

A G R E E M E N T

THIS AGREEMENT is entered into this _____ day of _____, 20____, by and between the City of Lincoln, Nebraska, a municipal corporation, hereinafter referred to as "City" and the Board of Regents, University of Nebraska, University of Nebraska-Lincoln, hereinafter collectively referred to as "UNL."

RECITALS

A.

The City proposes to engage UNL in accordance with the terms and conditions set forth herein to monitor pollutant loads from two watersheds within the City of Lincoln ("Stormwater Discharge Pollutant Load Model").

B.

UNL possesses certain skills, experience, education and competency to perform the Stormwater Discharge Pollutant Load Model on behalf of the City, and the City desires to engage UNL to conduct such Stormwater Discharge Pollutant Load Model on the terms herein provided.

C.

UNL hereby represents that UNL is willing and able to perform the Stormwater Discharge Pollutant Load Model in accordance with the Stormwater Discharge Pollutant Load Model proposal submitted with this Agreement.

NOW, THEREFORE, IN CONSIDERATION of the above Recitals and the mutual obligations of the parties hereto, the parties do agree as follows:

I.

EMPLOYMENT OF UNL

The City hereby agrees to employ UNL to perform the Stormwater Discharge Pollutant Load Model and UNL hereby agrees to perform said Stormwater Discharge Pollutant Load Model. Said Stormwater Discharge Pollutant Load Model is more particularly set forth in those portions of UNL's Proposal dated June 18, 2008 described as "Development of Storm Water Discharge Pollutant Load Model for Holmes Lake Watershed" attached hereto as Attachment A and incorporated by this reference.

**II.
SCOPE OF SERVICES**

UNL agrees to undertake, perform and complete in an expeditious, satisfactory and professional manner the Development of Storm Water Discharge Pollutant Load Model for Holmes Lake Watershed services set forth in Attachment A on behalf of the City.

**III.
TERMS OF AGREEMENT**

The term of this Agreement shall commence July 1, 2008 through December 31, 2008, unless extended by agreement of both parties.

**IV.
COMPENSATION**

The City agrees to pay UNL for the services set forth in Attachment "A" a sum not to exceed Thirty-Four Thousand Seven Hundred Sixty-Five and No/100 Dollars (\$34,765.00). An initial start up payment in the amount of \$17,382.50 shall be payable within 30 days from the execution of this Agreement by the City. Payment of the remaining \$17,382.50 shall be payable upon completion of the Development of Storm Water Discharge Pollutant Load Model per this contract. All payments will be made to UNL and sent to the Office of Sponsored Programs, 312 North 14th Street, Lincoln, NE 68588-0430.

Failure of the City to accept UNL's Stormwater Discharge Pollutant Load Model on the basis of differences of professional opinion shall not be the basis for rejection of the work performed by UNL or for nonpayment of UNL.

**V.
SERVICES TO BE CONFIDENTIAL**

The Parties acknowledge that it may be necessary to disclose information to the other Party that is considered proprietary or confidential ("Confidential Information"). If the provider of information considers the information as Confidential Information, it shall be identified as such in writing or marked "Confidential". If orally disclosed to or observed by the recipient, a description of the Confidential Information shall be reduced to writing by the provider, marked "Confidential," and delivered to recipient within thirty (30) days of disclosure.

The recipient of Confidential Information agrees to keep In confidence and not to disclose Confidential Information of the provider to any person outside the recipient's organization or to any unauthorized person within recipients organization and not to use providers Confidential

Information for any purpose other than the performance of recipient's obligations under this Agreement, without the prior written approval of provider. Recipient acknowledges it will treat providers Confidential Information in a manner consistent with recipient's treatment of its own similar Confidential Information. However, the foregoing limitations as to disclosure and use shall not apply to any portion of Confidential Information which:

- (i) was in the possession of recipient before receipt from provider; or
- (ii) is or becomes a matter of public knowledge through no fault of recipient; or
- (iii) Is rightfully received by recipient from a third party without a duty of confidentiality; or
- (iv) is disclosed by provider to a third party without a duty of confidentiality on the third party; or
- (v) is independently developed by recipient and shown by documentation; or
- (vi) is disclosed publicly under operation of law.

Each party retains the right to refuse to accept any Confidential Information which is not considered to be essential to the completion of the Research.

Recipient shall not disclose or otherwise use Confidential Information disclosed under this Agreement for a period of five (5) years from the date of expiration or termination of this Agreement.

Upon request of provider, recipient shall return or destroy all Confidential Information. However, recipient may retain one (1) copy for archival purposes and to confirm compliance with this Agreement.

VI. TERMINATION OF AGREEMENT

Both parties may terminate this Agreement, in whole or part, for any reason for their own convenience upon at least ten days written notice.

If the Agreement is terminated by the City, UNL shall be paid for all services performed, non-cancellable obligations and reimbursable expenses incurred, not to exceed the above-mentioned Agreement amounts, up until the date of termination.

UNL hereby expressly waives any and all claims for damages or compensation arising under this Agreement except as set forth in this paragraph in the event of termination.

In the event of such termination, UNL agrees that all work performed and all confidential information as described in Section V provided by UNL to the City or by the City to UNL shall remain confidential and shall not be provided to any person, firm, association or corporation without the consent of the City.

**VII.
EQUAL EMPLOYMENT AND FAIR LABOR PRACTICES**

In connection with the performance of work under this Agreement, UNL agrees that it shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, disability, national origin, age or marital status. In the employment of persons, UNL shall fully comply with the provisions of Chapter 11.08 of the Lincoln Municipal Code and shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, sex, disability, national origin, age or marital status. UNL shall maintain fair labor standards in the performance of this Agreement as required by Chapter 73, Nebraska Reissue Revised Statutes of 1943 (as amended).

**VIII.
INTEREST OF UNL**

UNL covenants that UNL presently has no interest, including but not limited to, other projects or independent contracts, and shall not acquire any such interest, direct or indirect, which would conflict in any manner or degree with the performance of the Stormwater Discharge Pollutant Load Model required to be performed under this Agreement. UNL further covenants that in the performance of this Agreement, no person having any such interest shall be employed or retained by UNL under this Agreement.

**IX.
INDEMNIFICATION**

Each party shall be responsible for its negligent acts and omissions and the negligent acts or omissions of its employees, officers, or directors to the extent allowed by law.

**X.
AUDIT PROVISION**

UNL shall be subject to audit pursuant to Chapter 4.66 of the Lincoln Municipal Code and shall make available to a contract auditor, as defined therein, copies of all financial and performance related records and materials germane to this Agreement, as allowed by law.

**XI.
INDEPENDENT CONTRACTOR**

The City is interested only in the results produced by this Agreement. UNL has sole and exclusive charge and control of the manner and means of performance. UNL shall perform as an independent contractor and it is expressly understood and agreed that UNL is not an employee of the City and is not entitled to any benefits to which City employees are entitled, including, but not limited to, overtime, retirement benefits, workmen's compensation benefits, sick leave or and injury leave.

**XII.
NEBRASKA LAW**

This Agreement shall be construed and interpreted according to the laws of the State of Nebraska.

**XIII.
INTEGRATION**

This Agreement represents the entire agreement between the parties and all prior negotiations and representations are hereby expressly excluded from this Agreement.

**XIV.
AMENDMENT**

This Agreement may be amended or modified only in writing signed by both the City and UNL.

**XV.
CAPACITY**

The undersigned person representing UNL does hereby agree and represent that he or she is legally capable to sign this Agreement and to lawfully bind UNL to this Agreement.

**XVI.
SEVERABILITY**

If any provision of this Agreement shall be held to be invalid or unenforceable for any reason, the remaining provisions shall continue to be valid and enforceable. If a court finds that any provision of this Agreement is invalid or unenforceable, but that by limiting such provision it

would become valid and enforceable, then such provision shall be deemed to be written, construed, and enforced as so limited.

**XVII.
WAIVER OF CONTRACTUAL RIGHT**

The failure of either party to enforce any provision of this Agreement shall not be construed as a waiver or limitation of that party's right to subsequently enforce and compel strict compliance with every provision of this Agreement.

**XVIII.
REPRESENTATIONS**

Each party hereby certifies, represents and warrants to the other party that the execution of this Agreement is duly authorized and constitutes a legal, valid and binding obligation of said party.

IN WITNESS WHEREOF, UNL and the City do hereby execute this Agreement.

CITY OF LINCOLN, NEBRASKA

Attest:

City Clerk

By: _____
Chris Beutler, Mayor of Lincoln

**BOARD OF REGENTS
UNIVERSITY OF NEBRASKA-Lincoln**

By: *Jeanne Wicks*
Jeanne Wicks
Director, Office of Sponsored Programs

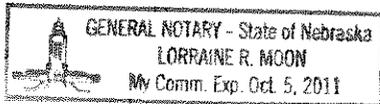
STATE OF NEBRASKA)
) ss.
COUNTY OF LANCASTER)

The foregoing instrument was acknowledged before me this _____ day of _____, 2008, by Chris Beutler, Mayor of the City of Lincoln, Nebraska, on behalf of the City of Lincoln, Nebraska.

Notary Public

STATE OF NEBRASKA)
) ss.
COUNTY OF LANCASTER)

The foregoing instrument was acknowledged before me this 24 day of June, 2008, by Jeanne Wicks, Director, Office of Sponsored Programs.



Lorraine R. Moon
Notary Public

PROJECT TITLE: **Development of Storm Water Discharge Pollutant Load Model for
Holmes Lake Watershed**

SUBMITTED TO: Ben Higgins, Project Director
Engineering Services
Public Works
City of Lincoln
901 N. 6th St.
Lincoln, Nebraska 68508

APPLICANT INSTITUTION: The University of Nebraska-Lincoln
312 N 14th Street
Alexander Building West
Lincoln, NE 68588-0430
Administrative Contact: Suzan Lund
Ph: 402-472-1930 Email: slund2@unl.edu

PROJECT PERIOD: July 1, 2008 through December 31, 2008

AMOUNT REQUESTED \$34,765

PRINCIPAL INVESTIGATORS: Bruce Dvorak, Associate Professor
David Admiraal, Associate Professor,
Civil Engineering Department
W348 Nebraska Hall
University of Nebraska
Lincoln, Nebraska 68588-0531

**A Proposal for:
Development of Storm Water Discharge Pollutant Load Model for Holmes Lake
Watershed**

Overview

A joint study of two Lincoln urban watersheds is proposed. The study collaborators will be the University of Nebraska (UNL)-Civil Engineering, U.S. Geological Survey Nebraska Water Science Center (USGS), and City of Lincoln. The sampling sites for the two watersheds shall be in Taylor Park and Colonial Park. The study is intended to occur over a five year period (2008-2012). The study will focus on evaluating the value of best management practices (BMPs) that have been implemented in the Holmes Lake watershed to reduce sediment and nutrient loadings.

Although this proposal discusses a five year project, the budget is only for the first year of the project given that year-to-year funding will be provided. A tentative 2009 budget is included for informational purposes only. It is anticipated that the budgets for the years after 2008 will be similar, but not identical to the tentative 2009 budget.

Overall Project Objectives

The proposed project has two primary research objectives.

Objective 1: To estimate the pollutant loads from two watersheds within the City of Lincoln during non-winter periods.

Objective 2: To identify any differences in pollutant loads and yields from the two watersheds (Taylor Park and Colonial Park) and attempt to attribute those differences to the presence of BMPs within the Holmes Lake Watersheds.

Approach

The project is a joint endeavor between UNL-Civil Engineering, USGS, and the City of Lincoln. The proposed study will consist of both continuous and discrete monitoring of the storm water flow and water quality from two sampling sites in eastern Lincoln. The two sampling sites will be at locations agreed upon by the three parties (UNL-Civil Engineering, USGS, and the City of Lincoln). The data will be used to develop correlations between the continuous and discrete monitoring data to then make estimates for the pollutant loadings. Only the UNL components of the project are discussed in this proposal.

This study is intended to occur over a five year period (2008-2012), beginning in late summer 2008. Although the tasks listed in this proposal are for a five year study, the contracts will be set up on a year-by-year basis. The specific tasks performed by UNL are described subsequently.

Equipment Installation

UNL Civil Engineering will assist the City of Lincoln in identifying locations to install ISCO autosamplers and ISCO bubble stage monitors (used for continuous flow measurement). UNL Civil Engineering will be responsible for installing discrete flow measurement devices, with assistance from City of Lincoln Public Works crews.

Site Maintenance

UNL Civil Engineering will have a team of at least two students visit the two field sampling sites during the study period at least every two weeks to maintain the auto sampler, bubble stage monitor, and other flow monitoring equipment. When appropriate, the UNL students will obtain dry weather water quality samples and calibration stream flow data as part of the site maintenance visits.

Flow Measurement

UNL Civil Engineering will obtain and utilize data from the ISCO bubble stage monitors for continuous flow monitoring and other flow measurement devices for discrete flow monitoring to obtain and report flow volume data for the two sites and for the entire sampling period: from July 1 through September 30, 2008, May 1 through September 30, 2009, May 1 through September 30, 2010, and May 1 through September 30, 2011. The details of the continuous and discrete flow monitoring are provided below.

Continuous Flow Measurement

ISCO bubble stage monitors will be used to continuously measure stage at both sampling sites. Stage-discharge relations will be used to convert stages measured with the stage monitors to volumetric discharges. Once calibrated, the stage monitors will provide a continuous record of volumetric discharge at the sampling sites for the entire sampling period. UNL Civil Engineering will maintain the stage monitors (installed with the autosamplers).

At each site, a rating curve that correlates stage to discharge must be determined. This will be accomplished by comparing stages measured with the stage monitors to simultaneous discharge measurements gathered with one of two calibration methods. For storm flows, an ISCO area-velocity meter will be used to calibrate the stage monitor. For very low flows, the area-velocity sensor will not work, and a small v-notch weir will be used instead. A variety of manual calibration methods (e.g. using a large weir or direct velocity measurements) serve as potential backups in case the area-velocity sensor is damaged, but the manual methods will be avoided if possible because it is difficult to accurately measure discharge with them for the highly unsteady storm flows that are typical of such small watersheds.

Discrete Flow Measurement

An ISCO 2150 Area Velocity Logger will be moved from site to site as a way to develop stage-discharge relations for the bubble stage monitors. In order to install the Area Velocity Logger at Taylor Park, we will need access to the manhole at the upstream end of the culvert that empties into Taylor Park. The logger will be mounted to the inside of the manhole and the sensor will be mounted to the bed of the elliptical culvert. At Colonial Park, the Area Velocity Logger sensor will be installed on a slab of concrete placed on the bed of the channel. The cable for the sensor will pass through the same cable conduit as autosampler and stage monitor cables, and the logger will be installed inside the equipment station. We expect the city to help with first-time installation of the device, including making a mount for the logger in the manhole at Taylor Park and making a mount for the sensor on the invert of the culvert at Taylor Park. Because the Area Velocity Logger can only be used at one site at a time, and as a backup procedure in case the Area Velocity Logger becomes damaged, calibration of rating curves will also be done using manual depth-velocity sampling techniques and weirs. We prefer to avoid

manual calibration as the sole method of calibrating the stage monitor rating curves because we think it will be less accurate in small watersheds.

The city will build and install equipment stations at Taylor Park and Colonial Park to house the autosamplers, stage monitors, and the 2150 data logger. The two equipment stations will include a steel enclosure mounted on a concrete slab. The city will also install a PVC conduit from the equipment station to the sampling location to protect sensor cables.

Potentially, additional calibration measurements for low stream flows will be performed using conductivity measurements from the continuous monitoring probe using tracer techniques.

Continuous Water-Quality Sampling

With the City of Lincoln's help, the USGS will install continuous monitoring devices (probes) at both sites to provide continuous data on the following water quality parameters: temperature, turbidity, specific conductance and dissolved oxygen. These parameters will be used as surrogates for other water quality parameters analyzed through the discrete water quality sampling discussed below. The continuous water quality monitoring will occur from July 1 through September 30, 2008, May 1 through September 30, 2009, May 1 through September 30, 2010, and May 1 through September 30, 2011. These data will be provided to UNL Civil Engineering.

Discrete Water-Quality Sampling

A series of water quality samples will be collected from both sites. Some of the samples will be collected to satisfy regulatory requirements for storm water sampling and other additional samples will be collected to compile "calibration" data sets to use to develop relationships with the surrogate water quality parameters collected from the continuous water quality sampling.

UNL Civil Engineering will have a team of at least two students visit the two field sampling sites during the study period to collect grab and composite samples for regulatory purposes from at least two measurable storm events of at least 3/8" of precipitation (referred to in Table 1 as "Regulatory Samples").

UNL Civil Engineering will have a team of at least two students visit the two field sampling sites during the study period immediately after four measurable rainfall events annually, except for the first year in which there will be two site visits immediately after measurable rainfall events. All water quality samples will be obtained from the ISCO auto sampler and are referred to in Table 1 as "Discrete Storm Events". The storm events sampled will be representative of the range of storm event duration, intensity, and total rainfall for the year. The sampled storm events will be at least two weeks apart. An average of six samples from different parts of the storm hydrograph will be tested for each storm event.

UNL Civil Engineering will have a team to at least two students visit the two field sampling sites during the study period of July 1 through September 30, 2008, May 1 through September 30, 2009, May 1 through September 30, 2010, and May 1 through September 30, 2011 at least once every two weeks to collect water quality samples from the dry weather flow (referred to in Table 1 as "Dry Weather Flows").

An overall matrix of the frequency and type of parameters to be collected is provided below in Table 1 for the 2008 sampling period and Table 2 for the 2009, 2010 and 2011 sampling seasons.

Table 1. Sampling Frequency and Type of Water Quality Parameters to be Obtained during July through Sept. 2008 Period for each Site.

	Sample Type				
	Regulatory Samples	Regulatory Samples	Discrete Storm Events	Dry Weather / Discrete Storm Events	Dry Weather
Sample Method:	Grab	Auto sampler / Composite	Auto sampler / Individual Aliquots	Auto sampler / Individual Aliquots	Grab
pH	2	2		10	5
Chlorine	2				5
Chloride			12		5
Total Copper			12	10	5
Surfactants					5
Fluoride			12		5
Nitrate	2	2	12	10	5
COD	2	2	12	10	5
Total Phosphorus		2	12	10	5
E. Coli	2		12	10	5
Total Suspended Solids	2	2	12	10	5
Turbidity	2		12		5
Conductivity			12	10	5
Dissolved Oxygen	2				5
Ammonia			12	10	5
TKN		2	12	10	5
Temperature,	2				5
Oil & Grease	2				

Table 2. Proposed Sampling Frequency and Type of Water Quality Parameters to be Obtained during 2009, 2010 and 2011 Sampling Seasons for each Site.

	Sample Type			
	Regulatory Samples	Regulatory Samples	Discrete Storm Events	Dry Weather
Sample Method:	Grab	Auto sampler / Composite	Auto sampler / Individual Aliquots	Grab
pH	4	4		10
Chlorine	4			10
Chloride			24	10
Total Copper			24	10
Surfactants				10
Fluoride				10
Nitrate	4	4	24	10
COD	4	4	24	10
Total Phosphorus		4	24	10
E. Coli	4		24	10
Total Suspended Solids	4	4	24	10
Turbidity	4		24	10
Conductivity			24	10
Dissolved Oxygen	4			10
Ammonia			24	10
TKN		4	24	10
Temperature,	4			10
Oil & Grease	4			

During the first year of the study, at least ten grab samples for E. Coli and total suspended solids will be collected during a storm event simultaneous to samples collected with the auto sampler. These ten samples will be collected from a combination of at least two storm events and from at least two dry weather flow sampling visits. These samples will be tested to determine if the similarity of results is sufficient to primarily use the auto sampler samples for estimating the pollutant concentrations for this research. The total suspended solids samples collected will be tested for both total suspended solids and for suspended sediment concentration (SSC).

Sample Collection

Samples and measurements taken as required shall be representative of the discharge. Samples to be tested for “regulatory purposes” shall be sampled in accordance with the requirements in 40 CFR 122. All samples shall be taken at the monitoring points specified.

- a. Composite sampling shall be conducted in one of the following manners:
 - (1) less than 24 hours - a minimum of hourly discrete aliquots or a continuously drawn sample shall be collected during the discharge, or

- (2) batch discharge - a minimum of three discrete aliquots shall be collected during each discharge.
- b. Composite samples shall be collected in one of the following manners:
 - (1) the volume of each aliquot must be proportional to either the waste stream flow at the time of sampling or the total waste stream flow since collection of the previous aliquot,
 - (2) a number of equal volume aliquots taken at varying time intervals in proportion to flow, and
 - (3) a sample continuously collected in proportion to flow.
- c. Grab samples shall consist of a single aliquot collected over a time period not exceeding 15 minutes. Grab samples collected for “regulatory purposes” shall be collected during the initial flush of the discharge
- d. Individual aliquots will be collected from storm events for non-regulatory purposes to expand the sample size for modeling purposes. These individual aliquots will be collected from a specific point in time using the autosampler.

Sampling Equipment

Composite sampling equipment (ISCO auto samplers) will be supplied and installed at the sites by the City. UNL shall be responsible for maintaining the monitoring equipment and associated appurtenances at the three urban runoff sampling locations. UNL shall also be responsible for maintaining the auto samplers, lines, bottles and batteries. Samples will be collected using dedicated sample bottles. Bacterial samples will be collected in dedicated bottles. Sampling personnel will be equipped with proper rain gear, boots, and rubber gloves. Sample bags will be stored in ice chests until they can be transferred to refrigerators in the UNL lab.

Sample Handling

Sample containers will be placed in coolers loaded with ice and transported immediately to the UNL lab where they will be stored in refrigerators until analyses are conducted. Sample containers will be labeled according to sample location and time of sampling. Standard Chain of Custody forms will be maintained for each sample collected. The Chain of Custody forms will include date, time, location, sample location number, sample identification number, analyses to be conducted, name and signature of sampler.

Discrete Water-Quality Sampling: Analytical Plan

The analyses listed in Tables 1 and 2 will be performed by University of Nebraska-Lincoln on water samples collected from each field site with flowing water. The ammoniate, TKN, and total phosphorus may be performed by the UNL Water Sciences Laboratory. E. Coli and total copper analysis may be performed by the Nebraska Department of Health and Human Services System Public Health lab.

Methods

The following analytical methods will be used for each analysis. The UNL Civil Engineering laboratory facilities will be used unless otherwise specified. Prior to analysis, samples will be

stored at 4°C. Other preservatives used are noted in the description of the analytical method for that parameter.

pH

The solution pH will be measured in the field using pocket pH meters by Hach and tested in the lab within 6 hours of sample collection. The pH meters are capable of measuring to the nearest 0.1 pH units, with a precision of about 0.2 pH units.

Chlorine

Will be tested using Hach Method 8167 (which is the consistent with Std. Method 4500). This will be tested on-site.

Chloride

Will be tested using Hach Method 8113. The maximum holding time will be 7 days.

Total Copper

Will be tested using (Standard) Methods 3030 for the Examination of Water and Wastewater (Standard Methods) with Atomic Absorption. Samples will be immediately acidified. Samples with particulate will be digested. The maximum holding time will be 3 months.

Surfactants

Will be tested using Hach Method 8028. The maximum holding time will be 24 hours.

Fluoride

Will be tested using Hach Method 8029 (US EPA method 340.1). The maximum holding time will be 7 days.

Nitrate plus Nitrite Nitrogen

Nitrate plus Nitrite Nitrogen will be analyzed by the UNL Water Science laboratory using the Cd-reduction method (Standard Method 4500-N). The maximum holding time allowed is 24 hours.

E. coli

E. coli samples will be analyzed by the State of Nebraska Health and Human Services Laboratory. Samples will be collected into sterile bottles, and dropped off for analysis within twenty hours of the sample collection. Enumeration by the State Lab will be done using the coli-lert-QT (quanti-tray method).

Total Suspended Solids

Will be measured following Standard Method 2540. The maximum holding time allowed for solids samples is 7 days.

Suspended Sediment Concentration

Will be measured following methods outlined in sources like Gray et al. (2000) Water Resources Investigations 00-419. The maximum holding time allowed for solids samples is 7 days.

Turbidity

Will be tested using Standard Methods 2130. The maximum holding time will be 8 hours.

Conductivity

Will be tested using Standard Methods 2510 using a probe. The maximum holding time will be 24 hours.

Dissolved Oxygen

Will be tested using Standard Methods 4500-O (Winkler method). The maximum holding time will be 8 hours.

Ammonia

Will be analyzed by the UNL Water Science laboratory using Standard Method 4500-NH₃. The maximum holding time will be 24 hours.

Total Kjeldahl Nitrogen

Total kjeldahl nitrogen (TKN) will be analyzed by the UNL Water Science laboratory using EPA Method 351.3. This method can be used to measure TKN concentrations between 0 - 150 mg/L. The maximum holding time allowed for TKN is 24 hours.

Chemical Oxygen Demand (COD)

COD will be analyzed using the dichromate methods (Standard Method 5220) and has a maximum holding time of 7 days, after nearly immediate sample acidification.

Total Phosphorous

Total Phosphorous will be analyzed according to Standard Method 4500-P. Samples for both total phosphorous may be sent to the UNL Water Science laboratory for analysis. The maximum holding time is 24 hours.

Temperature

The temperature of the grab samples will be measured in the field using an alcohol thermometer with 1°C temperature increments following Method 2550 from Standard Methods. The thermometer will be allowed to equilibrate and will be recorded to the nearest degree on the Chain of Custody sheet.

Oil and Grease

Samples for oil and grease will be analyzed by an external laboratory using EPA Method 1664. The maximum holding time allowed for oil and grease samples is 4 days.

Averages shall be calculated as an arithmetic mean except bacterial counts which shall be calculated as a geometric mean. All monitoring records (calibration and maintenance records, monitoring records and information, and all reports) will be organized and placed in a location agreeable to the City of Lincoln in case they need to be reviewed in the future. The records will be retained for at least three years after the end of the study.

QA/QC

UNL Civil Engineering (CIVE) will test at least 20 percent of the samples in duplicate (over the course of the summer) to estimate the "relative percentage error" for each analysis performed by UNL CIVE.

UNL Civil Engineering will test at least three travel blank samples (over the course of the summer) for each analysis performed by UNL CIVE. Six laboratory blanks will be analyzed for each parameter during the year.

UNL Civil Engineering will determine the Minimum Detection Limit [MDL] (following Standard Methods for Water and Wastewater Analysis) at the start of the summer for each analysis performed by UNL CIVE.

UNL Civil Engineering will test at least 8 standard samples with known concentrations (over the course of the summer) for each analysis performed by UNL CIVE. A new MDL will be determined using this data.

Records and Field Notes

Field notes will be kept by the UNL sampling team. Field notes will describe: time and date of storm, time interval from last storm, air temperature, wind, description of the storm water (e.g., floating debris, oil sheen), and anything that is observed that could affect sample results. A copy of the "NPDES Form PE – Record of Physical Examination Observations Results" or similar type format, is required to be filled out for each outfall tested. Records of all sampling or monitoring information shall include:

- a. the date(s), exact place, time and methods of sampling or measurements,
- b. the name(s) of the individual(s) who performed the sampling or measurements,
- c. the date(s) the analyses were performed,
- d. the individual(s) who performed the analyses,
- e. the analytical techniques or methods used,
- f. the results of such analyses, and
- g. laboratory data, bench sheets and other required information.

In addition, records related to auto sampler, bubbler, and other flow measurement devices will be maintained by UNL.

Reports

A short summary report including the 2008 data will be supplied by the end of December 2008. A further summary report including both the 2008 and 2009 data will be supplied by the end of December 2009 for the second project year. Initial analysis will be performed as part of a Masters of Science in Civil Engineering thesis, likely completed in the spring of 2010. The thesis will include the data, methods, correlations between the discrete and continuous monitoring, estimates of pollutant loadings, and preliminary pollutant yield estimates for the two watersheds.

Additional data and analysis will be performed as part of the thesis work of an additional graduate student, with a target completion of spring of 2013. The overall publishing goal of the project will be to develop two to three manuscripts to be prepared over the life of the project.

Budget Details

All equipment and supplies purchased by this project by UNL remain the property of UNL. This contract will be initiated as soon as possible after 1) appropriate approval by both UNL and the City of Lincoln, and 2) a qualified UNL student is recruited to carry out the work as specified above. The work will be carried out during the period between the approval date and December 31, 2008. The undergraduate student workers will be part-time students and full-time workers during the summer, thus a rate of 8% for benefits has been applied.

The most significant equipment to be purchased as part of this project will be an ISCO 2150 Area Velocity Logger that simultaneously measures depth and depth-averaged velocity and converts the measurements into volumetric flow rate. The ISCO 2150 is much more accurate than a stage measurement device because no rating curve is necessary. The ISCO 2150 will be used at both sampling sites to collect calibration data that will be used to convert ISCO bubble stage data to volumetric discharge data.

Budget

	7/08-12/08 (this project)	1/09-12/09 (potential future project)
Personnel		
Principal Investigators		
B. Dvorak (Summer Salary: 0.2 mo. And 0.4 mo.)	\$2,250	\$4,000
D. Admiraal (Summer Salary: 0.2 mo. and 0.4 mo.)	\$2,250	\$4,000
Subtotal:	\$4,500	\$8,000
Fringe Subtotal x 0.28	\$1,260	\$2,240
Graduate Research Assistant (GRA)	\$7,500	\$18,000
GRA Health Insurance	\$550	\$1,240
Graduate Fringe = GRA salary x .32	\$2,400	\$5,760
Undergraduate hourly worker (120 hr)	\$4,180	\$5,240
Undergraduate worker Fringe = salary x .08	\$334	\$419
Personnel & Benefits Total	\$20,724	\$40,899
Lab Testing Fees	\$4,000	\$5,800
Materials, Supplies, Equipment Maintenance	\$1,300	\$1,500
Operating (phone, copying, postage)	\$50	\$100
Travel	\$200	\$300
Equipment	\$5,330	
TOTAL DIRECT COSTS	\$31,604	\$48,599
Indirect Costs Rate x .10	\$3,160	\$4,860
TOTAL PROJECT COSTS (A-F)	\$34,765	\$53,459