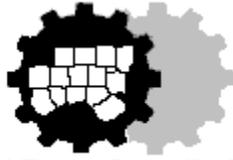


**Appendix A**  
**RWWCP Proposal**





**North Central Texas Council of Governments**

January 30, 2003

Steve Ligon  
Storm Water Permits Team Leader  
TCEQ – MC 148  
PO Box 13087  
Austin, TX 78711-3087

Dear Mr. Ligon:

On behalf of the regional storm water monitoring program, I would like to thank you for your willingness to work with the north central Texas regional storm water participants as we strive to develop a more effective monitoring program. It is our desire to devise a scientific, watershed-based regional monitoring program that yields useful information in a cost-effective manner. We want a monitoring program that goes beyond simple permit compliance and would like to involve all watershed partners in a cooperative monitoring effort that allows everyone to contribute to a solution in proportion to their share of the problem. We will continue to explore that possibility with our watershed partners. You are already aware of the cooperative study that has been initiated with the Trinity River Authority using Clean Rivers funding to statistically compare ambient water quality data with storm water runoff to gain a better understanding of their relationships. The study may also help us coordinate site locations so that future comparisons of state and local ambient water quality sampling with our regional storm water sampling can be more informative. As the Phase II cities get their permits next year and begin implementing their storm water management programs, they may see the benefit in partnering with us as we establish a baseline of water quality for some of our watersheds during high flows.

Please find attached a brief summary of our region's cooperative monitoring activities to date and how certain decisions about sampling seasons and parameters were made. We hope you find it informative and that it addresses any questions you might have had about the regional monitoring program. You will also find a copy of our proposed plan for the next permit term. In order to launch a coordinated monitoring program as outlined in the attached plan it will likely be necessary for participants to begin collecting data before they have obtained their permit from TCEQ. As was provided by EPA during the first round of permitting, we would like to ask for a letter of endorsement from TCEQ that grants participants credit for their sampling efforts that would be applied toward their eventual TPDES permit.

Please accept the attached regional monitoring plan as a formal submittal for use by reference in each of the regional participant's permit application submittals. We look forward to your letter of endorsement for the regional approach that gives coverage to permittees and allows our monitoring efforts to proceed on a timely basis. We also look forward to working with you and your storm water permits team as we craft a beneficial storm water management program.

Sincerely,

David Gattis  
Chairman, RSWMCC  
Assistant City Manager, City of Benbrook

## **Summary of the Dallas-Fort Worth Regional Monitoring Program**

### **Application Phase**

In response to EPA's National Pollutant Discharge Elimination System (NPDES) Phase I storm water rules in 1990, the seven largest cities (Dallas, Fort Worth, Arlington, Irving, Garland, Plano and Mesquite) and two Texas Department of Transportation Districts (TxDOT) in the Dallas-Fort Worth area worked through the North Central Texas Council of Governments (NCTCOG) to develop a regional strategy for storm water management. A component of this strategy was to develop a regional monitoring network in cooperation with the U.S. Geological Survey (USGS) to address the wet weather monitoring requirement of the new NPDES rules. A network of 30 outfall sites was established in small (160 acres or less) drainage basins, each categorized by a single predominant land use (11 residential, 9 industrial, 6 commercial, and 4 highway). Five sites each were located in the cities of Dallas and Fort Worth, four in Arlington, three each in Garland, Irving, Mesquite, and Plano and four sites along major highway thoroughfares. During 1992-1994, seven storm events were sampled from each site resulting in 210 storm event samples being collected from the network. These samples were each analyzed for 188 properties and constituents. The 188 parameters included all those required in 40 CFR 122 for wet weather monitoring as well as diazinon, and major ions recommended by the USGS for ion balance. The monitoring network of 30 sites was developed through negotiations with EPA Region 6. A reduction in the number of sites over what was typically required in storm water permits was offset by the doubling of samples per site (3 required vs. 7 taken) and the collective pooling and summation of data to commonly characterize local urban runoff. The cities and TxDOT used the data in the application process for NPDES storm water permits.

### **Permit Phase**

Following the application phase monitoring effort, the regional program participants enlisted the assistance of a regional consultant team and the USGS to analyze the existing monitoring network and to design an improved program based on technical merit and cost-effectiveness. The network analysis utilized non-parametric statistical analysis techniques to assess the differences between stations based on land use and season on a constituent-by-constituent basis. The network analysis identified 15 statistically redundant monitoring sites in the existing 30-site network. These sites were discontinued. Recognizing the inherent weakness in extrapolating the discharge quality of single land use outfalls to the behavior of an entire municipal separate storm sewer system (MS4) and then using this information to characterize potential impacts to receiving water quality, additional monitoring regimes were proposed. These included the monitoring of discharges of outfalls from larger mixed land use watersheds, the sampling in-stream of major urban waterways, and the monitoring of a developing watershed. Seven new sites were identified in these various categories (3 mixed land use, 3 in-stream and 1 developing site).

An evaluation of historical climatic data was conducted using EPA's SYNOP program to characterize storm characteristics and rainfall in the region. Seasons were subsequently defined for the north central Texas area as a September to October wet season, a November to February dry season, a March to June wet season, and a July to August dry season. This translated into two six-month periods characterized by a major and a minor component. The eventual permits required that sampling occur at least once in each six-month period.

Through the regional consultant team and the USGS, the parameters were extensively analyzed based on land use as well as seasonality. The analysis indicated that almost half of the 188 parameters monitored by the North Central Texas MS4s during the application phase were never detected. Of those detected, only a small portion were found in concentrations or at a frequency that warranted further study. The revised parameter list of 22 properties and constituents of priority concern were proposed to and approved by EPA Region 6 (meeting with Monica Burrell and Brent Larsen, May 26th, 1994). These are listed in Table 1 along with respective collection methods (i.e. grab or composite). Two of the listed parameters, nickel and phenol are specific to TxDOT-Dallas District's permit due to elevated levels of these constituents in their samples during the application phase. Also listed but not reported to EPA were 9 parameters used by USGS for ion balance and QA/QC.

<b>Table 1: REGIONAL PARAMETER SET</b>		
<b>PARAMETER</b>	<b>ACTION</b>	<b>METHOD OF COLLECTION</b>
BOD, 5-Day	◇	Composite
COD	◇	Composite
TSS	◇	Composite
TDS	◇	Composite
Cadmium	◇	Composite
Copper	◇	Composite
Lead	◇	Composite
Zinc	◇	Composite
Dissolved Phosphorus	◇	Composite
Total Phosphorus	◇	Composite
Total Kjeldahl Nitrogen (TKN)	◇	Composite
NO <sub>3</sub> + NO <sub>2</sub>	◇	Composite
Total Nitrogen	◇	Composite (derived from TKN + NO <sub>3</sub> + NO <sub>2</sub> )
Chromium	◇	Composite
Arsenic	◇	Composite
Fecal coliform	◇	Grab
Fecal streptococcus	◇	Grab
pH	◇	Grab
Diazinon (Cities only)	◇	Composite
Oil and Grease	◇	Grab
Water Temp.	◇	Grab
Total Hardness	◇	Composite
Phenol (TxDOT - Dallas only)	◇	Composite
Nickel (TxDOT - Dallas only)	◇	Composite
Calcium	*	Composite
Magnesium	*	Composite
Sodium	*	Composite
Potassium	*	Composite
Alkalinity	*	Composite
Sulfate	*	Composite
Conductance	*	Composite
Chloride	*	Composite
Nitrite Nitrogen	*	Composite

◇ Reported to EPA

\* Collected for Regional Program QA/QC but not reported to EPA

The compilation and analysis of data from the regional network was the capstone of the regional effort. Because the eight participants were sharing data from their respective sites for analysis, the participants realized the importance of coordinated data analysis. On a regional basis, the North Central Texas MS4s produced an annual summary review of the data collected from the permit-term network.

A five-year regional wet weather monitoring program for North Central Texas was approved by EPA Region 6. The original seven municipalities and TxDOT-Dallas District received NPDES storm water permits from EPA and participated in this program (TxDOT-Fort Worth district was a co-permittee with Fort Worth and Arlington). Their NPDES permits are:

<b>Permittee</b>	<b>EPA permit #</b>
City of Arlington	TXS000301
City of Dallas	TXS000701
City of Fort Worth	TXS000901
City of Garland	TXS001001
City of Irving	TXS001301
City of Plano	TXS001801
City of Mesquite	TXS001601
TxDOT Dallas District	TXS000702

The regional monitoring program operated somewhat independently from the rest of the participants' permit requirements. Participants in the monitoring program received approval from EPA Region 6 (see attached letter) to take credit for storm water monitoring conducted prior to their actual storm water permit issuance, as long as it occurred no earlier than 1997. From 1997 to 2001 over 330 samples were collected from the 22-site regional network and analyzed for the 33 constituents listed above.

The compilation and analysis of data from the regional network was the capstone of the regional effort. Because the eight participants were sharing data from their respective sites for analysis, the participants realized the importance of coordinated data analysis. On a regional basis, the North Central Texas MS4s produced an annual summary review of the data collected from the permit-term network. This regional storm water characterization report was submitted along with each permitted participant's annual report of their management programs.

### **Permit Renewal Phase**

Samples collected during the initial five-year program described above were taken primarily from small watersheds of a predominantly single land use type. While they served to characterize typical runoff from these specific land use areas, the samples did little to characterize urban runoff in general and much less to evaluate impacts on receiving streams. As the Phase I entities look toward a permit renewal, they are proposing to switch to in-stream monitoring of storm water runoff in order to more accurately assess this impact. A substantial dataset of single land use storm water discharges has been obtained thus far and little more new information can be expected from them. The primary goal of the in-stream monitoring program presented below will be to determine long-term trends and assess the impact of storm water input on receiving stream quality. Several years of data collection from each site will be

required before meaningful trend analysis can be conducted. Data collected from each site during this initial term will serve as a baseline for future analyses.

The Phase I participants have developed a preliminary protocol for this sampling effort as outlined below. During the first permit year, a detailed regional monitoring protocol describing sampling methodologies to be used by all regional participants will be finalized. The plan proposes a move away from strict fixed station automated sampling as conducted previously. Although automated sampling may still be used in some cases, flexibility is being introduced to be both cost-effective and adaptable to changing conditions and needs. The parameter set is reduced to 17 from the original 22 approved by EPA. The two Fecal bacteria samples have been replaced with one *E. coli* sample. Recent studies have indicated that *E. coli* may be a better indicator of anthropogenic sources of sewage material than Fecal bacteria and the Texas state water quality standard now uses this method. The two subclasses of nitrogen (Total Kjeldahl and Nitrate + Nitrite) have been dropped for practicality. The validity of the additional information they provide has been brought into question. Phenol and nickel were parameters specific to the TxDOT permit so are not warranted for the regional program as a whole. The 9 QA/QC parameters used by USGS are no longer needed since USGS will not likely be doing the monitoring.

In the proposed plan, each entity would select up to three watersheds; they would select a minimum of three sampling sites within each watershed; they would sample one watershed per year on a rotating basis; and they would take four samples from each of the three sites per year. The samples would be taken and analyzed independently by each permittee with the results being compiled and summarized by NCTCOG. Further details are provided in the attached regional monitoring plan. Given the existing staggered permit expiration dates among the participants, it is anticipated that permit issuance by TCEQ will also be staggered. The regional program will need to have written endorsement from TCEQ that participants will receive credit for any monitoring they contribute as part of this regional effort that would be applied toward their eventual permit. A formal request for this is contained in the cover letter of this document.

## **Regional Monitoring Network (Permit Renewal Phase)**

**GOAL:** To establish baseline data on receiving streams in the DFW Metroplex for use in determining long-term water quality trends. Identification of these trends will be used to define MS4 BMP design criteria and, eventually, evaluate BMP effectiveness.

### **NETWORK:**

7 Cities (Dallas, Ft. Worth, Arlington, Irving, Plano, Garland, Mesquite)

10 Cost share participants - Phase I cities, North Texas Tollway Authority and TxDOT-Dallas District, TxDOT- Fort Worth District

8 Watersheds sampled per year

3 sampling stations per watershed

24 sites sampled per year

1 sample per quarter/per site; 4 per year

Monitoring Periods: January 1 - March 31; April 1 - June 30; July 1 - September 30; October 1 - December 31 (an ambient sample in lieu of the summer sample could be collected during any other quarterly monitoring period immediately preceding a sampled storm event)

96 samples per year, total

21 watersheds evaluated over the permit term (some watersheds are multi-jurisdictional)

288 total samples over the permit term

### **SCHEDULE:**

Year 1 - Set up the sampling network (finalize sites, procure equipment, contract with laboratory, etc.)

Year 2 - Sample 3 storm events plus 1 ambient

Year 3 - Sample 3 storm events plus 1 ambient (rotate to watersheds different than Year 2)

Year 4 - Sample 3 storm events plus 1 ambient (rotate to watersheds different than Years 2 & 3)

Year 5 - Consolidate data, prepare final report

Repeat the cycle in the next permit term

Samples will be collected during years two through four of the five-year permit period. During the first permit year, final selections will be made for sampling locations and details of the sampling protocol will be finalized. The fifth year will be reserved for data consolidation and analysis, preparation of the final report, and development of any necessary amendments to the sampling protocol. During each sampling year, each participant will collect samples from one of their selected watersheds. For participants with three selected watersheds a different watershed will be sampled during each of the three sampling years (see map). Samples will be collected quarterly (four per year) from each site during a rain event. The monitoring periods will correspond to calendar year quarters (January 1 – March 31; April 1 – June 30; July 1 – September 30; October 1 – December 31). Because the summer quarter (July – September) is often very dry, with very few storm events available for sampling, a sample collected during ambient conditions during any quarter may be substituted for the summer quarter sample. This ambient sample should be collected under normal flow conditions with at least 72 hours of dry

weather preceding the collection. Also, if a valid event does not occur during a quarter, an attempt will be made to collect the sample in the following quarter. If the sample still cannot be collected the sample will be waived.

#### SAMPLING:

Grab Samples (4 grabs per sampling event, including first flush) taken manually or with automated samplers

- Samples will be collected and analyzed for *E. coli*, oil and grease, pH, BOD<sub>5</sub>, COD, TSS, TDS, As, Cd, Cr, Cu, Pb, Zn, dissolved and total phosphorus, total nitrogen, and Diazinon - parameters could be modified after studying available data.
- 2 liter first flush; analyze for *e. coli*, total coliform, O&G, pH
- Develop a first flush definition specific to this program (could be as simple as a 1/2" rise in water level from the base flow and/or a noticeable color change)
- 2 liters collected each 30 minutes thereafter, 8 liters total (final quantity to be based upon laboratory recommendations), 2 hour storm event maximum;

Each participating entity will be responsible for final selection of sampling sites. They may use in-house staff or a consultant of their choice for sample collection. Participants may also choose the laboratory of their choice for analysis as long as procedures and data quality objectives specified in the regional protocol (to be finalized during the first permit year) are met.

Grab samples will be collected as close to the first flush as possible for analysis of *E. coli*, oil and grease, and pH. An additional first flush sample and three subsequent samples collected at equal time intervals will be collected over the first two hours of the event and combined for a composite sample. Only the first two hours of runoff will be collected regardless of storm duration. The grab samples can be obtained either manually or from some type of automated collection.

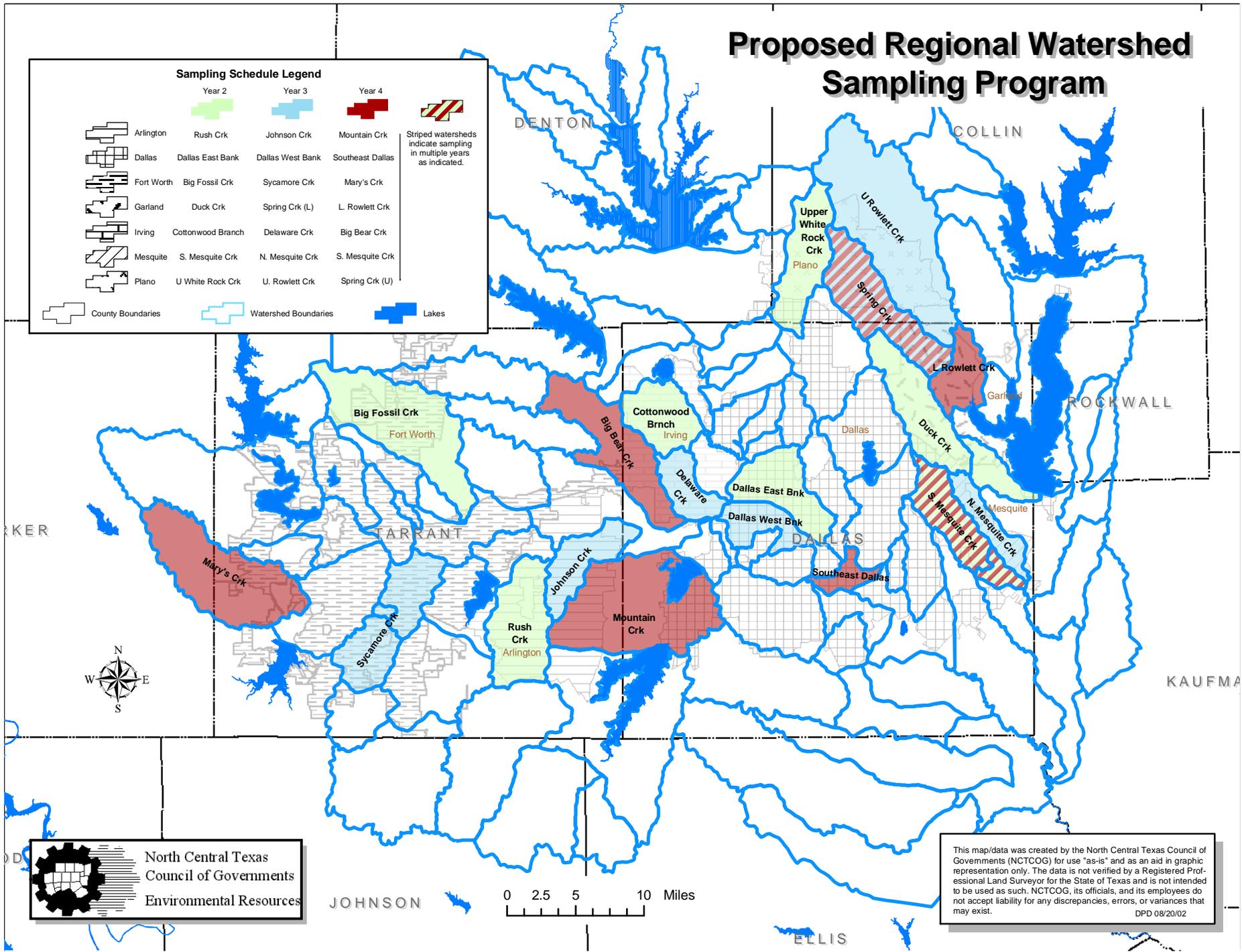
Sampling will be initiated based on a rise in water level. The specific level to be used will be determined during the first permit year. The appropriate amount of rise may vary between watersheds dependent on such factors as watershed size and amount of impervious area. It is anticipated that the rise used will be between two and six inches. Stream gauges, or other methods of determining water level, will be installed at each sampling location. Rain gauges may be deployed at the sampling locations, however rain does not need to fall at the site in order to have a rise in the level of the stream that would trigger sampling. Rainfall in the basin upstream of the site would cause a rise downstream without any rain actually falling at the sampling location.

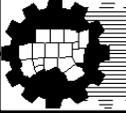
The North Central Texas Council of Governments (NCTCOG) role in the regional monitoring program will be to coordinate the overall program, the lab contracts, and the data collection; to assist participants in site selection and the development of sampling protocol; and to generate/deliver reports for use in Annual Reports.

# Proposed Regional Watershed Sampling Program

**Sampling Schedule Legend**

	Year 2	Year 3	Year 4	
				 Striped watersheds indicate sampling in multiple years as indicated.




 North Central Texas  
 Council of Governments  
 Environmental Resources

This map/data was created by the North Central Texas Council of Governments (NCTCOG) for use "as-is" and as an aid in graphic representation only. The data is not verified by a Registered Professional Land Surveyor for the State of Texas and is not intended to be used as such. NCTCOG, its officials, and its employees do not accept liability for any discrepancies, errors, or variances that may exist.

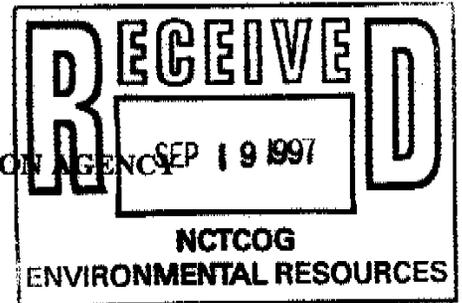
DPD 08/20/02



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6  
1445 ROSS AVENUE  
DALLAS, TEXAS 75202-2733

SEP 17 1997



CERTIFIED MAIL: RETURN RECEIPT REQUESTED (Z 698 454 895)

Mr. Samuel W. Brush  
Manager of Environmental Systems  
North Central Texas Council of Governments  
Department of Environmental Resources  
P.O. Box 5888  
Arlington, TX 76005-5888

Re: Dallas-Fort Worth Regional Urban Storm Water Monitoring Program

Dear Mr. Brush:

We appreciate you and the Dallas-Fort Worth Regional Urban Storm Water Management Representatives in developing a partnership to address urban runoff quality. As stated in our letter sent to you in August, 1996, EPA does not see any reason why the municipalities in the Regional Monitoring Program can not move forward.

The municipalities who participate in the Regional Monitoring Program will be able to take credit for any sampling performed prior to receiving a final National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System Permit. These cities will be allowed to report any sampling performed from the time of being issued a proposed permit until the cut-off time for the first annual report in their final permit. Hopefully, this will give the permittees a chance to cooperate and accommodate the schedules set forth in the Regional Monitoring Program. EPA recognizes the difficulties the Task Force has been facing and we appreciate you for all the hard work and energy required to manage this Regional effort.

If we can be of any other assistance, please feel free to contact Monica Burrell of my staff, at (214) 665-7530.

Sincerely yours,

*Jack V. Ferguson*  
Jack V. Ferguson, P.E.  
Chief  
NPDES Branch

cc: Mr. Michael Walter, city of Irving  
Mr. James Caffey, city of Arlington  
Mr. Dale Hoelting, city of Plano  
Mr. Matthew Holzappel, city of Mesquite  
Mr. Gene Rattan, city of Fort Worth  
Mr. Larry McDaniel, city of Dallas  
Mr. Philip Welsch, city of Garland  
Mr. Jay McCurley, Texas Dept. Of. Transportation