

NORTH CAROLINA  
ORANGE COUNTY

MUNICIPAL MAINTENANCE AGREEMENT

NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
AND THE  
TOWN OF CHAPEL HILL

COMPUTER, COMMUNICATIONS EQUIPMENT  
AND SYSTEM OPERATION FOR  
COMPUTERIZED TRAFFIC SIGNAL SYSTEM

2.7950068

**THIS AGREEMENT**, made and entered into this the \_\_\_\_\_ day \_\_\_\_\_, 2003, between the DEPARTMENT OF TRANSPORTATION, an agency of the State of North Carolina, hereinafter referred to as the Department, and the TOWN OF CHAPEL HILL, a municipal corporation, hereinafter referred to as the Municipality,

**WITNESSETH:**

**WHEREAS**, the Department and the Municipality, have jointly undertaken the implementation of a centralized computer based traffic signal system to control traffic signals within the Municipalities of Chapel Hill and Carrboro (including signals in Durham County which are part of the Chapel Hill Signal System) and,

**WHEREAS**, the construction of said computerized signal system is now complete, and,

**WHEREAS**, in the Municipal Agreement covering the construction of said computerized signal system, the Department and the Municipality agreed upon at the completion of the project, to enter into a separate Municipal Agreement for the maintenance of that portion of the system which is on the State Highway System, and,

**WHEREAS**, the provisions of the North Carolina General Statutes 136-66.1 and 136-18, authorize the Municipality to contract with the Department for the installation, repair and maintenance of highway signs and markings, electric traffic signals and other traffic control devices on State Highway System streets within the Municipalities of Chapel Hill and Carrboro, and,

**WHEREAS**, the Department finds it desirable and advantageous to enter into a Cost Reimbursement Agreement with the Municipality under which the Municipality maintains and operates that portion of the computerized traffic signal system which is on the State's Highway System within the Municipalities of Chapel Hill and Carrboro,

**WHEREAS**, the Municipality finds that it is in the best public interest to maintain and operate the computerized traffic signal system as hereinafter indicated on the streets of the State Highway System within the Municipalities of Chapel Hill and Carrboro,

**NOW, THEREFORE**, the Department and the Municipality do hereby agree as follows:

1. The Municipality shall maintain and operate the computerized traffic signal system as defined by Appendix I and as indicated hereinafter.
  - A. The Department and the Municipality recognize that each party to this Agreement has an obligation and responsibility to provide for the safe, orderly, and efficient flow of traffic on their respective street systems.
  - B. The Department and Municipality recognize the benefit to be derived from the periodic evaluation and development of timing plans. The Municipality shall be responsible for the evaluation and preparation of timing plans at all intersections in the traffic signal system. All traffic data needed for the evaluation and development of timing plans will be obtained by the Municipality whenever possible. The Municipality will notify the Department of any additional data that is required to evaluate and prepare the necessary timing plans. The Department shall, upon request, make available to the Municipality all current traffic count data for the existing signals. The timing plans affecting intersections on the State Highway System, utilized in system operation, will be subject to the approval of the Department and will reflect the needs of traffic on both the State Highway System and the Municipality's System. In

the event the Department and the Municipality cannot agree on the selection of a given timing plan, the decision of the Department will be final.

2. The reimbursement rates in this Agreement represent the Department's pro-rata share of 92% of the total operation and maintenance cost, with the Department's pro-rata share being based on the ratio of the number of State System intersections to the total number of intersections in the computerized traffic signal system.

3. The Department shall reimburse the Municipality based on an annual amount of \$48,492.00 for the operation and maintenance of the computerized traffic signal system. This total figure includes the Department's pro-rata share of cost for the salary and payroll additives of a System Operations Engineer and all other related maintenance costs. The System Operations Engineer, as a minimum, shall exhibit the qualifications and perform the duties as defined by Appendix II. The Municipality shall be responsible for the cost of providing all needed replacement parts only to the extent that the cost of any one replacement part shall not exceed the annual rate of reimbursement for maintenance of that piece of equipment. In the event the cost of a replacement part exceeds the annual rate of reimbursement for the maintenance of that piece of equipment, the Department shall either provide the replacement part to the Municipality or reimburse the Department's pro-rata share to the Municipality for the purchase of the replacement part. Under this Agreement, the Department will reimburse the Municipality for its pro-rata share for the replacement costs of items shown in Schedule "D" which are damaged beyond repair.

4. The Department shall reimburse the Municipality for maintaining the Central Computer and Associated Hardware, CCTV Camera System, Communications Infrastructure, and all other central and field equipment at the annual rate set out in Schedule "D", which is attached and made part of this Agreement.

5. The Municipality will not receive an annual reimbursement for preventive maintenance of the fiber optic communications cable. The Department will reimburse the Municipality its pro-rata share of the actual costs for the emergency restoration of fiber optic communications. This cost shall include: fiber optic cable, interconnect centers, splice trays, transceivers, labor, etc..

6. This Agreement shall be for a period of one (1) year. At the end of the year, the provisions and quality of results may be reviewed by the Department and Municipality. Any extensions will be contingent upon the increase of NCDOT maintenance funds by the General Assembly and may be made in one (1) year increments, incorporating any mutually agreed upon adjustments, up to a total duration of five (5) years. The Agreement may be terminated by either party upon 30 days written notice.

A. Upon termination of this Agreement and prior to execution of a new Agreement, the Municipality may request an adjustment of the annual rates based on actual cost records for the prior years. This request must indicate the new rate for each Schedule "D" item. Each rate must be verifiable by time sheets, salary rates, materials, equipment, and other qualifying costs in conformance with the standards of allowability of costs set forth in the Office of Management and Budget (OMB) Circular A-87. This shall be actual cost incurred with the exception of equipment owned by the Municipality. Reimbursement for the rates of equipment owned by the Municipality cannot exceed the Department's rates in effect for the time period in which the work is performed.

B. The cost records may be audited by the Department to determine any adjustments or revisions in the new rates.

7. The Department shall review and concur in any contract entered into by the Municipality for the purpose of maintenance of any items. The Department will reimburse the Municipality for its pro-rata share, as specified above, for any maintenance contract in which it concurs. The Department shall have access to the maintenance contractor's records and documentation for audit which pertain to any rates billed to the Municipality for the maintenance of those items for a period of three (3) years after the close of each fiscal year.

8. Items of equipment secured under the original construction contract as non-participating items by the Department (100 % Municipality costs) will continue as non-participating items with respect to maintenance.

9. The Department shall be billed quarterly by the Municipality at the Department's Seventh Division office for the cost of maintenance and operation of the computerized traffic signal system pursuant to this Agreement. Beginning on July 1, 2003, the reimbursement rates shown on the Schedule "D" may be increased three (3) percent each annum in consideration of recent inflation rates and work performance.

A. The Municipality shall submit an itemized invoice to the Department for said costs no later than three (3) months after the scheduled quarterly billing date. This invoice will reflect the balance between the quarterly payments issued by the Department and the total amount of \$48,492.00.

B. The Department shall reimburse the Municipality for the cost of maintenance and operation of the computerized signal system performed by the Municipality for the quarterly billing period upon approval by the Department's Seventh Division Engineer and the Fiscal Section.

C. The Municipality shall keep and maintain all cost records and supporting documentation for the work for which they bill the Department and shall make such information available to the Department upon request for audit for a period of three (3) years after closing of each fiscal year.

10. The Municipality shall furnish the Department's Division Seven - Division Engineer a certified quarterly status report that details the maintenance and operation of the signal system. The status report shall be certified in writing by the Systems Operations Engineer and shall indicate intersection failures, local and system detector failures, the percentage of time the computer system was off-line, the repairs that were made and the dates of said repairs/replacements. The quarterly report shall also identify any new/deleted intersections in the traffic signal system and all traffic signal timing optimization performed.

11. The Municipality shall not install any traffic control devices on any State Highway System street, which have not been approved by the Department pursuant to North Carolina General Statutes 20-169.

12. The Municipality shall not make any traffic signal phasing changes on the State Highway System without prior approval of the Department.

13. The Municipality shall maintain and operate the signal system in accordance with North Carolina General Statutes, the Department's current policies and guidelines as defined in Appendix I, and all local codes and ordinances. If, in the opinion of the Department, the Municipality does not maintain the signal system in accordance with the specified criteria, the Department shall have the right to enter into a separate maintenance agreement with a private Contractor and deduct the cost of said maintenance from the Municipality's funds allocated under G.S. 136-41.1 and Municipal Maintenance Agreements Schedule C and D.

IN WITNESS WHEREOF, this Agreement has been executed the day and year heretofore set out, in triplicate, on the part of the Department and the Municipality by authority duly given, as evidenced by the attached certified copy of Resolution, Ordinance or Charter Provision, as the case may be.

**"TOWN"**

**"DEPARTMENT"**

**TOWN OF CHAPEL HILL, NC**

**DEPARTMENT OF TRANSPORTATION**

By: \_\_\_\_\_

By: \_\_\_\_\_

Typed Name: W. CALVIN HORTON

Typed Name: \_\_\_\_\_

Title: TOWN MANAGER

Title: STATE HIGHWAY ADMINISTRATOR

Attest:

Attest:

By: \_\_\_\_\_

By: \_\_\_\_\_

Typed Name: JOYCE SMITH

Typed Name: \_\_\_\_\_

Title: TOWN CLERK

Title: \_\_\_\_\_

[CORPORATE SEAL]

[CORPORATE SEAL]

APPROVED AS TO FORM: \_\_\_\_\_  
ASSISTANT ATTORNEY GENERAL

APPROVED AS TO FORM: \_\_\_\_\_  
TOWN ATTORNEY

THIS INSTRUMENT HAS BEEN PRE-AUDITED IN THE MANNER REQUIRED BY THE LOCAL GOVERNMENT BUDGET AND FISCAL CONTROL ACT.

\_\_\_\_\_  
FINANCE DIRECTOR

\_\_\_\_\_  
ENGINEERING DIRECTOR

**COPY OF RESOLUTION PASSED BY THE CITY COUNCIL OF  
THE TOWN OF CHAPEL HILL, NORTH CAROLINA**

A motion was made by \_\_\_\_\_ and seconded by \_\_\_\_\_  
\_\_\_\_\_ for the adoption of the following Resolution, and upon being put to a vote  
was duly adopted:

WHEREAS, The North Carolina Department of Transportation and the Town of Chapel Hill had jointly undertaken the implementation of a centrally controller, computerized signal system to control traffic signals within the Municipalities of Chapel Hill and Carrboro; and,

WHEREAS, the construction of said computerized signal system is now complete; and,

WHEREAS, the Department and the Municipality propose to enter into an Agreement for the maintenance of that portion of the project which is on the State Highway system; and,

WHEREAS, the Municipality has agreed to maintain and operate the computerized traffic signal system on the streets which are a part of the State Highway System within the Municipalities of Chapel Hill and Carrboro, subject to reimbursement by the Department as set forth in this Agreements; and,

WHEREAS, this Agreement shall cover the maintenance and operation of this system for the period from July 1, 2003, through June 30, 2004, with mutually agreed upon extensions being made in one (1) year increments, up to a total duration of five (5) years.

**NOW, THEREFORE, BE IT RESOLVED** that this Agreement is hereby formally approved by the Town Council of the Town of Chapel Hill and that the Town Manager and Clerk of this Municipality are hereby empowered to sign and execute the Agreement between the Town of Chapel Hill and the Department of Transportation.

I, \_\_\_\_\_, Clerk of the Town of Chapel Hill do hereby certify that the foregoing is a true and correct copy of excerpts from the Minutes of the meeting of the Town Council duly held on the \_\_\_\_ day of \_\_\_\_\_, 2003.

WITNESS, my hand and the official seal of said Municipality on this the \_\_\_\_ day of \_\_\_\_\_, 2003.

CLERK (Seal)

CLERK TOWN OF CHAPEL HILL

NORTH CAROLINA

**SCHEDULE D  
MAINTENANCE OF TRAFFIC SIGNAL SYSTEM  
CHAPEL HILL, NC  
ORANGE COUNTY**

Item #	Description	Unit	Quantity	Annual		Time	Total
				Maintenance Rate	NCDOT%	Factor	
<b>1</b>	<b>System Hardware</b>						
	a) 486 Computer	each	3.00	150.00	92.00%	0.25	103.50
	b) Color Monitors 20 - 28"	each	3.00	50.00	92.00%	0.25	34.50
	c) Laptop	each	1.00	150.00	92.00%	0.25	34.50
	d) System Masters	each	12.00	542.00	92.00%	0.25	1495.92
	e) System Detectors	each	126.00	6.60	92.00%	0.25	191.27
	f) Electronic Switching	each	1.00	500.00	92.00%	0.25	115.00
	g) Printer	each	2.00	100.00	92.00%	0.25	46.00
	h) Hayes Modems	each	16.00	10.75	92.00%	0.25	39.56
<b>2</b>	<b>System Operating Costs</b>						
	a) Traffic Engineer	LS	1.00	81,767.00	50% of 92%	0.25	9403.21
<b>3</b>	<b>Cable</b>						
	a) 12 pair air core #1	miles	10.28	122.76	92.00%	0.25	290.25
	b) 18 pair air core #1	miles	2.04	122.76	92.00%	0.25	57.60
	c) 25 pair air core #1	miles	2.25	173.76	92.00%	0.25	89.92
	d) 50 pair air core #1	miles	0.84	218.67	92.00%	0.25	42.25
	<i>Underground</i>						
	e) 12 pair gel #19	miles	6.16	122.76	92.00%	0.25	173.93
	f) 25 pair gel #19	miles	0.14	173.76	92.00%	0.25	5.60
						<b>Total</b>	<b>12123.00</b>

# COMPUTERIZED TRAFFIC SIGNAL SYSTEM – SCHEDULE “D”

## APPENDIX I

### Traffic Signal System Maintenance and Operations

#### Levels of Service:

**Level-of-service “A”** – All of the signalized intersections in the Municipalities’ jurisdiction are monitored by the system. All of the signalized intersections are actively controlled for at least some periods of the day. (E.g. Timing plans are developed and implemented.)

All timing plans and day plans are evaluated on intervals of no greater than six months. Required new plans are developed and implemented within three months. On corridors with a significant annual growth in traffic volume (> 5.0%), new timing plans are developed and implemented annually.

The Municipality has an active traffic data collection program that includes turning movement counts at all signalized intersections; the collection of average daily traffic counts; and the performance of travel-time/delay studies on all subsystems a minimum of every two years. This data is used to evaluate system operations and performance.

Timing plans for newly installed intersections are implemented in conjunction with the installation of the traffic signal.

The Municipality has an active, on-going preventative maintenance program in which system communication components and central site hardware is tested and evaluated on intervals of no less than two times per year.

A minimum of 90% of all system detectors are operational at any given time. The maximum time to repair failed detection devices is 30 calendar days.

The control center is staffed by qualified personnel; during the AM & PM peak hours, and during other times of high traffic volumes. (e.g. special events).

The Municipality uses traffic responsive timing plans where appropriate and continually monitors and updates the thresholds.

**Level-of-service “B”** – Essentially all (+90%) of the signalized intersections in the Municipalities’ jurisdiction are monitored by the system. Practically all (+95%) of the signalized intersections are actively controlled.

All timing plans and day plans are evaluated on intervals of no greater than 12 months. Required new plans are developed and implemented within three months. On corridors with a significant annual growth in traffic volume (> 5.0%), new timing plans are developed and implemented annually.

The Municipality has an active, traffic data collection program that includes turning movement counts at all signalized intersections, the collection of average daily traffic counts, and travel-time/delay studies on all subsystems at a minimum of every two years. The data is used to evaluate system operations and performance.

Timing plans for newly installed intersections are implemented in conjunction with the installation of the signal.

The Municipality has an active, on-going preventative maintenance program in which system communication components and central site hardware is tested and evaluated on intervals of no less than two times per year.

A minimum of 85% of all system detectors is operational at any given time. The maximum time to repair failed detection devices is 30 calendar days.

The control center is staffed by qualified personnel during the AM & PM peak hours. The operations staff is on-call during other times of expected high traffic volume.

The Municipality uses traffic responsive timing plans where appropriate. Threshold values are evaluated annually.

**Level-of-service "C"** – The vast majority (+80%) of the signalized intersections in the Municipalities' jurisdiction are monitored by the system. The only traffic signals not monitored are those whose proximity do not lend themselves to cost-effective communication. The vast majority (+80%) of the signals monitored, are actively controlled by the system.

All timing plans and day plans are evaluated on intervals of no greater than 18 months. On average, required new plans are developed and implemented within six months. On corridors with a significant annual growth in traffic volume (> 5.0%), new timing plans are developed and implemented annually.

The Municipality has an active, traffic data collection program that includes turning movement counts at all signalized intersections, average daily traffic counts, and travel-time/delay studies at a minimum of every two years. The data is used to evaluate system operations and performance.

Timing plans for newly installed intersections are implemented within 30 days.

The Municipality has an active, on-going preventative maintenance program in which system communication components and central site hardware is tested and evaluated on intervals of no less than two times per year.

A minimum of 80% of all system detectors are operational at any given time. The maximum time to repair failed detection devices is 60 days.

The control center is staffed by qualified personnel during the AM & PM peak hours and special events.

The Municipality uses traffic responsive timing plans where appropriate. Threshold values are evaluated annually.

**Level-of-service "D"** – Most (+60%) of the signalized intersections in the Municipalities' jurisdiction are monitored by the system. Signalized intersections, which are in close proximity to other signalized intersections (<0.5 mile), are in operation but are not monitored by the system. Most (+60%) of the signals monitored, are actively controlled by the system.

All timing plans and day plans are evaluated on intervals of no greater than 24 months. New plans are developed and implemented within 12 months. On corridors with a significant annual growth in traffic volume (> 5.0%), new timing plans are developed and implemented on intervals of no greater than two years.



The Municipality has an active traffic data collection program that includes turning movement counts at all signalized intersections, average daily traffic counts, and travel-time/delay studies at a minimum of every three years. The data is used to evaluate system operations and performance.

Timing plans for newly installed intersections are implemented within 60 days of the installation of the traffic signal.

The Municipality has an active, on-going preventative maintenance program in which system communication components and central site hardware is tested and evaluated on intervals of no less than one time per year.

A minimum of 60% of all system detectors are operational at any given time. The maximum time to repair failed detection devices is 90 calendar days.

The control center is staffed during either the AM or PM peak hour; whichever is the highest volume period.

The Municipality has not evaluated the use of traffic responsive timing plans

**Level-of-service "F"** –Less than half (<50%) of the signalized intersections in the Municipality's jurisdiction are monitored by the system. Signalized intersections, which are in close proximity to other signalized intersections (<0.5 mile), are in operation but are not monitored by the system. Most (+60%) of the signals monitored, are actively controlled by the system.

All timing plans and day plans are evaluated on intervals greater than 30 months. On average, new plans are developed and implemented on intervals not to exceed 18 months. On corridors with a significant annual growth in traffic volume (> 5.0%), new timing plans are developed and implemented on intervals of no greater than two years.

The Municipality does not collect data to evaluate system performance and retune signals. All data used is provided by others.

Timing plans for newly installed intersections are implemented greater than 90 days from when the signal was first placed into operation.

The Municipality does not have an active, on-going preventative maintenance program in which system communication components and central site hardware is tested and evaluated. The Municipality provides emergency maintenance only for system communication and hardware components.

A minimum of 50% of all system detectors are operational at any given time. The maximum time to repair failed detection devices is 120 calendar days.

The control center is staffed during either the AM or PM peak hour; whichever is the highest volume period.

The Municipality has not evaluated the use of traffic responsive timing plans.

## APPENDIX II

### SYSTEMS OPERATIONS ENGINEER

#### EDUCATION AND EXPERIENCE:

- Graduation from a four-year college or university with a major in Civil Engineering and a minimum of 3 years of progressive transportation engineering experience; or an equivalent combination of training and directly related experience in traffic signal operations.
- Operations experience and knowledge of ITS concepts, data communications and computerized traffic signal systems equipment.
- Outstanding planning and organizational skills. Excellent oral and written communications skills including the ability to make public presentations.
- Working knowledge of the principles and practices of traffic signal timing and microcomputer applications of traffic signal optimization software, e.g., Synchro 3.2, PASSER-II, PASSER IV, TRANSYT 7F, NETSIM.
- Working knowledge of AUTOCADD and PC-BASED programs including MS Office (Word, Excel, Access, Powerpoint); GIS and various software programs for traffic optimization and traffic analysis.

#### ESSENTIAL DUTIES:

- Plans, organizes and directs the activities of the computerized traffic signal system operation to ensure that all required functions, activities and tasks are performed in an effective, efficient and timely manner.
- Performs field investigations, collects and analyzes traffic data and MOE's, computes traffic parameters to refine signal timing programs for optimum systems timing efficiency and develops time-space diagrams. Develops and implements new signal timing plans created by changes in traffic flow patterns, land-use and population.
- Prepares and installs timing plans (traffic responsive and time-of-day/day-of-week) for all corridors; prepares and implements special event timing plans and prepares temporary timing plans for failed detector locations.

- Maintains system databases and modifies as necessary to allow for expansion; reviews and evaluates all signalized intersections for phasing optimization; provides system data for and assists with various traffic studies and analysis projects regarding the computerized traffic signal system.
- Provides assistance to the transportation operations staff in diagnostic and maintenance activities.
- Interacts with and uses the features of the signal system control software to develop and modify timing plans using PC-based timing plan software.
- Manages the traffic signal system maintenance functions including: maintaining the graphics monitoring databases; performing periodic schedule data backup; assures the periodic image and graphic backups are accomplished and safely stored.
- Coordinates with the Department on roadway construction projects, which affect the traffic operations in the computerized traffic signal system. Develops and implements temporary timing plan strategies for construction work zones, alternate routes and incident diversion routes.
- Maintains daily control logs, event logs, timing plan ledgers and daily summary reports.

QUARTERLY REPORT  
Schedule "C" and "D"  
Traffic System Operations Program

QUARTER FROM \_\_\_\_\_ TO \_\_\_\_\_

Date: \_\_\_\_\_

**TOTAL MUNICIPALITY CHARGES IN QUARTER: \$ \_\_\_\_\_**

Labor: \$ \_\_\_\_\_

Material: \$ \_\_\_\_\_

Equipment: \$ \_\_\_\_\_

Total number of DOT signals maintained by Municipality: \_\_\_\_\_

**SCHEDULE "C"**

No. of intersections PM performed: \_\_\_\_\_

No. of intersections with Trouble Calls: \_\_\_\_\_

No. of intersections re-timed: \_\_\_\_\_

**SCHEDULE "D"**

Total number of signals in traffic signal system: \_\_\_\_\_

No. of DOT signals in traffic signal system: \_\_\_\_\_

No. of intersection failures: \_\_\_\_\_

No. of local detector failures: \_\_\_\_\_

No. of system detector failures: \_\_\_\_\_

% of time computer system was off line: \_\_\_\_\_%

List repairs made to the traffic signal system with dates of repairs/replacements.

List any new/deleted intersections in the traffic signal system.

List all traffic signal timing optimizations performed.

**CERTIFIED BY: \_\_\_\_\_**

(System Operations Engineer)