.00141	11.13	<.0001
Error	67	0.00847	0.00012644		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02238	0.00365	0.00477	37.69	<.0001
X4	-0.00043468	0.00012055	0.00164	13.00	0.0006
X1X2	0.06542	0.02830	0.00067561	5.34	0.0239
X1X3	0.00001159	0.00000825	0.00024921	1.97	0.1650
X3X4	7.064034E-8	3.342518E-8	0.00056475	4.47	0.0383

Bounds on condition number: 2.5197, 29.639

Stepwise Selection: Step 5

Variable X1X3 Removed: R-Square = 0.3816 and C(p) = 9.5732

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	0.00538	0.00179	13.99	<.0001
Error	68	0.00872	0.00012825		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02305	0.00364	0.00514	40.10	<.0001
X4	-0.00049727	0.00011280	0.00249	19.43	<.0001
X1X2	0.08054	0.02636	0.00120	9.34	0.0032
X3X4	1.064421E-7	2.176165E-8	0.00307	23.92	<.0001

Bounds on condition number: 1.0488, 9.3172

Stepwise Selection: Step 6

Variable X4X5 Entered: R-Square = 0.4276 and C(p) = 6.1075

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.00603	0.00151	12.51	<.0001
Error	67	0.00807	0.00012049		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02737	0.00399	0.00567	47.05	<.0001
X4	-0.00053713	0.00011068	0.00284	23.55	<.0001
X1X2	0.07790	0.02557	0.00112	9.28	0.0033
X3X4	2.536485E-7	6.689701E-8	0.00173	14.38	0.0003
X4X5	-0.00005754	0.00002481	0.00064786	5.38	0.0235

Bounds on condition number: 10.438, 91.221

Stepwise Selection: Step 7

Variable X2X4 Entered: R-Square = 0.4516 and C(p) = 5.2548

Analysis of Variance					
Source	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
Model	5	0.00637	0.00127	10.87	<.0001
Error	66	0.00773	0.00011720		
Corrected Total	71	0.01410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.02426	0.00434	0.00366	31.21	<.0001
X4	-0.00036802	0.00014774	0.00072723	6.21	0.0153
X1X2	0.10636	0.03028	0.00145	12.34	0.0008
X2X4	-0.00014999	0.00008830	0.00033815	2.89	0.0941
X3X4	2.451716E-7	6.616367E-8	0.00161	13.73	0.0004
X4X5	-0.00005459	0.00002453	0.00058039	4.95	0.0295

Bounds on condition number: 10.498, 133.61

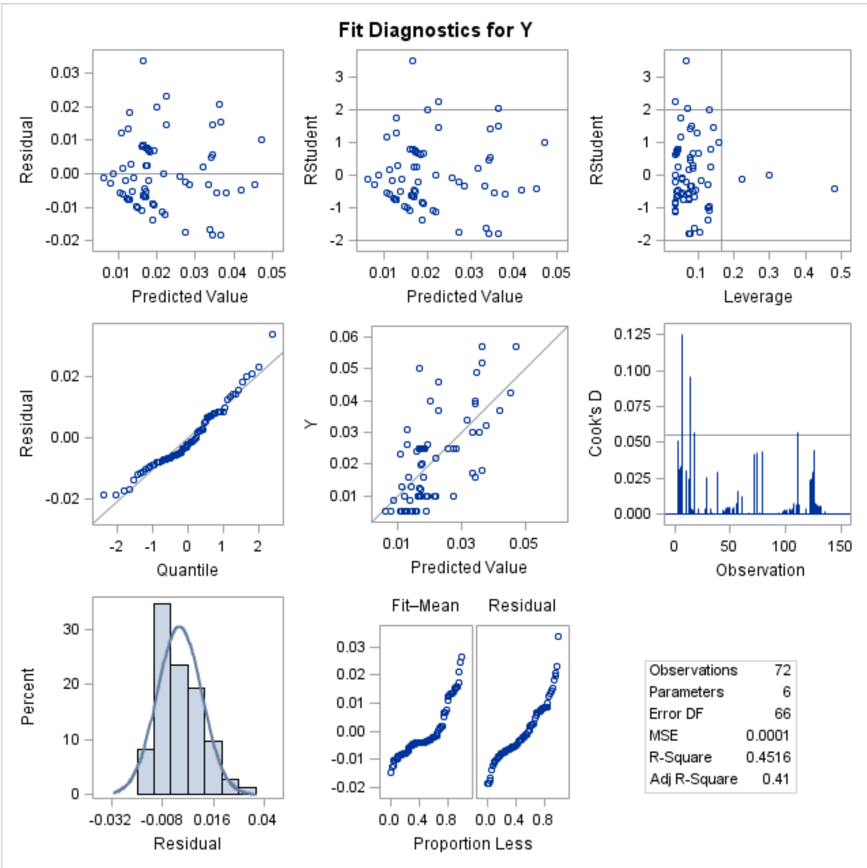
All variables left in the model are significant at the 0.1500 level.

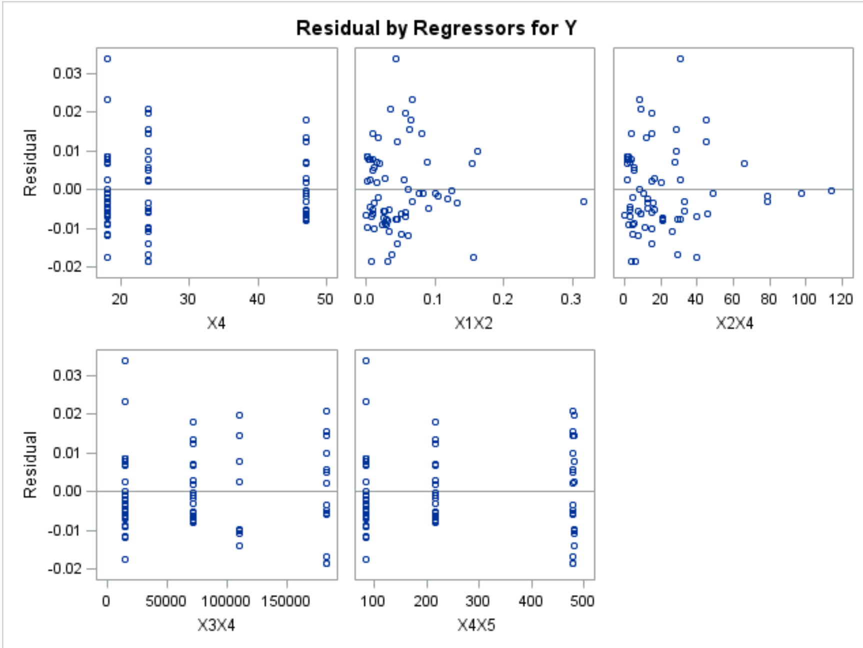
No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection								
Step	**Variable Entered**	**Variable Removed**	**Number Vars In**	**Partial R-Square**	**Model R-Square**	**C(p)**	**F Value**	**Pr > F**
1	X1X3		1	0.2624	0.2624	19.7645	24.90	<.0001
2	X4		2	0.0709	0.3333	13.3232	7.34	0.0085
3	X1X2		3	0.0260	0.3593	12.2352	2.75	0.1016
4	X3X4		4	0.0400	0.3993	9.4707	4.47	0.0383
5		X1X3	3	0.0177	0.3816	9.5732	1.97	0.1650
6	X4X5		4	0.0459	0.4276	6.1075	5.38	0.0235
7	X2X4		5	0.0240	0.4516	5.2548	2.89	0.0941

STEPWISE REGRESSION
Pollutant: Total Zinc
Y: Effluent Concentration, mg/L
X1: Influent Concentration, mg/L
X2: Rainfall Depth in
X3: Bioretention Basin Ponding Volume, cf
X4: Bioretention Media Depth, in
X5: Bioretention Retention Time, min

The REG Procedure
Model: MODEL1
Dependent Variable: Y




Residual by Regressors for Y
Residual
0.03
0.02
0.01
0.00
-0.01
-0.02
20 30 40 50
X4
0.0 0.1 0.2 0.3
X1X2
0 20 40 60 80 100 120
X2X4
0 50000 100000 150000
X3X4
100 200 300 400 500
X4X5

APPENDIX C

REFERENCES

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY STORMWATER SPECIFICATION NO. 9 - BIORETENTION

VIRGINIA DEQ STORMWATER DESIGN SPECIFICATION No. 9

BIORETENTION

VERSION 1.9
March 1, 2011

SECTION 1: DESCRIPTION

Individual bioretention areas can serve highly impervious drainage areas less than two (2) acres in size. Surface runoff is directed into a shallow landscaped depression that incorporates many of the pollutant removal mechanisms that operate in forested ecosystems. The primary component of a bioretention practice is the filter bed, which has a mixture of sand, soil, and organic material as the filtering media with a surface mulch layer. During storms, runoff temporarily ponds 6 to 12 inches above the mulch layer and then rapidly filters through the bed. Normally, the filtered runoff is collected in an underdrain and returned to the storm drain system. The underdrain consists of a perforated pipe in a gravel layer installed along the bottom of the filter bed. A bioretention facility with an underdrain system is commonly referred to as a *Bioretention Filter*.

Bioretention can also be designed to infiltrate runoff into native soils. This can be done at sites with permeable soils, a low groundwater table, and a low risk of groundwater contamination. This design features the use of a "partial exfiltration" system that promotes greater groundwater recharge. Underdrains are only installed beneath a portion of the filter bed, above a stone "sump" layer, or eliminated altogether, thereby increasing stormwater infiltration. A bioretention facility without an underdrain system, or with a storage sump in the bottom is commonly referred to as a *Bioretention Basin*.

Small-scale or Micro-Bioretention used on an individual residential lot is commonly referred to as a *Rain Garden*.

SECTION 2: PERFORMANCE

Bioretention creates a good environment for runoff reduction, filtration, biological uptake, and microbial activity, and provides high pollutant removal. Bioretention can become an attractive landscaping feature with high amenity value and community acceptance. The overall stormwater functions of the bioretention are summarized in **Table 9.1**.

Table 9.1. Summary of Stormwater Functions Provided by Bioretention Basins

Stormwater Function	Level 1 Design	Level 2 Design
Annual Runoff Volume Reduction (RR)	40%	80%
Total Phosphorus (TP) EMC Reduction[1] by BMP Treatment Process	25%	50%
Total Phosphorus (TP) Mass Load Removal	55%	90%
Total Nitrogen (TN) EMC Reduction[1] by BMP Treatment Process	40%	60%
Total Nitrogen (TN) Mass Load Removal	64%	90%
Channel and Flood Protection	• Use the Runoff Reduction Method (RRM) Spreadsheet to calculate the Cover Number (CN) Adjustment ***OR*** • Design extra storage (optional; as needed) on the surface, in the engineered soil matrix, and in the stone/underdrain layer to accommodate a larger storm, and use NRCS TR-55 Runoff Equations[2] to compute the CN Adjustment.	

[1] Change in event mean concentration (EMC) through the practice. Actual nutrient mass load removed is the product of the removal rate and the runoff reduction rate(see Table 1 in the *Introduction to the New Virginia Stormwater Design Specifications*).
[2] NRCS TR-55 Runoff Equations 2-1 thru 2-5 and Figure 2-1 can be used to compute a curve number adjustment for larger storm events based on the retention storage provided by the practice(s).

Sources: CWP and CSN (2008) and CWP (2007)

SECTION 3: DESIGN TABLES

The most important design factor to consider when applying bioretention to development sites is the **scale** at which it will be applied, as follows:

Micro-Bioretnetion or Rain Gardens. These are small, distributed practices designed to treat runoff from small areas, such as individual rooftops, driveways and other on-lot features in single-family detatched residential developments. Inflow is typically sheet flow, or can be concentrated flow with energy dissipation, when located at downspouts.

Bioretention Basins. These are structures treating parking lots and/or commercial rooftops, usually in commercial or institutional areas. Inflow can be either sheetflow or concentrated flow. Bioretention basins may also be distributed throughout a residential subdivision, but ideally they should be located in common area or within drainage easements, to treat a combination of roadway and lot runoff.

Urban Bioretention. These are structures such as expanded tree pits, curb extensions, and foundation planters located in ultra-urban developed areas such as city streetscapes. Please refer to **Appendix 9-A** of this specification for design criteria for Urban Bioretention.

Figure 9.1. A typical Bioretention Filter treating a commercial rooftop

The major design goal for bioretention is to maximize runoff volume reduction and nutrient removal. To this end, designers may choose to go with the baseline design (Level 1) or choose an enhanced design (Level 2) that maximizes nutrient and runoff reduction. If soil conditions require an underdrain, bioretention areas can still qualify for the Level 2 design if they contain a stone storage layer beneath the invert of the underdrain.

Both stormwater quality and quantity credits are accounted for in the Runoff Reduction Method (RRM) spreadsheet. The water quality credit represents an annual load reduction as a combination of the annual reduction of runoff volume (40% and 80% from Level 1 and Level 2 designs, respectively) and the reduction in the pollutant event mean concentration (EMC) (25% and 50% from Level 1 & 2 designs, respectively).

To compute the water quantity reduction for larger storm events, the designer can similarly use the RRM spreadsheet or, as an option, the designer may choose to compute the adjusted curve number associated with the retention storage using the TR-55 Runoff Equations, as noted in **Table 9.1**. The adjusted curve number is then used to compute the peak discharge for the required design storms.

Tables 9.2 and 9.3 outline the Level 1 and 2 design guidelines for the two scales of bioretention design.

***Table 9.2. Micro-Bioretention (Rain Garden) Design Criteria*[1]**

Level 1 Design (RR 40 TP: 25)	Level 2 Design (RR: 80 TP: 50)
Sizing: Filter surface area (sq. ft.) = 3% [2] of the contributing drainage area (CDA).	Sizing: Filter surface area (sq. ft.) = 4% [2] of the CDA (can be divided into different cells at downspouts).
Maximum contributing drainage area = 0.5 acres; 25% Impervious Cover (IC) [2]	
One cell design (can be divided into smaller cells at downspout locations) [2]	
Maximum Ponding Depth = 6 inches	
Filter Media Depth minimum = 18 inches; Recommended maximum = 36 inches	Filter Media Depth minimum = 24 inches; Recommended maximum = 36 inches
Media: mixed on-site or supplied by vendor	Media: supplied by vendor
All Designs: Media mix tested for an acceptable phosphorus index (P-Index) of between 10 and 30, ***OR*** Between 7 and 21 mg/kg of P in the soil media	
Sub-soil testing: not needed if an underdrain is used; Min infiltration rate > 1 inch/hour in order to remove the underdrain requirement.	Sub-soil testing: one per practice; Min infiltration rate > 1/2 inch/hour; Min infiltration rate > 1 inch/hour in order to remove the underdrain requirement.
Underdrain: corrugated HDPE or equivalent.	Underdrain: corrugated HDPE or equivalent, with a minimum 6-inch stone sump below the invert; ***OR*** none, if soil infiltration requirements are met
Clean-outs: not needed	
Inflow: sheetflow or roof leader	
Pretreatment: external (leaf screens, grass filter strip, energy dissipater, etc.).	Pretreatment: external *plus* a grass filter strip
Vegetation: turf, herbaceous, or shrubs (min = 1 out of those 3 choices).	Vegetation: turf, herbaceous, shrubs, or trees (min = 2 out of those 4 choices).
Building setbacks: 10 feet down-gradient; 25 feet up-gradient	

[1] Consult **Appendix 9-A** for design criteria for Urban Bioretention Practices.

[2] Micro-Bioretention (Rain Gardens) can be located at individual downspout locations to treat up to 1,000 sq. ft. of impervious cover (100% IC); the surface area is sized as 5% of the roof area (Level 1) or 6% of the roof area (Level 2), with the remaining Level 1 and Level 2 design criteria as provided in **Table 9.2**. If the Rain Garden is located so as to capture multiple rooftops, driveways, and adjacent pervious areas, the sizing rules within **Table 9.2** should apply.

Table 9.3. Bioretention Filter and Basin Design Criteria

Level 1 Design (RR 40 TP: 25)	Level 2 Design (RR: 80 TP: 50)
Sizing (**Section 6.1**): Surface Area (sq. ft.) = (T_V – the volume reduced by an upstream BMP) / Storage Depth [1]	Sizing (**Section 6.1**): Surface Area (sq. ft.) = [(1.25)(T_V) – the volume reduced by an upstream BMP] /Storage Depth [1]
Recommended maximum contributing drainage area = 2.5 acres	
Maximum Ponding Depth = 6 to 12 inches [2]	Maximum Ponding Depth = 6 to 12 inches [2]
Filter Media Depth minimum = 24 inches; recommended maximum = 6 feet	Filter Media Depth minimum = 36 inches; recommended maximum = 6 feet
Media & Surface Cover (**Section 6.6**) = supplied by vendor; tested for acceptable phosphorus index (P-Index) of between 10 and 30, ***OR*** Between 7 and 21 mg/kg of P in the soil media	
Sub-soil Testing (**Section 6.2**): not needed if an underdrain used; Min infiltration rate > 1/2 inch/hour in order to remove the underdrain requirement.	Sub-soil Testing (**Section 6.2**): one per 1,000 sq. ft. of filter surface; Min infiltration rate > 1/2 inch/hour in order to remove the underdrain requirement.
Underdrain (**Section 6.7**) = Schedule 40 PVC with clean-outs	Underdrain & Underground Storage Layer (**Section 6.7**) = Schedule 40 PVC with clean outs, and a minimum 12-inch stone sump below the invert; ***OR***, none, if soil infiltration requirements are met (**Section 6.2**)
Inflow: sheetflow, curb cuts, trench drains, concentrated flow, or the equivalent	
Geometry (**Section 6.3**): Length of shortest flow path/Overall length = 0.3; ***OR***, other design methods used to prevent short-circuiting; a one-cell design (not including the pre-treatment cell).	Geometry (**Section 6.3**): Length of shortest flow path/Overall length = 0.8; ***OR***, other design methods used to prevent short-circuiting; a two-cell design (not including the pretreatment cell).
Pre-treatment (**Section 6.4**): a pretreatment cell, grass filter strip, gravel diaphragm, gravel flow spreader, or another approved (manufactured) pre-treatment structure.	Pre-treatment (**Section 6.4**): a pretreatment cell *plus* one of the following: a grass filter strip, gravel diaphragm, gravel flow spreader, or another approved (manufactured) pre-treatment structure.
Conveyance & Overflow (**Section 6.5**)	Conveyance & Overflow (**Section 6.5**)
Planting Plan (**Section 6.8**): a planting template to include turf, herbaceous vegetation, shrubs, and/or trees to achieve surface area coverage of at least 75% within 2 years.	Planting Plan (**Section 6.8**): a planting template to include turf, herbaceous vegetation, shrubs, and/or trees to achieve surface area coverage of at least 90% within 2 years. If using turf, must combine with other types of vegetation [1].
Building Setbacks [3] (**Section 5**): 0 to 0.5 acre CDA = 10 feet if down-gradient from building or level (coastal plain); 50 feet if up-gradient. 0.5 to 2.5 acre CDA = 25 feet if down-gradient from building or level (coastal plain); 100 feet if up-gradient. (Refer to additional setback criteria in **Section 5**)	
Deeded Maintenance O&M Plan (**Section 8**)	
[1] Storage depth is the sum of the Void Ratio (V_r) of the soil media and gravel layers multiplied by their respective depths, plus the surface ponding depth. Refer to **Section 6.1**. [2] A ponding depth of 6 inches is preferred. Ponding depths greater than 6 inches will require a specific planting plan to ensure appropriate plant selection (**Section 6.8**). [3] These are recommendations for simple building foundations. If an in-ground basement or other special conditions exist, the design should be reviewed by a licensed engineer. Also, a special footing or drainage design may be used to justify a reduction of the setbacks noted above.	

SECTION 3: TYPICAL DETAILS

Figures 9.2 through 9.5 provide some typical details for several bioretention configurations. Also see additional details in **Appendix 9-B** of this design specification.

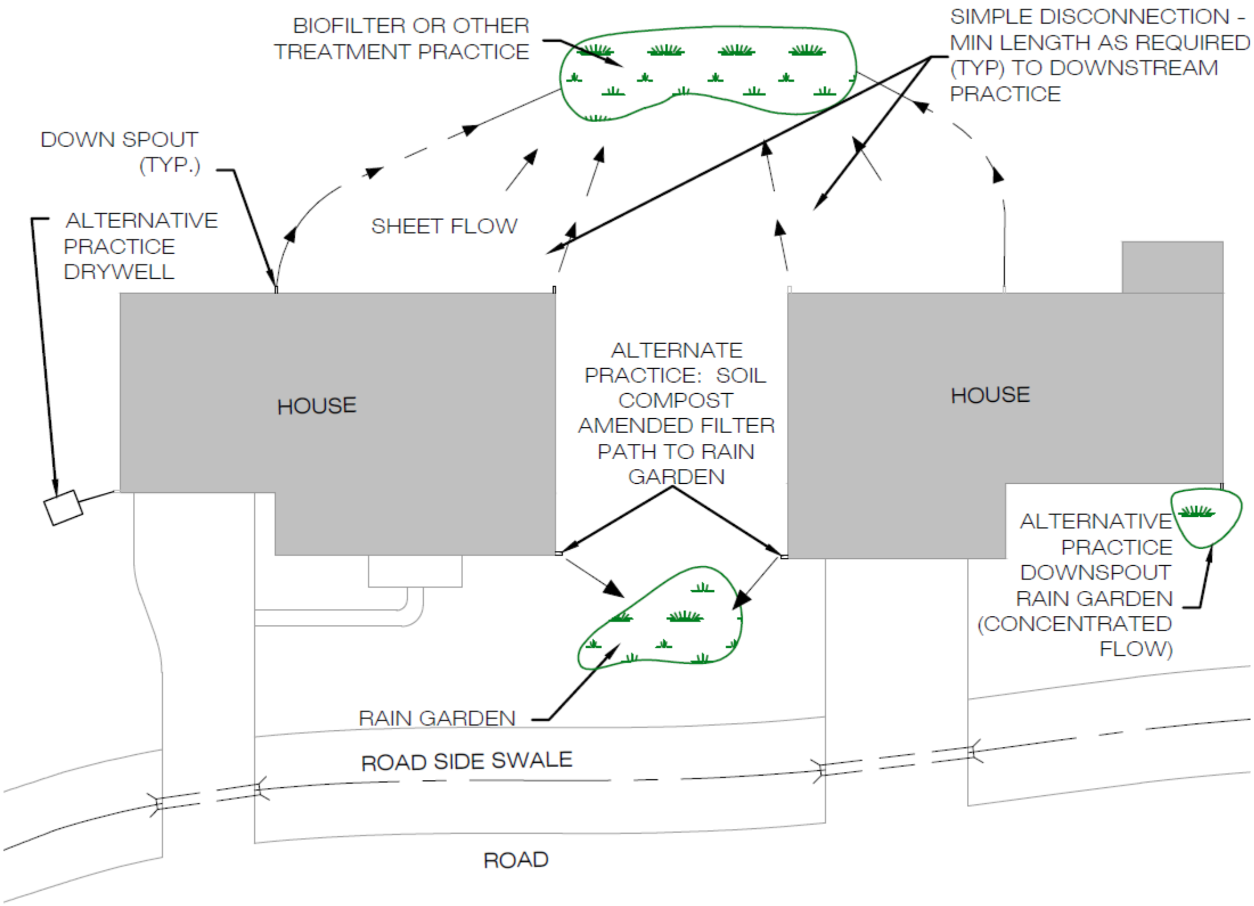


Figure 9.2. Residential Rooftop Treatment – Plan View: (a) Simple Disconnection to downstream Raingarden; (b) Disconnection – Alternative Practice: Raingarden; (c) Disconnection – Alternative Practice: Compost Amended Flow Path to downstream Raingarden

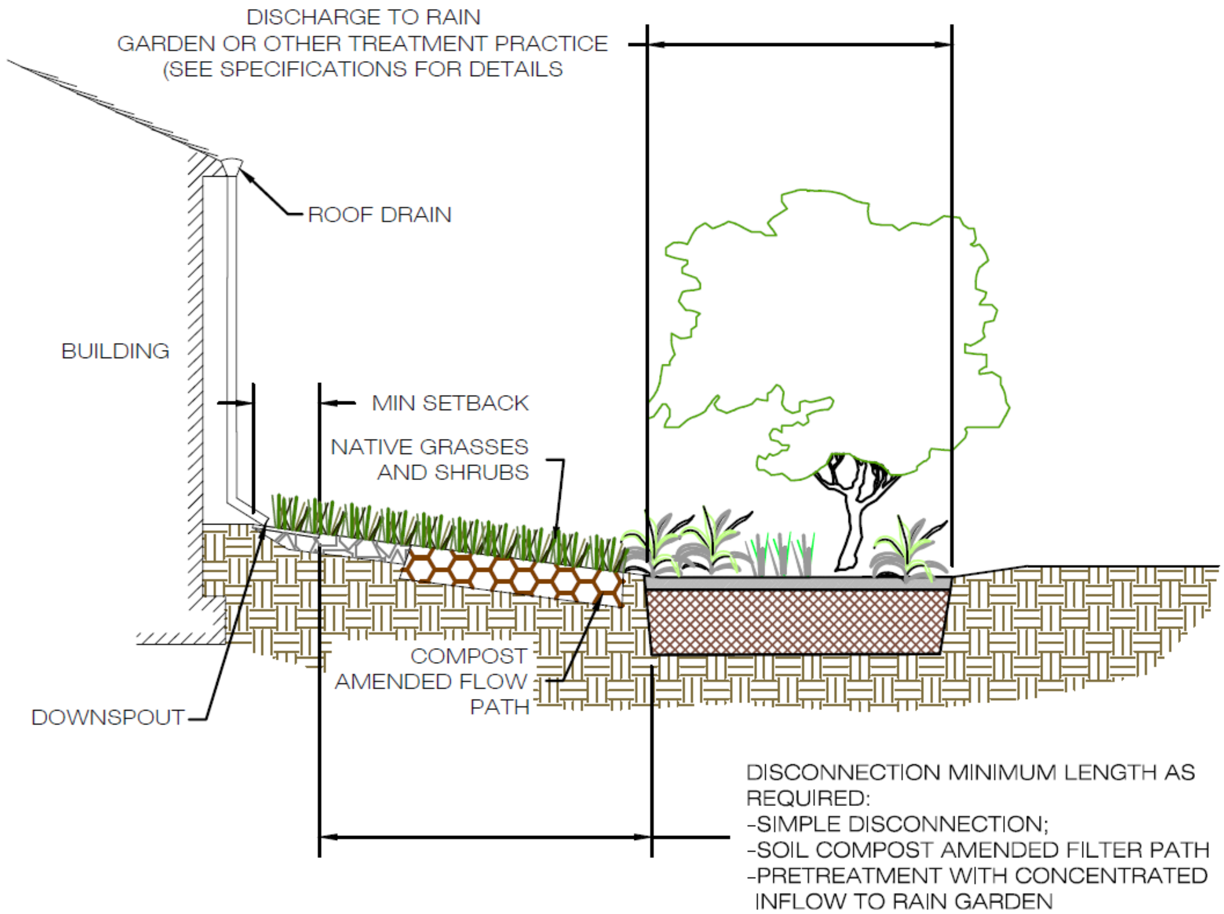


Figure 9.3A. Residential Rooftop Disconnection – Section View:
(a) Simple Disconnection to downstream Raingarden; (b) Disconnection – Alternative Practice: Compost Amended Flow Path to downstream Raingarden

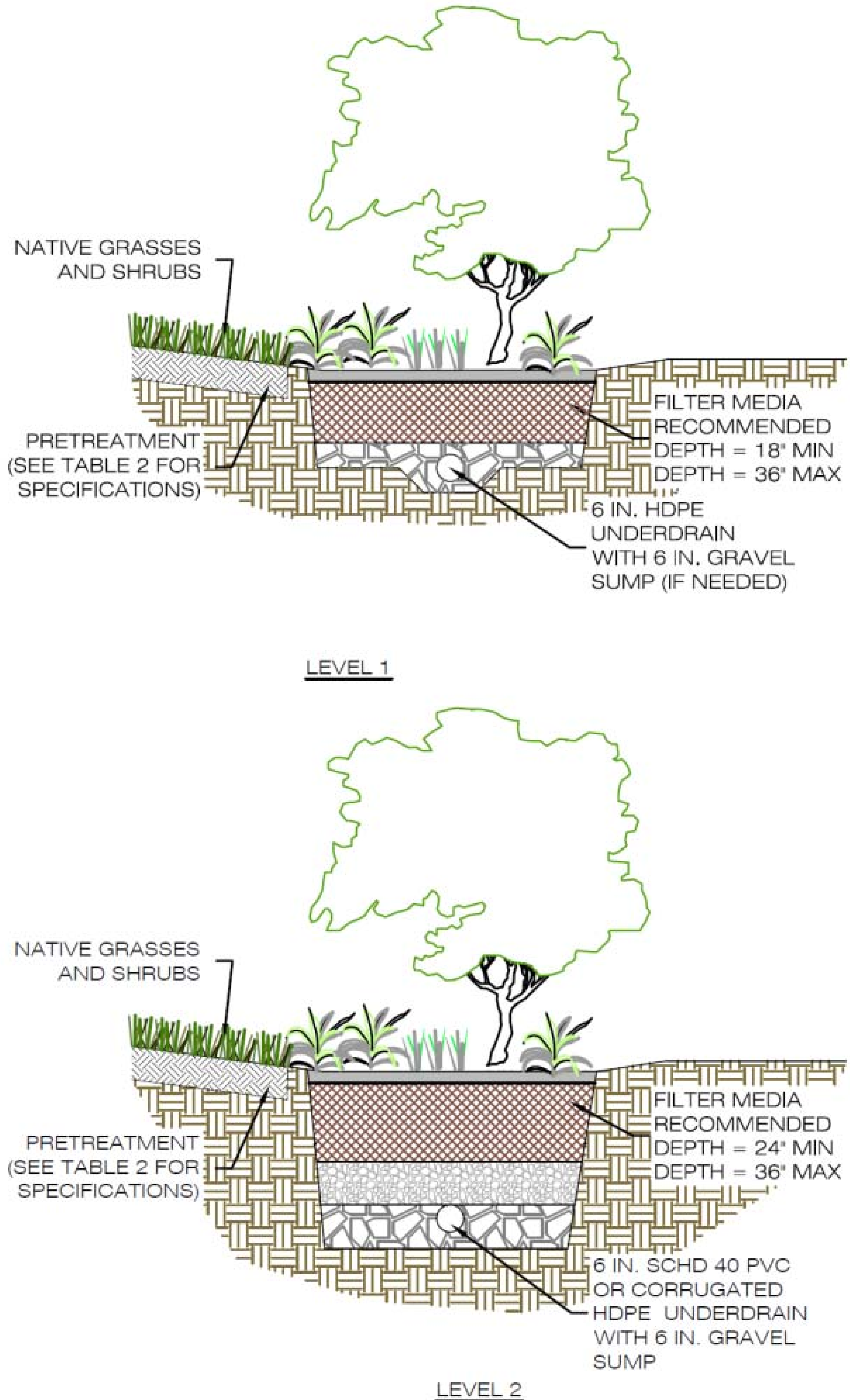


Figure 9.3B. Typical Micro-Bioretention Basin (Rain Garden) Level I and Level II – Section View:

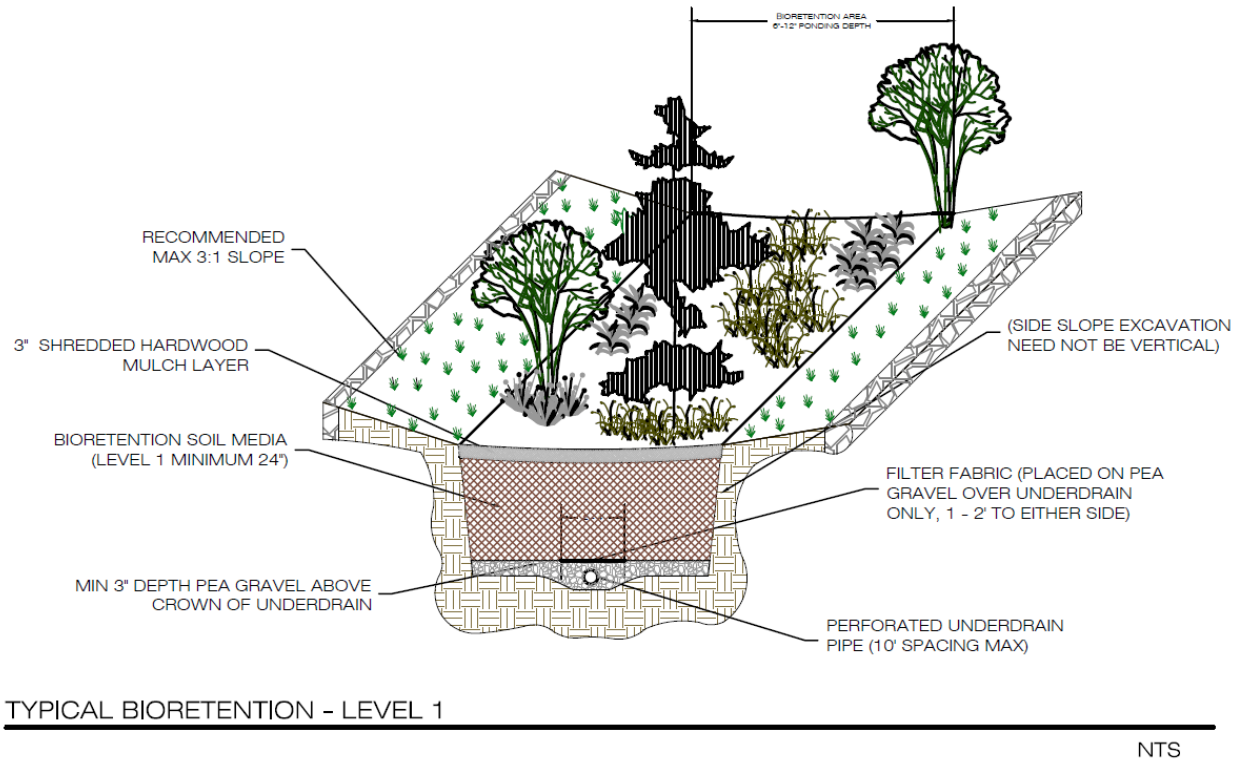


Figure 9.4a: Typical Detail of Bioretention Basin Level 1 Design

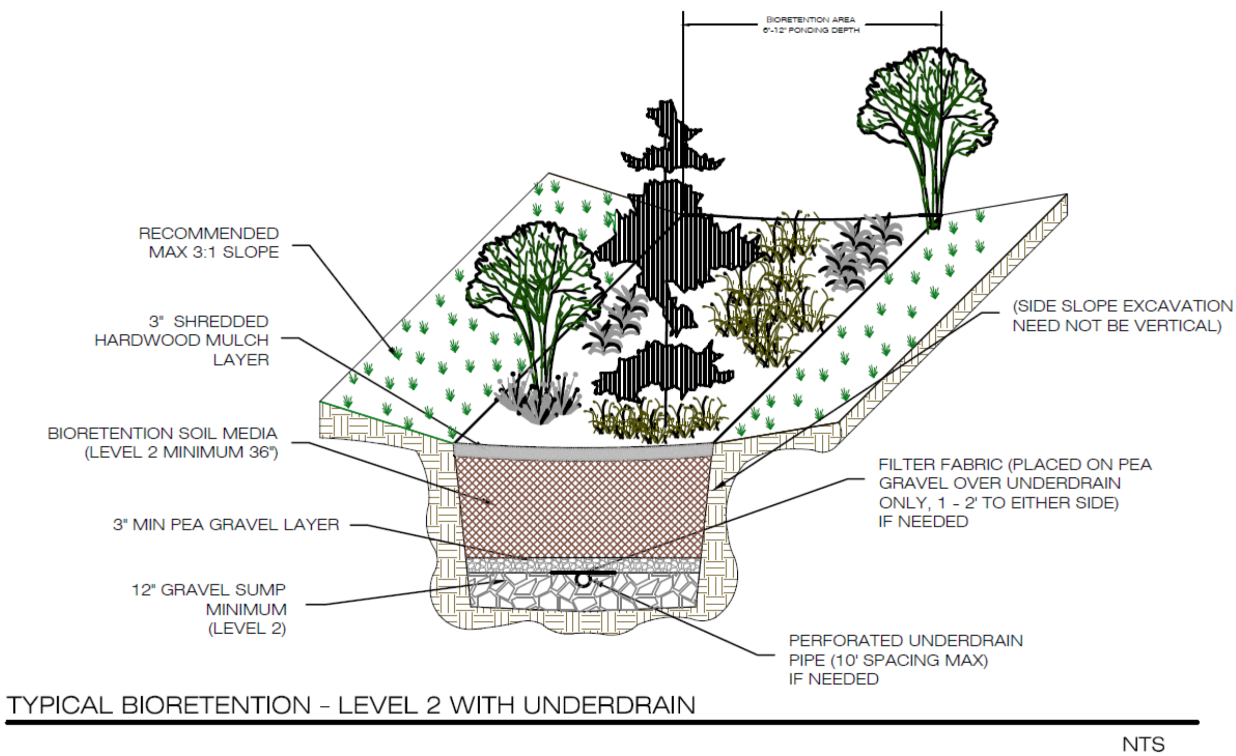


Figure 9.4b: Typical Detail of Bioretention Basin Level 2 Design

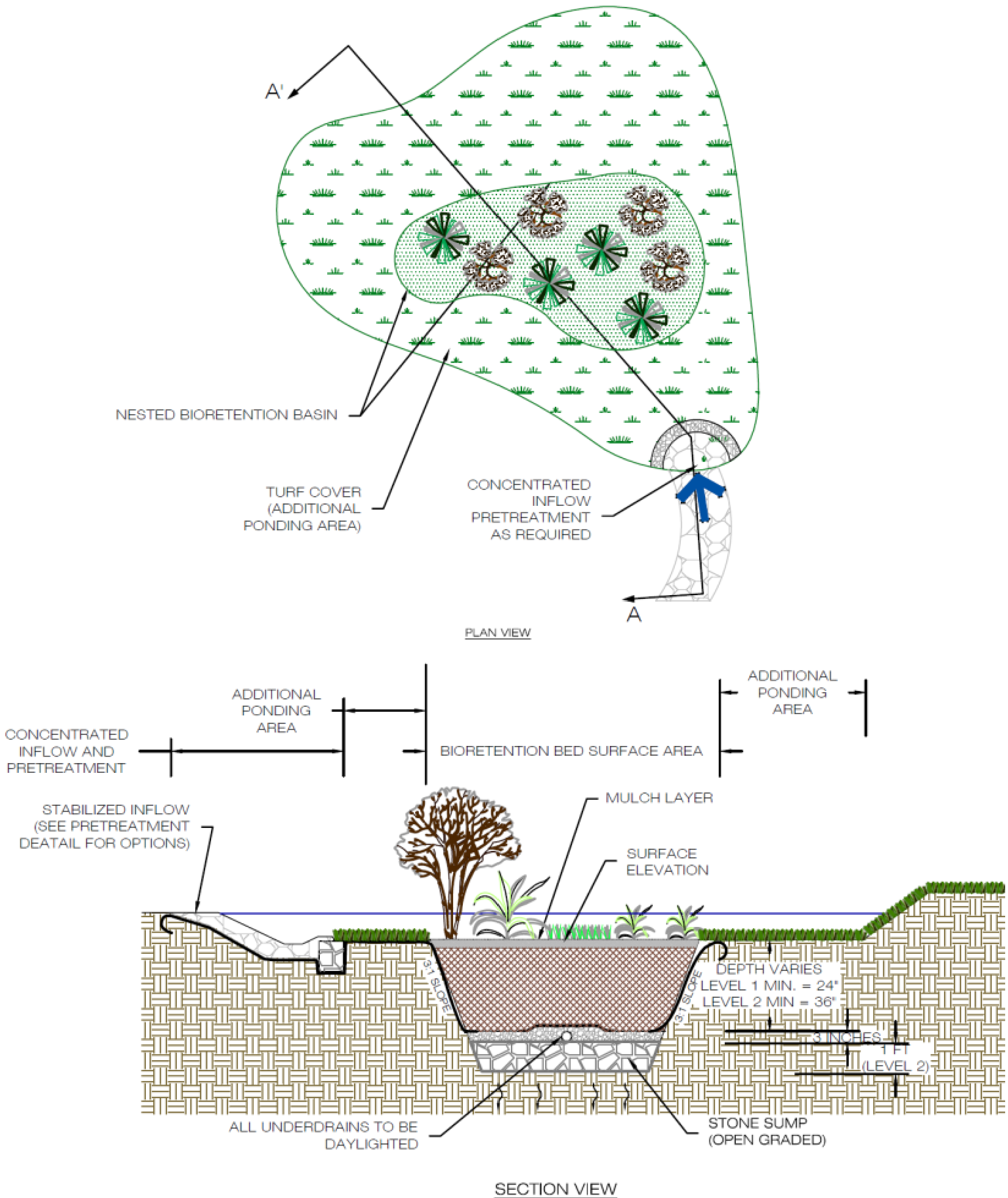


Figure 9.5. Typical Detail of Bioretention with Additional Surface Ponding

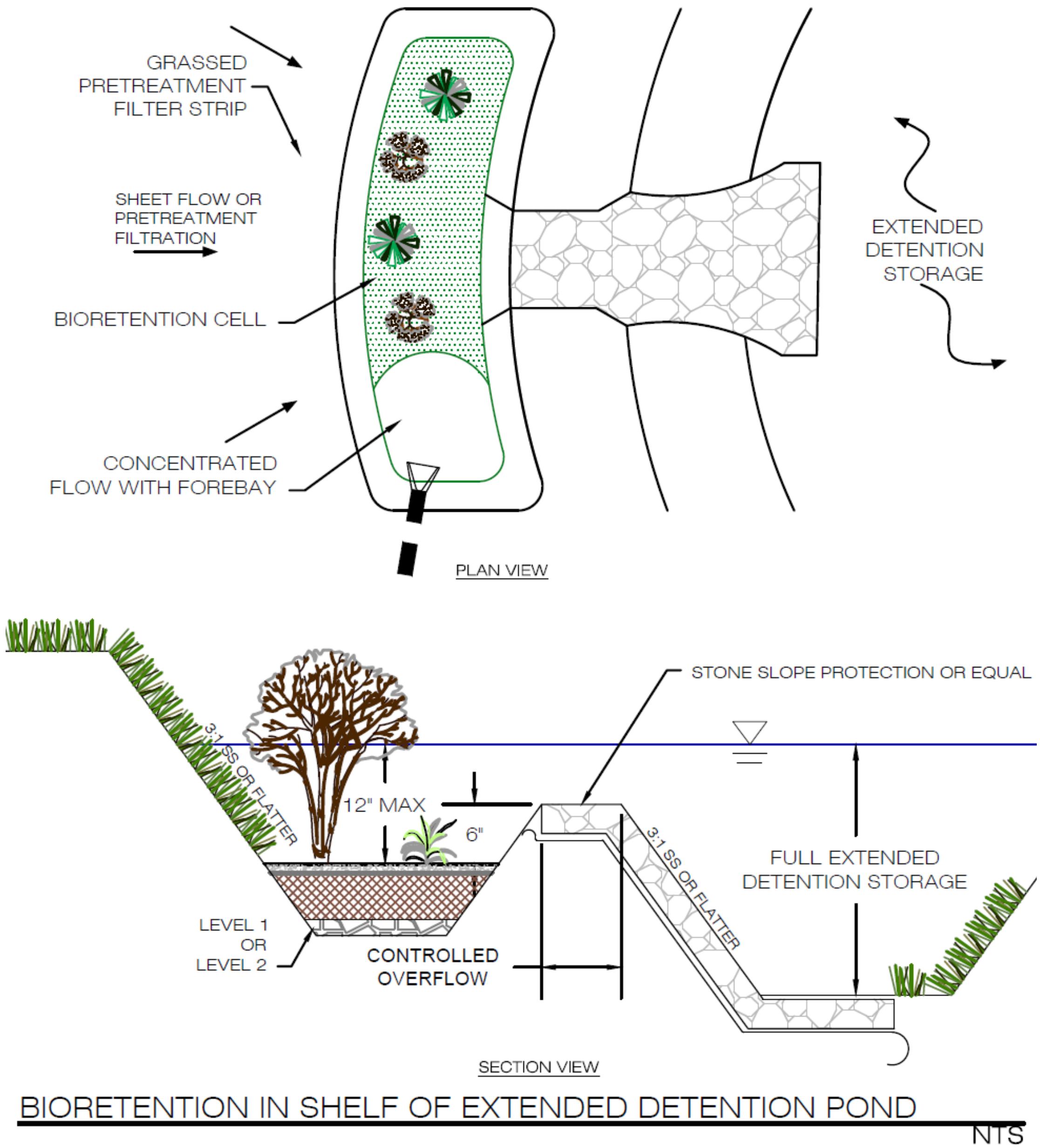


Figure 9.6. Typical Detail of a Bioretention Basin within the Upper Shelf of an ED Pond

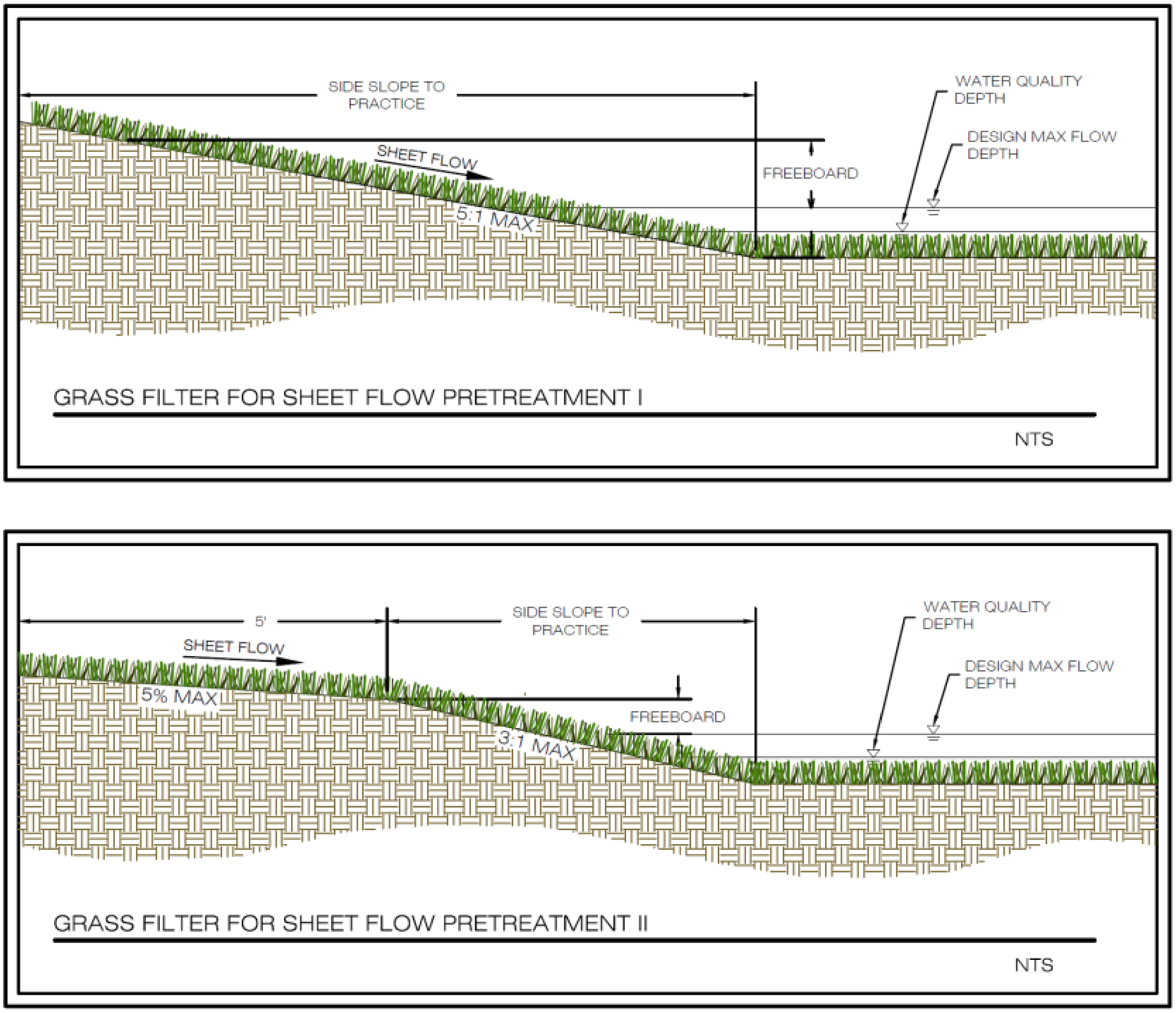


Figure 9.7 - Pretreatment I and II - Grass Filter for Sheet Flow

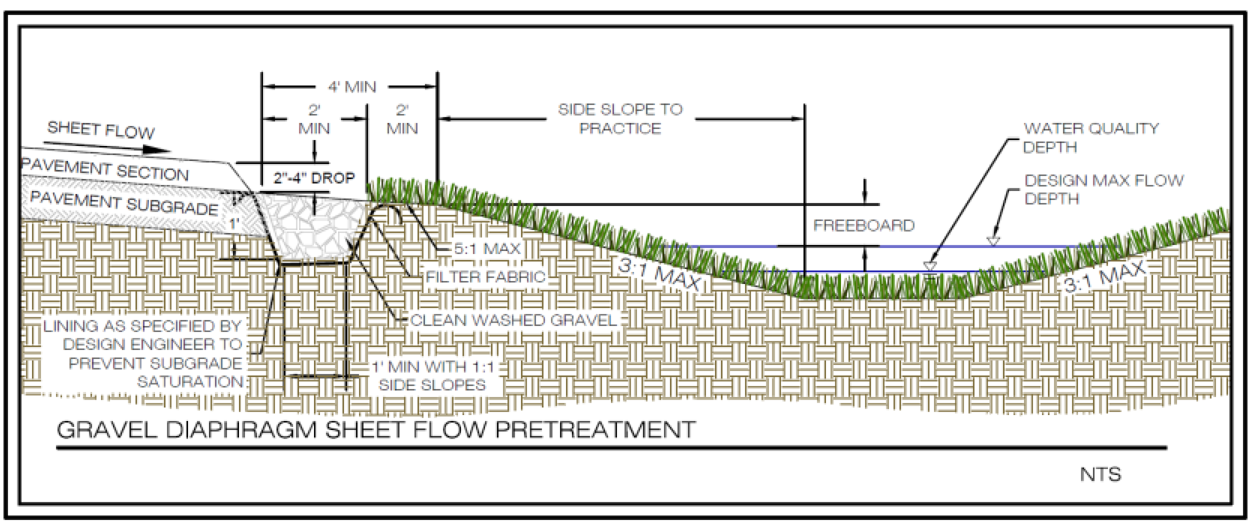


Figure 9.8 - Pretreatment – Gravel Diaphragm for Sheet Flow from Impervious or Pervious

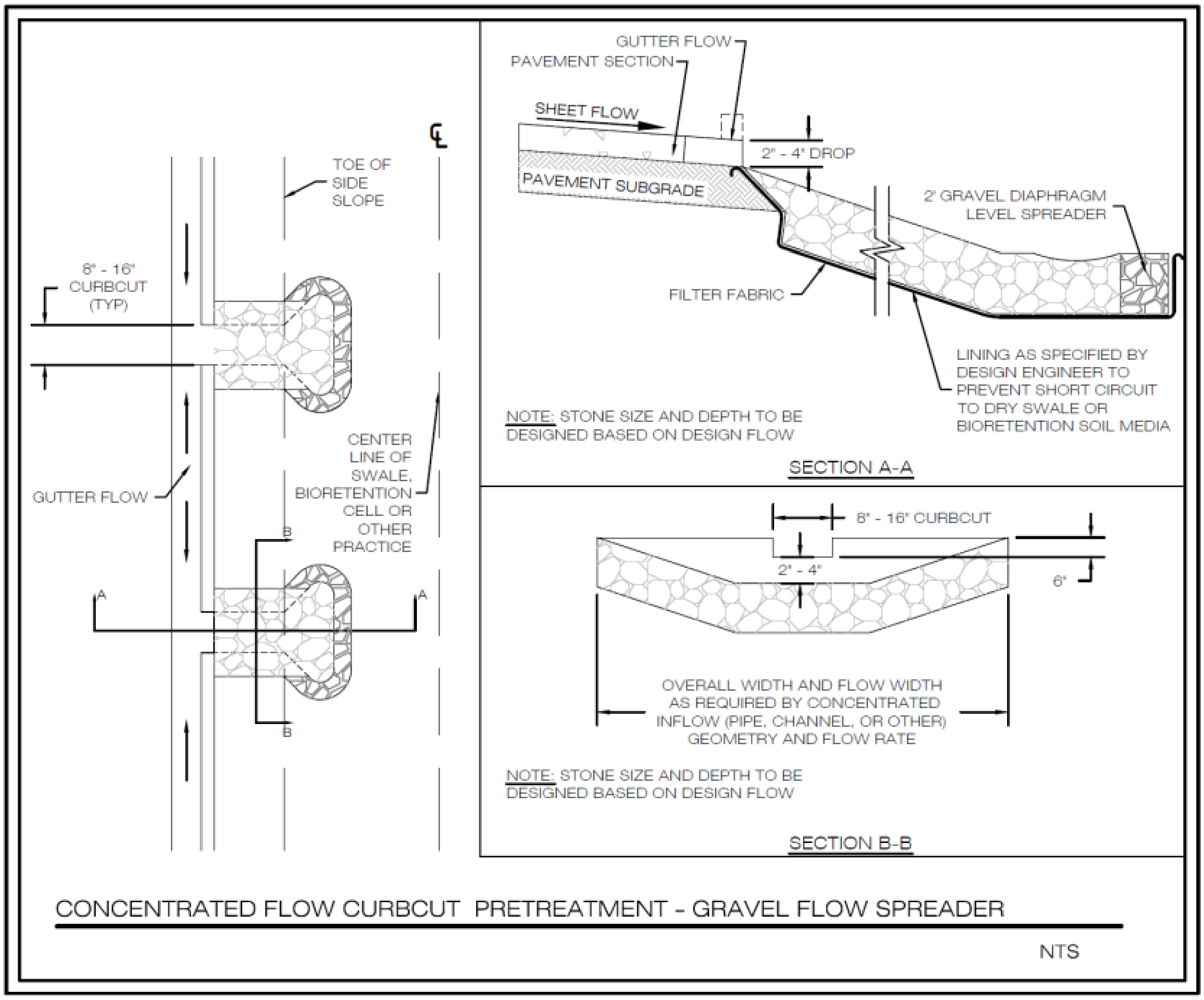


Figure 9.9: Pre-Treatment – Gravel Flow Spreader for Concentrated Flow

SECTION 5: PHYSICAL FEASIBILITY & DESIGN APPLICATIONS

5.1 Physical Feasibility

Bioretention can be applied in most soils or topography, since runoff simply percolates through an engineered soil bed and is returned to the stormwater system. Key constraints with bioretention include the following:

Available Space. Planners and designers can assess the feasibility of using bioretention facilities based on a simple relationship between the contributing drainage area and the corresponding required surface area. The bioretention surface area will be approximately 3% to 6% of the contributing drainage area, depending on the imperviousness of the CDA and the desired bioretention design level.

Site Topography. Bioretention is best applied when the grade of contributing slopes is greater than 1% and less than 5%.

Available Hydraulic Head. Bioretention is fundamentally constrained by the invert elevation of the existing conveyance system to which the practice discharges (i.e., the bottom elevation needed to tie the underdrain from the bioretention area into the storm drain system. In general, 4 to 5 feet of elevation above this invert is needed to create the hydraulic head needed to drive stormwater through a proposed bioretention filter bed. Less hydraulic head is needed if the underlying soils are permeable enough to dispense with the underdrain.

Water Table. Bioretention should always be separated from the water table to ensure that groundwater does not intersect the filter bed. Mixing can lead to possible groundwater contamination or failure of the bioretention facility. A separation distance of 2 feet is recommended between the bottom of the excavated bioretention area and the seasonally high ground water table. The separation distance may be reduced to 12 inches in coastal plain residential settings (Refer to **Section 7.2 –** Regional Adaptations).

Utilities. Designers should ensure that future tree canopy growth in the bioretention area will not interfere with existing overhead utility lines. Interference with underground utilities should also be avoided, particularly water and sewer lines. Local utility design guidance should be consulted in order to determine the horizontal and vertical clearance required between stormwater infrastructure and other dry and wet utility lines.

Soils. Soil conditions do not constrain the use of bioretention, although they determine whether an underdrain is needed. Impermeable soils in Hydrologic Soil Group (HSG) B, C or D usually require an underdrain, whereas HSG A soils generally do not. When designing a bioretention practice, designers should verify soil permeability by using the on-site soil investigation methods provided in Appendix 8-A of Stormwater Design Specification No. 8 (Infiltration).

Contributing Drainage Area. Bioretention cells work best with smaller contributing drainage areas, where it is easier to achieve flow distribution over the filter bed. Typical drainage area size can range from 0.1 to 2.5 acres and consist of up to 100% impervious cover. Three scales of bioretention are defined in this specification: (1) micro-bioretention or *Rain Gardens* (up to 0.5 acre contributing drainage area); (2) bioretention basins (up to 2.5 acres of contributing drainage area); and (3) Urban Bioretention (**Appendix 9-A**). Each of these has different design requirements (refer to **Tables 9.2 and 9.3** above). The maximum drainage area to a single bioretention basin or single cell of a bioretention basin is 5 acres, with a maximum recommended impervious cover of 2.5 acres (50% impervious cover) due to limitations on the ability of bioretention to effectively manage large volumes and peak rates of runoff. However, if hydraulic considerations are adequately addressed to manage the potentially large peak inflow of larger drainage areas (such as off-line or low-flow diversions, forebays, etc.), there may be case-by-case instances where the plan approving authority may allow these recommended maximums to be adjusted. In such cases, the bioretention facility should be located within the drainage area so as to capture the Treatment Volume (T_v) equally from the entire contributing area, and not fill the entire volume from the immediately adjacent area, thereby bypassing the runoff from the more remote portions of the site.

Hotspot Land Uses. Runoff from hotspot land uses should not be treated with infiltrating bioretention (i.e., constructed *without* an underdrain). For a list of potential stormwater hotspots, please consult Section 10.1 of Stormwater Design Specification No. 8 (Infiltration). An impermeable bottom liner and an underdrain system must be employed when bioretention is used to receive and treat hotspot runoff.

Floodplains. Bioretention areas should be constructed outside the limits of the ultimate 100-year floodplain.

No Irrigation or Baseflow**.** The planned bioretention area should not receive baseflow, irrigation water, chlorinated wash-water or other such non-stormwater flows that are not stormwater runoff.

Setbacks**.** To avoid the risk of seepage, do not allow bioretention areas to be hydraulically connected to structure foundations or pavement. Setbacks to structures and roads vary, based on the scale of the bioretention design (see **Table 9.2** above). At a minimum, bioretention basins should be located a horizontal distance of 100 feet from any water supply well (50 feet if the biofilter is lined), 50 feet from septic systems (20 feet if the biofilter is lined), and at least 5 feet from down-gradient wet utility lines. Dry utility lines such as gas, electric, cable and telephone may cross under bioretention areas if they are double-cased.

5.2 Potential Bioretention Applications

Bioretention can be used wherever water can be conveyed to a surface area. Bioretention has been used at commercial, institutional, and residential sites in spaces that are traditionally pervious and landscaped. It should be noted that special care must be taken to provide adequate pre-treatment for bioretention cells in space-constrained high traffic areas. Typical locations for bioretention include the following:

Parking lot islands. The parking lot grading is designed for sheet flow towards linear landscaping areas and parking islands between rows of spaces. Curb-less pavement edges can be used to convey water into a depressed island landscaping area. Curb cuts can also be used for this purpose, but they are more prone to blockage, clogging and erosion.

Parking lot edge. Small parking lots can be graded so that flows reach a curb-less pavement edge or curb cut before reaching catch basins or storm drain inlets. The turf at the edge of the parking lot functions as a filter strip to provide pre-treatment for the bioretention practice. The depression for bioretention is located in the pervious area adjacent to the parking lot.

Road medians, roundabouts, interchanges and cul-de-sacs. The road cross-section is designed to slope towards the center median or center island rather than the outer edge, using a curb-less edge.

Right-of-way or commercial setback. A linear configuration can be used to convey runoff in sheet flow from the roadway, or a grass channel or pipe may convey flows to the bioretention practice.

Courtyards. Runoff collected in a storm drain system or roof leaders can be directed to courtyards or other pervious areas on site where biorention can be installed.

Individual residential lots. Roof leaders can be directed to small bioretention areas, often called "rain gardens," located at the front, side, or rear of a home in a drainage easement. For smaller lots, the front yard bioretention corridor design may be preferable (See Stormwater Design Specification No. 1: Rooftop Disconnection).

Unused pervious areas on a site. Storm flows can be redirected from a a storm drain pipe to discharge into a bioretention area.

Dry Extended Detention (ED) basin. A bioretention cell can be located on an upper shelf of an extended detention basin, after the sediment forebay, in order to boost treatment. Depending on the ED basin design, the designer may choose to locate the bioretention cell in the bottom of the basin. However, the design must carefully account for the potentially deeper ponding depths (greater than 6 or 12 inches) associated with extended detention.

Retrofitting. Numerous options are available to retrofit bioretention in the urban landscape, as described in Profile Sheet ST-4 of Schueler et al (2007).

SECTION 6: DESIGN CRITERIA

6.1. Sizing of Bioretention Practices

6.1.1 Stormwater Quality

Sizing of the surface area (SA) for bioretention practices is based on the computed Treatment Volume (T_v) of the contributing drainage area and the storage provided in the facility. The required surface area (in square feet) is computed as the Treatment Volume (in cubic feet) divided by the equivalent storage depth (in feet). The equivalent storage depth is computed as the depth of media, gravel, or surface ponding (in feet) multiplied by the accepted void ratio.

The accepted Void Ratios (V_r) are (see **Figure 9.10** below):

Bioretention Soil Media $V_r = 0.25$
Gravel $V_r = 0.40$
Surface Storage $V_r = 1.0$

The equivalent storage depth for Level 1 with a 6-inch surface ponding depth and a 12-inch gravel layer is therefore computed as:

Equation 9.1. Bioretention Level 1 Design Storage Depth

$$(2 \text{ ft.} \times 0.25) + (1 \text{ ft.} \times 0.40) + (0.5 \times 1.0) = 1.40 \text{ ft.}$$

And the equivalent storage depth for Level 2 with a 6-inch surface ponding depth and a 12-inch gravel layer is computed as:

Equation 9.2. Bioretention Level 2 Design Storage Depth

$$(3 \text{ ft. } x\ 0.25) + (1 \text{ ft. } x\ 0.40) + (0.5\ x\ 1.0) = 1.65 \text{ ft}$$

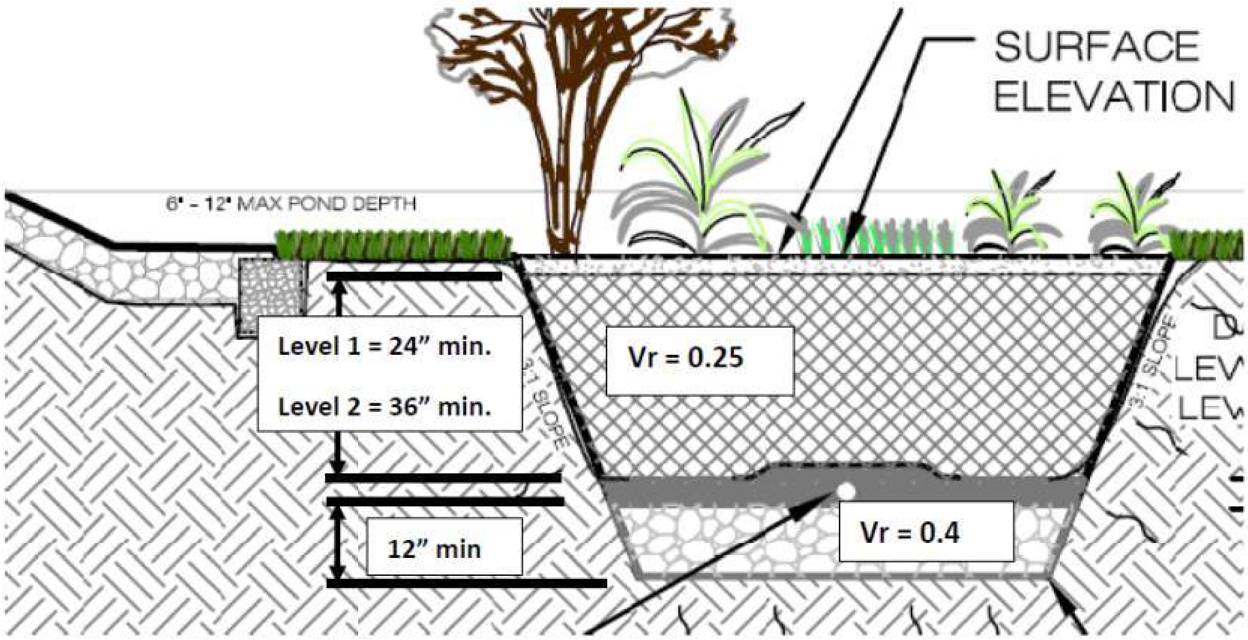


Figure 9.10. Typical Bioretention Section with Void Ratios for Volume Computations

Therefore, the Level 1 Bioretention Surface Area (SA) is computed as:

Equation 9.3. Bioretention Level 1 Design Surface Area

$$SA \text{ (sq. ft.)} = \{T_v - \text{the volume reduced by an upstream BMP}\} / 1.40 \text{ ft.}$$

And the Level 2 Bioretention Surface Area is computed as:

Equation 9.4. Bioretention Level 2 Design Surface Area

$$SA \text{ (sq. ft.)} = [(1.25 * Tv) - \text{the volume reduced by an upstream BMP}] / 1.65 \text{ ft.}$$

Where:

SA = Minimum surface area of bioretention filter (sq. ft.)

T_v = Treatment Volume (cu. ft.) = $[(1.0 \text{ in.})(R_v)(A) / 12]$
(NOTE: R_v = the composite runoff coefficient from the RR Method)

Equations 9.1 through 9.4 should be modified if the storage depths of the soil media, gravel layer, or ponded water vary in the actual design or with the addition of any surface or subsurface storage components (e.g., additional area of surface ponding, subsurface storage chambers, etc.).

6.1.2 Stormwater Quantity

The water quality Treatment Volume (T_v) can be counted as part of the Channel Protection Volume or Overbank Flood Protection Volume to satisfy stormwater quantity control requirements. In addition, designers may be able to create additional surface storage by expanding the surface ponding footprint in order to accommodate a greater quantity credit for channel and/or flood protection, without necessarily increasing the soil media footprint. In other words, the engineered soil media would only underlay part of the surface area of the bioretention (see **Figure 9.10** above).

In this regard, the ponding footprint can be increased as follows to allow for additional storage:

- 50% surface area increase if the ponding depth is 6 inches or less.
- 25% surface area increase if the ponding depth is between 6 and 12 inches.

These values may be modified as additional data on the long term permeability of bioretention filters becomes available.

6.2. Soil Infiltration Rate Testing

In order to determine if an underdrain will be needed, one must measure the infiltration rate of subsoils at the invert elevation of the bioretention area, as noted in the soil testing requirements for each scale of bioretention, in Design **Tables 9.2 and 9.3** above. The infiltration rate of subsoils must exceed 1 inch per hour in order to dispense with the underdrain requirement for Rain Gardens, and 1/2 inch per hour for bioretention basins. On-site soil infiltration rate testing procedures are outlined in Appendix 8-A of the Stormwater Design Specification No. 8 (Infiltration). Soil testing is not needed for Level 1 bioretention areas, where an underdrain is used.

6.3. BMP Geometry

Bioretention basins must be designed with an internal flow path geometry such that the treatment mechanisms provided by the bioretention are not bypassed or short-circuited. Examples of short-circuiting include inlets or curb cuts that are very close to outlet structures (see **Figure 9.11** below), or incoming flow that is diverted immediately to the underdrain through stone layers. Short-circuiting can be particularly problematic when there are multiple curb cuts or inlets.

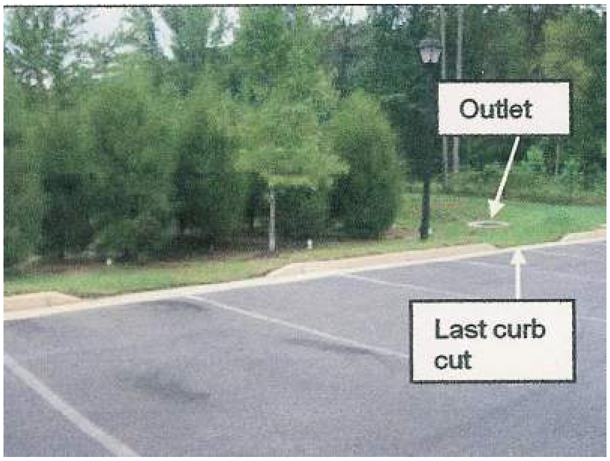


Figure 9.11. Examples of Short-Circuiting at Bioretention Facilities

In order for these bioretention areas to have an acceptable internal geometry, the “travel time” from each inlet to the outlet should be maximized, and incoming flow must be distributed as evenly as possible across the filter surface area.

One important characteristic is the length of the shortest flow path compared to the overall length, as shown in **Figure 9.12** below. In this figure, the ratio of the shortest flow path to the overall length is represented as:

Equation 9.5. Ratio of Shortest Flow Path to Overall Length

$$SFP / L$$

Where:

SFP = length of the shortest flow path
L = length from the most distant inlet to the outlet

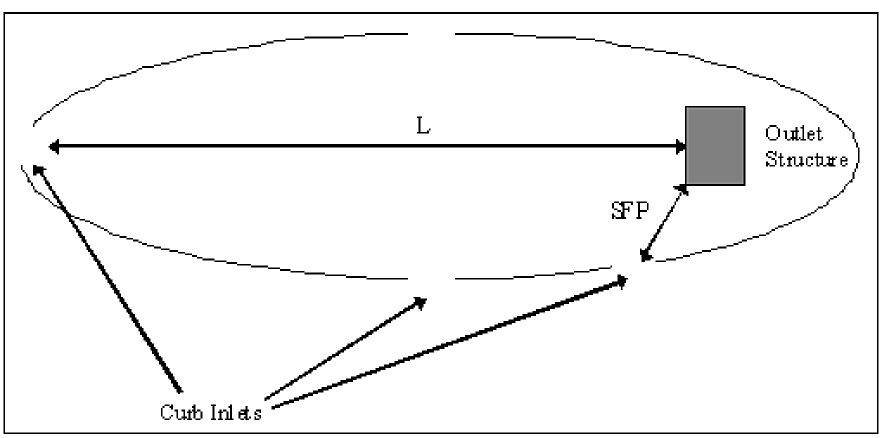


Figure 9.12. Diagram showing shortest flow path as part of BMP geometry

For Level 1 designs, the SFP/L ratio must be 0.3 or greater; the ratio must be 0.8 or greater for Level 2 designs. In some cases, due to site geometry, some inlets may not be able to meet these ratios. However, the drainage area served by such inlets should constitute no more than 20% of the contributing drainage area. Alternately, the designer may incorporate other design features that prevent short-circuiting, including features that help spread and distribute runoff as evenly as possible across the filter surface.

> ***Note: Local reviewers may waive or modify the guideline for the shortest flow path ratio in cases where (1) the outlet structure within the bioretention area is raised above the filter surface to the ponding depth elevation; and (2) the filter surface is flat.***

With regard to the first condition stated in the note above, field experience has shown that soil media immediately around a raised outlet structure is prone to scouring, erosion and, thus, short-circuiting of the treatment mechanism. For example, water can flow straight down through scour holes or sinkholes to the underdrain system (Hirschman et al., 2009). Design options should be used to prevent this type of scouring. One example is shown in **Figure 9.13**.

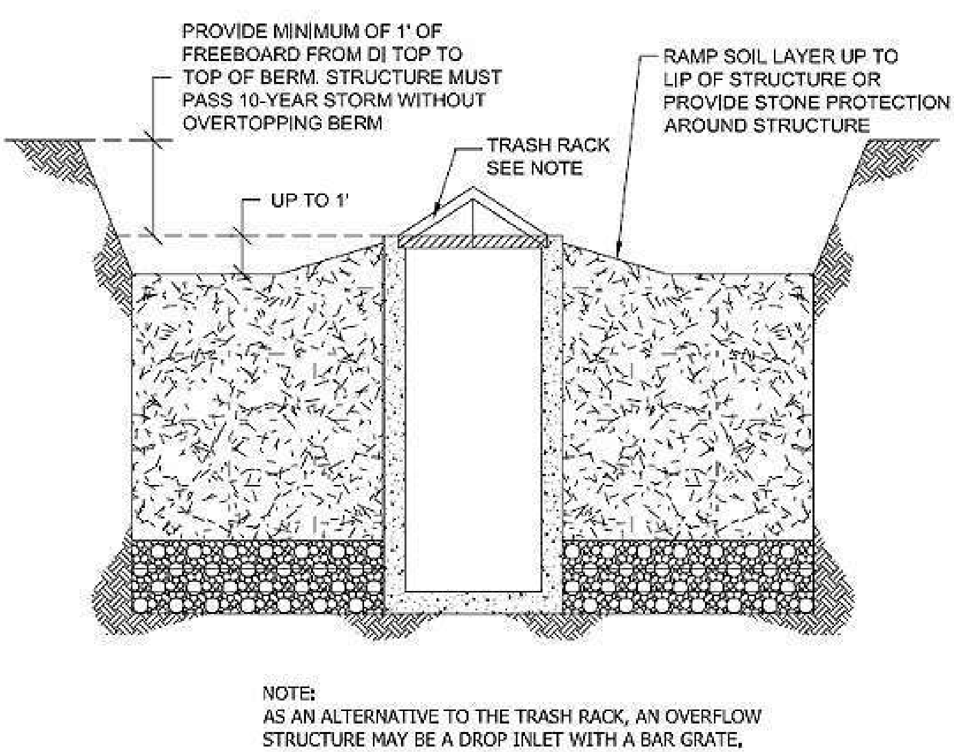


Figure 9.13. Typical Detail of how to prevent bypass or short-circuiting around the overflow structure

The designer should ensure that incoming flow is spread as evenly as possible across the filter surface to maximize the treatment potential.

6.4. Pre-treatment

Pre-treatment of runoff entering bioretention areas is necessary to trap coarse sediment particles before they reach and prematurely clog the filter bed. Pre-treatment measures must be designed to evenly spread runoff across the entire width of the bioretention area. Several pre-treatment measures are feasible, depending on the scale of the bioretention practice and whether it receives sheet flow, shallow concentrated flow or deeper concentrated flows. The following are appropriate pretreatment options:

For Micro Bioretention (Rain Gardens):

- **Leaf Screens** as part of the gutter system serve to keep the heavy loading of organic debris from accumulating in the bioretention cell.
- ***Grass Filter Strips*** (for sheet flow), applied on residential lots, where the lawn area can serve as a grass filter strip adjacent to a rain garden.
- ***Gravel or Stone Diaphragm*** (for either sheet flow or concentrated flow); this is a gravel diaphragm at the end of a downspout or other concentrated inflow point that should run perpendicular to the flow path to promote settling.

For Bioretention Basins:

- ***Pre-treatment Cells*** (channel flow): Similar to a forebay, this cell is located at piped inlets or curb cuts leading to the bioretention area and consists of an energy dissipater sized for the expected rates of discharge. It has a storage volume equivalent to at least 15% of the total Treatment Volume (inclusive) with a 2:1 length-to-width ratio. The cell may be formed by a wooden or stone check dam or an earthen or rock berm. Pretreatment cells do not need underlying engineered soil media, in contrast to the main bioretention cell.
- ***Grass Filter Strips*** (for sheet flow): Grass filter strips extend from the edge of pavement to the bottom of the bioretention basin at a 5:1 slope or flatter. Alternatively, provide a combined 5 feet of grass filter strip at a maximum 5% (20:1) slope and 3:1 or flatter side slopes on the bioretention basin. (**See Figure 9.7**)
- ***Gravel or Stone Diaphragms*** (sheet flow). A gravel diaphragm located at the edge of the pavement should be oriented perpendicular to the flow path to pre-treat lateral runoff, with a 2 to 4 inch drop. The stone must be sized according to the expected rate of discharge. (**See Figure 9.8**)
- ***Gravel or Stone Flow Spreaders*** (concentrated flow). The gravel flow spreader is located at curb cuts, downspouts, or other concentrated inflow points, and should have a 2 to 4 inch elevation drop from a hard-edged surface into a gravel or stone diaphragm. The gravel should extend the entire width of the opening and create a level stone weir at the bottom or treatment elevation of the basin. (**See Figure 9.9**)
- ***Innovative or Proprietary Structure*****:** An approved proprietary structure with demonstrated capability of reducing sediment and hydrocarbons may be used to provide pre-treatment. Refer to the Virginia BMP Clearinghouse web site (http://www.vwrrc.vt.edu/swc/) for information on approved proprietary structures.

6.5. Conveyance and Overflow

For On-line bioretention: An overflow structure should always be incorporated into on-line designs to safely convey larger storms through the bioretention area. The following criteria apply to overflow structures:

- The overflow associated with the 2 and 10 year design storms should be controlled so that velocities are non-erosive at the outlet point (i.e., to prevent downstream erosion).
- Common overflow systems within bioretention practices consist of an inlet structure, where the top of the structure is placed at the maximum water surface elevation of the bioretention area, which is typically 6 to 12 inches above the surface of the filter bed (6 inches is the preferred ponding depth).
- The overflow capture device (typically a yard inlet) should be scaled to the application – this may be a landscape grate inlet or a commercial-type structure.
- The filter bed surface should generally be flat so the bioretention area fills up like a bathtub.

Off-line bioretention: Off-line designs are preferred (see **Figure 9.14** for an example). One common approach is to create an alternate flow path at the inflow point into the structure such that when the maximum ponding depth is reached, the incoming flow is diverted past the facility. In this case, the higher flows do not pass over the filter bed and through the facility, and additional flow is able to enter as the ponding water filtrates through the soil media.

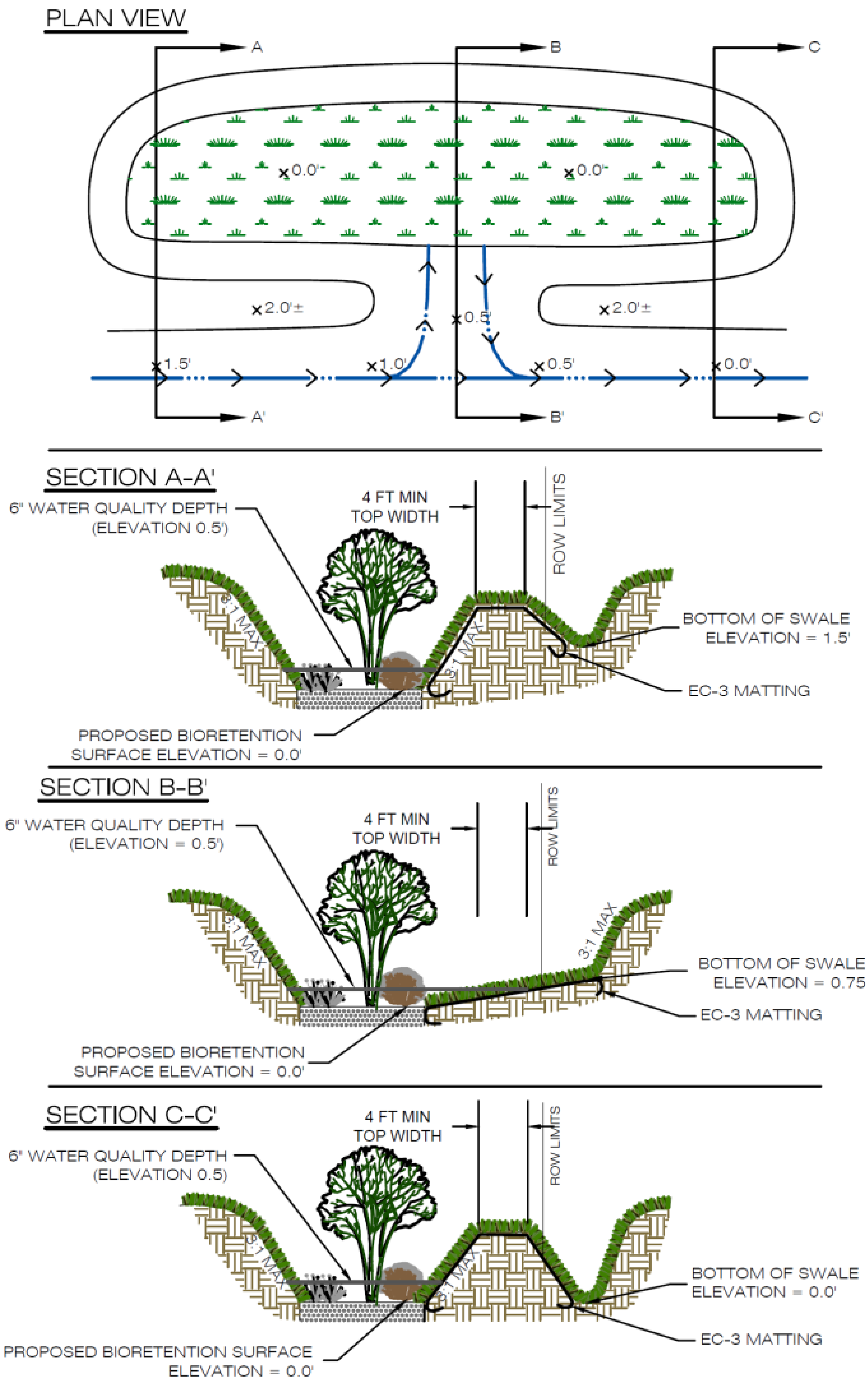


Figure 9.14. Typical Details for Off-Line Biofiltrattion

Another option is to utilize a low-flow diversion or flow splitter at the inlet to allow only the Treatment Volume to enter the facility. This may be achieved with a weir or curb opening sized for the target flow, in combination with a bypass channel. Using a weir or curb opening helps minimize clogging and reduces the maintenance frequency. (Further guidance on determining the Treatment Volume design peak flow rate will be necessary in order to ensure proper design of the diversion structure.)

6.6. Filter Media and Surface Cover

The filter media and surface cover are the two most important elements of a bioretention facility in terms of long-term performance. The following are key factors to consider in determining an acceptable soil media mixture.

- ***General Filter Media Composition.*** The recommended bioretention soil mixture is generally classified as a loamy sand on the USDA Texture Triangle, with the following composition:
    - 85% to 88% sand;
    - 8% to 12% soil fines; and
    - 3% to 5% organic matter.

It may be advisable to start with an open-graded coarse sand material and proportionately mix in topsoil that will likely contain anywhere from 30% to 50% soil fines (sandy loam, loamy sand) to achieve the desired ratio of sand and fines. An additional 3% to 5% organic matter can then be added. (The exact composition of organic matter and topsoil material will vary, making particle size distribution and recipe for the total soil media mixture difficult to define in advance of evaluating the available material.)

- ***P-Index.*** The P-Index provides a measure of soil phosphorus content and the risk of that phosphorus moving through the soil media. The risk of phosphorus movement through a soil is influenced by several soil physical properties: texture, structure, total pore space, pore-size, pore distribution, and organic matter. A soil with a lot of fines will hold phosphorus while also limiting the movement of water. A soil that is sandy will have a high permeability, and will therefore be less likely to hold phosphorus within the soil matrix.

  A primary factor in interpreting the desired P-Index of a soil is the bulk density. Saxton et. al. (1986) estimated generalized bulk densities and soil-water characteristics from soil texture. The expected bulk density of the loamy sand soil composition described above should be in the range of 1.6 to 1.7 g/cu. cm. Therefore, ***the recommended range for bioretention soil P-index of between 10 and 30*** corresponds to a ***phosphorus content range (mg of P to kg of soil) within the soil media of 7 mg/kg to 23 mg/kg***.

- ***Cation Exchange Capacity (CEC).*** The CEC of a soil refers to the total amount of positively charged elements that a soil can hold; it is expressed in milliequivalents per 100 grams (meq/100g) of soil. For agricultural purposes, these elements are the basic cations of calcium (Ca^{+2}), magnesium (Mg^{+2}), potassium (K^{+1}) and sodium (Na^{+1}) and the acidic cations of hydrogen (H^{+1}) and aluminum (Al^{+3}). The CEC of the soil is determined in part by the amount of clay and/or humus or organic matter present. ***Soils with CECs exceeding 10 are***

preferred for pollutant removal. Increasing the organic matter content of any soil will help to increase the CEC, since it also holds cations like the clays.

- ***Infiltration Rate.*** The bioretention soil media should have a minimum infiltration rate of 1 to 2 inches per hour (a proper soil mix will have an initial infiltration rate that is significantly higher).

- ***Depth.*** The standard minimum filter bed depth ranges from 24 and 36 inches for Level 1 and Level 2 designs, respectively, (18 to 24 inches for rain gardens or micro-bioretention). If trees are included in the bioretention planting plan, tree planting holes in the filter bed must be at least 4 feet deep to provide enough soil volume for the root structure of mature trees. Use turf, perennials or shrubs instead of trees to landscape shallower filter beds.

- ***Filter Media for Tree Planting Areas.*** A more organic filter media is recommended within the planting holes for trees, with a ratio of 50% sand, 30% toposoil and 20% acceptable leaf compost.

- ***Mulch.*** A 2 to 3 inch layer of mulch on the surface of the filter bed enhances plant survival, suppresses weed growth, and pre-treats runoff before it reaches the filter media. Shredded, aged hardwood bark mulch makes a very good surface cover, as it retains a significant amount of nitrogen and typically will not float away.

- ***Alternative to Mulch Cover.*** In some situations, designers may consider alternative surface covers such as turf, native groundcover, erosion control matting (coir or jute matting), river stone, or pea gravel. The decision regarding the type of surface cover to use should be based on function, cost and maintenance. Stone or gravel are not recommended in parking lot applications, since they increase soil temperature and have low water holding capacity.

- ***Media for Turf Cover.*** One adaptation is to design the filter media primarily as a sand filter with organic content only at the top. Leaf compost tilled into the top layers will provide organic content for the vegetative cover. If grass is the only vegetation, the ratio of compost may be reduced.

6.7. Underdrain and Underground Storage Layer

Some Level 2 designs will not use an underdrain (where soil infiltration rates meet minimum standards; see **Section 6.2** and **Section 3** design tables). For Level 2 designs with an underdrain, an underground storage layer of at 12 inches should be incorporated below the invert of the underdrain. The depth of the storage layer will depend on the target treatment and storage volumes needed to meet water quality, channel protection, and/or flood protection criteria. However, the bottom of the storage layer must be at least 2 feet above the seasonally high water table. The storage layer should consist of clean, washed #57 stone or an approved infiltration module.

All bioretention basins should include observation wells. The observation wells should be tied into any T's or Y's in the underdrain system, and should extend upwards to be flush with the surface, with a vented cap. In addition, cleanout pipes should be provided if the contributing drainage area exceeds 1 acre.

6.8. Bioretention Planting Plans

A landscaping plan must be provided for each bioretention area. Minimum plan elements shall include the proposed bioretention template to be used, delineation of planting areas, the planting plan, including the size, the list of planting stock, sources of plant species, and the planting sequence, including post-nursery care and initial maintenance requirements. It is highly recommended that the planting plan be prepared by a qualified landscape architect, in order to tailor the planting plan to the site-specific conditions.

Native plant species are preferred over non-native species, but some ornamental species may be used for landscaping effect if they are not aggressive or invasive. Some popular native species that work well in bioretention areas and are commercially available can be found in **Table 9.4**. Internet links to more detailed bioretention plant lists developed in piedmont and coastal plain communities of the Chesapeake Bay region are provided in **Table 9.5**.

The planting template refers to the form and combination of native trees, shrubs, and perennial ground covers that maintain the appearance and function of the bioretention area. The six most common bioretention templates are as follows:

- ***Turf.*** This option is typically restricted to on-lot micro-bioretention applications, such as a front yard rain garden. Grass species should be selected that have dense cover, are relatively slow growing, and require the least mowing and chemical inputs (e.g., fine fescue, tall fescue).

- ***Perennial garden.*** This option uses herbaceous plants and native grasses to create a garden effect with seasonal cover. It may be employed in both micro-scale and small scale bioretention applications. This option is attractive, but it requires more maintenance in the form of weeding.

- ***Perennial garden with shrubs.*** This option provides greater vertical form by mixing native shrubs and perennials together in the bioretention area. This option is frequently used when the filter bed is too shallow to support tree roots. Shrubs should have a minimum height of 30 inches.

- ***Tree, shrub and herbaceous plants.*** This is the traditional landscaping option for bioretention. It produces the most natural effect, and it is highly recommended for bioretention basin applications. The landscape goal is to simulate the structure and function of a native forest plant community.

- ***Turf and tree.*** This option is a lower maintenance version of the tree-shrub-herbaceous option 4, where the mulch layer is replaced by turf cover. Trees are planted within larger mulched islands to prevent damage during mowing operations.

- ***Herbaceous meadow.*** This is another lower maintenance approach that focuses on the herbaceous layer and may resemble a wildflower meadow or roadside vegetated area (e.g., with Joe Pye Weed, New York Ironweed, sedges, grasses, etc.). The goal is to establish a more natural look that may be appropriate if the facility is located in a lower maintenance area (e.g., further from buildings and parking lots). Shrubs and trees may be incorporated around the perimeter. Erosion control matting can be used in lieu of the conventional mulch layer.

Table 9.4. Popular Native Plant Materials for Bioretention

Perennials/Herbaceous	Shrubs	Trees
Virginia Wild Rye *(Elymus virginicus)*	Common Winterberry *(Ilex verticillatta)*	River Birch *(Betula nigra*)
Redtop Grass *(Agrostis alba)*	Inkberry *(Ilex glabra)*	Red Maple *(Acer rubrum)*
Swamp Milkweed *(Asclepias incarnata)*	Sweet Pepperbush *(Clethra ainifolia)*	Pin Oak *(Quercus palustris)*
Switchgrass *(Panicum virgatum)*	Wax Myrtle *(Myrica cerifera)*	Willow Oak *(Quercus phellos)*
Cardinal Flower *(Lobelia cardinalis)*	Virginia Sweetspire *(Itea virginica)*	Sweetgum *(Liquidambar styraciflua)*
Common Three Square *(Scirpus americanus)*	Swamp Azeala *(Azeala viscosum)*	Black Willow *(Salix nigra)*
Sensitive Fern *(Onoclea sensibilis)*	Button Bush *(Cephalanthus occidentalis)*	Grey Birch *(Betula populifolia)*
Blue Flag *(Iris versicolor)*	Black Haw *(Virburnum prunifolium))*	Black Gum *(Nyassa sylvatica)*
Woolgrass *(Scirpus cyperninus)*	Indigo Bush *(Amorpha fruticosa)*	Sycamore *(Platanus occidentalis)*
Indian Grass *(Sorghastrum nutans)*	Arrowwood *(Virburum dentatum)*	Green Ash *(Fraxinus pennsylvanica*
Marsh Marigold *(Caltha palustris)*		Sweetbay Magnolia* *(Magnolia virginiana)*
Joe Pye Weed *(Eupatorium purpureum)*		Atlantic White Cedar* *(Charnaecyparis thyoides)*
Turk's cap lily (*Lilium superbum*)		Bald Cypress* *(Taxodium distichum)*
Bee Balm *(Mornarda didyma)*		Grey Dogwood *(Cornus racernosa)*
Northern Sea Oats *(Chasmanthium latifolium)*		Smooth Alder *(Alnus serrulata))*
		Serviceberry *(Amelanchier canadensis)*
		Redbud (*Cercis candensis*)
		Box Elder *(Acer negundo)*
		Fringe Tree (*Chionanthus virginicus*)
Note: Prior to selection, please consult bioretention plant lists for more detailed information regarding inundation, drought and salt tolerance for each species. * most applicable to the coastal plain		

Table 9.5. Sources of Bioretention Plant Lists

Fairfax County, VA https://166.94.9.135/dpwes/publications/lti/07-03attach3.pdf
Prince Georges County, MD http://www.co.pg.md.us/Government/AgencyIndex/DER/ESD/Bioretention/pdf/Plant_list.pdf
City of Suffolk, VA http://www.suffolk.va.us/citygovt/udo/apdx_c/appendix_c9-2_plant_list.pdf
Virginia http://www.ext.vt.edu/pubs/waterquality/426-043/426-043.html
Bay Directory of Native Plant Nurseries http://www.montgomerycountymd.gov/Content/DEP/Rainscapes/nurseries.htm
Delaware Green Technology Standards and Specifications http://www.dnrec.state.de.us/DNREC2000/Divisions/Soil/Stormwater/New/GT_Stds%20&%20Specs_06-05.pdf

The choice of which planting template to use depends on the scale of bioretention, the context of the site in the urban environment, the filter depth, the desired landscape amenities, and the future owner's capability to maintain the landscape. In general, the vegetative goal is to cover up the filter surface with vegetation in a short amount of time. This means that the herbaceous layer is equally or more important than widely-spaced trees and shrubs. In the past, many bioretention areas in Virginia did not include enough herbaceous plants.

The following additional guidance is provided regarding developing an effective bioretention landscaping plan:

- Plants should be selected based on a specified zone of hydric tolerance and must be capable of surviving both wet and dry conditions.

- "Wet footed" species should be planted near the center, whereas upland species do better planted near the edge.

- Woody vegetation should not be located at points of inflow; trees should not be planted directly above underdrains, but should be located closer to the perimeter.

- If trees are part of the planting plan, a tree density of approximately one tree per 250 square feet (i.e., 15 feet on-center) is recommended.

- Shrubs and herbaceous vegetation should generally be planted in clusters and at higher densities (10 feet on-center and 1 to 1.5 feet on-center, respectively).

- Temporary or supplemental irrigation may be needed for the bioretention plantings in order for plant installers to provide a warranty regarding plant material survival.

- Supplemental irrigation by a rain tank system is also recommended (See Stormwater Design Specification No. 6: Rainwater Harvesting).

- Designers should also remember that planting holes for trees need must be at least 4 feet deep to provide enough soil volume for the root structure of mature trees. This applies even if the remaining soil media layer is shallower than 4 feet.

- If trees are used, plant shade-tolerant ground covers within the drip line.

- Maintenance is an important consideration in selecting plant species. Plant selection differs if the area will be frequently mowed, pruned, and weeded, in contrast to a site which will receive minimum annual maintenance.

- If the bioretention area is to be used for snow storage or is to accept snowmelt runoff, it should be planted with salt-tolerant, herbaceous perennials.

6.9. Bioretention Material Specifications

Table 9.6 outlines the standard material specifications used to construct bioretention areas.

Table 9.6. Bioretention Material Specifications

Material	Specification	Notes
Filter Media Composition	Filter Media to contain: • 85%-88% sand • 8%-12% soil fines • 3%-5% organic matter in the form of leaf compost	The volume of filter media based on 110% of the plan volume, to account for settling or compaction.
Filter Media Testing	P-Index range = 10-30, ***OR*** Between 7 and 21 mg/kg of P in the soil media. CECs greater than 10	The media must be procured from approved filter media vendors.
Mulch Layer	Use aged, shredded hardwood bark mulch	Lay a 2 to 3 inch layer on the surface of the filter bed.
Alternative Surface Cover	Use river stone or pea gravel, coir and jute matting, or turf cover.	Lay a 2 to 3 inch layer of to suppress weed growth.
Top Soil For Turf Cover	Loamy sand or sandy loam texture, with less than 5% clay content, pH corrected to between 6 and 7, and an organic matter content of at least 2%.	3 inch surface depth.
Geotextile/Liner	Use a non-woven geotextile fabric with a flow rate of > 110 gal./min./sq. ft. (e.g., Geotex 351 or equivalent)	Apply only to the sides and above the underdrain. For hotspots and certain karst sites only, use an appropriate liner on bottom.
Choking Layer	Lay a 2 to 4 inch layer of sand over a 2 inch layer of choker stone (typically #8 or #89 washed gravel), which is laid over the underdrain stone.	
Stone Jacket for Underdrain and/or Storage Layer	1 inch stone should be double-washed and clean and free of all fines (e.g., VDOT #57 stone).	12 inches for the underdrain; 12 to 18 inches for the stone storage layer, if needed
Underdrains, Cleanouts, and Observation Wells	Use 6 inch rigid schedule 40 PVC pipe (or equivalent corrugated HDPE for micro-bioretention), with 3/8-inch perforations at 6 inches on center; position each underdrain on a 1% or 2% slope located nor more than 20 feet from the next pipe.	Lay the perforated pipe under the length of the bioretention cell, and install non-perforated pipe as needed to connect with the storm drain system. Install T's and Y's as needed, depending on the underdrain configuration. Extend cleanout pipes to the surface with vented caps at the Ts and Ys.
Plant Materials	Plant one tree per 250 square feet (15 feet on-center, minimum 1 inch caliper). Shrubs a minimum of 30 inches high planted a minimum of 10 feet on-center. Plant ground cover plugs at 12 to 18 inches on-center; Plant container-grown plants at 18 to 24 inches on-center, depending on the initial plant size and how large it will grow.	Establish plant materials as specified in the landscaping plan and the recommended plant list. In general, plant spacing must be sufficient to ensure the plant material achieves 80% cover in the proposed planting areas within a 3-year period. If seed mixes are used, they should be from a qualified supplier, should be appropriate for stormwater basin applications, and should consist of native species (unless the seeding is to establish maintained turf).

SECTION 7: REGIONAL & SPECIAL CASE DESIGN ADAPTATIONS

7.1 Karst Terrain

Karst regions are found in much of the Ridge and Valley province of Virginia, which complicates both land development and stormwater design. While bioretention areas produce less deep ponding than conventional stormwater practices (e.g., ponds and wetlands), Level 2 bioretention designs (i.e., infiltration) are not recommended in any area with a moderate or high risk of sinkhole formation (Hyland, 2005). On the other hand, Level 1 designs that meet separation distance requirements (3 feet) and possess an impermeable bottom liner and an underdrain should work well. In general, micro-bioretention and bioretention basins with contributing drainage areas not exceeding 20,000 square feet are preferred (compared to bioretention with larger drainage areas), in order to prevent possible sinkhole formation. However, it may be advisable to increase standard setbacks to buildings.

7.2 Coastal Plain

The flat terrain, low hydraulic head, and high water table of many coastal plain sites can constrain the application of deeper bioretention areas (particularly Level 2 designs). In such settings, the following design adaptations may be helpful:

- A linear approach to bioretention, using multiple cells leading to the ditch system, helps conserve hydraulic head.
- The minimum depth of the filter bed may be 18 to 24 inches. It is useful to limit surface ponding to 6 to 9 inches and avoid the need for additional depth by establishing a turf cover rather than using mulch. The shallower media depth and the turf cover generally comply with the Dry Swale specification, and therefore will be credited with a slightly lower pollutant removal (See Stormwater Design Specification No. 10: Dry Swales).
- The minimum depth to the seasonally high water table from the invert of the system can be 1 foot, as long as the bioretention area is equipped with a large-diameter underdrain (e.g., 6 inches) that is only partially efficient at dewatering the bed.
- It is important to maintain at least a 0.5% slope in the underdrain to ensure positive drainage.
- The underdrain should be tied into the ditch or conveyance system.
- The mix of plant species selected should reflect coastal plain plant communities and should be more wet-footed and salt-tolerant than those used in typical Piedmont applications.

While these design criteria permit bioretention to be used on a wider range of coastal plain sites, it is important not to avoid using bioretention on marginal sites. Other stormwater practices, such as wet swales, ditch wetland restoration, and smaller linear wetlands, are often preferred alternatives for coastal plain sites.

7.3 Steep Terrain

In steep terrain, land with a slope of up to 15% may drain to a bioretention area, as long as a two cell design is used to dissipate erosive energy prior to filtering. The first cell, between the slope and the filter media, functions as a forebay to dissipate energy and settle any sediment that migrates down the slope. Designers may also want to terrace a series of bioretention cells to manage runoff across or down a slope. The drop in slope between cells should be limited to 1 foot and should be armored with river stone or a suitable equivalent.

7.4 Cold Climate and Winter Performance

Bioretention areas can be used for snow storage as long as an overflow is provided and they are planted with salt-tolerant, non-woody plant species. (NOTE: Designers may want to evaluate Chesapeake Bay wetland plant species that tolerate slightly brackish water.) Tree and shrub locations should not conflict with plowing and piling of snow into storage areas.

While several studies have shown that bioretention facilities operate effectively in Pennsylvania and West Virginia winters, it is a good idea to extend the filter bed and underdrain pipe below the frost line and/or oversize the underdrain by one pipe size to reduce the freezing potential.

7.5 Linear Highway Sites

Bioretention is a preferred practice for constrained highway right of ways when designed as a series of individual on-line or off-line cells. In these situations, the final design closely resembles that of dry swales. Salt tolerant species should be selected if salt compounds will be used to de-ice the contributing roadway in the winter.

SECTION 8: CONSTRUCTION

8.1. Construction Sequence

***Construction Stage E&S Controls*.** Micro-bioretention and small-scale bioretention areas should be fully protected by silt fence or construction fencing, particularly if they will rely on infiltration (i.e., have no underdrains). Ideally, bioretention should remain outside the limit of disturbance during construction to prevent soil compaction by heavy equipment. Bioretention basin locations may be used as small sediment traps or basins during construction. However, these must be accompanied by notes and graphic details on the E&S plan specifying that (1) the maximum excavation depth at the construction stage must be at least 1 foot above the post-construction installation, and (2) the facility must contain an underdrain. The plan must also show the proper procedures for converting the temporary sediment control practice to a permanent bioretention facility, including dewatering, cleanout and stabilization.

8.2 Bioretention Installation

The following is a typical construction sequence to properly install a bioretention basin (also see **Figure 9.16**). The construction sequence for micro-bioretention is more simplified. These steps may be modified to reflect different bioretention applications or expected site conditions:

Step 1. Construction of the bioretention area may only begin after the entire contributing drainage area has been stabilized with vegetation. It may be necessary to block certain curb or other inlets while the bioretention area is being constructed. The proposed site should be checked for existing utilities prior to any excavation.

Step 2. The designer and the installer should have a preconstruction meeting, checking the boundaries of the contributing drainage area and the actual inlet elevations to ensure they conform to original design. Since other contractors may be responsible for constructing portions of the site, it is quite common to find subtle differences in site grading, drainage and paving elevations that can produce hydraulically important differences for the proposed bioretention area. The designer should clearly communicate, in writing, any project changes determined during the preconstruction meeting to the installer and the plan review/inspection authority.

Step 3. Temporary E&S controls are needed during construction of the bioretention area to divert stormwater away from the bioretention area until it is completed. Special protection measures such as erosion control fabrics may be needed to protect vulnerable side slopes from erosion during the construction process.

Step 4. Any pre-treatment cells should be excavated first and then sealed to trap sediments.

Step 5. Excavators or backhoes should work from the sides to excavate the bioretention area to its appropriate design depth and dimensions. Excavating equipment should have scoops with adequate reach so they do not have to sit inside the footprint of the bioretention area. Contractors should use a cell construction approach in larger bioretention basins, whereby the basin is split into 500 to 1,000 sq. ft. temporary cells with a 10-15 foot earth bridge in between, so that cells can be excavated from the side.

Step 6. It may be necessary to rip the bottom soils to a depth of 6 to 12 inches to promote greater infiltration.

Step 7. Place geotextile fabric on the sides of the bioretention area with a 6-inch overlap on the sides. If a stone storage layer will be used, place the appropriate depth of #57 stone on the bottom, install the perforated underdrain pipe, pack #57 stone to 3 inches above the underdrain pipe, and add approximately 3 inches of choker stone/pea gravel as a filter between the underdrain and the soil media layer. If no stone storage layer is used, start with 6 inches of #57 stone on the bottom, and proceed with the layering as described above.

Step 8. Deliver the soil media from an approved vendor, and store it on an adjacent impervious area or plastic sheeting. Apply the media in 12-inch lifts until the desired top elevation of the bioretention area is achieved. Wait a few days to check for settlement, and add additional media, as needed, to achieve the design elevation.

Step 9. Prepare planting holes for any trees and shrubs, install the vegetation, and water accordingly. Install any temporary irrigation.

Step 10**.** Place the surface cover in both cells (mulch, river stone or turf), depending on the design. If coir or jute matting will be used in lieu of mulch, the matting will need to be installed prior to planting (**Step 9**), and holes or slits will have to be cut in the matting to install the plants.

Step 11**.** Install the plant materials as shown in the landscaping plan, and water them during weeks of no rain for the first two months.

Step 12**.** Conduct the final construction inspection (see **Section 9.2**). Then log the GPS coordinates for each bioretention facility and submit them for entry into the local maintenance tracking database.

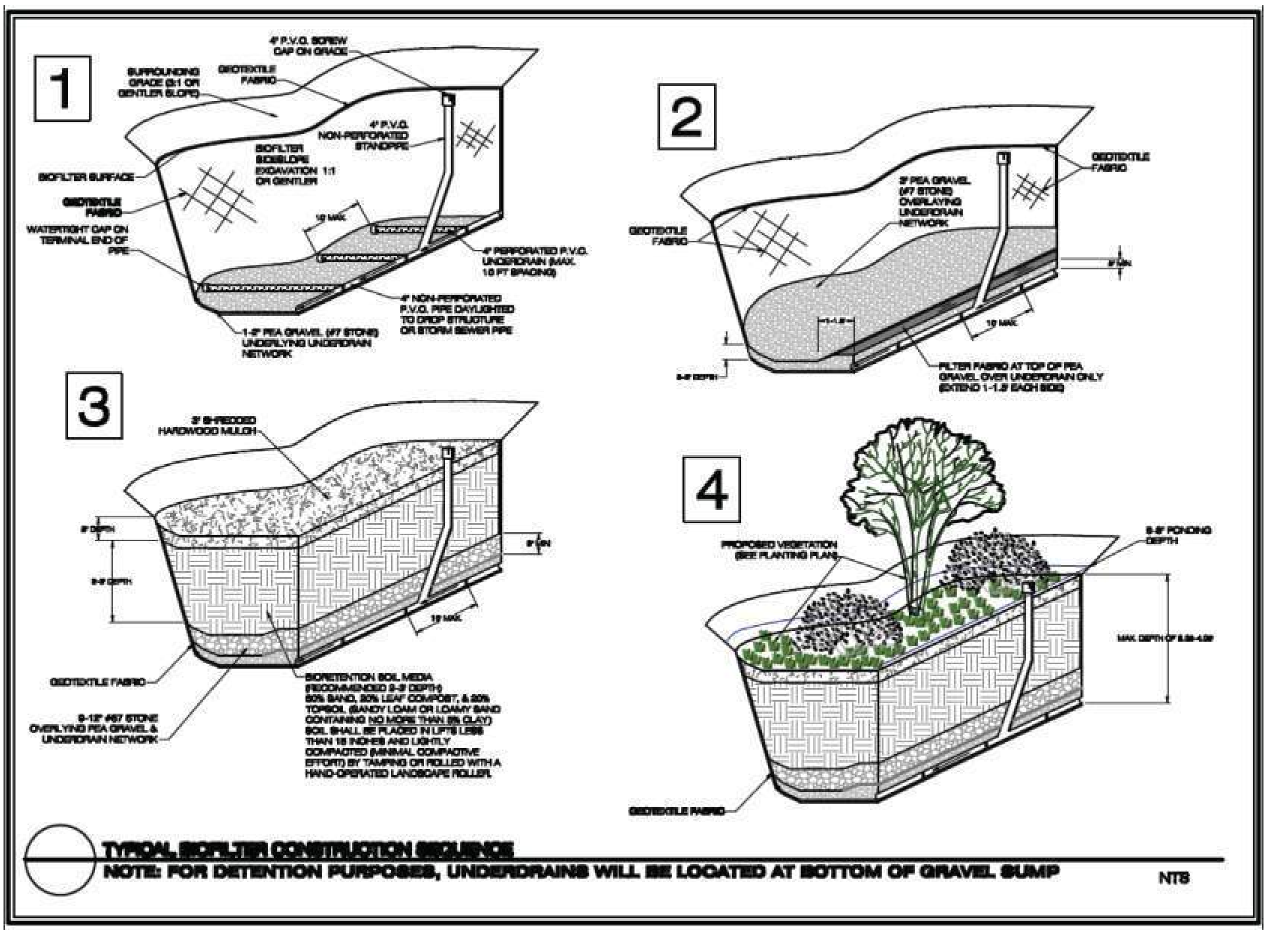


Figure 9.16. Typical Biofilter Construction Sequence

8.3.Construction Inspection

An example construction phase inspection checklist for Bioretention areas can be accessed at the CWP website at:

http://www.cwp.org/Resource_Library/Controlling_Runoff_and_Discharges/sm.htm
(scroll to Tool6: Plan Review, BMP Construction, and Maintenance Checklists)

SECTION 9: MAINTENANCE

9.1. Maintenance Agreements

Section 4 VAC 50-60-124 of the regulations specifies the circumstances under which a maintenance agreement ~~to~~ must be executed between the owner and the local program. This section sets forth inspection requirements, compliance procedures if maintenance is neglected, notification of the local program upon transfer of ownership, and right-of-entry for local program personnel.

For bioretention, maintenance agreements must contain recommended maintenance tasks and a copy of an annual inspection checklist. When micro-scale bioretention practices are applied on private residential lots, homeowners will need to be educated regarding their routine maintenance needs. A deed restriction, drainage easement or other mechanism enforceable by the qualifying local program must be in place to help ensure that rain gardens and bioretention filters are maintained and not converted or disturbed, as well as to pass the knowledge along to any subsequent owners. The mechanism should, if possible, grant authority for local agencies to access the property for inspection or corrective action.

9.2. First Year Maintenance Operations

Successful establishment of bioretention areas requires that the following tasks be undertaken in the first year following installation:

- ***Initial inspections.*** For the first 6 months following construction, the site should be inspected at least twice after storm events that exceed 1/2 inch of rainfall.
- ***Spot Reseeding.*** Inspectors should look for bare or eroding areas in the contributing drainage area or around the bioretention area, and make sure they are immediately stabilized with grass cover.
- ***Fertilization.*** One-time, spot fertilization may be needed for initial plantings.
- ***Watering.*** Watering is needed once a week during the first 2 months, and then as needed during first growing season (April-October), depending on rainfall.
- ***Remove and replace dead plants.*** Since up to 10% of the plant stock may die off in the first year, construction contracts should include a care and replacement warranty to ensure that vegetation is properly established and survives during the first growing season following construction. The typical thresholds below which replacement is required are 85% survival of plant material and 100% survival of trees.

9.3. Maintenance Inspections

It is highly recommended that a spring maintenance inspection and cleanup be conducted at each bioretention area. The following is a list of some of the key maintenance problems to look for:

- Check to see if 75% to 90% cover (mulch plus vegetative cover) has been achieved in the bed, and measure the depth of the remaining mulch.
- Check for sediment buildup at curb cuts, gravel diaphragms or pavement edges that prevents flow from getting into the bed, and check for other signs of bypassing.
- Check for any winter- or salt-killed vegetation, and replace it with hardier species.
- Note presence of accumulated sand, sediment and trash in the pre-treatment cell or filter beds, and remove it.
- Inspect bioretention side slopes and grass filter strips for evidence of any rill or gully erosion, and repair it.
- Check the bioretention bed for evidence of mulch flotation, excessive ponding, dead plants or concentrated flows, and take appropriate remedial action.
- Check inflow points for clogging, and remove any sediment.
- Look for any bare soil or sediment sources in the contributing drainage area, and stabilize them immediately.
- Check for clogged or slow-draining soil media, a crust formed on the top layer, inappropriate soil media, or other causes of insufficient filtering time, and restore proper filtration characteristics.

Example maintenance inspection checklists for Bioretention areas can be accessed in Appendix C of Chapter 9 of the *Virginia Stormwater Management Handbook* (2010) or at the Center for Watershed Protection website at:

http://www.cwp.org/Resource_Library/Controlling_Runoff_and_Discharges/sm.htm
(scroll to Tool6: Plan Review, BMP Construction, and Maintenance Checklists)

9.4. Routine and Non-Routine Maintenance Tasks

Maintenance of bioretention areas should be integrated into routine landscape maintenance tasks. If landscaping contractors will be expected to perform maintenance, their contracts should contain specifics on unique bioretention landscaping needs, such as maintaining elevation differences needed for ponding, proper mulching, sediment and trash removal, and limited use of fertilizers and pesticides. A customized maintenance schedule must be prepared for each bioretention facility, since the maintenance tasks will differ depending on the scale of bioretention, the landscaping template chosen, and the type of surface cover. A generalized summary of common maintenance tasks and their frequency is provided in **Table 9.7**.

The most common non-routine maintenance problem involves standing water. If water remains on the surface for more than 48 hours after a storm, adjustments to the grading may be needed or underdrain repairs may be needed. The surface of the filter bed should also be checked for accumulated sediment or a fine crust that builds up after the first several storm events. There are several methods that can be used to rehabilitate the filter (try the easiest things first, as listed below):

- Open the underdrain observation well or cleanout and pour in water to verify that the underdrains are functioning and not clogged or otherwise in need of repair. The purpose of this check is to see if there is standing water all the way down through the soil. If there is standing water on top, but not in the underdrain, then there is a clogged soil layer. If the underdrain and stand pipe indicates standing water, then the underdrain must be clogged and will need to be snaked.
- Remove accumulated sediment and till 2 to 3 inches of sand into the upper 8 to 12 inches of soil.
- Install sand wicks from 3 inches below the surface to the underdrain layer. This reduces the average concentration of fines in the media bed and promotes quicker drawdown times. Sand wicks can be installed by excavating or augering (using a tree auger or similar tool) down to the gravel storage zone to create vertical columns which are then filled with a clean open-graded coarse sand material (ASTM C-33 concrete sand or similar approved sand mix for bioretention media). A sufficient number of wick drains of sufficient dimension should be installed to meet the design dewatering time for the facility.
- Remove and replace some or all of the soil media.

Table 9.7. Suggested Annual Maintenance Activities for Bioretention

Maintenance Tasks	Frequency
• Mowing of grass filter strips and bioretention turf cover	At least 4 times a year
• Spot weeding, erosion repair, trash removal, and mulch raking	Twice during growing season
• Add reinforcement planting to maintain desired the vegetation density • Remove invasive plants using recommended control methods • Stabilize the contributing drainage area to prevent erosion	As needed
• Spring inspection and cleanup • Supplement mulch to maintain a 3 inch layer • Prune trees and shrubs	Annually
• Remove sediment in pre-treatment cells and inflow points	Once every 2 to 3 years
• Replace the mulch layer	Every 3 years

SECTION 9: REFERENCES

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In addition, the following individuals provided review and input for this version of the specification. Rick Scafidi (EQR), Bill Hunt (NCSU), Scott Thomas (JCC), Dave Hirschman (CWP) Don Rissmeyer (VA ASCE), Randy Greer (DENRC), Doug Biesch (WEG), Stuart Stein (GKY), Tim Schueler (MC), Christie Minami (MD SHA). Special thanks to the staff at WEG for providing the design schematics and details.

APPENDIX 9-A

URBAN BIORETENTION

Stormwater Planters
Expanded Tree Pits
Stormwater Curb Extensions

VERSION 1.7
March 8, 2010

SECTION 9-A-1: DESCRIPTION

Urban bioretention practices are similar in function to regular bioretention practices except they are adapted to fit into "containers" within urban landscapes. Typically, urban bioretention is installed within an urban streetscape or city street right-of-way, urban landscaping beds, tree pits and plazas, or other features within an *Urban Development Area*. Urban bioretention is not intended for large commercial areas, nor should it be used to treat small sub-areas of a large drainage area such as a parking lot. Rather, urban bioretention is intended to be incorporated into small fragmented drainage areas such as shopping or pedestrian plazas within a larger urban development.

Urban bioretention features hard edges, often with vertical concrete sides, as contrasted with the more gentle earthen slopes of regular bioretention. These practices may be open-bottomed, to allow some infiltration of runoff into the sub-grade, but they generally are served by an underdrain.

Stormwater planters (also known as vegetative box filters or foundation planters) take advantage of limited space available for stormwater treatment by placing a soil filter in a container located above ground or at grade in landscaping areas between buildings and roadways (**Figure 9-A.1**). The small footprint of foundation planters is typically contained in a precast or cast-in-place concrete vault. Other materials may include molded polypropylene cells and precast modular block systems.

Figure 9-A.1. Stormwater Planters

Extended tree pits are installed in the sidewalk zone near the street where urban street trees are normally installed. The soil volume for the tree pit is increased and used as a stormwater (**Figure 9-A.2**). Treatment is increased by using a series of connected tree planting areas together in a row. The surface of the enlarged planting area may be mulch, grates, permeable pavers, or conventional pavement. The large and shared rooting space and a reliable water supply increase the growth and survival rates in this otherwise harsh planting environment.

Figure 9-A.2. Expanded Tree Pits

Stormwater curb extensions (also known as parallel bioretention) are installed in the road right-of way either in the sidewalk area or in the road itself. In many cases, curb extensions serve as a traffic calming or street parking control device. The basic design adaptation is to move the raised concrete curb closer to the street or in the street, and then create inlets or curb cuts that divert street runoff into depressed vegetated areas within the expanded right of way (**Figure 9-A.3**).

Figure 9-A.3. Stormwater Curb Extensions

Each urban bioretention variant is planted with a mix of trees, shrubs, and grasses as appropriate for its size and landscaping context.

SECTION 9-A-2: PERFORMANCE

The typical stormwater functions of an urban bioretention area are described in **Table 9-A.1**. The three major design variants of urban bioretention are described below:

Table 9-A.1. Summary of Stormwater Functions Provided by Urban Bioretention Areas

Stormwater Function	Level 1 Design	Level 2 Design
Annual Runoff Volume Reduction (RR)	40% (for Water Quality credit in the RRM spreadsheet only) 0% credit for Channel Protection	NA
Total Phosphorus (TP) EMC Reduction[1] by BMP Treatment Process	25%	NA
Total Phosphorus (TP) Mass Load Removal	55%	
Total Nitrogen (TN) EMC Reduction[1] by BMP Treatment Process	40%	NA
	64%	
Channel Protection	None; or if sized according to Bioretention Basin, follow the Level 1 Bioretention basin criteria.	
Flood Mitigation	None	
[1] Change in the event mean concentration (EMC) through the practice. The actual nutrient mass load removed is the product of the removal rate and the runoff reduction rate (see Table 1 in the *Introduction to the New Virginia Stormwater Design Specifications*).		

Sources: CWP and CSN (2008) and CWP (2007)

SECTION 9-A-3: DESIGN TABLE

Table 9-A.2. Urban Bioretention Design Criteria

Level 1 Design Only (RR: 40; TP: 25)
Sizing (Refer to **Section 9-A-6.1**): Surface Area (sq. ft.) = $T_V/2$ = {[(1.0 inch)(R_V)(A)/12)] – the volume reduced by an upstream BMP}/2
Underdrain = Schedule 40 PVC with clean-outs (Refer to the Main Bioretention Design Specification, **Section 9.8**)
Maximum Drainage Area = 2,500 sq. ft.
Maximum Ponding Depth = 6 to 12 inches [1]
Filter media depth minimum = 30 inches; recommended maximum = 48 inches
Media and Surface Cover (Refer to the Main Bioretention Design Specification, **Section 9.8**)
Sub-soil testing (Refer to the Main Bioretention Design Specification, **Section 9.8**)
Inflow = sheetflow, curb cuts, trench drains, roof drains, concentrated flow, or equivalent
Building setbacks (Refer to **Section ~~A-4~~ 9-A-5**)
Deeded maintenance O&M plan (Refer to the Main Bioretention Design Specification, **Section 9.1**)
[1] Ponding depth above 6 inches will require a specific planting plan to ensure appropriate plants (Refer to the Main Bioretention Design Specification, **Section 6.8**).

SECTION 9-A-4: TYPICAL DETAILS

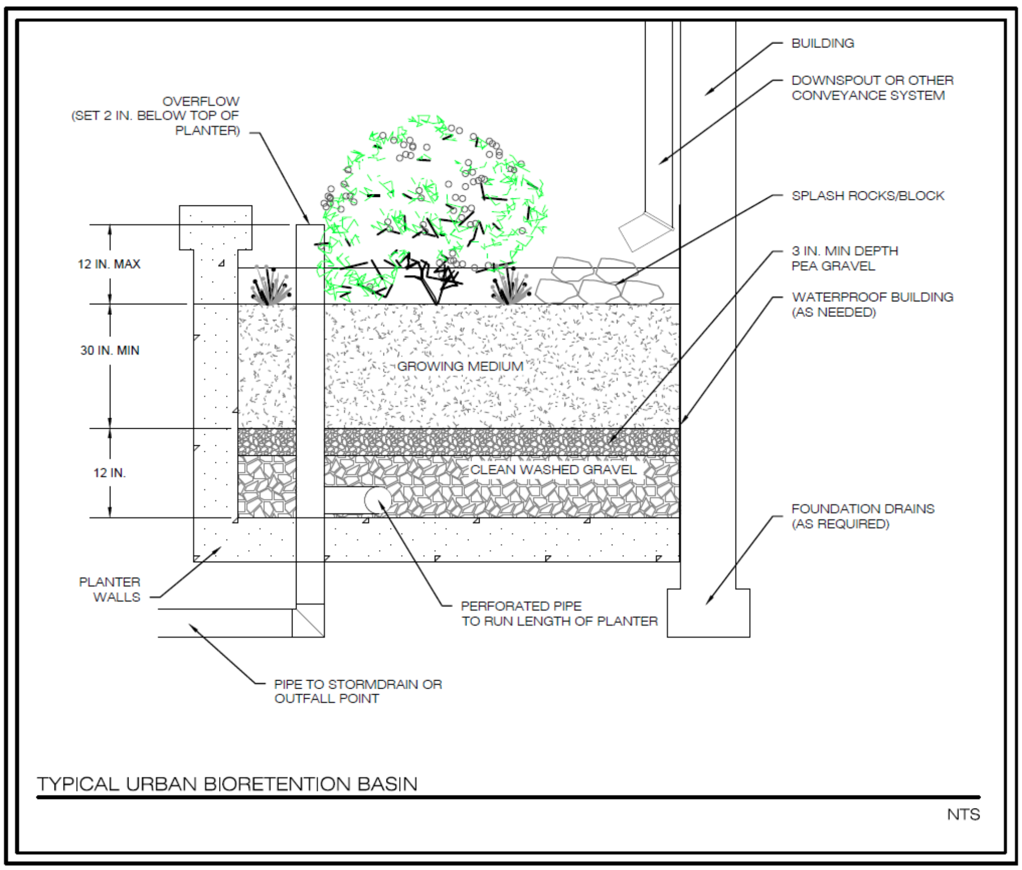

Figure 9-A.4. Stormwater Planter Cross-Section

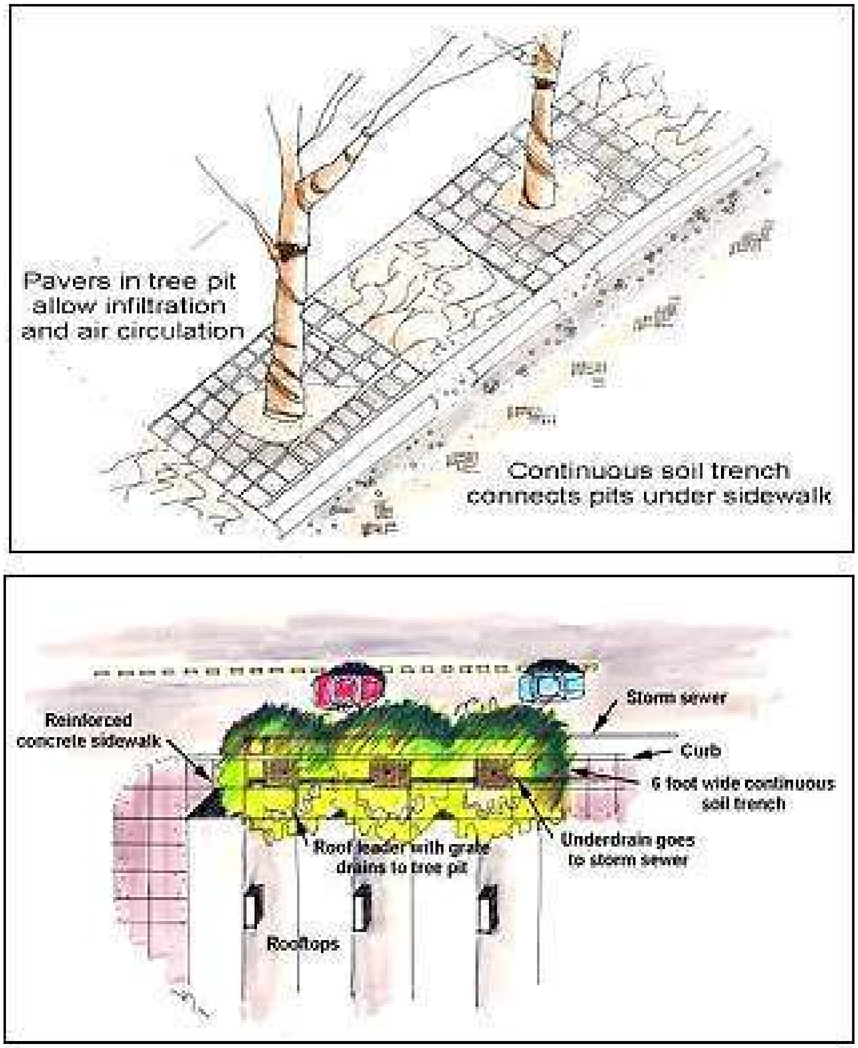

Figure 9-A.5. Expanded Tree Pit Details

Portland, Oregon (Portland BES, 2004) has thorough construction details for stormwater curb extensions, expanded tree pits, and utility house connections, available online at http://www.portlandonline.com/bes/index.cfm?c=44213& .

SECTION 9-A-5: PHYSICAL FEASIBILITY & DESIGN APPLICATIONS

In general, urban bioretention has the same constraints as regular bioretention, along with a few additional constraints as noted below:

Contributing Drainage Area. Urban bioretention is classified as a micro-bioretention practice and is therefore limited to 2,500 sq. ft. of drainage area to each unit. However, this is considered a general rule; larger drainage areas may be allowed with sufficient flow controls and other mechanisms to ensure proper function, safety, and community acceptance. The drainage areas in these urban settings are typically considered to be 100% impervious. While multiple units can be installed to maximize the treatment area in ultra-urban watersheds, urban bioretention is not intended to be used as treatment for large impervious areas (such as parking lots).

Adequate Drainage. Urban bioretention practice elevations must allow the untreated stormwater runoff to be discharged at the surface of the filter bed and ultimately connect to the local storm drain system.

Available Hydraulic Head. In general, 3 to 5 feet of elevation difference is needed between the downstream storm drain invert and the inflow point of the urban bioretention practice. This is generally not a constraint, due to the standard depth of most storm drains systems.

Setbacks from Buildings ~~Roads~~. If an impermeable liner and an underdrain are used, no setback is needed from the building. Otherwise, the standard 10 foot down-gradient setback applies.

Proximity to Underground Utilities. Urban bioretention practices frequently compete for space with a variety of utilities. Since they are often located parallel to the road right-of-way, care should be taken to provide utility-specific horizontal and vertical setbacks. However, conflicts with water and sewer laterals (e.g., house connections) may be unavoidable, and the construction sequence must be altered, as necessary, to avoid impacts to existing service.

Overhead Wires. Designers should also check whether future tree canopy heights achieved in conjunction with urban bioretention practices will interfere with existing overhead telephone, cable communications and power lines.

Minimizing External Impacts. Because urban bioretention practices are installed in ~~a~~ highly urban settings, individual units may be subject to higher public visibility, greater trash loads, pedestrian ~~use~~ traffic, vandalism, and even vehicular loads. Designers should design these practices in ways that prevent, or at least minimize, such impacts. In addition, designers should clearly recognize the need to perform frequent landscaping maintenance to remove trash, check for clogging, and maintain vigorous vegetation. The urban landscape context may feature naturalized landscaping or a more formal deign. When urban bioretention is used in sidewalk areas of high foot traffic, designers should not impede pedestrian movement or create a safety hazard. Designers may also install low fences, grates or other measures to prevent damage from pedestrian short-cutting across the practices.

SECTION 9-A-6: DESIGN CRITERIA

Urban bioretention practices are similar in function to regular bioretention practices except they are adapted to fit into “containers” within urban landscapes. Therefore, special sizing accommodations are made to allow these practices to fit in very constrained areas where other surface practices may not be feasible.

6.1. Sizing of Urban Bioretention

The required surface area of the urban bioretention filter is one-half of the Treatment Volume (**Equation 9-A.1** below). This criterion represents a balance between the need to size these structures so as to provide a reasonable alternative in ultra urban settings and the relationship between the surface area size, media permeability, and drawdown requirements. Ideally, urban bioretention facilities are in close proximity to the public or users of the adjacent buildings and/or commercial areas, and thus subjected to increased scrutiny. This provides a theoretical basis for adjusting the clogging factor for the media permeability coefficient (k, ft/day), or an increase in the allowable maximum drawdown time, resulting in the smaller sizing. However, as a result, Level 1 urban bioretention will only count towards water quality credit through the 40% volume reduction and/or the 25% TP pollutant removal. There is no credit given to channel protection due to the reduced surface area and storage volume.

Equation 9-A.1. Urban Bioretention Sizing

$$SA \text{ (sq. ft.)} = T_v \text{ (cu. ft.)} / 2.0 \text{ ft.}$$

Where:

SA = the surface area of the urban bioretention facility (in square feet)

T_v = the required Treatment Volume (in cubic feet)

6.2 General Design Criteria for Urban Bioretention

Design of urban bioretention should follow the general guidance presented in the main part of this Bioretention design specification. The actual geometric design of urban bioretention is usually dictated by other landscape elements such as buildings, sidewalk widths, utility corridors, retaining walls, etc. Designers can divert fractions of the runoff volume from small impervious surfaces into micro-bioretention units that are integrated with the overall landscape design. Inlets and outlets should be located as far apart as possible. The following is additional design guidance that applies to all variations of urban bioretention:

- The ground surface of the micro-bioretention cell should slope 1% towards the outlet, unless a stormwater planter is used.
- The soil media depth should be a minimum of 30 inches.
- If large trees and shrubs are to be installed, soil media depths should be a minimum of 4 feet.
- Each individual urban bioretention unit should be stenciled or otherwise permanently marked to designate it as a stormwater management facility. The stencil or plaque should indicate (1) its water quality purpose, (2) that it may pond briefly after a storm, and (3) that it is not to be disturbed except for required maintenance.
- All urban bioretention practices should be designed to fully drain within 24 hours.
- Any grates used above urban bioretention areas must be removable to allow maintenance access.
- The inlet(s) to urban bioretention should be stabilized using VDOT #3 stone, splash block, river stone or other acceptable energy dissipation measures. The following forms of inlet stabilization are recommended:

  - Downspouts to stone energy dissipators.
  - Sheet flow over a depressed curb with a 3-inch drop.
  - Curb cuts allowing runoff into the bioretention area.
  - Covered drains that convey flows across sidewalks from the curb or downspouts.
  - Grates or trench drains that capture runoff from the sidewalk or plaza area.
- Pre-treatment options overlap with those of regular bioretention practices. However, the materials used may be chosen based on their aesthetic qualities in addition to their functional properties. For example, river rock may be used in lieu of rip rap. Other pretreatment options may include one of the following:
  - A trash rack between the pre-treatment cell and the main filter bed. This will allow trash to be collected from one location.
  - A trash rack across curb cuts. While this trash rack may clog occasionally, it keeps trash in the gutter, where it can be picked up by street sweeping equipment.
  - A pre-treatment area above ground or a manhole or grate directly over the pre-treatment area.
- Overflows can either be diverted from entering the bioretention cell or dealt with via an overflow inlet. Optional methods include the following:
  - Size curb openings to capture only the Treatment Volume and bypass higher flows through the existing gutter.
  - Use landscaping type inlets or standpipes with trash guards as overflow devices.
  - Use a pre-treatment chamber with a weir design that limits flow to the filter bed area.

6.3 Specific Design Issues for Stormwater Planters

Since stormwater planters are often located near building foundations, waterproofing by using a watertight concrete shell or an impermeable liner is required to prevent seepage.

6.4 Specific Design Issues for Expanded Tree Pits

- The bottom of the soil layer must be a minimum of 4 inches below the root ball of plants to be installed.
- Extended tree pits designs sometimes cover portions of the filter media with pervious pavers or cantilevered sidewalks. In these situations, it is important that the filter media is connected beneath the surface so that stormwater and tree roots can share this space.
- Installing a tree pit grate over filter bed media is one possible solution to prevent pedestrian traffic and trash accumulation.
- Low, wrought iron fences can help restrict pedestrian traffic across the tree pit bed and serve as a protective barrier if there is a dropoff from the pavement to the micro-bioretention cell.
- A removable grate capable of supporting typical H-20 axel loads may be used to allow the tree to grow through it.
- Each tree needs a minimum of 400 cubic feet of shared root space.

6.5 Specific Design Issues for Stormwater Curb Extensions

Roadway stability can be a design issue where stormwater curb extensions are installed. Consult design standards pertaining to roadway drainage. It may be necessary to provide a barrier to keep water from saturating the road’s sub-base and demonstrate it is capable of supporting H-20 axel loads.

6.6 Planting and Landscaping Considerations

The degree of landscape maintenance that can be provided will determine some of the planting choices for urban bioretention areas. The planting cells can be formal gardens or naturalized landscapes.

In areas where less maintenance will be provided and where trash accumulation in shrubbery or herbaceous plants is a concern, consider a “turf and trees” landscaping model. Spaces for herbaceous flowering plants can be included. This may be attractive at a community entrance location.

Native trees or shrubs are preferred for urban bioretention areas, although some ornamental species may be used. As with regular bioretention, the selected perennials, shrubs, and trees must be tolerant of salt, drought, and inundation. Additionally, tree species should be those that are known to survive well in the compacted soils and polluted air and water of an urban landscape.

SECTION 9-A-7: URBAN BIORETENTION MATERIAL SPECIFICATIONS

Please consult the **main part of this design specification** (**Table 9.6**) for the typical materials needed for filter media, stone, mulch and other bioretention features. The unique components for urban bioretention may include the inlet control device, a concrete box or other containing shell, protective grates, and an underdrain that daylights to another stormwater practice or connects to the storm drain system. The underdrain should:

- Consist of slotted pipe greater than or equal to 4 inches in diameter, placed in a layer of washed (less than 1% passing a #200 sieve) VDOT #57 stone.
- Have a minimum of 2 inches of gravel laid above and below the pipe.
- Be laid at a minimum slope of 0.5 %.
- Extend the length of the box filter from one wall to within 6 inches of the opposite wall, and may be either centered in the box or offset to one side.
- Be separated from the soil media by non-woven, geotextile fabric or a 2 to 3 inch layer of either washed VDOT #8 stone or 1/8 to 3/8 inch pea gravel.

SECTION 9-A.8: CONSTRUCTION

The construction sequence and inspection requirements for urban bioretention are generally the same as micro-bioretention practices. Consult the construction sequence and inspection guidance provided in **the main part of this design specification**. In cases where urban bioretention is constructed in the road or right-of-way, the construction sequence may need to be adjusted to account for traffic control, pedestrian access and utility notification.

Urban bioretention areas should only be constructed after the drainage area to the facility is completely stabilized. The specified growth media should be placed and spread by hand with minimal compaction, in order to avoid compaction and maintain the porosity of the media. The media should be placed in 8 to 12 inch lifts with no machinery allowed directly on the media during or after construction. The media should be overfilled above the proposed surface elevation, as needed, to allow for natural settling. Lifts may be lightly watered to encourage settling. After the final lift is placed, the media should be raked (to level it), saturated, and allowed to settle for at least one week prior to installation of plant materials.

SECTION 9-A-9: MAINTENANCE

Routine operation and maintenance are essential to gain public acceptance of highly visible urban bioretention areas. Weeding, pruning, and trash removal should be done as needed to maintain the aesthetics necessary for community acceptance. During drought conditions, it may be necessary to water the plants, as would be necessary for any landscaped area.

To ensure proper performance, inspectors should check that stormwater infiltrates properly into the soil within 24 hours after a storm. If excessive surface ponding is observed, corrective measures include inspection for soil compaction and underdrain clogging. Consult the maintenance guidance outlined in **the main part of this design specification**.

SECTION 9-A-10: DESIGN REFERENCES

Center for Watershed Protection. 2006. *Urban Watershed Forestry Manual. Part 2: Conserving and Planting Trees at Development Sites.* Ellicott City, MD. Available online at: http://www.cwp.org/forestry/index.htm

City of Portland. Bureau of Environmental Services. (Portland BES). 2004. *Portland Stormwater Management Manual*. Portland, OR. http://www.portlandonline.com/bes/index.cfm?c=dfbcc

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Saxton, K.E., W.J. Rawls, J.S. Romberger, and R.I. Papendick. 1986. “Estimating generalized soil-water characteristics from texture.” *Soil Sci. Soc. Am. J.* 50(4):1031-1036.

Schueler, T., D. Hirschman, M. Novotney and J. Zielinski. 2007. *Urban stormwater retrofit practices*. Manual 3 in the Urban Subwatershed Restoration Manual Series. Center for Watershed Protection, Ellicott City, MD.

APPENDIX 9-B

ADDITIONAL DETAILS AND SCHEMATICS FOR REGULAR BIORETENTION PRACTICES

VERSION 1.6
September 31, 2009

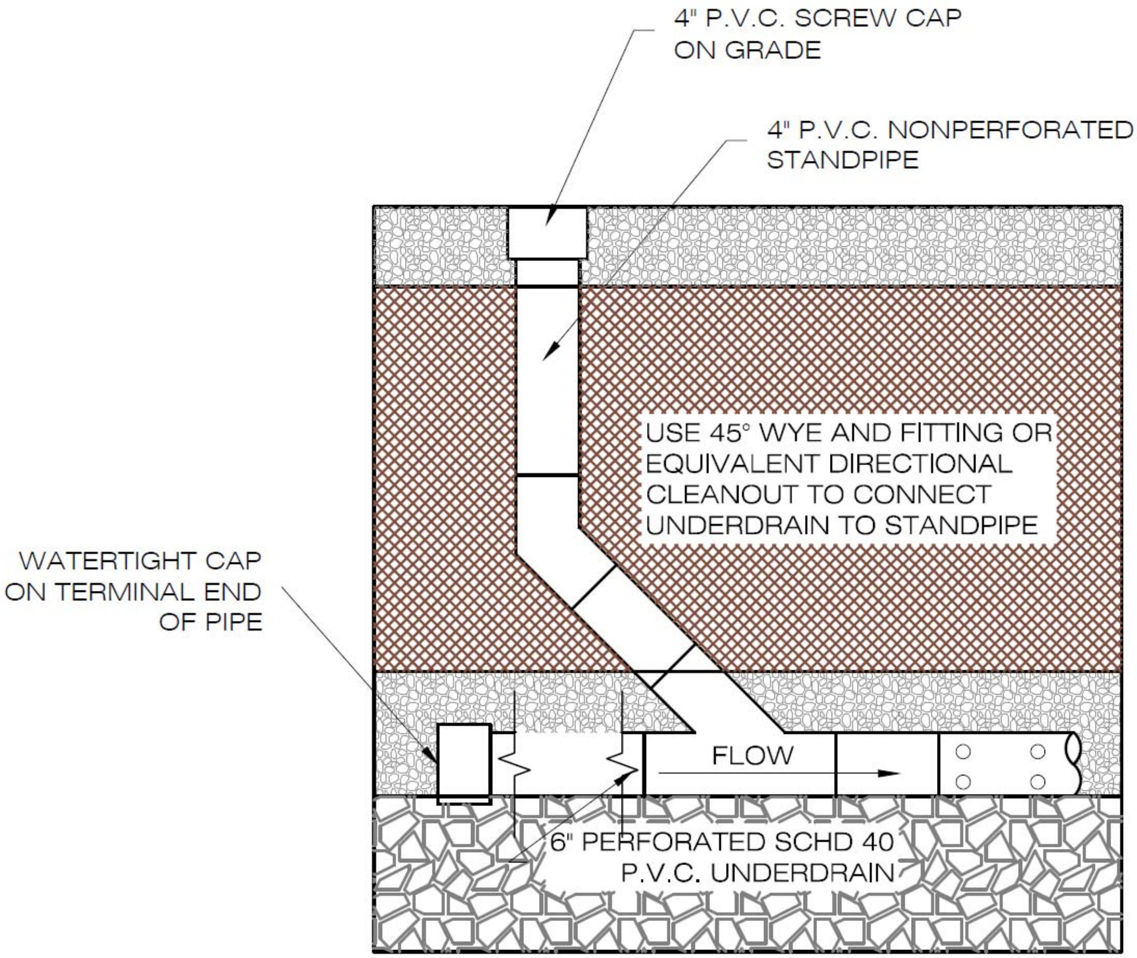


Figure 9-B.1. 4" P.V.C. Cleanout Detail

BIOFILTER PLANTING SPECIFICATIONS:

FROM VIRGINIA STORMWATER MANAGEMENT HANDBOOK

1. ROOT STOCK OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT FROM THE SOURCE TO THE JOB SITE AND UNTIL PLANTED.

2. WALLS OF PLANTING PIT SHALL BE DUG SO THAT THEY ARE VERTICAL.

3. THE DIAMETER OF THE PLANTING PIT MUST BE A MINIMUM OF SIX INCHES (6") LARGER THAN THE DIAMETER OF THE BALL OF THE TREE.

4. THE PLANTING PIT SHALL BE DEEP ENOUGH TO ALLOW 1/8 OF THE OVERALL DIMENSION OF THE ROOT BALL TO BE ABOVE GRADE. LOOSE SOIL AT THE BOTTOM OF THE PIT SHALL BE TAMPED BY HAND.

5. THE APPROPRIATE AMOUNT OF FERTILIZER IS TO BE PLACED AT THE BOTTOM OF THE PIT (SEE BELOW FOR FERTILIZATION RATES).

6. THE PLANT SHALL BE REMOVED FROM THE CONTAINER AND PLACED IN THE PLANTING PIT BY LIFTING AND CARRYING THE PLANT BY ITS' BALL (NEVER LIFT BY BRANCHES OR TRUNK).

7. SET THE PLANT STRAIGHT AND IN THE CENTER OF THE PIT SO THAT APPROXIMATELY 1/8 OF THE DIAMETER OF THE ROOT BALL IS ABOVE THE FINAL GRADE.

8. BACKFILL PLANTING PIT WITH EXISTING SOIL.

9. MAKE SURE PLANT REMAINS STRAIGHT DURING BACKFILLING PROCEDURE.

10. NEVER COVER THE TOP OF THE BALL WITH SOIL. MOUND SOIL AROUND THE EXPOSED BALL.

11. TREES SHALL BE BRACED BY USING 2" BY 2" WHITE OAK STAKES. STAKES SHALL BE PLACED PARALLEL TO WALKWAYS AND BUILDINGS. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL. UTILIZING HOSE AND WIRE THE TREE IS BRACED TO THE STAKES.

12. BECAUSE OF THE HIGH LEVELS OF NUTRIENTS IN STORMWATER RUNOFF TO BE TREATED, BIORETENTION BASIN PLANTS SHOULD NOT REQUIRE CHEMICAL FERTILIZATION.

ADDITIONAL PLANTING NOTES

SEE PLANT SCHEDULE FOR SPECIFIC PLANT SPECIES.

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LAYOUT OF ALL WORK COVERED UNDER THESE PLANS.

2. LANDSCAPE CONTRACTOR SHALL REFER TO THE STANDARDIZED LANDSCAPE SPECIFICATIONS FOR THE STATE OF VIRGINIA FOR ADDITIONAL INFORMATION. THE CONTRACTOR SHALL ABIDE BY ITS CONTENTS; HOWEVER ANY NOTES OR SPECIFICATIONS ON PLANS SHALL SUPERSEDE THOSE OUTLINED IN THE SPECIFICATIONS MANUAL. (COPIES ARE AVAILABLE FOR A FEE FROM THE VIRGINIA CHAPTER OF THE AMERICAN SOCIETY OF LANDSCAPE ARCHITECTS, VIRGINIA NURSERYMEN'S ASSOCIATION, INC. AND THE VIRGINIA SOCIETY OF LANDSCAPE DESIGNERS.)

3. ALL PLANT MATERIAL SHALL MEET THE MINIMUM SPECIFICATIONS AND STANDARDS DESCRIBED IN THE CURRENT ISSUE OF 'THE AMERICAN STANDARD FOR NURSERY STOCK', PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, 1250 I STREET, N.W., SUITE 500, WASHINGTON, D.C. 20005.

4. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD AND NOTIFY THE DESIGNER OF ANY VARIANCE FROM THE PLAN.

5. THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE LOCATION OF ANY ONSITE UTILITIES (CALL MISS UTILITY 1-800-552-7001 BEFORE ANY EXCAVATION.)

6. REFER TO FINAL SITE PLANS (UNDER SEPARATE COVER) FOR ANY DETAILED SITE INFORMATION.

7. ALL WORK SHALL BE COORDINATED WITH OTHER TRADES.

8. PLANTS WILL BE PREPARED FOR SHIPMENT IN A MANNER THAT WILL NOT CAUSE DAMAGE TO THE BARK, BUDS, BRANCHES, STEMS, OR OVERALL SHAPE OF THE STOCK. CONTAINER GROWN PLANTS WILL BE TRANSPORTED IN THE CONTAINERS IN WHICH THEY HAVE BEEN GROWN.

9. ALL PLANT MATERIAL, UNLESS OTHERWISE SPECIFIED, SHALL BE UNIFORMLY BRANCHED AND HAVE A VIGOROUS ROOT SYSTEM. PLANT MATERIAL SHALL BE HEALTHY, VIGOROUS, AND FREE FROM DEFECTS, DECAY, DISEASES, INSECT PEST EGGS, AND ALL FORMS OF INFESTATION. ALL PLANT MATERIAL SHALL BE FRESH, FREE FROM TRANSPLANT SHOCK OR VISIBLE WILT. PLANTS DEEMED UNHEALTHY WILL BE REJECTED.

10. ALL CONTAINER STOCK SHALL HAVE BEEN PROPAGATED IN A CONTAINER LONG ENOUGH FOR THE ROOT SYSTEM TO HAVE DEVELOPED SUFFICIENTLY TO HOLD ITS SOIL. CONTAINER STOCK WITH POORLY DEVELOPED ROOT SYSTEMS WILL NOT BE ACCEPTED.

11. PLANTS NOT INSTALLED ON THE DAY OF ARRIVAL ON SITE SHALL BE STORED AND PROTECTED BY THE CONTRACTOR. OUTSIDE STORAGE AREAS WILL BE SHADED AND PROTECTED FROM THE WIND AND SUN. PLANTS STORED ON SITE SHALL BE PROTECTED FROM ANY DRYING AT ALL TIMES BY COVERING THE BALLS OR ROOTS WITH MOIST SAWDUST, WET BURLAP, WOOD CHIPS, SHREDDED BARK, PEAT MOSS, OR OTHER SIMILAR MULCHING MATERIAL.

12. THE OWNER RESERVES THE RIGHT TO SUBSTITUTE PLANT MATERIAL TYPE, SIZE AND/OR QUANTITY. ANY SUBSTITUTIONS MUST BE APPROVED BY THE DESIGNER (WEG).

13. MINOR FIELD ADJUSTMENTS MAY BE NECESSARY DUE TO SITE CONDITIONS (EX: ROOTBALL AND UTILITY CONFLICT) MAJOR ADJUSTMENTS MUST BE APPROVED BY DESIGNER.

14. NO PLANTING SHALL OCCUR WHEN THE SOIL IS FROZEN.

15. PLANT MATERIAL SHALL BE PLACED IN EXISTING SOIL WITH EACH PLANTING PIT EXCAVATED TO A SIZE SUFFICIENT TO CONTAIN THE ENTIRE ROOT BALL OR ROOT MASS, WITHOUT CRAMPING ROOT STOCK.

16. THE CONTRACTOR SHALL MAINTAIN A ONE (1) CALENDAR YEAR 80% CARE AND REPLACEMENT WARRANTY FOR ALL PLANTINGS. THE PERIOD OF CARE AND REPLACEMENT SHALL BEGIN AFTER INSPECTION AND APPROVAL OF THE COMPLETE INSTALLATION OF ALL PLANTS AND CONTINUE FOR ONE CALENDAR YEAR.

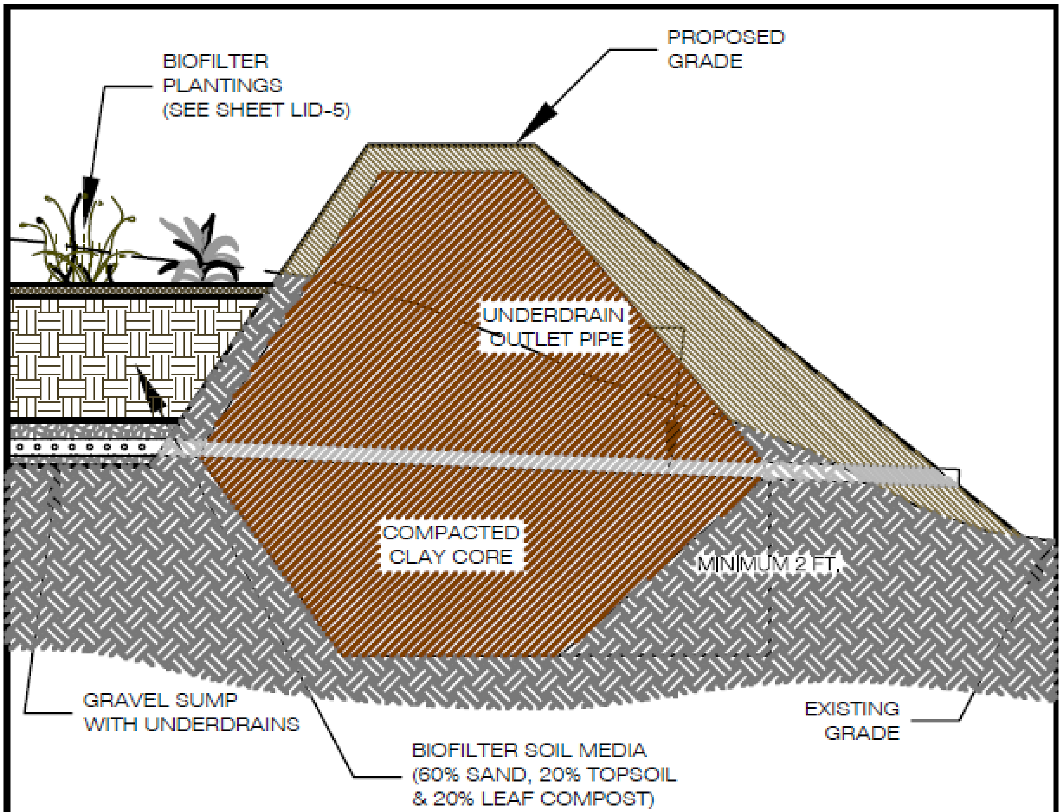
17. THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND DISPOSAL OF TRASH AND DEBRIS WITHIN THE LIMITS OF THE PLANTING ON A DAILY BASIS.

18. THE CONTRACTOR WILL NOT BE RESPONSIBLE FOR PLANT MATERIAL THAT HAS BEEN DAMAGED BY VANDALISM, FIRE, OR OTHER ACTIVITIES BEYOND THE CONTRACTOR'S CONTROL.

19. THE CONTRACTOR SHALL CONTACT THE WATER RESOURCES INSPECTOR 24 HOURS PRIOR TO BACKFILLING THE BIOFILTERS AND REQUEST AN INSPECTION AND APPROVAL OF THE UNDERDRAIN INSTALLATION AND THE SOIL MIX.

20. THE BIOFILTER PLANTING AREAS SHALL BE COVERED WITH HEAVY STRAW MULCH TO A DEPTH OF 4" IMMEDIATELY AFTER PLANTING.

Figure 9-B.2. Typical Biofilter Planting Specifications



NOTES:

1) STABILIZE BERM AND SPILLWAYS WITH EC-3 MATTING.

2) REMAINING DISTURBED SLOPES SHALL BE STABILIZED WITH EC-2 MATTING.

3) ALL BERM FILL MATERIAL SHALL CONSIST OF ML, CL, SC, OR GC SOILS AND FREE OF WOOD, ROOTS, ROCKS, OR ANY OTHER NONCOMPACTIBLE SOIL. COMPACTED FILL SHALL BE INSTALLED IN MAXIMUM 6 INCH LIFTS TO A DRY DENSITY OF 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY ASTM D698.

DETAIL: TYPICAL BIOFILTER BERM

NTS

Figure 9-B.3. Typical Bioretention Basin Berm

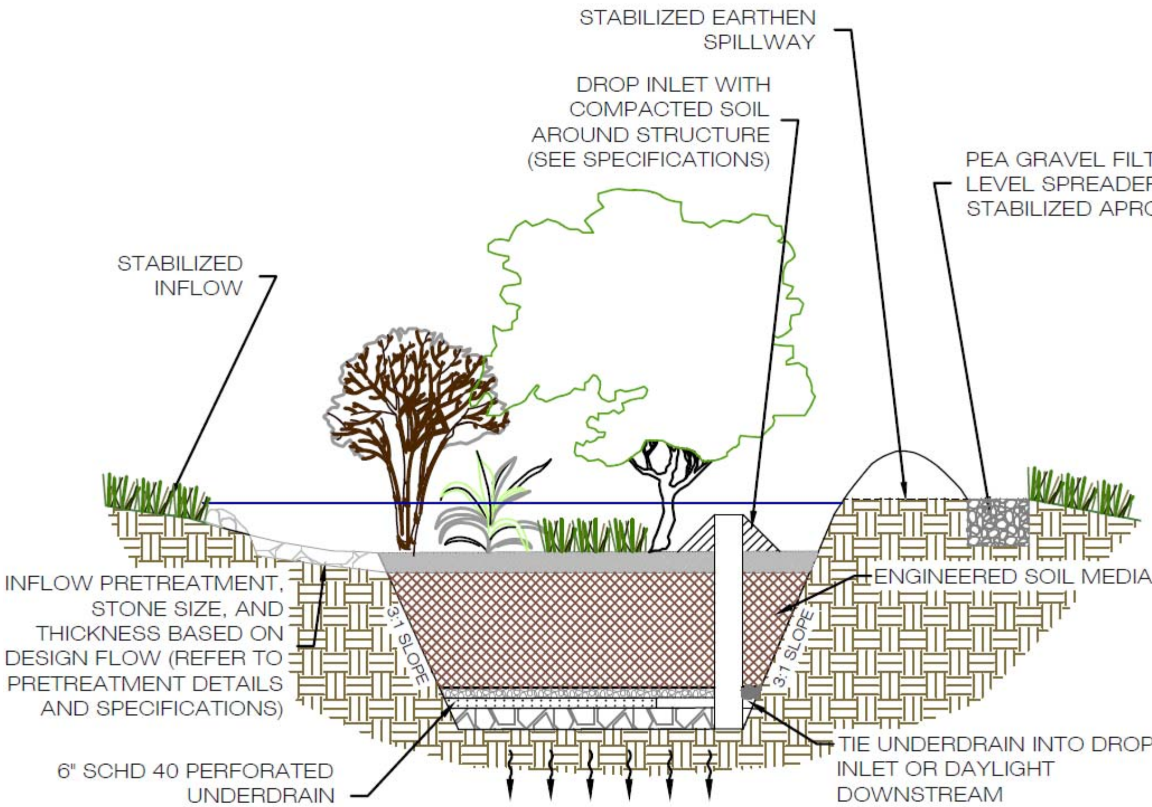


Figure 9-B.4. Typical Bioretention Basin – Inflow & Outflow - Section

INTERNATIONAL STORMWATER BMP DATABASE – BASIC TIPS FOR RETRIEVING DATA FROM THE INTERNATIONAL STORMWATER BMP DATABASE USING MICROSOFT ACCESS

INTERNATIONAL STORMWATER BMP DATABASE
www.bmpdatabase.org

Basic Tips for Retrieving Data from the International Stormwater BMP Database Using Microsoft Access

Introduction

This brief guide is intended to assist researchers in retrieving BMP performance study data from the International Stormwater BMP Database (BMP Database). A basic knowledge of relational databases is needed in order to use the BMP Database, and this brief "tips" guide is not intended as a tutorial for Microsoft Access. Nonetheless, these tips are written to be understandable for those with limited familiarity with database and software programming terminology, as well as those who proficiently use relational databases. The BMP Database User's Guide is a companion document to these tips that provides more detailed information on the BMP Database structure and data elements (i.e., reporting parameters or fields).

Regardless of the user's background, data retrieval should be conducted carefully and using common sense checks on the results returned. The BMP Database provides much useful information on BMP performance that can be used for many purposes; however, the BMP Database should not be viewed as a "black box" that returns absolute answers regarding BMP performance. BMP monitoring is often a messy endeavor; even the most reputable researchers can have monitoring equipment malfunctions or data entry errors that are not readily identified. One of the benefits of a large, centralized database containing studies from many researchers is that conclusions regarding BMP performance become less sensitive to minor errors and outliers associated with individual samples and studies.

Researchers should be aware that the BMP Database contains studies providing information on cutting-edge designs, as well as BMP designs that may not be optimal for water quality purposes. Alternatively, some studies may include well designed BMPs, but perhaps the BMPs have been poorly maintained or installed in manner that did not meet the design specifications. Studies of poorly performing BMPs can be just as valuable to the technical community as BMPs that perform well. (For example, bioretention cell "G1" in the BMP Database exports phosphorus due to the type of media installed in the bioretention cell. This provides valuable information on the importance of media installations closely adhering to design specifications.)

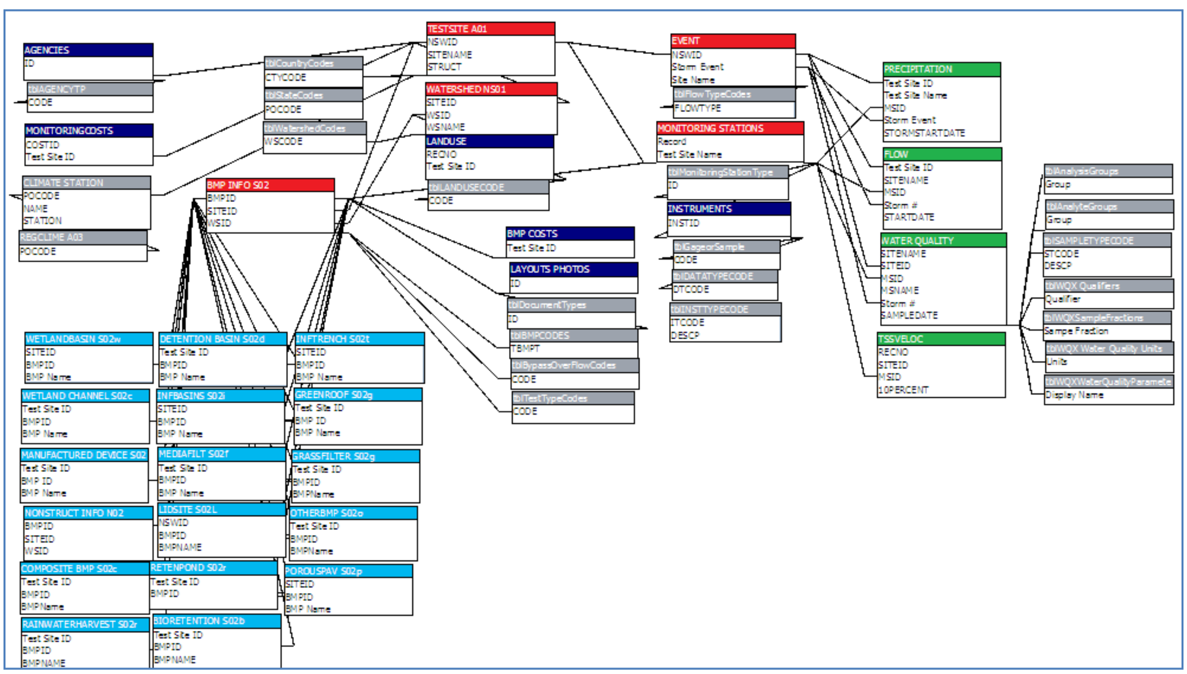
Researchers are encouraged to thoughtfully consider the objectives of their analysis as they develop queries to retrieve data. For example, research objectives could include broad generalizations regarding ranges of BMP performance where limited data screening is needed. Alternatively, more specific research objectives could be focused on the "best" performing BMPs in certain climates, BMPs in certain land uses or with certain watershed characteristics, BMPs with specific design criteria, BMP performance over a limited or broad range of storm characteristics, etc. Screening for targeted research purposes should be conducted in a manner that is objective, as opposed to selecting certain data subsets to support a pre-determined outcome or preference for particular BMP types. The remainder of this guide focuses on practical tips for effective data retrieval from the BMP Database.

Basic Orientation to the BMP Database Structure

The BMP Database is provided in Microsoft Access 2007, which the user must own in order to use the BMP Database. The Help feature in Access can provide instruction on getting started using Microsoft Access. Basic database components (objects) include tables of data, queries used to select data of interest, forms for data entry, and reports. This tips guide focuses primarily on queries, with some background on tables.

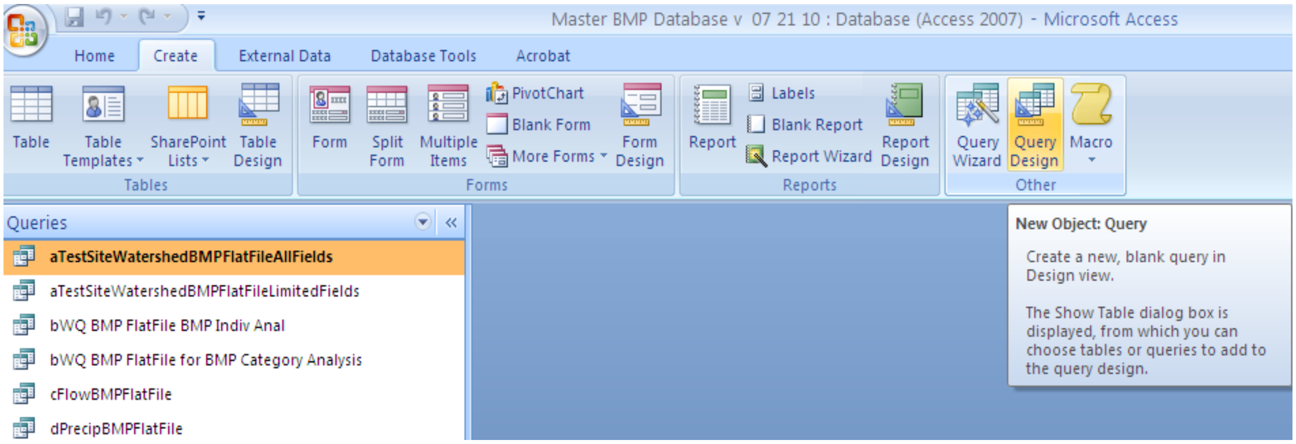
Before writing queries to retrieve data or simply using the data tables, users should view the “Relationships Report” that provides an overview of the BMP Database structure. The “Relationships Report” is provided in the Reports section of the BMP Database. A thumbnail of the relationships report is provided in Figure 1. Primary and supporting tables are differentiated by color-coding to help users become oriented to the critical features of the BMP Database. At a minimum, users should be familiar with the “red” coded tables prior to writing queries. These tables include information on the Test Site, Watershed, Storm Event needed to link storm data together, Monitoring Stations to relate the monitoring data to the BMP, and BMP information (BMP Info). The green-coded tables provide monitoring data, and the turquoise-coded tables provide BMP-specific design information. Grey tables provide supporting information or “look-up” tables for codes (also identified by a “tbl” prefix). Dark blue coding provides supporting data such as costs, land use, monitoring agencies, etc. Understanding which tables are primary versus supplemental and viewing the BMP Database in terms of general categories of tables can make using the Database more manageable.

Figure 1. Thumbnail of Relationships Report Showing Color Coding
(see full-sized 11 x 17 version at the end of this document)



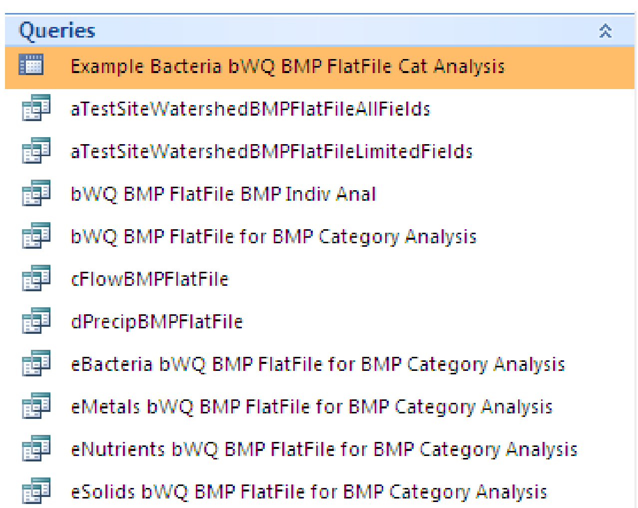
To begin writing queries, go to the "Create" tab in Access and select either the Query Wizard or Query Design options (See Figure 2 below).

Figure 2. Create Query Tab in Microsoft Access 2007



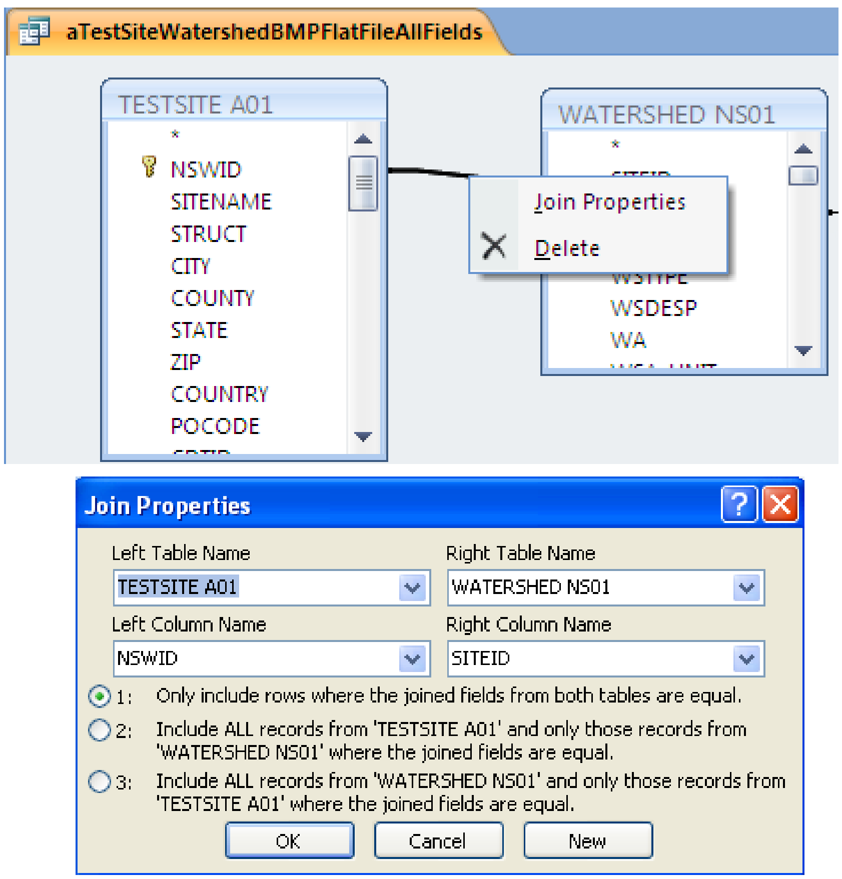
As a tool for BMP Database users, several "starter" queries have been provided in the BMP Database that establish correct linkages between various tables, essentially creating "flat files" of data that can be used as a starting point to generate more targeted queries. As shown in Figure 3, the "a" series queries create flat files of test site, watershed and general BMP information. The "b" series queries create pre-screened data sets for water quality data, with the "BMP Category" analysis representing initial screening used by the BMP Database team for category-level BMP analysis reports. The "Indiv Anal" query contains less restrictive screening for analysis of individual BMPs. (See more on this in the Monitoring Station discussion in this guide.) The "c" and "d" queries create flat files of flow and precipitation data, respectively. The "e" series queries provide queries restricted to several water quality parameter groups such as bacteria, metals, nutrients and solids. These form the basis of the initial data sets that the BMP Database Team uses to conduct analysis. Be aware that additional screening of these data sets may occur following the initial data retrieval in the starter query. Several example queries using the "Crosstab" query function in Microsoft Access are also provided. (*New examples will be added in periodic updates, as needed*.)

Figure 3. "Starter" Queries for Retrieving BMP Database Information



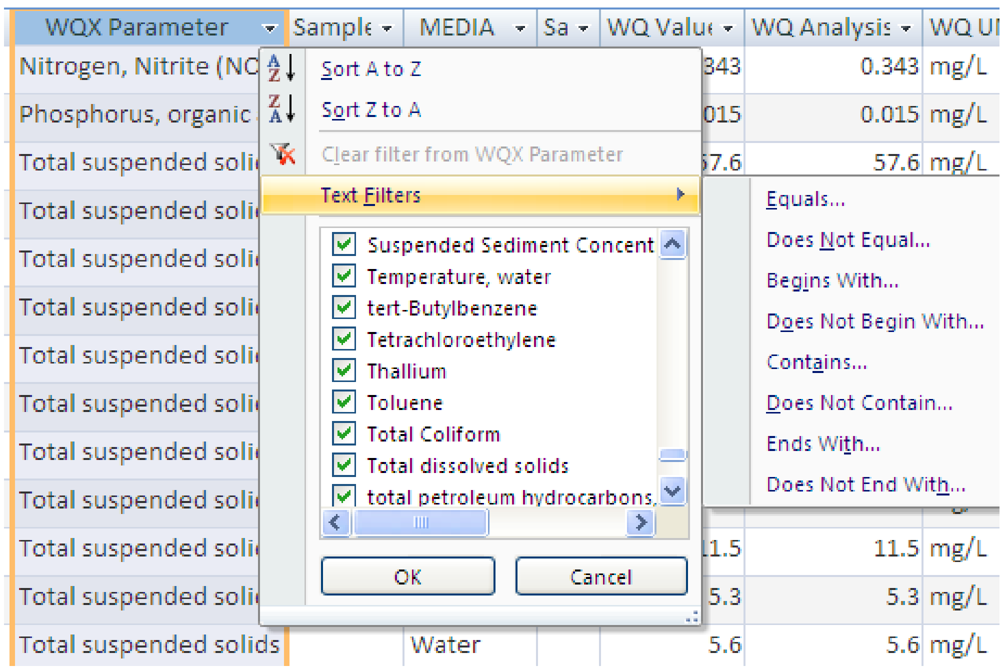
A common problem when writing queries is generation of duplicate records due to incorrect "join" properties between tables (Figure 4). For example, if you have 10 water quality records that you are pairing with precipitation event data, and your query results in 100 water quality records, you have generated duplicates. There may be an error in the "join properties" of your query or you may be using a field that does not have unique values, resulting in duplication of records. To adjust join properties between tables in a query, right-click on the line connecting the tables in the query design view. Watch for this issue when working with tables that have "one to many" relationship or "many to many" relationships. For example, one monitoring event will have many water quality records. Properly linking the "keys" (designated with a key symbol) in each data table is essential for effective queries. See Microsoft Access Help functions for more information on primary and foreign keys, and types of relationships between tables.

Figure 4. Defining Join Properties between Tables



As an alternative to writing queries in Access, users may also be able to use "filter" features, similar to those in Excel, to view, copy or print data sets of interest. Filtering can be done in Table view (Figure 5), which is a user environment similar to an Excel spreadsheet.

Figure 5. Using Table Filters to Select Data of Interest



Explore and Understand Critical Tables in the BMP Database

As previously described in this guide, the "red" coded tables within the Relationships Report are fundamental to correctly using the BMP Database and are the starting place for writing most queries. Highlights of four key components of the BMP Database structure follow.

1. Monitoring Station Table

- The Monitoring Station table includes fields that enable linkages to Test Site, Watershed, BMP Info and monitoring data tables (Precipitation, Flow, Water Quality). "Foreign keys" or ID codes for these tables have been carried in the Monitoring Station table to make data retrieval simpler for users.[1] Thus, the Monitoring Station table can be a good starting point for many types of queries. Generally the field names with "ID" in their name are the keys that should be used to link tables in queries (e.g., Test Site ID, MSID, BMPID, WSID, etc.).

- The Monitoring Station table contains two screening fields that can help users "pre-screen" studies that may not be well suited for analysis at the individual BMP level or the BMP category level. Setting query criteria to exclude data sets with "No" values in the analysis

[1] From a software programming perspective, the BMP Database Team is aware that this is not ideal in the context of software programming standards for normalization; however, since many users of the database do not have programming backgrounds, the decision was made to "carry" these foreign keys to reduce the number of steps users must implement in order to retrieve data.

screening fields provides an initial level of data screening that may be desirable to some researchers. These fields provide a transparent basis of data screening conducted by the BMP Database Project Team. Generally, more restrictive screening is applied to Category-level analysis. The reasons for excluded data are stated in the Comments and Analysis Comments fields in the Monitoring Station Table and may include considerations such as watershed conditions atypical for urban areas (e.g., agricultural land, landfills, garage washwater), very limited numbers of storm events, designs that clearly do not include water quality components (e.g., flood control basins), and so on.

- Shared monitoring stations for BMPs in series will be entered more than one time in the monitoring station table in association with each BMP that relies upon the data collected at that station. As a result, the monitoring station relies on a "composite key" formed by BMP ID and the Monitoring Station ID. For example, when the monitoring station table is joined to the water quality data table using the Monitoring Station ID field present in both tables, the monitoring data stored one time for the shared monitoring location becomes intentionally duplicated so that it is properly associated (e.g., as inflow or outflow) with both BMPs. This is a major structural change from previous versions of the BMP Database.

- The Monitoring Station Type field in the Monitoring Station table can be used as a query criterion to restrict data sets to inflow and/or outflow or other types of data.

- When a Monitoring Station Name is identified as "FCV Inflow", this indicates that the BMP Database Project Team calculated a composite value to represent the inflow for analysis purposes because multiple inflow locations were monitored at the site. At these sites, the individual inflow monitoring locations will have a "no" in the Analysis Screening fields so that only the FCV Inflow value is retrieved when the data set is queried. A few studies also have FCV Outflows.

2. Monitoring Data Tables (Event, Precipitation, Flow and Water Quality)

- The Event table is the key to pairing inflow and outflow data for a particular storm event, as well as linking precipitation to flow and flow to water quality, etc. A simple numeric event number is provided for all of the monitoring data tables. When linking these tables together, care should be taken with regard to "join" properties in order to prevent duplication of records. The Event Table relates to the monitoring data tables based on a "composite key" formed by unique Test Site ID and Event ID.

- When joining various types of monitoring data, consider writing limited queries in small steps and linking these queries together. (The starter queries are useful for this purpose.) Be aware that some studies do not contain records for all three types of monitoring data, so the query should be written either to 1) "include all records" for the monitoring data of primary interest (e.g., water quality) and "only those records that are equal" from the other table(s), or 2) "only records where all records from both fields are equal." (See Figure 4 regarding join properties.)

- In the Water Quality table, EPA's Water Quality Exchange (WQX) nomenclature system uses two separate fields to identify the water quality parameter: WQX Parameter (e.g., lead) and sample fraction (e.g., dissolved). Water quality queries should include both fields to prevent mixing of dissolved and total results in the query output. The supporting table "tblAnalysisGroups" is used by the Database Project Team to map these two fields into a single common name field for purposes of analysis and is incorporated in the "e" series starter queries.

- The Water Quality table contains two analysis result fields: Value and Analysis Value. The Value field is the value provided by the data provider in conjunction with a Qualifier (e.g., U for non-detect). The Analysis Value field is a calculated field calculated by the BMP Database Team for purposes of analysis that replaces "U" qualified data with one-half of the detection limit (a simple substitution method for censored data) for purposes of analysis. Bacteria data analysis values use a simple substitution method that replaces values exceeding the upper and lower quantitation limits with the reported value.

- The supporting table "tblAnalysisGroups" can be joined to the Water Quality table to retrieve categories of constituents such as metals, nutrients, solids, biological (bacteria), organics and general chemistry parameters. Similarly, the supporting table "tblAnalysisGroups" can be used to map similar parameters to a common analysis category. This table is particularly beneficial for certain nutrients that may be appropriate to analyze together (e.g., orthophosphate may be reported using various sample fractions that are assumed to be appropriate to analyze as one overall data set).

- As a general practice, users should verify that data sets retrieved report information in common units of measurement. Common units have been provided in the precipitation, flow and water quality tables.

- Avoid these common errors when writing Water Quality queries:

    - Use the Storm Event field to pair inflow and outflow data as opposed to using Sample Date. In many cases, inflows and outflows for storms may occur on different dates. Alternatively, there may be more than one storm event occurring on a particular date.

    - Specify "Media" type when writing water quality queries to avoid mixing sediment and runoff data. The BMP Database includes several different types of samples, including sediment samples. In the starter queries, "water" is specified as the media type.

    - Be aware that the Water Quality data table contains studies with grab samples, as well as EMCs. Exercise care when writing queries that retrieve both types of data, since grab samples result in multiple records per analyte per event, whereas EMCs result in one record per analyte per event.

    - The Crosstab query function in Microsoft Access has limited options for statistical outputs. When specifying a value to return in these types of queries, the user must specify whether to return first, last, average, etc. Microsoft Access does not calculate medians as a standard feature in cross-tab queries. Averages are typically not appropriate for water quality data because assumptions of normality are necessary for the average to be an appropriate measure of central tendency. See the "ExampleBacteriaCrossTab" as an example of a Crosstab query.

- Flow data: be aware that collection and proper documentation of flow data is challenging. Several comments are provided below to help reduce misuse of flow data retrieved from the BMP Database.

  - Some flow data provided in the BMP Database clearly assume that inflow equals outflow, as evidenced by identical flow volumes. Volume reduction for these BMPs would be assumed to be negligible, and, in general, these BMPs should be excluded from analysis of BMP volume reduction.

  - Some BMP types may not have monitored inflows; this may be the case for LID designs that inherently avoid concentration of flows and rely on distributed BMPs receiving runoff via shallow flow or sheet flow. Precipitation and watershed characteristics are particularly important for characterizing hydrology for these studies. (Download the Volume Reduction technical memorandum from www.bmpdatabase.org for more information.)

  - Be aware that some studies contain flow records where outflow exceeds inflow. A wide range of explanations should be considered such as unmeasured sheet flows, groundwater inflows, monitoring error, etc. These types of unmeasured flows can also result in underestimation of volume reduction in BMPs where volume reduction is occurring.

  - Flow measurement accuracy: There a number of factors that can compromise the accuracy of flow measurements at field monitoring sites such as backwater effects (especially at higher flows), debris or sediment accumulation (debris on weir crest), unsteady/non-uniform flow conditions, seepage, and other factors. These factors may not be consistently described in data submissions and can be difficult to detect by third parties using the flow data. Until recent years, the technical community has not intensively focused on volume reduction as a BMP performance objective; therefore, users should be aware that older data sets may have less precise flow characterization. Measures of uncertainty should always be used with flow data. During 2010, the BMP Database Team will be further analyzing the flow data set and may apply additional qualifiers/recommendations for use of the flow data. For example, in some cases, flow data may be useful for proportioning sample volumes for EMCs, but not appropriate for drawing conclusions related to volume reduction. Also see the *Urban Stormwater BMP Monitoring Manual* [Geosyntec and WWE 2009] downloadable from www.bmpdatabase.org for guidance related to flow monitoring and the BMP Database "Volume Reduction Technical Memorandum" for recommended volume analysis approaches. Typically, a combination of performance metrics is less likely to result in misleading conclusions regarding volume reduction in BMPs. Users of flow data should consider uncertainty when drawing conclusions regarding volume reduction. (*This is mentioned in this paper because simple percent volume reduction queries using the BMP Database are fairly straightforward to develop; however, it is also easy to misuse the flow data set.*)

3. BMP Information

- The table “BMP Info S02” is the “mother” table for the BMP design information. This table contains general BMP design characteristics that can be linked to the various “daughter” design characteristics for each BMP category (the turquoise-coded tables in the Relationships Report).

- Use BMPID when relating BMP records to other data. Be aware that BMP Name is not a unique field and can result in errors combining data sets. For example, there is more than one BMP in the BMP Database called “CDS Unit;” however, the BMP IDs for these two sites are unique.

- See the “Layouts Photos” table for photos and design sketches of BMPs. Click on the object in the field to view the photos and sketches.

- The Manufactured Device BMP category contains a relatively large number of studies (>65); however, the treatment processes in these devices vary substantially. Analysis of manufactured device data should group BMPs with similar unit treatment processes together.

- Be aware that some BMP studies contain limited design information. There are a variety of reasons for this situation. Two common reasons include: older studies may not have had design information readily accessible, and studies may have been entered prior to new Low Impact Development categories being entered into the BMP Database. For example, bioretention and green roof BMPs were historically “held” in the media filter BMP type until reporting parameters for these BMP categories were developed in late 2008. The BMP Database Team is gradually working to back-fill some of these missing fields and encourages those submitting data to be as complete as possible with regard to design parameters. This information is critical to identifying the factors that lead to better BMP performance.

4. Test Site and Watershed Characteristics

Several tables can be used to support queries based on test site and watershed characteristics, including:

- Test Site could be used to retrieve data for certain states (e.g., the mid-Atlantic region), as well as to link to the supporting table (“RegClime A03”) containing climate characteristics for the location. As the BMP Database has evolved over time, the Test Site ID key may be referred to several ways in various tables. NSWID, Test Site ID and SiteID are synonymous.

- Watershed (primary key is WSID) can be used to obtain a variety of information related to tributary land area characteristics such as total area, imperviousness, road and sewer system characteristics, etc.

- Land Use provides the relative percentages of the land uses present. One watershed record typically contains multiple land uses; therefore, land use is provided as a separate table (i.e., a one to many relationship is present between a watershed record and land uses).

Other: BMP Database Transition Notes for Historic Users of the BMP Database

- During 2008-2010, major revisions to the BMP Database were completed. For transparency with historic BMP Database users, some "legacy" fields used in the previous release of the BMP Database have been retained. These are identified by an "x" in front of the data element name. The two primary fields relevant to previous users of the BMP Database include the historic BMP category ("xoldTBMPT") in the BMP Info table) and the Legacy STORET water quality parameter ("xOldShortName (Legacy)"). The historic BMP type is provided because some BMP studies were moved to new BMP categories during 2008-2010, particularly manufactured devices and Low Impact Development BMPs. Legacy STORET nomenclature was a source of confusion for historic data providers. When the BMP Database was transitioned to the EPA's WQX nomenclature, published BMP study reports were cross-checked, where needed, to confirm the appropriate WQX parameter appropriate for the data set.

- "PDF ID" is a new field, originating in the BMP Gen Info table, which will form the basis for all analysis PDFs in the future. A document library containing PDFs of statistical analysis of the BMPs will be linked to these PDF IDs later in 2010. This field essentially replaces the random number generated field historically used for this purpose identified as "BMP ID."

- All BMP design information categories data now "pass through" the BMP Info table. Previous versions of the database had a bifurcated structure that separated non-structural and structural BMPs.

- The procedure defining the relationship between monitoring stations and BMPs had been significantly simplified relative to previous versions of the database.

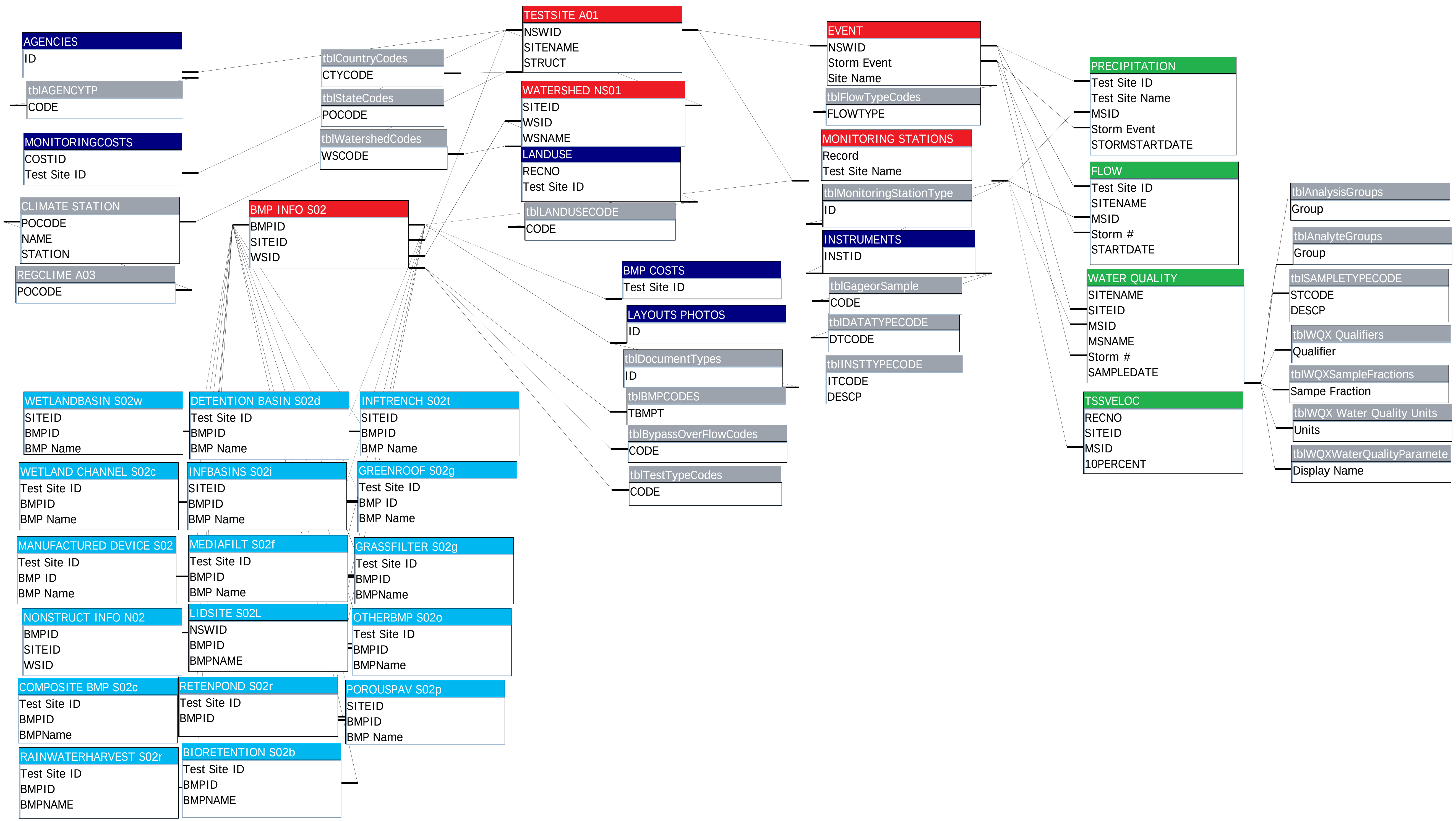
- Linking codes such as "linktoprecip" and "linktoflow" have been abandoned and replaced with the Storm Event number. Establishing linkages between various types of flow data has been simplified.

Contact for More Information

The BMP Database Project Team is available via phone and email to answer user questions. See www.bmpdatabase.org for a complete list of project contacts, or email clary@wrightwater.com with questions.

C:\Documents and Settings\jclary\Desktop\BMP Database Working Files 07 27 09\DRAFT Tips for Retrieving Data October 2010.docx

Relationships for Master BMP Database v 3.2 August 2010



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Evan Nathanial Waagen was born in 1990 in the town of Herndon, Virginia. Evan graduated from Herndon High School in spring 2009 and enrolled in undergraduate studies at Old Dominion University in Norfolk, Virginia. In the spring of 2013, Evan received his Bachelor's Degree in Civil Engineering. Evan is employed with Vanasse Hangen Brustlin as a water resources engineer. Evan's professional responsibilities include the design of stormwater conveyance systems, stormwater best management practices, and stream restoration projects. Evan regularly interacts with clients from the public and private sectors to best meet goals while meeting standards and regulations set forth by governing bodies and organizations. In the fall of 2012, Evan successfully passed the Fundamentals of Engineering Exam, earning the Engineer in Training (EIT) designation and will sit for the Principles and Practices of Engineering (PE) exam in April of 2018. In addition to the EIT designation, Evan holds Leadership in Energy and Environmental Design Accredited Professional (LEED AP BD+C) and Envision Sustainability Professional (ENV SP) certifications. Evan began work on his Master of Science degree in Environmental Engineering from ODU in the spring of 2014. Evan currently resides in Virginia Beach, Virginia.